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# SECTION **BRC**

## BRAKE CONTROL SYSTEM

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## PRECAUTION

### PRECAUTIONS

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

INFOID:000000008968274

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

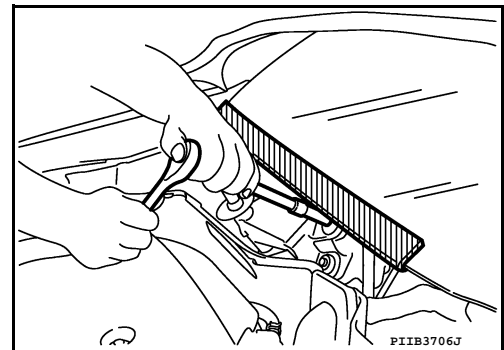
**WARNING:**

- 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 3 minutes before performing any service.

#### Precaution for Procedure without Cowl Top Cover

INFOID:000000008764587

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 Control System

INFOID:000000008764589

- Always perform a pre-driving check to drive the vehicle.
- Always check speed and safety while driving the vehicle.
- To operate CONSULT while driving, more than one person is required to be in the vehicle to avoid interference to driving and ensure safety.
- Slight vibrations are felt on the brake pedal and the operation noises occur, when ABS function or EBD function operates. This is not a malfunction because it is caused by ABS function or EBD function that is normally operated.
- When starting engine or when starting vehicle just after starting engine, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- Brake stopping distance may become longer than models without ABS function depending on the road conditions, when ABS function is operated on slippery road like rough road, gravel road or snowy road.
- When a malfunction is indicated, always collect information from the customer about conditions of occurrence, estimate cause and perform operation. Check brake booster operation, brake fluid level and brake fluid leakage, as well as electrical system.

# PRECAUTIONS

[VDC/TCS/ABS]

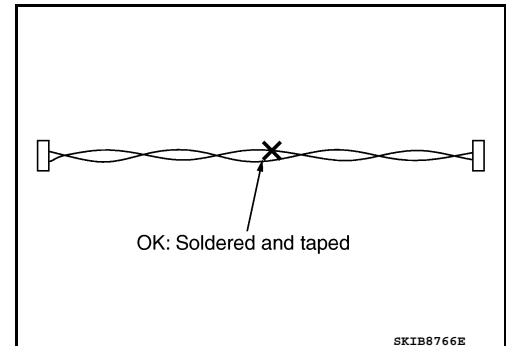
## < PRECAUTION >

- The optimum performance is achieved by control for ABS function or EBD function when all of brakes, suspensions and tires installed on the vehicle are the specified size and parts. Brake performance and controllability may be negatively affected when other parts than the specified are installed.
- Brake stopping distance may become longer and steering stability may be negatively affected, when tires in different size and combination or other parts than the specified are used.
- When a radio (including wiring), antenna and antenna lead line are located near ABS actuator and electric unit (control unit), a malfunction or improper operation may occur for the control of ABS function or EBD function.
- When the following items are replaced by other parts than genuine parts or modified, ABS warning lamp and brake warning lamp may turn ON, and the control may not operate normally for ABS function or EBD function.
  - Suspension component parts (shock absorber, spring, bushing and others)
  - Tire and wheel (other than the specified size)
  - Brake component parts (brake pad, disc rotor, brake caliper and others)
  - Engine component parts (ECM, muffler and others)
  - Body reinforcement component parts (rollover bar, tower bar and others)
- When suspension, tire and brake component parts are excessively worn or deteriorated and the vehicle is driven, ABS warning lamp and brake warning lamp may turn ON, and the control may not operate normally for ABS function or EBD function.
- ABS warning lamp and brake warning lamp may turn ON, when only front wheel or rear wheel is rotated using a free roller. This is not a malfunction, because it is caused by wheel speed difference between wheel that is rotated and wheel that is not rotated. In this case, perform self-diagnosis, check self-diagnosis results, and erase memory.
- When power supply voltage is not normal, ABS warning lamp and brake warning lamp turn ON. ABS actuator and electric unit (control unit) stops control for ABS function or EBD function. Ordinary brake operates. After power supply returns to normal, ABS warning lamp and brake warning lamp turn OFF. The control becomes operative for ABS function or EBD function.

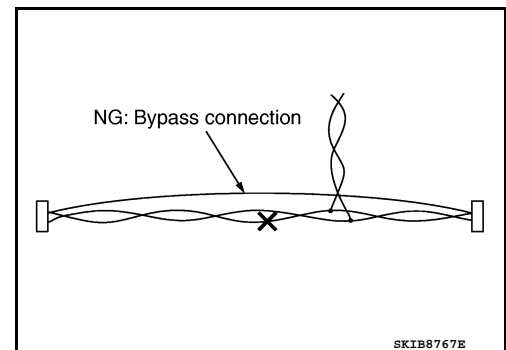
## Precaution for Harness Repair

INFOID:000000008764590

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



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



# PREPARATION

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[VDC/TCS/ABS]

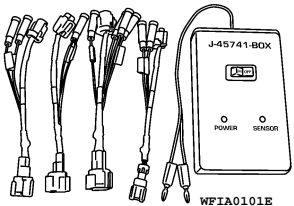
## PREPARATION

### PREPARATION

#### Special Service Tool

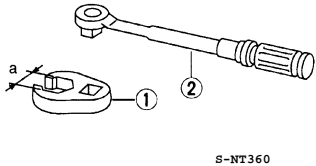
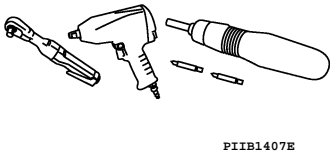
INFOID:000000009022373

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
<p>— (J-45741) ABS active wheel sensor tester</p> 	<p>Checking operation of ABS active wheel sensor</p>

#### Commercial Service Tools

INFOID:000000008971131

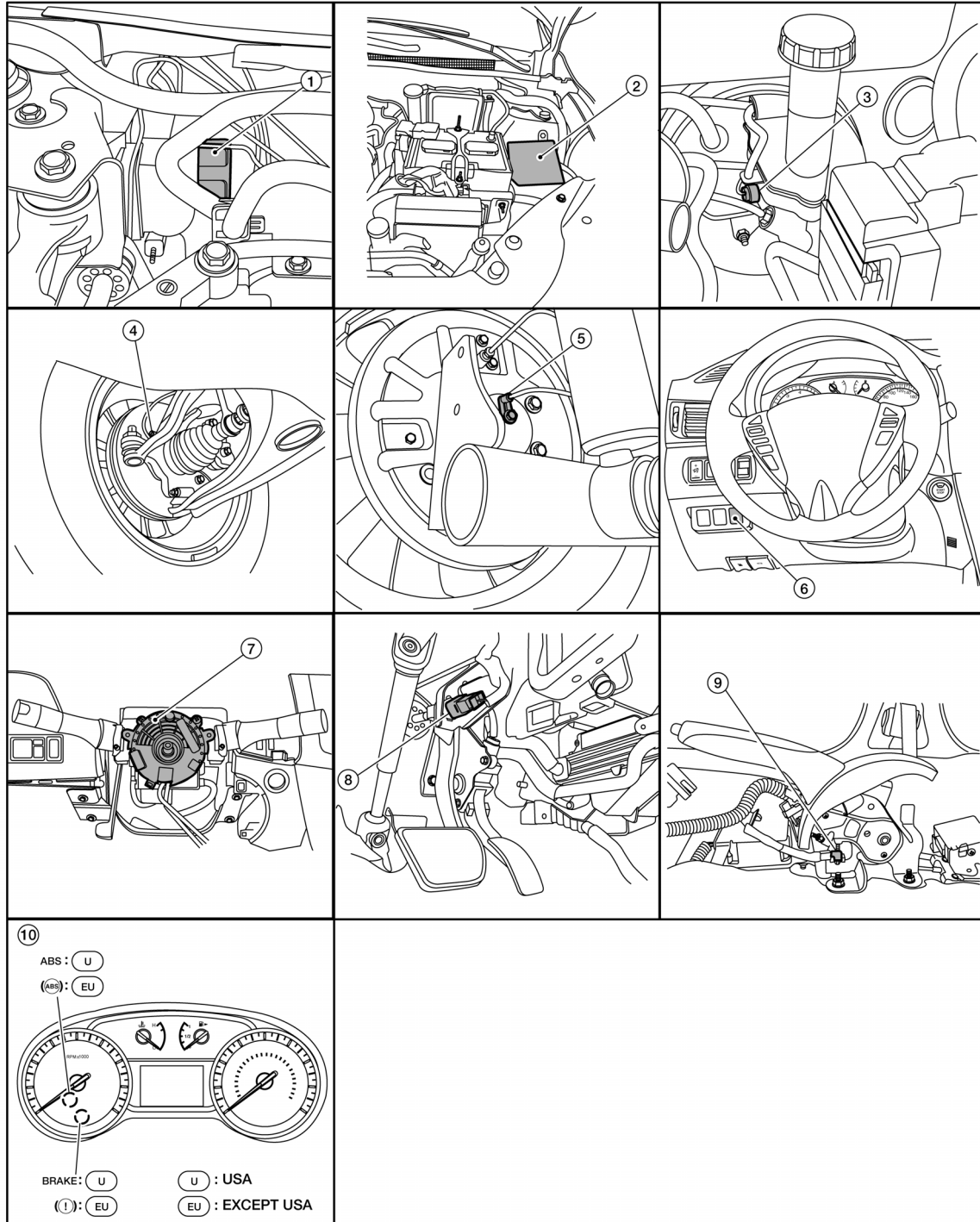
Tool name	Description
<p>1. Flare nut crowfoot 2. Torque wrench</p> 	<p>Removing and installing brake piping a: 10 mm (0.39 in)/12 mm (0.47 in)</p>
<p>Power tool</p> 	<p>Loosening nuts, screws and bolts</p>

## SYSTEM DESCRIPTION

### COMPONENT PARTS

#### Component Parts Location

INFOID:000000008832865



- |  |                                      |                             |
|--|--------------------------------------|-----------------------------|
| 1. ABS actuator and electric unit (control unit) | 2. IPDM E/R                          | 3. Brake fluid level switch |
| 4. Front wheel sensor LH (RH similar)            | 5. Rear wheel sensor LH (RH similar) | 6. VDC OFF switch           |

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# COMPONENT PARTS

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

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| 7. Steering angle sensor<br>(view with steering wheel removed) | 8. Stop lamp switch | 9. Parking brake switch |
| 10. Combination meter  |                     |                         |

## Component Description

INFOID:000000008832866

Component	Reference/Function
ABS actuator and electric unit (control unit)	<a href="#">BRC-8. "ABS Actuator and Electric Unit (Control Unit)"</a>
Wheel sensor	<a href="#">BRC-9. "Wheel Sensor and Sensor Rotor"</a>
Stop lamp switch	<a href="#">BRC-9. "Stop Lamp Switch"</a>
Steering angle sensor	<a href="#">BRC-9. "Steering Angle Sensor"</a>
VDC OFF switch	<a href="#">BRC-10. "VDC OFF Switch"</a>
Brake fluid level switch	<a href="#">BRC-9. "Brake Fluid Level Switch"</a>
Parking brake switch	<a href="#">BRC-9. "Parking Brake Switch"</a>
ABS warning lamp	<a href="#">BRC-11. "VDC/TCS/ABS : System Description"</a>
Brake warning lamp	
VDC OFF indicator lamp	
SLIP indicator lamp	
ECM	Transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• Accelerator pedal position signal</li> <li>• Engine speed signal</li> <li>• Target throttle position signal</li> </ul>
TCM	Transmits the current gear position signal to ABS actuator and electric unit (control unit) via CAN communication.

## ABS Actuator and Electric Unit (Control Unit)

INFOID:000000008832867

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

### ELECTRIC UNIT (CONTROL UNIT)

- Brake fluid pressure is 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 (Main Relay)

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

#### ABS IN Valve

Switches the fluid pressure line to increase or hold according to signals from control unit.

#### ABS OUT Valve

Switches the fluid pressure line to increase, hold or decrease according to signals from control unit.

#### Cut Valve 1, Cut Valve 2

Shuts off the ordinary brake line from master cylinder, when VDC function and TCS function are activated.

#### Suction Valve 1, Suction Valve 2



# COMPONENT PARTS

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

Supplies the brake fluid from master cylinder to the pump, when VDC function and TCS function are activated.

## Return Check Valve

Returns the brake fluid from brake caliper and wheel cylinder 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 and wheel cylinder.

## Yaw rate/side/decel G sensor

Calculates the following information that affects the vehicle.

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

## Pressure Sensor

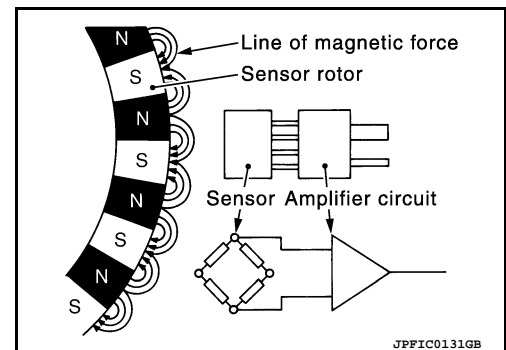
Detects the brake fluid pressure.

## Wheel Sensor and Sensor Rotor

INFOID:0000000008832868

### NOTE:

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



## Stop Lamp Switch

INFOID:0000000008832869

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

## Steering Angle Sensor

INFOID:0000000008832870

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

- Steering wheel rotation amount
- Steering wheel rotation angular velocity
- Steering wheel rotation direction

## Brake Fluid Level Switch

INFOID:0000000008832871

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.

## Parking Brake Switch

INFOID:0000000008832873

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

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## COMPONENT PARTS

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

### VDC OFF Switch

INFOID:000000008832874

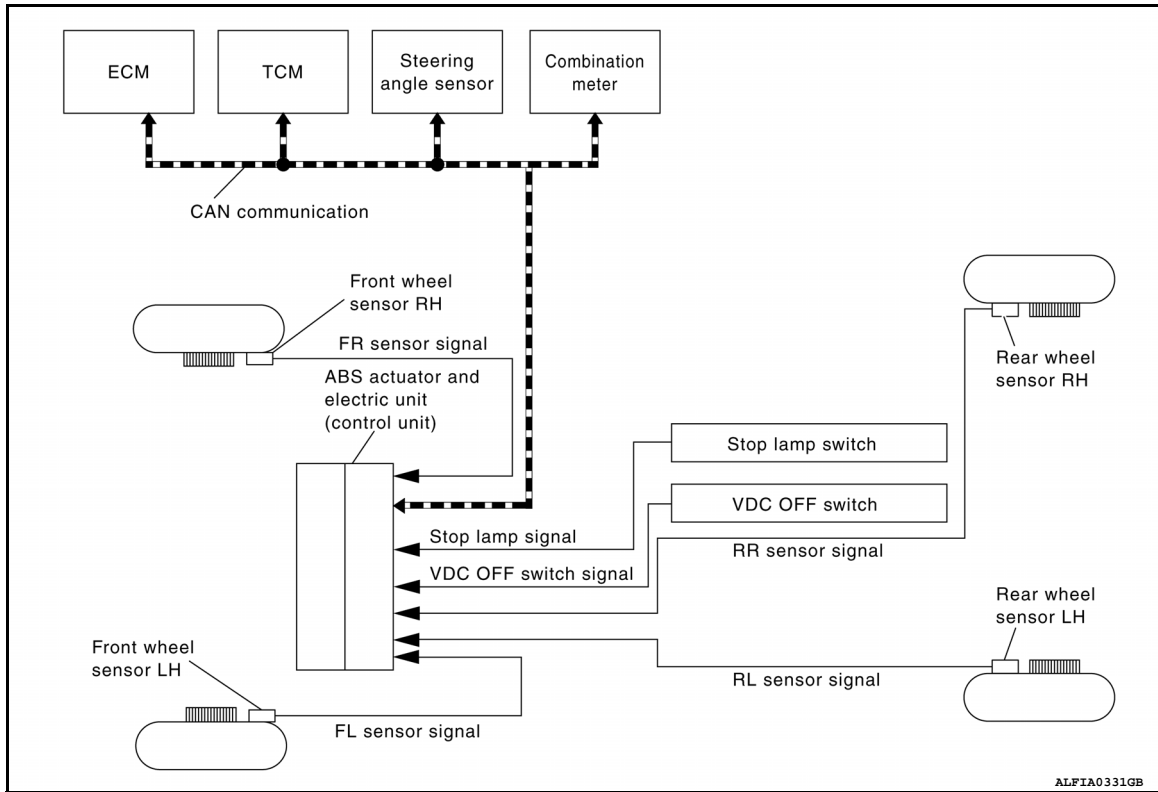
- Non-operational status or standby status of VDC and TCS functions can be selected using VDC OFF switch. VDC OFF indicator lamp indicates the operation status of function. (ON: Non-operational status, OFF: Standby status)
- VDC OFF indicator lamp turns OFF (standby status) when the engine is started again after it is stopped once while VDC OFF indicator lamp is ON (non-operational status).

SYSTEM

VDC/TCS/ABS

VDC/TCS/ABS : System Diagram

INFOID:000000008832875



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VDC/TCS/ABS : System Description

INFOID:000000008832876

- The system switches fluid pressure of each brake caliper and each wheel cylinder 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 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.

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# SYSTEM

< SYSTEM DESCRIPTION >

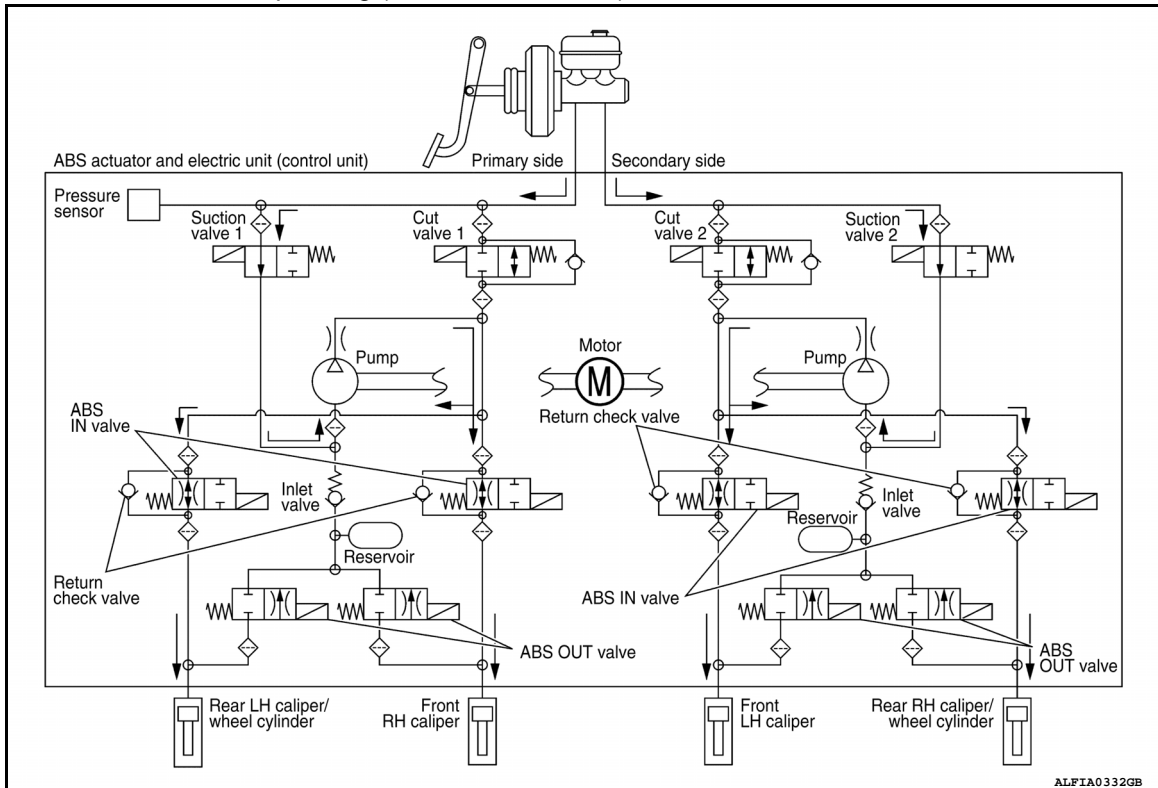
[VDC/TCS/ABS]

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. <ul style="list-style-type: none"> <li>• Accelerator pedal position signal</li> <li>• Engine speed signal</li> <li>• Target throttle position signal</li> </ul>
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. <ul style="list-style-type: none"> <li>• Brake fluid level switch signal</li> <li>• Parking brake switch signal</li> </ul> Receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• ABS warning lamp signal</li> <li>• Brake warning lamp signal</li> <li>• VDC OFF indicator lamp signal</li> <li>• SLIP indicator lamp signal</li> </ul>

## 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)

# SYSTEM

## < SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

Name	Not activated	Pressure increases
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each brake caliper and each wheel cylinder (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.

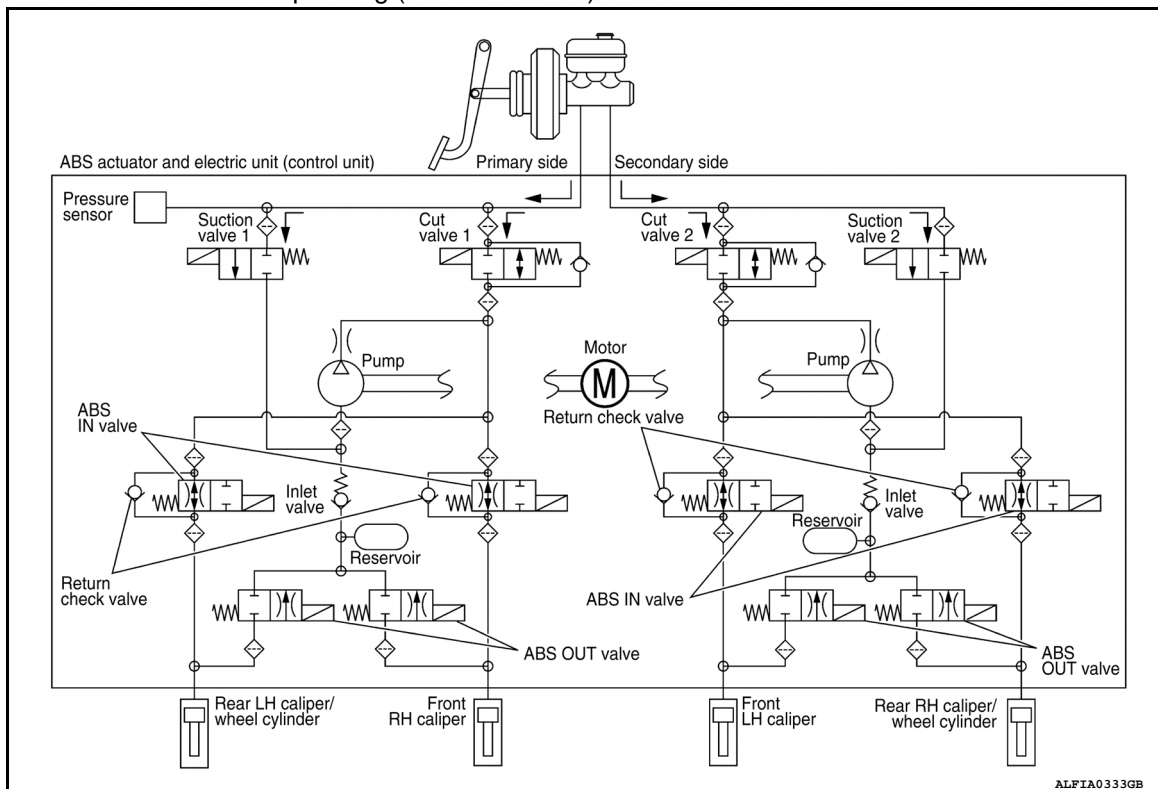
### Rear RH brake caliper/wheel cylinder

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

### Rear LH brake caliper/wheel cylinder

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

### VDC and TCS Functions Start Operating (Pressure Holds)



# SYSTEM

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

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 and each wheel cylinder (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.

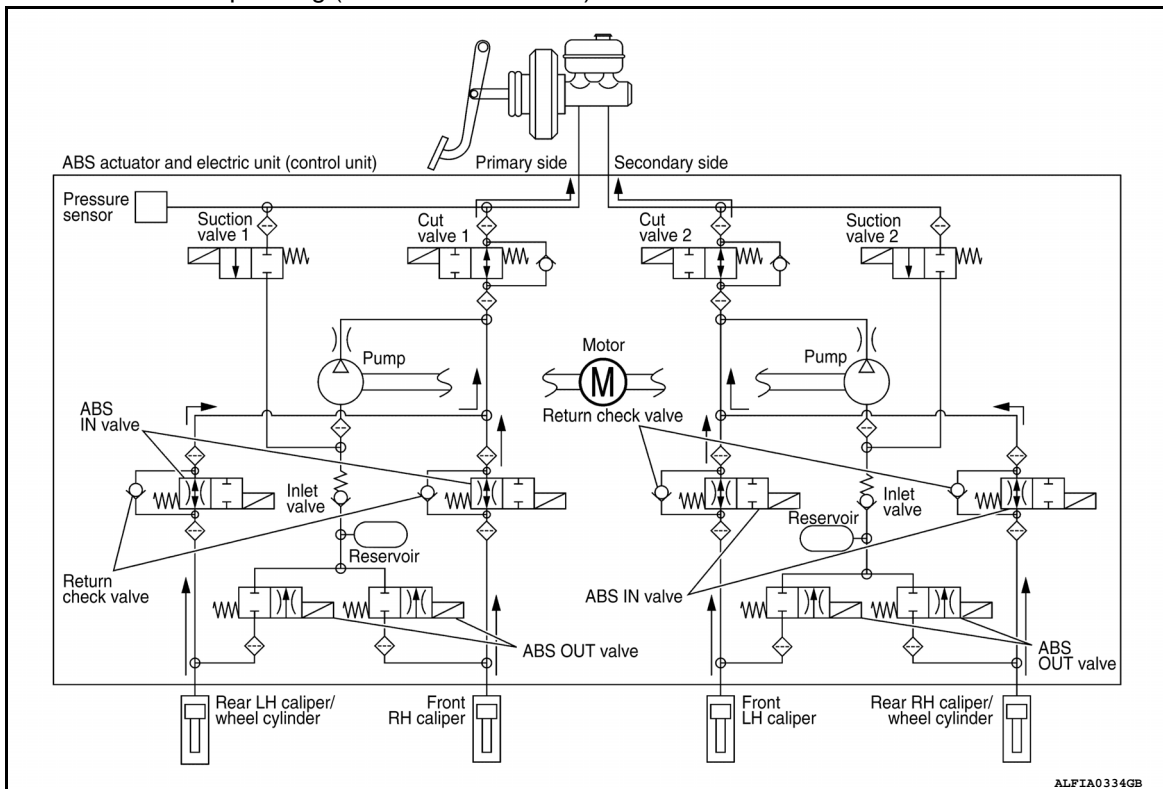
**Rear RH brake caliper/wheel cylinder**

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

**Rear LH brake caliper/wheel cylinder**

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

**VDC and TCS Functions Operating (Pressure Decreases)**



# SYSTEM

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

Name	Not activated	During pressure decreases	
Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)	A
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)	B
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)	C
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)	
Each brake caliper and each wheel cylinder (fluid pressure)	—	Pressure decreases	D

**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/wheel cylinder**

- 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/wheel cylinder 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/wheel cylinder is controlled separately from the left caliper/wheel cylinder.

**Rear LH brake caliper/wheel cylinder**

- 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/wheel cylinder 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/wheel cylinder is controlled separately from the right caliper/wheel 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.	M
Suction valve 1 Suction valve 2	Supplies the brake fluid from master cylinder to the pump.	N
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.	O
Return check valve	Returns the brake fluid from brake caliper and wheel cylinder 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 and wheel cylinder.	P
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.

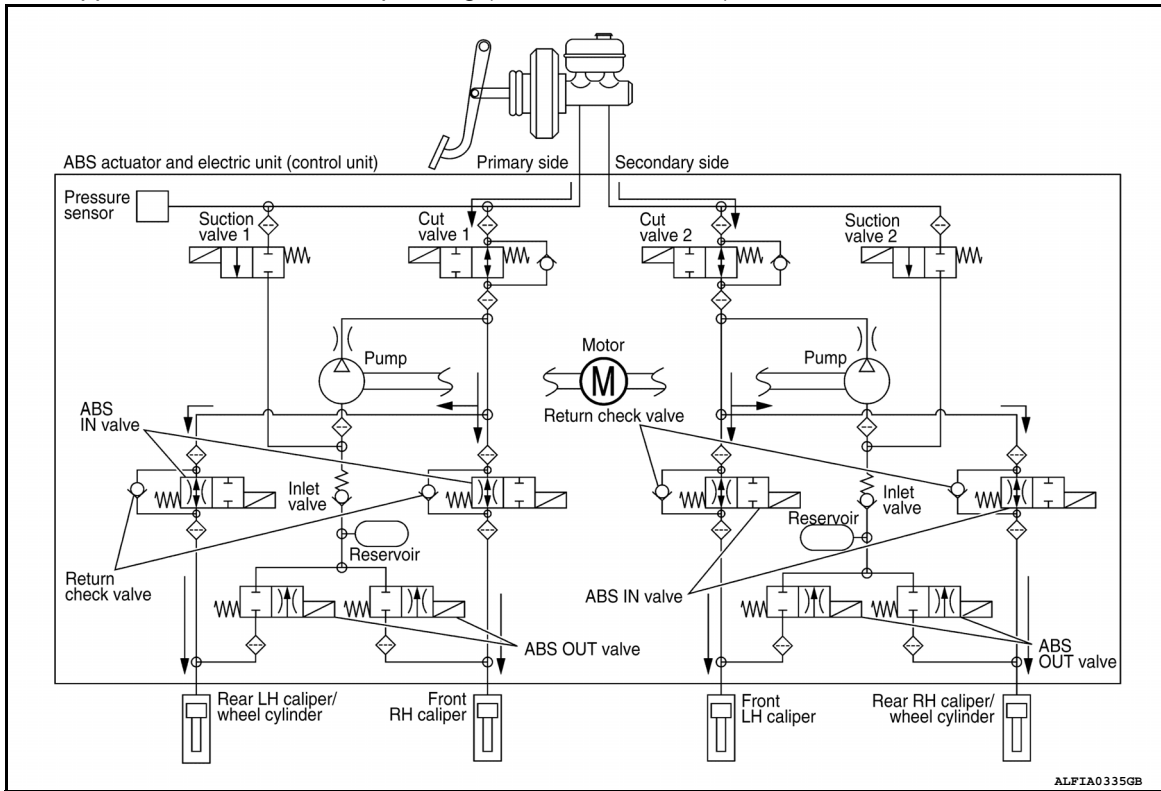
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# SYSTEM

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

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)
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 and each wheel cylinder (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/wheel cylinder

- When the cut valve 2 and the ABS IN valve opens, brake fluid is supplied to the rear RH brake caliper/wheel cylinder 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/wheel cylinder

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

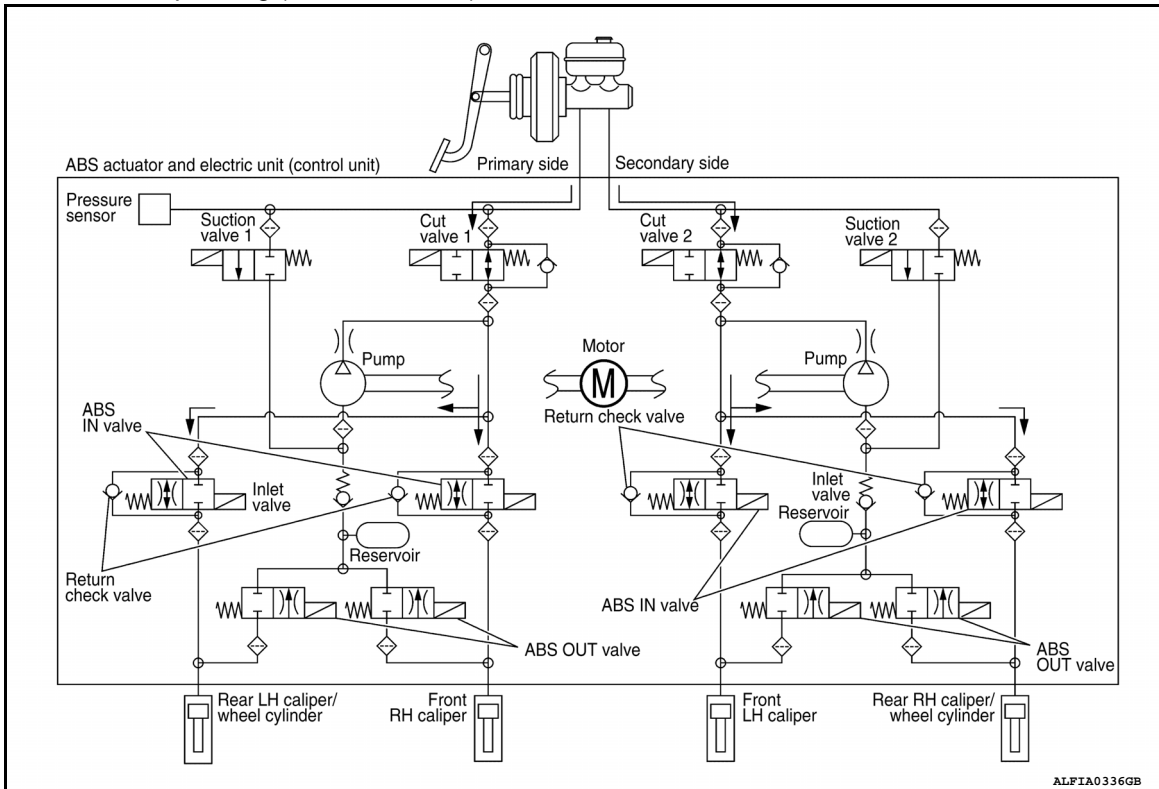


# SYSTEM

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

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)
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 and each wheel cylinder (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/wheel cylinder

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

### Rear LH brake caliper/wheel cylinder

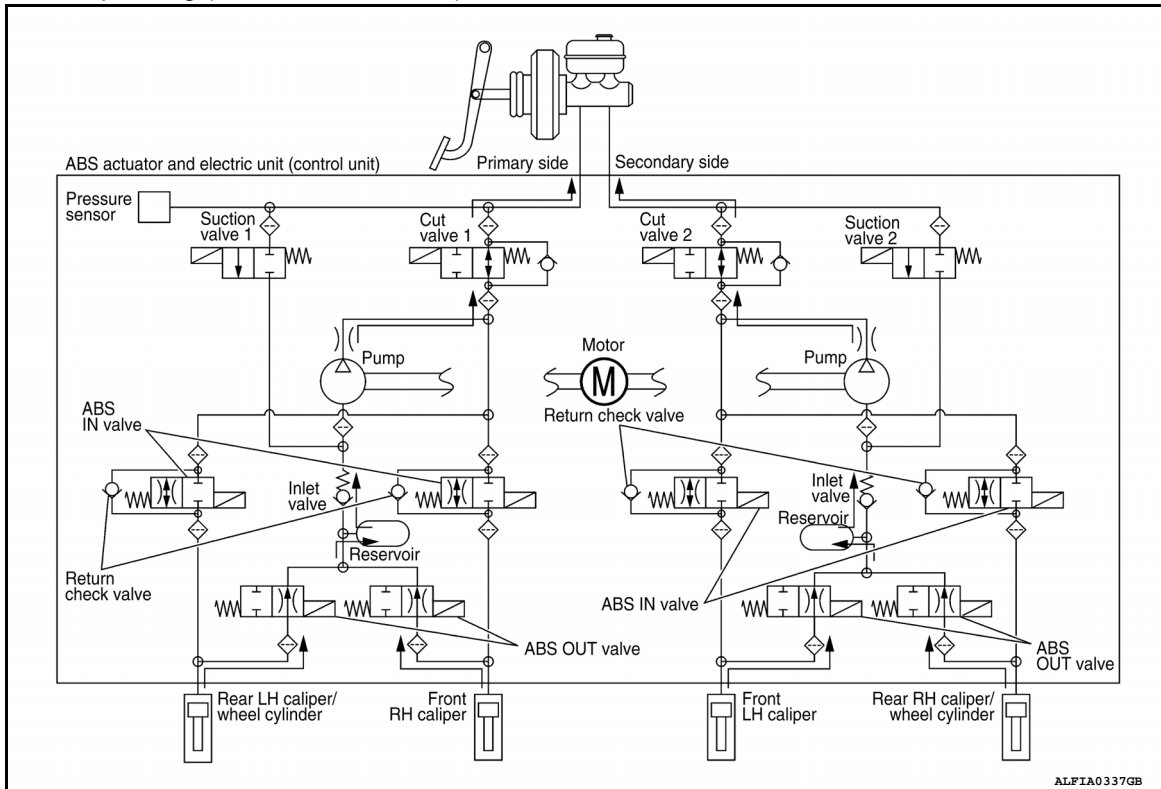
- Since the ABS IN valve and the ABS OUT valve are closed, the rear LH brake caliper/wheel cylinder, master cylinder, and reservoir are blocked. This maintains fluid pressure applied on the rear LH brake caliper/wheel cylinder.

# SYSTEM

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

## 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 and each wheel cylinder (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/wheel cylinder

- Since the ABS IN valve is closed and the ABS OUT valve is opened, fluid pressure applied on the rear RH brake caliper/wheel cylinder 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/wheel cylinder

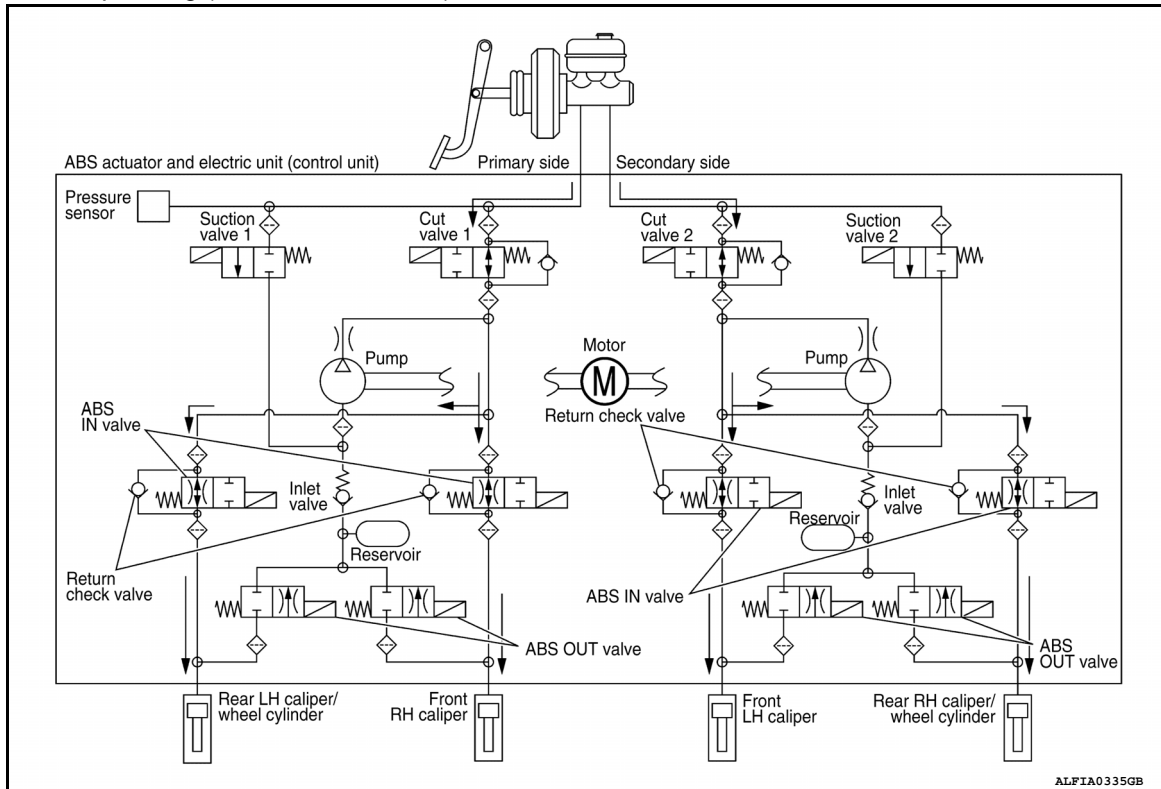
- Since the ABS IN valve is closed and the ABS OUT valve is opened, fluid pressure applied on the rear LH brake caliper/wheel cylinder is supplied to the reservoir through the ABS OUT valve. This fluid pressure decreases when sent to the master cylinder by the pump.

# SYSTEM

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

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 and each wheel cylinder (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/wheel cylinder

- Brake fluid is supplied to the rear RH brake caliper/wheel cylinder 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/wheel cylinder 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/wheel cylinder

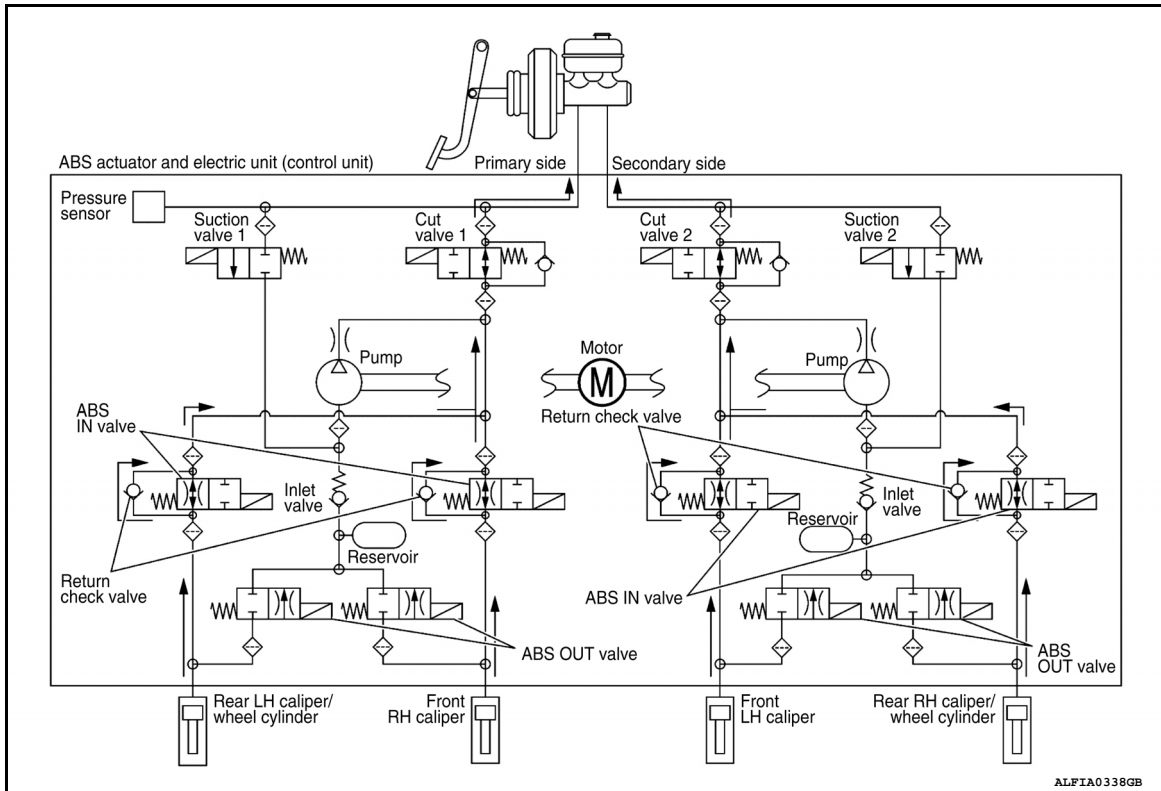
# SYSTEM

## < SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

- Brake fluid is supplied to the rear LH brake caliper/wheel cylinder 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/wheel cylinder 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 and each wheel cylinder (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/wheel cylinder

- Brake fluid is supplied to the rear RH brake caliper/wheel cylinder 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/wheel cylinder

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

# SYSTEM

[VDC/TCS/ABS]

## < SYSTEM DESCRIPTION >

### 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 and wheel cylinder 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 and wheel cylinder.
Pressure sensor	Detects the brake fluid pressure and transmits signal to ABS actuator and electric unit (control unit).

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### 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. 1 second 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

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### 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
Approx. 1 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
VDC function is malfunctioning	OFF	OFF
TCS function is malfunctioning	OFF	OFF
ABS function is malfunctioning	ON	OFF
EBD function is malfunctioning	ON	ON

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# SYSTEM

## < SYSTEM DESCRIPTION >

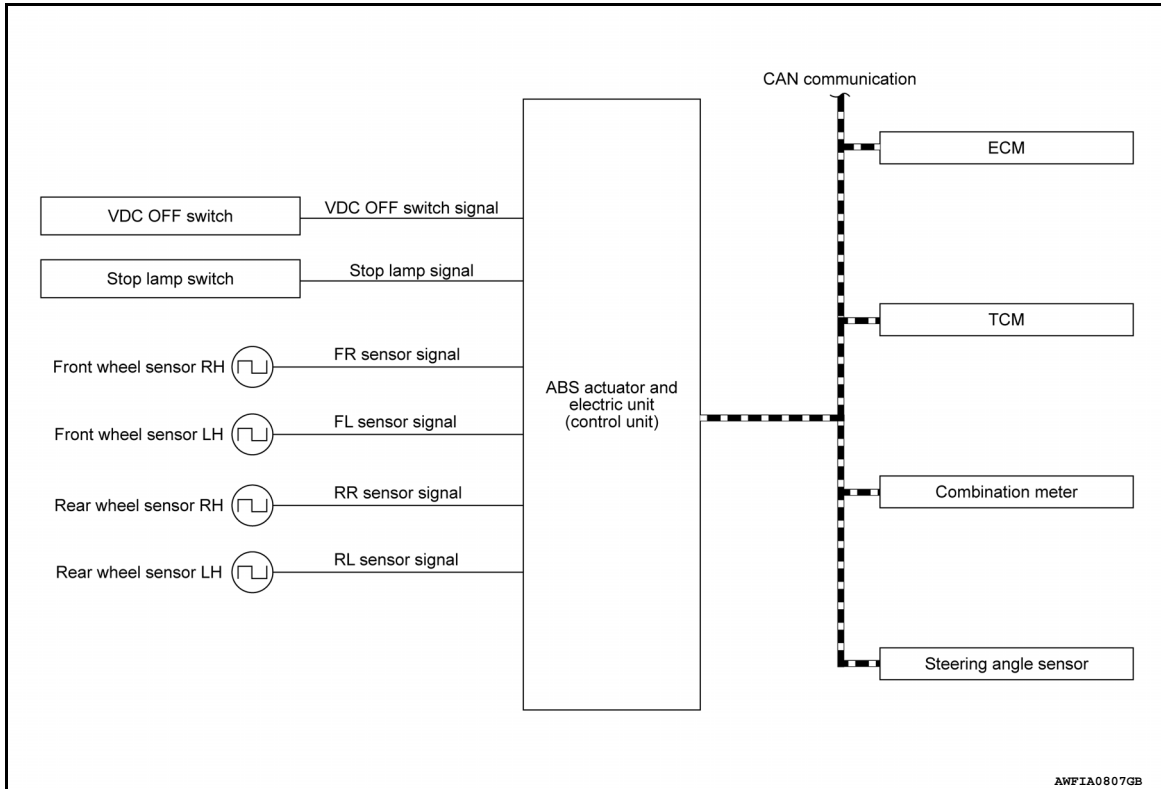
[VDC/TCS/ABS]

Condition (status)	ABS warning lamp	Brake warning lamp
Brake limited slip differential (BLSD) function is malfunctioning	OFF	OFF
VDC function is operating	OFF	OFF
TCS function is operating	OFF	OFF

## VDC/TCS/ABS : VDC Function

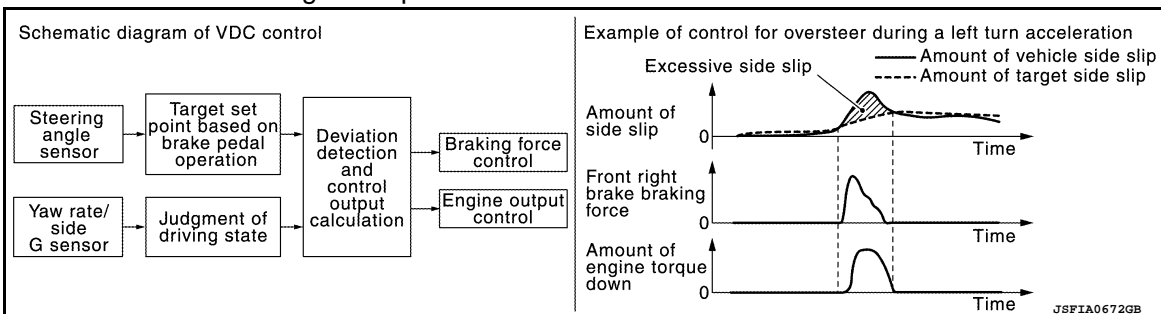
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## SYSTEM DIAGRAM



## SYSTEM DESCRIPTION

- Side slip or tail slip may occur while driving on a slippery road or intending an urgent evasive driving maneuver. 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. By comparing this information with vehicle side slip amount that is calculated from information from yaw rate/side G sensor and wheel sensor, vehicle driving conditions (conditions of understeer or oversteer) are judged and vehicle stability is improved by brake force control on all 4 wheels and engine output control.



- VDC function can be switched to non-operational status (OFF) by operating VDC OFF switch. In this case, VDC OFF indicator lamp turns ON.
- Control unit portion automatically improves driving stability by performing brake force control as well as engine output control, by transmitting drive signal to actuator portion according to difference between target side slip amount and vehicle side slip amount

# SYSTEM

## < SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

- Brake force control function at braking hard detects driver's brake operations with the pressure sensor, judges a brake booster's maximum brake power function by using information from the vacuum sensor, and enhances more powerful braking force by controlling brakes of four wheels.
- 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.
- Fail-safe function is adopted. When a malfunction occurs in VDC function, the control is suspended for VDC function and TCS function. However, ABS function and EBD function operate normally. Refer to [BRC-39, "Fail-safe"](#).

## INPUT SIGNAL AND OUTPUT SIGNAL

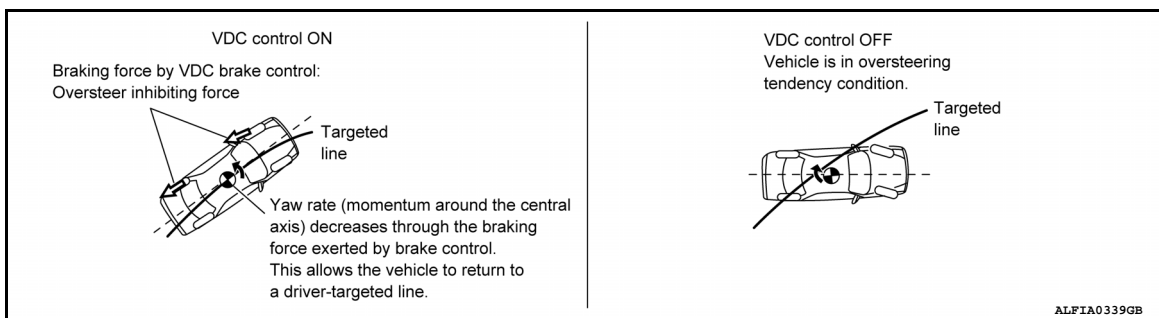
Major signal transmission between each unit via communication lines is shown in the following table.

Component	Signal description
ECM	Transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• Acceleration pedal position signal</li> <li>• Engine speed signal</li> <li>• Target throttle position signal</li> </ul>
TCM	Transmits the current gear position signal to ABS actuator and electric unit (control unit) via CAN communication.
Steering angle sensor	Transmits the steering angle sensor 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. <ul style="list-style-type: none"> <li>• Brake fluid level switch signal</li> <li>• parking brake switch signal</li> </ul> Receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• VDC OFF indicator lamp signal</li> <li>• SLIP indicator lamp signal</li> </ul>

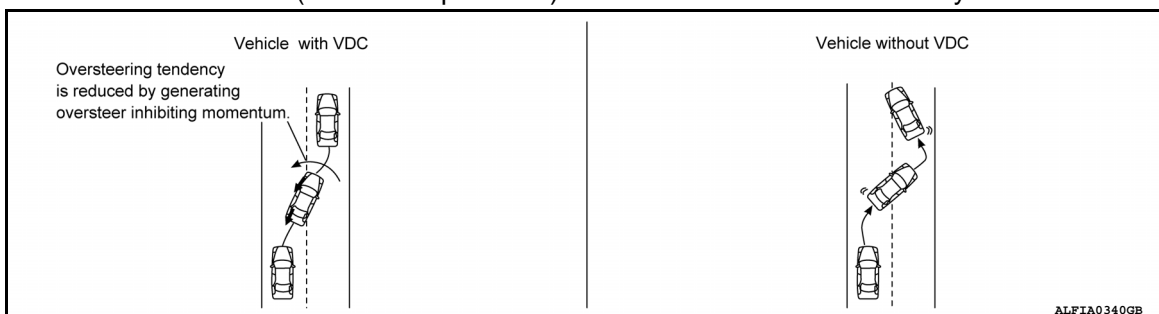
## OPERATION CHARACTERISTICS

### 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 is generated directing the vehicle toward the outer side of the turn. Oversteer is prevented.



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



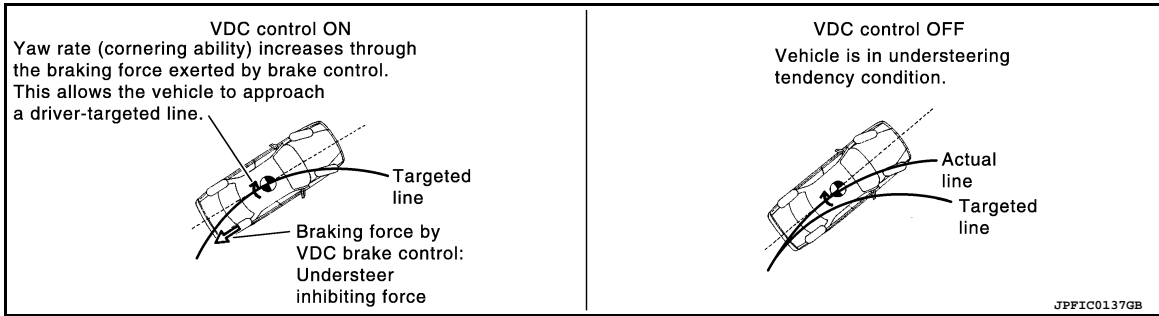
# SYSTEM

## < SYSTEM DESCRIPTION >

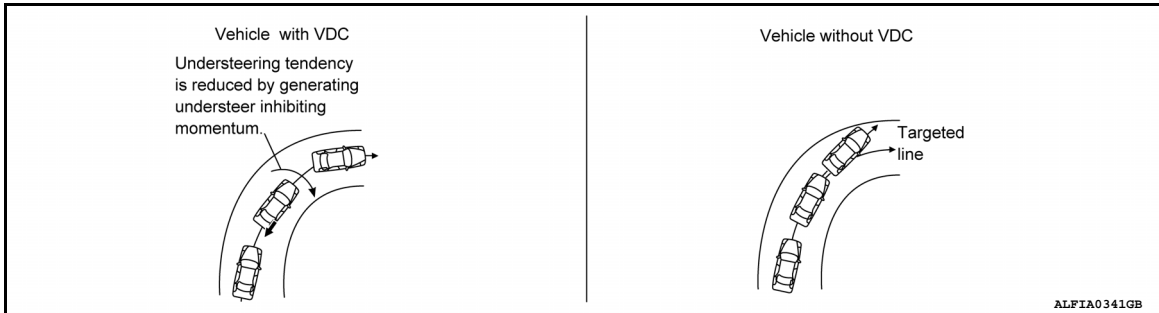
[VDC/TCS/ABS]

### 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 is generated directing the vehicle toward the inner side of the turn. Understeer is prevented.



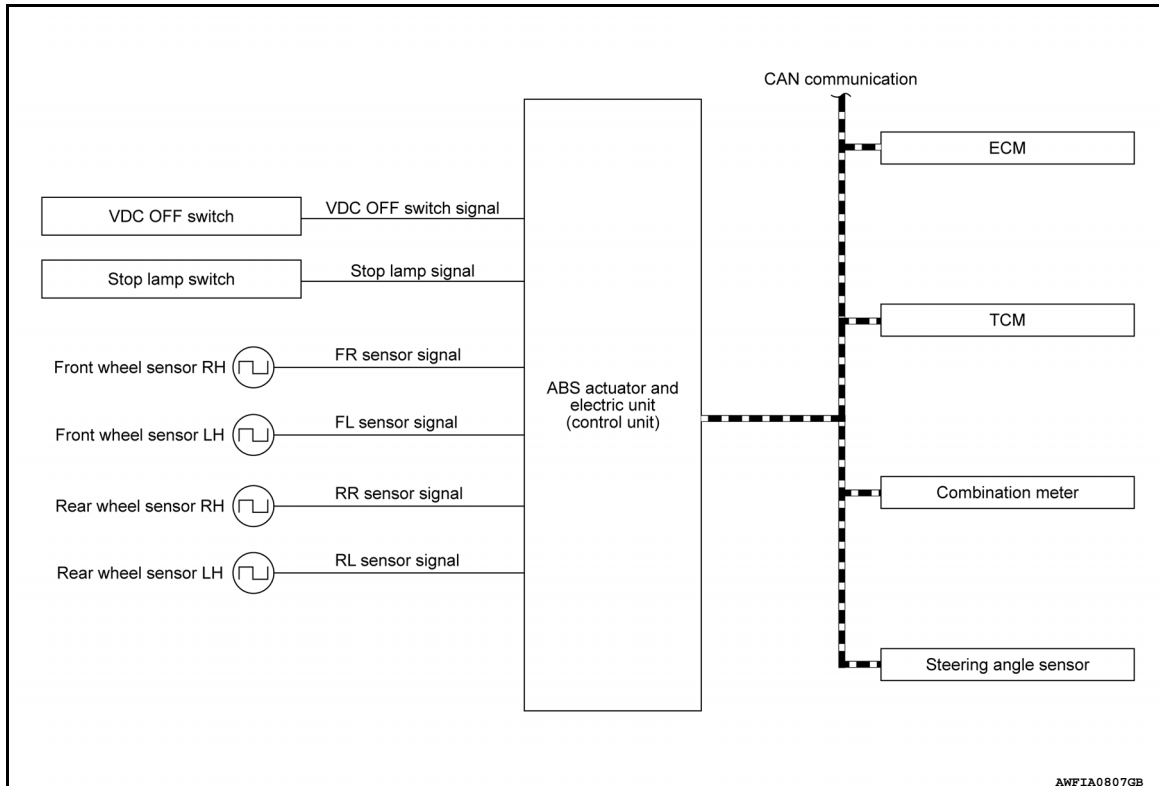
- Applying brakes during cornering on a slippery road, when there may be a tendency to understeer, engine output is controlled as well as brake force (brake fluid pressure) of 4 wheels. Understeer tendency decreases.



### VDC/TCS/ABS : TCS Function

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### SYSTEM DIAGRAM



### SYSTEM DESCRIPTION

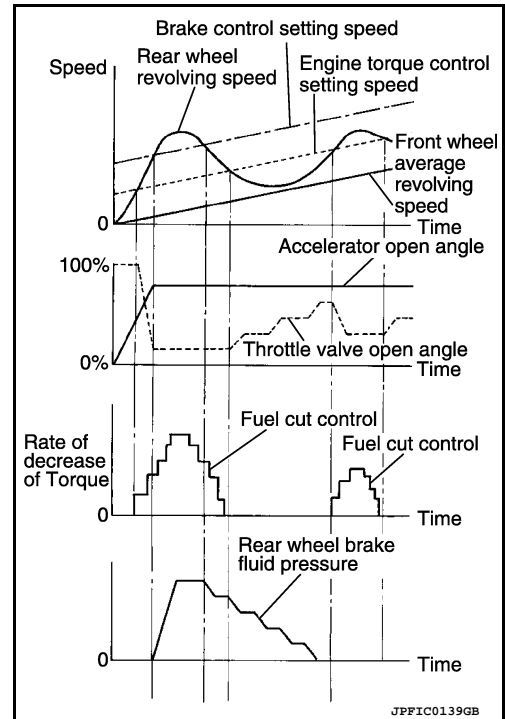


# SYSTEM

[VDC/TCS/ABS]

## < SYSTEM DESCRIPTION >

- Wheel spin status of drive wheel is detected by wheel sensor of 4 wheels. Engine output and transmission shift status is controlled so that slip rate of drive wheels is in appropriate level. When wheel spin occurs on drive wheel, ABS actuator and electric unit (control unit) perform brake force control of LH and RH drive wheels (apply brake force by increasing brake fluid pressure of drive wheel) and decrease engine torque by engine torque control. Wheel spin amount decreases. Engine torque is controlled to appropriate level.
- TCS function can be switched to non-operational status (OFF) by operating VDC OFF switch. In this case, VDC OFF indicator lamp turns ON.
- SLIP indicator 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.
- Fail-safe function is adopted. When a malfunction occurs in TCS function, the control is suspended for VDC function and TCS function. However, ABS function and EBD function operate normally. Refer to [BRC-39, "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	Transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• Accelerator pedal position signal</li> <li>• Engine speed signal</li> <li>• Target throttle position signal</li> </ul>
TCM	Transmits the current gear position signal to ABS actuator and electric unit (control unit) via CAN communication.
Steering angle sensor	Transmits the steering angle sensor 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. <ul style="list-style-type: none"> <li>• Brake fluid level switch signal</li> <li>• Parking brake switch signal</li> </ul> Receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• VDC OFF indicator lamp signal</li> <li>• SLIP indicator lamp signal</li> </ul>

# SYSTEM

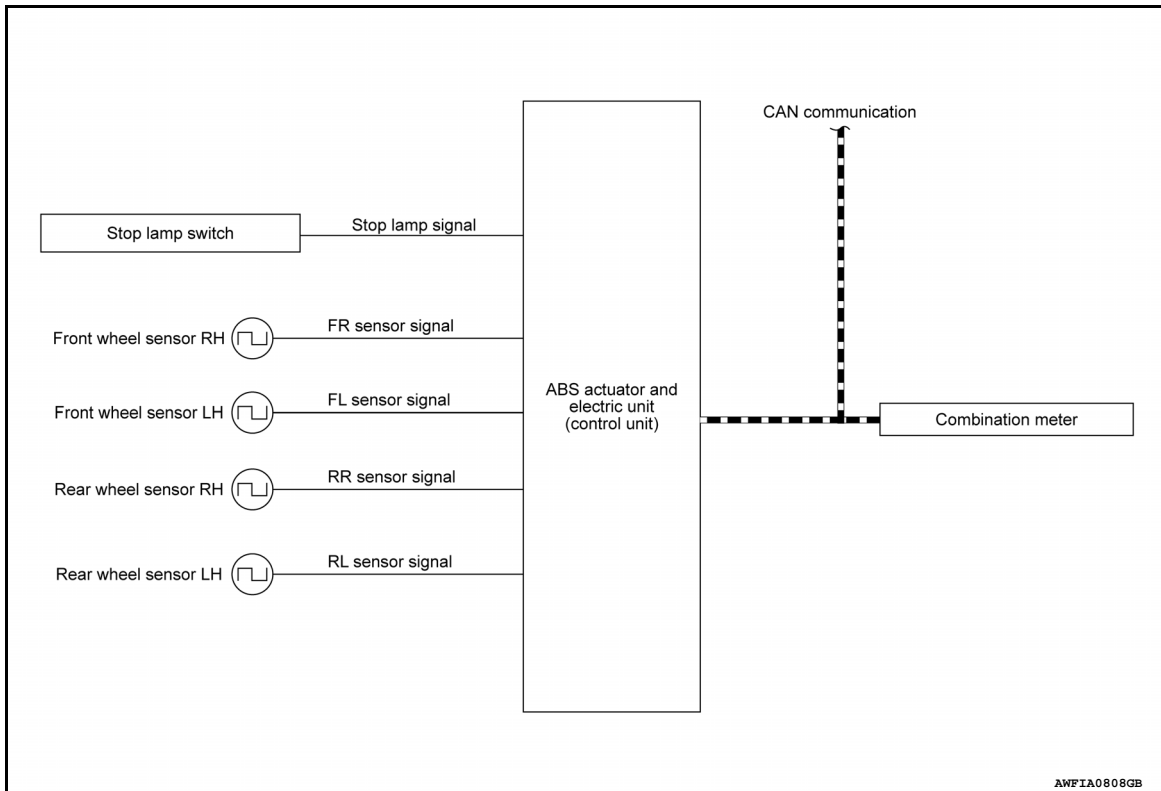
< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

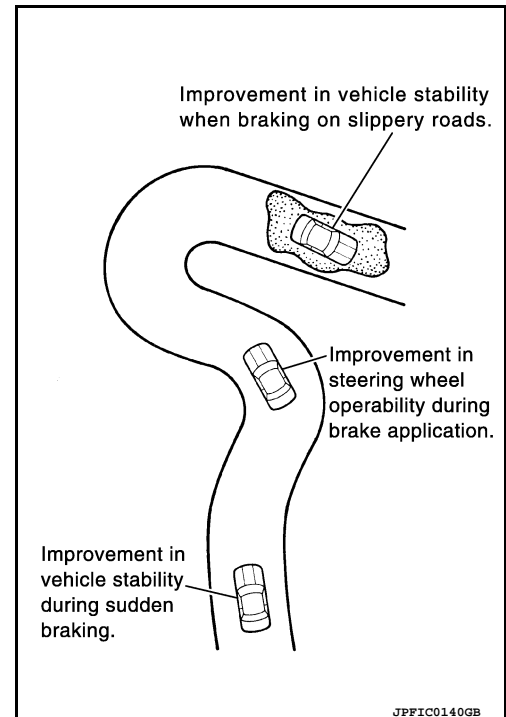
## VDC/TCS/ABS : ABS Function

INFOID:000000008832879

### 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 speeds, and transmit 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 while cornering.
  - Obstacles may be easily bypassed by steering operation during braking.
- CONSULT can be used to diagnose the system.
- Fail-safe function is adopted. When a malfunction occurs in ABS function, the control is suspended for VDC function, TCS function and ABS function. However, EBD function operates normally. Refer to [BRC-28. "VDC/TCS/ABS : Fail-safe"](#).



### INPUT SIGNAL AND OUTPUT SIGNAL

# SYSTEM

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

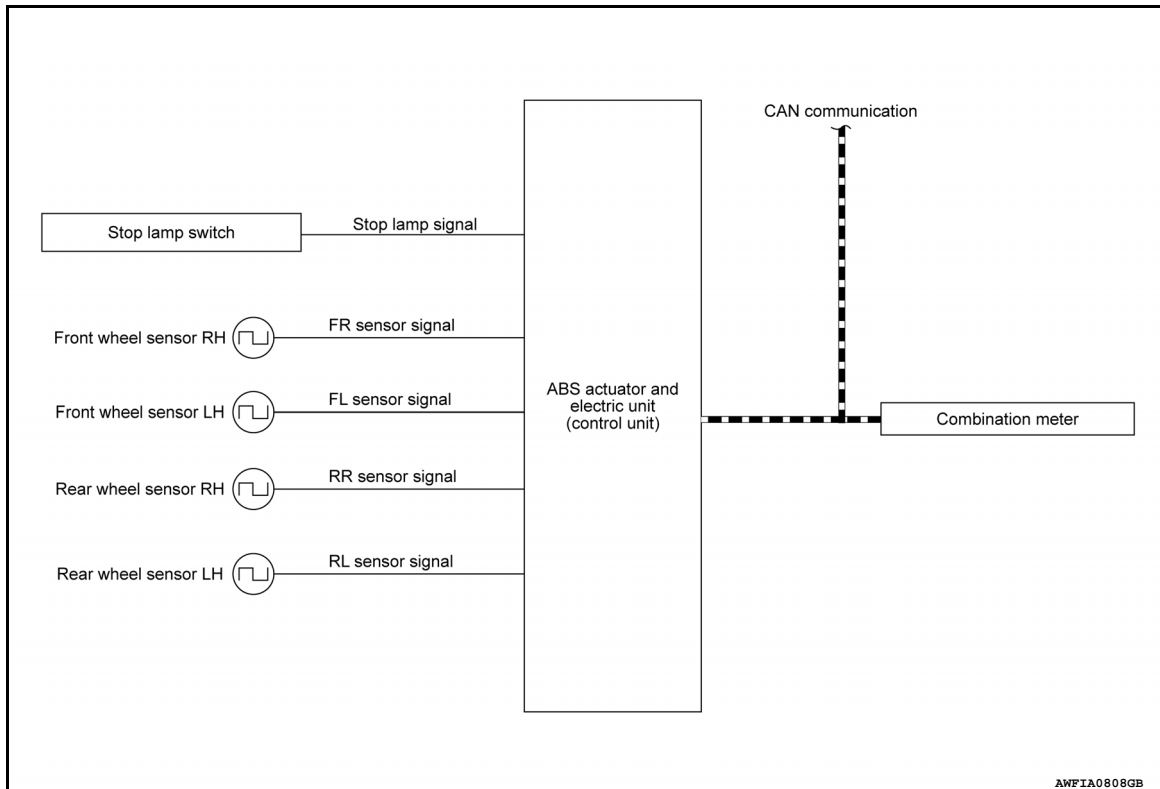
Major signal transmission between each unit via communication lines is shown in the following table.

Component	Signal description
Combination meter	Receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• VDC warning lamp signal</li> <li>• ABS warning lamp signal</li> </ul>

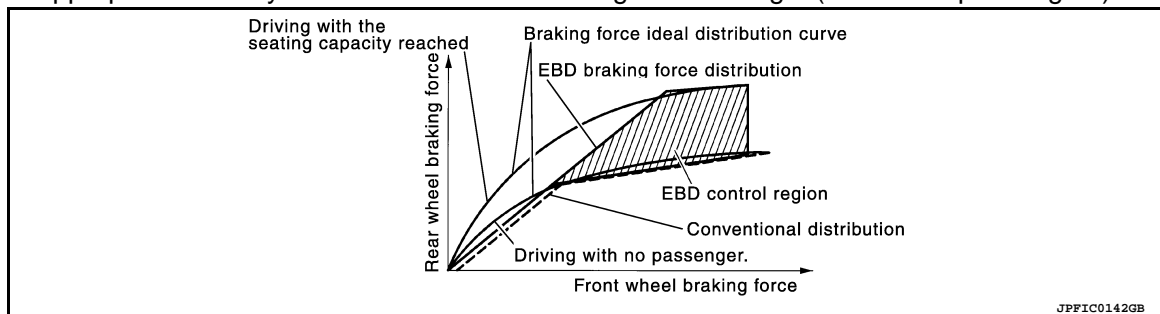
## VDC/TCS/ABS : EBD Function

INFOID:000000008832880

### SYSTEM DIAGRAM



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

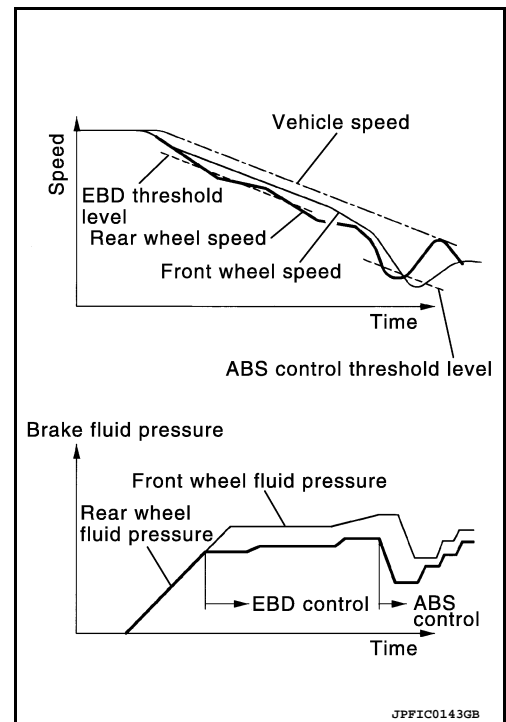


# SYSTEM

[VDC/TCS/ABS]

## < SYSTEM DESCRIPTION >

- During braking, control unit portion compares slight slip on front and rear wheels by wheel 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.
- Fail-safe function is adopted. When a malfunction occurs in EBD function, the control is suspended for VDC function, TCS function, ABS function and EBD function. Refer to [BRC-28, "VDC/TCS/ABS : 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	Receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• ABS warning lamp signal</li> <li>• Brake warning lamp signal</li> <li>• SLIP indicator lamp signal</li> </ul>

## VDC/TCS/ABS : Fail-safe

INFOID:000000008832881

## 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.

# SYSTEM

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

DTC	Malfunction detected condition	Fail-safe condition	A
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)	A
C1102	When an open circuit is detected in rear LH wheel sensor circuit.		B
C1103	When an open circuit is detected in front RH wheel sensor circuit.		C
C1104	When an open circuit is detected in front LH wheel sensor circuit.		D
C1105	<ul style="list-style-type: none"> <li>• When a short circuit is detected in rear RH wheel sensor circuit.</li> <li>• When power supply voltage of rear RH wheel sensor is in following state. - Rear RH wheel sensor power supply voltage: <math>7.2\text{ V} \geq</math> Rear RH wheel sensor power supply voltage</li> <li>• When distance between rear RH wheel sensor and rear RH wheel sensor rotor is large.</li> <li>• When installation of rear RH wheel sensor or rear RH wheel sensor rotor is not normal.</li> </ul>		E
C1106	<ul style="list-style-type: none"> <li>• When a short circuit is detected in rear LH wheel sensor circuit.</li> <li>• When power supply voltage of rear LH wheel sensor is in following state. - Rear LH wheel sensor power supply voltage: <math>7.2\text{ V} \geq</math> Rear LH wheel sensor power supply voltage</li> <li>• When distance between rear LH wheel sensor and rear LH wheel sensor rotor is large.</li> <li>• When installation of rear LH wheel sensor or rear LH wheel sensor rotor is not normal.</li> </ul>		<b>BRC</b>
C1107	<ul style="list-style-type: none"> <li>• When a short circuit is detected in front RH wheel sensor circuit.</li> <li>• When power supply voltage of front RH wheel sensor is in following state. - Front RH wheel sensor power supply voltage: <math>7.2\text{ V} \geq</math> Front RH wheel sensor power supply voltage</li> <li>• When distance between front RH wheel sensor and front RH wheel sensor rotor is large.</li> <li>• When installation of front RH wheel sensor or front RH wheel sensor rotor is not normal.</li> </ul>		G
C1108	<ul style="list-style-type: none"> <li>• When a short circuit is detected in front LH wheel sensor circuit.</li> <li>• When power supply voltage of front LH wheel sensor is in following state. - Front LH wheel sensor power supply voltage: <math>7.2\text{ V} \geq</math> Front LH wheel sensor power supply voltage</li> <li>• When distance between front LH wheel sensor and front LH wheel sensor rotor is large.</li> <li>• When installation of front LH wheel sensor or front LH wheel sensor rotor is not normal.</li> </ul>		H
C1109	<ul style="list-style-type: none"> <li>• When ignition power supply voltage is in following state. - Ignition power supply voltage: <math>10\text{ V} \geq</math> Ignition power supply voltage.</li> <li>- Ignition power supply voltage: <math>16\text{ V} \leq</math> Ignition power supply voltage.</li> </ul>		I
C1110	When there is an internal malfunction in the ABS actuator and electric unit (control unit).		J
C1111	When a malfunction is detected in motor or motor relay.	K	
C1113	When a malfunction is detected in longitudinal G signal.	L	
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.	M	
		N	
		O	
		P	

# SYSTEM

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

DTC	Malfunction detected condition	Fail-safe condition
C1116	When stop lamp switch signal is not input when brake pedal operates.	The following functions are suspended: • VDC • TCS
C1120	When a malfunction is detected in front LH ABS IN valve.	The following functions are suspended: • VDC • TCS • ABS • EBD
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
C1140	When a malfunction is detected in actuator relay.	The following functions are suspended: • VDC • TCS • ABS • EBD
C1142	When a malfunction is detected in VDC pressure sensor.	The following functions are suspended: • VDC • TCS
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.	
C1155	When brake fluid level low signal is detected.	The following functions are suspended: • VDC • TCS
C1164	When a malfunction is detected in cut valve 1.	The following functions are suspended: • VDC • TCS • ABS • EBD
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
U1000	When CAN communication signal is not continuously transmitted or received for 2 seconds or more.	The following functions are suspended: • VDC • TCS
U1002	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or less.	
U1010	When detecting error during the initial diagnosis of CAN controller of ABS actuator and electric unit (control unit).	

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

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

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

### CONSULT Function (ABS)

INFOID:000000008832882

#### FUNCTION

CONSULT can display each diagnostic item using the following direct diagnostic modes.

Direct Diagnostic Mode	Description
ECU identification	The ABS actuator and electric unit (control unit) part number is displayed.
Self Diagnostic Result	The ABS actuator and electric unit (control unit) self diagnostic results are displayed.
Data Monitor	The ABS actuator and electric unit (control unit) input/output data is displayed in real time.
Active Test	The ABS actuator and electric unit (control unit) activates outputs to test components.
Work support	The settings for ABS actuator and electric unit (control unit) functions can be changed.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication is displayed.

#### ECU IDENTIFICATION

ABS actuator and electric unit (control unit) part number is displayed.

#### SELF DIAGNOSTIC RESULT

##### Operation Procedure

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

##### How To Erase Self Diagnostic Result

1. After erasing DTC memory, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute as the final inspection, and make sure that the ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp turn OFF.

#### **CAUTION:**

**If memory cannot be erased, perform applicable diagnosis.**

#### **NOTE:**

- When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp, SLIP indicator lamp and brake warning lamp will not turn OFF even when the system is normal, unless the vehicle is driven at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
- Brake warning lamp will turn ON in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
- VDC OFF switch should not stay in ON position.

#### Display Item List

Refer to [BRC-43. "DTC Index"](#).

#### DATA MONITOR

Item (Unit)	Data monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
FR LH SENSOR (km/h, mph)	×	×	×	Wheel speed (km/h, mph) calculated by front wheel sensor LH signal is displayed.
FR RH SENSOR (km/h, mph)	×	×	×	Wheel speed (km/h, mph) calculated by front wheel sensor RH signal is displayed.
RR LH SENSOR (km/h, mph)	×	×	×	Wheel speed (km/h, mph) calculated by rear wheel sensor LH signal is displayed.
RR RH SENSOR (km/h, mph)	×	×	×	Wheel speed (km/h, mph) calculated by rear wheel sensor RH signal is displayed.

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

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

Item (Unit)	Data monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
DECEL G-SEN (G)	×	×	×	Longitudinal acceleration (G) detected by decel G-sensor is displayed.
FR RH IN SOL (On/Off)	-	×	×	Front RH IN ABS solenoid (On/Off) status is displayed.
FR RH OUT SOL (On/Off)	-	×	×	Front RH OUT ABS solenoid (On/Off) status is displayed.
FR LH IN SOL (On/Off)	-	×	×	Front LH IN ABS solenoid (On/Off) status is displayed.
FR LH OUT SOL (On/Off)	-	×	×	Front LH OUT ABS solenoid (On/Off) status is displayed.
RR RH IN SOL (On/Off)	-	×	×	Rear RH IN ABS solenoid (On/Off) status is displayed.
RR RH OUT SOL (On/Off)	-	×	×	Rear RH OUT ABS solenoid (On/Off) status is displayed.
RR LH IN SOL (On/Off)	-	×	×	Rear LH IN ABS solenoid (On/Off) status is displayed.
RR LH OUT SOL (On/Off)	-	×	×	Rear LH OUT ABS solenoid (On/Off) status is displayed.
EBD WARN LAMP (On/Off)	-	-	×	Brake warning lamp (On/Off) status is displayed.
STOP LAMP SW (On/Off)	×	×	×	Stop lamp switch (On/Off) status is displayed.
MOTOR RELAY (On/Off)	-	×	×	ABS motor relay signal (On/Off) status is displayed.
ACTUATOR RLY (On/Off)	-	×	×	ABS actuator relay signal (On/Off) status is displayed.
ABS WARN LAMP (On/Off)	-	×	×	ABS warning lamp (On/Off) status is displayed.
OFF LAMP (On/Off)	-	×	×	VDC OFF Lamp (On/Off) status is displayed.
SLIP/VDC LAMP (On/Off)	-	×	×	SLIP indicator lamp (On/Off) status is displayed.
BATTERY VOLT (V)	×	×	×	Voltage (V) supplied to ABS actuator and electric unit (control unit) is displayed.
GEAR (1, 2, 3, 4, 5)	×	×	×	Gear position (1, 2, 3, 4, 5) judged by transmission range switch signal is displayed.
SLCT LVR POSI	×	×	×	Current gear position judged from current gear position signal is displayed.
YAW RATE SEN (d/s)	×	×	×	Yaw rate (d/s) detected by yaw rate sensor is displayed.
R POSI SIG (On/Off)	-	-	×	Reverse shift position (On/Off) judged by transmission range switch signal.
N POSI SIG (On/Off)	-	-	×	Neutral position (On/Off) judged by transmission range switch signal.
P POSI SIG (On/Off)	-	-	×	Park position (On/Off) judged by transmission range switch signal.
ACCEL POS SIG (%)	×	-	×	Throttle valve open/close status judged by CAN communication signal is displayed.
SIDE G-SENSOR (m/s <sup>2</sup> )	×	-	×	Transverse acceleration detected by side G-sensor is displayed.



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

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

Item (Unit)	Data monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
STR ANGLE SIG (deg)	×	-	×	Steering angle detected by steering angle sensor is displayed.
PRESS SENSOR (bar)	×	-	×	Brake pressure detected by pressure sensor is displayed.
EBD SIGNAL (On/Off)	-	-	×	EBD operation (On/Off) status is displayed.
ABS SIGNAL (On/Off)	-	-	×	ABS operation (On/Off) status is displayed.
TCS SIGNAL (On/Off)	-	-	×	TCS operation (On/Off) status is displayed.
VDC SIGNAL (On/Off)	-	-	×	VDC operation (On/Off) status is displayed.
EBD FAIL SIG (On/Off)	-	-	×	EBD fail signal (On/Off) status is displayed.
ABS FAIL SIG (On/Off)	-	-	×	ABS fail signal (On/Off) status is displayed.
TCS FAIL SIG (On/Off)	-	-	×	TCS fail signal (On/Off) status is displayed.
VDC FAIL SIG (On/Off)	-	-	×	VDC fail signal (On/Off) status is displayed.
CRANKING SIG (On/Off)	-	-	×	The input state of the key SW START position signal is displayed.
FLUID LEV SW (On/Off)	×	-	×	Brake fluid level switch (On/Off) status is displayed.
PARK BRAKE SW (On/Off)	×	-	×	Park brake switch (On/Off) status is displayed.
USV[FL-RR] (On/Off)	—	—	×	Primary side USV solenoid valve (On/Off) status is displayed.
USV[FR-RL] (On/Off)	—	—	×	Secondary side USV solenoid valve (On/Off) status is displayed.
HSV[FL-RR] (On/Off)	—	—	×	Primary side HSV solenoid valve (On/Off) status is displayed.
HSV[FR-RL] (On/Off)	—	—	×	Secondary side HSV solenoid valve (On/Off) status is displayed.
V/R OUTPUT (On/Off)	—	—	×	Valve relay operation signal (On/Off) status is displayed.
M/R OUTPUT (On/Off)	—	—	×	Motor relay operation signal (On/Off) status is displayed.
ENGINE RPM (tr/min)	×	-	×	Engine speed judged by CAN communication signal is displayed.

×: Applicable

-: Not applicable

## 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.**

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

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

**NOTE:**

- When active test is performed while depressing the pedal, the pedal depressing stroke may change. This is not a malfunction.
- “TEST IS STOPPED” is displayed approx. 10 seconds after operation start.
- When performing active test again after “TEST IS STOPPED” is displayed, select “BACK”.
- ABS warning lamp, brake warning lamp and VDC warning lamp may turn ON during active test. This is not a malfunction.

**ABS IN Valve and ABS OUT Valve**

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

Test item	Display Item	Display		
		Up	Keep	Down
FR RH SOL	FR RH IN SOL	Off	On*	On*
	FR RH OUT SOL	Off	Off	On*
FR LH 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 approx. 2 seconds.

**ABS IN Valve (ACT) and ABS OUT Valve (ACT)**

When “Up”, “ACT UP” or “ACT KEEP” is selected on display screen, the following items are displayed when system is normal.

Test item	Display Item	Display		
		Up	ACT UP	ACT KEEP
FR RH ABS SOLE-NOID (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 ABS SOLE-NOID (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 ABS SOLE-NOID (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 ABS SOLE-NOID (ACT)	RR LH IN SOL	Off	On*	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.

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

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

Test item	Display Item	Display	
		On	Off
ABS MOTOR	MOTOR RELAY	On	Off
	ACTUATOR RLY <sup>(Note)</sup>	On	On

**NOTE:**

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

**WORK SUPPORT**

Conditions	Description
ST ANGLE SENSOR ADJUSTMENT	Steering angle sensor neutral position adjustment can be performed. Refer to <a href="#">BRC-54, "Work Procedure"</a> .

A  
B  
C  
D  
E  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

**BRC**

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

## ECU DIAGNOSIS INFORMATION

### ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:000000008832883

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

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

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
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
SLCT LVR POSI	Selector lever position.	Vehicle stopped	N/P
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

A  
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C  
D  
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BRC  
G  
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I  
J  
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M  
N  
O  
P

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
R POSI SIG	Transmission range switch signal ON/OFF condition	CVT shift position = R position	On
		CVT shift position = other than R position	Off
N POSI SIG	Transmission range switch signal ON/OFF condition	CVT shift position = N position	On
		CVT shift position = other than N position	Off
P POSI SIG	Transmission range switch signal ON/OFF condition	CVT shift position = P position	On
		CVT shift position = other than P position	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 <sup>2</sup>
		Vehicle turning right	Negative value (m/s <sup>2</sup> )
		Vehicle turning left	Positive value (m/s <sup>2</sup> )
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
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
PARK BRAKE SW	Parking brake switch	Parking brake switch is active	On
		Parking brake switch is inactive	Off

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
USV[FL-RR]	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (when in fail-safe mode)	On
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	Off
USV[FR-RL]	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (when in fail-safe mode)	On
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	Off
HSV[FL-RR]	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (when in fail-safe mode)	On
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	Off
HSV[FR-RL]	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (when in fail-safe mode)	On
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	Off
V/R OUTPUT	Solenoid valve relay activated	When the solenoid valve relay is active (when ignition switch OFF)	On
		When the solenoid valve relay is not active (in the fail-safe mode)	Off
M/R OUTPUT	Actuator motor and motor relay activated	When the actuator motor and motor relay are active ("ACTIVE TEST" with CONSULT)	On
		When the actuator motor and motor relay are inactive	Off
ENGINE RPM	With engine running	With engine stopped	0 rpm
		Engine running	Almost in accordance with tachometer display

Note 1: Confirm tire pressure is normal.

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

- Refer to [BRC-22, "VDC/TCS/ABS : VDC Function"](#).
- Refer to [BRC-24, "VDC/TCS/ABS : TCS Function"](#).
- Refer to [BRC-26, "VDC/TCS/ABS : ABS Function"](#).
- Refer to [BRC-27, "VDC/TCS/ABS : EBD Function"](#).

## Fail-safe

INFOID:000000008832884

## 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 ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

## 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)	
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	<ul style="list-style-type: none"> <li>• When a short circuit is detected in rear RH wheel sensor circuit.</li> <li>• When power supply voltage of rear RH wheel sensor is in following state.</li> <li>- Rear RH wheel sensor power supply voltage: <math>7.2\text{ V} \geq</math> Rear RH wheel sensor power supply voltage</li> <li>• When distance between rear RH wheel sensor and rear RH wheel sensor rotor is large.</li> <li>• When installation of rear RH wheel sensor or rear RH wheel sensor rotor is not normal.</li> </ul>		
C1106	<ul style="list-style-type: none"> <li>• When a short circuit is detected in rear LH wheel sensor circuit.</li> <li>• When power supply voltage of rear LH wheel sensor is in following state.</li> <li>- Rear LH wheel sensor power supply voltage: <math>7.2\text{ V} \geq</math> Rear LH wheel sensor power supply voltage</li> <li>• When distance between rear LH wheel sensor and rear LH wheel sensor rotor is large.</li> <li>• When installation of rear LH wheel sensor or rear LH wheel sensor rotor is not normal.</li> </ul>		
C1107	<ul style="list-style-type: none"> <li>• When a short circuit is detected in front RH wheel sensor circuit.</li> <li>• When power supply voltage of front RH wheel sensor is in following state.</li> <li>- Front RH wheel sensor power supply voltage: <math>7.2\text{ V} \geq</math> Front RH wheel sensor power supply voltage</li> <li>• When distance between front RH wheel sensor and front RH wheel sensor rotor is large.</li> <li>• When installation of front RH wheel sensor or front RH wheel sensor rotor is not normal.</li> </ul>		
C1108	<ul style="list-style-type: none"> <li>• When a short circuit is detected in front LH wheel sensor circuit.</li> <li>• When power supply voltage of front LH wheel sensor is in following state.</li> <li>- Front LH wheel sensor power supply voltage: <math>7.2\text{ V} \geq</math> Front LH wheel sensor power supply voltage</li> <li>• When distance between front LH wheel sensor and front LH wheel sensor rotor is large.</li> <li>• When installation of front LH wheel sensor or front LH wheel sensor rotor is not normal.</li> </ul>		
C1109	<ul style="list-style-type: none"> <li>• When ignition power supply voltage is in following state.</li> <li>- Ignition power supply voltage: <math>10\text{ V} \geq</math> Ignition power supply voltage.</li> <li>- Ignition power supply voltage: <math>16\text{ V} \leq</math> Ignition power supply voltage.</li> </ul>		The following functions are suspended: • VDC • TCS • ABS • EBD
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



# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

DTC	Malfunction detected condition	Fail-safe condition	
C1113	When a malfunction is detected in longitudinal G signal.	The following functions are suspended: • VDC • TCS	A
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	B C
C1116	When stop lamp switch signal is not input when brake pedal operates.	The following functions are suspended: • VDC • TCS	D
C1120	When a malfunction is detected in front LH ABS IN valve.	The following functions are suspended: • VDC • TCS • ABS • EBD	E
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	G H
C1140	When a malfunction is detected in actuator relay.	The following functions are suspended: • VDC • TCS • ABS • EBD	I J
C1142	When a malfunction is detected in VDC pressure sensor.	The following functions are suspended: • VDC • TCS	K
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.		L M
C1155	When brake fluid level low signal is detected.	The following functions are suspended: • VDC • TCS	N
C1164	When a malfunction is detected in cut valve 1.	The following functions are suspended: • VDC • TCS • ABS • EBD	O
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	P

BRC

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

DTC	Malfunction detected condition	Fail-safe condition
U1000	When CAN communication signal is not continuously transmitted or received for 2 seconds or more.	The following functions are suspended: • VDC • TCS
U1002	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or less.	
U1010	When detecting error during the initial diagnosis of CAN controller of ABS actuator and electric unit (control unit).	

## DTC Inspection Priority Chart

INFOID:00000000832885

When multiple DTCs are displayed simultaneously, check each one using the following priority list.

Priority	Detected item (DTC)
1	<ul style="list-style-type: none"> <li>• U1000 CAN COMM CIRCUIT</li> <li>• U1002 SYSTEM COMM(CAN)</li> <li>• U1010 CONTROL UNIT(CAN)</li> </ul>
2	<ul style="list-style-type: none"> <li>• C1110 CONTROLLER FAILURE</li> <li>• C1170 VARIANT CORDING</li> </ul>
3	<ul style="list-style-type: none"> <li>• C1130 ENGINE SIGNAL 1</li> <li>• C1144 ST ANG SEN SIGNAL</li> </ul>
4	<ul style="list-style-type: none"> <li>• C1109 BATTERY VOLTAGE [ABNORMAL]</li> <li>• C1111 PUMP MOTOR</li> <li>• C1140 ACTUATOR RLY</li> </ul>
5	<ul style="list-style-type: none"> <li>• C1101 RR RH SENSOR-1</li> <li>• C1102 RR LH SENSOR-1</li> <li>• C1103 FR RH SENSOR-1</li> <li>• C1104 FR LH SENSOR-1</li> <li>• C1105 RR RH SENSOR-2</li> <li>• C1106 RR LH SENSOR-2</li> <li>• C1107 FR RH SENSOR-2</li> <li>• C1108 FR LH SENSOR-2</li> <li>• C1113 G SENSOR</li> <li>• C1115 ABS SENSOR [ABNORMAL SIGNAL]</li> <li>• C1116 STOP LAMP SW</li> <li>• C1120 FR LH IN ABS SOL</li> <li>• C1121 FR LH OUT ABS SOL</li> <li>• C1122 FR RH IN ABS SOL</li> <li>• C1123 FR RH OUT ABS SOL</li> <li>• C1124 RR LH IN ABS SOL</li> <li>• C1125 RR LH OUT ABS SOL</li> <li>• C1126 RR RH IN ABS SOL</li> <li>• C1127 RR RH OUT ABS SOL</li> <li>• C1142 PRESS SEN CIRCUIT</li> <li>• C1143 ST ANG SEN CIRCUIT</li> <li>• C1145 YAW RATE SENSOR</li> <li>• C1146 SIDE G-SEN CIRCUIT</li> <li>• C1164 CV1</li> <li>• C1165 CV2</li> <li>• C1166 SV1</li> <li>• C1167 SV2</li> </ul>
6	<ul style="list-style-type: none"> <li>• C1155 BR FLUID LEVEL LOW</li> </ul>

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

## DTC Index

INFOID:000000008832886

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	<a href="#">BRC-56, "DTC Logic"</a>
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	<a href="#">BRC-58, "DTC Logic"</a>
C1106	RR LH SENSOR-2	
C1107	FR RH SENSOR-2	
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	<a href="#">BRC-60, "DTC Logic"</a>
C1110	CONTROLLER FAILURE	<a href="#">BRC-62, "DTC Logic"</a>
C1111	PUMP MOTOR	<a href="#">BRC-63, "DTC Logic"</a>
C1113	G SENSOR	<a href="#">BRC-65, "DTC Logic"</a>
C1115	ABS SENSOR [ABNORMAL SIGNAL]	<a href="#">BRC-66, "DTC Logic"</a>
C1116	STOP LAMP SW	<a href="#">BRC-68, "DTC Logic"</a>
C1120	FR LH IN ABS SOL	<a href="#">BRC-70, "DTC Logic"</a>
C1121	FR LH OUT ABS SOL	<a href="#">BRC-72, "DTC Logic"</a>
C1122	FR RH IN ABS SOL	<a href="#">BRC-70, "DTC Logic"</a>
C1123	FR RH OUT ABS SOL	<a href="#">BRC-72, "DTC Logic"</a>
C1124	RR LH IN ABS SOL	<a href="#">BRC-70, "DTC Logic"</a>
C1125	RR LH OUT ABS SOL	<a href="#">BRC-72, "DTC Logic"</a>
C1126	RR RH IN ABS SOL	<a href="#">BRC-70, "DTC Logic"</a>
C1127	RR RH OUT ABS SOL	<a href="#">BRC-72, "DTC Logic"</a>
C1130	ENGINE SIGNAL 1	<a href="#">BRC-74, "DTC Logic"</a>
C1140	ACTUATOR RLY	<a href="#">BRC-75, "DTC Logic"</a>
C1142	PRESS SEN CIRCUIT	<a href="#">BRC-77, "DTC Logic"</a>
C1143	ST ANG SEN CIRCUIT	<a href="#">BRC-78, "DTC Logic"</a>
C1144	ST ANG SEN SIGNAL	<a href="#">BRC-80, "DTC Logic"</a>
C1145	YAW RATE SENSOR	<a href="#">BRC-65, "DTC Logic"</a>
C1146	SIDE G-SEN CIRCUIT	
C1155	BR FLUID LEVEL LOW	<a href="#">BRC-81, "DTC Logic"</a>
C1164	CV 1	<a href="#">BRC-83, "DTC Logic"</a>
C1165	CV 2	
C1166	SV 1	
C1167	SV 2	
C1170	VARIANT CORDING	<a href="#">BRC-62, "DTC Logic"</a>
U1000	CAN COMM CIRCUIT	<a href="#">BRC-85, "DTC Logic"</a>
U1002	SYSTEM COMM(CAN)	<a href="#">BRC-86, "DTC Logic"</a>
U1010	CONTROL UNIT(CAN)	<a href="#">BRC-86, "DTC Logic"</a>

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D  
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I  
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**BRC**

# BRAKE CONTROL SYSTEM

[VDC/TCS/ABS]

< WIRING DIAGRAM >

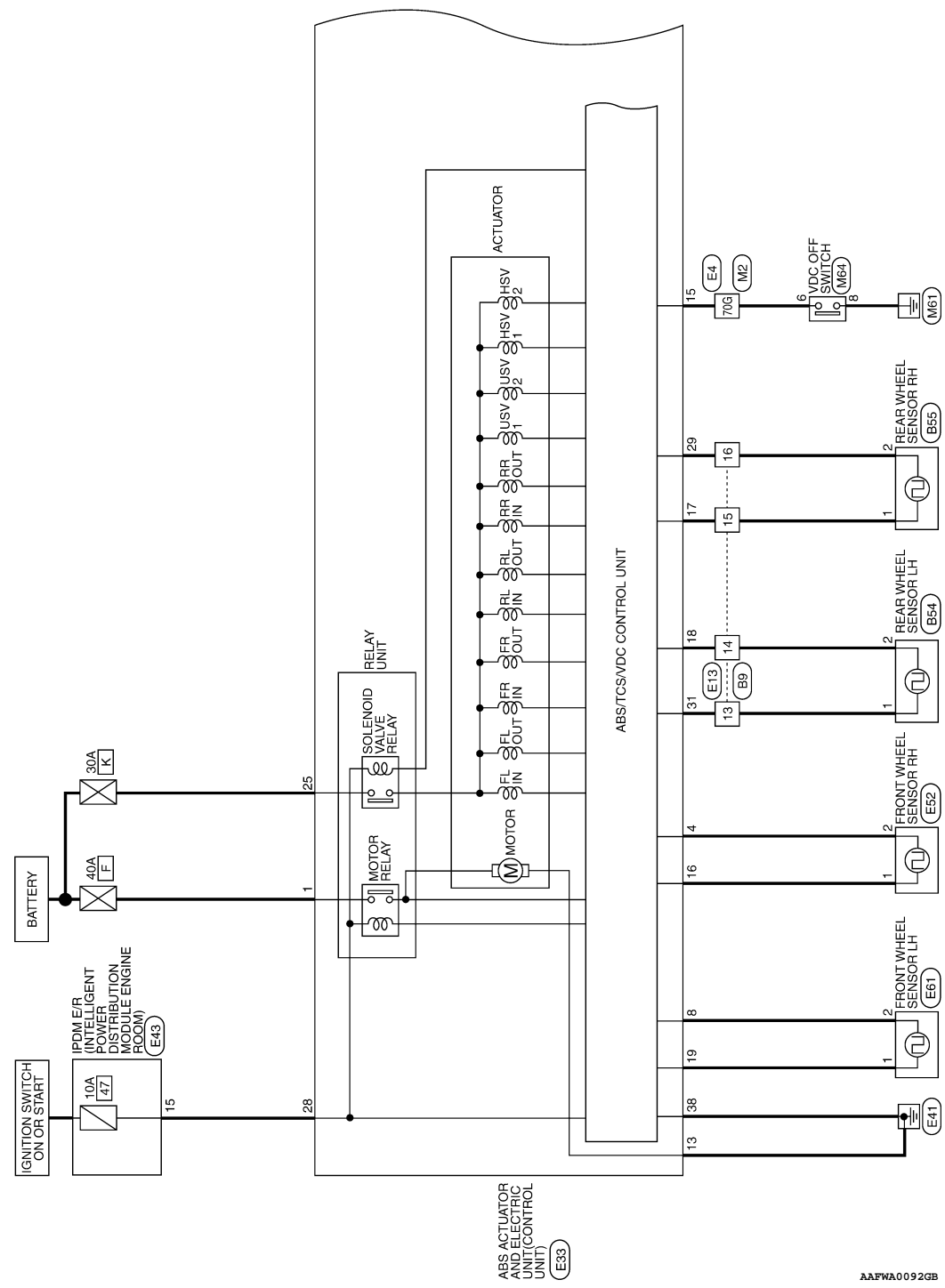
## WIRING DIAGRAM

### BRAKE CONTROL SYSTEM

Wiring Diagram

INFOID:000000008832887

#### BRAKE CONTROL SYSTEM



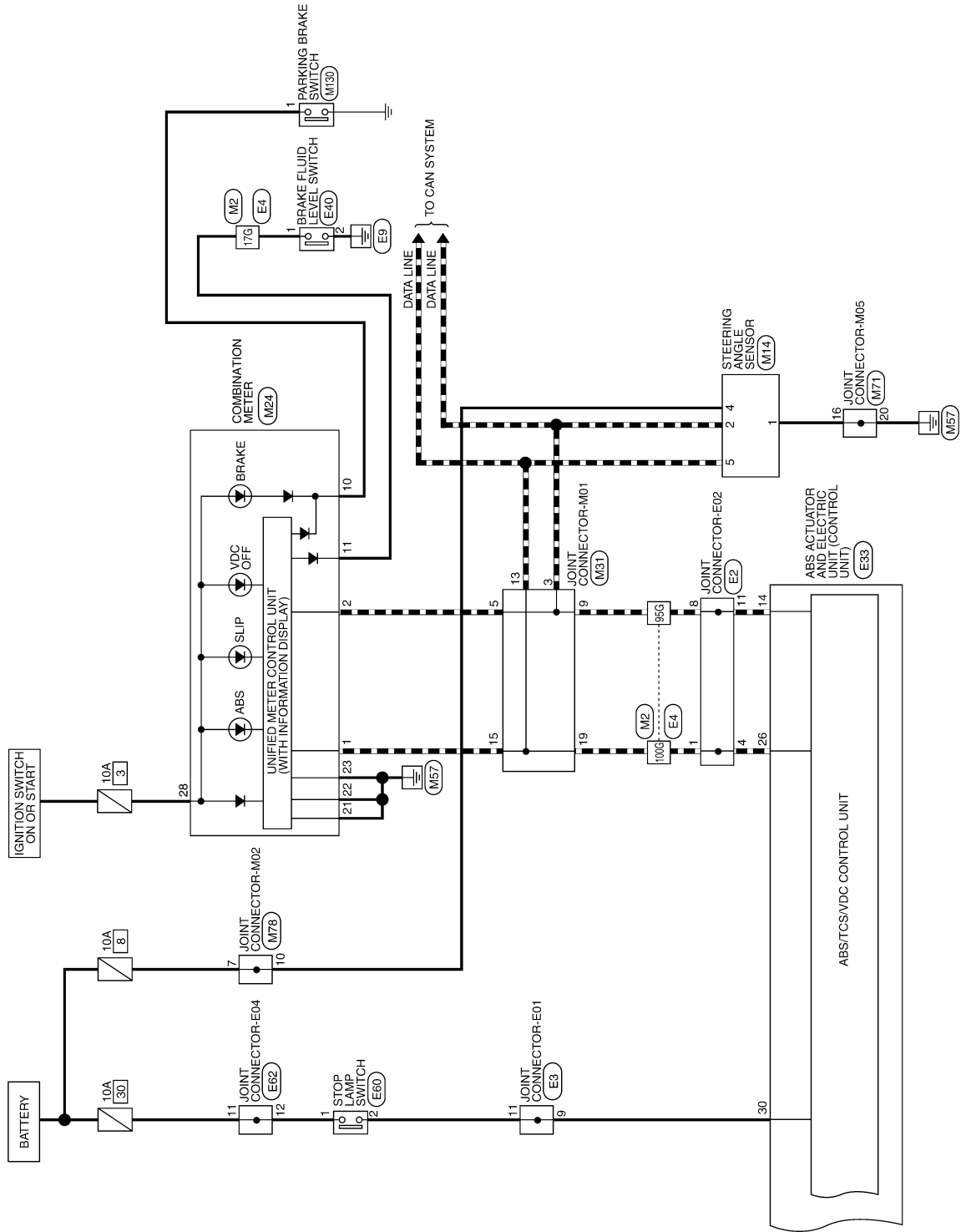
ABS ACTUATOR ELECTRIC CONTROL UNIT (E33)

AAFWA0092GB

# BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[VDC/TCS/ABS]



AAFVA0093GB

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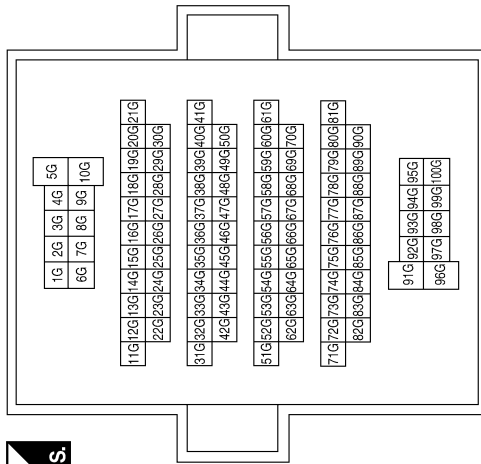
# BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[VDC/TCS/ABS]

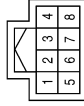
## BRAKE CONTROL SYSTEM CONNECTORS

Connector No.	M2
Connector Name	WIRE TO WIRE
Connector Color	WHITE



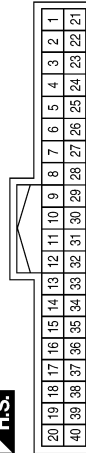
Terminal No.	Color of Wire	Signal Name
17G	G	-
70G	SB	-
95G	P	-
100G	L	-

Connector No.	M14
Connector Name	STEERING ANGLE SENSOR
Connector Color	WHITE



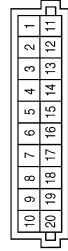
Terminal No.	Color of Wire	Signal Name
1	B	-
2	P	-
4	GR	-
5	L	-

Connector No.	M24
Connector Name	COMBINATION METER
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	L	CAN-H
2	P	CAN-L
10	SB	PKB SW
11	G	BRAKE OIL SW
21	B	GND (ILL)
22	B	GND2 (POWER)
23	B	GND3 (CIRCUIT)
28	GR	IGN

Connector No.	M31
Connector Name	JOINT CONNECTOR-M01
Connector Color	GRAY



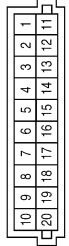
Terminal No.	Color of Wire	Signal Name
3	P	-
5	P	-
9	P	-
13	L	-
15	L	-
19	L	-

# BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

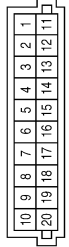
[VDC/TCS/ABS]

Connector No.	M78
Connector Name	JOINT CONNECTOR-M02
Connector Color	PINK



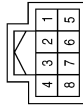
Terminal No.	Color of Wire	Signal Name
7	G	-
10	GR	-

Connector No.	M71
Connector Name	JOINT CONNECTOR-M05
Connector Color	PINK



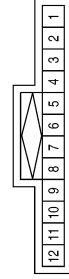
Terminal No.	Color of Wire	Signal Name
16	B	-
20	B	-

Connector No.	M64
Connector Name	VDC OFF SWITCH
Connector Color	BLACK



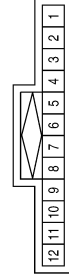
Terminal No.	Color of Wire	Signal Name
6	SB	-
8	B	-

Connector No.	E3
Connector Name	JOINT CONNECTOR-E01
Connector Color	BLUE



Terminal No.	Color of Wire	Signal Name
9	SB	-
11	SB	-

Connector No.	E2
Connector Name	JOINT CONNECTOR-E02
Connector Color	BLUE



Terminal No.	Color of Wire	Signal Name
1	L	-
4	L	-
8	P	-
11	P	-

Connector No.	M130
Connector Name	PARKING BRAKE SWITCH
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	SB	-

A  
B  
C  
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O  
P

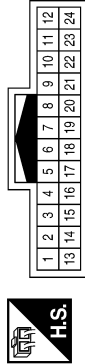
AAFIA0144GB

# BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[VDC/TCS/ABS]

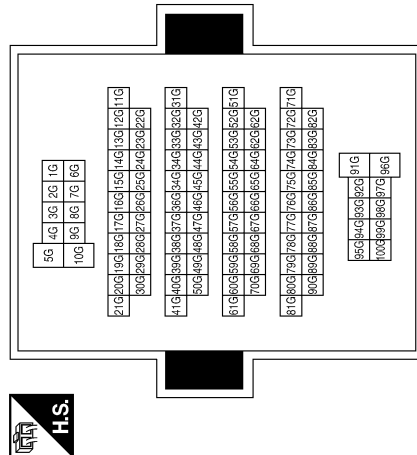
Connector No.	E13
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
13	SB	-
14	O	-
15	BR	-
16	Y	-

Terminal No.	Color of Wire	Signal Name
17G	LG	-
70G	GR	-
95G	P	-
100G	L	-

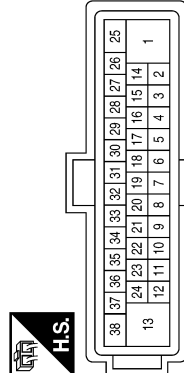
Connector No.	E4
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
23	-	-
24	-	-
25	L	UB (VR)
26	L	CAN-H
27	-	-
28	V	WAV
29	Y	DS RR
30	SB	BLS
31	SB	DP RL
32	-	-
33	-	-
34	-	-
35	-	-
36	-	-
37	-	-
38	B	GND

Terminal No.	Color of Wire	Signal Name
6	-	-
7	-	-
8	BR	DS FL
9	-	-
10	-	-
11	-	-
12	-	-
13	B	MGND
14	P	CAN-L
15	GR	VDC OFF
16	Y	DP FR
17	BR	DP RR
18	O	DS RL
19	Y	DP FL
20	-	-
21	-	-
22	-	-

Connector No.	E33
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	W	UB (MR)
2	-	-
3	-	-
4	W	DS FR
5	-	-

AAFIA0145GB



# BRAKE CONTROL SYSTEM

[VDC/TCS/ABS]

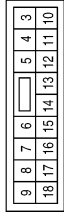
< WIRING DIAGRAM >

Connector No.	E60
Connector Name	STOP LAMP SWITCH
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	W	-
2	SB	-

Connector No.	E43
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



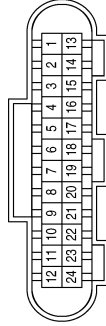
Terminal No.	Color of Wire	Signal Name
15	V	ABS ECU IGN

Connector No.	E40
Connector Name	BRAKE FLUID LEVEL SWITCH
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	LG	-
2	B	-

Connector No.	E62
Connector Name	JOINT CONNECTOR-E04
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
11	W	-
12	W	-

Connector No.	E61
Connector Name	FRONT WHEEL SENSOR LH
Connector Color	GRAY



Terminal No.	Color of Wire	Signal Name
1	Y	-
2	BR	-

Connector No.	E52
Connector Name	FRONT WHEEL SENSOR RH
Connector Color	GRAY



Terminal No.	Color of Wire	Signal Name
1	Y	-
2	W	-

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# BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[VDC/TCS/ABS]

Connector No.	B55
Connector Name	REAR WHEEL SENSOR RH
Connector Color	GRAY



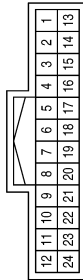
Terminal No.	Color of Wire	Signal Name
1	L	-
2	P	-

Connector No.	B54
Connector Name	REAR WHEEL SENSOR LH
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	B	-
2	BR	-

Connector No.	B9
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
13	B	-
14	BR	-
15	L	-
16	P	-

AAFIA0147GB

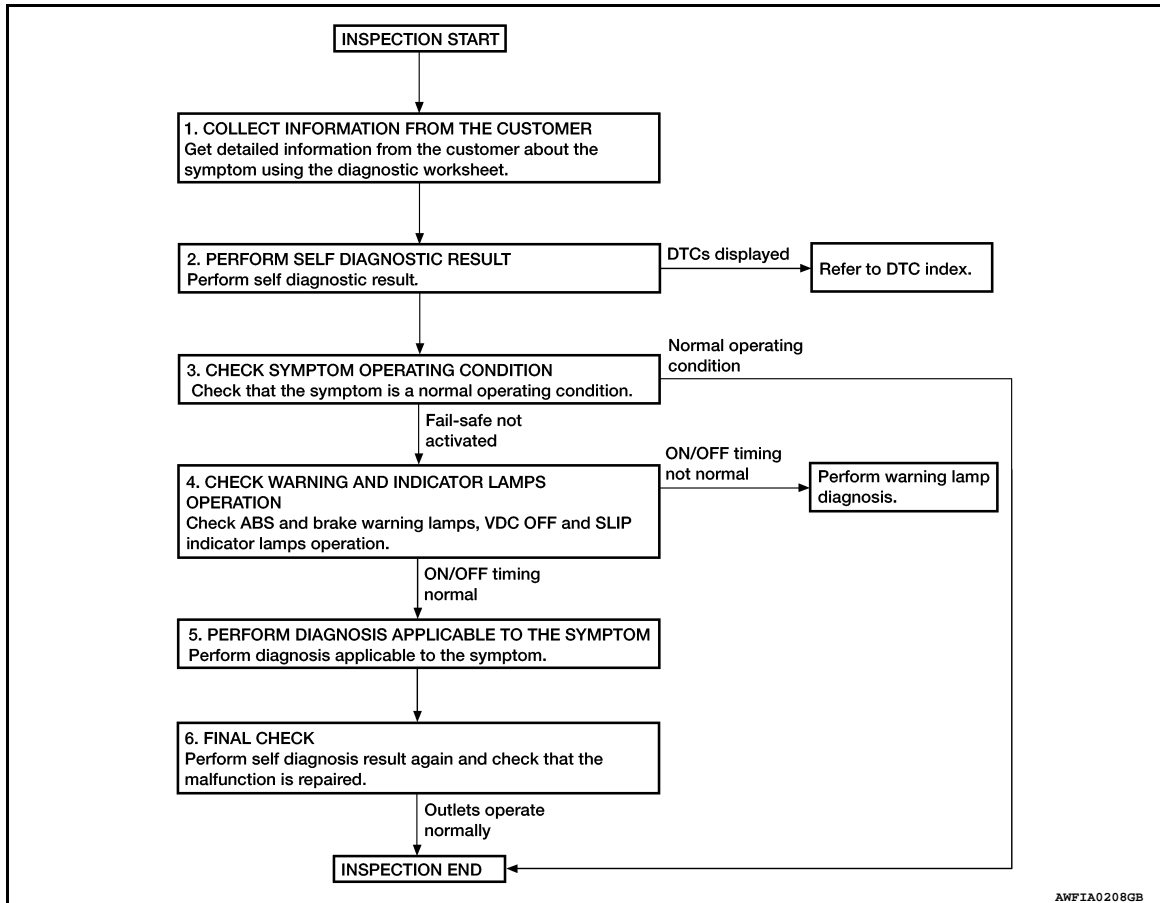
## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORK FLOW

#### Work Flow

INFOID:0000000008832888

#### OVERALL SEQUENCE



#### DETAILED FLOW

##### 1. COLLECT INFORMATION FROM THE CUSTOMER

Get detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnostic worksheet. Refer to [BRC-52, "Diagnostic Work Sheet"](#).

>> GO TO 2.

##### 2. PERFORM SELF DIAGNOSTIC RESULT

Perform self diagnostic result. Refer to [BRC-31, "CONSULT Function \(ABS\)"](#).

Are any DTCs displayed?

YES >> Refer to [BRC-43, "DTC Index"](#).

NO >> GO TO 3.

##### 3. CHECK SYMPTOM OPERATING CONDITION

Check that the symptom is a normal operating condition. Refer to [BRC-103, "Description"](#).

Is the symptom a normal operating condition?

YES >> Inspection End.

NO >> GO TO 4.

##### 4. CHECK WARNING AND INDICATOR LAMPS OPERATION

# DIAGNOSIS AND REPAIR WORK FLOW

[VDC/TCS/ABS]

## < BASIC INSPECTION >

Check ABS and brake warning lamps, and VDC OFF and SLIP indicator lamps operation. Refer to [MWI-8, "METER SYSTEM : System Description"](#).

Is ON/OFF timing normal?

YES >> GO TO 5.

NO >> Perform warning lamp diagnosis. Refer to [BRC-92, "Component Function Check"](#) (ABS warning lamp), [BRC-93, "Component Function Check"](#) (brake warning lamp), [BRC-94, "Component Function Check"](#) (VDC OFF indicator lamp) or [BRC-95, "Component Function Check"](#) (SLIP indicator lamp).

## 5. PERFORM DIAGNOSIS APPLICABLE TO THE SYMPTOM

Perform diagnosis applicable to the symptom. Refer to [BRC-96, "Symptom Table"](#).

>> GO TO 6.

## 6. FINAL CHECK

Perform self diagnostic result again, and check that the malfunction is repaired. After checking, erase the self diagnosis memory. Refer to [BRC-31, "CONSULT Function \(ABS\)"](#).

>> Inspection End.

## Diagnostic Work Sheet

INFOID:0000000008832889

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

ALFIA0308GB

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

< BASIC INSPECTION >

[VDC/TCS/ABS]

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

### Description

INFOID:000000008832890

When replacing the ABS actuator and electric unit (control unit), perform steering angle sensor neutral position adjustment. Refer to [BRC-54, "Work Procedure"](#).

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# ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

< BASIC INSPECTION >

[VDC/TCS/ABS]

## ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

### Description

INFOID:000000008832891

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

×: Required –: Not required

Situation	Adjustment of steering angle sensor neutral position
Removing/Installing ABS actuator and electric unit (control unit)	—
Replacing ABS actuator and electric unit (control unit)	×
Removing/Installing steering angle sensor	×
Replacing steering angle sensor	×
Removing/Installing steering components	×
Replacing steering components	×
Removing/Installing suspension components	×
Replacing suspension components	×
Change tires to new ones	—
Tire rotation	—
Adjusting wheel alignment	×
Battery disconnection	×

### Work Procedure

INFOID:000000008832892

#### 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 ANG SEN ADJUSTMENT" in order.
2. Touch "START".

##### **CAUTION:**

**Do not touch steering wheel while adjusting steering angle sensor.**

3. After approximately 10 seconds, touch "END".

##### **NOTE:**

After approximately 60 seconds, it ends automatically.

4. Turn ignition switch OFF, then turn it ON again.

##### **CAUTION:**

**Be sure to perform above operation.**

>> GO TO 3.

#### 3. CHECK DATA MONITOR

1. Run vehicle with front wheels in straight-ahead position, then stop.
2. Select "DATA MONITOR". Then make sure "STR ANGLE SIG" is within  $0 \pm 2.5^\circ$ .

Is the steering angle within the specified range?

YES >> GO TO 4.

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

#### 4. ERASE THE SELF-DIAGNOSIS MEMORY

Erase the self-diagnosis memory of the ABS actuator and electric unit (control unit) and ECM.

# ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

< BASIC INSPECTION >

[VDC/TCS/ABS]

- ABS actuator and electric unit (control unit): Refer to [BRC-31, "CONSULT Function \(ABS\)"](#).
- ECM: Refer to [EC-66, "CONSULT Function"](#).

Are the memories erased?

YES >> Inspection End

NO >> Check the items indicated by the self-diagnosis.

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# C1101, C1102, C1103, C1104 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## DTC/CIRCUIT DIAGNOSIS

### C1101, C1102, C1103, C1104 WHEEL SENSOR

#### DTC Logic

INFOID:000000008832894

#### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1101	RR RH SENSOR-1	When an open circuit is detected in rear wheel sensor RH circuit.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Wheel sensor</li><li>• ABS actuator and electric unit (control unit)</li></ul>
C1102	RR LH SENSOR-1	When an open circuit is detected in rear wheel sensor LH circuit.	
C1103	FR RH SENSOR-1	When an open circuit is detected in front wheel sensor RH circuit.	
C1104	FR LH SENSOR-1	When an open circuit is detected in front wheel sensor LH circuit.	

#### DTC CONFIRMATION PROCEDURE

##### 1. CHECK SELF DIAGNOSTIC RESULT

Ⓜ With CONSULT.

1. Start engine and drive vehicle at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
2. Perform self diagnostic result.

Is DTC C1101, C1102, C1103 or C1104 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-56, "Diagnosis Procedure"](#).  
NO >> Inspection End.

#### Diagnosis Procedure

INFOID:000000008832895

Regarding Wiring Diagram information, refer to [BRC-44, "Wiring Diagram"](#).

#### **CAUTION:**

**Do not check between wheel sensor terminals.**

##### 1. CONNECTOR INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) connector E54 and wheel sensor connector of wheel with DTC.
2. 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 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 3.



# C1101, C1102, C1103, C1104 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

NO >> Replace the wheel sensor. Refer to [BRC-104. "FRONT WHEEL SENSOR : Removal and Installation"](#) or [BRC-105. "REAR WHEEL SENSOR : Removal and Installation"](#).

## 3. CHECK WIRING HARNESS FOR OPEN CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) connector E33 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	E33	8	E61	2	Yes
		19		1	
Front RH		4	E52	2	
		16		1	
Rear LH		18	B54	2	
		31		1	
Rear RH		29	B55	2	
		17		1	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to [BRC-108. "Removal and Installation"](#).

NO >> Repair the circuit.

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# C1105, C1106, C1107, C1108 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1105, C1106, C1107, C1108 WHEEL SENSOR

### DTC Logic


INFOID:000000008832896

#### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1105	RR RH SENSOR-2	<ul style="list-style-type: none"><li>• When power supply voltage of rear wheel sensor RH is low.</li><li>• When distance between rear wheel sensor RH and rear wheel sensor RH rotor is large.</li><li>• When installation of rear wheel sensor RH or rear wheel sensor RH rotor is not normal.</li></ul>	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Wheel sensor</li><li>• ABS actuator and electric unit (control unit)</li><li>• Sensor rotor</li></ul>
C1106	RR LH SENSOR-2	<ul style="list-style-type: none"><li>• When power supply voltage of rear wheel sensor LH is low.</li><li>• When distance between rear wheel sensor LH and rear wheel sensor LH rotor is large.</li><li>• When installation of rear wheel sensor LH or rear wheel sensor LH rotor is not normal.</li></ul>	
C1107	FR RH SENSOR-2	<ul style="list-style-type: none"><li>• When power supply voltage of front wheel sensor RH is low.</li><li>• When distance between front wheel sensor RH and front wheel sensor RH rotor is large.</li><li>• When installation of front wheel sensor RH or front wheel sensor RH rotor is not normal.</li></ul>	
C1108	FR LH SENSOR-2	<ul style="list-style-type: none"><li>• When power supply voltage of front wheel sensor LH is low.</li><li>• When distance between front wheel sensor LH and front wheel sensor LH rotor is large.</li><li>• When installation of front wheel sensor LH or front wheel sensor LH rotor is not normal.</li></ul>	

#### DTC CONFIRMATION PROCEDURE

##### 1. CHECK SELF DIAGNOSTIC RESULT

 With CONSULT.

1. Start engine and drive vehicle at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
2. Perform self diagnostic result.

Is DTC C1105, C1106, C1107 or C1108 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-58, "Diagnosis Procedure"](#).  
NO >> Inspection End.

#### Diagnosis Procedure

INFOID:000000008832897

Regarding Wiring Diagram information, refer to [BRC-44, "Wiring Diagram"](#).

#### **CAUTION:**

**Do not check between wheel sensor terminals.**

##### 1. CONNECTOR INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) connector E54 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

# C1105, C1106, C1107, C1108 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

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 3.

NO >> Replace the wheel sensor. Refer to [BRC-104. "FRONT WHEEL SENSOR : Removal and Installation"](#) or [BRC-105. "REAR WHEEL SENSOR : Removal and Installation"](#).

### 3.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to [FAX-6. "Inspection"](#) or [RAX-5. "Inspection"](#) (rear).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace as necessary. Refer to [FAX-8. "Removal and Installation"](#) or [RAX-7. "Removal and Installation - Disc brake"](#) (rear).

### 4.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	E61	1	—	No
		2		
Front RH	E52	1		
		2		
Rear LH	B54	1		
		2		
Rear RH	B55	1		
		2		

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to [BRC-108. "Removal and Installation"](#).

NO >> Repair the circuit.

# C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1109 POWER AND GROUND SYSTEM

### DTC Logic

INFOID:000000008832898

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1109	BATTERY VOLTAGE [ABNORMAL]	<ul style="list-style-type: none"><li>• When ignition voltage is 10 V or less.</li><li>• When ignition voltage is 16 V or more.</li></ul>	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• ABS actuator and electric unit (control unit)</li><li>• Fuse</li><li>• Ignition power supply system</li><li>• Battery</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. CHECK SELF DIAGNOSTIC RESULT

④ With CONSULT.

1. Turn the ignition switch ON.
2. Perform self diagnostic result.

Is DTC C1109 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-60, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008832899

Regarding Wiring Diagram information, refer to [BRC-44, "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 E33 terminal 28 and ground.

ABS actuator and electric unit (control unit)		Ground	Condition	Voltage
Connector	Terminal			
E33	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 E33 terminals 13, 38 and ground.

# C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E33	13	Ground	Yes
	38		

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108, "Removal and Installation"](#).
- NO >> Repair or replace malfunctioning components.

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

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

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

### DTC Logic

INFOID:000000008832900

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1110	CONTROLLER FAILURE	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	• ABS actuator and electric unit (control unit)
C1170	VARIANT CODING	In a case where VARIANT CODING is different.	

#### DTC CONFIRMATION PROCEDURE

##### 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CONTROLLER FAILURE
VARIANT CODING

Is above displayed on the self-diagnosis display?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-62. "Diagnosis Procedure"](#).
- NO >> Inspection End.

#### Diagnosis Procedure

INFOID:000000008832901

##### 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-108. "Removal and Installation"](#).

# C1111 PUMP MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1111 PUMP MOTOR

### DTC Logic

INFOID:000000008832902

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1111	PUMP MOTOR	<ul style="list-style-type: none"> <li>When a malfunction is detected in motor or motor relay.</li> <li>When a low pressure malfunction is detected in accumulator.</li> <li>When a malfunction is detected in accumulator pressure sensor.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> <li>Fusible link</li> <li>Battery power supply system</li> <li>Motor/accumulator assembly</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### 1. CHECK SELF DIAGNOSTIC RESULT

Ⓜ With CONSULT.

- Turn ignition switch OFF.
- Depress brake pedal 20 times or more.
- Start the engine and wait for 3 minutes or more.
- Perform self diagnostic result.

Is DTC C1111 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-63, "Diagnosis Procedure"](#).  
 NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008832903

Regarding Wiring Diagram information, refer to [BRC-44, "Wiring Diagram"](#).

#### 1. CONNECTOR INSPECTION

- Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connectors.
- 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 E33 terminal 1 and ground.

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E33	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 E33 terminals 13, 38 and ground.

# C1111 PUMP MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E33	13	Ground	Yes
	38		

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108, "Removal and Installation"](#).
- NO >> Repair or replace malfunctioning components.



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

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

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

### DTC Logic

INFOID:000000008832904

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1113	G SENSOR	When a malfunction is detected in longitudinal G sensor signal.	• ABS actuator and electric unit (control unit)
C1145	YAW RATE SENSOR	<ul style="list-style-type: none"><li>• When a malfunction is detected in yaw rate signal.</li><li>• When yaw rate signal is not continuously received for 2 seconds or more.</li><li>• When side G signal is not continuously received for 2 seconds or more.</li><li>• When decel G signal is not continuously received for 2 seconds or more.</li></ul>	
C1146	SIDE G-SEN CIRCUIT	When a malfunction is detected in side/decel G signal.	

### DTC CONFIRMATION PROCEDURE

#### 1. CHECK SELF DIAGNOSTIC RESULT

Ⓜ With CONSULT.

1. Turn ignition switch OFF to ON.
2. Perform self diagnostic result.

Is DTC C1113, C1145 or C1146 detected?

YES >> Proceed to diagnosis procedure. Refer to [BRC-65, "Diagnosis Procedure"](#).

NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008832905

#### 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-108, "Removal and Installation"](#).

# C1115 ABS SENSOR [ABNORMAL SIGNAL]

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1115 ABS SENSOR [ABNORMAL SIGNAL]

### DTC Logic

INFOID:000000008832906

#### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1115	ABS SENSOR [ABNORMAL SIGNAL]	When difference in wheel speed between any wheel and others is detected while the vehicle is driven, because of installation of tires other than specified.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Wheel sensor</li><li>• Sensor rotor</li><li>• ABS actuator and electric unit (control unit)</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. CHECK SELF DIAGNOSTIC RESULT

Ⓜ With CONSULT.

1. Start engine and drive vehicle at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
2. Perform self diagnostic result.

Is DTC C1115 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-66, "Diagnosis Procedure"](#).  
NO >> Inspection End.

#### Diagnosis Procedure

INFOID:000000008832907

Regarding Wiring Diagram information, refer to [BRC-44, "Wiring Diagram"](#).

#### **CAUTION:**

**Do not check between wheel sensor terminals.**

##### 1. CONNECTOR INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) connector E33 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 3.  
NO >> Replace the wheel sensor. Refer to [BRC-104, "FRONT WHEEL SENSOR : Removal and Installation"](#) or [BRC-105, "REAR WHEEL SENSOR : Removal and Installation"](#).

##### 3. CHECK TIRES

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

Is the inspection result normal?

# C1115 ABS SENSOR [ABNORMAL SIGNAL]

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

- YES >> GO TO 4.
- NO >> Adjust tire pressure, or replace tire(s).

## 4.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	E61	1	—	No
		2		
Front RH	E52	1		
		2		
Rear LH	B54	1		
		2		
Rear RH	B55	1		
		2		

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Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Repair the circuit.

## 5.CHECK WIRING HARNESS FOR OPEN CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) connector E33 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	E33	8	E61	2	Yes
		19		1	
Front RH		4	E52	2	
		16		1	
Rear LH		18	B54	2	
		31		1	
Rear RH		29	B55	2	
		17		1	

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Is the inspection result normal?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to [BRC-108, "Removal and Installation"](#).
- NO >> Repair the circuit.

# C1116 STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1116 STOP LAMP SWITCH

### DTC Logic

INFOID:000000009002420

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1116	STOP LAMP SW	When stop lamp switch circuit is open.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Stop lamp switch</li><li>• ABS actuator and electric unit (control unit)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
STOP LAMP SW

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to [BRC-68. "Diagnosis Procedure"](#).

NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000009002421

Regarding Wiring Diagram information, refer to [BRC-44. "Wiring Diagram"](#).

#### 1.CONNECTOR INSPECTION

1. Disconnect stop lamp switch 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 E33 terminal 30 and ground.

ABS actuator and electric unit (control unit)		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
E33	30	—	Brake pedal depressed	Battery voltage
			Brake pedal released	0V

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108. "Removal and Installation"](#).

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 E33 terminal 30 and stop lamp switch connector E60 terminal 2.

# C1116 STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and electric unit (control unit)		Stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E33	30	E60	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 E33 terminal 30 and ground.

ABS actuator and electric unit (control unit)		Ground	Continuity
Connector	Terminal		
E33	30	—	No

Is the inspection result normal?

YES >> Replace stop lamp switch.

NO >> Repair harness or connectors.

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# C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

### DTC Logic

INFOID:000000008832910

#### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1120	FR LH IN ABS SOL	When a malfunction is detected in front LH ABS IN valve.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• ABS actuator and electric unit (control unit)</li><li>• Fusible link</li><li>• Battery power supply system</li></ul>
C1122	FR RH IN ABS SOL	When a malfunction is detected in front RH ABS IN valve.	
C1124	RR LH IN ABS SOL	When a malfunction is detected in rear LH ABS IN valve.	
C1126	RR RH IN ABS SOL	When a malfunction is detected in rear RH ABS IN valve.	

#### DTC CONFIRMATION PROCEDURE

##### 1. CHECK SELF DIAGNOSTIC RESULT

④ With CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.

Is DTC C1120, C1122, C1124 or C1126 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-70, "Diagnosis Procedure"](#).  
NO >> Inspection End.

#### Diagnosis Procedure

INFOID:000000008832911

Regarding Wiring Diagram information, refer to [BRC-44, "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 E33 terminal 25 and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E33	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 E33 terminals 13, 38 and ground.

# C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E33	13	Ground	Yes
	38		

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108, "Removal and Installation"](#).
- NO >> Repair or replace malfunctioning components.

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# C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

### DTC Logic

INFOID:000000008832912

#### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1121	FR LH OUT ABS SOL	When a malfunction is detected in front LH ABS OUT valve.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• ABS actuator and electric unit (control unit)</li><li>• Fusible link</li><li>• Battery power supply system</li></ul>
C1123	FR RH OUT ABS SOL	When a malfunction is detected in front RH ABS OUT valve.	
C1125	RR LH OUT ABS SOL	When a malfunction is detected in rear LH ABS OUT valve.	
C1127	RR RH OUT ABS SOL	When a malfunction is detected in rear RH ABS OUT valve.	

#### DTC CONFIRMATION PROCEDURE

##### 1. CHECK SELF DIAGNOSTIC RESULT

④ With CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.

Is DTC C1121, C1123, C1125 or C1127 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-72, "Diagnosis Procedure"](#).  
NO >> Inspection End.

#### Diagnosis Procedure

INFOID:000000008832913

Regarding Wiring Diagram information, refer to [BRC-44, "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 E33 terminal 25 and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E33	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 E33 terminals 13, 38 and ground.



# C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E33	13	Ground	Yes
	38		

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108, "Removal and Installation"](#).
- NO >> Repair or replace malfunctioning components.

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## C1130 ENGINE SIGNAL

### DTC Logic

INFOID:000000008832914

#### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1130	ENGINE SIGNAL 1	When a malfunction is detected in ECM system.	<ul style="list-style-type: none"> <li>ECM</li> <li>ABS actuator and electric unit (control unit)</li> <li>CAN communication line</li> </ul>

#### DTC CONFIRMATION PROCEDURE

##### 1. CHECK SELF DIAGNOSTIC RESULT

Ⓟ With CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.

Is DTC C1130 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-74, "Diagnosis Procedure"](#).  
 NO >> Inspection End.

#### Diagnosis Procedure

INFOID:000000008832915

##### 1. CHECK SELF DIAGNOSTIC RESULT FOR ENGINE SYSTEM

Ⓟ With CONSULT.

Perform self diagnostic result. Refer to [EC-66, "CONSULT Function"](#).

Are any ECM DTCs detected?

- YES >> Refer to [EC-93, "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 >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108, "Removal and Installation"](#).  
 NO >> Check pin terminals and connection of connectors for abnormal conditions. Repair or replace malfunctioning components.

# C1140 ACTUATOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1140 ACTUATOR RELAY SYSTEM

### DTC Logic

INFOID:000000008832916

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1140	ACTUATOR RLY	When a malfunction is detected in actuator relay.	<ul style="list-style-type: none"> <li>• Harness or connector</li> <li>• ABS actuator and electric unit (control unit)</li> <li>• Fusible link</li> <li>• Battery power supply system</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### 1. CHECK SELF DIAGNOSTIC RESULT

Ⓜ With CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.

Is DTC C1140 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-75, "Diagnosis Procedure"](#).  
 NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008832917

Regarding Wiring Diagram information, refer to [BRC-44, "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 E33 terminal 25 and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E33	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 E33 terminals 13, 38 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E33	13	Ground	Yes
	38		

## C1140 ACTUATOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

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Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108, "Removal and Installation"](#).
- NO >> Repair or replace malfunctioning components.

# C1142 PRESS SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1142 PRESS SENSOR

### DTC Logic

INFOID:000000008832918

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1142	PRESS SEN CIRCUIT	When a malfunction is detected in master cylinder pressure sensor.	<ul style="list-style-type: none"><li>• Stop lamp switch system</li><li>• ABS actuator and electric unit (control unit)</li><li>• Brake system</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF DIAGNOSTIC RESULT

ⓂWith CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.

Is DTC C1142 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-77, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008832919

#### 1.CHECK STOP LAMP SWITCH SYSTEM

Check stop lamp switch system. Refer to [BRC-68, "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-9, "Inspection"](#).

Is the inspection result normal?

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

#### 3.CHECK BRAKE PEDAL

Check brake pedal. 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-108, "Removal and Installation"](#).  
NO >> Inspection End.

# C1143 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1143 STEERING ANGLE SENSOR

### DTC Logic

INFOID:000000008832920

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1143	ST ANG SEN CIRCUIT	When a malfunction is detected in steering angle sensor.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Steering angle sensor</li><li>• ABS actuator and electric unit (control unit)</li><li>• Fuse</li><li>• Ignition power supply system</li><li>• CAN communication line</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF DIAGNOSTIC RESULT

④ With CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.

Is DTC C1143 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-78, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008832921

Regarding Wiring Diagram information, refer to [BRC-44, "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 M14 terminal 4 and ground.

Steering angle sensor		—	Voltage (Approx.)
Connector	Terminal		
M14	4	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 4.

# C1143 STEERING ANGLE SENSOR

[VDC/TCS/ABS]

## < DTC/CIRCUIT DIAGNOSIS >

- NO >> Check the following:
- Repair or replace harness.
  - Fuse.

### 4.CHECK STEERING ANGLE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between steering angle sensor connector M14 terminal 1 and ground.

Steering angle sensor		—	Continuity
Connector	Terminal		
M14	1	Ground	Yes

#### Is the inspection result normal?

- YES >> GO TO 5.  
NO >> Repair or replace malfunctioning components.

### 5.CHECK CAN COMMUNICATION LINE

Check "STRG BRANCH LINE CIRCUIT". Refer to [LAN-66. "Diagnosis Procedure"](#) (type 1) or [LAN-79. "Diagnosis Procedure"](#) (type 2).

#### Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108. "Removal and Installation"](#).  
NO >> Repair or replace malfunctioning components.

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# C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

### DTC Logic

INFOID:000000008832922

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1144	ST ANG SEN SIGNAL	When neutral position adjustment of steering angle sensor is not complete.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Steering angle sensor</li><li>• ABS actuator and electric unit (control unit)</li><li>• Incomplete neutral position adjustment of steering angle sensor</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF DIAGNOSTIC RESULT

Ⓢ With CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.

Is DTC C1144 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-80, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008832923

#### 1.ADJUST THE NEUTRAL POSITION OF STEERING ANGLE SENSOR

Perform neutral position adjustment of steering angle sensor. Refer to [BRC-54, "Work Procedure"](#).

>> GO TO 2.

#### 2.CHECK SELF DIAGNOSTIC RESULT

Ⓢ With CONSULT.

Perform self diagnostic result.

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-78, "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108, "Removal and Installation"](#).  
NO >> Repair or replace malfunctioning components.



# C1155 BR FLUID LEVEL LOW

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1155 BR FLUID LEVEL LOW

### DTC Logic

INFOID:000000008832928

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
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.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Brake fluid level switch</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BR FLUID LEVEL LOW

Is above displayed on the self-diagnosis display?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-81, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008832929

Regarding Wiring Diagram information, refer to [BRC-44, "Wiring Diagram"](#).

#### NOTE:

Check brake fluid level in brake reservoir tank before starting inspection.

#### 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-82, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Replace brake fluid level switch. Refer to [BR-31, "Exploded View"](#).

#### 3. CHECK BRAKE FLUID LEVEL SWITCH HARNESS

1. Check continuity between combination meter connector M24 terminal 11 and brake fluid level switch connector E40 terminal 1.

Combination meter		Brake fluid level switch		Continuity
Connector	Terminal	Connector	Terminal	
M24	11	E40	1	Yes

2. Check continuity between combination meter connector and ground.

# C1155 BR FLUID LEVEL LOW

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

Combination meter		—	Continuity
Connector	Terminal		
M24	11	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 E40 terminal 2 and ground.

Brake fluid level switch		—	Continuity
Connector	Terminal		
E40	2	Ground	No

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108, "Removal and Installation"](#)
- NO >> Repair or replace malfunctioning components.

## Component Inspection

INFOID:000000008832930

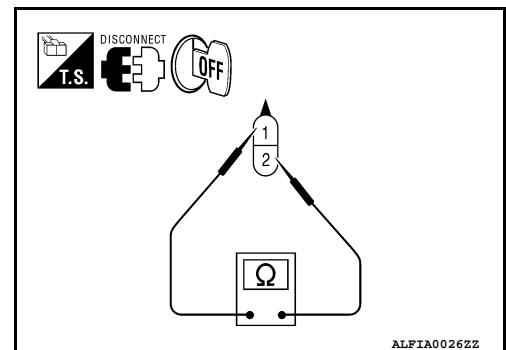
### 1.CHECK BRAKE FLUID LEVEL SWITCH

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-31, "Exploded View"](#).



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# C1164, C1165, C1166, C1167 CV/SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1164, C1165, C1166, C1167 CV/SV SYSTEM

### DTC Logic


INFOID:000000008832933

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1164	CV 1	When a malfunction is detected in cut valve 1.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• ABS actuator and electric unit (control unit)</li><li>• Fusible link</li><li>• Battery power supply system</li></ul>
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

 With CONSULT.

1. Turn ignition switch OFF to ON.
2. Perform self diagnostic result.

Is DTC C1164, C1165, C1166 or C1167 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-83. "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008832934

Regarding Wiring Diagram information, refer to [BRC-44. "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 E33 terminal 25 and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E33	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 E33 terminals 13, 38 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E33	13	Ground	Yes
	38		

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**BRC**

## C1164, C1165, C1166, C1167 CV/SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

---

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108, "Removal and Installation"](#).
- NO >> Repair or replace malfunctioning components.

# U1000 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## U1000 CAN COMM CIRCUIT

### DTC Logic

INFOID:000000008832943

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
U1000	CAN COMM CIRCUIT	When CAN communication signal is not continuously received for 2 seconds or more	CAN communication system malfunction

### Diagnosis Procedure

INFOID:000000008832944

#### 1. CHECK DTC DETECTION

Ⓜ With CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.

Is DTC U1000 detected?

- YES >> Proceed to diagnosis procedure. Refer to [LAN-16, "Trouble Diagnosis Flow Chart"](#).  
NO >> Refer to [GI-43, "Intermittent Incident"](#).

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# U1002 SYSTEM COMM (CAN)

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## U1002 SYSTEM COMM (CAN)

### DTC Logic

INFOID:000000008832945

#### 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.	<ul style="list-style-type: none"><li>• CAN communication line</li><li>• ABS actuator and electric unit (control unit)</li></ul>


#### 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-86, "Diagnosis Procedure"](#).  
NO >> Inspection End.

#### Diagnosis Procedure

INFOID:000000008832946

#### 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-43, "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.

# U1010 CONTROL UNIT (CAN)

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## U1010 CONTROL UNIT (CAN)

### Description

INFOID:000000008950040

Initial diagnosis of ABS actuator and electric unit (control unit)

### DTC Logic

INFOID:000000008950041

### DTC DETECTION LOGIC

DTC	Items (CONSULT screen terms)	DTC detection condition	Possible cause
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller of ABS actuator and electric unit (control unit).	ABS actuator and electric unit (control unit)

### DTC CONFIRMATION PROCEDURE

#### 1.PERFORM SELF-DIAGNOSIS

Ⓜ With CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.

#### Is DTC U1010 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-87, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008950042

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

Replace ABS actuator and electric unit (control unit). Refer to [BRC-108, "Removal and Installation"](#).

>> Inspection End.

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**BRC**

# PARKING BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## PARKING BRAKE SWITCH

### Component Function Check

INFOID:000000008832947

#### 1. CHECK PARKING BRAKE SWITCH OPERATION

Check that brake warning lamp in combination meter turns ON/OFF when parking brake is actuated.

Is the inspection result normal?

YES >> Inspection End.

NO >> Proceed to diagnosis procedure. Refer to [BRC-88, "Diagnosis Procedure"](#).

#### Diagnosis Procedure

INFOID:000000008832948

Regarding Wiring Diagram information, refer to [BRC-44, "Wiring Diagram"](#).

#### 1. CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect combination meter and parking brake 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 PARKING BRAKE SWITCH

Check parking brake switch. Refer to [BRC-89, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace parking brake switch. Refer to [PB-7, "Exploded View"](#).

#### 3. CHECK PARKING BRAKE SWITCH SIGNAL

 With CONSULT.

1. Connect combination meter connector and parking brake switch connectors.
2. Turn ignition switch ON.
3. In "DATA MONITOR" select "PARK BRAKE SW" and check parking brake switch signal.

Condition	DATA MONITOR
Actuate parking brake	On
Release parking brake	Off

Is the inspection result normal?

YES >> Refer to [BRC-51, "Work Flow"](#).

NO >> GO TO 4.

#### 4. CHECK PARKING BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter and parking brake switch connectors.
3. Check continuity between combination meter connector M24 terminal 10 and parking brake switch connector M130 terminal 1.

Combination meter		Parking brake switch		Continuity
Connector	Terminal	Connector	Terminal	
M24	10	M130	1	Yes

4. Check continuity between combination meter connector and ground.



# PARKING BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

Combination meter		—	Continuity
Connector	Terminal		
M24	10	Ground	No

Is the inspection result normal?

- YES >> Replace combination meter. Refer to [MWI-77, "Removal and Installation"](#).
- NO >> Repair or replace malfunctioning components.

## Component Inspection

INFOID:000000008832949

### 1. CHECK PARKING BRAKE SWITCH

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

Parking brake switch terminal	—	Condition	Continuity
1	Ground	Parking brake actuated	Yes
		Parking brake released	No

Is the inspection result normal?

- YES >> Inspection End.
- NO >> Replace parking brake switch. Refer to [PB-7, "Exploded View"](#).

# VDC OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## VDC OFF SWITCH

### Component Function Check

INFOID:000000008832950

#### 1. CHECK VDC OFF SWITCH OPERATION

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Proceed to diagnosis procedure. Refer to [BRC-90, "Diagnosis Procedure"](#).

#### Diagnosis Procedure

INFOID:000000008832951

Regarding Wiring Diagram information, refer to [BRC-44, "Wiring Diagram"](#).

#### 1. CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) and VDC OFF 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 VDC OFF SWITCH

Check VDC OFF switch. Refer to [BRC-91, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace VDC OFF switch. Refer to [BRC-110, "Removal and Installation"](#).

#### 3. CHECK VDC OFF SWITCH SIGNAL

ⓐ With CONSULT.

1. Connect ABS actuator and electric unit (control unit) and VDC OFF switch connectors.
2. Turn ignition switch ON.
3. In "DATA MONITOR" select "OFF SW" and check VDC OFF switch signal.

Condition	DATA MONITOR
VDC OFF switch is pressed and released	On
VDC OFF switch is pressed and released again	Off

Is the inspection result normal?

YES >> Refer to [BRC-51, "Work Flow"](#).

NO >> GO TO 4.

#### 4. CHECK VDC OFF SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) and VDC OFF switch connectors.
3. Check continuity between ABS actuator and electric unit (control unit) connector E33 terminal 15 and VDC OFF switch connector M64 terminal 6.

ABS actuator and electric unit (control unit)		VDC OFF switch		Continuity
Connector	Terminal	Connector	Terminal	
E33	15	M64	6	Yes

4. Check continuity between ABS actuator and electric unit (control unit) connector terminal E33 terminal 15 and ground.

# VDC OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E33	15	Ground	No

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace malfunctioning components.

## 5.CHECK VDC OFF SWITCH GROUND CIRCUIT

Check continuity between VDC OFF switch connector M64 terminal 8 and ground.

VDC OFF switch		—	Continuity
Connector	Terminal		
M64	8	Ground	Yes

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108, "Removal and Installation"](#).

NO >> Repair or replace malfunctioning components.

## Component Inspection

INFOID:000000008832952

## 1.CHECK VDC OFF SWITCH

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

VDC OFF switch terminals	Condition	Continuity
6 – 8	VDC OFF switch pressed	Yes
	VDC OFF switch released	No

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace VDC OFF switch. Refer to [BRC-110, "Removal and Installation"](#).

## ABS WARNING LAMP

### Component Function Check

INFOID:000000008832953

#### 1. CHECK ABS WARNING LAMP FUNCTION

Check that ABS warning lamp in combination meter turns ON for approximately 2 seconds after ignition switch is turned ON.

Is the inspection result normal?

YES >> Inspection End.

NO >> Proceed to diagnosis procedure. Refer to [BRC-92, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000008832954

#### 1. PERFORM THE SELF-DIAGNOSIS

 With CONSULT.

Perform self diagnostic result.

Are any DTCs detected?

YES >> Refer to [BRC-43, "DTC Index"](#).

NO >> GO TO 2.

#### 2. CHECK COMBINATION METER

Check if indication and operation of combination meter are normal. Refer to [MWI-8, "METER SYSTEM : System Description"](#).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108, "Removal and Installation"](#).

NO >> Replace combination meter. Refer to [MWI-77, "Removal and Installation"](#).

# BRAKE WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## BRAKE WARNING LAMP

### Component Function Check

INFOID:000000008832955

#### 1.CHECK BRAKE WARNING LAMP FUNCTION (1)

Check that brake warning lamp in combination meter turns ON for approximately 2 seconds after ignition switch is turned ON.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Proceed to diagnosis procedure. Refer to [BRC-93, "Diagnosis Procedure"](#).

#### 2.CHECK BRAKE WARNING LAMP FUNCTION (2)

Check that brake warning lamp in combination meter turns ON/OFF when parking brake is operated.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check parking brake switch system. Refer to [BRC-88, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000008832956

BRC

#### 1.PERFORM THE SELF-DIAGNOSIS

Ⓜ With CONSULT.

Perform self diagnostic result.

Are any DTCs detected?

YES >> Refer to [MWI-26, "DTC Index"](#).

NO >> GO TO 2.

#### 2.CHECK COMBINATION METER

Check if indication and operation of combination meter are normal. Refer to [MWI-8, "METER SYSTEM : System Description"](#).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108, "Removal and Installation"](#).

NO >> Replace combination meter. Refer to [MWI-77, "Removal and Installation"](#).

# VDC OFF INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## VDC OFF INDICATOR LAMP

### Description

INFOID:000000008832957

x: ON - : OFF

Condition	VDC OFF indicator lamp
Ignition switch OFF	-
For 2 seconds after turning ON ignition switch	x
2 seconds later after turning ON ignition switch	-
VDC OFF switch turned ON. (VDC function is OFF.)	x
VDC/TCS function is malfunctioning.	-
ABS function is malfunctioning.	-
EBD function is malfunctioning.	-

### Component Function Check

INFOID:000000008832958

#### 1. CHECK VDC OFF INDICATOR LAMP FUNCTION

Check that VDC OFF indicator lamp in combination meter turns ON for approximately 2 seconds after ignition switch is turned ON.

Is the inspection result normal?

YES >> Inspection End.

NO >> Proceed to diagnosis procedure. Refer to [BRC-94, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000008832959

#### 1. PERFORM THE SELF-DIAGNOSIS

 With CONSULT.

Perform self diagnostic result.

Are any DTCs detected?

YES >> Refer to [BRC-43, "DTC Index"](#).

NO >> GO TO 2.

#### 2. CHECK COMBINATION METER

Check if indication and operation of combination meter are normal. Refer to [MWI-8, "METER SYSTEM : System Description"](#).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108, "Removal and Installation"](#).

NO >> Replace combination meter. Refer to [MWI-77, "Removal and Installation"](#).

# SLIP INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## SLIP INDICATOR LAMP

### Component Function Check

INFOID:000000008832960

#### 1. CHECK SLIP INDICATOR LAMP FUNCTION

Check that slip indicator lamp in combination meter turns ON for approximately 2 seconds after ignition switch is turned ON.

Is the inspection result normal?

YES >> Inspection End.

NO >> Proceed to diagnosis procedure. Refer to [BRC-95, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000008832961

#### 1. PERFORM THE SELF-DIAGNOSIS

 With CONSULT.

Perform self diagnostic result.

Are any DTCs detected?

YES >> Refer to [BRC-43, "DTC Index"](#).

NO >> GO TO 2.

#### 2. CHECK COMBINATION METER

Check if indication and operation of combination meter are normal. Refer to [MWI-8, "METER SYSTEM : System Description"](#).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108, "Removal and Installation"](#).

NO >> Replace combination meter. Refer to [MWI-77, "Removal and Installation"](#).

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**BRC**

# SYMPTOM DIAGNOSIS

## VDC/TCS/ABS

### Symptom Table

INFOID:000000008832962

If ABS warning lamp and SLIP indicator lamp turn ON, perform self-diagnosis.

Symptom	Check item	Reference
Excessive ABS function operation frequency	Brake force distribution	<a href="#">BRC-97, "Diagnosis Procedure"</a>
	Looseness of front and rear axle	
	Wheel sensor and rotor system	
Unexpected pedal reaction	Brake pedal stroke	<a href="#">BRC-98, "Diagnosis Procedure"</a>
	Make sure the braking force is sufficient when the ABS is not operating.	
The braking distance is long	Check stopping distance when the ABS is not operating.	<a href="#">BRC-99, "Diagnosis Procedure"</a>
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	<a href="#">BRC-100, "Diagnosis Procedure"</a>
Pedal vibration or ABS operation sound occurs (Note 2)	Brake pedal	<a href="#">BRC-101, "Diagnosis Procedure"</a>
	ABS actuator and electric unit (control unit)	
Vehicle jerks during VDC/TCS/ABS control	ABS actuator and electric unit (control unit)	<a href="#">BRC-102, "Diagnosis Procedure"</a>
	TCM	
	ECM	

**NOTE:**

- 1: The ABS does not operate when the speed is 10 km/h (6 MPH) or less.
- 2: Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it). However, this is normal.
  - When shifting gears
  - When driving on slippery road
  - During cornering at high speed
  - When passing over bumps or grooves [approximately 50 mm (1.97 in) or more]
  - When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]



# EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

## EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

### Diagnosis Procedure

INFOID:000000008832963

#### 1.CHECK START

Check front and rear brake force distribution using a brake tester.

Is the inspection result normal?

YES >> GO TO 2

NO >> Check brake system.

#### 2.CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles. Refer to front: [FAX-6. "Inspection"](#), rear: [RAX-5. "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

#### 3.CHECK WHEEL SENSOR AND SENSOR ROTOR

Check the following:

- Wheel sensor installation for damage
- Sensor rotor installation for damage
- Wheel sensor connector
- Wheel sensor harness

Is the inspection result normal?

YES >> GO TO 4

- NO >>
- Replace wheel sensor [BRC-104. "FRONT WHEEL SENSOR : Removal and Installation"](#) or [BRC-105. "REAR WHEEL SENSOR : Removal and Installation"](#).
  - Replace sensor rotor [BRC-107. "FRONT SENSOR ROTOR : Removal and Installation"](#) or [BRC-107. "REAR SENSOR ROTOR : Removal and Installation"](#).
  - Repair harness.

#### 4.CHECK ABS WARNING LAMP DISPLAY

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Perform self diagnostic result. Refer to [BRC-31. "CONSULT Function \(ABS\)"](#).

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# UNEXPECTED PEDAL REACTION

[VDC/TCS/ABS]

< SYMPTOM DIAGNOSIS >

## UNEXPECTED PEDAL REACTION

### Diagnosis Procedure

INFOID:000000008832964

#### 1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to [BR-15, "Adjustment"](#).

Is the stroke too big?

- YES >> • Bleed air from brake line and hose. Refer to [BR-16, "Bleeding Brake System"](#).  
• Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to brake pedal: [BR-15, "Adjustment"](#) or brake booster assembly [BR-11, "Inspection"](#).

NO >> GO TO 2

#### 2.CHECK ABS FUNCTION

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

Is the inspection result normal?

- YES >> Inspection End.  
NO >> Check brake system.

# THE BRAKING DISTANCE IS LONG

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

## THE BRAKING DISTANCE IS LONG

### Diagnosis Procedure

INFOID:000000008832965

#### **CAUTION:**

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

#### **1. CHECK ABS FUNCTION**

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS.
3. Check stopping distance.
4. After inspection, reconnect connector.

Is the inspection result normal?

- YES >> Inspection End.  
NO >> Check brake system.

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**BRC**

## ABS FUNCTION DOES NOT OPERATE

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

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### ABS FUNCTION DOES NOT OPERATE

#### Diagnosis Procedure

INFOID:000000008832966

**CAUTION:**

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

**1**.CHECK ABS WARNING LAMP DISPLAY

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Perform self diagnostic result. Refer to [BRC-31, "CONSULT Function \(ABS\)"](#).

# PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

## PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

### Diagnosis Procedure

INFOID:000000008832967

#### **CAUTION:**

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

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

#### 1. SYMPTOM CHECK 1

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

Do symptoms occur?

YES >> GO TO 2

NO >> Inspect the brake pedal.

#### 2. SYMPTOM CHECK 2

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

Do symptoms occur?

YES >> GO TO 3

NO >> Perform self diagnostic result. Refer to [BRC-31. "CONSULT Function \(ABS\)".](#)

#### 3. SYMPTOM CHECK 3

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

Do symptoms occur?

YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.

NO >> Inspection End.

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# VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

## VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

### Diagnosis Procedure

INFOID:000000008832968

#### 1. SYMPTOM CHECK

Check if the vehicle jerks during VDC/TCS/ABS control.

Is the inspection result normal?

- YES >> Inspection End.
- NO >> GO TO 2

#### 2. CHECK SELF DIAGNOSTIC RESULT

Perform self diagnostic result of ABS actuator and electric unit (control unit). Refer to [BRC-31. "CONSULT Function \(ABS\)"](#).

Are self diagnostic results indicated?

- YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self diagnostic result again. Refer to [BRC-31. "CONSULT Function \(ABS\)"](#).
- NO >> GO TO 3

#### 3. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminals for deformation, disconnection, looseness, etc.
4. Securely reconnect connector and perform ABS actuator and electric unit (control unit) self diagnostic result. Refer to [BRC-31. "CONSULT Function \(ABS\)"](#).

Are self diagnostic results indicated?

- YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace.
- NO >> GO TO 4

#### 4. CHECK ECM AND TCM SELF DIAGNOSTIC RESULT

1. Perform ECM self diagnostic result. Refer to [EC-66. "CONSULT Function"](#).
2. Perform TCM self diagnostic result. Refer to [TM-107. "CONSULT Function"](#).

Are self diagnostic results indicated?

- YES >> Check the corresponding items.
  - ECM: Refer to [EC-93. "DTC Index"](#).
  - TCM: Refer to [TM-125. "DTC Index"](#).
- NO >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-108. "Removal and Installation"](#).

# NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

## NORMAL OPERATING CONDITION

### Description

INFOID:000000008832969

Symptom	Result
Slight vibrations are felt on the brake pedal and operation noises occur when VDC, TCS or ABS is activated.	This is a normal condition due to the VDC, TCS or ABS activation.
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.	
The brake pedal moves and generates noises when TCS or VDC is activated due to rapid acceleration or sharp turn.	
The brake pedal vibrates and motor operation noises occur from the engine room after the engine starts and just after the vehicle starts.	This is normal, and it is caused by the ABS operation check.
Depending on the road conditions, the driver may experience a sluggish feel in the brake pedal.	This is normal, because TCS places the highest priority on the optimum traction (stability).
TCS may activate momentarily if wheel speed changes when driving where road friction coefficient varies, when downshifting, or when fully depressing accelerator pedal.	
The ABS warning lamp and SLIP indicator lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running.	In this case, restart the engine on a normal road. If the normal condition is restored, there is no malfunction. At that time, erase the self-diagnosis memory.
VDC may not operate normally or the ABS warning lamp, and SLIP indicator lamp may illuminate when driving on a road that is extremely slanted (e.g., bank in a circuit course).	
A malfunction may occur in the yaw rate/side/decel G sensor system when the vehicle turns sharply, such as during a spin turn, axle turn, or drift driving, while the VDC function is OFF (VDC OFF indicator lamp illuminated).	
The vehicle speed will not increase even though the accelerator pedal is depressed, when inspecting the speedometer on a 2-wheel chassis dynamometer.	Normal (Deactivate the VDC/TCS function before performing an inspection on a chassis dynamometer.)
SLIP indicator lamp may simultaneously turn ON when low tire pressure warning lamp turns ON.	This is not a VDC system error but results from characteristic change of tire.

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# WHEEL SENSOR

< REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

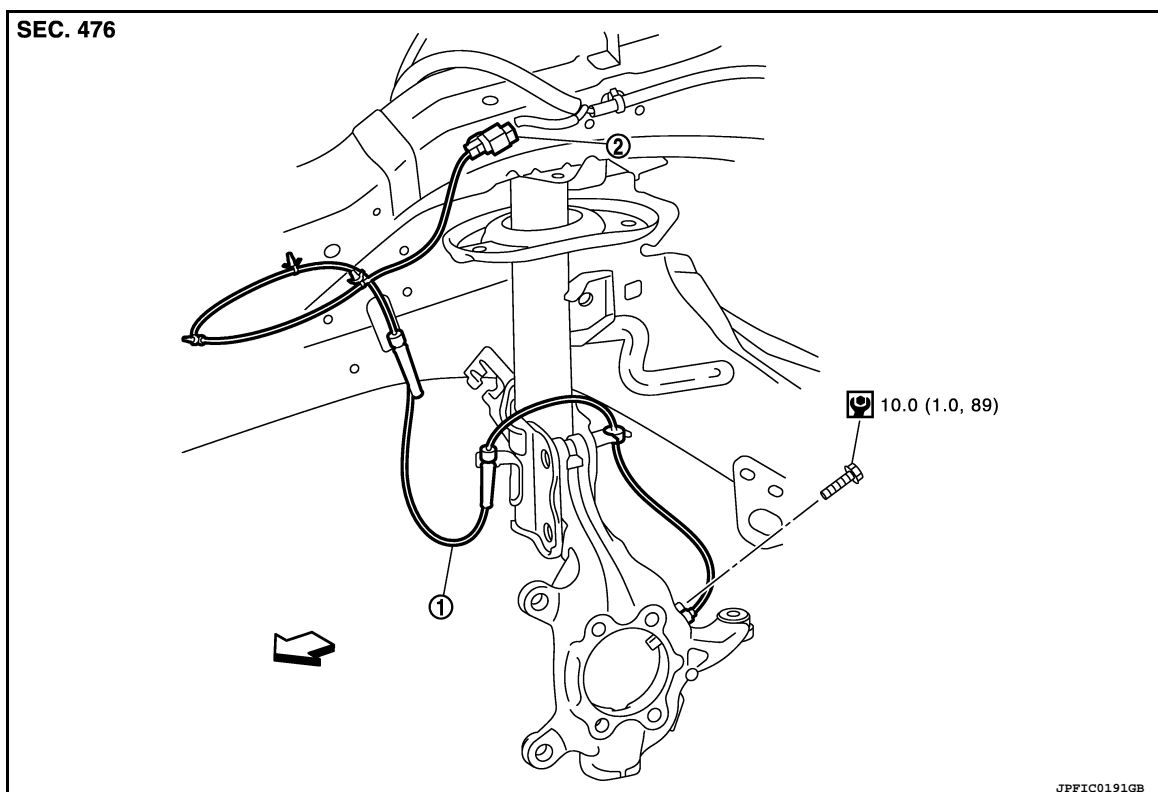
## REMOVAL AND INSTALLATION

### WHEEL SENSOR

#### FRONT WHEEL SENSOR

#### FRONT WHEEL SENSOR : Exploded View

INFOID:000000008764660



1. Front wheel sensor

2. Front wheel sensor harness connector ← Front

#### FRONT WHEEL SENSOR : Removal and Installation

INFOID:000000008764661

#### CAUTION:

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

#### REMOVAL

1. Remove the front wheels and tires using power tool. Refer to [WT-45, "Adjustment"](#).
2. Remove the fender protector (front). Refer to [EXT-28, "FENDER PROTECTOR : Removal and Installation - Front Fender Protector"](#).
3. Disconnect front wheel sensor harness connector.
4. Disconnect front wheel sensor harness from brackets.
5. Remove front wheel sensor bolt.
6. Remove front wheel sensor.

#### INSTALLATION



# WHEEL SENSOR

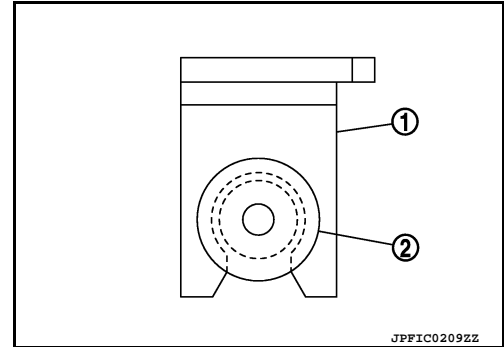
< REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

Installation is in the reverse order of removal.

**CAUTION:**

- During installation, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove and 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.

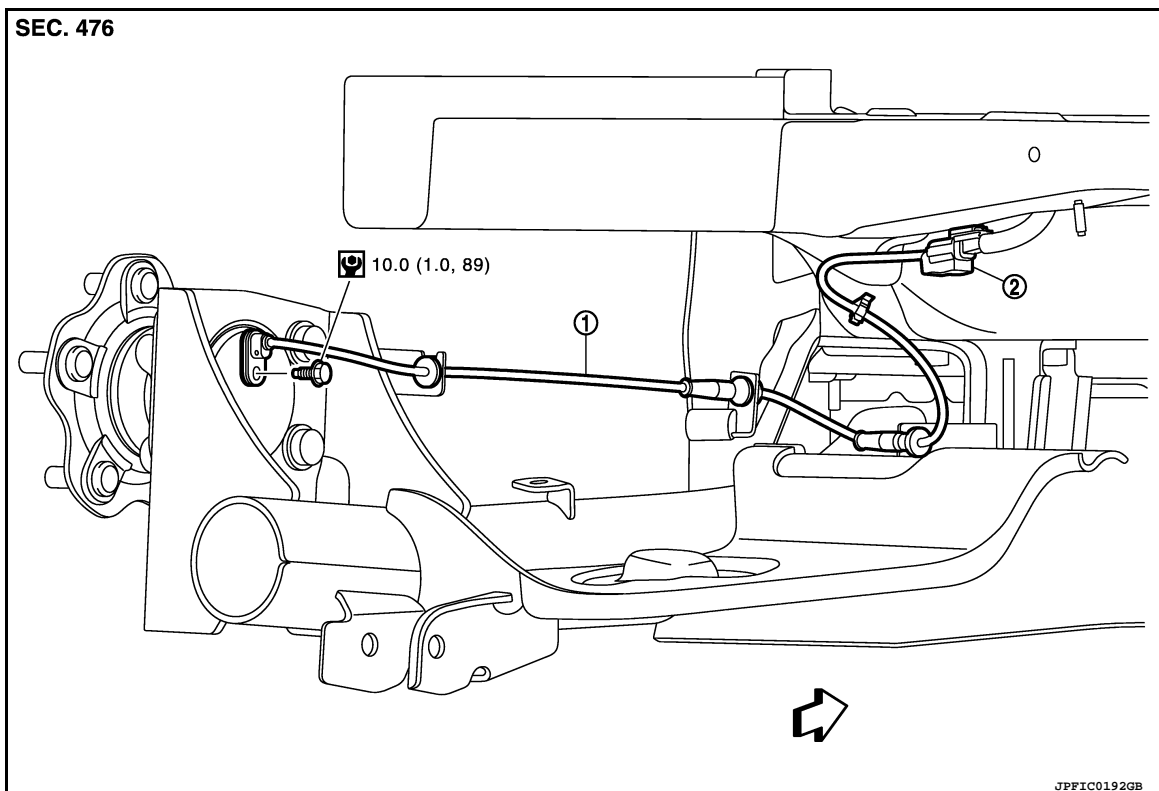


## REAR WHEEL SENSOR

### REAR WHEEL SENSOR : Exploded View

INFOID:000000008764662

BRC



1. Rear wheel sensor

2. Rear wheel sensor harness connector

⇐ Front

### REAR WHEEL SENSOR : Removal and Installation

INFOID:000000008764663

**CAUTION:**

- Be careful not to damage wheel sensor edge and sensor rotor teeth.
- When removing the front or rear wheel hub, first remove the wheel sensor from the wheel hub. Failure to do so may result in damage to the wheel sensor wires, making the sensor inoperative.
- Pull out the wheel sensor, being careful to turn it as little as possible. Do not pull on the wheel sensor harness.

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# WHEEL SENSOR

< REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

- Before installation, check if foreign objects such as iron fragments are adhered to the pick-up part of the sensor or to the inside of the hole in the wheel hub for the wheel sensor, or if a foreign object is caught in the surface of the mating surface for the sensor rotor. Clean as necessary and then install the wheel sensor.

## REMOVAL

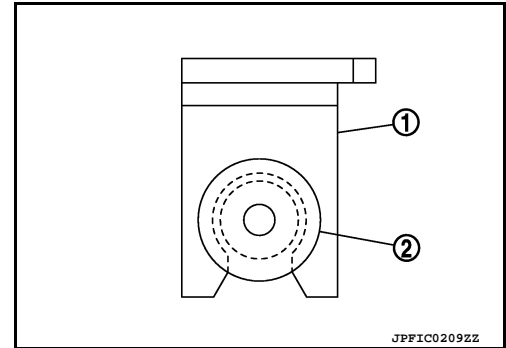
1. Remove rear wheel sensor harness connector.
2. Remove rear wheel sensor bolt.
3. Remove rear wheel sensor harness from the brackets.

## INSTALLATION

Installation is in the reverse order of removal.

### CAUTION:

- During installation, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove and 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.



# SENSOR ROTOR

< REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

## SENSOR ROTOR

### FRONT SENSOR ROTOR

#### FRONT SENSOR ROTOR : Removal and Installation

INFOID:000000008764664

The front wheel sensor rotor is an integral part of the wheel hub and bearing assembly and cannot be disassembled. Refer to [FAX-8. "Removal and Installation"](#).

### REAR SENSOR ROTOR

#### REAR SENSOR ROTOR : Removal and Installation

INFOID:000000008764665

The rear wheel sensor rotor is an integral part of the wheel hub and bearing assembly and cannot be disassembled. Refer to [RAX-6. "Removal and Installation - Drum brake"](#) (drum brake) or [RAX-7. "Removal and Installation - Disc brake"](#) (disc brake).

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# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

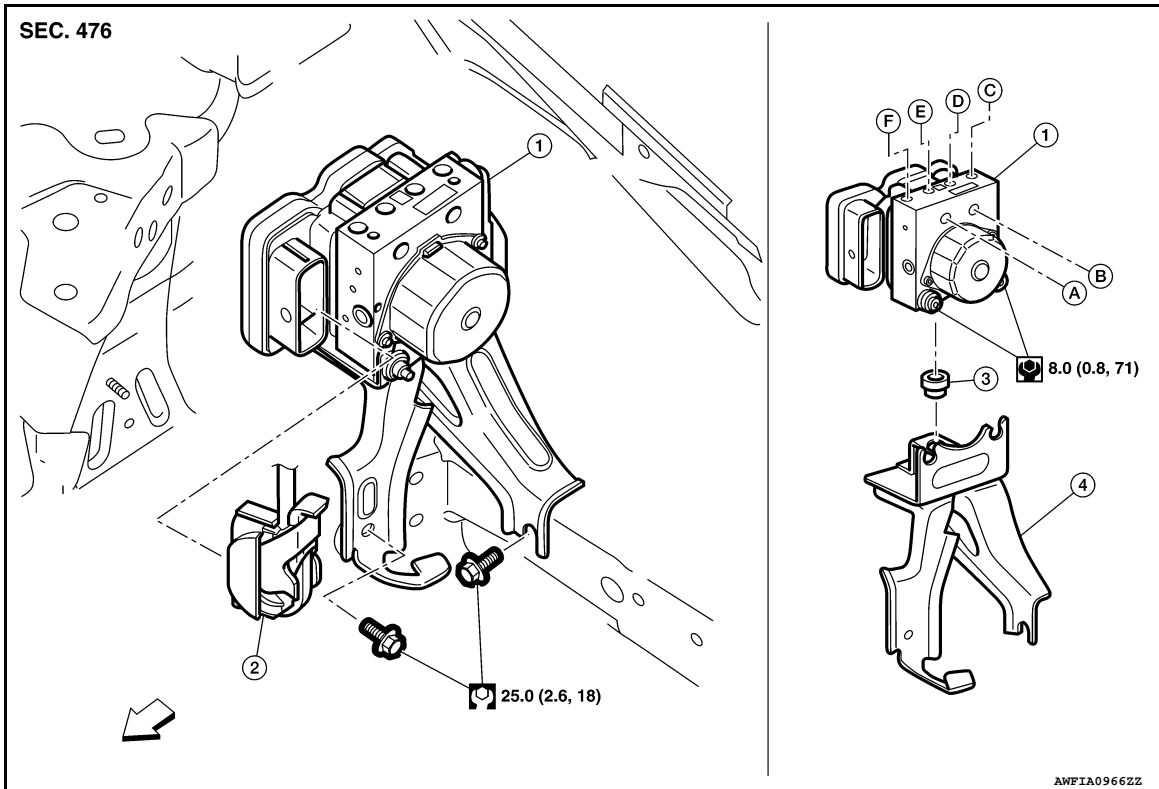
< REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:000000008764666



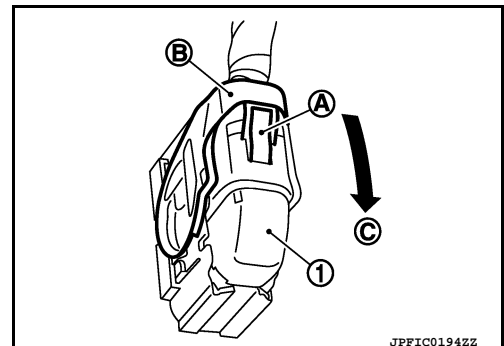
- |  |  |                                    |
|--|--|------------------------------------|
| 1. ABS actuator and electric unit (control unit) | 2. ABS actuator and electric unit (control unit) harness connector | 3. Bushing                         |
| 4. Bracket                                       | A. To master cylinder secondary side                               | B. To master cylinder primary side |
| C. To rear LH caliper                            | D. To front RH caliper   | E. To front LH caliper             |
| F. To rear RH caliper                            | ↶ Front  |                                    |

## Removal and Installation

INFOID:000000008764667

### REMOVAL

1. Disconnect battery negative terminal. Refer to [PG-50, "Exploded View"](#).
2. Drain brake fluid. Refer to [BR-16, "Drain and Refill"](#).
3. Remove the cowl top. Refer to [EXT-26, "Removal and Installation"](#).
4. Disconnect ABS actuator and electric unit (control unit) harness connector (1), follow the procedure described below.
  - a. Push the pawl (A).
  - b. Move the lever (B) in the direction (C) until locked.
  - c. Disconnect ABS actuator and electric unit (control unit) harness connector.
5. Loosen flare nut of brake tube using a flare nut wrench, and then remove brake tube from ABS actuator and electric unit (control unit). Refer to [BR-24, "FRONT : Exploded View"](#).
6. Remove ABS actuator and electric unit (control unit) and bracket.
7. Remove bracket and bushing from ABS actuator and electric unit (control unit).



# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

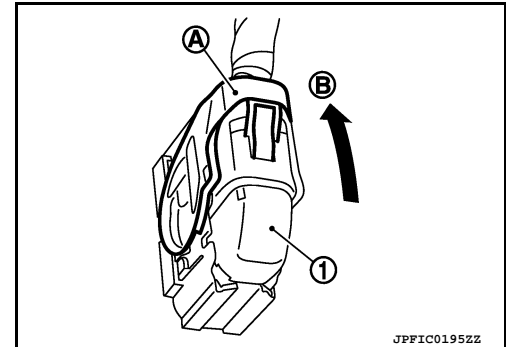
< REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

## INSTALLATION

Installation is in the reverse order of removal.

- When replacing with a new ABS actuator and electric unit (control unit), do not remove the protector of the brake tube mounting hole until right before the brake tube is installed.
- When installing brake tube, tighten to the specified torque using a flare nut torque wrench so that flare nut and brake tube are not damaged. Refer to [BR-24, "FRONT : Exploded View"](#).
- Do not remove and install ABS actuator and electric unit (control unit) by holding actuator harness.
- Bleed air from brake piping after installation. Refer to [BR-16, "Bleeding Brake System"](#).
- Do not apply excessive impact to actuator, such as by dropping it.
- After installing the ABS actuator and electric unit (control unit) harness connector (1), move the lever (A) in the direction (B) to secure the locking.



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# VDC OFF SWITCH

< REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

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## VDC OFF SWITCH

### Removal and Installation

INFOID:000000009007899

#### REMOVAL

1. Remove the instrument lower panel LH. Refer to [IP-21. "Removal and Installation"](#).
2. Remove the switch plate screws and remove the switch plate.
3. Release pawls using suitable tool and remove the VDC OFF switch.

#### INSTALLATION

Installation is in the reverse order of removal.

# STEERING ANGLE SENSOR

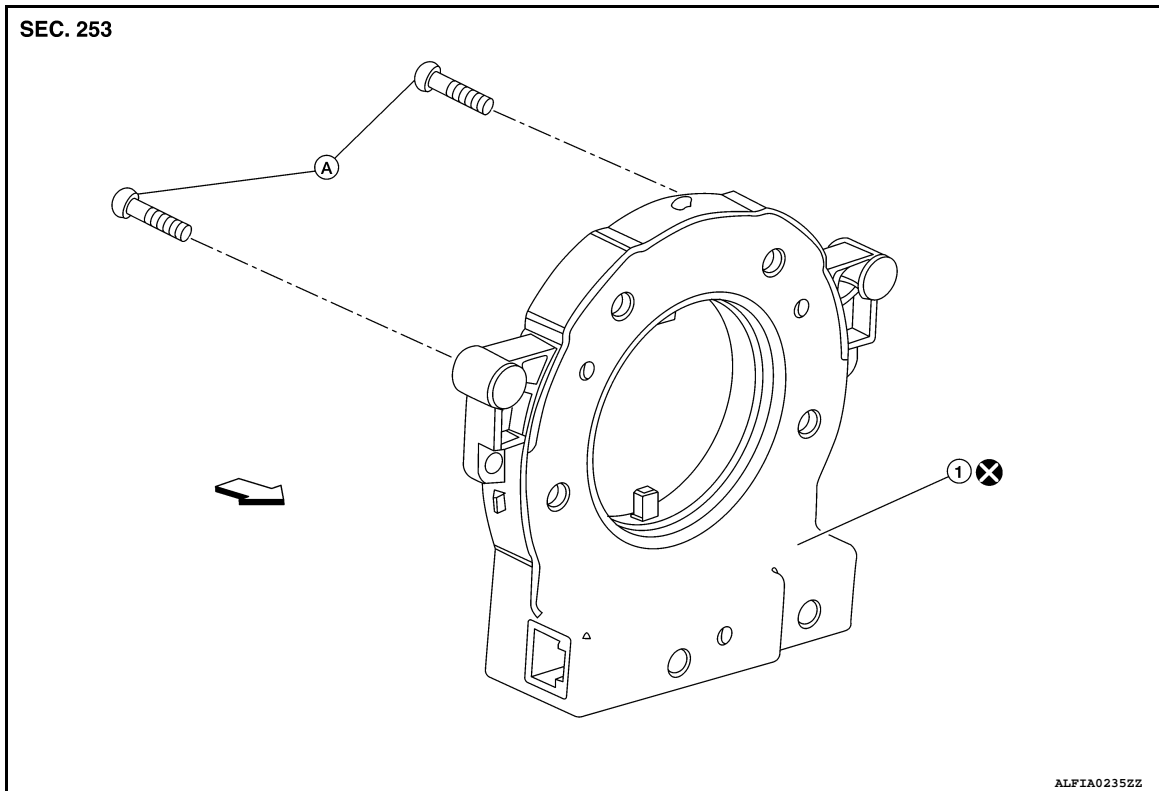
< REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

## STEERING ANGLE SENSOR

Exploded View

INFOID:000000008969361



1. Steering angle sensor

A. Screw

← Front

## Removal and Installation

INFOID:000000008969362

### REMOVAL

1. Remove spiral cable assembly. Refer to [SR-16, "Removal and Installation"](#).
2. Remove the two screws and the steering angle sensor from spiral cable.

### INSTALLATION

Installation is in the reverse order of removal.

#### **CAUTION:**

- Do not reuse steering angle sensor.
- Perform the neutral position adjustment of the steering angle sensor. Refer to [BRC-54, "Work Procedure"](#).