# SECTION BRAKE CONTROL SYSTEM

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# PRECAUTIONS

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

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, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.
- Improper repair, 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 Air Bag Diagnosis Sensor Unit or other Air Bag 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 or batteries, and wait at least three minutes before performing any service.

### Precaution for Brake System

#### WARNING:

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

- Brake fluid use refer to <u>MA-17</u>, "FOR USA AND CANADA : Fluids and Lubricants" (United States and Canada) or <u>MA-19</u>, "FOR MEXICO : Fluids and Lubricants" (Mexico).
- Do not reuse drained brake fluid.
- Do not spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Always confirm the specified tightening torque when installing the brake pipes.
- After pressing the brake pedal more deeply or harder than normal driving, such as air bleeding, check each item of brake pedal. Adjust brake pedal if it is outside the standard value.
- Do not use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.
- Tighten the brake tube flare nut to the specified torque with a crowfoot (A) and torque wrench (B).
- Always connect the battery terminal when moving the vehicle.
- Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) harness connector or the battery negative terminal before performing the work.
- Check that no brake fluid leakage is present after replacing the parts.



# PRECAUTIONS

# < PRECAUTION >

# Precaution for Brake Control System

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

### Precaution for Harness Repair

- INFOID:000000012551794
- 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.)



OK: Soldered and taped

INFOID:000000012551793

SKIB8766E

# PREPARATION

# < PREPARATION >

# PREPARATION PREPARATION

Special Service Tool

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

Tool number (TechMate No.) Tool name		Description	С
KV991J0080 (J-45741) ABS active wheel sensor tester	145741.BOX	Checking operation of ABS active wheel sen- sors	D
	WFIA0101E		E
			BRU

# **Commercial Service Tools**

INFOID:0000000012551796

Tightening brake tube flare nuts a: 10 mm (0.39 in)/12 mm (0.47 in)	ŀ
Lo	osening nuts, screws and bolts



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INFOID:000000012551795

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# **APPLICATION NOTICE**

#### < SYSTEM DESCRIPTION >

# SYSTEM DESCRIPTION APPLICATION NOTICE

# **Application Notice**

Service information	Remarks
TYPE 1	VDC/TCS/ABS
TYPE 2	HILL DESCENT CONTROL/VDC/TCS/ABS

# COMPONENT PARTS

# **Component Parts Location**

INFOID:000000012551798



[TYPE 1]

А

# **COMPONENT PARTS**

#### < SYSTEM DESCRIPTION >

1.	IPDM E/R	2.	ABS actuator and electric unit (con- trol unit)	3.	Brake fluid level switch (part of brake fluid reservoir)
4.	Vacuum sensor (attached to lower side of brake booster)	5.	Front wheel sensor LH (RH similar)	6.	Rear wheel sensor LH (RH similar)
7.	VDC OFF switch	8.	Steering angle sensor (view with steering wheel and steering column covers removed)	9.	Yaw rate/side/decel G sensor (view with the center console removed)
10.	Stop lamp switch	11.	Combination meter	12.	Parking brake switch

# **Component Description**

INFOID:000000012551799

Con	nponent	Reference/Function	
	Pump/motor		
	Motor relay		
	Actuator relay (main relay)		
ABS actuator and electric unit	ABS IN valve		
(control unit)	ABS OUT valve	<u> BRC-12, "ABS Actuator and Electric Unit (Control Unit)"</u>	
	Cut valve 1	_	
	Cut valve 2	_	
	Pressure sensor	_	
Wheel sensor		BRC-13. "Wheel Sensor and Sensor Rotor"	
Stop lamp switch		BRC-13, "Stop Lamp Switch"	
Steering angle sensor		BRC-13. "Steering Angle Sensor"	
Yaw rate/side/decel G sensor		BRC-13. "Yaw Rate/Side/Decel G Sensor"	
Vacuum sensor		BRC-14, "Vacuum Sensor"	
Brake fluid level switch		BRC-14, "Brake Fluid Level Switch"	
Parking brake switch		BRC-14. "Parking Brake Switch"	
VDC OFF switch		BRC-14. "VDC OFF Switch"	
ECM		<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</li> <li>Accelerator pedal position signal</li> <li>Engine speed signal</li> <li>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</li> <li>Target throttle position signal</li> </ul>	
ТСМ		<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</li> <li>Shift position signal</li> <li>Current gear position signal</li> </ul>	
ABS warning lamp			
Brake warning lamp		BRC-15, "System Description"	
VDC OFF indicator lamp			
SLIP indicator lamp			

# ABS Actuator and Electric Unit (Control Unit)

INFOID:000000012551800

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

#### ELECTRIC UNIT (CONTROL UNIT)

• Brake fluid pressure, engine and transmission are controlled according to signals from each sensor.

• If malfunction is detected, the system enters fail-safe mode.

#### **BRC-12**

# **COMPONENT PARTS**

< SYSTEM DESCRIPTION > [TYPE 1]	]
ACTUATOR The following components are integrated with ABS actuator.	A
Pump Returns the brake fluid reserved in reservoir to master cylinder by reducing pressure.	D
Motor Activates the pump according to signals from ABS actuator and electric unit (control unit).	В
Motor Relay Operates the motor ON/OFF according to signals from ABS actuator and electric unit (control unit).	С
Actuator Relay Operates each valve ON/OFF according to signals from ABS actuator and electric unit (control unit).	D
ABS IN Valve and ABS OUT Valve Increases, holds or decreases the fluid pressure of each caliper according to signals from ABS actuator and electric unit (control unit).	d ⊨
Pressure Sensor Detects the brake fluid pressure and transmits signal to ABS actuator and electric unit (control unit).	DDO
Cut Valve 1 (Primary Line), Cut Valve 2 (Secondary Line) Shuts off the ordinary brake line from master cylinder when VDC function, TCS function and hill start assis function are activated.	st
Wheel Sensor and Sensor Rotor	G 01
<ul> <li>NOTE:</li> <li>Wheel sensor and sensor rotor is integrated in wheel hub assembly.</li> <li>Never measure resistance and voltage value using a tester because sensor is active sensor.</li> </ul>	Н
<ul> <li>Downsize and weight reduction is aimed. IC for detection portion and magnet for sensor rotor are adopted.</li> <li>Power supply is supplied to detection portion so that magnetic field</li> </ul>	
<ul> <li>Ine is read. Magnetic field that is detected is converted to current signal.</li> <li>When sensor rotor rotates, magnetic field changes. Magnetic field</li> <li>Sensor Amplifier size is a converted to current signal.</li> </ul>	J
of magnetic field is proportional to wheel speed.	K
JPFIC0131GB	

#### Stop Lamp Switch

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

#### Steering Angle Sensor

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

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

#### Yaw Rate/Side/Decel G Sensor

Calculates the following information that affects the vehicle and transmits a signal to ABS actuator and electric unit (control unit) via communication lines:

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

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# **COMPONENT PARTS**

#### < SYSTEM DESCRIPTION >

#### Brake Fluid Level Switch

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

#### Vacuum Sensor

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

#### Parking Brake Switch

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

# VDC OFF Switch

- This is an integrated switch with switches for other functions.
- Non-operational status or standby status of the following functions can be selected using VDC OFF switch. VDC OFF indicator lamp indicates the operation status of function. (ON: Non-operational status, OFF: Standby status)
- VDC function
- NOTE:
- Brake limited slip differential (BLSD) control operates.
- TCS function
- VDC OFF indicator lamp turns OFF (standby status) when the engine is started again after it is stopped once while VDC OFF indicator lamp is ON (non-operational status).

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# SYSTEM





# System Description

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- The system switches fluid pressure of each brake caliper to increase, to hold or to decrease according to signals from control unit in ABS actuator and electric unit (control unit). This control system is applied to VDC function, TCS function, ABS function, EBD function and hill start assist function.
- Fail-safe function is available for each function and is activated by each function when system malfunction K occurs.

### INPUT SIGNAL AND OUTPUT SIGNAL

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

Component	Signal description		
Yaw rate/side/decel G sensor	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line*<sup>1</sup>:</li> <li>Yaw rate signal</li> <li>Side G sensor signal</li> <li>Decel G sensor signal</li> </ul>		
ECM	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Accelerator pedal position signal</li> <li>Engine speed signal</li> <li>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</li> <li>Target throttle position signal</li> </ul>		
ТСМ	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: <ul> <li>Shift position signal</li> </ul>		

#### VDC function, TCS function, ABS function and EBD function

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[TYPE	1]
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Component	Signal description
Steering angle sensor	<ul><li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</li><li>Steering angle sensor signal</li></ul>
Combination meter	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Brake fluid level switch signal</li> <li>Parking brake switch signal</li> <li>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>ABS warning lamp signal</li> <li>Brake warning lamp signal</li> <li>VDC warning lamp signal</li> <li>VDC OFE indicator lamp</li> </ul>

\*1: Communication line between yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit)

#### VALVE OPERATION (ABS AND EBD)

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

When ordinary brake is applied and ABS is in operation (when pressure increases).



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

When front RH wheel caliper pressure increases

#### < SYSTEM DESCRIPTION >

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

When front LH wheel caliper pressure increases

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

When rear RH wheel caliper pressure increases

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

When rear LH wheel caliper pressure increases

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

When ABS operation starts (when pressure holds)



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When front RH wheel caliper pressure holds

• Motor is activated. Brake fluid is pressurized by pump and is sent to secondary line through cut valve 2. At the same time, because ABS IN valve and ABS OUT valve are closed, fluid pressure holds.

Power supply is not supplied (close)

When front LH wheel caliper pressure holds

• Motor is activated. Brake fluid is pressurized by pump and is sent to primary line through cut valve 1. At the same time, because ABS IN valve and ABS OUT valve are closed, fluid pressure holds.

ABS OUT valve

Each caliper (fluid pressure)

Power supply is not supplied (close)

Pressure holds

[TYPE 1]

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#### < SYSTEM DESCRIPTION >

#### When rear RH wheel caliper pressure holds

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

When rear LH wheel caliper pressure holds

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

ABS is in operation (when pressure decreases)



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

When front RH wheel caliper pressure decreases

• Being supplied to reservoir through ABS OUT valve, the fluid pressure of brake caliper is decreased.

When front LH wheel caliper pressure decreases

• Being supplied to reservoir through ABS OUT valve, the fluid pressure of brake caliper is decreased.

When rear RH wheel caliper pressure decreases

• Being supplied to reservoir through ABS OUT valve, the fluid pressure of brake caliper is decreased.

When rear LH wheel caliper pressure decreases

• Being supplied to reservoir through ABS OUT valve, the fluid pressure of brake caliper is decreased.

**Component Parts and Function** 

#### < SYSTEM DESCRIPTION >

Component	FUNCTION	А
Reservoir	Temporarily reserves the brake fluid drained from brake caliper, so that pressure efficiently decreases when decreasing pressure of brake caliper.	
Pump	Returns the brake fluid reserved in reservoir to master cylinder by reducing pressure.	В
Motor	Drives the pump according to signals from control unit.	
ABS IN valve	Switches the fluid pressure line to increase or hold according to signals from control unit.	0
ABS OUT valve	Switches the fluid pressure line to increase, hold or decrease according to signals from control unit.	C
Return check valve	Returns the brake fluid from brake caliper to master cylinder by bypassing orifice of each valve when brake is released.	D
Cut valve 1 Cut valve 2	Performs the duty control of fluid pressure increased by pump according to signals from control unit.	D
Pressure Sensor	Detects the brake pedal operation amount.	F

#### VALVE OPERATION (OTHER THAN ABS AND EBD)

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

#### NOTE:

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

#### When Pressure Increases



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**[TYPE 1]** 

Name	Not activated	When Pressure Increases
Cut valve 1	Power supply is not supplied (open)	Wheel other than the one that the pressure is to be increased: Power supply is not sup- plied (open) Only wheel that the pressure is to be in- creased: Power supply is supplied (close)
Cut valve 2	Power supply is not supplied (open)	Wheel other than the one that the pressure is to be increased: Power supply is not sup- plied (open) Only wheel that the pressure is to be in- creased: Power supply is supplied (close)
ABS IN valve	Power supply is not supplied (open)	Only wheel that the pressure is to be in- creased: Power supply is not supplied (open) Wheel other than the one that the pressure is to be increased: Power supply is supplied (close)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each caliper (fluid pressure)	—	Pressure increases

When front RH wheel caliper pressure increases

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

When front LH wheel caliper pressure increases

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

When rear RH wheel caliper pressure increases

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

When rear LH wheel caliper pressure increases

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

#### < SYSTEM DESCRIPTION >

#### Released



• Being returned to master cylinder through ABS IN valve, fluid pressure of brake caliper is decreased.

When rear RH wheel caliper pressure decreases

• Being returned to master cylinder through ABS IN valve, fluid pressure of brake caliper is decreased.

When rear LH wheel caliper pressure decreases

Being returned to master cylinder through ABS IN valve, fluid pressure of brake caliper is decreased.

**Component Parts and Function** 

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

**Revision: November 2015** 

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#### < SYSTEM DESCRIPTION >

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

#### CONDITIONS FOR TURNING ON THE WARNING LAMP

#### ABS Warning Lamp

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

Condition (status)	ABS warning lamp
Ignition switch OFF	OFF
For approx. 1 second after the ignition switch is turned ON	ON
Approx. 1 second after ignition switch is turned ON (when the system is in normal operation)	OFF
ABS function is malfunctioning	ON
EBD function is malfunctioning	ON

#### Brake Warning Lamp

 Turns ON at the same time as ABS warning lamp and VDC warning lamp when EBD function is malfunctioning.

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

Condition (status)	Brake warning lamp
Ignition switch OFF	OFF
For approx. 1 seconds after the ignition switch is turned ON	ON
Approx. 1 second after ignition switch is turned ON (when the system is in normal operation)	OFF
After engine starts	OFF
When parking brake operates (parking brake switch ON)	ON
When brake booster vacuum decreases	ON
When vacuum sensor is malfunctioning	ON
When brake fluid is less than the specified level (brake fluid level switch ON)	ON
ABS function is malfunctioning	OFF
EBD function is malfunctioning	ON

VDC Warning Lamp

• Turns ON when either VDC function, TCS function, ABS function or EBD function is malfunctioning.

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

Condition (status)	VDC warning lamp
Ignition switch OFF	OFF
For approx. 1 second after the ignition switch is turned ON	ON
Approx. 1 second after ignition switch is turned ON (when the system is in normal operation)	OFF
VDC function is malfunctioning	ON
TCS function is malfunctioning	ON

#### < SYSTEM DESCRIPTION >

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Condition (status)	VDC warning lamp	
ABS function is malfunctioning	ON	A
EBD function is malfunctioning	ON	-
VDC function is operating	Blinking	В
TCS function is operating	Blinking	-

#### CONDITIONS FOR TURNING ON THE INDICATOR LAMP

#### VDC OFF indicator lamp

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

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

#### Fail-Safe

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#### VDC FUNCTION, TCS FUNCTION and hill start assist FUNCTION

VDC warning lamp in combination meter turns ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function and hill start assist function. However, ABS function and EBD function are operated normally.

#### ABS FUNCTION

ABS warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in system J [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function and hill start assist function. However, EBD function is operated normally. **NOTE:** 

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

#### EBD FUNCTION

ABS warning lamp, brake warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS function, EBD function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function and hill start assist function.

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#### < SYSTEM DESCRIPTION >

DTC	Malfunction detected condition	Fail-safe condition
C1101	When an open circuit is detected in rear RH wheel sensor circuit.	
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> <li>When power supply voltage of rear RH wheel sensor is low.</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>	The following functions are sus-
C1106	<ul> <li>When power supply voltage of rear LH wheel sensor is low.</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>	<ul> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>EBD function (only when both 2 rear wheels are malfunctioning)</li> </ul>
C1107	<ul> <li>When power supply voltage of front RH wheel sensor is low.</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>	hill start assist function
C1108	<ul> <li>When power supply voltage of front LH wheel sensor is low.</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><li>When ignition voltage is 10 V or less.</li><li>When ignition voltage is 16 V or more.</li></ul>	The following functions are sus- pended:
C1111	When a malfunction is detected in motor or motor relay.	<ul> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>EBD function</li> <li>hill start assist function</li> </ul>
C1115	When difference in wheel speed between any wheel and others is detected during the vehicle is driven, because of installation of other tires than specified.	The following functions are suspended:
C1116	When stop lamp switch signal is not input when brake pedal operates.	<ul> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>hill start assist function</li> </ul>
C1120	When a malfunction is detected in front LH ABS IN valve.	
C1121	When a malfunction is detected in front LH ABS OUT valve.	The following functions are sus-
C1122	When a malfunction is detected in front RH ABS IN valve.	pended:
C1123	When a malfunction is detected in front RH ABS OUT valve.	VDC function     TCS function
C1124	When a malfunction is detected in rear LH ABS IN valve.	ABS function
C1125	When a malfunction is detected in rear LH ABS OUT valve.	EBD function     bill start assist function
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 sus- pended: • VDC function • TCS function • hill start assist function

#### < SYSTEM DESCRIPTION >

#### [TYPE 1]

DTC	Malfunction detected condition	Fail-safe condition	
C1140	When a malfunction is detected in actuator relay.	<ul> <li>The following functions are suspended:</li> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>EBD function</li> <li>hill start assist function</li> </ul>	B
C1142	When a malfunction is detected in pressure sensor.	The following functions are sus-	С
C1143	When a malfunction is detected in steering angle sensor.	pended:	
C1144	When neutral position adjustment of steering angle sensor is not complete.	TCS function	D
C1145	When a malfunction is detected in yaw rate signal.	<ul> <li>hill start assist function</li> </ul>	
C1146	When a malfunction is detected in side/decel G signal.	The following functions are sus-	
C1155	When brake fluid level low signal is detected.	<ul> <li>pended:</li> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>hill start assist function</li> </ul>	E BR(
C1160	When calibration of yaw rate/side/decel G sensor is not complete.	<ul> <li>The following functions are suspended:</li> <li>VDC function</li> <li>TCS function</li> <li>hill start assist function</li> </ul>	G
C1164	When a malfunction is detected in cut valve 1.	The following functions are sus-	Ц
C1165	When a malfunction is detected in cut valve 2.	<ul> <li>pended:</li> <li>VDC function</li> </ul>	11
C1170	When the information in ABS actuator and electric unit (control unit) is not the same.	<ul> <li>TCS function</li> <li>ABS function</li> <li>EBD function</li> <li>hill start assist function</li> </ul>	I
C1197	When a malfunction is detected in vacuum sensor.		1
C1198	<ul> <li>When an open circuit is detected in vacuum sensor circuit.</li> <li>When a short circuit is detected in vacuum sensor circuit.</li> <li>When a malfunction is detected in vacuum sensor noise.</li> </ul>	Electrical vacuum assistance of brake booster is suspended.	5
C1199	When brake booster vacuum is approx. 0 kPa (0 mmHg) during engine running.	_	K
C119A	When a malfunction is detected in supply power voltage of vacuum sensor.	Electrical vacuum assistance of brake booster is suspended.	I
U1000	When CAN communication signal is not continuously received for 2 seconds or more.	<ul> <li>The following functions are suspended:</li> <li>VDC function</li> <li>TCS function</li> <li>hill start assist function</li> </ul>	M

# VDC FUNCTION

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#### **VDC FUNCTION : System Diagram**



# VDC FUNCTION : System Description

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



- VDC function can be switched to non-operational status (OFF) by operating VDC OFF switch. In this case, VDC OFF indicator lamp turns ON.
- Control unit portion automatically improves driving stability by performing brake force control as well as
  engine output control by transmitting drive signal to actuator portion according to difference between target
  side slip amount and vehicle side slip amount
- VDC warning lamp blinks while VDC function is in operation and indicates to the driver that the function is in operation.
- VDC function has brake limited slip differential (BLSD) function. LH and RH driving wheel spin is always monitored. If necessary, appropriate brake force is independently applied to LH or RH driving wheel so that one-sided wheel spin is avoided and traction is maintained. Mainly starting ability is improved. [Brake limited slip differential (BLSD) function operates while VDC function is in non-operational status (OFF) by VDC OFF

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switch.] VDC warning lamp turns ON when Brake limited slip differential (BLSD) function is in operation. Noises and vibration may be generated due to brake operation. This is not a malfunction.

- CONSULT can be used to diagnose the system.
- Fail-safe function is adopted. When a malfunction occurs in VDC function, the control is suspended for VDC function, TCS function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function and hill start assist function. However, ABS function and EBD function are operated normally. Refer to <u>BRC-23</u>, "Fail-Safe".

#### NOTE:

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

#### INPUT SIGNAL AND OUTPUT SIGNAL

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

Component	Signal description	
Yaw rate/side/decel G sensor	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line*1:</li> <li>Yaw rate signal</li> <li>Side G sensor signal</li> <li>Decel G sensor signal</li> </ul>	E
ECM	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Acceleration pedal position signal</li> <li>Engine speed signal</li> <li>Mainly receives the following signal from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Target throttle position signal</li> </ul>	G
ТСМ	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Shift position signal	
Steering angle sensor	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Steering angle sensor signal	I
Combination meter	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Brake fluid level switch signal</li> <li>Parking brake switch signal</li> <li>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>VDC warning lamp signal</li> <li>VDC OFF indicator lamp signal</li> </ul>	J K L

\*1: Communication line between yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit)

#### OPERATION CHARACTERISTICS

VDC Function That Prevents Oversteer Tendency

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



#### < SYSTEM DESCRIPTION >

# [TYPE 1]

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



VDC Function That Prevents Understeer Tendency

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



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



# TCS FUNCTION : System Diagram



# TCS FUNCTION : 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 at an appropriate level. When wheel spin occurs on drive wheel, ABS actuator and electric unit (control unit) perform brake force control of LH and RH drive wheels (apply brake force by increasing brake fluid pressure of drive wheel) and decrease engine torque by engine torque control. Wheel spin amount decreases. Engine torque is controlled to appropriate level.
- TCS function can be switched to non-operational status (OFF) by operating VDC OFF switch. In this case, VDC OFF indicator lamp turns ON.
- VDC warning lamp blinks while TCS function is in operation and indicates to the driver that the function is in operation.
- CONSULT can be used to diagnose the system.
- Fail-safe function is adopted. When a malfunction occurs in TCS function, the control is suspended for VDC function, TCS function, and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function and hill start assist function. However, ABS function and EBD function are operated normally. Refer to <u>BRC-23</u>, "Fail-Safe".

#### 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 DESCRIPTION >

[TYPE	1]
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Component	Signal description
Yaw rate/side/decel G sensor	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line*<sup>1</sup>:</li> <li>Yaw rate signal</li> <li>Side G sensor signal</li> <li>Decel G sensor signal</li> </ul>
ECM	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Accelerator pedal position signal</li> <li>Engine speed signal</li> <li>Mainly receives the following signal from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Target throttle position signal</li> </ul>
ТСМ	<ul><li>Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication:</li><li>Shift position signal</li></ul>
Steering angle sensor	<ul><li>Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication:</li><li>Steering angle sensor signal</li></ul>
Combination meter	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Brake fluid level switch signal</li> <li>Parking brake switch signal</li> <li>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>VDC warning lamp signal</li> <li>VDC OFF indicator lamp signal</li> </ul>

\*1: Communication line between yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit) ABS FUNCTION

# ABS FUNCTION : System Diagram

		CAN communication
Stop lamp switch		
Vacuum sensor Vacuum sensor signal		
Front wheel sensor RH	ABS actuator	
Front wheel sensor LH	and electric unit (control unit)	Combination meter
Rear wheel sensor RH		
Rear wheel sensor LH		
Yaw rate/side/decel G sensor		

#### < SYSTEM DESCRIPTION >

## **ABS FUNCTION : System Description**

- 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 avoided by steering operation.
- During braking, control unit calculates wheel speed and pseudo-vehicle speed, and transmits pressure increase, hold or decrease signals to actuator portion according to wheel slip status.
- The following effects are obtained by preventing wheel lock during braking.
- Vehicle tail slip is prevented during braking when driving straight.
- Understeer and oversteer tendencies are moderated during braking driving on a corner.
- Obstacles may be easily bypassed by steering operation during braking.
- · CONSULT can be used to diagnose the system diagnosis.
- · Fail-safe function is adopted. When a malfunction occurs in ABS function, the control is suspended for VDC function, TCS function, ABS function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function and hill start assist function. However, EBD function is operated normally. Refer to BRC-23, "Fail-Safe".

#### NOTE:

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



#### INPUT SIGNAL AND OUTPUT SIGNAL

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

Steering angle sensor       Mainly transmits the following signals to ABS actuator and electric unit (control unit) via C communication:         • Steering angle sensor signal         Mainly receives the following signals from ABS actuator and electric unit (control unit) via C	r
Mainly receives the following signals from ABS actuator and electric unit (control unit) via C	_ [
Combination meter • ABS warning lamp signal • VDC warning lamp signal	Γ

# EBD FUNCTION

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# [TYPE 1]

# EBD FUNCTION : System Diagram

		CAN communication
Stop lamp switch		
Vacuum sensor Vacuum sensor signal		
Front wheel sensor RH	ABS actuator	
Front wheel sensor LH	and electric unit (control unit)	Combination meter
Rear wheel sensor RH		
Rear wheel sensor LH		
Yaw rate/side/decel G sensor		
		AWFIA1217GB

# EBD FUNCTION : System Description

- 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 DESCRIPTION >

- During braking, control unit portion compares slight slip on front • and rear wheels by wheel speed sensor signal, transmits drive signal to actuator portion when rear wheel slip exceeds front wheel slip for the specified value or more, and controls rear wheel brake force (brake fluid pressure) so that increase of rear wheel slip is prevented and slips on front wheel and rear wheel are nearly equalized. ABS control is applied when slip on each wheel increases and wheel speed is the threshold value of ABS control or less.
- CONSULT can be used to diagnose the system.
- · Fail-safe function is adopted. When a malfunction occurs in EBD function, the control is suspended for VDC function, TCS function, ABS function, EBD function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function and hill start assist function. Refer to BRC-23, "Fail-Safe".



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#### 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	<ul> <li>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Brake warning lamp signal</li> <li>ABS warning lamp signal</li> <li>VDC warning lamp signal</li> </ul>	

### HIII START ASSIST FUNCTION

#### < SYSTEM DESCRIPTION >

# Hill start assist FUNCTION : System Diagram



#### Hill start assist FUNCTION : System Description

INFOID:000000012551821

- This function maintains brake fluid pressure so that the vehicle does not move backwards, even if brake pedal is released to depress accelerator pedal to start the vehicle, while it is stopped on an uphill slope by depressing brake pedal.
- This function operates when the vehicle is in stop status on an uphill slope of slope ratio 10% or more and selector lever is in any position other than P (Park) or N (Neutral).
- Hill start assist function is only for the start aid. It maintains the brake fluid pressure for approx. 2 seconds
  after releasing the brake pedal, and then decreases the pressure gradually. If the vehicle starts by accelerator operation, the brake is released automatically and a smooth start is performed.
- Fail-safe function is adopted. When a malfunction occurs in hill start assist function, the control is suspended for VDC function, TCS function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function and hill start assist function. However, ABS function and EBD function are operated normally. Refer to <u>BRC-23</u>, "Fail-Safe".

#### INPUT SIGNAL AND OUTPUT SIGNAL

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

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

#### < SYSTEM DESCRIPTION >

Component	Signal description	0
ТСМ	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: <ul> <li>Shift position signal</li> </ul>	A
Combination meter	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Brake fluid level switch signal</li> <li>Parking brake switch signal</li> <li>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>VDC warning lamp signal</li> <li>VDC OFF indicator lamp signal</li> </ul>	B C D

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

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Revision: November 2015

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

< SYSTEM DESCRIPTION >

[TYPE 1]

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

# **CONSULT** Function

INFOID:000000012551822

#### CAUTION:

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

#### APPLICATION ITEMS

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

Mode	Function description
ECU Identification	Parts number of ABS actuator and electric unit (control unit) can be read.
Self Diagnostic Result	Self-diagnostic results and freeze frame data can be read and erased quickly. $^{\star}$
Data Monitor	Input/Output data in the ABS actuator and electric unit (control unit) can be read.
Active Test	Diagnostic Test Mode in which CONSULT drives some actuators apart from the ABS actuator and elec- tric unit (control unit) and also shifts some parameters in a specified range.
Work support	Components can be quickly and accurately adjusted.

\*: The following diagnosis information is erased by erasing.

• DTC

• Freeze frame data (FFD)

#### ECU IDENTIFICATION

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

# SELF DIAGNOSTIC RESULT

Refer to <u>BRC-47, "DTC Index"</u>.

When "CRNT" is displayed on self-diagnosis result,

The system is presently malfunctioning.

When "PAST" is displayed on self-diagnosis result,

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

#### Freeze frame data (FFD)

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

Item name	Display item
IGN counter (0 – 39)	<ul> <li>The number of times that ignition switch is turned ON after the DTC is detected is displayed.</li> <li>When "0" is displayed: It indicates that the system is presently malfunctioning.</li> <li>When except "0" is displayed: It indicates that system malfunction in the past is detected, but the system is presently normal.</li> <li>NOTE:</li> <li>Each time when ignition switch is turned OFF to ON, numerical number increases in 1 → 2 → 338 → 39. When the operation number of times exceeds 39, the number do not increase and "39" is displayed until self-diagnosis is erased.</li> </ul>

#### ACTIVE TEST

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

#### **CAUTION:**

- Never perform ACTIVE TEST while driving the vehicle.
- Always bleed air from brake system before active test.
- Never perform active test when system is malfunctioning. NOTE:
< SYSTEM DESCRIPTION >

[TYPE 1]

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- 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 Itom	Display			
	Display item	Up	Кеер	Down	D
	FR RH IN SOL	Off	On*	On*	
FR RH SOL	FR RH OUT SOL	Off	Off	On*	E
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*	BRC
	RR RH OUT SOL	Off	Off	On*	
RR LH SOL	RR LH IN SOL	Off	On*	On*	G
	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.

To at its as	Diambau Itarra	Display			_
reschenn	Display item	Up	ACT UP	ACT KEEP	
	FR RH IN SOL	Off	Off	Off	J
FR RH ABS SOLE-	FR RH OUT SOL	Off	Off	Off	_
NOID (ACT)	CV1	Off	Off	Off	K
	CV2	Off	On*	On*	_
	FR LH IN SOL	Off	Off	Off	_
FR LH ABS SOLE-	FR LH OUT SOL	Off	Off	Off	L
NOID (ACT)	CV1	Off	On*	On*	_
	CV2	Off	Off	Off	M
	RR RH IN SOL	Off	Off	Off	
RR RH ABS SOLE-	RR RH OUT SOL	Off	Off	Off	_
NOID (ACT)	CV1	Off	On*	On*	Ν
	CV2	Off	Off	Off	_
	RR LH IN SOL	Off	On*	Off	0
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	Off	Off	Off	_ 0
	CV1	Off	Off	Off	_
	CV2	Off	On*	On*	Р

\*: 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.

< SYSTEM DESCRIPTION >

Test item	Display Item	Display	
	Display item	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.

#### DATA MONITOR

			×: Applicable
	Monitor item selection		
Item (Unit)	ECU INPUT SIG- NALS	MAIN SIGNALS	Note
FR LH SENSOR [km/h (MPH)]	×	×	Wheel speed calculated by front LH wheel sensor is displayed.
FR RH SENSOR [km/h (MPH)]	×	×	Wheel speed calculated by front RH wheel sensor is displayed.
RR LH SENSOR [km/h (MPH)]	×	×	Wheel speed calculated by rear LH wheel sensor is displayed.
RR RH SENSOR [km/h (MPH)]	×	×	Wheel speed calculated by rear RH wheel sensor is displayed.
DECEL G-SEN (m/s <sup>2</sup> )	×	×	Decel G detected by decel G sensor is displayed.
FR RH IN SOL (On/Off)		×	Operation status of front RH wheel ABS IN valve is displayed.
FR RH OUT SOL (On/Off)		×	Operation status of front RH wheel ABS OUT valve is displayed.
FR LH IN SOL (On/Off)		×	Operation status of front LH wheel ABS IN valve is displayed.
FR LH OUT SOL (On/Off)		×	Operation status of front LH wheel ABS OUT valve is displayed.
RR RH IN SOL (On/Off)		×	Operation status of rear RH wheel ABS IN valve is displayed.
RR RH OUT SOL (On/Off)		×	Operation status of rear RH wheel ABS OUT valve is displayed.
RR LH IN SOL (On/Off)		×	Operation status of rear LH wheel ABS IN valve is displayed.
RR LH OUT SOL (On/Off)		×	Operation status of rear LH wheel ABS OUT valve is displayed.
EBD WARN LAMP (On/Off)			Brake warning lamp ON/OFF status is displayed. (Note 1)
STOP LAMP SW (On/Off)	×	×	Stop lamp switch signal input status is displayed.
MOTOR RELAY (On/Off)		×	ABS motor and motor relay status is displayed.
ACTUATOR RLY (On/Off)		×	ABS actuator relay status is displayed.
ABS WARN LAMP (On/Off)		×	ABS warning lamp ON/OFF status is displayed. (Note 1)
OFF LAMP (On/Off)		×	VDC OFF indicator lamp ON/OFF status is displayed. <sup>(Note 1)</sup>
OFF SW (On/Off)	×	×	VDC OFF switch status is displayed

Revision: November 2015

#### < SYSTEM DESCRIPTION >

[TYPE 1]

	Monitor ite	m selection		٨
Item (Unit)	ECU INPUT SIG- NALS	MAIN SIGNALS	Note	A
SLIP/VDC LAMP (On/Off)		×	VDC warning lamp ON/OFF status is displayed. <sup>(Note 1)</sup>	В
BATTERY VOLT (V)	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.	
GEAR	×	×	Current gear position judged from current gear position sig-	С
SLCT LVR POSI	×	×	Current gear position judged from current gear position signal is displayed.	D
ENGINE SPEED (tr/min)	×	×	Engine speed status is displayed.	
YAW RATE SEN (d/s)	×	×	Yaw rate detected by yaw rate sensor is displayed.	Ε
R POSI SIG (On/Off)			R range signal input status judged from R range signal is displayed.	R
N POSI SIG (On/Off)			N range signal input status judged from N range signal is displayed.	
CV1 (On/Off)			Cut valve 1 operation status is displayed.	G
CV2 (On/Off)			Cut valve 2 operation status is displayed.	Н
ACCEL POS SIG (%)	×		Displays the Accelerator pedal position.	
SIDE G -SENSOR (m/s <sup>2</sup> )	×		Side G detected by side G sensor is displayed.	
STR ANGLE SIG (°)	×		Steering angle detected by steering angle sensor is displayed.	J
PRESS SENSOR (bar)	×		Brake fluid pressure detected by pressure sensor is displayed.	
EBD SIGNAL (On/Off)			EBD operation status is displayed.	K
ABS SIGNAL (On/Off)			ABS operation status is displayed.	L
TCS SIGNAL (On/Off)			TCS operation status is displayed.	
VDC SIGNAL (On/Off)			VDC operation status is displayed.	VI
EBD FAIL SIG (On/Off)			EBD fail-safe signal status is displayed.	Ν
ABS FAIL SIG (On/Off)			ABS fail-safe signal status is displayed.	
TCS FAIL SIG (On/Off)			TCS fail-safe signal status is displayed.	С
VDC FAIL SIG (On/Off)			VDC fail-safe signal status is displayed.	Ρ
CRANKING SIG (On/Off)			Cranking status is displayed.	
FLUID LEV SW (On/Off)	×		Brake fluid level signal input status via CAN communication is displayed.	

#### < SYSTEM DESCRIPTION >

[TYPE 1]

	Monitor item selection			
Item (Unit)	ECU INPUT SIG- NALS	MAIN SIGNALS	Note	
PARK BRAKE SW (On/Off)	×		Parking brake switch signal input status via CAN communi- cation is displayed.	
USS SIG <sup>(Note 2)</sup> (On/Off)			Hill start assist operation status is displayed.	

Note 1: Refer to <u>BRC-15</u>, "System Description" for ON/OFF conditions of each warning lamp and indicator lamp.

Note 2: USS means "hill start assist."

#### WORK SUPPORT

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

# < ECU DIAGNOSIS INFORMATION > ECU DIAGNOSIS INFORMATION APPLICATION NOTICE

# **Application Notice**

Service information	Remarks	0
TYPE 1	VDC/TCS/ABS	
TYPE 2	HILL DESCENT CONTROL/VDC/TCS/ABS	
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#### [TYPE 1]

INFOID:000000012551823

#### < ECU DIAGNOSIS INFORMATION >

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

#### **Reference Value**

INFOID:000000012551824

[TYPE 1]

#### CONSULT DATA MONITOR STANDARD VALUE

Monitor item	Condition	Reference values in normal operation
	Vehicle stopped	0.00 km/h (MPH)
FR LH SENSOR	When driving <sup>(Note 1)</sup>	Nearly matches the speedometer display (within $\pm 10\%$ )
	Vehicle stopped	0.00 km/h (MPH)
FR RH SENSOR	When driving <sup>(Note 1)</sup>	Nearly matches the speedometer display (within $\pm 10\%$ )
	Vehicle stopped	0.00 km/h (MPH)
RR LH SENSOR	When driving <sup>(Note 1)</sup>	Nearly matches the speedometer display (within $\pm 10\%$ )
	Vehicle stopped	0.00 km/h (MPH)
RR RH SENSOR	When driving <sup>(Note 1)</sup>	Nearly matches the speedometer display (within $\pm 10\%$ )
	When stopped	Approx. 0 m/s <sup>2</sup>
DECEL G-SEN	During acceleration	Positive value
	During deceleration	Negative value
	Active	On
	Not activated	Off
	Active	On
	Not activated	Off
ER I H IN SOI	Active	On
	Not activated	Off
FR LH OUT SOL	Active	On
	Not activated	Off
RR RH IN SOL	Active	On
	Not activated	Off
	Active	On
	Not activated	Off
RR I H IN SOL	Active	On
	Not activated	Off
RR I H OUT SOL	Active	On
	Not activated	Off
	When brake warning lamp is ON <sup>(Note 2)</sup>	On
EDD WARN LAWP	When brake warning lamp is OFF <sup>(Note 2)</sup>	Off
	Brake pedal depressed	On
STOP LAMP SW	Brake pedal not depressed	Off
	Active	On
	Not activated	Off
	Active	On
ACTUATOR RLY	When not operating (in fail-safe mode)	Off

#### < ECU DIAGNOSIS INFORMATION >

Monitor item	Condition	Reference values in normal operation	٩
	When ABS warning lamp is ON <sup>(Note 2)</sup>	On	A
ABS WARN LAMP	When ABS warning lamp is OFF <sup>(Note 2)</sup>	Off	
Monitor item ABS WARN LAMP OFF LAMP OFF SW SLIP/VDC LAMP BATTERY VOLT GEAR SLCT LVR POSI ENGINE SPEED VAW RATE SEN R POSI SIG N POSI SIG CV1 CV2 ACCEL POS SIG SIDE G-SENSOR SIDE G-SENSOR EBD SIGNAL	When VDC OFF indicator lamp is ON <sup>(Note 2)</sup>	On	В
OFF LAMP	When VDC OFF indicator lamp is OFF <sup>(Note 2)</sup>	Off	
	When VDC OFF switch is ON	On	С
OFF SW	When VDC OFF switch is OFF	Off	
	When VDC warning lamp is ON <sup>(Note 2)</sup>	On	_
SLIP/VDC LAMP	When VDC warning lamp is OFF <sup>(Note 2)</sup>	Off	D
BATTERY VOLT	Ignition switch ON	10 – 16 V	
GEAR	Driving	1 – 7 Depending on shift status	E
SLCT LVR POSI	Vehicle stopped	N/P Depending on shift status	BRC
ENGINE SPEED	Engine stopped	0 tr/min	
	Engine running	Almost same reading as tachometer	
YAW RATE SEN	Vehicle stopped	Approx. 0 d/s	G
	Turning right	Negative value	
	Turning left	Positive value	Н
R POSI SIG	When selector lever is in the R position	On	
R POSI SIG N POSI SIG CV1	When selector lever is in the other position than R	Off	
N POSI SIG	When selector lever is in the N position	On	
N POSI SIG	When selector lever is in the other position than N	Off	
C\/1	Active	On	J
	Not activated	Off	
CV2	Active	On	
	Not activated	Off	Κ
ACCEL POS SIG	Never depress accelerator pedal (with ignition switch ON)	0%	
	Depress accelerator pedal (with ignition switch ON)	0 – 100%	L
	Vehicle stopped	Approx. 0 m/s <sup>2</sup>	5.4
SIDE G-SENSOR	Right turn	Negative value	IVI
	Left turn	Positive value	
	When driving straight	0±2.5°	Ν
STR ANGLE SIG	When steering wheel is steered to LH by $90^\circ$	Approx. +90°	
	When steering wheel is steered to RH by $90^\circ$	Approx. –90°	
	Brake pedal not depressed	Approx. 0 bar	0
TREES SENSOR	Brake pedal depressed	(-40) – (+300 bar)	
EBD SIGNAL	EBD activated	On	Р
	EBD not activated	Off	
	ABS is activated	On	
	ABS is not activated	Off	
TCS SIGNAL	TCS activated	On	
TCS SIGNAL	TCS not activated	Off	

#### < ECU DIAGNOSIS INFORMATION >

Monitor item	Condition	Reference values in normal operation
	VDC activated	On
VDO SIGINAL	VDC not activated	Off
	In EBD fail-safe	On
	EBD is normal	Off
	In ABS fail-safe	On
ABSTAL SIG	ABS is normal	Off
	In TCS fail-safe	On
TOSTAL SIG	TCS is normal	Off
	In VDC fail-safe	On
VDC TAIL SIG	VDC is normal	Off
	At cranking	On
	Other than at cranking	Off
FLUID LEV SW	When brake fluid level switch is ON (brake fluid level is less than the specified level)	On
	When brake fluid level switch is OFF	Off
DADK BDAKE SWI	When parking brake is active	On
	Parking brake is released	Off
LISS SIC(Note 3)	Hill start assist is active	On
USS SIG(Note 5)	Hill start assist is inactive	Off

Note 1: Confirm tire pressure is standard value.

Note 2: Refer to <u>BRC-15</u>, "System Description" for ON/OFF conditions of each warning lamp and indicator lamp.

Note 3: USS means "hill start assist."

#### Fail-Safe

INFOID:000000012551825

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

VDC warning lamp in combination meter turns ON when a malfunction occurs in the system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function and hill start assist function. However, ABS function and EBD function are operated normally.

#### ABS FUNCTION

ABS warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in the system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function and hill start assist function. However, EBD function is operated normally. **NOTE:** 

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

#### EBD FUNCTION

ABS warning lamp, brake warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in the system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS function, EBD function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function and hill start assist function.

#### < ECU DIAGNOSIS INFORMATION >

[TYPE 1]

DTC	Malfunction detected condition	Fail-safe condition	А
C1101	When an open circuit is detected in rear RH wheel sensor circuit.		-
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.		В
C1104	When an open circuit is detected in front LH wheel sensor circuit.		
C1105	<ul> <li>When power supply voltage of rear RH wheel sensor is low.</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>	The following functions are sus-	С
C1106	<ul> <li>When power supply voltage of rear LH wheel sensor is low.</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>	<ul> <li>pended:</li> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>EBD function (only when both 2 rear wheels are malfunctioning)</li> </ul>	E
C1107	<ul> <li>When power supply voltage of front RH wheel sensor is low.</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>	hill start assist function	BR G
C1108	<ul> <li>When power supply voltage of front LH wheel sensor is low.</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>		Н
C1109	<ul><li>When ignition voltage is 10 V or less.</li><li>When ignition voltage is 16 V or more.</li></ul>	The following functions are suspended:	
C1111	When a malfunction is detected in motor or motor relay.	<ul> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>EBD function</li> <li>hill start assist function</li> </ul>	J
C1115	When difference in wheel speed between any wheel and others is detected during the vehicle is driven because of installation of other tires than specified.	The following functions are sus- pended:	K
C1116	When stop lamp switch signal is not input when brake pedal operates.	<ul> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>hill start assist function</li> </ul>	L
C1120	When a malfunction is detected in front LH ABS IN valve.		-
C1121	When a malfunction is detected in front LH ABS OUT valve.	The following functions are ave	n -
C1122	When a malfunction is detected in front RH ABS IN valve.	pended:	IVI
C1123	When a malfunction is detected in front RH ABS OUT valve.	VDC function     TCS function	
C1124	When a malfunction is detected in rear LH ABS IN valve.	ABS function	Ν
C1125	When a malfunction is detected in rear LH ABS OUT valve.	EBD function	
C1126	When a malfunction is detected in rear RH ABS IN valve.	• Thin Start assist function	
C1127	When a malfunction is detected in rear RH ABS OUT valve.		0
C1130	When a malfunction is detected in ECM system.	<ul> <li>The following functions are suspended:</li> <li>VDC function</li> <li>TCS function</li> <li>hill start assist function</li> </ul>	P

#### < ECU DIAGNOSIS INFORMATION >

DTC	Malfunction detected condition	Fail-safe condition
C1140	When a malfunction is detected in actuator relay.	<ul> <li>The following functions are suspended:</li> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>EBD function</li> <li>hill start assist function</li> </ul>
C1142	When a malfunction is detected in pressure sensor.	The following functions are sus-
C1143	When a malfunction is detected in steering angle sensor.	pended:
C1144	When neutral position adjustment of steering angle sensor is not complete.	TCS function
C1145	When a malfunction is detected in yaw rate signal.	<ul> <li>hill start assist function</li> </ul>
C1146	When a malfunction is detected in side/decel G signal.	The following functions are sus-
C1155	When brake fluid level low signal is detected.	<ul> <li>pended:</li> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>hill start assist function</li> </ul>
C1160	When calibration of yaw rate/side/decel G sensor is not complete.	The following functions are sus- pended: • VDC function • TCS function • hill start assist function
C1164	When a malfunction is detected in cut valve 1.	The following functions are sus-
C1165	When a malfunction is detected in cut valve 2.	<ul><li>Pended:</li><li>VDC function</li></ul>
C1170	When the information in ABS actuator and electric unit (control unit) is not the same.	<ul> <li>TCS function</li> <li>ABS function</li> <li>EBD function</li> <li>hill start assist function</li> </ul>
C1197	When a malfunction is detected in vacuum sensor.	
C1198	<ul> <li>When an open circuit is detected in vacuum sensor circuit.</li> <li>When a short circuit is detected in vacuum sensor circuit.</li> <li>When a malfunction is detected in vacuum sensor noise.</li> </ul>	Electrical vacuum assistance of brake booster is suspended.
C1199	When brake booster vacuum is approx. 0 kPa (0 mmHg) during engine running.	_
C119A	When a malfunction is detected in supply power voltage of vacuum sensor.	Electrical vacuum assistance of brake booster is suspended.
U1000	When CAN communication signal is not continuously received for 2 seconds or more.	The following functions are sus- pended: • VDC function • TCS function • hill start assist function

# DTC Inspection Priority Chart

INFOID:000000012551826

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

Priority	Detected item (DTC)
1	U1000 CAN COMM CIRCUIT
2	C1170 VARIANT CODING
3	<ul> <li>C1130 ENGINE SIGNAL 1</li> <li>C1144 ST ANG SEN SIGNAL</li> </ul>
4	<ul> <li>C1109 BATTERY VOLTAGE [ABNOMAL]</li> <li>C1111 PUMP MOTOR</li> <li>C1140 ACTUATOR RLY</li> </ul>

#### < ECU DIAGNOSIS INFORMATION >

[TYPE 1]

Priority	Detected item (DTC)	
	C1101 RR RH SENSOR-1	A
	C1102 RR LH SENSOR-1	
	C1103 FR RH SENSOR-1	
	C1104 FR LH SENSOR-1	В
	C1105 RR RH SENSOR-2	
	C1106 RR LH SENSOR-2	
	C1107 FR RH SENSOR-2	0
	CI110 FR LET SENSOR-2     C1115 ADS SENSOD IADNODMAL SIGNALI	C
	CITIS ADS SENSOR [ADNORMAL SIGNAL]     CITIS ADS SENSOR [ADNORMAL SIGNAL]	
	C1120 FR   H IN ABS SOL	
	C1121 FR LH OUT ABS SOL	D
	C1122 FR RH IN ABS SOL	
	C1123 FR RH OUT ABS SOL	
5	C1124 RR LH IN ABS SOL	
	C1125 RR LH OUT ABS SOL	
	C1126 RR RH IN ABS SOL	
	C1127 RR RH OUT ABS SOL	
	C1142 PRESS SEN CIRCUIT	BRC
	C1143 ST ANG SEN CIRCUIT	
	CI145 YAW RATE SENSOR     CI146 SIDE C SEN CIDCUIT	
	C1160 DECEL G SEN SET	$\sim$
	• C1164 CV 1	G
	• C1165 CV 2	
	C1197 VACUUM SENSOR	
	C1198 VACUUM SEN CIR	Н
	C1199 BRAKE BOOSTER	
	C119A VACUUM SEN VOLT	
6	C1155 BR FLUID LEVEL LOW	

# DTC Index

INFOID:000000012551827

DTC	Display Item	Refer to
C1101	RR RH SENSOR-1	
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	BRC-67, DTC Description
C1104	FR LH SENSOR-1	-
C1105	RR RH SENSOR-2	
C1106	RR LH SENSOR-2	BBC 72 "DTC Description"
C1107	FR RH SENSOR-2	BRC-72, DTC Description
C1108	FR LH SENSOR-2	-
C1109	BATTERY VOLTAGE [ABNOMAL]	BRC-79, "DTC Description"
C1111	PUMP MOTOR	BRC-81, "DTC Description"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-84, "DTC Description"
C1116	STOP LAMP SW	BRC-91, "DTC Description"
C1120	FR LH IN ABS SOL	BRC-95, "DTC Description"
C1121	FR LH OUT ABS SOL	BRC-97, "DTC Description"
C1122	FR RH IN ABS SOL	BRC-95, "DTC Description"
C1123	FR RH OUT ABS SOL	BRC-97, "DTC Description"
C1124	RR LH IN ABS SOL	BRC-95, "DTC Description"
C1125	RR LH OUT ABS SOL	BRC-97, "DTC Description"
C1126	RR RH IN ABS SOL	BRC-95, "DTC Description"
C1127	RR RH OUT ABS SOL	BRC-97, "DTC Description"

**BRC-47** 

#### < ECU DIAGNOSIS INFORMATION >

[TYPE 1]

DTC	Display Item	Refer to
C1130	ENGINE SIGNAL 1	BRC-99, "DTC Description"
C1140	ACTUATOR RLY	BRC-101, "DTC Description"
C1142	PRESS SEN CIRCUIT	BRC-103, "DTC Description"
C1143	ST ANG SEN CIRCUIT	BRC-106, "DTC Description"
C1144	ST ANG SEN SIGNAL	BRC-110, "DTC Description"
C1145	YAW RATE SENSOR	BBC 112 "DTC Description"
C1146	SIDE G SEN CIRCUIT	BRC-112, DTC Description
C1155	BR FLUID LEVEL LOW	BRC-115, "DTC Description"
C1160	DECEL G SEN SET	BRC-119, "DTC Description"
C1164	CV 1	PPC 121 "DTC Description"
C1165	CV 2	BRG-121, DTC Description
C1170	VARIANT CODING	BRC-123, "DTC Description"
C1197	VACUUM SENSOR	BRC-124, "DTC Description"
C1198	VACUUM SEN CIR	BRC-127, "DTC Description"
C1199	BRAKE BOOSTER	BRC-129, "DTC Description"
C119A	VACUUM SEN VOLT	BRC-132, "DTC Description"
U1000	CAN COMM CIRCUIT	BRC-135, "DTC Description"

# WIRING DIAGRAM BRAKE CONTROL SYSTEM

Wiring Diagram



BRAKE CONTROL SYSTEM - VDC WITHOUT HILL DESCENT CONTROL

INFOID:000000012551828

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Signal Name	GND1	GND2	PKB	IGN	BRAKE OIL SW	CAN-L	CAN-H		IG ANGLE SENSOF			4	8			Signal Name	GND	CAN-L	BAT	CAN-H					В
Color of Wire	8	в	σ	BG	J	٩.		. M54	me STEERIN		K	1 2 3	5 6 7		-	Color of Wire	GR	٩.	J	_					D
Rerminal No.	-	2	12	21	25	38	6E	Connector No	Connector Na		E	S H	Ď			Terminal No.	-	2	4	5					E
		_				2 1	22 21																		BF
DESCEN	METER					7 6 5 4 3	27 26 25 24 23	al Name	1		1	I	I	I	1	1									G
						12 11 10 9 8	32 31 30 29 28	of Signe																	Н
tor No. M2	tor Name CC					17 16 15 14 13	37 36 35 34 33	al No. Color c	0	J	۲. ۲	, L	G	٩	٩										I
SS - VDC	Connect		E		2	20 19 18	40 39 38	Termine	330	34G	35G	36G	55G	566	57G	58G									J
										_	$\left[ \right]$														K
	J/B)		0 2P 1P	P 9P 8P			ul Name					4G 5G	9G 10G		76 186 196 206 216	/6 28/6 29/6 30/6	7G38G39G40G41G 7G48G49G50G		76586596666666		7G78G79G80G81G 7G88G89G90G	040 050	99G 100G		L
0L SYST	JSE BLOCK ( HITE		5P 4P 3	14P 13P 12P 11P 10			Signe	31	IRE TO WIRE			16 26 36	6G 7G 8G	-	136 146 156 166 1	1236224625612662	133G134G135G136G13 143G144G145G146G14		153G54G55G56G5		173G 74G 75G 76G 7 183G 84G 85G 86G 8	916 026 036	96G 97G 98G		M
CONIHC	tor Name PL		7P 6P	16P15P			al No. Color c Wire BG	tor No. Mo	tor Name Wi						116126		31G32C 42G		516526		716726				Ν
Connec	Connec		E		5		Termini 8P	Connect	Connec	COLLIEC	E	SH											40	IRCP	0
-																								 	Р

# **BRAKE CONTROL SYSTEM**

< WIRING DIAGRAM >

[TYPE 1]

LACK	f Signal Name	4 RE TO WIRE 11TE 20 19 18 17 16 15 14 13	f Signal Name -	1
Connector No. E1 Connector Name FF Connector Color BL	Terminal No. Color o Wire 2 W	Connector No. E3 Connector Name WII Connector Color WF	Terminal No. Color o Wire 13 BG	4 -
0 / RATE/SIDE/DECEL G SOR CK	Signal Name	E BLOCK (J/B) FE	Signal Name -	I
Connector No. M16( Connector Name YAW SEN Connector Color BLA(	Terminal No.Color of Wire1GR2P3L4G	Connector No. E28 Connector Name FUSE Connector Color WHIT	Terminal No. Color of 5M Y	M/
OFF SWITCH	Signal Name		Signal Name	I
ector No. M71 ector Name VDC ( ector Color BLAC)	inal No. Color of Wire 2 GR	ector No. E21 ector Name BRAK SWIT ector Color GRAN	inal No. Color of Wire	2 B

#### ABFIA0933GB

20NNECTOR-E	Signal Name Signal Name	
E44 DINT ( MHITE 10 9 8 1 21 20 19 1 22 32 31 30 2	Wire Wire BLACK	
Sonnector No. Sonnector Nam	Terminal No. 00 12 13 20 20 20 20 20 20 20 20 20 20	
UT WHEEL SENSOR RH	Signal Name Signal Name Signal Name	_
E43 In BLAC	Wire BLAC	
Connector Nor. Connector Nam Connector Colo	Terminal No. Connector No. Connector Nam Connector Nam Connector Colo Terminal No. Connector Nam 3	
AP SWITCH	Signat Name	
10P LAN		
Version of the second s	Color BI Color LG	
Connector N Connector C Connector C	Terminal Nc 2 Connector N Connector N 1 1 1	

# BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[TYPE 1]

Revision: November 2015

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ABFIA1115GB

< WIRING DIAGRAM >	AM >
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	Color of	
Ferminal No.	Wire	Signal Name
14	Ι	I
15	٩	CAN-L
16	BG	CANM2 (+)
17	٩	RR RH SEN (SIGNAL)
18	BG	RR RH SEN (POWER)
19	M	FR LH SEN (SIGNAL)
20	ŋ	FR LH SEN (POWER)
21	Ι	I
22	I	I
23	I	I
24	I	I
25	_	CAN-H
26	I	I
27	I	I
28	В	VAC SEN (POWER)
29	I	I
30	н	VDC OFF SW
31	I	I
32	SHIELD	VAC SEN (GND)
33	I	I
34	BR	IGN (POWER)





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

ABFIA1116GB

Connector No. Connector Name	E152 WIRE TO WIRE		Terminal No.	Color of Wire	Signal Name	Connector No. E167 Connector Name VACUUM SENSOR		
Connector Color	WHITE		33G		1	Connector Color BLACK		
			34G	>	1			
			35G	۹.	1			
Н	56 10 20 20		36G	_	I	HS		
Ď	100 86 76 86		55G	BR	1			
			56G	æ	1			
21G	3206196186176166156146136126116		57G	٩.	I			
	30G 29G 28G 27G 26G 25G 24G 23G 22G		58G	BG	I	Terminal No. Wire Signal Name	Je	
41G	3406396386376366356346336326316							
	506496486476466456446436426					2 CHIELD		
61G	3606 596 586 576 566 556 546 536 526 516							
	70G 69G 68G 67G 66G 65G 64G 63G 62G							
81G	380617961786176176175617561746173617261716							
	90G 89G 88G 87G 86G 85G 84G 83G 82G							
	95G 94G 93G 92G 91G							
	1006996 986 976 966							
		ור						
								I
Connector No.	C10		Connector No	о. С11		Connector No. C13		
Connector Name	REAR WHEEL SENSOR LH		Connector Né	ame REAF	WHEEL SENSOR RH	Connector Name WIRE TO WIRE		
Connector Color	BLACK		Connector Co	olor GRA'		Connector Color BLACK		
	[			I				
	ľ.		Æ	لكرا				
H.S.			H.S.	ני	Ð	H.S.		
							ſ	
Terminal No. Colt	or of Signal Name		Terminal No.	Color of Wire	Signal Name	Terminal No. Vire Signal Name	Je	
-	1		-	>	1	- N 6		
2	- N		5	٩	1	10 B -		
-						11 P		
						12 V -		
						-		
						E		
N 0	M	K	J		G	C D E	В	А
						C		

# **BRAKE CONTROL SYSTEM**

< WIRING DIAGRAM >

[TYPE 1]

Revision: November 2015

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ABFIA0727GB

Connector Name WIRE TO WIRE Connector Color BLACK

Connector No. B13

< WIRING DIAGRAM >

Signal Name	I	I	I	I
Color of Wire	L	Р	BR	Υ
Terminal No.	13	14	15	16

8         4         3           10         6         4         3           11         0         5         1	Signal Name	1	I	I	I
	Color of Wire	Y	BR	Р	Γ
语 H.S.	Terminal No.	6	10	11	12

AAFIA0142GB

# **APPLICATION NOTICE**

# BASIC INSPECTION APPLICATION NOTICE

# **Application Notice**

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INFOID:000000012551829

[TYPE 1]

Service information	Remarks	C
TYPE 1	VDC/TCS/ABS	U
TYPE 2	HILL DESCENT CONTROL/VDC/TCS/ABS	

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Revision: November 2015

< BASIC INSPECTION >

# DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

[TYPE 1]

INFOID:000000012551830

DETAILED FLOW

#### **1.**INTERVIEW THE CUSTOMER

Clarify customer concerns before inspection. First of all, perform an interview utilizing <u>BRC-59</u>, "<u>Diagnostic</u> <u>Work Sheet</u>" and reproduce the symptom as well as fully understand it. Ask customer about his/her concerns carefully. Check symptoms by driving vehicle with customer, if necessary. **CAUTION**:

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

>> GO TO 2.

#### 2.CHECK SYMPTOM

Reproduce the symptom that is indicated by the customer, based on the information from the customer obtained in the interview. Also check that the symptom is not caused by fail-safe mode. Refer to <u>BRC-44</u>, <u>"Fail-Safe"</u>.

#### **CAUTION:**

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

>> GO TO 3.

**3.** PERFORM THE SELF-DIAGNOSIS

() With CONSULT

1. Turn the ignition switch OFF  $\rightarrow$  ON. CAUTION:

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

2. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC detected?

YES >> Record or print Self Diagnostic Results and Freeze Frame Data (FFD). GO TO 4.

- NO >> GO TO 6.
- **4.**RECHECK THE SYMPTOM

#### With CONSULT

- 1. Erase "Self Diagnostic Result" of "ABS".
- 2. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF. CAUTION:

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

3. Perform DTC confirmation procedures for the malfunctioning system.

NOTE:

If some DTCs are detected at the some time, determine the order for performing the diagnosis based on <u>BRC-46, "DTC Inspection Priority Chart"</u>.

#### Is DTC detected?

YES >> GO TO 5.

NO >> Check harness and connectors based on the information obtained in the interview. Refer to <u>GI-47</u>. <u>"Intermittent Incident"</u>.

# **5.** REPAIR OR REPLACE MALFUNCTIONING COMPONENT

- 1. Repair or replace malfunctioning components.
- 2. Reconnect component or connector after repairing or replacing.
- 3. When DTC is detected, erase "Self Diagnostic Result" of "ABS". CAUTION:
  - Turn the ignition switch  $\text{OFF} \rightarrow \text{ON} \rightarrow \text{OFF}$  after erasing Self Diagnostic Result.
  - Be sure to wait of 10 seconds after turning ignition switch OFF or ON.

#### **BRC-58**

## DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION > [TYPE 1	]
>> GO TO 7. 6.IDENTIFY MALFUNCTIONING SYSTEM BY SYMPTOM DIAGNOSIS	A
Identify malfunctioning system based on symptom diagnosis and perform inspection. <u>Can the malfunctioning system be identified?</u> YES >> GO TO 7.	В
NO >> Check harness and connectors based on the information obtained in the interview. Refer to <u>GI-47</u> <u>"Intermittent Incident"</u> . <b>7.</b> FINAL CHECK	<u>,</u> C
With CONSULT  Select "DATA MONITOR" of "ABS"	D
<ol> <li>Check the reference values. Refer to <u>BRC-42. "Reference Value"</u>.</li> <li>Recheck the symptom and check that the symptom is not reproduced on the same conditions. <u>Is the symptom reproduced?</u></li> </ol>	E
YES >> GO TO 3. NO >> Inspection End.	BR
Diagnostic Work Sheet	31
DESCRIPTION	G

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

		Interview sheet			
Customer	MR/MS	Registration number	Initial year registration		
name		Vehicle type	VIN		
Storage date		Engine/trac- tion Motor	Mileage km (Mile)		
		Does not operate ( ) function			
		□ Warning lamp turns ON.			
Symptom		ABS (ABS) BRAKE OF			
		□ Noise (Location: ) □ Vibration (Location: )			
		□ Other ( )			
First occurrence		□ Recently □ Other ( )			
Frequency of occurrence		□ Always □ Under a certain cor	nditions of Sometimes ( time(s)/day)		
		□ Irrelevant			
Climate con-	Weather	□ Fine □ Cloud □ Rain	□Snow □ Others ( )		
ditions	Temperature	□ Hot □Warm □ Cool	□ Cold □ Temperature [Approx. °C (°F)]		
	Relative humidity	□ High □ Moderate	□ Low		
Road conditions		□ Ordinary road □ Highway □ Mo	ountainous road (uphill or downhill) D Rough road		

INTERVIEW SHEET SAMPLE

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# **DIAGNOSIS AND REPAIR WORK FLOW**

#### < BASIC INSPECTION >

			Interview	sheet		
Customer	MR/MS	Registration number			Initial year registration	
Hame		Vehicle type			VIN	
Storage date		Engine/trac- tion Motor			Mileage	km (Mile)
Operating condition, etc.		<ul> <li>Irrelevant</li> <li>When engine/traction motor starts</li> <li>During idling</li> <li>During driving</li> <li>During acceleration</li> <li>At constant speed driving</li> <li>During deceleration</li> <li>Immediately before stop [Vehicle speed: Approx. km/h (MPH)]</li> <li>During cornering (right curve or left curve)</li> <li>When steering wheel is steered (to right or to left)</li> </ul>				
	VDC OFF switch operation	□ Yes [	🗆 No			
	Use of other functions (ex. ICC)	□ Yes [	🗆 No (	)		
Other condi- tions	Presence of non-genuine parts installation	□ Yes [	🗆 No (	)		

Memo

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

< BASIC INSPECTION > [TYPE 1]	
ADDITIONAL SERVICE WHEN REPLACING ABS ACTUATOR AND ELEC- TRIC UNIT (CONTROL UNIT)	A
Description	B
<ul> <li>After replacing the ABS actuator and electric unit (control unit), perform the following procedures:</li> <li>Neutral position adjustment for the steering angle sensor</li> <li>Calibration of the decel G sensor</li> </ul>	С
Work Procedure	
1. PERFORM THE NEUTRAL POSITION ADJUSTMENT FOR THE STEERING ANGLE SENSOR	D
Perform the neutral position adjustment for the steering angle sensor.	
>> Refer to <u>BRC-62. "Work Procedure"</u> , GO TO 2. <b>2.</b> PERFORM CALIBRATION OF THE DECEL G SENSOR	E
Perform calibration of the decel G sensor.	BRC
>> Refer to <u>BRC-64, "Work Procedure"</u> .	G
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# ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

#### < BASIC INSPECTION >

# ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

# Description

INFOID:000000012551834

**[TYPE 1]** 

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	x
Removing/Installing steering components	x
Replacing steering components	x
Removing/Installing suspension components	×
Replacing suspension components	x
Change tires to new ones	_
Tire rotation	_
Adjusting wheel alignment	x

#### Work Procedure

INFOID:000000012551835

# 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.

- After approximately 10 seconds, touch "END".
   NOTE: After approximately 60 seconds, it ends automatically.
- 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±2.5°.

Is the steering angle within the specified range?

YES >> GO TO 4.

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

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

Erase the self-diagnosis memory of the ABS actuator and electric unit (control unit) and ECM. • ABS actuator and electric unit (control unit): Refer to <u>BRC-36, "CONSULT Function"</u>.

## **BRC-62**

# ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

< BASIC INSPECTION > [TYPE 1]
• ECM: Refer to EC-71, "CONSULT Function" (USA and Canada) or EC-563, "CONSULT Function" (Mexico).
Are the memories erased?
YES >> Inspection End.
NO >> Check the items indicated by the self-diagnosis.

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## **CALIBRATION OF DECEL G SENSOR**

#### < BASIC INSPECTION >

# CALIBRATION OF DECEL G SENSOR

#### Description

Refer to the table below to determine if calibration of the decel G sensor is required.

Situation	Calibration of decel G sensor
Removing/Installing ABS actuator and electric unit (control unit)	_
Replacing ABS actuator and electric unit (control unit)	×
Removing/Installing steering components	_
Replacing steering components	_
Removing/Installing suspension components	_
Replacing suspension components	_
Removing/Installing tire	_
Replacing tire	_
Tire rotation	_
Adjusting wheel alignment	_
Removing/Installing yaw rate/side/decel G sensor	×
Replacing yaw rate/side/decel G sensor	×

#### Work Procedure

INFOID:000000012551837

# CALIBRATION OF DECEL G SENSOR

# To calibrate the decel G sensor, make sure to use CONSULT. (Calibration cannot be done without CONSULT).

**1.**ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

>> GO TO 2.

# 2. PERFORM CALIBRATION OF DECEL G SENSOR

- 1. On the CONSULT screen, touch "WORK SUPPORT" and "DECEL G SEN CALIBRATION" in order.
- 2. Touch "START".
- 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 "DECEL G SEN" is within  $\pm$  0.08G.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform calibration of decel G 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.

- ABS actuator and electric unit (control unit): Refer to <u>BRC-36, "CONSULT Function"</u>.
- ECM: Refer to EC-71, "CONSULT Function" (USA and Canada) or EC-563, "CONSULT Function" (Mexico).

#### **BRC-64**

2016 Pathfinder

INFOID:000000012551836

×: Required -: Not required

# **CALIBRATION OF DECEL G SENSOR**

BASI	C INSPECTION >	[TYPE 1]
re the	memories erased?	
YES	>> Inspection End.	A
NO	>> Check the items indicated by the self-diagnosis.	
		_
		E
		C
		Γ
		E
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		Δ
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		Ν
		C
		F

# DTC/CIRCUIT DIAGNOSIS APPLICATION NOTICE

# **Application Notice**

INFOID:000000012551838

Service information	Remarks
TYPE 1	VDC/TCS/ABS
TYPE 2	HILL DESCENT CONTROL/VDC/TCS/ABS

# C1101, C1102, C1103, C1104 WHEEL SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

# C1101, C1102, C1103, C1104 WHEEL SENSOR

# **DTC** Description

# DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC CRNT DTC Harness or connector Harness or connector Н ABS actuator and electric unit (control unit) power supply sys- Wheel sensor · ABS actuator and electric unit (control unit) tem · ABS actuator and electric unit (control unit) power supply sys- Fuse · Fusible link tem · Battery Fuse · Fusible link Battery J · Vehicle was not driven after previous repair

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

#### >> GO TO 2.

# 

۷.	CHECK DIG DETECTION	M
(P)	With CONSULT	
1.	Start the engine.	
2.	Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.	N
3.	Stop the vehicle.	IN
4.	Turn the ignition switch OFF.	
	NOTE:	
	Wait at least 10 seconds after turning ignition switch OFF.	0
5.	Start the engine.	
	NOTE:	
	Wait at least 10 seconds after starting the engine.	Ρ
6.	Perform "Self Diagnostic Result" of "ABS".	
ls I	DTC "C1101", "C1102", "C1103" or "C1104" detected?	
Y	ES-1 >> "C1101", "C1102", "C1103" or "C1104" is displayed as "CRNT": Proceed to <u>BRC-68, "Diagnosis</u>	
	Procedure".	
Y	ES-2 >> "C1101", "C1102", "C1103" or "C1104" is displayed as "PAST": Inspection End (Erase "Self Diag-	
	nostic Result" of "ABS")	

NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".

#### **BRC-67**

INFOID:000000012551839

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В

< DTC/CIRCUIT DIAGNOSIS >

#### NO-2 >> Confirmation after repair: Inspection End.

#### Diagnosis Procedure

#### **CAUTION:**

#### Never check between wheel sensor harness connector terminals.

1.CHECK WHEEL SENSOR

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

Is the inspection result normal?

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

2.REPLACE WHEEL SENSOR (1)

#### (P)With CONSULT

- Ĩ. Replace the wheel sensor.
- Front: Refer to <u>BRC-155</u>, "Removal and Installation Front Wheel Sensor". Rear: Refer to <u>BRC-157</u>, "Removal and Installation Rear Wheel Sensor".
- Erase "Self Diagnostic Result" of "ABS". 2.
- 3. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF.
- NOTE: Wait at least 10 seconds after turning ignition switch OFF or ON.
- 4. Start the engine.
- 5. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes. NOTE:
  - Vehicle must be driven after repair or replacement to erase the previous DTCs.
- 6. Stop the vehicle.
- 7. Turn the ignition switch OFF.

#### NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

8. Start the engine.

#### NOTE:

Wait at least 10 seconds after starting the engine.

Perform "Self Diagnostic Result" of "ABS". 9.

Is DTC "C1101", "C1102", "C1103" or "C1104" detected?

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

# 3.CHECK CONNECTOR

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

## Is the inspection result normal?

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

#### **4.**PERFORM SELF-DIAGNOSIS (1)

#### (P)With CONSULT

- Erase "Self Diagnostic Result" of "ABS".
- Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF. 2. NOTE:
  - Wait at least 10 seconds after turning ignition switch OFF or ON.
- Start the engine.
- 4. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes. NOTE:

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

- 5. Stop the vehicle.
- Turn the ignition switch OFF. 6. NOTE:

INFOID:000000012551840

	C1101, C1102, C1103, C1104 WHEEL SENSOR
< D	TC/CIRCUIT DIAGNOSIS > [TYPE 1]
7.	Wait at least 10 seconds after turning ignition switch OFF. Start the engine. NOTE:
8.	Wait at least 10 seconds after starting the engine. Perform "Self Diagnostic Result" of "ABS".
<u>Is D</u>	<u>)TC "C1101", "C1102", "C1103" or "C1104" detected?</u>
	S >> GO TO 5. >> Inspection End.
<b>5.</b> 0	CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIR- T
Che "Dia	eck the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-136,</u> agnosis Procedure".
<u>Is th</u>	<u>ne inspection result normal?</u>
	-S >> GO TO 6. D >> Repair / replace harness, connector, fuse, or fusible link.
<b>b.</b> 0	
1. 2. 3.	Turn the ignition switch OFF. Disconnect ABS actuator and electric unit (control unit) harness connector and then check the ABS actu- ator and electric unit (control unit) pin terminals for damage or loose connection with harness connector. Disconnect wheel sensor harness connector and check each wheel sensor pin terminal for damage or loose connection with harness connector.
<u>Is th</u>	ne inspection result normal?
YE NC 7.F	<ul> <li>S &gt;&gt; GO TO 8.</li> <li>&gt;&gt; Repair / replace harness, connector, or terminal, and GO TO 7.</li> <li>PERFORM SELF-DIAGNOSIS (2)</li> </ul>
1.	Connect ABS actuator and electric unit (control unit) harness connector.
2.	Connect wheel sensor harness connector.
3. 4.	Turn the ignition switch OFF $\rightarrow$ ON $\rightarrow$ OFF.
_	Wait at least 10 seconds after turning ignition switch OFF or ON.
5. 6.	Start the engine. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes. <b>NOTE:</b>
7.	Vehicle must be driven after repair or replacement to erase the previous DTCs. Stop the vehicle.
8.	NOTE: Wait at least 10 seconds after turning ignition switch OFE
9.	Start the engine. NOTE:
10.	Wait at least 10 seconds after starting the engine. Perform "Self Diagnostic Result" of "ABS".
<u>Is D</u>	<u>TC "C1101", "C1102", "C1103" or "C1104" detected?</u>
YE NC	S >> GO TO 8. D >> Inspection End.
8.0	CHECK WHEEL SENSOR HARNESS
1.	Turn the ignition switch OFF.

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

3. Disconnect wheel sensor harness connector.

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

# C1101, C1102, C1103, C1104 WHEEL SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

Power Supply Circuit

ABS actuator and electric unit (control unit)		Wheel sensor			Continuity	
Connector	Terminal	Connector		Terminal	Continuity	
	20	E18	(Front LH wheel)			
<b>E107</b>	10	E43	(Front RH wheel)	1	Vec	
L127	8	C10	(Rear LH wheel)		163	
	18	C11	(Rear RH wheel)			

#### Signal Circuit

ABS actuator and ele	Wheel sensor			Continuity	
Connector	Terminal	Connector		Terminal	Continuity
	19	E18	(Front LH wheel)	2	Yes
<b>E107</b>	9	E43	(Front RH wheel)		
EIZI	7	C10	(Rear LH wheel)		
	17	C11	(Rear RH wheel)		

#### Is the inspection result normal?

YES >> GO TO 10.

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

**9.** PERFORM SELF-DIAGNOSIS (3)

#### (P)With CONSULT

- T. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect wheel sensor harness connector.
- 3. Erase "Self Diagnostic Result" of "ABS".
- 4. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF. **NOTE:**

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

- 5. Start the engine.
- Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes. NOTE:

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

- 7. Stop the vehicle.
- 8. Turn the ignition switch OFF.
  - NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

9. Start the engine.

NOTE:

Wait at least 10 seconds after starting the engine.

- 10. Perform "Self Diagnostic Result" of "ABS".
- Is DTC "C1101", "C1102", "C1103" or "C1104" detected?
- YES >> GO TO 10.
- NO >> Inspection End.

10. CHECK WHEEL SENSOR OUTPUT SIGNAL

- 1. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 2. Disconnect wheel sensor harness connector.
- 3. Connect ABS active wheel sensor tester (SST: J-45741-A) to wheel sensor using appropriate adapter.
- 4. Turn the ABS active wheel sensor tester power switch ON.
- NOTE:

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

 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.

# C1101, C1102, C1103, C1104 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS > [TYPE 1]	
Does the ABS active wheel sensor tester detect a signal?	
YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u> lation".	
NO >> GO IO 11.	
TI.REPLACE WHEEL SENSOR	
(P)With CONSULT	
1. Replace the wheel sensor.	
- Front: Refer to <u>BRC-155</u> , "Removal and Installation - Front Wheel Sensor".	
- Rear: Refer to <u>BRC-157, "Removal and Installation - Rear Wheel Sensor"</u> .	
2. Connect AbS actuator and electric unit (control unit) namess connector. 3. Frase "Self Diagnostic Result" of "ΔBS"	
4. Turn the ignition switch $OFF \rightarrow ON \rightarrow OFF$ .	
NOTE:	
Wait at least 10 seconds after turning ignition switch OFF or ON.	
5. Start the engine.	
6. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.	_
NUTE: Vehicle must be driven after renair or replacement to erase the previous DTCs	R
7. Stop the vehicle.	
8. Turn the ignition switch OFF.	
NOTE:	
Wait at least 10 seconds after turning ignition switch OFF.	,
9. Start the engine.	
NOTE: Wait at least 10 seconds after starting the engine	
10 Perform "Self Diagnostic Result" of "ABS"	
Is DTC "C1101" "C1102" "C1103" or "C1104" detected?	
VES _>> Penlace the ABS actuator and electric unit (control unit). Pefer to BPC 160. "Permoval and Instal	
lation"	
NO >> Inspection End.	

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## C1105, C1106, C1107, C1108 WHEEL SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

# C1105, C1106, C1107, C1108 WHEEL SENSOR

#### **DTC** Description

INFOID:000000012551841

**[TYPE 1]** 

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

<ul> <li>Harness or connector</li> <li>Wheel sensor</li> <li>Sensor rotor</li> <li>Tire size</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Sensor and electric unit (control unit) power supply system</li> <li>ABS actuator and electric unit (control unit) power supply system</li> </ul>	PAST DTC	CRNT DTC
Fusible link     Fuse     Battery     Battery     Vebicle was not driven after previous repair	<ul> <li>Harness or connector</li> <li>Wheel sensor</li> <li>Sensor rotor</li> <li>Tire size</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>Harness or connector</li> <li>Wheel sensor</li> <li>Sensor rotor</li> <li>ABS actuator and electric unit (control unit)</li> <li>Tire size</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> <li>Vabiale was not driven after previous repair.</li> </ul>

#### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

#### >> GO TO 2.

#### 2.check dtc detection

With CONSULT 1. Start the engine.

- 2. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
- 3. Stop the vehicle.
- 4. Turn the ignition switch OFF.
|  | -      |
|--|--------|
| Wait at least 10 seconds after turning ignition switch OFF.<br>5. Start the engine.  | A      |
| Wait at least 10 seconds after starting the engine.<br>6. Perform "Self Diagnostic Result" of "ABS".   | В      |
| <u>Is DTC "C1105", "C1106", "C1107" or "C1108" detected?</u>   |        |
| YES-1 >> "C1105", "C1106", "C1107" or "C1108" is displayed as "CRNT": Proceed to <u>BRC-73, "Diagnosis</u><br><u>Procedure"</u> .  | С      |
| YES-2 >> "C1105", "C1106", "C1107" or "C1108" is displayed as "PAST": Inspection End (Erase "Self Diag<br>nostic Result" of "ABS").  |        |
| NO-1 >> To check malfunction symptom before repair: Refer to $GI-47$ , "Intermittent Incident".<br>NO-2 >> Confirmation after repair: Inspection End.  | D      |
| Diagnosis Procedure  | 2<br>E |
| CAUTION:   |        |
| 1 OUEOK MULEEL LIUD ASSEMBLY   | BRC    |
|  | DIXO   |
| <ul> <li>Check that there is no excessive looseness in wheel hub assembly.</li> <li>Front: Refer to <u>FAX-6, "Inspection"</u>.</li> <li>Rear: Refer to <u>RAX-5, "Inspection"</u>.</li> </ul>   | G      |
| Is the inspection result normal?   |        |
| <ul> <li>YES &gt;&gt; GO TO 2.</li> <li>NO &gt;&gt; Repair or replace the wheel hub assembly, and GO TO 2.</li> <li>Front: Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>".</li> <li>Rear: Refer to <u>RAX-7</u>, "<u>Removal and Installation</u>".</li> </ul> | Н      |
| 2 CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIR.   |        |
| CUIT   |        |
| Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-136</u><br>" <u>Diagnosis Procedure</u> ".   | J      |
| Is the inspection result normal?   |        |
| YES >> GO TO 3.<br>NO >> Repair / replace harness, connector, fuse, or fusible link.   | К      |
| 3. CHECK TIRE  |        |
| <ol> <li>Turn the ignition switch OFF.</li> <li>Check the tire air pressure, wear and size. Refer to <u>WT-67, "Tire Air Pressure"</u>.</li> </ol>   | L      |
| Is the inspection result normal?   | 5.4    |
| YES >> GO TO 6.<br>NO >> Adjust air pressure or replace tire, and GO TO 4.   | IVI    |
| 4.CHECK DATA MONITOR (1)   | N      |
|  |        |
| <ol> <li>Erase "Self Diagnostic Result" of "ABS".</li> <li>Turn the ignition switch OFF → ON → OFF.</li> <li>NOTE:</li> </ol>  | 0      |
| Wait at least 10 seconds after turning ignition switch OFF or ON.  |        |
| <ol> <li>Start the engine.</li> <li>Select "DATA MONITOR" of "ABS", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and<br/>"BR RH SENSOR"</li> </ol>   | Р      |
| NOTE:  |        |
| <ul> <li>Set the "DATA MONITOR" recording speed to "10 msec".</li> <li>5. Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor.</li> </ul>   |        |
| Vehicle must be driven after repair or replacement to erase the previous DTCs.   |        |

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively? YES >> GO TO 5.

NO >> GO TO 6.

**5.**PERFORM SELF-DIAGNOSIS (1)

### With CONSULT

- 1. Stop the vehicle.
- 2. Turn the ignition switch OFF.
  - NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

3. Start the engine.

#### NOTE:

Wait at least 10 seconds after start the engine.

4. Perform "Self Diagnostic Result" of "ABS".

<u>Is DTC "C1105", "C1106", "C1107" or "C1108" detected?</u>

YES >> GO TO 6.

NO >> Inspection End.

6.CHECK WHEEL SENSOR AND SENSOR ROTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect wheel sensor harness connector.
- 3. Remove dust and foreign matter adhered to the wheel sensor and sensor rotor with a vacuum dust collector through the wheel sensor mounting hole.
  - CAUTION:

Install wheel sensor with no backlash and float, and tighten the mounting bolt to the specified torque.

- Front: Refer to <u>BRC-155, "Exploded View Front Wheel Sensor"</u>.
- Rear: Refer to <u>BRC-156, "Exploded View Rear Wheel Sensor"</u>.

>> GO TO 7.

7.CHECK WHEEL SENSOR

Check the wheel sensor for damage.

Is the inspection result normal?

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

8. CHECK WHEEL SENSOR OUTPUT SIGNAL

- 1. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect ABS active wheel sensor tester (SST: J-45741-A) to wheel sensor using appropriate adapter.
- 3. Turn the ABS active wheel sensor tester power switch ON.
  - NOTE:

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

4. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash ON and OFF to indicate an output signal. NOTE:

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

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

**9.**REPLACE WHEEL SENSOR (1)

With CONSULT

- 1. Replace the wheel sensor.
- Front: Refer to BRC-155, "Removal and Installation Front Wheel Sensor".

< D	TC/CIRCUIT DIAGNOSIS > [TYPI	E 1]
-	Rear: Refer to BRC-157, "Removal and Installation - Rear Wheel Sensor".	
2.	Connect ABS actuator and electric unit (control unit) harness connector.	А
3.	Erase "Self Diagnostic Result" of "ABS".	
4.	Turn the ignition switch OFF $\rightarrow$ ON $\rightarrow$ OFF.	
	NOTE:	В
5	Start the engine	
5. 6	Select "DATA MONITOR" of "ABS" check "FR LH SENSOR" "FR RH SENSOR" "RR LH SENSOR"	and
•.	"RR RH SENSOR".	С
	NOTE:	
	Set the "DATA MONITOR" recording speed to "10 msec".	
7.	Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor.	D
	NOTE: Vahiala must be driven after repair or replacement to cross the providue DTCs	
NT . 1	venicie musi be driven aller repair of replacement to erase the previous DTCs.	
<u>N01</u>	e the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning wheel	<u>sen-</u>
<u>5%</u>	respectively?	
	$= S \rightarrow CO TO 10$	
N	20 >> GO TO 10.	BR
10		
	FERFORM SELF-DIAGNOSIS (2)	
$\mathbb{P}^{V}$	Vith CONSULT	G
1.	Stop the vehicle.	
2.	I urn the ignition switch OFF.	
	Wait at least 10 seconds after turning ignition switch OFF	Н
3.	Start the engine.	
-	NOTE:	
	Wait at least 10 seconds after start the engine.	1
4.	Perform "Self Diagnostic Result" of "ABS".	
<u>Is E</u>	DTC "C1105", "C1106", "C1107" or "C1108" detected?	
YE	ES >> GO TO 11.	J
N	O >> Inspection End.	
11	.CHECK CONNECTOR	
1.	Turn the janition switch OFF.	— K
2.	Check the ABS actuator and electric unit (control unit) harness connector for disconnection or loosen	ess.
3.	Check the wheel sensor harness connector for disconnection or looseness.	
<u>ls t</u>	he inspection result normal?	L
YE	ES >> GO TO 14.	
N	>> Repair / replace harness or connector, securely lock the connector, and GO TO 12.	
12	CHECK DATA MONITOR (2)	IVI
	Nith CONSLILT	
1	Frase "Self Diagnostic Result" of "ABS"	N
2.	Turn the ignition switch OFF $\rightarrow$ ON $\rightarrow$ OFF.	IN
	NOTE:	
	Wait at least 10 seconds after turning ignition switch OFF or ON.	$\bigcirc$
3.	Start the engine.	. 0
4.	Select "DATA MONITOR" of "ABS", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR"	and
		D
	Set the "DATA MONITOR" recording speed to "10 msec"	Р
5.	Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor.	
	NOTE:	
	Vehicle must be driven after repair or replacement to erase the previous DTCs.	
Not	te the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning wheel	sen-
<u>sor</u>	and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference w	<u>vithin</u>
<u>5%</u>	<u>, respectively?</u>	

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 13.

NO >> GO TO 14.

**13.**PERFORM SELF-DIAGNOSIS (3)

With CONSULT

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

Wait at least 10 seconds after start the engine.

- 4. Perform "Self Diagnostic Result" of "ABS".
- Is DTC "C1105", "C1106", "C1107" or "C1108" detected?
- YES >> GO TO 14.
- NO >> Inspection End.
- 14.CHECK TERMINAL
- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector and then check the ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
- 3. Disconnect wheel sensor harness connector and check each wheel sensor pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 17.

- NO >> Repair / replace harness, connector, or terminal, and GO TO 15.
- 15. CHECK DATA MONITOR (3)

With CONSULT

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect wheel sensor harness connector.
- 3. Erase "Self Diagnostic Result" of "ABS".
- 4. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF.
- NOTE:

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

- 5. Start the engine.
- 6. Select "DATA MONITOR" of "ABS", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".

NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

7. Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor. **NOTE:** 

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

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

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

**16.**PERFORM SELF-DIAGNOSIS (4)

#### With CONSULT

- 1. Stop the vehicle.
- 2. Turn the ignition switch OFF.
  - NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

Start the engine.
 NOTE:

Wait at least 10 seconds after start the engine.

4. Perform "Self Diagnostic Result" of "ABS".

C	1105, C1106, C1107, (	C1108 WHEEL SENS	OR
< DTC/CIRCUIT DIAGN	OSIS >		[TYPE 1]
<u>Is DTC "C1105", "C1106",</u>	"C1107" or "C1108" detected	<u>1?</u>	
YES >> GO TO 17.	ad a start of the		
2. Disconnect ABS actu	ator and electric unit (control	unit) harness connector.	
3. Disconnect wheel ser	nsor harness connector.	, , , , , , , , , , , , , , , , , , , ,	
4. Check the continuity	between ABS actuator and el	lectric unit (control unit) harr	less connector and ground.
Power Supply Circuit			
ABS actuator and e	etric unit (control unit)		Continuity
Connector	Terminal		<u> </u>
	20	-	
E127	10	Ground	No
	10	_	
le the inequation requit as	18		
YES >> CO TO 18	<u>IIIIdl (</u>		
NO >> Repair / repla	ce harness or connector, and	d GO TO 18.	
18. CHECK DATA MON	ITOR (4)		
With CONSULT			
1. Connect ABS actuato	or and electric unit (control un	iit) harness connector.	
2. Connect wheel sense	r harness connector.		
4. Turn the ignition swite	the Sult of ABS. The Sult of ABS is the Sult		
NOTE:			
5 Start the engine	nds after turning ignition swite	ch OFF or ON.	
<ol> <li>Start the engine.</li> <li>Select "DATA MONIT</li> </ol>	OR" of "ABS", check "FR LH	SENSOR", "FR RH SENSO	R", "RR LH SENSOR" and
"RR RH SENSOR".			
NOTE: Set the "DATA MONI"	TOR" recording speed to "10	msec"	
7. Read the values (whe	el speed) of both the normal	wheel sensors and malfund	tioning wheel sensor.
NOTE:	n offer renair or real compat	to orace the providuo DTCs	
Venicle must be drive	n after repair or replacement	to erase the previous DTCs	, malfunctioning wheel con
sor and the maximum/mi	nimum wheel speed detected	d by the normal wheel sens	ors, is the difference within
5%, respectively?		•	
YES >> GO TO 19.		t (a a start loosit). Defende DDC	
NO >> Replace the /	ABS actuator and electric uni	t (control unit). Refer to <u>BRC</u>	2-160, "Removal and Instal-
19 PERFORM SELE-D	AGNOSIS (5)		
1 Stop the vehicle			
2. Turn the ignition swite	ch OFF.		
NOTE:	ada after turning ignition quit		
3. Start the engine.	ius alter turning ignition swite		
NOTE:			
Wait at least 10 second	nds after start the engine.		
Is DTC "C1105" "C1106"	"C1107" or "C1108" detector	12	
YES >> Replace the A	ABS actuator and electric uni	<u>* ·</u> t (control unit) Refer to BRC	-160 "Removal and Instal-
		e control anny. I color to DICC	, iso, itomovarana motal-

lation"

< DTC/CIRCUIT DIAGNOSIS >

NO >> Inspection End. 20.REPLACE SENSOR ROTOR

### With CONSULT

- 1. Replace the sensor rotor.
- Front: Refer to <u>BRC-159</u>, "Removal and Installation Front Sensor Rotor".
- Rear: Refer to BRC-159, "Removal and Installation Rear Sensor Rotor".
- 2. Erase "Self Diagnostic Result" of "ABS".
- Turn the ignition switch OFF → ON → OFF.
   NOTE:

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

- 4. Start the engine.
- 5. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes. **NOTE:**

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

- 6. Stop the vehicle.
- 7. Turn the ignition switch OFF. NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

8. Start the engine.

NOTE:

Wait at least 10 seconds after start the engine.

9. Perform "Self Diagnostic Result" of "ABS".

### Is DTC "C1105", "C1106", "C1107" or "C1108" detected?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u> lation".
- NO >> Inspection End.

### C1109 POWER AND GROUND SYSTEM

### < DTC/CIRCUIT DIAGNOSIS >

## C1109 POWER AND GROUND SYSTEM

### **DTC** Description

### DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition	С
C1109	BATTERY VOLTAGE [ABNORMAL] (Battery voltage [abnormal])	<ul> <li>When ignition power supply voltage is in following state:</li> <li>Ignition power supply voltage: 10 V ≥ ignition power supply voltage.</li> <li>Ignition power supply voltage: 16 V ≤ ignition power supply voltage.</li> </ul>	D

# POSSIBLE CAUSE NOTE:

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

PAST DTC	CRNT DTC	BRC
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> <li>Charge system</li> </ul>	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> <li>IPDM E/R</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> <li>Charge system</li> </ul>	G
DTC CONFIRMATION PROCEDURE		I
1.PRECONDITIONING		I
If "DTC CONFIRMATION PROCEDURE" has been pre and wait at least 10 seconds before conducting the ne	eviously conducted, always turn the ignition switch OFF xt test.	J
>> GO TO 2.		
2. CHECK DTC DETECTION		K
<ul> <li>With CONSULT</li> <li>Turn the ignition switch OFF.</li> <li>NOTE:</li> </ul>		L
<ol> <li>Start the engine.</li> <li>NOTE:</li> </ol>	ch OFF.	M
<ul><li>Wait at least 10 seconds after starting the engine.</li><li>Perform "Self Diagnostic Result" of "ABS".</li></ul>		N
Is DTC "C1109" detected?		IN
YES-1 >> "C1109" is displayed as "CRN1": Proceed YES-2 >> "C1109" is displayed as "PAST": Inspection NO-1 >> To check malfunction symptom before rep. NO-2 >> Confirmation after repair: Inspection End.	to <u>BRC-79, "Diagnosis Procedure"</u> . n End (Erase "Self Diagnostic Result" of "ABS"). air: Refer to <u>GI-47, "Intermittent Incident"</u> .	0
Diagnosis Procedure	INFOID:000000012551844	D
1.CHECK CONNECTOR		Г
1. Turn the ignition switch OFF.		

2. Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness. Is the inspection result normal?

YES >> GO TO 3.

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

### **BRC-79**

INFOID:000000012551843

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## C1109 POWER AND GROUND SYSTEM

### < DTC/CIRCUIT DIAGNOSIS >

# 2.PERFORM SELF-DIAGNOSIS

- Turn the ignition switch OFF. NOTE: Wait at least 10 seconds after turning ignition switch OFF.
- Start the engine.
   NOTE:
   Wait at least 10 seconds after starting the engine.
- 3. Perform "Self Diagnostic Result" of "ABS".
- Is DTC "C1109" detected?
- YES >> GO TO 3.
- NO >> Inspection End.

 $\mathbf{3}$ . CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIRCUIT

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-136.</u> <u>"Diagnosis Procedure"</u>.

Is the inspection result normal?

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

**4.**CHECK TERMINAL

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

#### Is the inspection result normal?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u> lation".
- NO >> Repair / replace harness, connector, or terminal.

## C1111 ABS MOTOR, MOTOR RELAY SYSTEM

### < DTC/CIRCUIT DIAGNOSIS >

## C1111 ABS MOTOR, MOTOR RELAY SYSTEM

### **DTC** Description

### DTC DETECTION LOGIC

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

### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC		
Harness or connector	Harness or connector	В	BRC
<ul> <li>ABS actuator and electric unit (control unit) power supply sys- tem</li> </ul>	<ul> <li>ABS actuator and electric unit (control unit)</li> <li>ABS actuator and electric unit (control unit) pow</li> </ul>	er supply sys-	
• Fuse	tem		$\sim$
Fusible link     Batteny	Fuse     Eusible link		G
	• Battery		
DTC CONFIRMATION PROCEDURE			Н
1.preconditioning			
If "DTC CONFIRMATION PROCEDURE" has been pre and wait at least 10 seconds before conducting the net	eviously conducted, always turn the ignition xt test.	n switch OFF	I
>> GO TO 2.			J
2. CHECK DTC DETECTION			
With CONSULT			K
1. Turn the ignition switch OFF $\rightarrow$ ON, and wait 30 set	econds.		
<ol> <li>Drive the vehicle at approx. 50 km/h (31 MPH) or i</li> <li>Stop the vehicle</li> </ol>	more for approx. 2 minutes.		
4. Turn the ignition switch OFF.			L
NOTE:			
Wait at least 10 seconds after turning ignition swite	ch OFF.		
5. Start the engine.		ļ	M
Wait at least 10 seconds after start the engine.			
6. Perform "Self Diagnostic Result" of "ABS".			N.I.
Is DTC "C1111" detected?			N
YES-1 >> "C1111" is displayed as "CRNT": Proceed	to <u>BRC-81, "Diagnosis Procedure"</u> .		
YES-2 >> "C1111" is displayed as "PAST": Inspectior	n End (Erase "Self Diagnostic Result" of "A	.BS").	$\bigcirc$
NO-1 >> To check malfunction symptom before repairs NO-2 >> Confirmation after repairs Inspection End.	air: Refer to GI-47, "Intermittent Incident".		0
Diagnosis Procedure	JI.	NFOID:0000000012551846	Р
1.CHECK CONNECTOR			-
Diagnosis Procedure 1.check connector		NFOID:000000012551846	Ρ

1. Turn the ignition switch OFF.

2. Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness. Is the inspection result normal?

YES >> GO TO 3.

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

#### **BRC-81**

2016 Pathfinder

INFOID:000000012551845

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## C1111 ABS MOTOR, MOTOR RELAY SYSTEM

### < DTC/CIRCUIT DIAGNOSIS >

# 2.PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Turn the ignition switch OFF  $\rightarrow$  ON, and wait 30 seconds.
- 2. Start the engine.
- 3. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes. **NOTE:**

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

- 4. Stop the vehicle.
- 5. Turn the ignition switch OFF.
- NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

- 6. Start the engine.
  - NOTE:
  - Wait at least 10 seconds after starting the engine.
- 7. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1111" detected?

YES >> GO TO 3.

NO >> Inspection End.

 $\mathbf{3}$ . CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIRCUIT

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-136,</u> "<u>Diagnosis Procedure</u>".

Is the inspection result normal?

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

**4.**ERASE SELF-DIAGNOSIS RESULT (1)

With CONSULT

- 1. Start the engine.
- 2. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
- NOTE:

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

- 3. Stop the vehicle.
- 4. Erase "Self Diagnostic Result" of "ABS".
- 5. Turn the ignition switch  $OFF \rightarrow ON \rightarrow OFF$ .
- NOTE:

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

>> Inspection End.

5.CHECK TERMINAL

- 1. Turn the ignition switch OFF.
- Check the ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
- Is the inspection result normal?
- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u> lation".
- NO >> Repair / replace harness or connector, and GO TO 6.
- $\mathbf{6}$ .ERASE SELF-DIAGNOSIS RESULT (2)

#### With CONSULT

- 1. Start the engine.
- 2. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.

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

- 3. Stop the vehicle.
- Erase "Self Diagnostic Result" of "ABS".

C1111 ABS MOTOR, MOTOR RELAY SYSTEM	
DTC/CIRCUIT DIAGNOSIS >	[TYPE 1]
Turn the ignition switch OFF $\rightarrow$ ON $\rightarrow$ OFF.	
Wait at least 10 seconds after turning ignition switch OFF or ON.	
>> Inspection End.	

### < DTC/CIRCUIT DIAGNOSIS >

## C1115 WHEEL SENSOR

### **DTC** Description

INFOID:000000012551847

[TYPE 1]

### DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1115	ABS SENSOR [ABNORMAL SIGNAL] (Wheel sensor [abnormal sig- nal])	When difference in wheel speed between any wheel and others is detected when the vehicle is driven, because of installation of other tires than specified.

### POSSIBLE CAUSE

#### NOTE:

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

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

#### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

#### >> GO TO 2.

## 2. CHECK DTC DETECTION

### With CONSULT

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

Wait at least 10 seconds after turning ignition switch OFF.

5. Start the engine.

#### NOTE:

Wait at least 10 seconds after starting the engine.

6. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1115" detected?

YES-1 >> "C1115" is displayed as "CRNT": Proceed to <u>BRC-84, "Diagnosis Procedure"</u>.

- YES-2 >> "C1115" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

### **Diagnosis** Procedure

#### CAUTION:

Never check between wheel sensor harness connector terminals.

### **BRC-84**

INFOID:000000012551848

< DTC/CIRCUIT DIAGNOSIS >	[TYPE 1]
1.CHECK TIRE	
Check the tire air pressure, wear and size. Refer to <u>WT-67. "Tire Air Pressure"</u> .	
Is the inspection result normal?	
YES >> GO TO 4.	
NO >> Adjust air pressure or replace tire and GO TO 2.	
<b>Z</b> .CHECK DATA MONITOR (1)	
1. Erase "Self Diagnostic Result" of "ABS" 2. Turn the ignition switch OEE SON SOFE	
<b>NOTE:</b> $\mathbf{N}$	
Wait at least 10 seconds after turning ignition switch OFF or ON.	
3. Start the engine.	ISOD" and
"RR RH SENSOR".	SUR and
NOTE:	_
Set the "DATA MONITOR" recording speed to "10 msec".	
<ul> <li>Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel set NOTE:</li> </ul>	ISOF.
Vehicle must be driven after repair or replacement to erase the previous DTCs.	
Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning v	wheel sen-
sor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the differe	nce within
5%, respectively?	
NO $>>$ GO TO 4	
$\frac{3}{3}$ PERFORM SELE-DIAGNOSIS (1)	
With CONSULI     Stop the vehicle	
2. Turn the ignition switch OFF.	
NOTE:	
Wait at least 10 seconds after turning ignition switch OFF.	
NOTE:	
Wait at least 10 seconds after starting the engine.	
<ol> <li>Perform "Self Diagnostic Result" of "ABS".</li> </ol>	
s DTC "C1115" detected?	
YES >> GO TO 4.	
+.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GRC	UND CIR-
UII Check the ABC actuator and electric unit (control unit) newer cumply and ground circuite. Defer to	DDC 126
Diagnosis Procedure".	<u>BRC-130,</u>
Is the inspection result normal?	
YES >> GO TO 5.	
NO >> Repair / replace harness, connector, fuse, or fusible link.	
D.CHECK WHEEL SENSOR AND SENSOR ROTOR	
1. Turn the ignition switch OFF.	
2. Disconnect wheel sensor harness connector.	
<ol><li>Remove dust and foreign matter adhered to the wheel sensor and sensor rotor with a vacuum of the through the wheel sensor mounting help.</li></ol>	ust collec-
CAUTION:	
Install wheel sensor with no backlash and float, and tighten the mounting bolt to the	specified
torque.	-

Revision: November 2015

Front: Refer to <u>BRC-155</u>, "Exploded View - Front Wheel Sensor".
Rear: Refer to <u>BRC-156</u>, "Exploded View - Rear Wheel Sensor".

>> GO TO 6.

6.CHECK WHEEL SENSOR

Check the wheel sensor for damage.

#### Is the inspection result normal?

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

7. CHECK WHEEL SENSOR OUTPUT SIGNAL

- 1. Disconnect ABS actuator and electric unit (control unit) harness connector.
- Connect ABS active wheel sensor tester (SST: J-45741-A) to wheel sensor using appropriate adapter. 2.
- Turn the ABS active wheel sensor tester power switch ON. 3.
- 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.

Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel 4. sensor tester. The red SENSOR indicator should flash ON and OFF to indicate an output signal. NOTE:

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

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

**8.**REPLACE WHEEL SENSOR (1)

(P)With CONSULT

- Replace the wheel sensor. 1.
- Front: Refer to BRC-155, "Removal and Installation Front Wheel Sensor".
- Rear: Refer to BRC-157, "Removal and Installation Rear Wheel Sensor".
- 2. Connect ABS actuator and electric unit (control unit) harness connector.
- Erase "Self Diagnostic Result" of "ABS" 3.
- 4. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF. NOTE:

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

- 5. Start the engine.
- Select "DATA MONITOR" of "ABS", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and 6. "RR RH SENSOR".

NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor. NOTE:

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

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 9. NO >> GO TO 19.

**9.** PERFORM SELF-DIAGNOSIS (2)

(P)With CONSULT

- 1. Stop the vehicle.
- Turn the ignition switch OFF. 2. NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

- 3. Start the engine. NOTE: Wait at least 10 seconds after starting the engine.
- Perform "Self Diagnostic Result" of "ABS". 4.

< DTC/CIRCUIT DIAGNOSIS > [TYPE 1]
Is DTC "C1115" detected?
YES >> GO TO 10.
NO >> Inspection End.
<b>TU.</b> CHECK CONNECTOR
<ol> <li>Turn the ignition switch OFF.</li> <li>Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.</li> <li>Check the wheel sensor harness connector for disconnection or looseness.</li> </ol>
Is the inspection result normal?
YES >> GO TO 12.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 11.
I I.CHECK DATA MONITOR (2)
With CONSULT
1. Erase "Self Diagnostic Result" of "ABS"
2. Turn the ignition switch $OFF \rightarrow ON \rightarrow OFF$ .
Wait at least 10 seconds after turning ignition switch OFF or ON.
3. Start the engine.
4. Select DATA MUNITUR OF ABS, CHECK FRILH SENSUR, "FRIRH SENSUR", "RR LH SENSUR" and "RR RH SENSOR"
NOTE:
Set the "DATA MONITOR" recording speed to "10 msec".
<li>b. Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor. NOTE:</li>
Vehicle must be driven after repair or replacement to erase the previous DTCs.
Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning wheel sen-
sor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within
5%. respectively?
YES >> GO TO 12.
$\frac{12}{12} = 5 = 5 = 5 = 5 = 5 = 5 = 5 = 5 = 5 = $
12.PERFORM SELF-DIAGNOSIS (3)
1. Stop the vehicle. 2 Turn the ignition switch OFF
NOTE:
Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
Wait at least 10 seconds after starting the engine.
4. Perform "Self Diagnostic Result" of "ABS".
Is DTC "C1115" detected?
YES >> GO TO 13
NO >> Inspection End.
13.CHECK TERMINAL
1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector and then check the ABS actu-
ator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
loose connection with harness connector.
Is the inspection result normal?
YES >> GO TO 16.
NO >> Repair / replace harness, connector, or terminal, and GO TO 14.
14. CHECK DATA MONITOR (3)
14.CHECK DATA MONITOR (3)

## 

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

**BRC-87** 

#### < DTC/CIRCUIT DIAGNOSIS >

- 2. Connect wheel sensor harness connector.
- 3. Erase "Self Diagnostic Result" of "ABS"
- 4. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF. **NOTE:**

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

- 5. Start the engine.
- 6. Select "DATA MONITOR" of "ABS", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".

NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

7. Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor. **NOTE:** 

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

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 15.

**15.**PERFORM SELF-DIAGNOSIS (4)

#### With CONSULT

- 1. Stop the vehicle.
- 2. Turn the ignition switch OFF. **NOTE:**

Wait at least 10 seconds after turning ignition switch OFF.

3. Start the engine. **NOTE:** 

Wait at least 10 seconds after starting the engine.

4. Perform "Self Diagnostic Result" of "ABS".

Is DTC "C1115" detected?

YES >> GO TO 16.

NO >> Inspection End.

16. CHECK WHEEL SENSOR HARNESS

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Disconnect wheel sensor harness connector.
- 4. Check the continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector. (Check the continuity while turning steering wheel left and right, or while moving center harness in wheel housing.)

Power Supply Circuit

ABS actuator and ele	ectric unit (control unit)	Wheel sensor		Continuity	
Connector	Terminal	Connector		Terminal	Continuity
E127	20	E18	(Front LH wheel)		
	10	E43	(Front RH wheel)	1	Vec
	8	C10	(Rear LH wheel)		165
	18	C11	(Rear RH wheel)		

Signal Circuit

ABS actuator and ele	ectric unit (control unit)	Wheel sensor		Continuity	
Connector	Terminal	Connector		Terminal	Continuity
E127	19	E18	(Front LH wheel)		
	9	E43	(Front RH wheel)	<b>)</b>	Voc
	7	C10	(Rear LH wheel)	ζ	165
	17	C11	(Rear RH wheel)	+	

#### < DTC/CIRCUIT DIAGNOSIS >

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

Power Supply Circuit				
ABS actuator and ele	ectric unit (control unit)		Continuity	D
Connector	Terminal		Continuity	В
	20			
E 107	10		N	С
E127	8	- Grouna	NO	
	18			
Is the inspection result norr YES >> GO TO 17. NO >> Repair / replac 17.CHECK DATA MONIT	<u>nal?</u> e harness or connector, ar OR (4)	nd GO TO 17.		E
<ul> <li>With CONSULT</li> <li>Connect ABS actuator</li> <li>Connect wheel sensor</li> <li>Erase "Self Diagnostic</li> <li>Turn the ignition switch NOTE: Wait at least 10 second</li> </ul>	and electric unit (control u harness connector. Result" of "ABS" OFF $\rightarrow$ ON $\rightarrow$ OFF. Is after turning ignition swi	nit) harness connector. tch OFF or ON.		BRC G
<ol> <li>Start the engine.</li> <li>Select "DATA MONITO "RR RH SENSOR". NOTE:</li> </ol>	R" of "ABS", check "FR LF	H SENSOR", "FR RH SENSO	DR", "RR LH SENSOR" and	Η
<ul> <li>Set the "DATA MONITO"</li> <li>7. Read the values (whee NOTE:</li> <li>Vabials must be driven</li> </ul>	OR" recording speed to "10 I speed) of both the norma	) msec". al wheel sensors and malfund	ctioning wheel sensor.	I
Note the difference at 50 kr sor and the maximum/mini	n/h (31 MPH) between the mum wheel speed detected	wheel speed detected by the ed by the normal wheel sens	s. e malfunctioning wheel sen- ors, is the difference within	J
YES >> GO TO 18. NO >> Replace the Al	3S actuator and electric ur	nit (control unit). Refer to <u>BRC</u>	C-160, "Removal and Instal-	K
18.PERFORM SELF-DIA	GNOSIS (5)			L
<ul> <li>With CONSULT</li> <li>Stop the vehicle.</li> <li>Turn the ignition switch</li> <li>NOTE:</li> </ul>	OFF.			M
3. Start the engine. <b>NOTE:</b> Wait at least 10 second	is after turning ignition swi	tch OFF.		Ν
4. Perform "Self Diagnost	ic Result" of "ABS".			0
Is DTC "C1115" detected?         YES       >> Replace the AB         lation".       NO         NO       >> Inspection End         10       DEDLACE SENSOR	3S actuator and electric ur	nit (control unit). Refer to <u>BRC</u>	C-160, "Removal and Instal-	P
With CONSULT     Replace the sensor rot	or.			

- Front: Refer to <u>BRC-159</u>, "Removal and Installation Front Sensor Rotor". Rear: Refer to <u>BRC-159</u>, "Removal and Installation Rear Sensor Rotor". -
- \_
- 2. Erase "Self Diagnostic Result" of "ABS"

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< DTC/CIRCUIT DIAGNOSIS >

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

Wait at least 10 seconds after turning ignition switch OFF.

- 8. Start the engine.
  - NOTE:

Wait at least 10 seconds after starting the engine.

9. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1115" detected?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u> lation".
- NO >> Inspection End.

## C1116 STOP LAMP SWITCH

### < DTC/CIRCUIT DIAGNOSIS >

## C1116 STOP LAMP SWITCH

### **DTC** Description

### DTC DETECTION LOGIC

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

### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC	
<ul><li>Harness or connector</li><li>Stop lamp switch signal circuit</li></ul>	<ul> <li>Harness or connector</li> <li>Stop lamp switch</li> <li>ABS actuator and electric unit (control unit)</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<b>BRC</b> G
DTC CONFIRMATION PROCEDURE		
1.PRECONDITIONING		
If "DTC CONFIRMATION PROCEDURE" has been p and wait at least 10 seconds before conducting the r	previously conducted, always turn the ignition switch OFF next test.	I
		J
2 CHECK DTC DETECTION		
With CONSULT  Turn the ignition switch OFF, and wait 10 second	ds or more.	К
2. Start the engine. NOTE: Stop the vehicle.		L
<ol> <li>Wait 1 minute or more. NOTE: Never depress brake pedal.</li> <li>Depress brake pedal by 100 mm (3.94 in) or mor</li> </ol>	re, and maintain at that position for a minimum of 1 minute	Μ
<ul> <li>or more.</li> <li>5. Release brake pedal, and wait 1 minute or more</li> <li>6. Repeat step 4 to 5 ten or more times.</li> <li>7. Turn the ignition switch OFF.</li> </ul>	<u>.</u>	Ν
NOTE: Wait at least 10 seconds after turning ignition sw 8. Start the engine. NOTE:	vitch OFF.	0
Wait at least 10 seconds after starting the engine 9. Perform "Self Diagnostic Result" of "ABS".	e.	Ρ
<u>IS DTC "C1116" detected?</u> YES-1 >> "C1116" is displayed as "CRNT": Procee YES-2 >> "C1116" is displayed as "PAST": Inspecti NO-1 >> To check malfunction symptom before re NO-2 >> Confirmation after repair: Inspection Enc	ed to <u>BRC-92, "Diagnosis Procedure"</u> . ion End (Erase "Self Diagnostic Result" of "ABS"). epair: Refer to <u>GI-47, "Intermittent Incident"</u> . d.	

## **BRC-91**

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## < DTC/CIRCUIT DIAGNOSIS >

### Diagnosis Procedure

INFOID:000000012551850

### NOTE:

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

### **1.**INTERVIEW FROM THE CUSTOMER

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

Is there such a history?

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

2.PERFORM SELF-DIAGNOSIS

### With CONSULT

- 1. Erase "Self Diagnostic Result" of "ABS"
- 2. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF.
  - NOTE:

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

- 3. Start the engine. **NOTE:** 
  - Stop the vehicle.
- 4. Depress the brake pedal several times.
- 5. Turn the ignition switch OFF.

#### NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

6. Start the engine.

#### NOTE:

Wait at least 10 seconds after starting the engine.

7. Perform "Self Diagnostic Result" of "ABS".

### Is DTC "C1116" detected?

- YES >> GO TO 3.
- NO >> Inspection End.
- 3.STOP LAMP FOR ILLUMINATION

Depress brake pedal and check that stop lamps turn ON.

### Do the stop lamps turn ON?

YES >> GO TO 5.

- NO >> Check the stop lamp system. Refer to <u>EXL-80, "Wiring Diagram"</u>. GO TO 4.
- **4.**CHECK DATA MONITOR (1)

### With CONSULT

- 1. Erase "Self Diagnostic Result" of "ABS"
- 2. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF.
- **NOTE:** Wait at least 10 seconds after turning ignition switch OFF or ON.
- 3. Start the engine.
  - NOTE:
    - Stop the vehicle.
- 4. Select "DATA MONITOR" of "ABS", check "STOP LAMP SW". Check that data monitor displays "On" or "Off" when brake pedal is depressed or released. Refer to <u>BRC-42</u>, "<u>Reference Value</u>".

Is the inspection result normal?

YES >> Inspection End.

NO >> GO TO 5.

**5.**CHECK CONNECTOR AND TERMINAL

- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.

## **BRC-92**

<sup>1.</sup> Turn the ignition switch OFF.

## **C1116 STOP LAMP SWITCH**

< DTC/CIRCUIT DIAGNOSIS > [T	YPE 1]
<ol> <li>Check the ABS actuator and electric unit (control unit) pin terminals for damage or loose connecting harness connector.</li> <li>Disconnect stop lamp switch harness connector.</li> <li>Check the stop lamp switch harness connector for disconnection or looseness.</li> </ol>	ion with A
7. Check the stop lamp switch pin terminals for damage or loose connection with harness connector.	В
Is the inspection result normal?	
YES >> GO TO 6.	
6 CHECK ARE ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) ROM/ER SUPPLY AND CROUN	C
<b>O.</b> CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUN	ID CIR-
"Diagnosis Procedure"	<u> (C-136,</u> □
Is the inspection result normal?	
$YES \rightarrow GO TO 7$	E
NO >> Repair / replace harness, connector, fuse, or fusible link.	
7. CHECK DATA MONITOR (2)	
	BRC
1. Erase "Self Diagnostic Result" of "ABS"	
2. Turn the ignition switch OFF $\rightarrow$ ON $\rightarrow$ OFF.	C
NOTE:	G
3 Start the engine	
NOTE:	Н
Stop the vehicle.	
4. Select "DATA MONITOR" of "ABS", check "STOP LAMP SW". Check that data monitor displays "Off" when broke pedal is depressed or released. Befer to BBC 42. "Beference Value"	"On" or
Is the inspection result normal?	I
VES >> Inspection End	
NO $>>$ GO TO 8.	
8. CHECK STOP LAMP SWITCH CIRCUIT (1)	J
1. Turn the ignition switch OFF.	
<ol> <li>Disconnect ABS actuator and electric unit (control unit) harness connector.</li> </ol>	K
3. Check the voltage between ABS actuator and electric unit (control unit) harness connector and gro	ound.

ABS actuator and electric unit (control unit)			Condition	Voltage	L
Connector	Terminal		Condition	(Approx.)	
E107	5	Ground	Brake pedal depressed	Battery voltage	N
	5	Ground	Brake pedal not depressed	0 V	

4. Turn the ignition switch ON.

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

ABS actuator and electric unit (control unit)			- Condition	Voltage	-
Connector	Terminal		Condition	(Approx.)	C
E127	5	Ground	Brake pedal depressed	Battery voltage	-
	5	Ground	Brake pedal not depressed	(Approx.) Battery voltage 0 V	-

### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u><u>lation"</u>.

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

**9.**CHECK STOP LAMP SWITCH CIRCUIT (2)

1. Turn the ignition switch OFF.

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## C1116 STOP LAMP SWITCH

### < DTC/CIRCUIT DIAGNOSIS >

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

ABS actuator and ele	ectric unit (control unit)	Stop lamp switch		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
E127	5	E38	2	Yes	

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

ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal		Continuity
E127	5	Ground	No

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160. "Removal and Instal-</u><u>lation"</u>.

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

**10.**CHECK DATA MONITOR (3)

#### (I) With CONSULT

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect stop lamp switch harness connector.
- 3. Erase "Self Diagnostic Result" of "ABS"
- 4. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF.
- **NOTE:** Wait at least 10 seconds after turning ignition switch OFF or ON.
- 5. Start the engine.

NOTE:

- Stop the vehicle.
- 6. Select "DATA MONITOR" of "ABS", check "STOP LAMP SW". Check that data monitor displays "On" or "Off" when brake pedal is depressed or released. Refer to <u>BRC-42</u>, "<u>Reference Value</u>".

Is the inspection result normal?

- YES >> Inspection End.
- NO >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u> lation".

### Component Inspection

INFOID:000000012551851

### **1.**CHECK STOP LAMP SWITCH

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

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

#### Is the inspection result normal?

YES >> Inspection End.

NO >> Replace the stop lamp switch. Refer to <u>BR-20, "Removal and Installation"</u>.

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

### < DTC/CIRCUIT DIAGNOSIS >

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

### **DTC** Description

### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC CRNT DTC · Harness or connector Harness or connector Н ABS actuator and electric unit (control unit) power supply sys-· ABS actuator and electric unit (control unit) · ABS actuator and electric unit (control unit) power supply system Fuse tem · Fusible link Fuse Battery · Fusible link · Battery

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

#### With CONSULT

- Turn the ignition switch OFF.
   NOTE: Wait at least 10 seconds after turning ignition switch OFF.
   Start the engine. NOTE:
  - Wait at least 10 seconds after starting the engine.
- 3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1120", "C1122", "C1124" or "C1126" detected?

- YES-1 >> "C1120", "C1122", "C1124" or "C1126" is displayed as "CRNT": Proceed to <u>BRC-95</u>, "Diagnosis <u>Procedure"</u>.
   YES-2 >> "C1120", "C1122", "C1124" or "C1126" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-47, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: Inspection End.

### Diagnosis Procedure

**1.**CHECK CONNECTOR

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

### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn the ignition switch OFF.
- 2. Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness. Is the inspection result normal?
- YES >> GO TO 3.
- NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 2.
- 2.PERFORM SELF-DIAGNOSIS

With CONSULT

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

Wait at least 10 seconds after starting the engine.

- 3. Perform "Self Diagnostic Result" of "ABS".
- Is DTC "C1120", "C1122", "C1124" or "C1126" detected?
- YES >> GO TO 3.
- NO >> Inspection End.

 $\mathbf{3}$ . CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIRCUIT

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-136.</u> <u>"Diagnosis Procedure"</u>.

Is the inspection result normal?

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

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

Is the inspection result normal?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u><u>lation"</u>.
- NO >> Repair / replace harness, connector, or terminal.

[TYPE 1]

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

### < DTC/CIRCUIT DIAGNOSIS >

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

### **DTC** Description

### DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition	0
C1121	FR LH OUT ABS SOL (Front LH ABS OUT solenoid valve)	When a malfunction is detected in front LH ABS OUT valve.	
C1123	FR RH OUT ABS SOL (Front RH ABS OUT solenoid valve)	When a malfunction is detected in front RH ABS OUT valve.	C
C1125	RR LH OUT ABS SOL (Rear LH ABS OUT solenoid valve)	When a malfunction is detected in rear LH ABS OUT valve.	E
C1127	RR RH OUT ABS SOL (Rear RH ABS OUT solenoid valve)	When a malfunction is detected in rear RH ABS OUT valve.	

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC	
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> </ul>	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> <li>ABS actuator and electric unit (control unit) power supply sys-</li> </ul>	F
<ul><li>Fuse</li><li>Fusible link</li><li>Battery</li></ul>	tem • Fuse • Fusible link • Battery	

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

#### With CONSULT

- Turn the ignition switch OFF.
   NOTE: Wait at least 10 seconds after turning ignition switch OFF.
   Start the engine. NOTE:
  - Wait at least 10 seconds after starting the engine.
- 3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1121", "C1123", "C1125" or "C1127" detected?

- YES-1 >> "C1121", "C1123", "C1125" or "C1127" is displayed as "CRNT": Proceed to <u>BRC-97, "Diagnosis</u> <u>Procedure"</u>.
   YES-2 >> "C1121", "C1123", "C1125" or "C1127" is displayed as "PAST": Inspection End (Erase "Self Diag-
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-47, "Intermittent Incident"</u>.
- NO-2 >> Confirmation after repair: Inspection End.

## Diagnosis Procedure

1.CHECK CONNECTOR

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

### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

- 1. Turn the ignition switch OFF.
- 2. Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness. <u>Is the inspection result normal?</u>

YES >> GO TO 3.

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

2. PERFORM SELF-DIAGNOSIS

- 1. Turn the ignition switch OFF.
- NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

- 2. Start the engine.
  - NOTE:

Wait at least 10 seconds after starting the engine.

3. Perform "Self Diagnostic Result" of "ABS".

### Is DTC "C1121", "C1123", "C1125" or "C1127" detected?

YES >> GO TO 3.

NO >> Inspection End.

 $\mathbf{3}$ . CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIRCUIT

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-136.</u> "Diagnosis Procedure".

Is the inspection result normal?

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

### **4.**CHECK TERMINAL

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

Is the inspection result normal?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u> lation".
- NO >> Repair / replace harness, connector, or terminal.

## C1130 ENGINE SIGNAL

### < DTC/CIRCUIT DIAGNOSIS >

## C1130 ENGINE SIGNAL

### **DTC** Description

### DTC DETECTION LOGIC

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

### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC	
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> <li>CAN communication line</li> </ul>	<ul> <li>Harness or connector</li> <li>ECM</li> <li>ABS actuator and electric unit (control unit)</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> <li>CAN communication line</li> </ul>	G H
DTC CONFIRMATION PROCEDURE		
1.PRECONDITIONING		
If "DTC CONFIRMATION PROCEDURE" has been pre and wait at least 10 seconds before conducting the new	eviously conducted, always turn the ignition switch OFF xt test.	J
>> GO TO 2.		
2.CHECK DTC DETECTION		Κ
<ul> <li>With CONSULT</li> <li>Turn the ignition switch OFF.</li> <li>NOTE: Wait at least 10 seconds after turning ignition switch</li> <li>Start the engine.</li> </ul>	ch OFF.	L
<ul><li>NOTE: Wait at least 10 seconds after starting the engine.</li><li>Perform "Self Diagnostic Result" of "ABS".</li></ul>		Μ
<u>Is DTC "C1130" detected?</u> YES-1 >> "C1130" is displayed as "CRNT": Proceed YES-2 >> "C1130" is displayed as "PAST": Inspection NO-1 >> To check malfunction symptom before repa NO-2 >> Confirmation after repair: Inspection End.	to <u>BRC-99, "Diagnosis Procedure"</u> . າ End (Erase "Self Diagnostic Result" of "ABS"). air: Refer to <u>GI-47, "Intermittent Incident"</u> .	N
Diagnosis Procedure	INFOID:000000012551857	
1.CHECK ENGINE SYSTEM		Ρ
With CONSULT Perform "Self Diagnostic Result" of "ENGINE".     Is DTC detected?     YES >> Check the DTC. Refer to EC-104, "DTC II	ndex" (VQ35DE FOR USA AND CANADA) or <u>EC-592.</u>	

Revision: November 2015

>> GO TO 2.

NO

"DTC Index" (VQ35DE FOR MEXICO).

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## C1130 ENGINE SIGNAL

### < DTC/CIRCUIT DIAGNOSIS >

 $2. {\sf CHECK} \ {\sf ABS} \ {\sf ACTUATOR} \ {\sf AND} \ {\sf ELECTRIC} \ {\sf UNIT} \ ({\sf CONTROL} \ {\sf UNIT}) \ {\sf POWER} \ {\sf SUPPLY} \ {\sf AND} \ {\sf GROUND} \ {\sf CIRCUIT}$ 

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-136.</u> "Diagnosis Procedure".

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair / replace harness, connector, fuse, or fusible link.

## **3.**CHECK CONNECTOR AND TERMINAL

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

#### Is the inspection result normal?

YES >> GO TO 4.

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

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

#### (P)With CONSULT

- 1. Connect ECM harness connector.
- 2. Connect ABS actuator and electric unit (control unit) harness connector.
- 3. Erase "Self Diagnostic Result" of "ABS"
- Turn the ignition switch OFF.
   NOTE: Wait at least 10 seconds after turning ignition switch OFF.
   Start the engine.
- NOTE: Wait at least 10 seconds after starting the engine.
  Perform "Self Diagnostic Result" of "ABS".
- Is DTC "C1130" or "U1000" detected?

YES ("C1130")>>GO TO 1.

- YES ("U1000")>>Refer to LAN-21, "Trouble Diagnosis Flow Chart".
- NO >> Inspection End.

### C1140 ACTUATOR RELAY SYSTEM

### < DTC/CIRCUIT DIAGNOSIS >

## C1140 ACTUATOR RELAY SYSTEM

## **DTC Description**

### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

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**2.**PERFORM SELF-DIAGNOSIS

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< DTC/CIRCUIT DIAGNOSIS >

#### With CONSULT

- 1. Turn the ignition switch OFF. **NOTE:**
- Wait at least 10 seconds after turning ignition switch OFF.
- 2. Start the engine.
- NOTE: Wait at le
  - Wait at least 10 seconds after starting the engine.
- 3. Perform "Self Diagnostic Result" of "ABS".
- Is DTC "C1140" detected?
- YES >> GO TO 3.
- NO >> Inspection End.

 $\mathbf{3}$ . CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIRCUIT

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-136,</u> "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair / replace harness, connector, fuse, or fusible link.

### **4.**CHECK TERMINAL

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

Is the inspection result normal?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u><u>lation"</u>.
- NO >> Repair / replace harness, connector, or terminal.

## **C1142 PRESS SENSOR**

### < DTC/CIRCUIT DIAGNOSIS >

# C1142 PRESS SENSOR

### **DTC** Description

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

#### **POSSIBLE CAUSE**

#### NOTE:

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

PAST DTC	CRNT DTC	
<ul> <li>Harness or connector</li> <li>Air inclusion in the brake piping</li> <li>Stop lamp switch system</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Pattern</li> </ul>	<ul> <li>Stop lamp switch system</li> <li>ABS actuator and electric unit (control unit)</li> <li>Brake system</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	G BRC
	Air inclusion in the brake piping	Η
DTC CONFIRMATION PROCEDURE		
1.PRECONDITIONING		
If "DTC CONFIRMATION PROCEDURE" has been pre and wait at least 10 seconds before conducting the nex	eviously conducted, always turn the ignition switch OFF xt test.	J
2 CHECK DTC DETECTION		
<ul> <li>With CONSULT         <ol> <li>Turn the ignition switch OFF.</li> <li>NOTE:</li> <li>Wait at least 10 seconds after turning ignition switch</li> </ol> </li> <li>Start the engine.</li> <li>NOTE:</li> <li>Wait at least 10 seconds after starting the engine.</li> <li>Perform "Self Diagnostic Result" of "ABS".</li> <li>Is DTC "C1142" detected?</li> <li>YES-1 &gt;&gt; "C1142" is displayed as "CRNT": Proceed if YES-2 &gt;&gt; "C1142" is displayed as "PAST": Inspection NO-1 &gt;&gt; To check malfunction symptom before repare NO-2 &gt;&gt; Confirmation after repair: Inspection End.</li> </ul>	ch OFF. to <u>BRC-103, "Diagnosis Procedure"</u> . n End (Erase "Self Diagnostic Result" of "ABS"). air: Refer to <u>GI-47, "Intermittent Incident"</u> .	L M N
Diagnosis Procedure	INFOID:000000012551861	
<b>1.</b> STOP LAMP SWITCH SYSTEM		Ρ
Check the stop lamp switch system. Refer to <u>BRC-92</u> , <u>Is the inspection result normal?</u> YES >> GO TO 2. NO >> Repair or replace stop lamp switch system <b>2.</b> CHECK BRAKE FLUID LEAKAGE	"Diagnosis Procedure".	

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< DTC/CIRCUIT DIAGNOSIS >

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace brake fluid leakage part.

### 3.CHECK BRAKE PIPING

Check the brake piping. Refer to <u>BR-8, "Inspection"</u>.

Is the inspection result normal?

- YES >> GO TO 4. NO >> Repair of
  - >> Repair or replace brake piping.
    - Front: Refer to <u>BR-23</u>, "FRONT : Removal and Installation".
    - Rear: Refer to <u>BR-26, "REAR : Removal and Installation"</u>.

**4.**CHECK BRAKE PEDAL

Check the brake pedal.

- Brake pedal height: Refer to <u>BR-7, "Inspection"</u>.
- Brake pedal assembly: Refer to <u>BR-20, "Exploded View"</u>.

Is the inspection result normal?

- YES >> GO TO 5. NO >> Adjust the
  - >> Adjust the brake pedal height or replace brake pedal assembly.
    - Adjust the brake pedal: Refer to <u>BR-13, "Adjustment"</u>.
    - Replace the brake pedal: Refer to <u>BR-20. "Removal and Installation"</u>.

### **5.**CHECK BRAKE MASTER CYLINDER

Check the brake master cylinder. Refer to BR-9, "Inspection".

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Repair or replace brake master cylinder. Refer to <u>BR-28, "Removal and Installation"</u>.

**6.**CHECK BRAKE BOOSTER

Check the brake booster. Refer to <u>BR-10, "Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace brake booster. Refer to <u>BR-31, "Removal and Installation"</u>.

**7.**CHECK VACUUM PIPING

Check the vacuum piping. Refer to <u>BR-33. "Exploded View"</u>.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace vacuum piping. Refer to <u>BR-33, "Removal and Installation"</u>.

**8.**CHECK FRONT DISC BRAKE

Check the front disc brake caliper. Refer to <u>BR-36, "BRAKE CALIPER ASSEMBLY : Exploded View"</u>.

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Repair or replace front disc brake caliper. Refer to <u>BR-37, "BRAKE CALIPER ASSEMBLY :</u> <u>Removal and Installation"</u>.

9.CHECK REAR DISC BRAKE

Check the rear disc brake. Refer to <u>BR-41, "BRAKE CALIPER ASSEMBLY : Exploded View"</u>.

Is the inspection result normal?

- YES >> GO TO 10.
- NO >> Repair or replace rear disc brake. Refer to <u>BR-42</u>, "<u>BRAKE CALIPER ASSEMBLY</u> : <u>Removal and</u> <u>Installation</u>".

10.check abs actuator and electric unit (control unit) power supply and ground circuit

## **C1142 PRESS SENSOR**

< DTC/CIRCUIT DIAGNOSIS > [TYPE 1	]
Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-136</u> "Diagnosis Procedure".	<u>б.</u> А
Is the inspection result normal?	
YES >> GO TO 11.	D
11 OLEOK ADO AOTHATOD AND ELEOTDIO UNIT (OONTDOL UNIT)	В
IT.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)	_
<ul> <li>With CONSULT</li> <li>1. Erase "Self Diagnostic Result" of "ABS".</li> <li>2. Turn the ignition switch OFF.</li> <li>NOTE:</li> </ul>	С
<ul> <li>Wait at least 10 seconds after turning ignition switch OFF.</li> <li>3. Start the engine.</li> <li>NOTE:</li> </ul>	D
<ul> <li>Wait at least 10 seconds after starting the engine.</li> <li>4. Start the engine and drive the vehicle for a short period of time.</li> <li>NOTE:</li> </ul>	E
<ul><li>Vehicle must be driven after repair or replacement to erase the previous DTCs.</li><li>5. Stop the vehicle.</li><li>6. Perform "Self Diagnostic Result" of "ABS".</li></ul>	BRC
Is DTC "C1142" detected?	0
YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Insta</u> <u>lation"</u> .	<u>-</u> G
NO >> Check the ABS actuator and electric unit (control unit) harness connector and terminal for dar age, looseness and disconnection. Repair / replace harness, connector, or terminal.	<b>-</b> Н
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## **C1143 STEERING ANGLE SENSOR**

### < DTC/CIRCUIT DIAGNOSIS >

## C1143 STEERING ANGLE SENSOR

### **DTC** Description

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

### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> <li>CAN communication line</li> <li>Incomplete neutral position adjustment of steering angle sensor</li> <li>Improper installation of steering angle sensor</li> </ul>	<ul> <li>Harness or connector</li> <li>Steering angle sensor</li> <li>ABS actuator and electric unit (control unit)</li> <li>IPDM E/R</li> <li>CAN communication line</li> <li>Wheel alignment</li> <li>Incomplete neutral position adjustment of steering angle sensor</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

#### >> GO TO 2.

### 2. CHECK DTC DETECTION

#### With CONSULT

- Turn the ignition switch OFF.
  - NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

- 2. Start the engine.
  - NOTE:

Wait at least 10 seconds after starting the engine.

3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1143" detected?

YES-1 >> "C1143" is displayed as "CRNT": Proceed to <u>BRC-106, "Diagnosis Procedure"</u>.

- YES-2 >> "C1143" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

### **Diagnosis** Procedure

INFOID:000000012551863

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

#### With CONSULT

Perform neutral position adjustment of steering angle sensor. Refer to BRC-62, "Description".

### **BRC-106**

INFOID:000000012551862

## **C1143 STEERING ANGLE SENSOR**

< DTC/CIRCUIT DIAGNO	SIS >		[TYPE 1]
>> GO TO 2.			
2.PERFORM SELF-DIAG	NOSIS (1)		
With CONSULT 1. Turn the ignition switch	OFF.		
Wait at least 10 second 2. Start the engine. NOTE:	Is after turning ignition switc	h OFF.	
Wait at least 10 second 3. Perform "Self Diagnost	Is after starting the engine. ic Result" of "ABS".		
Is DTC "C1143" detected?			
YES-1 >> "C1143" is disp YES-2 >> "C1143" is disp NO >> Inspection End	layed as "CRNT": GO TO 3. layed as "PAST": Inspection	n End (Erase "Self Diagnos	tic Result" of "ABS").
<b>J.</b> CHECK CONNECTOR			
<ol> <li>Turn the ignition switch</li> <li>Check the ABS actuato</li> <li>Check the steering ang</li> </ol>	OFF. or and electric unit (control u le sensor harness connecto	nit) harness connector for or for disconnection or loos	disconnection or looseness. eness.
Is the inspection result norn	nal?		
NO >> Repair / replace	e harness or connector, sec	urely lock the connector, a	nd GO TO 4.
4.PERFORM SELF-DIAG	NOSIS (2)		
<ul> <li>With CONSULT</li> <li>Turn the ignition switch NOTE: Wait at least 10 second</li> <li>Start the engine.</li> </ul>	OFF. Is after turning ignition switc	h OFF.	
NOTE: Wait at least 10 second Perform "Self Diagnost	ls after starting the engine. ic Result" of "ABS"		
Is DTC "C1143" detected? YES >> GO TO 5. NO >> Inspection End			
<b>D.</b> CHECK STEERING AN	GLE SENSOR POWER SU	PPLY	
<ol> <li>Turn the ignition switch</li> <li>Disconnect steering an</li> <li>Check the voltage betw</li> </ol>	OFF. gle sensor harness connect veen steering angle sensor l	tor. harness connector and gro	und.
Steering a	ngle sensor	_	Voltage
Connector	Terminal		(Approx.)
M54	4	Ground	0 V
<ol> <li>Turn the ignition switch NOTE: Start the engine.</li> <li>Check the voltage betw</li> </ol>	ON. veen steering angle sensor h	harness connector and gro	und.
Steering a	ngle sensor		Voltage
Connector	<b>—</b> · ·	—	1 <sup>v</sup>
	Ierminal		(Approx.)

YES >> GO TO 7. NO >> GO TO 6. Revision: November 2015

## C1143 STEERING ANGLE SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

## 6. Check steering angle sensor power supply circuit

- 1. Turn the ignition switch OFF.
- 2. Check fuse 49 (10A).
- 3. Disconnect IPDM E/R harness connector.
- 4. Check the continuity between steering angle sensor harness connector and IPDM E/R harness connector.

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

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

Steering angle sensor			Continuity
Connector	Terminal		Continuity
M54	4	Ground	No

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.

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

### 7. CHECK STEERING ANGLE SENSOR GROUND CIRCUIT

#### 1. Turn the ignition switch OFF.

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

Steering angle sensor			Continuity
Connector	Terminal		Continuity
M54	1	Ground	Yes

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair / replace harness or connector.

 ${f 8}$ . CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIRCUIT

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-136.</u> "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair / replace harness, connector, fuse, or fusible link.

9.CHECK TERMINAL

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

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

#### Is the inspection result normal?

YES >> GO TO 10.

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

10. CHECK CAN COMMUNICATION LINE

Check the CAN communication line. Refer to LAN-21, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair / replace harness or connector.

**11.**CHECK DATA MONITOR

With CONSULT

1. Select "DATA MONITOR" of "ABS", check "STR ANGLE SIG".

Revision: November 2015

**BRC-108**
# C1143 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >	[TYPE 1]
<ol> <li>Check that the indication changes with the steering angle when the steering w the neutral position. Refer to <u>BRC-42</u>, "<u>Reference Value</u>".</li> </ol>	heel is turned left/right from A
Is the inspection result normal?	
<ul> <li>YES &gt;&gt; Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC</u><u>lation</u>".</li> <li>NO &gt;&gt; Replace the steering angle sensor. Refer to <u>BRC-164</u>, "Removal and I</li> </ul>	C-160, "Removal and Instal- B Installation".
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## C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

#### < DTC/CIRCUIT DIAGNOSIS >

# C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

## DTC Description

INFOID:000000012551864

[TYPE 1]

#### DTC DETECTION LOGIC

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

## POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC
Incomplete neutral position adjustment of steering angle sensor	<ul> <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.PRECONDITIONING

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

>> GO TO 2.

## 2.CHECK DTC DETECTION

(P)With CONSULT

Turn the ignition switch OFF. NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

2. Start the engine.

## NOTE:

Wait at least 10 seconds after starting the engine.

3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1144" detected?

- YES-1 >> "C1144" is displayed as "CRNT": Proceed to <u>BRC-110, "Diagnosis Procedure"</u>. YES-2 >> "C1144" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

## Diagnosis Procedure

INFOID:000000012551865

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

Perform neutral position adjustment of steering angle sensor. Refer to BRC-62, "Description".

>> GO TO 2.

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

(P)With CONSULT

1. Turn the ignition switch OFF. NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

## **C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT**

< DTC/CIRCUIT DIAGNOSIS > [TYPE 1	]
<ol> <li>Start the engine.</li> <li>NOTE: Wait at least 10 seconds after starting the engine.</li> <li>Derform "Oolf Diamondia Deputh" of "ADO".</li> </ol>	A
3. Perform "Self Diagnostic Result" of "ABS". Is DTC "C1144" detected?	В
YES >> GO TO 3. NO >> Inspection End.	
3. CHECK STEERING ANGLE SENSOR SYSTEM	С
<ol> <li>Turn the ignition switch OFF.</li> <li>Check the steering angle sensor system. Refer to <u>BRC-106. "Diagnosis Procedure"</u>. <u>Is the inspection result normal?</u></li> </ol>	D
YES >> GO TO 4. NO >> Repair / replace harness, connector, or terminal. <b>4.</b> CHECK DATA MONITOR	E
<ol> <li>With CONSULT</li> <li>Select "DATA MONITOR" of "ABS", check "STR ANGLE SIG".</li> <li>Check that the indication changes with the steering angle when the steering wheel is turned left/right from the neutral position. Refer to <u>BRC-42</u>, "<u>Reference Value</u>".</li> </ol>	BR(
Is the inspection result normal?	G
YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Insta</u> <u>lation"</u> .	Ŀ
NO >> Replace the steering angle sensor. Refer to <u>BRC-164, "Removal and Installation"</u> .	Н

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### **DTC** Description

INFOID:000000012551866

[TYPE 1]

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>Harness or connector</li> <li>Yaw rate/side/decel G sensor</li> <li>ABS actuator and electric unit (control unit)</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

>> GO TO 2.

### 2. CHECK DTC DETECTION

#### ()With CONSULT

- 1. Turn the ignition switch OFF.
- NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

- 2. Start the engine.
  - NOTE:

Wait at least 10 seconds after starting the engine.

3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1145" or "C1146" detected?

- YES-1 >> "C1145" or "C1146" is displayed as "CRNT": Proceed to <u>BRC-112</u>, "Diagnosis Procedure".
- YES-2 >> "C1145" or "C1146" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

#### **Diagnosis** Procedure

INFOID:000000012551867

#### CAUTION:

• A malfunction in yaw rate/side/decel G sensor system may be detected when the vehicle sharply turns during a spin turn, acceleration turn or drift driving while VDC function is OFF (VDC OFF indicator lamp is in ON status). This is not a malfunction if the status returns to normal after engine is started again. In that case, erase self-diagnosis result memory using CONSULT.

#### **BRC-112**

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

< DTC/CIRCUIT DIAGNOSIS >

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

. Turn the ignition switch 2. Disconnect yaw rate/sid 3. Check the voltage betw	OFF. e/decel G sensor harness o een yaw rate/side/decel G s	connector. sensor harness connector a	and ground.	
Yaw rate/side/d	ecel G sensor		Voltage	—
Yaw rate/side/d Connector	ecel G sensor Terminal	_	Voltage (Approx.)	

Never start engine.

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

Yaw rate/side/decel G sensor		_	Voltage	
Connector	Terminal		(Approx.)	G
M160	4	Ground	Battery voltage	
Is the inspection result norr	nal?			H

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

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

Turn the ignition switch OFF. 1.

2. Check fuse 49 (10A).

3. Disconnect IPDM E/R harness connector.

4. Check the continuity between yaw rate/side/decel G sensor harness connector and IPDM E/R harness connector.

Yaw rate/side/	Yaw rate/side/decel G sensor		IPDM E/R		-
Connector	Terminal	Connector Terminal		Continuity	
M160	4	E119	35	Yes	- L

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

Yaw rate/side/decel G sensor			Continuity	
Connector	Terminal		Continuity	
M160 4		Ground	No	N

#### Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.

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

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

1. Turn the ignition switch OFF.

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

Yaw rate/side/	decel G sensor		Continuity	
Connector	Terminal		Continuity	
M160	1	Ground	Yes	

Is the inspection result normal?

**[TYPE 1]** 

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

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 4.

NO >> Repair / replace harness or connector.

**4.**CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIR-CUIT

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-136,</u> "<u>Diagnosis Procedure</u>".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair / replace harness, connector, fuse, or fusible link.

**5.**CHECK COMMUNICATION LINE

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

Yaw rate/side/	decel G sensor	ABS actuator and ele	ABS actuator and electric unit (control unit)	
Connector	Terminal	Connector	Terminal	Continuity
M160	2	F127	6	Ves
WINO	3		16	165

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair / replace harness or connector. Refer to <u>BRC-8, "Precaution for Harness Repair"</u>.

#### **6.**CHECK TERMINAL

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

Is the inspection result normal?

YES >> GO TO 7.

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

7.REPLACE YAW RATE/SIDE/DECEL G SENSOR

#### With CONSULT.

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Replace the yaw rate/side/decel G sensor. Refer to BRC-162, "Removal and Installation".
- 3. Erase "Self Diagnostic Result" of "ABS"
- 4. Turn the ignition switch OFF.
- 5. Turn the ignition switch ON.

NOTE:

Never start engine.

6. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1145" or "C1146" detected?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160. "Removal and Instal-</u><u>lation"</u>.
- NO >> Inspection End.

## **C1155 BRAKE FLUID LEVEL SWITCH**

#### < DTC/CIRCUIT DIAGNOSIS >

# C1155 BRAKE FLUID LEVEL SWITCH

## **DTC** Description

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC	
<ul><li>Harness or connector</li><li>Brake fluid level is low</li></ul>	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> <li>Brake fluid level switch</li> <li>Combination meter</li> <li>Brake fluid level is low</li> </ul>	BRC G
DTC CONFIRMATION PROCEDURE		
1.PRECONDITIONING		Н
If "DTC CONFIRMATION PROCEDURE" has been pro and wait at least 10 seconds before conducting the ne	eviously conducted, always turn the ignition switch OFF xt test.	I
>> GO TO 2		
2. CHECK DTC DETECTION		1
<ul> <li>With CONSULT</li> <li>1. Turn the ignition switch OFF.</li> <li>NOTE:</li> <li>Wait at least 10 seconds after turning ignition switch</li> </ul>	ch OFF.	K
<ol> <li>Start the engine. NOTE: Wait at least 10 seconds after starting the engine.</li> <li>Perform "Self Diagnostic Result" of "ABS".</li> </ol>		L
Is DTC "C1155" detected? YES-1 >> "C1155" is displayed as "CRNT": Proceed YES-2 >> "C1155" is displayed as "PAST": Inspectio NO-1 >> To check malfunction symptom before rep NO-2 >> Confirmation after repair: Inspection End.	to <u>BRC-115, "Diagnosis Procedure"</u> . n End (Erase "Self Diagnostic Result" of "ABS"). air: Refer to <u>GI-47, "Intermittent Incident"</u> .	M
Diagnosis Procedure	INFOID:000000012551869	
1. CHECK BRAKE FLUID LEVEL		0
<ol> <li>Turn the ignition switch OFF.</li> <li>Check the brake fluid level. Refer to <u>BR-8. "Inspec</u> <u>Is the inspection result normal?</u></li> </ol>	ction".	Ρ
YES >> GO TO 3. NO >> Refill brake fluid. Refer to <u>BR-14, "Drain a</u> <b>2.</b> PERFORM SELF-DIAGNOSIS (1)	nd Refill". GO TO 2.	
With CONSULT     Erase "Self Diagnostic Result" of "ABS"		

INFOID:000000012551868

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< DTC/CIRCUIT DIAGNOSIS >

- 2. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF. NOTE:
  - Wait at least 10 seconds after turning ignition switch OFF or ON.
- Start the engine.
   NOTE:
  - Wait at least 10 seconds after starting the engine.
- 4. Perform "Self Diagnostic Result" of "ABS".
- Is DTC "C1155" detected?
- YES >> GO TO 3.
- NO >> Inspection End.
- **3.**CHECK CONNECTOR
- 1. Turn the ignition switch OFF.
- 2. Check the combination meter harness connector for disconnection or looseness.
- 3. Check the brake fluid level switch harness connector for disconnection or looseness.

#### Is the inspection result normal?

YES >> GO TO 5.

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

**4.** PERFORM SELF-DIAGNOSIS (2)

#### With CONSULT

- Turn the ignition switch OFF.
  - NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

- 2. Start the engine.
  - NOTE:

Wait at least 10 seconds after starting the engine.

- 3. Perform "Self Diagnostic Result" of "ABS".
- Is DTC "C1155" detected?
- YES >> GO TO 5.
- NO >> Inspection End.
- **5.**CHECK BRAKE FLUID LEVEL SWITCH

Check the brake fluid level switch. Refer to BR-28, "Exploded View".

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Replace the reservoir tank. Refer to <u>BR-28, "Exploded View"</u>. GO TO 6.

6.PERFORM SELF-DIAGNOSIS (3)

#### With CONSULT

- 1. Erase "Self Diagnostic Result" of "ABS"
- 2. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF. **NOTE:**

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

- 3. Start the engine.
- **NOTE:** Wait at least 10 seconds after starting the engine.

4. Perform "Self Diagnostic Result" of "ABS".

Is DTC "C1155" detected?

## YES >> GO TO 7.

NO >> Inspection End.

7. CHECK CONNECTOR AND TERMINAL

- 1. Turn the ignition switch OFF.
- 2. Disconnect brake fluid level switch harness connector.
- 3. Check the brake fluid level switch harness connector for disconnection or looseness.
- 4. Check the brake fluid level switch pin terminals for damage or loose connection with harness connector.
- 5. Disconnect combination meter harness connector.

## C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS > [TYP	'E 1]
<ol> <li>Check the combination meter harness connector for disconnection or looseness.</li> <li>Check the combination meter pin terminals for damage or loose connection with harness connector.</li> </ol>	A
Is the inspection result normal?	
YES >> GO TO 9. NO >> Repair / replace harness, connector, or terminal, and GO TO 8.	В
<b>Ö.</b> PERFORM SELF-DIAGNOSIS (4)	
<ul> <li>ⓐWith CONSULT</li> <li>1. Erase "Self Diagnostic Result" of "ABS"</li> <li>2. Turn the ignition switch OFF → ON → OFF.</li> </ul>	С
Wait at least 10 seconds after turning ignition switch OFF or ON. 3. Start the engine. NOTE:	D
<ul><li>Wait at least 10 seconds after starting the engine.</li><li>Perform "Self Diagnostic Result" of "ABS".</li></ul>	E
Is DTC "C1155" detected?	
YES >> GO TO 9. NO >> Inspection End.	BRC
9. CHECK BRAKE FLUID LEVEL SWITCH CIRCUIT	
1. Turn the ignition switch OFF.	G

- 2. Disconnect brake fluid level switch harness connector.
- 3. Disconnect combination meter harness connector.
- 4. Check the continuity between brake fluid level switch harness connector and combination meter harness H connector.

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

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

Brake fluid	level switch		Continuity	
Connector	Terminal		Continuity	
E21	1	Ground	No	

Is the inspection result normal?

YES >> GO TO 10.

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

10. CHECK BRAKE FLUID LEVEL SWITCH GROUND CIRCUIT

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

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

Is the inspection result normal?

YES >> GO TO 11.

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

11. CHECK COMBINATION METER

Check the combination meter. Refer to <u>MWI-18, "CONSULT Function (METER/M&A)"</u>.

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160. "Removal and Instal-</u><u>lation"</u>.

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## C1155 BRAKE FLUID LEVEL SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace combination meter. Refer to <u>MWI-85, "Removal and Installation"</u>.

# Component Inspection

INFOID:000000012551870

**[TYPE 1]** 

# 1. CHECK BRAKE FLUID LEVEL SWITCH

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

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace the reservoir tank. Refer to <u>BR-28</u>, "Exploded View".

## C1160 INCOMPLETE DECEL G SENSOR CALIBRATION

#### < DTC/CIRCUIT DIAGNOSIS >

# C1160 INCOMPLETE DECEL G SENSOR CALIBRATION

## **DTC** Description

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC	
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> </ul>	Incomplete calibration of decel G sensor     ABS actuator and electric unit (control unit)	BRC
<ul> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>Yaw rate/side/decel G sensor</li> <li>Harness or connector</li> </ul>	G
DTC CONFIRMATION PROCEDURE		
1.PRECONDITIONING		Н
If "DTC CONFIRMATION PROCEDURE" has been pre and wait at least 10 seconds before conducting the ne	eviously conducted, always turn the ignition switch OFF xt test.	I
>> GO TO 2.		
2. CHECK DTC DETECTION		J
<ul> <li>With CONSULT</li> <li>1. Turn the ignition switch OFF.</li> <li>NOTE:</li> <li>Wait at least 10 seconds after turning ignition swite</li> </ul>	ch OFF.	K
<ol> <li>Start the engine. NOTE: Wait at least 10 seconds after starting the engine.</li> <li>Perform "Self Diagnostic Result" of "ABS".</li> </ol>		L
Is DTC "C1160" detected?		M
YES-1 >> "C1160" is displayed as "CRNT": Proceed YES-2 >> "C1160" is displayed as "PAST": Inspection NO-1 >> To check malfunction symptom before rep. NO-2 >> Confirmation after repair: Inspection End.	to <u>BRC-119. "Diagnosis Procedure"</u> . n End (Erase "Self Diagnostic Result" of "ABS"). air: Refer to <u>GI-47. "Intermittent Incident"</u> .	Ν
Diagnosis Procedure	INFOID:000000012551872	
1. DECEL G SENSOR CALIBRATION		0
Perform decel G sensor calibration. Refer to BRC-64.	"Work Procedure".	Р
>> GO TO 2.		
2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (	CONTROL UNIT)	
(I) With CONSULT		

Perform "Self Diagnostic Result" of "ABS". Is DTC "C1160" detected? INFOID:000000012551871

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## **C1160 INCOMPLETE DECEL G SENSOR CALIBRATION**

< DTC/CIRCUIT DIAGNOSIS >

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

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

1. Turn the ignition switch OFF.

2. Check the yaw rate/side/decel G sensor system. Refer to BRC-112, "Diagnosis Procedure".

Is the inspection result normal?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160. "Removal and Instal-</u><u>lation"</u>.
- NO >> Replace the yaw rate/side/decel G sensor. Refer to <u>BRC-162</u>, "Removal and Installation".

## C1164, C1165 CV SYSTEM

#### < DTC/CIRCUIT DIAGNOSIS >

# C1164, C1165 CV SYSTEM

## **DTC** Description

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC	
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> </ul>	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> <li>ABS actuator and electric unit (control unit) power supply sys-</li> </ul>	G
• Fuse	tem	
Fusible link	• Fuse	
• Battery	Fusible link     Battery	Н
DTC CONFIRMATION PROCEDURE		
1.preconditioning		I
If "DTC CONFIRMATION PROCEDURE" has been pre-	eviously conducted, always turn the ignition switch OFF	
and wait at least 10 seconds before conducting the nex	xt test.	J
>> GO TO 2.		
2.CHECK DTC DETECTION		Κ
(I) With CONSULT		
1. Turn the ignition switch OFF.		L
NOTE: Wait at least 10 seconds after turning ignition swite		
2. Start the engine.		
NOTE:		M
Wait at least 10 seconds after starting the engine.		
3. Perform Self Diagnostic Result of ABS .		
IS DIC C1164 OF C1165 detected?		Ν
YES-1 >> "C1164" or "C1165" is displayed as "CRNI YES-2 >> "C1164" or "C1165" is displayed as "PAS	": Proceed to <u>BRC-121, "Diagnosis Procedure"</u> . T": Inspection End (Frase "Self Diagnostic Result" of	
"ABS").	The mapeer of the contrast of the plagnostic result of	$\sim$
NO-1 >> To check malfunction symptom before repa	air: Refer to GI-47, "Intermittent Incident".	0
NO-2 >> Confirmation after repair: Inspection End.		
Diagnosis Procedure	INFOID:000000012551874	Ρ
1.check connector		
1. Turn the ignition switch OFF.		

2. Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness. Is the inspection result normal?

YES >> GO TO 3.

INFOID:000000012551873

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## C1164, C1165 CV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

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

2. PERFORM SELF-DIAGNOSIS

#### ()With CONSULT

Perform "Self Diagnostic Result" of "ABS" again.

Is DTC "C1164" or "C1165" detected?

YES >> GO TO 3.

NO >> Inspection End.

 $\mathbf{3}$ . CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIRCUIT

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-136,</u> "<u>Diagnosis Procedure</u>".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair / replace harness, connector, fuse, or fusible link.

**4.**CHECK TERMINAL

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

Is the inspection result normal?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u> lation".
- NO >> Repair / replace harness, connector, or terminal.

## **C1170 VARIANT CODING**

#### < DTC/CIRCUIT DIAGNOSIS >

## C1170 VARIANT CODING

### **DTC** Description

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC	
	ABS actuator and electric unit (control unit)	BRC
DTC CONFIRMATION PROCEDURE		
1.PRECONDITIONING		G
If "DTC CONFIRMATION PROCEDURE" has been pre and wait at least 10 seconds before conducting the ne	eviously conducted, always turn the ignition switch OFF xt test.	0
>> GO TO 2		Н
2. CHECK DTC DETECTION		
1. Turn the ignition switch OFF.		
NOTE: Wait at least 10 seconds after turning ignition swite		J
2. Start the engine.		
NOTE:		L/
3. Perform "Self Diagnostic Result" of "ABS".		r.
Is DTC "C1170" detected?		
YES-1 >> "C1170" is displayed as "CRNT": Proceed YES-2 >> "C1170" is displayed as "PAST": Inspection NO-1 >> To check malfunction symptom before rep. NO-2 >> Confirmation after repair: Inspection End.	to <u>BRC-123, "Diagnosis Procedure"</u> . n End (Erase "Self Diagnostic Result" of "ABS"). air: Refer to <u>GI-47, "Intermittent Incident"</u> .	L
Diagnosis Procedure	INFOID:000000012551876	
1.CHECK SELF-DIAGNOSIS RESULTS		Ν
With CONSULT Replace the ABS actuator and electric unit (control uni "Self Diagnostic Result" of "ABS".	t) even if other DTC are displayed along with "C1170" in	0

>> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u> <u>lation"</u>.

[TYPE 1]

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## C1197 VACUUM SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

## C1197 VACUUM SENSOR

## **DTC Description**

[TYPE 1]

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>Harness or connector</li> <li>Vacuum sensor (brake booster)</li> <li>Vacuum piping</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 the ignition switch OFF and wait at least 10 seconds before conducting the next test.

#### >> GO TO 2.

## 2. CHECK DTC DETECTION

()With CONSULT

- 1. Turn the ignition switch OFF.
- NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

2. Start the engine.

#### NOTE:

Wait at least 10 seconds after starting the engine.

3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1197" detected?

YES-1 >> "C1197" is displayed as "CRNT": Proceed to <u>BRC-124, "Diagnosis Procedure"</u>.

- YES-2 >> "C1197" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

## **Diagnosis** Procedure

INFOID:000000012551878

#### **1.**CHECK CONNECTOR

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

#### Is the inspection result normal?

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

## 2. CHECK BRAKE BOOSTER

1. Turn the ignition switch OFF.

## **C1197 VACUUM SENSOR**

< DTC/CIRCUIT D	IAGNOSIS >				[TYPE 1]	
2. Check the brak	e booster. Refer to	BR-10, "Inspec	ction".			
Is the inspection result normal?						
YES >> GO TO 3.						
NO >> Replace the brake booster. Refer to <u>BR-31, "Removal and Installation"</u> .						
J.CHECK VACUU	<b>J.</b> CHECK VACUUM PIPING					
Check the vacuum	piping. Refer to BR	-33, "Exploded	View".			
Is the inspection re	sult normal?				(	
YES >> GO TC	) 4. The vacuum ninin	a Refer to BR-	33 "Remo	val and Installation"		
4.CHECK TERMI		g. Refer to <u>DR</u>		var and mstanation.	ſ	
1 Turn the ignitio	n switch OFF					
<ol> <li>Disconnect vac</li> <li>Check the vaci</li> <li>Disconnect AB</li> <li>Check the ABS harness conne</li> </ol>	Sum sensor harnes um sensor pin tern S actuator and elect actuator and elect ctor.	ss connector. hinals for dama tric unit (contro ric unit (control	ge or loose I unit) harr unit) pin te	e connection with harness less connector. erminals for damage or lo	ose connection with	
Is the inspection re	sult normal?					
YES >> GO TC	5.					
NO >> Repair	/ replace harness,	connector, or te	erminal.		(	
<b>D.</b> CHECK VACUU	M SENSOR CIRCU	JIT				
<ol> <li>Turn the ignitio</li> <li>Disconnect vac</li> <li>Disconnect AB</li> <li>Check the cont</li> </ol>	n switch OFF. cuum sensor harnes S actuator and elec inuity between vacu	ss connector. tric unit (contro uum sensor har	l unit) harr ness conn	less connector. ector and ABS actuator a	⊦ nd electric unit (con	
trol unit) harnes	ss connector.					
Vacuum	n sensor	ABS act	tuator and ele	ectric unit (control unit)	Continuity	
Connector	Terminal	Connec	tor	Terminal	Continuity	
	1			13		
E167	2	E127	,	32	Yes	
	3			28		
5. Check the cont	inuity between vac	uum sensor har	ness conn	ector and ground.	1	
	Vacuum sensor				Operationsity	
Connector	Te	erminal	+	-	Continuity	
		1			N	
E167		2		Ground	No	
		3			1	
Is the inspection re	sult normal?					
YES >> GO TO	) 6.					
NO >> Repair	/ replace narness c	or connector.			(	
U.REPLACE VAC	JUM SENSOR					
<ul> <li>With CONSULT</li> <li>1. Connect ABS a</li> <li>2. Replace the value</li> </ul>	actuator and electric cuum sensor.	c unit (control u	nit) harnes	s connector.	F	
Always replac	e brake booster b	ecause vacuu	ım sensor	cannot be disassemble	ed. Refer to <u>BR-31.</u>	
<ol> <li>Erase "Self Dia</li> <li>Turn the ignitio</li> <li>NOTE:</li> </ol>	ignostic Result" of " n switch OFF $\rightarrow$ ON	ABS″. N → OFF.				

#### < DTC/CIRCUIT DIAGNOSIS >

- Wait at least 10 seconds after turning ignition switch OFF or ON.
- 5. Start engine.
  - NOTE:

Wait at least 10 seconds after starting the engine.

6. Perform "Self Diagnostic Result" of "ĂBS".

#### Is DTC "C1197" detected?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u><u>lation"</u>.
- NO >> Inspection End.

## C1198 VACUUM SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

# C1198 VACUUM SENSOR

## **DTC Description**

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition	С
C1198	VACUUM SEN CIR (Vacuum sensor circuit)	<ul> <li>When an open circuit is detected in vacuum sensor circuit.</li> <li>When a short circuit is detected in vacuum sensor circuit.</li> <li>When a malfunction is detected in vacuum sensor noise.</li> </ul>	D

# POSSIBLE CAUSE **NOTE**:

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

PAST DTC	CRNT DTC	BRC
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>Harness or connector</li> <li>Vacuum sensor (brake booster)</li> <li>ABS actuator and electric unit (control unit)</li> </ul>	G
DTC CONFIRMATION PROCEDURE		Н
1.PRECONDITIONING		
If "DTC CONFIRMATION PROCEDURE" has been pre and wait at least 10 seconds before conducting the new	eviously conducted, always turn the ignition switch OFF xt test.	I
>> GO TO 2.		J
2. CHECK DTC DETECTION		
<ul> <li>With CONSULT</li> <li>1. Turn the ignition switch OFF.</li> </ul>		К
<ul> <li>Wait at least 10 seconds after turning ignition switc</li> <li>Start the engine.</li> <li>NOTE:</li> <li>Wait at least 10 seconds after starting the engine.</li> </ul>	ch OFF.	L
3. Perform "Self Diagnostic Result" of "ABS".		M
Is DTC "C1198" detected? YES-1 >> "CRNT" is displayed: Proceed to <u>BRC-127</u> YES-2 >> "PAST" is displayed: Inspection End (Erase NO-1 >> To check malfunction symptom before repa NO-2 >> Confirmation after repair: Inspection End.	′ <u>, "Diagnosis Procedure"</u> . e "Self Diagnostic Result" of "ABS"). air: Refer to <u>GI-47, "Intermittent Incident"</u> .	Ν
Diagnosis Procedure	INFOID:000000012551880	0
1.CHECK CONNECTOR		
<ol> <li>Turn the ignition switch OFF.</li> <li>Check the vacuum sensor harness connector for d</li> <li>Check the ABS actuator and electric unit (control u ls the inspection result normal?</li> <li>YES &gt;&gt; GO TO 2.</li> </ol>	lisconnection or looseness. unit) harness connector for disconnection or looseness.	Ρ
NO >> Repair / replace harness or connector, and	1 GO TO 2.	

INFOID:000000012551879

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# C1198 VACUUM SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

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

Is the inspection result normal?

YES >> GO TO 3.

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

3. CHECK VACUUM SENSOR CIRCUIT

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

Vacuur	n sensor	ABS actuator and ele	Continuity	
Connector Terminal		Connector	Terminal	Continuity
	1		13	
E167	2	E127	32	Yes
	3		28	

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

Vacuun	n sensor		Continuity	
Connector	Terminal			
	1	Ground	No	
E167	2			
	3			

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair / replace harness or connector.

#### **4.**REPLACE VACUUM SENSOR

#### With CONSULT

- T. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Replace the vacuum sensor.
  - CAUTION: Always replace brake booster because vacuum sensor cannot be disassembled. Refer to <u>BR-31,</u> "Removal and Installation".
- 3. Erase "Self Diagnostic Result" of "ABS"
- 4. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF.
- **NOTE:** Wait at least 10 seconds after turning ignition switch OFF or ON.
- 5. Start engine.
  - NOTE:

Wait at least 10 seconds after starting the engine.

6. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1198" detected?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u><u>lation"</u>.
- NO >> Inspection End.

## **C1199 BRAKE BOOSTER**

#### < DTC/CIRCUIT DIAGNOSIS >

# C1199 BRAKE BOOSTER

## **DTC** Description

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC			
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply sys-</li> </ul>	<ul><li>Harness or connector</li><li>Vacuum sensor (brake booster)</li></ul>	BRC		
tem • Fuse • Fusible link • Battery	<ul> <li>Vacuum piping</li> <li>ABS actuator and electric unit (control unit)</li> </ul>	G		
DTC CONFIRMATION PROCEDURE	DTC CONFIRMATION PROCEDURE			
1.preconditioning		11		
If "DTC CONFIRMATION PROCEDURE" has been pre and wait at least 10 seconds before conducting the net	eviously conducted, always turn the ignition switch OFF xt test.	I		
>> GO TO 2.				
2. CHECK DTC DETECTION		J		
With CONSULT				
1. Turn the ignition switch OFF.		Κ		
Wait at least 10 seconds after turning ignition swite	ch OFF.			
2. Start the engine.		L		
Wait at least 10 seconds after starting the engine.				
3. Perform "Self Diagnostic Result" of "ABS".		в. Л		
<u>IS DTC "C1199" detected?</u> VES 1 >> "CPNT" is displayed: Proceed to PPC 120	) "Diagnasis Preseduro"	IVI		
YES-2 >> "PAST" is displayed: Inspection End (Eras	e "Self Diagnostic Result" of "ABS").			
NO-1 >> To check malfunction symptom before rep NO-2 >> Confirmation after repair: Inspection End.	air: Refer to <u>GI-47, "Intermittent Incident"</u> .	Ν		
Diagnosis Procedure	INFOID:000000012551882			
1.CHECK CONNECTOR				
<ol> <li>Turn the ignition switch OFF.</li> <li>Check the vacuum sensor harness connector for disconnection or looseness.</li> <li>Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.</li> </ol>				
Is the inspection result normal?				
YES >> GO TO 2. NO >> Repair / replace harness or connector, and	d GO TO 2.			

2.CHECK BRAKE BOOSTER

INFOID:000000012551881

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# C1199 BRAKE BOOSTER

< DTC/CIRCUIT DIAGNOSIS >

2. Check the brake booster. Refer to BR-10, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace the brake booster. Refer to <u>BR-31, "Removal and Installation"</u>.

**3.**CHECK VACUUM PIPING

Check the vacuum piping. Refer to <u>BR-33, "Exploded View"</u>.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace the vacuum piping. Refer to <u>BR-33. "Removal and Installation"</u>.

**4**.CHECK TERMINAL

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

Is the inspection result normal?

YES >> GO TO 5.

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

**5.**CHECK VACUUM SENSOR CIRCUIT

1. Turn the ignition switch OFF.

- 2. Disconnect vacuum sensor harness connector.
- 3. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 4. Check the continuity between vacuum sensor harness connector and ABS actuator and electric unit (control unit) harness connector.

Vacuur	n sensor	sor ABS actuator and electric unit (control unit)		
Connector	Terminal	Connector	Terminal	Continuity
	1		13	
E167	2	E127	32	Yes
	3		28	

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

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

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair / replace harness or connector.

#### 6.REPLACE VACUUM SENSOR

#### With CONSULT

- T. Connect ABS actuator and electric unit (control unit) harness connector.
- Replace the vacuum sensor.
   CAUTION:

# Always replace brake booster because vacuum sensor cannot be disassembled. Refer to <u>BR-31</u>, <u>"Removal and Installation"</u>.

- 3. Erase "Self Diagnostic Result" of "ABS"
- 4. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF.

# **C1199 BRAKE BOOSTER**

< DTC/CIRCUIT DIAGNOSIS > [TYPE 1]	
NOTE: Wait at least 10 seconds after turning ignition switch OFF or ON. 5. Start engine.	A
Work: Wait at least 10 seconds after starting the engine. 6. Perform "Self Diagnostic Result" of "ABS".	В
YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u> lation".	С
NO >> Inspection End.	D

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## **C119A VACUUM SENSOR**

#### < DTC/CIRCUIT DIAGNOSIS >

# C119A VACUUM SENSOR

## **DTC Description**

[TYPE 1]

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>Harness or connector</li> <li>Vacuum sensor (brake booster)</li> <li>ABS actuator and electric unit (control unit)</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>

## DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

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

>> GO TO 2.

## 2. CHECK DTC DETECTION

#### (I) With CONSULT

1. Turn the ignition switch OFF. **NOTE:** 

Wait at least 10 seconds after turning ignition switch OFF.

2. Start the engine.

## NOTE:

- Wait at least 10 seconds after starting the engine.
- 3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C119A" detected?

YES-1 >> "CRNT" is displayed: Proceed to <u>BRC-132</u>, "Diagnosis Procedure".

- YES-2 >> "PAST" is displayed: Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident"
- NO-2 >> Confirmation after repair: Inspection End.

#### **Diagnosis** Procedure

INFOID:000000012551884

## 1.CHECK CONNECTOR

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

#### Is the inspection result normal?

YES >> GO TO 3.

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

# **C119A VACUUM SENSOR**

#### < DTC/CIRCUIT DIAGNOSIS >

**[TYPE 1]** 

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2	CHECK	VACUUM	SENSOR	POWER S	
-	.Oneon				

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

Vacuum sensor			Voltage	
Connector		Terminal		(Approx.)
E167		3	Ground	0 V
Turn the ignition <b>NOTE:</b> Start the engine Check the voltag	switch ON. ge between vacu	um sensor harness (	connector and ground.	
	Vacuum sensor			Voltage
Connector		Terminal		(Approx.)
E167		3	Ground	5 V
Turn the ignition Disconnect ABS Check the contin trol unit) harnes	switch OFF. actuator and ele nuity between va s connector.	ectric unit (control un cuum sensor harnes	it) harness connector. s connector and ABS actua	itor and electric unit (con
Vacuum	sensor	ABS actuato	or and electric unit (control unit)	
Connector	Terminal	Connector	Terminal	Continuity
E167	3	E127	28	Yes
Check the contin	nuity between va	cuum sensor harnes	s connector and ground.	
	Vacuum sensor			Continuity
Connector		Terminal		Continuity
Connector E167		Terminal 3	Ground	No
Connector E167 s the inspection res YES >> GO TO NO >> Repair / LCHECK VACUUN . Turn the ignition . Check the contin	ult normal? 4. replace harness / SENSOR GRC switch OFF. nuity between va	Terminal 3 or connector. UND CIRCUIT cuum sensor harnes	Ground	No
Connector E167 s the inspection res YES >> GO TO NO >> Repair / CHECK VACUUN . Turn the ignition Connector	ult normal? 4. replace harness / SENSOR GRC switch OFF. nuity between va	Terminal 3 or connector. UND CIRCUIT cuum sensor harnes	Ground is connector and ground.	Continuity

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair / replace harness or connector.

 $5. {\sf CHECK} \ {\sf ABS} \ {\sf ACTUATOR} \ {\sf AND} \ {\sf ELECTRIC} \ {\sf UNIT} \ ({\sf CONTROL} \ {\sf UNIT}) \ {\sf POWER} \ {\sf SUPPLY} \ {\sf AND} \ {\sf GROUND} \ {\sf CIRCUIT}$ 

## C119A VACUUM SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-136.</u> "<u>Diagnosis Procedure</u>".

Is the inspection result normal?

NO >> Repair / replace harness, connector, fuse, or fusible link.

6.CHECK TERMINAL

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

Is the inspection result normal?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u><u>lation"</u>.
- NO >> Repair / replace harness, connector, or terminal.

## **U1000 CAN COMM CIRCUIT**

#### < DTC/CIRCUIT DIAGNOSIS >

# U1000 CAN COMM CIRCUIT

## **DTC** Description

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC	
<ul><li>Harness or connector</li><li>CAN communication line</li></ul>	CAN communication system malfunction	BRC
DTC CONFIRMATION PROCEDURE		
1.PRECONDITIONING		G
If "DTC CONFIRMATION PROCEDURE" has been pre and wait at least 10 seconds before conducting the nex	eviously conducted, always turn the ignition switch OFF xt test.	Н
>> GO TO 2.		
2. CHECK DTC DETECTION		
<ul> <li>With CONSULT</li> <li>Turn the ignition switch OFF.</li> <li>NOTE:</li> <li>Wait at least 10 seconds after turning ignition switch</li> <li>Start the engine.</li> </ul>	ch OFF.	J
NOTE: Wait at least 10 seconds after starting the engine. 3. Perform "Self Diagnostic Result" of "ABS".		K
YES-1 >> "CRNT" is displayed: Proceed to <u>BRC-135</u> YES-2 >> "PAST" is displayed: Inspection End (Erast NO-1 >> To check malfunction symptom before repar NO-2 >> Confirmation after repair: Inspection End.	5. "Diagnosis Procedure". e "Self Diagnostic Result" of "ABS"). air: Refer to <u>GI-47. "Intermittent Incident"</u> .	M
Diagnosis Procedure	INFOID:000000012551886	NI
Proceed to LAN-21, "Trouble Diagnosis Flow Chart".		IN



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INFOID:000000012551885

## POWER SUPPLY AND GROUND CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

# POWER SUPPLY AND GROUND CIRCUIT

## **Diagnosis** Procedure

INFOID:000000012551887

[TYPE 1]

# **1.** CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) IGNITION POWER SUPPLY (1)

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

ABS actuator and ele	ectric unit (control unit)		Voltage	
Connector Terminal			(Approx.)	
E127	34	Ground	0 V	

 Turn the ignition switch ON NOTE:

Start the engine.

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

ABS actuator and electric unit (control unit)			Voltage	
Connector Terminal			(Approx.)	
E127	34	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

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

1. Turn the ignition switch OFF.

2. Check the 10A fuse (49).

3. Disconnect IPDM E/R harness connector.

 Check the continuity between ABS actuator and electric unit (control unit) harness connector and IPDM E/ R.

ABS actuator and ele	ectric unit (control unit)	IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E127	34	E119	35	Yes

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

ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal		Continuity
E127	34	Ground	No

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.

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

# $\mathbf{3}$ .check motor and motor relay power supply

1. Turn the ignition switch OFF.

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

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal		(Approx.)
E127	4	Ground	Battery voltage

3. Turn the ignition switch ON.

NOTE:

# POWER SUPPLY AND GROUND CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

Start the engine.

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

	ABS actuator and electric unit (control unit)		Voltage
Connector	Terminal	(Approx.)	(Approx.)
E127	4	Ground	Battery voltage
s the inspection result norma	<u>ll?</u>		
YES >> GO TO 5.			
NO >> GO TO 4.			
<b>I.</b> CHECK MOTOR AND MC	TOR RELAY POWER SUPPL	Y CIRCUIT	
. Turn the ignition switch C	DFF.		
<ol> <li>Check the 50A fusible lin</li> <li>Check the continuity and</li> </ol>	K (I). I short circuit between ABS ac	tuator and electric unit (c	ontrol unit) harness con-
nector terminal 4 and 50/	A fusible link (I).		
s the inspection result norma	<u>ll?</u>		
YES >> Perform trouble of	liagnosis for battery power sup	oply.	
NO >> Repair / replace h	harness, connector, or fusible I	ink.	
<b>D.</b> CHECK ACTUATOR REL	AY, ABS IN VALVE, ABS OUT	VALVE POWER SUPPLY	
. Turn the ignition switch C	)FF.		
2. Check the voltage betwee	en ABS actuator and electric u	nit (control unit) harness	connector and ground.
ABS actuator and ele		_	Voltage
Connector	Terminal		(Αρριοχ.)
E127	3	Ground	Battery voltage
Start the engine. Check the voltage betwee ABS actuator and ele	en ABS actuator and electric u	nit (control unit) harness	connector and ground.
Start the engine. Check the voltage between ABS actuator and ele Connector	en ABS actuator and electric u ectric unit (control unit) Terminal	nit (control unit) harness	Voltage (Approx.)
Start the engine. Check the voltage between ABS actuator and ele Connector E127	en ABS actuator and electric u ectric unit (control unit) Terminal 3	nit (control unit) harness o 	Voltage (Approx.) Battery voltage
Start the engine. 4. Check the voltage between ABS actuator and ele Connector E127 s the inspection result norma	en ABS actuator and electric u ectric unit (control unit) Terminal 3 I?	nit (control unit) harness o — Ground	Voltage (Approx.) Battery voltage
Start the engine. 4. Check the voltage betwee ABS actuator and ele Connector E127 <u>s the inspection result norma</u> YES >> GO TO 7.	en ABS actuator and electric u ectric unit (control unit) Terminal 3 1?	nit (control unit) harness o 	Voltage (Approx.) Battery voltage
Start the engine. ABS actuator and ele Connector E127 <u>s the inspection result norma</u> YES >> GO TO 7. NO >> GO TO 6.	en ABS actuator and electric u ectric unit (control unit) Terminal 3 N?	nit (control unit) harness - — Ground	Voltage (Approx.) Battery voltage
Start the engine. ABS actuator and ele Connector E127 <u>s the inspection result norma</u> YES >> GO TO 7. NO >> GO TO 6. <b>D</b> .CHECK ACTUATOR REL/	en ABS actuator and electric u ectric unit (control unit) Terminal 3 N? AY, ABS IN VALVE, ABS OUT	nit (control unit) harness of	Voltage (Approx.) Battery voltage
Start the engine. ABS actuator and ele Connector E127 <u>s the inspection result norma</u> YES >> GO TO 7. NO >> GO TO 6. <b>D</b> .CHECK ACTUATOR REL/ 1. Turn the ignition switch C	en ABS actuator and electric u ectric unit (control unit) Terminal 3 M? AY, ABS IN VALVE, ABS OUT OFF.	nit (control unit) harness of	Voltage (Approx.) Battery voltage
Start the engine. ABS actuator and ele Connector E127 <u>s the inspection result norma</u> YES >> GO TO 7. NO >> GO TO 6. <b>D.</b> CHECK ACTUATOR REL/ 1. Turn the ignition switch C 2. Check the 30A fusible lin	en ABS actuator and electric u ectric unit (control unit) Terminal 3 N? AY, ABS IN VALVE, ABS OUT OFF. k (J).	nit (control unit) harness of	Voltage (Approx.) Battery voltage
ABS actuator and ele ABS actuator and ele Connector E127 s the inspection result norma YES >> GO TO 7. NO >> GO TO 7. NO >> GO TO 6. CHECK ACTUATOR REL/ Turn the ignition switch C Check the 30A fusible lin Check the continuity and potor terminal 2 and 20/	en ABS actuator and electric u ectric unit (control unit) Terminal 3 M? AY, ABS IN VALVE, ABS OUT OFF. k (J). I short circuit between ABS ac A fueible link (J).	nit (control unit) harness of 	Connector and ground. Voltage (Approx.) Battery voltage CIRCUIT ontrol unit) harness con-
Start the engine. ABS actuator and ele Connector E127 S the inspection result norma YES >> GO TO 7. NO >> GO TO 6. CHECK ACTUATOR REL/ I. Turn the ignition switch C Check the 30A fusible lin Check the continuity and nector terminal 3 and 30/ S the inspection result normal	en ABS actuator and electric u ectric unit (control unit) Terminal 3 AY, ABS IN VALVE, ABS OUT OFF. k (J). l short circuit between ABS ac A fusible link (J).	nit (control unit) harness of Ground VALVE POWER SUPPLY tuator and electric unit (c	Voltage (Approx.) Battery voltage
Start the engine. ABS actuator and ele Connector E127 <u>S the inspection result norma</u> YES >> GO TO 7. NO >> GO TO 7. NO >> GO TO 6. CHECK ACTUATOR REL/ 1. Turn the ignition switch C 2. Check the 30A fusible lin 3. Check the continuity and nector terminal 3 and 30/ <u>S the inspection result norma</u> YES >> Perform trouble c	en ABS actuator and electric u ectric unit (control unit) Terminal 3 AY, ABS IN VALVE, ABS OUT OFF. k (J). Short circuit between ABS ac A fusible link (J). 12 13 13 13 13 14 15 15 15 15 15 15 15 15 15 15	nit (control unit) harness of Ground VALVE POWER SUPPLY tuator and electric unit (c	Voltage (Approx.) Battery voltage
ABS actuator and ele ABS actuator and ele Connector E127 <u>s the inspection result norma</u> YES >> GO TO 7. NO >> GO TO 6. <b>D.</b> CHECK ACTUATOR REL/ 1. Turn the ignition switch C 2. Check the 30A fusible lin 3. Check the continuity and nector terminal 3 and 30/ <u>s the inspection result norma</u> YES >> Perform trouble c NO >> Repair / replace h	en ABS actuator and electric u ectric unit (control unit) Terminal 3 AY, ABS IN VALVE, ABS OUT OFF. k (J). I short circuit between ABS ac A fusible link (J). 12 diagnosis for battery power sup narness, connector, or fusible l	nit (control unit) harness of Ground VALVE POWER SUPPLY tuator and electric unit (c oply. ink.	Voltage (Approx.) Battery voltage
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**[TYPE 1]** 

А

# POWER SUPPLY AND GROUND CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
	1	Ground	Ves
E127	2	Ground	105

Is the inspection result normal?

YES >> GO TO 8.

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

# 8. CHECK TERMINAL

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

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Instal-</u> lation".

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

## **PARKING BRAKE SWITCH**

COTC/CIRCUIT DIAG	NOSIS >				
PARKING BRAK	E SWITCH				
Description					INFOID:000000012551888
ransmits the parking b	rake switch signal to	the combination	meter.		
Component Functi	on Check				INFOID:000000012551889
Start engine	ER INFOT SIGNAL				
. Monitor BRAKE W/	L in Data Monitof	R while applying a	nd releasing the pa	arking brake.	
Condition	CONSUL	л			
Parking brake a	applied : ON				
Parking brake r	eleased : OFF				
>> Inspection I	End.				
iagnosis Procedu	ıre				INFOID:000000012551890
-					
egarding Wiring Diagr	am information, refe	r to <u>MWI-31,</u> "Wir	ng Diagram".		
0 0 0 0	,				
.CHECK PARKING B	RAKE SWITCH CIR	CUIT			
.CHECK PARKING B	RAKE SWITCH CIR	CUIT	nd parking brake s	witch harness of	connector E52
.CHECK PARKING B Disconnect combina Check continuity b	RAKE SWITCH CIR ation meter harness etween combination	CUIT connector M24 a meter harness	nd parking brake sy connector M24 te	witch harness c rminal 12 and	connector E52. parking brake
CHECK PARKING B Disconnect combina Check continuity b switch harness continuity	RAKE SWITCH CIR ation meter harness etween combination nector E52 terminal	CUIT connector M24 a meter harness 1.	nd parking brake sy connector M24 te	witch harness o rminal 12 and	connector E52. parking brake
.CHECK PARKING B . Disconnect combina . Check continuity b switch harness continuity Combination	RAKE SWITCH CIR ation meter harness etween combination nector E52 terminal	CUIT connector M24 a meter harness 1. Park	nd parking brake sy connector M24 te	witch harness o rminal 12 and	connector E52. parking brake
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CHECK PARKING B Disconnect combination Check continuity b switch harness continuity Combination Connector M24 Check continuity be Combined Connector M24	RAKE SWITCH CIR ation meter harness etween combination nector E52 terminal n meter Terminal 12 etween combination r bination meter 12	CUIT connector M24 at meter harness 1. <u>Park</u> <u>Connector</u> <u>E52</u> meter harness co	ing brake switch Termina 1 Ground	witch harness of rminal 12 and	connector E52. parking brake Continuity Yes Ind.
CHECK PARKING B Disconnect combination Check continuity b switch harness continuity Combination Connector M24 Committee Commit	RAKE SWITCH CIR ation meter harness etween combination nector E52 terminal n meter Terminal 12 etween combination r bination meter 12 normal?	CUIT connector M24 at meter harness 1. Park Connector E52 meter harness co	nd parking brake sy connector M24 te ing brake switch Termina 1 nnector M24 termin Ground	witch harness of rminal 12 and	connector E52. parking brake Continuity Yes Ind. htinuity No
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.CHECK PARKING B  . Disconnect combination Check continuity b switch harness control Connector M24 Connector Component Inspector COMPO	RAKE SWITCH CIR ation meter harness etween combination nector E52 terminal n meter Terminal 12 etween combination n bination meter bination meter 12 normal? End. place harness or co tion RAKE SWITCH en parking brake swi	CUIT connector M24 a n meter harness 1. Park Connector E52 meter harness co al nnectors.	ad parking brake sy connector M24 te ing brake switch Termina 1 nnector M24 termin Ground	witch harness of rminal 12 and nal 12 and grou Cor	Continuity Yes Ind. No
.CHECK PARKING B  . Disconnect combination Check continuity b switch harness control Connector M24 Connector M24 Connector M24 Connector M24 Connector M24 Component Inspector COMPONENT Inspector COMPONENT Inspector COMPONENT Inspector Component	RAKE SWITCH CIR ation meter harness etween combination nector E52 terminal n meter Terminal 12 etween combination n bination meter bination meter 12 normal? End. eplace harness or co tion RAKE SWITCH en parking brake swi	CUIT connector M24 a neter harness 1. Park Connector E52 meter harness co al nnectors.	Ind parking brake sw connector M24 te ing brake switch Termina 1 nnector M24 termin Ground	witch harness of rminal 12 and nal 12 and grou Cor	Continuity Yes Ind. INFOID:000000012551891
CHECK PARKING B Disconnect combination Check continuity b switch harness control Combination Connector M24 Check continuity be Comtext Comtext Connector M24 Check continuity be Comtext Component Inspect Component Com	RAKE SWITCH CIR ation meter harness etween combination nector E52 terminal n meter Terminal 12 etween combination r bination meter bination meter Terminal 12 normal? End. eplace harness or co ction RAKE SWITCH en parking brake swi	CUIT connector M24 at neter harness 1. Park Connector E52 meter harness co at nnectors. tch terminal 1 and Parkir	Ind parking brake sy connector M24 termina ing brake switch Termina 1 nnector M24 termin Ground d switch case groun Condition g brake applied	witch harness of rminal 12 and nal 12 and grou Cor	Continuity Continuity Yes Ind. INFOID:000000012551891 INFOID:000000012551891 INFOID:000000012551891 INFOID:000000012551891
CHECK PARKING B     Disconnect combinate Check continuity b switch harness con- Combination Connector M24 Check continuity be Connector M24 Connector M24 Sthe inspection result r YES >> Inspection E NO >> Repair or re Component Inspect CHECK PARKING B Check continuity betweet Component Parking brake switch	RAKE SWITCH CIR ation meter harness etween combination nector E52 terminal n meter Terminal 12 etween combination n bination meter bination meter terminal 12 normal? End. eplace harness or co ction RAKE SWITCH en parking brake swi Terminal n 1	CUIT connector M24 a neter harness 1.  Connector E52 meter harness co nnectors.  tch terminal 1 and Parkin Parkin	Ad parking brake sy connector M24 te ing brake switch Termina 1 nnector M24 termin Ground d switch case groun Condition g brake applied g brake released	witch harness of rminal 12 and	Continuity Yes INFOID:00000012551891 INFOID:000000012551891 INFOID:000000012551891 INFOID:000000012551891

NO >> Replace parking brake switch. Refer to <u>PB-7, "Exploded View"</u>.

## < DTC/CIRCUIT DIAGNOSIS >

# VDC OFF SWITCH

INFOID:000000012551892

[TYPE 1]

## 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 <u>BRC-140, "Diagnosis Procedure"</u>.

**Diagnosis** Procedure

INFOID:000000012551893

Regarding Wiring Diagram information, refer to <u>BRC-49, "Wiring Diagram"</u>.

# 1.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector E127 and VDC OFF switch connector M71.
- 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-141, "Component Inspection".

## Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Replace VDC OFF switch.

3.CHECK VDC OFF SWITCH SIGNAL

## With CONSULT.

- Connect ABS actuator and electric unit (control unit) connector E127 and VDC OFF switch connector M71.
- 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 <u>BRC-58, "Work Flow"</u>.

NO >> GO TO 4.

## CHECK VDC OFF SWITCH CIRCUIT

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector E127 and VDC OFF switch connector M71.
- Check continuity between ABS actuator and electric unit (control unit) connector E127 terminal 30 and VDC OFF switch connector M71 terminal 1.

ABS actuator and ele	ctric unit (control unit)	VDC OFF switch		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E127	30	M71	1	Yes

## **VDC OFF SWITCH**

#### < DTC/CIRCUIT DIAGNOSIS >

# 4. Check continuity between ABS actuator and electric unit (control unit) connector terminal E127 terminal 30 and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal		Continuity	В
E127	30	Ground	No	
Is the inspection result norm	nal?			C

YES >> GO TO 5.

NO >> Repair or replace malfunctioning components.

#### **5.**CHECK VDC OFF SWITCH GROUND CIRCUIT

Check continuity between VDC OFF switch connector M71 terminal 2 and ground.

					_
	VDC OF	FF switch		Continuity	E
	Connector	Terminal	—	Continuity	
	M71	2	Ground	Yes	BRC
Is the ir	nspection result norm	nal?			
YES	>> Replace ABS a tion".	ctuator and electric unit (cor	ntrol unit). Refer to <u>BRC-10</u>	60, "Removal and Installa-	G
NO	>> Repair or replace	ce malfunctioning component	S.		0
Comp	onent Inspection	n		INFOID:000000012551894	ш

#### **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	J
1 2	VDC OFF switch pressed	Yes	
1 – 2	VDC OFF switch released	No	k

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace VDC OFF switch.

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#### < DTC/CIRCUIT DIAGNOSIS >

## ABS WARNING LAMP

### Component Function Check

INFOID:000000012551895

[TYPE 1]

#### **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 <u>BRC-142. "Diagnosis Procedure"</u>.

#### Diagnosis Procedure

INFOID:000000012551896

#### **1.**PERFORM THE SELF-DIAGNOSIS

With CONSULT.
 Perform self-diagnostic result.

Are any DTCs detected?

YES >> Refer to <u>BRC-47, "DTC Index"</u>. NO >> GO TO 2.

2. CHECK COMBINATION METER

Check if indication and operation of combination meter are normal. Refer to <u>MWI-9</u>, <u>"METER SYSTEM : System Description"</u>.

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-85, "Removal and Installation"</u>.

## **BRAKE WARNING LAMP**

< DTC/CIRCUIT DIAGNOSIS > [TYPE 1]	
BRAKE WARNING LAMP	
Component Function Check	7
<b>1.</b> 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.	1
Is the inspection result normal?	
NO >> Proceed to diagnosis procedure. Refer to <u>BRC-143, "Diagnosis Procedure"</u> .	
<b>Z</b> .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       >> Inspection End.	
NO >> Check parking brake switch system. Refer to <u>BRC-139, "Diagnosis Procedure"</u> .	
	8
1.PERFORM THE SELF-DIAGNOSIS	
With CONSULT.	-
Perform self-diagnostic result.	
YES >> Refer to <u>BRC-47, "DTC Index"</u> . NO >> GO TO 2.	
2. CHECK COMBINATION METER	
Check if indication and operation of combination meter are normal. Refer to <u>MWI-9</u> , " <u>METER SYSTEM</u> : <u>System Description</u> ".	-
Is the inspection result normal?	
YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Installa</u> tion".	2
NO >> Replace combination meter. Refer to <u>MWI-85, "Removal and Installation"</u> .	

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< DTC/CIRCUIT DIAGNOSIS >

## VDC OFF INDICATOR LAMP

Component Function Check

**1.**CHECK VDC OFF INDICATOR LAMP FUNCTION (1)

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 >> GO TO 2.

NO >> Proceed to diagnosis procedure. Refer to <u>BRC-144</u>, "Diagnosis Procedure".

**2.**CHECK VDC OFF INDICATOR LAMP FUNCTION (2)

Check that VDC OFF indicator lamp in combination meter turns ON/OFF when VDC OFF switch is operated. <u>Is the inspection result normal?</u>

YES >> Inspection End.

NO >> Check VDC OFF switch. Refer to <u>BRC-140, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000012551900

**1.**PERFORM THE SELF-DIAGNOSIS

With CONSULT.
 Perform self diagnostic result.

Are any DTCs detected?

YES >> Refer to <u>BRC-47, "DTC Index"</u>.

NO >> GO TO 2.

2. CHECK COMBINATION METER

Check if indication and operation of combination meter are normal. Refer to <u>MWI-9, "METER SYSTEM : System Description"</u>.

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-85, "Removal and Installation"</u>.

INFOID:000000012551899
## SLIP INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >	[TYPE 1]
SLIP INDICATOR LAMP	
Component Function Check	INFOID:000000012551901
1. CHECK SLIP INDICATOR LAMP FUNCTION	
Check that slip indicator lamp in combination meter turns ON for approximately 2 seconds after is turned ON	er ignition switch
Is the inspection result normal?	
YES >> Inspection End.	
Diagnosis Procedure	INFOID:000000012551902
1. PERFORM THE SELE-DIAGNOSIS	
With CONSULT.	
Perform self diagnostic result.	ſ
Are any DTCs detected? YES >> Refer to BRC-47 "DTC Index"	
NO $>>$ GO TO 2.	-
2.CHECK COMBINATION METER	
Check if indication and operation of combination meter are normal. Refer to <u>MWI-9</u> , "METER tom Description"	SYSTEM : Sys-
Is the inspection result normal?	
YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Remo</u>	val and Installa-
NO >> Replace combination meter. Refer to <u>MWI-85, "Removal and Installation"</u> .	

# SYMPTOM DIAGNOSIS APPLICATION NOTICE

## **Application Notice**

Service information	Remarks	
TYPE 1	VDC/TCS/ABS	
TYPE 2	HILL DESCENT CONTROL/VDC/TCS/ABS	

## VDC/TCS/ABS

## < SYMPTOM DIAGNOSIS >

# VDC/TCS/ABS

## Symptom Table

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

Symptom	Check item	Reference	
Excessive ABS function operation fre-	Brake force distribution		
	Looseness of front and rear axle	BRC-148, "Diag- nosis Procedure"	
queney	Wheel sensor and rotor system	<u></u>	
Linevine tod nodel reaction	Brake pedal stroke	BRC-149, "Diag-	
Onexpected pedal reaction	Make sure the braking force is sufficient when the ABS is not operating.	nosis Procedure"	
The braking distance is long	Check stopping distance when the ABS is not operating.	<u>BRC-150, "Diag-</u> nosis Procedure"	
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-151, "Diag- nosis Procedure"	
Pedal vibration or ABS operation sound	Brake pedal	BRC-152, "Diag-	
occurs (Note 2)	ABS actuator and electric unit (control unit)	nosis Procedure"	
Vehicle jerks during VDC/TCS/ABS con- trol	ABS actuator and electric unit (control unit)		
	ТСМ	BRC-153, "Diag- nosis Procedure"	
	ECM	<u>Hesio Procedure</u>	

#### 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]

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**[TYPE 1]** 

## EXCESSIVE OPERATION FREQUENCY

#### < SYMPTOM DIAGNOSIS >

## EXCESSIVE OPERATION FREQUENCY

### Description

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

## **Diagnosis** Procedure

1. CHECK BRAKING FORCE	-
------------------------	---

Check brake force using a brake tester.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check brake system.

2.CHECK FRONT AND REAR AXLE

Check that there is no excessive looseness in front and rear axle.

Front axle: Refer to <u>FAX-6, "Inspection"</u>.
Rear axle: Refer to <u>RAX-5, "Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace malfunctioning components.

 ${
m 3.}$  Check wheel sensor

#### Check wheel sensor.

- Check installation and damage of wheel sensor.
- Check connection of wheel sensor harness connector.
- Check terminal of wheel sensor harness connector.

#### Is the inspection result normal?

#### YES >> GO TO 4. NO

- >> Repair installation or replace wheel sensor.
  - Front wheel sensor: Refer to BRC-155, "Removal and Installation Front Wheel Sensor".
  - Rear wheel sensor: Refer to BRC-157, "Removal and Installation Rear Wheel Sensor".

### **4.**CHECK SENSOR ROTOR

Check that there is no looseness, damage or foreign material on sensor rotor.

Is the inspection result normal?

- YES >> GO TO 5. NO
  - >> Repair installation or replace sensor rotor.
    - Front sensor rotor: Refer to <u>BRC-159</u>, "Removal and Installation Front Sensor Rotor".
    - Rear sensor rotor: Refer to BRC-159, "Removal and Installation Rear Sensor Rotor".

### 5.CHECK WARNING LAMP TURNS OFF

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

#### CAUTION:

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

Is the inspection result normal?

- YES >> Inspection End.
- NO >> Perform self-diagnosis result. Refer to <u>BRC-36, "CONSULT Function"</u>.

INFOID:000000012551906

## UNEXPECTED BRAKE PEDAL REACTION

< SYMPTOM DIAGNOSIS > [TYPE 1]	
UNEXPECTED BRAKE PEDAL REACTION	
Description	
A malfunction of brake pedal feel (height or others) is detected when brake pedal is depressed.	
Diagnosis Procedure	
1. CHECK FRONT AND REAR AXLE	
<ul> <li>Check that there is no excessive looseness in front and rear axle.</li> <li>Front axle: Refer to <u>FAX-6</u>, "Inspection".</li> <li>Rear axle: Refer to <u>RAX-5</u>, "Inspection".</li> <li>Is the inspection result normal?</li> <li>YES &gt;&gt; GO TO 2.</li> <li>NO &gt;&gt; Repair or replace malfunctioning components.</li> </ul>	
2. CHECK DISC ROTOR	_
Check disc rotor runout. <ul> <li>Front: Refer to <u>BR-16, "DISC ROTOR : Inspection"</u>.</li> <li>Rear: Refer to <u>BR-18, "DISC ROTOR : Inspection"</u>.</li> </ul>	В
Is the inspection result normal? YES >> GO TO 3. NO >> Refinish the disc rotor.	
J.CHECK BRAKE FLUID LEAKAGE	
Check fluid leakage. Refer to <u>BR-8, "Inspection"</u> . Is the inspection result normal?	
YES >> GO TO 4. NO >> Repair or replace malfunctioning components. 4 CHECK BRAKE PEDAL	
Check brake pedal Refer to BR-7 "Inspection"	
Is the inspection result normal?         YES       >> GO TO 5.         NO       >> Adjust brake pedal. Refer to <u>BR-13. "Adjustment"</u> . <b>5.</b> CHECK BRAKING FORCE	
Check brake force using a brake tester.	
<u>Is the inspection result normal?</u> YES >> GO TO 6. NO >> Check brake system.	
6. CHECK BRAKE PERFORMANCE	
Disconnect ABS actuator and electric unit (control unit) connector so that ABS does not operate. Check that brake force is normal in this condition. Connect harness connectors after checking.	
YES >> Inspection End. NO >> Check brake system.	

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< SYMPTOM DIAGNOSIS >

## THE BRAKING DISTANCE IS LONG

## Description

Brake stopping distance is long when ABS function is operated.

Diagnosis Procedure

#### CAUTION:

Brake stopping distance on slippery roads like a rough road, gravel road or snowy road may become longer when ABS is operated than when ABS is not operated.

**1.**CHECK BRAKING FORCE

Check brake force using a brake tester.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check brake system.

2. CHECK BRAKE PERFORMANCE

Disconnect ABS actuator and electric unit (control unit) connector so that ABS does not operate. Check brake stopping distance in this condition. Connect harness connectors after checking.

Is the inspection result normal?

YES >> Inspection End.

NO >> Check brake system.

INFOID:000000012551909

[TYPE 1]

### ABS FUNCTION DOES NOT OPERATE

#### < SYMPTOM DIAGNOSIS >

## ABS FUNCTION DOES NOT OPERATE

### Description

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

#### **Diagnosis** Procedure

INFOID:000000012551912

INFOID:000000012551911

#### CAUTION:

- VDC function, TCS function, ABS function, EBD function and hill start assist function never operate when the vehicle speed is 10 km/h (6.2 MPH) or less. However, hill start assist function operates when the vehicle speed is 0 km/h (0 MPH) (the vehicle is in stop status).
- D VDC function and TCS function never operate when VDC OFF switch is operated (when VDC OFF indicator lamp turns ON).

**1.**CHECK ABS WARNING LAMP

Ε Check that ABS warning lamp, brake warning lamp and VDC warning lamp turn ON and turn OFF approx. 1 second after key switch is turned ON. Check that ABS warning lamp, brake warning lamp and VDC warning lamp and stay in OFF status during driving. BRC CAUTION: Brake warning lamp turns ON when parking brake is operated (parking brake switch is ON) or brake fluid is less than the specified level (brake fluid level switch is ON).

#### Is the inspection result normal?

- YES >> Inspection End.
- NO >> Perform self-diagnosis result. Refer to <u>BRC-36, "CONSULT Function"</u>.

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## **BRAKE PEDAL VIBRATION OR OPERATION SOUND OCCURS**

### < SYMPTOM DIAGNOSIS >

## BRAKE PEDAL VIBRATION OR OPERATION SOUND OCCURS

## Description

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

#### CAUTION:

Vibration may be felt during brake pedal is lightly depressed (just placing a foot on it) in the following conditions. This is normal.

- · When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [Approx. 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approx. 10 km/h (6.2 MPH) or higher]

## Diagnosis Procedure

INFOID:000000012551914

[TYPE 1]

INFOID:000000012551913

**1**.SYMPTOM CHECK 1

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

Do vibrations occur?

YES >> GO TO 2.

NO >> Check brake pedal. Refer to <u>BR-7</u>, "Inspection".

2.SYMPTOM CHECK 2

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

Does the operation sound occur?

YES >> GO TO 3.

NO >> Perform self-diagnosis result. Refer to <u>BRC-36. "CONSULT Function"</u>.

**3.**SYMPTOM CHECK 3

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

Does the symptom occur?

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

#### VEHICLE JERKS DURING VDC/TCS/ABS CONTROL **[TYPE 1]** < SYMPTOM DIAGNOSIS > VEHICLE JERKS DURING VDC/TCS/ABS CONTROL А Description INFOID:000000012551915 The vehicle jerks when VDC function, TCS function, ABS function, EBD function or hill start assist function В operates. **Diagnosis** Procedure INEOID:000000012551916 1.CHECK SYMPTOM Check that the vehicle jerks when VDC function, TCS function, ABS function, EBD function or hill start assist D function operates.

Is the inspection result normal?

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

2. PERFORM THE SELF-DIAGNOSIS

With CONSULT Perform self-diagnosis result. Refer to <u>BRC-36, "CONSULT Function"</u>.

Is any DTC detected?

YES >> Check the DTC. Refer to <u>BRC-47, "DTC Index"</u>.

NO >> GO TO 3.

## $\mathbf{3}.$ CHECK CONNECTOR

#### With CONSULT

1. Turn the ignition switch OFF.

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

- 3. Check connector terminal for deformation, disconnection and looseness.
- Connect harness connector and perform self-diagnosis result. Refer to <u>BRC-36, "CONSULT Function"</u>. <u>Is the inspection result normal?</u>

YES >> GO TO 4.

NO >> Repair or replace connector terminal.

**4.**CHECK ECM AND TCM SELF-DIAGNOSIS RESULTS

#### With CONSULT

Perform self-diagnosis result for "ENGINE" and "TRANSMISSION".

#### Is any DTC detected?

- YES >> Check the DTC.
- NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-160, "Removal and Installa-</u> tion".

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### < SYMPTOM DIAGNOSIS >

## NORMAL OPERATING CONDITION

## Description

INFOID:000000012551917

[TYPE 1]

Symptom	Result	
Brake pedal slightly vibrates and operation sound (motor sound and sound from suspen- sion) occurs when VDC function, TCS function, ABS function, EBD function or hill start as- sist function operates.	This is not a malfunction, because it is	
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.	caused by VDC function, TCS function, ABS function, EBD function and hill start assist function that are normally operat- ed.	
Brake pedal vibrates and operation sound occurs during sudden acceleration and corner- ing, when VDC function or TCS function is operated.	eu.	
Brake pedal vibrates and motor sound from the engine room occurs when the engine starts or the vehicle starts just after starting the engine.	This is not a malfunction because it is caused by operation check of ABS actuator and electric unit (control unit).	
Acceleration may be felt insufficient depending on the road conditions.	This is not a malfunction because it is	
TCS function may operate momentarily while driving on a road where friction coefficient varies or when downshifting or fully depressing accelerator pedal.	caused by TCS function that puts the highest priority to obtain the optimum traction (stability).	
ABS warning lamp and VDC warning lamp may turn ON when the vehicle is on a rotating turntable or is given a strong shaking or large vibrations on a ship while the engine is running.	In this case, restart the engine on a nor-	
VDC warning lamp may turn ON and VDC function and TCS function may not normally operate, when driving on a special road the is extremely slanted (bank in a circuit course).	mal road. If the normal condition is re- stored, there is no malfunction. In that	
A malfunction in yaw rate/side/decel G sensor system may be detected when the vehicle sharply turns during a spin turn, acceleration turn or drift driving while VDC function and TCS function are OFF (VDC OFF switch is pressed and VDC OFF indicator lamp is in ON status).	case, erase "ABS" self-diagnosis result memory with CONSULT.	
The vehicle speed does not increase when the accelerator pedal is depressed while the vehicle is on a 2-wheel chassis dynamometer for speedometer check.	This is normal. (When checking the vehi- cle on a chassis dynamometer, operate VDC OFF switch so that TCS function is OFF.)	

# UNIT REMOVAL AND INSTALLATION WHEEL SENSOR

## Exploded View - Front Wheel Sensor

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INFOID:000000012551919



#### ← Front

## Removal and Installation - Front Wheel Sensor

#### **CAUTION:**

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

#### REMOVAL

- Remove the front wheel and tire using power tool. Refer to WT-59, "Adjustment".
- Partially remove the fender protector to gain access to the wheel sensor harness connector.
- Disconnect the front wheel sensor harness connector.
- 4. Remove the front wheel sensor bolt.
- Remove the front wheel sensor from the strut bracket and body brackets. 5.
- Remove the front wheel sensor from the steering knuckle. 6.

#### INSTALLATION

### **BRC-155**

Installation is in the reverse order of removal. **CAUTION:** 

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



Exploded View - Rear Wheel Sensor

INFOID:000000012551920



1. Rear wheel sensor

C. Rear wheel sensor connector

∠ Front

B. Clip

## WHEEL SENSOR

#### < UNIT REMOVAL AND INSTALLATION >

#### **[TYPE 1]**



#### REMOVAL

- 1. Remove the rear wheel and tire using power tool. Refer to WT-59, "Adjustment".
- 2. Remove the rear wheel sensor bolt.
- 3. Disconnect the rear wheel sensor harness connector.
- 4. Remove the rear wheel sensor from the sensor brackets.
- 5. Remove the rear wheel sensor from the rear knuckle.

#### INSTALLATION

Installation is in the reverse order of removal. **CAUTION:** 

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



Refer to RAX-7, "Removal and Installation".

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## < UNIT REMOVAL AND INSTALLATION >

## SENSOR ROTOR

Removal and Installation - Front Sensor Rotor

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

SENSOR ROTOR

Removal and Installation - Rear Sensor Rotor

The rear wheel sensor rotor is an integral part of the wheel hub and bearing and cannot be disassembled.

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INFOID:000000012551922

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< UNIT REMOVAL AND INSTALLATION >

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:000000012551924

[TYPE 1]



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

Removal and Installation

F. From master cylinder primary side <>> Front

INFOID:000000012551925

## REMOVAL

#### **CAUTION:**

• To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged.

#### • Do not remove actuator by holding harness.

#### NOTE:

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

- Disconnect negative battery terminal. Refer to <u>PG-93</u>, "Exploded View".
- Remove cowl top. Refer to <u>EXT-25, "Removal and Installation"</u>.
- Disconnect the harness connector from the ABS actuator and electric unit (control unit).
- 4. Separate brake tubes from ABS actuator and electric unit (control unit). Refer to BR-22, "FRONT : Exploded View".
- 5. Remove ABS actuator and electric unit (control unit) bracket bolts.
- 6. Remove ABS actuator and electric unit (control unit) from vehicle.

#### INSTALLATION

## **BRC-160**

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

## < UNIT REMOVAL AND INSTALLATION >

<ul> <li>Installation is in the reverse order of removal.</li> <li>After work is completed, bleed air from brake tube. Refer to <u>BR-14, "Bleeding Brake System"</u>.</li> <li>Adjust the neutral position of steering angle sensor. Refer to <u>BRC-62, "Description"</u>.</li> <li>Perform calibration of the yaw rate/side/decel G sensor: Refer to <u>BRC-64, "Description"</u>.</li> </ul>	А
<ul> <li>CAUTION:</li> <li>To install, use flare nut crowfoot and torque wrench.</li> <li>Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.</li> <li>Do not install actuator by holding harness.</li> <li>After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.</li> </ul>	B C
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## YAW RATE/SIDE/DECEL G SENSOR

## **Exploded View**

INFOID:000000012551926



## Removal and Installation

### REMOVAL

- 1. Remove the side stay cover from the center console assembly. Refer to <u>IP-27</u>, "Exploded View".
- 2. Disconnect the harness connector from the yaw rate/side/decel G sensor.
- 3. Remove the yaw rate/side/decel G sensor nuts.
- 4. Remove yaw rate/side/decel G sensor.

#### INSTALLATION

Installation is in the reverse order of removal.

- · Perform calibration of the yaw rate/side/decel G sensor. Refer to BRC-64, "Description".
- CAUTION:
- Do not use power tools on the yaw rate/side/decel G sensor because it is sensitive to the impact.
- Replace the yaw rate/side/decel G sensor if it has been dropped or sustained impact.

[TYPE 1]

## **VDC OFF SWITCH**

## **Removal and Installation**

### REMOVAL

- 1. Remove instrument lower panel LH. Refer to IP-15, "Removal and Installation".
- 2. Disconnect harness connector from VDC OFF switch.
- 3. Remove screws (A), then remove switch carrier lower and switch carrier upper from instrument lower panel LH.

4. Using suitable tool, release pawls and remove VDC OFF switch.

() : Pawl

**INSTALLATION** Installation is in the reverse order of removal.







**[TYPE 1]** 

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STEERING ANGLE SENSOR

## Removal and Installation

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

#### А PRECAUTIONS Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT В **PRF-TENSIONER**" INFOID:000000012551929 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. D 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, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer. Ε Improper repair, 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. BRC 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 Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the Н 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 or batteries, and wait at least three minutes before performing any service. Precaution for Brake System INFOID 000000012551930 WARNING:

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

- Brake fluid use refer to <u>MA-17</u>, "FOR USA AND CANADA : Fluids and Lubricants" (United States and Canada) or <u>MA-19</u>, "FOR MEXICO : Fluids and Lubricants" (Mexico).
- Do not reuse drained brake fluid.
- Do not spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Always confirm the specified tightening torque when installing the brake pipes.
- After pressing the brake pedal more deeply or harder than normal driving, such as air bleeding, check each item of brake pedal. Adjust brake pedal if it is outside the standard value.
- Do not use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.
- Tighten the brake tube flare nut to the specified torque with a crowfoot (A) and torque wrench (B).
- Always connect the battery terminal when moving the vehicle.
- Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) harness connector or the battery negative terminal before performing the work.
- Check that no brake fluid leakage is present after replacing the parts.



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**[TYPE 2]** 

## PRECAUTIONS

## < PRECAUTION >

## Precaution for Brake Control System

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

## Precaution for Harness Repair

INFOID:000000012551932

SKIB8766E

• 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.)



NG: Bypass connection

OK: Soldered and taped

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## < PREPARATION >

# PREPARATION PREPARATION

## Special Service Tool

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INFOID:000000012551933

[TYPE 2]

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

Tool number (TechMate No.) Tool name		Description	С
KV991J0080 (J-45741) ABS active wheel sensor tester	J-45741-BOX	Checking operation of ABS active wheel sen- sors	D
	WFIA0101E		E
			BRC

## **Commercial Service Tools**

INFOID:000000012551934

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

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## **APPLICATION NOTICE**

### < SYSTEM DESCRIPTION >

# SYSTEM DESCRIPTION APPLICATION NOTICE

## **Application Notice**

Service information	Remarks	
TYPE 1	VDC/TCS/ABS	
TYPE 2	HILL DESCENT CONTROL/VDC/TCS/ABS	

# < SYSTEM DESCRIPTION >

## COMPONENT PARTS

## **Component Parts Location**

INFOID:000000012551936



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## **COMPONENT PARTS**

### < SYSTEM DESCRIPTION >

#### 1. IPDM E/R 2. trol unit) 4. Vacuum sensor (attached to lower

- side of brake booster)
- VDC OFF switch 7.
- 10. Stop lamp switch
- 13. 4WD shift switch (hill descent control switch)

## **Component Description**

- ABS actuator and electric unit (con-3.
- 5. Front wheel sensor LH (RH similar) 6.
- Steering angle sensor (view with 8. steering wheel and steering column covers removed)
- 11. Combination meter

- Brake fluid level switch (part of brake fluid reservoir)
- Rear wheel sensor LH (RH similar)
- 9. Yaw rate/side/decel G sensor (view with the center console removed)
- 12. Parking brake switch

INFOID:000000012551937

Con	nponent	Reference/Function
ABS actuator and electric unit	Pump/motor	
	Motor relay	
	Actuator relay (main relay)	
	ABS IN valve	
(control unit)	ABS OUT valve	BRC-170, ABS Actuator and Electric Unit (Control Unit)
	Cut valve 1	
	Cut valve 2	
	Pressure sensor	
Wheel sensor		BRC-171, "Wheel Sensor and Sensor Rotor"
Stop lamp switch		BRC-171, "Stop Lamp Switch"
Steering angle sensor		BRC-171, "Steering Angle Sensor"
Yaw rate/side/decel G sensor		BRC-171, "Yaw Rate/Side/Decel G Sensor"
Vacuum sensor		BRC-172, "Vacuum Sensor"
Brake fluid level switch		BRC-172, "Brake Fluid Level Switch"
Hill descent control switch		BRC-298. "Description"
Parking brake switch		BRC-172. "Parking Brake Switch"
VDC OFF switch		BRC-172, "VDC OFF Switch"
ECM		<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</li> <li>Accelerator pedal position signal</li> <li>Engine speed signal</li> <li>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</li> <li>Target throttle position signal</li> </ul>
ТСМ		<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</li> <li>Shift position signal</li> <li>Current gear position signal</li> </ul>
ABS warning lamp		
Brake warning lamp		BRC-173, "System Description"
VDC OFF indicator lamp		
SLIP indicator lamp		
Hill descent control indicator lan	np	BRC-305, "Description"

## ABS Actuator and Electric Unit (Control Unit)

INFOID:000000012551938

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

#### **COMPONENT PARTS [TYPE 2]** < SYSTEM DESCRIPTION > ELECTRIC UNIT (CONTROL UNIT) Brake fluid pressure, engine and transmission are controlled according to signals from each sensor. А • If malfunction is detected, the system enters fail-safe mode. ACTUATOR В 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 Е Operates each valve ON/OFF according to signals from ABS actuator and electric unit (control unit). ABS IN Valve and ABS OUT Valve Increases, holds or decreases the fluid pressure of each caliper according to signals from ABS actuator and BRC electric unit (control unit). Pressure Sensor Detects the brake fluid pressure and transmits signal to ABS actuator and electric unit (control unit). Cut Valve 1 (Primary Line), Cut Valve 2 (Secondary Line) Shuts off the ordinary brake line from master cylinder when VDC function, TCS function and hill start assist function are activated. Н Wheel Sensor and Sensor Rotor INFOID:000000012551939 NOTE: Wheel sensor and sensor rotor is integrated in wheel hub assembly. 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. -Line of magnetic force · Power supply is supplied to detection portion so that magnetic field Sensor rotor s\_ line is read. Magnetic field that is detected is converted to current Ν signal. S • When sensor rotor rotates, magnetic field changes. Magnetic field change is converted to current signals (rectangular wave) and is Sensor Amplifier circuit transmitted to ABS actuator and electric unit (control unit). Change of magnetic field is proportional to wheel speed. JPFIC0131GB M Stop Lamp Switch INFOID:000000012551940

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

## Steering Angle Sensor

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

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

### Yaw Rate/Side/Decel G Sensor

Calculates the following information that affects the vehicle and transmits a signal to ABS actuator and electric unit (control unit) via communication lines:

Vehicle rotation angular velocity (yaw rate signal)

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## **COMPONENT PARTS**

#### < SYSTEM DESCRIPTION >

· Vehicle lateral acceleration (side G signal) / longitudinal acceleration (decel G signal)

### Brake Fluid Level Switch

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

### Vacuum Sensor

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

## Parking Brake Switch

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

## VDC OFF Switch

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

Brake limited slip differential (BLSD) control operates.

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

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INFOID:000000012551943

INFOID:000000012551945

## < SYSTEM DESCRIPTION >

## SYSTEM

System Diagram



## System Description

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- The system switches fluid pressure of each brake caliper to increase, to hold or to decrease according to signals from control unit in ABS actuator and electric unit (control unit). This control system is applied to VDC function, TCS function, ABS function, EBD function, hill start assist function and hill descent control function.
- Fail-safe function is available for each function and is activated by each function when system malfunction occurs.

### INPUT SIGNAL AND OUTPUT SIGNAL

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

Component	Signal description		
Yaw rate/side/decel G sensor	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line*1:</li> <li>Yaw rate signal</li> <li>Side G sensor signal</li> <li>Decel G sensor signal</li> </ul>	Ν	
ECM	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Accelerator pedal position signal</li> <li>Engine speed signal</li> <li>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</li> <li>Target throttle position signal</li> </ul>	O P	
ТСМ	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: <ul> <li>Shift position signal</li> </ul>		

#### VDC function, TCS function, ABS function and EBD function

**Revision: November 2015** 

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### < SYSTEM DESCRIPTION >

[TYPE 2	2]
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Component	Signal description
Steering angle sensor	<ul><li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</li><li>Steering angle sensor signal</li></ul>
Combination meter	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Brake fluid level switch signal</li> <li>Parking brake switch signal</li> <li>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>ABS warning lamp signal</li> <li>Brake warning lamp signal</li> <li>VDC warning lamp signal</li> <li>VDC OFF indicator lamp</li> <li>Hill descent control indicator lamp</li> </ul>

\*1: Communication line between yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit)

### VALVE OPERATION (ABS AND EBD)

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

When ordinary brake is applied and ABS is in operation (when pressure increases).



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

#### < SYSTEM DESCRIPTION >

#### When front RH wheel caliper pressure increases

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

When front LH wheel caliper pressure increases

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

When rear RH wheel caliper pressure increases

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

When rear LH wheel caliper pressure increases

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

When ABS operation starts (when pressure holds)



Name	Not activated	When pressure holds	Ν
Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)	•
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)	
ABS IN valve	Power supply is not supplied (open)	Power supply is supplied (close)	0
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)	
Each caliper (fluid pressure)		Pressure holds	Р

When front RH wheel caliper pressure holds

• Motor is activated. Brake fluid is pressurized by pump and is sent to secondary line through cut valve 2. At the same time, because ABS IN valve and ABS OUT valve are closed, fluid pressure holds.

When front LH wheel caliper pressure holds

#### < SYSTEM DESCRIPTION >

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

When rear RH wheel caliper pressure holds

• Motor is activated. Brake fluid is pressurized by pump and is sent to primary line through cut valve 1. At the same time, because ABS IN valve and ABS OUT valve are closed, fluid pressure holds.

When rear LH wheel caliper pressure holds

• Motor is activated. Brake fluid is pressurized by pump and is sent to secondary line through cut valve 2. At the same time, because ABS IN valve and ABS OUT valve are closed, fluid pressure holds.

ABS is in operation (when pressure decreases)



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

When front RH wheel caliper pressure decreases

• Being supplied to reservoir through ABS OUT valve, the fluid pressure of brake caliper is decreased.

When front LH wheel caliper pressure decreases

• Being supplied to reservoir through ABS OUT valve, the fluid pressure of brake caliper is decreased.

When rear RH wheel caliper pressure decreases

• Being supplied to reservoir through ABS OUT valve, the fluid pressure of brake caliper is decreased.

When rear LH wheel caliper pressure decreases

• Being supplied to reservoir through ABS OUT valve, the fluid pressure of brake caliper is decreased.

### < SYSTEM DESCRIPTION >

#### Component Parts and Function

Component	FUNCTION
Reservoir	Temporarily reserves the brake fluid drained from brake caliper, so that pressure efficiently decreas- es when decreasing pressure of brake caliper.
Pump	Returns the brake fluid reserved in reservoir to master cylinder by reducing pressure.
Motor	Drives the pump according to signals from control unit.
ABS IN valve	Switches the fluid pressure line to increase or hold according to signals from control unit.
ABS OUT valve	Switches the fluid pressure line to increase, hold or decrease according to signals from control unit.
Return check valve	Returns the brake fluid from brake caliper to master cylinder by bypassing orifice of each valve when brake is released.
Cut valve 1 Cut valve 2	Performs the duty control of fluid pressure increased by pump according to signals from control unit.
Pressure Sensor	Detects the brake pedal operation amount.

### VALVE OPERATION (OTHER THAN ABS AND EBD)

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

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

#### When Pressure Increases



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### < SYSTEM DESCRIPTION >

Name	Not activated	When Pressure Increases
Cut valve 1	Power supply is not supplied (open)	Wheel other than the one that the pressure is to be increased: Power supply is not sup- plied (open) Only wheel that the pressure is to be in- creased: Power supply is supplied (close)
Cut valve 2	Power supply is not supplied (open)	Wheel other than the one that the pressure is to be increased: Power supply is not sup- plied (open) Only wheel that the pressure is to be in- creased: Power supply is supplied (close)
ABS IN valve	Power supply is not supplied (open)	Only wheel that the pressure is to be in- creased: Power supply is not supplied (open) Wheel other than the one that the pressure is to be increased: Power supply is supplied (close)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each caliper (fluid pressure)		Pressure increases

When front RH wheel caliper pressure increases

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

When front LH wheel caliper pressure increases

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

When rear RH wheel caliper pressure increases

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

When rear LH wheel caliper pressure increases

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

### < SYSTEM DESCRIPTION >

#### Released



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

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

**Component Parts and Function** 

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

**Revision: November 2015** 

2016 Pathfinder

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### < SYSTEM DESCRIPTION >

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

### CONDITIONS FOR TURNING ON THE WARNING LAMP

#### ABS Warning Lamp

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

Condition (status)	ABS warning lamp
Ignition switch OFF	OFF
For approx. 1 second after the ignition switch is turned ON	ON
Approx. 1 second after ignition switch is turned ON (when the system is in normal operation)	OFF
ABS function is malfunctioning	ON
EBD function is malfunctioning	ON

#### Brake Warning Lamp

 Turns ON at the same time as ABS warning lamp and VDC warning lamp when EBD function is malfunctioning.

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

Condition (status)	Brake warning lamp
Ignition switch OFF	OFF
For approx. 1 seconds after the ignition switch is turned ON	ON
Approx. 1 second after ignition switch is turned ON (when the system is in normal operation)	OFF
After engine starts	OFF
When parking brake operates (parking brake switch ON)	ON
When brake booster vacuum decreases	ON
When vacuum sensor is malfunctioning	ON
When brake fluid is less than the specified level (brake fluid level switch ON)	ON
ABS function is malfunctioning	OFF
EBD function is malfunctioning	ON

VDC Warning Lamp

• Turns ON when either VDC function, TCS function, ABS function or EBD function is malfunctioning.

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

Condition (status)	VDC warning lamp
Ignition switch OFF	OFF
For approx. 1 second after the ignition switch is turned ON	ON
Approx. 1 second after ignition switch is turned ON (when the system is in normal operation)	OFF
VDC function is malfunctioning	ON
TCS function is malfunctioning	ON
#### < SYSTEM DESCRIPTION >

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Condition (status)	VDC warning lamp	
ABS function is malfunctioning	ON	A
EBD function is malfunctioning	ON	
VDC function is operating	Blinking	В
TCS function is operating	Blinking	

#### CONDITIONS FOR TURNING ON THE INDICATOR LAMP

#### VDC OFF indicator lamp

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

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

Hill descent control indicator lamp

- Turns ON when hill descent control function is switched to operational status (ON) by hill descent control switch.
- Turns ON when ignition switch turns ON and turns OFF when the system is normal for bulb check purposes.

Condition (status)	Hill descent control indicator lamp	
Ignition switch OFF	OFF	_ 1
For 2 seconds after turning ON ignition switch	ON	_
2 seconds later after turning ON ignition switch	OFF	J
Hill descent control function is malfunctioning	OFF	_

## Fail-Safe

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#### VDC FUNCTION, TCS FUNCTION and hill start assist FUNCTION

VDC warning lamp in combination meter turns ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function and hill start assist function. However, ABS function and EBD function are operated normally. Μ

#### ABS FUNCTION

ABS warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS Ν function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function and hill start assist function. However, EBD function is operated normally. NOTE:

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

#### EBD FUNCTION

Ρ ABS warning lamp, brake warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS function, EBD function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function and hill start assist function.

## < SYSTEM DESCRIPTION >

DTC	Malfunction detected condition	Fail-safe condition	
C1101	When an open circuit is detected in rear RH wheel sensor circuit.		
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> <li>When power supply voltage of rear RH wheel sensor is low.</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>	The following functions are sus-	
C1106	<ul> <li>When power supply voltage of rear LH wheel sensor is low.</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>	<ul> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>EBD function (only when both 2 rear wheels are malfunctioning)</li> <li>hill start assist function</li> </ul>	
C1107	<ul> <li>When power supply voltage of front RH wheel sensor is low.</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> <li>When power supply voltage of front LH wheel sensor is low.</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><li>When ignition voltage is 10 V or less.</li><li>When ignition voltage is 16 V or more.</li></ul>	The following functions are sus- pended:	
C1111	When a malfunction is detected in motor or motor relay.	<ul> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>EBD function</li> <li>hill start assist function</li> </ul>	
C1115	When difference in wheel speed between any wheel and others is detected during the vehicle is driven, because of installation of other tires than specified.	The following functions are suspended:	
C1116	When stop lamp switch signal is not input when brake pedal operates.	<ul> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>hill start assist function</li> </ul>	
C1120	When a malfunction is detected in front LH ABS IN valve.		
C1121	When a malfunction is detected in front LH ABS OUT valve.	The following functions are sus-	
C1122	When a malfunction is detected in front RH ABS IN valve.	pended:	
C1123	When a malfunction is detected in front RH ABS OUT valve.	VDC function     TCS function	
C1124	When a malfunction is detected in rear LH ABS IN valve.	ABS function	
C1125	When a malfunction is detected in rear LH ABS OUT valve.	EBD function     bill start assist function	
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 sus- pended: • VDC function • TCS function • hill start assist function	

#### < SYSTEM DESCRIPTION >

## [TYPE 2]

DTC	Malfunction detected condition	Fail-safe condition	
C1140	When a malfunction is detected in actuator relay.	<ul> <li>The following functions are suspended:</li> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>EBD function</li> <li>hill start assist function</li> </ul>	B
C1142	When a malfunction is detected in pressure sensor.	The following functions are sus-	С
C1143	When a malfunction is detected in steering angle sensor.	pended:	
C1144	When neutral position adjustment of steering angle sensor is not complete.	TCS function	D
C1145	When a malfunction is detected in yaw rate signal.	<ul> <li>hill start assist function</li> </ul>	
C1146	When a malfunction is detected in side/decel G signal.	The following functions are sus-	
C1155	When brake fluid level low signal is detected.	<ul> <li>pended:</li> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>hill start assist function</li> </ul>	E BR(
C1160	When calibration of yaw rate/side/decel G sensor is not complete.	<ul> <li>The following functions are suspended:</li> <li>VDC function</li> <li>TCS function</li> <li>hill start assist function</li> </ul>	G
C1164	When a malfunction is detected in cut valve 1.	The following functions are sus-	Ц
C1165	When a malfunction is detected in cut valve 2.	<ul> <li>pended:</li> <li>VDC function</li> </ul>	11
C1170	When the information in ABS actuator and electric unit (control unit) is not the same.	<ul> <li>TCS function</li> <li>ABS function</li> <li>EBD function</li> <li>hill start assist function</li> </ul>	I
C1197	When a malfunction is detected in vacuum sensor.		1
C1198	<ul> <li>When an open circuit is detected in vacuum sensor circuit.</li> <li>When a short circuit is detected in vacuum sensor circuit.</li> <li>When a malfunction is detected in vacuum sensor noise.</li> </ul>	Electrical vacuum assistance of brake booster is suspended.	5
C1199	When brake booster vacuum is approx. 0 kPa (0 mmHg) during engine running.	_	K
C119A	When a malfunction is detected in supply power voltage of vacuum sensor.	Electrical vacuum assistance of brake booster is suspended.	I
U1000	When CAN communication signal is not continuously received for 2 seconds or more.	<ul> <li>The following functions are suspended:</li> <li>VDC function</li> <li>TCS function</li> <li>hill start assist function</li> </ul>	M

# VDC FUNCTION

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### < SYSTEM DESCRIPTION >

## **VDC FUNCTION : System Diagram**



## VDC FUNCTION : System Description

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



- VDC function can be switched to non-operational status (OFF) by operating VDC OFF switch. In this case, VDC OFF indicator lamp turns ON.
- Control unit portion automatically improves driving stability by performing brake force control as well as
  engine output control by transmitting drive signal to actuator portion according to difference between target
  side slip amount and vehicle side slip amount
- VDC warning lamp blinks while VDC function is in operation and indicates to the driver that the function is in operation.
- VDC function has brake limited slip differential (BLSD) function. LH and RH driving wheel spin is always monitored. If necessary, appropriate brake force is independently applied to LH or RH driving wheel so that one-sided wheel spin is avoided and traction is maintained. Mainly starting ability is improved. [Brake limited slip differential (BLSD) function operates while VDC function is in non-operational status (OFF) by VDC OFF

#### < SYSTEM DESCRIPTION >

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switch.] VDC warning lamp turns ON when Brake limited slip differential (BLSD) function is in operation. Noises and vibration may be generated due to brake operation. This is not a malfunction.

- CONSULT can be used to diagnose the system.
- Fail-safe function is adopted. When a malfunction occurs in VDC function, the control is suspended for VDC function, TCS function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function and hill start assist function. However, ABS function and EBD function are operated normally. Refer to <u>BRC-181</u>, "Fail-Safe".

#### NOTE:

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

### INPUT SIGNAL AND OUTPUT SIGNAL

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

Component	Signal description	
Yaw rate/side/decel G sensor	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line*1:</li> <li>Yaw rate signal</li> <li>Side G sensor signal</li> <li>Decel G sensor signal</li> </ul>	E
ECM	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Acceleration pedal position signal</li> <li>Engine speed signal</li> <li>Mainly receives the following signal from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Target throttle position signal</li> </ul>	G
ТСМ	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Shift position signal	
Steering angle sensor	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Steering angle sensor signal	I
Combination meter	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Brake fluid level switch signal</li> <li>Parking brake switch signal</li> <li>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>VDC warning lamp signal</li> <li>VDC OFF indicator lamp signal</li> </ul>	J K L

\*1: Communication line between yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit)

## OPERATION CHARACTERISTICS

VDC Function That Prevents Oversteer Tendency

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



## < SYSTEM DESCRIPTION >

## [TYPE 2]

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



VDC Function That Prevents Understeer Tendency

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



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



### < SYSTEM DESCRIPTION >

## TCS FUNCTION : System Diagram



## TCS FUNCTION : 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 at an appropriate level. When wheel spin occurs on drive wheel, ABS actuator and electric unit (control unit) perform brake force control of LH and RH drive wheels (apply brake force by increasing brake fluid pressure of drive wheel) and decrease engine torque by engine torque control. Wheel spin amount decreases. Engine torque is controlled to appropriate level.
- TCS function can be switched to non-operational status (OFF) by operating VDC OFF switch. In this case, VDC OFF indicator lamp turns ON.
- VDC warning lamp blinks while TCS function is in operation and indicates to the driver that the function is in operation.
- CONSULT can be used to diagnose the system.
- Fail-safe function is adopted. When a malfunction occurs in TCS function, the control is suspended for VDC function, TCS function, and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function and hill start assist function. However, ABS function and EBD function are operated normally. Refer to <u>BRC-181</u>, "Fail-Safe".

#### 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 DESCRIPTION >

<b>[TYPE 2]</b>	
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Component	Signal description
Yaw rate/side/decel G sensor	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line*<sup>1</sup>:</li> <li>Yaw rate signal</li> <li>Side G sensor signal</li> <li>Decel G sensor signal</li> </ul>
ECM	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Accelerator pedal position signal</li> <li>Engine speed signal</li> <li>Mainly receives the following signal from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Target throttle position signal</li> </ul>
ТСМ	<ul><li>Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication:</li><li>Shift position signal</li></ul>
Steering angle sensor	<ul><li>Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication:</li><li>Steering angle sensor signal</li></ul>
Combination meter	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Brake fluid level switch signal</li> <li>Parking brake switch signal</li> <li>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>VDC warning lamp signal</li> <li>VDC OFF indicator lamp signal</li> </ul>

\*1: Communication line between yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit) ABS FUNCTION

## ABS FUNCTION : System Diagram

		CAN communication
Stop lamp switch		
Vacuum sensor		
Front wheel sensor RH	ABS actuator	
Front wheel sensor LH	and electric unit (control unit)	Combination meter
Rear wheel sensor RH		
Rear wheel sensor LH		
Yaw rate/side/decel G sensor		
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### < SYSTEM DESCRIPTION >

## **ABS FUNCTION : System Description**

- 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 avoided by steering operation.
- During braking, control unit calculates wheel speed and pseudo-vehicle speed, and transmits pressure increase, hold or decrease signals to actuator portion according to wheel slip status.
- The following effects are obtained by preventing wheel lock during braking.
- Vehicle tail slip is prevented during braking when driving straight.
- Understeer and oversteer tendencies are moderated during braking driving on a corner.
- Obstacles may be easily bypassed by steering operation during braking.
- · CONSULT can be used to diagnose the system diagnosis.
- · Fail-safe function is adopted. When a malfunction occurs in ABS function, the control is suspended for VDC function, TCS function, ABS function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function and hill start assist function. However, EBD function is operated normally. Refer to BRC-181, "Fail-Safe".

#### NOTE:

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



#### INPUT SIGNAL AND OUTPUT SIGNAL

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

Component	Signal description	ľ
Steering angle sensor	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Steering angle sensor signal</li> </ul>	L
Combination meter	<ul> <li>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>ABS warning lamp signal</li> <li>VDC warning lamp signal</li> </ul>	N

## EBD FUNCTION

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## < SYSTEM DESCRIPTION >

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# [TYPE 2]

## EBD FUNCTION : System Diagram

ſ		CAN communication
Stop lamp switch		
Vacuum sensor Vacuum sensor signal		
Front wheel sensor RH	ABS actuator	
Front wheel sensor LH	and electric unit (control unit)	Combination meter
Rear wheel sensor RH		
Rear wheel sensor LH		
Yaw rate/side/decel G sensor Communication line		
		AWFIA1217GB

## EBD FUNCTION : System Description

- 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 DESCRIPTION >

- During braking, control unit portion compares slight slip on front • and rear wheels by wheel speed sensor signal, transmits drive signal to actuator portion when rear wheel slip exceeds front wheel slip for the specified value or more, and controls rear wheel brake force (brake fluid pressure) so that increase of rear wheel slip is prevented and slips on front wheel and rear wheel are nearly equalized. ABS control is applied when slip on each wheel increases and wheel speed is the threshold value of ABS control or less.
- CONSULT can be used to diagnose the system.
- · Fail-safe function is adopted. When a malfunction occurs in EBD function, the control is suspended for VDC function, TCS function, ABS function, EBD function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function and hill start assist function. Refer to BRC-181, "Fail-Safe".



**[TYPE 2]** 

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## 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	<ul> <li>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Brake warning lamp signal</li> <li>ABS warning lamp signal</li> <li>VDC warning lamp signal</li> </ul>

## TIII SIAH ASSISI FUNCTIUN

### < SYSTEM DESCRIPTION >

## Hill start assist FUNCTION : System Diagram



## Hill start assist FUNCTION : System Description

INFOID:000000012551959

- This function maintains brake fluid pressure so that the vehicle does not move backwards, even if brake pedal is released to depress accelerator pedal to start the vehicle, while it is stopped on an uphill slope by depressing brake pedal.
- This function operates when the vehicle is in stop status on an uphill slope of slope ratio 10% or more and selector lever is in any position other than P (Park) or N (Neutral).
- Hill start assist function is only for the start aid. It maintains the brake fluid pressure for approx. 2 seconds after releasing the brake pedal, and then decreases the pressure gradually. If the vehicle starts by accelerator operation, the brake is released automatically and a smooth start is performed.
- Fail-safe function is adopted. When a malfunction occurs in hill start assist function, the control is suspended for VDC function, TCS function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function and hill start assist function. However, ABS function and EBD function are operated normally. Refer to <u>BRC-181</u>, "Fail-Safe".

#### INPUT SIGNAL AND OUTPUT SIGNAL

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

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

## < SYSTEM DESCRIPTION >

Component	Signal description	
ТСМ	<ul> <li>Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Shift position signal</li> </ul>	A
Combination meter	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Brake fluid level switch signal</li> <li>Parking brake switch signal</li> <li>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>VDC warning lamp signal</li> <li>VDC OFF indicator lamp signal</li> </ul>	B C D

\*: Communication line between yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit) hill descent control (Downhill Drive Support) FUNCTION

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



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

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- The hill descent control system will help maintain vehicle speed when driving under 25 km/h (15 MPH) on steeper downhill grades. Hill descent control will provide braking allowing the driver to concentrate on steering while reducing the burden of brake and accelerator operation.
- To operate the system, set the 4WD switch to 4WD LOCK and push the hill descent control switch. The hill
  descent control indicator in the combination meter will turn on. While hill descent control is operating, the
  stop/tail lamps will illuminate.
- If the accelerator or brake pedal is depressed while the hill descent control system is on, the system will stop operating.
- During hill descent control operation, a mechanical noise may be heard. This is normal.
- Electrical system diagnosis by CONSULT is available.

## INPUT SIGNAL AND OUTPUT SIGNAL

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

## **BRC-193**

### < SYSTEM DESCRIPTION >

Component	Signal description
Yaw rate/side/decel G sensor	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line *:</li> <li>Yaw rate signal</li> <li>Side G sensor signal</li> <li>Decel G sensor signal</li> </ul>
ECM	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Accelerator pedal position signal</li> <li>Engine speed signal</li> <li>Mainly receives the following signal from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Target throttle position signal</li> </ul>
ТСМ	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Shift position signal
Steering angle sensor	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Steering angle sensor signal
Combination meter	<ul> <li>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Brake fluid level switch signal</li> <li>Parking brake switch signal</li> <li>Mainly receives the following signal from ABS actuator and electric unit (control unit) via CAN communication:</li> <li>Hill descent control indicator lamp signal</li> </ul>

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

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

< SYSTEM DESCRIPTION >

**[TYPE 2]** DIAGNOSIS SYSTEM JABS ACTUATOR AND ELECTRIC UNIT (CONTROL

# UNIT)]

CONSULT Function

#### INFOID:000000012551962

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#### **CAUTION:**

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

#### APPLICATION ITEMS

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

Mode	Function description	
ECU Identification	Parts number of ABS actuator and electric unit (control unit) can be read.	E
Self Diagnostic Result	Self-diagnostic results and freeze frame data can be read and erased quickly.*	
Data Monitor	ata Monitor Input/Output data in the ABS actuator and electric unit (control unit) can be read.	
Active Test	Diagnostic Test Mode in which CONSULT drives some actuators apart from the ABS actuator and elec- tric unit (control unit) and also shifts some parameters in a specified range.	Bitte
Work support	Components can be quickly and accurately adjusted.	G
*: The following diagnosis inform • DTC	nation is erased by erasing.	

Freeze frame data (FFD)

#### ECU IDENTIFICATION

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

## SELF DIAGNOSTIC RESULT

Refer to BRC-206, "DTC Index".

When "CRNT" is displayed on self-diagnosis result,

The system is presently malfunctioning.

When "PAST" is displayed on self-diagnosis result, • System malfunction in the past is detected, but the system is presently normal.

Freeze frame data (FFD)

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

Item name	Display item	
IGN counter (0 – 39)	<ul> <li>The number of times that ignition switch is turned ON after the DTC is detected is displayed.</li> <li>When "0" is displayed: It indicates that the system is presently malfunctioning.</li> <li>When except "0" is displayed: It indicates that system malfunction in the past is detected, but the system is presently normal.</li> <li>NOTE:</li> <li>Each time when ignition switch is turned OFF to ON, numerical number increases in 1 → 2 → 338 → 39. When the operation number of times exceeds 39, the number do not increase and "39" is displayed until self-diagnosis is erased.</li> </ul>	M

#### ACTIVE TEST

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

#### CAUTION:

• Never perform ACTIVE TEST while driving the vehicle.

- Always bleed air from brake system before active test.
- Never perform active test when system is malfunctioning.

NOTE:

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

#### < SYSTEM DESCRIPTION >

[TYPE 2]

- 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	Diaplay Itam	Display			
	Display item	Up	Кеер	Down	
	FR RH IN SOL	Off	On*	On*	
FR RH SOL	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			
	Display item	Up	ACT UP	ACT KEEP	
	FR RH IN SOL	Off	Off	Off	
FR RH ABS SOLE-	FR RH OUT SOL	Off	Off	Off	
NOID (ACT)	CV1	Off	Off	Off	
	CV2	Off	On*	On*	
	FR LH IN SOL	Off	Off	Off	
FR LH ABS SOLE-	FR LH OUT SOL	Off	Off	Off	
NOID (ACT)	CV1	Off	On*	On*	
	CV2	Off	Off	Off	
	RR RH IN SOL	Off	Off	Off	
RR RH ABS SOLE-	RR RH OUT SOL	Off	Off	Off	
NOID (ACT)	CV1	Off	On*	On*	
	CV2	Off	Off	Off	
	RR LH IN SOL	Off	On*	Off	
RR LH ABS SOLE- NOID (ACT)	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 >

TYPE 2]	
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Test item	Display Item	Display	
	Display item	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 С checking purposes and is not a malfunction.

#### DATA MONITOR

			×: Applicable
	Monitor iter	m selection	
Item (Unit)	ECU INPUT SIG- NALS	MAIN SIGNALS	Note
FR LH SENSOR [km/h (MPH)]	×	×	Wheel speed calculated by front LH wheel sensor is displayed.
FR RH SENSOR [km/h (MPH)]	×	×	Wheel speed calculated by front RH wheel sensor is displayed.
RR LH SENSOR [km/h (MPH)]	×	×	Wheel speed calculated by rear LH wheel sensor is displayed.
RR RH SENSOR [km/h (MPH)]	×	×	Wheel speed calculated by rear RH wheel sensor is displayed.
DECEL G-SEN (m/s <sup>2</sup> )	×	×	Decel G detected by decel G sensor is displayed.
FR RH IN SOL (On/Off)		×	Operation status of front RH wheel ABS IN valve is displayed.
FR RH OUT SOL (On/Off)		×	Operation status of front RH wheel ABS OUT valve is displayed.
FR LH IN SOL (On/Off)		×	Operation status of front LH wheel ABS IN valve is displayed.
FR LH OUT SOL (On/Off)		×	Operation status of front LH wheel ABS OUT valve is displayed.
RR RH IN SOL (On/Off)		×	Operation status of rear RH wheel ABS IN valve is displayed.
RR RH OUT SOL (On/Off)		×	Operation status of rear RH wheel ABS OUT valve is displayed.
RR LH IN SOL (On/Off)		×	Operation status of rear LH wheel ABS IN valve is displayed.
RR LH OUT SOL (On/Off)		×	Operation status of rear LH wheel ABS OUT valve is displayed.
EBD WARN LAMP (On/Off)			Brake warning lamp ON/OFF status is displayed. <sup>(Note 1)</sup>
STOP LAMP SW (On/Off)	×	×	Stop lamp switch signal input status is displayed.
MOTOR RELAY (On/Off)		×	ABS motor and motor relay status is displayed.
ACTUATOR RLY (On/Off)		×	ABS actuator relay status is displayed.
ABS WARN LAMP (On/Off)		×	ABS warning lamp ON/OFF status is displayed. (Note 1)
OFF LAMP (On/Off)		×	VDC OFF indicator lamp ON/OFF status is displayed. <sup>(Note 1)</sup>
OFF SW (On/Off)	×	×	VDC OFF switch status is displayed

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

## < SYSTEM DESCRIPTION >

[TYPE 2]

	Monitor item selection		
Item (Unit)	ECU INPUT SIG- NALS	MAIN SIGNALS	Note
SLIP/VDC LAMP (On/Off)		×	VDC warning lamp ON/OFF status is displayed. <sup>(Note 1)</sup>
BATTERY VOLT (V)	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.
GEAR	×	×	Current gear position judged from current gear position signal is displayed.
SLCT LVR POSI	×	×	Current gear position judged from current gear position signal is displayed.
ENGINE SPEED (tr/min)	×	×	Engine speed status is displayed.
YAW RATE SEN (d/s)	×	×	Yaw rate detected by yaw rate sensor is displayed.
R POSI SIG (On/Off)			R range signal input status judged from R range signal is displayed.
4WD MODE MON (AUTO/2WD/LOCK)	×	×	4WD control status is displayed.
N POSI SIG (On/Off)			N range signal input status judged from N range signal is displayed.
CV1 (On/Off)			Cut valve 1 operation status is displayed.
CV2 (On/Off)			Cut valve 2 operation status is displayed.
ACCEL POS SIG (%)	×		Displays the Accelerator pedal position.
SIDE G -SENSOR (m/s <sup>2</sup> )	×		Side G detected by side G sensor is displayed.
STR ANGLE SIG (°)	×		Steering angle detected by steering angle sensor is dis- played.
PRESS SENSOR (bar)	×		Brake fluid pressure detected by pressure sensor is displayed.
EBD SIGNAL (On/Off)			EBD operation status is displayed.
ABS SIGNAL (On/Off)			ABS operation status is displayed.
TCS SIGNAL (On/Off)			TCS operation status is displayed.
VDC SIGNAL (On/Off)			VDC operation status is displayed.
EBD FAIL SIG (On/Off)			EBD fail-safe signal status is displayed.
ABS FAIL SIG (On/Off)			ABS fail-safe signal status is displayed.
TCS FAIL SIG (On/Off)			TCS fail-safe signal status is displayed.
VDC FAIL SIG (On/Off)			VDC fail-safe signal status is displayed.
CRANKING SIG (On/Off)			Cranking status is displayed.
FLUID LEV SW (On/Off)	×		Brake fluid level signal input status via CAN communication is displayed.

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

#### < SYSTEM DESCRIPTION >

**[TYPE 2]** 

	Monitor item selection			^
Item (Unit)	ECU INPUT SIG- NALS	MAIN SIGNALS	Note	A
PARK BRAKE SW (On/Off)	×		Parking brake switch signal input status via CAN communi- cation is displayed.	В
DDS SW <sup>(Note 2)</sup> (On/Off)			Hill descent control switch (On/Off) status is displayed.	C
DDS SIG <sup>(Note 2)</sup> (On/Off)			Hill descent control operation (On/Off) status is displayed.	C
USS SIG <sup>(Note 3)</sup> (On/Off)			Hill start assist operation status is displayed.	D
Note 1: Refer to BRC-173,	"System Descrip	otion" for ON/OI	FF conditions of each warning lamp and indicator	

lamp.

Note 2: DDS means "hill descent control."

Note 3: USS means "hill start assist."

#### WORK SUPPORT

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

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# ECU DIAGNOSIS INFORMATION APPLICATION NOTICE

## **Application Notice**

Service information	Remarks
TYPE 1	VDC/TCS/ABS
TYPE 2	HILL DESCENT CONTROL/VDC/TCS/ABS

### < ECU DIAGNOSIS INFORMATION >

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

## **Reference Value**

INFOID:000000012551964

## CONSULT DATA MONITOR STANDARD VALUE

Monitor item	Condition	Reference values in normal operation	
	Vehicle stopped	0.00 km/h (MPH)	С
FR LH SENSOR	When driving <sup>(Note 1)</sup>	Nearly matches the speedometer display (within $\pm 10\%$ )	
	Vehicle stopped	0.00 km/h (MPH)	D
FR RH SENSOR	When driving <sup>(Note 1)</sup>	Nearly matches the speedometer display (within $\pm 10\%$ )	_
	Vehicle stopped	0.00 km/h (MPH)	F
RR LH SENSOR	When driving <sup>(Note 1)</sup>	Nearly matches the speedometer display (within $\pm 10\%$ )	
	Vehicle stopped	0.00 km/h (MPH)	סתנ
RR RH SENSOR	When driving <sup>(Note 1)</sup>	Nearly matches the speedometer display (within $\pm 10\%$ )	G
	When stopped	Approx. 0 m/s <sup>2</sup>	0
DECEL G-SEN	During acceleration	Positive value	
	During deceleration	Negative value	Η
	Active	On	
FR RH IN SOL	Not activated	Off	
	Active	On	1
FR RH OUT SOL	Not activated	Off	
	Active	On	J
FR LH IN SOL	Not activated	Off	
	Active	On	V
FR EH OUT SOL	Not activated	Off	N
	Active	On	
KK KH IN SOL	Not activated	Off	L
	Active	On	
RR RH OUT SOL	Not activated	Off	
	Active	On	IVI
KK EITIN SOL	Not activated	Off	
	Active	On	Ν
KK EITOOT SOL	Not activated	Off	
	When brake warning lamp is ON <sup>(Note 2)</sup>	On	
EBD WARN LAMP	When brake warning lamp is OFF <sup>(Note 2)</sup>	Off	0
	Brake pedal depressed	On	
STOP LAMP SW	Brake pedal not depressed	Off	Ρ
	Active	On	
MUTOR RELAY	Not activated	Off	
	Active	On	
ACTUATOR RLY	When not operating (in fail-safe mode)	Off	

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### < ECU DIAGNOSIS INFORMATION >

Monitor item	Condition	Reference values in normal operation
	When ABS warning lamp is ON <sup>(Note 2)</sup>	On
ABS WARN LAMP	When ABS warning lamp is OFF <sup>(Note 2)</sup>	Off
	When VDC OFF indicator lamp is ON <sup>(Note 2)</sup>	On
OFF LAMP	When VDC OFF indicator lamp is OFF <sup>(Note 2)</sup>	Off
	When VDC OFF switch is ON	On
OFF SW	When VDC OFF switch is OFF	Off
	When VDC warning lamp is ON <sup>(Note 2)</sup>	On
SLIP/VDC LAIVIP	When VDC warning lamp is OFF <sup>(Note 2)</sup>	Off
BATTERY VOLT	Ignition switch ON	10 – 16 V
GEAR	Driving	1 – 7 Depending on shift status
SLCT LVR POSI	Vehicle stopped	N/P Depending on shift status
ENGINE SPEED	Engine stopped	0 tr/min
	Engine running	Almost same reading as tachometer
	Vehicle stopped	Approx. 0 d/s
YAW RATE SEN	Turning right	Negative value
	Turning left	Positive value
R POSI SIG	When selector lever is in the R position	On
	When selector lever is in the other position than R	Off
	When 4WD shift switch is in AUTO position	AUTO
4WD MODE MON	When 4WD shift switch is in 4H position	LOCK
	When 4WD shift switch is in 2WD position	2WD
	When selector lever is in the N position	On
N F031319	When selector lever is in the other position than N	Off
0)/1	Active	On
CVI	Not activated	Off
21/2	Active	On
CV2	Not activated	Off
	Never depress accelerator pedal (with ignition switch ON)	0%
ACCEL FOS SIG	Depress accelerator pedal (with ignition switch ON)	0 – 100%
	Vehicle stopped	Approx. 0 m/s <sup>2</sup>
SIDE G-SENSOR	Right turn	Negative value
	Left turn	Positive value
	When driving straight	0±2.5°
STR ANGLE SIG	When steering wheel is steered to LH by $90^\circ$	Approx. +90°
	When steering wheel is steered to RH by $90^{\circ}$	Approx. –90°
	Brake pedal not depressed	Approx. 0 bar
LKE99 JEINJOK	Brake pedal depressed	(–40) – (+300 bar)
	EBD activated	On
EBD SIGNAL	EBD not activated	Off
	ABS is activated	On
ABS SIGNAL	ABS is not activated	Off

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**BRC-202** 

#### < ECU DIAGNOSIS INFORMATION >

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Monitor item	Condition	Reference values in normal operation	
	TCS activated	On	A
ICS SIGNAL	TCS not activated	Off	
	VDC activated	On	В
VDC SIGNAL	VDC not activated	Off	
	In EBD fail-safe	On	
EBD FAIL SIG	EBD is normal	Off	С
	In ABS fail-safe	On	
ABS FAIL SIG	ABS is normal	Off	D
	In TCS fail-safe	On	
TGS FAIL SIG	TCS is normal	Off	
	In VDC fail-safe	On	E
VDC FAIL SIG	VDC is normal	Off	
	At cranking	On	BR
CRAINING SIG	Other than at cranking	Off	DIX
FLUID LEV SW	When brake fluid level switch is ON (brake fluid level is less than the specified level)	On	G
	When brake fluid level switch is OFF	Off	0
DADK BDAKE SWI	When parking brake is active	On	
FAIL DIALE SW	Parking brake is released	Off	Н
	Hill descent control switch ON	On	
DDS SIW(1000)	Hill descent control switch OFF	Off	
DDC CLC(Note 3)	Hill descent control is active	On	1
200 210 <sup>((100 2)</sup>	Hill descent control is inactive	Off	
LICE CIC(Note 4)	Hill start assist is active	On	J
000 010 (	Hill start assist is inactive	Off	

Note 1: Confirm tire pressure is standard value.

Note 2: Refer to <u>BRC-173, "System Description"</u> for ON/OFF conditions of each warning lamp and indicator K lamp.

Note 3: DDS means "hill descent control."

Note 4: USS means "hill start assist."

#### Fail-Safe

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

VDC warning lamp in combination meter turns ON when a malfunction occurs in the system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function and hill start sist assist function. However, ABS function and EBD function are operated normally.

#### ABS FUNCTION

ABS warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in the system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS function and hill start assist function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function and hill start assist function. However, EBD function is operated normally. **NOTE:** 

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

#### EBD FUNCTION

ABS warning lamp, brake warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in the system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS function, EBD function and hill start assist function. The vehicle status becomes

## **BRC-203**

#### < ECU DIAGNOSIS INFORMATION >

the same as models without VDC function, TCS function, ABS function, EBD function and hill start assist function.

DTC	Malfunction detected condition	Fail-safe condition
C1101	When an open circuit is detected in rear RH wheel sensor circuit.	
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> <li>When power supply voltage of rear RH wheel sensor is low.</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>	The following functions are sus-
C1106	<ul> <li>When power supply voltage of rear LH wheel sensor is low.</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>	<ul> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>EBD function (only when both 2 rear wheels are malfunctioning)</li> </ul>
C1107	<ul> <li>When power supply voltage of front RH wheel sensor is low.</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>	hill start assist function
C1108	<ul> <li>When power supply voltage of front LH wheel sensor is low.</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> <li>When ignition voltage is 10 V or less.</li> <li>When ignition voltage is 16 V or more.</li> </ul>	The following functions are sus- pended: • VDC function • TCS function
C1111	When a malfunction is detected in motor or motor relay.	<ul> <li>ABS function</li> <li>EBD function</li> <li>hill start assist function</li> </ul>
C1115	When difference in wheel speed between any wheel and others is detected during the vehicle is driven because of installation of other tires than specified.	The following functions are suspended: • VDC function
C1116	When stop lamp switch signal is not input when brake pedal operates.	<ul> <li>TCS function</li> <li>ABS function</li> <li>hill start assist function</li> </ul>
C1120	When a malfunction is detected in front LH ABS IN valve.	
C1121	When a malfunction is detected in front LH ABS OUT valve.	The following functions are sus-
C1122	When a malfunction is detected in front RH ABS IN valve.	pended:
C1123	When a malfunction is detected in front RH ABS OUT valve.	VDC function     TCS function
C1124	When a malfunction is detected in rear LH ABS IN valve.	ABS function
C1125	When a malfunction is detected in rear LH ABS OUT valve.	EBD function     bill start essist function
C1126	When a malfunction is detected in rear RH ABS IN valve.	- THIL STALL ASSIST TULICUUT
C1127	When a malfunction is detected in rear RH ABS OUT valve.	
C1130	When a malfunction is detected in ECM system.	<ul><li>The following functions are suspended:</li><li>VDC function</li><li>TCS function</li><li>hill start assist function</li></ul>

**[TYPE 2]** 

## < ECU DIAGNOSIS INFORMATION >

DTC	Malfunction detected condition	Fail-safe condition	•
C1140	When a malfunction is detected in actuator relay.	<ul> <li>The following functions are suspended:</li> <li>VDC function</li> <li>TCS function</li> <li>ABS function</li> <li>EBD function</li> <li>hill start assist function</li> </ul>	B
C1142	When a malfunction is detected in pressure sensor.	The following functions are sus-	С
C1143	When a malfunction is detected in steering angle sensor.	pended:	
C1144	When neutral position adjustment of steering angle sensor is not complete.	TCS function	D
C1145	When a malfunction is detected in yaw rate signal.	<ul> <li>hill start assist function</li> </ul>	
C1146	When a malfunction is detected in side/decel G signal.	The following functions are sus-	-
C1155	When brake fluid level low signal is detected.	pended: • VDC function • TCS function • ABS function • hill start assist function	E BRC
C1160	When calibration of yaw rate/side/decel G sensor is not complete.	<ul><li>The following functions are suspended:</li><li>VDC function</li><li>TCS function</li><li>hill start assist function</li></ul>	G
C1164	When a malfunction is detected in cut valve 1.	The following functions are sus-	н
C1165	When a malfunction is detected in cut valve 2.	<ul><li>Pended:</li><li>VDC function</li></ul>	
C1170	When the information in ABS actuator and electric unit (control unit) is not the same.	<ul> <li>TCS function</li> <li>ABS function</li> <li>EBD function</li> <li>hill start assist function</li> </ul>	Ι
C1197	When a malfunction is detected in vacuum sensor.		
C1198	<ul> <li>When an open circuit is detected in vacuum sensor circuit.</li> <li>When a short circuit is detected in vacuum sensor circuit.</li> <li>When a malfunction is detected in vacuum sensor noise.</li> </ul>	Electrical vacuum assistance of brake booster is suspended.	0
C1199	When brake booster vacuum is approx. 0 kPa (0 mmHg) during engine running.	_	K
C119A	When a malfunction is detected in supply power voltage of vacuum sensor.	Electrical vacuum assistance of brake booster is suspended.	
U1000	When CAN communication signal is not continuously received for 2 seconds or more.	<ul> <li>The following functions are suspended:</li> <li>VDC function</li> <li>TCS function</li> <li>hill start assist function</li> </ul>	M

## **DTC Inspection Priority Chart**

INFOID:000000012551966

**[TYPE 2]** 

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

Priority	Detected item (DTC)	C
1	U1000 CAN COMM CIRCUIT	
2	C1170 VARIANT CODING	-
3	C1130 ENGINE SIGNAL 1     C1144 ST ANG SEN SIGNAL	
4	<ul> <li>C1109 BATTERY VOLTAGE [ABNOMAL]</li> <li>C1111 PUMP MOTOR</li> <li>C1140 ACTUATOR RLY</li> </ul>	

## < ECU DIAGNOSIS INFORMATION >

Priority	Detected item (DTC)
5	<ul> <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>C1107 FR RH SENSOR-2</li> <li>C1116 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>C1123 FR RH OUT 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>C1127 RR RH OUT ABS SOL</li> <li>C1127 RR RH OUT ABS SOL</li> <li>C1126 RR RH IN ABS SOL</li> <li>C1127 RR RH OUT ABS SOL</li> <li>C1127 RR RH OUT ABS SOL</li> <li>C1145 YAW RATE SENSOR</li> <li>C1146 SIDE G SEN CIRCUIT</li> <li>C1166 DECEL G SEN SET</li> <li>C1166 CV 2</li> <li>C1199 BRAKE BOOSTER</li> <li>C1199 BRAKE BOOSTER</li> <li>C1199 BRAKE BOOSTER</li> <li>C1194 VACUUM SEN VOLT</li> </ul>
U	

## DTC Index

DTC	Display Item	Refer to
C1101	RR RH SENSOR-1	
C1102	RR LH SENSOR-1	RDC 226 "DTC Description"
C1103	FR RH SENSOR-1	BRC-220, DTC Description
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	
C1106	RR LH SENSOR-2	PPC 221 "DTC Description"
C1107	FR RH SENSOR-2	BRC-231, DTC Description
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNOMAL]	BRC-238, "DTC Description"
C1111	PUMP MOTOR	BRC-240, "DTC Description"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-243, "DTC Description"
C1116	STOP LAMP SW	BRC-250, "DTC Description"
C1120	FR LH IN ABS SOL	BRC-254, "DTC Description"
C1121	FR LH OUT ABS SOL	BRC-256, "DTC Description"
C1122	FR RH IN ABS SOL	BRC-254, "DTC Description"
C1123	FR RH OUT ABS SOL	BRC-256, "DTC Description"
C1124	RR LH IN ABS SOL	BRC-254, "DTC Description"
C1125	RR LH OUT ABS SOL	BRC-256, "DTC Description"
C1126	RR RH IN ABS SOL	BRC-254, "DTC Description"
C1127	RR RH OUT ABS SOL	BRC-256, "DTC Description"

## < ECU DIAGNOSIS INFORMATION >

[TYPE 2]

DTC	Display Item	Refer to	0
C1130	ENGINE SIGNAL 1	BRC-258, "DTC Description"	A
C1140	ACTUATOR RLY	BRC-260, "DTC Description"	
C1142	PRESS SEN CIRCUIT	BRC-262, "DTC Description"	В
C1143	ST ANG SEN CIRCUIT	BRC-265, "DTC Description"	
C1144	ST ANG SEN SIGNAL	BRC-269, "DTC Description"	
C1145	YAW RATE SENSOR	BBC-271 "DTC Description"	С
C1146	SIDE G SEN CIRCUIT		
C1155	BR FLUID LEVEL LOW	BRC-274, "DTC Description"	D
C1160	DECEL G SEN SET	BRC-278, "DTC Description"	
C1164	CV 1	BRC-280 "DTC Description"	
C1165	CV 2	<u>BRC-200, BTC Beschpilon</u>	E
C1170	VARIANT CODING	BRC-282, "DTC Description"	
C1197	VACUUM SENSOR	BRC-283, "DTC Description"	BRC
C1198	VACUUM SEN CIR	BRC-286. "DTC Description"	BRO
C1199	BRAKE BOOSTER	BRC-288, "DTC Description"	
C119A	VACUUM SEN VOLT	BRC-291, "DTC Description"	G
U1000	CAN COMM CIRCUIT	BRC-294, "DTC Description"	

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WIRING DIAGRAM BRAKE CONTROL SYSTEM

Wiring Diagram



**[TYPE 2]** 



Revision: November 2015

	ORS - VDC WITH H			Color of	
JCK (J/B)	Connector Name CC	DMBINATION METER	Terminal No.	Wire	Signal Name
	Connector Color WH	HITE	- 0	<u>م</u>	GND1
	4		57 F	n (	GND2 PKR
911P10P9P8P			21	BG 6	IGN
	·011		25	J	BRAKE OIL SW
	20 19 18 17 16 15 14 13	12 11 10 9 8 7 6 5 4 3 2 1	38	٩	CAN-L
Signal Name	40 39 38 37 36 35 34 33	32 31 30 29 28 27 26 25 24 23 22 21	36		CAN-H
I					
		J.	Connector No	MEA	
O WIRE	Terminal No. Wire	Signal Name	Connector N	ame STFF	RING ANGLE SENSOR
	33G 33G	1	Connector Co		
	34G G	1			1
	35G P	1	E	ſ	ĸ
2G 3G 4G 5G	36G L	1	SH	-	2 3 4
i 7G 8G 9G 10G	53G G	I	Ď	2	6 7 8
	55G G	1			
15G 16G 17G 18G 19G 20G 21G	56G P	1			
25622662762862296306	57G P	-	Terminal No.	Color of	Signal Name
35G 36G 37G 38G 39G 40G 41G	58G L	1	-	GR	GND
			2	٩	CAN-L
55G 56G 57G 58G 59G 60G 61G			4	σ	BAT
			5	_	CAN-H
G 76G 77G 78G 79G 80G 81G G 86G 87G 88G 89G 90G					
201 03.6 04.6 05.6					
976 986 996 1006					

# < WIRING DIAGRAM >

# BRAKE CONTROL SYSTEM

Revision: November 2015

ABFIA1117GB

## BRAKE CONTROL SYSTEM

#### < WIRING DIAGRAM >

**[TYPE 2]** 



Antical Signal Name     Editor No.     E28       ector Name     FUSE BLOCK (J/B)       ector Name     FUSE BLOCK (J/B)       ector Name     FUSE BLOCK (J/B)       minal No.     Wire       SM     R       TM     R       SM     R       Initial No.     Color of Signal Name       SM     R       TM     R       TM     R       SM     R       TM     R       TM     R       SM     R       TM     R       SM     R       TM     R       TM     R       SM     R       TM     R       TM     R       TM     R       SM     R       TM     R       TM     R       SM     R       T     Color of Signal Name       Minal No.     Wire       Minal No.     Signal Name       T     G

ABFIA1112GB

## **BRAKE CONTROL SYSTEM**

#### < WIRING DIAGRAM >



#### < WIRING DIAGRAM >



Connector No. E125	Terminal No.	Color of Wire	Signal Name	Terminal No.	Color of Wire	Signal Name
	9	٩	CANM2 (-)	21	I	I
Connector Name (CON I KUL UNI ) (WITH 4WD SYSTEM)	7	σ	RR LH SEN (SIGNAL)	22	I	I
Connector Color BLACK	8	н	RR LH SEN (POWER)	23	×	STP2
	6	N	FR RH SEN (SIGNAL)	24	ı	I
	10	U	FR RH SEN (POWER)	25	_	CAN-H
H.S. $\begin{bmatrix} 2 & 25 & 26 & 27 & 28 & 29 & 30 & 31 & 32 & 334 & 4 & 5 \\ 15 & 16 & 17 & 18 & 10 & 50 & 51 & 323 & 34 & 4 & 5 \end{bmatrix}$	11	I	I	26	I	I
	12	Ι	1	27	I	I
	13	W	VAC SEN (SIGNAL)	28	в	VAC SEN (POWER)
	14	Ι	I	29	ŋ	HDCS
Terminal No. Wire Signal Name	15	Р	CAN-L	30	æ	VDC OFF SW
1 B ECU (GND)	16	BG	CANM2 (+)	31	×	STPO
2 B/W MOTOR (GND)	17	Ч	RR RH SEN (SIGNAL)	32	SHIELD	VAC SEN (GND)
3 B SOLENOID (POWER)	18	BG	RR RH SEN (POWER)	33	1	I
4 W MOTOR (POWER)	19	Ν	FR LH SEN (SIGNAL)	34	BR	IGN (POWER)
5 R STOP LAMP SW	20	9	FR LH SEN (POWER)			
Connector No. E152	Torminal No	Color of	Signal Namo	Connector No	). E15	
Connector Name WIRE TO WIRE		Wire	Signal Name	Connector Na	ame HILL	DESCENT CONTROL
Connector Color WHITE	33G	ГG	I		REL	АҮ
	34G	۸	1	Connector Co	olor BLU	Е
	35G	٩	1			
56 46 36 26 16	36G	_	1	f		3
106 96 86 76 66	53G	U	1	H.S.		
	55G	ЯR	I			
216206196156176156156156126116	56G	Я	I			
306286276266256226226	57G	Р	I	Terminal No.	Color of Wire	Signal Name
41G40G38G38G37G36G36G34G33G32G31G Enconversion and and and and and and and	58G	BG	I	-	BB	I
				5	>	I
61 (60(5)9(5)8(6)58(6)55(5)5(5)5(5)5(5)5(5) 				n	7	1
halpederederederederederederederederederede				ى	æ	I
81.0[80:0]%96]%96]%63%963%63%63%63%63%75] 900389638863%753%63%653%453%253						
9565 9446 9326 925 916 10009986 3826 375 966						

ABFIA1114GB

# **BRAKE CONTROL SYSTEM**

# **Revision: November 2015**

< WIRING DIAGRAM >

BRAKE CONTRO	L SYSTEM

**[TYPE 2]** 



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# BASIC INSPECTION APPLICATION NOTICE

# **Application Notice**

Service information	Remarks
TYPE 1	VDC/TCS/ABS
TYPE 2	HILL DESCENT CONTROL/VDC/TCS/ABS
< BASIC INSPECTION >

Work Flow

# DIAGNOSIS AND REPAIR WORK FLOW

DETAILED FLOW <b>1</b> .INTERVIEW THE CUSTOMER	В
Clarify customer concerns before inspection. First of all, perform an interview utilizing <u>BRC-218</u> , " <u>Diagnostic</u> <u>Work Sheet</u> " and reproduce the symptom as well as fully understand it. Ask customer about his/her concerns carefully. Check symptoms by driving vehicle with customer, if necessary.	С
Customers are not professional. Never guess easily like "maybe the customer means that," or " maybe the customer mentions this symptom".	D
>> GO TO 2. <b>2.</b> СНЕСК SYMPTOM	Ε
Reproduce the symptom that is indicated by the customer, based on the information from the customer obtained in the interview. Also check that the symptom is not caused by fail-safe mode. Refer to <u>BRC-203</u> , <u>"Fail-Safe"</u> .	BR
CAUTION: When the symptom is caused by normal operation, fully inspect each portion and obtain the under- standing of customer that the symptom is not caused by a malfunction.	G
>> GO TO 3.	Н
<b>3.</b> PERFORM THE SELF-DIAGNOSIS	
With CONSULT 1. Turn the ignition switch OFF $\rightarrow$ ON. CAUTION:	I
Be sure to wait of 10 seconds after turning ignition switch OFF or ON. 2. Perform "Self Diagnostic Result" of "ABS".	J
Is DTC detected?	
NO >> GO TO 6.	K
4.RECHECK THE SYMPTOM	
<ul> <li>(■)With CONSULT</li> <li>1. Erase "Self Diagnostic Result" of "ABS".</li> <li>2. Turn the ignition switch OFF → ON → OFF.</li> </ul>	L
CAUTION: Be sure to wait of 10 seconds after turning ignition switch OFF or ON. 3. Perform DTC confirmation procedures for the malfunctioning system.	M
<b>NOTE:</b> If some DTCs are detected at the some time, determine the order for performing the diagnosis based on BRC-205, "DTC Inspection Priority Chart".	Ν
Is DTC detected?	0
<ul> <li>YES &gt;&gt; GO TO 5.</li> <li>NO &gt;&gt; Check harness and connectors based on the information obtained in the interview. Refer to <u>GI-47.</u></li> <li>"Intermittent Incident".</li> </ul>	0
5.REPAIR OR REPLACE MALFUNCTIONING COMPONENT	Ρ
<ol> <li>Repair or replace malfunctioning components.</li> <li>Reconnect component or connector after repairing or replacing.</li> <li>When DTC is detected, erase "Self Diagnostic Result" of "ABS".</li> <li>CAUTION:</li> </ol>	

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

INFOID:000000012551970

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< BASIC INSPECTION >

### >> GO TO 7.

### **6.** IDENTIFY MALFUNCTIONING SYSTEM BY SYMPTOM DIAGNOSIS

Identify malfunctioning system based on symptom diagnosis and perform inspection.

#### Can the malfunctioning system be identified?

YES >> GO TO 7.

NO >> Check harness and connectors based on the information obtained in the interview. Refer to <u>GI-47</u>. <u>"Intermittent Incident"</u>.

# 7.FINAL CHECK

#### With CONSULT

- 1. Select "DATA MONITOR" of "ABS"
- 2. Check the reference values. Refer to <u>BRC-201, "Reference Value"</u>.
- 3. Recheck the symptom and check that the symptom is not reproduced on the same conditions.

#### Is the symptom reproduced?

YES >> GO TO 3.

NO >> Inspection End.

### Diagnostic Work Sheet

INFOID:000000012551971

#### DESCRIPTION

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

#### INTERVIEW SHEET SAMPLE

	Interview sheet					
Customer name	MR/MS	Registration number		Initia regis	l year tration	
		Vehicle type		VIN		
Storage date		Engine/trac- tion Motor		Milea	age	km (Mile)
		Does not op	erate ( ) fund	ction		
		Warning land	np turns ON.			
Symptom		ABS (ABS) BRAKE or (C) C C C C C C C C C C C C C C C C C C				
		□ Noise (Location: ) □ Vibration (Location: )				
		□ Other ( )				
First occurren	ce	□ Recently	D Other (	)		
Frequency of	occurrence	□ Always	Under a certa	in conditions of	□ Sometimes (	time(s)/day)
		□ Irrelevant				
Climate con-	Weather	□ Fine □	Cloud D F	Rain □Snow	o □ Others (	)
ditions	Temperature	□ Hot □V	/arm □ Coo	I 🛛 Cold	□ Temperature [Ap	prox. °C (°F)]
	Relative humidity	□ High	□ Moderate	🗆 Low	I	
Road conditions				ad (uphill or downhil	I) □ Rough road	

# DIAGNOSIS AND REPAIR WORK FLOW

#### < BASIC INSPECTION >

[TYPE 2]

			Interviev	v sheet				
Customer	MR/MS	Registration number				Initial year registration		
		Vehicle type	!			VIN		
Storage date		Engine/trac- tion Motor				Mileage		km (Mile)
Operating con	idition, etc.	□ Irrelevant □ When eng □ During dri □ During de □ Immediat □ During co □ When ste	gine/traction ving eceleration ely before prnering (ri ering whe	on motor s Duri stop [Vehi ght curve o el is steere	tarts ng accelera cle speed: or left curve ed (to right	During idling ation Approx. e) or to left)	At constant speed km/h (MPH)]	driving
	VDC OFF switch operation	□ Yes	□ No					
	Use of other functions (ex. ICC)	□ Yes	🗆 No (	)				
Other condi- tions	Presence of non-genuine parts installation	□ Yes	🗆 No (	)				I
Memo								

0

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

< BASIC INSPECTION >

[TYPE 2]

# ADDITIONAL SERVICE WHEN REPLACING ABS ACTUATOR AND ELEC-TRIC UNIT (CONTROL UNIT)

# Description

INFOID:000000012551972

After replacing the ABS actuator and electric unit (control unit), perform the following procedures:

- Neutral position adjustment for the steering angle sensor
- Calibration of the decel G sensor

# Work Procedure

INFOID:000000012551973

**1.**PERFORM THE NEUTRAL POSITION ADJUSTMENT FOR THE STEERING ANGLE SENSOR

Perform the neutral position adjustment for the steering angle sensor.

>> Refer to <u>BRC-221, "Work Procedure"</u>, GO TO 2.

2.PERFORM CALIBRATION OF THE DECEL G SENSOR

Perform calibration of the decel G sensor.

>> Refer to <u>BRC-223</u>, "Work Procedure".

# ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

### < BASIC INSPECTION >

# ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

# Description

INFOID:000000012551974

[TYPE 2]

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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	×
1 -	
ALIGN THE VEHICLE STATUS Stop vehicle with front wheels in straight-ahead positio >> GO TO 2. PERFORM THE NEUTRAL POSITION ADJUSTME	n. ENT FOR THE STEERING ANGLE SENSOR
ALIGN THE VEHICLE STATUS Stop vehicle with front wheels in straight-ahead position >> GO TO 2. PERFORM THE NEUTRAL POSITION ADJUSTME On the CONSULT screen, touch "WORK SUPPOF Touch "START". CAUTION: Do not touch steering wheel while adjusting states After approximately 10 seconds, touch "END". NOTE: After approximately 60 seconds, it ends automatication After approximately 60 seconds, it ends automatication Turn ignition switch OFF, then turn it ON again. CAUTION: Be sure to perform above operation.	n. ENT FOR THE STEERING ANGLE SENSOR RT" and "ST ANG SEN ADJUSTMENT" in order. eering angle sensor. ally.
ALIGN THE VEHICLE STATUS Stop vehicle with front wheels in straight-ahead position >> GO TO 2. PERFORM THE NEUTRAL POSITION ADJUSTME On the CONSULT screen, touch "WORK SUPPOF Touch "START". CAUTION: Do not touch steering wheel while adjusting states After approximately 10 seconds, touch "END". NOTE: After approximately 60 seconds, it ends automaticated After approximately 60 seconds, it ends automaticated After approximately 60 seconds, it ends automaticated Turn ignition switch OFF, then turn it ON again. CAUTION: Be sure to perform above operation. >> GO TO 3.	n. ENT FOR THE STEERING ANGLE SENSOR RT" and "ST ANG SEN ADJUSTMENT" in order. eering angle sensor. ally.
ALIGN THE VEHICLE STATUS Stop vehicle with front wheels in straight-ahead position >> GO TO 2. PERFORM THE NEUTRAL POSITION ADJUSTME On the CONSULT screen, touch "WORK SUPPOF Touch "START". CAUTION: Do not touch steering wheel while adjusting stops After approximately 10 seconds, touch "END". NOTE: After approximately 60 seconds, it ends automatication After approximately 60 seconds, it ends automatication MOTE: After approximately 60 seconds, it ends automatication Security 20 Seconds in the second s	n. ENT FOR THE STEERING ANGLE SENSOR RT" and "ST ANG SEN ADJUSTMENT" in order. eering angle sensor. ally.

Erase the self-diagnosis memory of the ABS actuator and electric unit (control unit) and ECM. • ABS actuator and electric unit (control unit): Refer to <u>BRC-195, "CONSULT Function"</u>.

# **BRC-221**

# ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

< BASIC INSPECTION >

• ECM: Refer to EC-71, "CONSULT Function" (USA and Canada) or EC-563, "CONSULT Function" (Mexico). Are the memories erased?

YES >> Inspection End.

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

[TYPE 2]

# **CALIBRATION OF DECEL G SENSOR**

< BASIC INSPECTION >

# CALIBRATION OF DECEL G SENSOR

# Description

Refer to the table below to determine if calibration of the decel G sensor is required.

	×: Required –: Not required	
Situation	Calibration of decel G sensor	
Removing/Installing ABS actuator and electric unit (control unit)	(	С
Replacing ABS actuator and electric unit (control unit)	×	
Removing/Installing steering components		D
Replacing steering components		
Removing/Installing suspension components	_	
Replacing suspension components	—	Е
Removing/Installing tire		
Replacing tire	B	R(
Tire rotation		
Adjusting wheel alignment	_	
Removing/Installing yaw rate/side/decel G sensor	× (	G
Replacing yaw rate/side/decel G sensor	×	
Work Procedure	INFOID:000000012551977	Н
CALIBRATION OF DECEL G SENSOR CAUTION: To calibrate the decel G sensor, make sure to use C (Calibration cannot be done without CONSULT).	CONSULT.	I
<b>1</b> .ALIGN THE VEHICLE STATUS		.1
Stop vehicle with front wheels in straight-ahead positio	n.	0
>> GO TO 2. 2.PERFORM CALIBRATION OF DECEL G SENSOR	I	K
<ol> <li>On the CONSULT screen, touch "WORK SUPPOF</li> <li>Touch "START".</li> <li>After approximately 10 seconds, touch "END".</li> </ol>	RT" and "DECEL G SEN CALIBRATION" in order.	L
After approximately 60 seconds, it ends automatic 4. Turn ignition switch OFF, then turn it ON again. CAUTION:	ally.	Μ
be sure to perform above operation.	1	Ν
>> GO TO 3.		
<b>3.</b> CHECK DATA MONITOR		0
<ol> <li>Run vehicle with front wheels in straight-ahead point</li> <li>Select "DATA MONITOR". Then make sure "DECE"</li> </ol>	sition, then stop. EL G SEN" is within $\pm$ 0.08G.	_
Is the inspection result normal?		Р
YES >> GO TO 4. NO >> Perform calibration of decel G sensor agai	n, GO TO 1.	
4. ERASE THE SELF-DIAGNOSIS MEMORY		
Erase the self-diagnosis memory of the ABS actuator a • ABS actuator and electric unit (control unit): Refer to	and electric unit (control unit) and ECM. BRC-195, "CONSULT Function".	

• ECM: Refer to EC-71, "CONSULT Function" (USA and Canada) or EC-563, "CONSULT Function" (Mexico).

# **BRC-223**

INFOID:000000012551976

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В

< BASIC INSPECTION >

Are the memories erased?

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

## < DTC/CIRCUIT DIAGNOSIS >

# **DTC/CIRCUIT DIAGNOSIS APPLICATION NOTICE**

# **Application Notice**

INFOID:000000012551978

Service information	Remarks	(
TYPE 1	VDC/TCS/ABS	
TYPE 2	HILL DESCENT CONTROL/VDC/TCS/ABS	

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# < DTC/CIRCUIT DIAGNOSIS >

# C1101, C1102, C1103, C1104 WHEEL SENSOR

# **DTC** Description

INFOID:000000012551979

**[TYPE 2]** 

# DTC DETECTION LOGIC

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

### POSSIBLE CAUSE

#### NOTE:

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

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

### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

>> GO TO 2.

# 2. CHECK DTC DETECTION

#### With CONSULT

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

Wait at least 10 seconds after turning ignition switch OFF.

- Start the engine.
   NOTE:
   Wait at least 10 seconds after starting the engine.
- 6. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1101", "C1102", "C1103" or "C1104" detected?

- YES-1 >> "C1101", "C1102", "C1103" or "C1104" is displayed as "CRNT": Proceed to <u>BRC-227</u>, "<u>Diagnosis</u> <u>Procedure"</u>.
- YES-2 >> "C1101", "C1102", "C1103" or "C1104" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".

## **BRC-226**

< DTC/CIRCUIT DIAGNOSIS >	[TYPE 2]
NO-2 >> Confirmation after repair: Inspection End.	
Diagnosis Procedure	INFOID:000000012551980
CAUTION:	
Never check between wheel sensor harness connector terminals.	E
I.CHECK WHEEL SENSOR	
<ol> <li>Turn the ignition switch OFF.</li> <li>Check the wheel sensor for damage.</li> </ol>	(
Is the inspection result normal?	
YES >> GO TO 3.	Γ
2 REPLACE WHEEL SENSOR (1)	
	F
(I) With CONSULT     1. Replace the wheel sensor.	la
- Front: Refer to <u>BRC-317</u> , "Removal and Installation - Front Wheel Sensor".	
<ul> <li>Rear: Refer to <u>BRC-319</u>, "<u>Removal and Installation - Rear Wheel Sensor</u>".</li> <li>Erase "Self Diagnostic Result" of "ABS"</li> </ul>	B
3. Turn the ignition switch OFF $\rightarrow$ ON $\rightarrow$ OFF.	
NOTE:	(
4. Start the engine.	
5. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.	
NOTE: Vehicle must be driven after renair or replacement to erase the previous DTCs	ŀ
<ol> <li>Stop the vehicle.</li> </ol>	
7. Turn the ignition switch OFF.	1
Wait at least 10 seconds after turning ignition switch OFF.	
8. Start the engine.	
NOTE: Wait at least 10 seconds after starting the engine.	,
9. Perform "Self Diagnostic Result" of "ABS".	
<u>Is DTC "C1101", "C1102", "C1103" or "C1104" detected?</u>	ŀ
YES >> GO TO 3.	
3 CHECK CONNECTOR	1
<ol> <li>Furn the ignition switch OFF.</li> <li>Check the ABS actuator and electric unit (control unit) harness connector for disconnection.</li> <li>Check the wheel sensor harness connector for disconnection or looseness.</li> </ol>	on or looseness.
Is the inspection result normal?	
YES >> GO TO 5.	1
NO >> Repair / replace namess or connector, securely lock the connector, and GO TO 4	ł. '
4.PERFORM SELF-DIAGNOSIS (1)	
With CONSULT     Frase "Self Diagnostic Result" of "ARS"	(
2. Turn the ignition switch OFF $\rightarrow$ ON $\rightarrow$ OFF.	
NOTE:	F
3. Start the engine.	
<ol> <li>Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.</li> <li>NOTE:</li> </ol>	
Vehicle must be driven after repair or replacement to erase the previous DTCs.	
<ol> <li>Stop the vehicle.</li> <li>Turn the ignition switch OFF</li> </ol>	
NOTE:	

< DTC/CIRCUIT DIAGNOSIS >

- Wait at least 10 seconds after turning ignition switch OFF.
- 7. Start the engine.
  - NOTE:
  - Wait at least 10 seconds after starting the engine.
- 8. Perform "Self Diagnostic Result" of "ABS".

Is DTC "C1101", "C1102", "C1103" or "C1104" detected?

YES >> GO TO 5.

NO >> Inspection End.

 $\mathbf{5}$ . CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIRCUIT

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-295,</u> "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair / replace harness, connector, fuse, or fusible link.

**6.**CHECK TERMINAL

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

Is the inspection result normal?

YES >> GO TO 8.

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

7. PERFORM SELF-DIAGNOSIS (2)

### With CONSULT

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect wheel sensor harness connector.
- 3. Erase "Self Diagnostic Result" of "ABS".
- 4. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF. **NOTE:**

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

- 5. Start the engine.
- 6. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
- NOTE:

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

- 7. Stop the vehicle.
- 8. Turn the ignition switch OFF. **NOTE:**

Wait at least 10 seconds after turning ignition switch OFF.

- 9. Start the engine.
  - NOTE:
  - Wait at least 10 seconds after starting the engine.
- 10. Perform "Self Diagnostic Result" of "ABS".

Is DTC "C1101", "C1102", "C1103" or "C1104" detected?

YES >> GO TO 8.

NO >> Inspection End.

8.CHECK WHEEL SENSOR HARNESS

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Disconnect wheel sensor harness connector.
- 4. Check the continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector. (Check the continuity while turning steering wheel left and right, or while moving center harness in wheel housing.)

### < DTC/CIRCUIT DIAGNOSIS >

Power Supply Circuit А ABS actuator and electric unit (control unit) Wheel sensor Continuity Connector Terminal Connector Terminal (Front LH wheel) 20 E18 В E43 10 (Front RH wheel) E125 Yes 1 8 C10 (Rear LH wheel) 18 C11 (Rear RH wheel) Signal Circuit ABS actuator and electric unit (control unit) Wheel sensor D Continuity Connector Terminal Connector Terminal 19 E18 (Front LH wheel) Е 9 E43 (Front RH wheel) E125 2 Yes 7 C10 (Rear LH wheel) 17 C11 (Rear RH wheel) BRC Is the inspection result normal? YES >> GO TO 10. NO >> Repair / replace harness or connector, and GO TO 9. 9.PERFORM SELF-DIAGNOSIS (3) (P)With CONSULT Н Connect ABS actuator and electric unit (control unit) harness connector. 1. Connect wheel sensor harness connector. 2. Erase "Self Diagnostic Result" of "ABS". 3. 4. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF. NOTE: Wait at least 10 seconds after turning ignition switch OFF or ON. 5. Start the engine. 6. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes. NOTE: Vehicle must be driven after repair or replacement to erase the previous DTCs. 7. Stop the vehicle. Κ 8. Turn the ignition switch OFF. NOTE: Wait at least 10 seconds after turning ignition switch OFF. L Start the engine. NOTE: Wait at least 10 seconds after starting the engine. 10. Perform "Self Diagnostic Result" of "ABS". M Is DTC "C1101", "C1102", "C1103" or "C1104" detected? YES >> GO TO 10. NO >> Inspection End. Ν 10. CHECK WHEEL SENSOR OUTPUT SIGNAL 1. Disconnect ABS actuator and electric unit (control unit) harness connector. Ο 2. Disconnect wheel sensor harness connector. 3. Connect ABS active wheel sensor tester (SST: J-45741-A) to wheel sensor using appropriate adapter. 4. Turn the ABS active wheel sensor tester power switch ON. Ρ NOTE: The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding. 5. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash ON and OFF to indicate an output signal. NOTE:

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

< DTC/CIRCUIT DIAGNOSIS >

#### Does the ABS active wheel sensor tester detect a signal?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322, "Removal and Instal-</u> lation".
- NO >> GO TO 11.

**11.**REPLACE WHEEL SENSOR

### With CONSULT

- 1. Replace the wheel sensor.
- Front: Refer to <u>BRC-317</u>, "Removal and Installation Front Wheel Sensor".
- Rear: Refer to BRC-319, "Removal and Installation Rear Wheel Sensor".
- 2. Connect ABS actuator and electric unit (control unit) harness connector.
- 3. Erase "Self Diagnostic Result" of "ABS".
- 4. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF.

### NOTE:

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

- 5. Start the engine.
- 6. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes. **NOTE:**

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

- 7. Stop the vehicle.
- 8. Turn the ignition switch OFF.
  - NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

9. Start the engine.

### NOTE:

Wait at least 10 seconds after starting the engine.

10. Perform "Self Diagnostic Result" of "ABS".

### Is DTC "C1101", "C1102", "C1103" or "C1104" detected?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322, "Removal and Instal-</u> lation".
- NO >> Inspection End.

# < DTC/CIRCUIT DIAGNOSIS >

# C1105, C1106, C1107, C1108 WHEEL SENSOR

# **DTC Description**

### DTC DETECTION LOGIC

00012551981	

**[TYPE 2]** 

INFOID:00000

# В

J

Ρ

А

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

### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC	
Harness or connector     Wheel sensor	Harness or connector     Wheel sensor	K
<ul> <li>Sensor rotor</li> <li>Tire size</li> <li>ABS actuator and electric unit (control unit) power supply sys-</li> </ul>	<ul> <li>Sensor rotor</li> <li>ABS actuator and electric unit (control unit)</li> <li>Tire size</li> </ul>	L
<ul> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> </ul>	M
	<ul><li>Battery</li><li>Vehicle was not driven after previous repair</li></ul>	N

### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

### >> GO TO 2.

# 2. CHECK DTC DETECTION

(B) With CONSULT

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

< DTC/CIRCUIT DIAGNOSIS >

### NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

- 5. Start the engine.
  - NOTE:

Wait at least 10 seconds after starting the engine.

- 6. Perform "Self Diagnostic Result" of "ABS".
- Is DTC "C1105", "C1106", "C1107" or "C1108" detected?
- YES-1 >> "C1105", "C1106", "C1107" or "C1108" is displayed as "CRNT": Proceed to <u>BRC-232</u>, "<u>Diagnosis</u> <u>Procedure"</u>.
- YES-2 >> "C1105", "C1106", "C1107" or "C1108" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

## Diagnosis Procedure

INFOID:000000012551982

#### CAUTION:

NO

#### Never check between wheel sensor harness connector terminals.

**1.**CHECK WHEEL HUB ASSEMBLY

Check that there is no excessive looseness in wheel hub assembly.

Front: Refer to <u>FAX-6, "Inspection"</u>.

Rear: Refer to <u>RAX-5, "Inspection"</u>.

Is the inspection result normal?

- YES >> GO TO 2.
  - >> Repair or replace the wheel hub assembly, and GO TO 2.
    - Front: Refer to FAX-8, "Removal and Installation".
    - Rear: Refer to <u>RAX-7, "Removal and Installation"</u>.

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-295.</u> "Diagnosis Procedure".

Is the inspection result normal?

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

**3.**CHECK TIRE

- 1. Turn the ignition switch OFF.
- 2. Check the tire air pressure, wear and size. Refer to <u>WT-67, "Tire Air Pressure"</u>.

#### Is the inspection result normal?

YES >> GO TO 6.

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

**4.**CHECK DATA MONITOR (1)

### With CONSULT

- 1. Erase "Self Diagnostic Result" of "ABS".
- 2. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF.
- NOTE: Wait at least 10 sec

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

- 3. Start the engine.
- 4. Select "DATA MONITOR" of "ABS", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".
  - NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

5. Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor. **NOTE:** 

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

## **BRC-232**

**[TYPE 2]** < DTC/CIRCUIT DIAGNOSIS > Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within А 5%, respectively? YES >> GO TO 5. NO >> GO TO 6. В **5.** PERFORM SELF-DIAGNOSIS (1) (P)With CONSULT 1. Stop the vehicle. 2. Turn the ignition switch OFF. NOTE: Wait at least 10 seconds after turning ignition switch OFF. D 3. Start the engine. NOTE: Wait at least 10 seconds after start the engine. E 4. Perform "Self Diagnostic Result" of "ABS". Is DTC "C1105", "C1106", "C1107" or "C1108" detected? YES >> GO TO 6. BRC NO >> Inspection End. **6.**CHECK WHEEL SENSOR AND SENSOR ROTOR 1. Turn the ignition switch OFF. 2. Disconnect wheel sensor harness connector. Remove dust and foreign matter adhered to the wheel sensor and sensor rotor with a vacuum dust collector through the wheel sensor mounting hole. Н CAUTION: Install wheel sensor with no backlash and float, and tighten the mounting bolt to the specified torque. Front: Refer to <u>BRC-317</u>, "Exploded View - Front Wheel Sensor". • Rear: Refer to BRC-318, "Exploded View - Rear Wheel Sensor". >> GO TO 7. 7.CHECK WHEEL SENSOR Check the wheel sensor for damage. Κ Is the inspection result normal? YES >> GO TO 8. NO >> GO TO 9. 8.CHECK WHEEL SENSOR OUTPUT SIGNAL 1 Disconnect ABS actuator and electric unit (control unit) harness connector. M Connect ABS active wheel sensor tester (SST: J-45741-A) to wheel sensor using appropriate adapter. 2. 3. Turn the ABS active wheel sensor tester power switch ON. NOTE: The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the Ν battery in the ABS active wheel sensor tester before proceeding. 4. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash ON and OFF to indicate an output signal. Ο NOTE: If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest. Ρ Does the ABS active wheel sensor tester detect a signal? YES >> GO TO 12. NO >> GO TO 9. **9.**REPLACE WHEEL SENSOR (1) (P)With CONSULT

**Revision: November 2015** 

Replace the wheel sensor.

1.

## **BRC-233**

Front: Refer to <u>BRC-317</u>, "Removal and Installation - Front Wheel Sensor".

### < DTC/CIRCUIT DIAGNOSIS >

- 2. Connect ABS actuator and electric unit (control unit) harness connector.
- 3. Erase "Self Diagnostic Result" of "ABS".
- 4. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF. **NOTE:**

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

- 5. Start the engine.
- 6. Select "DATA MONITOR" of "ABS", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".

NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

7. Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor. **NOTE:** 

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

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 10.

NO >> GO TO 20.

**10.**PERFORM SELF-DIAGNOSIS (2)

With CONSULT

- 1. Stop the vehicle.
- 2. Turn the ignition switch OFF.
  - NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

- 3. Start the engine.
  - NOTE:

Wait at least 10 seconds after start the engine.

4. Perform "Self Diagnostic Result" of "ABS".

Is DTC "C1105", "C1106", "C1107" or "C1108" detected?

- YES >> GO TO 11.
- NO >> Inspection End.

11. CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 14.

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

**12.**CHECK DATA MONITOR (2)

With CONSULT

- T. Erase "Self Diagnostic Result" of "ABS".
- 2. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF.

NOTE:

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

- 3. Start the engine.
- 4. Select "DATA MONITOR" of "ABS", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".

NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

5. Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor. **NOTE:** 

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

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

#### - --- -14/111

C1105, C1106, C1107, C1108 WHEEL SENSOR	
< DTC/CIRCUIT DIAGNOSIS > [IYPE 2]	-
YES >> GO TO 13.	
	ŀ
I J.PERFORM SELF-DIAGNOSIS (3)	_
With CONSULT	F
1. Stop the vehicle.	
2. Turn the ignition switch OFF.	
Wait at least 10 seconds after turning ignition switch OFF.	(
3. Start the engine.	
NOTE:	
A Perform "Self Diagnostic Result" of "ABS"	
Ls DTC "C1105" "C1106" "C1107" or "C1108" detected?	
YES $>>$ GO TO 14	г
NO >> Inspection End.	E
14 CHECK TERMINAL	
	B
<ol> <li>Turn the ignition switch OFF.</li> <li>Disconnect ABS actuator and electric unit (control unit) harness connector and then check the ABS actu-</li> </ol>	_
ator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.	
3. Disconnect wheel sensor harness connector and check each wheel sensor pin terminals for damage o	۲ (
loose connection with harness connector.	
Is the inspection result normal?	
YES >> GO TO 17.	ŀ
<b>1 S</b> A supervision of the management of the minimum and GO TO 15.	
I J.CHECK DATA MONITOR (3)	_
With CONSULT	-
1. Connect ABS actuator and electric unit (control unit) harness connector.	
2. Connect wheel sensor harness connector. 3. Erase "Self Diagnostic Result" of "ARS"	
4. Turn the ignition switch OFF $\rightarrow$ ON $\rightarrow$ OFF.	
NOTE:	
Wait at least 10 seconds after turning ignition switch OFF or ON.	ŀ
5. Start the engine. 6. Select "DATA MONITOR" of "ABS" check "EPIH SENSOR" "EP PH SENSOR" "PPIH SENSOR" and	4
"RR RH SENSOR".	
NOTE:	l
Set the "DATA MONITOR" recording speed to "10 msec".	
7. Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor. NOTE:	
Vehicle must be driven after repair or replacement to erase the previous DTCs.	I)
Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning wheel sen	-
sor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within	<u> </u>
<u>5%, respectively?</u>	1
YES >> GO TO 16.	
NO >> GO TO 17.	(
<b>10.</b> PERFORM SELF-DIAGNOSIS (4)	
(P)With CONSULT	-
1. Stop the vehicle.	F
2. Turn the ignition switch OFF.	
NUTE: Wait at least 10 seconds after turning ignition switch OFF	
3. Start the engine.	
NOTE:	
Wait at least 10 seconds after start the engine	

Wait at least 10 seconds after start the engine.Perform "Self Diagnostic Result" of "ABS".

< DTC/CIRCUIT DIAGNOSIS >

#### Is DTC "C1105", "C1106", "C1107" or "C1108" detected?

YES >> GO TO 17.

NO >> Inspection End.

17. CHECK WHEEL SENSOR HARNESS

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

Power Supply Circuit

ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal		Continuity
	20		No
E125	10	Ground	
E125	8		
	18		

#### Is the inspection result normal?

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

18. CHECK DATA MONITOR (4)

#### With CONSULT

- T. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect wheel sensor harness connector.
- 3. Erase "Self Diagnostic Result" of "ABS".
- 4. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF. **NOTE:** 
  - Wait at least 10 seconds after turning ignition switch OFF or ON.
- 5. Start the engine.
- 6. Select "DATA MONITOR" of "ABS", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".

#### NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

7. Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor. **NOTE:** 

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

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

- YES >> GO TO 19.
- NO >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322</u>, "<u>Removal and Instal-</u> lation".

**19.**PERFORM SELF-DIAGNOSIS (5)

#### With CONSULT

- 1. Stop the vehicle.
- 2. Turn the ignition switch OFF. **NOTE:**

Wait at least 10 seconds after turning ignition switch OFF.

3. Start the engine.

# NOTE:

- Wait at least 10 seconds after start the engine.
- 4. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1105", "C1106", "C1107" or "C1108" detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322, "Removal and Instal-</u> lation".

C1105, C1106, C1107, C1108 WHEEL SENSOR < DTC/CIRCUIT DIAGNOSIS > [TYPE 2]
NO >> Inspection End.
20. REPLACE SENSOR ROTOR
1. Replace the sensor rotor.
<ul> <li>Front: Refer to <u>BRC-321</u>, "Removal and Installation - Front Sensor Rotor".</li> </ul>
- Rear: Refer to <u>BRC-321, "Removal and Installation - Rear Sensor Rotor"</u> .
2. Erase "Self Diagnostic Result" of "ABS".
3. I urn the ignition switch $OFF \rightarrow ON \rightarrow OFF$ .
NUTE: Wait at least 10 seconds after turning ignition switch OEE or ON
4 Start the engine
5. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
NOTE:
Vehicle must be driven after repair or replacement to erase the previous DTCs.
6. Stop the vehicle.
7. Turn the ignition switch OFF.
NOTE:
Walt at least 10 seconds after turning ignition switch OFF.
NOTE.
Wait at least 10 seconds after start the engine
9. Perform "Self Diagnostic Result" of "ABS".
Is DTC "C1105" "C1106" "C1107" or "C1108" detected?
VES >> Peolace the ABS actuator and electric unit (control unit). Refer to BBC-322. "Removal and Instal-
lation"
NO >> Inspection End.

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# C1109 POWER AND GROUND SYSTEM

# < DTC/CIRCUIT DIAGNOSIS >

# C1109 POWER AND GROUND SYSTEM

# **DTC Description**

INFOID:000000012551983

**[TYPE 2]** 

# DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1109	BATTERY VOLTAGE [ABNORMAL] (Battery voltage [abnormal])	<ul> <li>When ignition power supply voltage is in following state:</li> <li>Ignition power supply voltage: 10 V ≥ ignition power supply voltage.</li> <li>Ignition power supply voltage: 16 V ≤ ignition power supply voltage.</li> </ul>

# POSSIBLE CAUSE NOTE:

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

PAST DTC	CRNT DTC
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> <li>Charge system</li> </ul>	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> <li>IPDM E/R</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> <li>Charge system</li> </ul>

### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

>> GO TO 2.

## 2. CHECK DTC DETECTION

(I) With CONSULT

- 1. Turn the ignition switch OFF.
- NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

- 2. Start the engine.
  - NOTE:

Wait at least 10 seconds after starting the engine.

3. Perform "Self Diagnostic Result" of "ABS".

### Is DTC "C1109" detected?

YES-1 >> "C1109" is displayed as "CRNT": Proceed to <u>BRC-238</u>, "Diagnosis Procedure".

YES-2 >> "C1109" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").

NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".

NO-2 >> Confirmation after repair: Inspection End.

# Diagnosis Procedure

INFOID:000000012551984

# **1.**CHECK CONNECTOR

1. Turn the ignition switch OFF.

2. Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness. Is the inspection result normal?

YES >> GO TO 3.

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

Revision: November 2015

# **BRC-238**

2016 Pathfinder

# C1109 POWER AND GROUND SYSTEM

CTIUS POWER AND GROUND STSTEW	
< DTC/CIRCUIT DIAGNOSIS > [TYPE 2]	
2. PERFORM SELF-DIAGNOSIS	Δ
1. Turn the ignition switch OFF.	$\square$
NOTE: Wait at least 10 seconds after turning ignition switch OFF	
<ol> <li>Start the engine.</li> <li>NOTE:</li> </ol>	В
Wait at least 10 seconds after starting the engine.	
3. Perform "Self Diagnostic Result" of "ABS".	С
Is DTC "C1109" detected?	
YES >> GO TO 3.	D
3. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIR-	D
CUIT	
Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-295</u> . " <u>Diagnosis Procedure</u> ".	
Is the inspection result normal?	BD(
YES >> GO TO 4. NO >> Repair / replace harness, connector, fuse, or fusible link.	DIRC
4.CHECK TERMINAL	G
1. Check the ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.	0
2. Check the IPDM E/R pin terminals for damage or loose connection with harness connector.	Н
Is the inspection result normal?	
YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322</u> , "Removal and Instal-	
lation".	

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# C1111 ABS MOTOR, MOTOR RELAY SYSTEM

# < DTC/CIRCUIT DIAGNOSIS >

# C1111 ABS MOTOR, MOTOR RELAY SYSTEM

# **DTC** Description

**[TYPE 2]** 

### DTC DETECTION LOGIC

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

### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>

# DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

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

### >> GO TO 2.

# 2. CHECK DTC DETECTION

#### (B) With CONSULT

- 1. Turn the ignition switch OFF  $\rightarrow$  ON, and wait 30 seconds.
- 2. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
- 3. Stop the vehicle.
- 4. Turn the ignition switch OFF.
- NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

- 5. Start the engine.
  - NOTE:

Wait at least 10 seconds after start the engine.

6. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1111" detected?

YES-1 >> "C1111" is displayed as "CRNT": Proceed to <u>BRC-240, "Diagnosis Procedure"</u>.

- YES-2 >> "C1111" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

## Diagnosis Procedure

INFOID:000000012551986

# 1.CHECK CONNECTOR

1. Turn the ignition switch OFF.

2. Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness. Is the inspection result normal?

#### YES >> GO TO 3.

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

Revision: November 2015

### **BRC-240**

2016 Pathfinder

# C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS > [TYPE 2]	
2. PERFORM SELF-DIAGNOSIS	
<ul> <li>(■)With CONSULT</li> <li>1. Turn the ignition switch OFF → ON, and wait 30 seconds.</li> <li>2. Start the engine.</li> <li>3. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.</li> </ul>	B
<ul> <li>NOTE: Vehicle must be driven after repair or replacement to erase the previous DTCs.</li> <li>4. Stop the vehicle.</li> <li>5. Turn the ignition switch OFF.</li> </ul>	С
<ul> <li>NOTE: Wait at least 10 seconds after turning ignition switch OFF.</li> <li>6. Start the engine.</li> <li>NOTE:</li> </ul>	D
Wait at least 10 seconds after starting the engine. 7. Perform "Self Diagnostic Result" of "ABS". <u>Is DTC "C1111" detected?</u> YES >> GO TO 3	E
NO >> Inspection End.	BF
<b>3.</b> CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIR- CUIT Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-295</u> .	G
"Diagnosis Procedure".	
YES >> GO TO 5.	
<b>4.</b> ERASE SELF-DIAGNOSIS RESULT (1)	
With CONSULT  Start the engine.  Drive the vehicle at approx. 50 km/b (21 MDH) or more for approx. 2 minutes	.1
<ul> <li>NOTE: Vehicle must be driven after repair or replacement to erase the previous DTCs.</li> <li>Stop the vehicle.</li> <li>Erase "Self Diagnostic Result" of "ABS".</li> <li>Turn the ignition switch OFF → ON → OFF. NOTE:</li> </ul>	K
Wait at least 10 seconds after turning ignition switch OFF or ON.	L
>> Inspection End. 5.CHECK TERMINAL	M
<ol> <li>Turn the ignition switch OFF.</li> <li>Check the ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.</li> </ol>	Ν
<u>Is the inspection result normal?</u> YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322</u> , " <u>Removal and Instal-</u> <u>lation</u> ".	0
6. Repair / replace harness or connector, and GO TO 6.	P
<ul> <li>With CONSULT</li> <li>Start the engine.</li> <li>Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes. NOTE: Vehicle must be driven after repair or replacement to erase the previous DTCs.</li> <li>Stop the vehicle.</li> <li>Erase "Self Diagnostic Result" of "ABS".</li> </ul>	ľ

Revision: November 2015

< DTC/CIRCUIT DIAGNOSIS >

5. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF. **NOTE:** 

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

>> Inspection End.

# < DTC/CIRCUIT DIAGNOSIS >

# C1115 WHEEL SENSOR

# **DTC Description**

### DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition	С
C1115	ABS SENSOR [ABNORMAL SIGNAL] (Wheel sensor [abnormal sig- nal])	When difference in wheel speed between any wheel and others is detected when the vehicle is driven, because of installation of other tires than specified.	D

## POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC	BRC
<ul> <li>Harness or connector</li> <li>Wheel sensor</li> <li>Sensor rotor</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>Harness or connector</li> <li>Wheel sensor</li> <li>Sensor rotor</li> <li>ABS actuator and electric unit (control unit)</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> <li>Tire size</li> </ul>	G
DTC CONFIRMATION PROCEDURE		I
1.PRECONDITIONING		J
If "DTC CONFIRMATION PROCEDURE" has been pre and wait at least 10 seconds before conducting the net	eviously conducted, always turn the ignition switch OFF xt test.	K
>> GO TO 2.		IX.
2. CHECK DTC DETECTION		
<ul> <li>With CONSULT</li> <li>Start the engine.</li> <li>Drive the vehicle at approx. 50 km/h (31 MPH) or r</li> <li>Stop the vehicle.</li> </ul>	more for approx. 2 minutes.	L

4. Turn the ignition switch OFF.

#### NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

5. Start the engine. **NOTE:** 

Wait at least 10 seconds after starting the engine.

6. Perform "Self Diagnostic Result" of "ABS".

### Is DTC "C1115" detected?

YES-1 >> "C1115" is displayed as "CRNT": Proceed to <u>BRC-243, "Diagnosis Procedure"</u>.

- YES-2 >> "C1115" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

# Diagnosis Procedure

# CAUTION:

Never check between wheel sensor harness connector terminals.

INFOID:000000012551988

INFOID:000000012551987

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< DTC/CIRCUIT DIAGNOSIS >

# **1.**CHECK TIRE

Check the tire air pressure, wear and size. Refer to WT-67. "Tire Air Pressure".

Is the inspection result normal?

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

2. CHECK DATA MONITOR (1)

With CONSULT

- T. Erase "Self Diagnostic Result" of "ABS"
- 2. Turn the ignition switch  $OFF \rightarrow ON \rightarrow OFF$ .
- NOTE:

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

- 3. Start the engine.
- 4. Select "DATA MONITOR" of "ABS", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".

NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

5. Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor. **NOTE:** 

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

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 3.

NO >> GO TO 4.

**3.** PERFORM SELF-DIAGNOSIS (1)

With CONSULT

- 1. Stop the vehicle.
- 2. Turn the ignition switch OFF. **NOTE:**

Wait at least 10 seconds after turning ignition switch OFF.

3. Start the engine. **NOTE:** 

Wait at least 10 seconds after starting the engine.

4. Perform "Self Diagnostic Result" of "ABS".

Is DTC "C1115" detected?

YES >> GO TO 4.

NO >> Inspection End.

**4.**CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIR-CUIT

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-295.</u> "<u>Diagnosis Procedure</u>".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair / replace harness, connector, fuse, or fusible link.

### **5.**CHECK WHEEL SENSOR AND SENSOR ROTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect wheel sensor harness connector.
- Remove dust and foreign matter adhered to the wheel sensor and sensor rotor with a vacuum dust collector through the wheel sensor mounting hole.

#### CAUTION:

# Install wheel sensor with no backlash and float, and tighten the mounting bolt to the specified torque.

- Front: Refer to <u>BRC-317, "Exploded View Front Wheel Sensor"</u>.
- Rear: Refer to <u>BRC-318</u>, "Exploded View Rear Wheel Sensor".

## **BRC-244**

< DTC/CIRCUIT DIAGNOSIS >

>> GO TO 6.	A
6.CHECK WHEEL SENSOR	
Check the wheel sensor for damage.	В
Is the inspection result normal?	
YES >> GO TO 7.	0
7. CHECK WHEEL SENSOR OUTPUT SIGNAL	C
<ol> <li>Disconnect ABS actuator and electric unit (control unit) harness connector.</li> <li>Connect ABS active wheel sensor tester (SST: J-45741-A) to wheel sensor using appropriate adapter.</li> <li>Turn the ABS active wheel sensor tester power switch ON.</li> </ol>	D
<ul> <li>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.</li> <li>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.</li> </ul>	E
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?	G
YES >> GO TO 11.	
8. REPLACE WHEEL SENSOR (1)	Н
With CONSULT	
<ol> <li>Replace the wheel sensor.</li> <li>Front: Refer to BRC-317 "Removal and Installation - Front Wheel Sensor"</li> </ol>	
- Rear: Refer to <u>BRC-319</u> , "Removal and Installation - Rear Wheel Sensor".	
<ol> <li>Connect ABS actuator and electric unit (control unit) harness connector.</li> <li>Frase "Self Diagnostic Result" of "ABS"</li> </ol>	J
4. Turn the ignition switch OFF $\rightarrow$ ON $\rightarrow$ OFF.	
NOTE: Wait at least 10 seconds after turning ignition switch OEE or ON	
5. Start the engine.	K
6. Select "DATA MONITOR" of "ABS", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".	
	L
7. Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor.	
NOTE:	M
Vehicle must be driven after repair or replacement to erase the previous DTCs.	
sor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within	N
5%. respectively?	14
YES >> GO TO 9.	
9 perform set e-diagnosis (2)	0
1. Stop the vehicle.	Ρ
2. Turn the ignition switch OFF.	
Wait at least 10 seconds after turning ignition switch OFF.	
3. Start the engine.	
Wait at least 10 seconds after starting the engine.	
4. Perform "Self Diagnostic Result" of "ABS".	

< DTC/CIRCUIT DIAGNOSIS >

Is DTC "C1115" detected?

YES >> GO TO 10.

NO >> Inspection End.

10. CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 12.

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

11.CHECK DATA MONITOR (2)

### () With CONSULT

- T. Erase "Self Diagnostic Result" of "ABS"
- 2. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF.
- NOTE: Wait at leas

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

- 3. Start the engine.
- 4. Select "DATA MONITOR" of "ABS", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".

NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

5. Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor. **NOTE:** 

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

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 12. NO >> GO TO 13.

- 12.PERFORM SELF-DIAGNOSIS (3)
- With CONSULT 1. Stop the vehicle.
- Stop the vehicle.
   Turn the ignition switch OFF.
- NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

- Start the engine.
   NOTE: Wait at least 10 seconds after starting the engine.
- 4. Perform "Self Diagnostic Result" of "ABS".
- Is DTC "C1115" detected?
- YES >> GO TO 13.
- NO >> Inspection End.

13.CHECK TERMINAL

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

Is the inspection result normal?

YES >> GO TO 16.

NO >> Repair / replace harness, connector, or terminal, and GO TO 14.

**14.**CHECK DATA MONITOR (3)

### With CONSULT

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

< D	TC/CIRCUIT DIAGNOSIS > [TYPE 2]	
2.	Connect wheel sensor harness connector.	
3.	Erase "Self Diagnostic Result" of "ABS"	Α
4.	Turn the ignition switch OFF $\rightarrow$ ON $\rightarrow$ OFF.	
	NOTE:	
F	Walt at least 10 seconds after turning ignition switch OFF or ON.	В
5. 6.	Select "DATA MONITOR" of "ABS", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".	
	NOTE:	С
7.	Set the "DATA MONITOR" recording speed to "10 msec". Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor.	
	Vehicle must be driven after repair or replacement to erase the previous DTCs.	D
Not	the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning wheel sen-	
sor	and the maximum/minimum wheel speed detected by the normal wheel sensors is the difference within	
5%	. respectively?	E
Y	======================================	
N	O >> GO TO 16.	
15	D.PERFORM SELF-DIAGNOSIS (4)	BRC
	Vith CONSULT	
1.	Stop the vehicle.	G
2.	Turn the ignition switch OFF.	
	NOTE:	
~	Wait at least 10 seconds after turning ignition switch OFF.	Н
3.	Start the engine.	
	NOTE: Wait at least 10 seconds after starting the angine	
Δ	Perform "Self Diagnostic Result" of "ARS"	1
т. Іс Г	T Choin Blaghostic Nesdit of Abo .	I
<u>IS L</u>		
YE	ES >> GO TO 16.	1
	o >> Inspection End.	J
10	CHECK WHEEL SENSOR HARNESS	
1.	Turn the ignition switch OFF.	LZ.
2.	Disconnect ABS actuator and electric unit (control unit) harness connector.	N
3.	Disconnect wheel sensor harness connector.	
4.	Check the continuity between ABS actuator and electric unit (control unit) harness connector and wheel	
	sensor harness connector. (Check the continuity while turning steering wheel left and right, or while mov- ing center harness in wheel housing.)	L

Power Supply Circuit

ABS actuator and electric unit (control unit)		Wheel sensor			Continuity	IV
Connector	Terminal	Connector Terminal		Continuity		
	20	E18	(Front LH wheel)			N
E125	10	E43	(Front RH wheel)	1	Voc	
	8	C10	(Rear LH wheel)		165	
	18	C11	(Rear RH wheel)			0

Signal Circuit

ABS actuator and electric unit (control unit)		Wheel sensor			Continuity	Р
Connector	Terminal	Connector Terminal		Continuity		
	19	E18	(Front LH wheel)			
E125	9	E43	(Front RH wheel)		Vac	
	7	C10	(Rear LH wheel)		165	
	17	C11	(Rear RH wheel)			

### < DTC/CIRCUIT DIAGNOSIS >

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

Power Supply Circuit

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector Terminal			Continuity	
E125	20			
	10	Cround	No	
	8	Gibunu		
	18	*		

Is the inspection result normal?

- YES >> GO TO 17.
- NO >> Repair / replace harness or connector, and GO TO 17.
- 17.CHECK DATA MONITOR (4)

#### With CONSULT

- T. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect wheel sensor harness connector.
- 3. Erase "Self Diagnostic Result" of "ABS"
- 4. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF. **NOTE:** 
  - Wait at least 10 seconds after turning ignition switch OFF or ON.
- 5. Start the engine.
- 6. Select "DATA MONITOR" of "ABS", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".

NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

7. Read the values (wheel speed) of both the normal wheel sensors and malfunctioning wheel sensor. **NOTE:** 

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

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the malfunctioning wheel sensors and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

- YES >> GO TO 18.
- NO >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322, "Removal and Instal-</u> lation".

**18.**PERFORM SELF-DIAGNOSIS (5)

### With CONSULT

- 1. Stop the vehicle.
- 2. Turn the ignition switch OFF. **NOTE:**

Wait at least 10 seconds after turning ignition switch OFF.

- 3. Start the engine.
- NOTE: Wait at least
  - Wait at least 10 seconds after starting the engine.
- 4. Perform "Self Diagnostic Result" of "ABS".
- Is DTC "C1115" detected?
- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322, "Removal and Instal-</u> lation".
- NO >> Inspection End.
- **19.**REPLACE SENSOR ROTOR

### With CONSULT

- 1. Replace the sensor rotor.
- Front: Refer to <u>BRC-321</u>, "Removal and Installation Front Sensor Rotor".
- Rear: Refer to <u>BRC-321</u>, "Removal and Installation Rear Sensor Rotor".
- 2. Erase "Self Diagnostic Result" of "ABS"

< D	TC/CIRCUIT DIAGNOSIS > [TYPE 2]	
3.	Turn the ignition switch OFF $\rightarrow$ ON $\rightarrow$ OFF.	
	NOTE: Wait at least 10 seconds after turning ignition switch OFF or ON.	A
4.	Start the engine.	
5.	Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.	В
	Vehicle must be driven after repair or replacement to erase the previous DTCs.	
6. 7	Stop the vehicle.	C
1.	NOTE:	C
•	Wait at least 10 seconds after turning ignition switch OFF.	
8.	Start the engine.	D
	Wait at least 10 seconds after starting the engine.	
9.	Perform "Self Diagnostic Result" of "ABS".	F
<u>ls [</u>	<u>)TC "C1115" detected?</u>	
ΥI	-S >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322, "Removal and Instal-</u> lation".	
N	D >> Inspection End.	BRC
		G
		0
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		J
		K
		L
		M
		Ν
		0
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# C1116 STOP LAMP SWITCH

# < DTC/CIRCUIT DIAGNOSIS >

# C1116 STOP LAMP SWITCH

# **DTC Description**

INFOID:000000012551989

**[TYPE 2]** 

### DTC DETECTION LOGIC

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

### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC
<ul><li>Harness or connector</li><li>Stop lamp switch signal circuit</li></ul>	<ul> <li>Harness or connector</li> <li>Stop lamp switch</li> <li>ABS actuator and electric unit (control unit)</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

>> GO TO 2.

# 2. CHECK DTC DETECTION

### (I) With CONSULT

- Turn the ignition switch OFF, and wait 10 seconds or more.
- 2. Start the engine. NOTE: Stop the vehicle.
- 3. Wait 1 minute or more.

#### NOTE:

Never depress brake pedal.

- 4. Depress brake pedal by 100 mm (3.94 in) or more, and maintain at that position for a minimum of 1 minute or more.
- 5. Release brake pedal, and wait 1 minute or more.
- 6. Repeat step 4 to 5 ten or more times.
- Turn the ignition switch OFF.
   NOTE: Wait at least 10 seconds after turning ignition switch OFF.
- Start the engine.
   NOTE: Wait at least 10 seconds after starting the engine.
- 9. Perform "Self Diagnostic Result" of "ABS".

### Is DTC "C1116" detected?

YES-1 >> "C1116" is displayed as "CRNT": Proceed to <u>BRC-251, "Diagnosis Procedure"</u>.

- YES-2 >> "C1116" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

# **BRC-250**

# **C1116 STOP LAMP SWITCH**

< DTC/CIRCUIT DIAGNOSIS >	[TYPE 2]
Diagnosis Procedure	INFOID:000000012551990
<b>NOTE:</b> DTC "C1116" may be detected when the brake pedal and the accelerator pedal are simult for 1 minute or more while driving the vehicle. This is not a malfunction. <b>1.</b> INTERVIEW FROM THE CUSTOMER	aneously depressed
Check if the brake pedal and the accelerator pedal are simultaneously depressed for 1 n	ninute or more while
Is there such a history?	
YES >> GO TO 2.	
NO >> GO TO 3.	
Z.PERFORM SELF-DIAGNOSIS	
<ul> <li>(■)With CONSULT</li> <li>1. Erase "Self Diagnostic Result" of "ABS"</li> <li>2. Turn the ignition switch OFF → ON → OFF.</li> </ul>	
Wait at least 10 seconds after turning ignition switch OFF or ON. 3. Start the engine.	
Stop the vehicle.	
4. Depress the brake pedal several times.	
NOTE:	
<ul> <li>Wait at least 10 seconds after turning ignition switch OFF.</li> <li>6. Start the engine.</li> <li>NOTE:</li> </ul>	
<ul><li>Wait at least 10 seconds after starting the engine.</li><li>7. Perform "Self Diagnostic Result" of "ABS".</li></ul>	
Is DTC "C1116" detected?	
YES >> GO TO 3.	
3. STOP LAMP FOR ILLUMINATION	
Depress brake pedal and check that stop lamps turn ON	
Do the stop lamps turn ON?	
YES >> GO TO 5.	
NO >> Check the stop lamp system. Refer to <u>EXL-80, "Wiring Diagram"</u> . GO TO 4.	
4.CHECK DATA MONITOR (1)	
With CONSULT  Frase "Self Diagnostic Result" of "ARS"	
2. Turn the ignition switch OFF $\rightarrow$ ON $\rightarrow$ OFF.	
NOTE: Wait at least 10 seconds after turning ignition switch OEE or ON	
<ol> <li>Start the engine.</li> <li>NOTE:</li> </ol>	
Stop the vehicle.	itan diantara "O-"
4. Select DATA MONTOR OF "ABS", CRECK "STOP LAMP SW". Check that data mon "Off" when brake pedal is depressed or released. Refer to <u>BRC-201. "Reference Valu</u>	itor displays "On" of
Is the inspection result normal?	
YES >> Inspection End. NO >> GO TO 5.	
5. CHECK CONNECTOR AND TERMINAL	

Turn the ignition switch OFF. 1.

2.

Disconnect ABS actuator and electric unit (control unit) harness connector. Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness. 3.

# **BRC-251**

# C1116 STOP LAMP SWITCH

### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

- 4. Check the ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
- 5. Disconnect stop lamp switch harness connector.
- 6. Check the stop lamp switch harness connector for disconnection or looseness.
- 7. Check the stop lamp switch pin terminals for damage or loose connection with harness connector.

#### Is the inspection result normal?

YES >> GO TO 6.

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

**O**.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIR-CUIT

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-295,</u> "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair / replace harness, connector, fuse, or fusible link.

**7.**CHECK DATA MONITOR (2)

(B) With CONSULT

- T. Erase "Self Diagnostic Result" of "ABS"
- 2. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF.
  - NOTE:
    - Wait at least 10 seconds after turning ignition switch OFF or ON.
- 3. Start the engine.
- NOTE:

Stop the vehicle.

4. Select "DATA MONITOR" of "ABS", check "STOP LAMP SW". Check that data monitor displays "On" or "Off" when brake pedal is depressed or released. Refer to <u>BRC-201, "Reference Value"</u>.

Is the inspection result normal?

YES >> Inspection End.

NO >> GO TO 8.

**8.**CHECK STOP LAMP SWITCH CIRCUIT (1)

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

ABS actuator and electric unit (control unit)			Condition	Voltage
Connector	Terminal		Condition	(Approx.)
E125 5	5	Ground	Brake pedal depressed	Battery voltage
	Crodina	Brake pedal not depressed	0 V	

4. Turn the ignition switch ON.

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

ABS actuator and electric unit (control unit)			Condition	Voltage
Connector	Terminal		Condition	(Approx.)
E125	5	Ground	Brake pedal depressed	Battery voltage
			Brake pedal not depressed	0 V

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322. "Removal and Instal-</u> lation".

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

**9.**CHECK STOP LAMP SWITCH CIRCUIT (2)

1. Turn the ignition switch OFF.
### C1116 STOP LAMP SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

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INFOID:000000012551991

- 2. Disconnect stop lamp switch harness connector.
- 3. Check the continuity between ABS actuator and electric unit (control unit) harness connector and stop A lamp switch harness connector.

ABS actuator and ele	ectric unit (control unit)	Stop lar	np switch	Continuity	В
Connector	Terminal	Connector	Terminal	Continuity	
E125	5	E38	2	Yes	_

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

ABS actuator and electric unit (control unit)			Continuity	D
Connector	Terminal		Continuity	
E125	5	Ground	No	Ε

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322</u>, "<u>Removal and Instal-</u> <u>lation</u>".

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

**10.**CHECK DATA MONITOR (3)

#### (B)With CONSULT

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

2. Connect stop lamp switch harness connector.

- 3. Erase "Self Diagnostic Result" of "ABS"
- 4. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF.
- **NOTE:** Wait at least 10 seconds after turning ignition switch OFF or ON.
- 5. Start the engine.

NOTE:

- Stop the vehicle.
- Select "DATA MONITOR" of "ABS", check "STOP LAMP SW". Check that data monitor displays "On" or "Off" when brake pedal is depressed or released. Refer to <u>BRC-201, "Reference Value"</u>.

#### Is the inspection result normal?

- YES >> Inspection End.
- NO >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322</u>, "<u>Removal and Instal-</u><u>lation</u>".

#### Component Inspection

#### **1.**CHECK STOP LAMP SWITCH

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

Stop lamp switch	Condition		
Terminal	Condition	Continuity	С
1 0	When stop lamp switch is released (When brake pedal is depressed)	Yes	
1-2	When stop lamp switch is pressed (When brake pedal is released)	No	Ρ

#### Is the inspection result normal?

YES >> Inspection End.

NO >> Replace the stop lamp switch. Refer to <u>BR-20, "Removal and Installation"</u>.

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### **DTC Description**

INFOID:000000012551992

**[TYPE 2]** 

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF. **NOTE:** 

Wait at least 10 seconds after turning ignition switch OFF.

- 2. Start the engine. NOTE:
  - Wait at least 10 seconds after starting the engine.
- 3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1120", "C1122", "C1124" or "C1126" detected?

- YES-1 >> "C1120", "C1122", "C1124" or "C1126" is displayed as "CRNT": Proceed to <u>BRC-254</u>, "<u>Diagnosis</u> <u>Procedure</u>".
- YES-2 >> "C1120", "C1122", "C1124" or "C1126" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

### Diagnosis Procedure

**1.**CHECK CONNECTOR

INFOID:000000012551993

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C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM
< DTC/CIRCUIT DIAGNOSIS > [TYPE 2]
<ol> <li>Turn the ignition switch OFF.</li> <li>Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.</li> </ol>
Is the inspection result normal?
YES >> GO TO 3. NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 2.
<b>Z</b> .PERFORM SELF-DIAGNOSIS
<ul> <li>With CONSULT</li> <li>Turn the ignition switch OFF.</li> <li>NOTE:</li> </ul>
Wait at least 10 seconds after turning ignition switch OFF. 2. Start the engine.
Wait at least 10 seconds after starting the engine. 3. Perform "Self Diagnostic Result" of "ABS".
<u>Is DTC "C1120", "C1122", "C1124" or "C1126" detected?</u>
YES >> GO TO 3. NO >> Inspection End.
${f 3}.$ CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIR- CUIT
Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-295</u> , <u>"Diagnosis Procedure"</u> .
Is the inspection result normal?
YES >> GO TO 4. NO >> Repair / replace harness, connector, fuse, or fusible link.
4.CHECK TERMINAL
Check the ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with har- ness connector.
Is the inspection result normal?
YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322, "Removal and Instal-</u> lation".
NO >> Repair / replace harness, connector, or terminal.

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

### **DTC Description**

INFOID:000000012551994

**[TYPE 2]** 

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF. **NOTE:** 

Wait at least 10 seconds after turning ignition switch OFF.

- 2. Start the engine. NOTE:
  - Wait at least 10 seconds after starting the engine.
- 3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1121", "C1123", "C1125" or "C1127" detected?

- YES-1 >> "C1121", "C1123", "C1125" or "C1127" is displayed as "CRNT": Proceed to <u>BRC-256, "Diagnosis</u> <u>Procedure"</u>.
- YES-2 >> "C1121", "C1123", "C1125" or "C1127" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

### Diagnosis Procedure

**1.**CHECK CONNECTOR

INFOID:000000012551995

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C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM	
< DTC/CIRCUIT DIAGNOSIS > [TYPI	Ξ2]
<ol> <li>Turn the ignition switch OFF.</li> <li>Check the ABS actuator and electric unit (control unit) harness connector for disconnection or loosen</li> </ol>	ess.
Is the inspection result normal?	
YES >> GO TO 3.	
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 2.	
2.PERFORM SELF-DIAGNOSIS	
1. Turn the ignition switch OFF.	
NOTE: Wait at least 10 seconds after turning ignition switch OFE	
2. Start the engine.	
NOTE:	
Wait at least 10 seconds after starting the engine.	
3. Perform "Self Diagnostic Result" of "ABS".	
<u>Is DTC "C1121", "C1123", "C1125" or "C1127" detected?</u>	
YES >> GO TO 3.	
NO >> Inspection End.	
${f 3}.$ CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND (	CIR-
CUIT	
Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to BRC-	295.
"Diagnosis Procedure".	
Is the inspection result normal?	
YES >> GO TO 4.	
NO >> Repair / replace harness, connector, fuse, or fusible link.	
4.CHECK TERMINAL	
Check the ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with	har-
ness connector.	
Is the inspection result normal?	
YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-322, "Removal and In	<u>stal-</u>
lation".	
NO >> Repair / replace harness, connector, or terminal.	

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### C1130 ENGINE SIGNAL

#### < DTC/CIRCUIT DIAGNOSIS >

## C1130 ENGINE SIGNAL

### **DTC Description**

**[TYPE 2]** 

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> <li>CAN communication line</li> </ul>	<ul> <li>Harness or connector</li> <li>ECM</li> <li>ABS actuator and electric unit (control unit)</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> <li>CAN communication line</li> </ul>

#### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

#### >> GO TO 2.

#### 2.CHECK DTC DETECTION

#### (I) With CONSULT

- 1. Turn the ignition switch OFF.
  - NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

2. Start the engine.

#### NOTE:

Wait at least 10 seconds after starting the engine.

3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1130" detected?

YES-1 >> "C1130" is displayed as "CRNT": Proceed to <u>BRC-258, "Diagnosis Procedure"</u>.

- YES-2 >> "C1130" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

#### Diagnosis Procedure

#### INFOID:000000012551997

#### **1.**CHECK ENGINE SYSTEM

#### With CONSULT

Perform "Self Diagnostic Result" of "ENGINE".

#### Is DTC detected?

- YES >> Check the DTC. Refer to <u>EC-104, "DTC Index"</u> (VQ35DE FOR USA AND CANADA) or <u>EC-592,</u> <u>"DTC Index"</u> (VQ35DE FOR MEXICO).
- NO >> GO TO 2.

### **BRC-258**

### **C1130 ENGINE SIGNAL**

< DTC/CIRCUIT DIAGNOSIS >	[TYPE 2]
2. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GE	ROUND CIR-
CUIT	
Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer "Diagnosis Procedure".	to <u>BRC-295,</u>
Is the inspection result normal?	
YES >> GO TO 3.	
NO >> Repair / replace harness, connector, fuse, or fusible link.	
<b>J.</b> CHECK CONNECTOR AND TERMINAL	
1. Turn the ignition switch OFF.	
<ol> <li>Disconnect ECM harness connector.</li> <li>Disconnect APS actuator and electric unit (control unit) harness connector.</li> </ol>	
4. Check the connector for disconnection or looseness.	
5. Check the pin terminals for damage or loose connection with harness connector.	
Is the inspection result normal?	
YES >> GO TO 4.	
NO >> Repair / replace harness, connector, or terminal, securely lock the connector, and GC	) TO 4.
<b>4.</b> CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)	
With CONSULT	
1. Connect ECM harness connector.	
<ol> <li>Connect ABS actuator and electric unit (control unit) namess connector.</li> <li>Frase "Self Diagnostic Result" of "ABS"</li> </ol>	
4. Turn the ignition switch OFF.	
NOTE:	
Wait at least 10 seconds after turning ignition switch OFF.	
NOTE:	
Wait at least 10 seconds after starting the engine.	
6. Perform "Self Diagnostic Result" of "ABS".	
Is DTC "C1130" or "U1000" detected?	
YES ("C1130")>>GO TO 1. VES ("L1000")>>Pefer to LAN 21. "Trouble Diagnosis Flow Chart"	
NO $>>$ Inspection End.	

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### C1140 ACTUATOR RELAY SYSTEM

#### < DTC/CIRCUIT DIAGNOSIS >

### C1140 ACTUATOR RELAY SYSTEM

### **DTC** Description

#### DTC DETECTION LOGIC

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

#### **POSSIBLE CAUSE**

#### NOTE:

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

PAST DTC	CRNT DTC
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>

#### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

#### >> GO TO 2.

#### 2. CHECK DTC DETECTION

#### ()With CONSULT

- 1. Turn the ignition switch OFF.
  - **NOTE:** Wait at least 10 seconds after turning ignition switch OFF.
- 2. Start the engine.
  - **NOTE:** Wait at least 10 seconds after starting the engine.
- 3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1140" detected?

YES-1 >> "C1140" is displayed as "CRNT": Proceed to <u>BRC-260, "Diagnosis Procedure"</u>.

- YES-2 >> "C1140" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-47, "Intermittent Incident"</u>.

NO-2 >> Confirmation after repair: Inspection End.

#### Diagnosis Procedure

INFOID:000000012551999

### 1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness. <u>Is the inspection result normal?</u>
- YES >> GO TO 3.

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

2. PERFORM SELF-DIAGNOSIS

INFOID:000000012551998

### C1140 ACTUATOR RELAY SYSTEM

	CTI40 ACTORTOR RELAT STSTEM	
< DTC/CIRCUIT	DIAGNOSIS >	[TYPE 2]
With CONSUL	Г	
1. Turn the igniti	on switch OFF.	
NOTE:		
Wait at least	10 seconds after turning ignition switch OFF.	
NOTE:	ile.	
Wait at least	10 seconds after starting the engine.	
3. Perform "Self	Diagnostic Result" of "ABS".	
<u>Is DTC "C1140" d</u>	etected?	
YES >> GO T	O 3.	
NO >> Inspe	ction End.	
3.CHECK ABS A	CTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GR	OUND CIR-
CUIT		
Check the ABS a	ctuator and electric unit (control unit) power supply and ground circuits. Refer t	to <u>BRC-295,</u>
"Diagnosis Procee	<u>lure"</u> .	
Is the inspection r	esult normal?	
YES >> GO T	O 4.	
NO >> Repa	r / replace harness, connector, fuse, or fusible link.	
<b>4.</b> CHECK TERM	INAL	
Check the ABS a		ion with har-
ness connector.		
Is the inspection r	esult normal?	
YES >> Repla	ice the ABS actuator and electric unit (control unit). Refer to BRC-322, "Remova	<u>al and Instal-</u>
lation	' 	
по кера	r replace hamess, connector, or terminal.	

#### < DTC/CIRCUIT DIAGNOSIS >

### C1142 PRESS SENSOR

### **DTC Description**

**[TYPE 2]** 

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC
<ul> <li>Harness or connector</li> <li>Air inclusion in the brake piping</li> <li>Stop lamp switch system</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>Stop lamp switch system</li> <li>ABS actuator and electric unit (control unit)</li> <li>Brake system</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> <li>A is inclusion in the backs pining</li> </ul>
	Air inclusion in the brake piping

#### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

>> GO TO 2.

### 2. CHECK DTC DETECTION

#### () With CONSULT

- Turn the ignition switch OFF.
- NOTE: Wait at least 10 seconds after turning ignition switch OFF. 2. Start the engine.
- Start the engination of the start the start the engination of the enginatio of the enginted of the engination of the engination of the en

Wait at least 10 seconds after starting the engine.

3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1142" detected?

YES-1 >> "C1142" is displayed as "CRNT": Proceed to <u>BRC-262, "Diagnosis Procedure"</u>.

- YES-2 >> "C1142" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

#### Diagnosis Procedure

**1**.STOP LAMP SWITCH SYSTEM

Check the stop lamp switch system. Refer to BRC-251, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace stop lamp switch system.

2. CHECK BRAKE FLUID LEAKAGE

INFOID:000000012552001

### **C1142 PRESS SENSOR**

< DTC/CIRCUIT DIAGNOSIS >	[TYPE 2]
Check the brake fluid leakage. Refer to BR-8, "Inspection".	
Is the inspection result normal?	l
YES >> GO TO 3.	
NO >> Repair or replace brake fluid leakage part.	r
<b>J</b> .CHECK BRAKE PIPING	L
Check the brake piping. Refer to <u>BR-8, "Inspection"</u> .	
Is the inspection result normal?	(
YES >> GO TO 4.	
<ul> <li>NO &gt;&gt; Repair or replace brake piping.</li> <li>Front: Refer to BR-23 "FRONT : Removal and Installation"</li> </ul>	
Rear: Refer to <u>BR-26, "REAR : Removal and Installation"</u> .	
4.CHECK BRAKE PEDAL	
Check the brake pedal.	F
Brake pedal height: Refer to <u>BR-7, "Inspection"</u> .	
Brake pedal assembly: Refer to <u>BR-20, "Exploded View"</u> .	
Is the inspection result normal?	BI
YES >> GU TO 5.	
Adjust the brake pedal Refer to <u>BR-13, "Adjustment</u> ".	(
<ul> <li>Replace the brake pedal: Refer to <u>BR-20. "Removal and Installation"</u>.</li> </ul>	
5. CHECK BRAKE MASTER CYLINDER	
Check the brake master cylinder. Refer to BR-9, "Inspection".	
Is the inspection result normal?	
YES >> GO TO 6.	
NO >> Repair or replace brake master cylinder. Refer to <u>BR-28</u> , " <u>Removal and Installation</u> ".	
<b>6</b> .CHECK BRAKE BOOSTER	
Check the brake booster. Refer to <u>BR-10. "Inspection"</u> .	1
Is the inspection result normal?	
YES >> GO TO 7.	
NO >> Repair or replace brake booster. Refer to <u>BR-31, "Removal and Installation"</u> .	ł
I .CHECK VACUUM PIPING	
Check the vacuum piping. Refer to BR-33. "Exploded View".	
Is the inspection result normal?	
YES >> GO TO 8.	
NO >> Repair or replace vacuum piping. Refer to <u>BR-33, "Removal and Installation"</u> .	Π
O.CHECK FRONT DISC BRAKE	
Check the front disc brake caliper. Refer to BR-36, "BRAKE CALIPER ASSEMBLY : Exploded View	<u>ew"</u> .
Is the inspection result normal?	I
YES >> GO TO 9.	
NO >> Repair or replace front disc brake callper. Refer to <u>BR-37, "BRAKE CALIPER A</u> Removal and Installation"	<u> () 192FINIRTA :</u>
9 CHECK REAR DISC BRAKE	
Check the rear diag broke Defer to PD 41 "DDAKE CALIDED ASSEMBLY - Evolution View"	
Le the inspection result normal?	I
NO >> Repair or replace rear disc brake. Refer to BR-42 "BRAKE CALIPER ASSEMBLY F	Removal and
Installation".	
10. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AN	ID GROUND
CIRCUIT	

### C1142 PRESS SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-295.</u> "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair / replace harness, connector, fuse, or fusible link.

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

With CONSULT

- 1. Erase "Self Diagnostic Result" of "ABS".
- 2. Turn the ignition switch OFF. NOTE: Wait at least 10 seconds after turning igniti
  - Wait at least 10 seconds after turning ignition switch OFF.
- 3. Start the engine. **NOTE:**

Wait at least 10 seconds after starting the engine.

- 4. Start the engine and drive the vehicle for a short period of time.
  - **NOTE:** Vehicle must be driven after repair or replacement to erase the previous DTCs.
- 5. Stop the vehicle.
- 6. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1142" detected?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322</u>, "<u>Removal and Instal-</u><u>lation</u>".
- NO >> Check the ABS actuator and electric unit (control unit) harness connector and terminal for damage, looseness and disconnection. Repair / replace harness, connector, or terminal.

#### < DTC/CIRCUIT DIAGNOSIS >

### C1143 STEERING ANGLE SENSOR

### **DTC** Description

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC	
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> </ul>	Harness or connector     Steering angle sensor     APS actuator and electric unit (control unit)	BRC
<ul> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>IPDM E/R</li> <li>CAN communication line</li> <li>Wheel alignment</li> </ul>	G
<ul> <li>CAN communication line</li> <li>Incomplete neutral position adjustment of steering angle sensor</li> <li>Improper installation of steering angle sensor</li> </ul>	<ul> <li>Incomplete neutral position adjustment of steering angle sensor</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> </ul>	Н
	<ul><li>Fusible link</li><li>Battery</li></ul>	I

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

#### >> GO TO 2.

### 2. CHECK DTC DETECTION

(P)With CONSULT		
1. Turn the ignition switch OFF.		
NOTE:		в. Л
Wait at least 10 seconds after turning ignition switch OFF.		IVI
2. Start the engine.		
NOTE:		
Wait at least 10 seconds after starting the engine.		Ν
<ol><li>Perform "Self Diagnostic Result" of "ABS".</li></ol>		
Is DTC "C1143" detected?		
YES-1 >> "C1143" is displayed as "CRNT": Proceed to <u>BRC-265, "Diagnosis Procedure"</u> .		0
YES-2 >> "C1143" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" o	of "ABS").	
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Inciden	<u>nt"</u> .	
NO-2 >> Confirmation after repair: Inspection End.		D
Diagnosis Procedure		Г
	INFOID:000000012552003	
1		

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

#### With CONSULT

Perform neutral position adjustment of steering angle sensor. Refer to BRC-221, "Description".

### **BRC-265**

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INFOID:000000012552002

< DTC/CIRCUIT DIAGNOSIS >

>> GO TO 2.

## 2. PERFORM SELF-DIAGNOSIS (1)

#### With CONSULT

- Turn the ignition switch OFF.
  - NOTE:
    - Wait at least 10 seconds after turning ignition switch OFF.
- 2. Start the engine.
  - NOTE:
    - Wait at least 10 seconds after starting the engine.
- 3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1143" detected?

- YES-1 >> "C1143" is displayed as "CRNT": GO TO 3.
- YES-2 >> "C1143" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO >> Inspection End.

### 3.CHECK CONNECTOR

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

Is the inspection result normal?

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

**4.**PERFORM SELF-DIAGNOSIS (2)

#### With CONSULT

Turn the ignition switch OFF. **NOTE:** 

Wait at least 10 seconds after turning ignition switch OFF.

- 2. Start the engine.
  - NOTE:

Wait at least 10 seconds after starting the engine.

- 3. Perform "Self Diagnostic Result" of "ABS".
- Is DTC "C1143" detected?
- YES >> GO TO 5.
- NO >> Inspection End.

**5.**CHECK STEERING ANGLE SENSOR POWER SUPPLY

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

Steering angle sensor			Voltage
Connector	Terminal		(Approx.)
M54	4	Ground	0 V

4. Turn the ignition switch ON.

NOTE:

Start the engine.

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

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

Is the inspection result normal?

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

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

#### 6.check steering angle sensor power supply circuit 1. Turn the ignition switch OFF. Check fuse 49 (10A). 2. 3. Disconnect IPDM E/R harness connector. Check the continuity between steering angle sensor harness connector and IPDM E/R harness connector. 4. IPDM E/R Steering angle sensor Continuity Connector Terminal Connector Terminal 4 M54 E119 35 Yes Check the continuity between steering angle sensor harness connector and ground. 5 Steering angle sensor Continuity Е Terminal Connector M54 4 Ground No Is the inspection result normal? BRC >> Perform trouble diagnosis for ignition power supply. YES NO >> Repair / replace harness, connector, or fuse. 7.CHECK STEERING ANGLE SENSOR GROUND CIRCUIT 1. Turn the ignition switch OFF. 2. Check the continuity between steering angle sensor harness connector and ground. Н Steering angle sensor Continuity Connector Terminal M54 1 Ground Yes Is the inspection result normal? YES >> GO TO 8. >> Repair / replace harness or connector. NO ${f 8}$ . CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIR-Κ CUIT Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to BRC-295, "Diagnosis Procedure". L Is the inspection result normal? YES >> GO TO 9. NO >> Repair / replace harness, connector, fuse, or fusible link. M **9.**CHECK TERMINAL 1. Check the steering angle sensor pin terminals for damage or loose connection with harness connector. Check the IPDM E/R pin terminals for damage or loose connection with harness connector. 2. Ν Is the inspection result normal? YES >> GO TO 10. NO >> Repair / replace harness, connector, or terminal. 10. CHECK CAN COMMUNICATION LINE Check the CAN communication line. Refer to LAN-21, "Trouble Diagnosis Flow Chart". Ρ Is the inspection result normal? YES >> GO TO 11. NO >> Repair / replace harness or connector. **11.**CHECK DATA MONITOR

With CONSULT

1. Select "DATA MONITOR" of "ABS", check "STR ANGLE SIG".

#### < DTC/CIRCUIT DIAGNOSIS >

2. Check that the indication changes with the steering angle when the steering wheel is turned left/right from the neutral position. Refer to <u>BRC-201</u>, "Reference Value".

#### Is the inspection result normal?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322. "Removal and Instal-</u><u>lation"</u>.
- NO >> Replace the steering angle sensor. Refer to <u>BRC-325</u>, "Removal and Installation".

### C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

#### < DTC/CIRCUIT DIAGNOSIS >

## C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

### **DTC** Description

INFOID:000000012552004

**[TYPE 2]** 

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#### DTC DETECTION LOGIC

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

### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC		BR
Incomplete neutral position adjustment of steering angle sensor	<ul> <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>	G
DTC CONFIRMATION PROCEDURE	·	
1.PRECONDITIONING		Н
If "DTC CONFIRMATION PROCEDURE" has been pre and wait at least 10 seconds before conducting the nex	eviously conducted, always turn the ignition switch OFF xt test.	I
>> GO TO 2.		
2. CHECK DTC DETECTION		.1
		0
1. Turn the ignition switch OFF.		
Wait at least 10 seconds after turning ignition swite	ch OFF.	K
2. Start the engine.		
Wait at least 10 seconds after starting the engine.		L
3. Perform "Self Diagnostic Result" of "ABS".		
<u>ISDIC CI144 delected?</u> YES-1 >> "C1144" is displayed as "CRNT". Proceed	to BRC-269 "Diagnosis Procedure"	M
YES-2 >> "C1144" is displayed as "PAST": Inspectior	n End (Erase "Self Diagnostic Result" of "ABS").	
NO-1 >> To check malfunction symptom before repair NO-2 >> Confirmation after repair: Inspection End	air: Refer to GI-47, "Intermittent Incident".	Ν
Diagnosis Procedure		
	INF-OID:000000012552005	0
<b>1.</b> ADJUST THE NEUTRAL POSITION OF STEERING	G ANGLE SENSOR	0
Perform neutral position adjustment of steering angle s	sensor. Refer to <u>BRC-221, "Description"</u> .	
		Ρ
$2 \sim 00102$ .		
With CONSULT     Turn the ignition switch OFF		
NOTE:		

Wait at least 10 seconds after turning ignition switch OFF.

### C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

- 2. Start the engine. NOTE:
  - Wait at least 10 seconds after starting the engine.
- 3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1144" detected?

YES >> GO TO 3.

NO >> Inspection End.

 $\mathbf{3}$ . Check steering angle sensor system

1. Turn the ignition switch OFF.

2. Check the steering angle sensor system. Refer to BRC-265. "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 4.

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

**4.**CHECK DATA MONITOR

#### With CONSULT

- 1. Select "DATA MONITOR" of "ABS", check "STR ANGLE SIG".
- 2. Check that the indication changes with the steering angle when the steering wheel is turned left/right from the neutral position. Refer to <u>BRC-201</u>, "Reference Value".

Is the inspection result normal?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322</u>, "<u>Removal and Instal-</u> lation".
- NO >> Replace the steering angle sensor. Refer to <u>BRC-325</u>, "Removal and Installation".

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### **DTC** Description

#### INFOID:000000012552006

**[TYPE 2]** 

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#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC	кU
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>Harness or connector</li> <li>Yaw rate/side/decel G sensor</li> <li>ABS actuator and electric unit (control unit)</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	G
DTC CONFIRMATION PROCEDURE	I	
1.preconditioning		
If "DTC CONFIRMATION PROCEDURE" has been pre and wait at least 10 seconds before conducting the new	eviously conducted, always turn the ignition switch OFF tt test.	J
>> GO TO 2.	k	K
2. CHECK DTC DETECTION		
<ul> <li>With CONSULT</li> <li>1. Turn the ignition switch OFF.</li> <li>NOTE:</li> </ul>	L	L
<ul> <li>Wait at least 10 seconds after turning ignition swite</li> <li>Start the engine.</li> <li>NOTE:</li> </ul>	ch OFF.	M
Wait at least 10 seconds after starting the engine. 3 Perform "Self Diagnostic Result" of "ABS"		
Is DTC "C1145" or "C1146" detected?	Ν	Ν
YES-1 >> "C1145" or "C1146" is displayed as "CRNT YES-2 >> "C1145" or "C1146" is displayed as "PAS "ABS").	": Proceed to <u>BRC-271, "Diagnosis Procedure"</u> . T": Inspection End (Erase "Self Diagnostic Result" of	0
NO-1 >> Io check malfunction symptom before reparent NO-2 >> Confirmation after repair: Inspection End.	air: Refer to GI-47, "Intermittent Incident".	
Diagnosis Procedure	INFOID:000000012552007	Ρ

#### CAUTION:

• A malfunction in yaw rate/side/decel G sensor system may be detected when the vehicle sharply turns during a spin turn, acceleration turn or drift driving while VDC function is OFF (VDC OFF indicator lamp is in ON status). This is not a malfunction if the status returns to normal after engine is started again. In that case, erase self-diagnosis result memory using CONSULT.

### **BRC-271**

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

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

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

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

1. Turn the ignition switch OFF.

- 2. Disconnect yaw rate/side/decel G sensor harness connector.
- 3. Check the voltage between yaw rate/side/decel G sensor harness connector and ground.

Yaw rate/side/decel G sensor			Voltage
Connector Terminal			(Approx.)
M160	4	Ground	0 V

4. Turn the ignition switch ON.

NOTE:

Never start engine.

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

Yaw rate/side/decel G sensor			Voltage	
Connector	Terminal		(Approx.)	
M160	4	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

## 2.check yaw rate/side/decel g sensor power supply circuit

1. Turn the ignition switch OFF.

2. Check fuse 49 (10A).

- 3. Disconnect IPDM E/R harness connector.
- 4. Check the continuity between yaw rate/side/decel G sensor harness connector and IPDM E/R harness connector.

Yaw rate/side/	decel G sensor	IPDN	/I E/R	Continuity
Connector	Terminal	Connector	Terminal	Continuity
M160	4	E119	35	Yes

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

Yaw rate/side/	decel G sensor		Continuity	
Connector Terminal			Continuity	
M160	4	Ground	No	

#### Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.

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

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

1. Turn the ignition switch OFF.

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

Yaw rate/side/	decel G sensor		Continuity
Connector Terminal			Continuity
M160	1	Ground	Yes

Is the inspection result normal?

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

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

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YES >> GO TO 4.

NO >> Repair / replace harness or connector.

**4.**CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIR-CUIT

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-295</u>, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair / replace harness, connector, fuse, or fusible link.

5. CHECK COMMUNICATION LINE

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

Yaw rate/side/o	decel G sensor	ABS actuator and ele	ectric unit (control unit)	Orationity	
Connector	Terminal	Connector	Terminal	Continuity	
M160	2	E125	6	Vee	BRO
IVI IOU	3	E125	16	Tes	
Is the inspection result	t normal?				G
YES >> GO TO 6.					
NO >> Repair / re	eplace harness or con	nector. Refer to <u>BRC-</u>	166, "Precaution for Ha	<u>irness Repair"</u> .	
<b>O.</b> CHECK TERMINAI	L				Н
1. Check the ABS ad	ctuator and electric ur	nit (control unit) pin ter	minals for damage or l	oose connection with	
harness connecto	r. ta/sida/dasal C. sansr	or nin terminale for dan	nago or looso connocti	on with harnoss oon	1
nector.			hage of loose connecti		1
3. Check the IPDM E	E/R pin terminals for c	lamage or loose conne	ection with harness con	nector.	
Is the inspection result	<u>t normal?</u>				J
YES >> GO TO 7.					
NO >> Repair / re	eplace harness, conne	ector, or terminal.			
<b><i>I</i></b> .REPLACE YAW RA	ATE/SIDE/DECEL G 8	SENSOR			K
With CONSULT.					
1. Connect ABS actu	Jator and electric unit	(control unit) harness	connector.	tion"	L
3. Erase "Self Diagn	ostic Result" of "ABS"	, ,	<u>Removal and installa</u>	<u>uon</u> .	
4. Turn the ignition s	witch OFF.				
5. Turn the ignition s	witch ON.				M
Never start engine	Э.				
6. Perform "Self Diag	gnostic Result" of "AB	S".			N
Is DTC "C1145" or "C1	146" detected?				IN
YES >> Replace the second seco	he ABS actuator and	electric unit (control ur	nit). Refer to <u>BRC-322.</u>	"Removal and Instal-	
NO >> Inspection	End				0
					P

### C1155 BRAKE FLUID LEVEL SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

### C1155 BRAKE FLUID LEVEL SWITCH

#### DTC Description

INFOID:000000012552008

**[TYPE 2]** 

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC
<ul><li>Harness or connector</li><li>Brake fluid level is low</li></ul>	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> <li>Brake fluid level switch</li> <li>Combination meter</li> <li>Brake fluid level is low</li> </ul>

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

>> GO TO 2.

### 2.CHECK DTC DETECTION

(P)With CONSULT

Turn the ignition switch OFF. 1. NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

2. Start the engine.

### NOTE:

Wait at least 10 seconds after starting the engine.

3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1155" detected?

- YES-1 >> "C1155" is displayed as "CRNT": Proceed to <u>BRC-274, "Diagnosis Procedure"</u>. YES-2 >> "C1155" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

### **Diagnosis** Procedure

INFOID:000000012552009

**1.**CHECK BRAKE FLUID LEVEL

- Turn the ignition switch OFF. 1.
- Check the brake fluid level. Refer to <u>BR-8, "Inspection"</u>. 2.

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Refill brake fluid. Refer to <u>BR-14, "Drain and Refill"</u>. GO TO 2.

2.PERFORM SELF-DIAGNOSIS (1)

#### (P)With CONSULT

Erase "Self Diagnostic Result" of "ABS"

C1155 BRAKE FLUID LEVEL SWITCH	
< DTC/CIRCUIT DIAGNOSIS >	[TYPE 2]
2. Turn the ignition switch OFF $\rightarrow$ ON $\rightarrow$ OFF.	
NOTE: Wait at least 10 seconds after turning ignition switch OFF or ON.	
3. Start the engine.	
NOTE: Wait at least 10 seconds after starting the engine	
4. Perform "Self Diagnostic Result" of "ABS".	
Is DTC "C1155" detected?	
YES >> GO TO 3.	
NO >> Inspection End.	
J.CHECK CONNECTOR	
1. Turn the ignition switch OFF.	
<ol> <li>Check the brake fluid level switch harness connector for disconnection or looseness.</li> </ol>	
Is the inspection result normal?	
YES >> GO TO 5.	-
NO >> Repair / replace harness or connector, and GO TO 4.	В
4.PERFORM SELF-DIAGNOSIS (2)	
With CONSULT	
1. Turn the ignition switch OFF.	
Wait at least 10 seconds after turning ignition switch OFF.	
2. Start the engine.	
NOTE: Wait at least 10 seconds after starting the engine	
3. Perform "Self Diagnostic Result" of "ABS".	
Is DTC "C1155" detected?	
YES >> GO TO 5.	
NO >> Inspection End.	
<b>O.</b> CHECK BRAKE FLUID LEVEL SWITCH	
Check the brake fluid level switch. Refer to <u>BR-28, "Exploded View"</u> .	
Is the inspection result normal?	
YES >> GO TO 7. NO >> Replace the reservoir tank Refer to BR-28 "Exploded View" GO TO 6	
6 PERFORM SELE-DIAGNOSIS (3)	
UNIT CONSULI 1 Frase "Self Diagnostic Result" of "ABS"	
2. Turn the ignition switch OFF $\rightarrow$ ON $\rightarrow$ OFF.	
NOTE:	
Wait at least 10 seconds after turning ignition switch OFF or ON. 3 Start the engine	
NOTE:	
Wait at least 10 seconds after starting the engine.	
4. PERIOTIN SET DIAGNOSTIC RESULT OF ABS .	
YES >> GO TO 7	
NO >> Inspection End.	
7. CHECK CONNECTOR AND TERMINAL	
1. Turn the ignition switch OFF.	

2. Disconnect brake fluid level switch harness connector.

3. Check the brake fluid level switch harness connector for disconnection or looseness.

4. Check the brake fluid level switch pin terminals for damage or loose connection with harness connector.

5. Disconnect combination meter harness connector.

### C1155 BRAKE FLUID LEVEL SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Is the inspection result normal?

YES >> GO TO 9.

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

8. PERFORM SELF-DIAGNOSIS (4)

#### () With CONSULT

- 1. Erase "Self Diagnostic Result" of "ABS"
- 2. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF. **NOTE:** 
  - Wait at least 10 seconds after turning ignition switch OFF or ON.
- 3. Start the engine.
  - NOTE:

Wait at least 10 seconds after starting the engine.

4. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1155" detected?

YES >> GO TO 9.

NO >> Inspection End.

9. CHECK BRAKE FLUID LEVEL SWITCH CIRCUIT

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

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

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

Brake fluid level switch			Continuity
Connector	Terminal		Continuity
E21	1	Ground	No

Is the inspection result normal?

YES >> GO TO 10.

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

**10.**CHECK BRAKE FLUID LEVEL SWITCH GROUND CIRCUIT

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

Brake fluid level switch			Continuity
Connector	Terminal		
E21	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 11.

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

**11.**CHECK COMBINATION METER

Check the combination meter. Refer to <u>MWI-18, "CONSULT Function (METER/M&A)"</u>.

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322. "Removal and Instal-</u> lation".

### C1155 BRAKE FLUID LEVEL SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

#### NO >> Repair or replace combination meter. Refer to <u>MWI-85. "Removal and Installation"</u>.

#### Component Inspection

# 1. CHECK BRAKE FLUID LEVEL SWITCH

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

Brake fluid level switch	Condition	Continuity	-
Terminal	Continuity		D
1 0	When brake fluid level in reservoir tank is within the specified level.	No	-
1-2	When brake fluid level in reservoir tank is less than the specified level.	Yes	-
le the increation requit w			- E

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace the reservoir tank. Refer to <u>BR-28</u>, "Exploded View".

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**[TYPE 2]** 

INFOID:000000012552010

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### C1160 INCOMPLETE DECEL G SENSOR CALIBRATION

#### < DTC/CIRCUIT DIAGNOSIS >

### C1160 INCOMPLETE DECEL G SENSOR CALIBRATION

### **DTC** Description

INFOID:000000012552011

**[TYPE 2]** 

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

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

#### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

>> GO TO 2.

### 2. CHECK DTC DETECTION

#### With CONSULT

1. Turn the ignition switch OFF.

#### NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

2. Start the engine.

#### NOTE:

Wait at least 10 seconds after starting the engine.

3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1160" detected?

YES-1 >> "C1160" is displayed as "CRNT": Proceed to <u>BRC-278, "Diagnosis Procedure"</u>.

- YES-2 >> "C1160" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

#### **Diagnosis** Procedure

INFOID:000000012552012

#### **1.**DECEL G SENSOR CALIBRATION

Perform decel G sensor calibration. Refer to BRC-223, "Work Procedure".

>> GO TO 2.

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

With CONSULT
 Perform "Self Diagnostic Result" of "ABS".
 <u>Is DTC "C1160" detected?</u>

### **C1160 INCOMPLETE DECEL G SENSOR CALIBRATION**

< DTC/CIRCUIT DIAGNOSIS >	[TYPE 2]	
YES >> GO TO 3.		
NO >> Inspection End.		Α
<b>3.</b> CHECK YAW RATE/SIDE/DECEL G SENSOR SYSTEM		
<ol> <li>Turn the ignition switch OFF.</li> <li>Check the yaw rate/side/decel G sensor system. Refer to <u>BRC-271, "Diagnosis Procedure"</u>.</li> </ol>		В
Is the inspection result normal?		
YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322</u> , " <u>Removal</u> <u>lation</u> ".	and Instal-	С

NO >> Replace the yaw rate/side/decel G sensor. Refer to <u>BRC-324, "Removal and Installation"</u>.

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Revision: November 2015

### C1164, C1165 CV SYSTEM

#### < DTC/CIRCUIT DIAGNOSIS >

### C1164, C1165 CV SYSTEM

### **DTC** Description

INFOID:000000012552013

**[TYPE 2]** 

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

#### >> GO TO 2.

### 2. CHECK DTC DETECTION

#### (B) With CONSULT

- Turn the ignition switch OFF.
- NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

- 2. Start the engine.
- NOTE:
  - Wait at least 10 seconds after starting the engine.
- 3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1164" or "C1165" detected?

YES-1 >> "C1164" or "C1165" is displayed as "CRNT": Proceed to <u>BRC-280, "Diagnosis Procedure"</u>.

- YES-2 >> "C1164" or "C1165" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47. "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

#### Diagnosis Procedure

INFOID:000000012552014

- 1.CHECK CONNECTOR
- 1. Turn the ignition switch OFF.

2. Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness. Is the inspection result normal?

YES >> GO TO 3.

### C1164, C1165 CV SYSTEM

< DTC/0	CIRCUIT DIAGNOSIS > [TYPE 2]
NO	>> Repair / replace harness or connector, securely lock the connector, and GO TO 2.
2.per	FORM SELF-DIAGNOSIS
With     Perform	CONSULT ı "Self Diagnostic Result" of "ABS" again.
<u>Is DTC </u>	<u>"C1164" or "C1165" detected?</u>
YES NO	>> GO TO 3. >> Inspection End.
3.CHE	CK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIR-
Check t <u>"Diagno</u>	he ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-295.</u> <u>usis Procedure</u> ".
Is the in	ispection result normal?
YES NO	>> GO TO 4. >> Repair / replace harness, connector, fuse, or fusible link
4.CHF	CK TERMINAL
Check t	be ABS actuator and electric unit (control unit) nin terminals for damage or loose connection with bar-
ness.	
Is the in	spection result normal?
YES	>> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322</u> , "Removal and Instal-
NO	lation". >> Renair / replace harness, connector, or terminal
NO	

### **C1170 VARIANT CODING**

#### < DTC/CIRCUIT DIAGNOSIS >

### C1170 VARIANT CODING

#### **DTC Description**

**[TYPE 2]** 

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC
	ABS actuator and electric unit (control unit)

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

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

#### >> GO TO 2.

#### 2. CHECK DTC DETECTION

#### With CONSULT

- Turn the ignition switch OFF.
  - NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

- 2. Start the engine.
  - NOTE:

Wait at least 10 seconds after starting the engine.

3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1170" detected?

- YES-1 >> "C1170" is displayed as "CRNT": Proceed to <u>BRC-282</u>, "Diagnosis Procedure".
- YES-2 >> "C1170" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair. Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

#### Diagnosis Procedure

INFOID:000000012552016

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

#### With CONSULT

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

>> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322. "Removal and Instal-</u> lation".

### **C1197 VACUUM SENSOR**

#### < DTC/CIRCUIT DIAGNOSIS >

## C1197 VACUUM SENSOR

### **DTC** Description

### DTC DETECTION LOGIC

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

#### **POSSIBLE CAUSE**

#### NOTE:

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

<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> <li>ABS actuator and electric unit (control unit)</li> <li>G</li> <li>DTC CONFIRMATION PROCEDURE</li> <li>If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.</li> </ul>
DTC CONFIRMATION PROCEDURE 1.PRECONDITIONING If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.
1.PRECONDITIONING       H         If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.
I.PRECONDITIONING If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.
If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.
>> GO TO 2.
2.CHECK DTC DETECTION
<ul> <li>With CONSULT</li> <li>1. Turn the ignition switch OFF.</li> <li>NOTE: Wait at least 10 seconds after turning ignition switch OFF.</li> <li>2. Start the engine.</li> </ul>
NOTE: Wait at least 10 seconds after starting the engine. 3. Perform "Self Diagnostic Result" of "ABS".
Is DTC "C1197" detected?
YES-1 >> "C1197" is displayed as "CRNT": Proceed to <u>BRC-283, "Diagnosis Procedure"</u> .YES-2 >> "C1197" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-47, "Intermittent Incident"</u> .NO-2 >> Confirmation after repair: Inspection End.
Diagnosis Procedure
1.CHECK CONNECTOR
<ol> <li>Turn the ignition switch OFF.</li> <li>Check the vacuum sensor harness connector for disconnection or looseness.</li> <li>Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.</li> <li>Is the inspection result normal?</li> </ol>
YES >> GO TO 2. NO >> Repair / replace harness or connector, and GO TO 2. 2 CHECK RRAKE ROOSTER
Turn the ignition switch OEE

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### C1197 VACUUM SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace the brake booster. Refer to <u>BR-31, "Removal and Installation"</u>.

**3.**CHECK VACUUM PIPING

Check the vacuum piping. Refer to <u>BR-33, "Exploded View"</u>.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace the vacuum piping. Refer to <u>BR-33, "Removal and Installation"</u>.

**4.**CHECK TERMINAL

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

Is the inspection result normal?

YES >> GO TO 5.

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

5. CHECK VACUUM SENSOR CIRCUIT

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

Vacuum sensor		ABS actuator and ele	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
	1	E125	13	Yes
E167	2		32	
	3		28	

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

Vacuun	n sensor		Continuity	
Connector Terminal			Continuity	
	1	Ground	No	
E167	2			
	3			

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair / replace harness or connector.

**6.**REPLACE VACUUM SENSOR

#### With CONSULT

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Replace the vacuum sensor. CAUTION:

# Always replace brake booster because vacuum sensor cannot be disassembled. Refer to <u>BR-31</u>, <u>"Removal and Installation"</u>.

- 3. Erase "Self Diagnostic Result" of "ABS".
- 4. Turn the ignition switch OFF  $\rightarrow$  ON  $\rightarrow$  OFF. **NOTE:**

### **C1197 VACUUM SENSOR**

< D	TC/CIRCUIT DIAGNOSIS > [TYPE 2]	
5.	Wait at least 10 seconds after turning ignition switch OFF or ON. Start engine. <b>NOTE:</b>	A
6. <u>Is D</u>	Perform "Self Diagnostic Result" of "ABS". <u>PTC "C1197" detected?</u>	В
YE NC	<ul> <li>&gt;&gt; Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322, "Removal and Instal lation"</u>.</li> <li>&gt;&gt; Inspection End.</li> </ul>	= C
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#### < DTC/CIRCUIT DIAGNOSIS >

### C1198 VACUUM SENSOR

### **DTC Description**

INFOID:000000012552019

**[TYPE 2]** 

#### DTC DETECTION LOGIC

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

# POSSIBLE CAUSE NOTE:

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

PAST DTC	CRNT DTC
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>Harness or connector</li> <li>Vacuum sensor (brake booster)</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 the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

#### 2.check dtc detection

() With CONSULT

- Turn the ignition switch OFF.
- NOTE: Wait at least 10 seconds after turning ignition switch OFF.
  Start the engine. NOTE:

Wait at least 10 seconds after starting the engine.

3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1198" detected?

YES-1 >> "CRNT" is displayed: Proceed to <u>BRC-286, "Diagnosis Procedure"</u>.

- YES-2 >> "PAST" is displayed: Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to <u>GI-47, "Intermittent Incident"</u>.

NO-2 >> Confirmation after repair: Inspection End.

#### **Diagnosis** Procedure

INFOID:000000012552020

### 1.CHECK CONNECTOR

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

#### Is the inspection result normal?

YES >> GO TO 2.

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

2.CHECK TERMINAL

	C	1198 VACUU	JM SEN	SOR	
< DTC/CIRCUIT E	)IAGNOSIS >				[TYPE 2]
<ol> <li>Turn the ignition</li> <li>Disconnect van</li> <li>Check the vac</li> <li>Disconnect AE</li> <li>Disconnect AE</li> <li>Check the ABS</li> <li>harness connect</li> </ol>	on switch OFF. cuum sensor harnes uum sensor pin tern S actuator and elect cotor.	ss connector. ninals for damage tric unit (control un ric unit (control un	or loose onit) harnes nit) pin terr	connection with harnes as connector. minals for damage or	ss connector. loose connection with
Is the inspection re	sult normal?				
NO >> Repair	) 3. / replace harness, (	connector, or term	ninal.		
3. CHECK VACUL	JM SENSOR CIRCL	, TIL			
<ol> <li>Turn the ignition</li> <li>Disconnect van</li> <li>Disconnect AE</li> <li>Check the control unit harne</li> </ol>	on switch OFF. cuum sensor harnes S actuator and elec tinuity between vacu ss connector.	ss connector. tric unit (control u uum sensor harne	nit) harnes ss connec	es connector. tor and ABS actuator	and electric unit (con-
Vacuur	n sensor	ABS actuat	tor and elect	ric unit (control unit)	Continuity
Connector	Terminal	Connector		Terminal	Continuity
	1			13	
E167	2	E125		32	Yes
	3			28	
Connector E167	Vacuum sensor	erminal	ſ		Continuity
		3			NO
Is the inspection re YES >> GO TO NO >> Repair 4.REPLACE VAC	e <u>sult normal?</u> ) 4. : / replace harness c UUM SENSOR	or connector.			
<ul> <li>With CONSULT</li> <li>Connect ABS</li> <li>Replace the vac CAUTION: Always replace</li> </ul>	actuator and electric acuum sensor. ce brake booster b	c unit (control unit) Decause vacuum	) harness o sensor c	connector. annot be disassemb	led. Refer to <u>BR-31,</u>
<ol> <li>Erase "Self Dia 4. Turn the ignition NOTE: Wait at least 1</li> </ol>	agnostic Result" of " on switch OFF $\rightarrow$ Of 0 seconds after turn	ABS" N $\rightarrow$ OFF.	OFF or O	N	
Wait at least to seconds after turning ignition switch OFF of ON.         5. Start engine.         NOTE:         Wait at least 10 seconds after starting the engine.         Deform "Solf Diagnostic Deputy" of "ARS"					
<u>Is DTC "C1198" de</u>	tected?				

#### YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322, "Removal and Instal-</u> lation".

>> Inspection End. NO

### C1199 BRAKE BOOSTER

#### < DTC/CIRCUIT DIAGNOSIS >

### C1199 BRAKE BOOSTER

### **DTC Description**

INFOID:000000012552021

**[TYPE 2]** 

#### DTC DETECTION LOGIC

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

#### POSSIBLE CAUSE

#### NOTE:

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

PAST DTC	CRNT DTC
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply system</li> <li>Fuse</li> <li>Fusible link</li> <li>Battery</li> </ul>	<ul> <li>Harness or connector</li> <li>Vacuum sensor (brake booster)</li> <li>Vacuum piping</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 the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

### 2. CHECK DTC DETECTION

#### With CONSULT

1. Turn the ignition switch OFF.

#### NOTE:

Wait at least 10 seconds after turning ignition switch OFF.

2. Start the engine.

#### NOTE:

Wait at least 10 seconds after starting the engine.

3. Perform "Self Diagnostic Result" of "ABS".

#### Is DTC "C1199" detected?

YES-1 >> "CRNT" is displayed: Proceed to <u>BRC-288, "Diagnosis Procedure"</u>.

- YES-2 >> "PAST" is displayed: Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

### **Diagnosis** Procedure

INFOID:000000012552022

### 1.CHECK CONNECTOR

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

#### Is the inspection result normal?

YES >> GO TO 2.

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

2.CHECK BRAKE BOOSTER
## **C1199 BRAKE BOOSTER**

< DTC/CIRCUIT D	IAGNOSIS >			OTEN.	[TYPE 2]
1. Turn the ignitio	n switch OFF.	PD 10 "Inonoo	tion"		
Is the inspection re	sult normal?	BR-TU, Inspec	<u>uon</u> .		A
YES >> GO TO	) 3.				
NO >> Replac	e the brake booster	r. Refer to <u>BR-3</u>	<u>1, "Remov</u>	al and Installation".	В
J.CHECK VACUU			\ <i>/</i>		
Check the vacuum	piping. Refer to <u>BR</u> sult pormal?	-33, "Exploded	<u>View"</u> .		С
YES >> GO TC	) 4.				
NO >> Replac	e the vacuum pipin	g. Refer to <u>BR-3</u>	<u>33, "Remov</u>	val and Installation".	D
4.CHECK TERMI	NAL				
<ol> <li>Turn the ignitio</li> <li>Disconnect vac</li> <li>Check the vac</li> <li>Disconnect AB</li> <li>Check the ABS harness conne</li> </ol>	n switch OFF. cuum sensor harnes uum sensor pin tern S actuator and elect actuator and elect ctor.	ss connector. ninals for damag stric unit (control tric unit (control	ge or loose l unit) harn unit) pin te	e connection with harnes ess connector. erminals for damage or l	s connector.
Is the inspection re	sult normal?				
YES >> GO TO	) 5. ( rankas harraas				G
5 CHECK VACUU	/ replace namess, (	Connector, or te	rminal.		
1 Turn the ignitio					———— Н
<ol> <li>Disconnect Vac</li> <li>Disconnect AB</li> <li>Check the cont trol unit) harnes</li> </ol>	S actuator and election traines S actuator and election traines tinuity between vacuum ss connector.	ss connector. stric unit (control uum sensor har	l unit) harn ness conne	ess connector. ector and ABS actuator a	and electric unit (con-
Vacuun	n sensor	ABS act	uator and ele	ctric unit (control unit)	Continuity
Connector	Terminal	Connect	tor	Terminal	
<b>E</b> 407	1	F 4 0 F	·	13	— K
E167	2	E125		28	Yes
5. Check the cont	tinuity between vac	uum sensor har	ness conn	ector and ground.	
				solor and ground.	L
	Vacuum sensor			_	Continuity
Connector	Т	erminal			M
<b>F</b> 407		1			
E167		2		Ground	No
Is the inspection re	sult normal?	5			
YES >> GO TC	) 6.				0
NO >> Repair	/ replace harness of	or connector.			
<b>O</b> .REPLACE VAC	UUM SENSOR				
<ul> <li>With CONSULT</li> <li>Connect ABS a</li> <li>Replace the vac CAUTION: Always replace</li> <li>"Removal and</li> <li>Erase "Self Dia</li> </ul>	actuator and electric icuum sensor. <b>ce brake booster k</b> <u>Installation"</u> . agnostic Result" of "	c unit (control ur <b>because vacuu</b> ABS"	nit) harness <b>m sensor</b>	s connector. cannot be disassemb	P led. Refer to <u>BR-31,</u>
4. I urn the ignitio	n switch OFF $\rightarrow$ Of	$N \rightarrow OFF.$			

< DTC/CIRCUIT DIAGNOSIS >

### NOTE:

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

- 5. Start engine.
  - NOTE:

Wait at least 10 seconds after starting the engine.

- 6. Perform "Self Diagnostic Result" of "ABS".
- Is DTC "C1199" detected?
- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-322, "Removal and Instal-</u> lation".
- NO >> Inspection End.

## **C119A VACUUM SENSOR**

### < DTC/CIRCUIT DIAGNOSIS >

## C119A VACUUM SENSOR

## **DTC** Description

### DTC DETECTION LOGIC

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

### POSSIBLE CAUSE

### NOTE:

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

PAST DTC	CRNT DTC	
<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit) power supply sys-</li> </ul>	<ul> <li>Harness or connector</li> <li>Vacuum sensor (brake booster)</li> </ul>	BRC
tem	ABS actuator and electric unit (control unit)	
• Fuse	ABS actuator and electric unit (control unit) power supply sys-	G
Fusible link     Battery	• Fuse	0
Duttoly	Fusible link	
	• Battery	Н
DTC CONFIRMATION PROCEDURE		
1.PRECONDITIONING		
and wait at least 10 seconds before conducting the net	xt test.	J
2. CHECK DTC DETECTION		
(P)With CONSULT		Κ
1. Turn the ignition switch OFF.		
NOTE: Wait at least 10 seconds after turning ignition switt		1
2 Start the engine	CITOFF.	
NOTE:		
Wait at least 10 seconds after starting the engine.		ЪЛ
3. Perform "Self Diagnostic Result" of "ABS".		IVI
Is DTC "C119A" detected?		
YES-1 >> "CRNT" is displayed: Proceed to BRC-291	, "Diagnosis Procedure".	N
YES-2 >> "PAST" is displayed: Inspection End (Eras	e "Self Diagnostic Result" of "ABS").	IN

## Diagnosis Procedure

INFOID:0000000012552024

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## 1.CHECK CONNECTOR

1. Turn the ignition switch OFF.

- 2. Check the vacuum sensor harness connector for disconnection or looseness.
- 3. Check the ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.

NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident"

### Is the inspection result normal?

YES >> GO TO 3.

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

NO-2 >> Confirmation after repair: Inspection End.

## **BRC-291**

INFOID:000000012552023

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### < DTC/CIRCUIT DIAGNOSIS >

# 2. CHECK VACUUM SENSOR POWER SUPPLY

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

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

4. Turn the ignition switch ON. NOTE:

Start the engine.

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

Vacuun	n sensor		Voltage
Connector	Terminal		(Approx.)
E167	3	Ground	5 V

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

 $\mathbf{3}$ .check vacuum sensor power supply circuit

1. Turn the ignition switch OFF.

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

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

Vacuum sensor ABS actuator and electric		ectric unit (control unit)	Continuity		
Connector	Terminal	Connector	Terminal	- Continuity	
E167	3	E125	28	Yes	

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

Vacuum sensor		_	Continuity	
Connector	Terminal		Continuity	
E167	3	Ground	No	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair / replace harness or connector.

4. CHECK VACUUM SENSOR GROUND CIRCUIT

1. Turn the ignition switch OFF.

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

Vacuum sensor			Continuity	
Connector	Terminal		Continuity	
E167	2	Ground	No	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair / replace harness or connector.

 ${f b}.$ CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND GROUND CIRCUIT

## **C119A VACUUM SENSOR**

< DTC/CIRCUIT DIAGNOSIS > [ITFE 2]	
Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-295.</u> "Diagnosis Procedure".	ļ
Is the inspection result normal?	
YES >> GO TO 6. NO >> Repair / replace harness, connector, fuse, or fusible link.	E
6.CHECK TERMINAL	
<ol> <li>Check the vacuum sensor pin terminals for damage or loose connection with harness connector.</li> <li>Check the ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with</li> </ol>	C

harness connector.

### Is the inspection result normal?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-322, "Removal and Installation".
- NO >> Repair / replace harness, connector, or terminal.

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**Revision: November 2015** 

## **U1000 CAN COMM CIRCUIT**

### < DTC/CIRCUIT DIAGNOSIS >

## U1000 CAN COMM CIRCUIT

## **DTC Description**

**[TYPE 2]** 

#### INFOID:000000012552025

### DTC DETECTION LOGIC

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

### POSSIBLE CAUSE

### NOTE:

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

PAST DTC	CRNT DTC	
<ul><li>Harness or connector</li><li>CAN communication line</li></ul>	CAN communication system malfunction	

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

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

### >> GO TO 2.

## 2. CHECK DTC DETECTION

With CONSULT

- Turn the ignition switch OFF.
- NOTE:
  - Wait at least 10 seconds after turning ignition switch OFF.
- 2. Start the engine.

### NOTE:

Wait at least 10 seconds after starting the engine.

3. Perform "Self Diagnostic Result" of "ABS".

### Is DTC "U1000" detected?

YES-1 >> "CRNT" is displayed: Proceed to <u>BRC-294</u>, "Diagnosis Procedure".

- YES-2 >> "PAST" is displayed: Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

### **Diagnosis** Procedure

INFOID:000000012552026

Proceed to LAN-21, "Trouble Diagnosis Flow Chart".

## POWER SUPPLY AND GROUND CIRCUIT

### < DTC/CIRCUIT DIAGNOSIS >

## POWER SUPPLY AND GROUND CIRCUIT

### **Diagnosis** Procedure

## **1.**CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) IGNITION POWER SUPPLY (1)

1. Turn the ignition switch OFF.

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

ABS actuator and ele	ectric unit (control unit)		Voltage	_
Connector	Terminal		(Approx.)	D
E125	34	Ground	0 V	

 Turn the ignition switch ON NOTE:

Start the engine.

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

ABS actuator and ele	ectric unit (control unit)		Voltage	
Connector	Terminal		(Approx.)	G
E125	34	Ground	Battery voltage	0

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

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

1. Turn the ignition switch OFF.

2. Check the 10A fuse (49).

3. Disconnect IPDM E/R harness connector.

 Check the continuity between ABS actuator and electric unit (control unit) harness connector and IPDM E/ R.

ABS actuator and ele	ectric unit (control unit)	IPDM E	E/R	Continuity	k
Connector	Terminal	Connector	Terminal	Continuity	
E125	34	E119	35	Yes	

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

ABS actuator and ele	ectric unit (control unit)		Continuity	M
Connector	Terminal	_	Continuity	
E125	34	Ground	No	N

### Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.

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

## $\mathbf{3}$ .check motor and motor relay power supply

1. Turn the ignition switch OFF.

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

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal		(Approx.)
E125	4	Ground	Battery voltage

3. Turn the ignition switch ON.

NOTE:

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## POWER SUPPLY AND GROUND CIRCUIT

### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

### Start the engine.

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

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal		(Approx.)
E125	4	Ground	Battery voltage

Is the inspection result normal?

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

### **4.**CHECK MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Check the 50A fusible link (I).
- 3. Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal 4 and 50A fusible link (I).

#### Is the inspection result normal?

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

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

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

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal		(Approx.)
E125	3	Ground	Battery voltage

3. Turn the ignition switch ON **NOTE:** 

Start the engine.

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

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal		(Approx.)
E125	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

### $\mathbf{6}.$ CHECK ACTUATOR RELAY, ABS IN VALVE, ABS OUT VALVE POWER SUPPLY CIRCUIT

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

### Is the inspection result normal?

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

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

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

## POWER SUPPLY AND GROUND CIRCUIT

### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

ABS actuator and ele	ctric unit (control unit)		Orafiavity	А
Connector	Terminal		Continuity	
E125	1 2	Ground	Yes	В
Is the inspection result normal? YES >> GO TO 8. NO >> Repair / replace ha 8.CHECK TERMINAL	? arness, connector, or terminal.			С
<ol> <li>Check the ABS actuator a harness connector.</li> <li>Check the IPDM E/R pin te ls the inspection result normal?</li> </ol>	nd electric unit (control unit) p erminals for damage or loose o	in terminals for damage connection with harness	or loose connection with connector.	D
YES >> Replace the ABS a lation". NO >> Repair / replace ha	actuator and electric unit (cont arness, connector, or terminal.	rol unit). Refer to <u>BRC-3</u>	22, "Removal and Instal-	BR
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## HILL DESCENT CONTROL SWITCH

### < DTC/CIRCUIT DIAGNOSIS >

## HILL DESCENT CONTROL SWITCH

## Description

The hill descent control switch activates (turn ON) the hill descent control function when the hill descent control switch is pressed.

## **Component Function Check**

## **1**.CHECK 4WD SHIFT SWITCH (HILL DESCENT CONTROL SWITCH) OPERATION

Turn ON/OFF the hill descent control switch and check that the hill descent control indicator lamp in the combination meter turns ON/OFF correctly.

Condition	Hill descent control indicator lamp illumina- tion status
Hill descent control switch: ON	ON
Hill descent control switch: OFF	OFF

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-298, "Diagnosis Procedure"</u>.

### **Diagnosis** Procedure

INFOID:000000012552030

Regarding Wiring Diagram information, refer to BRC-208, "Wiring Diagram".

### 1.CHECK 4WD SHIFT SWITCH (HILL DESCENT CONTROL SWITCH)

Perform the hill descent control switch component inspection. Refer to <u>BRC-299, "Component Inspection"</u>. <u>Is the inspection result normal?</u>

YES >> GO TO 2

NO >> Replace hill descent control switch.

2.CHECK 4WD SHIFT SWITCH (HILL DESCENT CONTROL SWITCH) HARNESS

- 1. Disconnect ABS actuator and electric unit (control unit) connector.
- Check continuity between ABS actuator and electric unit (control unit) connector E125 terminal 29 and hill descent control switch connector M212 terminal 1.

ABS actuator a (contr	and electric unit ol unit)	Hill descent	control switch	Continuity
Connector	Terminal	Connector	Terminal	
E125	29	M212	1	Yes

3. Check continuity between ABS actuator and electric unit (control unit) connector E125 terminal 29 and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
E125	29	Ground	No

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness.

3.CHECK 4WD SHIFT SWITCH (HILL DESCENT CONTROL SWITCH) GROUND

Check continuity between hill descent control switch connector M212 terminal 2 and ground.

INFOID:000000012552028

## HILL DESCENT CONTROL SWITCH

### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

Hill descent	control switch		Continuity		A
Connector	Terminal		Continuity		
M212	2	Ground	Yes		F
s the inspection re	<u>sult normal?</u>				
YES >> GO TC	) 4				
NO >> Repair	or replace harness				(
+.CHECK COMBI	NATION METER				
Check if the indicat	ion and operation o	of combination r	neter are norma	al. Refer to <u>MWI-18, "Description"</u> .	Г
s the inspection re	sult normal?				L
YES >> Replac	e ABS actuator an	d electric unit (	control unit). Re	efer to <u>BRC-322, "Removal and Installa-</u>	
NO >> Replac	e combination met	er. Refer to <u>MW</u>	/I-85, "Removal	and Installation".	E
Component Ins	nection				
	pection			INF-OID:000000012552031	Ы
CHECK 4WD S	HIFT SWITCH (HIL	L DESCENT C	ONTROL SWIT	ĊH)	DI
. Turn ignition sv	vitch OFF.				
2. Disconnect hill	descent control sw	itch connector.			(
<ol> <li>Check continui</li> </ol>	ty between hill des	cent control swi	tch terminals.		
switch terminals	" Cor	dition	Continuity		ľ
	Hill descent cont	rol switch is ON.	Yes		
1 – 2	Hill descent cont	rol switch is OFF.	No		
s the inspection re	sult normal?				
YES >> Inspec	tion End				
NO >> Replac	e hill descent contr	ol switch. Refer	<sup>-</sup> to <u>BRC-327, "I</u>	Removal and Installation	,
Special Repair	Requirement			INFOID:000000012552032	
					ŀ
I.ADJUSIMENT	OF STEERING AN	GLE SENSOR	NEUTRAL POS	STION	
Always perform ne	utral position adjus	stment for the s	steering angle s	sensor when replacing the ABS actuator	
	fillioi unili). Refer lu	DRC-221, DE	<u>scription</u> .		
>> GO TC	12				
2 CALIBRATION		SOP			ľ
		501			
Always perform cal Refer to BRC-223	"Description"	sensor when re	splacing the AB	S actuator and electric unit (control unit).	
(0)01 to <u>D1(0 220,</u>	<u>Decomption</u> .				ľ
>> END					
2.10					4
					(
					ſ

## PARKING BRAKE SWITCH

### < DTC/CIRCUIT DIAGNOSIS >

## PARKING BRAKE SWITCH

## Description

### Transmits the parking brake switch signal to the combination meter.

### **Component Function Check**

## **1.**COMBINATION METER INPUT SIGNAL

### 1. Start engine.

2. Monitor BRAKE W/L in DATA MONITOR while applying and releasing the parking brake.

ConditionCONSULTParking brake applied: ONParking brake released: OFF

>> Inspection End.

### **Diagnosis Procedure**

Regarding Wiring Diagram information, refer to MWI-31, "Wiring Diagram".

## 1. CHECK PARKING BRAKE SWITCH CIRCUIT

1. Disconnect combination meter harness connector M24 and parking brake switch harness connector E52.

2. Check continuity between combination meter harness connector M24 terminal 12 and parking brake switch harness connector E52 terminal 1.

Combination meter		Parking brake switch		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M24	12	E52	1	Yes

3. Check continuity between combination meter harness connector M24 terminal 12 and ground.

Combination meter			Continuity
Connector	Terminal	Ground	Continuity
M24	12		No

Is the inspection result normal?

YES >> Inspection End.

NO >> Repair or replace harness or connectors.

## Component Inspection

INFOID:000000012552036

## 1. CHECK PARKING BRAKE SWITCH

Check continuity between parking brake switch terminal 1 and switch case ground.

Component	Terminal	Condition	Continuity
Parking brake switch	1	Parking brake applied	Yes
	I	Parking brake released	No

Is the inspection result normal?

YES >> Inspection End.

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

### **BRC-300**

INFOID:000000012552033

INFOID:000000012552034

## VDC OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >		[TYPE 2]
VDC OFF SWITCH		
Component Function Check		INFOID:000000012552037
Check VDC OFF SWITCH OPERATION		
Check that VDC OFF indicator lamp in combination	on meter turns ON/OFF when VDC OFF	switch is operated.
VES >> Inspection End		
NO >> Proceed to diagnosis procedure. Refe	er to <u>BRC-301, "Diagnosis Procedure"</u> .	
Diagnosis Procedure		INFOID:000000012552038
Regarding Wiring Diagram information, refer to BI	RC-208, "Wiring Diagram".	
1.CONNECTOR INSPECTION		
1. Turn ignition switch OFF.		
2. Disconnect ABS actuator and electric unit (co	ontrol unit) connector E125 and VDC O	FF switch connector
<ol> <li>Check connectors and terminals for deformation</li> </ol>	ion, disconnection, looseness or damag	e.
Is the inspection result normal?		
YES >> GO TO 2.		
NO >> Repair or replace as necessary.		
<b>Z</b> .CHECK VDC OFF SWITCH		
Check VDC OFF switch. Refer to <u>BRC-302</u> , "Com	ponent Inspection".	
Is the inspection result normal?		
YES >> GO TO 3. NO >> Replace VDC OFF switch		
3. CHECK VDC OFF SWITCH SIGNAL		
1. Connect ABS actuator and electric unit (con	trol unit) connector E125 and VDC OF	F switch connector
M71.		
<ol> <li>In "DATA MONITOR" select "OFF SW" and ch</li> </ol>	neck VDC OFF switch signal.	
Condition	DATA MONITOR	
VDC OFF switch is pressed and released	On	
VDC OFF switch is pressed and released again	Uff	
IS the Inspection result normal? VES >> Refer to RPC_217 "Work Flow"		
NO $>>$ GO TO 4.		
4.CHECK VDC OFF SWITCH CIRCUIT		
1. Turn ignition switch OFF.		
<ol> <li>Disconnect ABS actuator and electric unit (co M71</li> </ol>	ontrol unit) connector E125 and VDC O	⊢⊢ switch connector
<ol> <li>Check continuity between ABS actuator and VDC OFF switch connector M71 terminal 1.</li> </ol>	electric unit (control unit) connector E	125 terminal 30 and
ABS actuator and electric unit (control unit)	VDC OFF switch	<u> </u>
		Continuity

Connector

E125

Connector

M71

Terminal

1

Terminal

30

Yes

## **VDC OFF SWITCH**

### < DTC/CIRCUIT DIAGNOSIS >

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

ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal	_	Continuity
E125	30	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 M71 terminal 2 and ground.

VDC OFF switch			Continuity
Connector	Terminal		Continuity
M71	2	Ground	Yes

### Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-322</u>, "<u>Removal and Installa-</u> tion".
- NO >> Repair or replace malfunctioning components.

### Component Inspection

## 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
1 – 2	VDC OFF switch pressed	Yes
	VDC OFF switch released	No

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace VDC OFF switch.

Revision: November 2015

## ABS WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >	[TYPE 2]
ABS WARNING LAMP	
Component Function Check	INFOID:000000012552040
1. CHECK ABS WARNING LAMP FUNCTION	
Check that ABS warning lamp in combination meter turns ON for approximately 2 seconds after is turned ON.	ignition switch
<u>Is the inspection result normal?</u> YES >> Inspection End. NO >> Proceed to diagnosis procedure. Refer to <u>BRC-303, "Diagnosis Procedure"</u> .	
Diagnosis Procedure	INFOID:000000012552041
1.PERFORM THE SELF-DIAGNOSIS	
With CONSULT.     Perform self-diagnostic result. <u>Are any DTCs detected?</u>	
YES >> Refer to <u>BRC-206, "DTC Index"</u> . NO >> GO TO 2.	
<b>Z</b> .CHECK COMBINATION METER	
tem Description".	<u>101LIVI . 0ys-</u>
<u>Is the inspection result normal?</u> YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-322</u> , "Remova	al and Installa-
NO >> Replace combination meter. Refer to <u>MWI-85, "Removal and Installation"</u> .	

## BRAKE WARNING LAMP

## Component Function Check

**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 <u>BRC-304, "Diagnosis Procedure"</u>.

**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 >> Inspection End.

NO >> Check parking brake switch system. Refer to <u>BRC-300, "Diagnosis Procedure"</u>.

### Diagnosis Procedure

INFOID:000000012552043

**1**.PERFORM THE SELF-DIAGNOSIS

With CONSULT. Perform self-diagnostic result.

Are any DTCs detected?

YES >> Refer to BRC-206, "DTC Index".

NO >> GO TO 2.

2. CHECK COMBINATION METER

Check if indication and operation of combination meter are normal. Refer to <u>MWI-9, "METER SYSTEM : System Description"</u>.

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-322, "Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-85, "Removal and Installation"</u>.

## HILL DESCENT CONTROL INDICATOR LAMP

### < DTC/CIRCUIT DIAGNOSIS >

## HILL DESCENT CONTROL INDICATOR LAMP

## Description

**[TYPE 2]** 

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Description	INFOID:000000012552044
	×: ON –: OFF
Condition	Hill descent control indicator lamp
Ignition switch OFF	_
For 2 seconds after turning ON ignition switch	×
2 seconds later after turning ON ignition switch	-
Hill descent control function is malfunctioning.	-
Component Function Check	INFOID:000000012552045
1. CHECK HILL DESCENT CONTROL INDICATOR I	LAMP OPERATION
Check that the lamp illuminates for approximately 2 se	econds after the ignition switch is turned ON.
Is the inspection result normal?	
YES >> Inspection End	
NO >> Go to diagnosis procedure. Refer to <u>BRC</u>	-305, Diagnosis Procedure.
Diagnosis Procedure	INFOID:000000012552046
1.CHECK SELF-DIAGNOSIS	
Perform ABS actuator and electric unit (control unit) s	elf-diagnosis. Refer to <u>BRC-195, "CONSULT Function"</u> .
Is the inspection result normal?	
YES >> GO TO 2	
NO >> Check items displayed by self-diagnosis.	
<b>Z</b> .CHECK COMBINATION METER	
Check if the indication and operation of combination n	neter are normal. Refer to <u>MWI-18, "Description"</u> .
Is the inspection result normal?	
YES >> Replace ABS actuator and electric unit (	control unit). Refer to <u>BRC-322, "Removal and Installa-</u>
NO >> Replace combination meter. Refer to <u>MW</u>	1-85. "Removal and Installation".
Special Repair Requirement	INFOID:000000012552047
1.ADJUSTMENT OF STEERING ANGLE SENSOR	NEUTRAL POSITION
Always perform neutral position adjustment for the s	steering angle sensor when replacing the ABS actuator
	<u>scription</u> .
>> GO TO 2	
2.CALIBRATION OF DECEL G SENSOR	
Always perform calibration of decel G sensor when re	eplacing the ABS actuator and electric unit (control unit)
Refer to <u>BRC-223, "Description"</u> .	
>> FND	

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< DTC/CIRCUIT DIAGNOSIS >

## VDC OFF INDICATOR LAMP

Component Function Check

**1**.CHECK VDC OFF INDICATOR LAMP FUNCTION (1)

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 >> GO TO 2.

NO >> Proceed to diagnosis procedure. Refer to <u>BRC-306</u>, "Diagnosis Procedure".

**2.**CHECK VDC OFF INDICATOR LAMP FUNCTION (2)

Check that VDC OFF indicator lamp in combination meter turns ON/OFF when VDC OFF switch is operated. <u>Is the inspection result normal?</u>

YES >> Inspection End.

NO >> Check VDC OFF switch. Refer to <u>BRC-301, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000012552049

**1.**PERFORM THE SELF-DIAGNOSIS

With CONSULT. Perform self diagnostic result.

Are any DTCs detected?

YES >> Refer to <u>BRC-206, "DTC Index"</u>.

NO >> GO TO 2.

2. CHECK COMBINATION METER

Check if indication and operation of combination meter are normal. Refer to <u>MWI-9, "METER SYSTEM : System Description"</u>.

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-322</u>, "<u>Removal and Installa-</u> <u>tion</u>".
- NO >> Replace combination meter. Refer to <u>MWI-85, "Removal and Installation"</u>.

## SLIP INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >	[TYPE 2]
SLIP INDICATOR LAMP	
Component Function Check	OID:0000000012552050
1. CHECK SLIP INDICATOR LAMP FUNCTION	
Check that slip indicator lamp in combination meter turns ON for approximately 2 seconds after igrist turned ON	nition switch
Is the inspection result normal?	
YES >> Inspection End. NO >> Proceed to diagnosis procedure. Refer to BRC-307. "Diagnosis Procedure".	
Diagnosis Procedure	OID:0000000012552051
1.PERFORM THE SELF-DIAGNOSIS	
With CONSULT.	
Are any DTCs detected?	
YES >> Refer to <u>BRC-206, "DTC Index"</u> .	
NO >> GO TO 2.	
2.CHECK COMBINATION METER	
Check if indication and operation of combination meter are normal. Refer to <u>MWI-9, "METER SYS</u> tem Description"	<u> Sys-</u>
Is the inspection result normal?	
YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-322</u> , "Removal a	and Installa-
NO >> Replace combination meter. Refer to <u>MWI-85, "Removal and Installation"</u> .	

## SYMPTOM DIAGNOSIS APPLICATION NOTICE

## **Application Notice**

Service information	Remarks
TYPE 1	VDC/TCS/ABS
TYPE 2	HILL DESCENT CONTROL/VDC/TCS/ABS

## VDC/TCS/ABS

## < SYMPTOM DIAGNOSIS >

## VDC/TCS/ABS

## Symptom Table

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

Symptom	Check item	Reference	
	Brake force distribution		(
Excessive ABS function operation fre-	Looseness of front and rear axle	BRC-310, "Diag-	
queney	Wheel sensor and rotor system	<u>1100101110000010</u>	
	Brake pedal stroke	BRC-311, "Diagno-	[
Unexpected pedal reaction	Make sure the braking force is sufficient when the ABS is not operating.	sis Procedure"	
The braking distance is long	Check stopping distance when the ABS is not operating.	BRC-312, "Diag- nosis Procedure"	I
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-313, "Diag- nosis Procedure"	Б
Pedal vibration or ABS operation sound	Brake pedal	BRC-314, "Diag-	В
occurs (Note 2)	ABS actuator and electric unit (control unit)	nosis Procedure"	
	ABS actuator and electric unit (control unit)		(
Vehicle jerks during VDC/TCS/ABS con- trol	ТСМ	BRC-315, "Diag- nosis Procedure"	
	ECM	<u>nooio r roccuire</u>	

#### 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]

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## EXCESSIVE OPERATION FREQUENCY

### < SYMPTOM DIAGNOSIS >

## EXCESSIVE OPERATION FREQUENCY

## Description

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

### **Diagnosis** Procedure

I.CHECK BRAKING FORCE
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Check brake force using a brake tester.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check brake system.

2.CHECK FRONT AND REAR AXLE

Check that there is no excessive looseness in front and rear axle.

Front axle: Refer to <u>FAX-6, "Inspection"</u>.
Rear axle: Refer to <u>RAX-5, "Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace malfunctioning components.

 ${
m 3.}$  Check wheel sensor

#### Check wheel sensor.

- Check installation and damage of wheel sensor.
- Check connection of wheel sensor harness connector.
- Check terminal of wheel sensor harness connector.

### Is the inspection result normal?

#### YES >> GO TO 4. NO

- >> Repair installation or replace wheel sensor.
  - Front wheel sensor: Refer to <u>BRC-317, "Removal and Installation Front Wheel Sensor"</u>.
  - Rear wheel sensor: Refer to BRC-319, "Removal and Installation Rear Wheel Sensor".

### **4.**CHECK SENSOR ROTOR

Check that there is no looseness, damage or foreign material on sensor rotor.

Is the inspection result normal?

- YES >> GO TO 5. NO
  - >> Repair installation or replace sensor rotor.
    - · Front sensor rotor: Refer to BRC-321, "Removal and Installation Front Sensor Rotor".
    - Rear sensor rotor: Refer to BRC-321, "Removal and Installation Rear Sensor Rotor".

### 5.CHECK WARNING LAMP TURNS OFF

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

### CAUTION:

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

Is the inspection result normal?

- YES >> Inspection End.
- NO >> Perform self-diagnosis result. Refer to BRC-195, "CONSULT Function".

INFOID:000000012552054

## UNEXPECTED BRAKE PEDAL REACTION

< SYMPTOM DIAGNOSIS >	[TYPE 2]
UNEXPECTED BRAKE PEDAL REACTION	
Description	INFOID:000000012552056
A malfunction of brake pedal feel (height or others) is detected when brake pedal is depressed	
Diagnosis Procedure	INFOID:000000012552057
1.CHECK FRONT AND REAR AXLE	
Check that there is no excessive looseness in front and rear axle.  • Front axle: Refer to <u>FAX-6</u> , "Inspection".  • Rear axle: Refer to <u>RAX-5</u> , "Inspection".  Is the inspection result normal?  YES >> GO TO 2. NO >> Repair or replace malfunctioning components.  2 CHECK DISC ROTOR	
Check disc rotor runout.	
<ul> <li>Front: Refer to <u>BR-16, "DISC ROTOR : Inspection"</u>.</li> <li>Rear: Refer to <u>BR-18, "DISC ROTOR : Inspection"</u>.</li> </ul>	
Is the inspection result normal? YES >> GO TO 3. NO >> Refinish the disc rotor.	
3.CHECK BRAKE FLUID LEAKAGE	
Check fluid leakage. Refer to <u>BR-8, "Inspection"</u> .	
Is the inspection result normal?         YES       >> GO TO 4.         NO       >> Repair or replace malfunctioning components. <b>4</b> _CHECK BRAKE PEDAL	
Check brake pedal. Refer to BR-7, "Inspection".	
Is the inspection result normal?	
YES >> GO TO 5. NO >> Adjust brake pedal. Refer to <u>BR-13. "Adjustment"</u> . <b>5.</b> CHECK BRAKING FORCE	
Check brake force using a brake tester.	
<u>Is the inspection result normal?</u> YES >> GO TO 6. NO >> Check brake system.	
6. CHECK BRAKE PERFORMANCE	
Disconnect ABS actuator and electric unit (control unit) connector so that ABS does not operabrake force is normal in this condition. Connect harness connectors after checking.	ate. Check that
<u>Is the inspection result normal?</u> YES >> Inspection End. NO >> Check brake system.	

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< SYMPTOM DIAGNOSIS >

## THE BRAKING DISTANCE IS LONG

### Description

Brake stopping distance is long when ABS function is operated.

Diagnosis Procedure

### CAUTION:

Brake stopping distance on slippery roads like a rough road, gravel road or snowy road may become longer when ABS is operated than when ABS is not operated.

**1.**CHECK BRAKING FORCE

Check brake force using a brake tester.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check brake system.

2. CHECK BRAKE PERFORMANCE

Disconnect ABS actuator and electric unit (control unit) connector so that ABS does not operate. Check brake stopping distance in this condition. Connect harness connectors after checking.

Is the inspection result normal?

YES >> Inspection End.

NO >> Check brake system.

INFOID:000000012552058

**[TYPE 2]** 

## **ABS FUNCTION DOES NOT OPERATE**

### < SYMPTOM DIAGNOSIS >

## ABS FUNCTION DOES NOT OPERATE

### Description

VDC function, TCS function, ABS function, EBD function, hill start assist function or hill descent control func-

### **Diagnosis** Procedure

### **CAUTION:**

- VDC function, TCS function, ABS function, EBD function, hill start assist function and hill descent control function never operate when the vehicle speed is 10 km/h (6.2 MPH) or less. However, hill start assist function operates when the vehicle speed is 0 km/h (0 MPH) (the vehicle is in stop status).
- VDC function and TCS function never operate when VDC OFF switch is operated (when VDC OFF indicator lamp turns ON).
- Hill descent control function operates when hill descent control switch is operated (when hill descent control system on indicator light turns ON.
- **1.**CHECK ABS WARNING LAMP

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

### **CAUTION:**

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

### Is the inspection result normal?

- YES >> Inspection End.
- NO >> Perform self-diagnosis result. Refer to <u>BRC-195, "CONSULT Function"</u>.

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## **BRAKE PEDAL VIBRATION OR OPERATION SOUND OCCURS**

### < SYMPTOM DIAGNOSIS >

## BRAKE PEDAL VIBRATION OR OPERATION SOUND OCCURS

## Description

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

### CAUTION:

Vibration may be felt during brake pedal is lightly depressed (just placing a foot on it) in the following conditions. This is normal.

- · When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [Approx. 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approx. 10 km/h (6.2 MPH) or higher]

## Diagnosis Procedure

INFOID:000000012552063

**[TYPE 2]** 

INFOID:000000012552062

**1**.SYMPTOM CHECK 1

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

Do vibrations occur?

YES >> GO TO 2.

NO >> Check brake pedal. Refer to <u>BR-7</u>, "Inspection".

2.SYMPTOM CHECK 2

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

Does the operation sound occur?

YES >> GO TO 3.

NO >> Perform self-diagnosis result. Refer to <u>BRC-195, "CONSULT Function"</u>.

**3.**SYMPTOM CHECK 3

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

Does the symptom occur?

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

VEHICLE JERKS DURING VDC/TCS/ABS CONTROL < SYMPTOM DIAGNOSIS > [TYPE 2]
VEHICLE JERKS DURING VDC/TCS/ABS CONTROL
Description
The vehicle jerks when VDC function, TCS function, ABS functionEBD function, hill start assist function or hill descent control function operates.
Diagnosis Procedure
1.снеск сумртом
Check that the vehicle jerks when VDC function, TCS function, ABS function, EBD function, hill start assist function or hill descent control function operates.
YES >> Inspection End. NO >> GO TO 2.
2.PERFORM THE SELF-DIAGNOSIS
With CONSULT Perform self-diagnosis result. Refer to <u>BRC-195, "CONSULT Function"</u> .
YES >> Check the DTC. Refer to <u>BRC-206, "DTC Index"</u> . NO >> GO TO 3.
3. CHECK CONNECTOR
<ul> <li>With CONSULT</li> <li>Turn the ignition switch OFF.</li> <li>Disconnect ABS actuator and electric unit (control unit) harness connector.</li> <li>Check connector terminal for deformation, disconnection and looseness.</li> <li>Connect harness connector and perform self-diagnosis result. Refer to <u>BRC-195, "CONSULT Function"</u>.</li> </ul>
YES >> GO TO 4. NO >> Repair or replace connector terminal.
Perform self-diagnosis result for "ENGINE" and "TRANSMISSION".
Is any DTC detected?
NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-322, "Removal and Installa-</u> tion".

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### < SYMPTOM DIAGNOSIS >

## NORMAL OPERATING CONDITION

## Description

INFOID:000000012552066

[TYPE 2]

Symptom	Result	
Brake pedal slightly vibrates and operation sound (motor sound and sound from suspen- sion) occurs when VDC function, TCS function, ABS function, EBD function, hill start assist function or hill descent control function operates.	This is not a malfunction, because it is caused by VDC function, TCS function, ABS function, EBD function, hill start as- sist function or hill descent control func- tion function that are normally operated.	
Brake stopping distance may become longer than models without ABS function depending on the road conditions, when ABS function is operated on slippery road like rough road, gravel road or snowy road.		
Brake pedal vibrates and operation sound occurs during sudden acceleration and corner- ing, when VDC function or TCS function is operated.		
Brake pedal vibrates and motor sound from the engine room occurs when the engine starts or the vehicle starts just after starting the engine.	This is not a malfunction because it is caused by operation check of ABS actuator and electric unit (control unit).	
Acceleration may be felt insufficient depending on the road conditions.	This is not a malfunction because it is caused by TCS function that puts the highest priority to obtain the optimum traction (stability).	
TCS function may operate momentarily while driving on a road where friction coefficient varies or when downshifting or fully depressing accelerator pedal.		
ABS warning lamp and VDC warning lamp may turn ON when the vehicle is on a rotating turntable or is given a strong shaking or large vibrations on a ship while the engine is running.	In this case, restart the engine on a nor- mal road. If the normal condition is re- stored, there is no malfunction. In that case, erase "ABS" self-diagnosis result memory with CONSULT.	
VDC warning lamp may turn ON and VDC function and TCS function may not normally operate, when driving on a special road the is extremely slanted (bank in a circuit course).		
A malfunction in yaw rate/side/decel G sensor system may be detected when the vehicle sharply turns during a spin turn, acceleration turn or drift driving while VDC function and TCS function are OFF (VDC OFF switch is pressed and VDC OFF indicator lamp is in ON status).		
The vehicle speed does not increase when the accelerator pedal is depressed while the vehicle is on a 2-wheel chassis dynamometer for speedometer check.	This is normal. (When checking the vehi- cle on a chassis dynamometer, operate VDC OFF switch so that TCS function is OFF.)	

## UNIT REMOVAL AND INSTALLATION WHEEL SENSOR

## Exploded View - Front Wheel Sensor

INFOID:000000012552067 В

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## Removal and Installation - Front Wheel Sensor

### **CAUTION:**

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

### REMOVAL

- Remove the front wheel and tire using power tool. Refer to WT-59, "Adjustment".
- Partially remove the fender protector to gain access to the wheel sensor harness connector.
- Disconnect the front wheel sensor harness connector.
- 4. Remove the front wheel sensor bolt.
- Remove the front wheel sensor from the strut bracket and body brackets. 5.
- Remove the front wheel sensor from the steering knuckle. 6.

### INSTALLATION

INFOID:000000012552068

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< UNIT REMOVAL AND INSTALLATION >

Installation is in the reverse order of removal. **CAUTION:** 

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



Exploded View - Rear Wheel Sensor

INFOID:000000012552069



1. Rear wheel sensor

C. Rear wheel sensor connector

A. Rear wheel sensor bracket
 <□ Front</li>

## WHEEL SENSOR

### < UNIT REMOVAL AND INSTALLATION >

### **[TYPE 2]**



### REMOVAL

- 1. Remove the rear wheel and tire using power tool. Refer to WT-59. "Adjustment".
- 2. Remove the rear wheel sensor bolt.
- 3. Disconnect the rear wheel sensor harness connector.
- 4. Remove the rear wheel sensor from the sensor brackets.
- 5. Remove the rear wheel sensor from the rear knuckle.

#### INSTALLATION

Installation is in the reverse order of removal. **CAUTION:** 

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## < UNIT REMOVAL AND INSTALLATION >

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



# SENSOR ROTOR < UNIT REMOVAL AND INSTALLATION >

## SENSOR ROTOR

Removal and Installation - Front Sensor Rotor

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

Removal and Installation - Rear Sensor Rotor

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

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INFOID:000000012552071

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< UNIT REMOVAL AND INSTALLATION >

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:000000012552073

**[TYPE 2]** 



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

E. To front LH brake caliper

Removal and Installation

F. From master cylinder primary side <>> Front

INFOID:000000012552074

## REMOVAL

### **CAUTION:**

• To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged.

### • Do not remove actuator by holding harness.

### NOTE:

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

- Disconnect negative battery terminal. Refer to <u>PG-93</u>, "Exploded View".
- Remove cowl top. Refer to <u>EXT-25, "Removal and Installation"</u>.
- Disconnect the harness connector from the ABS actuator and electric unit (control unit).
- 4. Separate brake tubes from ABS actuator and electric unit (control unit). Refer to BR-22, "FRONT : Exploded View".
- 5. Remove ABS actuator and electric unit (control unit) bracket bolts.
- 6. Remove ABS actuator and electric unit (control unit) from vehicle.

### INSTALLATION

## **BRC-322**

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

## < UNIT REMOVAL AND INSTALLATION >

<ul> <li>Installation is in the reverse order of removal.</li> <li>After work is completed, bleed air from brake tube. Refer to <u>BR-14, "Bleeding Brake System"</u>.</li> <li>Adjust the neutral position of steering angle sensor. Refer to <u>BRC-221, "Description"</u>.</li> <li>Perform calibration of the yaw rate/side/decel G sensor: Refer to <u>BRC-223, "Description"</u>.</li> </ul>	
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CAUTION.	В
<ul> <li>To install, use flare nut crowfoot and forque wrench.</li> <li>Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.</li> <li>Do not install actuator by holding harness.</li> </ul>	
• After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.	С
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## < UNIT REMOVAL AND INSTALLATION >

## YAW RATE/SIDE/DECEL G SENSOR

## **Exploded View**

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## Removal and Installation

## REMOVAL

- 1. Remove the side stay cover from the center console assembly. Refer to <u>IP-27, "Exploded View"</u>.
- 2. Disconnect the harness connector from the yaw rate/side/decel G sensor.
- 3. Remove the yaw rate/side/decel G sensor nuts.
- 4. Remove yaw rate/side/decel G sensor.

### INSTALLATION

Installation is in the reverse order of removal.

- Perform calibration of the yaw rate/side/decel G sensor. Refer to BRC-223, "Description".
- CAUTION:
- Do not use power tools on the yaw rate/side/decel G sensor because it is sensitive to the impact.
- Replace the yaw rate/side/decel G sensor if it has been dropped or sustained impact.
## **STEERING ANGLE SENSOR**

< UNIT REMOVAL AND INSTALLATION > [TYPE 2]	
STEERING ANGLE SENSOR	^
Removal and Installation	A
To remove and install the steering angle sensor, remove and install spiral cable. Refer to <u>SR-15, "Removal</u> and Installation".	В
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## < UNIT REMOVAL AND INSTALLATION >

# VDC OFF SWITCH

### Removal and Installation

#### REMOVAL

- 1. Remove instrument lower panel LH. Refer to IP-15, "Removal and Installation".
- 2. Disconnect harness connector from VDC OFF switch.
- 3. Remove screws (A), then remove switch carrier lower and switch carrier upper from instrument lower panel LH.

4. Using suitable tool, release pawls and remove VDC OFF switch.

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INSTALLATION Installation is in the reverse order of removal.

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## HILL DESCENT CONTROL SWITCH

## < UNIT REMOVAL AND INSTALLATION >

# HILL DESCENT CONTROL SWITCH

### Removal and Installation

The hill descent control switch is integral part of the 4WD shift switch, to remove and install the hill descent control switch. Refer to <u>DLN-102</u>, "<u>Removal and Installation</u>".

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**[TYPE 2]** 

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