SECTION BRAKE CONTROL SYSTEM

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PRECAUTIONS

< PRECAUTION > PRECAUTION 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 "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

WARNING:

Always observe the following items for preventing accidental activation.

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

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

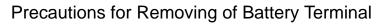
WARNING:

Always observe the following items for preventing accidental activation.

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

Precaution for Procedure without Cowl Top Cover

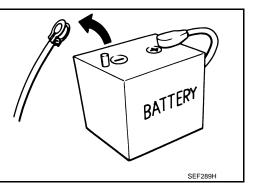
When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.



 When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
 NOTE:

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

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



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

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

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

Precaution for Brake System

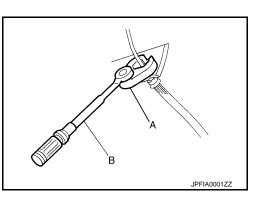
WARNING:

Since dust covering the front and rear brakes has an affect on human body, the dust must be removed with a dust collector. Never splatter the dust with an air blow gun.

- Brake fluid use refer to <u>MA-15</u>, "FOR NORTH AMERICA : Fluids and Lubricants" (for North America), <u>MA-16</u>, "FOR MEXICO : Fluids and Lubricants" (for Mexico).
- Never reuse drained brake fluid.
- Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Always confirm the specified tightening torque when installing the brake pipes.
- After pressing the brake pedal more deeply or harder than normal driving, such as air bleeding, check each item of brake pedal. Adjust brake pedal if it is outside the standard value.
- Never use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- 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.

Precaution for Brake Control System

- 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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- Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC function, TCS function, ABS function, EBD function, hill start assist function or brake limited slip differential (BLSD) function
- operates. This is not a malfunction because it is caused by VDC function, TCS function, ABS function, EBD function, EBD function, hill start assist function or brake limited slip differential (BLSD) function that is normally operated.
- When starting engine or when starting vehicle just after starting engine, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- Brake stopping distance may become longer than models without ABS function depending on the road conditions, when ABS function is operated on slippery road like rough road, gravel road or snowy road.
- When a malfunction is indicated, always collect information from the customer about conditions of occurrence, estimate cause and perform operation. Check brake booster operation, brake fluid level and brake fluid leakage, as well as electrical system.
- The optimum performance is achieved by control for VDC function, TCS function, ABS function, EBD function, hill start assist function or brake limited slip differential (BLSD) function when all of brakes, suspensions and tires installed on the vehicle are the specified size and parts. Brake performance and controllability may be negatively affected when other parts than the specified are installed.
- Brake stopping distance may become longer and steering stability may be negatively affected, when tires in different size and combination or other parts than the specified are used.
- When a radio (including wiring), antenna and antenna lead line are located near ABS actuator and electric unit (control unit), a malfunction or improper operation may occur for the control of VDC function, TCS function, ABS function, EBD function, hill start assist function or brake limited slip differential (BLSD) function.
- When the following items are replaced by other parts than genuine parts or modified, ABS warning lamp, brake warning lamp and VDC warning lamp may turn ON, and the control may not operate normally for VDC function, TCS function, ABS function, EBD function, hill start assist function or brake limited slip differential (BLSD) function.
- Suspension component parts (shock absorber, spring, bushing and others)

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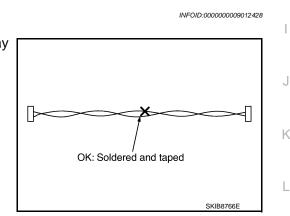
PRECAUTIONS

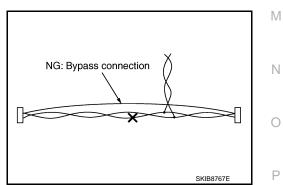
< PRECAUTION >

- Tire and wheel (other than the specified size)
- Brake component parts (brake pad, disc rotor, brake caliper and others)
- Engine component parts (ECM, muffler and others)
- Body reinforcement component parts (rollover bar, tower bar and others)
- When suspension, tire and brake component parts are excessively worn or deteriorated and the vehicle is driven, ABS warning lamp, brake warning lamp and VDC warning lamp may turn ON, and the control may not operate normally for VDC function, TCS function, ABS function, EBD function, hill start assist function or brake limited slip differential (BLSD) function.
- ABS warning lamp, brake warning lamp and VDC warning lamp may turn ON, when only front wheel or rear wheel is rotated using a free roller. This is not a malfunction, because it is caused by wheel speed difference between wheel that is rotated and wheel that is not rotated. In this case, perform self-diagnosis, check self-diagnosis results, and erase memory.
- When power supply voltage is not normal, ABS warning lamp, brake warning lamp and VDC warning lamp turn ON. ABS actuator and electric unit (control unit) stops control for VDC function, TCS function, ABS function, EBD function, hill start assist function or brake limited slip differential (BLSD) function. Ordinary brake operates. After power supply returns to normal, ABS warning lamp, brake warning lamp and VDC warning lamp turn OFF. The control becomes operative for VDC function, TCS function, ABS function, hill start assist function or brake limited slip differential (BLSD) function.
- VDC warning lamp may turn ON and VDC function or TCS function may not normally operate, when driving on a special road the is extremely slanted (bank in a circuit course). This is not a malfunction if the status returns to normal for VDC function or TCS function after the engine is started again. In this case, perform self-diagnosis, check self-diagnosis results, and erase memory.
- A malfunction in yaw rate/side/decel G sensor system may be detected when the vehicle sharply turns during a spin turn, acceleration turn or drift driving while VDC function or TCS function are OFF (VDC OFF switch is pressed and VDC OFF indicator lamp is in ON status). This is not a malfunction if the status returns to normal for VDC function or TCS function after the engine is started again. In this case, perform self-diagnosis, check self-diagnosis results, and erase memory

Precaution for Harness Repair

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





• Never bypass the repair point with wire. (If it is bypassed, the turnout point cannot be separated and the twisted wire characteristics are lost.) А

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PREPARATION

Commercial Service Tools

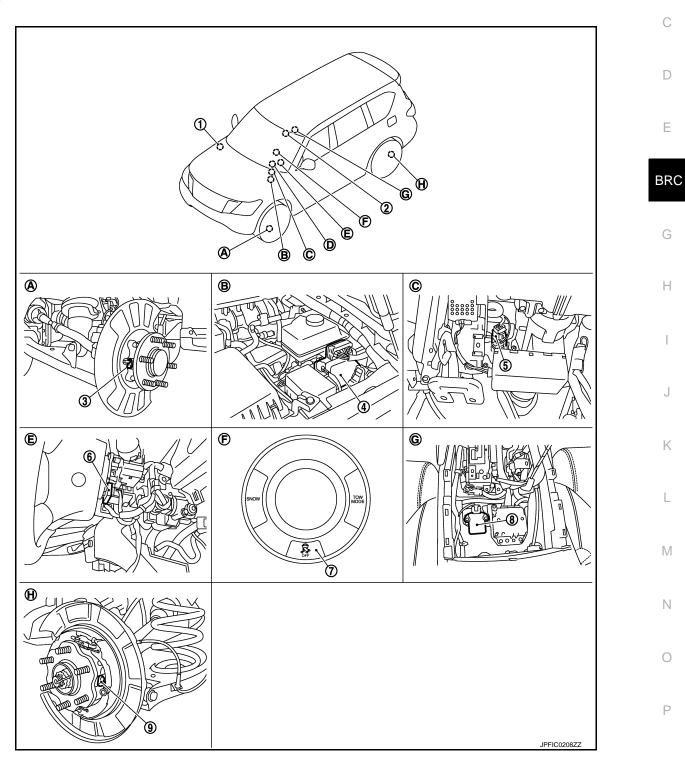
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Tool name		Description
Power tool	PBIC0190E	Loosening bolts and nuts

< SYSTEM DESCRIPTION >

SYSTEM DESCRIPTION COMPONENT PARTS

2WD



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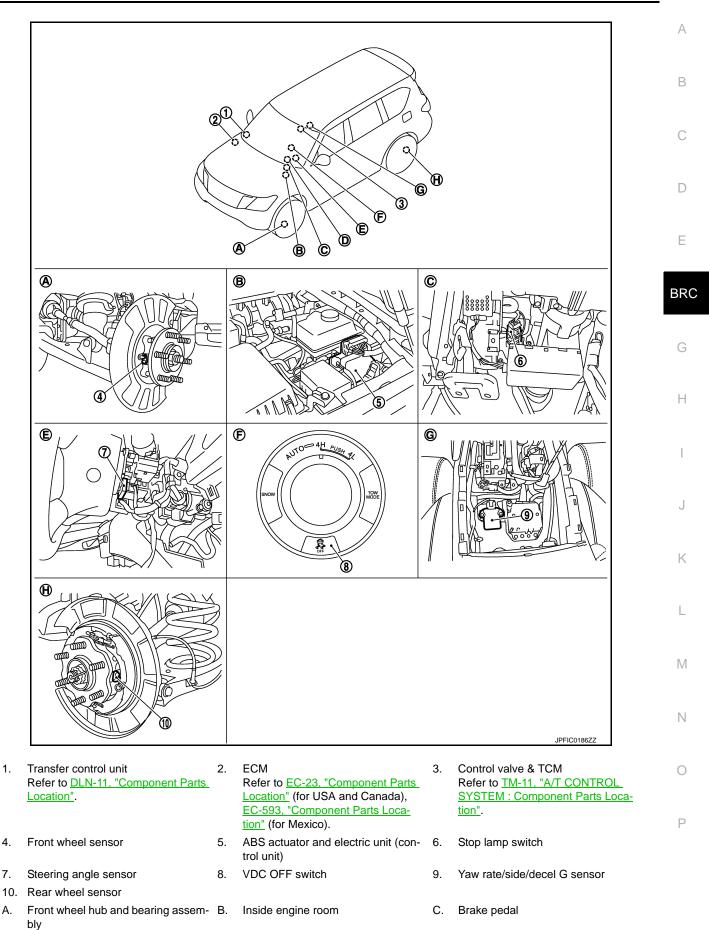
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< SYSTEM DESCRIPTION >

1.	ECM Refer to EC-23, "Component Parts Location".	2.	Control valve & TCM Refer to <u>TM-11, "A/T CONTROL</u> <u>SYSTEM : Component Parts Loca-</u> tion".	3.	Front wheel sensor
4.	ABS actuator and electric unit (con- trol unit)	5.	Stop lamp switch	6.	Steering angle sensor
7.	VDC OFF switch	8.	Yaw rate/side/decel G sensor	9.	Rear wheel sensor
Α.	Front wheel hub and bearing assembly	В.	Inside engine room	C.	Brake pedal
D.	ABS warning lamp, brake warning lamp, VDC warning lamp, VDC OFF indicator lamp	E.	Back of spiral cable assembly	F.	Center console assembly
G.	Under center console assembly	H.	Rear wheel hub and bearing assembly		

< SYSTEM DESCRIPTION >

[WITH VDC]



< SYSTEM DESCRIPTION >

Component Description

E. Back of spiral cable assembly

F. Center console assembly

- D. ABS warning lamp, brake warning lamp, VDC warning lamp, VDC OFF indicator lamp
- G. Under center console assembly
- H. Rear wheel hub and bearing assembly

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Cor	nponent	Reference/Function			
	Motor/accumulator assembly				
	Motor relay				
	Actuator relay (main relay)				
	ABS IN valve				
	ABS OUT valve				
ABS actuator and electric unit (control unit)	Cut valve 1	BRC-13. "ABS Actuator and Electric Unit (Control Unit)"			
	Cut valve 2				
	Suction valve 1				
	Suction valve 2				
	Control pressure sensor ^{*1}				
	Accumulator pressure sensor				
	Master cylinder pressure sensor				
Wheel sensor	-	BRC-13. "Wheel Sensor and Sensor Rotor"			
Stop lamp switch		BRC-14, "Stop Lamp Switch"			
Steering angle sensor		BRC-14, "Steering Angle Sensor"			
Yaw rate/side/decel G sensor		BRC-14, "Yaw Rate/Side/Decel G 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		 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Accelerator pedal position signal Engine speed signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. Target throttle position signal 			
ТСМ		Mainly transmits the following signals to ABS actuator and ele tric unit (control unit) via CAN communication. • Shift position signal • Current gear position signal			
Transfer control unit ^{*2}		Mainly transmits the following signals to ABS actuator and elec tric unit (control unit) via CAN communication. • Current 4WD mode signal			
ABS warning lamp					
Brake warning lamp		BRC-15, "System Description"			
VDC warning lamp		1			
VDC OFF indicator lamp		1			

*1: Models with Advanced Driver Assistance System

*2: Models with 4WD system

[WITH VDC]

ABS Actuator and Electric Unit (Control Unit)	Λ
Electric unit (control unit) is integrated with actuator and motor/accumulator assembly and comprehensively controls VDC function, TCS function, ABS function, EBD function, hill start assist function or brake limited slip differential function.	A
 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. 	С
ACTUATOR The following components are integrated with ABS actuator.	
Motor/accumulator Assembly	D
Pump • Operates the pump drive according to signals from ABS actuator and electric unit (control unit) by the motor.	E
Motor Operates the motor drive according to signals from ABS actuator and electric unit (control unit). 	BRO
Accumulator The accumulator accumulates brake fluid conveyed by the motor and pump. 	
Motor Relay Operates the motor ON/OFF according to signals from ABS actuator and electric unit (control unit).	G
Actuator Relay (Main Relay) Operates each valve ON/OFF according to signals from ABS actuator and electric unit (control unit).	Н
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).	I
Cut Valve 1, Cut Valve 2 Shuts off the ordinary brake line from master cylinder to signals from ABS actuator and electric unit (control unit).	J
Suction Valve 1 Suction Valve 1 switches the brake path to convey accumulator pressure to the front system, according to a signal transmitted from the ABS actuator and electric unit (control unit).	K
Suction Valve 2 Suction valve 2 releases accumulator pressure, according to a signal transmitted from the ABS actuator and electric unit (control unit).	L
Control Pressure Sensor (models with Advanced Driver Assistance System) Detects the brake fluid pressure of brake caliper side and transmits a signal to ABS actuator and electric unit (control unit).	M
Accumulator Pressure Sensor The accumulator pressure sensor detects brake fluid pressure accumulated in the accumulator and conveys the detected result to the ABS actuator and electric unit (control unit).	Ν
Master cylinder Pressure Sensor Detects the brake fluid pressure of master cylinder part and transmits a signal to ABS actuator and electric unit (control unit).	0
Wheel Sensor and Sensor Rotor	_
NOTE:	Ρ

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.

< SYSTEM DESCRIPTION >

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

Stop Lamp Switch

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)

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.

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

- VDC OFF switch is integrated in SNOW MODE / TOW MODE / VDC OFF switch assembly (2WD models) or 4WD switch assembly (4WD models).
- The operation of the VDC OFF switch enables the arbitrary switching of the VDC function between stop status and standby status. The status of the function is indicated by the VDC OFF indicator lamp. (ON: Nonoperational 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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Revision: 2013 September

PUNENT PARTS

Line of magnetic force Sensor rotor N Sensor Amplifier circuit Sensor Amplifier circuit

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[WITH VDC]

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SYSTEM

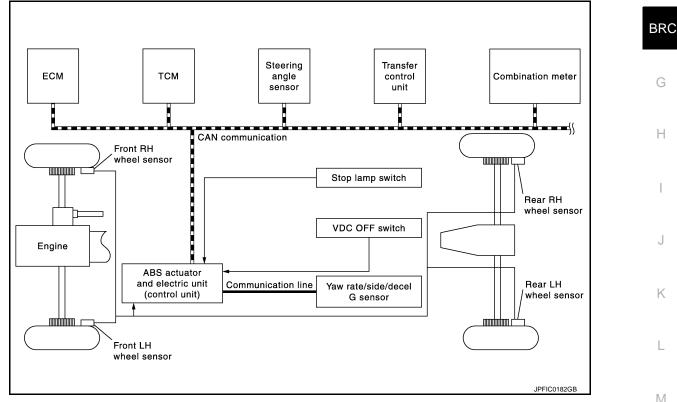
System Description

- 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 brake limited slip differential (BLSD) function
- Fail-safe function is available for each function and is activated by each function when system malfunction occurs.
- The adoption of the 4WD switch assembly (4WD shift switch and VDC OFF switch) enables to change the control characteristics of the VDC function, the TCS function and the brake limited slip differential (BLSD) function into an optimal characteristics, based on a state of the 4WD shift switch. (Models with 4WD system)

SYSTEM DIAGRAM

NOTE:

Transfer control unit is applied to models with 4WD system.



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

Component	Signal description	Г
Yaw rate/side/decel G sensor	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line^{*1}. Yaw rate signal Side G sensor signal Decel G sensor signal 	C
ECM	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Accelerator pedal position signal Engine speed signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. Target throttle position signal 	F

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Component	Signal description
ТСМ	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Shift position signal Current gear position signal
Transfer control unit ^{*2}	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Current 4WD mode signal
Steering angle sensor	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Steering angle sensor signal
Combination meter	 Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. ABS warning lamp signal Brake warning lamp signal VDC warning lamp signal VDC OFF indicator lamp

*1: Communication line between yaw rate/side/decal G sensor and ABS actuator and electric unit (control unit) *2: Models with 4WD system

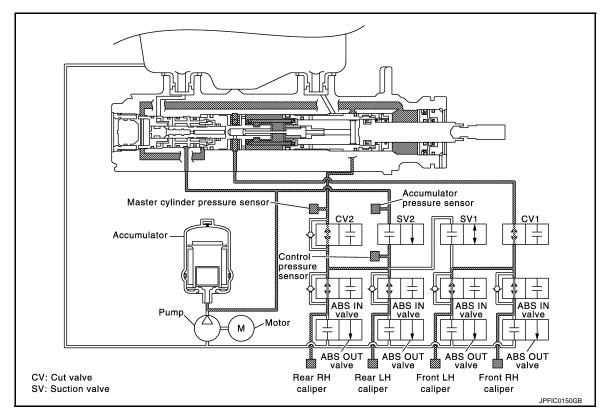
VALVE OPERATION

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

When Ordinary Brake is Applied

NOTE:

Control pressure sensor is applied to models with Advanced Driver Assistance System.



Name	Not activated	When depressing brake pedal Power supply is not supplied (open)	
Cut valve 1	Power supply is not supplied (open)		
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)	
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)	
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)	

< SYSTEM DESCRIPTION >

Name	Not activated	When depressing brake pedal	•
ABS IN valve	Power supply is not supplied (open)	Power supply is not supplied (open)	- A
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)	_
Each caliper (fluid pressure)	_	Pressure increases	В

Front RH caliper

• Pressurized brake fluid from accumulator is supplied to front RH caliper through master cylinder part, cut valve 1 and ABS IN valve.

Front LH caliper

 Pressurized brake fluid from accumulator is supplied to front LH caliper through master cylinder part, cut valve 1 and ABS IN valve.

Rear RH caliper

 Pressurized brake fluid from accumulator is supplied to rear RH caliper through master cylinder part, cut valve 2 and ABS IN valve.

Rear LH caliper

 Pressurized brake fluid from accumulator is supplied to rear LH caliper through master cylinder part, cut valve 2 and ABS IN valve.

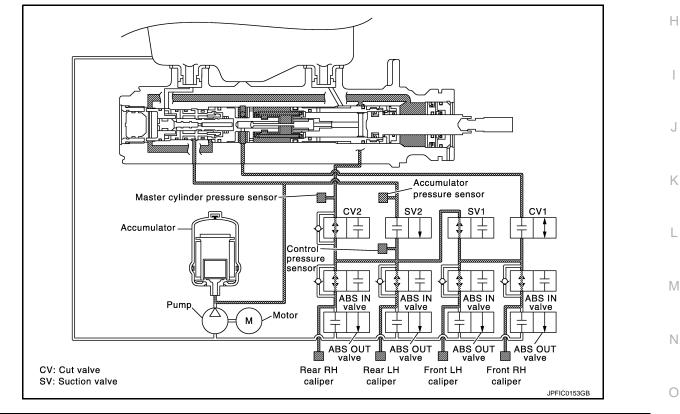
ABS is Operation (When Pressure Increases)

NOTE:

Control pressure sensor is applied to models with Advanced Driver Assistance System.

G

[WITH VDC]



Name	Not activated	When Pressure Increases	
Cut valve 1	Power supply is not supplied (open)	Power supply is supplied (close)	Ρ
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)	
Suction valve 1	Power supply is not supplied (close)	Power supply is supplied (open)	
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)	
ABS IN valve	Power supply is not supplied (open)	Power supply is not supplied (open)	

< SYSTEM DESCRIPTION >

Name	Not activated	When Pressure Increases	
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)	
Each caliper (fluid pressure)	<u> </u>	Pressure increases	

Front RH caliper

• Pressurized brake fluid from accumulator is supplied to front RH caliper through master cylinder part, cut valve 2, suction valve 1 and ABS IN valve.

Front LH caliper

• Pressurized brake fluid from accumulator is supplied to front LH caliper through master cylinder part, cut valve 2, suction valve 1 and ABS IN valve.

Rear RH caliper

 Pressurized brake fluid from accumulator is supplied to rear RH caliper through master cylinder part, cut valve 2 and ABS IN valve.

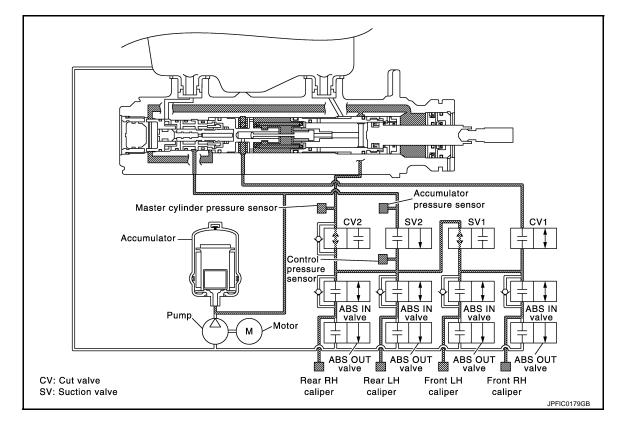
Rear LH caliper

• Pressurized brake fluid from accumulator is supplied to rear LH caliper through master cylinder part, cut valve 2 and ABS IN valve.

ABS is Operation (When Pressure Holds)

NOTE:

Control pressure sensor is applied to models with Advanced Driver Assistance System.



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

Revision: 2013 September

< SYSTEM DESCRIPTION >

А

В

D

Front RH caliper

ABS IN valve is close, fluid pressure of front RH caliper is holds.

Front LH caliper

ABS IN valve is close, fluid pressure of front LH caliper is holds.

Rear RH caliper

ABS IN valve is close and fluid pressure of rear RH caliper is holds.

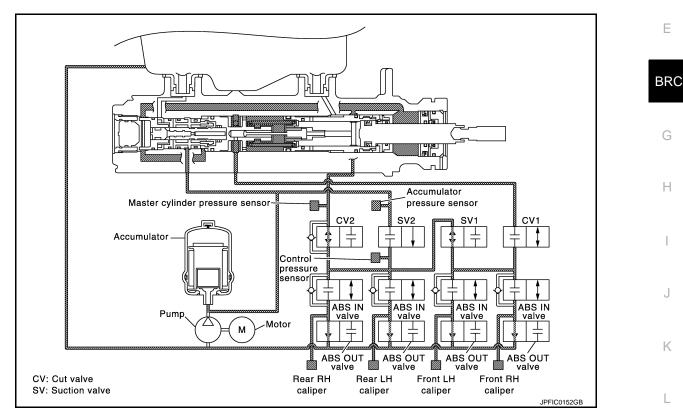
Rear LH caliper

ABS IN valve is close and fluid pressure of rear LH caliper is holds.

ABS is Operation (When Pressure Decreases)

NOTE:

Control pressure sensor is applied to models with Advanced Driver Assistance System.



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

Front RH caliper

• Being returned to reservoir tank through ABS OUT valve, fluid pressure of front RH caliper is decreased.

Front LH caliper

• Being returned to reservoir tank through ABS OUT valve, fluid pressure of front LH caliper is decreased.

Rear RH caliper

• Being returned to reservoir tank through ABS OUT valve, fluid pressure of rear RH caliper is decreased.

Rear LH caliper

Ρ

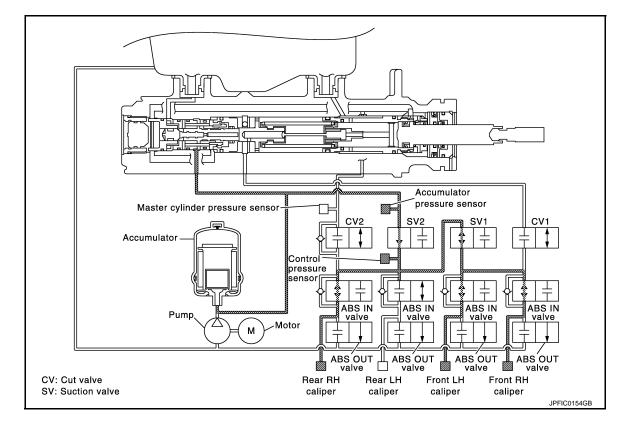
< SYSTEM DESCRIPTION >

• Being returned to reservoir tank through ABS OUT valve, fluid pressure of rear LH caliper is decreased.

VDC is Operation (When Pressure Increases)

NOTE:

Control pressure sensor is applied to models with Advanced Driver Assistance System. Example: When other than rear LH wheel is operation in the figure.



Name	Not activated	When Pressure Increases	
Cut valve 1	Power supply is not supplied (open)	Power supply is supplied (close)	
Cut valve 2	Power supply is not supplied (open)	Power supply is supplied (close)	
Suction valve 1	Power supply is not supplied (close)	Power supply is supplied (open)	
Suction valve 2	Power supply is not supplied (close)	Power supply is supplied (open)	
ABS IN valve	Power supply is not supplied (open)	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 (only wheel that the pressure is to be increased)	

Front RH caliper

 Pressurized brake fluid from accumulator is supplied to front RH caliper through suction valve 2, suction valve 1 and ABS IN valve. When not increases, ABS IN valve is closed and brakes fluid is not supplied to front RH caliper.

Front LH caliper

 Pressurized brake fluid from accumulator is supplied to front LH caliper through suction valve 2, suction valve 1 and ABS IN valve. When not increases, ABS IN valve is closed and brakes fluid is not supplied to front LH caliper.

Rear RH caliper

< SYSTEM DESCRIPTION >

[WITH VDC]

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В

• Pressurized brake fluid from accumulator is supplied to rear RH caliper through suction valve 2 and ABS IN valve. When not increases, ABS IN valve is closed and brakes fluid is not supplied to rear RH caliper.

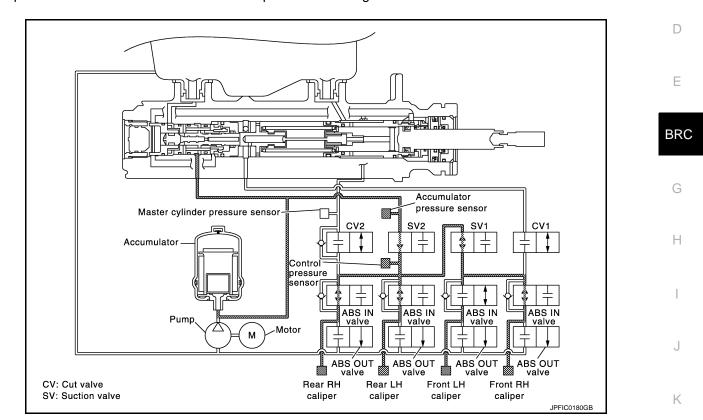
Rear LH caliper

 Pressurized brake fluid from accumulator is supplied to rear LH caliper through suction valve 2 and ABS IN valve. When not increases, ABS IN valve is closed and brakes fluid is not supplied to rear LH caliper.

VDC is Operation (When Pressure Holds)

NOTE:

Control pressure sensor is applied to models with Advanced Driver Assistance System. Example: When other than front LH wheel is operation in the figure.



Name	Not activated When Pressure holds	
Cut valve 1	Power supply is not supplied (open)	Power supply is supplied (close)
Cut valve 2	Power supply is not supplied (open)	Power supply is supplied (close)
Suction valve 1	Power supply is not supplied (close)	Power supply is supplied (open)
Suction valve 2	Power supply is not supplied (close)	Power supply is supplied (open)
ABS IN valve	Power supply is not supplied (open)	Only wheel that the pressure is to be holds: Power supply is supplied (close) Wheel other than the one that the pressure is to be holds: 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 holds (only wheel that the pres- sure is to be holds)

Front RH caliper

• ABS IN valve is close, fluid pressure of front RH caliper is holds.

Front LH caliper

• ABS IN valve is close, fluid pressure of front LH caliper is holds.

Rear RH caliper

• ABS IN valve is close, fluid pressure of rear RH caliper is holds.

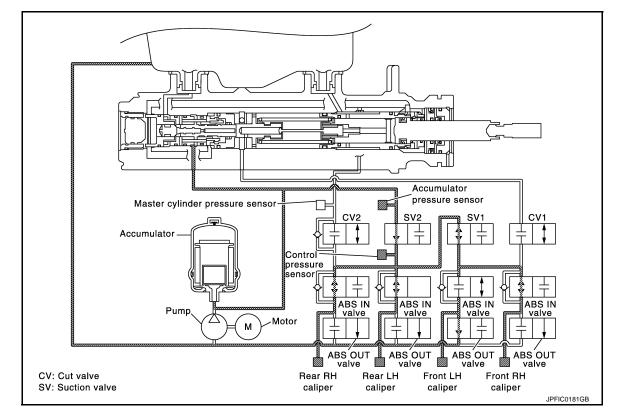
Rear LH caliper

• ABS IN valve is close, fluid pressure of rear LH caliper is holds.

VDC is Operation (When Pressure Decreases)

NOTE:

Control pressure sensor is applied to models with Advanced Driver Assistance System. Example: When other than front LH wheel is operation in the figure.



Name	Not activated	Not activated When pressure decreases	
Cut valve 1	Power supply is not supplied (open)	Power supply is supplied (close)	
Cut valve 2	Power supply is not supplied (open)	Power supply is supplied (close)	
Suction valve 1	Power supply is not supplied (close)	Power supply is supplied (open)	
Suction valve 2	Power supply is not supplied (close)	Power supply is supplied (open)	
ABS IN valve	Power supply is not supplied (open)	Only wheel that the pressure is to be de- creases: Power supply is supplied (close) Wheel other than the one that the pressure is to be decreases: Power supply is not supplied (open)	
ABS OUT valve	Power supply is not supplied (close)	Only wheel that the pressure is to be de- creases: Power supply is supplied (open) Wheel other than the one that the pressure is to be decreases: Power supply is not supplied (close)	
Each caliper (fluid pressure)	_	Pressure decreases (only wheel that the pressure is to be decreases)	

Front RH caliper

• Being returned to reservoir tank through ABS OUT valve, fluid pressure of front RH caliper is decreased.

Front LH caliper

• Being returned to reservoir tank through ABS OUT valve, fluid pressure of front LH caliper is decreased.

Rear RH caliper

• Being returned to reservoir tank through ABS OUT valve, fluid pressure of rear RH caliper is decreased.

< SYSTEM DESCRIPTION >

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Rear LH caliper

• Being returned to reservoir tank through ABS OUT valve, fluid pressure of rear LH caliper is decreased.

Component Parts and Function

Component	Function
Pump	Operates the pump drive according to signals from ABS actuator and electric unit (control unit) by the motor.
Motor	Operates the motor drive according to signals from ABS actuator and electric unit (control unit).
Accumulator	The accumulator accumulates brake fluid conveyed by the motor and pump.
ABS IN valve	Increases, holds or decreases the fluid pressure of each caliper according to signals from ABS ac- tuator and electric unit (control unit).
ABS OUT valve	Increases, holds or decreases the fluid pressure of each caliper according to signals from ABS ac- tuator and electric unit (control unit).
Cut valve 1 Cut valve 2	Shuts off the ordinary brake line from master cylinder to signals from ABS actuator and electric unit (control unit).
Suction valve 1	Suction Valve 1 switches the brake line to convey accumulator pressure to the front system, accord- ing to a signal transmitted from the ABS actuator and electric unit (control unit).
Suction valve 2	Suction valve 2 releases accumulator pressure, according to a signal transmitted from the ABS ac- tuator and electric unit (control unit).
Control pressure sensor*	Detects the brake fluid pressure of rear brake caliper and transmits a signal to ABS actuator and electric unit (control unit).
Accumulator pressure sensor	The accumulator pressure sensor detects brake fluid pressure accumulated in the accumulator and conveys the detected result to the ABS actuator and electric unit (control unit).
Master cylinder pressure sensor	Detects the brake fluid pressure of master cylinder part and transmits a signal to ABS actuator and electric unit (control unit).

*: Models with Advanced Driver Assistance System

CONDITION FOR TURN ON THE WARNING LAMP

ABS Warning Lamp

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

ABS warning lamp	
OFF	
ON	
OFF	Ν
ON	
ON	
	OFF ON OFF ON

Brake Warning Lamp

- Turns ON at the same time as ABS warning lamp and VDC warning lamp when EBD function, motor/accumulator assembly or motor system is malfunctioning.
- Turns ON when ignition switch turns ON and turns OFF when the system is normal, for bulb check purposes. $^{\circ\circ}$

Condition (status)	Brake warning lamp	
Ignition switch OFF	OFF	
For approx. 1 seconds after the ignition switch is turned ON	ON	
Approx. 1 seconds after ignition switch is turned ON (when the system is in normal operation)	OFF	
After engine starts	OFF	
When parking brake operates (parking brake switch ON)	ON	

< SYSTEM DESCRIPTION >

Condition (status)	Brake warning lamp	
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	
Accumulator is low pressure	ON	
Motor system is malfunctioning	ON	
Ignition power supply system is malfunctioning	ON	

VDC Warning Lamp

 Turns ON when either VDC function, TCS function, ABS function or EBD function, hill start assist function or brake limited slip differential (BLSD) function is malfunctioning.

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

Condition (status)	VDC warning lamp	
Ignition switch OFF	OFF	
For approx. 1 seconds after the ignition switch is turned ON	ON	
Approx. 1 seconds after ignition switch is turned ON (when the system is in normal operation)	OFF	
VDC function is malfunctioning	ON	
TCS function is malfunctioning	ON	
ABS function is malfunctioning	ON	
EBD function is malfunctioning	ON	
hill start assist function is malfunctioning	ON	
Brake limited slip differential (BLSD) function is malfunctioning	ON	
VDC function is operating	Blinking	
TCS function is operating	Blinking	

CONDITION FOR TURN ON THE INDICATOR LAMP

VDC OFF Indicator Lamp

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

Condition (status)	VDC OFF indicator lamp
Ignition switch OFF	OFF
For approx. 1 seconds after the ignition switch is turned ON	ON
Approx. 1 seconds after ignition switch is turned ON (when the system is in normal operation)	OFF
When VDC OFF switch is ON (VDC function and TCS function are OFF)	ON
4WD mode: 4L*	ON

*: Models with 4WD system

Fail-safe

INFOID:000000009012441

VDC FUNCTION, TCS FUNCTION, hill start assist FUNCTION AND BRAKE LIMITED SLIP DIFFER-ENTIAL (BLSD) FUNCTION

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

BRC-24

[WITH VDC]

С

ABS FUNCTION

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

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

EBD FUNCTION

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

DTC	Malfunction detected condition	Fail-safe condition	
C1101	When an open circuit is detected in rear RH wheel sensor circuit.		BI
C1102	When an open circuit is detected in rear LH wheel sensor circuit.		
C1103	When an open circuit is detected in front RH wheel sensor circuit.		
C1104	When an open circuit is detected in front LH wheel sensor circuit.		(
C1105	 When power supply voltage of rear RH wheel sensor is low. When distance between rear RH wheel sensor and rear RH wheel sensor rotor is large. When installation of rear RH wheel sensor or rear RH wheel sensor rotor is not normal. 	The following functions are sus- pended. • VDC function	ŀ
C1106	 When power supply voltage of rear LH wheel sensor is low. When distance between rear LH wheel sensor and rear LH wheel sensor rotor is large. When installation of rear LH wheel sensor or rear LH wheel sensor rotor is not normal. 	 VDC function TCS function ABS function EBD function (only when both 2 rear wheels are malfunctioning) hill start assist function 	
C1107	 When power supply voltage of front RH wheel sensor is low. When distance between front RH wheel sensor and front RH wheel sensor rotor is large. When installation of front RH wheel sensor or front RH wheel sensor rotor is not normal. 	 Brake limited slip differential (BLSD) function 	ŀ
C1108	 When power supply voltage of front LH wheel sensor is low. When distance between front LH wheel sensor and front LH wheel sensor rotor is large. When installation of front LH wheel sensor or front LH wheel sensor rotor is not normal. 		
C1109	When ignition voltage is 10 V or less.When ignition voltage is 16 V or more.	The following functions are sus- pended.	-
C1111	 When a malfunction is detected in motor or motor relay. When a low pressure malfunction is detected in accumulator. When a malfunction is detected in accumulator pressure sensor. 	 VDC function TCS function ABS function EBD function hill start assist function Brake limited slip differential (BLSD) function 	1
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.	F
C1116	When stop lamp switch signal is not input when brake pedal depress.When stop lamp switch signal is not input when stop lamp relay operates.	 VDC function TCS function ABS function 	
C1118 ^{*1}	When a malfunction is detected in transfer control unit system.	 hill start assist function Brake limited slip differential (BLSD) function 	

< SYSTEM DESCRIPTION >

DTC	Malfunction detected condition	Fail-safe condition	
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.VDC function	
C1123	hen a malfunction is detected in front RH ABS OUT valve. hen a malfunction is detected in rear LH ABS IN valve. hen a malfunction is detected in rear RH ABS IN valve. hen a malfunction is detected in rear RH ABS OUT valve. hen a malfunction is detected in rear RH ABS OUT valve. hen a malfunction is detected in ECM system. hen a malfunction is detected in ECM system. hen a malfunction is detected in actuator relay. hen a malfunction is detected in master cylinder pressure sensor or control pre re sensor. hen a malfunction is detected in steering angle sensor. hen neutral position adjustment of steering angle sensor is not complete. When a malfunction is detected in yaw rate signal. When yaw rate signal is not continuously received for 2 seconds or more. When side G signal is not continuously received for 2 seconds or more. When a malfunction is detected in side/decel G signal. When pare fluid level low signal is detected. When a malfunction is detected in is detected. When a malfunction is detected in tot valve 2. hen a malfunction is detected in cut valve 1. hen a malfunction is detected in cut valve 2. hen a malfunction is detected in suction valve 2.	TCS function	
C1124	When a malfunction is detected in rear LH ABS IN valve.	 ABS function EBD function 	
C1125	When a malfunction is detected in rear LH ABS OUT valve.	hill start assist function	
C1126	When a malfunction is detected in rear RH ABS IN valve.	 Brake limited slip differential (BLSD) function 	
C1127	When a malfunction is detected in rear RH ABS OUT valve.		
C1130	When a malfunction is detected in ECM system.	 The following functions are suspended. VDC function TCS function hill start assist function Brake limited slip differential (BLSD) function 	
C1140	When a malfunction is detected in actuator relay.	The following functions are sus- pended. • VDC function • TCS function • ABS function • EBD function • hill start assist function • Brake limited slip differential (BLSD) function	
C1142 ^{*2} When a malfunction is detected in master cylinder pressure sensor or control pressure sensor.		The following functions are suspended.	
C1143	When a malfunction is detected in steering angle sensor.	VDC function TCS function	
C1144	When neutral position adjustment of steering angle sensor is not complete.	 hill start assist function 	
C1145	When a malfunction is detected in yaw rate signal.When yaw rate signal is not continuously received for 2 seconds or more.	Brake limited slip differential (BLSD) function	
01145	When side G signal is not continuously received for 2 seconds or more.When decel G signal is not continuously received for 2 seconds or more.	The following functions are suspended.	
C1146	 When a malfunction is detected in side/decel G signal. When a malfunction is detected in side/decel G signal. When a malfunction is detected in side/decel G signal. TCS function TCS function Hill start assist function Brake limited slip differentia (BLSD) function The following functions are supended. VDC function TCS function TCS function Hill start assist function Brake limited slip differentia (BLSD) function 		
C1155	When brake fluid level low signal is detected.When an open circuit is detected in brake fluid level switch circuit.	tected in side/decel G signal. • VDC function iow signal is detected. • TCS function iow signal is detected. • ABS function is detected in brake fluid level switch circuit. • hill start assist function ate/side/decal G sensor is not complete. • Brake limited slip differential (BLSD) function tected in cut valve 1. • The following functions are suspended	
C1160	When calibration of yaw rate/side/decal G sensor is not complete.		
C1164	When a malfunction is detected in cut valve 1.		
C1165	When a malfunction is detected in cut valve 2.	pended.	
C1166	When a malfunction is detected in suction valve 1.	VDC functionTCS function	
C1167	When a malfunction is detected in suction valve 2.	 ABS function EBD function hill start assist function Brake limited slip differential (BLSD) function 	
C1170	When the information in ABS actuator and electric unit (control unit) is not the same.	 The following functions are suspended. VDC function TCS function ABS function hill start assist function Brake limited slip differential (BLSD) function 	

< SYSTEM DESCRIPTION >

DTC	Malfunction detected condition	Fail-safe condition
C118E	When performing excessive brake pedal operation with the vehicle stopped. [When accumulator fluid pressure reaches 11.43 MPa (114 bar, 116.6 kg/cm ² , 1657 psi) after reaching 17.3 MPa (173 bar, 176.5 kg/cm ² , 2509 psi.]	The following functions are sus- pended. • VDC function • TCS function • ABS function • EBD function • hill start assist function • Brake limited slip differential (BLSD) function
U1000	When CAN communication signal is not continuously received for 2 seconds or more.	The following functions are sus- pended. • VDC function • TCS function • ABS function

*1: Models with 4WD System

*2: Models with Advanced Driver Assistance System

Protection Function

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Ε

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Ν

· hill start assist function

(BLSD) function

Brake limited slip differential

[WITH VDC]

The VDC warning lamp, ABS warning lamp and brake warning lamp turns ON and DTC "C118E" may be detected in self-diagnosis result of "ABS" when the brake pedal is excessively operated, such as air bleeding. This is not a system malfunction because this occurs due to the temporary decrease in accumulator fluid pressure. The system returns to normal condition when the accumulator fluid pressure reaches the specified pressure with the ignition switch ON and the VDC warning lamp, ABS warning lamp, and brake warning lamp turn OFF. After these steps, erase self-diagnosis results for "ABS" with CONSULT.

DTC	VDC warning lampABS warning lampBrake warning lamp	Condition	Description protection function	J
C118E	ON	When temporary decrease in accumulator fluid pres- sure. NOTE: System is not malfunction.	The following functions are suspended temporarily • VDC function • TCS function • ABS function • EBD function • hill start assist function • Brake limited slip differential (BLSD) function	K

NOTE:

DTC "C1111" is detected in self-diagnosis results of "ABS" when the accumulator system has a malfunction. VDC FUNCTION

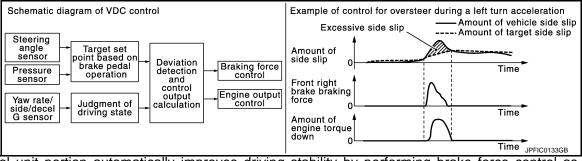
VDC FUNCTION : System Description

- Side slip or tail slip may occur while driving on a slippery road or intending an urgent evasive driving. VDC function detects side slip status using each sensor when side slip or tail slip is about to occur and improves vehicle stability by brake control and engine output control during driving.
- In addition to ABS function, EBD function and TCS function, target side slip amount is calculated according to steering operation amount from steering angle sensor and brake operation amount from pressure sensor. By comparing this information with vehicle side slip amount that is calculated from information from yaw rate/

INFOID:000000009012443

< SYSTEM DESCRIPTION >

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.



- 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 function can be switched to non-operational status (OFF) by operating VDC OFF switch. In this case, VDC OFF indicator lamp turns ON.
- VDC function is not operate when 4WD mode is "4L". (Models with 4WD system)
- VDC warning lamp blinking while VDC function is in operation and indicates to the driver that the function is in operation.
- Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC function operates. This is not a malfunction because it is caused by VDC function that is normally operated.
- CONSULT can be used to diagnose the system diagnosis.
- Fail-safe function is adopted. When a malfunction occurs in VDC function, the control is suspended for VDC function, TCS function, hill start assist function and brake limited slip differential (BLSD) function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function and brake limited slip differential (BLSD) function and brake limited slip differential (BLSD) function. However, ABS function and EBD function are operated normally. Refer to <u>BRC-24, "Fail-safe"</u>.

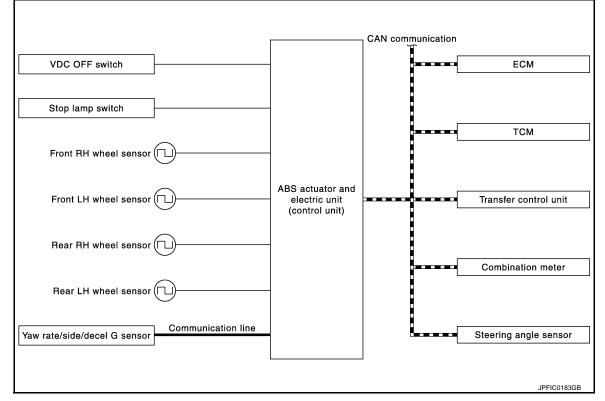
NOTE:

VDC has the characteristic as described here, but it is not the device that helps reckless driving.

SYSTEM DIAGRAM

NOTE:

Transfer control unit is applied to models with 4WD system.



INPUT SIGNAL AND OUTPUT SIGNAL

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

Component	Signal description
Yaw rate/side/decel G sensor	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line^{*1}. Yaw rate signal Side G sensor signal Decel G sensor signal
ECM	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Accelerator pedal position signal Engine speed signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. Target throttle position signal
ТСМ	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.Shift position signal
Transfer control unit ^{*2}	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Current 4WD mode signal
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.Steering angle sensor signal
Combination meter	 Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. VDC warning lamp signal VDC OFF indicator lamp

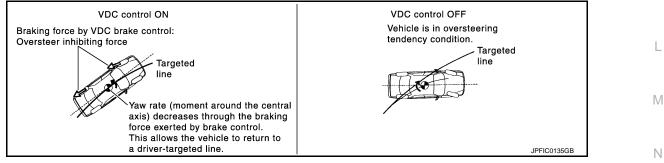
*1: Communication line between yaw rate/side/decal G sensor and ABS actuator and electric unit (control unit)

*2: Models with 4WD system

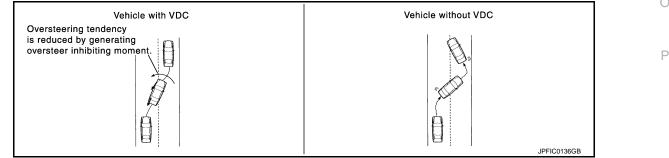
OPERATION CHARACTERISTICS

VDC Function That Prevents Oversteer Tendency

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



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

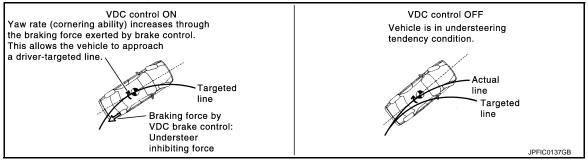


VDC Function That Prevents Understeer Tendency

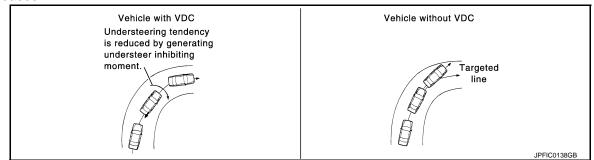
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During a cornering, brake force (brake fluid pressure) is applied on front wheel and rear wheel on the inner side of turn. Moment directing towards the inner side of turn is generated. Understeer is prevented.



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



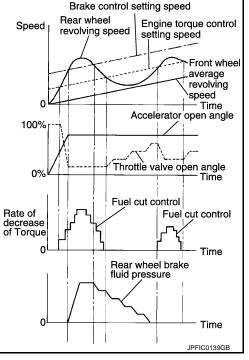
TCS FUNCTION

TCS FUNCTION : System Description

- Wheel spin status of drive wheel is detected by wheel sensor of 4 wheels. Engine output and transmission shift status is controlled so that slip rate of drive wheels is in appropriate level. When wheel spin occurs on drive wheel, ABS actuator and electric unit (control unit) perform brake force control of LH and RH drive wheels (apply brake force by increasing brake fluid pressure of drive wheel) and decrease engine torque by engine torque control. Wheel spin amount decreases. Engine torque is controlled to appropriate level.
- TCS function can be switched to non-operational status (OFF) by operating VDC OFF switch. In this case, VDC OFF indicator lamp turns ON.
- TCS function is not operate when 4WD mode is "4L". (Models with 4WD system)
- VDC warning lamp blinking while TCS function is in operation and indicates to the driver that the function is in operation.
- Slight vibrations are felt on the brake pedal and the operation noises occur, when TCS function operates. This is not a malfunction because it is caused by TCS function that is normally operated.
- CONSULT can be used to diagnose the system diagnosis.
- Fail-safe function is adopted. When a malfunction occurs in TCS function, the control is suspended for VDC function, TCS function, hill start assist function and brake limited slip differential (BLSD)

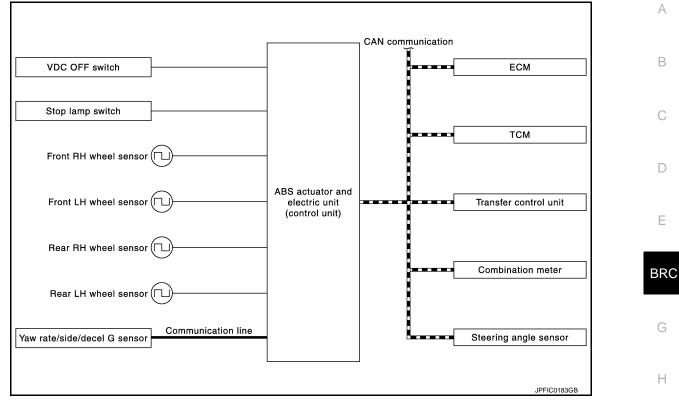
function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function and brake limited slip differential (BLSD) function. However, ABS function and EBD function are operated normally. Refer to <u>BRC-24</u>, "Fail-safe".

SYSTEM DIAGRAM NOTE:



< SYSTEM DESCRIPTION >

Transfer control unit is applied to models with 4WD system.



INPUT SIGNAL AND OUTPUT SIGNAL

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

Component	Signal description
Yaw rate/side/decel G sensor	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line^{*1}. Yaw rate signal Side G sensor signal Decel G sensor signal
ECM	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Accelerator pedal position signal Engine speed signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. Target throttle position signal
ТСМ	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Shift position signal
Transfer control unit ^{*2}	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Current 4WD mode signal
Steering angle sensor	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Steering angle sensor signal
Combination meter	 Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. VDC warning lamp signal VDC OFF indicator lamp

*1: Communication line between yaw rate/side/decal G sensor and ABS actuator and electric unit (control unit) *2: Models with 4WD system

ABS FUNCTION

< SYSTEM DESCRIPTION >

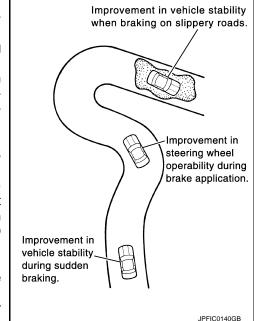
ABS FUNCTION : System Description

- 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 easily bypassed by steering operation.
- During braking, control units calculates wheel speed and pseudo-vehicle speed, and transmits pressure increase, hold or decrease signals to actuator portion according to wheel slip status.
- The following effects are obtained by preventing wheel lock during braking.
- Vehicle tail slip is prevented during braking when driving straight.
- Understeer and oversteer tendencies are moderated during braking driving on a corner.
- Obstacles may be easily bypassed by steering operation during braking.
- Slight vibrations are felt on the brake pedal and the operation noises occur, when ABS function operates. This is not a malfunction because it is caused by ABS function that is normally operated.
- 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, hill start assist function and brake limited slip differential (BLSD) function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, hill start assist function and brake limited slip differential (BLSD) function. However, EBD function is operated normally. Refer to <u>BRC-24</u>, "Fail-safe".

NOTE:

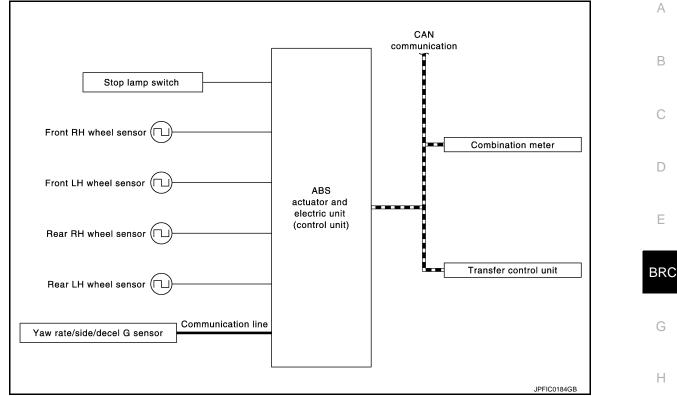
- ABS has the characteristic as described here, but it is not the device that helps reckless driving.
- To stop vehicle efficiently, ABS does not operate and ordinary brake operates at low speed [approx. 10 km/h (6.2 MPH) or less, but differs subject to road conditions).
- Self-diagnosis is performed immediately after when engine starts and when vehicle initially is driven [by vehicle speed approx. 15 km/h (9.3 MPH)]. Motor sounds are generated during self-diagnosis. In addition, brake pedal may be felt heavy when depressing brake pedal lightly. These symptoms are not malfunctions.

SYSTEM DIAGRAM NOTE:



[WITH VDC]

Transfer control unit is applied to models with 4WD system.



INPUT SIGNAL AND OUTPUT SIGNAL

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

Component	Signal description
Yaw rate/side/decel G sensor	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line^{*1}. Yaw rate signal Side G sensor signal Decel G sensor signal
Transfer control unit ^{*2}	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Current 4WD mode signal
Combination meter	 Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. ABS warning lamp signal VDC warning lamp signal

*1: Communication line between yaw rate/side/decal G sensor and ABS actuator and electric unit (control unit) *2: Models with 4WD system

EBD FUNCTION

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.

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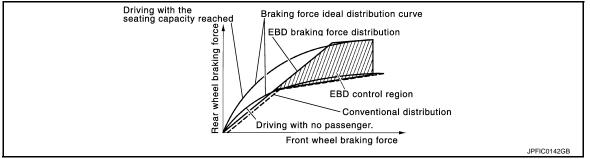
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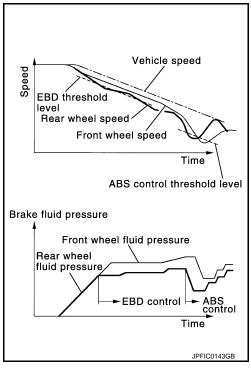
< SYSTEM DESCRIPTION >

[WITH VDC]

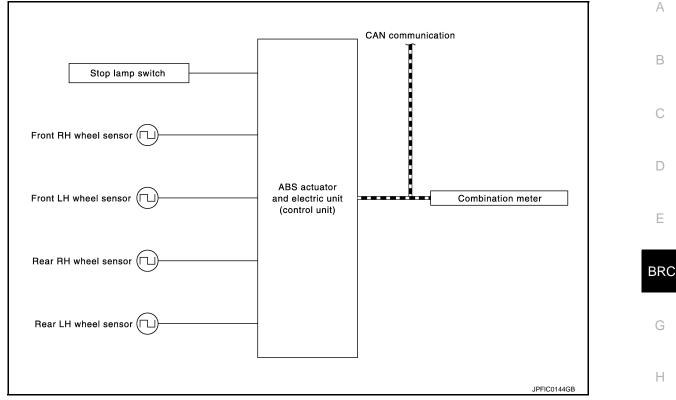
• EBD function is expanded and developed from conventional ABS function and corrects rear wheel brake force to appropriate level by electronic control according to load weight (number of passengers).



- During braking, control unit portion compares slight slip on front and rear wheels by wheel speed sensor signal, transmits drive signal to actuator portion when rear wheel slip exceeds front wheel slip for the specified value or more, and controls rear wheel brake force (brake fluid pressure) so that increase of rear wheel slip is prevented and slips on front wheel and rear wheel are nearly equalized. ABS control is applied when slip on each wheel increases and wheel speed is the threshold value of ABS control or less.
- CONSULT can be used to diagnose the system diagnosis.
- Fail-safe function is adopted. When a malfunction occurs in EBD function, the control is suspended for VDC function, TCS function, ABS function, EBD function, hill start assist function and brake limited slip differential (BLSD) function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, hill start assist function and brake limited slip differential (BLSD) function. Refer to <u>BRC-24, "Fail-safe"</u>.



SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

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

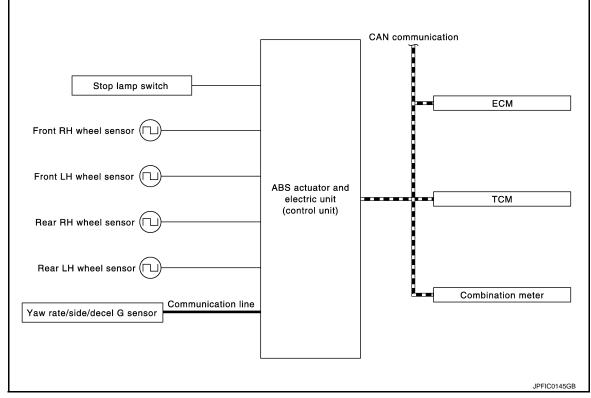
Component	Signal description	
Combination meter	 Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. VDC warning lamp signal ABS warning lamp signal Brake warning lamp signal 	

hill start assist FUNCTION

hill start assist FUNCTION : System Description

- INFOID:000000009012447
- This function maintains brake fluid pressure so that the vehicle does not move backwards even if brake pedal is released to depress accelerator pedal to start the vehicle while it is stopped on an uphill slope by depressing brake pedal.
- This function operates when the vehicle is in stop status on a uphill slope of slope ratio 10% or more and selector lever is in the position other than P or N.
- hill start assist function is only for the start aid. It maintains the brake fluid pressure for approx. 2 seconds after releasing the brake pedal, and then decreases the pressure gradually. If the vehicle can start by the accelerator operation, the brake is released automatically and a smooth start can be performed.
- Fail-safe function is adopted. When a malfunction occurs in hill start assist function, the control is suspended for VDC function, TCS function, hill start assist function and brake limited slip differential (BLSD) function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function and brake limited slip differential (BLSD) function. However, ABS function and EBD function are operated normally. Refer to <u>BRC-24, "Fail-safe"</u>.

SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

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

Component	Signal description
Yaw rate/side/decel G sensor	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line *. Yaw rate signal Side G sensor signal Decel G sensor signal
ECM	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Accelerator pedal position signal Engine speed signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. Target throttle position signal
ТСМ	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Shift position signal
Combination meter	 Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. VDC warning lamp signal

*: Communication line between yaw rate/side/decal G sensor and ABS actuator and electric unit (control unit) BRAKE LIMITED SLIP DIFFERENTIAL (BLSD) FUNCTION

BRAKE LIMITED SLIP DIFFERENTIAL (BLSD) FUNCTION : System Description

INFOID:000000009012448

- LH and RH driving wheel spin is always monitored. If necessary, appropriate brake force is independently
 applied to LH or RH driving wheel so that one-sided wheel spin is avoided and traction is maintained. Mainly
 starting ability is improved.
- Brake limited slip differential (BLSD) function operates while VDC function is in non-operational status (OFF) by VDC OFF switch.

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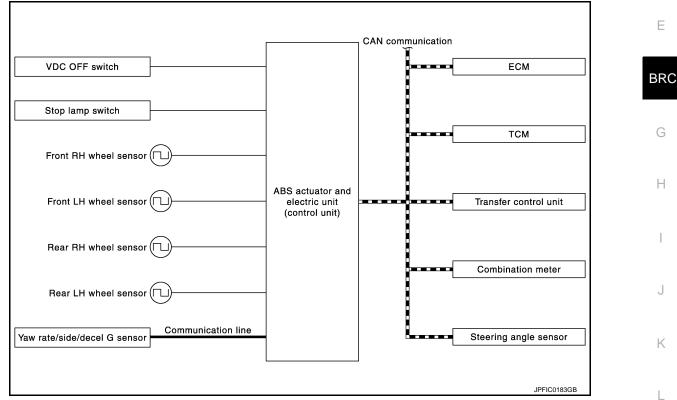
< SYSTEM DESCRIPTION >

- VDC warning lamp blinking while brake limited slip differential (BLSD) function is in operation and indicates to the driver that the function is in operation.
- Slight vibrations are felt on the brake pedal and the operation noises occur, when brake limited slip differential (BLSD) function operates. This is not a malfunction because it is caused by brake limited slip differential (BLSD) function that is normally operated.
- Fail-safe function is adopted. When a malfunction occurs in brake limited slip differential (BLSD) function, the control is suspended for VDC function, TCS function, hill start assist function and brake limited slip differential (BLSD) function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function and brake limited slip differential (BLSD) function. TCS function, hill start assist function. However, ABS function and C EBD function are operated normally. Refer to <u>BRC-24. "Fail-safe"</u>.

SYSTEM DIAGRAM

NOTE:

Transfer control unit is applied to models with 4WD system.



INPUT SIGNAL AND OUTPUT SIGNAL

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

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

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< SYSTEM DESCRIPTION >

Component	Signal description
Transfer control unit ^{*2}	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Current 4WD mode signal
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.Steering angle sensor signal
Combination meter	 Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. VDC warning lamp signal

*1: Communication line between yaw rate/side/decal G sensor and ABS actuator and electric unit (control unit) *2: Models with 4WD system

< SYSTEM DESCRIPTION >

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

CONSULT Function

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.*	L
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.	E
WORK SUPPORT	Components can be quickly and accurately adjusted.	
The following diagnosis information is erased by erasing.		BF

• 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-50, "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)

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

DATA MONITOR **NOTE**:

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

			×: Applicable	(
ltere (Linit)	Monitor iter	n selection	Net-	
Item (Unit)	INPUT SIGNALS	MAIN ITEMS	Note	
FR LH SENSOR [km/h (MPH)]	×	×	Wheel speed calculated by front LH wheel sensor is displayed.	F
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.	

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< SYSTEM DESCRIPTION >

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ltere (Linit)	Monitor item selection		Note	
Item (Unit)	INPUT SIGNALS	MAIN ITEMS	Note	
DECEL G-SEN (G)	×	×	Decel G detected by decel G sensor is displayed.	
FR RH IN SOL (On/Off)		×	Operation status of front RH wheel ABS IN valve is displayed.	
FR RH OUT SOL (On/Off)		×	Operation status of front RH wheel ABS OUT valve is displayed.	
FR LH IN SOL (On/Off)		×	Operation status of front LH wheel ABS IN valve is displayed.	
FR LH OUT SOL (On/Off)		×	Operation status of front LH wheel ABS OUT valve is displayed.	
RR RH IN SOL (On/Off)		×	Operation status of rear RH wheel ABS IN valve is displayed	
RR RH OUT SOL (On/Off)		×	Operation status of rear RH wheel ABS OUT valve is displayed.	
RR LH IN SOL (On/Off)		×	Operation status of rear LH wheel ABS IN valve is displayed.	
RR LH OUT SOL (On/Off)		×	Operation status of rear LH wheel ABS OUT valve is displayed.	
EBD WARN LAMP (On/Off)			Brake warning lamp ON/OFF status is displayed. (Note 1)	
STOP LAMP SW (On/Off)	×	×	Stop lamp switch signal input status is displayed.	
MOTOR RELAY (On/Off)		×	ABS motor and motor relay status is displayed.	
ACTUATOR RLY (On/Off)		×	ABS actuator relay status is displayed.	
ABS WARN LAMP (On/Off)		×	ABS warning lamp ON/OFF status is displayed. (Note 1)	
OFF LAMP (On/Off)		×	VDC OFF indicator lamp ON/OFF status is displayed. ^(Note 1)	
OFF SW (On/Off)	×	×	VDC OFF switch signal input status is displayed.	
SLIP/VDC LAMP (On/Off)		×	VDC warning lamp ON/OFF status is displayed. ^(Note 1)	
BATTERY VOLT (V)	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.	
GEAR	×	×	Current gear position judged from current gear position sig- nal 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/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.	

< SYSTEM DESCRIPTION >

[WITH VDC]

Item (Unit)	Monitor iter	n selection	Note	
	INPUT SIGNALS	MAIN ITEMS		
SV1 (On/Off)			Suction valve 1 operation status is displayed.	
SV2 (On/Off)			Suction valve 2 operation status is displayed.	
STOP LAMP SW2 (On/Off)			Stop lamp switch signal input status is displayed.	
ACCEL POS SIG (%)	×		Displays the Accelerator pedal position	
SIDE G-SENSOR (m/s ²)	×		Side G detected by side G sensor is displayed.	
STR ANGLE SIG (°)	×		Steering angle detected by steering angle sensor is displayed.	
PRESS SENSOR (bar)	×		Detects the brake fluid pressure of master cylinder part is displayed.	
ACCUM PRESS SEN (bar)			Detects the brake fluid pressure of accumulator is displayed.	
CONT PRESS SEN (bar)			Detects the brake fluid pressure of control pressure sensor is displayed	
EBD SIGNAL (On/Off)			EBD operation status is displayed.	
ABS SIGNAL (On/Off)			ABS operation status is displayed.	
TCS SIGNAL (On/Off)			TCS operation status is displayed.	
VDC SIGNAL (On/Off)			VDC operation status is displayed.	
EBD FAIL SIG (On/Off)			EBD fail-safe signal status is displayed.	
ABS FAIL SIG (On/Off)			ABS fail-safe signal status is displayed.	
TCS FAIL SIG (On/Off)			TCS fail-safe signal status is displayed.	
VDC FAIL SIG (On/Off)			VDC fail-safe signal status is displayed.	
CRANKING SIG (On/Off)			Cranking status is displayed.	
FLUID LEV SW (On/Off)	×		Brake fluid level signal input status via CAN communication is displayed.	
PARK BRAKE SW (On/Off)	×		Parking brake switch signal input status via CAN communi- cation is displayed.	
STP ON RLY (On/Off)			Stop lamp switch relay status is displayed.	
USS SIG ^(Note 2) (On/Off)			hill start assist operation status is displayed.	

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

Note 2: USS means "hill start assist"

ACTIVE TEST

The active test is used to determine and identify details of a malfunction, based on self-diagnosis test result sand data obtained in the DATA MONITOR. In response to instructions from CONSULT, instead of those from

< SYSTEM DESCRIPTION >

[WITH VDC]

ABS actuator and electric unit (control unit) on the vehicle, a drive signal is sent to the actuator to check its operation.

CAUTION:

- Never perform ACTIVE TEST while driving the vehicle.
- Always bleed air from brake system before active test.
- Never perform active test when system is malfunctioning.
- NOTE:
- When active test is performed while depressing the pedal, the pedal depressing stroke may change. This is not a malfunction.
- "TEST IS STOPPED" is displayed approx. 10 seconds after operation start.
- When performing active test again after "TEST IS STOPPED" is displayed, select "BACK".
- ABS warning lamp, brake warning lamp and VDC warning lamp may turn ON during active test. This is not a malfunction.

ABS IN Valve and ABS OUT Valve

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

Test item	Dianlay Itom	Display		
	Display Item	Up	Кеер	Down
FR RH SOL	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*
KK KH SUL	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 KEEP" or "ACT UP" is selected on display screen, the following items are displayed when system is normal.

Test item	Dianlay Itam		Display		
IEST ILEITI	Display Item	Up	ACT KEEP	ACT UP	
	FR RH IN SOL	Off	Off	On*	
	FR RH OUT SOL	Off	Off	Off	
FR RH SOL (ACT)	CV1	Off	On*	On*	
	SV1	Off	Off	On*	
	FR LH IN SOL	Off	Off	On*	
	FR LH OUT SOL	Off	Off	Off	
FR LH SOL (ACT)	CV1	Off	On*	On*	
	SV1	Off	Off	On*	
	RR RH IN SOL	Off	Off	On*	
	RR RH OUT SOL	Off	Off	Off	
RR RH SOL (ACT)	CV2	Off	On*	On*	
	SV2	Off	Off	On*	
RR LH SOL (ACT)	RR LH IN SOL	Off	Off	On*	
	RR LH OUT SOL	Off	Off	Off	
	CV2	Off	On*	On*	
	SV2	Off	Off	On*	

< SYSTEM DESCRIPTION >

*: Immediately after being selected, status is "On". Status changes to "Off" after approx. 2 seconds.

Stop Lamp ON Relay

When "On" or "Off" is selected on display screen, the following items are displayed when system is normal.

Test item	Display Item	Display	
lest tem	Display item	On	Off
STOP LAMP ON RELAY	STOP LAMP ON RELAY	On	Off

NOTE:

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

WORK SUPPORT

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

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< ECU DIAGNOSIS INFORMATION >

ECU DIAGNOSIS INFORMATION

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:000000009012450

[WITH VDC]

CONSULT DATA MONITOR STANDARD VALUE

NOTE:

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

Monitor item	Condition	Reference values in normal operation
	Vehicle stopped	0.00 km/h (MPH)
FR LH SENSOR	When driving ^(Note 1)	Nearly matches the speedometer display (within ±10%)
	Vehicle stopped	0.00 km/h (MPH)
FR RH SENSOR	When driving ^(Note 1)	Nearly matches the speedometer display (within $\pm 10\%$)
	Vehicle stopped	0.00 km/h (MPH)
RR LH SENSOR	When driving ^(Note 1)	Nearly matches the speedometer display (within ±10%)
	Vehicle stopped	0.00 km/h (MPH)
RR RH SENSOR	When driving ^(Note 1)	Nearly matches the speedometer display (within $\pm 10\%$)
	When stopped	Approx. 0 G
DECEL G-SEN	During acceleration	Positive value
	During deceleration	Negative value
FR RH IN SOL	Active	On
	Inactive	Off
FR RH OUT SOL	Active	On
	Inactive	Off
FR LH IN SOL	Active	On
	Inactive	Off
FR LH OUT SOL	Active	On
FR LH OUT SOL	Inactive	Off
RR RH IN SOL	Active	On
	Inactive	Off
RR RH OUT SOL	Active	On
KK KH OOT SOL	Inactive	Off
RR LH IN SOL	Active	On
IN EITIN SOL	Inactive	Off
RR LH OUT SOL	Active	On
KK EITOOT SOL	Inactive	Off
EBD WARN LAMP	When brake warning lamp is ON ^(Note 2)	On
	When brake warning lamp is OFF ^(Note 2)	Off
STOP LAMP SW	Brake pedal depressed	On
UTOF LAIVIE UV	Brake pedal not depressed	Off
MOTOR RELAY	Active	On
	Inactive	Off

Revision: 2013 September

< ECU DIAGNOSIS INFORMATION >

[WITH VDC]

Monitor item	Condition	Reference values in normal operation
ACTUATOR RLY	Active	On
ACTUATOR RLY	Inactive (in fail-safe mode)	Off
	When ABS warning lamp is ON ^(Note 2)	On
ABS WARN LAMP	When ABS warning lamp is OFF ^(Note 2)	Off
	When VDC OFF indicator lamp is ON ^(Note 2)	On
OFF LAMP	When VDC OFF indicator lamp is OFF ^(Note 2)	Off
	VDC OFF switch ON	On
OFF SW	VDC OFF switch OFF	Off
	When VDC warning lamp is ON or Blinking ^(Note 2)	On
SLIP/VDC LAMP	When VDC warning lamp is OFF ^(Note 2)	Off
BATTERY VOLT	Ignition switch ON	10 – 16 V
		1-7
GEAR	Driving	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
K F 031 313	When selector lever is in the other position than R	Off
	When 4WD sift switch is AUTO position	AUTO
4WD MODE MON	When 4WD sift switch is 4H position	LOCK
	When 4WD sift switch is 4L position	##
N POSI SIG	When selector lever is in the N position	On
N F 001 010	When selector lever is in the other position than N	Off
CV1	Active	On
	Inactive	Off
CV2	Active	On
~~ <i>L</i>	Inactive	Off
SV1	Active	On
	Inactive	Off
SV2	Active	On
	Inactive	Off
STOP LAMP SW2	Brake pedal depressed	On
	Brake pedal not depressed	Off
ACCEL POS SIG	Never depress accelerator pedal (with ignition switch ON)	0%
	Depress accelerator pedal (with ignition switch ON)	0 – 100%
	Vehicle stopped	Approx. 0 m/s ²
SIDE G-SENSOR	Right turn	Negative value
	Left turn	Positive value

< ECU DIAGNOSIS INFORMATION >

Monitor item	Condition	Reference values in normal operation
	When driving straight	0±2.5°
STR ANGLE SIG	When steering wheel is steered to LH by 90°	Approx. –90°
	When steering wheel is steered to RH by 90°	Approx. +90°
	Brake pedal not depressed	Approx. 0 bar
PRESS SENSOR	Brake pedal depressed	(-40) – (+300) bar
ACCUM PRESS SEN	With ignition switch ON	Approx. 0 – 210 bar (Proportional to the amount of accumulated pressure in the accumulator)
CONT PRESS SEN	Brake pedal not depressed	Approx. 0 bar
CONT PRESS SEN	Brake pedal depressed	(-40) - (+300) bar
EBD SIGNAL	EBD is active	On
EDD SIGNAL	EBD is inactive	Off
	ABS is active	On
ABS SIGNAL	ABS is inactive	Off
TCS SIGNAL	TCS is active	On
	TCS is inactive	Off
VDC SIGNAL	VDC is active	On
	VDC is inactive	Off
	In EBD fail-safe	On
EBD FAIL SIG	EBD is normal	Off
ABS FAIL SIG	In ABS fail-safe	On
	ABS is normal	Off
	In TCS fail-safe	On
TCS FAIL SIG	TCS is normal	Off
	In VDC fail-safe	On
VDC FAIL SIG	VDC is normal	Off
	At cranking	On
CRANKING SIG	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
	When parking brake is active	On
PARK BRAKE SW	Parking brake is released	Off
	Stop lamp relay is active	On
STP ON RLY	Stop lamp relay is inactive	Off
	hill start assist is active	On
USS SIG ^(Note 3)	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/Blinking/OFF conditions of each warning lamp and indicator lamp.

Note 3: USS means "hill start assist".

Fail-safe

INFOID:000000009012451

VDC FUNCTION, TCS FUNCTION, hill start assist FUNCTION AND BRAKE LIMITED SLIP DIFFER-ENTIAL (BLSD) FUNCTION

VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, hill start assist function

BRC-46

< ECU DIAGNOSIS INFORMATION >

and brake limited slip differential (BLSD) function. The Vehicle status becomes the same as models without VDC function, TCS function, hill start assist function and brake limited slip differential (BLSD) function. However, ABS function and EBD function are operated normally.

ABS FUNCTION

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

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

EBD FUNCTION

ABS warning lamp, brake warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS function, EBD function, hill start assist function and brake limited slip differential (BLSD) function. The vehicle status becomes the same as models without VDC function, TCS function, ABS BRC function, EBD function, hill start assist function and brake limited slip differential (BLSD) 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	 When power supply voltage of rear RH wheel sensor is low. When distance between rear RH wheel sensor and rear RH wheel sensor rotor is large. When installation of rear RH wheel sensor or rear RH wheel sensor rotor is not normal. 	The following functions are sus- pended. • VDC function
C1106	 When power supply voltage of rear LH wheel sensor is low. When distance between rear LH wheel sensor and rear LH wheel sensor rotor is large. When installation of rear LH wheel sensor or rear LH wheel sensor rotor is not normal. 	 VDC function TCS function ABS function EBD function (only when both 2 rear wheels are malfunctioning) hill start assist function
C1107	 When power supply voltage of front RH wheel sensor is low. When distance between front RH wheel sensor and front RH wheel sensor rotor is large. When installation of front RH wheel sensor or front RH wheel sensor rotor is not normal. 	 Brake limited slip differential (BLSD) function
C1108	 When power supply voltage of front LH wheel sensor is low. When distance between front LH wheel sensor and front LH wheel sensor rotor is large. When installation of front LH wheel sensor or front LH wheel sensor rotor is not normal. 	
C1109	When ignition voltage is 10 V or less.When ignition voltage is 16 V or more.	The following functions are suspended.
C1111	 When a malfunction is detected in motor or motor relay. When a low pressure malfunction is detected in accumulator. When a malfunction is detected in accumulator pressure sensor. 	 VDC function TCS function ABS function EBD function hill start assist function Brake limited slip differential (BLSD) function

[WITH VDC]

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< ECU DIAGNOSIS INFORMATION >

[WITH VDC]

DTC	Malfunction detected condition	Fail-safe condition
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 depress.When stop lamp switch signal is not input when stop lamp relay operates.	 VDC function TCS function ABS function
C1118 ^{*1}	When a malfunction is detected in transfer control unit system.	 hill start assist function Brake limited slip differential (BLSD) function
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 suspended.
C1122	When a malfunction is detected in front RH ABS IN valve.	VDC function
C1123	When a malfunction is detected in front RH ABS OUT valve.	TCS function ABS function
C1124	When a malfunction is detected in rear LH ABS IN valve.	EBD function
C1125	When a malfunction is detected in rear LH ABS OUT valve.	hill start assist function Broke limited align differential
C1126	When a malfunction is detected in rear RH ABS IN valve.	Brake limited slip differential (BLSD) function
C1127	When a malfunction is detected in rear RH ABS OUT valve.	
C1130	When a malfunction is detected in ECM system.	 The following functions are suspended. VDC function TCS function hill start assist function Brake limited slip differential (BLSD) function
C1140	When a malfunction is detected in actuator relay.	 The following functions are suspended. VDC function TCS function ABS function EBD function hill start assist function Brake limited slip differential (BLSD) function
C1142 ^{*2}	When a malfunction is detected in master cylinder pressure sensor or control pressure sensor.	The following functions are suspended.
C1143	When a malfunction is detected in steering angle sensor.	VDC function TCS function
C1144	When neutral position adjustment of steering angle sensor is not complete.	 TCS function hill start assist function
C1145	 When a malfunction is detected in yaw rate signal. When yaw rate signal is not continuously received for 2 seconds or more. 	Brake limited slip differential (BLSD) function
01145	 When side G signal is not continuously received for 2 seconds or more. When decel G signal is not continuously received for 2 seconds or more. 	The following functions are suspended.
C1146	When a malfunction is detected in side/decel G signal.	 VDC function TCS function
C1155	When brake fluid level low signal is detected.When an open circuit is detected in brake fluid level switch circuit.	ABS functionhill start assist function
C1160	When calibration of yaw rate/side/decal G sensor is not complete.	 Brake limited slip differential (BLSD) 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.	pended.VDC function
C1166	When a malfunction is detected in suction valve 1.	TCS function
C1167	When a malfunction is detected in suction valve 2.	 ABS function EBD function hill start assist function Brake limited slip differential (BLSD) function

< ECU DIAGNOSIS INFORMATION >

DTC	Malfunction detected condition	Fail-safe condition	_
C1170	When the information in ABS actuator and electric unit (control unit) is not the same.	 The following functions are suspended. VDC function TCS function ABS function hill start assist function Brake limited slip differential (BLSD) function 	- A B C
C118E	When performing excessive brake pedal operation with the vehicle stopped. [When accumulator fluid pressure reaches 11.43 MPa (114 bar, 116.6 kg/cm ² , 1657 psi) after reaching 17.3 MPa (173 bar, 176.5 kg/cm ² , 2509 psi.]	 The following functions are suspended. VDC function TCS function ABS function EBD function hill start assist function Brake limited slip differential (BLSD) function 	D
U1000	When CAN communication signal is not continuously received for 2 seconds or more.	 The following functions are suspended. VDC function TCS function ABS function hill start assist function Brake limited slip differential (BLSD) function 	BRC G

*1: Models with 4WD System

*2: Models with Advanced Driver Assistance System

Protection Function

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[WITH VDC]

The VDC warning lamp, ABS warning lamp and brake warning lamp turns ON and DTC "C118E" may be detected in self-diagnosis result of "ABS" when the brake pedal is excessively operated, such as air bleeding. This is not a system malfunction because this occurs due to the temporary decrease in accumulator fluid pressure. The system returns to normal condition when the accumulator fluid pressure reaches the specified pressure with the ignition switch ON and the VDC warning lamp, ABS warning lamp, and brake warning lamp turn OFF. After these steps, erase self-diagnosis results for "ABS" with CONSULT.

DTC	VDC warning lampABS warning lampBrake warning lamp	Condition	Description protection function	L
C118E	ON	When temporary decrease in accumulator fluid pres- sure. NOTE: System is not malfunction.	The following functions are suspended temporarily • VDC function • TCS function • ABS function • EBD function • hill start assist function • Brake limited slip differential (BLSD) function	N N

NOTE:

DTC "C1111" is detected in self-diagnosis results of "ABS" when the accumulator system has a malfunction.

DTC Inspection Priority Chart

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

INFOID:000000009012453

< ECU DIAGNOSIS INFORMATION >

[WITH VDC]

Priority	Detected item (DTC)
3	 C1118 4WD SYSTEM[*] C1130 ENGINE SIGNAL 1 C1144 ST ANG SEN SIGNAL
4	 C1109 BATTERY VOLTAGE [ABNORMAL] C1111 PUMP MOTOR C1140 ACTUATOR RLY
5	 C1101 RR RH SENSOR-1 C1102 RR LH SENSOR-1 C1103 FR RH SENSOR-1 C1104 FR LH SENSOR-1 C1105 RR RH SENSOR-2 C1106 RR LH SENSOR-2 C1107 FR RH SENSOR-2 C1108 FR LH SENSOR-2 C1118 SENSOR [ABNORMAL SIGNAL] C1116 STOP LAMP SW C1120 FR LH IN ABS SOL C1121 FR LH OUT ABS SOL C1122 FR RH IN ABS SOL C1123 FR RH OUT ABS SOL C1123 FR RH OUT ABS SOL C1124 RR LH IN ABS SOL C1125 RR LH OUT ABS SOL C1127 RR RH OUT ABS SOL C1127 RR RH OUT ABS SOL C1128 RR HI N ABS SOL C1127 RR RH OUT ABS SOL C1126 RR RH IN ABS SOL C1127 RR RH OUT ABS SOL C1126 RR RH IN ABS SOL C1127 RR RH OUT ABS SOL C1126 RR RH IN ABS SOL C1127 RR RH OUT ABS SOL C1142 PRESS SEN CIRCUIT C1145 YAW RATE SENSOR C1146 SIDE G-SEN CIRCUIT C1164 CV 1 C1165 CV 2 C1166 SV 1 C1167 SV 2
6	C1155 BR FLUID LEVEL LOW C118E ACCUMULATOR PRESS

*: Models with 4WD system

DTC Index

INFOID:000000009012454

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	
C1102	RR LH SENSOR-1	PPC 66 "DTC Logic"
C1103	FR RH SENSOR-1	BRC-66, "DTC Logic"
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	
C1106	RR LH SENSOR-2	PPC 60 "DTC Logic"
C1107	FR RH SENSOR-2	BRC-69, "DTC Logic"
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-74, "DTC Logic"
C1111	PUMP MOTOR	BRC-77, "DTC Logic"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-79, "DTC Logic"
C1116	STOP LAMP SW	BRC-84, "DTC Logic"
C1118 [*]	4WD SYSTEM	BRC-94, "DTC Logic"
C1120	FR LH IN ABS SOL	BRC-95, "DTC Logic"

< ECU DIAGNOSIS INFORMATION >

[WITH VDC]

DTC	Items (CONSULT screen terms)	Reference	Δ.
C1121	FR LH OUT ABS SOL	BRC-97, "DTC Logic"	— A
C1122	FR RH IN ABS SOL	BRC-95, "DTC Logic"	
C1123	FR RH OUT ABS SOL	BRC-97, "DTC Logic"	В
C1124	RR LH IN ABS SOL	BRC-95, "DTC Logic"	
C1125	RR LH OUT ABS SOL	BRC-97, "DTC Logic"	
C1126	RR RH IN ABS SOL	BRC-95, "DTC Logic"	С
C1127	RR RH OUT ABS SOL	BRC-97, "DTC Logic"	
C1130	ENGINE SIGNAL 1	BRC-99, "DTC Logic"	D
C1140	ACTUATOR RLY	BRC-100, "DTC Logic"	
C1142	PRESS SEN CIRCUIT	BRC-102, "DTC Logic"	
C1143	ST ANG SEN CIRCUIT	BRC-104, "DTC Logic"	E
C1144	ST ANG SEN SIGNAL	BRC-106, "DTC Logic"	
C1145	YAW RATE SENSOR		BRC
C1146	SIDE G-SEN CIRCUIT	BRC-107, "DTC Logic"	DICC
C1155	BR FLUID LEVEL LOW	BRC-111, "DTC Logic"	
C1160	DECEL G SEN SET	BRC-114, "DTC Logic"	G
C1164	CV 1		
C1165	CV 2	BRC-115, "DTC Logic"	
C1166	SV 1		— H
C1167	SV 2	BRC-117, "DTC Logic"	
C1170	VARIANT CODING	BRC-119, "DTC Logic"	
C118E	ACCUMULATOR PRESS	BRC-120, "DTC Logic"	
U1000	CAN COMM CIRCUIT	BRC-121, "DTC Logic"	

*: Models with 4WD system

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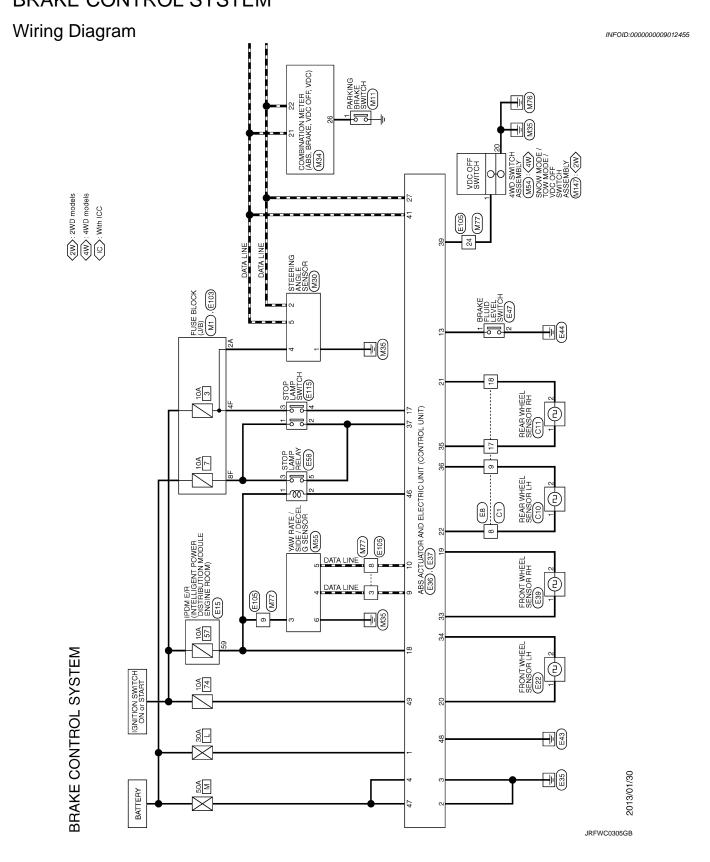
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[WITH VDC]

WIRING DIAGRAM BRAKE CONTROL SYSTEM

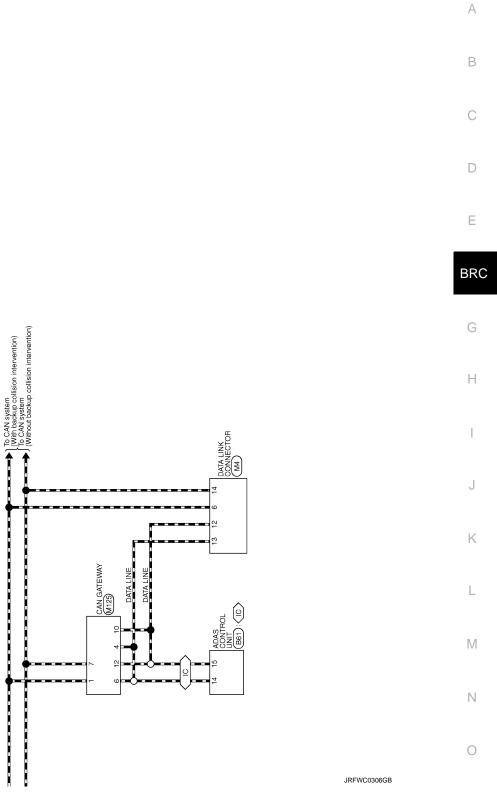


Revision: 2013 September

< WIRING DIAGRAM >

BRAKE CONTROL SYSTEM

[WITH VDC]



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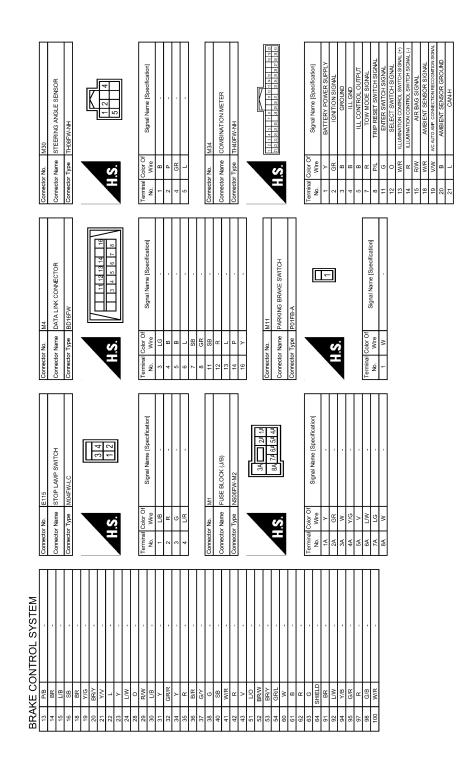
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< BASIC INSPECTION >

BASIC INSPECTION DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:000000009012456

IWITH VDC1

DETAILED FLOW

1.INTERVIEW FROM THE CUSTOMER

Clarify customer complaints 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 complaints carefully. Check symptoms by driving vehicle with customer, if necessary.

CAUTION:

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

>> GO TO 2.

2.CHECK SYMPTOM

Reproduce the symptom that is indicated by the customer, based on the information from the customer obtained by interview. Also check that the symptom is not caused by fail-safe mode. Refer to <u>BRC-46, "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

Perform self-diagnosis.

Is DTC detected?

YES >> Record or print self-diagnosis results and freeze frame data (FFD). GO TO 4.

NO >> GO TO 6.

4.RECHECK THE SYMPTOM

(B) With CONSULT

1. Erase self-diagnostic results for "ABS".

2. Perform DTC confirmation procedures for the error-detected system.

NOTE:

If some DTCs are detected at the some time, determine the order for performing the diagnosis based on <u>BRC-49, "DTC Inspection Priority Chart"</u> [ABS actuator and electric unit (control unit)].

Is any DTC detected?

YES >> GO TO 5.

NO >> Check harness and connectors based on the information obtained by interview. Refer to <u>GI-43</u>, <u>"Intermittent Incident"</u>.

5.REPAIR OR REPLACE ERROR-DETECTED PART

• Repair or replace error-detected parts.

- Reconnect part or connector after repairing or replacing.
- When DTC is detected, erase self-diagnostic result for "ABS".

>> GO TO 7.

O.IDENTIFY ERROR-DETECTED SYSTEM BY SYMPTOM DIAGNOSIS

Estimate error-detected system based on symptom diagnosis and perform inspection. Can the error-detected system be identified?

BRC-58

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

[WITH VDC]

- YES >> GO TO 7. NO >> Check harness and connectors based on the information obtained by interview. Refer to GI-43, А "Intermittent Incident". **7.**FINAL CHECK В With CONSULT 1. Check the reference value for "ABS". 2. Recheck the symptom and check that the symptom is not reproduced on the same conditions. Is the symptom reproduced? YES >> GO TO 3. NO >> INSPECTION END D Diagnostic Work Sheet INFOID:000000009012457 Description Ε • In general, customers have their own criteria for a problem. Therefore, it is important to understand the
- 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 sl	neet					
Customer	MR/MS	Registration number				Initial ye registra			
name		Vehicle type				VIN			
Storage date		Engine				Mileage	e kr	m (Mile)
I		Does not o	perate (ŀ) f	unction
		Warning la	mp for () tur	ns ON.
Symptom		D Noise				□ Vib	ration		
		□ Other ()
First occurren	се	□ Recently	□ Other	()
Frequency of occurrence		□ Always	□ Under	a certain	condition	s of	□ Sometimes (time(s)/day)
		□ Irrelevant							
Climate con-	Weather	□ Fine □	Cloud	🗆 Rair	ם n	Snow	D Others ()
ditions	Temperature	□ Hot □V	Varm 🗆	Cool	Cold	🗆 Te	emperature [Approx.	. °С (°F)]
	Relative humidity	□ High	□ Moo	derate		□ Low			
Road conditio	ns	□ Urban area □ Mountaino		Suburb a hill or dov			Highway Rough road		
Operating condition, etc.		□Irrelevant □When engir □ During driv □ During dec □ During corr □ When stee	ing □ eleration nering (right	During a curve or		e)	☐ At constant speed	d driving	

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BRC

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

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

Memo

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

< BASIC INSPECTION >

[WITH VDC]

ADDITIONAL SERVICE WHEN REPLACING ABS ACTUATOR AND ELEC-TRIC UNIT (CONTROL UNIT)

Description

INFOID:000000009012458

When replaced the ABS actuator and electric unit (control unit), perform decel G sensor calibration. Refer to <u>BRC-64, "Work Procedure"</u>.

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ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION < BASIC INSPECTION > [WITH VDC]

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Description

INFOID:000000009012459

Always adjust the neutral position of steering angle sensor before driving when the following operation is performed.

<:	Required	-: Not	required
----	----------	--------	----------

>

Procedure	Adjust the neutral position of steering angle sensor
Removing/ installing ABS actuator and electric unit (control unit)	_
Replacing ABS actuator and electric unit (control unit)	_
Removing/installing steering angle sensor	×
Replacing steering angle sensor	×
Removing/installing steering components	×
Replacing steering components	×
Removing/installing suspension components	×
Replacing suspension components	×
Removing/installing tire	-
Replacing tire	_
Tire rotation	—
Adjusting wheel alignment.	X

Work Procedure

INFOID:000000009012460

ADJUST THE NEUTRAL POSITION OF STEERING ANGLE SENSOR

CAUTION:

Always use CONSULT when adjusting the neutral position of steering angle sensor. (It cannot be adjusted other than with CONSULT.)

1.CHECK THE VEHICLE STATUS

Stop vehicle with front wheels in the straight-ahead position.

Does the vehicle stay in the straight-ahead position?

YES >> GO TO 2.

NO >> Steer the steering wheel to the straight-ahead position. Stop the vehicle.

2.ADJUST NEUTRAL POSITION OF STEERING ANGLE SENSOR

() With CONSULT

Turn the ignition switch ON. CAUTION:

Never start engine.

- 2. Select "ABS", "WORK SUPPORT" and "ST ANGLE SENSOR ADJUSTMENT" in this order.
- 3. Select "START". CAUTION:

Never touch steering wheel while adjusting steering angle sensor.

- 4. After approx. 10 seconds, select "END".
- Turn ignition switch OFF and then turn it ON again.
 CAUTION:

Be sure to perform the operation above.

>> GO TO 3.

3.CHECK DATA MONITOR

With CONSULT

1. The vehicle is either pointing straight ahead or the vehicle needs to be moved. Stop when it is pointing straight ahead.

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION [WITH VDC]

< BASIC INSPECTION >

2.	Select "ABS", "DATA MONITOR", "ECU INPUT SIGNALS" and "STR ANGLE SIG" in the order. Check that the signal is within the specified value.	A
	STR ANGLE SIG : $0\pm2.5^{\circ}$	
<u>ls t</u>	he inspection result normal?	В
YE	ES >> GO TO 4.	
N	0 >> GO TO 1.	
4.	ERASE SELF-DIAGNOSIS MEMORY	С

(P)With CONSULT Erase Self-diagnosis result of "ABS". D Are the memories erased? YES >> INSPECTION END Е

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

INFOID:000000009012461

[WITH VDC]

CAUTION:

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

Yaw rate/side/decel G sensor calibration is performed when performing the decel G sensor calibration.

X: Required —: Not require	ed
----------------------------	----

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

Work Procedure

INFOID:000000009012462

Decel G sensor calibration

CAUTION:

Always use CONSULT for the decel G sensor calibration. (It cannot be adjusted other than with CON-SULT.)

NOTE:

Yaw rate/side/decel G sensor calibration is performed when performing the decel G sensor calibration.

1.CHECK THE VEHICLE STATUS

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

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

YES >> GO TO 2.

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

2.PERFORM DECEL G SENSOR CALIBRATION

CAUTION:

• Never allow passenger or load on the vehicle.

• Never apply vibration to the vehicle body when opening or closing door during calibration.

(I) With CONSULT

Turn the ignition switch ON.

CAUTION:

Never start engine.

- 2. Select "ABS", "WORK SUPPORT", "DECEL G-SENSOR CALIBRATION" in this order.
- 3. Select "START".
- 4. After approx. 10 seconds, select "END".
- 5. Turn ignition switch OFF and then turn it ON again.
- CAUTION: Be sure to perform the operation above.

BRC-64

CALIBRATION OF DECEL G SENSOR

< BASIC INSPECTION >

[WITH VDC]

	-
>> GO TO 3. 3.CHECK DATA MONITOR	
	-
1. Drive the vehicle. Steer the steering wheel to the straight-ahead position. Stop the vehicle on level sur	-
face. 2. Select "ABS", "DATA MONITOR", "ECU INPUT SIGNALS" and "DECEL G-SENSOR" in this order. Chec that the signal is within the specified value.	۲
DECEL G-SENSOR : Approx. 0 G	
Is the inspection result normal?	
YES >> GO TO 4. NO >> GO TO 1.	
4. ERASE SELF-DIAGNOSIS MEMORY	
With CONSULT	-
Erase Self-diagnosis result of "ABS". Are the memories erased?	
YES >> GO TO 5.	_
NO >> Check the items indicated by the self-diagnosis.	
5.PERFORM DECEL G SENSOR CALIBRATION (TRANSMISSION)	_
Perform decel G sensor calibration. Refer to <u>TM-97, "Work Procedure"</u> .	
>> INSPECTION END	

C1101, C1102, C1103, C1104 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

DTC/CIRCUIT DIAGNOSIS C1101, C1102, C1103, C1104 WHEEL SENSOR

DTC Logic

INFOID:000000009012463

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1101	RR RH SENSOR-1	When an open circuit is detected in rear RH wheel sensor circuit.	
C1102	RR LH SENSOR-1	When an open circuit is detected in rear LH wheel sensor circuit.	Harness or connectorWheel sensor
C1103	FR RH SENSOR-1	When an open circuit is detected in front RH wheel sensor circuit.	 ABS actuator and electric unit (control unit)
C1104	FR LH SENSOR-1	When an open circuit is detected in front LH wheel sensor circuit.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

() With CONSULT

- 1. Turn the ignition switch OFF to ON.
- 2. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 3. Stop the vehicle.
- 4. Perform self-diagnosis for "ABS".

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

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-66, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

CAUTION:

Never check between wheel sensor harness connector terminals.

1.CHECK WHEEL SENSOR

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

Is the inspection result normal?

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

2.REPLACE WHEEL SENSOR (1)

(I) With CONSULT

- 1. Replace wheel sensor.
- Front: Refer to <u>BRC-143</u>, "FRONT WHEEL SENSOR : Removal and Installation"
- Rear: Refer to BRC-144, "REAR WHEEL SENSOR : Removal and Installation"
- 2. Erase self-diagnosis result for "ABS".
- 3. Turn the ignition switch OFF, and wait 10 seconds or more.
- 4. Start the engine.
- 5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 6. Stop the vehicle.

Revision: 2013 September

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INFOID:000000009012464

[WITH VDC]

C1101, C1102, C1103, C1104 WHEEL SENSOR
< DTC/CIRCUIT DIAGNOSIS > [WITH VDC]
7. Perform self-diagnosis for "ABS".
<u>Is DTC "C1101", "C1102", "C1103" or "C1104" detected?</u>
YES >> GO TO 3. NO >> INSPECTION END
3. CHECK CONNECTOR
 Turn the ignition switch OFF. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness. Check wheel sensor harness connector for disconnection or looseness. Is the inspection result normal? YES >> GO TO 5. NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 4. PERFORM SELF-DIAGNOSIS (1)
(ii) With CONSULT
 Erase self-diagnosis result for "ABS". Turn the ignition switch OFF, and wait 10 seconds or more. Start the engine. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
5. Stop the vehicle.
 Perform self-diagnosis for "ABS". <u>Is DTC "C1101", "C1102", "C1103" or "C1104" detected?</u>
YES >> GO TO 5.
NO >> INSPECTION END 5.CHECK TERMINAL
 Turn the ignition switch OFF. Disconnect ABS actuator and electric unit (control unit) harness connector and then check ABS actuator 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 terminals for damage or loose connection with harness connector.
Is the inspection result normal?
YES >> GO TO 7.
NO >> Repair or replace error-detected parts and GO TO 6.
6.PERFORM SELF-DIAGNOSIS (2)
 With CONSULT Connect ABS actuator and electric unit (control unit) harness connector. Connect wheel sensor harness connector. Erase self-diagnosis result for "ABS".
4. Turn the ignition switch OFF, and wait 10 seconds or more.
 Start the engine. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
7. Stop the vehicle.
8. Perform self-diagnosis for "ABS".
<u>Is DTC "C1101", "C1102", "C1103" or "C1104" detected?</u> YES >> GO TO 7.
NO >> INSPECTION END
7.CHECK WHEEL SENSOR HARNESS
 Turn the ignition switch OFF. Disconnect ABS actuator and electric unit (control unit) harness connector. Disconnect wheel sensor harness connector.

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Disconnect wheel sensor harness connector.
 Check continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector. (Check continuity when steering wheel is steered to RH and LH, or center harness in wheel housing is moved.)

C1101, C1102, C1103, C1104 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

Measurement terminal for	or power supply circuit				
ABS actuator and elec	S actuator and electric unit (control unit) Wheel sensor			Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
	20	E22 (Front LH)			
F20	33	E39 (Front RH)	4	Eviated	
E36	22	C10 (Rear LH)	1	Existed	
	35	C11 (Rear RH)			
Measurement terminal for	or signal circuit				
ABS actuator and elec	ctric unit (control unit)	Wheel	sensor	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
	34	E22 (Front LH)			
500	19	E39 (Front RH)	0	Encieta d	
E36	36	C10 (Rear LH)	2	Existed	
	21	C11 (Rear RH)			

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace error-detected parts and GO TO 8.

8. PERFORM SELF-DIAGNOSIS (3)

(D) With CONSULT

- T. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect wheel sensor harness connector.
- 3. Erase self-diagnosis result for "ABS".
- 4. Turn the ignition switch OFF, and wait 10 seconds or more.
- 5. Start the engine.
- 6. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 7. Stop the vehicle.
- 8. Perform self-diagnosis for "ABS".

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

- YES >> GO TO 9.
- NO >> INSPECTION END
- **9.**REPLACE WHEEL SENSOR

With CONSULT

- 1. Replace wheel sensor.
- Front: Refer to BRC-143, "FRONT WHEEL SENSOR : Removal and Installation"
- Rear: Refer to <u>BRC-144</u>, "REAR WHEEL SENSOR : Removal and Installation"
- 2. Erase self-diagnosis result for "ABS".
- 3. Turn the ignition switch OFF, and wait 10 seconds or more.
- 4. Start the engine.
- 5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 6. Stop the vehicle.
- 7. Perform self-diagnosis for "ABS".

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

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146, "Removal and Installa-</u> tion".
- NO >> INSPECTION END

< DTC/CIRCUIT DIAGNOSIS >

C1105, C1106, C1107, C1108 WHEEL SENSOR

DTC Logic

DTC DETECTION LOGIC

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INFOID:000000009012465

[WITH VDC]

DTC	Display Item	Malfunction detected condition	Possible causes	
C1105	RR RH SENSOR-2	 When power supply voltage of rear RH wheel sensor is low. When distance between rear RH wheel sensor and rear RH wheel sensor rotor is large. When installation of rear RH wheel sensor or rear RH wheel sensor rotor is not normal. 		
C1106	RR LH SENSOR-2	 When power supply voltage of rear LH wheel sensor is low. When distance between rear LH wheel sensor and rear LH wheel sensor rotor is large. When installation of rear LH wheel sensor or rear LH wheel sensor rotor is not normal. 	 Harness or connector Wheel sensor 	В
C1107	FR RH SENSOR-2	 When power supply voltage of front RH wheel sensor is low. When distance between front RH wheel sensor and front RH wheel sensor rotor is large. When installation of front RH wheel sensor or front RH wheel sensor rotor is not normal. 	 ABS actuator and electric unit (control unit) Sensor rotor 	
C1108	FR LH SENSOR-2	 When power supply voltage of front LH wheel sensor is low. When distance between front LH wheel sensor and front LH wheel sensor rotor is large. When installation of front LH wheel sensor or front LH wheel sensor rotor is not normal. 		
DTC CO	ONFIRMATION PROC	EDURE		
.PRE	CONDITIONING			
		EDURE" has been previously conducted, always	turn ignition switch OFF and	Ī

>> GO TO 2. 2. CHECK DTC DETECTION With CONSULT Turn the ignition switch OFF to ON. 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. 2. 3. Stop the vehicle. Perform self-diagnosis for "ABS". 4. Is DTC "C1105", "C1106", "C1107" or "C1108" detected? YES >> Proceed to diagnosis procedure. Refer to <u>BRC-69, "Diagnosis Procedure"</u>. >> INSPECTION END NO Diagnosis Procedure INFOID:000000009012466

CAUTION:

Never check between wheel sensor harness connector terminals.

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

Check ABS actuator and electric unit (control unit) power supply system. Refer to <u>BRC-122</u>, "<u>Diagnosis Proce-dure</u>".

Is the inspection result normal?

YES >> GO TO 2.

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

2.CHECK TIRE

- 1. Turn the ignition switch OFF.
- 2. Check tire air pressure, wear and size. Refer to WT-68, "Tire Air Pressure".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Adjust air pressure or replace tire and GO TO 3.

3.CHECK DATA MONITOR (1)

(B) With CONSULT

- 1. Erase self-diagnosis result for "ABS".
- 2. Turn the ignition switch OFF, and wait 10 seconds or more.
- 3. Start the engine.
- Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".

NOTE:

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

5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

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

4.PERFORM SELF-DIAGNOSIS (1)

(B) With CONSULT

- 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 2. Stop the vehicle.
- 3. Perform self-diagnosis for "ABS".

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

YES >> GO TO 5.

NO >> INSPECTION END

5.CHECK WHEEL SENSOR

- 1. Turn the ignition switch OFF.
- 2. Check wheel sensor for damage.
- Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 6.

6.REPLACE WHEEL SENSOR (1)

(B) With CONSULT

- 1. Replace wheel sensor.
- Front: Refer to BRC-143, "FRONT WHEEL SENSOR : Removal and Installation"
- Rear: Refer to BRC-144, "REAR WHEEL SENSOR : Removal and Installation"
- 2. Erase self-diagnosis result for "ABS".
- 3. Turn the ignition switch OFF, and wait 10 seconds or more.
- 4. Start the engine.
- 5. Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".

NOTE:

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

6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 7.

< DTC/CIRCUIT DIAGNOSIS > [WITH VDC]
NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146. "Removal and Installa-</u> tion".
7. PERFORM SELF-DIAGNOSIS (2)
(B)With CONSULT
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
2. Stop the vehicle.
 Perform self-diagnosis for "ABS". Is DTC "C1105", "C1106", "C1107" or "C1108" detected?
YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146, "Removal and Installa-</u>
tion".
NO >> INSPECTION END
8. CHECK CONNECTOR
1. Turn the ignition switch OFF.
 Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness. Check wheel sensor harness connector for disconnection or looseness.
Is the inspection result normal?
YES >> GO TO 11.
NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 9.
9. CHECK DATA MONITOR (2)
With CONSULT
1. Erase self-diagnosis result for "ABS".
 Turn the ignition switch OFF, and wait 10 seconds or more. Start the engine.
4. Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR"
and "RR RH SENSOR". NOTE:
Set the "DATA MONITOR" recording speed to "10 msec".
5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.
Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting
wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the differ- ence within 5%, respectively?
YES >> GO TO 10.
NO >> GO TO 11.
10.perform self-diagnosis (3)
With CONSULT
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
 Stop the vehicle. Perform self-diagnosis for "ABS".
Is DTC "C1105", "C1106", "C1107" or "C1108" detected?
YES >> GO TO 11.
NO >> INSPECTION END
11.CHECK TERMINAL
1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector and then check 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 14. NO >> Repair or replace error-detected parts and GO TO 12.
12. CHECK DATA MONITOR (3)

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect wheel sensor harness connector.
- 3. Erase self-diagnosis result for "ABS".
- 4. Turn the ignition switch OFF, and wait 10 seconds or more.
- 5. Start the engine.
- Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".

NOTE:

- Set the "DATA MONITOR" recording speed to "10 msec".
- 7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 13.

NO >> GO TO 14.

13.PERFORM SELF-DIAGNOSIS (4)

() With CONSULT

- 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 2. Stop the vehicle.
- 3. Perform self-diagnosis for "ABS".
- Is DTC "C1105", "C1106", "C1107" or "C1108" detected?
- YES >> GO TO 14.
- NO >> INSPECTION END

14.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 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
E36	20, 34		Not existed
	33, 19	Ground	
	22, 36	Giouna	
	35, 21	1	

Is the inspection result normal?

- YES >> GO TO 15.
- NO >> Repair or replace error-detected parts and GO TO 15.

15.CHECK DATA MONITOR (4)

() With CONSULT

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect wheel sensor harness connector.
- 3. Erase self-diagnosis result for "ABS".
- 4. Turn the ignition switch OFF, and wait 10 seconds or more.
- 5. Start the engine.
- Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".
 - NOTE:
 - Set the "DATA MONITOR" recording speed to "10 msec".
- 7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 16.

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C1105, C1106, C1107, C1108 WHEEL SENSOR	
< DTC/CIRCUIT DIAGNOSIS > [WITH VDC]	_
NO >> GO TO 17.	
16. PERFORM SELF-DIAGNOSIS (5)	
 With CONSULT Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. Stop the vehicle. Perform self-diagnosis for "ABS". <u>Is DTC "C1105", "C1106", "C1107" or "C1108" detected?</u> 	
YES >> GO TO 17.	
NO >> INSPECTION END	
17. REPLACE WHEEL SENSOR	
 With CONSULT Replace wheel sensor. Front: Refer to <u>BRC-143</u>, "FRONT WHEEL SENSOR : Removal and Installation" 	
 Rear: Refer to <u>BRC-144, "REAR WHEEL SENSOR : Removal and Installation"</u> Erase self-diagnosis result for "ABS". 	_
3. Turn the ignition switch OFF, and wait 10 seconds or more.	I
 Start the engine. Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR". 	
NOTE: Set the "DATA MONITOR" recording speed to "10 msec".	
6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor. Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the differ-	
ence within 5%, respectively?	
YES >> GO TO 18. NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146. "Removal and Installa-</u> tion".	
18. PERFORM SELF-DIAGNOSIS (6)	
 Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. 	
 Stop the vehicle. Perform self-diagnosis for "ABS". 	
Is DTC "C1105", "C1106", "C1107" or "C1108" detected? YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146, "Removal and Installa-</u>	
tion". NO >> INSPECTION END	

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< DTC/CIRCUIT DIAGNOSIS >

C1109 POWER AND GROUND SYSTEM

Description

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

DTC Logic

INFOID:000000009012468

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

() With CONSULT

- Turn the ignition switch OFF to ON.
- 2. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 3. Stop the vehicle.
- 4. Perform self-diagnosis for "ABS".

Is DTC "C1109" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-74, "Diagnosis Procedure"</u>.
- NO >> INSPECTION ĔND

Diagnosis Procedure

INFOID:000000009012469

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

ABS actuator and ele	BS actuator and electric unit (control unit)		Voltage
Connector	Terminal		vollage
E36	18	Ground	Approx. 0 V

4. Turn the ignition switch ON.

CAUTION:

Never start engine.

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

ABS actuator and ele	ctric unit (control unit)		Voltage	
Connector	Terminal		voliage	
E36	18	Ground	10 – 16 V	

Is the inspection result normal?

YES >> GO TO 3.

INFOID:000000009012467

[WITH VDC]

C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 2.

. Turn the ignition	n switch OFF.				
. Check 10Å fuse	e (#57).				
			electric unit (cont	trol unit) harn	ess connector and IPDM E/R
ABS actuator and elect	tric unit (control unit)	IPD	M E/R		_
Connector	Terminal	Connector	Terminal	- Continuity	
E36	18	E15	59	Existed	
. Check for cont ground.	tinuity between A	BS actuator a	and electric unit	t (control unit)	harness connector and the
ABS actuator and elect	tric unit (control unit)		Continuity	•	
Connector	Terminal		Continuity	_	
E36	18	Ground	Not existed	-	
the inspection res	sult normal?				
	n trouble diagnosi R SUPPLY -".	s for ignition p	ower supply. Re	efer to <u>PG-59,</u>	"Wiring Diagram - IGNITION
	or replace error-d	etected parts.			
•	•	•		JNIT) IGNITIO	N POWER SUPPLY (2)
. Turn the ignition			,	,	
		uator and elec	tric unit (control	unit) harness	connector and ground.
				,	
				,	_
	lectric unit (control uni	t)	_		_
Connector	Terminal		-	Voltage	-
Connector E37	Terminal 49				-
Connector E37 . Turn the ignition	Terminal 49			Voltage	- -
Connector E37 . Turn the ignition CAUTION: Never start en	Terminal 49 n switch ON. gine.	Gro		Voltage Approx. 0 V	- -
Connector E37 . Turn the ignition CAUTION: Never start en	Terminal 49 n switch ON. gine.	Gro		Voltage Approx. 0 V	connector and ground.
Connector E37 . Turn the ignition CAUTION: Never start en . Check voltage l	Terminal 49 n switch ON. gine. between ABS actu	Gro uator and elec		Voltage Approx. 0 V	 connector and ground.
Connector E37 . Turn the ignition CAUTION: Never start en . Check voltage	Terminal 49 n switch ON. gine. between ABS action lectric unit (control unit	Gro uator and elec		Voltage Approx. 0 V	connector and ground.
Connector E37 Turn the ignition CAUTION: Never start en Check voltage I ABS actuator and el Connector	Terminal 49 n switch ON. gine. between ABS actu lectric unit (control uni Terminal	Group	etric unit (control	Voltage Approx. 0 V unit) harness Voltage	connector and ground.
Connector E37 Turn the ignition CAUTION: Never start en Check voltage ABS actuator and el Connector E37	Terminal 49 n switch ON. gine. between ABS actu- lectric unit (control uni Terminal 49	Group		Voltage Approx. 0 V unit) harness	connector and ground.
Connector E37 . Turn the ignition CAUTION: Never start en Check voltage I ABS actuator and el Connector E37 s the inspection res	Terminal 49 n switch ON. gine. between ABS actu lectric unit (control uni Terminal 49 sult normal?	Group	etric unit (control	Voltage Approx. 0 V unit) harness Voltage	connector and ground.
Connector E37 . Turn the ignition CAUTION: Never start en . Check voltage I ABS actuator and el Connector E37 : the inspection res YES >> GO TO	Terminal 49 n switch ON. gine. between ABS actu lectric unit (control uni Terminal 49 sult normal? 5.	Group	etric unit (control	Voltage Approx. 0 V unit) harness Voltage	connector and ground.
Connector E37 Turn the ignition CAUTION: Never start en Check voltage I ABS actuator and el Connector E37 the inspection res YES >> GO TO NO >> GO TO	Terminal 49 n switch ON. gine. between ABS actu- lectric unit (control unit Terminal 49 sult normal? 5. 4.	uator and elec	etric unit (control	Voltage Approx. 0 V unit) harness Voltage 10 – 16 V	- -
Connector E37 Turn the ignition CAUTION: Never start en Check voltage ABS actuator and el Connector E37 the inspection res YES >> GO TO NO >> GO TO	Terminal 49 n switch ON. gine. between ABS actu- lectric unit (control unit Terminal 49 sult normal? 5. 4.	uator and elec	etric unit (control	Voltage Approx. 0 V unit) harness Voltage 10 – 16 V	
Connector E37 Turn the ignition CAUTION: Never start en Check voltage ABS actuator and el Connector E37 the inspection res YES >> GO TO NO >> GO TO CHECK ABS AC 2) Turn the ignition	Terminal 49 n switch ON. gine. between ABS actu- lectric unit (control uni Terminal 49 <u>sult normal?</u> 5. 4. CTUATOR AND EL	uator and elec	etric unit (control	Voltage Approx. 0 V unit) harness Voltage 10 – 16 V	- -
Connector E37 Turn the ignition CAUTION: Never start en Check voltage I ABS actuator and el Connector E37 the inspection res YES >> GO TO NO >> GO TO CHECK ABS AC C Turn the ignition Check 10A fuse	Terminal 49 n switch ON. gine. between ABS actu- lectric unit (control uni Terminal 49 sult normal? 5. 4. CTUATOR AND EL n switch OFF. e (#74).	uator and elec	tric unit (control	Voltage Approx. 0 V unit) harness Voltage 10 – 16 V NIT) IGNITIOI	N POWER SUPPLY CIRCUIT
Connector E37 Turn the ignition CAUTION: Never start en Check voltage I ABS actuator and el Connector E37 the inspection res YES >> GO TO NO >> GO TO CHECK ABS AC Check 10A fuse Check continuit	Terminal 49 n switch ON. gine. between ABS actu lectric unit (control unit Terminal 49 sult normal? 5. 4. CTUATOR AND EL n switch OFF. e (#74). ty and short circui	LECTRIC UNI	tric unit (control	Voltage Approx. 0 V unit) harness Voltage 10 – 16 V NIT) IGNITIOI	- -
Connector E37 . Turn the ignition CAUTION: Never start en Check voltage ABS actuator and el Connector E37 the inspection res YES >> GO TO NO >> GO TO NO >> GO TO CHECK ABS AC 2) . Turn the ignition Check 10A fuse . Check continuit terminal (49) ar	Terminal 49 n switch ON. gine. between ABS actu- lectric unit (control uni Terminal 49 sult normal? 5. 4. CTUATOR AND EL n switch OFF. e (#74). ty and short circui nd 10A fuse (#74)	LECTRIC UNI	tric unit (control	Voltage Approx. 0 V unit) harness Voltage 10 – 16 V NIT) IGNITIOI	N POWER SUPPLY CIRCUIT
Connector E37 Turn the ignition CAUTION: Never start en Check voltage ABS actuator and el Connector E37 the inspection res YES >> GO TO NO >> GO TO CHECK ABS AC Check 10A fuse Check continuit terminal (49) ar	Terminal 49 n switch ON. gine. between ABS actu- lectric unit (control uni Terminal 49 sult normal? 5. 4. CTUATOR AND EL n switch OFF. e (#74). ty and short circui nd 10A fuse (#74) sult normal?	uator and elec t) Gro Gro Gro CECTRIC UNI t between ABS	etric unit (control	Voltage Approx. 0 V unit) harness Voltage 10 – 16 V NIT) IGNITIOI	N POWER SUPPLY CIRCUIT
Connector E37 . Turn the ignition CAUTION: Never start en . Check voltage I ABS actuator and el Connector E37 Sthe inspection res YES >> GO TO NO >> GO TO NO >> GO TO . CHECK ABS AC 2) . Turn the ignition . Check 10A fuse . Check continuit terminal (49) ar Sthe inspection res YES >> Perform POWEI	Terminal 49 n switch ON. gine. between ABS actu- lectric unit (control uni Terminal 49 sult normal? 5. 4. CTUATOR AND EL n switch OFF. e (#74). ty and short circui nd 10A fuse (#74) sult normal?	Group	tric unit (control	Voltage Approx. 0 V unit) harness Voltage 10 – 16 V NIT) IGNITIOI	N POWER SUPPLY CIRCUIT

BRC-75

[WITH VDC]

C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

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

1. Turn the ignition switch OFF.

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

ABS actuator and ele	ectric unit (control unit)	_	Continuity
Connector	Terminal		Continuity
E36	2		
E30	3	Ground	Existed
E37	48		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.CHECK TERMINAL

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146. "Removal and Installa-</u> tion".

NO >> Repair or replace error-detected parts.

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

DTC Logic

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1111	PUMP MOTOR	 When a malfunction is detected in motor or motor relay. When a low pressure malfunction is detected in accumulator. When a malfunction is detected in accumulator pressure sensor. 	 Harness or connector ABS actuator and electric unit (control unit) Fusible link Battery power supply system Motor/accumulator assembly
		•	wolon/accumulator assembly
		DURE" has been previously conducted, always	s turn ignition switch OFE and
	east 10 seconds before c		
つ	>> GO TO 2.		
	CK DTC DETECTION		
1. Turr 2. Star	t the engine and wait for		uator and electric unit (control
 Turr Star Stop unit 	n the ignition switch OFF t the engine and wait for o the vehicle and depress) motor repeats ON and 0	3 minutes or more. the brake pedal, and then operate the ABS act PFF 4 times or more.	uator and electric unit (control
 Turr Star Stop unit Period 	n the ignition switch OFF t the engine and wait for o the vehicle and depress) motor repeats ON and (form self-diagnosis for "A	3 minutes or more. the brake pedal, and then operate the ABS act PFF 4 times or more.	uator and electric unit (control
1. Turr 2. Star 3. Stop unit 4. Peri <u>Is DTC '</u> YES	the ignition switch OFF t the engine and wait for t the vehicle and depress motor repeats ON and (form self-diagnosis for "A <u>(C1111" detected?</u> >> Proceed to diagnosis	3 minutes or more. the brake pedal, and then operate the ABS act PFF 4 times or more.	
 Turr Star Stop unit Peri <u>Is DTC</u> YES NO 	the ignition switch OFF t the engine and wait for t the vehicle and depress motor repeats ON and (form self-diagnosis for "A <u>(C1111" detected?</u> >> Proceed to diagnosis >> INSPECTION END	3 minutes or more. the brake pedal, and then operate the ABS act PFF 4 times or more. 3S".	edure".
 Turr Star Stop unit Peri <u>Is DTC</u> YES NO 	the ignition switch OFF t the engine and wait for t the vehicle and depress motor repeats ON and (form self-diagnosis for "A <u>(C1111" detected?</u> >> Proceed to diagnosis	3 minutes or more. the brake pedal, and then operate the ABS act PFF 4 times or more. 3S".	
 Turr Star Stop unit Peri <u>Is DTC '</u> YES NO Diagno 	the ignition switch OFF the engine and wait for the vehicle and depress motor repeats ON and 0 form self-diagnosis for "A <u>C1111" detected?</u> >> Proceed to diagnosis >> INSPECTION END osis Procedure	3 minutes or more. the brake pedal, and then operate the ABS act PFF 4 times or more. 3S".	edure".
1. Turr 2. Star 3. Stop 4. Peri <u>Is DTC '</u> YES NO Diagno 1. CHE 1. Turr 2. Disc	the ignition switch OFF the engine and wait for the vehicle and depress motor repeats ON and C form self-diagnosis for "A <u>C1111" detected?</u> >> Proceed to diagnosis >> INSPECTION END DSIS Procedure CK ABS MOTOR AND M the ignition switch OFF.	 B minutes or more. the brake pedal, and then operate the ABS act DFF 4 times or more. 3S". procedure. Refer to <u>BRC-77, "Diagnosis Proce</u> DTOR RELAY POWER SUPPLY electric unit (control unit) harness connector. 	edure". INFOID:000000009012471
1. Turr 2. Star 3. Stop 4. Peri <u>Is DTC '</u> YES NO Diagno 1. CHE 1. Turr 2. Disc	the ignition switch OFF the engine and wait for the vehicle and depress motor repeats ON and C form self-diagnosis for "A <u>C1111" detected?</u> >> Proceed to diagnosis >> INSPECTION END DSIS Procedure CK ABS MOTOR AND M the ignition switch OFF.	3 minutes or more. the brake pedal, and then operate the ABS act PFF 4 times or more. 3S". procedure. Refer to <u>BRC-77, "Diagnosis Proce</u> DTOR RELAY POWER SUPPLY	edure". INFOID:000000009012471
1. Turr 2. Star 3. Stop unit 4. Peri <u>Is DTC</u> YES NO Diagno 1. CHE 1. Turr 2. Disc 3. Che	the ignition switch OFF the engine and wait for the vehicle and depress motor repeats ON and C form self-diagnosis for "A <u>C1111" detected?</u> >> Proceed to diagnosis >> INSPECTION END DSIS Procedure CK ABS MOTOR AND M the ignition switch OFF.	3 minutes or more. the brake pedal, and then operate the ABS act DFF 4 times or more. 3S". procedure. Refer to <u>BRC-77. "Diagnosis Proce</u> DTOR RELAY POWER SUPPLY electric unit (control unit) harness connector. actuator and electric unit (control unit) harness hit)	edure". INFOID:000000009012471
1. Turr 2. Star 3. Stop unit 4. Perf <u>IS DTC '</u> YES NO Diagno 1.CHE 1. Turr 2. Disc 3. Che ABS actu	the ignition switch OFF the engine and wait for the vehicle and depress motor repeats ON and C form self-diagnosis for "A <u>C1111" detected?</u> >> Proceed to diagnosis >> INSPECTION END OSIS Procedure CK ABS MOTOR AND M the ignition switch OFF. connect ABS actuator and eck voltage between ABS	 B minutes or more. the brake pedal, and then operate the ABS act DFF 4 times or more. 3S". procedure. Refer to <u>BRC-77, "Diagnosis Proce</u> DTOR RELAY POWER SUPPLY electric unit (control unit) harness connector. actuator and electric unit (control unit) harness 	edure". INFOID:000000009012471
1. Turr 2. Star 3. Stop unit 4. Peri <u>Is DTC '</u> YES NO Diagno 1. CHE 1. Turr 2. Disc 3. Che ABS actu	the ignition switch OFF the engine and wait for the vehicle and depress motor repeats ON and C form self-diagnosis for "A <u>C1111" detected?</u> >> Proceed to diagnosis >> INSPECTION END OSIS Procedure CK ABS MOTOR AND M the ignition switch OFF. connect ABS actuator and eck voltage between ABS	3 minutes or more. the brake pedal, and then operate the ABS act DFF 4 times or more. 3S". procedure. Refer to <u>BRC-77. "Diagnosis Proce</u> DTOR RELAY POWER SUPPLY electric unit (control unit) harness connector. actuator and electric unit (control unit) harness hit)	edure". INFOID:000000009012471

Never start engine.

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

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal	—	voltage
E36	4	Ground	Battery voltage
E37	47	Globalia	Dattery voltage

Is the inspection result normal?

YES >> GO TO 3.

Ρ

[WITH VDC]

INFOID:000000009012470

А

В

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 2.

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Check 50Å fusible link (M).
- 3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (4 or 47) and 50A fusible link (M).

Is the inspection result normal?

- YES >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-11, "Wiring Diagram BATTERY</u> <u>POWER SUPPLY -"</u>.
- NO >> Repair or replace error-detected parts.

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

1. Turn the ignition switch OFF.

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

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
E36	2	Ground	
230	3		Existed
E37	48		
1 4 1 4	1. 10		

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK MOTOR/ACCUMULATOR ASSEMBLY

Check motor/accumulator assembly. Refer to BR-15, "Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace motor/accumulator assembly. Refer to <u>BR-29</u>, "<u>Removal and Installation</u>" and <u>BR-30</u>, <u>"Disassembly and Assembly"</u>.

5.CHECK TERMINAL

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146, "Removal and Installa-</u> tion".
- NO >> Repair or replace error-detected parts.

Malfunction detected condition

< DTC/CIRCUIT DIAGNOSIS >

C1115 WHEEL SENSOR

Display Item

DTC

А

В

2C

INFOID:000000009012472

Possible causes

[WITH VDC]

DIC	Display item	Manufaction detected condition	Possible causes
C1115	ABS SENSOR [ABNORMAL SIGNAL]	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.	 Harness or connector Wheel sensor Sensor rotor ABS actuator and electric unit (control unit)
DTC CO	ONFIRMATION PROCED	DURE	
	CONDITIONING		
f "DTC	CONFIRMATION PROCED	URE" has been previously conducted, always	turn ignition switch OFF and
	east 10 seconds before con		J
)	>> GO TO 2.		
L.CHE	CK DTC DETECTION		
	CONSULT n the ignition switch OFF to	ON	
2. Driv	e the vehicle at approx. 30	km/h (19 MPH) or more for approx. 1 minute.	
	o the vehicle. form self-diagnosis for "ABS	וור	
	C1115" detected?	· ·	
YES		rocedure. Refer to <u>BRC-79, "Diagnosis Proce</u>	dure".
NO	>> INSPECTION END		
Diagno	osis Procedure		INFOID:000000009012473
)N·		
	eel sensor, never check be	etween terminals.	
.CHE	CK ABS ACTUATOR AND	ELECTRIC UNIT (CONTROL UNIT) POWER	SUPPLY SYSTEM
	BS actuator and electric un	it (control unit) power supply system. Refer to	BRC-122, "Diagnosis Proce-
<u>lure"</u> .			
<u>s the in</u> YES	spection result normal? >> GO TO 2.		
NO	>> Repair or replace error	-detected parts.	
2.CHE	CK TIRE		
	n the ignition switch OFF.		
		nd size. Refer to <u>WT-68, "Tire Air Pressure"</u> .	
	spection result normal? >> GO TO 5.		
YES NO	>> Adjust air pressure or r	eplace tire and GO TO 3.	
•	CK DATA MONITOR (1)		
_	CONSULT		
1. Era	se self-diagnosis result for "		
	n the ignition switch OFF, ar t the engine.	nd wait 10 seconds or more.	
I. Sele	ect "ABS" and "DATA MON	ITOR", check "FR LH SENSOR", "FR RH S	ENSOR", "RR LH SENSOR"
and	"RR RH SENSOR".		

DTC Logic

DTC DETECTION LOGIC

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

NOTE:

BRC-79

< DTC/CIRCUIT DIAGNOSIS >

5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor. <u>Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting</u> <u>wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the differ-</u> <u>ence within 5%, respectively?</u>

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

4.PERFORM SELF-DIAGNOSIS (1)

With CONSULT

- 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 2. Stop the vehicle.
- 3. Perform self-diagnosis for "ABS".

Is DTC "C1115" detected?

- YES >> GO TO 5.
- NO >> INSPECTION END
- **5.**CHECK WHEEL SENSOR
- 1. Turn the ignition switch OFF.
- 2. Check wheel sensor for damage.

Is the inspection result normal?

YES	>> GO TO 8.
NO	>> GO TO 6.

6.REPLACE WHEEL SENSOR (1)

With CONSULT

- 1. Replace wheel sensor.
- Front: Refer to <u>BRC-143</u>, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-144, "REAR WHEEL SENSOR : Removal and Installation".
- 2. Erase self-diagnosis result for "ABS".
- 3. Turn the ignition switch OFF, and wait 10 seconds or more.
- 4. Start the engine.
- Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".

NOTE:

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

6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 7.

NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146. "Removal and Installa-</u> tion".

7. PERFORM SELF-DIAGNOSIS (2)

(B) With CONSULT

- 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 2. Stop the vehicle.
- 3. Perform self-diagnosis for "ABS".
- Is DTC "C1115" detected?
- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146, "Removal and Installa-</u> tion".

NO >> INSPECTION END

8. CHECK CONNECTOR

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

Is the inspection result normal?

	[WITH VDC]
< DTC/CIRCUIT DIAGNOSIS >	
YES >> GO TO 11. NO >> Repair or replace error-detected parts, securely lock the connector, and GO	TO 9.
9. CHECK DATA MONITOR (2)	
Erase self-diagnosis result for "ABS".	
 Turn the ignition switch OFF, and wait 10 seconds or more. 	
 Start the engine. Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR' and "RR RH SENSOR". 	', "RR LH SENSOR"
NOTE: Sat the "DATA MONITOR" recording speed to "10 meas"	
Set the "DATA MONITOR" recording speed to "10 msec". Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel	l sensor.
Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by	
wheel sensor and the maximum/minimum wheel speed detected by the normal wheel s	
ence within 5%, respectively?	
YES >> GO TO 10. NO >> GO TO 11.	
0.PERFORM SELF-DIAGNOSIS (3)	
 Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. Stop the vehicle. 	
Perform self-diagnosis for "ABS".	
DTC "C1115" detected?	
YES >> GO TO 11.	
NO >> INSPECTION END	
1.CHECK TERMINAL	
Turn the ignition switch OFF.	<u> </u>
 Disconnect ABS actuator and electric unit (control unit) harness connector and then and electric unit (control unit) pin terminals for damage or loose connection with harn Disconnect wheel sensor harness connector and check each wheel sensor pin tern loose connection with harness connector. 	less connector.
the inspection result normal?	
YES >> GO TO 14.	
NO >> Repair or replace error-detected parts and GO TO 12.	
2.CHECK DATA MONITOR (3)	
. Connect ABS actuator and electric unit (control unit) harness connector.	
 Connect wheel sensor harness connector. Erase self-diagnosis result for "ABS". 	
. Turn the ignition switch OFF, and wait 10 seconds or more.	
. Start the engine.	
Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR' and "RR RH SENSOR". NOTE:	', "RR LH SENSOR"
Set the "DATA MONITOR" recording speed to "10 msec".	
7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel	sensor.
Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by	
wheel sensor and the maximum/minimum wheel speed detected by the normal wheel s	sensors, is the differ-
ence within 5%, respectively?	
YES >> GO TO 13. NO >> GO TO 14.	
10 <i>>></i> 80 10 14.	

13. PERFORM SELF-DIAGNOSIS (4)

With CONSULT
Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.

< DTC/CIRCUIT DIAGNOSIS >

2. Stop the vehicle.

3. Perform self-diagnosis for "ABS".

Is DTC "C1115" detected?

YES >> GO TO 14.

NO >> INSPECTION END

14.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 continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector. (Check continuity when steering wheel is steered to RH and LH, or center harness in wheel housing is moved.)

Measurement terminal for power supply circuit

ABS actuator and ele	ectric unit (control unit)	Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
	20	E22 (Front LH)		
E36	33	E39 (Front RH)	1	Existed
E30	22	C10 (Rear LH)	- 1	Existed
	35	C11 (Rear RH)		

Measurement termina	l for signal circuit			
ABS actuator and el	ectric unit (control unit)	Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
	34	E22 (Front LH)		Existed
Fac	19	E39 (Front RH)		
E36	36	C10 (Rear LH)	2	Existed
	21	C11 (Rear RH)		

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

ABS actuator and el	ABS actuator and electric unit (control unit)		Continuity	
Connector	Terminal		Continuity	
	20, 34		Not existed	
E36	33, 19	Ground		
230	22, 36	Giodila	NOT EXISTEN	
	35, 21			

Is the inspection result normal?

YES >> GO TO 15.

NO >> Repair or replace error-detected parts and GO TO 15.

15.CHECK DATA MONITOR (4)

() With CONSULT

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect wheel sensor harness connector.
- 3. Erase self-diagnosis result for "ABS".
- 4. Turn the ignition switch OFF, and wait 10 seconds or more.
- 5. Start the engine.
- Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".

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

7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

NOTE:

IMITH VDC1

< DTC/CIRCUIT DIAGNOSIS > [WITH VDC	2]
Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting	ng
wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5% manual wheel sensors.	<u>ər-</u>
ence within 5%, respectively?	
YES >> GO TO 16. NO >> GO TO 17.	
16. PERFORM SELF-DIAGNOSIS (5)	
(P)With CONSULT	
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.	
2. Stop the vehicle.	
3. Perform self-diagnosis for "ABS".	
Is DTC "C1115" detected?	
YES >> GO TO 17.	
NO >> INSPECTION END	
17.REPLACE WHEEL SENSOR	
With CONSULT	
1. Replace wheel sensor.	1
- Front: Refer to <u>BRC-143</u> , "FRONT WHEEL SENSOR : Removal and Installation".	
 Rear: Refer to <u>BRC-144, "REAR WHEEL SENSOR : Removal and Installation"</u>. Erase self-diagnosis result for "ABS". 	
3. Turn the ignition switch OFF, and wait 10 seconds or more.	
4. Start the engine.	
5. Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOI	R"
and "RR RH SENSOR". NOTE:	
Set the "DATA MONITOR" recording speed to "10 msec".	
6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.	
Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting	ng
wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the diffe	
ence within 5%, respectively?	
YES >> GO TO 18.	
NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146, "Removal and Install</u> tion".	<u>a-</u>
18.PERFORM SELF-DIAGNOSIS (6)	
With CONSULT	
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.	
 Stop the vehicle. Perform self-diagnosis for "ABS". 	
Is DTC "C1115" detected?	
YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146</u> , "Removal and Install	
tion".	<u>a-</u>
NO >> INSPECTION END	

< DTC/CIRCUIT DIAGNOSIS >

C1116 STOP LAMP SWITCH

DTC Logic

INFOID:000000009012474

INFOID:000000009012475

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1116	STOP LAMP SW	 When stop lamp switch signal is not input when brake pedal depress. When stop lamp switch signal is not input when stop lamp relay operates. 	 Harness or connector Stop lamp switch Stop lamp relay ABS actuator and electric unit (control unit) Battery power supply system

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(D) With CONSULT

1. Turn the ignition switch OFF to ON.

2. Perform self-diagnosis for "ABS".

Is DTC "C1116" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-84, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

NOTE:

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

1.INTERVIEW FROM THE CUSTOMER

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

Is there such a history?

YES	>> GO TO 2.

NO >> GO TO 3.

2. PERFORM SELF-DIAGNOSIS

With CONSULT

- 1. Erase self-diagnosis result for "ABS".
- 2. Turn the ignition switch OFF, and wait 10 seconds or more.
- 3. Start the engine.
 - CAUTION:

Never start the vehicle.

- 4. Depress the brake pedal several times.
- 5. Perform self-diagnosis for "ABS".

Is DTC "C1116" detected?

YES >> GO TO 4.

NO >> INSPECTION END

Depress brake pedal and check that stop lamp turns ON.

< DTC/CIRCUIT DIAGNOSIS >	[WITH VDC]
Does stop lamp turn ON?	
YES >> GO TO 5.	- 11
NO >> Check stop lamp system. Refer to <u>EXL-108, "BODY SIDE : Diagnosis Procedur</u>	<u>e"</u> .
4.CHECK DATA MONITOR (1)	
With CONSULT 1. Erase self-diagnosis result for "ABS".	
2. Turn the ignition switch OFF, and wait 10 seconds or more.	
3. Start the engine.	
CAUTION: Never start the vehicle.	
4. Select "ABS", "DATA MONITOR" and "STOP LAMP SW" according to this order. Check	
 displays "On" or "Off" when brake pedal is depress or release. Refer to <u>BRC-44, "Reference</u> Select "ABS", "DATA MONITOR" and "PRESS SENSOR" according to this order. Check 	
displays "5 bar" or less when brake pedal is depress. Refer to <u>BRC-44. "Reference Valu</u>	
Is the inspection result normal?	_
YES >> INSPECTION END	-
NO >> GO TO 5.	E
5. CHECK STOP LAMP SWITCH CLEARANCE	
1. Turn the ignition switch OFF.	
2. Check stop lamp clearance. Refer to <u>BR-7, "Inspection and Adjustment"</u> .	
Is the inspection result normal? YES >> GO TO 7.	
NO >> Adjust stop lamp switch clearance. Refer to <u>BR-7, "Inspection and Adjustment"</u> .	GO TO 6.
6. CHECK DATA MONITOR (2)	
With CONSULT	
1. Erase self-diagnosis result for "ABS".	
 Turn the ignition switch OFF, and wait 10 seconds or more. Start the engine. 	
CAUTION:	
Never start the vehicle. 4. Select "ABS", "DATA MONITOR" and "STOP LAMP SW" according to this order. Check	that data monitor
displays "On" or "Off" when brake pedal is depress or release. Refer to <u>BRC-44, "Refere</u>	
5. Select "ABS", "DATA MONITOR" and "PRESS SENSOR" according to this order. Check	that data monitor
displays "5 bar" or less when brake pedal is depress. Refer to <u>BRC-44, "Reference Value</u>	<u>e"</u> .
<u>s the inspection result normal?</u> YES >> INSPECTION END	
NO $>>$ GO TO 7.	
CHECK STOP LAMP SWITCH	
Check stop lamp switch. Refer to BRC-93, "Component Inspection (Stop lamp Switch)".	
Is the inspection result normal?	
YES >> GO TO 9.	
NO >> Repair or replace stop lamp switch. Refer to <u>BR-20, "Removal and Installation"</u> .	GO TO 8.
3. CHECK DATA MONITOR (3)	
With CONSULT	
 Erase self-diagnosis result for "ABS". Turn the ignition switch OFF, and wait 10 seconds or more. 	
3. Start the engine.	
CAUTION: Nover start the vehicle	
 Never start the vehicle. Select "ABS", "DATA MONITOR" and "STOP LAMP SW" according to this order. Check 	that data monitor
displays "On" or "Off" when brake pedal is depress or release. Refer to BRC-44, "Reference	<u>ence Value"</u> .
 Select "ABS", "DATA MONITOR" and "PRESS SENSOR" according to this order. Check displays "5 bar" or less when brake pedal is depress. Refer to <u>BRC-44, "Reference Valu</u> 	
Is the inspection result normal?	<u>.</u> .

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< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

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

 $\sim >> GO 10 9.$

9.CHECK CONNECTOR AND TERMINAL (1)

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

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace error-detected parts. GO TO 10.

10.CHECK DATA MONITOR (4)

With CONSULT

- 1. Erase self-diagnosis result for "ABS".
- 2. Turn the ignition switch OFF, and wait 10 seconds or more.
- 3. Start the engine. CAUTION:

Never start the vehicle.

- 4. Select "ABS", "DATA MONITOR" and "STOP LAMP SW" according to this order. Check that data monitor displays "On" or "Off" when brake pedal is depress or release. Refer to <u>BRC-44, "Reference Value"</u>.
- 5. Select "ABS", "DATA MONITOR" and "PRESS SENSOR" according to this order. Check that data monitor displays "5 bar" or less when brake pedal is depress. Refer to <u>BRC-44, "Reference Value"</u>.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 11.

11.CHECK STOP LAMP SWITCH POWER SUPPLY (1)

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

ABS actuator and ele	ectric unit (control unit)		Condition	Voltago	
Connector	Terminal	—	Condition	Voltage	
E36	17	Ground	Brake pedal depressed	Approx. 0 V	
E30	17	Ground	Brake pedal not depressed		

3. Turn the ignition switch ON.

CAUTION:

Never start engine.

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

ABS actuator and ele	and electric unit (control unit)		Condition	Voltage
Connector	Terminal		Condition	vonage
E36	17 Cround	Ground	Brake pedal depressed	Battery voltage
E30		Ground	Brake pedal not depressed	Approx. 0 V

Is the inspection result normal?

YES >> GO TO 16.

NO >> GO TO 12.

12.CHECK STOP LAMP SWITCH CIRCUIT (1)

1. Turn the ignition switch OFF.

2. Disconnect stop lamp switch harness connector.

< DTC/CIRCUIT DIAGNOSIS >

3. Check 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 lan	np switch	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E36	17	E115	4	Existed

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

ABS actuator and electric unit (control unit)			Continuity	
Connector	Terminal		Continuity	
E36	17	Ground	Not existed	

Is the inspection result normal?

YES >> GO TO 13.

NO >> Repair or replace error-detected parts.

13.CHECK STOP LAMP SWITCH POWER SUPPLY (2)

Check voltage between stop lamp switch harness connector and ground. 1.

Stop lar	np switch		Voltage
Connector	Terminal		vollage
E115	3	Ground	Approx. 0 V

Turn the ignition switch ON.

CAUTION: Never start engine.

3. Check voltage between stop lamp switch harness connector and ground.

Stop lan	Stop lamp switch		Voltago
Connector	Terminal		Voltage
E115	3	Ground	Battery voltage
s the inspection	result normal?	·	

Is the inspection result normal?

>> Check pin terminals and connection of stop lamp switch harness connector for abnormal condi-YES tions. Repair or replace error-detected parts.

NO >> GO TO 14.

14. CHECK STOP LAMP SWITCH CIRCUIT (2)

Turn the ignition switch OFF. 1.

Check 10A fuse (#3). 2.

- 3. Disconnect fuse block (J/B) harness connector.
- 4. Check fuse block (J/B) pin terminals for damage or loose connection with harness connector.
- 5. Check continuity between stop lamp switch harness connector and fuse block (J/B).

Stop lan	np switch	Fuse bl	Continuity	
Connector	Terminal	Connector Terminal		Continuity
E115	3	E103	4F	Existed

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to PG-59, "Wiring Diagram - IGNITION POWER SUPPLY -"

NO >> Repair or replace error-detected parts. GO TO 15.

15. CHECK DATA MONITOR (5)

With CONSULT

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

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[WITH VDC]

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< DTC/CIRCUIT DIAGNOSIS >

- 2. Connect stop lamp switch harness connector.
- 3. Connect fuse block (J/B) harness connector.
- 4. Erase self-diagnosis result for "ABS".
- 5. Turn the ignition switch OFF, and wait 10 seconds or more.
- 6. Start the engine. CAUTION:

Never start the vehicle.

- 7. Select "ABS", "DATA MONITOR" and "STOP LAMP SW" according to this order. Check that data monitor displays "On" or "Off" when brake pedal is depress or release. Refer to <u>BRC-44</u>, "<u>Reference Value</u>".
- 8. Select "ABS", "DATA MONITOR" and "PRESS SENSOR" according to this order. Check that data monitor displays "5 bar" or less when brake pedal is depress. Refer to <u>BRC-44, "Reference Value"</u>.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 16.

16.CHECK STOP LAMP SWITCH POWER SUPPLY (3)

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

3. Check 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	voltage
E36	E36 37	Ground	Brake pedal depressed	Battery voltage
E30	57	Ground	Brake pedal not depressed	Approx. 0 V

4. Turn the ignition switch ON.

CAUTION:

Never start engine.

5. Check 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	voltage
E36	E36 37	Ground	Brake pedal depressed	Battery voltage
230		Gibuna	Brake pedal not depressed	Approx. 0 V

Is the inspection result normal?

YES >> GO TO 21.

NO >> GO TO 17.

17.CHECK STOP LAMP SWITCH CIRCUIT (3)

1. Turn the ignition switch OFF.

2. Disconnect stop lamp switch harness connector.

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

ABS actuator and electric unit (control unit)		Stop lan	Continuity		
Connector	Terminal	Connector Terminal		Continuity	
E36	37	E115	2	Existed	

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

ABS actuator and ele	ctric unit (control unit)		Continuity
Connector	Terminal		Continuity
E36	37	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 18.

< DTC/CIRCUIT DI		16 STO	P LAMP SV	WITCH	[WITH VDC]
	or replace error-dete	octed narts			
	LAMP SWITCH PC				
				<u> </u>	
Check voltage b	etween stop lamp s	witch harne	ess connector a	and ground.	
Stop Jamp ou	iitab				
Stop lamp sw		_	Voltage		
Connector	Terminal		Datta		
E115		Ground	Battery volta	ge	
. Turn the ignition CAUTION: Never start eng . Check voltage b		witch harne	ess connector a	and ground.	
Stop lamp sw	vitch				
Connector	Terminal	—	Voltage		
E115		Ground	Battery volta	ge	
s the inspection res				<u> </u>	
tions. Re NO >> GO TO	epair or replace erro	or-detected		itch harness con	nector for abnormal condi-
Turn the ignition					
. Check continuity	k (J/B) pin terminals / between stop lamp		rness connecto	or and fuse block	
	np switch	0	Fuse block (Continuity
Connector	Terminal			Terminal	
E115 the inspection res	1	E	103	8F	Existed
NO >> Repair of NO CHECK DATA	<u>SUPPLY -"</u> . or replace error-dete	ected parts.	GO TO 20.		<u> Viring Diagram - BATTERY</u>
Connect fuse block Erase self-diagn	mp switch harness o ock (J/B) harness c osis result for "ABS switch OFF, and w	onnector. .".	nds or more.		
Never start the Select "ABS", "D displays "On" or Select "ABS", "D	OATA MONITOR" ar "Off" when brake p OATA MONITOR" ar or less when brake	edal is depi id "PRESS	ress or release SENSOR" acc	. Refer to <u>BRC-4</u> ording to this ord	er. Check that data monitor <u>4, "Reference Value"</u> . er. Check that data monitor <u>ence Value"</u> .
YES >> INSPEC					
NO >> GO TO					

NO >> GO TO 21.

21. CHECK STOP LAMP RELAY

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

Check stop lamp relay. Refer to BRC-93. "Component Inspection (Stop Lamp Relay)".

Is the inspection result normal?

- YES >> GO TO 22.
- NO >> Repair or replace stop lamp relay. GO TO 22.

22. CHECK CONNECTOR AND TERMINAL (2)

1. Turn the ignition switch OFF.

- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
- Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
- 5. Disconnect stop lamp relay harness connector.
- 6. Check stop lamp relay harness connector for disconnection or looseness.
- 7. Check stop lamp relay pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 23.

NO >> Repair or replace error-detected parts. GO TO 23.

23.CHECK STOP LAMP RELAY POWER SUPPLY (1)

1. Turn the ignition switch OFF.

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

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal		voltage
E36	46	Ground	Approx. 0 V

3. Turn the ignition switch ON.

CAUTION: Never start engine.

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

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal		vonage
E36	46	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 27.

NO >> GO TO 24.

24.CHECK STOP LAMP RELAY CIRCUIT (1)

1. Turn the ignition switch OFF.

2. Disconnect stop lamp relay harness connector.

3. Check continuity between ABS actuator and electric unit (control unit) harness connector and stop lamp relay harness connector.

ABS actuator and ele	ABS actuator and electric unit (control unit)		Stop lamp relay	
Connector	Terminal	Connector	Terminal	Continuity
E36	46	E58	2	Existed

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

ABS actuator and ele	ctric unit (control unit)		Continuity
Connector	Terminal		Continuity
E36	46	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 25.

DTC/CIRCUIT I		datastad parts			-
•	r or replace error- P LAMP RELAY F	•	Y (2)		
	on switch OFF.		.1 (2)		
	e between stop lar	np relay harnes	s connector and	d ground.	
Stop lamp	relay				
Connector	Terminal	_	Voltage		
E58	1	Ground	Approx. 0 V		
. Turn the ignition CAUTION: Never start en . Check voltage		np relay harnes	s connector and	d ground.	
Stop lamp	relay		Voltaga		
Connector	Terminal	_	Voltage		
E58	1	Ground	Battery voltag	e	
YES >> Check tions. NO >> GO TO 6.CHECK STO Turn the ignitio Check 10A fus	c pin terminals an Repair or replace O 26. P LAMP RELAY (on switch OFF. se (#57).	error-detected p		ay harness conr	nector for adhormal con
YES >> Check tions. NO >> GO TO CO.CHECK STO Turn the ignition Check 10A fus Disconnect IP Check IPDM E Check continu	c pin terminals an Repair or replace O 26. P LAMP RELAY (on switch OFF. se (#57). DM E/R harness (E/R pin terminals f ity between stop l	error-detected p CIRCUIT (2) connector. for damage or lo	oose connection	n with harness co	onnector.
YES >> Check tions. NO >> GO TO CHECK STO Turn the ignition Check 10A fus Disconnect IP Check IPDM E Check continu	c pin terminals an Repair or replace D 26. P LAMP RELAY (on switch OFF. se (#57). DM E/R harness (E/R pin terminals f hity between stop l lamp relay	error-detected p CIRCUIT (2) connector. for damage or lo amp relay harne	oose connection ess connector a	n with harness co and IPDM E/R ha	onnector.
YES >> Check tions. NO >> GO TO 26.CHECK STO . Turn the ignitic 2. Check 10A fus 3. Disconnect IP 4. Check IPDM E 5. Check continu Stop Connector	c pin terminals an Repair or replace D 26. P LAMP RELAY (on switch OFF. se (#57). DM E/R harness of E/R pin terminals f ity between stop f lamp relay Terminal	error-detected p CIRCUIT (2) connector. for damage or lo lamp relay harne	oose connection ess connector a IPDM E/R ector	n with harness co and IPDM E/R ha	onnector. arness connector. Continuity
YES >> Check tions. NO >> GO TO CONCECK STO Turn the ignition Check 10A fus Disconnect IP Check IPDM E Check continue Stop Connector E58	c pin terminals an Repair or replace D 26. P LAMP RELAY (on switch OFF. se (#57). DM E/R harness of E/R pin terminals f nity between stop 1 lamp relay Terminal 1	error-detected p CIRCUIT (2) connector. for damage or lo amp relay harne	oose connection ess connector a IPDM E/R ector	n with harness co and IPDM E/R ha	onnector. arness connector.
tions. NO >> GO TO 26.CHECK STO 1. Turn the ignition 2. Check 10A fus 3. Disconnect IP 4. Check IPDM E 5. Check continue Stop Connector E58 <u>s the inspection rec</u> YES >> Perfor <u>POWE</u> NO >> Repai 27.CHECK STO	c pin terminals an Repair or replace D 26. P LAMP RELAY (on switch OFF. se (#57). DM E/R harness of E/R pin terminals f ity between stop 1 lamp relay lamp relay Terminal 1 esult normal? m trouble diagnos <u>ER SUPPLY -"</u> . r or replace error- P LAMP RELAY F	error-detected p CIRCUIT (2) connector. for damage or lo amp relay harned Conn E1 sis for ignition po detected parts.	oose connection ess connector a IPDM E/R ector 15 ower supply. Re GO TO 27.	n with harness co and IPDM E/R ha Terminal 59	onnector. arness connector. Continuity
YES >> Check tions. NO >> GO TO CONTRACTOR Turn the ignition Check 10A fus Disconnect IP Check IPDM E Check continue Stop Connector E58 Sthe inspection re YES >> Perfor POWE NO >> Repai 27.CHECK STO	c pin terminals an Repair or replace D 26. P LAMP RELAY (on switch OFF. se (#57). DM E/R harness of E/R pin terminals f ity between stop 1 lamp relay lamp relay Terminal 1 esult normal? m trouble diagnos ER SUPPLY -". r or replace error- P LAMP RELAY F on switch OFF.	error-detected p CIRCUIT (2) connector. for damage or lo amp relay harned Conn E1 sis for ignition po detected parts. (POWER SUPPL	oose connection ess connector a IPDM E/R ector 5 ower supply. Re GO TO 27. Y (3)	n with harness co and IPDM E/R ha Terminal 59 efer to <u>PG-59, "V</u>	onnector. arness connector. Continuity Existed
YES >> Check tions. NO >> GO TO 26.CHECK STO Turn the ignitic Check 10A fus Disconnect IP Check IPDM E Check continue Stop Connector E58 Sthe inspection re YES >> Perfor POWE NO >> Repai 27.CHECK STO Turn the ignitic Check voltage	c pin terminals an Repair or replace D 26. P LAMP RELAY (on switch OFF. se (#57). DM E/R harness of E/R pin terminals f ity between stop 1 lamp relay lamp relay Terminal 1 esult normal? m trouble diagnos ER SUPPLY -". r or replace error- P LAMP RELAY F on switch OFF.	error-detected p CIRCUIT (2) connector. for damage or lo amp relay harned conn E1 sis for ignition po detected parts. O POWER SUPPL tuator and elect	oose connection ess connector a IPDM E/R ector 5 ower supply. Re GO TO 27. Y (3) ric unit (control	n with harness co and IPDM E/R ha Terminal 59 efer to <u>PG-59, "V</u>	Onnector. arness connector. Continuity Existed Viring Diagram - IGNITIC
YES >> Check tions. NO >> GO TO 26.CHECK STO Turn the ignitic Check 10A fus Disconnect IP Check IPDM E Check Continue Stop Connector E58 Sthe inspection re YES >> Perfor POWE NO >> Repai 27.CHECK STO Turn the ignitic Check voltage	c pin terminals an Repair or replace D 26. P LAMP RELAY (on switch OFF. se (#57). DM E/R harness of E/R pin terminals f ity between stop 1 lamp relay Terminal 1 esult normal? m trouble diagnos <u>ER SUPPLY -"</u> . r or replace error- P LAMP RELAY F on switch OFF. e between ABS ac	error-detected p CIRCUIT (2) connector. for damage or lo amp relay harned conn E1 sis for ignition po detected parts. O POWER SUPPL tuator and elect	pose connection ess connector a IPDM E/R ector 5 ower supply. Re GO TO 27. Y (3) ric unit (control	Terminal 59 efer to <u>PG-59, "V</u> unit) harness co	Onnector. arness connector. Continuity Existed Viring Diagram - IGNITIC
YES >> Check tions. NO >> GO TO 26.CHECK STO 1. Turn the ignitio 2. Check 10A fus 3. Disconnect IP 4. Check IPDM E 5. Check continue Stop Connector E58 5 the inspection re YES >> Perfor POWE NO >> Repai 27.CHECK STO 1. Turn the ignitio 2. Check voltage ABS actuator and ele	a pin terminals an Repair or replace D 26. P LAMP RELAY (on switch OFF. se (#57). DM E/R harness of E/R pin terminals f ity between stop f lamp relay Terminal 1 esult normal? m trouble diagnos <u>ER SUPPLY -"</u> . r or replace error- P LAMP RELAY F on switch OFF. e between ABS ac	error-detected p CIRCUIT (2) connector. for damage or lo amp relay harned conn E1 sis for ignition po detected parts. O POWER SUPPL tuator and elect	bose connection ess connector a IPDM E/R ector 5 bwer supply. Re GO TO 27. Y (3) ric unit (control Brake pe	n with harness co and IPDM E/R ha Terminal 59 efer to <u>PG-59, "V</u> unit) harness co	Onnector. arness connector. Continuity Existed Viring Diagram - IGNITIC

4. Check voltage between stop lamp relay harness connector and ground.

< DTC/CIRCUIT DIAGNOSIS >

ABS actuator and electric unit (control unit)			Condition	Voltage	
Connector	Terminal		Condition	vollage	
E36	37	Ground	Brake pedal depressed	Battery voltage	
L30	51	Ground	Brake pedal not depressed	Approx. 0 V	
Is the inspection re YES >> Replac tion".		nd electric unit (c	ontrol unit). Refer to <u>BRC-1</u>	46, "Removal and Inst	<u>alla-</u>
NO >> GO TO	D 28.				
28. снеск sto	P LAMP RELAY C	IRCUIT (3)			
1. Turn the ignition	on switch OFF.				

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

ABS actuator and ele	ectric unit (control unit)	Stop lamp relay		Continuity	
Connector	Terminal	Connector Terminal			
E36	37	E58	5	Existed	

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

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
E36	37	Ground	Not existed
	14 10		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair or replace error-detected parts.

```
29.CHECK STOP LAMP RELAY POWER SUPPLY (4)
```

1. Check voltage between stop lamp relay harness connector and ground.

Stop lar	mp relay		Voltage
Connector	Connector Terminal		vollage
E58	3	Ground	Battery voltage

2. Turn the ignition switch ON.

CAUTION:

Never start engine.

3. Check voltage between stop lamp relay harness connector and ground.

Stop la	mp relay		Voltage	
Connector	Connector Terminal		Voltage	
E58	3	Ground	Battery voltage	

Is the inspection result normal?

YES >> Check pin terminals and connection of stop lamp relay harness connector for abnormal conditions. Repair or replace error-detected parts.

NO >> GO TO 30.

30.CHECK STOP LAMP RELAY CIRCUIT (4)

- 2. Disconnect fuse block (J/B) harness connector.
- 3. Check fuse block (J/B) pin terminals for damage or loose connection with harness connector.
- 4. Check continuity between stop lamp relay harness connector and fuse block (J/B).

BRC-92

^{1.} Check 10A fuse (#7).

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

Stop lamp	relay	Fuse blo	ck (J/B)	Continuity
Connector	Terminal	Connector	Terminal	Communy
E58	3	E103	8F	Existed
the inspection result	normal?			
		battery power suppl	y. Refer to <u>PG-11, "W</u>	<u>iring Diagram - BATTE</u>
NO >> Repair or re	<u>UPPLY -"</u> . eplace error-detec	ted parts		
I		•		
omponent Inspe	clion (Stop lan	ip Switch)		INFOID:000000009
.CHECK STOP LAM	P SWITCH			
Turn the ignition sw	vitch OFF.			
Disconnect stop la	mp switch harness			
Check continuity w	hen stop lamp swi	tch is operated.		
Stan Jamp quitch				
Stop lamp switch Terminal	Co	ndition	Continuity	
remina	When stop lamp sw	vitch is released		
1 – 2	(When brake pedal		Existed	
3 – 4	When stop lamp sw		Not existed	
	(When brake pedal	is released)		
YES >> INSPECTION NO >> Replace strong Component Inspect	ON END op lamp switch. Re ction (Stop Lar	efer to <u>BR-20. "Remo</u> np Relay)	val and Installation".	INF01D:000000009
YES >> INSPECTIONO >> Replace state Component Inspection CHECK STOP LAM Apply 12 V to stop CAUTION: • Never make the • Connect the fus	ON END op lamp switch. Re ction (Stop Lar P RELAY lamp relay connec terminals short. e between the ter	np Relay) tor terminal (1 and 2) rminals when apply). ing the voltage.	INF01D:000000009
YES >> INSPECTION NO >> Replace store omponent Inspection .CHECK STOP LAM Apply 12 V to stop CAUTION: • Never make the • Connect the fus	ON END op lamp switch. Re ction (Stop Lar P RELAY lamp relay connec terminals short. e between the ter	np Relay) tor terminal (1 and 2). ing the voltage.	INFOID:000000009
YES >> INSPECTION NO >> Replace state Component Inspection CHECK STOP LAM Apply 12 V to stop CAUTION: • Never make the • Connect the fus Check continuity be	ON END op lamp switch. Re ction (Stop Lar P RELAY lamp relay connec terminals short. e between the ter etween stop lamp i	np Relay) tor terminal (1 and 2 rminals when apply relay connector termi). i ng the voltage. nals.	INFOID:000000009
NO >> Replace sta Component Inspect CHECK STOP LAM Apply 12 V to stop CAUTION: • Never make the • Connect the fus	ON END op lamp switch. Re ction (Stop Lar P RELAY lamp relay connec terminals short. e between the ter etween stop lamp i	np Relay) tor terminal (1 and 2) rminals when apply). ing the voltage.	INF01D:000000009
YES >> INSPECTION NO >> Replace state Component Inspect CHECK STOP LAM Apply 12 V to stop CAUTION: • Never make the • Connect the fus Check continuity be Stop lamp relay Terminal	ON END op lamp switch. Re ction (Stop Lar P RELAY lamp relay connect terminals short. e between the ter etween stop lamp relay Cor	np Relay) tor terminal (1 and 2 rminals when apply relay connector termi). i ng the voltage. nals.	INFOID:000000009
YES >> INSPECTION NO >> Replace str Component Inspect CHECK STOP LAM Apply 12 V to stop CAUTION: • Never make the • Connect the fus Check continuity be	ON END op lamp switch. Re ction (Stop Lar P RELAY lamp relay connect terminals short. e between the ter etween stop lamp in Con Apply 12 V to stop in terminal (1 and 2)	np Relay) tor terminal (1 and 2) rminals when apply relay connector terminal ndition lamp relay connector o stop lamp relay con-). ing the voltage. inals. Continuity	INFOID:00000000
YES >> INSPECTION NO >> Replace states COMPONENT INSPECTION CHECK STOP LAM Apply 12 V to stop CAUTION: • Never make the • Connect the fus Check continuity be Stop lamp relay Terminal 3 - 5	ON END op lamp switch. Re ction (Stop Lar P RELAY lamp relay connect terminals short. e between the ter etween stop lamp re Con Apply 12 V to stop l terminal (1 and 2) Do not apply 12 V to nector terminal (1 and 2)	np Relay) tor terminal (1 and 2) rminals when apply relay connector terminal ndition lamp relay connector o stop lamp relay con-). ing the voltage. inals. Continuity Existed Not existed	INFOID:000000009
YES >> INSPECTION NO >> Replace state omponent Inspect .CHECK STOP LAM Apply 12 V to stop CAUTION: • Never make the • Connect the fus Check continuity be Stop lamp relay Terminal 3 - 5	ON END op lamp switch. Re ction (Stop Lar P RELAY lamp relay connect terminals short. e between the ter etween stop lamp re Con Apply 12 V to stop l terminal (1 and 2) Do not apply 12 V to nector terminal (1 and 2)	mp Relay) etor terminal (1 and 2) eminals when apply relay connector terminal ndition lamp relay connector o stop lamp relay con- ind 2)). ing the voltage. inals. Continuity Existed Not existed	INFOID:00000000
YES >> INSPECTION NO >> Replace state Component Inspect CHECK STOP LAM Apply 12 V to stop CAUTION: • Never make the • Connect the fus Check continuity be Stop lamp relay Terminal 3 - 5	ON END op lamp switch. Re ction (Stop Lar P RELAY lamp relay connect terminals short. e between the ter etween stop lamp re Con Apply 12 V to stop l terminal (1 and 2) Do not apply 12 V t nector terminal (1 and petween stop lamp	mp Relay) etor terminal (1 and 2) eminals when apply relay connector terminal ndition lamp relay connector o stop lamp relay con- ind 2)). ing the voltage. inals. Continuity Existed Not existed	INFOID:000000009
YES >> INSPECTION NO >> Replace structure Component Inspect CHECK STOP LAM Apply 12 V to stop CAUTION: • Never make the • Connect the fus Check continuity be Stop lamp relay Terminal 3 – 5 Check resistance be Stop lamp relay Terminal	ON END op lamp switch. Re ction (Stop Lar P RELAY lamp relay connect terminals short. e between the ter etween stop lamp re Con Apply 12 V to stop l terminal (1 and 2) Do not apply 12 V to nector terminal (1 and 2)	mp Relay) etor terminal (1 and 2) eminals when apply relay connector terminal ndition lamp relay connector o stop lamp relay con- ind 2)). ing the voltage. inals. Continuity Existed Not existed	INFOID:00000000
YES >> INSPECTION NO >> Replace state Component Inspect CHECK STOP LAM Apply 12 V to stop CAUTION: • Never make the • Connect the fus Check continuity be Stop lamp relay 3 - 5 Check resistance be Stop lamp relay	ON END op lamp switch. Re ction (Stop Lar P RELAY lamp relay connect terminals short. e between the ter etween stop lamp re Con Apply 12 V to stop l terminal (1 and 2) Do not apply 12 V t nector terminal (1 and petween stop lamp	mp Relay) etor terminal (1 and 2) eminals when apply relay connector terminal ndition lamp relay connector o stop lamp relay con- ind 2)). ing the voltage. inals. Continuity Existed Not existed	INFOID:000000009

C1118 TRANSFER CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

C1118 TRANSFER CONTROL UNIT

DTC Logic

INFOID:000000009012478

[WITH VDC]

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1118	4WD SYSTEM	When a malfunction is detected in transfer control unit system.	 Transfer control unit ABS actuator and electric unit (control unit) CAN communication line

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn 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 to ON.
- 2. Perform self-diagnosis for "ABS".

Is DTC "C1118" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-94, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000000012479

1.CHECK TRANSFER CONTROL UNIT SYSTEM

With CONSULT

Perform self-diagnosis for "ALL MODE AWD/4WD".

Is any DTC detected?

YES >> Check the DTC.

NO >> GO TO 2.

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

(I) With CONSULT

- 1. Erase Self-diagnosis result for "ABS".
- 2. Turn the ignition switch OFF.
- 3. Start the engine and drive the vehicle for a short period of time.
- 4. Check that the 4WD warning lamp turns OFF.
- 5. After the vehicle stops, perform self-diagnosis for "ABS".

Is DTC "C1118" detected?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146, "Removal and Installa-</u> tion".
- NO >> Check pin terminals and connection of each harness connector for abnormal conditions. Repair or replace error-detected parts.

C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

DTC Logic

[WITH VDC]

INFOID:000000009012480

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DTC DE	ETECTION	LOGIC				
DTC	Disp	lay Item	Malfunct	ion detected condition	Possible causes	
C1120	FR LH IN AB	SSOL	Vhen a malfunction alve.	is detected in front LH ABS IN		
C1122	FR RH IN AB	S SOL	 When a malfunction is detected in front RH ABS IN valve. Harness or connector ABS actuator and electric (control unit) 			
C1124	RR LH IN AB	SSOL	Vhen a malfunction alve.	is detected in rear LH ABS IN	 Fusible link Battery power supply system 	
C1126	RR RH IN AB	IS SOL	Vhen a malfunction alve.	is detected in rear RH ABS IN		
DTC CC	ONFIRMAT	ION PROCED	JRE			
1.PREG	CONDITION	ING				
		TION PROCEDU nds before conc			ays turn ignition switch OFF and	
2.сне	>> GO TO 2 CK DTC DE ⁻					
1. Turr 2. Perf	form self-dia	switch OFF to 0 gnosis for "ABS"		od2		
YES NO				o <u>BRC-95, "Diagnosis Pr</u>	ocedure".	
	osis Proce				INFOID:000000009012481	
		ALVE POWER	SUPPLY			
2. Disc	connect ABS			ol unit) harness connecto ic unit (control unit) harne	r. ess connector and ground.	
ABS ac	tuator and elec	tric unit (control unit)			
Co	nnector	Terminal		Voltage		
	E36	1	Ground	Battery voltage		
CAL Nev	n the ignition JTION: ver start eng eck voltage b	ine.	uator and electr	ic unit (control unit) harne	ess connector and ground.	
ABS act	uator and elect	ric unit (control unit)				
-	nector	Terminal		Voltage		
	E36	1	Ground	Battery voltage		
YES NO	spection resi >> GO TO 3 >> GO TO 2 CK ABS IN \	3.	SUPPLY CIRCL	ЛТ		

C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

- 1. Turn the ignition switch OFF.
- 2. Check 30A fusible link (L).
- 3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (1) and 30A fusible link (L).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-11, "Wiring Diagram - BATTERY</u> <u>POWER SUPPLY -"</u>.

NO >> Repair or replace error-detected parts.

$\mathbf{3}$. CHECK ABS IN VALVE GROUND CIRCUIT

1. Turn the ignition switch OFF.

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

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal		Continuity	
E36	2			
E30	3	Ground	Existed	
E37	E37 48			

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK TERMINAL

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146. "Removal and Installa-</u> tion".
- NO >> Repair or replace error-detected parts.

C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

DTC Logic

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[WITH VDC]

DICL	ogic			INFOID:00000009012482
DTC DE	ETECTION LOGIC			
DTC	Display Item	Malfu	nction detected condition	Possible causes
C1121	FR LH OUT ABS SOL	When a malfunct valve.	ion is detected in front LH ABS OUT	
C1123	FR RH OUT ABS SOL	When a malfuncti valve.	on is detected in front RH ABS OUT	 Harness or connector ABS actuator and electric unit
C1125	RR LH OUT ABS SOL	When a malfunct valve.	ion is detected in rear LH ABS OUT	 (control unit) Fusible link Battery power supply system
C1127	RR RH OUT ABS SOL	When a malfunct valve.	ion is detected in rear RH ABS OUT	
DTC CC	ONFIRMATION PROCED	URE		
1.PREC	CONDITIONING			В
	CONFIRMATION PROCED at least 10 seconds before			s turn the ignition switch OFF
2.CHE	CK DTC DETECTION			
With C 1. Turr	CONSULT the ignition switch OFF to form self-diagnosis for "ABS			
	<u>C1121", "C1123", "C1125" c</u>		cted?	
YES NO	>> Proceed to diagnosis proceed to diagnosis proceed to diagnosis processes of the second	ocedure. Refer	to BRC-97, "Diagnosis Proce	<u>edure"</u> .
	DSIS Procedure	R SUPPLY		INFOID:000000009012483
1. Turr 2. Disc	n the ignition switch OFF. connect ABS actuator and e	lectric unit (con	trol unit) harness connector. tric unit (control unit) harness	connector and ground.
ABS actu	ator and electric unit (control unit)			
Conne	ector Terminal		Voltage	
E3	6 1	Ground	Battery voltage	
CAL Nev	n the ignition switch ON. JTION: er start engine. ck voltage between ABS ac	tuator and elec	tric unit (control unit) harness	
ABS act	uator and electric unit (control unit)		
	nnector Terminal	<u> </u>	Voltage	
	E36 1	Ground	Battery voltage	
YES NO	spection result normal? >> GO TO 3. >> GO TO 2. CK ABS OUT VALVE POWI	ER SUPPLY CI	RCUIT	

C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

1. Turn the ignition switch OFF.

- 2. Check 30A fusible link (L).
- 3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (1) and 30A fusible link (L).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-11, "Wiring Diagram - BATTERY</u> <u>POWER SUPPLY -"</u>.

NO >> Repair or replace error-detected parts.

3.CHECK ABS OUT VALVE GROUND CIRCUIT

1. Turn the ignition switch OFF.

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

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal		Continuity	
E36	2			
230	3	Ground	Existed	
E37 48		†		

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK TERMINAL

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146. "Removal and Installa-</u> tion".
- NO >> Repair or replace error-detected parts.

C1130 ENGINE SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

C1130 ENGINE SIGNAL

DTC Logic

INFOID:000000009012484

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[WITH VDC]

DTC DETECTION LOGIC В DTC Malfunction detected condition Possible causes **Display Item** • ECM · ABS actuator and electric unit C1130 **ENGINE SIGNAL 1** When a malfunction is detected in ECM system. (control unit) CAN communication line D DTC CONFIRMATION PROCEDURE 1.PRECONDITIONING Е If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test. BRC >> GO TO 2. 2. CHECK DTC DETECTION With CONSULT Turn the ignition switch OFF to ON. 1. Perform self-diagnosis for "ABS". 2. Н Is DTC "C1130" detected? YES >> Proceed to diagnosis procedure. Refer to <u>BRC-99, "Diagnosis Procedure"</u>. >> INSPECTION END NO Diagnosis Procedure INFOID:000000009012485 CHECK ENGINE SYSTEM (P)With CONSULT

Perform self-diagnosis for "ENGINE".

Is any DTC detected?

YES	>> Check the DTC.
	>> GO TO 2.
2.сне	CK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

With CONSULT

- 1. Erase Self-diagnosis result for "ABS".
- 2. Turn the ignition switch OFF.
- 3. Start the engine and drive the vehicle for a short period of time.
- 4. Check that the malfunction indicator lamp (MIL) turns OFF.
- 5. After the vehicle stops, perform self-diagnosis for "ABS".

Is DTC "C1130" detected?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146, "Removal and Installa-</u> <u>tion"</u>.
- NO >> Check pin terminals and connection of each harness connector for abnormal conditions. Repair or replace error-detected parts.

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C1140 ACTUATOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1140 ACTUATOR RELAY SYSTEM

DTC Logic

INFOID:000000009012486

[WITH VDC]

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1140	ACTUATOR RLY	When a malfunction is detected in actuator relay.	 Harness or connector ABS actuator and electric unit (control unit) Fusible link Battery power supply system

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

- Turn the ignition switch OFF to ON.
- 2. Perform self-diagnosis for "ABS".

Is DTC "C1140" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-100, "Diagnosis Procedure"</u>.
- NO >> INSPECTION ĔND

Diagnosis Procedure

INFOID:000000009012487

1.CHECK ACTUATOR RELAY POWER SUPPLY

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

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal		voltage
E36	1	Ground	Battery voltage

4. Turn the ignition switch ON. CAUTION:

Never start engine.

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

ABS actuator and ele	ectric unit (control unit)	_	Voltage	
Connector	Terminal		voltage	
E36	1	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2. CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Check 30Ă fusible link (L).
- 3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (1) and 30A fusible link (L).

BRC-100

C1140 ACTUATOR RELAY SYSTEM

< DTC/CIRCUIT D	AGNOSIS >			[WITH VDC]				
Is the inspection re	sult normal?							
- '	or replace error-de	•						
3.CHECK ACTUA	TOR RELAY GRO	UND CIRCUIT						
	ity between ABS ac	ctuator and ele	ctric unit (contro	ol unit) harness connector and the ground.				
ABS actuator and ele	, ,	_	Continuity					
Connector	Terminal		-	_				
E36	2							
L30	3	Ground	Existed					
E37	E37 48							
Is the inspection re	Is the inspection result normal?							
	YES >> GO TO 4.							
4.CHECK TERMI	4. CHECK TERMINAL							

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146. "Removal and Installa-</u> H <u>tion"</u>.
- NO >> Repair or replace error-detected parts.

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< DTC/CIRCUIT DIAGNOSIS >

C1142 PRESS SENSOR

DTC Logic

INFOID:000000009012488

[WITH VDC]

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1142	PRESS SEN CIRCUIT	When a malfunction is detected in master cylinder pressure sensor or control pressure sensor [*] .	 Stop lamp switch system ABS actuator and electric unit (control unit) Brake system

*: Models with Advanced Driver Assistance System

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(P)With CONSULT

1. Turn the ignition switch OFF to ON.

2. Perform self-diagnosis for "ABS".

Is DTC "C1142" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-102, "Diagnosis Procedure"</u>.

>> INSPECTION END NO

Diagnosis Procedure

1.CHECK STOP LAMP SWITCH SYSTEM

Check stop lamp switch system. Refer to BRC-84, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK BRAKE FLUID LEAKAGE

Check brake fluid leakage. Refer to BR-10, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

 ${f 3.}$ CHECK BRAKE PIPING

Check brake piping. Refer to BR-24, "FRONT : Inspection" (front), BR-26, "REAR : Inspection" (rear).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK BRAKE PEDAL

Check brake pedal. Refer to BR-21, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 5.

>> Repair or replace error-detected parts. NO

5.CHECK HYDRAULIC BOOSTER ASSEMBLY

Check hydraulic booster assembly. Refer to BR-32, "Inspection and Adjustment".

INFOID-000000009012489

C1142 PRESS SENSOR

CT142 PRE35 SENSOR	
< DTC/CIRCUIT DIAGNOSIS > [WITH VDC]	
Is the inspection result normal?	•
YES >> GO TO 6.	
NO >> Repair or replace error-detected parts.	
6.CHECK FRONT DISC BRAKE	
Check front disc brake. Refer to BR-39, "BRAKE CALIPER ASSEMBLY : Inspection".	•
Is the inspection result normal?	
YES >> GO TO 7.	
NO >> Repair or replace error-detected parts.	
7.CHECK REAR DISC BRAKE	
Check rear disc brake. Refer to BR-45, "BRAKE CALIPER ASSEMBLY : Inspection".	•
Is the inspection result normal?	
YES >> GO TO 8.	
NO >> Repair or replace error-detected parts.	
8. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)	
(P)With CONSULT	-
1. Erase Self-diagnosis result for "ABS".	
 Start the engine and drive the vehicle for a short period of time. Deform set diagnosis for "ADS" 	
3. Perform self-diagnosis for "ABS".	
Is DTC "C1142" detected?	
YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146, "Removal and Installa-</u> tion"	-
NO >> Check ABS actuator and electric unit (control unit) harness connector and terminal for damage, looseness and disconnection. Repair or replace error-detected parts.	

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C1143 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

C1143 STEERING ANGLE SENSOR

DTC Logic

INFOID:000000009012490

[WITH VDC]

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1143	ST ANG SEN CIRCUIT	When a malfunction is detected in steering angle sen- sor.	 Harness or connector Steering angle sensor ABS actuator and electric unit (control unit) Fuse Ignition power supply system CAN communication line

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(I) With CONSULT

- 1. Turn the ignition switch OFF to ON.
- 2. Perform self-diagnosis for "ABS".

Is DTC "C1143" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-104, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000009012491

1.CHECK STEERING ANGLE SENSOR MOUNTING CONDITION

Check steering angle sensor mounting condition. Refer to SR-14, "Exploded View".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK STEERING ANGLE SENSOR POWER SUPPLY

1. Turn the ignition switch OFF.

- 2. Disconnect steering angle sensor harness connector.
- 3. Check voltage between steering angle sensor harness connector and ground.

Steering a	ngle sensor		Voltage
Connector	Connector Terminal		voltage
M30	4	Ground	Approx. 0 V

4. Turn the ignition switch ON.

CAUTION:

Never start engine.

5. Check voltage between steering angle sensor harness connector and ground.

Steering a	ngle sensor		Voltage
Connector	Connector Terminal		voltage
M30	4	Ground	Battery voltage

C1143 STEERING ANGLE SENSOR

	(
DTC/CIRCUI	IT DIAGNOSIS	>			[WITH VDC]
•	n result normal?	<u> </u>			
) TO 4.				
) TO 3.				
CHECK STE	ERING ANGLE	SENSOR PO	WER SUPPLY (
	nition switch OF	F.			
	t fuse block (J/B)) harness conn	ector		
				connector and fuse block (J/B)	harness connec-
tor.					
Steering ar	ngle sensor		ock (J/B)	Continuity	
Connector	Terminal	Connector	Terminal		
M30	4	M1	2A	Existed	
Check conf	tinuity between s	steering angle	sensor harness	connector and ground.	
					1
	ngle sensor	_	Continuity		
Connector	Terminal		,		
M30	4	Ground	Not existed		
ES >> Per PO O >> Re CHECK STE	WER SUPPLY - pair or replace e EERING ANGLE	agnosis for ignir <u></u> error-detected p E SENSOR GR	parts.	ly. Refer to <u>PG-59, "Wiring Dia</u>	gram - IGNITION
ES >> Per PO IO >> Re CHECK STE Turn the ign	rform trouble dia WER SUPPLY pair or replace e EERING ANGLE nition switch OF	agnosis for ignit <u>-"</u> . error-detected p E SENSOR GR F.	oarts. OUND CIRCUIT		gram - IGNITION
ES >> Per PO IO >> Re .CHECK STE Turn the igr Check cont	rform trouble dia WER SUPPLY pair or replace e EERING ANGLE nition switch OF tinuity between s	agnosis for ignit <u>-"</u> . error-detected p E SENSOR GR F.	oarts. OUND CIRCUIT	- -	gram - IGNITION
ES >> Per PO IO >> Re CHECK STE Turn the ign Check cont	rform trouble dia WER SUPPLY pair or replace e EERING ANGLE nition switch OF tinuity between s	agnosis for ignit <u>-"</u> . error-detected p E SENSOR GR F.	oarts. OUND CIRCUIT	- -	gram - IGNITION
ES >> Per PO O >> Re CHECK STE Turn the igr Check cont Steering ar Connector	rform trouble dia WER SUPPLY pair or replace e EERING ANGLE nition switch OF tinuity between s ngle sensor Terminal	agnosis for ignit <u></u> error-detected p E SENSOR GR F. steering angle s	oarts. OUND CIRCUIT sensor harness Continuity	- -	gram - IGNITION
ES >> Per <u>PO</u> O >> Re CHECK STE Turn the igr Check cont Steering ar Connector M30	rform trouble dia WER SUPPLY - pair or replace e EERING ANGLE nition switch OF tinuity between s ngle sensor Terminal 1	agnosis for ignit <u>-"</u> . error-detected p E SENSOR GR F. steering angle s — Ground	oarts. OUND CIRCUIT sensor harness	- -	gram - IGNITION
ES >> Per PO O >> Re CHECK STE Turn the igi Check cont Steering ar Connector M30 the inspection	rform trouble dia WER SUPPLY pair or replace e EERING ANGLE nition switch OF tinuity between s ngle sensor Terminal 1 n result normal?	agnosis for ignit <u>-"</u> . error-detected p E SENSOR GR F. steering angle s — Ground	oarts. OUND CIRCUIT sensor harness Continuity	- -	gram - IGNITION
ES >> Per PO O >> Re CHECK STE Turn the igr Check cont Steering ar Connector M30 the inspection ES >> GC	rform trouble dia WER SUPPLY pair or replace e EERING ANGLE nition switch OF tinuity between s ngle sensor Terminal 1 n result normal? O TO 5.	agnosis for ignit <u></u> error-detected p E SENSOR GR F. steering angle s 	oarts. OUND CIRCUIT sensor harness Continuity Existed	- -	gram - IGNITION
ES >> Per PO O >> Re CHECK STE Turn the igr Check cont Steering ar Connector M30 the inspection ES >> GC O >> Re	rform trouble dia WER SUPPLY pair or replace e ERING ANGLE nition switch OF tinuity between s ngle sensor Terminal 1 n result normal?) TO 5. pair or replace e	agnosis for ignit <u></u> error-detected p E SENSOR GR F. steering angle s 	oarts. OUND CIRCUIT sensor harness Continuity Existed	- -	gram - IGNITION
ES >> Per PO O >> Re CHECK STE Turn the igr Check cont Steering ar Connector M30 the inspection ES >> GC O >> Re CHECK TER	rform trouble dia WER SUPPLY pair or replace e ERING ANGLE nition switch OF tinuity between s ngle sensor Terminal 1 n result normal? D TO 5. pair or replace e RMINAL	agnosis for ignit <u></u> error-detected p E SENSOR GR F. steering angle s <u></u> <u>Ground</u> error-detected p	oarts. OUND CIRCUIT sensor harness Continuity Existed	connector and ground.	
ES >> Per PO O >> Re CHECK STE Turn the ign Check cont Steering ar Connector M30 the inspection ES >> GC O >> Re CHECK TEF Check steerin	rform trouble dia WER SUPPLY pair or replace e EERING ANGLE nition switch OF tinuity between s ngle sensor Terminal 1 n result normal? O TO 5. pair or replace e RMINAL ng angle sensor	agnosis for ignit <u></u> . error-detected p E SENSOR GR F. steering angle s <u></u> <u>Ground</u> P error-detected p pin terminals for	oarts. OUND CIRCUIT sensor harness Continuity Existed	- -	nnector.
ES >> Per PO O >> Re CHECK STE Turn the igr Check cont Steering ar Connector M30 the inspection ES >> GC O >> Re CHECK TER Check steerin Check fuse bl	rform trouble dia WER SUPPLY pair or replace e EERING ANGLE nition switch OF tinuity between s ngle sensor Terminal 1 n result normal? O TO 5. pair or replace e RMINAL ng angle sensor	agnosis for ignit <u></u> . error-detected p E SENSOR GR F. steering angle s Ground P error-detected p pin terminals for dam	oarts. OUND CIRCUIT sensor harness Continuity Existed	connector and ground.	nnector.
ES >> Per PO O >> Re CHECK STE Turn the igr Check cont Steering ar Connector M30 the inspection ES >> GC O >> Re CHECK TEF Check steerin Check fuse bi the inspection	rform trouble dia WER SUPPLY pair or replace e ERING ANGLE nition switch OF tinuity between s ngle sensor Terminal 1 n result normal?) TO 5. pair or replace e RMINAL ng angle sensor lock (J/B) pin ter n result normal?	agnosis for ignit <u></u> . error-detected p E SENSOR GR F. steering angle s Ground P error-detected p pin terminals for dam	oarts. OUND CIRCUIT sensor harness Continuity Existed	connector and ground.	nnector.
ES >> Per PO PO PO PO PO PO PO PO PO PO	rform trouble dia WER SUPPLY pair or replace e ERING ANGLE nition switch OF tinuity between s ngle sensor Terminal 1 n result normal? O TO 5. pair or replace e RMINAL ng angle sensor lock (J/B) pin ter n result normal? O TO 6. pair or replace e	agnosis for ignit <u></u>	oarts. OUND CIRCUIT sensor harness Continuity Existed oarts.	connector and ground.	nnector.
ES >> Per PO O >> Re CHECK STE Turn the igr Check cont Steering ar Connector M30 the inspection ES >> GC O >> Re CHECK TER Check steerin Check fuse bl the inspection ES >> GC O >> Re	rform trouble dia WER SUPPLY pair or replace e ERING ANGLE nition switch OF tinuity between s ngle sensor Terminal 1 n result normal? D TO 5. pair or replace e RMINAL ng angle sensor lock (J/B) pin ter n result normal? D TO 6.	agnosis for ignit <u></u>	oarts. OUND CIRCUIT sensor harness Continuity Existed oarts.	connector and ground.	nnector.
ES >> Per PO IO >> Re CHECK STE Turn the igr Check cont Steering ar Connector M30 the inspection ES >> GC IO >> Re CHECK TEF Check steerin Check fuse bl the inspection ES >> GC IO >> Re CHECK TEF Check steerin Check fuse bl the inspection ES >> GC IO >> Re CHECK CAN	rform trouble dia WER SUPPLY pair or replace e EERING ANGLE nition switch OF tinuity between s ngle sensor Terminal 1 n result normal? O TO 5. pair or replace e RMINAL ng angle sensor lock (J/B) pin ter n result normal? O TO 6. pair or replace e N COMMUNICA	agnosis for ignit <u></u> error-detected p E SENSOR GR F. steering angle s Ground P error-detected p pin terminals for dam P error-detected p TION LINE	oarts. OUND CIRCUIT sensor harness Continuity Existed oarts. or damage or loose co hage or loose co	connector and ground.	nnector.
YES >> Perport PO NO >> Report CHECK STE Turn the ign Check cont Steering and Connector M30 the inspection YES CHECK TEF Check steerin Check steerin Check steerin Check steerin Check fuse bit the inspection YES >> GC IO >> Report CHECK CAN CHECK CAN Deck "STRG E	rform trouble dia WER SUPPLY pair or replace e EERING ANGLE nition switch OF tinuity between s ngle sensor Terminal 1 n result normal? O TO 5. pair or replace e RMINAL ng angle sensor lock (J/B) pin ter n result normal? O TO 6. pair or replace e N COMMUNICA	agnosis for ignit <u></u>	oarts. OUND CIRCUIT sensor harness Continuity Existed oarts. or damage or loose co hage or loose co	connector and ground.	nnector.
YES >> Perport PO NO >> Report CHECK STE Turn the igit Check cont Steering and Connector M30 the inspection YES CHECK TEF Check steering CHECK TEF Check fuse bit the inspection YES CHECK TEF Check fuse bit YES YES CHECK CAN CHECK CAN Deck "STRG E the inspection	rform trouble dia WER SUPPLY pair or replace e ERING ANGLE nition switch OF tinuity between s ngle sensor Terminal 1 n result normal?) TO 5. pair or replace e RMINAL ng angle sensor lock (J/B) pin ter n result normal?) TO 6. pair or replace e N COMMUNICA BRANCH LINE (n result normal?	agnosis for ignit <u></u>	oarts. OUND CIRCUIT sensor harness Continuity Existed oarts. or damage or loo hage or loose co barts.	connector and ground.	nnector. or.

C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

< DTC/CIRCUIT DIAGNOSIS >

C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

DTC Logic

INFOID:000000009012492

[WITH VDC]

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1144	ST ANG SEN SIGNAL	When neutral position adjustment of steering angle sensor is not complete.	 Harness or connector Steering angle sensor ABS actuator and electric unit (control unit) Incomplete neutral position ad- justment of steering angle sen- sor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

()With CONSULT

- 1. Turn the ignition switch OFF to ON.
- 2. Perform self-diagnosis for "ABS".

Is DTC "C1144" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-106, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000009012493

1.ADJUST THE NEUTRAL POSITION OF STEERING ANGLE SENSOR

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

>> GO TO 2.

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

With CONSULT

Perform self-diagnosis for "ABS".

- Is DTC "C1144" detected?
- YES >> GO TO 3.
- NO >> INSPECTION END

3.CHECK STEERING ANGLE SENSOR SYSTEM

- 1. Turn the ignition switch OFF.
- 2. Check steering angle sensor system. Refer to <u>BRC-104. "Diagnosis Procedure"</u>.

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146, "Removal and Installa-</u> tion".
- NO >> Repair or replace error-detected parts.

C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

< DTC/CIRCUIT DIAGNOSIS >

C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

DTC Logic

[WITH VDC]

INFOID:000000009012494

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DTC DE	ETECTION LOGIC			
DTC	Display Item	Malfunction detected condition	Possible causes	
C1145	YAW RATE SENSOR	 When a malfunction is detected in yaw rate signal. When yaw rate signal is not continuously received for 2 seconds or more. When side G signal is not continuously received for 2 seconds or more. When decel G signal is not continuously received for 2 seconds or more. When decel G signal is not continuously received for 2 seconds or more. When decel G signal is not continuously received for 2 seconds or more. Unable State State		
C1146	SIDE G-SEN CIRCUIT	When a malfunction is detected in side/decel G sig- nal.	- • Fuse	
DTC CO	ONFIRMATION PROC	EDURE		
1.PRE	CONDITIONING			
	east 10 seconds before o	EDURE" has been previously conducted, always conducting the next test.	turn ignition switch OFF and	
2.сне	>> GO TO 2. CK DTC DETECTION			
1. Turr 2. Perl	CONSULT n the ignition switch OFF form self-diagnosis for "A <u>'C1145" or "C1146" detec</u>	BS". <u>sted?</u>	o du ro "	
NO	>> INSPECTION END	s procedure. Refer to <u>BRC-107, "Diagnosis Proc</u>	edure .	
Diagno	osis Procedure		INFOID:000000009012495	
turns cator starte • When	function in yaw rate/si during a spin turn, acc lamp is in ON status). d again. In that case, er the engine is in runnir	de/decel G sensor system may be detected eleration turn or drift driving while VDC func This is not a malfunction if the status return ase self-diagnosis result memory using CON og status and the vehicle is on a turntable at arning lamp may turn ON and "ABS" self-dia	tion is OFF (VDC OFF indi- s to normal after engine is ISULT. the entrance of parking lot	
when case,	the vehicle is left from erase self-diagnosis re	e, yaw rate sensor is not malfunctioning. The the turntable or moving unit and the engi sult memory using CONSULT.		
		CEL G SENSOR MOUNTING CONDITION		
Is the in YES NO	spection result normal? >> GO TO 2. >> Repair or replace er	•	oloded View".	
	CK YAW RATE/SIDE/DE	CEL G SENSOR POWER SUPPLY		

^{1.} Turn the ignition switch OFF.

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

Disconnect yaw rate/side/decel G sensor harness connector. 2.

C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Yaw rate/side/	decel G sensor	·	Voltage
Connector	Terminal		
M55	3	Ground	Approx. 0 V

4. Turn the ignition switch ON.

CAUTION:

Never start engine.

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

Yaw rate/side/	decel G sensor		Voltage
Connector	Terminal		
M55	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

${f 3.}$ CHECK YAW RATE/SIDE/DECEL G SENSOR POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.

- 2. Check 10A fuse (#57).
- 3. Disconnect IPDM E/R harness connector.
- Check continuity between yaw rate/side/decel G sensor harness connector and IPDM E/R harness connector.

Yaw rate/side/decel G sensor		IPDM E/R		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
M55	3	E15	59	Existed	

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

Yaw rate/side/	decel G sensor		Continuity
Connector	Terminal		
M55	3	Ground	Not existed

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to <u>PG-59</u>, "Wiring Diagram - IGNITION <u>POWER SUPPLY -"</u>.

NO >> Repair or replace error-detected parts.

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

1. Turn the ignition switch OFF.

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

Yaw rate/side/	decel G sensor		Continuity
Connector	Terminal		
M55	6	Ground	Existed

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK COMMUNICATION LINE (1)

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

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

C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

	ecel G sensor	ABS actuator and ele	ectric unit (control unit)	Continuity
Connector	Terminal	Connector	Terminal	Continuity
M55	4	E36	9	Existed
10100	5	E30	10	EXISTED
CHECK COMMUN	replace error-detec NICATION LINE (2)			
	tuator and electric un between yaw rate/s		hess connector. harness connector ter	minals.
Yaw rate/side/d	ecel G sensor			
Connector	Terminal	Resistance		
NEC	4	100 110 0		
M55	5	100 – 140 Ω		
NO >> Replace <u>tion"</u> . CHECK COMMUN		lectric unit (control	unit). Refer to <u>BRC-14</u>	46, "Removal and Inst
Yaw rate/side/d Connector	ecel G sensor Terminal		Continuity	
	4			
M55		Ground	Not existed	
	5	Ground	Not existed	
the inspection resu YES >> GO TO 8 NO >> Repair of	5 It normal? replace error-detec		Not existed	
the inspection resurves YES >> GO TO 8 NO >> Repair of CHECK TERMINA Check ABS actuato ness connector. Check yaw rate/sid	5 It normal? replace error-detec L or and electric unit (e/decel G sensor pir	ted parts. control unit) pin terr n terminals for dama	ninals for damage or I ge or loose connectior	oose connection with n with harness connect
the inspection resurves YES >> GO TO 8 NO >> Repair of CHECK TERMINA Check ABS actuato ness connector. Check yaw rate/sid Check IPDM E/R pi the inspection resurves YES >> GO TO 9	5 It normal? replace error-detect L or and electric unit (e/decel G sensor pir n terminals for dama It normal?	ted parts. control unit) pin terr n terminals for dama age or loose connec	ninals for damage or I	n with harness connect
the inspection resurverse of the inspection results o	5 It normal? replace error-detect L or and electric unit (e/decel G sensor pir n terminals for dama It normal?	ted parts. control unit) pin terr n terminals for dama age or loose connec ted parts.	ninals for damage or I ge or loose connectior	n with harness connect
the inspection resurverse of the inspection results o	5 It normal? replace error-detect L or and electric unit (e/decel G sensor pir n terminals for dama It normal?	ted parts. control unit) pin terr n terminals for dama age or loose connec ted parts.	ninals for damage or I ge or loose connectior	n with harness connect

Never start engine.

7. Perform self-diagnosis for "ABS".

BRC-109

< DTC/CIRCUIT DIAGNOSIS >

Is DTC "C1145" or "C1146" detected?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146, "Removal and Installa-</u> tion".
- NO >> INSPECTION END

C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

DTC DETECTION LOGIC

C1155 BRAKE FLUID LEVEL SWITCH

Display Item

BR FLUID LEVEL LOW

DTC Logic

DTC

C1155

	switch circuit.	Brake fluid level switch
DTC CONFIRMATION PROCED	DURE	
1. PRECONDITIONING		
	URE" has been previously conducted, alway	s turn ignition switch OFF and
wait at least 10 seconds before cor		5
>> GO TO 2.		
2. CHECK DTC DETECTION		
(P)With CONSULT		
1. Turn the ignition switch OFF to	ON, and then wait 1 minute or more.	
2. Perform self-diagnosis for "ABS <u>Is DTC "C1155" detected?</u>	.	
	rocedure. Refer to <u>BRC-111, "Diagnosis Pro</u>	cedure".
NO >> INSPECTION END		
Diagnosis Procedure		INFOID:00000009012497
1. CHECK BRAKE FLUID LEVEL		
1. Turn the ignition switch OFF.		
2. Check brake fluid level. Refer t Is the inspection result normal?	o <u>BR-10, "Inspection"</u> .	
YES >> GO TO 2.		
NO >> Refill brake fluid. Refer	-	
2.PERFORM SELF-DIAGNOSIS	1)	
 Erase self-diagnosis result for ' Turn the ignition switch OFF, and 		
3. Turn the ignition switch ON.		
CAUTION: Never start the engine.		
4. Perform self-diagnosis for "ABS	о".	
Is DTC "C1155" detected?		
YES >> INSPECTION END NO >> GO TO 3.		
3. CHECK BRAKE FLUID LEVEL	SWITCH	
	er to BRC-113, "Component Inspection".	
Is the inspection result normal?		
YES >> GO TO 5. NO >> Replace reservoir tank	Poter to PP 20 "Disassembly and Assemb	
4.PERFORM SELF-DIAGNOSIS (Refer to <u>BR-30, "Disassembly and Assemb</u> 2)	<u>IV</u> . GO TO 4.
	_,	
Revision: 2013 September	BRC-111	2014 QX80

Malfunction detected condition

• When an open circuit is detected in brake fluid level

• When brake fluid level low signal is detected.

[WITH VDC]

INFOID:000000009012496

Possible causes

· ABS actuator and electric unit

· Harness or connector

(control unit)

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C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

- 1. Erase self-diagnosis result for "ABS".
- 2. Turn the ignition switch OFF, and wait 10 seconds or more.
- 3. Turn the ignition switch ON.

CAUTION: Never start the engine.

4. Perform self-diagnosis for "ABS".

Is DTC "C1155" detected?

YES >> INSPECTION END

NO >> GO TO 5.

5.CHECK CONNECTOR AND TERMINAL

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

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts. GO TO 6.

6.PERFORM SELF-DIAGNOSIS (3)

() With CONSULT

- 1. Connect brake fluid level switch harness connector.
- 2. Connect ABS actuator and electric unit (control unit) harness connector.
- 3. Erase self-diagnosis result for "ABS".
- 4. Turn the ignition switch OFF, and wait 10 seconds or more.
- Turn the ignition switch ON. CAUTION:
- Never start the engine.
- 6. Perform self-diagnosis for "ABS".

Is DTC "C1155" detected?

YES >> INSPECTION END

NO >> GO TO 7.

7. CHECK BRAKE FLUID LEVEL SWITCH HARNESS

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

Brake fluid	Brake fluid level switch ABS actuator and elec		ABS actuator and electric unit (control unit)	
Connector	Terminal	Connector Terminal		Continuity
E47	1	E36	13	Existed

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

Brake fluid	level switch		Continuity
Connector	Terminal		Continuity
E47	1	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts. GO TO 8.

C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

INFOID:000000009012498

8. CHECK BRAKE FLUID LEVEL SWITCH GROUND

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

Brake fluid	level switch		Continuity
Connector	Terminal		Continuity
E47	2	Ground	Existed
	10		

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146. "Removal and Installa-</u> tion".

NO >> Repair or replace error-detected parts.

Component Inspection

1. CHECK BRAKE FLUID LEVEL SWITCH

1. Turn the ignition switch OFF.

2. Disconnect brake fluid level switch harness connector.

3. Check resistance between terminals of brake fluid level switch.

Brake fluid level switch	Condition	Resistance	G
Terminal	Condition	Resistance	
	When brake fluid level in reservoir tank is within the specified level.	1.9 – 2.1 kΩ	
1 – 2	When brake fluid level in reservoir tank is less than the specified level.	1.0 Ω or less	H

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace reservoir tank. Refer to <u>BR-30, "Disassembly and Assembly"</u>.

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C1160 DECEL G SEN SET

< DTC/CIRCUIT DIAGNOSIS >

C1160 DECEL G SEN SET

DTC Logic

INFOID:000000009012499

[WITH VDC]

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1160	DECEL G SEN SET	When calibration of yaw rate/side/decal G sensor is not complete.	 Yaw rate/side/decel G sensor Harness or connector ABS actuator and electric unit (control unit) Decel G sensor calibration is not performed

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(I) With CONSULT

1. Turn the ignition switch OFF to ON.

2. Perform self-diagnosis for "ABS".

Is DTC "C1160" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-114, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

1.DECEL G SENSOR CALIBRATION

Perform decel G sensor calibration. Refer to <u>BRC-64, "Work Procedure"</u>.

>> GO TO 2.

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

With CONSULT

Perform self-diagnosis for "ABS".

Is DTC "C1160" detected?

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

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

1. Turn the ignition switch OFF.

2. Check yaw rate/side/decel G sensor system. Refer to BRC-107, "Diagnosis Procedure".

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146, "Removal and Installa-</u> tion".
- NO >> Repair or replace error-detected parts.

INFOID:000000009012500

C1164, C1165 CV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

DTC DETECTION LOGIC

C1164, C1165 CV SYSTEM

DTC Logic

[WITH VDC]

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INFOID:000000009012501

DTC	Display Item	Malfun	ction detected condition	Possible causes
C1164	CV 1	When a malfunction	on is detected in cut valve 1.	Harness or connector ABS actuator and electric unit
C1165	CV 2	When a malfunction	on is detected in cut valve 2.	(control unit)Fusible linkBattery power supply system
тс со	ONFIRMATION PROCE	DURE		
1.PREC	CONDITIONING			
	CONFIRMATION PROCED east 10 seconds before co			ways turn ignition switch OFF and
wan at it				
`	>> GO TO 2.			
	CK DTC DETECTION			
	CONSULT in the ignition switch OFF to			
	form self-diagnosis for "AB			
s DTC "	C1164" or "C1165" detecte			
YES NO	>> Proceed to diagnosis p >> INSPECTION END	procedure. Refer	o <u>BRC-115, "Diagnosis</u>	Procedure".
-	osis Procedure			
				INF01D:000000009012502
1. CHE	CK CUT VALVE POWER S	SUPPLY		
	n the ignition switch OFF.	olootrio unit (oont	col unit) barnass connos	tor
				ness connector and ground.
	unter and electric unit (control un	:4)		
	uator and electric unit (control un nnector Terminal		Voltage	
	E36 1	Ground	Battery voltage	
	the ignition switch ON.		,,	
CAL	JTION: er start engine.			
		ctuator and elect	ric unit (control unit) har	ness connector and ground.
	tuator and electric unit (control u	nit)	Voltage	
	nnector Terminal			
		Ground	Battery voltage	
<u>s the ins</u> YES	spection result normal? >> GO TO 3.			
NO	>> GO TO 2.			
2. СНЕ(CK CUT VALVE POWER S	SUPPLY CIRCUIT		
1. Turr	the ignition switch OFF.			

- I urn the ignition switch OFF.
 Check 30A fusible link (L).

Revision: 2013 September

C1164, C1165 CV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (1) and 30A fusible link (L).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-11, "Wiring Diagram - BATTERY</u> <u>POWER SUPPLY -"</u>.

NO >> Repair or replace error-detected parts.

3.CHECK CUT VALVE GROUND CIRCUIT

1. Turn the ignition switch OFF.

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

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector Terminal		_	Continuity
E36	2		
	3	Ground	Existed
E37	48		

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK TERMINAL

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146, "Removal and Installa-</u> tion".
- NO >> Repair or replace error-detected parts.

C1166, C1167 SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

DTC DETECTION LOGIC

C1166, C1167 SV SYSTEM

DTC Logic

[WITH VDC]

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INFOID:000000009012503

DTC	Display	Item	Malfun	ction detected condition	Possible causes
C1166	SV 1		When a malfunction	on is detected in suction valve 1.	Harness or connector
C1167	SV 2		When a malfunction	on is detected in suction valve 2.	 ABS actuator and electric unit (control unit) Fusible link Battery power supply system
тс со	ONFIRMATION	I PROCEDU	RE		
.PRE	CONDITIONING	ì			
	CONFIRMATIO				vs turn ignition switch OFF and
_	>> GO TO 2.				
CHE	CK DTC DETEC	TION			
. Turr 2. Perl	CONSULT in the ignition sw form self-diagno fC1166" or "C110	sis for "ABS".			
YES NO		diagnosis pro		to <u>BRC-117, "Diagnosis Pro</u>	cedure".
Diagno	osis Procedu	re			INFOID:000000009012504
	CK SUCTION V				
	the ignition sw				
. Disc	connect ABS act	tuator and ele		rol unit) harness connector. ric unit (control unit) harnes:	s connector and ground.
ABS act	uator and electric u	nit (control unit)		Velterre	
Cor	nnector	Terminal	_	Voltage	
	E36	1	Ground	Battery voltage	
CAI Nev	n the ignition sw JTION: er start engine ick voltage betw		ator and elect	ric unit (control unit) harnes	s connector and ground.
ABS act	tuator and electric u	nit (control unit)			
	nector	Terminal		Voltage	
	E36	1	Ground	Battery voltage	
		ormal?	1		
s the in:	spection result r >> GO TO 3.	ormal?			

1. Turn the ignition switch OFF.

2. Check 30Ă fusible link (L).

C1166, C1167 SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (1) and 30A fusible link (L).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-11, "Wiring Diagram - BATTERY</u> <u>POWER SUPPLY -"</u>.

NO >> Repair or replace error-detected parts.

3.CHECK SUCTION VALVE GROUND CIRCUIT

1. Turn the ignition switch OFF.

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

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector Terminal		_	Continuity	
E36	2			
	3	Ground	Existed	
E37	48			

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK TERMINAL

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146, "Removal and Installa-</u> tion".
- NO >> Repair or replace error-detected parts.

C1170 VARIANT CODING

< DTC/CIRCUIT DIAGNOSIS >

C1170 VARIANT CODING

DTC Logic

INFOID:000000009012505

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DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes	
C1170	VARIANT CODING	When the information in ABS actuator and electric unit (control unit) is not the same.	ABS actuator and electric unit (control unit)	С
DTC CC	ONFIRMATION PROCED	URE		
1.PREG	CONDITIONING			D
	CONFIRMATION PROCED	JRE" has been previously conducted, alway conducting the next test.	s turn the ignition switch OFF	Е
0	>> GO TO 2.			
2.CHE	CK DTC DETECTION			BRC
With 0	CONSULT			
	n the ignition switch OFF to (G
	form self-diagnosis for "ABS "C1170" detected?			
YES		ocedure. Refer to <u>BRC-119, "Diagnosis Proc</u>	coduro"	
NO	>> INSPECTION END	ocedure. Refer to <u>BRC-119, Diagnosis Proc</u>	<u>.eduie</u> .	Н
Diagno	osis Procedure		WE010-0000000000000000000000000000000000	
			INFOID:000000009012506	
1. CHE	CK SELF-DIAGNOSIS RES	ULTS		
	ABS actuator and electric n self-diagnosis for "ABS".	unit (control unit) even if other display thar	" "VARIANT CODING" is dis-	J
	>> Replace ABS actuator a <u>tion"</u> .	and electric unit (control unit). Refer to <u>BRC</u>	C-146. "Removal and Installa-	K
				L

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< DTC/CIRCUIT DIAGNOSIS >

C118E ACCUMULATOR

INFOID:000000009012507

[WITH VDC]

DTC Logic

DTC DETECTION LOGIC

CAUTION:

The VDC warning lamp, ABS warning lamp and brake warning lamp turns ON and DTC "C118E" may be detected in self-diagnosis result of "ABS" when the brake pedal is excessively operated, such as air bleeding. This is not a system malfunction because this occurs due to the temporary decrease in accumulator fluid pressure. The system returns to normal condition when the accumulator fluid pressure reaches the specified pressure with the ignition switch ON and the VDC warning lamp, ABS warning lamp, and brake warning lamp turn OFF. After these steps, ABS self-diagnosis results are erased.

DTC	Display Item	Malfunction detected condition	Possible causes
C118E	ACCUMULATOR PRESS	When performing excessive brake pedal operation with the vehicle stopped. [When accumulator fluid pressure reaches 11.43 MPa (114 bar, 116.6 kg/cm ² , 1657 psi) after reaching 17.3 MPa (173 bar, 176.5 kg/ cm ² , 2509 psi.]	_

Diagnosis Procedure

INFOID:000000009012508

1.ERASE SELF-DIAGNOSIS RESULT

CAUTION:

The VDC warning lamp, ABS warning lamp and brake warning lamp turns ON and DTC "C118E" may be detected in self-diagnosis result of "ABS" when the brake pedal is excessively operated, such as air bleeding. This is not a system malfunction because this occurs due to the temporary decrease in accumulator fluid pressure. The system returns to normal condition when the accumulator fluid pressure reaches the specified pressure with the ignition switch ON and the VDC warning lamp, ABS warning lamp, and brake warning lamp turn OFF. After these steps, ABS self-diagnosis results are erased.

With CONSULT

- 1. Erase Self-diagnosis result for "ABS".
- 2. Turn the ignition switch OFF.
- 3. Depress brake pedal to full stroke 20 times or more.
- 4. Start the engine, and then wait 2 minutes or more.
- 5. Check VDC warning lamp, ABS warning lamp and brake warning lamp turns OFF.
- 6. Perform self-diagnosis for "ABS".

Is any DTC detected?

- YES >> Check the DTC. Refer to <u>BRC-50, "DTC Index"</u>.
- NO >> INSPECTION END

U1000 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

U1000 CAN COMM CIRCUIT

Description

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

DTC Logic

INFOID:0000000000012510

INFOID:000000009012511

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF to ON.

2. Perform self-diagnosis for "ABS".

Is DTC "U1000" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-121, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

Proceed to LAN-22, "Trouble Diagnosis Flow Chart".

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POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

POWER SUPPLY AND GROUND CIRCUIT

Description

ABS actuator and electric unit (control unit) power supply

Diagnosis Procedure

INFOID:000000009012513

INFOID:000000009012512

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

ABS actuator and electric unit (control unit)			Voltage
Connector	Terminal		voltage
E36	18	Ground	Approx. 0 V

4. Turn the ignition switch ON CAUTION:

Never start engine.

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

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal		vollage
E36	18	Ground	10 – 16 V

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

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

- 1. Turn the ignition switch OFF.
- 2. Check 10A fuse (#57).
- 3. Disconnect IPDM E/R harness connector.
- 4. Check continuity between ABS actuator and electric unit (control unit) harness connector and IPDM E/R harness connector.

ABS actuator and electric unit (control unit)		IPDM E/R		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
E36	18	E15	59	Existed	

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

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
E36	18	Ground	Not existed

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to <u>PG-59, "Wiring Diagram - IGNITION</u> <u>POWER SUPPLY -"</u>.

NO >> Repair or replace error-detected parts.

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

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

BRC-122

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

ABS actuator and electric unit (contr	ol unit)			
Connector Termir		-	Voltage	
E37 49		round	Approx. 0 V	
Turn the ignition switch ON				
CAUTION:				
Never start engine.				
Check voltage between ABS	actuator and elec	ctric unit (contro	unit) harness connector and g	round.
100				
ABS actuator and electric unit (contr	,	_	Voltage	
Connector Termin				
E37 49	G	round	10 – 16 V	
the inspection result normal?				
YES >> GO TO 5. NO >> GO TO 4.				-
CHECK ABS ACTUATOR AN	D ELECTRIC UNI	I (CONTROL U	NII) IGNITION POWER SUPP	
 Turn the ignition switch OFF. Check 10A fuse (#74). 				
	ircuit between AB	S actuator and e	electric unit (control unit) harnes	ss connector
terminal (49) and 10A fuse (a	#74).			
the inspection result normal?				
YES >> Perform trouble diag	nosis for ignition	power supply. R	efer to <u>PG-59, "Wiring Diagram</u>	- IGNITION
POWER SUPPLY -"				
NO >> Repair or replace er	-			
CHECK MOTOR AND MOTO	R RELAY POWE	R SUPPLY CIRC	JUIT	
 Turn the ignition switch OFF. Check voltage between ABS 		ctric unit (contro	unit) harness connector and g	round.
ABS actuator and electric unit (control	unit)	Valtaga		
Connector Terminal		Voltage		
E36 4				
E37 47	Ground	Battery voltag	je	
. Turn the ignition switch ON.		U	—	
CAUTION:				
Never start engine.				
		strie unit (sentre)		u a a d
	actuator and ele	ctric unit (contro	unit) harness connector and g	round.
. Check voltage between ABS		ctric unit (contro	unit) harness connector and g	round.
ABS actuator and electric unit (control		ctric unit (contro Voltage	unit) harness connector and g	round.
ABS actuator and electric unit (control Connector Terminal			unit) harness connector and g	round.
ABS actuator and electric unit (control Connector Terminal E36 4				round.
ABS actuator and electric unit (control Connector Terminal E36 4 E37 47	unit)	Voltage		round.
ABS actuator and electric unit (control Connector Terminal E36 4 E37 47 Sthe inspection result normal?	unit)	Voltage		round.
. Check voltage between ABS ABS actuator and electric unit (control Connector Terminal E36 4 E37 47 the inspection result normal? YES >> GO TO 7.	unit)	Voltage		round.
. Check voltage between ABS ABS actuator and electric unit (control Connector Terminal E36 4 E37 47 S the inspection result normal? YES >> GO TO 7. NO >> GO TO 6.	unit) Ground	Voltage Battery voltag	e	round.
. Check voltage between ABS ABS actuator and electric unit (control Connector Terminal E36 4 E37 47 the inspection result normal? YES >> GO TO 7.	unit) Ground	Voltage Battery voltag	e	round.
. Check voltage between ABS ABS actuator and electric unit (control Connector Terminal E36 4 E37 47 S the inspection result normal? YES >> GO TO 7. NO >> GO TO 6.	unit) Ground R RELAY POWEI	Voltage Battery voltag	e	round.
ABS actuator and electric unit (control Connector Terminal E36 4 E37 47 Sthe inspection result normal? YES >> GO TO 7. NO >> GO TO 6. O.CHECK MOTOR AND MOTO . Turn the ignition switch OFF. . Check 50A fusible link (M).	unit) Ground R RELAY POWEI	Voltage Battery voltag	e	

BRC-123

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-11, "Wiring Diagram - BATTERY</u> <u>POWER SUPPLY -"</u>.

NO >> Repair or replace error-detected parts.

7. CHECK ACTUATOR RELAY, ABS IN VALVE, ABS OUT VALVE, AND CUT VALVE, SUCTION VALVE POWER SUPPLY

1. Turn the ignition switch OFF.

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

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal		voltage
E36	1	Ground	Battery voltage

3. Turn the ignition switch ON

CAUTION:

Never start engine.

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

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal		voltage
E36	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 8.

 ${f 8}$. CHECK ACTUATOR RELAY, ABS IN VALVE, ABS OUT VALVE, AND CUT VALVE, SUCTION VALVE POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.

2. Check 30A fusible link (L).

3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (1) and 30A fusible link (L).

Is the inspection result normal?

YES	>> Perform trouble diagnosis for battery power supply. Refer to PG-11, "Wiring Diagram - BATTERY
	POWER SUPPLY -

NO >> Repair or replace error-detected parts.

${f 9.}$ CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

Check for 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
E36	2		Existed
	3	Ground	
E37	48		

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace error-detected parts.

10.CHECK TERMINAL

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

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

Is the inspection result normal?

YES >> INSPECTION END

[WITH VDC]

< DTC/CIR	POWER SUPPLY AND GROUND CIRCUIT RCUIT DIAGNOSIS >	[WITH VDC]	
	 Repair or replace error-detected parts. 	<u> </u>	A
			В
			С
			D
			E
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PARKING BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

PARKING BRAKE SWITCH

Component Function Check

1.CHECK PARKING BRAKE SWITCH OPERATION

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to diagnosis procedure. Refer to <u>BRC-126, "Diagnosis Procedure"</u>.

Diagnosis Procedure

1. CHECK PARKING BRAKE SWITCH CIRCUIT

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

Parking b	Parking brake switch		Combination meter		
Connector	Terminal	Connector Terminal		Continuity	
M11	1	M34	26	Existed	

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

Parking brake switch			Continuity	
Connector	Terminal		Continuity	
M11	1	Ground	Not existed	

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK PARKING BRAKE SWITCH

Check parking brake switch. Refer to BRC-127, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace parking brake switch. Refer to <u>PB-5, "Removal and Installation"</u>.

3.CHECK PARKING BRAKE SWITCH SIGNAL

With CONSULT

- 1. Connect parking brake switch harness connector.
- 2. Connect combination meter harness connector.
- 3. Select "ABS", "DATA MONITOR" and "PARK BRAKE SW" according to this order. Check parking brake switch signal.

Condition	DATA MONITOR
Operate parking brake	On
Release the parking brake	Off

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

4.CHECK COMBINATION METER

Check combination meter. Refer to <u>MWI-31, "CONSULT Function"</u>.

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INFOID:0000000009012515

PARKING BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS > [WITH VDC]	
Is the inspection result normal?	
YES >> GO TO 5.	А
NO >> Repair or replace combination meter. Refer to <u>MWI-87, "Removal and Installation"</u> .	
5. CHECK TERMINAL	R
 Check combination meter pin terminals for damage or loose connection with harness connector. Check parking brake switch pin terminals for damage or loose connection with harness connector. 	D
Is the inspection result normal?	С
YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146. "Removal and Installa-</u> tion".	0
NO >> Repair or replace error-detected parts.	D
Component Inspection	D
1.CHECK PARKING BRAKE SWITCH	Е
1. Turn the ignition switch OFF.	
 Disconnect parking brake switch harness connector. Check continuity between parking brake switch terminal and ground. 	
3. Check continuity between parking brake switch terminal and ground.	BRC

Parking brake switch		Condition	Continuity	
Terminal		Condition	Continuity	G
1	Ground	When parking brake switch is pressed	Existed	
· ·	Giouna	When parking brake switch is released	Not existed	
	-10			H

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace parking brake switch. Refer to <u>PB-5</u>, "Removal and Installation".

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< DTC/CIRCUIT DIAGNOSIS >

VDC OFF SWITCH

INFOID:000000009012517

INFOID:000000009012518

[WITH VDC]

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-128, "Diagnosis Procedure"</u>.

Diagnosis Procedure

NOTE:

VDC OFF switch is integrated in SNOW MODE / TOW MODE / VDC OFF switch assembly (2WD models) or 4WD switch assembly (4WD models).

1.CHECK VDC OFF SWITCH CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Disconnect SNOW MODE / TOW MODE / VDC OFF switch assembly (2WD models) or 4WD switch assembly (4WD models) harness connector.
- 4. Check continuity between ABS actuator and electric unit (control unit) harness connector and SNOW MODE / TOW MODE / VDC OFF switch assembly (2WD models) or 4WD switch assembly (4WD models) harness connector.

ABS actuator and electric unit (control unit)		SNOW MODE / TOW MODE / VDC OFF switch assembly (2WD models) or 4WD switch assembly (4WD models)		Continuity
Connector	Terminal	Connector	Terminal	
E36	39	M147 ^{*1} M54 ^{*2}	1	Existed

*1: SNOW MODE / TOW MODE / VDC OFF switch assembly (2WD models)

- *2: 4WD switch assembly (4WD models)
- 5. Check continuity between ABS actuator and electric unit (control unit) harness connector terminal and ground.

ABS actuator and ele	ctric unit (control unit)		Continuity	
Connector	Terminal		Continuity	
E36	39	Ground	Not existed	

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK VDC OFF SWITCH GROUND CIRCUIT

Check continuity between SNOW MODE / TOW MODE / VDC OFF switch assembly (2WD models) or 4WD switch assembly (4WD models) harness connector terminal and ground.

SNOW MODE / TOW MODE / VDC OFF switch assembly (2WD models) or 4WD switch assembly (4WD models)		_	Continuity
Connector	Terminal		
M147 ^{*1} M54 ^{*2}	20	Ground	Existed

*1: SNOW MODE / TOW MODE / VDC OFF switch assembly (2WD models) *2: 4WD switch assembly (4WD models)

BRC-128

VDC OFF SWITCH

		[WITH VDC]
Is the inspection result normal?		
YES >> GO TO 3.		
NO >> Repair or replace error-detected	l parts.	
3. CHECK VDC OFF SWITCH		
Check VDC OFF switch. Refer to BRC-129,	"Component Inspection".	
Is the inspection result normal?		
YES >> GO TO 4. NO >> Replace VDC OFF switch. Refe	r to BBC-149 "Removal and Instal	lation"
4. CHECK VDC OFF SWITCH SIGNAL		
 With CONSULT Connect ABS actuator and electric unit ((control unit) barness connector	
2. Connect SNOW MODE / TOW MODE /		models) or 4WD switch assem-
bly (4WD models) harness connector.	NEE SIM" apparding to this order. Ch	
3. Select "ABS", "DATA MONITOR" and "O	FF SW according to this order. Cr	Teck VDC OFF Switch signal.
Condition	DATA MONITOR	
When VDC OFF switch is pressed and VDC OFF indic	cator On	
lamp in combination meter is in ON status		
When VDC OFF switch is pressed and VDC OFF indic lamp in combination meter is in OFF status	Cator Off	
Is the inspection result normal?	1	
YES >> INSPECTION END		
NO >> GO TO 5.		
5.CHECK TERMINAL		
Check ABS actuator and electric unit (cor	ntrol unit) pin terminals for damage	or loose connection with har-
noss connoctor		
ness connector. • Check SNOW MODE / TOW MODE / VD	C OFF switch assembly (2)//D mo	
 Check SNOW MODE / TOW MODE / VD0 (4WD models) pin terminals for damage or 		dels) or 4WD switch assembly
Check SNOW MODE / TOW MODE / VD		dels) or 4WD switch assembly
 Check SNOW MODE / TOW MODE / VDG (4WD models) pin terminals for damage or <u>Is the inspection result normal?</u> YES >> Replace ABS actuator and elect 	r loose connection with harness co	dels) or 4WD switch assembly nnector.
 Check SNOW MODE / TOW MODE / VDG (4WD models) pin terminals for damage or <u>Is the inspection result normal?</u> YES >> Replace ABS actuator and election". 	r loose connection with harness construction	dels) or 4WD switch assembly nnector.
 Check SNOW MODE / TOW MODE / VDG (4WD models) pin terminals for damage or <u>Is the inspection result normal?</u> YES >> Replace ABS actuator and elecc <u>tion</u>". NO >> Repair or replace error-detected 	r loose connection with harness construction	dels) or 4WD switch assembly nnector.
 Check SNOW MODE / TOW MODE / VDG (4WD models) pin terminals for damage or <u>Is the inspection result normal?</u> YES >> Replace ABS actuator and election". 	r loose connection with harness construction	dels) or 4WD switch assembly nnector.
 Check SNOW MODE / TOW MODE / VDG (4WD models) pin terminals for damage or <u>Is the inspection result normal?</u> YES >> Replace ABS actuator and election". NO >> Repair or replace error-detected Component Inspection NOTE: 	r loose connection with harness con stric unit (control unit). Refer to <u>BR</u> I parts.	dels) or 4WD switch assembly nnector. C-146. "Removal and Installa-
 Check SNOW MODE / TOW MODE / VDG (4WD models) pin terminals for damage or Is the inspection result normal? YES >> Replace ABS actuator and election". NO >> Repair or replace error-detected Component Inspection NOTE: VDC OFF switch is integrated in SNOW MODE 	r loose connection with harness con stric unit (control unit). Refer to <u>BR</u> I parts.	dels) or 4WD switch assembly nnector. C-146. "Removal and Installa-
 Check SNOW MODE / TOW MODE / VDG (4WD models) pin terminals for damage or Is the inspection result normal? YES >> Replace ABS actuator and elect tion". NO >> Repair or replace error-detected Component Inspection NOTE: VDC OFF switch is integrated in SNOW MO 4WD switch assembly (4WD models). 	r loose connection with harness con stric unit (control unit). Refer to <u>BR</u> I parts.	dels) or 4WD switch assembly nnector. C-146. "Removal and Installa-
 Check SNOW MODE / TOW MODE / VDG (4WD models) pin terminals for damage or Is the inspection result normal? YES >> Replace ABS actuator and elect tion". NO >> Repair or replace error-detected Component Inspection NOTE: VDC OFF switch is integrated in SNOW MO 4WD switch assembly (4WD models). CHECK VDC OFF SWITCH 	r loose connection with harness con stric unit (control unit). Refer to <u>BR</u> I parts.	dels) or 4WD switch assembly nnector. C-146. "Removal and Installa-
 Check SNOW MODE / TOW MODE / VDG (4WD models) pin terminals for damage or Is the inspection result normal? YES >> Replace ABS actuator and elect tion". NO >> Repair or replace error-detected Component Inspection NOTE: VDC OFF switch is integrated in SNOW MO 4WD switch assembly (4WD models). CHECK VDC OFF SWITCH Turn the ignition switch OFF. 	r loose connection with harness con etric unit (control unit). Refer to <u>BR</u> I parts. DDE / TOW MODE / VDC OFF swit	dels) or 4WD switch assembly nnector. <u>C-146. "Removal and Installa-</u> <i>INFOID:00000000001251</i> tch assembly (2WD models) or
 Check SNOW MODE / TOW MODE / VDG (4WD models) pin terminals for damage or Is the inspection result normal? YES >> Replace ABS actuator and election". NO >> Repair or replace error-detected Component Inspection NOTE: VDC OFF switch is integrated in SNOW MO 4WD switch assembly (4WD models). CHECK VDC OFF SWITCH Turn the ignition switch OFF. Disconnect SNOW MODE / TOW MOD assembly (4WD models) harness conner 	r loose connection with harness con etric unit (control unit). Refer to <u>BR</u> I parts. DDE / TOW MODE / VDC OFF swit DE / VDC OFF switch assembly o ector.	dels) or 4WD switch assembly nnector. C-146. "Removal and Installa- INFOID:00000000012518 tch assembly (2WD models) or (2WD models) or 4WD switch
 Check SNOW MODE / TOW MODE / VDG (4WD models) pin terminals for damage or Is the inspection result normal? YES >> Replace ABS actuator and election". NO >> Repair or replace error-detected Component Inspection NOTE: VDC OFF switch is integrated in SNOW MO 4WD switch assembly (4WD models). 1.CHECK VDC OFF SWITCH 1. Turn the ignition switch OFF. 2. Disconnect SNOW MODE / TOW MOD assembly (4WD models) harness connect 3. Check continuity between terminals of \$ 	r loose connection with harness con stric unit (control unit). Refer to <u>BR</u> d parts. DDE / TOW MODE / VDC OFF swit DE / VDC OFF switch assembly of actor. SNOW MODE / TOW MODE / VD	dels) or 4WD switch assembly nnector. C-146. "Removal and Installa- INFOID:00000000012518 tch assembly (2WD models) or (2WD models) or 4WD switch
 Check SNOW MODE / TOW MODE / VDG (4WD models) pin terminals for damage or Is the inspection result normal? YES >> Replace ABS actuator and election". NO >> Repair or replace error-detected Component Inspection NOTE: VDC OFF switch is integrated in SNOW MO 4WD switch assembly (4WD models). CHECK VDC OFF SWITCH Turn the ignition switch OFF. Disconnect SNOW MODE / TOW MOD assembly (4WD models) harness conner 	r loose connection with harness con stric unit (control unit). Refer to <u>BR</u> d parts. DDE / TOW MODE / VDC OFF swit DE / VDC OFF switch assembly of actor. SNOW MODE / TOW MODE / VD	dels) or 4WD switch assembly nnector. C-146. "Removal and Installa- <i>INFOID:0000000001251!</i> tch assembly (2WD models) or (2WD models) or 4WD switch
 Check SNOW MODE / TOW MODE / VDG (4WD models) pin terminals for damage or Is the inspection result normal? YES >> Replace ABS actuator and election". NO >> Repair or replace error-detected Component Inspection NOTE: VDC OFF switch is integrated in SNOW MO 4WD switch assembly (4WD models). CHECK VDC OFF SWITCH Turn the ignition switch OFF. Disconnect SNOW MODE / TOW MOI assembly (4WD models) harness conne Check continuity between terminals of S models) or 4WD switch assembly (4WD 	r loose connection with harness con stric unit (control unit). Refer to <u>BR</u> d parts. DDE / TOW MODE / VDC OFF swit DE / VDC OFF switch assembly of actor. SNOW MODE / TOW MODE / VD	dels) or 4WD switch assembly nnector. C-146. "Removal and Installa- <i>INFOID:0000000001251!</i> tch assembly (2WD models) or (2WD models) or 4WD switch
 Check SNOW MODE / TOW MODE / VDG (4WD models) pin terminals for damage or Is the inspection result normal? YES >> Replace ABS actuator and election". NO >> Repair or replace error-detected Component Inspection NOTE: VDC OFF switch is integrated in SNOW MO 4WD switch assembly (4WD models). CHECK VDC OFF SWITCH Turn the ignition switch OFF. Disconnect SNOW MODE / TOW MOI assembly (4WD models) harness conne Check continuity between terminals of S models) or 4WD switch assembly (4WD 	r loose connection with harness con stric unit (control unit). Refer to <u>BR</u> d parts. DDE / TOW MODE / VDC OFF swit DE / VDC OFF switch assembly of actor. SNOW MODE / TOW MODE / VD	dels) or 4WD switch assembly nnector. C-146. "Removal and Installa- INFOID:00000000012518 tch assembly (2WD models) or (2WD models) or 4WD switch
 Check SNOW MODE / TOW MODE / VDG (4WD models) pin terminals for damage or Is the inspection result normal? YES >> Replace ABS actuator and election". NO >> Repair or replace error-detected Component Inspection NOTE: VDC OFF switch is integrated in SNOW MO 4WD switch assembly (4WD models). CHECK VDC OFF SWITCH Turn the ignition switch OFF. Disconnect SNOW MODE / TOW MOI assembly (4WD models) harness conne Check continuity between terminals of S models) or 4WD switch assembly (4WD 	r loose connection with harness constric unit (control unit). Refer to BR I parts. DDE / TOW MODE / VDC OFF switch DE / VDC OFF switch assembly of ector. SNOW MODE / TOW MODE / VD models) connector.	dels) or 4WD switch assembly nnector. C-146. "Removal and Installa- INFOID:00000000012519 tch assembly (2WD models) or (2WD models) or 4WD switch C OFF switch assembly (2WD
 Check SNOW MODE / TOW MODE / VDG (4WD models) pin terminals for damage or Is the inspection result normal? YES >> Replace ABS actuator and election". NO >> Repair or replace error-detected Component Inspection NOTE: VDC OFF switch is integrated in SNOW MO 4WD switch assembly (4WD models). CHECK VDC OFF SWITCH Turn the ignition switch OFF. Disconnect SNOW MODE / TOW MOI assembly (4WD models) harness conne Check continuity between terminals of S models) or 4WD switch assembly (4WD SNOW MODE / TOW MODE / VDC OFF switch assembly (2WD models) or 4WD switch assembly (4WD models) 	r loose connection with harness constric unit (control unit). Refer to BR I parts. DDE / TOW MODE / VDC OFF switch DE / VDC OFF switch assembly of ector. SNOW MODE / TOW MODE / VD models) connector.	dels) or 4WD switch assembly nnector. C-146. "Removal and Installa- INFOID:00000000012519 tch assembly (2WD models) or (2WD models) or 4WD switch C OFF switch assembly (2WD

Is the inspection result normal?

YES >> INSPECTION END

VDC OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

NO >> Replace VDC OFF switch. Refer to <u>BRC-149</u>, "Removal and Installation".

ABS WARNING LAMP

ABS WARNING LAWP	
< DTC/CIRCUIT DIAGNOSIS >	[WITH VDC]
ABS WARNING LAMP	
Component Function Check	INFOID:000000009012520
1.CHECK ABS WARNING LAMP FUNCTION	
Check that ABS warning lamp in combination meter turns ON for approx. 1 second af	ter ignition switch is
urned ON.	ter ignition switch is
CAUTION: Never start engine.	
s the inspection result normal?	
YES >> INSPECTION END	
NO >> Proceed to diagnosis procedure. Refer to <u>BRC-131, "Diagnosis Procedure"</u> .	
Diagnosis Procedure	INFOID:000000009012521
1. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY	
CUIT	
Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power suppl	ly and ground circuit.
Refer to BRC-122, "Diagnosis Procedure".	
s the inspection result normal?	
YES >> GO TO 2. NO >> Repair or replace error-detected parts.	
2.PERFORM THE SELF-DIAGNOSIS	
-	
With CONSULT Perform self-diagnosis for "ABS".	
s any DTC detected?	
YES >> Check the DTC. Refer to <u>BRC-50, "DTC Index"</u> .	
NO >> GO TO 3.	
3. CHECK ABS WARNING LAMP SIGNAL	
With CONSULT	
1. Select "ABS", "DATA MONITOR" and "ABS WARN LAMP" according to this order.	
 Turn the ignition switch OFF. Check that data monitor displays "On" for approx. 1 second after ignition switch is 	turned ON and then
changes to "Off".	
CAUTION: Never start engine.	
s the inspection result normal?	
YES >> GO TO 4.	
NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146. "R</u> tion".	emoval and Installa-
4. CHECK COMBINATION METER	
Check combination meter. Refer to MWI-31, "CONSULT Function".	
Check combination meter. Refer to <u>MWI-31, "CONSULT Function"</u> . s the inspection result normal?	
	emoval and Installa-

< DTC/CIRCUIT DIAGNOSIS >

BRAKE WARNING LAMP

Component Function Check

1.CHECK BRAKE WARNING LAMP FUNCTION (1)

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

CAUTION:

Never start engine.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Proceed to diagnosis procedure. Refer to <u>BRC-132, "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. **NOTE:**

Brake warning lamp turns ON when parking brake is operated (when parking brake switch is ON).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check parking brake switch system. Refer to <u>BRC-126, "Diagnosis Procedure"</u>.

3.CHECK BRAKE WARNING LAMP FUNCTION (3)

Check that brake warning lamp in combination meter turns ON/OFF when brake fluid level switch is operated while brake fluid level in reservoir tank is with the specified level.

NOTE:

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Check brake fluid level switch system. Refer to <u>BRC-111, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:0000000009012523

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

Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to <u>BRC-122. "Diagnosis Procedure"</u>.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. PERFORM THE SELF-DIAGNOSIS

With CONSULT

Perform self-diagnosis for "ABS".

Is any DTC detected?

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

NO >> GO TO 3.

 ${f 3.}$ CHECK BRAKE WARNING LAMP SIGNAL

()With CONSUL-.

- 1. Select "ABS", "DATA MONITOR" and "EBD WARN LAMP" according to this order.
- 2. Turn the ignition switch OFF.
- 3. Check that data monitor displays "On" for approx. 1 second after ignition switch is turned ON and then changes to "Off".
 - CAUTION: Never start engine.

Is the inspection result normal?

< DTC/CIRCUIT DIAGNOSIS > [WITH VDC]
YES >> GO TO 4. NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146, "Removal and Installa</u> <u>tion"</u> .	<u>а-</u> А
4.CHECK COMBINATION METER	_
Check combination meter. Refer to MWI-31, "CONSULT Function".	- В

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-146, "Removal and Installa-С tion".
- NO >> Repair or replace combination meter. Refer to MWI-87, "Removal and Installation".

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VDC WARNING LAMP

Component Function Check

1.CHECK VDC WARNING LAMP FUNCTION

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

CAUTION:

Never start engine.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to diagnosis procedure. Refer to <u>BRC-134, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000009012525

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

Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to <u>BRC-122</u>, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. PERFORM THE SELF-DIAGNOSIS

() With CONSULT

Perform self-diagnosis for "ABS".

Is any DTC detected?

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

3.CHECK VDC WARNING LAMP SIGNAL

With CONSULT

- I. Select "ABS", "DATA MONITOR" and "SLIP/VDC LAMP" according to this order.
- 2. Turn the ignition switch OFF.
- 3. Check that data monitor displays "On" for approx. 1 second after ignition switch is turned ON and then changes to "Off".

CAUTION:

Never start engine.

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146. "Removal and Installa-</u> tion".

4.CHECK COMBINATION METER

Check combination meter. Refer to <u>MWI-31, "CONSULT Function"</u>.

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146. "Removal and Installa-</u> tion".
- NO >> Repair or replace combination meter. Refer to <u>MWI-87, "Removal and Installation"</u>.

INFOID:000000009012524

VDC OFF INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >	[WITH VDC]
VDC OFF INDICATOR LAMP	
Component Function Check	A
1. CHECK VDC OFF INDICATOR LAMP FUNCTION (1)	_
Check that VDC OFF indicator lamp in combination meter turns ON for approx. 1 second after	B
is turned ON. CAUTION:	-
Never start engine.	С
Is the inspection result normal?	_
YES >> GO TO 2. NO >> Proceed to diagnosis procedure. Refer to <u>BRC-135, "Diagnosis Procedure"</u>	D
2.CHECK VDC WARNING LAMP FUNCTION (2)	
Check that VDC OFF indicator lamp in combination meter turns ON/OFF when VDC OFF switc	h is operated.
<u>Is the inspection result normal?</u> YES >> INSPECTION END	
YES >> INSPECTION END NO >> Check VDC OFF switch system. Refer to <u>BRC-128, "Diagnosis Procedure"</u> .	BRO
Diagnosis Procedure	INFOID:000000009012527
1. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND	G GROUND CIR-
Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and Refer to <u>BRC-122, "Diagnosis Procedure"</u> .	ground circuit.
Is the inspection result normal?	
YES >> GO TO 2. NO >> Repair or replace error-detected parts.	1
2. CHECK VDC OFF INDICATOR LAMP SIGNAL (1)	
	J
 Select "ABS", "DATA MONITOR" and "OFF LAMP" according to this order. Turn the ignition switch OFF. 	
3. Check that data monitor displays "On" for approx. 1 second after ignition switch is turned	d ON and then $^{\rm K}$
changes to "Off". CAUTION:	
Never start engine.	L
Is the inspection result normal? YES >> GO TO 3.	
NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146. "Remov</u> tion".	al and Installa- M
3. CHECK VDC OFF INDICATOR LAMP SIGNAL (2)	
With CONSULT	N
 Select "ABS", "DATA MONITOR" and "OFF LAMP" according to this order. Check that data monitor displays "On" or "Off" each time when VDC OFF switch is operate 	d.
Is the inspection result normal?	0
YES >> GO TO 4. NO >> Check VDC OFF switch system. Refer to <u>BRC-128, "Diagnosis Procedure"</u> .	
4. CHECK COMBINATION METER	Р
Check combination meter. Refer to <u>MWI-31, "CONSULT Function"</u> .	
Is the inspection result normal?	
YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146. "Remov</u> tion".	al and Installa-
NO >> Repair or replace combination meter. Refer to <u>MWI-87, "Removal and Installation"</u> .	

BRC-135

SYMPTOM DIAGNOSIS EXCESSIVE OPERATION FREQUENCY

Description

VDC function, TCS function, ABS function, EBD function, hill start assist function and brake limited slip differential (BLSD) 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> (2WD), <u>FAX-15, "Inspection"</u> (4WD).
 Rear axle: Refer to <u>RAX-5, "Inspection"</u>

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

 ${
m 3.check}$ 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 or replace wheel sensor.
 - Front wheel sensor: Refer to <u>BRC-143</u>, "FRONT WHEEL SENSOR : Removal and Installation".
 Rear wheel sensor: Refer to <u>BRC-144</u>, "REAR WHEEL SENSOR : Removal and Installation".

4.CHECK WARNING LAMP TURNS OFF

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

CAUTION:

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

Is the inspection result normal?

- YES >> Normal
- NO >> Perform self-diagnosis for "ABS" with CONSULT.

INFOID:000000009012529

INFOID:000000009012528

UNEXPECTED BRAKE PEDAL REACTION [WITH VDC] < SYMPTOM DIAGNOSIS > UNEXPECTED BRAKE PEDAL REACTION А Description INFOID:000000009012530 A malfunction of brake pedal feel (height or others) is detected when brake pedal is depressed. В Diagnosis Procedure INFOID:0000000009012531 **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" (2WD), <u>FAX-15</u>, "Inspection" (4WD). Rear axle: Refer to <u>RAX-5</u>, "Inspection" D Is the inspection result normal? YFS >> GO TO 2. E NO >> Repair or replace error-detected parts. 2. CHECK DISC ROTOR Check disc rotor runout. BRC • Front: Refer to BR-16, "DISC ROTOR : Inspection and Adjustment". Rear: Refer to <u>BR-18</u>, "DISC ROTOR : Inspection and Adjustment". Is the inspection result normal? >> GO TO 3. YES NO >> Refinish or replace disc rotor. Front: Refer to <u>BR-16, "DISC ROTOR : Inspection and Adjustment"</u>. Н • Rear: Refer to BR-18, "DISC ROTOR : Inspection and Adjustment". 3.CHECK BRAKE FLUID LEAKAGE Check fluid leakage. Front: Refer to <u>BR-24, "FRONT : Inspection"</u>. Rear: Refer to <u>BR-26, "REAR : Inspection"</u>. Is the inspection result normal? YES >> GO TO 4. NO >> Repair or replace error-detected parts. **4.**CHECK BRAKE PEDAL Κ Check each item of brake pedal. Refer to BR-7, "Inspection and Adjustment". Is the inspection result normal? YES >> GO TO 5. NO >> Adjust each item of brake pedal. Refer to BR-7, "Inspection and Adjustment". **5.**CHECK BRAKING FORCE M Check brake force using a brake tester. Is the inspection result normal? Ν YES >> GO TO 6. NO >> Check each components of brake system. **6.**CHECK BRAKE PERFORMANCE C Disconnect ABS actuator and electric unit (control unit) connector so that ABS does not operate. Check that brake force is normal in this condition. Connect harness connectors after checking.

Is the inspection result normal?

YES >> Normal

NO >> Check each components of brake system.

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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 road like rough road, gravel road or snowy road may become longer when ABS is operated than when ABS is not operated.

1.CHECK BRAKING FORCE

Check brake force using a brake tester.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check each components of brake system.

2. CHECK BRAKE PERFORMANCE

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

Is the inspection result normal?

YES >> Normal

NO >> Check each components of brake system.

INFOID:000000009012532

[WITH VDC]

INFOID:000000009012533

DOES NOT OPERATE

< SYMPTOM DIAGNOSIS > DOES NOT OPERATE

Description

VDC function, TCS function, ABS function, EBD function, hill start assist function and brake limited slip differential (BLSD) function does not operate.

Diagnosis Procedure

INFOID:000000009012535

CAUTION:

- VDC function, ABS function and EBD function never operate when the vehicle speed is 10 km/h (6.2 MPH) or less.
- TCS function, hill start assist function and brake limited slip differential (BLSD) function operates when the vehicle speed is 0 km/h (0 MPH) (the vehicle is in stop status).
- VDC function and TCS function never operate when VDC OFF switch is operated (when VDC OFF indicator lamp turns ON).
- **1.**CHECK ABS WARNING LAMP

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

CAUTION:

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

Is the inspection result normal?

YES >> Normal

NO >> Perform self-diagnosis for "ABS" with CONSULT.

INFOID:000000009012534

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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:000000009012537

[WITH VDC]

INFOID:000000009012536

1.CHECK SYMPTON 1

Depress the brake pedal 10 times or more with the engine stopped and decrease the accumulator pressure to 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-21, "Inspection and Adjustment"</u>.

2. CHECK SYMPTON 2

Depress the brake pedal 10 times or more with the engine stopped and decrease the accumulator pressure to check that motor noise from ABS actuator and electric unit (control unit) occurs when the engine starts.

Does the operation sound occur?

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

3.CHECK SYMPTON 3

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

Does the symptom occur?

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

VEHICLE JERKS DURING

< SYMPTOM DIAGNOSIS >	[WITH VDC]
VEHICLE JERKS DURING	
Description	INFOID:000000009012538
The vehicle jerks when VDC function, TCS function, ABS function, EBD function, hill start ass brake limited slip differential (BLSD) function operates.	ist function and
Diagnosis Procedure	INFOID:000000009012539
1. СНЕСК ЗҮМРТОМ	
Check that the vehicle jerks when VDC function, TCS function, ABS function, EBD function, function and brake limited slip differential (BLSD) function operates. Is the inspection result normal? YES >> Normal NO >> GO TO 2.	hill start assist
2.PERFORM THE SELF-DIAGNOSIS	
Perform self-diagnosis for "ABS". <u>Is any DTC detected?</u> YES >> Check the DTC. Refer to <u>BRC-50, "DTC Index"</u> . NO >> GO TO 3.	
3. CHECK CONNECTOR	
 With CONSULT 1. Turn the ignition switch OFF. 2. Disconnect ABS actuator and electric unit (control unit) harness connector. 3. Check connector terminal for deformation, disconnection and looseness. 4. Connect harness connector and perform self-diagnosis for "ABS" again. 	
Is the inspection result normal?YES>> GO TO 4.NO>> Poor connection of connector terminal. Repair or replace connector terminal.	
4. CHECK ECM AND TCM SELF-DIAGNOSIS RESULTS	
With CONSULT Perform self-diagnosis for "ENGINE" and "TRANSMISSION". <u>Is any DTC detected?</u>	
 YES >> Check the DTC. NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-146. "Remov</u> tion". 	al and Installa-

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NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

Description

INFOID:000000009012540

Symptom	Result	
Brake pedal slightly vibrates and operation sound (motor sound and sound from suspension) occurs when VDC function, TCS function, ABS function, EBD function, hill start assist function and brake limited slip differential (BLSD) function operates.	This is not a malfunction, The symptom occurs VDC function, TCS function, ABS function, EBD function, hill start assist function and brake limited slip differential (BLSD) function that are normally operat- ed.	
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, TCS function, hill start assist function and brake limited slip differ- ential (BLSD) 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. The symptom occurs during the brake fluid accumula- tion in the accumulator and operational check of the ABS actuator and electric unit (control unit).	
Acceleration may be felt insufficient depending on the road conditions.	This is not a malfunction. The symptom occurs TCS function that puts the highest priority to obtain the optimum traction (stability).	
TCS 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 self-diagnosis result memory for "ABS" with CONSULT.	
VDC warning lamp may turn ON and VDC function, TCS function, hill start assist function and brake limited slip differential (BLSD) 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 not malfunction. (When checking the vehicle on a chassis dynamometer, operate VDC OFF switch so that TCS function is OFF.)	
The VDC warning lamp, ABS warning lamp and brake warning lamp turn ON and DTC "C118E" may be detected in self-diagnosis result of "ABS" when the brake pedal is exces- sively operated, such as air bleeding.	This is not a system malfunction because this occurs due to the temporary de- crease in accumulator fluid pressure. The system returns to normal condition when the accumulator fluid pressure reaches the specified pressure with the ignition switch ON and the VDC warning lamp, ABS warning lamp, and brake warning lamp turn OFF. After these steps, ABS self-diagnosis results are erased.	
VDC OFF indicator lamp turns ON and TCS function is not operate when 4WD mode is "4L". (Models with 4WD system)	This is not a malfunction. When the 4WD mode becomes "4L" state, the TCS function is disabled. This function is enabled when the 4WD mode becomes "AUTO" or "4H".	

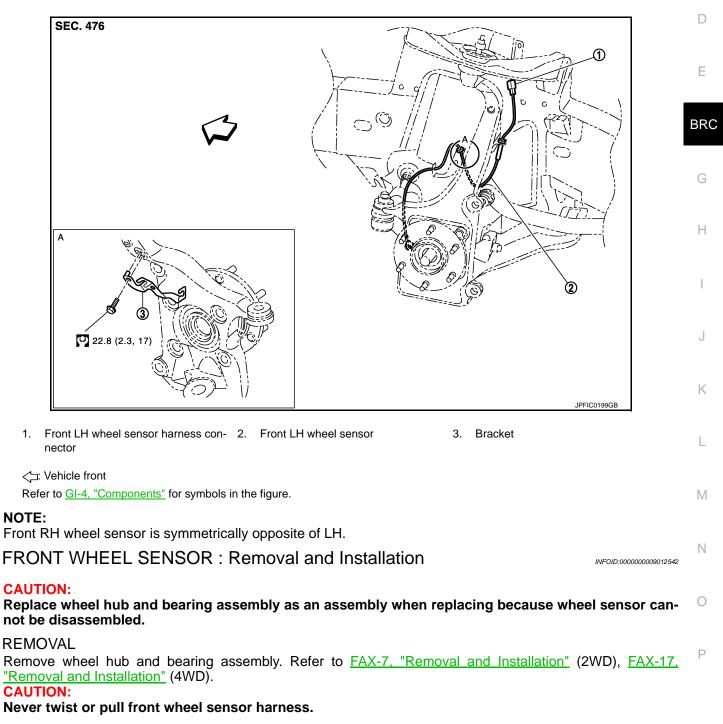
< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION WHEEL SENSOR FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

CAUTION:

Replace wheel hub and bearing assembly as an assembly when replacing because wheel sensor cannot be disassembled.



INSTALLATION

Note the following, and install in the reverse order of the removal.

BRC-143

INFOID:000000009012541

В

WHEEL SENSOR

< REMOVAL AND INSTALLATION >

• Never twist front wheel sensor harness when installing front wheel sensor. Check that grommet is fully inserted to bracket. Check that front wheel sensor harness is not twisted after installation.

• Check that front wheel sensor identification line face toward the vehicle rear.

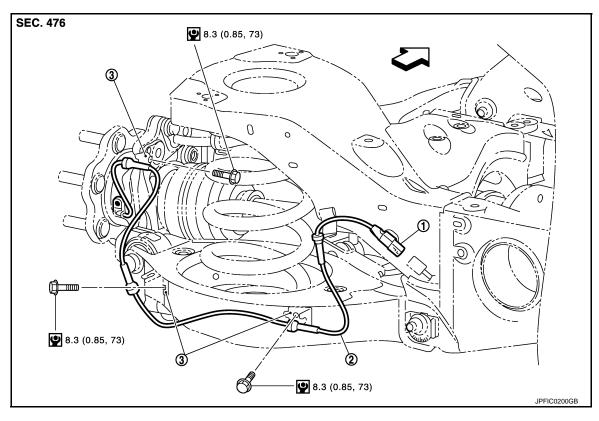
REAR WHEEL SENSOR

REAR WHEEL SENSOR : Exploded View

INFOID:000000009012543

CAUTION:

Replace wheel hub and bearing assembly as an assembly when replacing because wheel sensor cannot be disassembled.



 1. Rear LH wheel sensor harness con 2. Rear LH wheel sensor
 3. Bracket

 nector
 3.

Refer to GI-4, "Components" for symbols in the figure.

NOTE:

Rear RH wheel sensor is symmetrically opposite of LH.

REAR WHEEL SENSOR : Removal and Installation

INFOID:000000009012544

CAUTION:

Replace wheel hub and bearing assembly as an assembly when replacing because wheel sensor cannot be disassembled.

REMOVAL

Remove wheel hub and bearing assembly. Refer to <u>RAX-7, "Removal and Installation"</u>.

Never twist or pull rear wheel sensor harness.

INSTALLATION

Note the following, and install in the reverse order of the removal.

Never twist rear wheel sensor harness when installing rear wheel sensor. Check that grommet is fully inserted to bracket. Check that rear wheel sensor harness is not twisted after installation.

SENSOR ROTOR < REMOVAL AND INSTALLATION > [WITH VDC]	
< REMOVAL AND INSTALLATION > [WITH VDC] SENSOR ROTOR	
FRONT SENSOR ROTOR	
FRONT SENSOR ROTOR : Removal and Installation	
CAUTION: Replace wheel hub and bearing assembly as an assembly when replacing because sensor rotor can- not be disassembled.	
REMOVAL Remove wheel hub and bearing assembly. Refer to <u>FAX-7, "Removal and Installation"</u> (2WD), <u>FAX-17,</u> <u>"Removal and Installation"</u> (4WD).	
INSTALLATION Install wheel hub and bearing assembly. Refer to <u>FAX-7, "Removal and Installation"</u> (2WD), <u>FAX-17, "Removal and Installation"</u> (4WD). REAR SENSOR ROTOR	
REAR SENSOR ROTOR : Removal and Installation	
CAUTION: Replace wheel hub and bearing assembly as an assembly when replacing because sensor rotor can- not be disassembled.	
REMOVAL Remove wheel hub and bearing assembly. Refer to <u>RAX-7, "Removal and Installation"</u> .	
INSTALLATION Install wheel hub and bearing assembly. Refer to <u>RAX-7, "Removal and Installation"</u> .	

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ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< REMOVAL AND INSTALLATION >

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Removal and Installation

INFOID:000000009012547

[WITH VDC]

REMOVAL

 Remove hydraulic booster assembly. Refer to <u>BR-29, "Removal and Installation"</u>. CAUTION:

After replacing the hydraulic booster assembly or motor/accumulator assembly, always follow the accumulator disposal procedure to discard the hydraulic booster assembly or motor/accumulator assembly. Refer to <u>BR-33</u>, "<u>Disposal</u>".

2. Remove ABS actuator and electric unit (control unit). Refer to <u>BR-30, "Disassembly and Assembly"</u>.

INSTALLATION

Note the following, and install in the reverse order of removal.

- When installing brake tube, tighten to the specified torque using a crowfoot and torque wrench so that flare nut and brake tube are not damaged. Refer to <u>BR-22</u>, "FRONT : Exploded View".
- Never remove and install hydraulic booster assembly by holding harness.
- Bleed air from brake piping after installation. Refer to <u>BR-11, "Bleeding Brake System"</u>.
- Never apply excessive impact to hydraulic booster assembly, such as by dropping it.
- Check that connector is fully locked after hydraulic booster assembly harness connector is installed.
- Perform decel G sensor calibration when hydraulic booster assembly [ABS actuator and electric unit (control unit)] is replaced. Refer to <u>BRC-64, "Work Procedure"</u>.

< REMOVAL AND INSTALLATION >

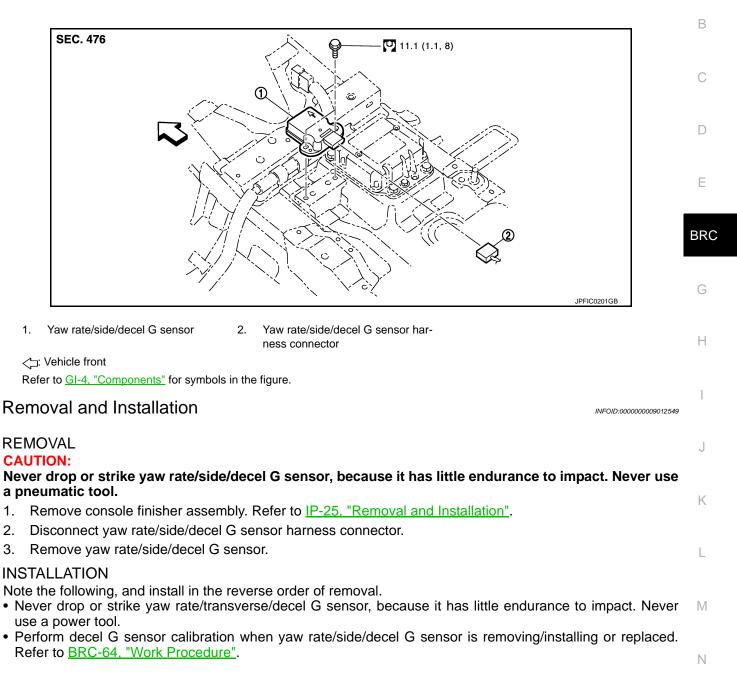
YAW RATE/SIDE/DECEL G SENSOR

Exploded View

INFOID:000000009012548

А

[WITH VDC]



STEERING ANGLE SENSOR

INFOID:000000009012550

Removal and Installation

REMOVAL

- 1. Remove spiral cable assembly. Refer to <u>SR-14, "Removal and Installation"</u>.
- 2. Remove steering angle sensor.

INSTALLATION

Note the following, and install in the reverse order of removal.

 Perform steering angle sensor neutral position adjustment when steering angle sensor is removing/installing or replaced. Refer to <u>BRC-62</u>, "Work Procedure".

VDC OFF SWITCH

< REMOVAL AND INSTALLATION >

VDC OFF SWITCH

Removal and Installation

NOTE:

VDC OFF switch is integrated in SNOW MODE / TOW MODE / VDC OFF switch assembly (2WD models) or 4WD switch assembly (4WD models).

REMOVAL

- Remove console finisher assembly from center console assembly. Refer to <u>IP-25, "Removal and Installa-</u> tion".
- Disconnect SNOW MODE / TOW MODE / VDC OFF switch assembly (2WD models) or 4WD switch D assembly (4WD models) harness connector.
- Press SNOW MODE / TOW MODE / VDC OFF switch assembly (2WD models) or 4WD switch assembly (4WD models) fixing pawls, and remove SNOW MODE / TOW MODE / VDC OFF switch assembly (2WD models) or 4WD switch assembly (4WD models) from console finisher assembly.

INSTALLATION

Install in the reverse order of removal.

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< PRECAUTION > PRECAUTION PRECAUTIONS

Precautions for Removing of Battery Terminal

 When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
 NOTE:

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

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

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

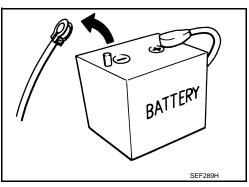
After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.
 NOTE:

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

Precautions for Preview Function Service

CAUTION:

- Never look straight into the laser beam discharger when adjusting laser beam aiming.
- Never use the ICC sensor removed from vehicle. Never disassemble or remodel.
- Erase DTC when replacing parts of ICC system. Then check the operation of ICC system after adjusting laser beam aiming if necessary.



INFOID:000000009012552

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[BRAKE ASSIST (WITH PREVIEW FUNCTION)]

< SYSTEM DESCRIPTION >

SYSTEM DESCRIPTION COMPONENT PARTS

Component Parts Location

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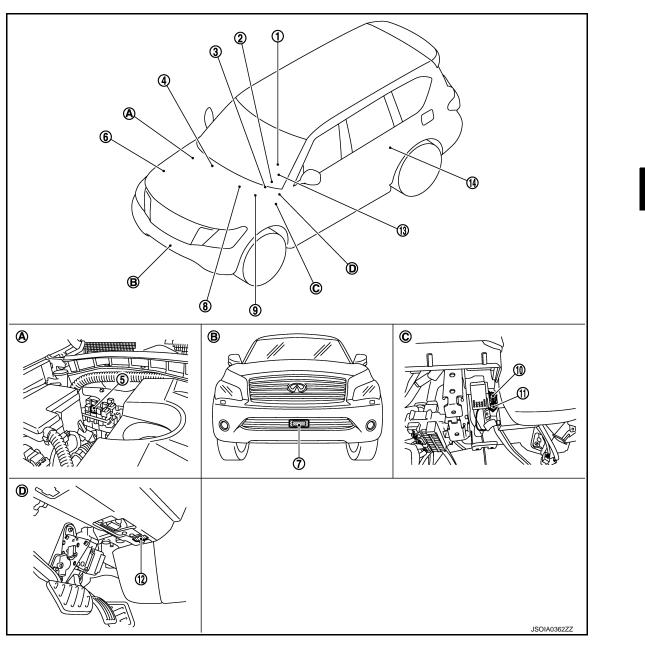
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1. ICC steering switch

- 4. Transfer control unit Refer to <u>DLN-11, "Component Parts</u> <u>Location"</u>
- Information display, ICC system warning lamp, IBA OFF indicator lamp, buzzer (On the combination meter)

5. ICC brake hold relay

- BCM Refer to <u>BCS-4, "BODY CONTROL</u> <u>SYSTEM : Component Parts Loca-</u> <u>tion"</u>
 ECM
 - Refer to the following
 For USA and Canada: <u>EC-23,</u> <u>"Component Parts Location"</u>
 For Mexico: EC-593, "Component
 - For Mexico: <u>EC-593</u>, "Component Parts Location"

< SYSTEM DESCRIPTION >

- 7. ICC sensor
- 10. Stop lamp switch

13. Steering angle sensor Refer to <u>BRC-9, "Component Parts</u> <u>Location"</u>

- A. Back side of engine room (RH)
- D. Under side of instrument lower driver panel

Component Description

COMPONENT PARTS [BRAKE ASSIST (WITH PREVIEW FUNCTION)]

- 8. TCM Refer to <u>TM-11</u>, "A/T CONTROL <u>SYSTEM : Component Parts Loca-</u> <u>tion"</u>
- ICC brake switch
 ADAS control unit Refer to <u>DAS-17, "Component Parts</u> <u>Location"</u>

B. Front bumper (center)

- 9. ABS actuator and electric unit (control unit) Refer to <u>BRC-9, "Component Parts</u> <u>Location"</u>
- 12. IBA OFF switch
- C. Upper side of brake pedal

INFOID:000000009012554

×: Applicable

		Fun	iction				
Component	Vehicle-to-vehicle distance control mode	Conventional (fixed speed) cruise control mode	Intelligent Brake Assist (IBA)	Brake Assist (with preview function)	Description		
ADAS control unit	×	×	×	×	 ADAS control unit calculates a target distance between vehicles and a target speed, based on signals received from each sensor and switch to transmit an engine torque command value to ECM and a brake fluid pressure control signal to ABS actuator and electric unit (control unit) via CAN communication ADAS control unit transmits buzzer output signal to combination meter via CAN communication 		
ICC sensor	×	×	×	×	 ICC sensor detects light reflected from a vehicle ahead by irradiating laser forward and calculates a distance from the vehicle ahead and a relative speed, based on the detected signal ICC sensor transmits the presence/absence of vehicle ahead and the distance from the vehicle to ADAS control unit via ITS communication 		
ECM	×	×	×	×	 ECM transmits the accelerator pedal position signal, ICC brake switch signal, stop lamp switch signal, ICC steering switch signal, etc. to ADAS control unit via CAN communication ECM controls the electric throttle control actuator based on the engine torque demand received from the ADAS control unit via CAN communication 		
ABS actuator and electric unit (control unit)	×	×	×	×	 ABS actuator and electric unit (control unit) transmits the vehicle speed signal (wheel speed), stop lamp signal and VDC/TCS/ABS system operation condition to ADAS control unit via CAN communication ABS actuator and electric unit (control unit) controls the brake, based on a brake fluid pressure control signal received from the ADAS control unit via CAN communication 		
BCM	×				BCM transmits the front wiper request signal to ADAS control unit via CAN communication		

< SYSTEM DESCRIPTION >

COMPONENT PARTS [BRAKE ASSIST (WITH PREVIEW FUNCTION)]

		Fur	iction				
Component	Vehicle-to-vehicle distance control mode	Conventional (fixed speed) cruise control mode	Intelligent Brake Assist (IBA)	Brake Assist (with preview function)	Description		
ТСМ	×	×			TCM transmits the signal related to A/T control to ADAS control unit via CAN communication		
Combination meter	×	×	×	×	 Performs the following operations using the signals received from the ADAS control unit via the CAN communication Displays the ICC system operation status using the meter display signal Illuminates the ICC system warning lamp using the ICC warning lamp signal Illuminates the IBA OFF indicator lamp using the IBA OFF indicator lamp signal Operates the buzzer (ICC warning chime) using the buzzer output signal 		
ICC steering switch	×	×			 ICC steering switch allows the ON/OFF of the Intelligent Cruise Control and the settings of a vehicle speed and distance be- tween vehicles ICC steering switch signal is transmitted to ECM. ECM transmits the signal to the ADAS control unit via CAN communication 		
ICC brake switch	×	×	×	×	• ICC brake switch is turned OFF and stop lamp switch is turned		
Stop lamp switch	×	×	×	×	 ON, when depressing the brake pedal ICC brake switch signal is input to ECM. These signals are transmitted from ECM to ADAS control unit via CAN communication Stop lamp switch signal is input to ECM and ABS actuator and electric unit (control unit). These signals are transmitted from ECM and ABS actuator and electric unit (control unit) to ADAS control unit) to ADAS control unit via CAN communication 		
ICC brake hold relay	×		×		ICC brake hold relay activates the stop lamp by ICC brake hold re- lay drive signal (stop lamp drive signal) outputted by the ADAS control unit		
Transfer control unit	×	×	×	×	Transfer control unit transmits a mode selection state of 4WD shift switch to the ADAS control unit via CAN communication		
IBA OFF switch			× ^{Note}		IBA OFF switch signal is input to the ADAS control unit		
Steering angle sensor	×				Measures the rotation amount, rotation speed, and rotation direc- tion of steering wheel, and then transmits them to ADAS control unit via CAN communication		

NOTE:

Only IBA system uses

SYSTEM

BRAKE ASSIST (WITH PREVIEW FUNCTION)

BRAKE ASSIST (WITH PREVIEW FUNCTION) : System Description

INFOID:000000009012555

FUNCTION DESCRIPTION

When the Preview Function identifies the need to apply emergency braking by sensing a vehicle ahead in the same lane and the distance and relative speed from it, it applies the brake pre-pressure before the driver depress the brake pedal and helps improve brake response by reducing pedal free play.

The Preview Function shares component parts and diagnosis with the Intelligent Cruise Control (ICC) system. CAUTION:

This system is only an aid to assist braking operation and is not a collision warning or avoidance device. It is the driver's responsibility to stay alert, drive safely and be in control of the vehicle at all times.

OPERATION DESCRIPTION

- The system detects the distance to the vehicle in front with the ICC sensor of ICC and judges the necessity of emergency braking.
- The system detects the accelerator pedal release operation of the driver by the accelerator pedal position sensor and estimates the driver's brake operation intention.
- If the system is judged that the emergency braking is necessary and that the driver has the intention to operate the brake, the ABS actuator and electric unit (control unit) applies pre-pressure to reduce brake pedal play.

NOTE:

This system will not operate under the following conditions:

- When the vehicle is moving at approximately 32 km/h (20 MPH) or less.
- When the 4WD shift switch is in the 4H or 4L position.

END OF OPERATION

The pre-pressure function ceases when the following conditions are met:

- 1. When the driver depresses the accelerator pedal or the brake pedal.
- 2. If the driver does not operate the accelerator pedal or brake pedal within approximately 1 second.

BRAKE ASSIST (WITH PREVIEW FUNCTION) < DTC/CIRCUIT DIAGNOSIS > [BRAKE ASSIST (WITH PREVIEW FUNCTION)]	
DTC/CIRCUIT DIAGNOSIS	
BRAKE ASSIST (WITH PREVIEW FUNCTION)	А
Diagnosis Procedure	В
1.PREVIEW FUNCTION DIAGNOSIS	
When the preview function is not operating properly, the buzzer sounds and the preview function warning lamp will come on.	С
NOTE: The preview function warning lamp shares the ICC system warning lamp.	D
>> Go to ICC. Refer to <u>CCS-75, "Work Flow"</u> .	
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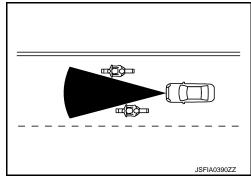
SYMPTOM DIAGNOSIS NORMAL OPERATING CONDITION

Description

INFOID:000000009012557

PRECAUTIONS FOR PREVIEW FUNCTION

- This system is only an aid to assist braking operation and is not a collision warning or avoidance device. It is the driver's responsibility to stay alert, drive safely and be in control of the vehicle at all times.
- As there is a performance limit to the Preview Function, never rely solely on this system. This system does not correct careless inattentive or absent-minded driving, or overcome poor visibility in rain, fog, or other bad weather. Reduce vehicle speed by depressing the brake pedal, in order to maintain a safe distance between vehicles.
- The system may not detect a vehicle ahead, depending on road or weather conditions. While the vehicle still travels and the Brake Assist System operates under normal conditions, the Preview Function may operate improperly under the following conditions:
- When rain, snow or dirt adhere to the system sensor
- When strong light (for example, at sunrise or sunset) is directly shining on the front of the vehicle
- Winding or hilly roads may cause the sensor to temporarily not detect a vehicle in the same lane or may detect objects or vehicles in other lanes.
- Vehicle position in the lane may cause the sensor to temporarily not detect a vehicle in the same lane or may detect objects or vehicles in other lanes.
- The system will not detect:
- Pedestrians or objects in the roadway
- Oncoming vehicles in the same lane
- Motorcycles traveling offset in the travel lane as illustrated
- When the Preview Function operates may make a small noise. This is not a system malfunction.



< PRECAUTION > PRECAUTION PRECAUTIONS

Precautions for Removing of Battery Terminal

 When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
 NOTE:

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

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

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

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

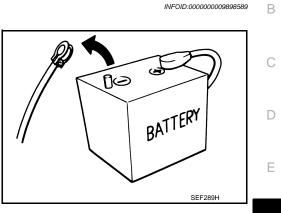
The removal of 12V battery may cause a DTC detection error.

Precautions for IBA System Service

CAUTION:

- Never look straight into the laser beam discharger when adjusting laser beam aiming.
- Never use the ICC sensor removed from vehicle. Never disassemble or remodel.
- Erase DTC when replacing parts of ICC system. Then check the operation of ICC system after adjusting laser beam aiming if necessary.
- Never change IBA system state ON/OFF without the consent of the customer. NOTE:

IBA system automatically returns to ON, when erasing self-diagnosis result of "ICC/ADAS" with CONSULT.



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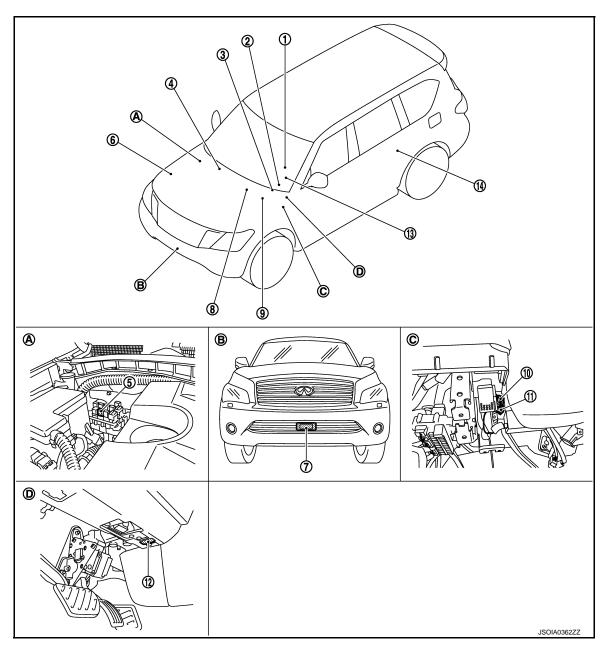
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< SYSTEM DESCRIPTION > SYSTEM DESCRIPTION COMPONENT PARTS

Component Parts Location

INFOID:000000009012559



1. ICC steering switch

- 4. Transfer control unit Refer to <u>DLN-11, "Component Parts</u> <u>Location"</u>
- Information display, ICC system warning lamp, IBA OFF indicator lamp, buzzer (On the combination meter)
- 5. ICC brake hold relay
- 3. BCM Refer to <u>BCS-4</u>, "BODY CONTROL <u>SYSTEM : Component Parts Loca-</u> tion"

6. ECM

Refer to the following
For USA and Canada: <u>EC-23.</u>

"Component Parts Location"
For Mexico: <u>EC-593</u>, "Component <u>Parts Location"</u>

COMPONENT PARTS

8.

< SYSTEM DESCRIPTION >

- ICC sensor 7.
- 10. Stop lamp switch
- 13. Steering angle sensor Refer to <u>BRC-9</u>, "Component Parts Location"
- A. Back side of engine room (RH)
- D. Under side of instrument lower driver panel

Component Description

[INTELLIGENT BRAKE ASSIST]

- TCM 9. ABS actuator and electric unit (con-Refer to TM-11, "A/T CONTROL trol unit) Refer to BRC-9, "Component Parts SYSTEM : Component Parts Loca-Location" tion" 12. IBA OFF switch 11. ICC brake switch 14. ADAS control unit Refer to DAS-17, "Component Parts Location" C. Upper side of brake pedal
- B. Front bumper (center)

- INFOID:000000009012560
 - ×: Applicable

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		Fur	oction				
Component	Vehicle-to-vehicle distance control mode	Conventional (fixed speed) cruise control mode	Intelligent Brake Assist (IBA)	Brake Assist (with preview function)	Description		
ADAS control unit	×	×	×	×	 ADAS control unit calculates a target distance between vehicles and a target speed, based on signals received from each sensor and switch to transmit an engine torque command value to ECM and a brake fluid pressure control signal to ABS actuator and electric unit (control unit) via CAN communication ADAS control unit transmits buzzer output signal to combination meter via CAN communication 		
ICC sensor	×	×	×	×	 ICC sensor detects light reflected from a vehicle ahead by irradiating laser forward and calculates a distance from the vehicle ahead and a relative speed, based on the detected signal ICC sensor transmits the presence/absence of vehicle ahead and the distance from the vehicle to ADAS control unit via ITS communication 		
ECM	×	×	×	×	 ECM transmits the accelerator pedal position signal, ICC brake switch signal, stop lamp switch signal, ICC steering switch sig- nal, etc. to ADAS control unit via CAN communication ECM controls the electric throttle control actuator based on the engine torque demand received from the ADAS control unit via CAN communication 		
ABS actuator and electric unit (control unit)	×	×	×	×	 ABS actuator and electric unit (control unit) transmits the vehicle speed signal (wheel speed), stop lamp signal and VDC/TCS/ ABS system operation condition to ADAS control unit via CAN communication ABS actuator and electric unit (control unit) controls the brake, based on a brake fluid pressure control signal received from the ADAS control unit via CAN communication 		
BCM	×				BCM transmits the front wiper request signal to ADAS control unit via CAN communication		

COMPONENT PARTS

< SYSTEM DESCRIPTION >

	Function					
Component	Vehicle-to-vehicle distance control mode	Conventional (fixed speed) cruise control mode	Intelligent Brake Assist (IBA)	Brake Assist (with preview function)	Description	
ТСМ	×	×			TCM transmits the signal related to A/T control to ADAS control unit via CAN communication	
Combination meter	×	×	×	×	 Performs the following operations using the signals received from the ADAS control unit via the CAN communication Displays the ICC system operation status using the meter display signal Illuminates the ICC system warning lamp using the ICC warning lamp signal Illuminates the IBA OFF indicator lamp using the IBA OFF indicator lamp signal Operates the buzzer (ICC warning chime) using the buzzer output signal 	
ICC steering switch	×	×			 ICC steering switch allows the ON/OFF of the Intelligent Cruise Control and the settings of a vehicle speed and distance be- tween vehicles ICC steering switch signal is transmitted to ECM. ECM transmits the signal to the ADAS control unit via CAN communication 	
ICC brake switch	×	×	×	×	ICC brake switch is turned OFF and stop lamp switch is turned ON when depending the backs and all	
Stop lamp switch	×	×	×	×	 ON, when depressing the brake pedal ICC brake switch signal is input to ECM. These signals are transmitted from ECM to ADAS control unit via CAN communication Stop lamp switch signal is input to ECM and ABS actuator and electric unit (control unit). These signals are transmitted from ECM and ABS actuator and electric unit (control unit) to ADAS control unit via CAN communication 	
ICC brake hold relay	×		×		ICC brake hold relay activates the stop lamp by ICC brake hold re- lay drive signal (stop lamp drive signal) outputted by the ADAS control unit	
Transfer control unit	×	×	×	×	Transfer control unit transmits a mode selection state of 4WD shift switch to the ADAS control unit via CAN communication	
IBA OFF switch			× ^{Note}		IBA OFF switch signal is input to the ADAS control unit	
Steering angle sensor	×				Measures the rotation amount, rotation speed, and rotation direc- tion of steering wheel, and then transmits them to ADAS control unit via CAN communication	

NOTE:

Only IBA system uses

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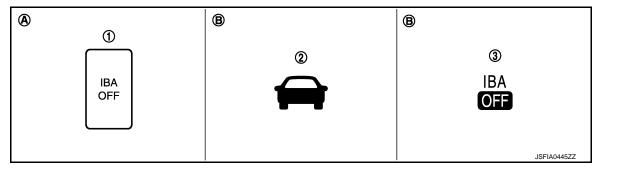
< SYSTEM DESCRIPTION > SYSTEM INTELLIGENT BRAKE ASSIST INTELLIGENT BRAKE ASSIST : System Description INFOID:000000000901256 FUNCTION DESCRIPTION Intelligent Brake Assist (IBA) system warns the driver by a vehicle ahead detection indicator and chime when there is a risk of a collision with the vehicle ahead in the traveling lane and the driver must take avoidance action immediately. The system helps reduce the rear-end collision speed by applying the brakes when it judges a collision can not be avoided. CAUTION: The IBA system is a not collision avoidance system. It is the driver's responsibility to stay alert, drive safely and be in control of the vehicle at all times. As there is a performance limit, it may not provide a warning or brake in certain conditions. NOTE: • The IBA system shares component parts and diagnosis with the Intelligent Cruise Control (ICC) system. New parts added to the IBA system is the IBA OFF indicator lamp in the combination meter and the IBA OFF switch on the instrument driver lower panel. • The ICC sensor integrated unit shares the parts with the ICC, but the IBA system will operate even when the ICC system is turned to OFF. **OPERATION DESCRIPTION** The IBA system uses an ICC sensor located below the front bumper to measure the distance to a vehicle ahead. When the system judges that the distance gets shorter, the vehicle ahead detection indicator on the combination meter blinks and the warning chime sounds.

To turn the system OFF/ON, push and hold the IBA OFF switch after starting the engine for more than 1 second.

NOTE:

- The system ON/OFF condition will be memorized even if the ignition switch turns OFF.
- The IBA system operates under the following conditions.
- The IBA system will function when the vehicle is driven at speeds of approximately 15 km/h (10 MPH) and above, and when the vehicle's speed is approximately 15 km/h (10 MPH) faster than that of the vehicle ahead.

Switch and Indicators



1. IBA OFF switch

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- Vehicle ahead detection indicator On the combination meter
- IBA OFF indicator lamp 3.

Under side of Instrument lower panel B.

2.

Temporary unavailable indication

SYSTEM

< SYSTEM DESCRIPTION >

Condition	Description	Indication on the combination meter
When the 4WD shift switch is in the 4H or 4L position	The system is temporary unavailable. (Without the warning chime)	IBA OFF / \ JSFIA0444ZZ

Fail-safe Indication

Condition	Description	Indication on the combination meter
When the sensor window is dirtyWhen the system malfunction	The system will be cancelled automatically with a beep sound.	
When driving into a strong light (i.e. sunlight)	The system is temporary unavailable. (Without the warning chime)	IBA OFF
		JSFIA0392ZZ

NOTE:

When the IBA turns OFF, the IBA OFF indicator lamp will illuminate.

DTC/CIRCUIT DIAGNOSIS INTELLIGENT BRAKE ASSIST

Diagnosis Procedure

INFOID:000000009012562

1.INTELLIGENT BRAKE ASSIST DIAGNOSIS

• The system will be cancelled automatically with a beep sound and IBA OFF indicator lamp on the combination meter will illuminate, when the system will not operate properly.

• When the IBA OFF indicator lamp continues to illuminate even if the IBA system is turned on after the engine restarts, perform the trouble-diagnosis.

NOTE:

IBA system automatically returns to ON, when erasing self-diagnosis result of "ICC/ADAS" with CONSULT.

>> Go to ICC. Refer to CCS-75, "Work Flow".

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SWITCH DOES NOT TURN ON / SWITCH DOES NOT TURN OFF

< SYMPTOM DIAGNOSIS >

[INTELLIGENT BRAKE ASSIST]

SYMPTOM DIAGNOSIS

SWITCH DOES NOT TURN ON / SWITCH DOES NOT TURN OFF

Symptom Table

INFOID:000000009012563

CAUTION:

Perform the self-diagnosis with CONSULT before the symptom diagnosis. Perform the trouble diagnosis if any DTC is detected.

Sym	Inspection item/Reference page	
IBA system does not turn ON/OFF	IBA OFF indicator lamp is not turned ON⇔OFF when operating IBA OFF switch	BRC-164, "Diagnosis Procedure"

Description

INFOID:000000009012564

IBA system does not turn ON/OFF.

- IBA OFF indicator lamp does not illuminate even if the IBA OFF switch is depressed when IBA OFF indicator lamp is not illuminated.
- IBA OFF indicator lamp does not turn off even if the IBA OFF switch is depressed when IBA OFF indicator lamp is illuminated.

NOTE:

- To turn the system OFF⇔ON, push and hold the IBA OFF switch after starting the engine for more than 1 second.
- The system ON/OFF condition will be memorized even if the ignition switch turns OFF.

Diagnosis Procedure

INFOID:000000009012565

1.PERFORM THE SELF-DIAGNOSIS

- 1. Perform "All DTC Reading" with CONSULT.
- Check if the DTC is detected in self-diagnosis results for "ICC/ADAS" with CONSULT. Refer to <u>DAS-45</u>, <u>"DTC Index"</u>.

Is any DTC detected?

- YES >> GO TO 6.
- NO >> GO TO 2.

2. IBA OFF SWITCH INSPECTION

1. Start the engine.

2. Check that "IBA SW" operates normally in "DATA MONITOR" for "ICC/ADAS" with CONSULT.

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 5.

 ${f 3.}$ CHECK IBA OFF INDICATOR CIRCUIT

- 1. Start the engine.
- 2. Select the active test item "METER LAMP" for "ICC/ADAS" with CONSULT.
- 3. Check if the IBA OFF indicator lamp illuminates when the test item is operated.

Is the inspection result normal?

YES >> Refer to <u>CCS-75, "Work Flow"</u>.

NO >> GO TO 4.

4.CHECK DATA MONITOR OF COMBINATION METER

Check that "BA W/L" operates normally in "DATA MONITOR" for "METER/M&A" with CONSULT, when the IBA OFF switch is pushed and hold for more than 1 second.

Is the inspection result normal?

YES >> Replace the combination meter. Refer to <u>MWI-87, "Removal and Installation"</u>.

NO >> Replace the ADAS control unit. Refer to DAS-72, "Removal and Installation".

SWITCH DOES NOT TURN ON / SWITCH DOES NOT TURN OFF

< SYMPTOM DIAGNOSIS >

[INTELLIGENT BRAKE ASSIST]

5. CHECK IBA OFF SWITCH	Δ
Check IBA OFF switch. Refer to CCS-133. "Component Inspection (IBA OFF Switch)".	
Is the inspection result normal?	
YES >> GO TO 7.	В
NO $>>$ GO TO 6.	
6.REPAIR OR REPLACE MALFUNCTIONING PARTS	
Repair or replace malfunctioning parts.	С
>> GO TO 7.	D
7.CHECK IBA SYSTEM	
Check that IBA OFF indicator lamp turned ON⇔OFF, when operating IBA OFF switch.	
>> INSPECTION END	
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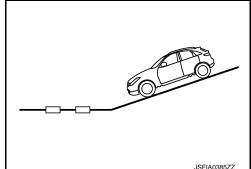
< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

Description

PRECAUTIONS FOR INTELLIGENT BRAKE ASSIST

- The IBA system is a not collision avoidance system. It is the driver's responsibility to stay alert, drive safely and be in control of the vehicle at all times.
- As there is a performance limit, it may not provide a warning or brake in certain conditions.
- The system will not detect the following objects:
- Pedestrians, animals, or obstacles in the roadway
- Oncoming vehicles in the same lane
- The system will not detect under the following conditions:
- When the sensor gets dirty and it is impossible to detect the distance from the vehicle ahead.
- When driving into a strong light (i.e. sunlight)
- The sensor generally detects the signals returned from the reflectors on a vehicle ahead. Therefore, the system may not function properly under the following conditions:
- When the reflectors of the vehicle ahead are positioned high or close each other (including a small vehicle such as motorcycles).
- When the sensor gets dirty or and it is impossible to detect the distance from the vehicle ahead.
- When the reflectors on the vehicle ahead is missing, damaged or covered.
- When the reflector of the vehicle ahead is covered with dirt, snow and road spray.
- When visibility is low (such as rain, fog, snow, etc.).
- When snow or road spray from traveling vehicles are raised up.
- When dense exhaust or other smoke (black smoke) from vehicles reduces the sensor visibility.
- When excessively heavy baggage is loaded in the rear seat or the luggage room of vehicle.
- When abruptly accelerating or decelerating.
- On steep downhill or roads with sharp curves.
- When there is a highly reflective object near the vehicle ahead (i.e. very close to other vehicle, signboard, etc.).
- While towing a trailer or other vehicle.
- Depending on certain road conditions (curved, beginning of a curve), vehicle conditions (steering position, vehicle position), or preceding vehicle's conditions (position in lane, etc.), the system may not function properly.
- The system may not function in offset conditions.
- The system may not function when the distance to the vehicle ahead is extremely close.
- The system detect highly reflective objects such as reflectors, signs, white markers, and other stationary objects on the road or near the traveling lane, and when in extreme conditions, detection of these objects may cause the system to function.
- The system is designed to automatically check the sensor's functionality. If the sensor is covered with ice, a transparent or translucent plastic bag, etc., the system may not detect them. In these instances the system may not be able to warn properly. Be sure to check and clean the sensor regularly.
- Excessive noise will interfere with the warning chime sound, and the chime may not be heard.
- Never step in under the brake pedal to avoid an accident when IBA system turns ON.
- Sudden appearance of the vehicle in front (i.e. it abruptly cuts in) may not be detected and the system may not warn soon enough.
- The system will be cancelled automatically with a beep sound and the IBA OFF indicator lamp will illuminate under the following conditions:
- When the sensor window is dirty
- When the system malfunctions



INFOID:000000009012566

< REMOVAL AND INSTALLATION > **REMOVAL AND INSTALLATION IBA OFF SWITCH**

Re	moval and Installation	INFOID:0000000009012567	E
RE	MOVAL		
1.	Remove instrument lower panel. Refer to IP-13, "Exploded View".		С
2.	Disengage the pawl. Then remove IBA OFF switch.		
	STALLATION tall in the reverse order of removal.		C

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