SECTION BRAKE CONTROL SYSTEM

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< 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. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. 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.

Precautions Necessary for Steering Wheel Rotation After Battery Disconnection

CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- Before removing and installing any control units, first turn the ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation pro-

OPERATION PROCEDURE

- Connect both battery cables.
 NOTE: Supply power using jumper cables if battery is discharged.
- Turn the ignition switch to ACC position. (At this time, the steering lock will be released.)
- 3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.

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PRECAUTIONS

< PRECAUTION >

- 4. Perform the necessary repair operation.
- 5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the ignition switch is turned to LOCK position.)
- 6. Perform self-diagnosis check of all control units using CONSULT.

Precaution for Procedure without Cowl Top Cover

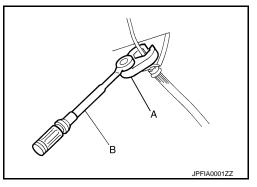
When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.

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-16, "FOR NORTH AMERICA : Fluids and Lubricants"</u> (for USA and Canada), <u>MA-18, "FOR MEXICO : Fluids and Lubricants"</u> (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.
- Never damage caliper (made by aluminum).
- Always loosen the brake tube flare nut with a flare nut wrench.
- Tighten flare nut of brake tube to the specified torque using a crowfoot (A) and torque wrench (B).
- 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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Precaution for Brake Control System

- 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, Rise-up & Build-up function, Brake force distribution function or Active trace control function operates. This is not a malfunction because it is caused by VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function, Brake force distribution function or Active trace control 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.

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PRECAUTIONS

< PRECAUTION >

[WITH VDC]

- 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, Rise-up & Build-up function, Brake force distribution function and Active trace control 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, Rise-up & Build-up function, Brake force distribution function and Active trace control 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, Rise-up & Build-up function, Brake force distribution function and Active trace control function.
- Suspension component parts (shock absorber, spring, bushing and others)
- Tire and wheel (other than the specified size)
- Brake component parts (brake pad, disc rotor, brake caliper and others)
- Engine component parts (ECM, muffler and others)
- Body reinforcement component parts (rollover bar, tower bar and others)
- When suspension, tire and brake related 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, Rise-up & Build-up function, Brake force distribution function and Active trace control 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 selfdiagnosis 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, Rise-up & Build-up function, Brake force distribution function and Active trace control 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, EBD function, hill start assist function, Rise-up & Build-up function, Rise-up & Build-up function, Brake force distribution function and Active force function.
- Brake pedal vibrates and operation sound occurs during sudden acceleration and cornering, when VDC function, TCS function, Rise-up & Build-up function, Brake force distribution function or Active trace control function is operated. This is not a malfunction because it is caused by VDC function, TCS function, Rise-up & Build-up function, Brake force distribution function or Active trace control function, that is operated normally.
- VDC warning lamp may turn ON and VDC function, TCS function, Rise-up & Build-up function, Brake force distribution function and Active trace control 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, TCS function, Rise-up & Build-up function, Brake force distribution function and Active trace control function, Rise-up & Build-up function, Brake force distribution function and Active trace control 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, TCS function, Rise-up & Build-up function, Brake force distribution function and Active trace control 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, TCS function, Rise-up & Build-up function, Brake force distribution function, Rise-up & Build-up function, Brake force distribution function and Active trace control function and Active trace returns to normal for vDC function, TCS function, Rise-up & Build-up function, Brake force distribution function and Active trace control function after the engine is started again. In this case, perform self-diagnosis, check self-diagnosis results, and erase memory.

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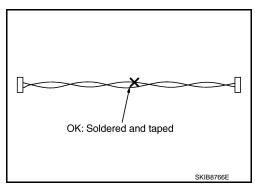
out point cannot be separated and the twisted wire characteristics are lost.)

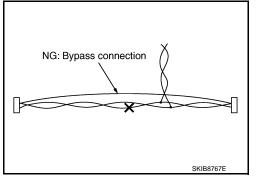
• Solder the repair part, and wrap it with tape. [Twisted wire fray must be 110 mm (4.33 in) or less.]

< PRECAUTION >

Precaution for Harness Repair

• Never bypass the repair point with wire. (If it is bypassed, the turn-





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PREPARATION

[WITH VDC]

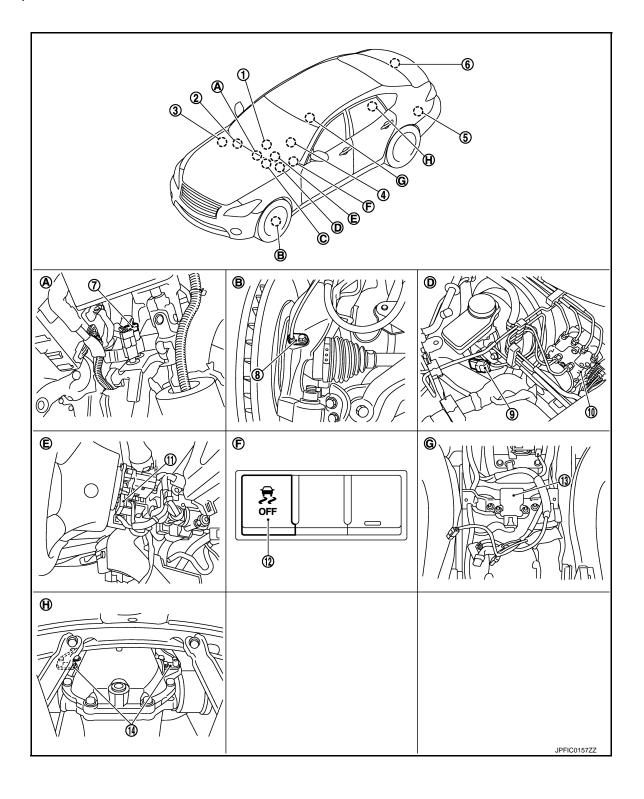
REPARATION			
ommercial Service Too	ls	INFOID:0000000	08132982
Tool name		Description	(
Power tool		Loosening bolts and nuts	I
	PBIC0190E		
			В

< PREPARATION >

SYSTEM DESCRIPTION COMPONENT PARTS

Component Parts Location

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< SYSTEM DESCRIPTION >

[WITH VDC]

1.	Drive mode select switch Refer to <u>DMS-3, "Component Parts</u> <u>Location"</u> .	2.	A/C auto AMP. Refer to <u>HAC-6, "AUTOMATIC AIR</u> <u>CONDITIONING SYSTEM : Compo-</u> <u>nent Parts Location"</u> (automatic air	3.	ECM Refer to EC-37, "ENGINE CON- TROL SYSTEM : Component Parts Location" (VQ37VHR for USA and	A
			conditioning system), <u>HAC-9, "FOR-EST AIR SYSTEM : Component</u> <u>Parts Location"</u> (forest air system).		Canada), <u>EC-549, "ENGINE CON-</u> <u>TROL SYSTEM : Component Parts</u> <u>Location"</u> (VQ37VHR for Mexico), <u>EC-948, "ENGINE CONTROL SYS-</u>	В
					TEM : Component Parts Location" (VK56VD for USA and Canada), <u>EC-</u> 1519, "ENGINE CONTROL SYS-	С
					<u>TEM : Component Parts Location</u> " (VK56VD for Mexico).	D
4.		5.	4WAS main control unit*1	6.	ADAS control unit*2	
	Refer to <u>TM-11, "A/T CONTROL</u> <u>SYSTEM : Component Parts Loca-</u> <u>tion"</u> .		Refer to <u>STC-31, "4WAS SYSTEM :</u> <u>Component Parts Location"</u> .		Refer to DAS-14, "Component Parts Location".	E
7.	Stop lamp switch	8.	Front wheel sensor	9.	Vacuum sensor	
10.	ABS actuator and electric unit (con- trol unit)	11.	Steering angle sensor	12.	VDC OFF switch	BRO
13.	Yaw rate/side/decel G sensor	14.	Rear wheel sensor			
A.	Brake pedal	B.	Steering knuckle	C.	ABS warning lamp, brake warning lamp, VDC warning lamp, VDC OFF indicator lamp (in combination meter)	G
D.	Inside of brake master cylinder cover	Ε.	Back of spiral cable assembly	F.	Instrument driver lower panel	Н
G.	Under of center console	Н.	Rear final drive assembly			
*1: I	Models with 4WAS					
*2: I	Models with ICC system					1

Component Description

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Component		Reference/Function		
	Pump		-	
	Motor			
	Actuator Relay (Main relay)		l	
ABS actuator and electric unit	ABS IN valve			
(control unit)	ABS OUT valve	BRC-12, "ABS Actuator and Electric Unit (Control Unit)"		
	Cut valve 1 (Primary line)		Ν	
	Cut valve 2 (Secondary line)		ľ	
	Pressure Sensor			
Wheel sensor		BRC-12, "Wheel Sensor and Sensor Rotor"	_	
Yaw rate/side/decel G sensor		BRC-13, "Yaw Rate/Side/Decel G Sensor"	_ (
Steering angle sensor		BRC-13, "Steering Angle Sensor"		
Vacuum sensor Stop lamp switch		BRC-13, "Vacuum Sensor"	F	
		BRC-13, "Stop Lamp Switch"		
VDC OFF switch		BRC-13, "VDC OFF Switch"		

< SYSTEM DESCRIPTION >

Component	Reference/Function
ABS warning lamp	
Brake Warning Lamp	PDC 15 "System Description"
VDC warning lamp	BRC-15, "System Description"
VDC OFF indicator lamp	
ECM	EC-57, "ENGINE CONTROL SYSTEM : System Description" (VQ37VHR for USA and Canada) EC-567, "ENGINE CONTROL SYSTEM : System Description" (VQ37VHR for Mexico) EC-969, "ENGINE CONTROL SYSTEM : System Description" (VK56VD for USA and Canada) EC-1539, "ENGINE CONTROL SYSTEM : System Description" (VK56VD for USA and Canada) EC-1539, "ENGINE CONTROL SYSTEM : System Description" (VK56VD for Mexico)
ТСМ	TM-43, "A/T CONTROL SYSTEM : System Description"
4WAS main control unit ^{*1}	STC-37, "4WAS SYSTEM : System Description"
ADAS control unit*2	DAS-15. "System Description"
A/C auto AMP.	HAC-15, "AUTOMATIC AIR CONDITIONING SYSTEM : System Description" (Automatic air conditioning system) HAC-23, "FOREST AIR SYSTEM : System Description" (Forest air system)
Drive mode select switch	DMS-5, "Infiniti Drive Mode Selector : System Description"

*1: Models with 4WAS

*2: Models with ICC system

Wheel Sensor and Sensor Rotor

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NOTE:

- Sensor rotor of front wheel is integrated in wheel hub assembly.
- Sensor rotor of rear wheel is installed on drive shaft (rear final drive side).
- Never measure resistance and voltage value using a tester because sensor is active sensor.
- 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.

Line of magnetic force Sensor rotor Sensor Amplifier circuit

ABS Actuator and Electric Unit (Control Unit)

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Electric unit (control unit) is integrated with actuator and comprehensively controls VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function and Brake force distribution function.

ELECTRIC UNIT (CONTROL UNIT)

- Brake fluid pressure, engine and transmission are controlled according to signals from each sensor.
- If malfunction is detected, the system enters fail-safe mode.

ACTUATOR

The following components are integrated with ABS actuator.

Pump

Returns the brake fluid reserved in reservoir to master cylinder by reducing pressure.

Motor

< SYSTEM DESCRIPTION >	[WITH VDC]	
Activates the pump according to signals from ABS actuator and electric unit (control unit).		
Motor Relay Operates the motor ON/OFF according to signals from ABS actuator and electric unit (control u	nit).	A
Actuator Relay Operates each valve ON/OFF according to signals from ABS actuator and electric unit (control	unit).	В
ABS IN Valve and ABS OUT Valve Increases, holds or decreases the fluid pressure of each caliper according to signals from ABS electric unit (control unit).	S actuator and	С
Pressure Sensor Detects the brake fluid pressure and transmits signal to ABS actuator and electric unit (control u	unit).	D
Cut Valve 1 (Primary Line), Cut Valve 2 (Secondary Line) Shuts off the ordinary brake line from master cylinder, when VDC function, TCS function, hill station, Rise-up & Build-up function and Brake force distribution function are activated.	art assist func-	E
ADAS Control Unit	INFOID:000000008132987	_
Controls Active trace control function in ADAS control unit and transmits Active trace control actuator and electric unit (control unit) via CAN communication. NOTE:	signal to ABS	BRO
Models with ICC system		G
Stop Lamp Switch	INFOID:000000008132988	
Detects the operation status of brake pedal and transmits converted electric signal to ABS actu tric unit (control unit).	ator and elec-	Н
Steering Angle Sensor	INFOID:000000008132989	
 Detects the following information and transmits steering angle signal to ABS actuator and electrunit) via CAN communication. Steering wheel rotation amount Steering wheel rotation angular velocity Steering wheel rotation direction 	ric unit (control	J
Yaw Rate/Side/Decel G Sensor	INFOID:000000008132990	K
 Calculates the following information that affects the vehicle, and transmits a signal to ABS actutic unit (control unit) via communication lines. Vehicle rotation angular velocity (yaw rate signal) Vehicle lateral acceleration (side G signal) and longitudinal acceleration (decel G signal) 	uator and elec-	L
Brake Fluid Level Switch	INFOID:000000008132991	M
Detects the brake fluid level in reservoir tank and transmits converted electric signal from combin ABS actuator and electric unit (control unit) via CAN communication, when brake fluid level is level or less.		N
Vacuum Sensor	INFOID:000000008132992	
Detects the vacuum in brake booster and transmits converted electric signal to ABS actuator a (control unit).	nd electric unit	0
Parking Brake Switch	INFOID:000000008132993	Р
Detects the operation status of parking brake switch and transmits converted electric signal from meter to ABS actuator and electric unit (control unit).	m combination	
VDC OFF Switch	INFOID:000000008132994	

< SYSTEM DESCRIPTION >

- Non-operational status or standby status of the following functions can be selected using VDC OFF switch. VDC OFF indicator lamp indicates the operation status of function. (ON: Non-operational status, OFF: Standby status)
- VDC function
- NOTE: Brake limit

Brake limited slip differential (BLSD) control operates.

- TCS function
- Active trace control 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).

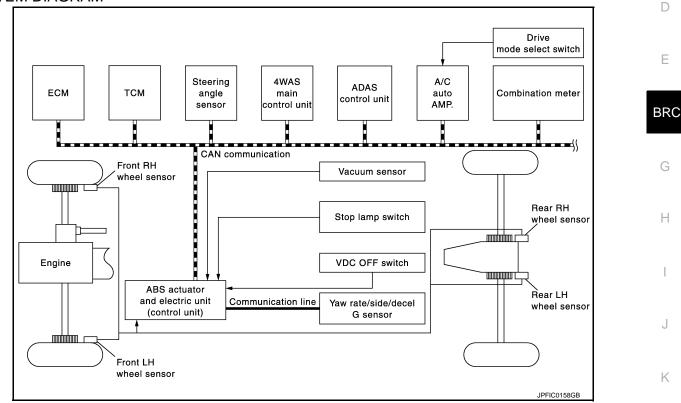
< SYSTEM DESCRIPTION >

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, Rise-up & Build-up function, Brake force distribution function and Active trace control function.
- Fail-safe function is available for each function and is activated by each function when system malfunction ^C occurs.

SYSTEM DIAGRAM



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

VDC function, TCS function, ABS function, EBD function, Rise-up & Build-up function and Brake force distribution function

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	
4WAS main control unit*2	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • 4WAS signal	

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< SYSTEM DESCRIPTION >

Component	Signal description	
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 transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Brake fluid level switch signal Parking brake switch signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. ABS warning lamp signal Brake warning lamp signal VDC warning lamp signal VDC OFF indicator lamp 	

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

Active trace control function

Component	Signal description	
ADAS control unit	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAI communication.Active trace control 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 	
ABS actuator and electric unit (control unit)	 Mainly transmits the following signals to ADAS control unit via CAN communication. Vehicle speed signal (ABS) Stop lamp switch signal (brake signal) VDC OFF switch signal Yaw rate signal Side G sensor signal Decel G sensor signal 	
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 	
Drive mode select switch	Outputs ON/OFF status of STANDARD, SPORT, ECO, SNOW mode to A/C auto AMP.	
A/C auto AMP.	Mainly transmits the following signals to ADAS control unit via CAN communication. Drive mode select switch signal 	
Steering angle sensor	Mainly transmits the following signals to ADAS 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 OFF indicator lamp signal VDC warning lamp signal Mainly receives the following signals from ADAS control unit via CAN communication. IBA warning lamp signal 	

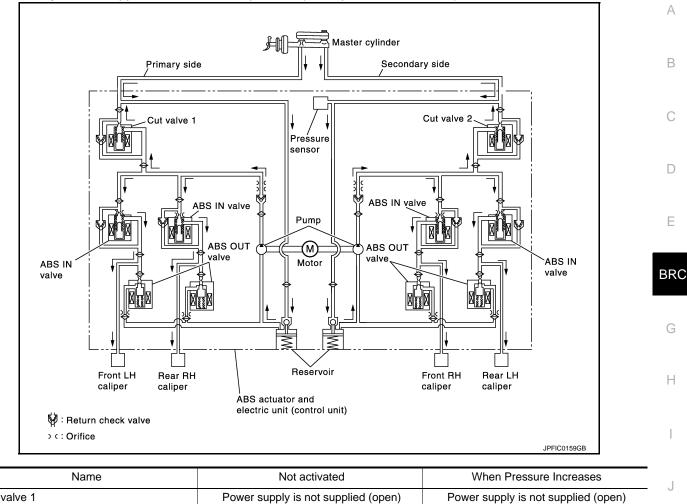
*: Communication line between yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit)

VALVE OPERATION (ABS AND EBD)

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

< SYSTEM DESCRIPTION >

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



Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)	
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)	-
ABS IN valve	Power supply is not supplied (open)	Power supply is not supplied (open)	K
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)	-
Each caliper (fluid pressure)	-	Pressure increases	

When front RH wheel caliper pressure increases

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

When front LH wheel caliper pressure increases

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

When rear RH wheel caliper pressure increases

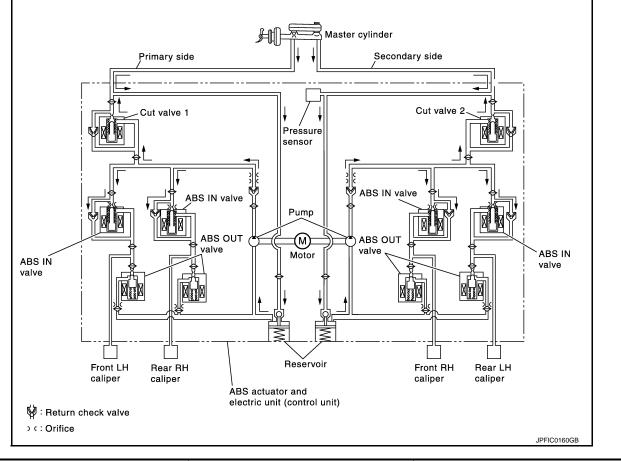
 Motor is activated. Brake fluid is pressurized by pump and is sent to primary line through cut valve 1. At the same time, pressurized brake fluid is supplied to rear RH wheel caliper through ABS IN valve.

When rear LH wheel caliper pressure increases

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

[WITH VDC]

< SYSTEM DESCRIPTION >



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

When front RH wheel caliper pressure holds

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

When front LH wheel caliper pressure holds

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

When rear RH wheel caliper pressure holds

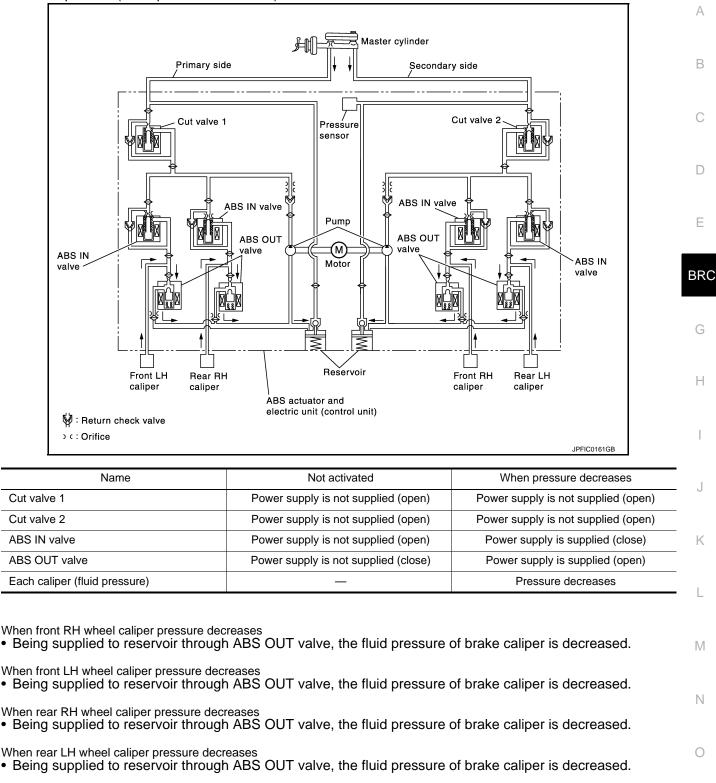
• Motor is activated. Brake fluid is pressurized by pump and is sent to primary line through cut valve 1. At the same time, because ABS IN valve and ABS OUT vale are closed, fluid pressure holds.

When rear LH wheel caliper pressure holds

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

< SYSTEM DESCRIPTION >

ABS is in operation (when pressure decreases)



Component Parts and Function

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

< SYSTEM DESCRIPTION >

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

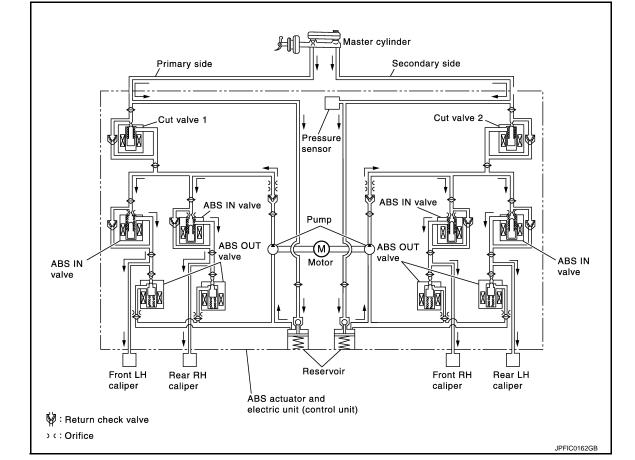
VALVE OPERATION (OTHER THAN ABS AND EBD)

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

NOTE:

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

When Pressure Increases



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

< SYSTEM DESCRIPTION >

Name	Not activated	When Pressure Increases	
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)	E
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)	C
Each caliper (fluid pressure)	_	Pressure increases	

When front RH wheel caliper pressure increases

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

When front LH wheel caliper pressure increases

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

When rear RH wheel caliper pressure increases

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

When rear LH wheel caliper pressure increases

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



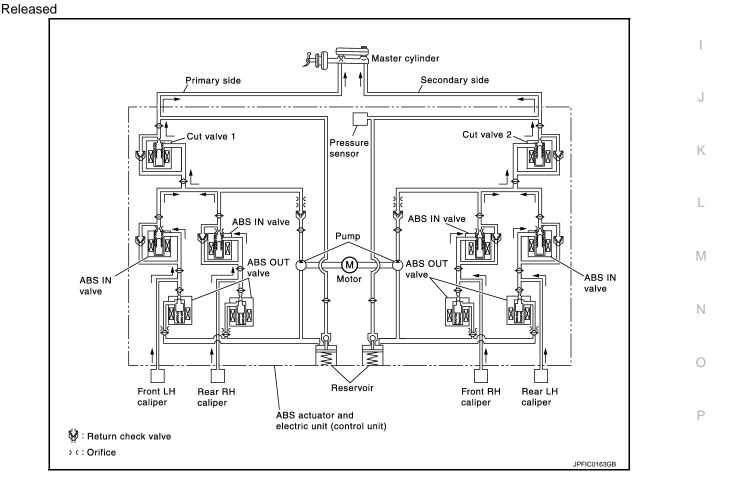
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Revision: 2013 September

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

When front RH wheel caliper pressure decreases

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

When front LH wheel caliper pressure decreases

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

When rear RH wheel caliper pressure decreases

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

When rear LH wheel caliper pressure decreases

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

Component Parts and Function

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

CONDITION FOR TURN ON THE WARNING LAMP

ABS Warning Lamp

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

Condition (status)	ABS warning lamp
Ignition switch OFF	OFF
For approx. 1 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
ABS function is malfunctioning	ON
EBD function is malfunctioning	ON

Brake Warning Lamp

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

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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	
When brake booster vacuum decreases	ON	
When vacuum sensor is malfunctioning	ON	
When brake fluid is less than the specified level (brake fluid level switch ON)	ON	
ABS function is malfunctioning	OFF	
EBD function is malfunctioning	ON	

VDC Warning Lamp

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

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

Condition (status)	VDC warning lamp	(
Ignition switch OFF.	OFF	
For approx. 1 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	
VDC function is operating	Blinking	
TCS function is operating	Blinking	

IBA OFF indicator lamp

• Turns ON when Active trace control function is malfunctioning.

NOTE:

Lamp ON condition of intelligent brake assistance OFF indicator lamp is that intelligent brake assistance OFF switch is in the pressed and not turned ON status.

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	C
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	P
When VDC OFF switch is ON (VDC function, TCS function and Active trace control function are OFF)	ON	

Fail-Safe

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VDC FUNCTION, TCS FUNCTION, hill start assist FUNCTION, RISE-UP & BUILD-UP FUNCTION

AND BRAKE FORCE DISTRIBUTION FUNCTION

VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, hill start assist function, Rise-up & Build-up function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function, Rise-up & Build-up function and Brake force distribution function, Rise-up & Build-up function and Brake force distribution function, Rise-up & Build-up function and Brake force distribution function, Rise-up & Build-up function and Brake force distribution function are operated normally.

ABS FUNCTION

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

NOTE:

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

EBD FUNCTION

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

ACTIVE TRACE CONTROL FUNCTION

Intelligent brake assistance OFF indicator lamp turns ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for Active trace control function. The vehicle becomes the same as models without Active trace control function.
 CAUTION:

Lamp ON condition of intelligent brake assistance OFF indicator lamp is that intelligent brake assistance OFF switch is in the pressed and not turned ON status.

 Mode is fixed to the mode when a malfunction occurs if CAN communication malfunction (DTC "U1000", DTC "U1010", DTC "U0424") occurs between ADAS control unit and A/C auto AMP. The mode is fixed to STANDARD mode after ignition switch turns OFF to ON.

< SYSTEM DESCRIPTION >

[WITH VDC]

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. 	 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. 	 Rise-up & Build-up function Brake force distribution 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.	 VDC function TCS function ABS function EBD function hill start assist function Rise-up & Build-up function Brake force distribution function
C1115	When difference in wheel speed between any wheel and others is detected during the vehicle is driven, because of installation of other tires than specified.	The following functions are suspended.
C1116	When stop lamp switch signal is not input when brake pedal operates.	 VDC function TCS function ABS function hill start assist function Rise-up & Build-up function Brake force distribution 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 sus- pended.
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.	ABS functionEBD 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.	 Rise-up & Build-up function Brake force distribution 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 sus-
C1138	When a malfunction is detected in 4 Wheel Active Steer system.	 pended. VDC function TCS function hill start assist function Rise-up & Build-up function Brake force distribution function

< SYSTEM DESCRIPTION >

[WITH VDC]

DTC	Malfunction detected condition	Fail-safe condition	
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 Rise-up & Build-up function Brake force distribution function 	
C1142	When a malfunction is detected in pressure sensor.	The following functions are sus-	
C1143	When a malfunction is detected in steering angle sensor.	pended.VDC function	
C1144	When neutral position adjustment of steering angle sensor is not complete.	TCS function	
C1145	When a malfunction is detected in yaw rate signal.	 hill start assist function Rise-up & Build-up function Brake force distribution function 	
C1146	When a malfunction is detected in side/decel G signal.	The following functions are sus-	
C1155	When brake fluid level low signal is detected.	 pended. VDC function TCS function ABS function hill start assist function Rise-up & Build-up function Brake force distribution function 	
C1160	When calibration of yaw rate/side/decel G sensor is not complete.	 The following functions are suspended. VDC function TCS function hill start assist function Rise-up & Build-up function Brake force distribution 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.	
C1170	When the information in ABS actuator and electric unit (control unit) is not the same.	 VDC function TCS function ABS function EBD function hill start assist function Rise-up & Build-up function Brake force distribution function 	
C1197	When a malfunction is detected in vacuum sensor.		
C1198	 When an open circuit is detected in vacuum sensor circuit. When a short circuit is detected in vacuum sensor circuit. When a malfunction is detected in vacuum sensor noise. 	Electrical vacuum assistance of brake booster is suspended.	
C1199	When brake booster vacuum is approx. 0 kPa (0 mmHg) during engine running.	—	
C119A	When a malfunction is detected in supply power voltage of vacuum sensor.	Electrical vacuum assistance of brake booster is suspended.	
U1000	When CAN communication signal is not continuously received for 2 seconds or more.	 The following functions are suspended. VDC function TCS function hill start assist function Rise-up & Build-up function Brake force distribution function 	
U0424*	When signal that is transmitted from A/C auto AMP. is not the latest information.	Mode is fixed to the mode when a malfunction of drive mode selector occurs. The mode is fixed to STAN-DARD mode after ignition switch turns OFF to ON.	

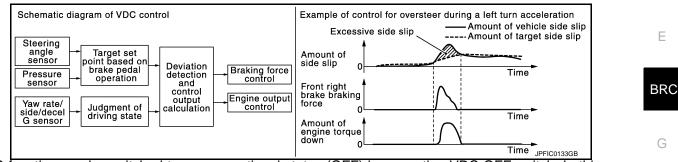
*: This is DTC that is detected in ADAS control unit side.

BRC-26

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 brake pressure sensor. By comparing this information with vehicle side slip amount that is calculated from information from yaw rate/side/decel G sensor and wheel sensor, vehicle driving conditions (conditions of understeer or oversteer) are judged and vehicle stability is improved by brake force control on all 4 wheels and engine output control.



- VDC function can be switched to non-operational status (OFF) by operating VDC OFF switch. In this case, VDC OFF indicator lamp turns ON.
- Control unit portion automatically improves driving stability by performing brake force control as well as engine output control, by transmitting drive signal to actuator portion according to difference between target side slip amount and vehicle side slip amount
- VDC warning lamp blinks while VDC function is in operation and indicates to the driver that the function is in operation.
- VDC function has brake limited slip differential (BLSD) function. LH and RH driving wheel spin is always monitored. If necessary, appropriate brake force is independently applied to LH or RH driving wheel so that one-sided wheel spin is avoided and traction is maintained. Mainly starting ability is improved. [Brake limited slip differential (BLSD) function operates while VDC function is in non-operational status (OFF) by VDC OFF switch.] VDC warning lamp turns ON when Brake limited slip differential (BLSD) function is in operation. Noises and vibration may be generated due to brake operation. This is not a malfunction.
- CONSULT can be used to diagnose the system 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, Rise-up & Build-up function, Brake force distribution function and Active trace control function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. However, ABS function and EBD function are operated normally. Refer to BRC-23, "Fail-Safe".

NOTE:

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

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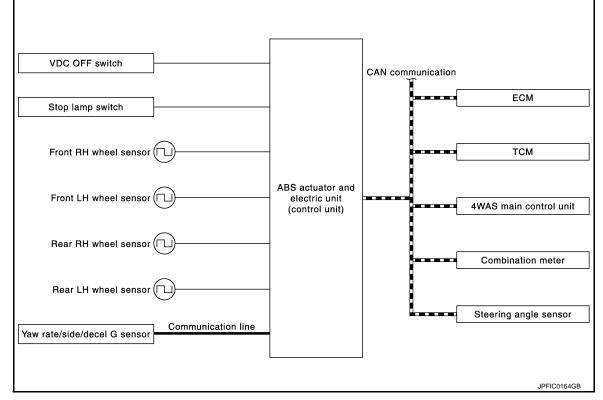
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SYSTEM DIAGRAM



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*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. Acceleration 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 	
4WAS main control unit*2	rol unit ^{*2} Mainly transmits the following signals to ABS actuator and electric unit (control unit) via Control unit) via Control unit ^{*2} • 4WAS 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 transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Brake fluid level switch signal Parking brake switch signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. VDC warning lamp signal VDC OFF indicator lamp signal 	

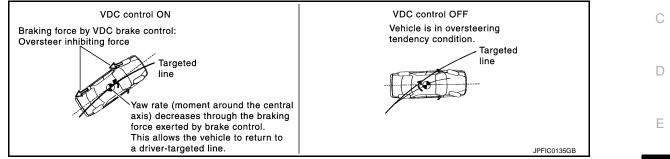
*1: Communication line between yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit) *2: Models with 4WAS

SYSTEM

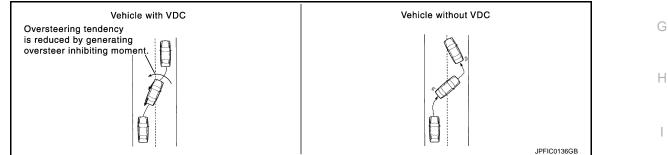
OPERATION CHARACTERISTICS

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.

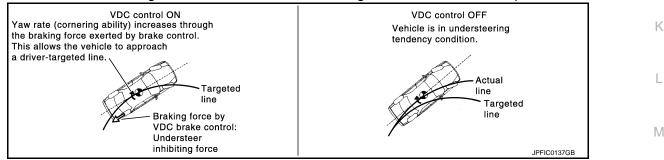


 Changing driving lane on a slippery road, when oversteer tendency is judged large, engine output is controlled as well as brake force (brake fluid pressure) of 4 wheels. Oversteer tendency decreases.

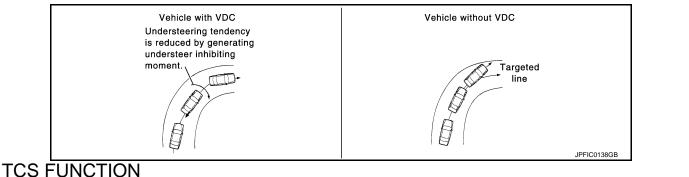


VDC Function That Prevents Understeer Tendency

• 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.

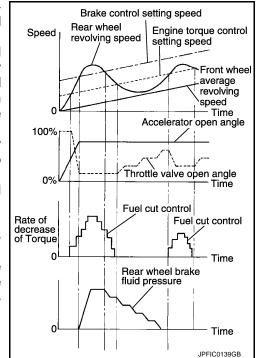


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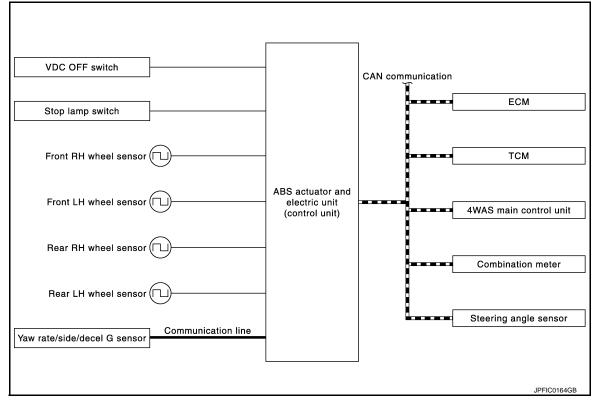
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TCS FUNCTION : System Description

- 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.
- VDC warning lamp blinks while TCS function is in operation and indicates to the driver that the function is in operation.
- CONSULT can be used to diagnose the system diagnosis.
- Fail-safe function is adopted. When a malfunction occurs in TCS function, the control is suspended for VDC function, TCS function, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function, However, ABS function and EBD function are operated normally. Refer to <u>BRC-23</u>, "Fail-Safe".



SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

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

[WITH VDC]

< SYSTEM DESCRIPTION >

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	
4WAS main control unit*2	 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. 4WAS 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 transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Brake fluid level switch signal Parking brake switch signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. VDC warning lamp signal VDC OFF indicator lamp signal 	

*2: Models with 4WAS

ABS FUNCTION

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.

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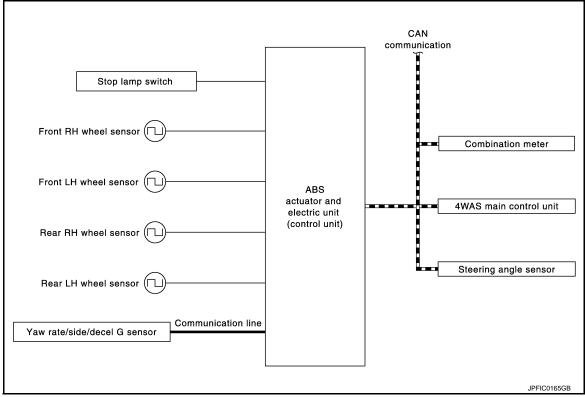
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- The following effects are obtained by preventing wheel lock during braking.
- Vehicle tail slip is prevented during braking when driving straight.
- Understeer and oversteer tendencies are moderated during braking driving on a corner.
- Obstacles may be easily bypassed by steering operation during braking.
- CONSULT can be used to diagnose the system diagnosis.
- Fail-safe function is adopted. When a malfunction occurs in ABS function, the control is suspended for VDC function, TCS function, ABS function, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, hill start assist function, Rise-up & Build-up function, Brake force distribution function, Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. However, EBD function is operated normally. Refer to <u>BRC-23, "Fail-Safe"</u>.

NOTE:

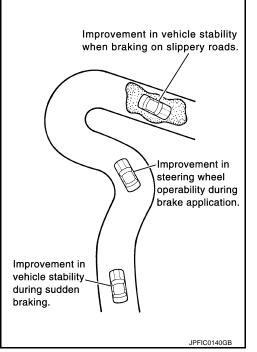
- ABS has the characteristic as described here, This is not the device that helps reckless driving.
- To stop vehicle efficiently, ABS does not operate and ordinary brake operates at low speed [approx. 10 km/h (6 MPH) or less, but differs subject to road conditions).
- Self-diagnosis is performed immediately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



SYSTEM DIAGRAM

INPUT SIGNAL AND OUTPUT SIGNAL

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



Component	Signal description
4WAS main control unit*	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. 4WAS 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 VDC warning lamp signal

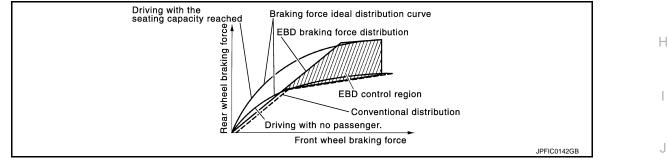
*: Models with 4WAS EBD FUNCTION

EBD FUNCTION : System Description

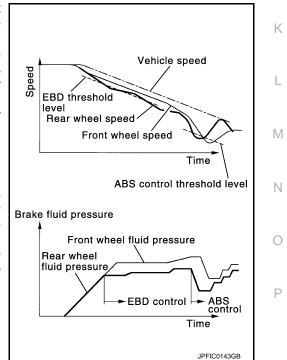
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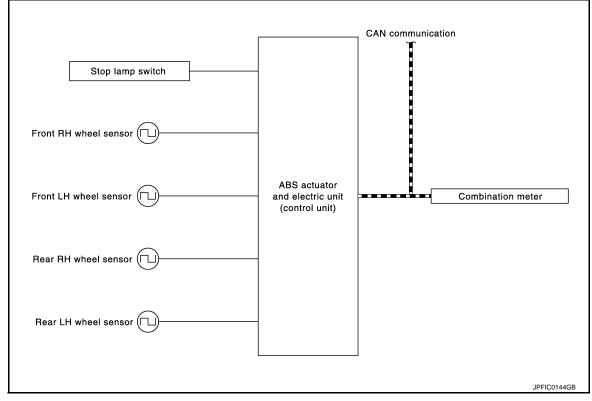
- By preventing rear wheel slip increase through rear wheel brake force (brake fluid pressure) control that is electronically controlled when slight skip on front and rear wheels are detected during braking, stability during braking is improved.
- EBD function is expanded and developed from conventional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



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



SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

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

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

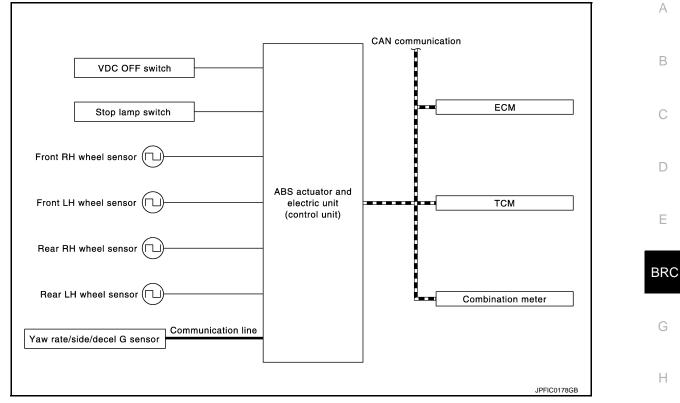
Hill start assist FUNCTION

Hill start assist FUNCTION : System Description

INFOID:000000008133001

- 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, Rise-up & Build-up function, Brake force distribution function and Active trace control function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function, Rise-up & Build-up function, Brake force distribution function and Active trace control function. However, ABS function and EBD function are operated normally. Refer to BRC-23, "Fail-Safe".

SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

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

Component	Signal description
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 transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Brake fluid level switch signal Parking brake switch signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. VDC warning lamp signal VDC OFF indicator lamp signal

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

< SYSTEM DESCRIPTION >

ACTIVE STABILITY ASSIST : System Description

INFOID:000000008133002

- Combination of Active trace control function, Rise-up & Build-up function and Brake force distribution function is named to as Active stability assist. Active trace control function is available for models with ICC system.
- Active stability assist system is aimed to smooth the vehicle movement utilizing VDC function for enjoyable driving with reliable feeling of the driver.
- Active trace control function
- Active Trace Control helps enhance the transition from braking into and then accelerating out of corners. Active Trace Control utilizes the vehicle's VDC system to help improve cornering feel by automatically applying brakes, or smoothening engine torque characteristics while accelerating. Furthermore, Active Trace Control will apply selective braking to help create increased steering response in S-turns. For example, if driving through an S-turn that starts with steering to the right, the right-side brakes are engaged to create a yaw moment and help turn the vehicle. When steering back to the left, left-side brakes are engaged. Refer to BRC-37, "ACTIVE STABILITY ASSIST : Active Trace Control Function".
- Rise-up & Build-up function
- Rise-up & Build-up gives the drivers secure brake feeling with optimized braking characteristics according to the amount of brake operation and the behavior of vehicle. Refer to <u>BRC-39</u>, "<u>ACTIVE STABILITY ASSIST</u>: <u>Rise-up & Build-up Function</u>".
- Brake Force Distribution function
- During braking, Brake force Distribution optimizes the distribution of brake force to each of the four wheels depending on the state of the turn detected by driver's steering and some sensors. Brake force Distribution helps provide a more stable and secure feeling. Refer to <u>BRC-39</u>, "ACTIVE STABILITY ASSIST : Brake Force Distribution Function".
- Active trace control can be switched to operational status or non-operational status by operating VDC OFF switch to ON/OFF.

CAN communication VDC OFF switch ECM Stop lamp switch Drive mode select switch Front RH wheel sensor ([A/C auto AMP. ABS actuator and Front LH wheel sensor (electric unit (control unit) ADAS control unit Rear RH wheel sensor Combination meter Rear LH wheel sensor ([Communication line Yaw rate/side/decel G sensor Steering angle sensor JPFIC0166GF

SYSTEM DIAGRAM

INPUT SIGNAL AND OUTPUT SIGNAL

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

< SYSTEM DESCRIPTION >

Signal description	
 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Active trace control signal 	
 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 	
 Mainly transmits the following signals to ADAS control unit via CAN communication. Vehicle speed signal (ABS) Stop lamp switch signal (brake signal) VDC OFF switch signal Yaw rate signal Side G sensor signal Decel G sensor signal 	
 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 	
Outputs ON/OFF status of STANDARD, SPORT, ECO, SNOW mode to A/C auto AMP.	
Mainly transmits the following signals to ADAS control unit via CAN communication. Drive mode select switch signal 	
Mainly transmits the following signals to ADAS control unit via CAN communication. Steering angle sensor signal 	
 Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. Brake fluid level switch signal Parking brake switch signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. 	
 VDC OFF indicator lamp signal VDC warning lamp signal Mainly receives the following signals from ADAS control unit via CAN communication. 	

- electric unit (control unit).
 This system senses driving based on the driver's steering and acceleration/braking patterns, and individually controls the braking and application of engine torque to each of the four wheels to help smooth vehicle
- When the drive mode selector switch is set to the "SPORT" mode, the amount of brake control provided by Active trace control function is reduced.
- When the VDC OFF switch is turn OFF the VDC function, the Active trace control function is also turned OFF.
- Active trace control function is malfunctioning properly, the IBA OFF indicator lamp turns ON. **NOTE:**

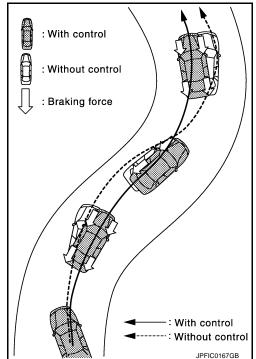
Effect to decrease delay of vehicle yaw rate in response to steering operation may not always be obtained in all driving conditions (example: when road surface resistance is low).

OPERATION CHARACTERISTICS

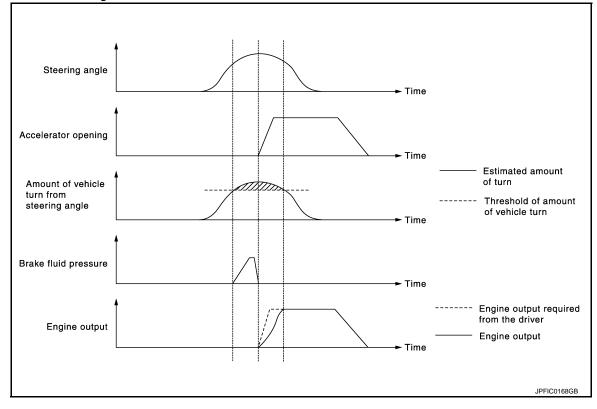
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< SYSTEM DESCRIPTION >

Active Trace Control helps enhance the transition from braking into and then accelerating out of corners. Active Trace Control utilizes the vehicle's VDC system to help improve cornering feel by automatically applying brakes, or smoothening engine torque characteristics while accelerating. Furthermore, Active Trace Control will apply selective braking to help create increased steering response in Sturns. For example, if driving through an S-turn that starts with steering to the right, the right-side brakes are engaged to create a yaw moment and help turn the vehicle.



 Brake control amount and engine output are controlled according to steering operation status by the driver and vehicle cornering status.



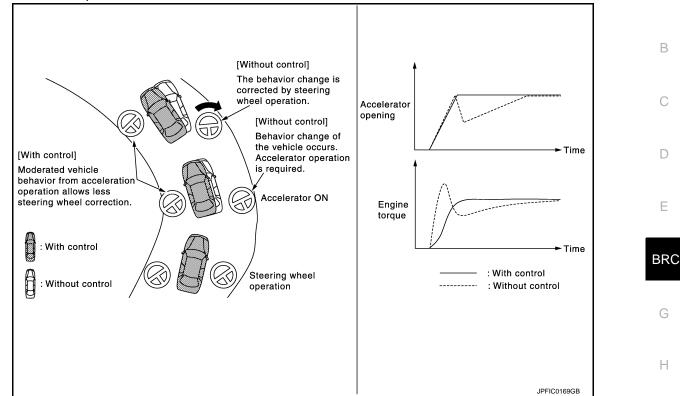
[WITH VDC]

< SYSTEM DESCRIPTION >

[WITH VDC]

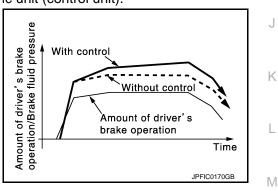
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• By preventing a sudden torque change, vehicle behavior moderates. As a result, accelerator pedal operation by the driver is improved.



ACTIVE STABILITY ASSIST : Rise-up & Build-up Function

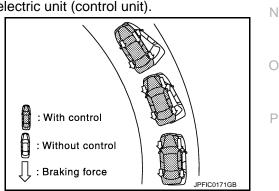
- Rise-up & Build-up function is controlled by ABS actuator and electric unit (control unit).
- The system gradually adjusts braking power during normal braking to help provide an enhanced brake feel.
- VDC warning lamp turns ON when Rise-up & Build-up function is malfunctioning.



ACTIVE STABILITY ASSIST : Brake Force Distribution Function

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

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



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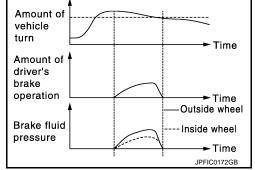
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< SYSTEM DESCRIPTION >

- During cornering, when brake operation is performed brake fluid pressure of each wheel is controlled based on steering operation amount by the driver and vehicle cornering status amount detected by each sensor.
- VDC warning lamp turn ON when Brake force distribution function is malfunctioning.

NOTE:

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



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

< SYSTEM DESCRIPTION >

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

CONSULT Function

APPLICATION ITEMS

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

Mode	Function description	
ECU identification	Parts number of ABS actuator and electric unit (control unit) can be read.	г
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.

• 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-52, "DTC Index"</u>.

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

• The system is presently malfunctioning.

When "PAST" is displayed on self-diagnosis result,System malfunction in the past is detected, but the system is presently normal.

Freeze frame data (FFD)

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

Item name	Display item	
IGN counter	 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. 	L
(0 – 39)	NOTE: 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.	M

ACTIVE TEST

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

CAUTION:

- Never perform ACTIVE TEST while driving the vehicle.
- Always bleed air from brake system before active test.
- Never perform active test when system is malfunctioning.

NOTE:

- 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".

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[WITH VDC]

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

< SYSTEM DESCRIPTION >

[WITH VDC]

 ABS warning lamp, brake warning lamp and VDC warning lamp may turn ON during active test. This is not a malfunction.

ABS IN Valve and ABS OUT Valve

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

Test item	Display Itom	Display		
Test item	Display Item	Up	Кеер	Down
	FR RH IN SOL	Off	On*	On*
FR RH SOL	FR RH OUT SOL	Off	Off	On*
	CV2	Off	Off	Off
FR LH SPL	FR LH IN SOL	Off	On*	On*
	FR LH OUT SOL	Off	Off	On*
	CV1	Off	Off	Off
RR RH SOL	RR RH IN SOL	Off	On*	On*
	RR RH OUT SOL	Off	Off	On*
	CV1	Off	Off	Off
RR LH SOL	RR LH IN SOL	Off	On*	On*
	RR LH OUT SOL	Off	Off	On*
	CV2	Off	Off	Off

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

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

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

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

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

ABS MOTOR

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

Test item	Display Item	Display	
rest tient	Display Keni	On	Off
	MOTOR RELAY	On	Off
ABS MOTOR	ACTUATOR RLY ^(Note)	On	On

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

< SYSTEM DESCRIPTION >

[WITH VDC]

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NOTE:

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

DATA MONITOR

NOTE:

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

14 /1 1 - 10	Monitor item selection		NI-1-
Item (Unit)	INPUT SIGNALS	MAIN ITEMS	- Note
FR LH SENSOR [km/h (MPH)]	×	×	Wheel speed calculated by front LH wheel sensor is displayed.
FR RH SENSOR [km/h (MPH)]	×	×	Wheel speed calculated by front RH wheel sensor is displayed.
RR LH SENSOR km/h (MPH)]	×	×	Wheel speed calculated by rear LH wheel sensor is displayed.
RR RH SENSOR km/h (MPH)]	×	×	Wheel speed calculated by rear RH wheel sensor is displayed.
BATTERY VOLT (V)	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.
STOP LAMP SW On/Off)	×	×	Stop lamp switch signal input status is displayed.
OFF SW On/Off)	×	×	VDC OFF switch signal input status is displayed.
YAW RATE SEN (d/s)	×	×	Yaw rate detected by yaw rate 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.
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)
DFF LAMP On/Off)		×	VDC OFF indicator lamp ON/OFF status is displayed. ^(Note 1)
SLIP/VDC LAMP On/Off)		×	VDC warning lamp ON/OFF status is displayed. ^(Note 1)
ACCEL POS SIG (%)	×		Displays the Accelerator pedal position

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

< SYSTEM DESCRIPTION >

[WITH VDC]

	Monitor item selection		Nata
Item (Unit)	INPUT SIGNALS	MAIN ITEMS	- Note
SIDE G -ENSOR (m/s ²)	×		Side G detected by side G sensor is displayed.
DECEL G-SEN (m/s ²)	×		Decel G detected by decel G sensor is displayed.
STR ANGLE SIG (°)	×		Steering angle detected by steering angle sensor is displayed.
ENGINE SPEED (tr/min)	×		Engine speed status is displayed.
PRESS SENSOR (bar)	×		Brake fluid pressure detected by pressure sensor 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.
CV1 (On/Off)			Cut valve 1 operation status is displayed.
CV2 (On/Off)			Cut valve 2 operation status 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.
EBD WARN LAMP (On/Off)			Brake warning lamp ON/OFF status is displayed. (Note 1)
GEAR	×	×	Current gear position judged from current gear position sig- nal is displayed.
N POSI SIG (On/Off)			N range signal input status judged from N range signal is displayed.
R POSI SIG (On/Off)			R range signal input status judged from R range signal is displayed.
4WD MODE MON ^(Note 2) (AUTO/LOCK/2WD)	×	×	AWD control status is displayed.
USS SIG ^(Note 3) (On/Off)			hill start assist operation status is displayed.

Note 1: Refer to <u>BRC-15</u>, "System Description" for ON/OFF conditions of each warning lamp and indicator lamp. Note 2: AWD models

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

< SYSTEM DESCRIPTION >

Note 3: USS means "hill start assist"

WORK SUPPORT

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

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Revision: 2013 September

< ECU DIAGNOSIS INFORMATION >

ECU DIAGNOSIS INFORMATION

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:000000008133007

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 $\pm 10\%$)
	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 $\pm 10\%$)
	Vehicle stopped	0.00 km/h (MPH)
RR RH SENSOR	When driving ^(Note 1)	Nearly matches the speedometer display (within $\pm 10\%$)
BATTERY VOLT	Ignition switch ON	10 – 16 V
	Brake pedal depressed	On
STOP LAMP SW	Brake pedal not depressed	Off
	VDC OFF switch ON	On
OFF SW	VDC OFF switch OFF	Off
	Vehicle stopped	Approx. 0 d/s
YAW RATE SEN	Turning right	Negative value
	Turning left	Positive value
FR RH IN SOL	Active	On
	Not activated	Off
FR RH OUT SOL	Active	On
	Not activated	Off
FR LH IN SOL	Active	On
	Not activated	Off
FR LH OUT SOL	Active	On
	Not activated	Off
RR RH IN SOL	Active	On
	Not activated	Off
RR RH OUT SOL	Active	On
	Not activated	Off
RR LH IN SOL	Active	On
	Not activated	Off
RR LH OUT SOL	Active	On
NN LEI OUT GOL	Not activated	Off

< ECU DIAGNOSIS INFORMATION >

[WITH VDC]

Monitor item	Condition	Reference values in normal operation
MOTOR RELAY	Active	On
	Not activated	Off
ACTUATOR RLY	Active	On
ACTORIOR REL	When not operating (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
	When VDC warning lamp is ON ^(Note 2)	On
SLIP/VDC LAMP	When VDC warning lamp is OFF ^(Note 2)	Off
	Never depress accelerator pedal (with ignition switch ON)	0%
ACCEL POS SIG	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
	When stopped	Approx. 0 m/s ²
DECEL G-SEN	During acceleration	Positive value
	During deceleration	Negative value
	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°
	Engine stopped	0 tr/min
ENGINE SPEED	Engine running	Almost same reading as tachometer
PRESS SENSOR	Brake pedal not depressed	Approx. 0 bar
RESS SENSOR	Brake pedal depressed	(–40) – (+300 bar)
FLUID LEV SW	When brake fluid level switch is ON (brake fluid level is less than the specified level)	On
	When brake fluid level switch is OFF	Off
PARK BRAKE SW	When parking brake is active	On
ARR DRARE SW	Parking brake is released	Off
CV1	Active	On
	Not activated	Off
CV2	Active	On
J V Z	Not activated	Off
EBD SIGNAL	EBD activated	On
JU JIGINAL	EBD not activated	Off
ABS SIGNAL	ABS is activated	On
UU UUINAL	ABS is not activated	Off
TCS SIGNAL	TCS activated	On
I GO GIGINAL	TCS not activated	Off
VDC SIGNAL	VDC activated	On
V DO SIGINAL	VDC not activated	Off

< ECU DIAGNOSIS INFORMATION >

Monitor item	Condition	Reference values in normal operation
EBD FAIL SIG	In EBD fail-safe	On
EDD FAIL SIG	EBD is normal	Off
ABS FAIL SIG	In ABS fail-safe	On
ABS FAIL SIG	ABS is normal	Off
TCS FAIL SIG	In TCS fail-safe	On
TCS FAIL SIG	TCS is normal	Off
VDC FAIL SIG	In VDC fail-safe	On
VDC FAIL SIG	VDC is normal	Off
CRANKING SIG	At cranking	On
CRAINING SIG	Other than at cranking	Off
EBD WARN LAMP	When brake warning lamp is ON ^(Note 2)	On
	When brake warning lamp is OFF ^(Note 2)	Off
GEAR	Driving	1 – 7 Depending on shift status
N POSI SIG	When selector lever is in the N position	On
N POSI SIG	When selector lever is in the other position than N	Off
R POSI SIG	When selector lever is in the R position	On
K F031316	When selector lever is in the other position than R	Off
4WD MODE MON ^(Note 3) Always		AUTO, LOCK, 2WD (depending on AWD control status)
USS SIG (Note 4)	When hill start assist is active	On
022 216 (1999 1)	When hill start assist is not active	Off

Note 1: Confirm tire pressure is standard value.

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

Note 3: AWD models

Note 4: USS means "hill start assist"

Fail-Safe

INFOID:000000008133008

VDC FUNCTION, TCS FUNCTION, hill start assist FUNCTION, RISE-UP & BUILD-UP FUNCTION AND BRAKE FORCE DISTRIBUTION FUNCTION

VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, hill start assist function, Rise-up & Build-up function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function, Rise-up & Build-up function and Brake force distribution function, Rise-up & Build-up function and Brake force distribution function, Rise-up & Build-up function and Brake force distribution function, Rise-up & Build-up function and Brake force distribution function are operated normally.

ABS FUNCTION

ABS warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS function, hill start assist function, Rise-up & Build-up function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, hill start assist function and Brake force distribution function. The vehicle tion, Rise-up & Build-up function and Brake force distribution function. However, EBD function is operated normally.

NOTE:

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

EBD FUNCTION

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



< ECU DIAGNOSIS INFORMATION >

[WITH VDC]

А

Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function and Brake force distribution 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. 	 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. 	 Rise-up & Build-up function Brake force distribution 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.	 VDC function TCS function ABS function EBD function hill start assist function Rise-up & Build-up function Brake force distribution function
C1115	When difference in wheel speed between any wheel and others is detected during the vehicle is driven, because of installation of other tires than specified.	The following functions are suspended.
C1116	When stop lamp switch signal is not input when brake pedal operates.	 VDC function TCS function ABS function hill start assist function Rise-up & Build-up function Brake force distribution 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 sus-
C1122	When a malfunction is detected in front RH ABS IN valve.	pended.VDC function
C1123	When a malfunction is detected in front RH ABS OUT valve.	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.	 Rise-up & Build-up function Brake force distribution function
C1127	When a malfunction is detected in rear RH ABS OUT valve.	

< ECU DIAGNOSIS INFORMATION >

[WITH VDC]

DTC	Malfunction detected condition	Fail-safe condition
C1130	When a malfunction is detected in ECM system.	The following functions are sus-
C1138	When a malfunction is detected in 4 Wheel Active Steer system.	 pended. VDC function TCS function hill start assist function Rise-up & Build-up function Brake force distribution 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 Rise-up & Build-up function Brake force distribution function
C1142	When a malfunction is detected in pressure sensor.	The following functions are sus-
C1143	When a malfunction is detected in steering angle sensor.	pended.VDC function
C1144	When neutral position adjustment of steering angle sensor is not complete.	TCS function
C1145	When a malfunction is detected in yaw rate signal.	 hill start assist function Rise-up & Build-up function Brake force distribution function
C1146	When a malfunction is detected in side/decel G signal.	The following functions are sus-
C1155	When brake fluid level low signal is detected.	 pended. VDC function TCS function ABS function hill start assist function Rise-up & Build-up function Brake force distribution function
C1160	When calibration of yaw rate/side/decel G sensor is not complete.	 The following functions are suspended. VDC function TCS function hill start assist function Rise-up & Build-up function Brake force distribution 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
C1170	When the information in ABS actuator and electric unit (control unit) is not the same.	 TCS function ABS function EBD function hill start assist function Rise-up & Build-up function Brake force distribution function
C1197	When a malfunction is detected in vacuum sensor.	
C1198	 When an open circuit is detected in vacuum sensor circuit. When a short circuit is detected in vacuum sensor circuit. When a malfunction is detected in vacuum sensor noise. 	Electrical vacuum assistance of brake booster is suspended.
C1199	When brake booster vacuum is approx. 0 kPa (0 mmHg) during engine running.	_
C119A	When a malfunction is detected in supply power voltage of vacuum sensor.	Electrical vacuum assistance of brake booster is suspended.

< ECU DIAGNOSIS INFORMATION >

DTC	Malfunction detected condition	Fail-safe condition	
U1000	When CAN communication signal is not continuously received for 2 seconds or more.	 The following functions are suspended. VDC function TCS function hill start assist function Rise-up & Build-up function Brake force distribution function 	Ē
U0424*	When signal that is transmitted from A/C auto AMP. is not the latest information.	Mode is fixed to the mode when a malfunction of drive mode selector occurs. The mode is fixed to STAN- DARD mode after ignition switch turns OFF to ON.	

*: This is DTC that is detected in ADAS control unit side.

DTC Inspection Priority Chart

INFOID:000000008133009

Ε

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 U0424 HVAC CAN CIR 1*	
2	C1170 VARIANT CODING	
3	C1130 ENGINE SIGNAL 1 C1144 ST ANG SEN SIGNAL C1138 4WAS CIRCUIT	
4	 C1109 BATTERY VOLTAGE [ABNOMAL] C1111 PUMP MOTOR C1140 ACTUATOR RLY 	
5	 C1101 RR RH SENSOR-1 C1102 RR LH SENSOR-1 C1103 FR RH SENSOR-1 C1105 RR RH SENSOR-1 C1105 RR RH SENSOR-2 C1106 RR LH SENSOR-2 C1107 FR RH SENSOR-2 C1108 FR LH SENSOR-2 C1108 FR LH SENSOR [ABNORMAL SIGNAL] C1116 STOP LAMP SW C1120 FR LH NABS SOL C1121 FR LH OUT ABS SOL C1122 FR RH IN ABS SOL C1123 FR RH OUT ABS SOL C1124 RR LH IN ABS SOL C1125 RR LH OUT ABS SOL C1126 RR RH IN ABS SOL C1127 RR RH OUT ABS SOL C1127 RR RH OUT ABS SOL C1128 RR HIN ABS SOL C1127 RR RH OUT ABS SOL C1127 RR RH OUT ABS SOL C1126 RR RH IN ABS SOL C1127 RR RH OUT ABS SOL C1127 RR RH OUT ABS SOL C1143 ST ANG SEN CIRCUIT C1143 ST ANG SEN CIRCUIT C1146 SIDE G SEN CIRCUIT C1146 SIDE G SEN CIRCUIT C1146 SIDE G SEN SET C1164 CV 1 C1165 CV 2 C1197 VACUUM SENSOR C1199 BRAKE BOOSTER C1199 BRAKE BOOSTER C1199 VACUUM SEN VQLT 	
	C1199 BRAKE BOOSTER C119A VACUUM SEN VOLT	

*: This is DTC that is detected in ADAS control unit side.

[WITH VDC]

< ECU DIAGNOSIS INFORMATION >

DTC Index

INFOID:000000008133010

DTC	Display Item	Refer to	
C1101	RR RH SENSOR-1		
C1102	RR LH SENSOR-1	BRC-64, "DTC Logic"	
C1103	FR RH SENSOR-1	DICO-04, DIC LOUIC	
C1104	FR LH SENSOR-1		
C1105	RR RH SENSOR-2		
C1106	RR LH SENSOR-2	PPC 67 "DTC Logic"	
C1107	FR RH SENSOR-2	BRC-67, "DTC Logic"	
C1108	FR LH SENSOR-2		
C1109	BATTERY VOLTAGE [ABNOMAL]	BRC-72, "DTC Logic"	
C1111	PUMP MOTOR	BRC-74, "DTC Logic"	
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-76, "DTC Logic"	
C1116	STOP LAMP SW	BRC-82, "DTC Logic"	
C1120	FR LH IN ABS SOL	BRC-87, "DTC Logic"	
C1121	FR LH OUT ABS SOL	BRC-89, "DTC Logic"	
C1122	FR RH IN ABS SOL	BRC-87, "DTC Logic"	
C1123	FR RH OUT ABS SOL	BRC-89, "DTC Logic"	
C1124	RR LH IN ABS SOL	BRC-87, "DTC Logic"	
C1125	RR LH OUT ABS SOL	BRC-89, "DTC Logic"	
C1126	RR RH IN ABS SOL	BRC-87, "DTC Logic"	
C1127	RR RH OUT ABS SOL	BRC-89, "DTC Logic"	
C1130	ENGINE SIGNAL 1	BRC-91, "DTC Logic"	
C1138	4WAS CIRCUIT	BRC-92, "DTC Logic"	
C1140	ACTUATOR RLY	BRC-93, "DTC Logic"	
C1142	PRESS SEN CIRCUIT	BRC-95, "DTC Logic"	
C1143	ST ANG SEN CIRCUIT	BRC-97, "DTC Logic"	
C1144	ST ANG SEN SIGNAL	BRC-99, "DTC Logic"	
C1145	YAW RATE SENSOR		
C1146	SIDE G SEN CIRCUIT	BRC-100, "DTC Logic"	
C1155	BR FLUID LEVEL LOW	BRC-103, "DTC Logic"	
C1160	DECEL G SEN SET	BRC-106, "DTC Logic"	
C1164	CV 1		
C1165	CV 2	BRC-107, "DTC Logic"	
C1170	VARIANT CODING	BRC-109, "DTC Logic"	
C1197	VACUUM SENSOR	BRC-110, "DTC Logic"	
C1198	VACUUM SEN CIR	BRC-112, "DTC Logic"	
C1199	BRAKE BOOSTER	BRC-114, "DTC Logic"	
C119A	VACUUM SEN VOLT	BRC-116, "DTC Logic"	
U1000	CAN COMM CIRCUIT	BRC-118, "DTC Logic"	
U0424*	HVAC CAN CIR 1	BRC-119, "DTC Logic"	

*: This is DTC that is detected in ADAS control unit.

ADAS CONTROL UNIT

< ECU DIAGNOSIS INFORMATION >

ADAS CONTROL UNIT

List of ECU Reference

INFOID:000000008133011

[WITH VDC]

Refer to	
DAS-33, "Reference Value"	
DAS-38, "Fail-safe"	С
DAS-39, "DTC Inspection Priority Chart"	
DAS-40, "DTC Index"	
	DAS-33, "Reference Value" DAS-38, "Fail-safe" DAS-39, "DTC Inspection Priority Chart"

ACTIVE TRACE CONTROL FUNCTION

Intelligent brake assist OFF indicator lamp turns ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for Active trace control function. The vehicle becomes the same as models without Active trace control function. Refer to <u>DAS-15</u>, "System Description" for ON/OFF conditions of each warning lamp and indicator lamp.

CAUTION:

Lamp ON condition of intelligent brake assist OFF indicator lamp is that intelligent brake assist OFF BRC switch is in the pressed and not turned ON status.

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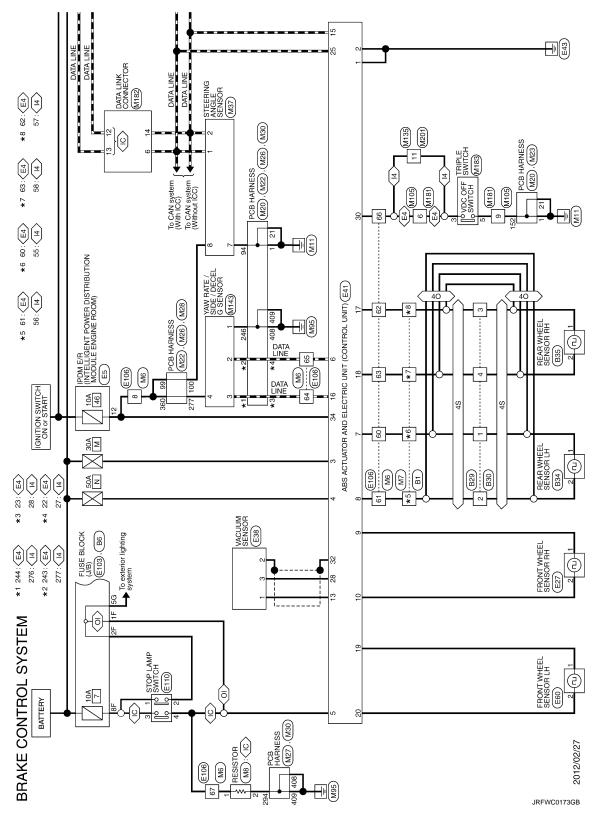
А

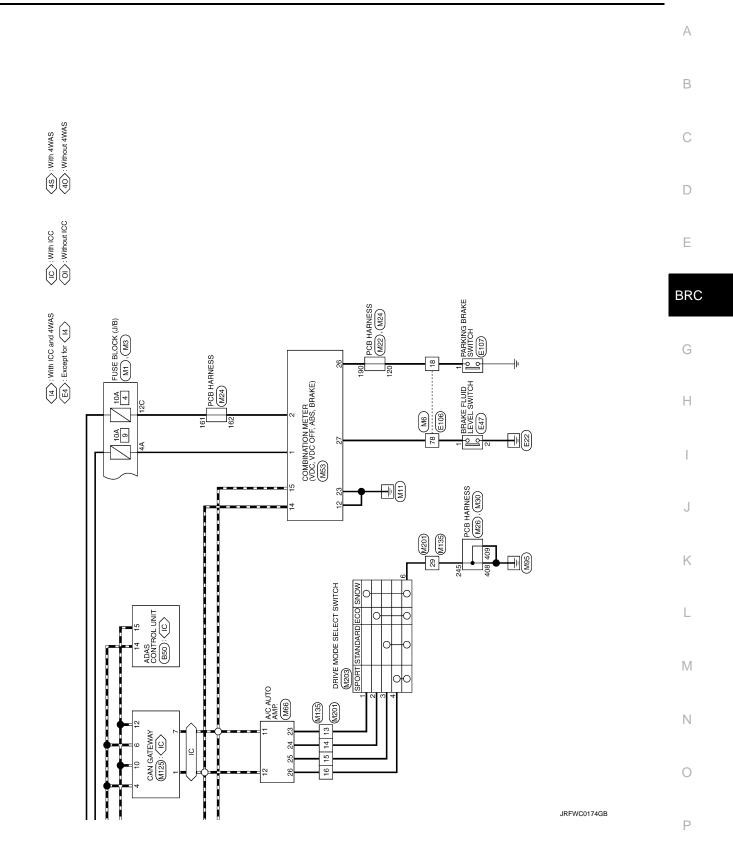
WIRING DIAGRAM BRAKE CONTROL SYSTEM

Wiring Diagram

INFOID:000000008133012

For connector terminal arrangements, harness layouts, and alphabets in a \bigcirc (option abbreviation; if not described in wiring diagram), refer to <u>GI-12, "Connector Information"</u>.





< BASIC INSPECTION >

BASIC INSPECTION DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:000000008133013

IWITH VDC1

DETAILED FLOW

1.INTERVIEW FROM THE CUSTOMER

Clarify customer complaints before inspection. First of all, perform an interview utilizing <u>BRC-57</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-48</u>, "Fail-<u>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

(P)With CONSULT

1. 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

With CONSULT

1. Erase self-diagnostic results.

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-51, "DTC Inspection Priority Chart"</u> [ABS actuator and electric unit (control unit)], <u>DAS-39, "DTC Inspection Priority Chart"</u> (ADAS 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.

6. IDENTIFY ERROR-DETECTED SYSTEM BY SYMPTOM DIAGNOSIS

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

DIAGNOSIS AND REPAIR WORK FLOW

[WITH VDC]

< BASIC INSPECTION > [WITH VDC]	
Can the error-detected system be identified?	
YES >> GO TO 7. NO >> Check harness and connectors based on the information obtained by interview. Refer to <u>GI-43.</u> <u>"Intermittent Incident"</u> .	A
7.FINAL CHECK	6
 With CONSULT Check the reference value for "ABS". Recheck the symptom and check that the symptom is not reproduced on the same conditions. 	(
Is the symptom reproduced? YES >> GO TO 3. NO >> INSPECTION END	[
Diagnostic Work Sheet	
Description	E
 Description In general, customers have their own criteria for a problem. Therefore, it is important to understand the symptom and status well enough by asking the customer about his/her concerns carefully. To systemize all the information for the diagnosis, prepare the interview sheet referring to the interview points. In some cases, multiple conditions that appear simultaneously may cause a DTC to be detected. 	BI
INTERVIEW SHEET SAMPLE	(
Interview object	

			Interview	sheet				
Customer name	MR/MS	Registration number				Initial y registra		
		Vehicle type				VIN		
Storage date		Engine				Mileage	9	km (Mile)
		Does not operate () function) function
		U Warning la	amp for () turns ON.
Symptom		Noise				🗆 Vib	oration	
		□ Other (] Other)					
First occurrence		□ Recently	□ Recently □ Other ()					
Frequency of occurrence		□ Always □ Under a certain conditions of □ Sometimes (time(s)/day)					time(s)/day)	
		□ Irrelevant						
Climate con-	Weather	□ Fine	Cloud	🗆 Rain	۵D	now	□ Others ()
ditions	Temperature	□ Hot [⊐Warm	Cool	□ Co	ld I	☐ Temperature [App	rox. °C (°F)]
	Relative humidity	□ High	D Mo	oderate	[Low		
Road conditions		□ Urban area □ Suburb area □ Highway □ Mountainous road (uphill or downhill) □ Rough road						
Operating condition, etc.		□Irrelevant □When eng □ During dri □ During de □ During co □ When ste	iving [eceleration ernering (righ		eleration	1	□ At constant speed	

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DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

		Interview shee	t	
Customer	MR/MS	Registration number	Initial year registration	
name		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:000000008133015

When replaced the ABS actuator and electric unit (control unit), Perform decel G sensor calibration. Refer to <u>BRC-62, "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:000000008133016

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:000000008133017

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".
- 5. Turn the 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.	t A
	STR ANGLE SIG : 0±2.5°	
<u>ls t</u>	ne inspection result normal?	E
YE	S >> GO TO 4.	
N) >> GO TO 1.	
4.	ERASE SELF-DIAGNOSIS MEMORY	C

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

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

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CALIBRATION OF DECEL G SENSOR

< BASIC INSPECTION >

CALIBRATION OF DECEL G SENSOR

Description

INFOID:000000008133018

[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.

×: Required —: Not required

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

Work Procedure

INFOID:000000008133019

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.

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 the ignition switch OFF and then turn it ON again.
- CAUTION: Be sure to perform the operation above.

CALIBRATION OF DECEL G SENSOR

< BASIC INSPECTION >

	-
>> GO TO 3.	А
3. CHECK DATA MONITOR	
With CONSULT Drive the vehicle. Steer the steering wheel to the straight-ahead position. Stop the vehicle on level sur 	- B
 face. Select "ABS", "DATA MONITOR", "ECU INPUT SIGNALS" and "DECEL G SENSOR" in this order. Check that the signal is within the specified value. 	
DECEL G SENSOR : Approx. 0 m/s ²	D
s the inspection result normal?	L
YES >> GO TO 4. NO >> GO TO 1.	E
4. ERASE SELF-DIAGNOSIS MEMORY	
With CONSULT Erase self-diagnosis result of "ABS".	BF
Are the memories erased? YES >> GO TO 5. NO >> Check the items indicated by the self-diagnosis. D.PERFORM DECEL G SENSOR CALIBRATION (TRANSMISSION)	G
Perform decel G sensor calibration. Refer to TM-89, "Special Repair Requirement".	-
>> INSPECTION END	I
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	(
	- E

C1101, C1102, C1103, C1104 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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

DTC Logic

INFOID:000000008133020

[WITH VDC]

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 the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

(B) With CONSULT

- 1. Start engine and drive vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 2. Perform self-diagnosis for "ABS".

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

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-64, "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?

2.REPLACE WHEEL SENSOR (1)

With CONSULT

- 1. Replace wheel sensor.
- Front: Refer to BRC-138, "FRONT WHEEL SENSOR : Removal and Installation"
- Rear: Refer to BRC-139, "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?

BRC-64

INFOID:000000008133021

CENICOD C4400 C440

C1101, C1102, C1103, C1104 WHEEL SENSOR
< DTC/CIRCUIT DIAGNOSIS > [WITH VDC]
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.
4.PERFORM SELF-DIAGNOSIS (1)
 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". Is DTC "C1101", "C1102", "C1103" or "C1104" detected?
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". 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. 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. Check continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector.

sor 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]

ABS actuator and ele	ctric unit (control unit)	Wheel se	ensor	Continuity	
Connector	Terminal	Connector Terminal		Continuity	
	9	E27 (Front RH)			
E 44	19	E60 (Front LH)	4	Eviated	
E41 -	17	B35 (Rear RH)	1	Existed	
-	7	B34 (Rear LH)	-		
leasurement terminal f	or signal circuit				
ABS actuator and ele	ctric unit (control unit)	Wheel sensor		Continuity	
Connector	Terminal	Connector	Terminal	- Continuity	
	10	E27 (Front RH)			
E41	20	E60 (Front LH)		Estated	
	18	B35 (Rear RH)	2	Existed	
	8	B34 (Rear LH)			

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)

(B) 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-138, "FRONT WHEEL SENSOR : Removal and Installation"
- Rear: Refer to <u>BRC-139</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-142, "Removal and Installa-</u> tion".
- NO >> INSPECTION END

< DTC/CIRCUIT DIAGNOSIS >

C1105, C1106, C1107, C1108 WHEEL SENSOR

DTC Logic

DTC DETECTION LOGIC

INFOID:000000008133022

[WITH VDC]

В

А

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. 		C
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 connectorWheel sensor	E
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 	G
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. 		H

CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2. L 2.CHECK DTC DETECTION With CONSULT Μ Start engine and drive vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. 1. Perform self-diagnosis for "ABS". 2. Is DTC "C1105", "C1106", "C1107" or "C1108" detected? Ν YES >> Proceed to diagnosis procedure. Refer to <u>BRC-67, "Diagnosis Procedure"</u>. >> INSPECTION END NO Diagnosis Procedure INFOID:000000008133023 CAUTION: Never check between wheel sensor harness connector terminals. Ρ ${f 1}$.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY SYSTEM Check ABS actuator and electric unit (control unit) power supply system. Refer to BRC-120, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

< DTC/CIRCUIT DIAGNOSIS >

2.CHECK TIRE

- 1. Turn the ignition switch OFF.
- Check tire air pressure, wear and size. Refer to <u>WT-63, "Tire Air Pressure"</u>.

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)

()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.
- 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 difference within 5%, respectively?

YES >> GO TO 4.

NO >> GO TO 5.

4.PERFORM SELF-DIAGNOSIS (1)

With CONSULT

- T. 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.
- 3. Remove dust and foreign matter adhered to the sensor rotor with a vacuum dust collector through the wheel sensor mounting hole.

CAUTION:

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

- Front: Refer to <u>BRC-138, "FRONT WHEEL SENSOR : Exploded View"</u>.
- Rear: Refer to <u>BRC-139, "REAR WHEEL SENSOR : Exploded View"</u>.

Is the inspection result normal?

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

NO >> GO TO 6.

O.REPLACE WHEEL SENSOR (1)

With CONSULT

- 1. Replace wheel sensor.
- Front: Refer to BRC-138. "FRONT WHEEL SENSOR : Removal and Installation"
- Rear: Refer to <u>BRC-139</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. 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".

[WITH VDC] < DTC/CIRCUIT DIAGNOSIS > Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor. 6. Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting А wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively? YES >> GO TO 7. В NO >> GO TO 19. **7.** PERFORM SELF-DIAGNOSIS (2) (P)With CONSULT 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. 2. Stop the vehicle. D 3. Perform self-diagnosis for "ABS". Is DTC "C1105", "C1106", "C1107" or "C1108" detected? YES >> GO TO 19. Е NO >> INSPECTION END **8.**CHECK CONNECTOR 1. Turn the ignition switch OFF. BRC Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness. 2. Check wheel sensor harness connector for disconnection or looseness. 3. Is the inspection result normal? YES >> GO TO 11. NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 9. ${f 9.}$ CHECK DATA MONITOR (2) Н (P)With CONSULT Erase self-diagnosis result for "ABS". Turn the ignition switch OFF, and wait 10 seconds or more. 2. Start the engine. 3. Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" 4 and "RR RH SENSOR". NOTE: Set the "DATA MONITOR" recording speed to "10 msec". Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor. Κ 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? L YES >> GO TO 10. NO >> GO TO 11. 10. PERFORM SELF-DIAGNOSIS (3) M With CONSULT 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. Stop the vehicle. 2. Ν Perform self-diagnosis for "ABS". 3. Is DTC "C1105", "C1106", "C1107" or "C1108" detected? YES >> GO TO 11. NO >> INSPECTION END **11.**CHECK TERMINAL 1. Turn the ignition switch OFF. Disconnect ABS actuator and electric unit (control unit) harness connector and then check ABS actuator 2. 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 3. 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.

< DTC/CIRCUIT DIAGNOSIS >

12. CHECK DATA MONITOR (3)

With CONSULT

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect wheel sensor harness connector.
- 3. Erase self-diagnosis result for "ABS".
- 4. Turn the ignition switch OFF, and wait 10 seconds or more.
- 5. Start the engine.
- 6. 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)

(D) 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
	9, 10	Ground	Not existed
E41	19, 20		
E41	17, 18		
	7, 8		

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.

< DTC/CIRCUIT DIAGNOSIS > [WITH VDC]
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 16. NO >> GO TO 17.
6.PERFORM SELF-DIAGNOSIS (5)
 Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. Stop the vehicle.
. Perform self-diagnosis for "ABS".
s DTC "C1105", "C1106", "C1107" or "C1108" detected?
YES >> GO TO 17.
NO >> INSPECTION END
7.REPLACE WHEEL SENSOR
. Replace wheel sensor.
Front: Refer to <u>BRC-138, "FRONT WHEEL SENSOR : Removal and Installation"</u> Rear: Refer to <u>BRC-139, "REAR WHEEL SENSOR : Removal and Installation"</u>
. 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", "RR LH SENSOR"
and "RR RH SENSOR".
NOTE:
Set the "DATA MONITOR" recording speed to "10 msec". . Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.
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
vheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the differ-
nce within 5%, respectively?
YES >> GO TO 18.
NO >> GO TO 19.
8. PERFORM SELF-DIAGNOSIS (6)
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".
DTC "C1105", "C1106", "C1107" or "C1108" detected?
YES >> GO TO 19.
NO >> INSPECTION END
9. REPLACE SENSOR ROTOR
With CONSULT
Replace sensor rotor.
Front: Refer to <u>BRC-141</u> , "FRONT SENSOR ROTOR : Removal and Installation".
Rear: Refer to <u>BRC-141, "REAR SENSOR ROTOR : Removal and Installation"</u> . 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. Stop the vehicle.
. Perform self-diagnosis for "ABS".
<u>S DTC "C1105", "C1106", "C1107" or "C1108" detected?</u>
YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-142. "Removal and Installa-</u>
tion"

NO >> INSPECTION END

< 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:000000008133025

INFOID:000000008133024

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1109	BATTERY VOLTAGE [ABNOMAL]	 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 the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

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

Is DTC "C1109" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-72, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000008133026

$1. \mathsf{CHECK} \text{ ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) IGNITION POWER SUPPLY}$

- 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 electric unit (control unit)			Voltage
Connector Terminal			vollage
E41	34	Ground	Approx. 0 V

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)			Voltage
Connector	Terminal		vollage
E41	34	Ground	10 – 16 V

Is the inspection result normal?

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

C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) IGNITION POWER SUPPLY CIRCUIT А 1. Turn the ignition switch OFF. Check 10 A fuse (#46). 2. 3. Disconnect IPDM E/R harness connector. В Check continuity between ABS actuator and electric unit (control unit) harness connector and IPDM E/R 4. harness connector. IPDM E/R ABS actuator and electric unit (control unit) Continuity Terminal Connector Terminal Connector E41 34 E5 12 Existed D 5. Check for continuity between ABS actuator and electric unit (control unit) harness connector and the around. Е ABS actuator and electric unit (control unit) Continuity Connector Terminal BRC E41 34 Ground Not existed Is the inspection result normal? YES >> Perform trouble diagnosis for ignition power supply. Refer to PG-27, "Wiring Diagram - IGNITION POWER SUPPLY -". NO >> Repair or replace error-detected parts. ${f 3.}$ CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT Н 1. Turn the ignition switch OFF. Check continuity between ABS actuator and electric unit (control unit) harness connector and ground. 2. ABS actuator and electric unit (control unit) Continuity Connector Terminal 1 E41 Ground Existed 2 Κ Is the inspection result normal? YES >> GO TO 4. NO >> Repair or replace error-detected parts. L **4.**CHECK TERMINAL Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector. Μ 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-142, "Removal and Installa-</u> Ν tion". NO >> Repair or replace error-detected parts.

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C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

DTC Logic

INFOID:000000008133027

[WITH VDC]

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1111	PUMP MOTOR	When a malfunction is detected in motor or motor re- lay.	 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 the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

(I) With CONSULT

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

Is DTC "C1111" detected?

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

Diagnosis Procedure

INFOID:000000008133028

1. CHECK ABS MOTOR AND MOTOR 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
E41	4	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
E41	4	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

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

BRC-74

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

[WITH VDC] < DTC/CIRCUIT DIAGNOSIS > Is the inspection result normal? А YES >> Perform trouble diagnosis for battery power supply. Refer to PG-11, "Wiring Diagram - BATTERY POWER SUPPLY -". NO >> Repair or replace error-detected parts. 3. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUITВ 1. Turn the ignition switch OFF. Check continuity between ABS actuator and electric unit (control unit) harness connector and the ground. 2. С ABS actuator and electric unit (control unit) Continuity ____ Connector Terminal D 1 E41 Ground Existed 2 Е Is the inspection result normal? YES >> GO TO 4. NO >> Repair or replace error-detected parts. BRC **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-142, "Removal and Installa-</u> tion". Н

NO >> Repair or replace error-detected parts.

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< DTC/CIRCUIT DIAGNOSIS >

C1115 WHEEL SENSOR

DTC Logic

INFOID:000000008133029

INEOID-000000008133030

[WITH VDC]

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1115	ABS SENSOR [ABNORMAL SIGNAL]	When difference in wheel speed between any wheel and others is detected 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 CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(e) with CONSULT

- 1. Start engine and drive vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 2. Perform self-diagnosis for "ABS".

Is DTC "C1115" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-76, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

CAUTION:

For wheel sensor, never check between 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-120. "Diagnosis Proce-</u> dure".

Is the inspection result normal?

YES >> GO TO 2.

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-63, "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)

(D) 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.

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< DTC/CIRCUIT DIAGNOSIS > [WITH VDC
Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detection
wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the differ
ence 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".
<u>Is DTC "C1115" detected?</u> YES >> GO TO 5.
NO >> INSPECTION END
5. CHECK WHEEL SENSOR
1. Turn the ignition switch OFF.
2. Check wheel sensor for damage.
3. Remove dust and foreign matter adhered to the sensor rotor with a vacuum dust collector through the wheel sensor mounting hole.
CAUTION:
Install wheel sensor with no backlash and float, and tighten the mounting bolt to the specified
torque. Front: Refer to <u>BRC-138, "FRONT WHEEL SENSOR : Exploded View"</u>.
Rear: Refer to BRC-139, "REAR WHEEL SENSOR : Exploded View".
Is the inspection result normal?
YES >> GO TO 8. NO >> GO TO 6.
6.REPLACE WHEEL SENSOR (1)
With CONSULT Replace wheel sensor.
 Front: Refer to <u>BRC-138</u>, "FRONT WHEEL SENSOR : Removal and Installation".
 Rear: Refer to <u>BRC-139</u>, "<u>REAR WHEEL SENSOR</u> : <u>Removal and Installation</u>". Frace cells discusses that "ABS".
 Erase self-diagnosis result for "ABS". 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".
 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 detection</u>
wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the differ
ence within 5%, respectively?
YES >> GO TO 7. NO >> GO TO 19.
7.PERFORM SELF-DIAGNOSIS (2)
 With CONSULT 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 19. NO >> INSPECTION END
8. CHECK CONNECTOR
1. Turn the ignition switch OFF.

Revision: 2013 September

< DTC/CIRCUIT DIAGNOSIS >

- 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?

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".
- 2. Turn the ignition switch OFF, and wait 10 seconds or more.
- 3. 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 difference within 5%, respectively?

YES >> GO TO 10.

NO >> GO TO 11.

10. PERFORM SELF-DIAGNOSIS (3)

(B) With CONSULT

- T. 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 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)

(I) 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.
- 6. 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.

< DTC/CIRCUIT DIAGNOSIS >

DIC/CIRCUIT DIA				
3. PERFORM SELF	-DIAGNOSIS (4)			
With CONSULT Drive the vehicle a Stop the vehicle. Perform self-diagr	at approx. 30 km/h (19 nosis for "ABS".	9 MPH) or more for a	approx. 1 minute.	
DTC "C1115" detect	ed?			
YES >> GO TO 14 NO >> INSPECT	l			
4.CHECK WHEEL				
 Turn the ignition s Disconnect ABS a Disconnect wheel Check continuity b 	witch OFF. ctuator and electric u sensor harness conn between ABS actuato ector. (Check continui	nit (control unit) harı ector. r and electric unit (c	ontrol unit) harness co	onnector and wheel sen- nd LH, or center harness
Measurement terminal f	or power supply circuit			
ABS actuator and elec	ctric unit (control unit)	Whe	el sensor	Continuity
Connector	Terminal	Connector	Terminal	Continuity
	9	E27 (Front RH)		
F 44	19	E60 (Front LH)		Eviated
E41 -	17	B35 (Rear RH)	1	Existed
-	7	B34 (Rear LH)		
Measurement terminal f	or signal circuit			
ABS actuator and elec	ctric unit (control unit)	Whe	eel sensor	Continuity
Connector	Terminal	Connector	Terminal	Continuity
	10	E27 (Front RH)		
F 44	20	E60 (Front LH)		Eviated
E41 -	18	B35 (Rear RH)	2	Existed
-	8	B34 (Rear LH)		
Check continuity b	etween ABS actuato	r and electric unit (co	ontrol unit) harness co	nnector and the ground.
ABS actuator and elect	ric unit (control unit)		Continuity	
Connector	Terminal		Continuity	
	9, 10			
	19, 20	Orected	Not or detail	
E41 —	17, 18	Ground	Not existed	
	7, 8			
the inspection result	normal?			
YES >> GO TO 15	i. replace error-detecte	d parts and GO TO $^{\prime}$	15.	
With CONSULT Connect ABS actu Connect wheel se Erase self-diagnos Turn the ignition s Start the engine.	ator and electric unit nsor harness connec sis result for "ABS". witch OFF, and wait 1 "DATA MONITOR",	tor. 0 seconds or more.		OR", "RR LH SENSOR"

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< DTC/CIRCUIT DIAGNOSIS >

- 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.

NO >> GO TO 17.

16.PERFORM SELF-DIAGNOSIS (5)

(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 >> GO TO 17.
- NO >> INSPECTION END
- **17.**REPLACE WHEEL SENSOR

With CONSULT

- 1. Replace wheel sensor.
- Front: Refer to BRC-138. "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-139, "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 18.

NO >> GO TO 19.

18.PERFORM SELF-DIAGNOSIS (6)

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 19.
- NO >> INSPECTION END
- **19.**REPLACE SENSOR ROTOR

With CONSULT

- 1. Replace sensor rotor.
- Front: Refer to <u>BRC-141</u>, "FRONT SENSOR ROTOR : Removal and Installation".
- Rear: Refer to <u>BRC-141</u>, "REAR SENSOR ROTOR : 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 "C1115" detected?

< DTC/CIRCUIT DIAGNOSIS >	[WITH VDC]
YES >> Replace ABS actuator and electric unit (control unit). Refer to	BRC-142, "Removal and Installa-
tion". NO >> INSPECTION END	

Ρ

C1116 STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

C1116 STOP LAMP SWITCH

DTC Logic

INFOID:000000008133031

[WITH VDC]

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 operates.	 Harness or connector Stop lamp switch ABS actuator and electric unit (control unit) Resistor (models without ICC system) Battery power supply system

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

()With CONSULT

- 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-82, "Diagnosis Procedure"</u>.

NO >> INSPECTION ĔND

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 3.

$$3.$$
STOP LAMP FOR ILLUMINATION

Depress brake pedal and check that stop lamp turns ON.

INFOID:000000008133032

C1116 STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >	[WITH VDC]
Does stop lamp turn ON?	
YES >> GO TO 5.	
NO >> Check stop lamp system. Refer to <u>EXL-45, "EXTERIOR LIGHTING SYSTEM</u> GO TO 4.	<u>1: Wiring Diagram</u> .
4.CHECK DATA MONITOR (1)	
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. Che 	ck that data monitor
displays "On" or "Off" when brake pedal is depress or release. Refer to BRC-46, "Refe	<u>erence Value"</u> .
 Select "ABS", "DATA MONITOR" and "PRESS SENSOR" according to this order. Che displays "5 bar" or less when brake pedal is depress. Refer to <u>BRC-46, "Reference Va</u> 	
Is the inspection result normal?	-
YES >> INSPECTION END NO >> GO TO 5.	В
_	
5. CHECK STOP LAMP SWITCH CLEARANCE	
 Turn the ignition switch OFF. Check stop lamp switch clearance. Refer to <u>BR-7</u>, "Inspection and Adjustment". 	
Is the inspection result normal?	
YES >> GO TO 7.	
NO >> Adjust stop lamp switch clearance. Refer to <u>BR-7, "Inspection and Adjustmen</u>	<u>t"</u> . GO TO 6.
6. CHECK DATA MONITOR (2)	
With CONSULT	
 Erase self-diagnosis result for "ABS". 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. Che	ck that data monitor
displays "On" or "Off" when brake pedal is depress or release. Refer to BRC-46, "Refe	erence Value".
 Select "ABS", "DATA MONITOR" and "PRESS SENSOR" according to this order. Che displays "5 bar" or less when brake pedal is depress. Refer to <u>BRC-46, "Reference Va</u> 	
Is the inspection result normal?	<u></u> .
YES >> INSPECTION END	
_NO >> GO TO 7.	
7.CHECK STOP LAMP SWITCH	
Check stop lamp switch. Refer to BRC-85, "Component Inspection".	
Is the inspection result normal?	
YES >> GO TO 9.	٥
NO >> Replace stop lamp switch. Refer to <u>BR-18</u> , "Removal and Installation". GO TO 8 CHECK DATA MONITOR (2)	58.
8.CHECK DATA MONITOR (3)	
 With CONSULT Erase self-diagnosis result for "ABS". 	
 Erase self-diagnosis result for "ABS". 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. Che	ck that data monitor

displays "On" or "Off" when brake pedal is depress or release. Refer to <u>BRC-46, "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-46, "Reference Value"</u>.

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< DTC/CIRCUIT DIAGNOSIS >

<u>Is the inspection result normal?</u> YES >> INSPECTION END

NO >> GO TO 9.

9. CHECK CONNECTOR AND TERMINAL

- 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 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

- T. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect stop lamp switch 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.

CAUTION:

Never start the vehicle.

- 6. 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-46, "Reference Value"</u>.
- 7. 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-46, "Reference Value"</u>.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 11.

11.CHECK STOP LAMP SWITCH CIRCUIT (1)

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

ABS actuator and ele	ectric unit (control unit)		Condition	Voltage
Connector	Terminal	—	Condition	vollage
E41	5	Ground	Brake pedal depressed	Battery voltage
E41	5	Ground	Brake pedal not depressed	Approx. 0 V

4. Turn the ignition switch ON.

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

ABS actuator and ele	ectric unit (control unit)		Condition	Voltage
Connector	Terminal	—	Condition	voltage
E41	5	Ground	Brake pedal depressed	Battery voltage
L41	5	Gibund	Brake pedal not depressed	Approx. 0 V

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-142, "Removal and Installa-</u> tion".

NO >> Repair or replace error-detected parts. GO TO 12.

12.CHECK STOP LAMP SWITCH CIRCUIT (2)

C1116 STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

- 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 lamp switch		- Continuity
Connector	Terminal	Connector	Terminal	Continuity
E 44	-	E440	4 ^{*1}	E trait
E41	5	E110	2 ^{*2}	- Existed
*1: With ICC *2: Without ICC Check continuity	between ABS actua	tor and electric unit	(control unit) harnes	s connector and the groun
ABS actuator and elec	etric unit (control unit)			•
Connector	Terminal	_	Continuity	
E41	5	Ground	Not existed	-
 Connect stop lam Erase self-diagno Turn the ignition s Start the engine. CAUTION: Never start the v Select "ABS", "D/ 	ATA MONITOR" and	**************************************	re. ' according to this or	der. Check that data monito
. Select "ABS", "DA	ATA MONITOR" and r less when brake po It normal?	"PRESS SENSOR		<u>46, "Reference Value"</u> . der. Check that data monit <u>rence Value"</u> .
NO >> Replace <u>tion"</u> . Component Inspe		lectric unit (control	unit). Refer to <u>BRC-</u>	142. "Removal and Install
.CHECK STOP LA	MP SWITCH			
. Turn the ignition s . Disconnect stop I	switch OFF. lamp switch harness when stop lamp swi		Continuity	

TerminalWhen stop lamp switch is released
(When brake pedal is depressed)Existed $3-4^{*2}$ When stop lamp switch is pressed
(When brake pedal is released)Not existed

*1: Without ICC system

*2: With ICC system

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C1116 STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal? YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to <u>BR-18, "Removal and Installation"</u>.

C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

DTC Logic

[WITH VDC]

INFOID:000000008133034

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	Display Item	Malfur	nction detected condition	Possible causes
C1120	FR LH IN ABS SOL	When a malfunctio valve.	n is detected in front LH ABS IN	
C1122	FR RH IN ABS SOL	When a malfunctio valve.	n is detected in front RH ABS IN	 Harness or connector ABS actuator and electric unit (control unit)
C1124	RR LH IN ABS SOL	When a malfunctio valve.	n is detected in rear LH ABS IN	 Fusible link Battery power supply system
C1126	RR RH IN ABS SOL	When a malfunctio valve.	n is detected in rear RH ABS IN	
тс сс	ONFIRMATION PROCE	DURE		
.PREC	CONDITIONING			
	CONFIRMATION PROCE at least 10 seconds befo			ys turn the ignition switch OFF
0	>> GO TO 2.			
	CK DTC DETECTION			
Turn Perf	CONSULT the ignition switch OFF orm self-diagnosis for "Al C1120", "C1122", "C1124	3S".	cted?	
			r to <u>BRC-87, "Diagnosis Proc</u>	edure".
	>> INSPECTION END	p	<u> </u>	
iagnc	sis Procedure			
				INFOID:00000008133035
.CHEC	CK ABS IN VALVE POWE	R SUPPLY		INFOID:0000000813303
Turn Disc	the ignition switch OFF. connect ABS actuator and	l electric unit (con	ntrol unit) harness connector. Stric unit (control unit) harnes	
Turn Disc Che	the ignition switch OFF. connect ABS actuator and ck voltage between ABS	l electric unit (con actuator and elec		
Turn Disc Cheo ABS actu	the ignition switch OFF. connect ABS actuator and	l electric unit (con actuator and elec		s connector and ground.
Turn Disc Che ABS actu	the ignition switch OFF. connect ABS actuator and ck voltage between ABS	l electric unit (con actuator and elec	tric unit (control unit) harnes	
ABS actu Con E Con Con E Con E CAL	a the ignition switch OFF. connect ABS actuator and ck voltage between ABS nator and electric unit (control unector Terminal 41 3 the ignition switch ON. JTION: er start engine.	l electric unit (con actuator and elec nit)	voltage	s connector and ground.
Turn Disc Che Con E Turn CAL Nev Che	a the ignition switch OFF. connect ABS actuator and ck voltage between ABS hator and electric unit (control unector Terminal 41 3 hathe ignition switch ON. JTION: er start engine. ck voltage between ABS	l electric unit (con actuator and elec nit)	Voltage Battery voltage	s connector and ground.
ABS actu Con E Turn CAU Nev ABS actu	a the ignition switch OFF. connect ABS actuator and ck voltage between ABS nator and electric unit (control unector Terminal 41 3 the ignition switch ON. JTION: er start engine.	l electric unit (con actuator and elec nit)	Voltage Battery voltage	s connector and ground.

C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

- Turn the ignition switch OFF.
 Check 30 A fusible link (#M).
- Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (3) and 30 A 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 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	
E11	1	Ground	Existed	
	E41 2		Existed	

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?

NO >> Repair or replace error-detected parts.

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-142</u>, "<u>Removal and Installa-</u> tion".

C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

DTC Logic

[WITH VDC]

А

	ETECTION LOGIC			
DTC	Display Item	Malfur	nction detected condition	Possible causes
C1121	FR LH OUT ABS SOL	When a malfuncti 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 (control unit)
C1125	RR LH OUT ABS SOL	When a malfuncti valve.	ion is detected in rear LH ABS OUT	Fusible linkBattery power supply system
C1127	RR RH OUT ABS SOL	When a malfuncti valve.	ion is detected in rear RH ABS OUT	
	ONFIRMATION PROCE	JURE		
.PRE	CONDITIONING			
	t at least 10 seconds befor >> GO TO 2. CK DTC DETECTION	J. J		
. Turr . Per	CONSULT the ignition switch OFF to form self-diagnosis for "AB	S".		
YES NO	<u>C1121", "C1123", "C1125"</u> >> Proceed to diagnosis (>> INSPECTION END		<u>ted ?</u> to <u>BRC-89. "Diagnosis Proce</u>	edure".
-				
nagno	osis Procedure			INFOID:00000008133037
.CHE	CK ABS OUT VALVE POW	ER SUPPLY		
. Disc			trol unit) harness connector. tric unit (control unit) harness	connector and ground.
	uator and electric unit (control uni	t)		
ABS acti				
	nector Terminal		Voltage	
Cor		Ground	Voltage Battery voltage	
Cor I . Turr CAI Nev	Terminal E41 3 the ignition switch ON. JTION: ver start engine.		_	connector and ground.
Cor I . Turr CAI Nev . Che	Terminal E41 3 The ignition switch ON. JTION: The start engine. Eack voltage between ABS a	ctuator and elect	Battery voltage	connector and ground.
Cor I . Turr CAI Nev . Che	Innector Terminal E41 3 The ignition switch ON. JTION: Yer start engine. eck voltage between ABS a uator and electric unit (control unit)	ctuator and elect	Battery voltage	connector and ground.
Cor I . Turr CAI Nev . Che ABS act	Innector Terminal E41 3 In the ignition switch ON. JTION: rer start engine. eck voltage between ABS a uator and electric unit (control unit nector	ictuator and elect	Battery voltage tric unit (control unit) harness Voltage	connector and ground.
Cor I CAI Nev 5. Che ABS act Cor	InnectorTerminalE413E413In the ignition switch ON.JTION:Fer start engine.eck voltage between ABS auator and electric unit (control unit control unit)InnectorTerminalE413	ctuator and elect	Battery voltage	connector and ground.
Cor F CAI Nev CAI Nev ABS act Cor ABS act Cor S the in YES NO	Innector Terminal E41 3 In the ignition switch ON. JTION: rer start engine. eck voltage between ABS a uator and electric unit (control unit nector	ictuator and elect	Battery voltage tric unit (control unit) harness Voltage Battery voltage	connector and ground.

C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

- 1. Turn the ignition switch OFF.
- 2. Check 30 A fusible link (#M).
- 3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (3) and 30 A 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 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	ctric unit (control unit)		Continuity
Connector	Terminal	_	Continuity
F41	1	Ground	Existed
	2	Ground	LABled

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?

NO >> Repair or replace error-detected parts.

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-142</u>, "<u>Removal and Installa-</u> tion".

C1130 ENGINE SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

C1130 ENGINE SIGNAL

DTC Logic

INFOID:000000008133038

А

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 Ε If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test. 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-91, "Diagnosis Procedure"</u>. >> INSPECTION END NO Diagnosis Procedure INFOID:00000008133039 1.CHECK ENGINE SYSTEM (P)With CONSULT Perform self-diagnosis for "ENGINE". Κ Is any DTC detected? YES >> Check the DTC. NO >> GO TO 2. **2.**CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) L ()With CONSULT 1. Erase self-diagnosis result for "ABS". M Turn the ignition switch OFF. 2. Start the engine and drive the vehicle for a short period of time. 3. Check that the malfunction indicator lamp (MIL) turns OFF. 4 Ν After the vehicle stops, perform self-diagnosis for "ABS". 5. Is DTC "C1130" detected? YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-142, "Removal and Installation". NO >> Check pin terminals and connection of each harness connector for abnormal conditions. Repair or replace error-detected parts.

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< DTC/CIRCUIT DIAGNOSIS >

C1138 4WAS SYSTEM

DTC Logic

INFOID:000000008133040

INFOID:000000008133041

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1138	4WAS CIRCUIT	When a malfunction is detected in 4WAS system.	 4WAS control unit ABS actuator and electric unit (control unit) CAN communication line

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

()With CONSULT

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

Is DTC "C1138" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-92, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK 4WAS SYSTEM

With CONSULT

Perform self-diagnosis for "4WAS (MAIN)/RAS/HICAS".

Is any DTC detected?

YES >> Check the DTC.

NO >> GO TO 2.

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

(P)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 4WAS warning lamp turns OFF.
- 5. After the vehicle stops, perform self-diagnosis for "ABS".

Is DTC "C1138" detected?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-142, "Removal and Installa-</u> tion".
- NO >> Check pin terminals and connection of each harness connector for abnormal conditions. Repair or replace error-detected parts.

C1140 ACTUATOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

DTC DETECTION LOGIC

C1140 ACTUATOR RELAY SYSTEM

DTC Logic

[WITH VDC]

INFOID:000000008133042

	U	isplay Item	Malfu	Inction detected condition	Possible causes
C1140	C1140 ACTUATOR RLY When a malfunction is detected in actuator relay. When a malfunction is detected in actuator relay. • Harness or connector • ABS actuator and electric uni (control unit) • Fusible link • Battery power supply system				
TC CO	ONFIRMA	TION PROCEDL	JRE		
.PRE	CONDITIO	NING			
		ATION PROCEDU) seconds before (ays turn the ignition switch OF
	>> GO TC) 2.			
.CHE	CK DTC DI	ETECTION			
	CONSULT				
		n switch OFF to C agnosis for "ABS"			
	<u>"C1140" de</u>	0	-		
YES			cedure. Refer	r to <u>BRC-93, "Diagnosis Pro</u>	cedure".
NO		CTION END			
liagno	osis Proc	edure			INFOID:00000008133
.CHE	CK ACTUA	TOR RELAY POV	VER SUPPLY		
. Turi . Dise	n the ignitio connect AB	n switch OFF. S actuator and ele	ectric unit (con	ntrol unit) harness connector stric unit (control unit) harnes	
. Turi . Disc . Che	n the ignitio connect AB eck voltage	n switch OFF. S actuator and ele	ectric unit (con	ctric unit (control unit) harnes	
. Turi . Disc . Che ABS ac	n the ignitio connect AB eck voltage	n switch OFF. S actuator and ele between ABS actu	ectric unit (con		
. Turi . Disc . Che ABS ac	n the ignitio connect AB eck voltage tuator and ele	n switch OFF. S actuator and ele between ABS actu ctric unit (control unit)	ectric unit (con	ctric unit (control unit) harnes	
. Turi . Disi . Che ABS ac Co . Turi CA Nev	n the ignitio connect AB eck voltage tuator and ele nnector E41 n the ignitio UTION: /er start en	n switch OFF. S actuator and ele between ABS actu ctric unit (control unit) Terminal 3 n switch ON. gine.	ectric unit (con uator and elec Ground	Voltage Battery voltage	ss connector and ground.
. Turi . Disi . Che ABS ac Co . Turi CA Nev	n the ignitio connect AB eck voltage tuator and ele nnector E41 n the ignitio UTION: /er start en	n switch OFF. S actuator and ele between ABS actu ctric unit (control unit) Terminal 3 n switch ON. gine.	ectric unit (con uator and elec Ground	Voltage	ss connector and ground.
. Turi . Disi . Che ABS ac Co . Turi CA Nev . Che	n the ignitio connect AB eck voltage tuator and ele nnector E41 n the ignitio UTION: /er start en eck voltage	n switch OFF. S actuator and ele between ABS actu ctric unit (control unit) Terminal 3 n switch ON. gine.	ectric unit (con uator and elec Ground	Voltage Battery voltage	ss connector and ground.
. Turi . Disc . Che ABS ac Co . Turi CA Nev . Che	n the ignitio connect AB eck voltage tuator and ele nnector E41 n the ignitio UTION: /er start en eck voltage	n switch OFF. S actuator and ele between ABS actu ctric unit (control unit) Terminal 3 n switch ON. gine. between ABS actu	ectric unit (con uator and elec Ground	Voltage Battery voltage	ss connector and ground.
. Turi . Disi . Che ABS ac Co . Turi CA Nev . Che ABS act	n the ignitio connect AB eck voltage tuator and ele nnector E41 n the ignitio UTION: ver start en eck voltage	n switch OFF. S actuator and ele between ABS actu ctric unit (control unit) Terminal 3 n switch ON. Igine. between ABS actu	ectric unit (con uator and elec Ground	Voltage Battery voltage	ss connector and ground.
. Turn . Diso . Che ABS ac Co . Turn CA Nev . Che ABS act Cor	n the ignitio connect AB eck voltage tuator and ele nnector E41 n the ignitio UTION: ver start en eck voltage uator and elec nnector E41 spection re	n switch OFF. S actuator and ele between ABS actu ctric unit (control unit) Terminal 3 n switch ON. ogine. between ABS actu tric unit (control unit) Terminal 3 sult normal?	ectric unit (con uator and elec Ground	Voltage Battery voltage Ctric unit (control unit) harnes Voltage	ss connector and ground.
. Turi . Disc . Che ABS ac Co . Turi CA Nev . Che ABS act	n the ignitio connect AB eck voltage tuator and ele nnector E41 n the ignitio UTION: ver start en eck voltage uator and elec nnector E41	n switch OFF. S actuator and ele between ABS actu ctric unit (control unit) Terminal 3 n switch ON. ogine. between ABS actu tric unit (control unit) Terminal 3 sult normal?	ectric unit (con uator and elec Ground	Voltage Battery voltage Ctric unit (control unit) harnes Voltage	ss connector and ground.

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

BRC-93

В

C1140 ACTUATOR RELAY SYSTEM

< 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.

3. CHECK ACTUATOR RELAY 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
F41	1	Ground	Existed
L41	2	Giodina	LAISted

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-142, "Removal and Installa-</u> tion".
- NO $>> \overline{\text{Repair}}$ or replace error-detected parts.

C1142 PRESS SENSOR

< DTC/CIRCUIT DIAGNOSIS >

C1142 PRESS SENSOR

DTC Logic

INFOID:000000008133044

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DTC	Display Item	Malfunction detected condition	Possible causes
C1142	PRESS SEN CIRCUIT	When a malfunction is detected in pressure sensor.	 Stop lamp switch system ABS actuator and electric unit (control unit) Brake system
отс со	ONFIRMATION PROCE	EDURE	
1. PREC	CONDITIONING		
		DURE" has been previously conducted, alway bre conducting the next test.	s turn the ignition switch OFI
anu wan	at least to seconds beit	re conducting the next test.	
•	>> GO TO 2.		
	CK DTC DETECTION		
9	CONSULT the ignition switch OFF		
	form self-diagnosis for "A		
<u>Is DTC "</u>	C1142" detected?		
YES NO	>> Proceed to diagnosis >> INSPECTION END	procedure. Refer to <u>BRC-95, "Diagnosis Proce</u>	edure".
-	osis Procedure		
			INFOID:000000081330
1. CHE	CK STOP LAMP SWITCH	I SYSTEM	
		Refer to <u>BRC-82, "Diagnosis Procedure"</u> .	
<u>Is the ins</u> YES	spection result normal? >> GO TO 2.		
NO	>> Repair or replace err	or-detected parts.	
2.сне	CK BRAKE FLUID LEAK		
Check b	rake fluid leakage. Refer	to <u>BR-10, "Inspection"</u> .	
Is the in	spection result normal?		
	>> GO TO 3.	an detected parts	
	>> Repair or replace err CK BRAKE PIPING	braelected parts.	
	rake piping. Refer to <u>BR-</u> spection result normal?	26, "FRONT : Inspection" (front), BR-31, "REAF	<u>R : Inspection"</u> (rear).
YES	>> GO TO 4.		
NO	>> Repair or replace err	or-detected parts.	
4. CHE	CK BRAKE PEDAL		
Check b	rake pedal. Refer to <u>BR-</u>	19. "Inspection and Adjustment".	
Is the in	spection result normal?		
YES	>> GO TO 5.	ar detected parts	
	>> Repair or replace err	•	
J.CHE	CK BRAKE MASTER CY	LINDER	

Check brake master cylinder. Refer to BR-34, "Inspection".

Is the inspection result normal?

< DTC/CIRCUIT DIAGNOSIS >

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

6.CHECK BRAKE BOOSTER

Check brake booster. Refer to BR-36, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7.CHECK VACUUM PIPING

Check vacuum piping. Refer to <u>BR-39, "Inspection"</u>.

Is the inspection result normal?

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

8.CHECK FRONT DISC BRAKE

Check front disc brake. Refer to <u>BR-47, "BRAKE CALIPER ASSEMBLY (2 PISTON TYPE) : Inspection"</u> (2 piston type), <u>BR-51, "BRAKE CALIPER ASSEMBLY (4 PISTON TYPE) : Inspection"</u> (4 piston type).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace error-detected parts.

9.CHECK REAR DISC BRAKE

Check rear disc brake. Refer to <u>BR-60, "BRAKE CALIPER ASSEMBLY (1 PISTON TYPE) : Inspection"</u> (1 piston type), <u>BR-64, "BRAKE CALIPER ASSEMBLY (2 PISTON TYPE) : Inspection"</u> (2 piston type).

Is the inspection result normal?

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

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

With CONSULT

- 1. Erase self-diagnosis result for "ABS".
- 2. Start the engine and drive the vehicle for a short period of time.
- 3. Perform self-diagnosis for "ABS".

Is DTC "C1142" detected?

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

C1143 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

C1143 STEERING ANGLE SENSOR

DTC Logic

DTC DETECTION LOGIC В DTC Malfunction detected condition Possible causes **Display Item** · Harness or connector · Steering angle sensor · ABS actuator and electric unit When a malfunction is detected in steering angle sen-ST ANG SEN CIRCUIT C1143 (control unit) sor. D Fuse Ignition power supply system CAN communication line Ε DTC CONFIRMATION PROCEDURE 1.PRECONDITIONING BRC If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test. >> GO TO 2. 2 . CHECK DTC DETECTION With CONSULT Н Turn the ignition switch OFF to ON. 1. 2. Perform self-diagnosis for "ABS". Is DTC "C1143" detected? YES >> Proceed to diagnosis procedure. Refer to <u>BRC-97, "Diagnosis Procedure"</u>. >> INSPECTION END NO INFOID:00000008133047

Diagnosis Procedure

1.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
M37	8	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		vollage
M37	8	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

2.CHECK STEERING ANGLE SENSOR POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.

2. Check 10 A fuse (#46).

BRC-97

[WITH VDC]

INFOID:00000008133046

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C1143 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

3. Disconnect IPDM E/R harness connector.

4. Check continuity between steering angle sensor harness connector and IPDM E/R harness connector.

Steering angle sensor		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M37	8	E5	12	Existed

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

Steering a	ngle sensor		Continuity
Connector	Connector Terminal		Continuity
M37	8	Ground	Not existed

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to <u>PG-27, "Wiring Diagram - IGNITION</u> <u>POWER SUPPLY -"</u>.

NO >> Repair or replace error-detected parts.

${\it 3.}$ check steering angle sensor ground circuit

1. Turn the ignition switch OFF.

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

Steering a	ngle sensor		Continuity
Connector	Terminal		Continuity
M37	7	Ground	Existed

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK TERMINAL

• Check steering angle sensor 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 >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK CAN COMMUNICATION LINE

Check "STRG BRANCH LINE CIRCUIT". Refer to LAN-92, "Diagnosis Procedure".

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-142</u>, "<u>Removal and Installa-</u> tion".
- NO >> Repair or replace error-detected parts. Refer to <u>BRC-8, "Precaution for Harness Repair"</u>.

C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT [WITH VDC]

< DTC/CIRCUIT DIAGNOSIS >

C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

DTC Logic

INFOID:000000008133048

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	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
	ONFIRMATION PROCE	DURE	
1.PRE	CONDITIONING		
		DURE" has been previously conducted, always	s turn the ignition switch OFF
anu wai	t at least 10 seconds belo	re conducting the next test.	
-	>> GO TO 2.		
2.che	CK DTC DETECTION		
	CONSULT n the ignition switch OFF t		
	form self-diagnosis for "AE		
	"C1144" detected?		
YES NO	>> Proceed to diagnosis >> INSPECTION END	procedure. Refer to <u>BRC-99, "Diagnosis Proce</u>	<u>edure"</u> .
_	osis Procedure		INFOID:0000000813304
		TION OF STEERING ANGLE SENSOR	Work Procedure"
		nt of steering angle sensor. Refer to <u>BRC-60. "</u>	Work Procedure".
			Work Procedure".
Perform	neutral position adjustme		Work Procedure".
Perform 2.CHE	 neutral position adjustme >> GO TO 2. CK ABS ACTUATOR AND CONSULT 	nt of steering angle sensor. Refer to <u>BRC-60.</u> "	Work Procedure".
Perform 2.CHE BWith Perform	neutral position adjustme >> GO TO 2. CK ABS ACTUATOR AND CONSULT self-diagnosis for "ABS".	nt of steering angle sensor. Refer to <u>BRC-60.</u> "	Work Procedure".
Perform 2.CHE With Perform Is DTC YES	 neutral position adjustme > GO TO 2. CK ABS ACTUATOR AND CONSULT self-diagnosis for "ABS". <u>"C1144" detected?</u> >> GO TO 3. 	nt of steering angle sensor. Refer to <u>BRC-60.</u> "	Work Procedure".
Perform 2.CHE With Perform IS DTC YES NO	neutral position adjustme >> GO TO 2. CK ABS ACTUATOR ANE CONSULT self-diagnosis for "ABS". <u>"C1144" detected?</u> >> GO TO 3. >> INSPECTION END	nt of steering angle sensor. Refer to <u>BRC-60.</u>	Work Procedure".
Perform 2.CHE With Perform IS DTC YES NO 3.CHE	 neutral position adjustme >> GO TO 2. CK ABS ACTUATOR AND CONSULT self-diagnosis for "ABS". <u>"C1144" detected?</u> >> GO TO 3. >> INSPECTION END CK STEERING ANGLE S 	nt of steering angle sensor. Refer to <u>BRC-60.</u>	Work Procedure".
Perform 2.CHE With Perform IS DTC YES NO 3.CHE 1. Turn	 neutral position adjustme > GO TO 2. CK ABS ACTUATOR ANE CONSULT self-diagnosis for "ABS". <u>"C1144" detected?</u> > GO TO 3. > INSPECTION END CK STEERING ANGLE S n the ignition switch OFF. 	nt of steering angle sensor. Refer to <u>BRC-60.</u>	
Perform 2.CHE With Perform IS DTC ' YES NO 3.CHE 1. Turn 2. Che	 neutral position adjustme > GO TO 2. CK ABS ACTUATOR ANE CONSULT self-diagnosis for "ABS". <u>"C1144" detected?</u> > GO TO 3. > INSPECTION END CK STEERING ANGLE S n the ignition switch OFF. 	nt of steering angle sensor. Refer to <u>BRC-60.</u>	
Perform 2.CHE With Perform IS DTC ' YES NO 3.CHE 1. Turn 2. Che	 neutral position adjustme >> GO TO 2. CK ABS ACTUATOR AND CONSULT self-diagnosis for "ABS". <u>"C1144" detected?</u> >> GO TO 3. >> INSPECTION END CK STEERING ANGLE S n the ignition switch OFF. eck steering angle sensor spection result normal? 	nt of steering angle sensor. Refer to <u>BRC-60.</u>	<u>.6.</u>

C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

< DTC/CIRCUIT DIAGNOSIS >

C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

DTC Logic

INFOID:000000008133050

INFOID:000000008133051

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1145	YAW RATE SENSOR	When a malfunction is detected in yaw rate signal.	Harness or connector
C1146	SIDE G SEN CIRCUIT	When a malfunction is detected in side/decel G sig- nal.	 Yaw rate/side/decel G sensor ABS actuator and electric unit (control unit) Ignition power supply system Fuse

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(I) With CONSULT

1. Turn the ignition switch OFF to ON.

2. Perform self-diagnosis for "ABS".

Is DTC "C1145" or "C1146" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-100, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

CAUTION:

- A malfunction in yaw rate/side/decel G sensor system may be detected when the vehicle sharply turns during a spin turn, acceleration turn or drift driving while VDC function is OFF (VDC OFF indicator lamp is in ON status). This is not a malfunction if the status returns to normal after engine is started again. In that case, erase self-diagnosis result memory using CONSULT.
- When the engine is in running status and the vehicle is on a turntable at the entrance of parking lot or on a moving unit, VDC warning lamp may turn ON and "ABS" self-diagnosis may display "YAW RATE SENSOR". In this case, yaw rate sensor is not malfunctioning. The status returns to normal when the vehicle is left from the turntable or moving unit and the engine is started again. In that case, erase self-diagnosis result memory using CONSULT.

1.CHECK YAW RATE/SIDE/DECEL G SENSOR POWER SUPPLY

- 1. Turn the ignition switch OFF.
- 2. Disconnect yaw rate/side/decel G sensor harness connector.
- 3. Check voltage between yaw rate/side/decel G sensor harness connector and ground.

Yaw rate/side/decel G sensor			Voltage
Connector	Terminal		
M143	4	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.

C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

Yaw rate/side	/decel G sens	or		N / 1/		
Connector	Tern	ninal	—	Voltage		
M143	4	1	Ground	Battery voltage		
s the inspection res YES >> GO TO NO >> GO TO CHECK YAW RA . Turn the ignition	3. 2. \TE/SIDE/D	ECEL G SEN	SOR POWER S			
 Check 10 A fus Disconnect IPD Check continuit nector. 	M`E/R harr			harness connector an	d IPDM E/R harness	con-
Yaw rate/side/dece	G sensor	IPD	M E/R	Continuity		
Connector	Terminal	Connector	Terminal	Continuity		
M143	4	E5	12	Existed		
6. Check continuit	y between	yaw rate/side/	decel G sensor	harness connector and	d ground.	
Yaw rate/side/decel	G sensor			-		
		_	Continuity			
Connector	Terminal					
M143 the inspection res YES >> Perform <u>POWEF</u> NO >> Repair	4 sult normal? n trouble dia R SUPPLY or replace e	agnosis for ign <u>-"</u> . error-detected	parts.	_ ply. Refer to <u>PG-27, "V</u>	Viring Diagram - IGNIT	<u>'ION</u>
M143 S the inspection res YES >> Perform <u>POWER</u> NO >> Repair CHECK YAW RA	4 sult normal? trouble dia <u>R SUPPLY</u> or replace e TE/SIDE/D	agnosis for ign - <u>"</u> error-detected ECEL G SEN	ition power supp parts.		Viring Diagram - IGNIT	<u>10N</u>
M143 the inspection res YES >> Perform <u>POWER</u> NO >> Repair CHECK YAW RA . Turn the ignition	4 sult normal? n trouble dia R SUPPLY or replace e TE/SIDE/D n switch OF	agnosis for ign error-detected ECEL G SEN F.	ition power sup parts. SOR GROUND			<u>'ION</u>
M143 the inspection res YES >> Perform <u>POWEF</u> NO >> Repair CHECK YAW RA . Turn the ignition	4 at trouble dia <u>R SUPPLY</u> or replace e aTE/SIDE/D a switch OF y between y	agnosis for ign error-detected ECEL G SEN F.	ition power sup parts. SOR GROUND decel G sensor	CIRCUIT		
M143 the inspection res YES >> Perform <u>POWEF</u> NO >> Repair CHECK YAW RA . Turn the ignitior . Check continuit Yaw rate/side/decel	4 at trouble dia <u>R SUPPLY</u> or replace e aTE/SIDE/D a switch OF y between y	agnosis for ign error-detected ECEL G SEN F.	ition power sup parts. SOR GROUND	CIRCUIT		
M143 s the inspection res YES >> Perform <u>POWEF</u> NO >> Repair CHECK YAW RA . Turn the ignition . Check continuit Yaw rate/side/decel	4 sult normal? n trouble dia <u>R SUPPLY</u> or replace e TE/SIDE/D n switch OF y between G sensor	agnosis for ign error-detected ECEL G SEN F.	ition power sup parts. SOR GROUND decel G sensor	CIRCUIT		<u>'ion</u>
M143 s the inspection res YES >> Perform <u>POWER</u> NO >> Repair CHECK YAW RA . Turn the ignition Check continuit Yaw rate/side/decel Connector M143	4 sult normal? a trouble dia <u>R SUPPLY</u> or replace e TE/SIDE/D a switch OF y between G sensor Terminal 1	agnosis for ign <u>-"</u> . error-detected ECEL G SEN F. yaw rate/side/ Ground	ition power supports. SOR GROUND decel G sensor	CIRCUIT		ION
M143 s the inspection res YES >> Perform <u>POWER</u> NO >> Repair CHECK YAW RA . Turn the ignition Check continuit Yaw rate/side/decel <u>Connector</u> M143 s the inspection res YES >> GO TO NO >> Repair	4 sult normal? a trouble dia <u>R SUPPLY</u> or replace e TE/SIDE/D a switch OF y between G sensor Terminal 1 sult normal? 4. or replace e	agnosis for ign error-detected ECEL G SEN F. yaw rate/side/ Ground	ition power supports. SOR GROUND decel G sensor Continuity Existed	CIRCUIT		<u>10N</u>
M143 s the inspection res YES >> Perform <u>POWER</u> NO >> Repair CHECK YAW RA . Turn the ignition Check continuit Yaw rate/side/decel Connector M143 s the inspection res YES >> GO TO NO >> Repair LCHECK COMMU	4 sult normal? A trouble dia R SUPPLY or replace of TE/SIDE/D A switch OF y between y G sensor Terminal 1 sult normal? 4. or replace of JNICATION	agnosis for ign error-detected ECEL G SEN F. yaw rate/side/ Ground 2 error-detected LINE	ition power supports. SOR GROUND decel G sensor Continuity Existed	CIRCUIT harness connector and	d ground.	
M143 s the inspection res YES >> Perform <u>POWEF</u> NO >> Repair CHECK YAW RA . Turn the ignition . Check continuit Yaw rate/side/decel Connector M143 s the inspection res YES >> GO TO NO >> Repair . CHECK COMMU Check continuity be	4 sult normal? a trouble dia <u>R SUPPLY</u> or replace e TE/SIDE/D a switch OF y between y G sensor Terminal 1 sult normal? 4. or replace e JNICATION tween yaw	agnosis for ign <u>-</u> "- error-detected ECEL G SEN F. yaw rate/side/ Ground C error-detected LINE rate/side/dece	ition power supports. SOR GROUND decel G sensor Continuity Existed	CIRCUIT	d ground.	
M143 s the inspection res YES >> Perform <u>POWER</u> NO >> Repair CHECK YAW RA . Turn the ignition . Check continuit Yaw rate/side/decel Connector M143 s the inspection res YES >> GO TO NO >> Repair . CHECK COMML Check continuity be control unit) harnes	4 sult normal? a trouble dia <u>R SUPPLY</u> or replace e TE/SIDE/D a switch OF y between y G sensor Terminal 1 sult normal? 4. or replace e JNICATION tween yaw	agnosis for ign <u>-</u> "- error-detected ECEL G SEN F. yaw rate/side/ Ground error-detected LINE rate/side/dece r.	ition power supports. SOR GROUND decel G sensor Continuity Existed parts.	CIRCUIT harness connector and	d ground. S actuator and electric	
M143 s the inspection res YES >> Perform <u>POWER</u> NO >> Repair CHECK YAW RA . Turn the ignition Check continuit Yaw rate/side/decel Connector M143 s the inspection res YES >> GO TO NO >> Repair CHECK COMML Check continuity be control unit) harnes	4 sult normal? A trouble dia R SUPPLY or replace of TE/SIDE/D a switch OF y between y G sensor Terminal 1 sult normal? 4. or replace of JNICATION tween yaw ss connecto /decel G sens	agnosis for ign 	ition power supports. SOR GROUND decel G sensor Continuity Existed parts.	CIRCUIT harness connector and	d ground.	
M143 s the inspection res YES >> Perform <u>POWER</u> NO >> Repair CHECK YAW RA . Turn the ignition Check continuit Yaw rate/side/decel Connector M143 s the inspection res YES >> GO TO NO >> Repair LCHECK COMML Check continuity be control unit) harnes Yaw rate/side	4 sult normal? a trouble dia <u>R SUPPLY</u> or replace e TE/SIDE/D a switch OF y between y G sensor Terminal 1 sult normal? 4. or replace e JNICATION tween yaw ss connector /decel G sens Term	agnosis for ign 	ition power supports. SOR GROUND decel G sensor Continuity Existed parts. el G sensor harn	CIRCUIT harness connector and 	d ground. S actuator and electric	

5.CHECK COMMUNICATION LINE (2)

C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

Check communication lines between 4WAS front control unit and 4WAS main control unit. Refer to <u>STC-107.</u> <u>"Diagnosis Procedure"</u>.

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 yaw rate/side/decel G sensor 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 >> GO TO 7.

NO >> Repair or replace error-detected parts.

7.REPLACE YAW RATE/SIDE/DECEL G SENSOR

With CONSULT.

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Replace yaw rate/side/decel G sensor. Refer to BRC-144, "Removal and Installation".
- 3. Erase self-diagnosis result for "ABS".
- 4. Turn the ignition switch OFF.
- 5. Turn the ignition switch ON. CAUTION:

Never start engine.

- 6. Perform self-diagnosis for "ABS".
- Is DTC "C1145" or "C1146" detected?
- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-142, "Removal and Installa-</u> tion".
- NO >> INSPECTION END

C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

C1155 BRAKE FLUID LEVEL SWITCH

DTC Logic

[WITH VDC]

A

INFOID:000000008133052

DTC	Display Item	Malfunction detected condition	Possible causes
C1155	BR FLUID LEVEL LOW	When brake fluid level low signal is detected.	 Harness or connector ABS actuator and electric unit (control unit) Brake fluid level switch Combination meter
DTC C	ONFIRMATION PROCE	EDURE	
1. PRE	CONDITIONING		
		EDURE" has been previously conducted, alw pre conducting the next test.	ays turn the ignition switch OF
anu wai	t at least 10 seconds beit	sie conducting the next test.	
_	>> GO TO 2.		
2.сне	CK DTC DETECTION		
	CONSULT n the ignition switch OFF	to ON	
	form self-diagnosis for "A		
	"C1155" detected?		
YES NO	>> Proceed to diagnosis >> INSPECTION END	procedure. Refer to <u>BRC-103</u> , "Diagnosis P	rocedure".
Diagn	osis Procedure		INFOID:00000008133
	CK BRAKE FLUID LEVEI		
	n the ignition switch OFF.	_	
2. Che	eck brake fluid level. Refe	r to <u>BR-10, "Inspection"</u> .	
<u>Is the in</u> YES	spection result normal? >> GO TO 2.		
NO	>> Refill brake fluid. Ref	er to <u>BR-10, "Refilling"</u> .	
2.per	FORM SELF-DIAGNOSIS	S (1)	
With	CONSULT	"A D O "	
	se self-diagnosis result fo n the ignition switch OFF,	and wait 10 seconds or more.	
3. Tur	n the ignition switch ON. UTION:		
Nev	ver start the engine.		
	form self-diagnosis for "Al	BS".	
<u>IS DTC</u> YES	<u>"C1155" detected?</u>		
1 – 1 – 1	>> GO TO 3.		
NO		SWITCH	
NO	CK BRAKE FLUID LEVE		
NO 3. CHE Check t	orake fluids level switch. R	Refer to <u>BRC-105, "Component Inspection"</u> .	
NO 3. CHE Check t			

4.PERFORM SELF-DIAGNOSIS (2)

< DTC/CIRCUIT DIAGNOSIS >

(D) With CONSULT

- 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.
 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 combination meter harness connector.
- 6. Check combination meter harness connector for disconnection or looseness.
- 7. Check combination meter pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

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YES >> GO TO 7.
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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 combination meter harness connector.
- 3. Erase self-diagnosis result for "ABS".
- 4. Turn the ignition switch OFF, and wait 10 seconds or more.
- 5. Turn the ignition switch ON.

CAUTION: Never start the engine.

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 combination meter harness connector.
- Check continuity between brake fluid level switch harness connector and combination meter harness connector.

Brake fluid	level switch	Combina	tion meter	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E47	1	M53	27	Existed

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

Brake fluid	level switch	— Continuity		
Connector	Terminal			
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]

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$\mathbf{8}.$ Check brake fluid level switch ground

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

Brake fluid	level switch	Continuity			В
Connector	Terminal		Continuity		
E47	2	Ground	Existed		
Is the inspection res	ult normal?				C
YES >> GO TO S	•••				
· ·	•	cted parts. GO TO 9.			D
9.CHECK COMBIN	ATION METER				
Check combination r	meter. Refer to MWI-	31, "CONSULT Fund	ction".		
Is the inspection res	ult normal?				E
	ABS actuator and e	electric unit (control	unit). Refer to <u>BRC-1</u>	42, "Removal and Installa-	
tion".	n namla sa sanahin stis	w wester Defende M		la stelletie » "	
NO >> Repair c	or replace combination	on meter. Refer to M	NI-79, "Removal and	Installation".	BRC
Component Insp	pection			INFOID:00000008133054	
1.CHECK BRAKE	FLUID LEVEL SWIT	СН			G
	e fluid level switch h	arness connector. of brake fluid level sv	witch.		Η

Brake fluid level switch	Condition	Continuity	
Terminal	Condition	Continuity	
	When brake fluid level in reservoir tank is within the specified level.	Not existed	
1 – 2	When brake fluid level in reservoir tank is less than the specified level.	Existed	J
Is the inspection result	normal?		
YES >> INSPECTION			K

YES >> INSPECTION END

NO >> Replace reservoir tank. Refer to BR-33, "Disassembly and Assembly".

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C1160 INCOMPLETE DECEL G SENSOR CALIBRATION

< DTC/CIRCUIT DIAGNOSIS >

C1160 INCOMPLETE DECEL G SENSOR CALIBRATION

DTC Logic

INFOID:000000008133055

[WITH VDC]

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1160	DECEL G SEN SET	When calibration of yaw rate/side/decel 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 the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

(I) With CONSULT

1. Turn the ignition switch OFF to ON.

2. Perform self-diagnosis for "ABS".

Is DTC "C1160" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-106, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

1.DECEL G SENSOR CALIBRATION

Perform decel G sensor calibration. Refer to <u>BRC-62, "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-100, "Diagnosis Procedure".

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-142</u>, "<u>Removal and Installa-</u> tion".
- NO >> Repair or replace error-detected parts.

INFOID:000000008133056

C1164, C1165 CV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

DTC DETECTION LOGIC

C1164, C1165 CV SYSTEM

DTC Logic

[WITH VDC]

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INFOID:000000008133057

DTC Possible causes **Display Item** Malfunction detected condition C1164 CV 1 When a malfunction is detected in cut valve 1. · Harness or connector · ABS actuator and electric unit (control unit) C1165 CV 2 When a malfunction is detected in cut valve 2. Fusible link D · Battery power supply system DTC CONFIRMATION PROCEDURE Ε 1.PRECONDITIONING If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test. BRC >> GO TO 2. 2.check dtc detection With CONSULT Turn the ignition switch OFF to ON. 1. Н 2. Perform self-diagnosis for "ABS". Is DTC "C1164" or "C1165" detected? >> Proceed to diagnosis procedure. Refer to <u>BRC-107, "Diagnosis Procedure".</u> YES >> INSPECTION END NO Diagnosis Procedure INFOID:00000008133058 1.CHECK CUT VALVE POWER SUPPLY 1. Turn the ignition switch OFF. Disconnect ABS actuator and electric unit (control unit) harness connector. 2. Κ 3. Check voltage between ABS actuator and electric unit (control unit) harness connector and ground. ABS actuator and electric unit (control unit) L Voltage Connector Terminal E41 3 Ground Battery voltage M Turn the ignition switch ON. 4. CAUTION: Never start engine. Check voltage between ABS actuator and electric unit (control unit) harness connector and ground. 5. Ν ABS actuator and electric unit (control unit) Voltage Connector Terminal E41 3 Ground Battery voltage Is the inspection result normal? Ρ YES >> GO TO 3. NO >> GO TO 2. 2.CHECK CUT VALVE POWER SUPPLY CIRCUIT Turn the ignition switch OFF. 1.

2. Check 30 A fusible link (#M).

BRC-107

C1164, C1165 CV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (3) and 30 A 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 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	ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal		Continuity
F41	1	Ground	Existed
L41	2	Giouna	LAISteu

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-142, "Removal and Installa-</u> tion".
- NO >> Repair or replace error-detected parts.

C1170 VARIANT CODING

< DTC/CIRCUIT DIAGNOSIS >

C1170 VARIANT CODING

DTC Logic

INFOID:000000008133059

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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	URE" has been previously conducted, alway conducting the next test.	s turn the ignition switch OFF	Е	
	>> GO TO 2.				
2.CHE	CK DTC DETECTION			BRC	
 With CONSULT 1. Turn the ignition switch OFF to ON. 					
	form self-diagnosis for "ABS				
	<u>C1170" detected?</u>	andura Refer to RRC 100 "Diagnosis Dro	ooduro"		
YES NO	>> INSPECTION END	ocedure. Refer to <u>BRC-109, "Diagnosis Proc</u>	<u>cedule</u> .	Н	
Diagno	osis Procedure		INFOID:00000008133060		
			INFOID.00000008133000		
1. CHE	CK SELF-DIAGNOSIS RES	ULTS			
Replace ABS actuator and electric unit (control unit) even if other display than "VARIANT CODING" is displayed in self-diagnosis for "ABS".					
	>> Replace ABS actuator a tion".	and electric unit (control unit). Refer to BRC	C-142, "Removal and Installa-	K	
				L	

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C1197 VACUUM SENSOR

< DTC/CIRCUIT DIAGNOSIS >

C1197 VACUUM SENSOR

DTC Logic

INFOID:000000008133061

[WITH VDC]

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1197	VACUUM SENSOR	When a malfunction is detected in vacuum sensor.	 Harness or connector Vacuum sensor (brake booster) Vacuum piping ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

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

Is DTC "C1197" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-110, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK BRAKE BOOSTER

- 1. Turn the ignition switch OFF.
- 2. Check brake booster. Refer to <u>BR-36, "Inspection and Adjustment"</u>.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace brake booster. Refer to <u>BR-35, "Removal and Installation"</u>.

2. CHECK VACUUM PIPING

Check vacuum piping. Refer to BR-39, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace vacuum piping. Refer to <u>BR-39</u>, "Removal and Installation".

3.CHECK VACUUM SENSOR CIRCUIT

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

Vacuun	n sensor	ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector Terminal		Continuity
	1		13	
E38	2	E41	32	Existed
	3	†	28	

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

BRC-110

C1197 VACUUM SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

	m sensor		Continuity		
Connector	Terminal		Continuity		
E38	1 2 3	Ground	Not existed		
′ES >> 0	⊥ <u>ion result norr</u> GO TO 4. Repair or repla	⊥ <u>mal?</u> ice error-detect	ted parts.		
CHECK T	• •		I		
Check ABS ness conne	actuator and	electric unit (c		se connection with harness connector. I terminals for damage or loose connection with har-	
′ES >> 0 10 >> F	GO TO 5. Repair or repla	ce error-detect	ted parts.		В
		INSOR			
With CONS Connect		and electric un	nit (control unit	harness connector.	
Replace CAUTIO		or. Refer to <u>BR</u>	-35, "Removal	and Installation".	
Always r					
				sensor cannot be disassembled.	
Turn the	If-diagnosis re ignition switch	sult for "ABS".		sensor cannot be disassembled.	
Turn the Start eng	If-diagnosis re ignition switch ine.	esult for "ABS". NOFF.		sensor cannot be disassembled.	
Turn the Start eng Perform s DTC "C119	If-diagnosis re ignition switch ine. self-diagnosis <u>97" detected?</u>	esult for "ABS". OFF. for "ABS".			
Turn the Start eng Perform s DTC "C119 ′ES >> F	If-diagnosis re ignition switch ine. self-diagnosis <u>97" detected?</u> Replace ABS a	esult for "ABS". OFF. for "ABS".		sensor cannot be disassembled. htrol unit). Refer to <u>BRC-142. "Removal and Installa-</u>	
Turn the Start eng Perform s <u>DTC "C119</u> ′ES >> F <u>ti</u>	If-diagnosis re ignition switch ine. self-diagnosis <u>97" detected?</u>	esult for "ABS". OFF. for "ABS". actuator and el			
Turn the Start eng Perform s <u>DTC "C119</u> ′ES >> F <u>ti</u>	If-diagnosis re ignition switch ine. self-diagnosis <u>97" detected?</u> Replace ABS a <u>on"</u> .	esult for "ABS". OFF. for "ABS". actuator and el			
Turn the Start eng Perform s <u>DTC "C119</u> ′ES >> F <u>ti</u>	If-diagnosis re ignition switch ine. self-diagnosis <u>97" detected?</u> Replace ABS a <u>on"</u> .	esult for "ABS". OFF. for "ABS". actuator and el			
Turn the Start eng Perform s <u>DTC "C119</u> ′ES >> F <u>ti</u>	If-diagnosis re ignition switch ine. self-diagnosis <u>97" detected?</u> Replace ABS a <u>on"</u> .	esult for "ABS". OFF. for "ABS". actuator and el			
Turn the Start eng Perform s <u>DTC "C119</u> ′ES >> F <u>ti</u>	If-diagnosis re ignition switch ine. self-diagnosis <u>97" detected?</u> Replace ABS a <u>on"</u> .	esult for "ABS". OFF. for "ABS". actuator and el			
Turn the Start eng Perform s <u>DTC "C119</u> ′ES >> F <u>ti</u>	If-diagnosis re ignition switch ine. self-diagnosis <u>97" detected?</u> Replace ABS a <u>on"</u> .	esult for "ABS". OFF. for "ABS". actuator and el			
Turn the Start eng Perform s <u>DTC "C119</u> ′ES >> F <u>ti</u>	If-diagnosis re ignition switch ine. self-diagnosis <u>97" detected?</u> Replace ABS a <u>on"</u> .	esult for "ABS". OFF. for "ABS". actuator and el			
Turn the Start eng Perform s <u>DTC "C119</u> ′ES >> F <u>ti</u>	If-diagnosis re ignition switch ine. self-diagnosis <u>97" detected?</u> Replace ABS a <u>on"</u> .	esult for "ABS". OFF. for "ABS". actuator and el			
Turn the Start eng Perform s <u>DTC "C119</u> ′ES >> F <u>ti</u>	If-diagnosis re ignition switch ine. self-diagnosis <u>97" detected?</u> Replace ABS a <u>on"</u> .	esult for "ABS". OFF. for "ABS". actuator and el			

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< DTC/CIRCUIT DIAGNOSIS >

C1198 VACUUM SENSOR

DTC Logic

INFOID:000000008133063

INFOID:000000008133064

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1198	VACUUM SEN CIR	 When an open circuit is detected in vacuum sensor circuit. When a short circuit is detected in vacuum sensor circuit. When a malfunction is detected in vacuum sensor noise. 	 Harness or connector Vacuum sensor (brake booster) ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(D) With CONSULT

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

Is DTC "C1198" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-112, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

1. CHECK VACUUM SENSOR CIRCUIT

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

Vacuun	Vacuum sensor ABS actuator and electric unit (control unit)		Continuity	
Connector	Terminal	Connector Terminal		Continuity
	1		13	
E38	2	E41	32	Existed
	3	†	28	

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

Vacuur	n sensor		Continuity	
Connector	Terminal		Continuity	
	1			
E38	2	Ground	Not existed	
	3			

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

BRC-112

C1198 VACUUM SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

Z.CHECK TERMINAL	А
 Check vacuum sensor pin terminals for damage or loose connection with harness connector. Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector. 	<i>2</i> x
Is the inspection result normal? YES >> GO TO 3.	В
NO >> Repair or replace error-detected parts.	С
3.REPLACE VACUUM SENSOR	
 With CONSULT Connect ABS actuator and electric unit (control unit) harness connector. Replace vacuum sensor. Refer to <u>BR-35, "Removal and Installation"</u>. CAUTION: 	D
 Always replace brake booster because vacuum sensor cannot be disassembled. 3. Erase self-diagnosis result for "ABS". 	Ε
 Turn the ignition switch OFF. Start engine. Perform self-diagnosis for "ABS". Is DTC "C1198" detected? 	BRC
YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-142, "Removal and Installa-</u> <u>tion"</u> . NO >> INSPECTION END	G
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C1199 BRAKE BOOSTER

< DTC/CIRCUIT DIAGNOSIS >

C1199 BRAKE BOOSTER

DTC Logic

INFOID:000000008133065

[WITH VDC]

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1199	BRAKE BOOSTER	When brake booster vacuum is approx. 0 kPa (0 mm- Hg) during engine running.	 Harness or connector Vacuum sensor (brake booster) Vacuum piping ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

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

Is DTC "C1199" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-114, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK BRAKE BOOSTER

- 1. Turn the ignition switch OFF.
- 2. Check brake booster. Refer to <u>BR-36, "Inspection and Adjustment"</u>.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace brake booster. Refer to <u>BR-35, "Removal and Installation"</u>.

2. CHECK VACUUM PIPING

Check vacuum piping. Refer to BR-39, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace vacuum piping. Refer to <u>BR-39, "Removal and Installation"</u>.

3.CHECK VACUUM SENSOR CIRCUIT

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

Vacuun	n sensor	ABS actuator and electric unit (control unit)		Continuity	
Connector	Terminal	Connector Terminal		Continuity	
	1		13		
E38	2	E41	32	Existed	
	3	†	28		

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

BRC-114

C1199 BRAKE BOOSTER

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

Vacuur	m sensor		Continuity				
Connector	Terminal		Continuity				
E38	1 2 3	Ground	Not existed				
/ES >> 0	ion result norr GO TO 4.						
NO >> F .CHECK T		ce error-detect	ted parts.				_
	actuator and			se connection win terminals for da		nnector. se connection with har-	
YES >> 0	ion result norr 30 TO 5. Repair or repla	<u>nal?</u> ce error-detect	ted parts				E
	E VACUUM SE		ieu paris.				
With CON							-
				harness connec			
Replace CAUTIO Always I	vacuum senso <mark>N:</mark> r eplace brake	or. Refer to <u>BR</u> booster beca	<u>-35, "Removal</u> ause vacuum	harness connec and Installation". sensor cannot b		bled.	
Replace CAUTIO Always I Erase se Turn the Start eng	vacuum senso N: replace brake If-diagnosis re ignition switch ine.	br. Refer to <u>BR</u> booster beca sult for "ABS". OFF.	<u>-35, "Removal</u> ause vacuum	and Installation".		bled.	
Replace CAUTIO Always I Erase se Turn the Start eng Perform s DTC "C119 (ES >> F	vacuum senso N: replace brake If-diagnosis re ignition switch ine. self-diagnosis <u>99" detected?</u> Replace ABS a	or. Refer to <u>BR</u> booster beca sult for "ABS". OFF. for "ABS".	<u>-35, "Removal</u> ause vacuum	and Installation". sensor cannot b	e disassemt	bled. "Removal and Installa-	
Replace CAUTIO Always I Erase se Turn the Start eng Perform s DTC "C119 'ES >> F	vacuum senso N: replace brake If-diagnosis re ignition switch ine. self-diagnosis <u>99" detected?</u>	or. Refer to <u>BR</u> booster beca sult for "ABS". OFF. for "ABS". actuator and e	<u>-35, "Removal</u> ause vacuum	and Installation". sensor cannot b	e disassemt		
Replace CAUTIO Always I Erase se Turn the Start eng Perform s DTC "C119 (ES >> F	vacuum senso N: replace brake If-diagnosis re ignition switch ine. self-diagnosis 99" detected? Replace ABS a ion".	or. Refer to <u>BR</u> booster beca sult for "ABS". OFF. for "ABS". actuator and e	<u>-35, "Removal</u> ause vacuum	and Installation". sensor cannot b	e disassemt		:
Replace CAUTIO Always I Erase se Turn the Start eng Perform s DTC "C119 (ES >> F	vacuum senso N: replace brake If-diagnosis re ignition switch ine. self-diagnosis 99" detected? Replace ABS a ion".	or. Refer to <u>BR</u> booster beca sult for "ABS". OFF. for "ABS". actuator and e	<u>-35, "Removal</u> ause vacuum	and Installation". sensor cannot b	e disassemt		
Replace CAUTIO Always I Erase se Turn the Start eng Perform s DTC "C119 YES >> F	vacuum senso N: replace brake If-diagnosis re ignition switch ine. self-diagnosis 99" detected? Replace ABS a ion".	or. Refer to <u>BR</u> booster beca sult for "ABS". OFF. for "ABS". actuator and e	<u>-35, "Removal</u> ause vacuum	and Installation". sensor cannot b	e disassemt		-
Replace CAUTIO Always I Erase se Turn the Start eng Perform s DTC "C119 YES >> F	vacuum senso N: replace brake If-diagnosis re ignition switch ine. self-diagnosis 99" detected? Replace ABS a ion".	or. Refer to <u>BR</u> booster beca sult for "ABS". OFF. for "ABS". actuator and e	<u>-35, "Removal</u> ause vacuum	and Installation". sensor cannot b	e disassemt		-

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C119A VACUUM SENSOR

< DTC/CIRCUIT DIAGNOSIS >

C119A VACUUM SENSOR

DTC Logic

INFOID:000000008133067

INFOID-00000008133068

[WITH VDC]

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C119A	VACUUM SEN VOLT	When a malfunction is detected in supply power volt- age of vacuum sensor.	 Harness or connector Vacuum sensor (brake booster) ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

()With CONSULT

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

Is DTC "C119A" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-116, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK VACUUM SENSOR POWER SUPPLY

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

Vacuun	n sensor		Voltage
Connector	Terminal		voltage
E38	3	Ground	0 V

4. Turn the ignition switch ON.

CAUTION: Nover start engine

Never start engine.

5. Check voltage between vacuum sensor harness connector and ground.

Vacuun	n sensor		Voltage
Connector	Terminal		voltage
E38	3	Ground	4.75 V – 5.25 V

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2.CHECK VACUUM SENSOR POWER SUPPLY CIRCUIT

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

BRC-116

C119A VACUUM SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

Vacuum	n sensor	ABS actuator	and electric unit (co		Continuity		
Connector	Terminal	Connecto	or Term	ninal	Continuity		
E38	3	E41	28	8	Existed		
. Check co	ntinuity betw	een vacuum s	sensor harness	connecto	r and groun	d.	
Vacuum	n sensor			-			
Connector	Terminal		Continuity				
E38	3	Ground	Not existed	_			
the inspecti	on result nor	mal?		-			
R NO >> R	efer to <u>BRC-</u> epair or repla	osis of ABS a <u>120, "Diagnos</u> ace error-dete SOR GROUN	sis Procedure". cted parts.	ctric unit ((control unit)	power supply and ground circuit.	
	gnition switc ntinuity betw		sensor harness	connecto	r and groun	d.	
<u> </u>	/acuum sensor						
Connector		erminal	—	Contin	uity		
E38		2	Ground	Eviet			
				Existe	ed		
		mal?		EXISIE	ed		
YES >> G NO >> R	O TO 4. epair or repla	mal? ace error-dete		EXISI	ed		
NO >> R CHECK TE Check vacu	O TO 4. epair or repla ERMINAL um sensor pi actuator and	ace error-dete n terminals fo	ected parts.	ose conne	ection with t	arness connector. ge or loose connection with har-	
YES >> G NO >> R •CHECK TE Check vacu Check ABS ness connect the inspecti	O TO 4. epair or repla ERMINAL um sensor pi actuator and ctor. on result nor	ace error-dete n terminals fo d electric unit mal?	ected parts. or damage or loo (control unit) p	ose conne in termina	ection with h als for dama	ge or loose connection with har-	
YES >> G NO >> R CHECK TE Check vacu Check ABS ness connec the inspecti YES >> R	O TO 4. epair or repla ERMINAL um sensor pl actuator and ctor. on result nor eplace ABS	ace error-dete n terminals fo d electric unit mal?	ected parts. or damage or loo (control unit) p	ose conne in termina	ection with h als for dama		
YES >> G NO >> R CHECK TE Check vacuu Check ABS ness connec the inspecti YES >> R	O TO 4. epair or repla ERMINAL um sensor pl actuator and ctor. on result nor eplace ABS on".	ace error-dete n terminals fo d electric unit mal?	ected parts. or damage or loo (control unit) p electric unit (co	ose conne in termina	ection with h als for dama	ge or loose connection with har-	
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YES >> G NO >> R •CHECK TE Check vacuu Check ABS ness connect the inspecti YES >> R	O TO 4. epair or repla ERMINAL um sensor pl actuator and ctor. on result nor eplace ABS on".	ace error-dete n terminals fo d electric unit <u>mal?</u> actuator and	ected parts. or damage or loo (control unit) p electric unit (co	ose conne in termina	ection with h als for dama	ge or loose connection with har-	
YES >> G NO >> R •CHECK TE Check vacuu Check ABS ness connect the inspecti YES >> R	O TO 4. epair or repla ERMINAL um sensor pl actuator and ctor. on result nor eplace ABS on".	ace error-dete n terminals fo d electric unit <u>mal?</u> actuator and	ected parts. or damage or loo (control unit) p electric unit (co	ose conne in termina	ection with h als for dama	ge or loose connection with har-	
YES >> G NO >> R •CHECK TE Check vacu Check ABS ness connec the inspecti YES >> R tic	O TO 4. epair or repla ERMINAL um sensor pl actuator and ctor. on result nor eplace ABS on".	ace error-dete n terminals fo d electric unit <u>mal?</u> actuator and	ected parts. or damage or loo (control unit) p electric unit (co	ose conne in termina	ection with h als for dama	ge or loose connection with har-	
YES >> G NO >> R •CHECK TE Check vacu Check ABS ness connec the inspecti YES >> R tic	O TO 4. epair or repla ERMINAL um sensor pl actuator and ctor. on result nor eplace ABS on".	ace error-dete n terminals fo d electric unit <u>mal?</u> actuator and	ected parts. or damage or loo (control unit) p electric unit (co	ose conne in termina	ection with h als for dama	ge or loose connection with har-	
YES >> G NO >> R CHECK TE Check vacu Check ABS ness connec the inspecti YES >> R	O TO 4. epair or repla ERMINAL um sensor pl actuator and ctor. on result nor eplace ABS on".	ace error-dete n terminals fo d electric unit <u>mal?</u> actuator and	ected parts. or damage or loo (control unit) p electric unit (co	ose conne in termina	ection with h als for dama	ge or loose connection with har-	
YES >> G NO >> R CHECK TE Check vacu Check ABS ness connect the inspecti YES >> R	O TO 4. epair or repla ERMINAL um sensor pl actuator and ctor. on result nor eplace ABS on".	ace error-dete n terminals fo d electric unit <u>mal?</u> actuator and	ected parts. or damage or loo (control unit) p electric unit (co	ose conne in termina	ection with h als for dama	ge or loose connection with har-	
YES >> G NO >> R •CHECK TE Check vacuu Check ABS ness connect the inspecti YES >> R	O TO 4. epair or repla ERMINAL um sensor pl actuator and ctor. on result nor eplace ABS on".	ace error-dete n terminals fo d electric unit <u>mal?</u> actuator and	ected parts. or damage or loo (control unit) p electric unit (co	ose conne in termina	ection with h als for dama	ge or loose connection with har-	
YES >> G NO >> R •CHECK TE Check vacuu Check ABS ness connect the inspecti YES >> R	O TO 4. epair or repla ERMINAL um sensor pl actuator and ctor. on result nor eplace ABS on".	ace error-dete n terminals fo d electric unit <u>mal?</u> actuator and	ected parts. or damage or loo (control unit) p electric unit (co	ose conne in termina	ection with h als for dama	ge or loose connection with har-	
YES >> G NO >> R •CHECK TE Check vacu Check ABS ness connect the inspecti YES >> R	O TO 4. epair or repla ERMINAL um sensor pl actuator and ctor. on result nor eplace ABS on".	ace error-dete n terminals fo d electric unit <u>mal?</u> actuator and	ected parts. or damage or loo (control unit) p electric unit (co	ose conne in termina	ection with h als for dama	ge or loose connection with har-	

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:000000008133070

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

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(B) With CONSULT

Turn the ignition switch OFF to ON.

2. Perform self-diagnosis for "ABS".

Is DTC "U1000" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-118, "Diagnosis Procedure"</u>.

NO >> INSPECTION ĔND

Diagnosis Procedure

INFOID:000000008133071

Proceed to LAN-27, "Trouble Diagnosis Flow Chart".

U0424 HVAC CAN CIRCUIT 1

< DTC/CIRCUIT DIAGNOSIS >

U0424 HVAC CAN CIRCUIT 1

Description

ADUS control unit reads status of signal that is transmitted from A/C auto AMP. to ADAS control unit.

DTC Logic

INFOID:000000008133073

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
U0424	HVAC CAN CIR 1	When signal that is transmitted from A/C auto AMP. is not the latest information	A/C auto AMP.
отс со	ONFIRMATION PROCE	DURE	
1.PRE	CONDITIONING		
		DURE" has been previously conducted, always re conducting the next test.	s turn the ignition switch OFF
	a least to seconds belo	re conducting the next test.	
`	>> GO TO 2.		
	CK DTC DETECTION		
	CONSULT n the ignition switch OFF t	0 ON	
2. Per	form self-diagnosis for "IC		
<u>s DTC -</u> YES	<u>'U1010" detected?</u> >> Proceed to diagnosis	procedure. Refer to BRC-119, "Diagnosis Proc	edure".
NO	>> INSPECTION END	· · · · · · · · · · · · · · · · · · ·	
Diagno	osis Procedure		INFOID:0000000813307
1.peri	FORM ADAS CONTROL	UNIT SELF-DIAGNOSIS	
	CONSULT	24.0"	
	self-diagnosis for "ICC/AI C "U1010" and "U0424" sir		
YES	>> Refer to DAS-52, "Dia	agnosis Procedure".	
NO	>> Replace A/C auto AM	P. Refer to <u>HAC-163, "Removal and Installation</u>	<u>)"</u> .

Ρ

INFOID:000000008133072

А

В

С

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:000000008133076

INFOID:00000008133075

1. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) IGNITION 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	ctric unit (control unit)		Voltage
Connector	Terminal		voltage
E41	34	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		Voltage
E41	34	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. Turn the ignition switch OFF.
- 2. Check 10 A fuse (#46).
- 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 ele	ectric unit (control unit)	IPDN	M E/R	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E41	34	E5	12	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
E41	34	Ground	Not existed

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to <u>PG-27, "Wiring Diagram - IGNITION</u> <u>POWER SUPPLY -"</u>.

NO >> Repair or replace error-detected parts.

 $\mathbf{3}$. Check abs motor and motor relay power supply

1. Turn the ignition switch OFF.

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

BRC-120

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC]

Connector	ectric unit (control unit)	1 —	Voltage	
E41	4	Ground	Battery voltage	
. Turn the igniti	-	Ground	Ballery Vollage	
CAUTION:				
Never start e Check voltage		ator and elec	tric unit (control unit) harness connector and ground	d.
ABS actuator and ele	ectric unit (control unit)) (altara	
Connector	Terminal	_	Voltage	
E41	4	Ground	Battery voltage	
the inspection r	esult normal?		·	
YES >> GO T				
NO >> GO T				
CHECK ABS M	IOTOR AND MOTO	OR RELAY PC	WER SUPPLY CIRCUIT	
	on switch OFF.			
	isible link (#N).	botwoon AR	S actuator and electric unit (control unit) harness co	nnoctor
	nd 50 A fusible link			mector
the inspection r		、		
YES >> Perfor	rm trouble diagnosi	s for battery p	ower supply. Refer to <u>PG-11, "Wiring Diagram - BA</u>	TTERY
	ER SUPPLY -"			
NO >> Repai	r or replace error-de	etected parts		
		•		
CHECK ACTU	ATOR RELAY, ABS	IN VALVE, AI	3S OUT VALVE, AND CUT VALVE POWER SUPPL	
CHECK ACTU Turn the igniti Check voltage	ATOR RELAY, ABS	IN VALVE, AI	tric unit (control unit) harness connector and ground	
CHECK ACTU Turn the igniti Check voltage	ATOR RELAY, ABS on switch OFF. between ABS actu	IN VALVE, AI		
CHECK ACTU Turn the igniti Check voltage	ATOR RELAY, ABS on switch OFF. between ABS actu	IN VALVE, AI	tric unit (control unit) harness connector and ground	
ABS actuator and ele Connector E41	ATOR RELAY, ABS on switch OFF. between ABS actu ctric unit (control unit) Terminal 3	IN VALVE, AI	tric unit (control unit) harness connector and ground	
ABS actuator and ele Connector E41 CAUTION:	ATOR RELAY, ABS on switch OFF. between ABS actu ctric unit (control unit) Terminal 3 on switch ON.	IN VALVE, AI	tric unit (control unit) harness connector and ground	
ABS actuator and ele Connector E41 Turn the igniti CAUTION: Never start e	ATOR RELAY, ABS on switch OFF. between ABS actu- ctric unit (control unit) Terminal 3 on switch ON. ngine.	IN VALVE, Al	tric unit (control unit) harness connector and ground Voltage Battery voltage	d.
ABS actuator and ele Connector E41 Turn the igniti Connector E41	ATOR RELAY, ABS on switch OFF. between ABS actu- ctric unit (control unit) Terminal 3 on switch ON. ngine.	IN VALVE, Al	tric unit (control unit) harness connector and ground	d.
ABS actuator and ele Connector E41 Turn the igniti Connector E41 CAUTION: Never start e Check voltage	ATOR RELAY, ABS on switch OFF. between ABS actu ctric unit (control unit) Terminal 3 on switch ON. ngine. between ABS actu	IN VALVE, Al	tric unit (control unit) harness connector and ground Voltage Battery voltage	d.
ABS actuator and ele Connector E41 Turn the igniti Connector E41 Turn the igniti CAUTION: Never start e Check voltage	ATOR RELAY, ABS on switch OFF. between ABS actu- ctric unit (control unit) Terminal 3 on switch ON. ngine. between ABS actu- ctric unit (control unit)	IN VALVE, Al	tric unit (control unit) harness connector and ground Voltage Battery voltage	d.
ABS actuator and ele Connector E41 Turn the igniti Connector E41 CAUTION: Never start e Check voltage	ATOR RELAY, ABS on switch OFF. between ABS actu- ctric unit (control unit) Terminal 3 on switch ON. ngine. between ABS actu- ctric unit (control unit) Terminal	IN VALVE, Al	tric unit (control unit) harness connector and ground Voltage Battery voltage tric unit (control unit) harness connector and ground Voltage	d.
ABS actuator and ele Connector E41 Turn the igniti Connector E41 Turn the igniti CAUTION: Never start e Check voltage ABS actuator and ele Connector E41	ATOR RELAY, ABS on switch OFF. between ABS actu- ctric unit (control unit) Terminal 3 on switch ON. ngine. between ABS actu- ctric unit (control unit) Terminal 3	IN VALVE, Al	tric unit (control unit) harness connector and ground Voltage Battery voltage tric unit (control unit) harness connector and ground	d.
ABS actuator and ele Connector E41 Turn the igniti Connector E41 Turn the igniti CAUTION: Never start e Check voltage ABS actuator and ele Connector E41 the inspection re	ATOR RELAY, ABS on switch OFF. between ABS actu- ctric unit (control unit) Terminal 3 on switch ON. ngine. between ABS actu- ctric unit (control unit) Terminal 3 esult normal?	IN VALVE, Al	tric unit (control unit) harness connector and ground Voltage Battery voltage tric unit (control unit) harness connector and ground Voltage	d.
ABS actuator and ele Connector E41 Turn the igniti Connector E41 Turn the igniti CAUTION: Never start e Check voltage ABS actuator and ele Connector E41 the inspection re YES >> GO T	ATOR RELAY, ABS on switch OFF. between ABS actu- ctric unit (control unit) Terminal 3 on switch ON. ngine. between ABS actu- ectric unit (control unit) Terminal 3 esult normal? O 6.	IN VALVE, Al	tric unit (control unit) harness connector and ground Voltage Battery voltage tric unit (control unit) harness connector and ground Voltage	d.
ABS actuator and ele Connector E41 Turn the igniti Connector E41 Turn the igniti CAUTION: Never start e Check voltage ABS actuator and ele Connector E41 the inspection re YES >> GO To	ATOR RELAY, ABS on switch OFF. between ABS actu- ctric unit (control unit) Terminal 3 on switch ON. ngine. between ABS actu- ctric unit (control unit) Terminal 3 esult normal? O 6. O 7.	IN VALVE, Al	Voltage Battery voltage tric unit (control unit) harness connector and ground Voltage Battery voltage Voltage Battery voltage Battery voltage	d.
ABS actuator and ele Connector E41 Turn the igniti CAUTION: Never start e Check voltage ABS actuator and ele Connector E41 Check voltage ABS actuator and ele Connector E41 Sthe inspection re YES >> GO TO NO >> GO TO	ATOR RELAY, ABS on switch OFF. between ABS actu- ctric unit (control unit) Terminal 3 on switch ON. ngine. between ABS actu- ctric unit (control unit) Terminal 3 esult normal? O 6. O 7.	IN VALVE, Al	tric unit (control unit) harness connector and ground Voltage Battery voltage tric unit (control unit) harness connector and ground Voltage	d.
ABS actuator and ele Connector E41 Turn the igniti Connector E41 Turn the igniti CAUTION: Never start e Check voltage ABS actuator and ele Connector E41 Sthe inspection re YES >> GO Te NO >> GO Te O.CHECK ACTU	ATOR RELAY, ABS on switch OFF. between ABS actu- ctric unit (control unit) Terminal 3 on switch ON. ngine. between ABS actu- ctric unit (control unit) Terminal 3 esult normal? O 6. O 7. ATOR RELAY, ABS	IN VALVE, Al	Voltage Battery voltage tric unit (control unit) harness connector and ground Voltage Battery voltage Voltage Battery voltage Battery voltage	d.
ABS actuator and ele Connector E41 Turn the igniti CAUTION: Never start e Check voltage ABS actuator and ele Connector E41 Check voltage ABS actuator and ele Connector E41 Sthe inspection re YES >> GO To O.CHECK ACTU UIT Turn the igniti Check 30 A fu	ATOR RELAY, ABS on switch OFF. between ABS actu- ctric unit (control unit) Terminal 3 on switch ON. ngine. between ABS actu- ctric unit (control unit) Terminal 3 esult normal? O 6. O 7. ATOR RELAY, ABS on switch OFF. isible link (#M).	IN VALVE, Al	Voltage Battery voltage tric unit (control unit) harness connector and ground Voltage Battery voltage Voltage Battery voltage Source Source Battery voltage Battery voltage	d. d.
ABS actuator and ele Connector E41 Turn the igniti CAUTION: Never start e Check voltage ABS actuator and ele Connector E41 Check voltage ABS actuator and ele Connector E41 Sthe inspection re YES >> GO To OCHECK ACTU UIT Turn the igniti Check 30 A fu Check continu	ATOR RELAY, ABS on switch OFF. between ABS actu- ctric unit (control unit) Terminal 3 on switch ON. ngine. between ABS actu- ctric unit (control unit) Terminal 3 esult normal? O 6. O 7. ATOR RELAY, ABS on switch OFF. isible link (#M).	IN VALVE, Al	Voltage Battery voltage tric unit (control unit) harness connector and ground Voltage Battery voltage Voltage Battery voltage Battery voltage	d. d.

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

- 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 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 ele	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
F41	1	Ground	Existed
L41	2	Ground	Existed

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8.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

NO >> Repair or replace error-detected parts.

[WITH VDC]

PARKING BRAKE SWITCH

	AGNOSIS >			[WITH VDC]
PARKING BRA	AKE SWITCH			
Component Fun	ction Check			INFOID:00000008133077
1.CHECK PARKING				
Check that brake wa Is the inspection resu		nation meter turns ON	OFF when parking brak	e is operated.
YES >> INSPEC				
NO >> Proceed	I to diagnosis proced	lure. Refer to <u>BRC-123</u>	3, "Diagnosis Procedure"	5
Diagnosis Proce	edure			INFOID:00000000813307
1.CHECK PARKING	G BRAKE SWITCH (CIRCUIT		
3. Disconnect com	ing brake switch har bination meter harne	ess connector.	onnector and combination	on meter harness con-
Parking	brake switch	Comb	ination meter	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E107	1	M53 ake switch harness co	26	Existed
Connector	rake switch Terminal	_	Continuity	
E107	1	Ground	Not existed	
is the inchaction reci				
2.CHECK PARKING Check parking brake Is the inspection resures YES >> GO TO 3 NO >> Replace 3.CHECK PARKING	or replace error-detect G BRAKE SWITCH e switch. Refer to <u>BR</u> <u>ult normal?</u> 3. e parking brake switc G BRAKE SWITCH S	<u>C-124. "Component Ir</u> h. Refer to <u>PB-6. "Ren</u> SIGNAL	nspection". Inoval and Installation".	
YES >> GO TO 2 NO >> Repair o 2.CHECK PARKING Check parking brake Is the inspection resu YES >> GO TO 3 NO >> Replace 3.CHECK PARKING With CONSULT 1. Connect parking 2. Connect combin 3. Select "ABS", "E switch signal.	or replace error-detect G BRAKE SWITCH e switch. Refer to <u>BR</u> <u>ult normal?</u> 3. • parking brake switc G BRAKE SWITCH S • brake switch harness DATA MONITOR" an	C-124. "Component Ir h. Refer to <u>PB-6. "Ren</u> SIGNAL ss connector. connector. d "PARK BRAKE SW		. Check parking brake
YES >> GO TO 2 NO >> Repair o 2.CHECK PARKING Check parking brake Is the inspection resu YES >> GO TO 3 NO >> Replace 3.CHECK PARKING With CONSULT 1. Connect parking 2. Connect combin 3. Select "ABS", "D switch signal.	or replace error-detect G BRAKE SWITCH e switch. Refer to <u>BR</u> <u>ult normal?</u> 3. e parking brake switc G BRAKE SWITCH S brake switch harness DATA MONITOR" an	C-124, "Component Ir h. Refer to <u>PB-6, "Ren</u> SIGNAL ss connector. connector.	noval and Installation".	Check parking brake
YES >> GO TO 2 NO >> Repair o 2.CHECK PARKING Check parking brake Is the inspection resu YES >> GO TO 3 NO >> Replace 3.CHECK PARKING With CONSULT 1. Connect parking 2. Connect combin 3. Select "ABS", "E switch signal.	or replace error-detect G BRAKE SWITCH e switch. Refer to <u>BR</u> ult normal? 3. e parking brake switc G BRAKE SWITCH S brake switch harness DATA MONITOR" an	C-124. "Component Ir h. Refer to <u>PB-6. "Ren</u> SIGNAL ss connector. connector. d "PARK BRAKE SW	noval and Installation".	. Check parking brake

PARKING BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace combination meter. Refer to MWI-79, "Removal and Installation".

5.CHECK TERMINAL

• 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.

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-142. "Removal and Installa-</u> tion".
- NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:000000008133079

[WITH VDC]

1. CHECK PARKING BRAKE SWITCH

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

Parking brake switch		Condition	Continuity
Terminal		Condition	Continuity
1	Ground	When parking brake switch is pressed	Existed
		When parking brake switch is released	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace parking brake switch. Refer to <u>PB-6, "Removal and Installation"</u>.

VDC OFF SWITCH

< DTC/CIRCU	IT DIAGNO	DSIS >	120		[WITH VDC]
VDC OFF	SWITCH				
Component	Functior	n Check			INFOID:00000008133080
1.CHECK VD	C OFF SWI	ITCH OPER	ATION		
Check that VD	C OFF indic	cator lamp ir	n combinat	ion meter tui	rns ON/OFF when VDC OFF switch is operated.
Is the inspection					
-	SPECTION		redure Re	fer to BRC-1	25, "Diagnosis Procedure".
Diagnosis P					INFOID:00000008133081
1.CHECK VD			JIT		
1. Turn the ig	nition switc	h OFF.	_		
2. Disconnec	t ABS actua	ator and ele		ontrol unit) h	arness connector.
		ch harness o een ABS ac		electric unit	(control unit) harness connector and triple switch
harness co		U			(control unit) namess connector and tiple switch
	d alactria				-
ABS actuator and (control		Triple	switch	Continuity	
Connector	Terminal	Connector	Terminal		_
E41	30	M183	3	Existed	_
5. Check con	tinuity betw	een ABS ac	ctuator and	electric unit	(control unit) harness connector and ground.
ABS actuator and	d electric unit ((con-			-
	d electric unit (l unit)		_	Continuity	
Connector	Termina	ıl		-	_
E41	30	Gr	ound	Not existed	_
Is the inspectio		mal?			
	D TO 2. epair or repla	ace error-de	etected par	ts.	
2.CHECK VD					
Check continui					d ground.
	· · · · ·				_
Triple	e switch			Continuity	-
Connector	Termina	ıl		Containing	_
M183	5		ound	Existed	-
Is the inspectio		<u>rmal?</u>			
	D TO 3. epair or repla	ace error-de	etected par	ts.	
3.CHECK VD			·		
Check VDC OF	FF switch. F	Refer to BRO	C-126, "Co	mponent Ins	pection".
Is the inspectio					
	D TO 4.				
4	•			<u> 3RC-146, "R</u>	temoval and Installation".
4.CHECK VD	C OFF SW	ITCH SIGN/	4L		
With CONSU		r opd ole -+'	0.0014 /		and connector
		r and electri harness cor		uorunit) nari	ness connector.

Connect triple switch harness connector.
 Select "ABS", "DATA MONITOR" and "OFF SW" according to this order. Check VDC OFF switch signal.

VDC OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

INFOID:000000008133082

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 5.

5.CHECK TERMINAL

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

• Check triple switch 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-142, "Removal and Installa-</u> tion".

NO >> Repair or replace error-detected parts.

Component Inspection

1.CHECK VDC OFF SWITCH

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

Triple switch	Condition	Continuity
Terminal	Condition	Continuity
3-5	When VDC OFF switch is pressed	Existed
5-5	When VDC OFF switch is not pressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VDC OFF switch. Refer to <u>BRC-146, "Removal and Installation"</u>.

ABS WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >	[WITH VDC]
ABS WARNING LAMP	
Component Function Check	INFOID:00000008133083
1. CHECK ABS WARNING LAMP FUNCTION	
Check that ABS warning lamp turns ON for approx. 1 second after ignition switch is turne CAUTION: Never start engine.	d ON.
<u>Is the inspection result normal?</u> YES >> INSPECTION END	
NO >> Proceed to diagnosis procedure. Refer to <u>BRC-127, "Diagnosis Procedure"</u> .	
Diagnosis Procedure	INFOID:00000008133084
$1.\mbox{check}$ abs actuator and electric unit (control unit) power supply cuit	AND GROUND CIR-
Perform diagnosis of ABS actuator and electric unit (control unit) power supply and gro BRC-120, "Diagnosis Procedure".	ound circuit. Refer to
<u>Is the inspection result normal?</u> 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-52, "DTC Index"</u> . NO >> GO TO 3.	
3. CHECK ABS WARNING LAMP SIGNAL	
 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 t changes to "Off". 	turned ON, and then
CAUTION: Never start engine.	
Is the inspection result normal?	
YES >> Check combination meter. Refer to <u>MWI-31, "CONSULT Function"</u> . NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-142, "R</u> tion".	emoval and Installa-

Ρ

< DTC/CIRCUIT DIAGNOSIS >

BRAKE WARNING LAMP

Component Function Check

1.CHECK BRAKE WARNING LAMP FUNCTION (1)

Check that brake warning lamp 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-128. "Diagnosis Procedure"</u>.

2.CHECK BRAKE WARNING LAMP FUNCTION (2)

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

NOTE:

Brake warning lamp turns ON when parking brake is operated (when parking brake switch is ON). <u>Is the inspection result normal?</u>

YES >> GO TO 3.

NO >> Check brake fluid level switch system. Refer to <u>BRC-123</u>, "Diagnosis Procedure".

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-103</u>, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:000000008133086

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

Perform diagnosis of ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to <u>BRC-120, "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-52, "DTC Index"</u>.

NO >> GO TO 3.

3.CHECK THAT BRAKE WARNING LAMP TURNS ON

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-142, "Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-79, "Removal and Installation"</u>.

VDC WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >	[WITH VDC]	
VDC WARNING LAMP		Δ
Component Function Check	INFOID:000000008133087	A
1. CHECK VDC WARNING LAMP FUNCTION		В
Check that VDC warning lamp turns ON for approx. 1 second after ignition switch is turned OI CAUTION:	٧.	
Never start engine.		С
<u>Is the inspection result normal?</u> YES >> INSPECTION END		
NO >> Proceed to diagnosis procedure. Refer to <u>BRC-129, "Diagnosis Procedure"</u> .		D
Diagnosis Procedure	INFOID:000000008133088	
1. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY AND CUIT	GROUND CIR-	E
Perform diagnosis of ABS actuator and electric unit (control unit) power supply and ground BRC-120, "Diagnosis Procedure".	circuit. Refer to	BR
Is the inspection result normal?		
YES >> GO TO 2. NO >> Repair or replace error-detected parts.		G
2.PERFORM THE SELF-DIAGNOSIS		
(a)With CONSULT		Н
Perform self-diagnosis for "ABS".		
Is any DTC detected? YES >> Check the DTC. Refer to <u>BRC-52, "DTC Index"</u> .		I
NO $>>$ GO TO 3.		
3. CHECK VDC WARNING LAMP SIGNAL		J
 Select "ABS", "DATA MONITOR" and "SLIP/VDC LAMP" according to this order. Turn the ignition switch OFF. 		IZ.
3. Check that data monitor displays "On" for approx. 1 second after ignition switch is turne	d ON, and then	K
changes to "Off". CAUTION:		
Never start engine.		L
Is the inspection result normal?		
 YES >> Check combination meter. Refer to <u>MWI-31, "CONSULT Function"</u>. NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-142, "Remo</u> <u>tion"</u>. 	val and Installa-	M
		Ν
		1.4
		~
		0

< DTC/CIRCUIT DIAGNOSIS >

VDC OFF INDICATOR LAMP

Component Function Check

1.CHECK VDC OFF INDICATOR LAMP FUNCTION (1)

Check that VDC OFF indicator lamp 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-130, "Diagnosis Procedure"</u>.

2. CHECK VDC WARNING LAMP FUNCTION (2)

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Check VDC OFF switch system. Refer to <u>BRC-125, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000008133090

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

Perform diagnosis of ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to <u>BRC-120, "Diagnosis Procedure"</u>.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK VDC OFF INDICATOR LAMP SIGNAL (1)

()With CONSULT

- T. Select "ABS", "DATA MONITOR" and "OFF LAMP" according to this order.
- 2. Turn the ignition switch OFF.
- 3. Check that data monitor displays "On" for 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 3.
- NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-142, "Removal and Installa-</u> tion".

3.CHECK VDC OFF INDICATOR LAMP SIGNAL (2)

With CONSULT

- 1. Select "ABS", "DATA MONITOR" and "OFF LAMP" according to this order.
- 2. Check that data monitor displays "On" or "Off" each time when VDC OFF switch is operated.

Is the inspection result normal?

- YES >> Check combination meter. Refer to <u>MWI-31, "CONSULT Function"</u>.
- NO >> Check VDC OFF switch system. Refer to <u>BRC-125, "Diagnosis Procedure"</u>.

[WITH VDC]

< SYMPTOM DIAGNOSIS > SYMPTOM DIAGNOSIS **EXCESSIVE OPERATION FREQUENCY**

Description	В
VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function or Brake force distribution function operates in excessive operation frequency.	
Diagnosis Procedure	С
1.CHECK BRAKING FORCE	D
Check brake force using a brake tester.	
<u>Is the inspection result normal?</u> YES >> GO TO 2.	Е
NO >> Check brake system.	
2.CHECK FRONT AND REAR AXLE Check that there is no excessive looseness in front and rear axle.	BRC
Front axle	
 2WD: Refer to <u>FAX-7, "Inspection"</u>. AWD: Refer to <u>FAX-16, "Inspection"</u>. 	G
 Rear axle: Refer to <u>RAX-6. "Inspection"</u>. Is the inspection result normal? 	
YES >> GO TO 3.	Н
NO >> Repair or replace error-detected parts. 3.CHECK WHEEL SENSOR	
Check wheel sensor.	I
 Check installation and damage of wheel sensor. Check connection of wheel sensor harness connector. Check terminal of wheel sensor harness connector. 	J
Is the inspection result normal?	
YES >> GO TO 4. NO >> Repair installation or replace wheel sensor.	К
 Front wheel sensor: Refer to <u>BRC-138, "FRONT WHEEL SENSOR : Removal and Installation"</u>. Rear wheel sensor: Refer to <u>BRC-139, "REAR WHEEL SENSOR : Removal and Installation"</u>. 	
4. CHECK SENSOR ROTOR	L
Check that there is no looseness, damage or foreign material on sensor rotor.	
<u>Is the inspection result normal?</u> YES >> GO TO 5.	Μ
NO >> Repair installation or replace sensor rotor.	
 Front sensor rotor: Refer to <u>BRC-141, "FRONT SENSOR ROTOR : Removal and Installation"</u> Rear sensor rotor: Refer to <u>BRC-141, "REAR SENSOR ROTOR : Removal and Installation"</u> 	Ν
5. CHECK WARNING LAMP TURNS OFF	
Check that ABS warning lamp, brake warning lamp and VDC warning lamp turn OFF approx. 1 second after key switch is turned ON and stay in OFF status during driving. CAUTION:	0
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).	Ρ

Is the inspection result normal?

YES >> Normal

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

А

UNEXPECTED BRAKE PEDAL REACTION

< SYMPTOM DIAGNOSIS >

UNEXPECTED BRAKE PEDAL REACTION

Description

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

Diagnosis Procedure

1.CHECK FRONT AND REAR AXLE

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

- Front axle
- 2WD: Refer to FAX-7, "Inspection".
- AWD: Refer to FAX-16, "Inspection".
- Rear axle: Refer to RAX-6, "Inspection".

Is the inspection result normal?

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

2.CHECK DISC ROTOR

Check disc rotor runout.

- Front: Refer to BR-14, "DISC ROTOR : Inspection and Adjustment".
- Rear: Refer to BR-16, "DISC ROTOR : Inspection and Adjustment".

Is the inspection result normal?

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

3.CHECK BRAKE FLUID LEAKAGE

Check fluid leakage.

- Front: Refer to <u>BR-26, "FRONT : Inspection"</u>.
 Rear: Refer to <u>BR-31, "REAR : Inspection"</u>.
- Is the inspection result normal?
- YES >> GO TO 4.
- NO >> Repair or replace error-detected parts.

4.CHECK BRAKE PEDAL

Check each item of brake pedal. Refer to BR-7, "Inspection 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

Check brake force using a brake tester.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Check each components of brake system.

6.CHECK BRAKE PERFORMANCE

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

Is the inspection result normal?

- YES >> Normal
- >> Check each components of brake system. NO

INFOID:000000008133093

THE BRAKING DISTANCE IS LONG

SYMPTOM DIAGNOSIS >	[WITH VDC]
HE BRAKING DISTANCE IS LONG	
escription	INFOID:00000008133095
rake stopping distance is long when ABS function is operated.	
iagnosis Procedure	INFOID:00000008133096
AUTION: rake stopping distance on slippery road like rough road, gravel road or onger when ABS is operated than when ABS is not operated. .CHECK BRAKING FORCE	snowy road may become
heck brake force using a brake tester. <u>the inspection result normal?</u> YES >> GO TO 2. NO >> Check each components of brake system. .CHECK BRAKE PERFORMANCE	
isconnect ABS actuator and electric unit (control unit) connector so that ABS doe	es not operate. Check brake
opping distance in this condition. Connect harness connectors after checking. the inspection result normal?	
YES >> Normal NO >> Check each components of brake system.	

< SYMPTOM DIAGNOSIS >

DOES NOT OPERATE

Description

VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function or Brake force distribution function does not operate.

Diagnosis Procedure

INFOID:000000008133098

CAUTION:

- VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Buildup function and Brake force distribution function never operate when the vehicle speed is 10 km/h (6.2 MPH) or less. However, hill start assist function operates when the vehicle speed is 0 km/h (0 MPH) (the vehicle is in stop status).
- VDC function and TCS function never operate when VDC OFF switch is operated (when VDC OFF indicator lamp turns ON).
- **1.**CHECK ABS WARNING LAMP

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

CAUTION:

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

Is the inspection result normal?

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

BRAKE PEDAL VIBRATION OR OPERATION SOUND OCCURS

< SYMPTOM DIAGNOSIS > [WITH VDC] 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

1.SYMPTOM CHECK 1
 BRC

 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-19</u>, "Inspection and Adjustment".

2.SYMPTOM CHECK 2

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

Does the operation sound occur?

YES >> GO TO 3.

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

3.SYMPTOM CHECK 3

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

Does the symptom occur?

YES >> Check that radio (including wiring), antenna and antenna lead-in wires are not located near ABS actuator and electric unit (control unit). Move them if they are located near ABS actuator and electric unit (control unit).

NO >> Normal

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VEHICLE JERKS DURING

< SYMPTOM DIAGNOSIS >

VEHICLE JERKS DURING

Description

The vehicle jerks when VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function or Brake force distribution function operates.

Diagnosis Procedure

INFOID:000000008133102

1.CHECK SYMPTOM

Check that the vehicle jerks when VDC function, TCS function, ABS function, EBD function, hill start assist function, Rise-up & Build-up function or Brake force distribution function operates.

Is the inspection result normal?

YES >> Normal NO >> GO TO 2.

2. PERFORM THE SELF-DIAGNOSIS

With CONSULT

Perform self-diagnosis for "ABS".

Is any DTC detected?

YES >> Check the DTC. Refer to <u>BRC-52, "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".

Is any DTC detected?

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

< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

Description

INFOID:000000008133103

[WITH VDC]

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

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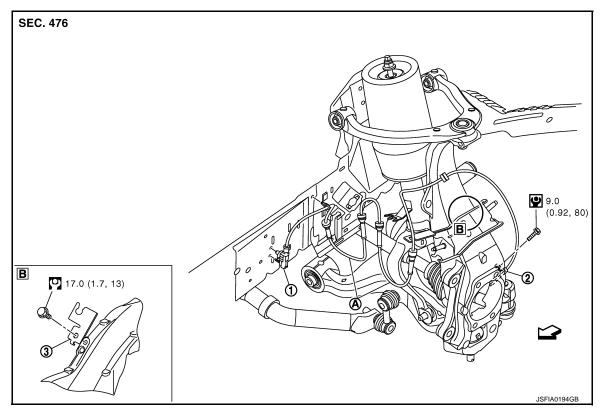
А

< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION WHEEL SENSOR FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

INFOID:000000008133104



- 1. Front LH wheel sensor harness con 2. Front LH wheel sensor
 3. Bracket

 nector
 3.
- A: Identification line

<☐: Vehicle front

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

NOTE:

Front RH wheel sensor is symmetrically opposite of LH.

FRONT WHEEL SENSOR : Removal and Installation

REMOVAL

- 1. Remove tires with power tool.
- 2. Remove the fender protector (front). Refer to <u>EXT-24</u>, "FENDER PROTECTOR : Removal and Installation".
- 3. Remove front wheel sensor from steering knuckle. CAUTION:

Never rotate and never pull front wheel sensor as much as possible, when pulling out.

 Remove front wheel sensor harness from the vehicle.
 CAUTION: Never twist or pull front wheel sensor harness, when removing.

INSTALLATION

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

BRC-138

[WITH VDC]

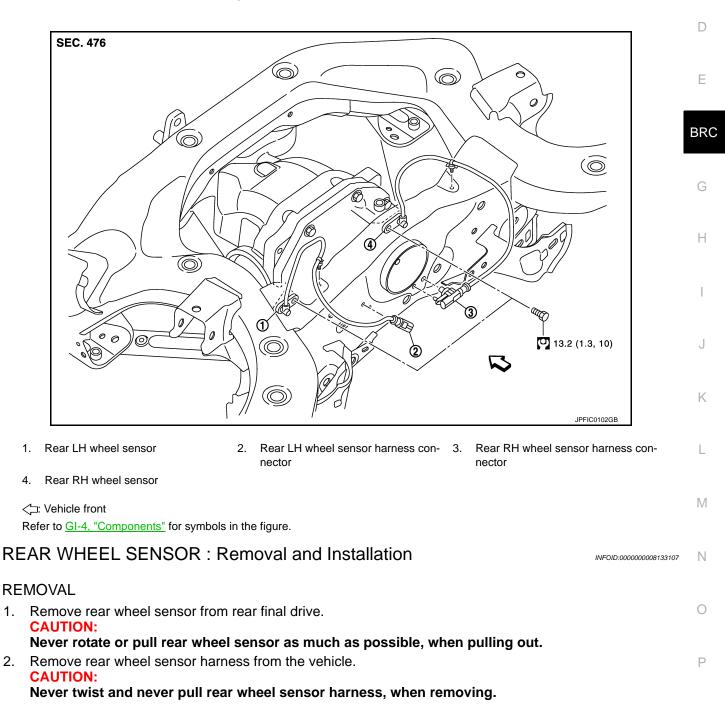
WHEEL SENSOR

< REMOVAL AND INSTALLATION >

- · Check that there is no foreign material like iron powder or damage on inner surface of front wheel sensor mounting hole of steering knuckle and sensor rotor. Install after cleaning when there are foreign material like iron powder, or replace when there is a malfunction.
- 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. CAUTION:

Check that front wheel sensor identification line faces toward the vehicle front. REAR WHEEL SENSOR

REAR WHEEL SENSOR : Exploded View



INSTALLATION

2.

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

 Check that there is no foreign material like iron powder or damage on inner surface of rear wheel sensor mounting hole of rear final drive and sensor rotor. Install after cleaning when there are foreign material like iron powder, or replace when there is a malfunction.

BRC-139

INFOID:000000008133106

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< REMOVAL AND INSTALLATION >

• 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 VD	C]
SENSOR ROTOR	
FRONT SENSOR ROTOR	
FRONT SENSOR ROTOR : Removal and Installation	33108
REMOVAL	
Replace wheel hub as an assembly when replacing because sensor rotor cannot be disassembled. Refer <u>FAX-8, "Removal and Installation"</u> (2WD models), <u>FAX-18, "Removal and Installation"</u> (AWD models).	to
INSTALLATION	
Replace wheel hub as an assembly when replacing because sensor rotor cannot be disassembled. Refer <u>FAX-8, "Removal and Installation"</u> (2WD models), <u>FAX-18, "Removal and Installation"</u> (AWD models). REAR SENSOR ROTOR	to
REAR SENSOR ROTOR : Removal and Installation	33109
REMOVAL	
1. Remove drive shaft. Refer to RAX-13, "Removal and Installation".	
2. Remove sensor rotor from rear drive shaft. Refer to <u>RAX-17</u> , "FINAL DRIVE SIDE : Disassembly a <u>Assembly</u> ".	<u>nd</u>
INSTALLATION	
Installation is the reverse order of removal.	

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ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

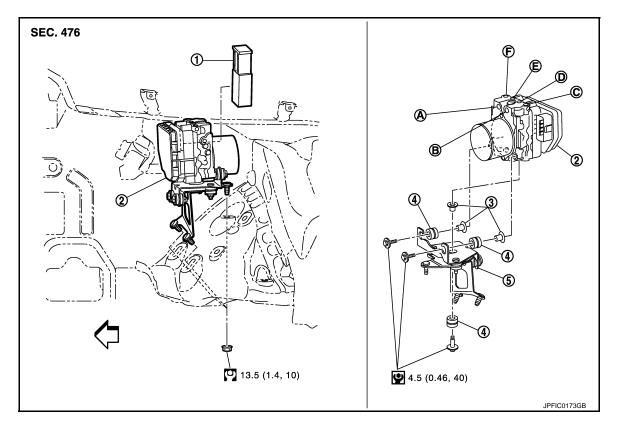
< REMOVAL AND INSTALLATION >

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:000000008133110

[WITH VDC]



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

- 4. Bushing
- A: To master cylinder secondary side
- D: To rear RH caliper
- <: : Vehicle front

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

Removal and Installation

REMOVAL

- 1. Disconnect battery cable from negative terminal.
- 2. Remove brake master cylinder cover and hood ledge cover. Refer to EXT-21, "Removal and Installation".
- 3. Drain brake fluid. Refer to <u>BR-10, "Draining"</u>.
- 4. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 5. Loosen flare nut of brake tube using a flare nut wrench, and then remove brake tube from ABS actuator and electric unit (control unit). Refer to BR-20, "FRONT : Exploded View".
- 6. Remove front RH tire with power tool.
- 7. Remove fender protector (rear) (front RH wheel). Refer to EXT-24, "FENDER PROTECTOR : Removal and Installation".
- 8. Remove ABS actuator and electric unit (control unit) and bracket. CAUTION:
 - Never remove and never install ABS actuator and electric unit (control unit) by holding harness connector.
 - Be careful not to drop ABS actuator and electric unit (control unit) and apply excessive impact to it.

BRC-142

- 2. ABS actuator and electric unit (control unit)
- Bracket 5.

E. To rear LH caliper

- B: To master cylinder primary side
- C: To front LH caliper

Collar

F. To front RH caliper

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< REMOVAL AND INSTALLATION >

[WITH VDC]

9. Remove bracket, bushing and collar from ABS actuator and electric unit (control unit).

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-20, "FRONT : Exploded View"</u>.
- Never remove and install actuator by holding actuator harness.
- Bleed air from brake piping after installation. Refer to <u>BR-11, "Bleeding Brake System"</u>.
- Never apply excessive impact to actuator, such as by dropping it.
- Check that connector is fully locked after ABS actuator and electric unit (control unit) harness connector is installed.
- Perform decel G sensor calibration when ABS actuator and electric unit (control unit) is replaced. Refer to <u>BRC-62, "Work Procedure"</u>.

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YAW RATE/SIDE/DECEL G SENSOR

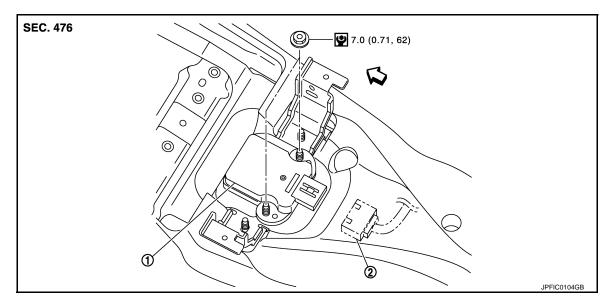
< REMOVAL AND INSTALLATION >

YAW RATE/SIDE/DECEL G SENSOR

Exploded View

INFOID:000000008133112

[WITH VDC]



1. Yaw rate/side/decel G sensor

2. Yaw rate/side/decel G sensor harness connector

∠: Vehicle front

Refer to <u>GI-4, "Components"</u> for symbols in the figure.

Removal and Installation

INFOID:000000008133113

REMOVAL

CAUTION:

Never drop or strike yaw rate/side/decel G sensor, because it has little endurance to impact. Never use a pneumatic tool.

- 1. Remove center console. Refer to IP-24, "Removal and Installation".
- 2. Disconnect yaw rate/side/decel G sensor harness connector.
- 3. Remove yaw rate/side/decel G sensor.

INSTALLATION

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

- Never drop or strike yaw rate/transverse/decel G sensor, because it has little endurance to impact. Never use a power tool.
- Perform decel G sensor calibration when yaw rate/side/decel G sensor is replaced. Refer to <u>BRC-62</u>, "Work <u>Procedure"</u>.

STEERING ANGLE SENSOR

< REMOVAL AND INSTALLATION > STEERING ANGLE SENSOR **Removal and Installation** INFOID:000000008133114 REMOVAL

Remove spiral cable assembly. Refer to SR-14, "Removal and Installation". 1.

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 removed and D installed, or replaced.
- Without 4WAS: Refer to BRC-60, "Work Procedure".
- With 4WAS: Refer to STC-74, "Work Procedure (Pattern 3)".

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< REMOVAL AND INSTALLATION >

VDC OFF SWITCH

Removal and Installation

NOTE:

This is an integrated switch with switches for other functions.

REMOVAL

- 1. Remove lower instrument panel LH. Refer to IP-13, "Removal and Installation".
- 2. Remove switch panel. Refer to IP-13, "Removal and Installation".
- 3. Remove VDC OFF switch.

INSTALLATION

Installation is the reverse order of removal.

< PRECAUTION > PRECAUTION PRECAUTIONS

Precautions for Preview Function Service

INFOID:000000008133116 B

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.

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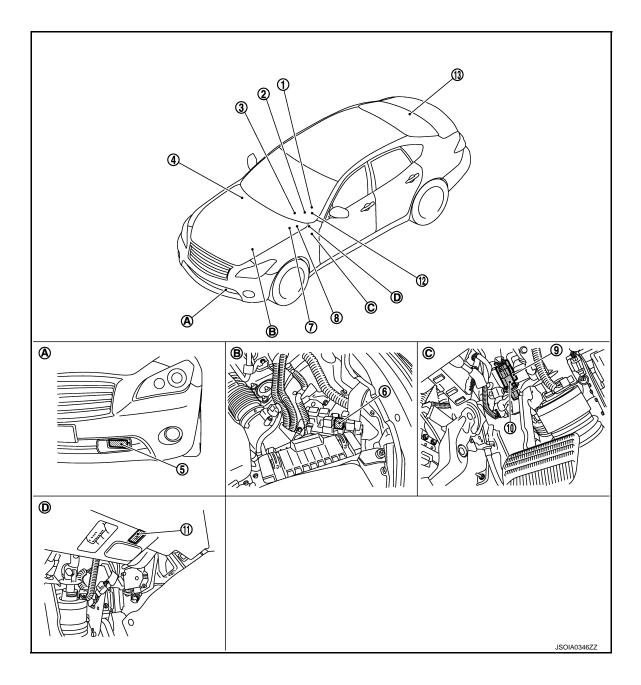
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COMPONENT PARTS [BRAKE ASSIST (WITH PREVIEW FUNCTION)]

SYSTEM DESCRIPTION COMPONENT PARTS

Component Parts Location



< SYSTEM DESCRIPTION >

COMPONENT PARTS [BRAKE ASSIST (WITH PREVIEW FUNCTION)]

1.	ICC steering switch	2.	Information display, ICC system warning lamp, IBA OFF indicator	3.	BCM Refer to BCS-4, "BODY CONTROL	A
			lamp, buzzer (On the combination meter)		SYSTEM : Component Parts Loca- tion"	
4.	ECM	5.	ICC sensor	6.	ICC brake hold relay	В
	Refer to the following					
	VQ37VHR: <u>EC-37, "ENGINE</u>					
	CONTROL SYSTEM : Component Parts Location"					С
	VK56VD (USA and Canada): EC-					
	948, "ENGINE CONTROL SYS-					
	TEM : Component Parts Location"					D
	 VK56VD (Mexico): <u>EC-1519</u>, "EN- GINE CONTROL SYSTEM : Com- 					
	ponent Parts Location"					
7.	ABS actuator and electric unit (con-	8.	ТСМ	9.	Stop lamp switch	E
	trol unit)		Refer to TM-11, "A/T CONTROL			
	Refer to <u>BRC-10, "Component Parts</u> Location"		SYSTEM : Component Parts Loca- tion"			
10	ICC brake switch	44	IBA OFF switch	10		BRC
10.	ICC brake switch	11.	IBA OFF Switch	12.	Steering angle sensor Refer to <u>BRC-10, "Component Parts</u>	
					Location"	
13.	ADAS control unit					G
	Refer to DAS-14, "Component Parts					
	Location"					
Α.	Front bumper (LH)	В.	Engine room (LH)	C.	Upper side of brake pedal	Н
D.	Instrument lower panel (LH)					
Com	a an ant Departmetian					

Component Description

×: Applicable	e

		Fun	ction				
Component	Vehicle-to-vehicle distance control mode	Conventional (fixed speed) cruise control mode	Intelligent Brake Assist (IBA)	Brake Assist (with preview function)	Description	K L M	
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 	O P	
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 		

< SYSTEM DESCRIPTION >

COMPONENT PARTS [BRAKE ASSIST (WITH PREVIEW FUNCTION)]

		Fun	ction				
Component	Vehicle-to-vehicle distance control mode	Conventional (fixed speed) cruise control mode	Intelligent Brake Assist (IBA)	Brake Assist (with preview function)	Description		
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	×				Transmits the front wiper request signal to ADAS control unit via CAN communication		
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 between 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 depressing the brake nedal		
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		

COMPONENT PARTS [BRAKE ASSIST (WITH PREVIEW FUNCTION)]

Description

Function (fixed speed) cruise control mode vehicle distance control mode ssist (with preview function) igent Brake Assist (IBA)

	Vehicle-to-	Conventional	Intell	Brake A		E
IBA OFF switch			× ^{Note}		IBA OFF switch signal is input to the ADAS control unit	BRC
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	G

NOTE: Only IBA system uses

< SYSTEM DESCRIPTION >

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SYSTEM

BRAKE ASSIST (WITH PREVIEW FUNCTION)

BRAKE ASSIST (WITH PREVIEW FUNCTION) : System Description

INFOID:000000008133119

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.

NOTÉ:

This system will not operate when the vehicle is moving at approximately 32 km/h (20 MPH) or less.

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.

<pre>BRAKE ASSIST (WITH PREVIEW FUNCTION) < DTC/CIRCUIT DIAGNOSIS > [BRAKE ASSIST (WITH PREVIEW FUNCTION)]</pre>	
DTC/CIRCUIT DIAGNOSIS	٨
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. NOTE:	С
The preview function warning lamp shares the ICC system warning lamp.	D
>> Go to ICC. Refer to <u>CCS-63, "Work Flow"</u> .	Е
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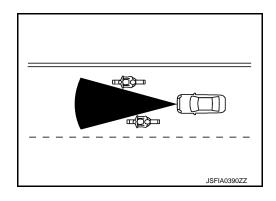
SYMPTOM DIAGNOSIS NORMAL OPERATING CONDITION

Description

INFOID:000000008133121

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



< PRECAUTION > PRECAUTION PRECAUTIONS

Precautions for IBA System Service

INFOID:000000008133122

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.

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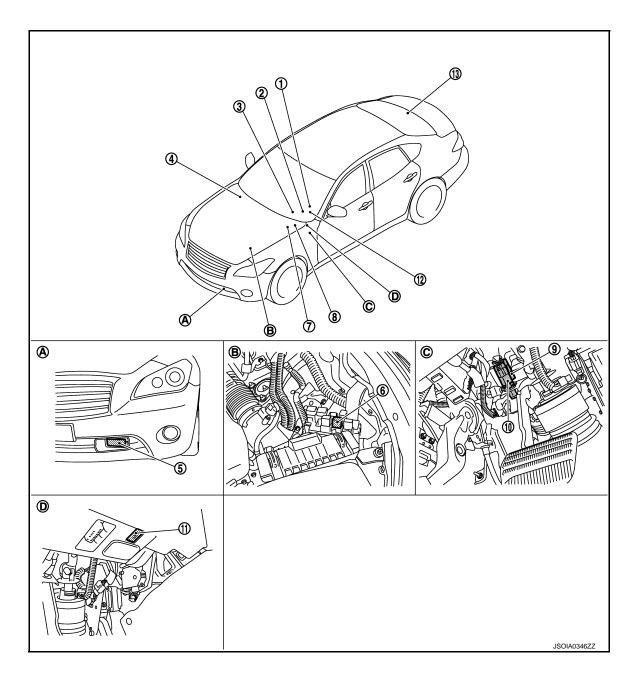
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< SYSTEM DESCRIPTION > SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location



COMPONENT PARTS

< SYSTEM DESCRIPTION >

[INTELLIGENT BRAKE ASSIST]

1.	ICC steering switch	2.	Information display, ICC system warning lamp, IBA OFF indicator lamp, buzzer (On the combination meter)	3.	BCM Refer to <u>BCS-4, "BODY CONTROL</u> <u>SYSTEM : Component Parts Loca-</u> tion <u>"</u>	A
4.	ECM	5.	ICC sensor	6.	ICC brake hold relay	В
	Refer to the following					
	VQ37VHR: <u>EC-37, "ENGINE</u>					
	CONTROL SYSTEM: Component Parts Location"					С
	VK56VD (USA and Canada): EC-					
	948, "ENGINE CONTROL SYS-					
	 <u>TEM : Component Parts Location</u>" VK56VD (Mexico): <u>EC-1519</u>, "EN- 					D
	GINE CONTROL SYSTEM : Com-					
	ponent Parts Location"					
7.	ABS actuator and electric unit (con-	8.	ТСМ	9.	Stop lamp switch	E
	trol unit)		Refer to TM-11, "A/T CONTROL			
	Refer to <u>BRC-10, "Component Parts</u> Location"		SYSTEM : Component Parts Loca- tion"			
10.	ICC brake switch	11.		12.	Steering angle sensor	BRC
					Refer to <u>BRC-10, "Component Parts</u>	
					Location"	
13.	ADAS control unit					G
	Refer to DAS-14, "Component Parts					
•	Location"	-		0		
Α.	Front bumper (LH)	В.	Engine room (LH)	C.	Upper side of brake pedal	Н
D.	Instrument lower panel (LH)					
Com	against Description					

Component Description

×: Applica	ble

		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	J K L N	
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 	O P	
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 		

COMPONENT PARTS

< SYSTEM DESCRIPTION >

		Fun	oction				
Component	Vehicle-to-vehicle distance control mode	Conventional (fixed speed) cruise control mode	Intelligent Brake Assist (IBA)	Brake Assist (with preview function)	Description		
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	×				Transmits the front wiper request signal to ADAS control unit via CAN communication		
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 between 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 depressing the brake pedal ICC brake switch signal is input to ECM. These signals are transmitted from ECM to ADAS control unit via CAN communi- cation 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		

COMPONENT PARTS

< SYSTEM DESCRIPTION >

		Fur	nction				
	control mode	cruise control mode	ist (IBA)	<pre>xe Assist (with preview function)</pre>	Description	A	
Component	Vehicle-to-vehicle distance Conventional (fixed speed) cru	speed) cru	Brake Ass			С	
		nal (fixed	Intelligent Brake Assist (IBA)			D	
			Brake		E		
IBA OFF switch			× ^{Note}		IBA OFF switch signal is input to the ADAS control unit	BRC	
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	G	

NOTE: Only IBA system uses

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SYSTEM INTELLIGENT BRAKE ASSIST

INTELLIGENT BRAKE ASSIST : System Description

INFOID:000000008133125

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 lower panel.
- The IBA system will operate even when the ICC system is turned to OFF.

OPERATION DESCRIPTION

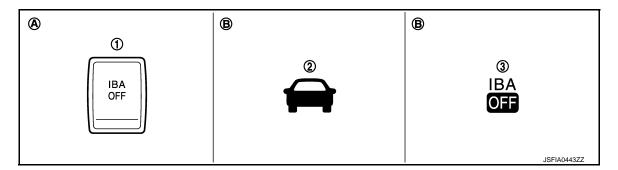
The IBA system uses a ICC sensor located below the front bumper to measure the distance to a vehicle ahead. When the system judges that the distance gets shorter, the vehicle ahead detection indicator on the combination meter blinks and the warning chime sounds.

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

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

A. Under side of instrument lower panel B. (LH)

Fail-safe Indication

SYSTEM

< SYSTEM DESCRIPTION >

[INTELLIGENT BRAKE ASSIST]

Condition	Description	Indication on the combination meter	А
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	В
			С
		JSFIA0392ZZ	

NOTE:

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

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DTC/CIRCUIT DIAGNOSIS INTELLIGENT BRAKE ASSIST

Diagnosis Procedure

INFOID:000000008133126

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-63, "Work Flow".

SYMPTOM DIAGNOSIS > [INTELLIGENT BRAKE ASSIST]

SWITCH DOES NOT TURN ON / SWITCH DOES NOT TURN OFF

Symptom Table

INFOID:000000008133127 B

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CAUTION:

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

Symptom		Inspection item/Reference page
IBA system does not turn on/off	IBA OFF indicator lamp is not turned ON⇔OFF when operating IBA OFF switch	BRC-163, "Diagnosis Procedure"
Description		INFOID:00000008133128
 IBA system does not turn on/off. IBA OFF indicator lamp does not illulamp is not illuminated. IBA OFF indicator lamp does not tulamp is illuminated. 		s depressed when IBA OFF indicator depressed when IBA OFF indicator
 To turn the system OFF⇔ON, push second. 	h and hold the IBA OFF switch afte	r starting the engine for more than 1
The system ON/OFF condition will	be memorized even if the ignition sw	vitch turns OFF.
Diagnosis Procedure		INFOID:00000008133129
1. PERFORM THE SELF-DIAGNOS	IS	
<u>"DTC Index"</u> .		S" with CONSULT. Refer to <u>DAS-40.</u>
Is any DTC detected? YES >> GO TO 6. NO >> GO TO 2. 2. IBA OFF SWITCH INSPECTION		
 Start the engine. Check that "IBA SW" operates not ls the inspection result normal? YES >> GO TO 3. NO >> GO TO 5. 	ormally in "DATA MONITOR" for "ICO	C/ADAS" with CONSULT.
3.CHECK IBA OFF INDICATOR CIF	RCUIT	
	ER LAMP" for "ICC/ADAS" with CON imp illuminates when the test item is	
Is the inspection result normal?YES>> Refer to CCS-63. "WorkNO>> GO TO 4.	Flow".	
4. CHECK DATA MONITOR OF COM	MBINATION METER	
		and Installation".

NO >> Replace the ADAS control unit. Refer to <u>DAS-55, "Removal and Installation"</u>.

BRC-163

SWITCH DOES NOT TURN ON / SWITCH DOES NOT TURN OFF

< SYMPTOM DIAGNOSIS >

[INTELLIGENT BRAKE ASSIST]

5. CHECK IBA OFF SWITCH

Check IBA OFF switch. Refer to CCS-123, "Component Inspection (IBA OFF Switch)".

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

6.REPAIR OR REPLACE MALFUNCTIONING PARTS

Repair or replace malfunctioning parts.

>> GO TO 7. **7.**CHECK IBA SYSTEM

Check that IBA OFF indicator lamp turned ON⇔OFF, when operating IBA OFF switch.

>> INSPECTION END

NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

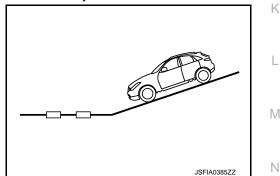
Description

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.
- As there is a performance limit, it may not provide
 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



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[INTELLIGENT BRAKE ASSIST]

REMOVAL AND INSTALLATION IBA OFF SWITCH

Removal and Installation

INFOID:000000008133131

REMOVAL

- 1. Remove instrument lower panel (LH). Refer to <u>IP-12, "Exploded View"</u>.
- 2. Disengage the pawl. Then remove IBA OFF switch.

INSTALLATION

Install in the reverse order of removal.