

SECTION BRC

BRAKE CONTROL SYSTEM

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WITH VDC (ESP)

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< HOW TO USE THIS MANUAL >

HOW TO USE THIS MANUAL

HOW TO USE THIS SECTION

Information

INFOID:000000010724304

- Both “VDC” and “ESP” are used in this manual. These indicate the same system.
- Both “hill start assist” and “Uphill start support” are used in this manual. These indicate the same system.
- Both “advanced hill descent control” and “downhill drive support” are used in this manual. These indicate the same system.
- Both “active trace control” and “dynamic cornering enhancement” are used in this manual. These indicate the same system.

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< PRECAUTION >

PRECAUTION

PRECAUTIONS

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

INFOID:0000000010723615

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

WARNING:

Always observe the following items for preventing accidental activation.

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

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

WARNING:

Always observe the following items for preventing accidental activation.

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

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000010723616

CAUTION:

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

- Before removing and installing any control units, first turn the ignition power source and accessory power source to the OFF, 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 procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.

NOTE:

Supply power using jumper cables if battery is discharged.

2. Open driver door.
3. Turn the ignition switch to the ON position.
(At this time, the steering lock will be released.)
4. Turn the ignition switch to OFF position with driver door open.
5. Wait for 3 minutes or longer with driver door open.

NOTE:

- Do not close driver door because the steering wheel locks when driver door is closed.

PRECAUTIONS

[WITH VDC (ESP)]

< PRECAUTION >

- The auto acc function is adapted to this vehicle. For this reason, even when the ignition switch is turned to OFF position, the accessory power source does not turn OFF and continues to be supplied for a certain amount of time.
- 6. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
- 7. Perform the necessary repair operation.
- 8. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the ignition switch from OFF position to ON position, then to LOCK position. (The steering wheel will lock when the ignition switch is turned to LOCK position.)
- 9. Perform self-diagnosis check of all control units using CONSULT.

Precautions for Removing Battery Terminal

INFOID:000000010735263

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.
- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing "How to disconnect 12V battery terminal" described below.

NOTE:

Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage may occur.

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

NOTE:

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

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

NOTE:

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

HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.

For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

1. Open the hood.
2. Turn key switch to the OFF position with the driver side door opened.
3. Get out of the vehicle and close the driver side door.
4. Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes
K9K engine	: 4 minutes
M9R engine	: 4 minutes
R9M engine	: 4 minutes
V9X engine	: 4 minutes

CAUTION:

While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

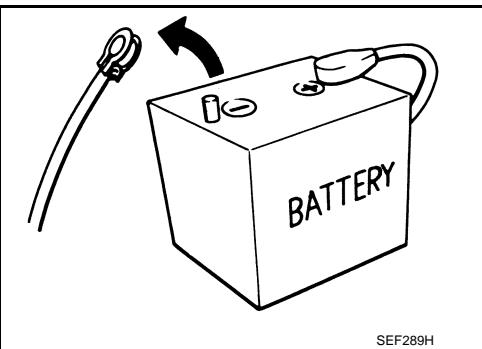
5. Remove 12V battery terminal.

CAUTION:

After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

1. Unlock the door with intelligent key or remote keyless entry.



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PRECAUTIONS

[WITH VDC (ESP)]

< PRECAUTION >

NOTE:

At this moment, ACC power is supplied.

2. Open the driver side door.
3. Open the hood.
4. Close the driver side door.
5. Wait at least 3 minutes.

CAUTION:

While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

6. Remove 12V battery terminal.

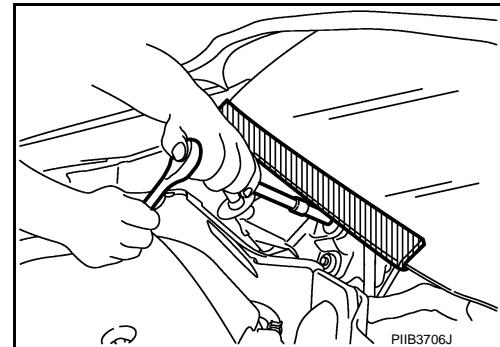
CAUTION:

After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000010723618

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 Stop/Start System Service

INFOID:0000000011003224

CAUTION:

When performing an inspection and its related work with the engine at idle, always turn the stop/start OFF switch ON or open the hood to release the stop/start system.

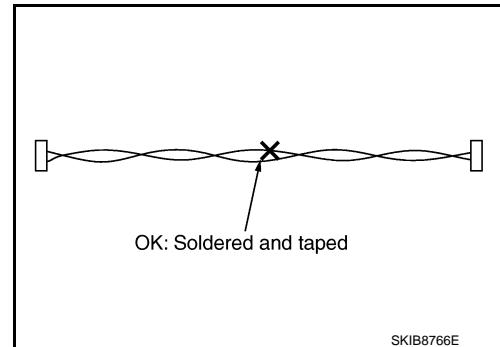
Precautions for Harness Repair

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- Solder the repaired area and wrap tape around the soldered area.

NOTE:

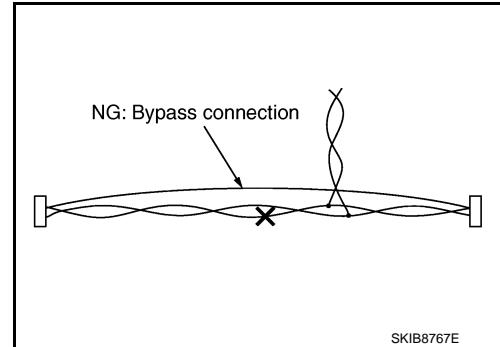
A fray of twisted lines must be within 110 mm (4.33 in).



- Bypass connection is never allowed at the repaired area.

NOTE:

Bypass connection may cause CAN communication error. The spliced wire becomes separated and the characteristics of twisted line are lost.



< PRECAUTION >

- Replace the applicable harness as an assembly if error is detected on the shield lines of CAN communication line.

Precaution for Brake System

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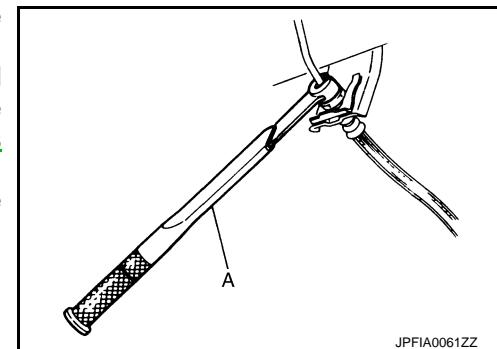
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WARNING:

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 [MA-23, "Fluids and Lubricants"](#).
- Never reuse drained brake fluid.
- Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Always confirm the specified tightening torque when installing the brake pipes.
- After pressing the brake pedal more deeply or harder than normal driving, such as air bleeding, check each item of brake pedal. Adjust brake pedal if it is outside the standard value.
- Never use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.
- Tighten flare nut of brake tube to the specified torque using a flare nut torque wrench (A).
- 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. Refer to [BRC-9, "Precautions for Removing Battery Terminal"](#).
- Check that no brake fluid leakage is present after replacing the parts.



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Precaution for Brake Control System

INFOID:0000000010723621

- Always perform a pre-driving check to drive the vehicle.
- Always check speed and safety while driving the vehicle.
- To operate CONSULT while driving, more than one person is required to be in the vehicle to avoid interference to driving and ensure safety.
- Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) or active ride control function (control of chassis control module) operates. This is not a malfunction because it is caused by VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) or active ride control function (control of chassis control module) that is normally operated.
- When starting engine or when starting vehicle just after starting engine, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- Brake stopping distance may become longer than models without ABS function depending on the road conditions, when ABS function is operated on slippery road like rough road, gravel road or snowy road.
- When a malfunction is indicated, always collect information from the customer about conditions of occurrence, estimate cause, and perform operation. Check brake booster operation, brake fluid level, and brake fluid leakage, as well as electrical system.
- The optimum performance is achieved by control for VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module), 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.

PRECAUTIONS

[WITH VDC (ESP)]

< PRECAUTION >

- 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, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module).
- 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, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module).
 - 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, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module).
- ABS warning lamp, brake warning lamp and VDC warning lamp may turn ON, when only front wheel or rear wheel is rotated using a free roller. This is not a malfunction, because it is caused by wheel speed difference between wheel that is rotated and wheel that is not rotated. In this case, perform self-diagnosis, check self-diagnosis results, and erase memory.
- When power supply voltage is not normal, ABS warning lamp, brake warning lamp and VDC warning lamp turn ON. ABS actuator and electric unit (control unit) stops control for VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). 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, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module).
- Brake pedal vibrates and operation sound occurs during sudden acceleration and cornering, when VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module) are operated. This is not a malfunction because it is caused by VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module) that is operated normally.
- VDC warning lamp may turn ON and VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module) may not normally operate, when driving on a special road that is extremely slanted (bank in a circuit course). This is not a malfunction if the status returns to normal for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module) 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 and TCS function are OFF (VDC OFF switch is pressed and VDC OFF indicator lamp is in ON status). This is not a malfunction if the status returns

PRECAUTIONS

[WITH VDC (ESP)]

< PRECAUTION >

to normal for VDC function and TCS function after the engine is started again. In this case, perform self-diagnosis, check self-diagnosis results, and erase memory.

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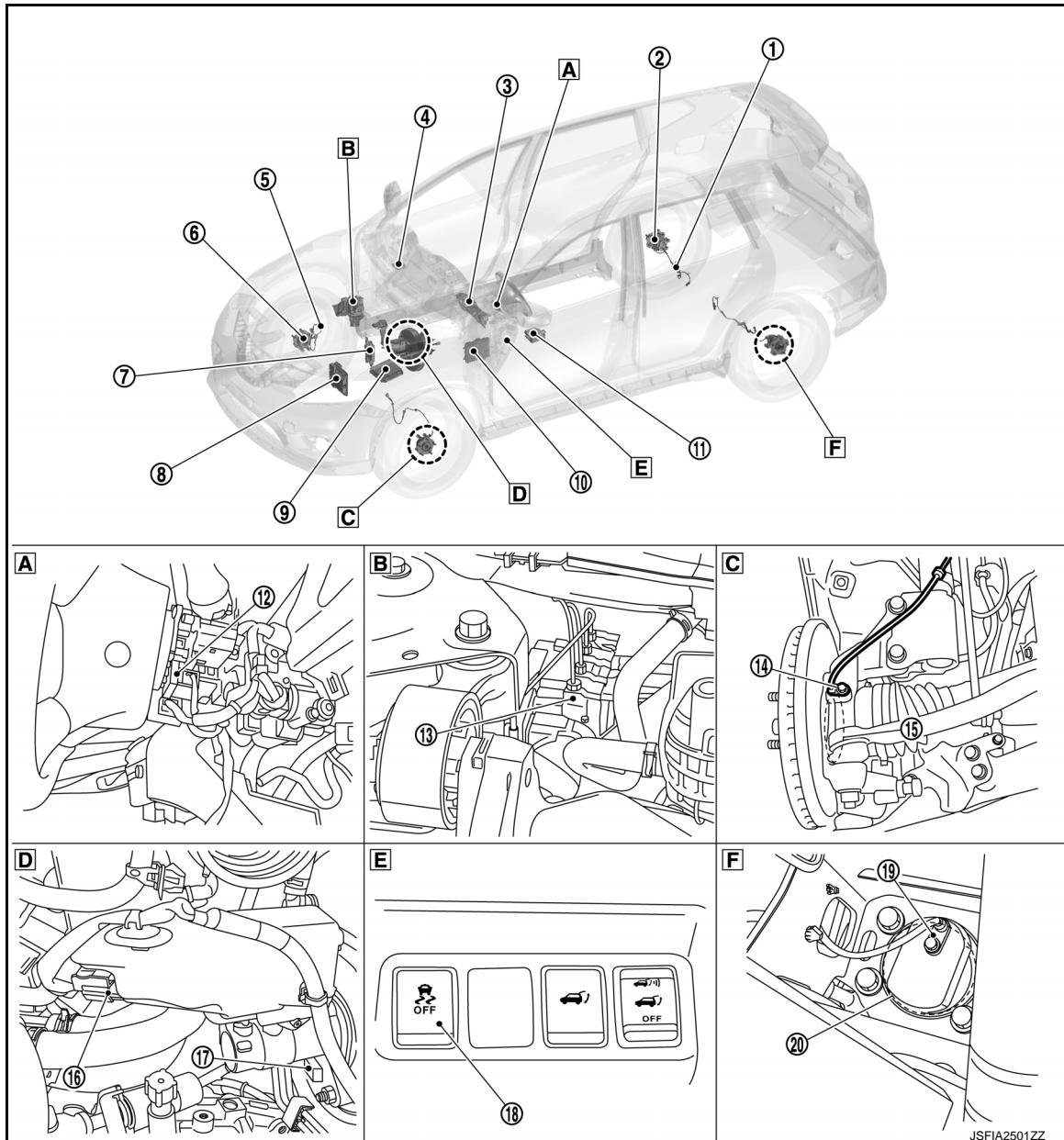
SYSTEM DESCRIPTION**COMPONENT PARTS**

Component Parts Location

INFOID:0000000010723622

LHD

2WD Models



A Back of spiral cable assembly

B Engine room (RH side)

C Steering knuckle

D Engine room (LH side)

E Instrument driver lower panel

F Rear axle housing

No.	Component parts	Function
①	Rear RH wheel sensor	BRC-27, "Wheel Sensor and Sensor Rotor"
②	Rear RH sensor rotor	BRC-27, "Wheel Sensor and Sensor Rotor"

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

No.	Component parts	Function
③	Combination meter	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Parking brake switch signal • Brake fluid level switch signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • ABS warning lamp signal • VDC OFF indicator lamp signal • VDC warning lamp signal • Brake warning lamp signal • hill start assist indicator lamp signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via chassis control module via CAN communication.</p> <ul style="list-style-type: none"> • hill start assist display request signal <p>Refer to MWI-7, "METER SYSTEM : Component Parts Location" for detailed installation location.</p>
④	Chassis control module	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Active trace control signal • Active ride control signal • Chassis control module malfunction signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • hill start assist display request signal <p>Mainly transmits the following signals to combination meter via CAN communication.</p> <ul style="list-style-type: none"> • hill start assist display request signal <p>Refer to DAS-166, "Component Parts Location" for detailed installation location.</p>
⑤	Front RH wheel sensor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑥	Front RH sensor rotor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑦	TCM*	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • N range signal • P range signal • R range signal • Current gear position signal • Shift position signal • TCM malfunction signal <p>Refer to TM-235, "CVT CONTROL SYSTEM : Component Parts Location" (gasoline engine models), TM-466, "CVT CONTROL SYSTEM : Component Parts Location" (diesel engine models) for detailed installation location.</p>
⑧	ECM	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Accelerator pedal position signal • Engine speed signal • Engine status signal • ECM malfunction signal <p>Refer to EC-28, "ENGINE CONTROL SYSTEM : Component Parts Location" (MR20DD models), EC-812, "Component Parts Location" (R9M models) for detailed installation location.</p>
⑨	IPDM E/R	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Ignition switch ON signal <p>Refer to PCS-5, "Component Parts Location" for detailed installation location.</p>

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COMPONENT PARTS

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

No.	Component parts	Function
⑩	BCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • Stop lamp switch signal • Brake pedal position switch signal • Cranking signal • Ignition switch ON signal Refer to BCS-6, "BODY CONTROL SYSTEM : Component Parts Location" for detailed installation location.
⑪	Electric parking brake control module	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • Electric parking brake operation signal Refer to PB-8, "Component Parts Location" for detailed installation location.
⑫	Steering angle sensor	BRC-27, "Steering Angle Sensor"
⑬	ABS actuator and electric unit (control unit)	BRC-25, "ABS Actuator and Electric Unit (Control Unit)"
⑭	Front LH wheel sensor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑮	Front LH sensor rotor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑯	Brake fluid level switch	BRC-28, "Brake Fluid Level Switch"
⑰	Brake vacuum sensor	BRC-29, "Brake Vacuum Sensor"
⑱	VDC OFF switch	BRC-28, "VDC (ESP) OFF Switch"
⑲	Rear LH wheel sensor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑳	Rear LH sensor rotor	BRC-27, "Wheel Sensor and Sensor Rotor"

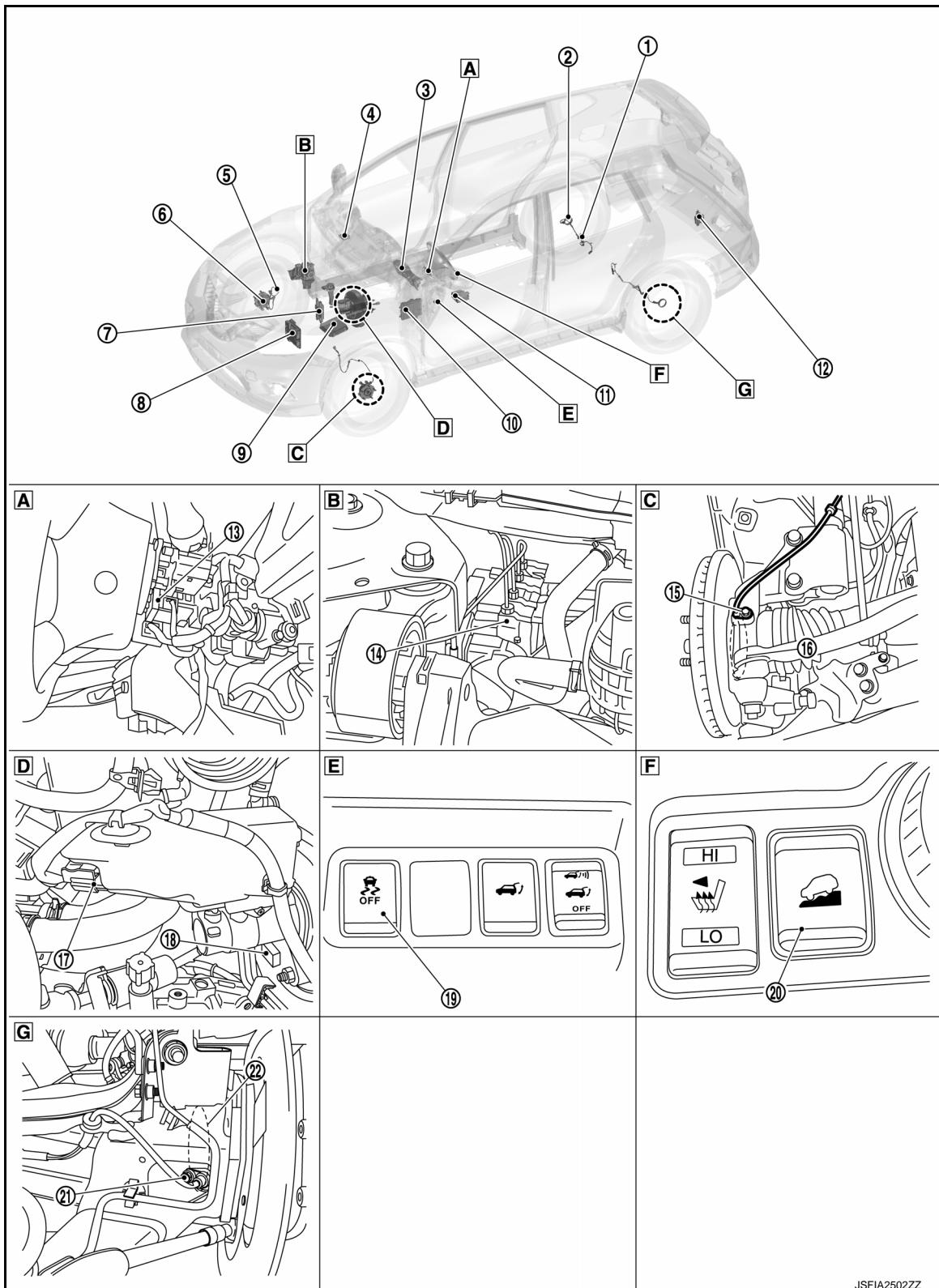
*: CVT models

4WD Models

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]



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A Back of spiral cable assembly
D Engine room (LH side)
G Rear axle housing

B Engine room (RH side)
E Instrument driver lower panel

C Steering knuckle
F Center console

JSFIA2502ZZ

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

No.	Component parts	Function
①	Rear RH wheel sensor	BRC-27, "Wheel Sensor and Sensor Rotor"
②	Rear RH sensor rotor	BRC-27, "Wheel Sensor and Sensor Rotor"
③	Combination meter	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Parking brake switch signal • Brake fluid level switch signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • ABS warning lamp signal • VDC OFF indicator lamp signal • VDC warning lamp signal • Brake warning lamp signal • hill start assist indicator lamp signal • hill descent control indicator lamp signal^{*2} <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via chassis control module via CAN communication.</p> <ul style="list-style-type: none"> • hill start assist display request signal • hill descent control display request signal^{*2} <p>Refer to MWI-7, "METER SYSTEM : Component Parts Location" for detailed installation location.</p>
④	Chassis control module	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Active trace control signal • Active ride control signal • Chassis control module malfunction signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • hill start assist display request signal • hill descent control display request signal^{*2} <p>Mainly transmits the following signals to combination meter via CAN communication.</p> <ul style="list-style-type: none"> • hill start assist display request signal • hill descent control display request signal^{*2} <p>Refer to DAS-166, "Component Parts Location" for detailed installation location.</p>
⑤	Front RH wheel sensor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑥	Front RH sensor rotor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑦	TCM ^{*1}	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • N range signal • P range signal • R range signal • Current gear position signal • Shift position signal • TCM malfunction signal <p>Refer to TM-235, "CVT CONTROL SYSTEM : Component Parts Location" (gasoline engine models), TM-466, "CVT CONTROL SYSTEM : Component Parts Location" (diesel engine models) for detailed installation location.</p>

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

No.	Component parts	Function
⑧	ECM	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Accelerator pedal position signal • Engine speed signal • Engine status signal • ECM malfunction signal <p>Refer to EC-28, "ENGINE CONTROL SYSTEM : Component Parts Location" (MR20DD engine models), EC-440, "Component Parts Location" (QR25DE engine models), EC-812, "Component Parts Location" (R9M engine models) for detailed installation location.</p>
⑨	IPDM E/R	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Ignition switch ON signal <p>Refer to PCS-5, "Component Parts Location" for detailed installation location.</p>
⑩	BCM	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Stop lamp switch signal • Brake pedal position switch signal • Cranking signal • Ignition switch ON signal <p>Refer to BCS-6, "BODY CONTROL SYSTEM : Component Parts Location" for detailed installation location.</p>
⑪	Electric parking brake control module	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Electric parking brake operation signal <p>Refer to PB-8, "Component Parts Location" for detailed installation location.</p>
⑫	4WD control unit	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • 4WD malfunction signal • 4WD operation signal <p>Refer to DLN-14, "Component Parts Location" (MR20DD engine and QR25DE engine models), DLN-117, "Component Parts Location" (R9M engine models) for detailed installation location.</p>
⑬	Steering angle sensor	BRC-27, "Steering Angle Sensor"
⑭	ABS actuator and electric unit (control unit)	BRC-25, "ABS Actuator and Electric Unit (Control Unit)"
⑮	Front LH wheel sensor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑯	Front LH sensor rotor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑰	Brake fluid level switch	BRC-28, "Brake Fluid Level Switch"
⑱	Brake vacuum sensor	BRC-29, "Brake Vacuum Sensor"
⑲	VDC OFF switch	BRC-28, "VDC (ESP) OFF Switch"
⑳	hill descent control switch*2	MWI-42, "WARNING LAMPS/INDICATOR LAMPS : hill descent control (Downhill Drive Support) Indicator lamp"
㉑	Rear LH wheel sensor	BRC-27, "Wheel Sensor and Sensor Rotor"
㉒	Rear LH sensor rotor	BRC-27, "Wheel Sensor and Sensor Rotor"

*1: CVT models

*2: Gasoline engine models

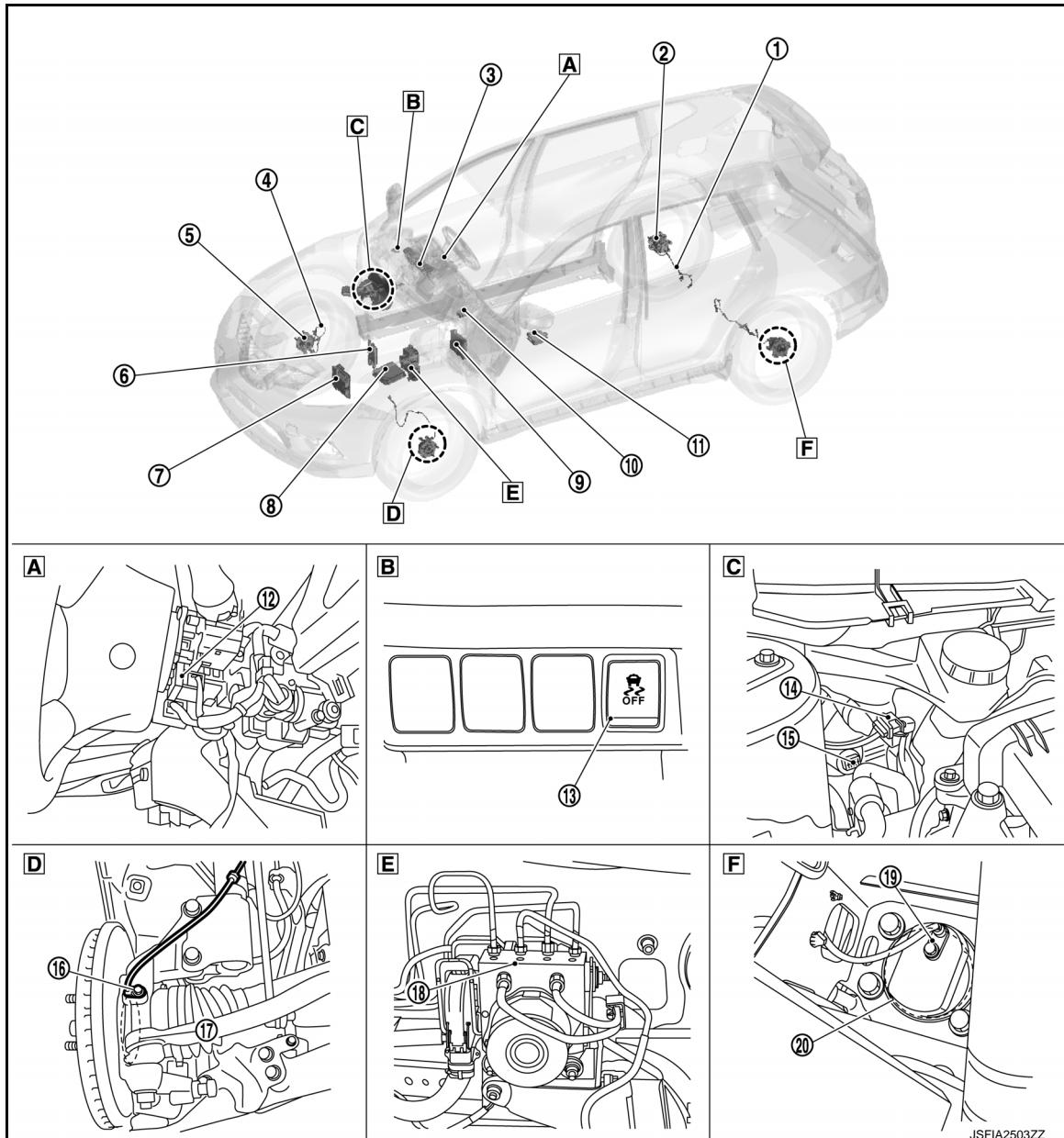
RHD

2WD Models

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]



JSFIA2503ZZ

A Back of spiral cable assembly

B Instrument driver lower panel

C Engine room (RH side)

D Steering knuckle

E Engine room (LH side)

F Rear axle housing

No.	Component parts	Function
①	Rear RH wheel sensor	BRC-27, "Wheel Sensor and Sensor Rotor"
②	Rear RH sensor rotor	BRC-27, "Wheel Sensor and Sensor Rotor"

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

No.	Component parts	Function
③	Combination meter	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Parking brake switch signal • Brake fluid level switch signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • ABS warning lamp signal • VDC OFF indicator lamp signal • VDC warning lamp signal • Brake warning lamp signal • hill start assist indicator lamp signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via chassis control module via CAN communication.</p> <ul style="list-style-type: none"> • hill start assist display request signal <p>Refer to MWI-7, "METER SYSTEM : Component Parts Location" for detailed installation location.</p>
④	Front RH wheel sensor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑤	Front RH sensor rotor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑥	TCM*	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • N range signal • P range signal • R range signal • Current gear position signal • Shift position signal • TCM malfunction signal <p>Refer to TM-466, "CVT CONTROL SYSTEM : Component Parts Location" for detailed installation location.</p>
⑦	ECM	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Accelerator pedal position signal • Engine speed signal • Engine status signal • ECM malfunction signal <p>Refer to EC-812, "Component Parts Location" for detailed installation location.</p>
⑧	IPDM E/R	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Ignition switch ON signal <p>Refer to PCS-5, "Component Parts Location" for detailed installation location.</p>
⑨	BCM	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Stop lamp switch signal • Brake pedal position switch signal • Cranking signal • Ignition switch ON signal <p>Refer to BCS-6, "BODY CONTROL SYSTEM : Component Parts Location" for detailed installation location.</p>

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COMPONENT PARTS

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[WITH VDC (ESP)]

No.	Component parts	Function
⑩	Chassis control module	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Active trace control signal • Active ride control signal • Chassis control module malfunction signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • hill start assist display request signal <p>Mainly transmits the following signals to combination meter via CAN communication.</p> <ul style="list-style-type: none"> • hill start assist display request signal <p>Refer to DAS-166, "Component Parts Location" for detailed installation location.</p>
⑪	Electric parking brake control module	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Electric parking brake operation signal <p>Refer to PB-8, "Component Parts Location" for detailed installation location.</p>
⑫	Steering angle sensor	BRC-27, "Steering Angle Sensor"
⑬	VDC OFF switch	BRC-28, "VDC (ESP) OFF Switch"
⑭	Brake fluid level switch	BRC-28, "Brake Fluid Level Switch"
⑮	Brake vacuum sensor	BRC-29, "Brake Vacuum Sensor"
⑯	Front LH wheel sensor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑰	Front LH sensor rotor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑱	ABS actuator and electric unit (control unit)	BRC-25, "ABS Actuator and Electric Unit (Control Unit)"
⑲	Rear LH wheel sensor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑳	Rear LH sensor rotor	BRC-27, "Wheel Sensor and Sensor Rotor"

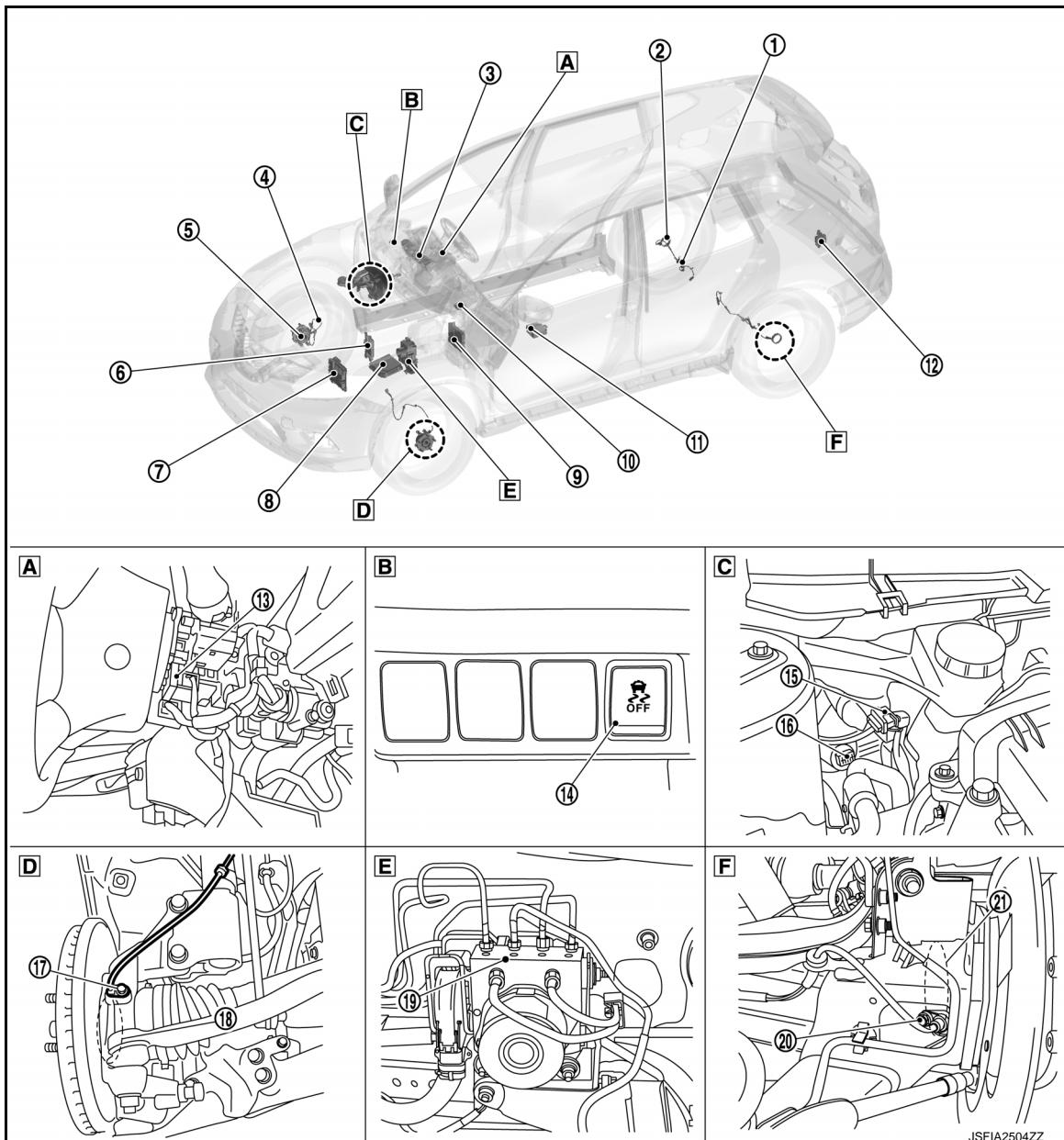
*: CVT models

4WD Models

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]



A Back of spiral cable assembly

D Steering knuckle

B Instrument driver lower panel

E Engine room (LH side)

C Engine room (RH side)

F Rear axle housing

No.	Component parts	Function
①	Rear RH wheel sensor	BRC-27, "Wheel Sensor and Sensor Rotor"
②	Rear RH sensor rotor	BRC-27, "Wheel Sensor and Sensor Rotor"

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COMPONENT PARTS

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

No.	Component parts	Function
③	Combination meter	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Parking brake switch signal • Brake fluid level switch signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • ABS warning lamp signal • VDC OFF indicator lamp signal • VDC warning lamp signal • Brake warning lamp signal • hill start assist indicator lamp signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via chassis control module via CAN communication.</p> <ul style="list-style-type: none"> • hill start assist display request signal <p>Refer to MWI-7, "METER SYSTEM : Component Parts Location" for detailed installation location.</p>
④	Front RH wheel sensor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑤	Front RH sensor rotor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑥	TCM*	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • N range signal • P range signal • R range signal • Current gear position signal • Shift position signal • TCM malfunction signal <p>Refer to TM-466, "CVT CONTROL SYSTEM : Component Parts Location" for detailed installation location.</p>
⑦	ECM	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Accelerator pedal position signal • Engine speed signal • Engine status signal • ECM malfunction signal <p>Refer to EC-812, "Component Parts Location" for detailed installation location.</p>
⑧	IPDM E/R	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Ignition switch ON signal <p>Refer to PCS-5, "Component Parts Location" for detailed installation location.</p>
⑨	BCM	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Stop lamp switch signal • Brake pedal position switch signal • Cranking signal • Ignition switch ON signal <p>Refer to BCS-6, "BODY CONTROL SYSTEM : Component Parts Location" for detailed installation location.</p>

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

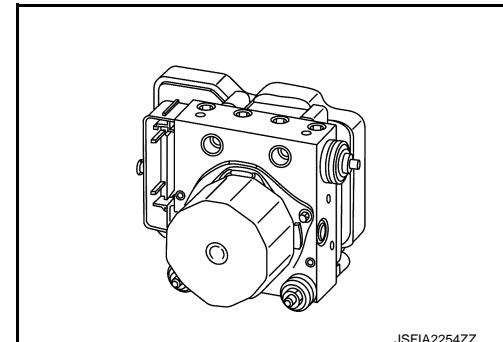
No.	Component parts	Function
⑩	Chassis control module	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Active trace control signal • Active ride control signal • Chassis control module malfunction signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • hill start assist display request signal <p>Mainly transmits the following signals to combination meter via CAN communication.</p> <ul style="list-style-type: none"> • hill start assist display request signal <p>Refer to DAS-166, "Component Parts Location" for detailed installation location.</p>
⑪	Electric parking brake control module	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Electric parking brake operation signal <p>Refer to PB-8, "Component Parts Location" for detailed installation location.</p>
⑫	4WD control unit	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • 4WD malfunction signal • 4WD operation signal <p>Refer to DLN-117, "Component Parts Location" for detailed installation location.</p>
⑬	Steering angle sensor	BRC-27, "Steering Angle Sensor"
⑭	VDC OFF switch	BRC-28, "VDC (ESP) OFF Switch"
⑮	Brake fluid level switch	BRC-28, "Brake Fluid Level Switch"
⑯	Brake vacuum sensor	BRC-29, "Brake Vacuum Sensor"
⑰	Front LH wheel sensor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑱	Front LH sensor rotor	BRC-27, "Wheel Sensor and Sensor Rotor"
⑲	ABS actuator and electric unit (control unit)	BRC-25, "ABS Actuator and Electric Unit (Control Unit)"
⑳	Rear LH wheel sensor	BRC-27, "Wheel Sensor and Sensor Rotor"
㉑	Rear LH sensor rotor	BRC-27, "Wheel Sensor and Sensor Rotor"

*: CVT models

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, Brake limited slip differential (BLSD) function, Brake assist function, brake force distribution function, hill start assist function and advanced hill descent control function (4WD models with Gasoline engine).



CONTROL UNIT

- Brake fluid pressure, engine and transaxle 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

COMPONENT PARTS

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

- Pressure the brake fluid and send.
- Returns the brake fluid reserved in reservoir to master cylinder by reducing pressure.

Motor

Activates the pump according to signals from ABS actuator and electric unit (control unit).

Motor Relay

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

Actuator Relay

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

ABS In Valve

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

NOTE:

Valve is a solenoid valve.

ABS Out Valve

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

NOTE:

Valve is a solenoid valve.

Cut Valve 1, Cut Valve 2

Shuts off the ordinary brake line from master cylinder, when VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function and advanced hill descent control function (4WD models with gasoline engine) are activated.

NOTE:

Valve is a solenoid valve.

Suction Valve 1, Suction Valve 2

Supplies the brake fluid from master cylinder to the pump, when VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function and advanced hill descent control function (4WD models with gasoline engine) are activated.

NOTE:

Valve is a solenoid valve.

Inlet Valve

Brake fluid sucked from the reservoir by the pump does not backflow.

NOTE:

Valve is a solenoid valve.

Outlet Valve

Brake fluid discharged from the pump does not backflow.

NOTE:

Valve is a solenoid valve.

Return Check Valve

Returns the brake fluid from brake caliper to master cylinder by bypassing orifice of each valve when brake is released.

Reservoir

Temporarily reserves the brake fluid drained from brake caliper and wheel cylinder, so that pressure efficiently decreases when decreasing pressure of brake caliper.

Yaw Rate/Side/Decel G Sensor

Calculates the following information that affects the vehicle, and transmits a signal to ABS actuator and electric unit (control unit) via communication lines. [Yaw rate/side/decel G sensor is integrated in ABS actuator and electric unit (control unit).]

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

Pressure Sensor

Detects the brake fluid pressure and transmits signal to ABS actuator and electric unit (control unit). [Pressure sensor is integrated in ABS actuator and electric unit (control unit).]

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

Wheel Sensor and Sensor Rotor

INFOID:000000010723624

- Wheel sensor of front wheel is installed on steering knuckle.

CAUTION:

Never measure resistance and voltage value using a tester because sensor is active sensor.

- Sensor rotor of front wheel is integrated in wheel hub assembly.
- Wheel sensor of rear wheel is installed on wheel hub assembly. (2WD models)

CAUTION:

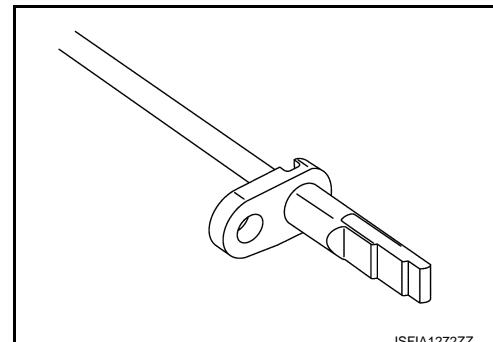
Never measure resistance and voltage value using a tester because sensor is active sensor.

- Wheel sensor of rear wheel is installed on rear axle housing. (4WD models)

CAUTION:

Never measure resistance and voltage value using a tester because sensor is active sensor.

- Sensor rotor of rear wheel is integrated in wheel hub assembly. (2WD models)
- Sensor rotor of rear wheel is installed on drive shaft (wheel side). (4WD models)



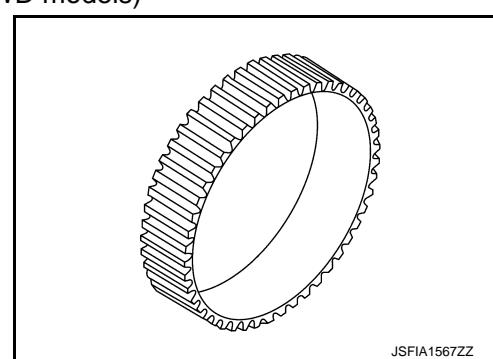
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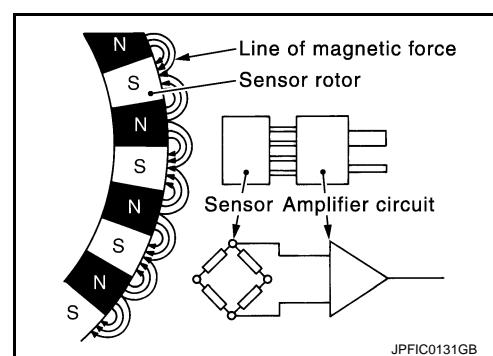
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- Downsize and weight reduction is aimed. IC for detection portion and magnet for sensor rotor are adopted.
- Power supply is supplied to detection portion so that magnetic field line is read. Magnetic field that is detected is converted to current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

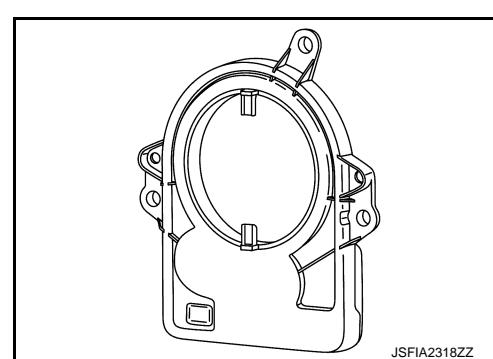


Steering Angle Sensor

INFOID:000000010723625

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

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



COMPONENT PARTS

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

VDC (ESP) OFF Switch

INFOID:0000000010723626

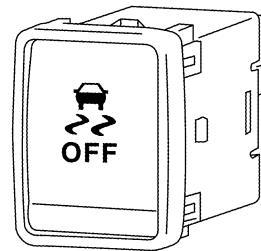
- Non-operational status or standby status of the following functions can be selected using VDC OFF switch. VDC OFF indicator lamp indicates the operation status of function. (ON: Non-operational status, OFF: Standby status)

- VDC function
- TCS function
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

NOTE:

ABS function, EBD function, Brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function and advanced hill descent control function (4WD models with gasoline engine) control operates.

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



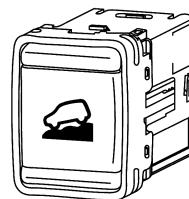
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hill descent control (Downhill Drive Support) Switch

INFOID:0000000010723627

The operation of the hill descent control switch enables the arbitrary switching of the advanced hill descent control function between stop status and standby status. The status of the function is indicated by the hill descent control indicator lamp.

- ON:
 - When advanced hill descent control function is under operating condition
 - Advanced hill descent control function operating or operational (condition is satisfied)
- Blinking: Advanced hill descent control function operating or operational (condition is not satisfied)
- OFF: Advanced hill descent control function switch OFF (non-operational status)



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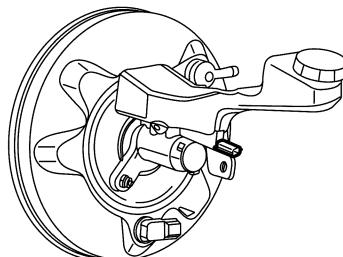
NOTE:

Applied to 4WD models with gasoline engine.

Brake Fluid Level Switch

INFOID:0000000010723628

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



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COMPONENT PARTS

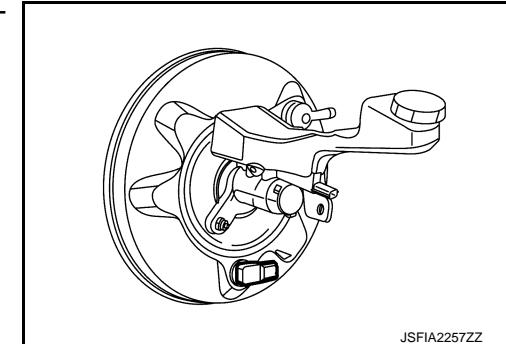
< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

Brake Vacuum Sensor

INFOID:000000010723629

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



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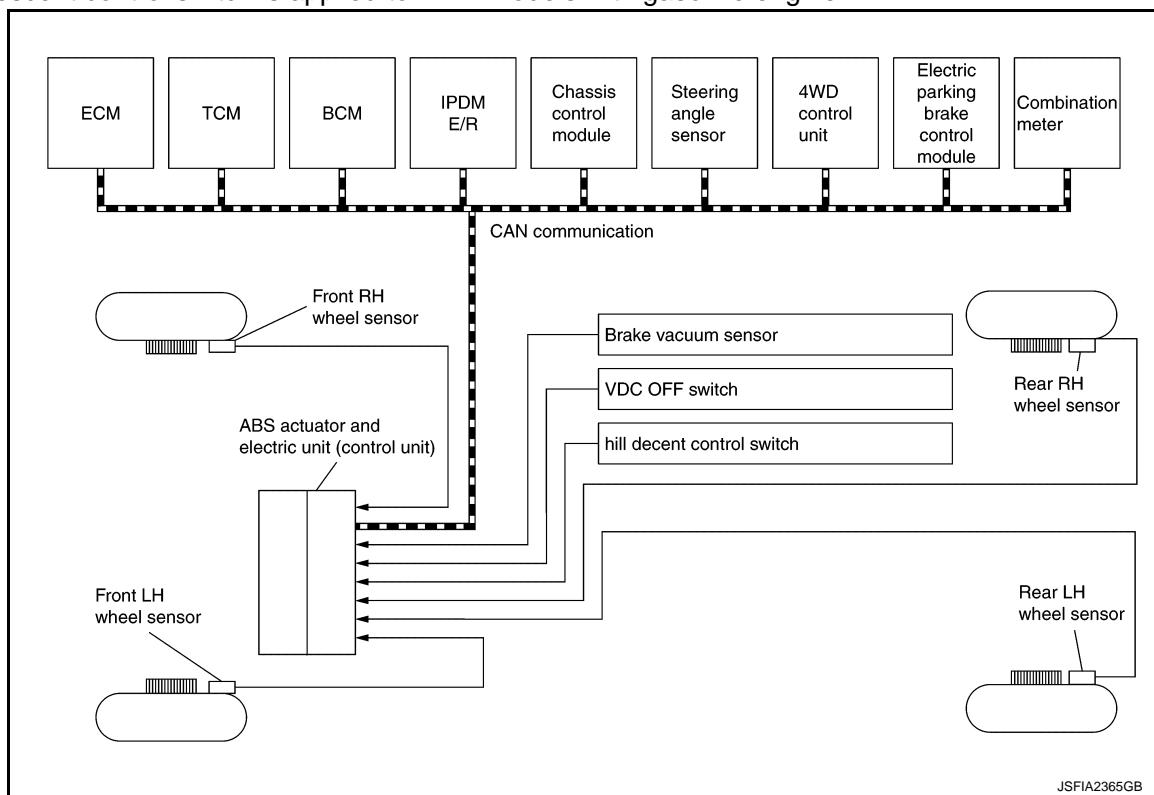
SYSTEM**System Description**

INFOID:0000000010723631

- The system switches fluid pressure of each brake 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, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function and advanced hill descent control function (4WD models with gasoline engine).
- Fail-safe function is available for each function and is activated by each function when system malfunction occurs.

SYSTEM DIAGRAM**NOTE:**

- 4WD control unit is applied to 4WD models.
- TCM is applied to CVT models.
- hill descent control switch is applied to 4WD models with gasoline engine.

**INPUT SIGNAL AND OUTRET SIGNAL**

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

SYSTEM

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

Component parts	Signal description
Combination meter	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Parking brake switch signal • Brake fluid level switch signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • ABS warning lamp signal • VDC OFF indicator lamp signal • VDC warning lamp signal • Brake warning lamp signal • hill start assist indicator lamp signal • hill descent control indicator lamp signal^{*1} <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via chassis control module via CAN communication.</p> <ul style="list-style-type: none"> • hill start assist display request signal • hill descent control display request signal^{*1}
TCM ^{*2}	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • N range signal • P range signal • R range signal • Current gear position signal • Shift position signal • TCM malfunction signal
ECM	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Accelerator pedal position signal • Engine speed signal • Engine status signal • ECM malfunction signal
IPDM E/R	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Ignition switch ON signal
BCM	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Stop lamp switch signal • Brake pedal position switch signal • Cranking signal • Ignition switch ON signal
Chassis control module	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Active trace control signal • Active ride control signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • hill start assist display request signal • hill descent control display request signal^{*1} <p>Mainly transmits the following signals to combination meter via CAN communication.</p> <ul style="list-style-type: none"> • hill start assist display request signal • hill descent control display request signal^{*1}
Electric parking brake control module	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Electric parking brake operation signal
4WD control unit ^{*3}	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • 4WD malfunction signal • 4WD operation signal
Steering angle sensor	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Steering angle sensor signal

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SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

*1: 4WD models with gasoline engine

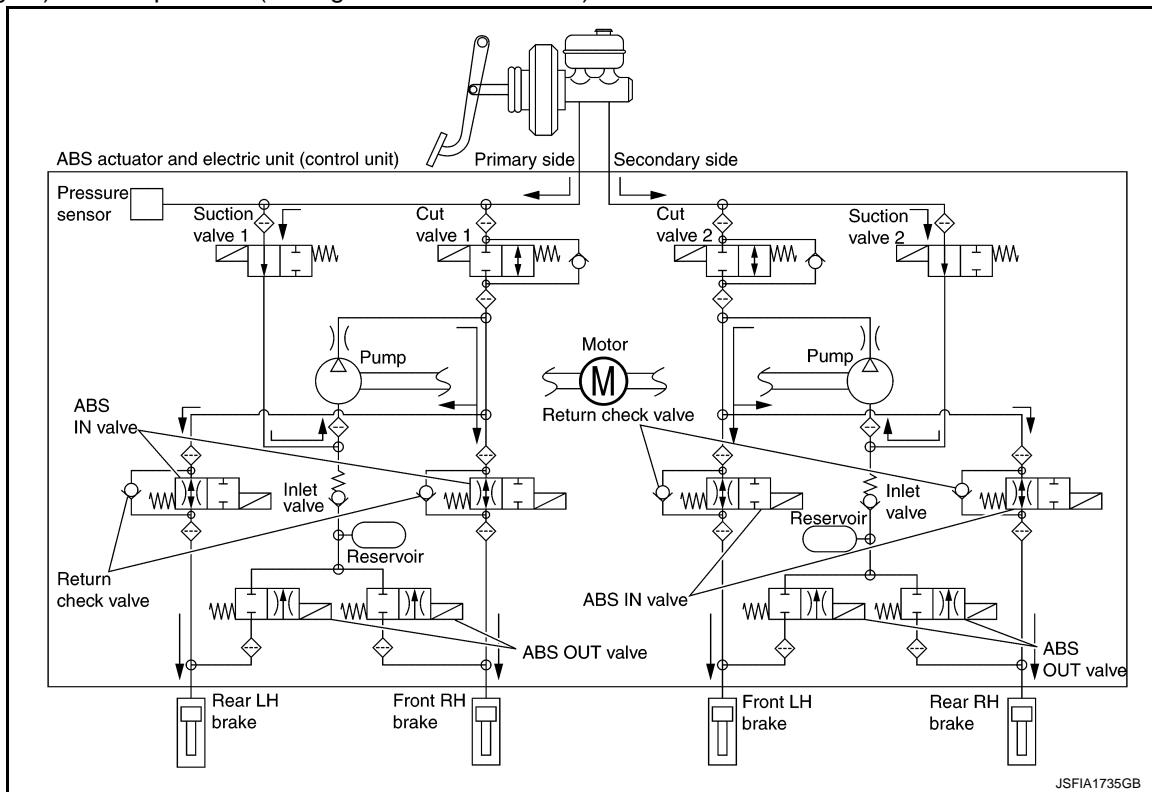
*2: CVT models

*3: 4WD models

VALVE OPERATION [VDC FUNCTION, TCS FUNCTION, BRAKE LIMITED SLIP DIFFERENTIAL (BLSD) FUNCTION, BRAKE ASSIST FUNCTION, BRAKE FORCE DISTRIBUTION FUNCTION, hill start assist FUNCTION AND ADVANCED hill descent control FUNCTION (4WD MODELS WITH GASOLINE ENGINE)]

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

VDC Function, TCS Function, Brake Limited Slip Differential (BLSD) Function, Brake Assist Function, Brake force distribution Function, hill start assist Function and Advanced hill descent control Function (4WD Models with Gasoline Engine) are in Operation (During Pressure Increases)



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

During pressure front RH brake increases

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

During pressure front LH brake increases

- Brake fluid is conveyed to the pump from the master cylinder through suction valve 2 and is pressurized by the pump operation. The pressurized brake fluid is supplied to the front LH brake through the ABS IN valve.

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

For the right brake, brake fluid pressure is maintained because the pressurization is unnecessary. The pressurization for the right brake is controlled separately from the left brake.

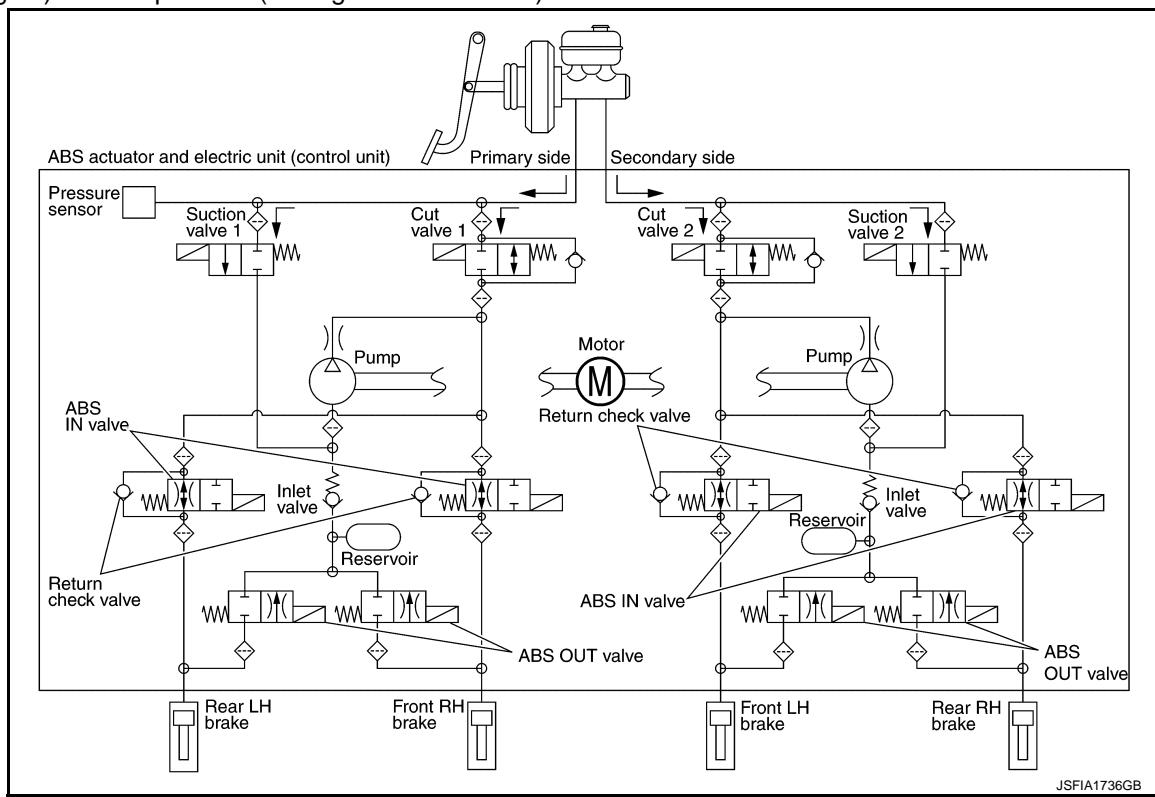
During pressure rear RH brake increases

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

During pressure rear LH brake increases

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

VDC Function, TCS Function, Brake Limited Slip Differential (BLSD) Function, Brake Assist Function, Brake force distribution Function, hill start assist Function and Advanced hill descent control Function (4WD Models with Gasoline Engine) are in Operation (During Pressure Holds)



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

During pressure front RH brake holds

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

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

During pressure front LH brake holds

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

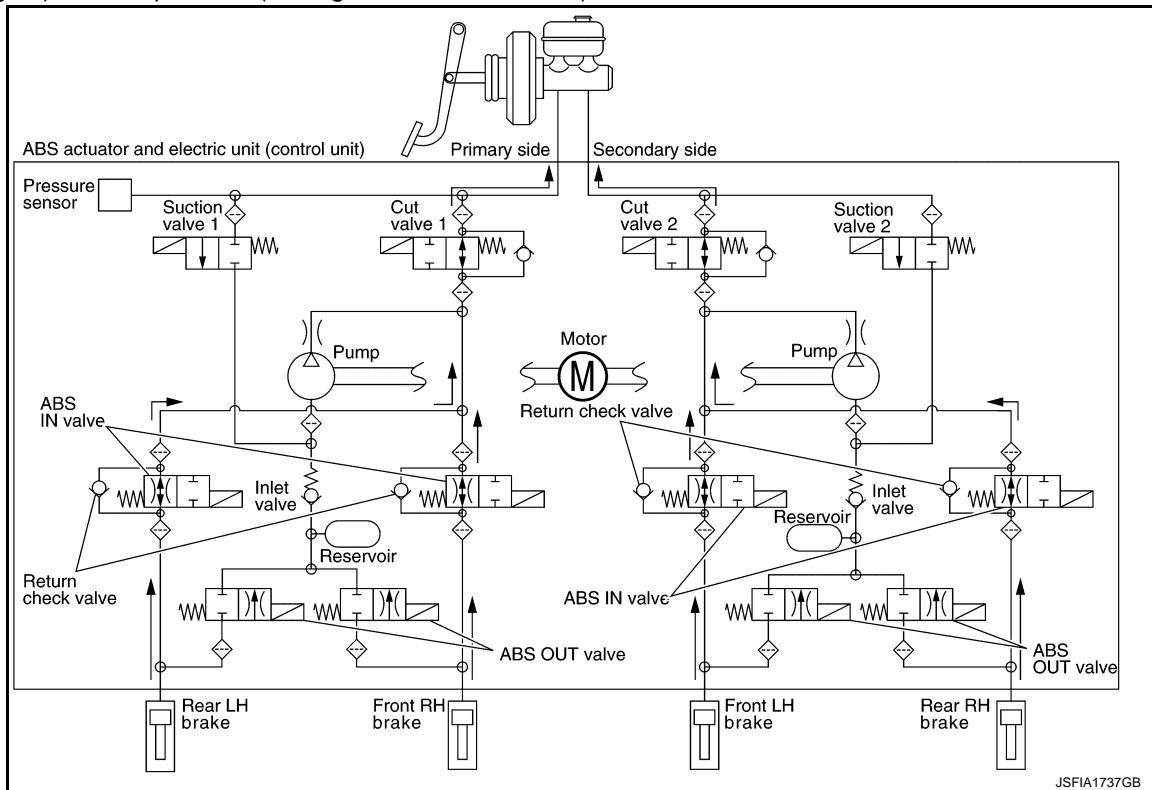
During pressure rear RH brake holds

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

During pressure rear LH brake holds

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

VDC Function, TCS Function, Brake Limited Slip Differential (BLSD) Function, Brake Assist Function, Brake force distribution Function, hill start assist Function and Advanced hill descent control Function (4WD Models with Gasoline Engine) are in Operation (During Pressure Decrease)



Component parts	Not activated	When pressure decrease
Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)
ABS IN valve	Power supply is not supplied (open)	Power supply is not supplied (open)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each brake (fluid pressure)	—	Pressure decreases

During pressure front RH brake decreased

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

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

During pressure front LH brake decreased

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

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During pressure rear RH brake decreased

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

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During pressure rear LH brake decreased

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

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Component Parts and Function

Component parts	Function
Pump	<ul style="list-style-type: none">Pressure the brake fluid and send.Returns the brake fluid reserved in reservoir to master cylinder by reducing pressure.
Motor	Activates the pump according to signals from ABS actuator and electric unit (control unit).
Cut valve 1 Cut valve 2	Shuts off the ordinary brake line from master cylinder.
Suction valve 1 Suction valve 2	Supplies the brake fluid from master cylinder to the pump.
ABS IN valve	Switches the fluid pressure line to increase or hold according.
ABS OUT valve	Switches the fluid pressure line to increase, hold or decrease according.
return check valve	Returns the brake fluid from each brake to master cylinder by bypassing orifice of each valve when brake is released.
Reservoir	Temporarily reserves the brake fluid drained from each brake, so that pressure efficiently decreases when decreasing pressure of each brake.
Pressure sensor	Detects the brake fluid pressure and transmits signal to ABS actuator and electric unit (control unit).

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VALVE OPERATION (ABS FUNCTION)

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

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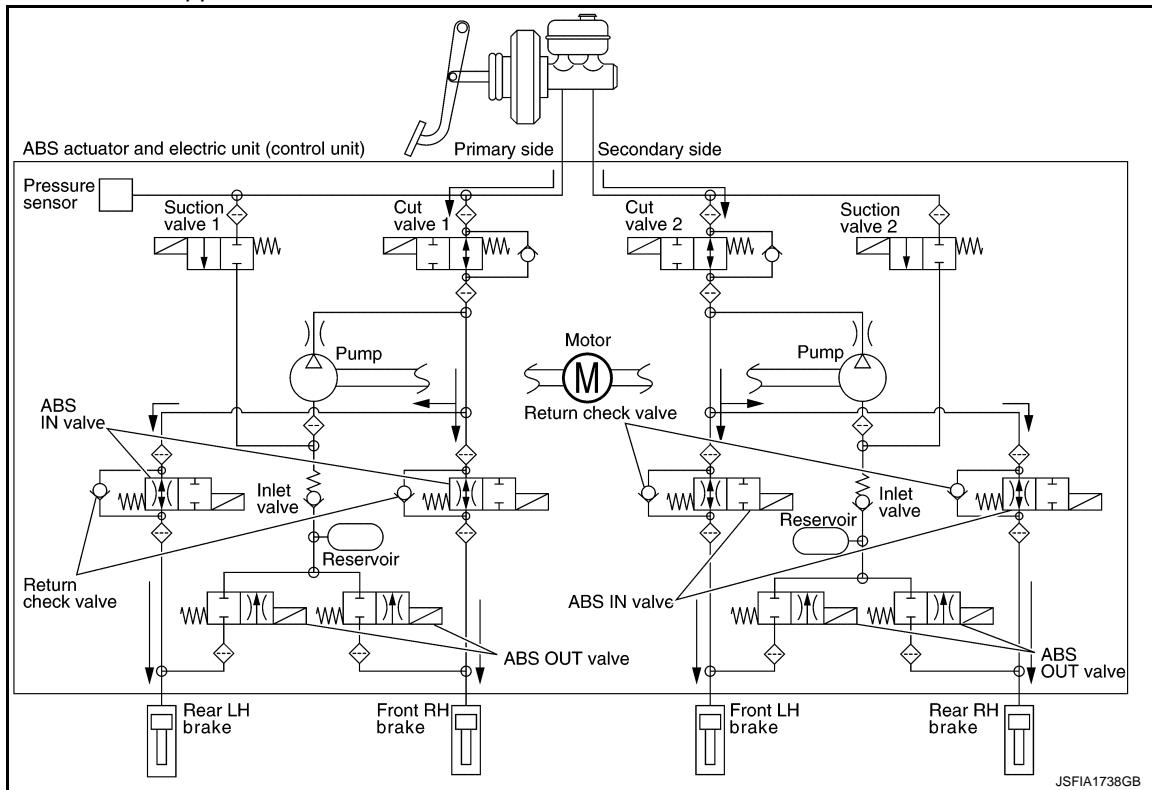
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SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

When Brake Pedal is Applied



JSFIA1738GB

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

During pressure front RH brake increases

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

During pressure front LH brake increases

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

During pressure rear RH brake increases

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

During pressure rear LH brake increases

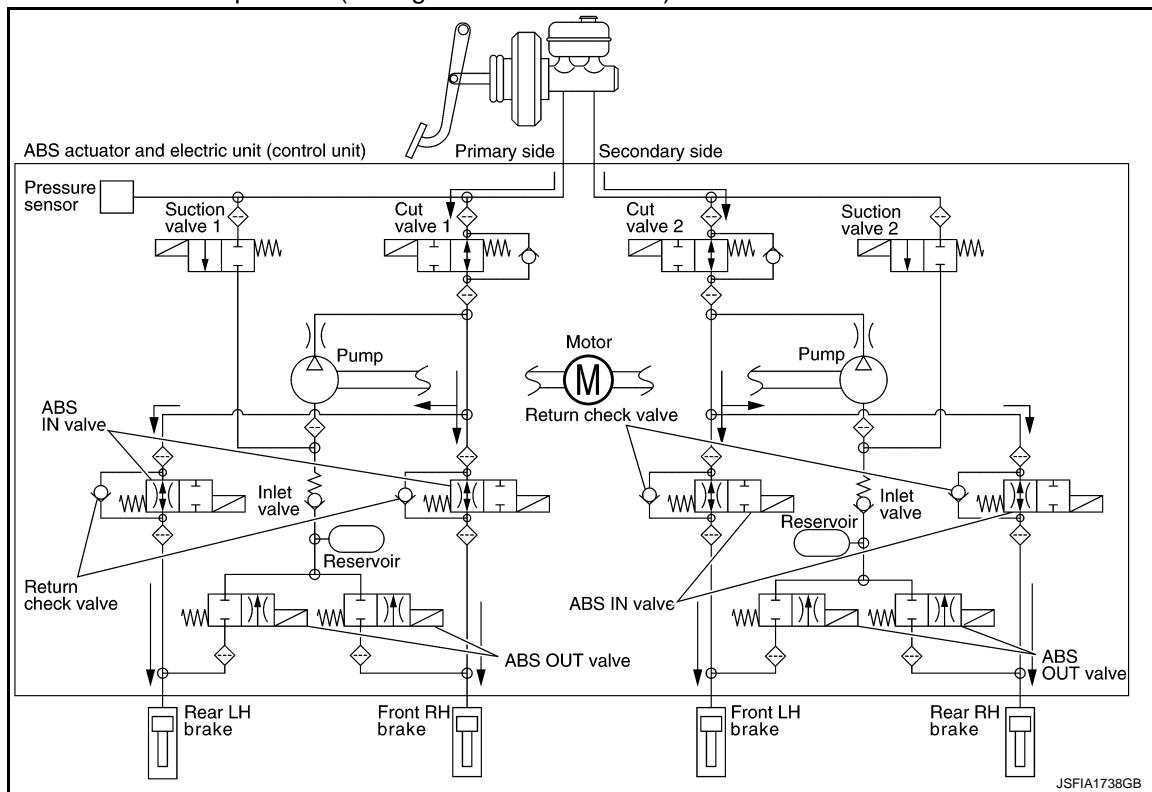
- When the cut valve 1 and the ABS IN valve opens, brake fluid is supplied to the rear LH brake from the master cylinder through the ABS IN valve. Brake fluid does not flow into the reservoir because the ABS OUT valve is closed.

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

When ABS Function is in Operation (During Pressure Increases)



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

During pressure front RH brake increases

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

During pressure front LH brake increases

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

During pressure rear RH brake increases

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

During pressure rear LH brake increases

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

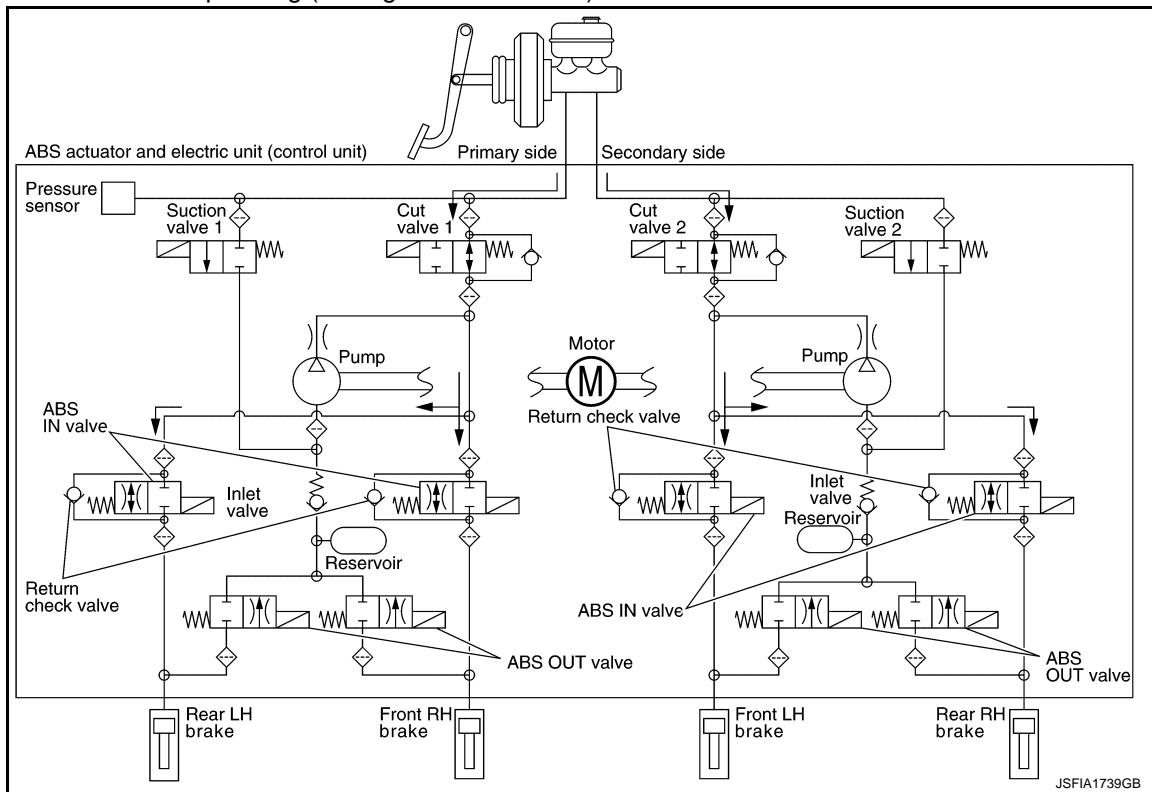
SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

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

When ABS Function is Operating (During Pressure Holds)



Component parts	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)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)
ABS IN valve	Power supply is not supplied (open)	Power supply is supplied (close)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each brake (fluid pressure)	—	Pressure holds

During pressure front RH brake holds

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

During pressure front LH brake holds

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

During pressure rear RH brake holds

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

During pressure rear LH brake holds

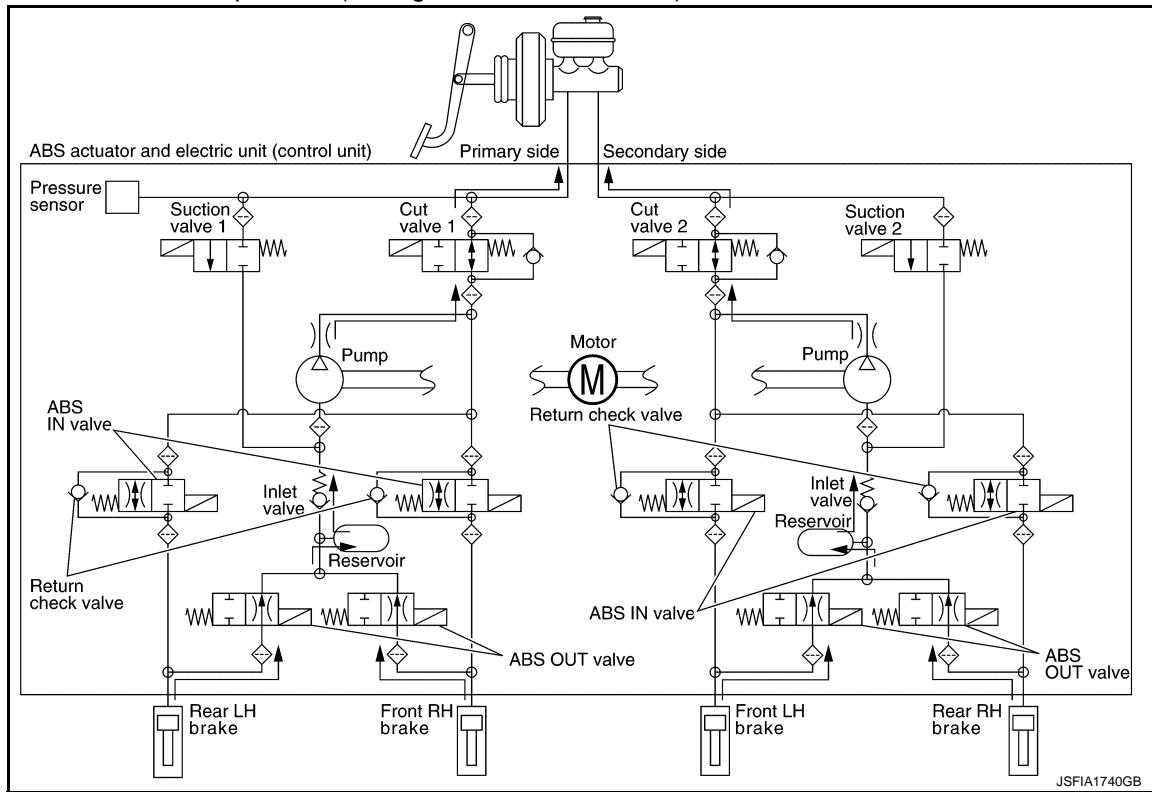
- Since the ABS IN valve and the ABS OUT valve are closed, the rear LH brake, master cylinder, and reservoir are blocked. This maintains fluid pressure applied on the rear LH brake.

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

When ABS Function is in Operation (During Pressure Decreases)



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Component parts	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)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)
ABS IN valve	Power supply is not supplied (open)	Power supply is supplied (close)
ABS OUT valve	Power supply is not supplied (close)	Power supply is supplied (open)
Each brake (fluid pressure)	—	Pressure decreases

During pressure front RH brake decreased

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

During pressure front LH brake decreased

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

During pressure rear RH brake decreased

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

During pressure rear LH brake decreased

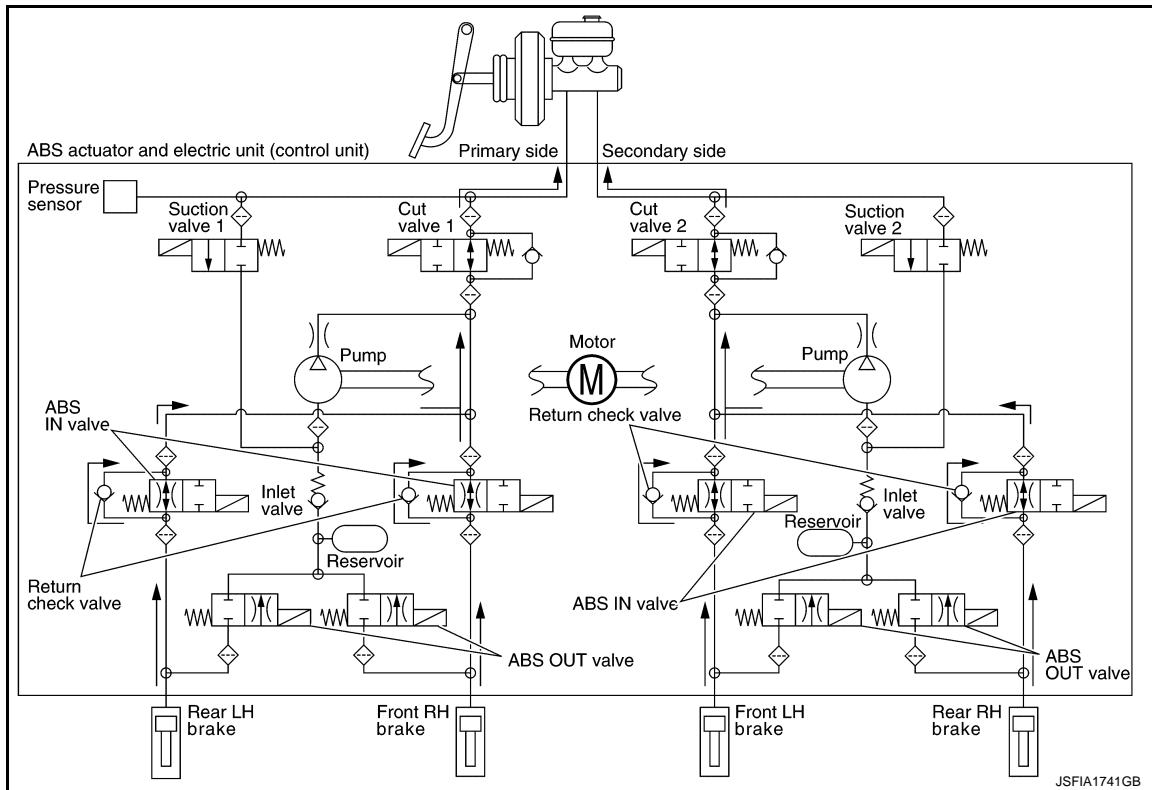
- Since the ABS IN valve is closed and the ABS OUT valve is opened, fluid pressure applied on the rear LH brake is supplied to the reservoir through the ABS OUT valve. This fluid pressure decreases when sent to the master cylinder by the pump.

SYSTEM

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

When Brake Release



Component parts	Not activated	When pressure decrease
Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)
ABS IN valve	Power supply is not supplied (open)	Power supply is not supplied (open)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each brake (fluid pressure)	—	Pressure decreases

During pressure front RH brake release

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

During pressure front LH brake release

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

During pressure rear RH brake release

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

During pressure rear LH brake release

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

Component Parts and Function

Component parts	Function
Pump	<ul style="list-style-type: none"> Pressure the brake fluid and send. Returns the brake fluid reserved in reservoir to master cylinder by reducing pressure.
Motor	Activates the pump according to signals from ABS actuator and electric unit (control unit).

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

Component parts	Function
Cut valve 1 Cut valve 2	Shuts off the ordinary brake line from master cylinder.
Suction valve 1 Suction valve 2	Supplies the brake fluid from master cylinder to the pump.
ABS IN valve	Switches the fluid pressure line to increase or hold according.
ABS OUT valve	Switches the fluid pressure line to increase, hold or decrease according.
return check valve	Returns the brake fluid from each brake to master cylinder by bypassing orifice of each valve when brake is released.
Reservoir	Temporarily reserves the brake fluid drained from each brake, so that pressure efficiently decreases when decreasing pressure of each brake.
Pressure sensor	Detects the brake fluid pressure and transmits signal to ABS actuator and electric unit (control unit).

CONDITION FOR TURN ON THE WARNING LAMP

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

Condition (status)	ABS warning lamp	Brake warning lamp	VDC warning lamp
Ignition switch OFF	OFF	OFF	OFF
For approx. 1 second after the ignition switch is turned ON	ON	ON	ON
Approx. 1 second after ignition switch is turned ON (when the before engine starts, system is in normal operation)	OFF	ON	OFF
After engine starts	OFF	OFF	OFF
When parking brake operates (parking brake switch ON)	OFF	OFF	OFF
When brake fluid is less than the specified level (brake fluid level switch ON)	OFF	ON	ON
VDC function is malfunctioning	OFF	OFF	ON
TCS function is malfunctioning	OFF	OFF	ON
ABS function is malfunctioning	ON	OFF	ON
EBD function is malfunctioning	ON	ON	ON
Brake limited slip differential (BLSD) function is malfunctioning	OFF	OFF	ON
Brake assist function is malfunctioning	OFF	OFF	ON
Brake force distribution function is malfunctioning	OFF	OFF	ON
hill start assist function is malfunctioning	OFF	OFF	ON
Advanced hill descent control function is malfunctioning*	OFF	OFF	ON
Brake vacuum sensor function is malfunctioning	OFF	ON	OFF
VDC function is operating	OFF	OFF	Blinking
TCS function is operating	OFF	OFF	Blinking
ABS function is operating	OFF	OFF	OFF
EBD function is operating	OFF	OFF	OFF
Brake limited slip differential (BLSD) function is operating	OFF	OFF	Blinking
Brake assist function is operating	OFF	OFF	OFF
Brake force distribution function is operating	OFF	OFF	OFF
hill start assist function is operating	OFF	OFF	OFF
Advanced hill descent control function is operating*	OFF	OFF	OFF

*: 4WD models with gasoline engine

CONDITION FOR TURN ON THE INDICATOR LAMP

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

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SYSTEM

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

Condition (status)	VDC OFF indicator lamp	hill start assist indicator lamp	hill descent control indicator lamp*
Ignition switch OFF	OFF	OFF	OFF
For approx. 1 second after the ignition switch is turned ON	ON	ON	ON
Approx. 1 second after ignition switch is turned ON (when system is in normal operation)	OFF	OFF	OFF
After engine starts (when system is in normal operation)	OFF	OFF	OFF
When VDC OFF switch is ON (VDC function and TCS function are OFF)	ON	OFF	OFF
VDC function is malfunctioning	OFF	OFF	OFF
TCS function is malfunctioning	OFF	OFF	OFF
hill start assist function is operating	OFF	Blinking	OFF
hill start assist function is operational (condition is satisfied)	OFF	ON	OFF
hill start assist function is operational (condition is not satisfied)	OFF	OFF	OFF
hill start assist function is malfunctioning	OFF	OFF	OFF
Advanced hill descent control function is operating*	OFF	OFF	ON
Advanced hill descent control function is operational (condition is satisfied)*	OFF	OFF	ON
Advanced hill descent control function is operational (condition is not satisfied)*	OFF	OFF	Blinking
Advanced hill descent control function is malfunctioning*	OFF	OFF	OFF

*: 4WD models with gasoline engine

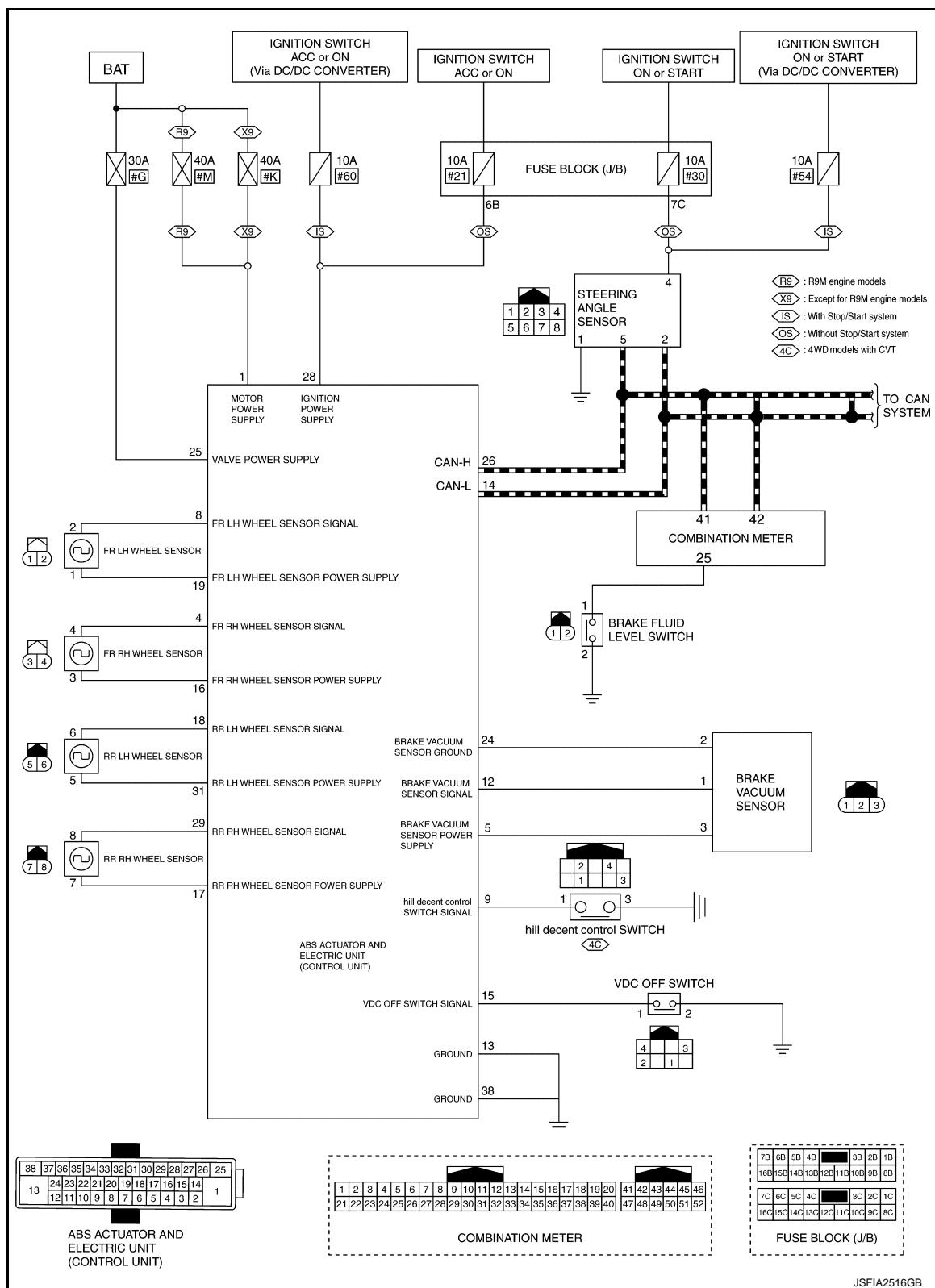
SYSTEM

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

Circuit Diagram

INFOID:000000010723632



Fail-Safe

INFOID:000000010735268

VDC FUNCTION, TCS FUNCTION, BRAKE LIMITED SLIP DIFFERENTIAL (BLSD) FUNCTION, BRAKE ASSIST FUNCTION, BRAKE FORCE DISTRIBUTION FUNCTION, hill start assist FUNCTION AND ADVANCED hill descent control FUNCTION (4WD MODELS WITH GASOLINE ENGINE)

BCR-43

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SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). The vehicle status becomes the same as models without VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). However, ABS function and EBD function are operated normally.

ABS FUNCTION

ABS warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). The vehicle status becomes the same as models without VDC function, TCS function, ABS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). However, EBD function is operated normally.

NOTE:

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

EBD FUNCTION

ABS warning lamp, brake warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module).

DTC	Fail-safe condition
C10D7	<p>The following functions are suspended.</p> <ul style="list-style-type: none">Deceleration control (brake control by VDC function) performed by pulling the parking brake switch while driving the vehicle [10 km/h (6.2 MPH) or more].
C1101	<p>The following functions are suspended.</p> <ul style="list-style-type: none">VDC functionTCS functionABS function
C1102	
C1103	
C1104	<p>The following functions are suspended.</p> <ul style="list-style-type: none">EBD function (only when both 2 rear wheels are malfunctioning)Brake limited slip differential (BLSD) functionBrake assist functionBrake force distribution functionhill start assist function
C1105	
C1106	
C1107	<ul style="list-style-type: none">Advanced hill descent control function^{*1}Active trace control function (control of chassis control module)Active ride control function (control of chassis control module)
C1108	

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

DTC	Fail-safe condition	
C1109	The following functions are suspended. <ul style="list-style-type: none">• VDC function• TCS function• ABS function• EBD function	A
C1110	<ul style="list-style-type: none">• Brake limited slip differential (BLSD) function• Brake assist function• Brake force distribution function• hill start assist function• Advanced hill descent control function^{*1}• Active trace control function (control of chassis control module)• Active ride control function (control of chassis control module)	B C D
C1111	<p>The following functions are suspended.</p> <ul style="list-style-type: none">• VDC function• TCS function• ABS function• Brake limited slip differential (BLSD) function• Brake assist function• Brake force distribution function• hill start assist function• Advanced hill descent control function^{*1}• Active trace control function (control of chassis control module)• Active ride control function (control of chassis control module)	E BRC G
C1113	<p>The following functions are suspended.</p> <ul style="list-style-type: none">• VDC function• TCS function• ABS function^{*1}• Brake limited slip differential (BLSD) function• Brake assist function^{*1}• Brake force distribution function• hill start assist function• Advanced hill descent control function^{*1}• Active trace control function (control of chassis control module)• Active ride control function (control of chassis control module)	H I J
C1115	<p>The following functions are suspended.</p> <ul style="list-style-type: none">• VDC function• TCS function• ABS function• EBD function• Brake limited slip differential (BLSD) function• Brake assist function• Brake force distribution function• hill start assist function• Advanced hill descent control function^{*1}• Active trace control function (control of chassis control module)• Active ride control function (control of chassis control module)	K L M N
C1116	<p>The following functions are suspended.</p> <ul style="list-style-type: none">• VDC function• TCS function• Brake limited slip differential (BLSD) function• Brake assist function• Brake force distribution function• hill start assist function• Advanced hill descent control function^{*1}• Active trace control function (control of chassis control module)• Active ride control function (control of chassis control module)	O P
C1118	<p>The following functions are suspended.</p> <ul style="list-style-type: none">• Advanced hill descent control function^{*1}	

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

DTC	Fail-safe condition
C1120	The following functions are suspended. <ul style="list-style-type: none">• VDC function• TCS function• ABS function• EBD function• Brake limited slip differential (BLSD) function• Brake assist function• Brake force distribution function• hill start assist function
C1121	
C1122	
C1123	
C1124	
C1125	
C1126	
C1127	
C1130	The following functions are suspended. <ul style="list-style-type: none">• VDC function• TCS function• Brake limited slip differential (BLSD) function• Brake force distribution function• hill start assist function• Advanced hill descent control function^{*1}• Active trace control function (control of chassis control module)• Active ride control function (control of chassis control module)
C1140	The following functions are suspended. <ul style="list-style-type: none">• VDC function• TCS function• ABS function• EBD function• Brake limited slip differential (BLSD) function• Brake assist function• Brake force distribution function• hill start assist function• Advanced hill descent control function^{*1}• Active trace control function (control of chassis control module)• Active ride control function (control of chassis control module)
C1142	The following functions are suspended. <ul style="list-style-type: none">• VDC function• TCS function• Brake limited slip differential (BLSD) function• Brake assist function• Brake force distribution function• hill start assist function• Advanced hill descent control function^{*1}• Active trace control function (control of chassis control module)• Active ride control function (control of chassis control module)
C1143	The following functions are suspended. <ul style="list-style-type: none">• VDC function• TCS function• Brake limited slip differential (BLSD) function• Brake force distribution function• hill start assist function
C1144	

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

DTC	Fail-safe condition	
C1145	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function • TCS function • ABS function ^{*1} • Brake limited slip differential (BLSD) function • Brake assist function ^{*1} • Brake force distribution function • hill start assist function • Advanced hill descent control function ^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module) 	A
C1146		B
C1153	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • hill start assist function • Advanced hill descent control function ^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module) 	C
C1154	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake force distribution function • hill start assist function • Advanced hill descent control function ^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module) 	D
C1155	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • hill start assist function • Advanced hill descent control function ^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module) 	E
C1160	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function • TCS function • ABS function ^{*1} • Brake limited slip differential (BLSD) function • Brake assist function ^{*1} • Brake force distribution function • hill start assist function • Advanced hill descent control function ^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module) 	F
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SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

DTC	Fail-safe condition
C1164	The following functions are suspended. <ul style="list-style-type: none">• VDC function• TCS function• ABS function• EBD function
C1165	
C1166	
C1167	
C1170	<ul style="list-style-type: none">• Brake limited slip differential (BLSD) function• Brake assist function• Brake force distribution function• hill start assist function• Advanced hill descent control function^{*1}• Active trace control function (control of chassis control module)• Active ride control function (control of chassis control module)
C1197	
C1198	Electrical vacuum assistance of brake booster is suspended
C1199	Normal control
C119A	Electrical vacuum assistance of brake booster is suspended
C1B60	The following functions are suspended. <ul style="list-style-type: none">• Active trace control function (control of chassis control module)• Active ride control function (control of chassis control module)
U1000	The following functions are suspended. <ul style="list-style-type: none">• VDC function• TCS function
U1002	
U1010	<ul style="list-style-type: none">• ABS function^{*2}• EBD function^{*2}• Brake limited slip differential (BLSD) function• Brake assist function• Brake force distribution function• hill start assist function• Advanced hill descent control function^{*1}• Active trace control function (control of chassis control module)• Active ride control function (control of chassis control module)

*1: 4WD models with gasoline engine

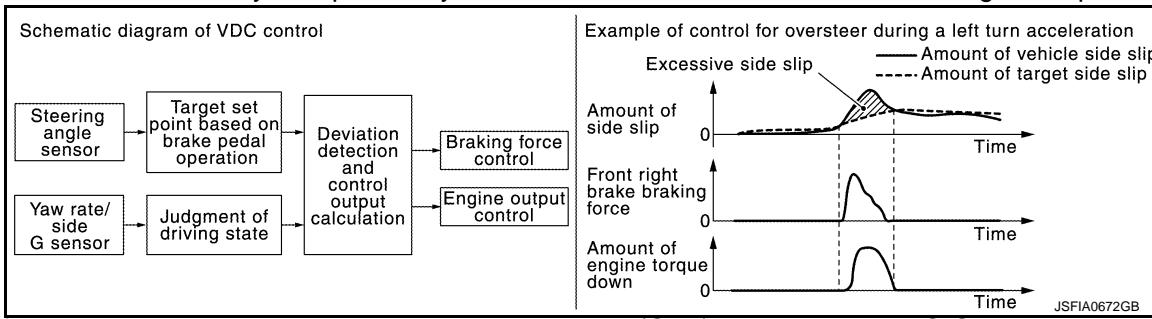
*2: When a malfunction detected in CAN communication [between ABS actuator and electric unit (control unit) and chassis control module].

VDC (ESP) FUNCTION

VDC (ESP) FUNCTION : System Description

INFOID:000000010723634

- 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 TCS function, ABS function and EBD function, target side slip amount is calculated according to steering operation amount from steering angle sensor and brake operation amount from pressure sensor. By comparing this information with vehicle side slip amount that is calculated from information from yaw rate/ side G sensor and wheel sensor, vehicle driving conditions (conditions of understeer or oversteer) are judged and vehicle stability is improved by brake force control on all 4 wheels and engine output control.



- VDC function can be switched to non-operational status (OFF) by operating VDC OFF switch. In this case, VDC OFF indicator lamp turns ON.

< SYSTEM DESCRIPTION >

- Control unit portion automatically improves driving stability by performing brake force control as well as engine output control, by transmitting drive signal to actuator portion according to difference between target side slip amount and vehicle side slip amount.
- VDC warning lamp blinks while VDC function is in operation and indicates to the driver that the function is in operation.
- CONSULT can be used to diagnose the system diagnosis.
- Fail-safe function is adopted. When a malfunction occurs in VDC function, the control is suspended for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). The vehicle status becomes the same as models without VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). However, ABS function and EBD function are operated normally. Refer to [BRC-43, "Fail-Safe".](#)

NOTE:

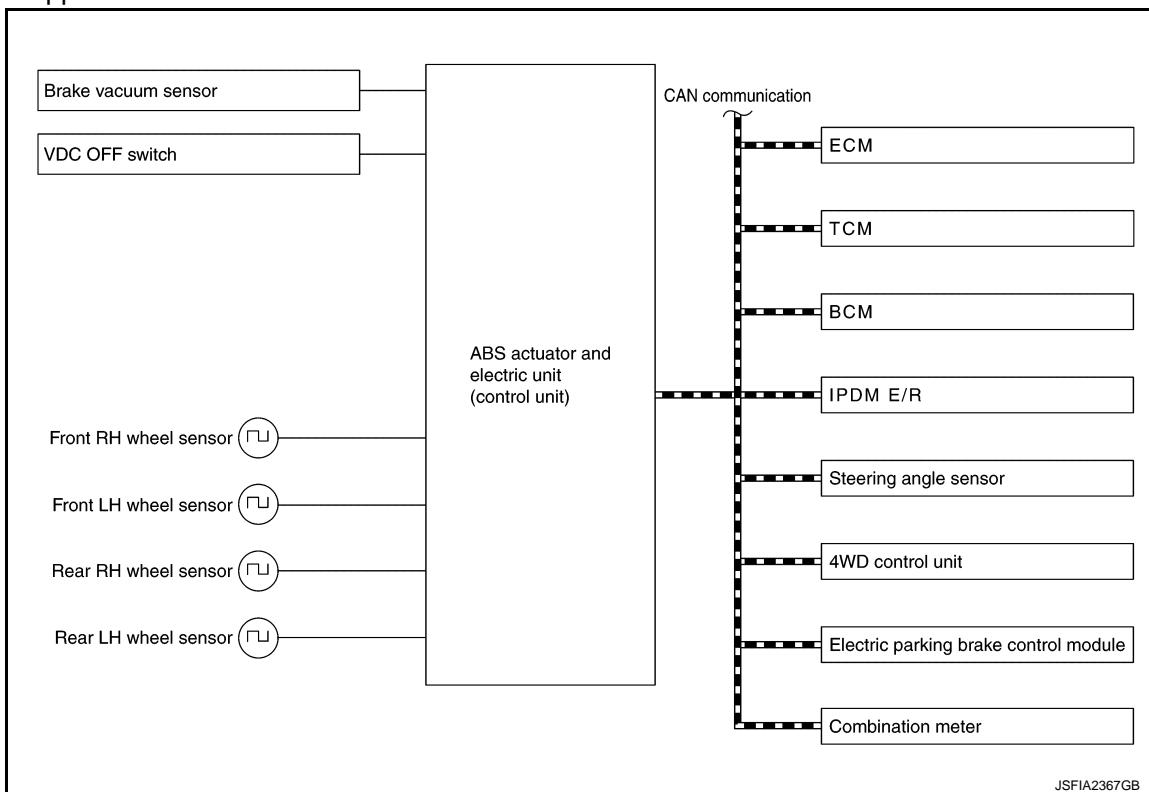
VDC has the characteristic as described here, This is not the device that helps reckless driving.

SYSTEM DIAGRAM

BRC

NOTE:

- 4WD control unit is applied to 4WD models.
- TCM is applied to CVT models.



INPUT SIGNAL AND OUTPUT SIGNAL

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

SYSTEM

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

Component parts	Signal description
Combination meter	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• Parking brake switch signal• Brake fluid level switch signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• ABS warning lamp signal• VDC OFF indicator lamp signal• VDC warning lamp signal• Brake warning lamp signal
TCM ^{*1}	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• N range signal• P range signal• R range signal• Current gear position signal• Shift position signal• TCM malfunction signal
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• Accelerator pedal position signal• Engine speed signal• Engine status signal• ECM malfunction signal
IPDM E/R	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• Ignition switch ON signal
BCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• Stop lamp switch signal• Brake pedal position switch signal• Cranking signal• Ignition switch ON signal
Electric parking brake control module	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• Electric parking brake operation signal
4WD control unit ^{*2}	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• 4WD malfunction signal• 4WD operation signal
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• Steering angle sensor signal

*1: CVT models

*2: 4WD models

OPERATION CHARACTERISTICS

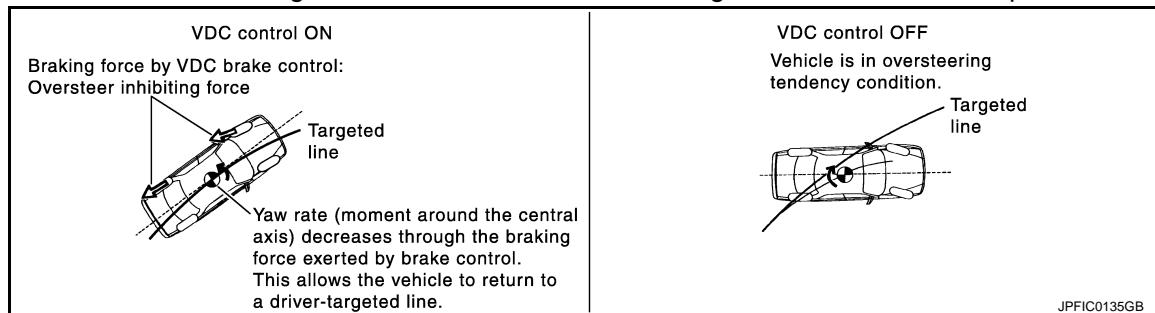
VDC Function That Prevents Oversteer Tendency

SYSTEM

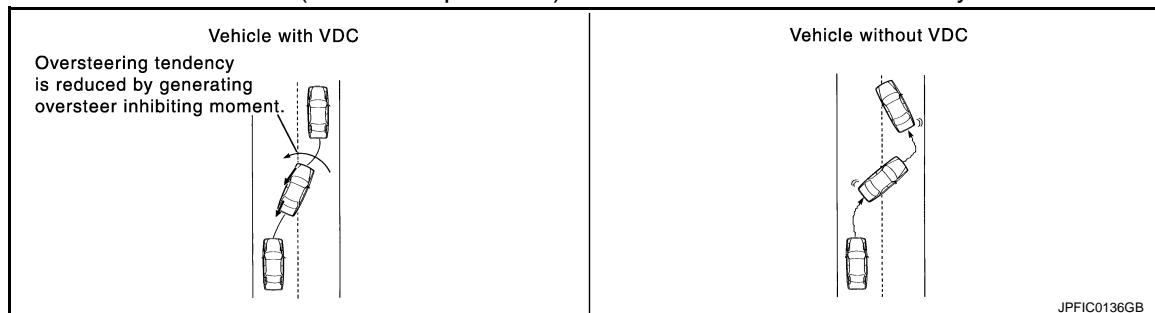
< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

- 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.

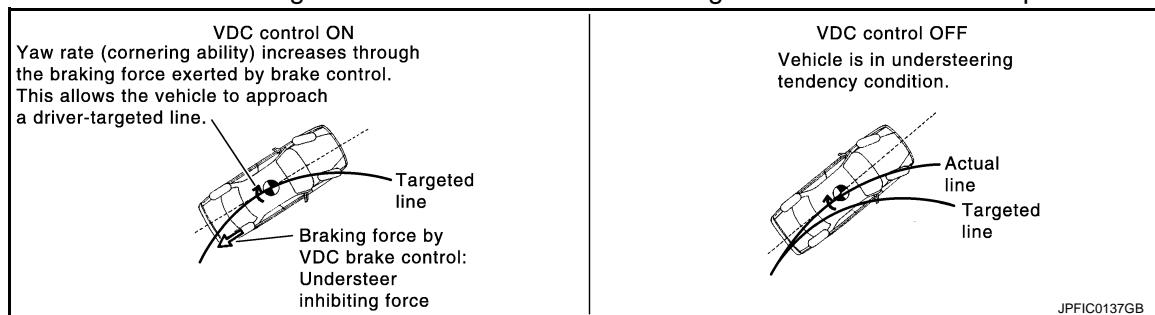


- Changing driving lane on a slippery road, when oversteer tendency is judged large, engine output is controlled as well as brake force (brake fluid pressure) of 4 wheels. Oversteer tendency decreases.

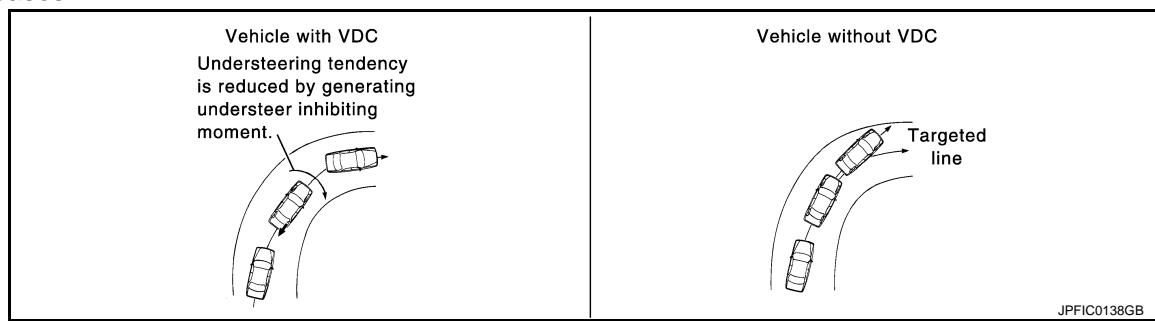


VDC Function That Prevents Tendency

- 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.



TCS FUNCTION

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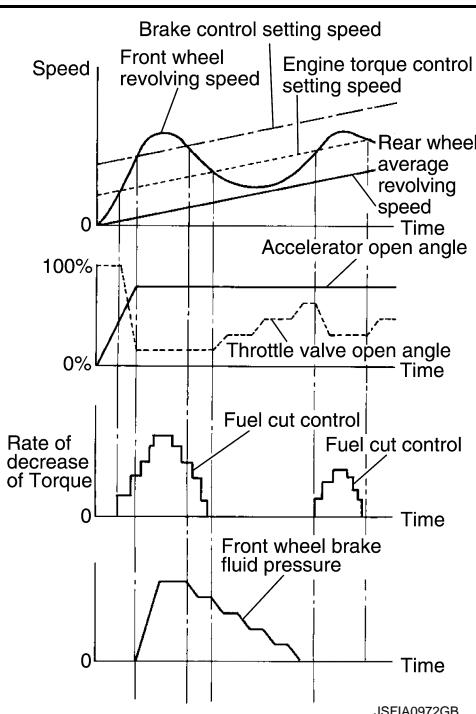
< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

TCS FUNCTION : System Description

INFOID:000000010723635

- 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, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). The vehicle status becomes the same as models without VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). However, ABS function and EBD function are operated normally. Refer to [BRC-43, "Fail-Safe".](#)

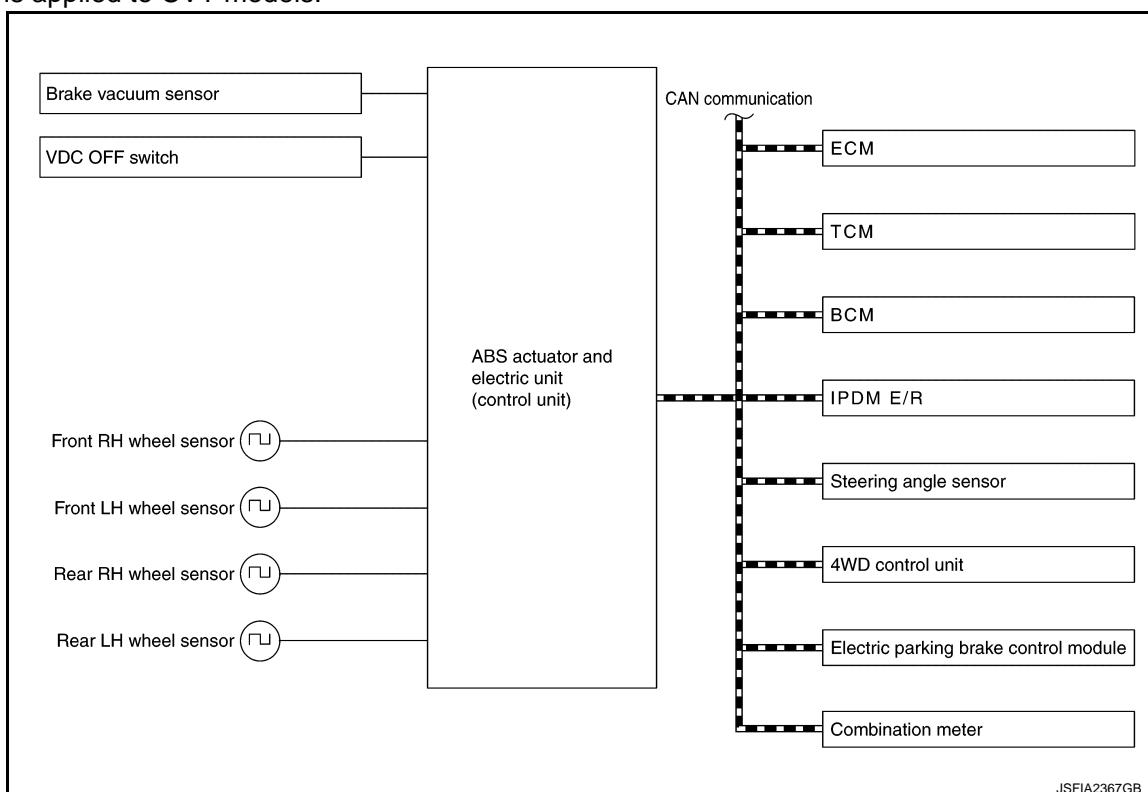


JSFIA0972GB

SYSTEM DIAGRAM

NOTE:

- 4WD control unit is applied to 4WD models.
- TCM is applied to CVT models.



JSFIA2367GB

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

INPUT SIGNAL AND OUTPUT SIGNAL

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

Component parts	Signal description
Combination meter	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• Parking brake switch signal• Brake fluid level switch signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• ABS warning lamp signal• VDC OFF indicator lamp signal• VDC warning lamp signal• Brake warning lamp signal
TCM ^{*1}	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• N range signal• P range signal• R range signal• Current gear position signal• Shift position signal• TCM malfunction signal
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• Accelerator pedal position signal• Engine speed signal• Engine status signal• ECM malfunction signal
IPDM E/R	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• Ignition switch ON signal
BCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• Stop lamp switch signal• Brake pedal position switch signal• Cranking signal• Ignition switch ON signal
Electric parking brake control module	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• Electric parking brake operation signal
4WD control unit ^{*2}	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• 4WD malfunction signal• 4WD operation signal
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none">• Steering angle sensor signal

*1: CVT models

*2: 4WD models

ABS FUNCTION

ABS FUNCTION : System Description

INFOID:000000010723636

- 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.

SYSTEM

[WITH VDC (ESP)]

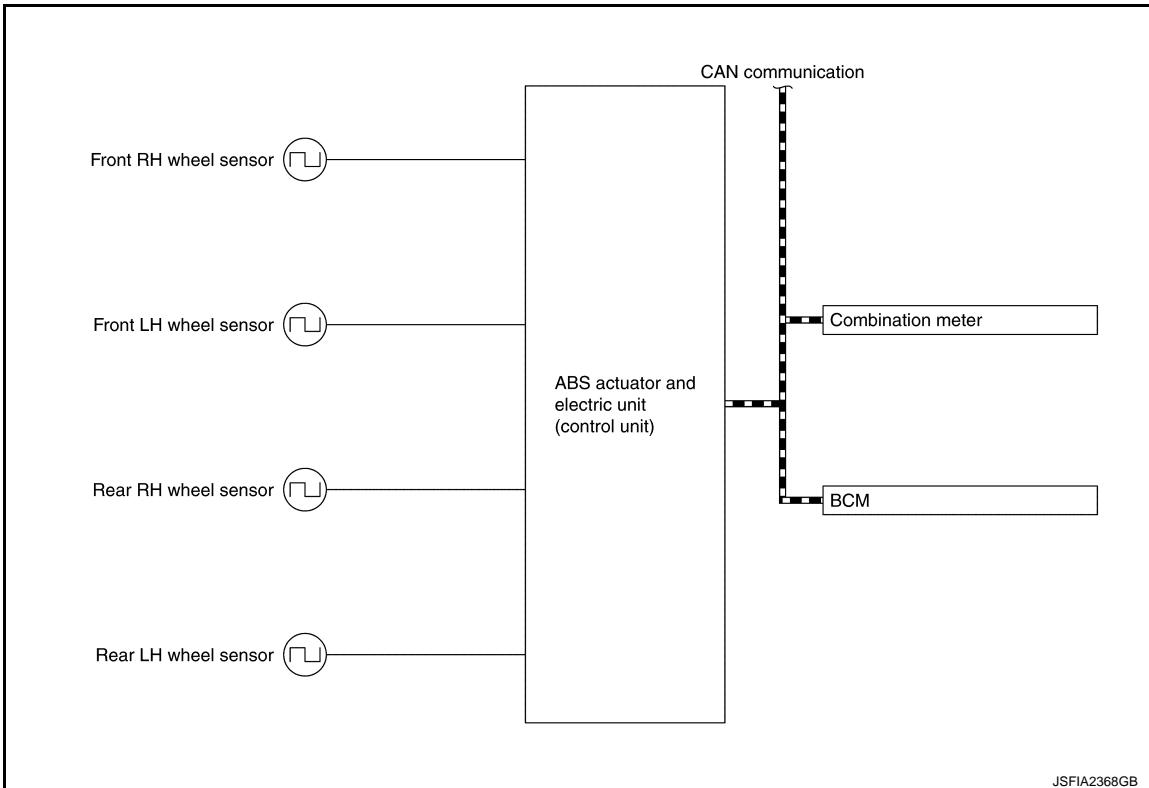
< SYSTEM DESCRIPTION >

- 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, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). The vehicle status becomes the same as models without VDC function, TCS function, ABS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). However, EBD function is operated normally. Refer to [BRC-43, "Fail-Safe"](#).

NOTE:

- ABS function 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.

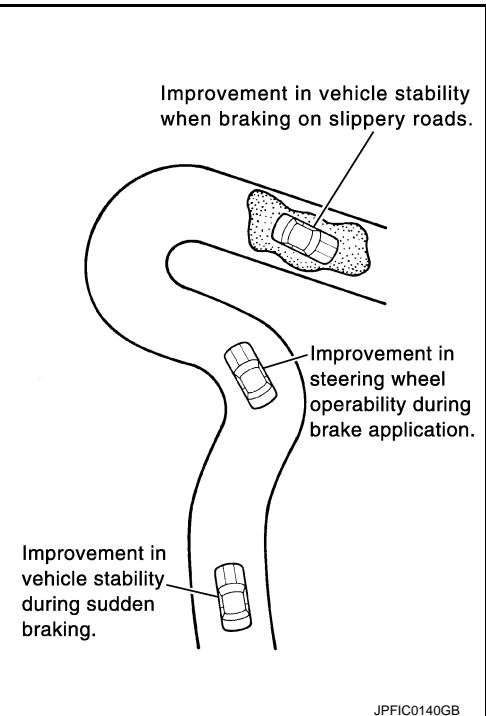
SYSTEM DIAGRAM



JSFIA2368GB

INPUT SIGNAL AND OUTPUT SIGNAL

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



JPFIC0140GB

< SYSTEM DESCRIPTION >

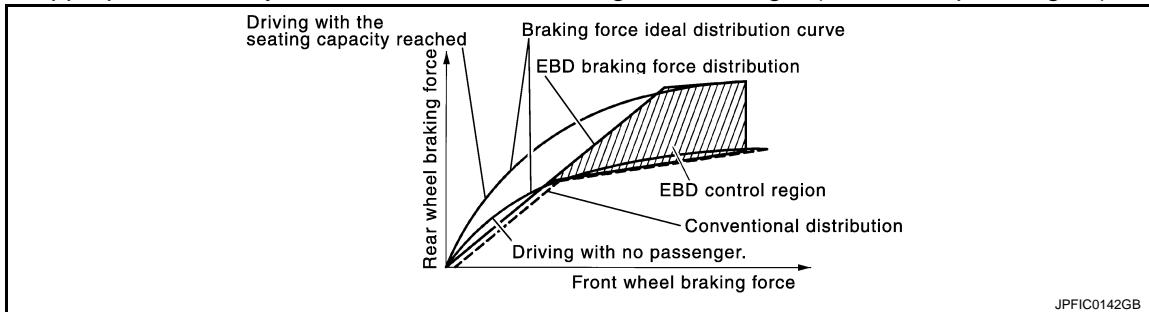
Component parts	Signal description
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • VDC warning lamp signal • ABS warning lamp signal
BCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • Stop lamp switch signal

EBD FUNCTION

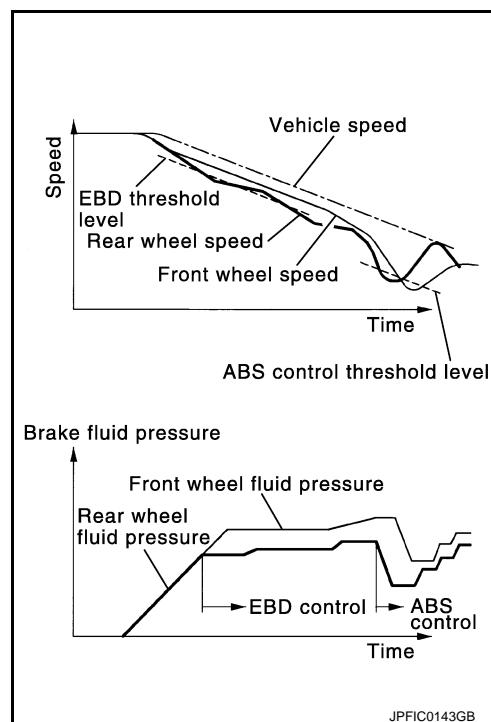
EBD FUNCTION : System Description

INFOID:0000000010723637

- 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, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). Refer to [BRC-43, "Fail-Safe"](#).

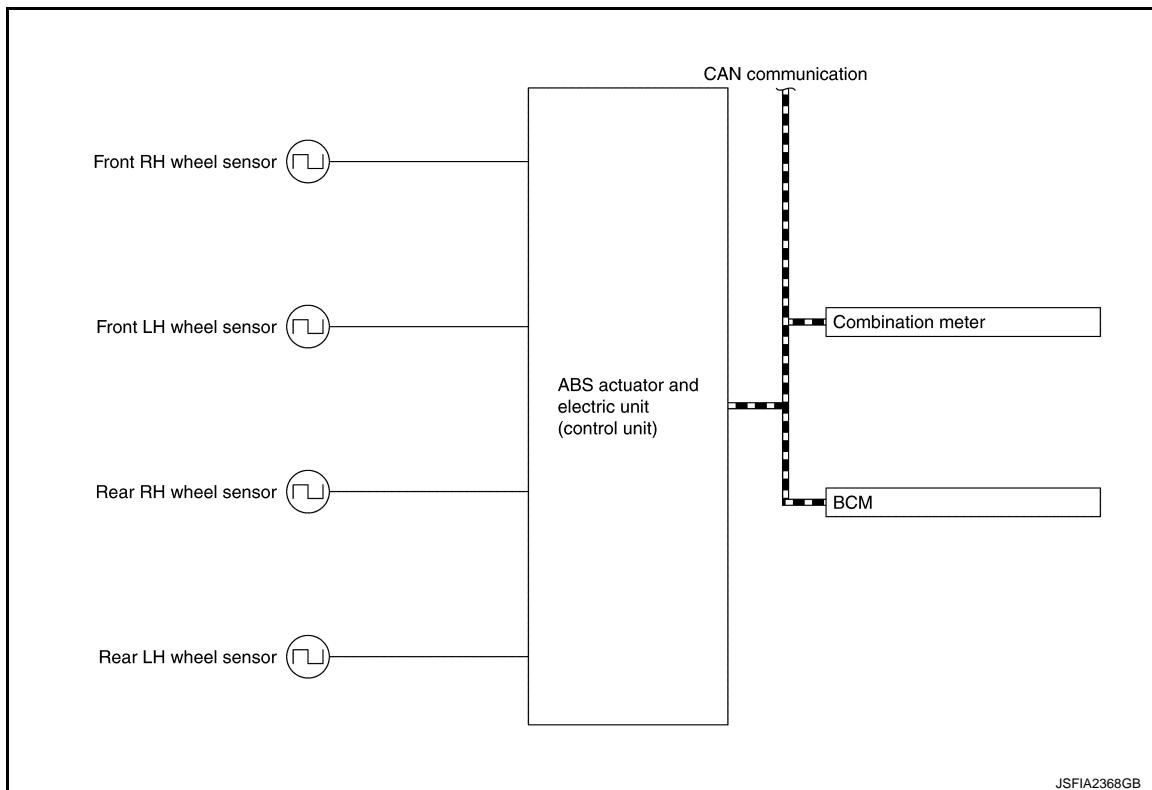


SYSTEM

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

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

Component parts	Signal description
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • VDC warning lamp signal • ABS warning lamp signal • Brake warning lamp signal
BCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • Stop lamp switch signal

BRAKE LIMITED SLIP DIFFERENTIAL (BLSD) FUNCTION

BRAKE LIMITED SLIP DIFFERENTIAL (BLSD) FUNCTION : System Description

INFOID:000000010723638

- 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 blinking while brake limited slip differential (BLSD) function is in operation and indicates to the driver that the function is in operation.
- Slight vibrations are felt on the brake pedal and the operation noises occur, when brake limited slip differential (BLSD) function operates. This is not a malfunction because it is caused by brake limited slip differential (BLSD) function that is normally operated.
- Fail-safe function is adopted. When a malfunction occurs in brake limited slip differential (BLSD) function, the control is suspended for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). The vehicle status becomes the same as models without VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist func-

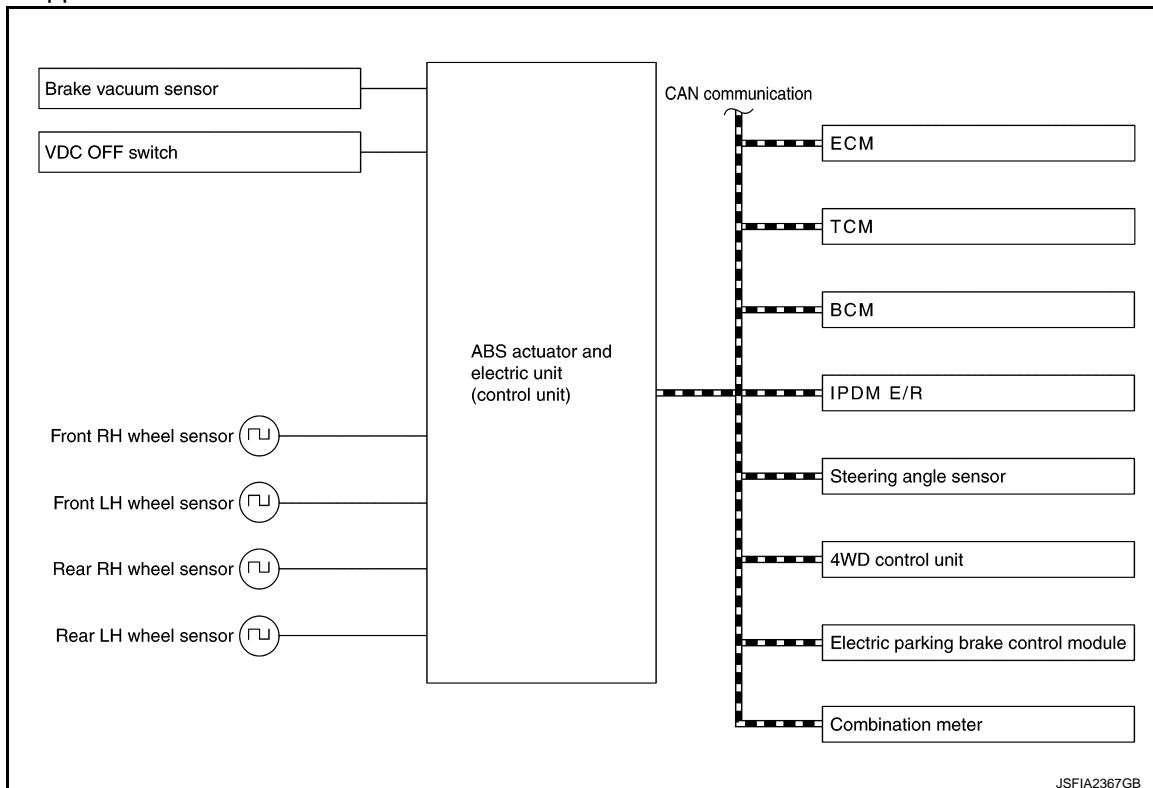
< SYSTEM DESCRIPTION >

tion, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). However, ABS function and EBD function are operated normally. Refer to [BRC-43, "Fail-Safe"](#).

SYSTEM DIAGRAM

NOTE:

- 4WD control unit is applied to 4WD models.
- TCM is applied to CVT models.



INPUT SIGNAL AND OUTPUT SIGNAL

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

Component parts	Signal description
Combination meter	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Parking brake switch signal • Brake fluid level switch signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • ABS warning lamp signal • VDC OFF indicator lamp signal • VDC warning lamp signal • Brake warning lamp signal
TCM ^{*1}	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • N range signal • P range signal • R range signal • Current gear position signal • Shift position signal • TCM malfunction signal

SYSTEM

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

Component parts	Signal description
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • Accelerator pedal position signal • Engine speed signal • Engine status signal • ECM malfunction signal
IPDM E/R	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • Ignition switch ON signal
BCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • Stop lamp switch signal • Brake pedal position switch signal • Cranking signal • Ignition switch ON signal
Electric parking brake control module	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • Electric parking brake operation signal
4WD control unit ^{*2}	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • 4WD malfunction signal • 4WD operation signal
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • Steering angle sensor signal

*1: CVT models

*2: 4WD models

BRAKE ASSIST FUNCTION

BRAKE ASSIST FUNCTION : System Description

INFOID:000000010723639

- When the driver brakes hard in an emergency, the stopping distance is reduced by increasing brake fluid pressure.
- Fail-safe function is adopted. When a malfunction occurs in brake assist function, the control is suspended for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). The vehicle status becomes the same as models without VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). However, ABS function and EBD function are operated normally. Refer to [BRC-43, "Fail-Safe".](#)

SYSTEM DIAGRAM

NOTE:

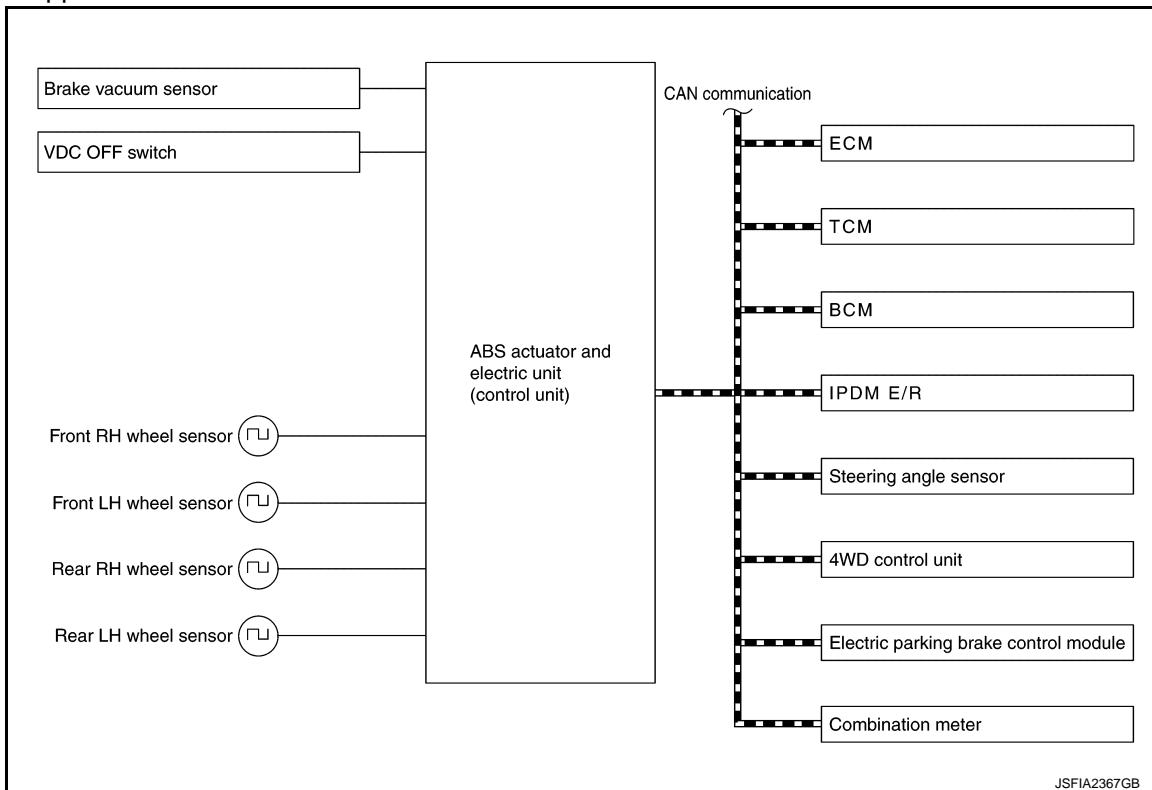
- 4WD control unit is applied to 4WD models.

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

- TCM is applied to CVT models.



INPUT SIGNAL AND OUTPUT SIGNAL

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

Component parts	Signal description
Combination meter	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Parking brake switch signal • Brake fluid level switch signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • ABS warning lamp signal • VDC OFF indicator lamp signal • VDC warning lamp signal • Brake warning lamp signal
TCM ^{*1}	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • N range signal • P range signal • R range signal • Current gear position signal • Shift position signal • TCM malfunction signal
ECM	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Accelerator pedal position signal • Engine speed signal • Engine status signal • ECM malfunction signal
IPDM E/R	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Ignition switch ON signal

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

Component parts	Signal description
BCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • Stop lamp switch signal • Brake pedal position switch signal • Cranking signal • Ignition switch ON signal
Electric parking brake control module	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • Electric parking brake operation signal
4WD control unit ^{*2}	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • 4WD malfunction signal • 4WD operation signal
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • Steering angle sensor signal

*1: CVT models

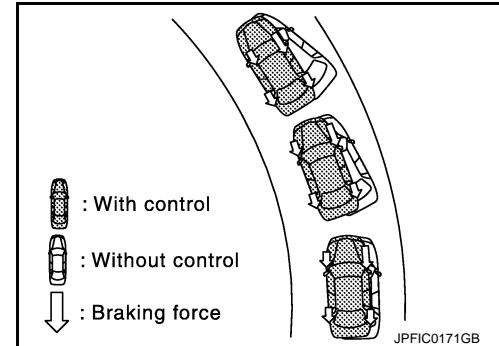
*2: 4WD models

BRAKE FORCE DISTRIBUTION FUNCTION

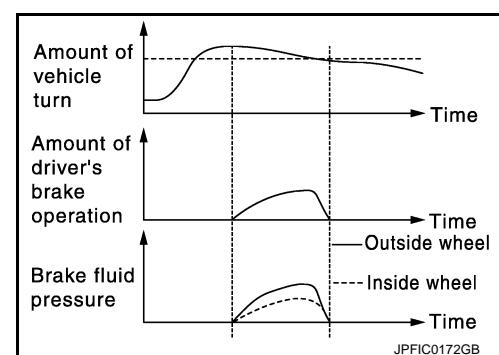
BRAKE FORCE DISTRIBUTION FUNCTION : System Description

INFOID:0000000010723640

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



- 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.
- Fail-safe function is adopted. When a malfunction occurs in brake force distribution function, the control is suspended for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). The vehicle status becomes the same as models without VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). However ABS function and EBD function are operated normally. Refer to [BRC-43, "Fail-Safe"](#).



NOTE:

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

SYSTEM DIAGRAM

NOTE:

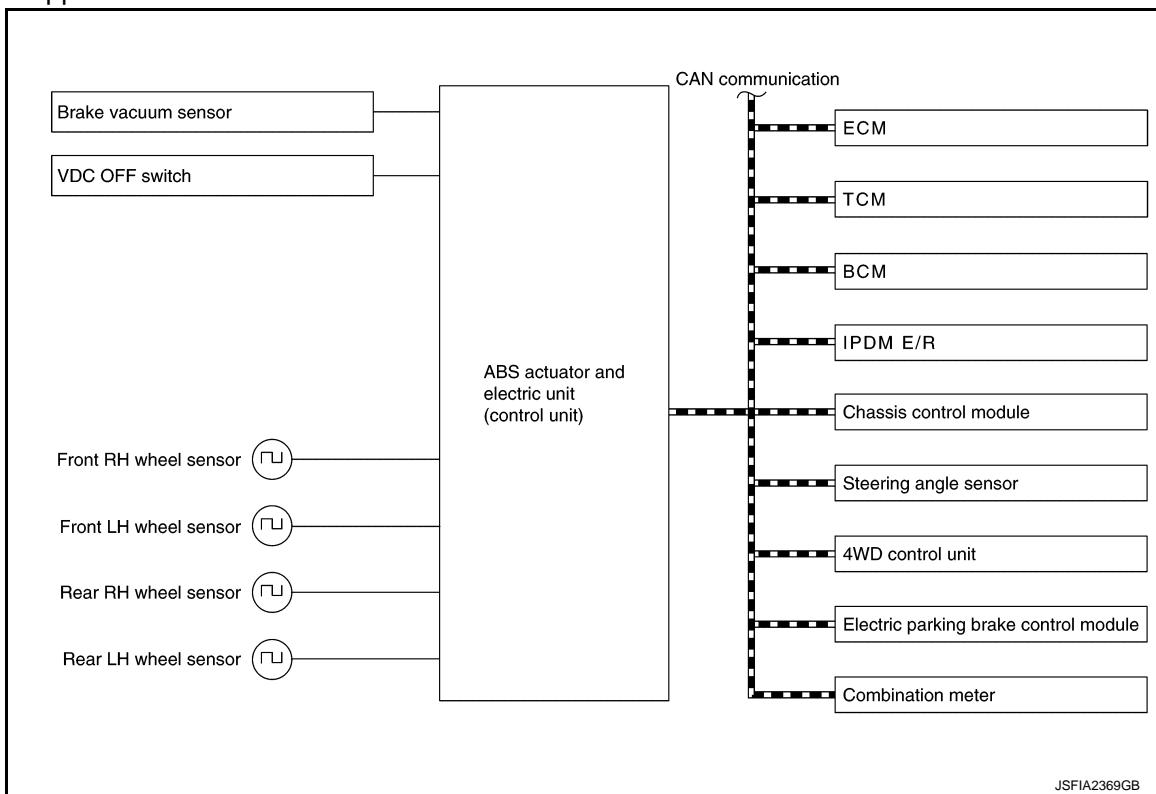
- 4WD control unit is applied to 4WD models.

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

- TCM is applied to CVT models.



INPUT SIGNAL AND OUTPUT SIGNAL

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

Component parts	Signal description
Combination meter	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Parking brake switch signal • Brake fluid level switch signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • ABS warning lamp signal • VDC OFF indicator lamp signal • VDC warning lamp signal • Brake warning lamp signal
TCM ^{*1}	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • N range signal • P range signal • R range signal • Current gear position signal • Shift position signal • TCM malfunction signal
ECM	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Accelerator pedal position signal • Engine speed signal • Engine status signal • ECM malfunction signal
IPDM E/R	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Ignition switch ON signal

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

Component parts	Signal description
BCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • Stop lamp switch signal • Brake pedal position switch signal • Cranking signal • Ignition switch ON signal
Chassis control module	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • Active trace control signal • Active ride control signal
Electric parking brake control module	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • Electric parking brake operation signal
4WD control unit*2	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • 4WD malfunction signal • 4WD operation signal
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> • Steering angle sensor signal

*1: CVT models

*2: 4WD models

hill start assist (UPHILL START SUPPORT) FUNCTION

hill start assist (UPHILL START SUPPORT) FUNCTION : System Description

INFOID:000000010723641

- 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 (engine running) on an uphill slope of slope ratio 10% or more, selector lever is in the position other than P or N, brake pedal is depressed and accelerator pedal is not depressed. (CVT models)
- This function operates when the vehicle is in stop status (engine running) on an uphill slope of slope ratio 10% or more, shift lever is in the position other than neutral position, brake pedal is depressed and accelerator pedal is not depressed. (M/T models)
- hill start assist indicator lamp turn ON when hill start assist function is satisfied to operational conditions.
- hill start assist indicator lamp blinks when hill start assist function is operation conditions.
- 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, does not turn ON or blink the hill start assist indicator lamp on the combination meter, the control is suspended for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). The vehicle status becomes the same as models without VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). However, ABS function and EBD function are operated normally. Refer to [BRC-43, "Fail-Safe"](#).

SYSTEM DIAGRAM

NOTE:

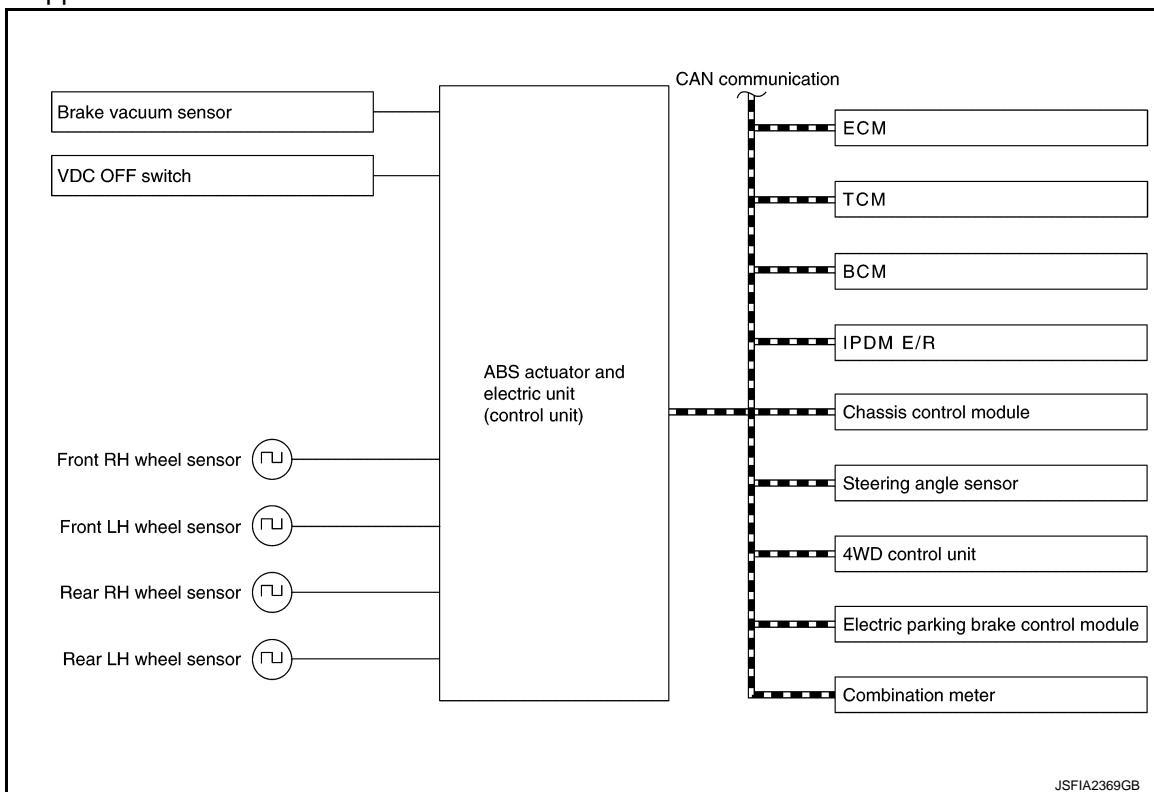
- 4WD control unit is applied to 4WD models.

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

- TCM is applied to CVT models.



INPUT SIGNAL AND OUTPUT SIGNAL

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

Component parts	Signal description
Combination meter	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Parking brake switch signal • Brake fluid level switch signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • ABS warning lamp signal • VDC OFF indicator lamp signal • VDC warning lamp signal • Brake warning lamp signal • hill start assist indicator lamp signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via chassis control module via CAN communication.</p> <ul style="list-style-type: none"> • hill start assist display request signal
TCM ^{*1}	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • N range signal • P range signal • R range signal • Current gear position signal • Shift position signal • TCM malfunction signal
ECM	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Accelerator pedal position signal • Engine speed signal • Engine status signal • ECM malfunction signal

SYSTEM

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

Component parts	Signal description
IPDM E/R	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Ignition switch ON signal
BCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Stop lamp switch signal • Brake pedal position switch signal • Cranking signal • Ignition switch ON signal
Chassis control module	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. • hill start assist display request signal Mainly transmits the following signals to combination meter via CAN communication. • hill start assist display request signal
Electric parking brake control module	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Electric parking brake operation signal
4WD control unit ^{*2}	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • 4WD malfunction signal • 4WD operation signal
Steering angle sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. • Steering angle sensor signal

*1: CVT models

*2: 4WD models

ADVANCED hill descent control (DOWNHILL DRIVE SUPPORT) FUNCTION

ADVANCED hill descent control (DOWNHILL DRIVE SUPPORT) FUNCTION : System Description

INFOID:000000010723642

- Advanced hill descent control function is applied to 4WD models with gasoline engine.
- At a steep descent, vehicle speed is normally controlled by the driver's brake operation. On the other hand, advanced hill descent control function automatically reduces and maintains vehicle speed.
- Advanced hill descent control function starts when all of the following conditions are satisfied: hill descent control switch is ON and, vehicle speed is 25 km/h (15.5 MPH) or less, the inclination is 10% or more and selector lever is in the other than P and N position.
- Advanced hill descent control function is cancelled when depressing the accelerator pedal or brake pedal. (Advanced hill descent control function restarts when releasing the accelerator pedal or brake pedal.)

NOTE:

- While driving in the forward direction, the vehicle decelerates when the brake pedal is depressed and maintains the speed [15 km/h (9.3 MPH) or less] achieved at a brake pedal release.
- While driving in the forward direction, the vehicle accelerates when the accelerator pedal is depressed and maintains a speed [15 km/h (9.3 MPH) or less] achieved at an accelerator pedal release.
- As for M/T models, although the hill descent control indicator lamp blinks and advanced hill descent control function becomes deactivated when engine coolant water temperature is low, this is normal. (advanced hill descent control function starts when engine coolant water temperature rises and hill descent control indicator lamp turns ON.)
- hill descent control switch is ON and turns ON when advanced hill descent control function are operation or satisfied to operational conditions.
- The Stop lamp of the rear combination lamp stays ON during the operation of advanced hill descent control function.
- Slight vibrations are felt on the brake pedal and the operation noises occur, when advanced hill descent control function operates. This is not a malfunction because it is caused by advanced hill descent control function that is normally operated.
- Fail-safe function is adopted. When a malfunction occurs in advanced hill descent control function, the operation of the hill descent control switch does not turn ON or blink the hill descent control indicator lamp on the combination meter, and the control is suspended for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function,

SYSTEM

< SYSTEM DESCRIPTION >

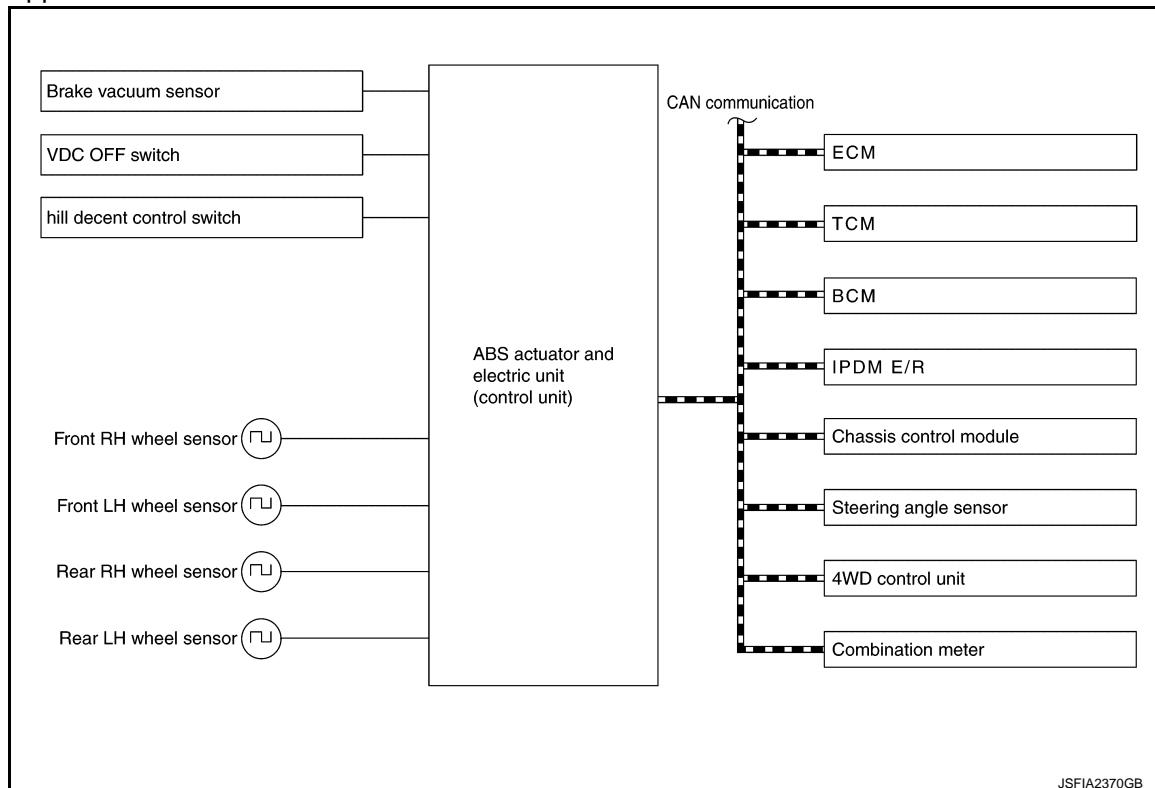
[WITH VDC (ESP)]

advanced hill descent control function, active trace control function (control of chassis control module) and active ride control function (control of chassis control module). The vehicle status becomes the same as models without VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function, active trace control function (control of chassis control module) and active ride control function (control of chassis control module). However, ABS function and EBD function are operated normally. Refer to [BRC-43, "Fail-Safe"](#).

SYSTEM DIAGRAM

NOTE:

TCM is applied to CVT models.



INPUT SIGNAL AND OUTPUT SIGNAL

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

SYSTEM

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

Component parts	Signal description
Combination meter	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Parking brake switch signal • Brake fluid level switch signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • ABS warning lamp signal • VDC OFF indicator lamp signal • VDC warning lamp signal • Brake warning lamp signal • hill descent control indicator lamp signal <p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via chassis control module via CAN communication.</p> <ul style="list-style-type: none"> • hill descent control display request signal
TCM*	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • N range signal • P range signal • R range signal • Current gear position signal • Shift position signal • TCM malfunction signal
ECM	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Accelerator pedal position signal • Engine speed signal • Engine status signal • ECM malfunction signal
IPDM E/R	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Ignition switch ON signal
BCM	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Stop lamp switch signal • Brake pedal position switch signal • Cranking signal • Ignition switch ON signal
Chassis control module	<p>Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • hill descent control display request signal <p>Mainly transmits the following signals to combination meter via CAN communication.</p> <ul style="list-style-type: none"> • hill descent control display request signal
4WD control unit	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • 4WD malfunction signal • 4WD operation signal
Steering angle sensor	<p>Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> • Steering angle sensor signal

*: CVT models

WARNING/INDICATOR/CHIME LIST

SYSTEM

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

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

INFOID:000000010723643

Name	Design	Layout/Function
ABS warning lamp		For layout: Refer to MWI-10, "METER SYSTEM : Design" . For function: Refer to MWI-24, "WARNING LAMPS/INDICATOR LAMPS : ABS Warning Lamp" .
VDC warning lamp		For layout: Refer to MWI-10, "METER SYSTEM : Design" . For function: Refer to MWI-61, "WARNING LAMPS/INDICATOR LAMPS : VDC (ESP) Warning Lamp" .
Brake warning lamp		For layout: Refer to MWI-10, "METER SYSTEM : Design" . For function: Refer to MWI-26, "WARNING LAMPS/INDICATOR LAMPS : Brake Warning Lamp (Red)" .
VDC OFF indicator lamp		For layout: Refer to MWI-10, "METER SYSTEM : Design" . For function: Refer to MWI-60, "WARNING LAMPS/INDICATOR LAMPS : VDC (ESP) OFF Indicator Lamp" .
hill start assist indicator lamp		For layout: Refer to MWI-10, "METER SYSTEM : Design" . For function: Refer to MWI-44, "WARNING LAMPS/INDICATOR LAMPS : hill start assist (Uphill Start Support) Indicator lamp" .
hill descent control indicator lamp*		For layout: Refer to MWI-10, "METER SYSTEM : Design" . For function: Refer to MWI-42, "WARNING LAMPS/INDICATOR LAMPS : hill descent control (Downhill Drive Support) Indicator lamp" .

*: 4WD models with gasoline engine

INFORMATION DISPLAY (COMBINATION METER)

INFORMATION DISPLAY (COMBINATION METER) : Chassis Control Display

INFOID:000000010723644

DESIGN/PURPOSE

- hill start assist function information is displayed on the information display.
- Advanced hill descent control function information is displayed on the information display. (4WD models with gasoline engine)

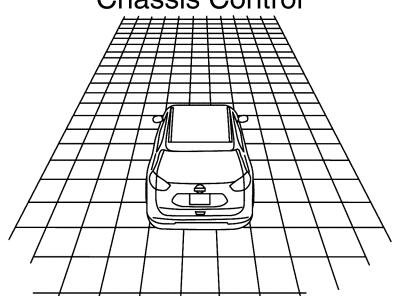
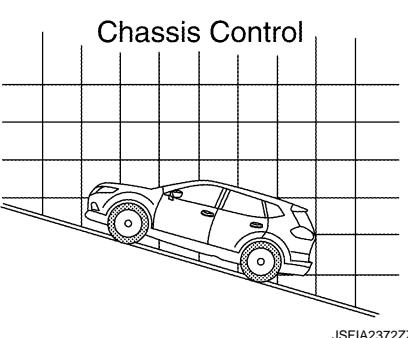
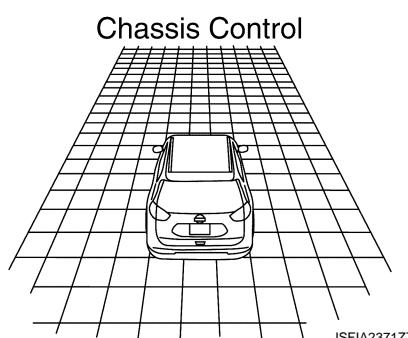
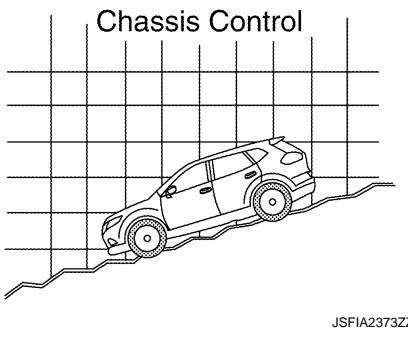
System Information

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

hill start assist function

Design	Description
<p>Chassis Control</p> 	hill start assist function operation condition is not satisfied
<p>Chassis Control</p> 	<ul style="list-style-type: none"> Not blinking (tire): hill start assist function operation condition is satisfied (not operating) Blinking (tire): hill start assist function is operating
Advanced hill descent control function (4WD models with gasoline engine)	
<p>Chassis Control</p> 	Advanced hill descent control function is not operating
<p>Chassis Control</p> 	Advanced hill descent control function is operating

SYNCHRONIZATION WITH MASTER WARNING LAMP

Not applicable

SYSTEM DIAGRAM

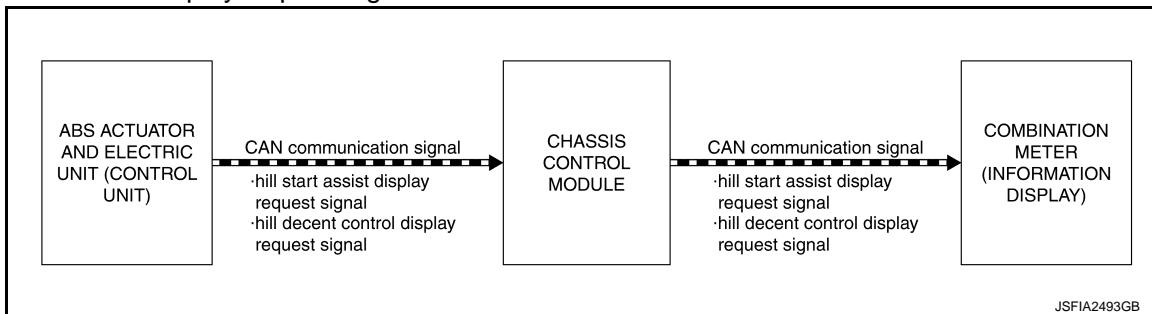
NOTE:

SYSTEM

[WITH VDC (ESP)]

< SYSTEM DESCRIPTION >

hill descent control display request signal is 4WD models



SIGNAL PATH

hill start assist Function

- The ABS actuator and electric unit (control unit) transmits a hill start assist display request signal to the chassis control module via CAN communication when operating status in the hill assist function.
- The chassis control module receiving a hill start assist display request signal, and transmits a hill start assist display request signal to the combination meter via CAN communication.
- The combination meter shows the chassis control display on the information display, according to the signal.

Advanced hill descent control Function (4WD Models with Gasoline Engine)

- The ABS actuator and electric unit (control unit) transmits a hill descent control display request signal to the chassis control module via CAN communication when operating status in the advanced hill descent control function.
- The chassis control module receiving a hill descent control display request signal, and transmits a hill descent control display request signal to the combination meter via CAN communication.
- The combination meter shows the chassis control display on the information display, according to the signal.

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

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

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

CONSULT Function

INFOID:0000000010723645

APPLICATION ITEMS

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

Mode	Function description
ECU identification	Parts number of ABS actuator and electric unit (control unit) can be read.
Self Diagnostic Result	Self-diagnostic results and freeze frame data can be read and erased quickly.*
Date Monitor	Input/Output data in the ABS actuator and electric unit (control unit) can be read.
Active Test	Diagnostic Test Mode in which CONSULT drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.
Work support	Components can be quickly and accurately adjusted.
Re/programming, Configuration	<ul style="list-style-type: none">Read and save the vehicle specification (TYPE ID).Write the vehicle specification (TYPE ID) when replacing ABS actuator and electric unit (control unit).

*: The following diagnosis information is erased by erasing

- DTC
- Freeze frame data (FFD)

ECU IDENTIFICATION

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

SELF DIAGNOSTIC RESULT

Refer to [BRC-84, "DTC Index"](#).

When "CRNT" is displayed on self-diagnosis result

- The system is presently malfunctioning.

When "PAST" is displayed on self-diagnosis result

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

Freeze frame data (FFD)

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

Item name	Display Item
IGN counter (0 – 39)	<p>The number of times that ignition switch is turned ON after the DTC is detected is displayed.</p> <ul style="list-style-type: none">• 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. <p>NOTE: Each time when ignition switch is turned OFF to ON, numerical number increases in 1→2→3...38→39. When the operation number of times exceeds 39, the number do not increase and "39" is displayed until self diagnosis is erased.</p>

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.

x: Applicable

Item (Unit)	Monitor item selection		Note
	INPUT SIGNALS	MAIN ITEMS	
FR LH SENSOR (km/h)	x	x	Wheel speed calculated by front LH wheel sensor is displayed.
FR RH SENSOR (km/h)	x	x	Wheel speed calculated by front RH wheel sensor is displayed.

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

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

Item (Unit)	Monitor item selection		Note
	INPUT SIGNALS	MAIN ITEMS	
RR LH SENSOR (km/h)	×	×	Wheel speed calculated by rear LH wheel sensor is displayed.
RR RH SENSOR (km/h)	×	×	Wheel speed calculated by rear RH wheel sensor is displayed.
DECCEL G-SEN (G)	×	×	Decel G detected by decel G sensor is displayed.
FR RH IN SOL ^{*1} (On/Off)		×	Operation status of front RH wheel ABS IN valve is displayed.
FR RH OUT SOL ^{*1} (On/Off)		×	Operation status of front RH wheel ABS OUT valve is displayed.
FR LH IN SOL ^{*1} (On/Off)		×	Operation status of front LH wheel ABS IN valve is displayed.
FR LH OUT SOL ^{*1} (On/Off)		×	Operation status of front LH wheel ABS OUT valve is displayed.
RR RH IN SOL ^{*1} (On/Off)		×	Operation status of rear RH wheel ABS IN valve is displayed.
RR RH OUT SOL ^{*1} (On/Off)		×	Operation status of rear RH wheel ABS OUT valve is displayed.
RR LH IN SOL ^{*1} (On/Off)		×	Operation status of rear LH wheel ABS IN valve is displayed.
RR LH OUT SOL ^{*1} (On/Off)		×	Operation status of rear LH wheel ABS OUT valve is displayed.
EBD WARN LAMP (On/Off)			Brake warning lamp ON/OFF status is displayed.* ²
STOP LAMP SW (On/Off)	×	×	Stop lamp switch signal input status is displayed.
MOTOR RELAY (On/Off)		×	ABS motor and motor relay status is displayed.
ACTUATOR RLY ^{*1} (On/Off)		×	ABS actuator relay status is displayed.
ABS WARN LAMP (On/Off)		×	ABS warning lamp ON/OFF status is displayed.* ²
OFF LAMP (On/Off)		×	VDC OFF indicator lamp ON/OFF status is displayed.* ²
SLIP/VDC LAMP (On/Off)		×	VDC warning lamp ON/OFF status is displayed.* ²
BATTERY VOLT (V)	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.
GEAR ^{*3}	×	×	Current gear position judged from current gear position signal is displayed.
SELECT LVR POSI ^{*3}	×	×	Current shift position judged from shift position signal is displayed.
YAW RATE SEN (d/s)	×	×	Yaw rate detected by yaw rate/side/decel G sensor is displayed.
R POSI SIG ^{*3}			R range signal input status judged from R range signal is displayed.
4WD MODE MON (2WD/4WD)		×	Drive status is displayed.
N POSI SIG ^{*3}			N range signal input status judged from N range signal is displayed.

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

<SYSTEM DESCRIPTION>

[WITH VDC (ESP)]

Item (Unit)	Monitor item selection		Note
	INPUT SIGNALS	MAIN ITEMS	
P POSI SIG* ³			P range signal input status judged from P range signal is displayed.
ACCEL POS SIG (%)	×		Displays the Accelerator pedal position.
SIDE G-SENSOR (m/s ²)	×		Side G detected by yaw rate/side/decel G sensor is displayed.
STR ANGLE SIG (deg)	×		Steering angle detected by steering angle sensor is displayed.
PRESS SENSOR (bar)	×		Brake fluid pressure detected by pressure sensor is displayed.
EBD SIG (On/Off)			Operation status of EBD function is displayed.
ABS SIG (On/Off)			Operation status of ABS function is displayed.
TCS SIG (On/Off)			Operation status of TCS function is displayed.
VDC SIG (On/Off)			Operation status of VDC function is displayed.
EBD FAIL SIG (On/Off)			Fail-safe signal status of EBD function is displayed.
ABS FAIL SIG (On/Off)			Fail-safe signal status of ABS function is displayed.
TCS FAIL SIG (On/Off)			Fail-safe signal status of TCS function is displayed.
VDC FAIL SIG (On/Off)			Fail-safe signal status of VDC function is displayed.
CRANKING SIG (On/Off)			Cranking status is displayed.
FLUID LEV SW (On/Off)	×		Brake fluid level signal input status is displayed.
PARK BRAKE SW (On/Off)			Parking brake switch signal input status is displayed.
USV[FL-RR] ^{*1} (On/Off)			Operation status of cut valve 1 is displayed.
USV[FR-RL] ^{*1} (On/Off)			Operation status of cut valve 2 is displayed.
HSV[FL-RR] ^{*1} (On/Off)			Operation status of suction valve 1 is displayed.
HSV[FR-RL] ^{*1} (On/Off)			Operation status of suction valve 2 is displayed.
V/ROUTPUT ^{*1} (On/Off)			ABS actuator relay status is displayed.
M/R OUTPUT (On/Off)			ABS motor and motor relay status is displayed.
ENGINE RPM			Engine speed status is displayed.
STP ON RLY (On/Off)			Operation status of stop lamp ON relay is displayed.
DDS SW ^{*4} (On/Off)			Operation status of hill descent control switch is displayed.

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

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

Item (Unit)	Monitor item selection		Note
	INPUT SIGNALS	MAIN ITEMS	
DDS SIG ^{*4} (On/Off)			Operation status of advanced hill descent control function is displayed.
USS SIG ^{*5} (On/Off)			Operation status of hill start assist function is displayed.
1ST GEAR SIG ^{*6} (On/Off)			1st range status is displayed.
OFF SW (On/Off)	×	×	VDC OFF switch status is displayed.

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

*2: Refer to [BRC-67, "WARNING/INDICATOR/CHIME LIST : Warning Lamp/Indicator Lamp"](#) for ON/OFF conditions of each warning lamp and indicator lamp.

*3: CVT models

*4: "DDS" means "hill descent control" or "downhill drive support".

*5: "USS" means "hill start assist" or "Uphill Start Support".

*6: M/T models

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

ABS In Valve and ABS Out Valve

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

Test item	Display item	Display		
		Up	Keep	Down
FR RH SOL	FR RH IN SOL	Off	On	On
	FR RH OUT SOL	Off	Off	On*
	USV[FL-RR]	Off	Off	Off
	USV[FR-RL]	Off	Off	Off
	HSV[FL-RR]	Off	Off	Off
	HSV[FR-RL]	Off	Off	Off
FR LH SOL	FR LH IN SOL	Off	Off	On
	FR LH OUT SOL	Off	Off	On*
	USV[FL-RR]	Off	Off	Off
	USV[FR-RL]	Off	Off	Off
	HSV[FL-RR]	Off	Off	Off
	HSV[FR-RL]	Off	Off	Off

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

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

Test item	Display item	Display		
		Up	Keep	Down
RR RH SOL	RR RH IN SOL	Off	On	On
	RR RH OUT SOL	Off	Off	On*
	USV[FL-RR]	Off	Off	Off
	USV[FR-RL]	Off	Off	Off
	HSV[FL-RR]	Off	Off	Off
	HSV[FR-RL]	Off	Off	Off
RR LH SOL	RR LH IN SOL	Off	On	On
	RR LH OUT SOL	Off	Off	On*
	USV[FL-RR]	Off	Off	Off
	USV[FR-RL]	Off	Off	Off
	HSV[FL-RR]	Off	Off	Off
	HSV[FR-RL]	Off	Off	Off

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

ABS In Valve (ACT), ABS Out Valve (ACT)

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

Test item	Display item	Display		
		Up	ACT KEEP	ACT UP
FR RH ABS SOLE- NOID(ACT)	FR RH IN SOL	Off	Off	Off
	FR RH OUT SOL	Off	Off	Off
	USV[FL-RR]	Off	Off	Off
	USV[FR-RL]	Off	On	On
	HSV[FL-RR]	Off	Off	Off
	HSV[FL-RL]	Off	On*	Off
FR LH ABS SOLE- NOID(ACT)	FR LH IN SOL	Off	Off	Off
	FR LH OUT SOL	Off	Off	Off
	USV[FL-RR]	Off	On	On
	USV[FR-RL]	Off	Off	Off
	HSV[FL-RR]	Off	On*	Off
	HSV[FR-RL]	Off	Off	Off
RR RH ABS SOLE- NOID(ACT)	RR RH IN SOL	Off	Off	Off
	RR RH OUT SOL	Off	Off	Off
	USV[FL-RR]	Off	On	On
	USV[FR-RL]	Off	Off	Off
	HSV[FL-RR]	Off	On*	Off
	HSV[FR-RL]	Off	Off	Off
RR LH ABS SOLE- NOID(ACT)	RR LH IN SOL	Off	Off	Off
	RR LH OUT SOL	Off	Off	Off
	USV[FL-RR]	Off	Off	Off
	USV[FR-RL]	Off	On	On
	HSV[FL-RR]	Off	Off	Off
	HSV[FR-RL]	Off	On*	Off

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

< SYSTEM DESCRIPTION >

[WITH VDC (ESP)]

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

ABS MOTOR

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

Test item	Display item	Display	
		On	Off
ABS MOTOR	MOTOR RELAY	On	Off
	ACTUATOR RLY	On	On
	V/R OUTPUT	On	Off
	M/R OUTPUT	On	Off

STOP LAMP ON RELAY

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

Test item	Display	
	On	Off
STOP ON RLY	On	Off

WORK SUPPORT

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

RE/PROGRAMMING, CONFIGURATION

Configuration includes the following functions.

Function	Description
Read/Write Configuration	Before replacing ECU <ul style="list-style-type: none"> Allows the reading of vehicle specification (Type ID) written in ABS actuator and electric unit (control unit). Allows the reading of vehicle specification (Type ID) stored in CONSULT.
	After replacing ECU <ul style="list-style-type: none"> Allows the writing of vehicle information (Type ID) stored in CONSULT into the ABS actuator and electric unit (control unit).
Manual Configuration	Allows the writing of vehicle specification (Type ID) into the ABS actuator and electric unit (control unit) by hand.

ECU DIAGNOSIS INFORMATION

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000010723646

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 value in normal operation
FR LH SENSOR	Vehicle stopped	0.00 km/h (MPH)
	When driving ^{*1}	Nearly matches the speedometer display (within ±10%)
FR RH SENSOR	Vehicle stopped	0.00 km/h (MPH)
	When driving ^{*1}	Nearly matches the speedometer display (within ±10%)
RR LH SENSOR	Vehicle stopped	0.00 km/h (MPH)
	When driving ^{*1}	Nearly matches the speedometer display (within ±10%)
RR RH SENSOR	Vehicle stopped	0.00 km/h (MPH)
	When driving ^{*1}	Nearly matches the speedometer display (within ±10%)
DECCEL G-SEN	When stopped	Approx. 0 G
	During acceleration	Positive value
	During deceleration	Negative value
FR RH IN SOL ^{*2}	When front RH ABS IN valve is active	On
	When front RH ABS IN valve is not activated	Off
FR RH OUT SOL ^{*2}	When front RH ABS OUT valve is active	On
	When front RH ABS OUT valve is not activated	Off
FR LH IN SOL ^{*2}	When front LH ABS IN valve is active	On
	When front LH ABS IN valve is not activated	Off
FR LH OUT SOL ^{*2}	When front LH ABS OUT valve is active	On
	When front LH ABS OUT valve is not activated	Off
RR RH IN SOL ^{*2}	When rear RH ABS IN valve is active	On
	When rear RH ABS IN valve is not activated	Off
RR RH OUT SOL ^{*2}	When rear RH ABS OUT valve is active	On
	When rear RH ABS OUT valve is not activated	Off
RR LH IN SOL ^{*2}	When rear LH ABS IN valve is active	On
	When rear LH ABS IN valve is not activated	Off
RR LH OUT SOL ^{*2}	When rear LH ABS OUT valve is active	On
	When rear LH ABS OUT valve is not activated	Off
EBD WARN LAMP	Brake warning lamp is ON ^{*3}	On
	Brake warning lamp is OFF ^{*3}	Off
STOP LAMP SW	Brake pedal depressed	On
	Brake pedal not depressed	Off
MOTOR RELAY	When ABS motor and motor relay are active	On
	When ABS motor and motor relay are not activated	Off

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[WITH VDC (ESP)]

Monitor item	Condition	Reference valve in normal operation
ACTUATOR RLY* ²	When ABS actuator relay is active	On
	When ABS actuator relay is not activated (in fail-safe mode)	Off
ABS WARN LAMP	ABS warning lamp is ON* ³	On
	ABS warning lamp is OFF* ³	Off
OFF LAMP	VDC OFF indicator lamp is ON* ³	On
	VDC OFF indicator lamp is OFF* ³	Off
SLIP/VDC LAMP	VDC warning lamp is ON* ³	On
	VDC warning lamp is OFF* ³	Off
BATTERY VOLT	Ignition switch ON	10 – 16 V
GEAR* ⁴	When driving	Depending on shift status
SLCT LVR POSI	When selector lever operating	Selector lever position is displayed
YAW RATE SEN	Vehicle stopped	Approx. 0 d/s
	Turning right	Negative value
	Turning left	Positive value
R POSI SIG* ⁴	When selector lever is in the R position	On
	When selector lever is in the other than R position	Off
4WD MODE MON	When 2WD	2WD
	When 4WD	4WD
N POSI SIG* ⁴	When selector lever is in the N position	On
	When selector lever is in the other than N position	Off
P POSI SIG* ⁴	When selector lever is in the P position	On
	When selector lever is in the other than P position	Off
ACCEL POS SIG	Never depress accelerator pedal (Ignition switch ON)	0%
	Depress accelerator pedal (Ignition switch ON)	0 – 100%
SIDE G-SENSOR	Vehicle stopped	Approx. 0 m/s ²
	Turning right	Negative value
	Turning left	Positive value
STR ANGLE SIG	When driving straight	±2.5°
	When steering wheel is steered to RH by 90°	Approx. +90°
	When steering wheel is steered to LH by 90°	Approx. -90°
PRESS SENSOR	Brake pedal not depressed	Approx. 0 bar
	Brake pedal depressed	(-40) – 300 bar
EBD SIGNAL	When EBD function is active	On
	When EBD function is not activated	Off
ABS SIGNAL	When ABS function is active	On
	When ABS function is not activated	Off
TCS SIGNAL	When TCS function is active	On
	When TCS function is not activated	Off
VDC SIGNAL	When VDC function is active	On
	When VDC function is not activated	Off

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ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[WITH VDC (ESP)]

Monitor item	Condition	Reference valve in normal operation
EBD FAIL SIG	When EBD function is fail-safe	On
	When EBD function is normal	Off
ABS FAIL SIG	When ABS function is fail-safe	On
	When ABS function is normal	Off
TCS FAIL SIG	When TCS function is fail-safe	On
	When TCS function is normal	Off
VDC FAIL SIG	When VDC function is fail-safe	On
	When VDC function is normal	Off
CRANKING SIG	When cranking	On
	When other than cranking	Off
FLUID LEV SW	When brake fluid level switch is ON (brake fluid level is less than the specified level)	On
	When brake fluid level switch is OFF	Off
PARK BRAKE SW	When parking brake is active	On
	When parking brake is released	Off
USV[FL-RR]	When cut valve 1 is active	On
	When cut valve 1 is not activated	Off
USV[FR-RL]	When cut valve 2 is active	On
	When cut valve 2 is not activated	Off
HSV[FL-RR]	When suction valve 1 is active	On
	When suction valve is not activated	Off
HSV[FR-RL]	When suction valve 2 is active	On
	When suction valve is not activated	Off
V/R OUTPUT	When ABS actuator relay is active	On
	When ABS actuator relay is not activated	Off
M/R OUTPUT	When ABS motor and motor relay are active	On
	When ABS motor and motor relay are not activated	Off
ENGINE RPM	Engine stopped	0 tr/min
	Engine running	Almost same reading as tachometer
STP ON RLY	When stop lamp ON relay is active	On
	When stop lamp ON relay is not activated	Off
DDS SW ^{*5}	When hill descent control switch is ON	On
	When hill descent control switch is OFF	Off
DDS SIG ^{*5}	When advanced hill descent control function is active	On
	When advanced hill descent control function is not activated	Off
USS SIG ^{*6}	When hill start assist function is active	On
	When hill start assist function is not activated	Off
1ST GEAR SIG ^{*7}	When shifter lever is in the 1st gear position	On
	When shifter lever is in the other than 1st gear position	Off
OFF SW	When VDC OFF switch is ON	On
	When VDC OFF switch is OFF	Off

*1: Confirm tire pressure is standard value.

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[WITH VDC (ESP)]

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

*3: Refer to [BRC-67. "WARNING/INDICATOR/CHIME LIST : Warning Lamp/Indicator Lamp"](#) for ON/OFF conditions of each warning lamp and indicator lamp.

*4: CVT models

*5: "DDS" means "hill descent control" or "downhill drive support".

*6: "USS" means "hill start assist" or "Uphill Start Support".

*7: M/T models

Fail-Safe

INFOID:0000000010723647

VDC FUNCTION, TCS FUNCTION, BRAKE LIMITED SLIP DIFFERENTIAL (BLSD) FUNCTION, BRAKE ASSIST FUNCTION, BRAKE FORCE DISTRIBUTION FUNCTION, hill start assist FUNCTION AND ADVANCED hill descent control FUNCTION (4WD MODELS WITH GASOLINE ENGINE)

VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). The vehicle status becomes the same as models without VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). However, ABS function and EBD function are operated normally.

ABS FUNCTION

ABS warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). The vehicle status becomes the same as models without VDC function, TCS function, ABS function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). However, EBD function is operated normally.

NOTE:

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

EBD FUNCTION

ABS warning lamp, brake warning lamp and VDC warning lamp in combination meter turn ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module). The vehicle status becomes the same as models without VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, advanced hill descent control function (4WD models with gasoline engine), active trace control function (control of chassis control module) and active ride control function (control of chassis control module).

DTC	Fail-safe condition
C10D7	The following functions are suspended. <ul style="list-style-type: none">Deceleration control (brake control by VDC function) performed by pulling the parking brake switch while driving the vehicle [10 km/h (6.2 MPH) or more].

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[WITH VDC (ESP)]

DTC	Fail-safe condition
C1101	The following functions are suspended. <ul style="list-style-type: none">• VDC function
C1102	<ul style="list-style-type: none">• TCS function
C1103	<ul style="list-style-type: none">• ABS function
C1104	<ul style="list-style-type: none">• EBD function (only when both 2 rear wheels are malfunctioning)
C1105	<ul style="list-style-type: none">• Brake limited slip differential (BLSD) function
C1106	<ul style="list-style-type: none">• Brake assist function
C1107	<ul style="list-style-type: none">• Brake force distribution function
C1108	<ul style="list-style-type: none">• hill start assist function
C1109	<ul style="list-style-type: none">• Advanced hill descent control function^{*1}
C1110	<ul style="list-style-type: none">• Active trace control function (control of chassis control module)
C1110	<ul style="list-style-type: none">• Active ride control function (control of chassis control module)
C1111	The following functions are suspended. <ul style="list-style-type: none">• VDC function• TCS function• ABS function• Brake limited slip differential (BLSD) function• Brake assist function• Brake force distribution function• hill start assist function• Advanced hill descent control function^{*1}• Active trace control function (control of chassis control module)• Active ride control function (control of chassis control module)
C1113	The following functions are suspended. <ul style="list-style-type: none">• VDC function• TCS function• ABS function^{*1}• Brake limited slip differential (BLSD) function• Brake assist function^{*1}• Brake force distribution function• hill start assist function• Advanced hill descent control function^{*1}• Active trace control function (control of chassis control module)• Active ride control function (control of chassis control module)
C1115	The following functions are suspended. <ul style="list-style-type: none">• VDC function• TCS function• ABS function• EBD function• Brake limited slip differential (BLSD) function• Brake assist function• Brake force distribution function• hill start assist function• Advanced hill descent control function^{*1}• Active trace control function (control of chassis control module)• Active ride control function (control of chassis control module)

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[WITH VDC (ESP)]

DTC	Fail-safe condition	
C1116	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • hill start assist function • Advanced hill descent control function^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module) 	A B C
C1118	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • Advanced hill descent control function^{*1} 	D
C1120	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function 	E
C1121	<ul style="list-style-type: none"> • TCS function 	
C1122	<ul style="list-style-type: none"> • ABS function 	
C1123	<ul style="list-style-type: none"> • EBD function • Brake limited slip differential (BLSD) function 	BRC
C1124	<ul style="list-style-type: none"> • Brake assist function 	
C1125	<ul style="list-style-type: none"> • Brake force distribution function 	
C1126	<ul style="list-style-type: none"> • hill start assist function • Advanced hill descent control function^{*1} 	G
C1127	<ul style="list-style-type: none"> • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module) 	
C1130	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake force distribution function • hill start assist function • Advanced hill descent control function^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module) 	H I J
C1140	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function • TCS function • ABS function • EBD function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • hill start assist function • Advanced hill descent control function^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module) 	K L M
C1142	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • hill start assist function • Advanced hill descent control function^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module) 	N O P

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[WITH VDC (ESP)]

DTC	Fail-safe condition
C1143	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake force distribution function • hill start assist function
C1144	<ul style="list-style-type: none"> • Advanced hill descent control function^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module)
C1145	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function • TCS function • ABS function^{*1} • Brake limited slip differential (BLSD) function • Brake assist function^{*1} • Brake force distribution function • hill start assist function • Advanced hill descent control function^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module)
C1146	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • hill start assist function • Advanced hill descent control function^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module)
C1153	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function • TCS function • ABS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • hill start assist function • Advanced hill descent control function^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module)
C1154	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake force distribution function • hill start assist function • Advanced hill descent control function^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module)
C1155	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function • TCS function • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • hill start assist function • Advanced hill descent control function^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module)
C1160	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • VDC function • TCS function • ABS function^{*1} • Brake limited slip differential (BLSD) function • Brake assist function^{*1} • Brake force distribution function • hill start assist function • Advanced hill descent control function^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module)

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[WITH VDC (ESP)]

DTC	Fail-safe condition	
C1164	The following functions are suspended.	A
C1165	<ul style="list-style-type: none"> • VDC function 	B
C1166	<ul style="list-style-type: none"> • TCS function 	C
C1167	<ul style="list-style-type: none"> • ABS function • EBD function 	D
C1170	<ul style="list-style-type: none"> • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • hill start assist function • Advanced hill descent control function^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module) 	E
C1197	Electrical vacuum assistance of brake booster is suspended	
C1198		
C1199	Normal control	
C119A	Electrical vacuum assistance of brake booster is suspended	
C1B60	<p>The following functions are suspended.</p> <ul style="list-style-type: none"> • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module) 	BRC
U1000	The following functions are suspended.	G
U1002	<ul style="list-style-type: none"> • VDC function • TCS function 	H
U1010	<ul style="list-style-type: none"> • ABS function^{*2} • EBD function^{*2} • Brake limited slip differential (BLSD) function • Brake assist function • Brake force distribution function • hill start assist function • Advanced hill descent control function^{*1} • Active trace control function (control of chassis control module) • Active ride control function (control of chassis control module) 	I

*1: 4WD models with gasoline engine

*2: When a malfunction detected in CAN communication [between ABS actuator and electric unit (control unit) and chassis control module].

DTC Inspection Priority Chart

INFOID:0000000010723648

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

Priority	Detected item (DTC)
1	<ul style="list-style-type: none"> • U1000 CAN COMM CIRCUIT • U1002 SYSTEM COMM (CAN) • U1010 CONTROL UNIT (CAN)
2	<ul style="list-style-type: none"> • C1110 CONTROLLER FAILURE • C1153 EMERGENCY BRAKE • C1170 VARIANT CODING
3	<ul style="list-style-type: none"> • C10D7 PARKING BRAKE SYSTEM • C1118 4WD SYSTEM • C1130 ENGINE SIGNAL 1 • C1144 ST ANG SEN SIGNAL • C1B60 EXTERNAL CONTROL MODULE
4	<ul style="list-style-type: none"> • C1109 BATTERY VOLTAGE [ABNROMAL] • C1111 PUMP MOTOR • C1140 ACTUATOR RLY

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[WITH VDC (ESP)]

Priority	Detected item (DTC)
5	<ul style="list-style-type: none"> • C1101 RR RH SENSOR-1 • C1102 RR LH SENSOR-1 • C1103 FR RH SENSOR-1 • C1104 FR LH SENSOR-1 • C1105 RR RH SENSOR-2 • C1106 RR LH SENSOR-2 • C1107 FR RH SENSOR-2 • C1108 FR LH SENSOR-2 • C1113 G SENSOR • C1115 ABS SENSOR [ABNORMAL SIGNAL] • C1116 STOP LAMP SW • C1120 FR LH IN SOL • C1121 FR LH OUT SOL • C1122 FR RH IN SOL • C1123 FR RH OUT SOL • C1124 RR LH IN SOL • C1125 RR LH OUT SOL • C1126 RR RH IN SOL • C1127 RR RH OUT SOL • C1142 PRESS SEN CIRCUIT • C1143 ST ANG SEN CIRCUIT • C1145 YAW RATE SENSOR • C1146 SIDE G SEN CITCUIT • C1154 PNP POSI SIG • C1160 DECEL G SEN SET • C1164 CV 1 • C1165 CV 2 • C1166 SV 1 • C1167 SV 2 • C1197 VACUUM SENSOR • C1198 VACUUM SEN CIR • C1199 BRAKE BOOSTER • C119A VACUUM SEN VOLT
6	<ul style="list-style-type: none"> • C1155 BR FLUID LEVEL LOW

DTC Index

INFOID:0000000010723649

DTC	Display item	VDC warning lamp	ABS warning lamp	Brake warning lamp	Refer to
C10D7	PARKING BRAKE SYSTEM	OFF	OFF	OFF	BRC-107. "DTC Description"
C1101	RR RH SENSOR-1	ON	ON	ON ^{*1}	BRC-109. "DTC Description"
C1102	RR LH SENSOR-1	ON	ON	ON ^{*1}	BRC-109. "DTC Description"
C1103	FR RH SENSOR-1	ON	ON	ON ^{*1}	BRC-113. "DTC Description"
C1104	FR LH SENSOR-1	ON	ON	ON ^{*1}	BRC-113. "DTC Description"
C1105	RR RH SENSOR-2	ON	ON	ON ^{*1}	BRC-113. "DTC Description"
C1106	RR LH SENSOR-2	ON	ON	ON ^{*1}	BRC-113. "DTC Description"
C1107	FR RH SENSOR-2	ON	ON	ON ^{*1}	BRC-113. "DTC Description"
C1108	FR LH SENSOR-2	ON	ON	ON ^{*1}	BRC-113. "DTC Description"
C1109	BATTERY VOLTAGE [ABNROM-AL]	ON	ON	ON	BRC-119. "DTC Description"
C1110	CONTROLLER FAILURE	ON	ON	ON	BRC-122. "DTC Description"
C1111	PUMP MOTOR	ON	ON	ON	BRC-123. "DTC Description"
C1113	G SENSOR	ON	OFF ^{*2} ON ^{*3}	OFF	BRC-126. "DTC Description"

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[WITH VDC (ESP)]

DTC	Display item	VDC warning lamp	ABS warning lamp	Brake warning lamp	Refer to
C1115	ABS SENSOR [ABNORMAL SIGNAL]	ON	ON	ON	BRC-127, "DTC Description"
C1116	STOP LAMP SW	ON	OFF	OFF	BRC-133, "DTC Description"
C1118	4WD SYSTEM	OFF	OFF	OFF	BRC-135, "DTC Description"
C1120	FR LH IN SOL	ON	ON	ON	BRC-137, "DTC Description"
C1121	FR LH OUT SOL	ON	ON	ON	BRC-140, "DTC Description"
C1122	FR RH IN SOL	ON	ON	ON	BRC-137, "DTC Description"
C1123	FR RH OUT SOL	ON	ON	ON	BRC-140, "DTC Description"
C1124	RR LH IN SOL	ON	ON	ON	BRC-137, "DTC Description"
C1125	RR LH OUT SOL	ON	ON	ON	BRC-140, "DTC Description"
C1126	RR RH IN SOL	ON	ON	ON	BRC-137, "DTC Description"
C1127	RR RH OUT SOL	ON	ON	ON	BRC-140, "DTC Description"
C1130	ENGINE SIGNAL 1	ON	OFF	OFF	BRC-143, "DTC Description"
C1140	ACTUATOR RLY	ON	ON	ON	BRC-145, "DTC Description"
C1142	PRESS SEN CIRCUIT	ON	OFF	OFF	BRC-147, "DTC Description"
C1143	ST ANG SEN CIRCUIT	ON	OFF	OFF	BRC-150, "DTC Description"
C1144	ST ANG SEN SIGNAL	ON	OFF	OFF	BRC-153, "DTC Description"
C1145	YAW RATE SENSOR	ON	OFF	OFF	BRC-126, "DTC Description"
C1146	SIDE G SEN CITCUIT	ON	OFF	OFF	
C1153	EMERGENCY BRAKE	ON	ON	OFF	BRC-122, "DTC Description"
C1154	PNP POSI SIG	ON	OFF	OFF	BRC-155, "DTC Description"
C1155	BR FLUID LEVEL LOW	ON	OFF	OFF	BRC-157, "DTC Description"
C1160	DECEL G SEN SET	ON	OFF ^{*2} ON ^{*3}	OFF	BRC-161, "DTC Description"
C1164	CV 1	ON	ON	ON	BRC-162, "DTC Description"
C1165	CV 2	ON	ON	ON	
C1166	SV 1	ON	ON	ON	BRC-165, "DTC Description"
C1167	SV 2	ON	ON	ON	
C1170	VARIANT CODING	ON	ON	ON	BRC-168, "DTC Description"
C1197	VACUUM SENSOR	OFF	OFF	ON	BRC-170, "DTC Description"
C1198	VACUUM SEN CIR	OFF	OFF	ON	BRC-173, "DTC Description"
C1199	BRAKE BOOSTER	OFF	OFF	ON	BRC-176, "DTC Description"
C119A	VACUUM SEN VOLT	OFF	OFF	ON	BRC-179, "DTC Description"
C1B60	EXTERNAL CONTROL MODULE	OFF	OFF	OFF	BRC-182, "DTC Description"
U1000	CAN COMM CIRCUIT	ON	ON	ON	BRC-184, "DTC Description"
U1002	SYSTEM COMM (CAN)	ON	ON	ON	BRC-185, "DTC Description"
U1010	CONTROL UNIT (CAN)	ON	ON	ON	BRC-187, "DTC Description"

*1: Only when both 2 rear wheels are malfunctioning

*2: 2WD models

*3: 4WD models

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BRC

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P

BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[WITH VDC (ESP)]

WIRING DIAGRAM

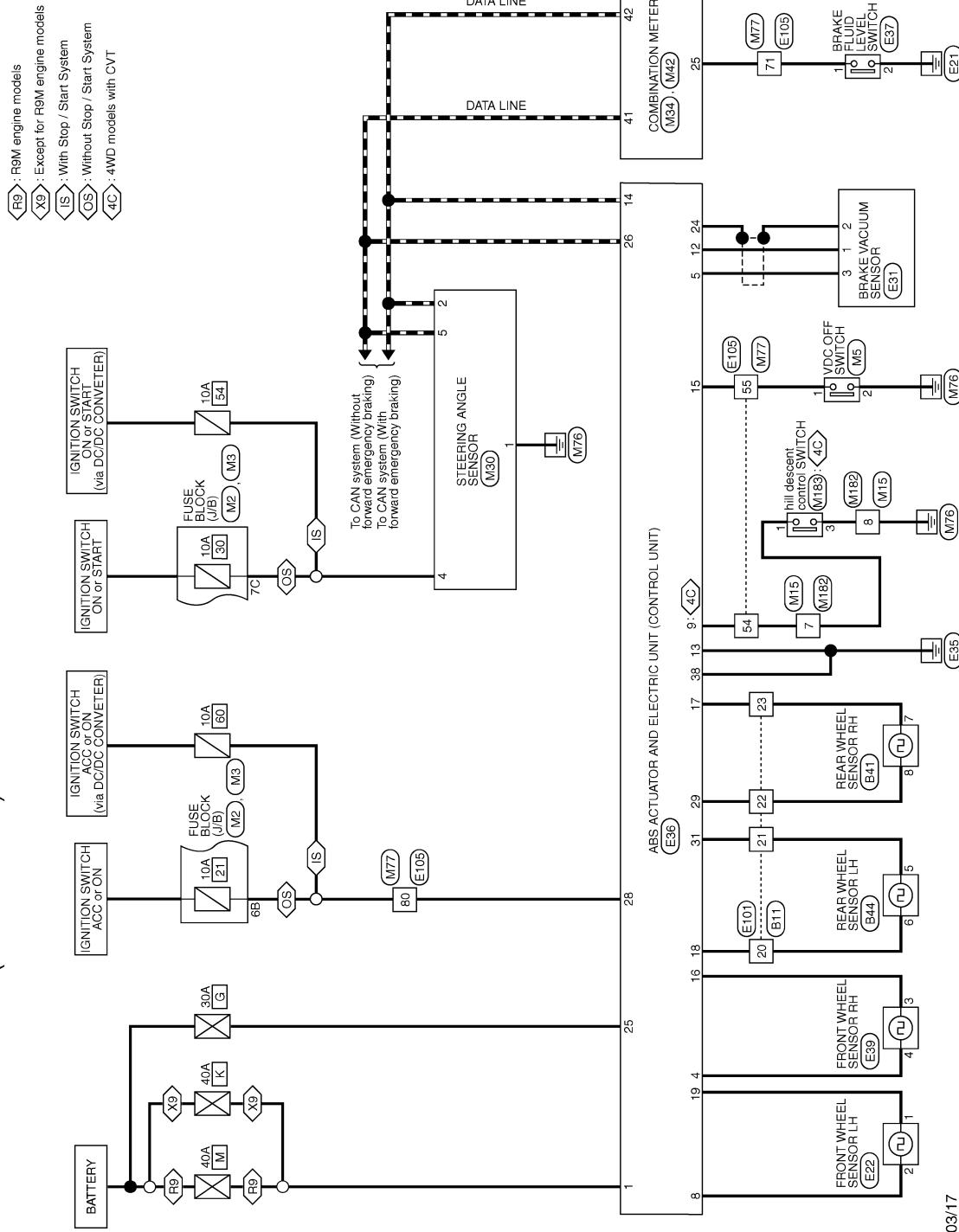
BRAKE CONTROL SYSTEM

LHD

LHD : Wiring Diagram

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BRAKE CONTROL SYSTEM (LHD MODELS)



2014/03/17

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BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[WITH VDC (ESP)]

BRAKE CONTROL SYSTEM (LHD MODELS)

Connector No.	B11	Connector No.	E22	Connector No.	E66
Connector Name	WIRE TO WIRE	Connector Name	FRONT WHEEL SENSOR LH	Connector Name	ABIS ACTUATORS AND ELECTRIC UNIT (CONTROLLER)
Connector Type	TH80MDCY-C516-TM4	Connector Type	RH021B	Connector Type	BEZ341B-B12Z-B12Z-FH

Terminal No.	Color Of Wire	Signal Name (Specification)
1	Y	MOTOR POWER SUPPLY
4	SB	FR LH WHEEL SENSOR SIGNAL
5	V	BRKE VACUUM SENSOR POWER SUPPLY
8	P	FR LH WHEEL SENSOR SIGNAL
9	Y	Hill descent control SWITCH SIGNAL
12	LG	BRKE VACUUM SENSOR SIGNAL
13	B	GROUND(MOTOR)
14	P	CAN-H
15	BR	VEC OFF SWITCH SIGNAL
16	R	FR RH WHEEL SENSOR POWER SUPPLY
17	Y	RR RH WHEEL SENSOR POWER SUPPLY
18	G	FR LH WHEEL SENSOR SIGNAL
19	W	FR LH WHEEL SENSOR POWER SUPPLY
24	SHIELD	BRKE VACUUM SENSOR GROUND
25	BR	VALVE POWER SUPPLY
26	L	CAN-H
28	GR	IGNITION POWER SUPPLY
29	LG	FR RH WHEEL SENSOR SIGNAL
31	BR	RR LH WHEEL SENSOR POWER SUPPLY
38	BR	GROUND(VALET)

The image shows a front wheel sensor LH connector with part number 112. The connector is a black plastic housing with a metal pin protruding from the bottom. The part number 112 is printed in a circle on the side of the connector.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	W	-
2	P	-
Connector No.	E31	
Connector Name	Brake Vacuum Sensor	
Connector Type	FRH03FB	
Terminal No.	Color Of Wire	Signal Name [Specification]
1	SHIELD	-
2	LG	-
3	123	

Terminal No.	Color Of Wire	Signal Name [Specification]
7	BG	-
8	Y	-

Connector No.	Signal Name [Specification]
B44	REAR WHEEL SENSOR LH
Connector Type	RH02FB


HS.

Terminal	Color	Wire	Signal Name [Specification]
No.			
1	G	-	
2	LA/BR	-	
	BG	-	
11	BR	-	
12	W	-	
13	P	-	
14	SB	-	
15	V	-	
16	P	-	
17	P	-	
18	G	-	
19	P	-	
20	R	-	
21	BR	-	
22	Y	-	
23	BG	-	
24	SB	-	
25	G	-	
26	B	-	
27	P	-	
28	R	-	
29	LG	-	
30	P	-	
92	BR	-	
93	GR	-	
94	Y	-	
95	LG	-	

BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[WITH VDC (ESP)]

BRAKE CONTROL SYSTEM (LHD MODELS)

Connector No.	Connector No.	Connector Name	WIRE TO WIRE	Signal Name (Specification)	Terminal Color Of Wire No.	Color Of Wire	Signal Name (Specification)
E37	E101	Connector Name	WIRE TO WIRE		2	W	-
		Connector Type	TH80FDY-CS16-TM4		5	V	- [Without ISS]
					5	W	- [With ISS]
					8	L	-
					9	LG	-
					10	LG	-
					11	BR	-
					12	W	-
					13	P	-
					14	SB	-
					15	V	-
					16	P	-
					17	P	-
					18	G	-
					19	P	-
					20	G	-
					21	BR	-
					22	LG	-
					23	Y	-
					24	SB	-
					25	G	-
					26	B	-
					27	P	-
					28	R	-
					29	LG	-
					30	P	-
					32	BR	-
					33	GR	-
					34	R	-
					35	LG	-
					36	LG	-
					37	V	-
					38	G	-
					39	BR	-
					40	L	-
					41	P	-
					47	GR	-
					48	SB	-
					51	P	-
					52	L	-
					53	W	-
					54	Y	-
					55	BR	-
					56	P	-
					57	B	-
					58	L	-
					59	W	-
					60	G	-
					61	BR	-
					62	V	-
					63	BR	-
					64	GR	-
					65	R	-

JRFWC1748GB

BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[WITH VDC (ESP)]

BRAKE CONTROL SYSTEM (LHD MODELS)

Terminal Color Of No. Wire	Signal Name [Specification]	Terminal Color Of No. Wire	Signal Name [Specification]
10C L/G		10C L/G	
13C LAG		13C R	
14C R		15C L	
16C LA/W		16C LA/W	
1C R		1C R	
2C G		2C G	
3C Y		3C Y	
4C LG		4C LG	
5C GR		6C L/A/R	
7C Y		8C BR	J/With (SS) - (Without (SS))
8C L/A/R		9C L	
9C V	- (With corner sensor) - (Without corner sensor)	1 V	- (With corner sensor) - (Without corner sensor)
2 B	- (Without corner sensor)	2 Y	- (Without corner sensor)
2 SB	- (With corner sensor)	2 SB	- (Without corner sensor)
7 LA/L	-	10 B	- (With corner sensor)
8 B	-	10 B	- (Without corner sensor)
9 B	- (With corner sensor)	11 Y	- (With corner sensor)
9 G	- (Without corner sensor)	12 Y	- (Without corner sensor)
10 B	- (With corner sensor)	13 Y	- (With corner sensor)
10 Y	-	14 B	-
11 B	-	15 G	-
15 G	-	16 B	-
30 LG	AMBENT MODE SIGNAL	30 LG	AMBENT MODE SIGNAL
31 SB	NONMANUAL MODE SIGNAL	31 SB	NONMANUAL MODE SIGNAL
32 BG	MANUAL MODE SHIFT UP SIGNAL	32 BG	MANUAL MODE SHIFT UP SIGNAL
33 BR	MANUAL MODE SHIFT DOWN SIGNAL	33 BR	MANUAL MODE SHIFT DOWN SIGNAL

JRFWC1749GB

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L

BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[WITH VDC (ESP)]

BRAKE CONTROL SYSTEM (LHD MODELS)

Terminal No.	Color Of Wire	Signal Name [Specification]	Terminal No.	Color Of Wire	Signal Name [Specification]
2	AIR	-	80	LAL	- (Without ISS)
5	V	- (Without ISS)	82	GR	-
5	W	- (With ISS)	83	LG	-
8	G	-	84	SB	-
9	Y	-	85	G	-
10	R	-	86	G	-
20	W	-	87	B	-
21	B	-	88	B	-
22	SHIELD	-	91	L	-
31	V	-	92	W	-
32	GR	-	93	W	-
33	G	-	96	LG	-
34	LG	-	97	BR	-
35	BG	-	98	V	-
36	LG	-	99	R	-
37	V	-			
38	G	-			
39	BR	-			
40	L	-			
41	P	-			
47	Y	-			
48	BG	-			
51	GR	-			
52	SB	-			
53	R	-			
54	LAL	-			
55	BR	-			
56	P	-			
57	B	-			
58	L	-			
59	W	-			
60	AIR	-			
61	P	-			
62	V	-			
63	LALBR	-			
64	Y	-			
65	GR	-			
66	BG	-			
67	L	-			
68	R	-			
71	Y	-			
72	L	-			
73	Y	-			
76	L	-			
77	V	-			
78	LG	-			
79	SHIELD	-			
80	L	- (With ISS)			

JRFWC1750GB

RHD

BRAKE CONTROL SYSTEM

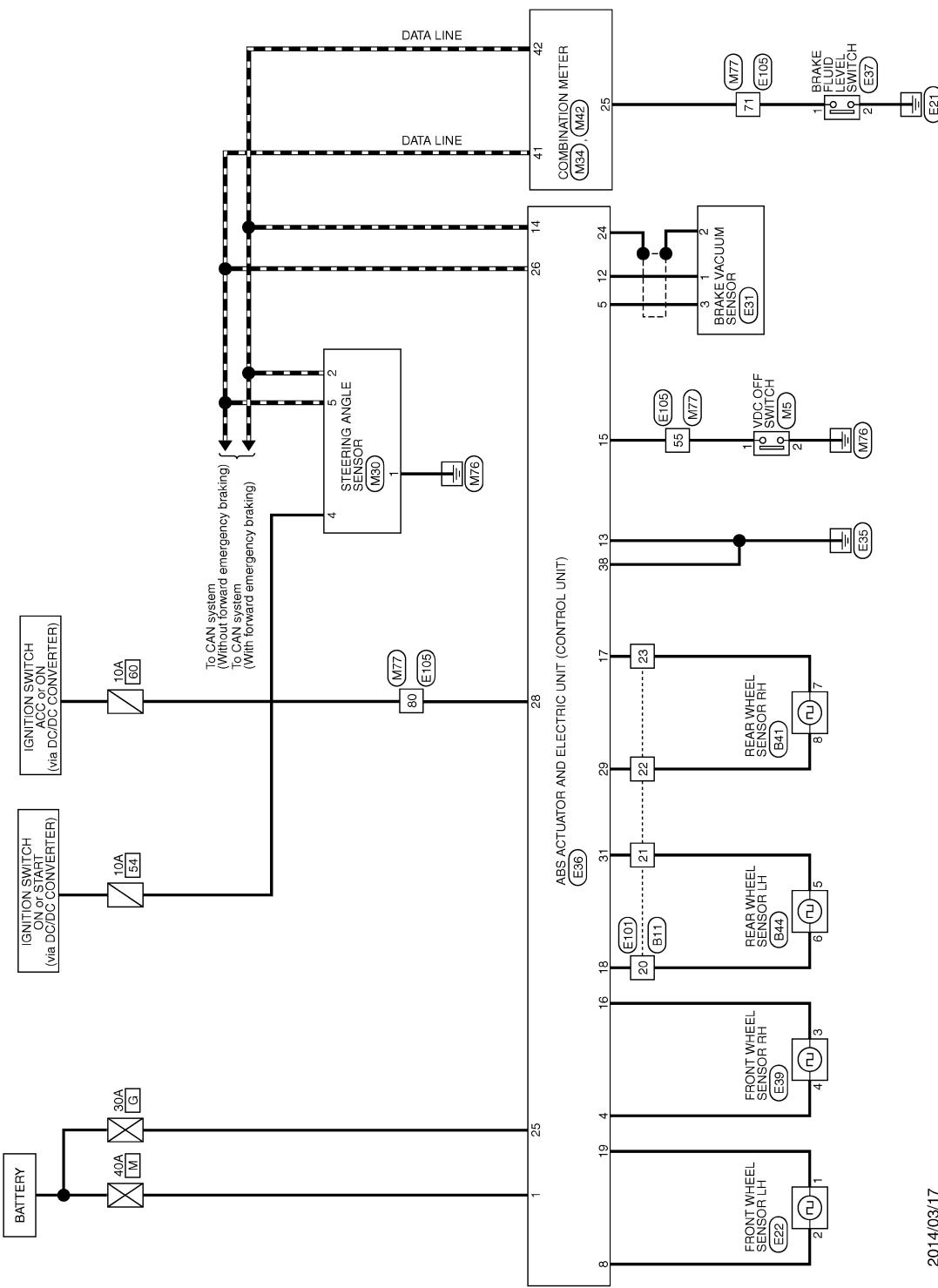
< WIRING DIAGRAM >

[WITH VDC (ESP)]

RHD : Wiring Diagram

INFOID:000000010723651

BRAKE CONTROL SYSTEM (RHD MODELS)



2014/03/17

JRFWC1751GB

BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[WITH VDC (ESP)]

BRAKE CONTROL SYSTEM (RHD MODELS)

Connector No.	Connector No.	Connector Name	Signal Name [Specification]	Terminal Color Of No.	Color Of Wire	Signal Name [Specification]	Terminal Color Of No.	Color Of Wire	Signal Name [Specification]
B11	B41	WIRE TO WIRE	-	1	G	-	1	Y	MOTOR POWER SUPPLY
Connector Name	Connector Name	Connector Name	Connector Name	Connector No.	Connector No.	Connector Name	Connector No.	Connector No.	Connector Name
TH01NDGY-C516-TM4	REAR WHEEL SENSOR RH	FRONT WHEEL SENSOR LH	FRONT WHEEL SENSOR LH	2	BG	-	2	P	FR RH WHEEL SENSOR SIGNAL
Connector Type	RH02FB	RH02GY	RH02GY	5	BG	-	5	V	FR RH WHEEL VACUUM SENSOR POWER SUPPLY
				11	BR	-	11	R	FR LH WHEEL SENSOR SIGNAL
				12	W	-	12	P	HILL DESCENT CONTROL SWITCH SIGNAL
				13	P	-	13	LG	FR BRAKE VACUUM SENSOR SIGNAL
				14	Sb	-	14	B	GROUND (MOTORS CANAL)
				15	V	-	15	BR	VDC OFF SWITCH SIGNAL
				16	P	-	16	R	FR RH WHEEL SENSOR POWER SUPPLY
				17	P	-	17	Y	FR RH WHEEL SENSOR POWER SUPPLY
				18	G	-	18	G	FR LH WHEEL SENSOR SIGNAL
				19	P	-	19	W	FR LH WHEEL VACUUM SENSOR POWER SUPPLY
				20	R	-	20	SHIELD	FR LH WHEEL VACUUM SENSOR GROUND
				21	BR	-	21	BR	IGNITION POWER SUPPLY
				22	Y	-	22	L	CANH
				23	BG	-	23	GR	IGNITION POWER SUPPLY
				24	SB	-	24	BR	R/R RH WHEEL SENSOR POWER SUPPLY
				25	G	-	25	LG	R/R RH WHEEL SENSOR POWER SUPPLY
				26	B	-	26	B	R/R LH WHEEL SENSOR POWER SUPPLY
				27	P	-	27	BR	R/R LH WHEEL GROUND (VALVE)
				28	R	-	28	V	-
				29	LG	-	29	LG	-
				30	P	-	30	LG	-
				32	BR	-	32	LG	-
				33	GR	-	33	LG	-
				94	Y	-	94	LG	-
				95	LG	-	95	LG	-
				97	LG	-	97	LG	-

JRFWC1752GB

BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[WITH VDC (ESP)]

BRAKE CONTROL SYSTEM (RH MODELS)

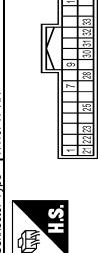
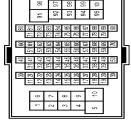
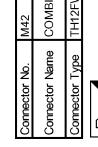
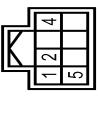
Connector No.	Connector No.	Connector Name	Wire To Wire	Terminal Color Of Wire No.	Signal Name [Specification]	Signal Name [Specification]	Terminal Color Of Wire No.	Signal Name [Specification]	Signal Name [Specification]
E37	E101	BRAKE FLUID LEVEL SWITCH	WIRE TO WIRE	1	G	-	2	W	-
		Connector Type	TH902FB	2	W	-	5	V	- [Without ISS]
				5	G	-	5	W	- [With ISS]
				11	BR	-	8	L	-
				12	W	-	9	LG	-
				13	P	-	10	W	-
				14	SB	-	20	W	-
				15	V	-	21	B	-
				16	P	-	22	SHIELD	-
				17	P	-	31	Y	-
				18	G	-	32	W	-
				19	P	-	33	SB	-
				20	G	-	34	LG	-
				21	BR	-	35	BG	-
				22	LG	-	36	LG	-
				23	Y	-	37	V	-
				24	SB	-	38	G	-
				25	G	-	39	BR	-
				26	B	-	40	L	-
				27	P	-	41	P	-
				28	R	-	47	GR	-
				29	LG	-	48	SB	-
				30	P	-	51	P	-
				32	BR	-	52	L	-
				33	GR	-	53	W	-
				34	R	-	54	Y	-
				95	L	-	55	BR	-
				97	LG	-	56	P	-
							57	B	-
							58	L	-
							59	W	-
							60	G	-
							61	BR	-
							62	V	-
							63	BR	-
							64	GR	-

JRFWC1753GB

BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[WITH VDC (ESP)]

BRAKE CONTROL SYSTEM (RH MODELS)		Terminal No.	Color Of Wire	Signal Name [Specification]	Terminal No.	Color Of Wire	Signal Name [Specification]		
Connector No.	M30	36	GR	ILLUMINATION CONTROL SWITCH SIGNAL (+)	80	LA/L	- (Without ISS)		
Connector Name	STEERING ANGLE SENSOR	37	V	-	82	GR	-		
Connector Type	TH08/GY-NH	38	G	VEHICLE SPEED SIGNAL (6-PULSE)	83	LG	-		
		39	W	VEHICLE SPEED SIGNAL (2-PULSE)	84	SB	-		
		5	V	- (Without ISS)	85	G	-		
		8	W	- (With ISS)	86	G	-		
		9	G	-	87	B	-		
		10	Y	-	88	B	-		
		20	R	-	91	L	-		
		21	W	-	92	W	-		
		22	LG	-	93	W	-		
		31	LG	-	96	LG	-		
		32	GR	-	97	BR	-		
		33	LG	-	98	V	-		
		34	LG	-	99	R	-		
		41	LG	IGNITION SIGNAL (Without ISS)	38	G	-		
		42	LG	CANH	39	BR	-		
		43	LG	CANL	40	L	-		
		44	LG	ILLUMINATION CONTROL SIGNAL	41	P	-		
		45	LG	FUEL LEVEL SENSOR GROUND	47	Y	-		
		46	LG	BATTERY POWER SUPPLY	48	BR	-		
		47	LG	IGNITION SIGNAL (Without ISS)	51	GR	-		
		48	LG	IGNITION SIGNAL (With ISS)	52	SB	-		
		49	LG	AV COMMUNICATION SIGNAL (H)	53	R	-		
		50	LG	AV COMMUNICATION SIGNAL (L)	54	LA/L	-		
		51	LG	OIL LEVEL SENSOR GROUND	55	BR	-		
		52	LG	OIL LEVEL SENSOR SIGNAL	56	P	-		
		53	LG	FUEL LEVEL SENSOR SIGNAL	57	B	-		
		54	LG	GROUND	58	L	-		
		60	LG	GROUND	59	W	-		
		61	P	-	60	LA/R	-		
		62	V	-	61	V	-		
		63	LA/BR	-	62	Y	-		
		64	Y	-	63	LG/BR	-		
		65	GR	-	64	Y	-		
		66	BR	-	65	GR	-		
		67	L	-	66	BR	-		
		68	R	-	67	L	-		
		71	Y	-	68	R	-		
		72	L	-	69	Y	-		
		73	Y	-	70	L	-		
		76	L	-	71	Y	-		
		77	V	-	72	L	-		
		78	LG	-	73	Y	-		
		79	LG	-	74	LG	-		
		80	L	- (With ISS)	75	LG	-		
									
									
									
									
									
									
									
									
									
									

JRFWC1754GB

< BASIC INSPECTION >

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000010723652

DETAILED FLOW

1. INTERVIEW FROM THE CUSTOMER

Clarify customer complaints before inspection. First of all, perform an interview utilizing [BRC-96, "Diagnostic Work Sheet"](#) and reproduce the symptom as well as fully understand it. Ask customer about his/her complaints carefully. Check symptoms by driving vehicle with customer, if necessary.

CAUTION:

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

>> GO TO 2.

2. CHECK SYMPTOM

BRC

Reproduce the symptom that is indicated by the customer, based on the information from the customer obtained by interview. Also check that the symptom is not caused by fail-safe mode. Refer to [BRC-79, "Fail-Safe"](#).

CAUTION:

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

>> GO TO 3.

3. PERFORM SELF-DIAGNOSIS

With CONSULT

Perform self-diagnosis for “ABS”.

Is DTC detected?

YES >> Record or print self-diagnosis results and freeze frame data (FFD). GO TO 4.
NO >> GO TO 6.

4. RECHECK SYMPTOM

With CONSULT

1. Erase self-diagnostic results for “ABS”.
2. Perform DTC confirmation procedures for the error-detected system.

NOTE:

If some DTCs are detected at the same time, determine the order for performing the diagnosis based on [BRC-83, "DTC Inspection Priority Chart"](#).

Is DTC detected?

YES >> GO TO 5.
NO >> Check harness and connectors based on the information obtained by interview. Refer to [GI-44, "Intermittent Incident"](#).

5. REPAIR OR REPLACE ERROR-DETECTED PART

1. Repair or replace error-detected parts.
2. Reconnect part or connector after repairing or replacing.
3. When DTC is detected, erase self-diagnostic result 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

< BASIC INSPECTION >

[WITH VDC (ESP)]

Can the error-detected system be identified?

YES >> GO TO 7.

NO >> Check harness and connectors based on the information obtained by interview. Refer to [GI-44, "Intermittent Incident".](#)

7.FINAL CHECK

(B)With CONSULT

1. Check the reference value for "ABS".

2. Recheck the symptom and check that the symptom is not reproduced on the same conditions.

Is the symptom reproduced?

YES >> GO TO 3.

NO >> INSPECTION END

Diagnostic Work Sheet

INFOID:0000000010723653

Description

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

INTERVIEW SHEET SAMPLE

Interview sheet						
Customer name	MR/MS	Registration number		Initial year registration		
		Vehicle type		VIN		
Storage date		Engine		Mileage	km (Mile)	
Symptom	<input type="checkbox"/> Does not operate () function					
	<input type="checkbox"/> Warning lamp for () turns ON.					
	<input type="checkbox"/> Noise			<input type="checkbox"/> Vibration		
	<input type="checkbox"/> Other ()					
First occurrence	<input type="checkbox"/> Recently <input type="checkbox"/> Other ()					
Frequency of occurrence	<input type="checkbox"/> Always		<input type="checkbox"/> Under a certain conditions of		<input type="checkbox"/> Sometimes (time(s)/day)	
Climate conditions	<input type="checkbox"/> Irrelevant					
	Weather	<input type="checkbox"/> Fine	<input type="checkbox"/> Cloud	<input type="checkbox"/> Rain	<input type="checkbox"/> Snow	<input type="checkbox"/> Others ()
	Temperature	<input type="checkbox"/> Hot	<input type="checkbox"/> Warm	<input type="checkbox"/> Cool	<input type="checkbox"/> Cold	<input type="checkbox"/> Temperature [Approx. °C (°F)]
Relative humidity	<input type="checkbox"/> High <input type="checkbox"/> Moderate			<input type="checkbox"/> Low		
Road conditions	<input type="checkbox"/> Urban area <input type="checkbox"/> Suburb area <input type="checkbox"/> Highway					
	<input type="checkbox"/> Mountainous road (uphill or downhill) <input type="checkbox"/> Rough road					
Operating condition, etc.	<input type="checkbox"/> Irrelevant					
	<input type="checkbox"/> When engine starts <input type="checkbox"/> During idling					
	<input type="checkbox"/> During driving <input type="checkbox"/> During acceleration <input type="checkbox"/> At constant speed driving					
	<input type="checkbox"/> During deceleration					
	<input type="checkbox"/> During cornering (right curve or left curve)					
	<input type="checkbox"/> When steering wheel is steered (to right or to left)					

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

[WITH VDC (ESP)]

Interview sheet

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

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

< BASIC INSPECTION >

[WITH VDC (ESP)]

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

Description

INFOID:0000000010723654

When replaced the ABS actuator and electric unit (control unit), be sure to perform the following item.

- Configuration: Refer to [BRC-104, "Work Procedure"](#).
- Adjust the neutral position of steering angle sensor: Refer to [BRC-99, "Work Procedure"](#).
- Calibration of the decel G sensor. Refer to [BRC-102, "Work Procedure"](#).

Work Procedure

INFOID:0000000010723655

1. CONFIGURATION

With CONSULT

Perform configuration of the ABS actuator and electric unit. Refer to [BRC-104, "Work Procedure"](#).

>> GO TO 2.

2. ADJUSTMENT THE NEUTRAL POSITION OF STEERING ANGLE SENSOR

With CONSULT

Perform adjustment the neutral of steering angle sensor. Refer to [BRC-99, "Work Procedure"](#).

>> GO TO 3.

3. CALIBRATION OF DECEL G SENSOR

With CONSULT

Perform calibration of decel G sensor. Refer to [BRC-102, "Work Procedure"](#).

>> END of work.

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

< BASIC INSPECTION >

[WITH VDC (ESP)]

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Description

INFOID:0000000010723656

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.	×

Work Procedure

INFOID:0000000010723657

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 (1)

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

1. 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 ignition switch OFF, and then turn it ON again.

CAUTION:

Be sure to perform the operation above.

>> GO TO 3.

3. CHECK DATA MONITOR (1)

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

< BASIC INSPECTION >

[WITH VDC (ESP)]

2. Select "ABS", "DATA MONITOR", "ECU INPUT SIGNALS" and "STR ANGLE SIG" in the order. Check that the signal is within the specified value.

STR ANGLE SIG : $0\pm2.5^\circ$

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 4.

4. CHECK STEERING COMPONENT PARTS

Check the installation condition of steering component parts. Refer to [ST-11, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts. GO TO 5.

5. CHECK SUSPENSION COMPONENT PARTS

Check the installation condition of suspension component parts.

- Front: Refer to [FSU-7, "Inspection"](#).
- Rear: Refer to [RSU-6, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

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

6. CHECK WHEEL ALIGNMENT

Check the wheel alignment.

- Front: Refer to [FSU-8, "Inspection"](#).
- Rear: Refer to [RSU-7, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Adjust the wheel alignment. GO TO 7.

- Front: Refer to [FSU-9, "Adjustment"](#).
- Rear: Refer to [RSU-8, "Adjustment"](#).

7. CHECK THE VEHICLE STATUS (2)

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

Does the vehicle stay in the straight-ahead position?

YES >> GO TO 8.

NO >> Steer the steering wheel to the straight-ahead position. GO TO 8.

8. CHECK DATA MONITOR (2)

With CONSULT

1. The vehicle is either pointing straight ahead, or the vehicle needs to be moved. Stop when it is pointing straight ahead.
2. Select "ABS", "DATA MONITOR", "ECU INPUT SIGNALS" and "STR ANGLE SIG" in the order. Check that the signal is within the specified value.

STR ANGLE SIG : $0\pm2.5^\circ$

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 9.

9. CHECK DATA MONITOR (3)

With CONSULT

1. The vehicle is either pointing straight ahead, or the vehicle needs to be moved.

CAUTION:

- Drive the vehicle at approx. 30 km/h (19MPH) or more for 300 m (985 ft) or more.
- Never use tester

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

< BASIC INSPECTION >

[WITH VDC (ESP)]

2. The vehicle is either pointing straight ahead, or the vehicle needs to be moved. Stop when it is pointing straight ahead.
3. Select "ABS", "DATA MONITOR", "ECU INPUT SIGNALS" and "STR ANGLE SIG" in the order. Check that the signal is within the specified value.

STR ANGLE SIG : $0\pm2.5^\circ$

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 1.

10. ERASE SELF-DIAGNOSIS MEMORY

With CONSULT

1. Record or print self-diagnosis results and freeze frame data (FFD).
2. Erase self-diagnosis result of "ABS".

Are the memories erased?

YES >> End of work.

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

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CALIBRATION OF DECEL G SENSOR

< BASIC INSPECTION >

[WITH VDC (ESP)]

CALIBRATION OF DECEL G SENSOR

Description

INFOID:0000000010723658

CAUTION:

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

NOTE:

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

×: Required —: Not required

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

Work Procedure

INFOID:0000000010723659

Decel G sensor calibration

CAUTION:

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

NOTE:

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

1. CHECK THE VEHICLE STATUS

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

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

YES >> GO TO 2.

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

2. PERFORM DECEL G SENSOR CALIBRATION

CAUTION:

- Never allow passenger or load on the vehicle.
- Never apply vibration to the vehicle body when opening or closing door during calibration.

With CONSULT

1. Turn the ignition switch ON.

CAUTION:

Never start engine.

2. Select "ABS", "WORK SUPPORT", "DECCEL G SENSOR CALIBRATION" in this order.
3. Select "START".
4. After approx. 10 seconds, select "END".
5. Turn ignition switch OFF and then turn it ON again.

CAUTION:

Be sure to perform the operation above.

>> GO TO 3.

CALIBRATION OF DECEL G SENSOR

< BASIC INSPECTION >

[WITH VDC (ESP)]

3. CHECK DATA MONITOR

With CONSULT

1. Drive the vehicle. Steer the steering wheel to the straight-ahead position. Stop the vehicle on level surface.
2. Select "ABS", "DATA MONITOR", "ECU INPUT SIGNALS" and "DECEL G SENSOR" in this order. Check that the signal is within the specified value.

DECEL G SENSOR : Approx. ± 0.08 G

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 1.

4. ERASE SELF-DIAGNOSIS MEMORY

With CONSULT

Erase self-diagnosis result of "ABS".

Are the memories erased?

YES >> End of work.
NO >> Check the items indicated by the self-diagnosis.

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CONFIGURATION [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

< BASIC INSPECTION >

[WITH VDC (ESP)]

CONFIGURATION [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

Work Procedure

INFOID:0000000010723660

CAUTION:

- Use "Manual Configuration" only when "TYPE ID" of ABS actuator and electric unit (control unit) cannot be read.
- After configuration, turn the ignition switch from OFF to ON and check that the VDC warning lamp turns OFF after staying illuminated for approximately two seconds.
- If an error occurs during configuration, start over from the beginning.

1. CHECKING TYPE ID (1)

Use FAST (service parts catalogue) to search ABS actuator and electric unit (control unit) of the applicable vehicle and find "Type ID".

Is "Type ID" displayed?

YES >> Print out "Type ID" and GO TO 2.

NO >> "Configuration" is not required for ABS actuator and electric unit (control unit). Replace in the usual manner.

• LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).

• RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

2. CHECKING TYPE ID (2)

CONSULT Configuration

1. Select "Before Replace ECU" of "Read/Write Configuration".
2. Check that "Type ID" is displayed on the CONSULT screen.

Is "Type ID" displayed?

YES >> GO TO 3.

NO >> GO TO 7.

3. VERIFYING TYPE ID (1)

CONSULT Configuration

Compare a "Type ID" displayed on the CONSULT screen with the one searched by using FAST (service parts catalogue) to check that these "Type ID" agree with each other.

NOTE:

For the "Type ID" searched by using FAST (service parts catalog), use the last five digits of the "Type ID".

>> GO TO 4.

4. SAVING TYPE ID

CONSULT Configuration

Save "Type ID" on CONSULT.

>> GO TO 5.

5. REPLACING ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (1)

Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

CAUTION:

Never perform the following work items:

- Air bleeding
- Adjustment of steering angle sensor neutral position
- Calibration of decel G sensor

>> GO TO 6.

6. WRITING (AUTOMATIC WRITING)

CONFIGURATION [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

[WITH VDC (ESP)]

< BASIC INSPECTION >

CONSULT Configuration

1. Select "After Replace ECU" of "Re/programming, Configuration" or that of "Read / Write Configuration".
2. Select the "Type ID" agreeing with the one stored on CONSULT and the one searched by using FAST (service parts catalogue) to write the "Type ID" into the ABS actuator and electric unit (control unit).

NOTE:

For the "Type ID" searched by using FAST (service parts catalog), use the last five digits of the "Type ID".

>> GO TO 9.

7. REPLACING ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (2)

Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BR-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BR-220, "RHD : Removal and Installation"](#).

CAUTION:

Never perform the following work items:

- Air bleeding
- Adjustment of steering angle sensor neutral position
- Calibration of decel G sensor

BR

>> GO TO 8.

8. WRITING (MANUAL WRITING)

CONSULT Configuration

1. Select "Manual Configuration".
2. Select the "Type ID" searched by using FAST (service parts catalogue) to write the "Type ID" into the ABS actuator and electric unit (control unit).

NOTE:

For the "Type ID" searched by using FAST (service parts catalog), use the last five digits of the "Type ID".

>> GO TO 9.

9. VERIFYING TYPE ID (2)

Compare "Type ID" written into the ABS actuator and electric unit (control unit) with the one searched by using FAST (service parts catalogue) to check that these "Type ID" agree with each other.

NOTE:

For the "Type ID" searched by using FAST (service parts catalog), use the last five digits of the "Type ID".

>> GO TO 10.

10. CHECKING VDC WARNING LAMP

1. Turn the ignition switch OFF.
2. Turn the ignition switch ON and check that the VDC warning lamp turns OFF after staying illuminated for approximately two seconds.

CAUTION:

Never start the engine.

Is the inspection result normal?

YES >> GO TO 11.

NO >> Perform the self-diagnosis of "ABS".

11. PERFORMING SUPPLEMENTARY WORK

1. Perform the air bleeding.
 - LHD: Refer to [BR-14, "Bleeding Brake System"](#).
 - RHD: Refer to [BR-78, "Bleeding Brake System"](#).
2. Perform the adjustment of steering angle sensor neutral position. Refer to [BR-99, "Work Procedure"](#).
3. Perform the calibration of decel G sensor. Refer to [BR-102, "Work Procedure"](#).
4. Perform the self-diagnosis of all systems.
5. Record or print self-diagnosis result and freeze frame data (FFD).
6. Erase self-diagnosis results.

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CONFIGURATION [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]
< BASIC INSPECTION > **[WITH VDC (ESP)]**

>> End of work.

< DTC/CIRCUIT DIAGNOSIS >

A

DTC/CIRCUIT DIAGNOSIS

B

C10D7 PARKING BRAKE SYSTEM

C

DTC Description

INFOID:0000000010723661

D

DTC DETECTION LOGIC

E

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C10D7	PARKING BRAKE SYSTEM (Parking brake system)	When a malfunction is detected in electric parking brake system.

BRC

POSSIBLE CAUSE

G

- Harness or connector
- Electric parking brake control module
- ABS actuator and electric unit (control unit)

H

FAIL-SAFE

I

The following functions are suspended.

J

- Deceleration control (brake control by VDC function) performed by pulling the parking brake switch while driving the vehicle [10 km/h (6.2 MPH) or more].

K

DTC CONFIRMATION PROCEDURE

L

1. PRECONDITIONING

M

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.

N

>> GO TO 2.

2. CHECK DTC DETECTION

O

With CONSULT

P

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

Is DTC "C10D7" detected?

Q

YES >> Proceed to [BRC-107, "Diagnosis Procedure"](#).

R

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

S

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723662

1. CHECK ELECTRIC PARKING BRAKE SYSTEM

T

With CONSULT

U

Perform self-diagnosis for "EHS/PKB".

V

Is any DTC detected?

W

YES >> Check the DTC. Refer to [PB-36, "DTC Index"](#).

X

NO >> GO TO 2.

2. CHECK CONNECTOR AND TERMINALS

Y

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

Is the inspection result normal?

Z

YES >> GO TO 3

NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 3.

3. PERFORM SELF-DIAGNOSIS

With CONSULT

1. Connect the electric parking brake control module harness connector.
2. Connect the ABS actuator and electric unit (control unit) harness connector.
3. Erase self-diagnosis result for "ABS".
4. Turn the ignition switch OFF to ON.
5. Perform self-diagnosis for "ABS".

Is any DTC "C10D7" or "U1000" detected?

YES ("C10D7")>>Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

YES ("U1000")>>Refer to [LAN-17, "Trouble Diagnosis Flow Chart"](#).

NO >> INSPECTION END

C1101, C1102, C1103, C1104 WHEEL SENSOR

DTC Description

INFOID:0000000010723663

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

- Harness or connector
- Wheel sensor
- ABS actuator and electric unit (control unit)

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function
- EBD function (only when both 2 rear wheels are malfunctioning)
- Brake limited slip differential (BLSD) function
- Brake assist function
- hill start assist function
- Brake force distribution function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

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

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

YES >> Proceed to [BRC-109, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723664

CAUTION:

Never check between wheel sensor harness connector terminals.

C1101, C1102, C1103, C1104 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

1. CHECK WHEEL SENSOR

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

Is the inspection result normal?

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

2. REPLACE WHEEL SENSOR (1)

(H) With CONSULT

1. Replace the wheel sensor.
 - Front: Refer to [BRС-212, "FRONT WHEEL SENSOR : Removal and Installation"](#).
 - Rear: Refer to [BRС-214, "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 any DTC "C1101", "C1102", "C1103", "C1104" detected?

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

3. CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 4.

4. PERFORM SELF-DIAGNOSIS (1)

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

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

YES >> GO TO 5.
NO >> INSPECTION END

5. CHECK TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the ABS actuator and electric unit (control unit) harness connector and then check the ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
3. Disconnect the each wheel sensor harness connector and then check the 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)

(H) With CONSULT

1. Connect the ABS actuator and electric unit (control unit) harness connector.
2. Connect the wheel sensor harness connector.

C1101, C1102, C1103, C1104 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

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 any DTC "C1101", "C1102", "C1103", "C1104" detected?

YES >> GO TO 7.

NO >> INSPECTION END

7. CHECK WHEEL SENSOR HARNESS

1. Turn the ignition switch OFF.
2. Disconnect the ABS actuator and electric unit (control unit) harness connector.
3. Disconnect the wheel sensor harness connector.
4. Check the continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector. (Check the continuity when steering wheel is steered to RH and LH, or center harness in wheel housing is moved.)

Measurement connector and terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	19	E22 (FR LH wheel)	1	Existed
	16	E39 (FR RH wheel)	3	
	31	B44 (RR LH wheel)	5	
	17	B41 (RR RH wheel)	7	

Measurement connector and terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	8	E22 (FR LH wheel)	2	Existed
	4	E39 (FR RH wheel)	4	
	18	B44 (RR LH wheel)	6	
	29	B41 (RR RH wheel)	8	

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)

With CONSULT

1. Connect the ABS actuator and electric unit (control unit) harness connector.
2. Connect the wheel sensor harness connector.
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Erase self-diagnosis result for "ABS".
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 any DTC "C1101", "C1102", "C1103", "C1104" detected?

YES >> GO TO 9.

NO >> INSPECTION END

9. REPLACE WHEEL SENSOR (2)

With CONSULT

1. Replace the wheel sensor.
- Front: Refer to [BRC-212, "FRONT WHEEL SENSOR : Removal and Installation"](#).
- Rear: Refer to [BRC-214, "REAR WHEEL SENSOR : Removal and Installation"](#).

C1101, C1102, C1103, C1104 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Erase self-diagnosis result for "ABS".
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 any DTC "C1101", "C1102", "C1103", "C1104" detected?

YES >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> INSPECTION END

< DTC/CIRCUIT DIAGNOSIS >

C1105, C1106, C1107, C1108 WHEEL SENSOR**DTC Description**

INFOID:0000000010723665

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1105	RR RH SENSOR-2 (Rear RH wheel sensor-2)	<ul style="list-style-type: none"> When a short circuit is detected in rear RH wheel sensor circuit. When power supply voltage of rear RH wheel sensor is in following state. <ul style="list-style-type: none"> Rear RH wheel sensor power supply voltage: $7.2 \text{ V} \geq \text{Rear RH wheel sensor power supply voltage}$ When distance between rear RH wheel sensor and rear RH wheel sensor rotor is large. When installation of rear RH wheel sensor or rear RH wheel sensor rotor is not normal.
C1106	RR LH SENSOR-2 (Rear LH wheel sensor-2)	<ul style="list-style-type: none"> When a short circuit is detected in rear LH wheel sensor circuit. When power supply voltage of rear LH wheel sensor is in following state. <ul style="list-style-type: none"> Rear LH wheel sensor power supply voltage: $7.2 \text{ V} \geq \text{Rear LH wheel sensor power supply voltage}$ When distance between rear LH wheel sensor and rear LH wheel sensor rotor is large. When installation of rear LH wheel sensor or rear LH wheel sensor rotor is not normal.
C1107	FR RH SENSOR-2 (Front RH wheel sensor-2)	<ul style="list-style-type: none"> When a short circuit is detected in front RH wheel sensor circuit. When power supply voltage of front RH wheel sensor is in following state. <ul style="list-style-type: none"> Front RH wheel sensor power supply voltage: $7.2 \text{ V} \geq \text{Front RH wheel sensor power supply voltage}$ When distance between front RH wheel sensor and front RH wheel sensor rotor is large. When installation of front RH wheel sensor or front RH wheel sensor rotor is not normal.
C1108	FR LH SENSOR-2 (Front LH wheel sensor-2)	<ul style="list-style-type: none"> When a short circuit is detected in front LH wheel sensor circuit. When power supply voltage of front LH wheel sensor is in following state. <ul style="list-style-type: none"> Front LH wheel sensor power supply voltage: $7.2 \text{ V} \geq \text{Front LH wheel sensor power supply voltage}$ When distance between front LH wheel sensor and front LH wheel sensor rotor is large. When installation of front LH wheel sensor or front LH wheel sensor rotor is not normal.

POSSIBLE CAUSE

- Harness or connector
- Wheel sensor
- ABS actuator and electric unit (control unit)
- Sensor rotor

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function
- EBD function (only when both 2 rear wheels are malfunctioning)
- Brake limited slip differential (BLSD) function
- Brake assist function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

DTC CONFIRMATION PROCEDURE**1. PRECONDITIONING**

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

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

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

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

YES >> Proceed to [BRC-114, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723666

CAUTION:

Never check between wheel sensor harness connector terminals.

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

Check the ABS actuator and electric unit (control unit) power supply system. Refer to [BRC-188, "Diagnosis Procedure"](#).

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-66, "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)

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

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 any DTC "C1105", "C1106", "C1107", "C1108" detected?

YES >> GO TO 5.

NO >> INSPECTION END

5. CHECK WHEEL SENSOR

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

< DTC/CIRCUIT DIAGNOSIS >

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 [BRC-212, "FRONT WHEEL SENSOR : Exploded View"](#).
- Rear: [BRC-213, "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

1. Replace the wheel sensor.
 - Front: Refer to [BRC-212, "FRONT WHEEL SENSOR : Removal and Installation"](#).
 - Rear: Refer to [BRC-214, "REAR WHEEL SENSOR : Removal and Installation"](#).
2. Erase self-diagnosis result for "ABS".
3. Turn the ignition switch OFF, and wait 10 seconds or more.
4. Start the engine.
5. Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR".

NOTE:

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

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

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

YES >> GO TO 7.

NO >> GO TO 19.

7. PERFORM SELF-DIAGNOSIS (2)

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 any DTC "C1105", "C1106", "C1107", "C1108" detected?

YES >> GO TO 19.

NO >> INSPECTION END

8. CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 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.

C1105, C1106, C1107, C1108 WHEEL SENSOR

[WITH VDC (ESP)]

< DTC/CIRCUIT DIAGNOSIS >

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)

(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 any DTC "C1105", "C1106", "C1107", "C1108" detected?

YES >> GO TO 11.
NO >> INSPECTION END

11. CHECK TERMINAL

1. Turn the ignition switch OFF.
2. Disconnect the ABS actuator and electric unit (control unit) harness connector and then check the ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
3. Disconnect the each wheel sensor harness connector and then check the 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)

(With CONSULT

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

(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 any DTC "C1105", "C1106", "C1107", "C1108" detected?

YES >> GO TO 14.
NO >> INSPECTION END

14. CHECK WHEEL SENSOR HARNESS

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	19, 8	Ground	
	16, 4		
	31, 18		Not existed
	17, 29		

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 the ABS actuator and electric unit (control unit) harness connector.
2. Connect the 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 16.

NO >> GO TO 17.

16. PERFORM SELF-DIAGNOSIS (5)

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 any DTC "C1105", "C1106", "C1107", "C1108" detected?

YES >> GO TO 17.

NO >> INSPECTION END

17. REPLACE WHEEL SENSOR (2)

With CONSULT

1. Replace the wheel sensor.
- Front: Refer to [BRC-212, "FRONT WHEEL SENSOR : Removal and Installation"](#).
- Rear: Refer to [BRC-214, "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 any DTC "C1105", "C1106", "C1107", "C1108" detected?

YES >> GO TO 19.

NO >> INSPECTION END

19. REPLACE SENSOR ROTOR

With CONSULT

1. Replace the sensor rotor.
 - Front: Refer to [BRC-216, "FRONT SENSOR ROTOR : Removal and Installation"](#).
 - Rear: Refer to [BRC-216, "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 any DTC "C1105", "C1106", "C1107", "C1108" detected?

YES >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> INSPECTION END

C1109 POWER AND GROUND SYSTEM

DTC Description

INFOID:0000000010723667

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1109	BATTERY VOLTAG [ABNORMAL] (Battery voltage [abnormal])	When ignition power supply voltage is in following state. • Ignition power supply voltage: $10 \text{ V} \geq \text{Ignition power supply voltage}$ • Ignition power supply voltage: $16 \text{ V} \leq \text{Ignition power supply voltage}$

POSSIBLE CAUSE

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

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function
- EBD function
- Brake limited slip differential (BLSD) function
- Brake assist function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

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 "C1109" detected?

YES >> Proceed to [BRC-119, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723668

1. CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

2. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis for "ABS" again.

Is DTC "C1109" detected?

YES >> GO TO 3.

NO >> INSPECTION END

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

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	28	Ground	Approx. 0 V

4. Turn the ignition switch ON.

CAUTION:

Never start engine.

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	28	Ground	10 – 16 V

Is the inspection result normal?

YES >> GO TO 6.

NO (with stop / start system)>>GO TO 4.

NO (without stop / start system)>>GO TO 5.

4. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) IGNITION POWER SUPPLY CIRCUIT (WITH STOP / START SYSTEM)

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#60).
3. Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (28) and 10A fuse (#60).

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.

NO >> Repair or replace error-detected parts.

5. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) IGNITION POWER SUPPLY CIRCUIT (WITHOUT STOP / START SYSTEM)

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#21).
3. Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (28) and 10A fuse (#21).

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.

NO >> Repair or replace error-detected parts.

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	13	Ground	Existed
	38		

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7. CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit).

• LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).

• RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

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C1110, C1153 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)**DTC Description**

INFOID:0000000010723669

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1110	CONTROLLER FAILURE (Controller failure)	When there is an internal malfunction in the ABS actuator and electric unit (control unit).
C1153	EMERGENCY BRAKE (Emergency brake)	When ABS actuator and electric unit (control unit) is malfunctioning. (Pressure increase is too much or too little)

POSSIBLE CAUSE

- ABS actuator and electric unit (control unit)

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function
- EBD function (When DTC "C1110")
- Brake limited slip differential (BLSD) function
- Brake assist function
- hill start assist function
- Brake force distribution function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

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 any DTC "C1110" or "C1153" detected?YES >> Proceed to [BRC-122, "Diagnosis Procedure"](#).NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723670

1. CHECK SELF-DIAGNOSIS RESULTS

Replace the ABS actuator and electric unit (control unit) even if other display than "C1110" or "C1153" is displayed in self-diagnosis for "ABS".

>> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

DTC Description

INFOID:0000000010723671

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

A

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function
- Brake limited slip differential (BLSD) function
- Brake assist function
- hill start assist function
- Brake force distribution function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

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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.

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>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

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

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Is DTC "C1111" detected?

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YES >> Proceed to [BRC-123, "Diagnosis Procedure"](#).

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NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

S

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723672

1. CHECK CONNECTOR

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

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Is the inspection result normal?

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YES >> GO TO 3.

V

NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

2. PERFORM SELF-DIAGNOSIS

W

Perform self-diagnosis for "ABS" again.

Is DTC "C1111" detected?

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

YES >> GO TO 3.

NO >> INSPECTION END

3. CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	1	Ground	10 – 16 V

4. Turn the ignition switch ON.

CAUTION:

Never start engine.

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	1	Ground	10 – 16 V

Is the inspection result normal?

YES >> GO TO 6.

NO (R9M engine models)>>GO TO 4.

NO (Except for R9M engine models)>>GO TO 5.

4. CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT (R9M ENGINE MODELS)

1. Turn the ignition switch OFF.
2. Check the 40A fusible link (#M).
3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (1) and 40A fusible link (#M).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply.

NO >> Repair or replace error-detected parts.

5. CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT (EXCEPT FOR R9M ENGINE MODELS)

1. Turn the ignition switch OFF.
2. Check the 40A fusible link (#K).
3. Check continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (1) and 40A fusible link (#K).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply.

NO >> Repair or replace error-detected parts.

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	13	Ground	Existed
	38		

Is the inspection result normal?

YES >> GO TO 7.

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

NO >> Repair or replace error-detected parts.

7. CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).

- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

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C1113, C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR**DTC Description**

INFOID:000000010723673

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1113	G SENSOR (Decel G sensor)	When a malfunction is detected in decel G sensor signal.
C1145	YAW RATE SENSOR (Yaw rate sensor circuit)	When a malfunction is detected in yaw rate sensor signal.
C1146	SIDE G-SEN CIRCUIT (Side G sensor circuit)	When a malfunction is detected in side G sensor signal.

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function (4WD models)
- Brake limited slip differential (BLSD) function
- Brake assist function (4WD models)
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

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

① With CONSULT

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

Is any DTC "C1113", "C1145", "C1146" detected?

YES >> Proceed to [BRC-126, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:000000010723674

1. CHECK SELF-DIAGNOSIS RESULTS

Replace the ABS actuator and electric unit (control unit) even if other display than "C1113", "C1145" or "C1146" is displayed in self-diagnosis for "ABS".

>> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

< DTC/CIRCUIT DIAGNOSIS >

C1115 WHEEL SENSOR**DTC Description**

INFOID:0000000010723675

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1115	ABS SENSOR [ABNORMAL SIGNAL] (Wheel 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.

POSSIBLE CAUSE

- Harness or connector
- Wheel sensor
- Sensor rotor
- ABS actuator and electric unit (control unit)

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function
- EBD function
- Brake limited slip differential (BLSD) function
- Brake assist function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

DTC CONFIRMATION PROCEDURE**1. PRECONDITIONING**

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

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

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

Is DTC "C1115" detected?

YES >> Proceed to [BRC-127, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723676

CAUTION:

Never check between wheel sensor harness connector terminals.

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

Check the ABS actuator and electric unit (control unit) power supply system. Refer to [BRC-188, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 2.

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

2.CHECK TIRE

1. Turn the ignition switch OFF.
2. Check tire air pressure, wear and size. Refer to [WT-66, "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)

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

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

Is DTC "C1115" detected?

YES >> GO TO 5.

NO >> INSPECTION END

5.CHECK WHEEL SENSOR

1. Turn the ignition switch OFF.
2. Check the 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 [BRC-212, "FRONT WHEEL SENSOR : Exploded View"](#).
- Rear: Refer to [BRC-213, "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

1. Replace the wheel sensor.
 - Front: Refer to [BRC-212, "FRONT WHEEL SENSOR : Removal and Installation"](#).
 - Rear: Refer to [BRC-214, "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:

< DTC/CIRCUIT DIAGNOSIS >

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

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

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

YES >> GO TO 7.

NO >> GO TO 19.

7. PERFORM SELF-DIAGNOSIS (2)

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

8. CHECK CONNECTOR (2)

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

Is the inspection result normal?

YES >> GO TO 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)

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 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 the ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
3. Disconnect each wheel sensor harness connector and then check the each wheel sensor pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 14.

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< DTC/CIRCUIT DIAGNOSIS >

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

12. CHECK DATA MONITOR (3) With CONSULT

1. Connect the ABS actuator and electric unit (control unit) harness connector.
2. Connect the 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) 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 14.

NO >> INSPECTION END

14. CHECK WHEEL SENSOR HARNESS

1. Turn the ignition switch OFF.
2. Disconnect the ABS actuator and electric unit (control unit) harness connector.
3. Disconnect the wheel sensor harness connector.
4. Check the continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector. (Check the continuity when steering wheel is steered to RH and LH, or center harness in wheel housing is moved.)

Measurement connector and terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	19	E22 (FR LH wheel)	1	Existed
	16	E39 (FR RH wheel)	3	
	31	B44 (RR LH wheel)	5	
	17	B41 (RR RH wheel)	7	

Measurement connector and terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E36	8	E22 (FR LH wheel)	2	Existed
	4	E39 (FR RH wheel)	4	
	18	B44 (RR LH wheel)	6	
	29	B41 (RR RH wheel)	8	

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

< DTC/CIRCUIT DIAGNOSIS >

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	19, 8	Ground	
	16, 4		Not existed
	31, 18		
	17, 29		

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 the ABS actuator and electric unit (control unit) harness connector.
2. Connect the 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 16.

NO >> GO TO 17.

16. PERFORM SELF-DIAGNOSIS (5)

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 (2)

With CONSULT

1. Replace the wheel sensor.
- Front: Refer to [BRC-212, "FRONT WHEEL SENSOR : Removal and Installation"](#).
- Rear: Refer to [BRC-214, "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.

< DTC/CIRCUIT DIAGNOSIS >

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 the sensor rotor.
 - Front: Refer to [BRC-216, "FRONT SENSOR ROTOR : Removal and Installation"](#).
 - Rear: Refer to [BRC-216, "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?

YES >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> INSPECTION END

< DTC/CIRCUIT DIAGNOSIS >

C1116 STOP LAMP SWITCH

DTC Description

INFOID:0000000010723677

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

- Stop lamp switch
- BCM
- ABS actuator and electric unit (control unit)

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- Brake limited slip differential (BLSD) function
- Brake assist function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

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 "C1116" detected?

YES >> Proceed to [BRC-133, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723678

1. CHECK BCM SYSTEM

With CONSULT

Perform self-diagnosis for "BCM".

Is any DTC detected?

YES >> Check the DTC. Refer to [BCS-78, "DTC Index"](#).

NO >> GO TO 2.

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 and drive the vehicle for a short period of time.

C1116 STOP LAMP SWITCH

[WITH VDC (ESP)]

< DTC/CIRCUIT DIAGNOSIS >

4. Stop the vehicle.
5. Vehicle stopped, and perform self-diagnosis for "ABS".

Is DTC "C1116" detected?

YES >> Replace the ABS actuator and electric unit (control unit).
 • LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
 • RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> Check pin terminals and connection of each harness connector for abnormal conditions. Repair or replace error-detected parts.

< DTC/CIRCUIT DIAGNOSIS >

C1118 4WD SYSTEM**DTC Description**

INFOID:0000000010723679

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1118	4WD SYSTEM (4WD system)	When a malfunction is detected in 4WD system.

POSSIBLE CAUSE

- Harness or connector
- 4WD control unit
- ABS actuator and electric unit (control unit)

FAIL-SAFE

The following functions are suspended.

- Advanced hill descent control function (Gasoline engine models)

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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 "C1118" detected?YES >> Proceed to [BRC-135, "Diagnosis Procedure"](#).NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723680

1. CHECK 4WD SYSTEM **With CONSULT**

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

Is any DTC detected?

YES >> Check the DTC.

- MR20DD engine and QR25DE engine models: Refer to [DLN-30, "DTC Index"](#).
- R9M engine models: Refer to [DLN-134, "DTC Index"](#).

NO >> GO TO 2.

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 and drive the vehicle for a short period of time.
4. Stop the vehicle.
5. Vehicle stooped, and perform self-diagnosis for "ABS".

Is DTC "C1118" detected?

YES >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).

C1118 4WD SYSTEM

[WITH VDC (ESP)]

< DTC/CIRCUIT DIAGNOSIS >

- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> Check pin terminals and connection of each harness connector for abnormal conditions. Repair or replace error-detected parts.

C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

DTC Description

INFOID:0000000010723681

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function
- EBD function
- Brake limited slip differential (BLSD) function
- Brake assist function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

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 any DTC "C1120", "C1122", "C1124", "C1126" detected?

YES >> Proceed to [BRC-137, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723682

1. CHECK CONNECTOR

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

C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

2. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis for "ABS" again.

Is any DTC "C1120", "C1122", "C1124", "C1126" detected?

YES >> GO TO 3.

NO >> INSPECTION END

3. CHECK ABS IN VALVE POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	25	Ground	10 – 16 V

4. Turn the ignition switch ON.

CAUTION:

Never start engine.

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	25	Ground	10 – 16 V

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK ABS IN VALVE POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check the 30A fusible link (#G).
3. Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (25) and 30A fusible link (#G).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply.

NO >> Repair or replace error-detected parts.

5. CHECK ABS IN VALVE GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	13	Ground	Existed
	38		

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.

C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

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C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM**DTC Description**

INFOID:0000000010723683

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function
- EBD function
- Brake limited slip differential (BLSD) function
- Brake assist function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

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**(H) With CONSULT**

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

Is any DTC "C1121", "C1123", "C1125", "C1127" detected?

YES >> Proceed to [BRC-140, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723684

1. CHECK CONNECTOR

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

C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

[WITH VDC (ESP)]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

2. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis for "ABS" again.

Is any DTC "C1121", "C1123", "C1125", "C1127" detected?

YES >> GO TO 3.

NO >> INSPECTION END

3. CHECK ABS OUT VALVE POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	25	Ground	10 – 16 V

4. Turn the ignition switch ON.

CAUTION:

Never start engine.

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	25	Ground	10 – 16 V

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK ABS OUT VALVE POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check the 30A fusible link (#G).
3. Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (25) and 30A fusible link (#G).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply.

NO >> Repair or replace error-detected parts.

5. CHECK ABS OUT VALVE GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	13	Ground	Existed
	38		

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.

C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

< DTC/CIRCUIT DIAGNOSIS >

C1130 ENGINE SIGNAL

DTC Description

INFOID:0000000010723685

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

- ECM
- ABS actuator and electric unit (control unit)
- CAN communication line

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- Brake limited slip differential (BLSD) function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

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 "C1130" detected?

YES >> Proceed to [BRC-143, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723686

1. CHECK ENGINE SYSTEM

With CONSULT

Perform self-diagnosis for "ENGINE".

Is any DTC detected?

YES >> Check the DTC.

- MR20DD models: Refer to [EC-109, "DTC Index"](#).
- QR25DE models: Refer to [EC-517, "DTC Index"](#).
- R9M models: Refer to [EC-908, "DTC Index"](#).

NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS

With CONSULT

1. Erase self-diagnosis result for "ABS".

< DTC/CIRCUIT DIAGNOSIS >

2. Turn the ignition switch OFF, and wait 10 seconds or more.
3. Start the engine and drive the vehicle for a short period of time.
4. Stop the vehicle.
5. Check that the malfunction indicator lamp (MIL) turns OFF.
6. Vehicle stopped, and perform self-diagnosis for "ABS".

Is DTC "C1130" detected?

YES >> Replace the ABS actuator and electric unit (control unit).
 • LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
 • RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> Check pin terminals and connection of each harness connector for abnormal conditions. Repair or replace error-detected parts.

< DTC/CIRCUIT DIAGNOSIS >

C1140 ACTUATOR RELAY SYSTEM

DTC Description

INFOID:0000000010723687

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function
- EBD function
- Brake limited slip differential (BLSD) function
- Brake assist function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

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 "C1140" detected?

YES >> Proceed to [BRC-145, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723688

1. CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

2. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis for "ABS" again.

C1140 ACTUATOR RELAY SYSTEM

[WITH VDC (ESP)]

< DTC/CIRCUIT DIAGNOSIS >

Is DTC "C1140" detected?

YES >> GO TO 3.

NO >> INSPECTION END

3. CHECK ACTUATOR RELAY POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	25	Ground	10 – 16 V

4. Turn the ignition switch ON.

CAUTION:

Never start engine.

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	25	Ground	10 – 16 V

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check the 30A fusible link (#G).
3. Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (25) and 30A fusible link (#G).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply.

NO >> Repair or replace error-detected parts.

5. CHECK ACTUATOR RELAY GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	13	Ground	Existed
	38		

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.

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit).

• LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).

• RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

< DTC/CIRCUIT DIAGNOSIS >

C1142 PRESS SENSOR

DTC Description

INFOID:0000000010723689

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

- Stop lamp switch system
- ABS actuator and electric unit (control unit)
- Brake system

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- Brake limited slip differential (BLSD) function
- Brake assist function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

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 "C1142" detected?

YES >> Proceed to [BRC-147, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723690

1. CHECK STOP LAMP SWITCH SYSTEM

Check the stop lamp switch system. Refer to [BRC-133, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK BRAKE FLUID LEAKAGE

Check the brake fluid leakage.

- LHD models: Refer to [BR-13, "Inspection"](#).
- RHD models: Refer to [BR-77, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

3. CHECK [BR-100. "INSPECTION AND ADJUSTMENT"](#) BRAKE PIPING

Check the brake piping.

- Front
 - LHD models: Refer to [BR-27, "FRONT : Inspection"](#).
 - RHD models: Refer to [BR-91, "FRONT : Inspection"](#).
- Rear
 - LHD models: Refer to [BR-31, "REAR : Inspection"](#).
 - RHD models: Refer to [BR-94, "REAR : Inspection"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK BRAKE PEDAL

Check the brake pedal.

- LHD models: Refer to [BR-22, "Inspection and Adjustment"](#).
- RHD models: Refer to [BR-86, "Inspection and Adjustment"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5. CHECK BRAKE MASTER CYLINDER

Check the brake master cylinder.

- LHD models: Refer to [BR-35, "Inspection"](#).
- RHD models: Refer to [BR-98, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6. CHECK BRAKE BOOSTER AND CHECK VALVE

Check the brake booster and the check valve.

- LHD models: Refer to [BR-38, "Inspection and Adjustment"](#).
- RHD models: Refer to [BR-100, "Inspection and Adjustment"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7. CHECK VACUUM PIPING

Check the vacuum piping.

- LHD models
 - MR20DD: Refer to [BR-40, "MR20DD : Inspection"](#).
 - QR25DE: Refer to [BR-41, "QR25DE : Inspection"](#).
 - R9M: Refer to [BR-42, "R9M : Inspection"](#).
- RHD models: Refer to [BR-102, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8. CHECK FRONT DISC BRAKE

Check the front disc brake.

- LHD models
 - 1 piston type: Refer to [BR-54, "BRAKE CALIPER ASSEMBLY \(1 PISTON TYPE\) : Inspection"](#).
 - 2 piston type: Refer to [BR-59, "BRAKE CALIPER ASSEMBLY \(2 PISTON TYPE\) : Inspection"](#).
- RHD models
 - 1 piston type: Refer to [BR-114, "BRAKE CALIPER ASSEMBLY \(1 PISTON TYPE\) : Inspection"](#).
 - 2 piston type: Refer to [BR-119, "BRAKE CALIPER ASSEMBLY \(2 PISTON TYPE\) : Inspection"](#).

Is the inspection result normal?

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 9.

NO >> Repair or replace error-detected parts.

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9. CHECK REAR DISC BRAKE

Check the rear disc brake.

- LHD models: Refer to [BR-66, "BRAKE CALIPER ASSEMBLY : Inspection and Adjustment"](#).
- RHD models: Refer to [BR-126, "BRAKE CALIPER ASSEMBLY : Inspection and Adjustment"](#).

B

Is the inspection result normal?

C

YES >> GO TO 10.

D

NO >> Repair or replace error-detected parts.

10. PERFORM SELF-DIAGNOSIS

E

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".

F

Is DTC "C1142" detected?

G

YES >> Replace the ABS actuator and electric unit (control unit).

BRC

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

H

NO >> Check ABS actuator and electric unit (control unit) harness connector and terminal for damage, looseness and disconnection. Repair or replace error-detected parts.

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C1143 STEERING ANGLE SENSOR

DTC Description

INFOID:0000000010723691

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- Brake limited slip differential (BLSD) function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

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 "C1143" detected?

YES >> Proceed to [BRC-150, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723692

1. CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

2. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis for "ABS" again.

Is DTC "C1143" detected?

C1143 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

YES >> GO TO 3.

NO >> INSPECTION END

3. CHECK STEERING ANGLE SENSOR POWER SUPPLY

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

Steering angle sensor		—	Voltage
Connector	Terminal		
M30	4	Ground	Approx. 0 V

4. Turn the ignition switch ON.

CAUTION:

Never start engine.

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

Steering angle sensor		—	Voltage
Connector	Terminal		
M30	4	Ground	10 – 16 V

Is the inspection result normal?

YES >> GO TO 6.

NO (With stop / start system)>>GO TO 4.

NO (Without stop / start system)>>GO TO 5.

4. CHECK STEERING ANGLE SENSOR POWER SUOOLY CIRCUIT (WITH STOP / START SYSTEM)

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#54).
3. Check the continuity and short circuit between steering angle sensor harness connector terminal (4) and 10A fuse (#54).

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.

NO >> Repair or replace error-detected parts.

5. CHECK STEERING ANGLE SENSOR POWER SUOOLY CIRCUIT (WITHOUT STOP / START SYSTEM)

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#30).
3. Check the continuity and short circuit between steering angle sensor harness connector terminal (4) and 10A fuse (#30).

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.

NO >> Repair or replace error-detected parts.

6. CHECK STEERING ANGLE SENSOR GROUND CIRCUIT

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

Steering angle sensor		—	Continuity
Connector	Terminal		
M30	1	Ground	Existed

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7. CHECK TERMINAL

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

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8.CHECK CAN COMMUNICATION LINE

Check the CAN communication. Refer to [LAN-17, "Trouble Diagnosis Flow Chart"](#).

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).

- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> Repair or replace error-detected parts. Refer to [BRC-10, "Precautions for Harness Repair"](#).

C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

DTC Description

INFOID:0000000010723693

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- Brake limited slip differential (BLSD) function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

BRC

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 "C1144" detected?

YES >> Proceed to [BRC-153, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723694

1. ADJUST THE NEUTRAL POSITION OF STEERING ANGLE SENSOR

Perform neutral position adjustment of steering angle sensor. Refer to [BRC-99, "Work Procedure"](#).

>> GO TO 2.

2. PERFORM SELF-DIAGNOSIS

With CONSULT

Perform self-diagnosis for "ABS".

Is DTC "C1144" detected?

YES >> GO TO 3.

NO >> INSPECTION END

C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

3. CHECK STEERING ANGLE SENSOR

1. Turn the ignition switch OFF.
2. Check the steering angle sensor. Refer to [BRC-150, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

< DTC/CIRCUIT DIAGNOSIS >

C1154 TRANSMISSION RANGE SWITCH**DTC Description**

INFOID:0000000010723695

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1154	PNP POSI SIG (PNP position signal)	When a malfunction is detected in TCM system.

POSSIBLE CAUSE

- TCM
- ABS actuator and electric unit (control unit)
- CAN communication line

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- Brake limited slip differential (BLSD) function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

BRC

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 "C1154" detected?

YES >> Proceed to [BRC-155, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723696

CAUTION:

"C1154" may be detected when going up a slope, being toed with ignition switch ON and the gear in a shift position other than R position. This is not a shift position error. The system returns to normal when parking on level ground after stopping the traction and restarting the engine.

1. CHECK CVT SYSTEM

With CONSULT

Perform self-diagnosis for "TRANSMISSION".

Is any DTC detected?

YES >> Check the DTC.

- Gasoline engine models: Refer to [TM-288, "DTC Index"](#).
- Diesel engine models: Refer to [TM-529, "DTC Index"](#).

NO >> GO TO 2.

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 and drive the vehicle for a short period of time.
4. Stop the vehicle.
5. Vehicle stopped, and perform self-diagnosis for "ABS".

Is DTC "C1154" detected?

YES >> Replace the ABS actuator and electric unit (control unit).
• LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
• RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> Check pin terminals and connection of each harness connector for abnormal conditions. Repair or replace error-detected parts.

C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

C1155 BRAKE FLUID LEVEL SWITCH

DTC Description

INFOID:0000000010723697

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1155	BE FLUID LEVEL LOW (Brake fluid level low)	<ul style="list-style-type: none">When brake fluid level low signal is detected.When an open circuit is detected in brake fluid level switch circuit.

POSSIBLE CAUSE

- Harness or connector
- ABS actuator and electric unit (control unit)
- Brake fluid level switch
- Combination meter

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- Brake limited slip differential (BLSD) function
- Brake assist function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

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 "C1155" detected?

YES >> Proceed to [BRC-157, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723698

1. CHECK BRAKE FLUID LEVEL

1. Turn the ignition switch OFF.
2. Check the brake fluid level.
 - LHD models: Refer to [BR-13, "Inspection"](#).
 - RHD models: Refer to [BR-77, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Refill the brake fluid, and GO TO 2.

- LHD models: Refer to [BR-13, "Refilling"](#).
- RHD models: Refer to [BR-77, "Refilling"](#).

C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

2. PERFORM SELF-DIAGNOSIS (1)

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.

4. Perform self-diagnosis for "ABS".

Is DTC "C1155" detected?

YES >> GO TO 3.

NO >> INSPECTION END

3. CHECK BRAKE FLUID LEVEL SWITCH

Check the brake fluid level switch. Refer to [BRC-159, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace the reservoir tank, and GO TO 4.

- LHD models: Refer to [BR-34, "Disassembly and Assembly"](#).
- RHD models: Refer to [BR-97, "Disassembly and Assembly"](#).

4. PERFORM SELF-DIAGNOSIS (2)

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.

4. Perform self-diagnosis for "ABS".

Is DTC "C1155" detected?

YES >> GO TO 5.

NO >> INSPECTION END

5. CHECK CONNECTOR AND TERMINALS

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

Is the inspection result normal?

YES >> GO TO 7.

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

6. PERFORM SELF-DIAGNOSIS (3)

With CONSULT

1. Connect the brake fluid level switch harness connector.
2. Connect the 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.

6. Perform self-diagnosis for "ABS".

Is DTC "C1155" detected?

YES >> GO TO 7.

NO >> INSPECTION END

C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

7. CHECK BRAKE FLUID LEVEL SWITCH CIRCUIT

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

Brake fluid level switch		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
E37	1	M34	25	Existed

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

Brake fluid level switch		—	Continuity
Connector	Terminal		
E37	1	Ground	Not existed

Is the inspection result normal?

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

8. CHECK BRAKE FLUID LEVEL SWITCH GROUND CIRCUIT

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

Brake fluid level switch		—	Continuity
Connector	Terminal		
E37	2	Ground	Existed

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace error-detected parts, and GO TO 9.

9. CHECK COMBINATION METER

Check the combination meter.

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit).
• LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
• RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).
NO >> Repair or replace combination meter. Refer to [MWI-151, "Removal and Installation"](#).

Component Inspection

INFOID:000000010723699

1. CHECK BRAKE FLUID LEVEL SWITCH

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

Brake fluid level switch		Condition	Continuity
Terminal			
1 – 2		When brake fluid level in reservoir tank is within the specified level.	Not existed
		When brake fluid level in reservoir tank is less than the specified level.	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace the reservoir tank.

C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

- LHD models: Refer to [BR-34, "Disassembly and Assembly"](#).
- RHD models: Refer to [BR-97, "Disassembly and Assembly"](#).

C1160 INCOMPLETE DECEL G SENSOR CALIBRATION

DTC Description

INFOID:0000000010723700

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

- ABS actuator and electric unit (control unit)
- Incomplete calibration of decel G sensor

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function (4WD models)
- Brake limited slip differential (BLSD) function
- Brake assist function (4WD models)
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

DTC CONFIRMATION PROCEDURE

1. CHECK DTC DETECTION

With CONSULT

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

Is DTC "C1160" detected?

YES >> Proceed to [BRC-161, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723701

1. CALIBRATION OF DECEL G SENSOR

Perform decel G sensor calibration. Refer to [BRC-102, "Work Procedure"](#).

>> GO TO 2.

2. PERFORM SELF-DIAGNOSIS

With CONSULT

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

Is DTC "C1160" detected?

YES >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> INSPECTION END

< DTC/CIRCUIT DIAGNOSIS >

C1164, C1165 CV SYSTEM**DTC Description**

INFOID:0000000010723702

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function
- EBD function
- Brake limited slip differential (BLSD) function
- Brake assist function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

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 any DTC "C1164" or "C1165" detected?

YES >> Proceed to [BRC-162, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723703

1. CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

< DTC/CIRCUIT DIAGNOSIS >

2. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis for "ABS" again.

Is any DTC "C1164" or "C1165" detected?

YES >> GO TO 3.

NO >> INSPECTION END

3. CHECK CUT VALVE POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	25	Ground	10 – 16 V

4. Turn the ignition switch ON.

CAUTION:**Never start engine.**

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	25	Ground	10 – 16 V

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK CUT VALVE POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check the 30A fusible link (#G).
3. Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (25) and 30A fusible link (#G).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply.

NO >> Repair or replace error-detected parts.

5. CHECK CUT VALVE GGROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	13	Ground	Existed
	38		

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.

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).

C1164, C1165 CV SYSTEM

[WITH VDC (ESP)]

< DTC/CIRCUIT DIAGNOSIS >

- RHD models: Refer to [BRC-220, "RHD : Removal and Installation".](#)

NO >> Repair or replace error-detected parts.

< DTC/CIRCUIT DIAGNOSIS >

C1166, C1167 SV SYSTEM**DTC Description**

INFOID:0000000010723704

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1166	SV 1 (Suction valve 1)	When a malfunction is detected in suction valve 1.
C1167	SV 2 (Suction valve 2)	When a malfunction is detected in suction valve 2.

POSSIBLE CAUSE

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

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function
- EBD function
- Brake limited slip differential (BLSD) function
- Brake assist function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

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 any DTC "C1166" or "C1167" detected?

YES >> Proceed to [BRC-165, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723705

1. CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 2.

< DTC/CIRCUIT DIAGNOSIS >

2. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis for "ABS" again.

Is any DTC "C1166" or "C1167" detected?

YES >> GO TO 3.

NO >> INSPECTION END

3. CHECK SUCTION VALVE POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal	—	Voltage
E36	25	Ground	10 – 16 V

4. Turn the ignition switch ON.

CAUTION:**Never start engine.**

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal	—	Voltage
E36	25	Ground	10 – 16 V

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK SUCTION VALVE POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check the 30A fusible link (#G).
3. Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (25) and 30A fusible link (#G).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply.

NO >> Repair or replace error-detected parts.

5. CHECK SUCTION VALVE GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal	—	Continuity
E36	13	Ground	Existed
	38		

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.

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).

C1166, C1167 SV SYSTEM

[WITH VDC (ESP)]

< DTC/CIRCUIT DIAGNOSIS >

- RHD models: Refer to [BRC-220, "RHD : Removal and Installation".](#)

NO >> Repair or replace error-detected parts.

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< DTC/CIRCUIT DIAGNOSIS >

C1170 VARIANT CODING**DTC Description**

INFOID:0000000010723706

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1170	VARIANT CODING (Variant coding)	When calibration of configuration is not complete.

POSSIBLE CAUSE

- ABS actuator and electric unit (control unit)

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function
- EBD function
- Brake limited slip differential (BLSD) function
- Brake assist function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

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 "C1170" detected?YES >> Proceed to [BRC-168, "Diagnosis Procedure"](#).NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723707

1. CONFIGURATION OF ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Perform configuration of ABS actuator and electric unit (control unit). Refer to [BRC-104, "Work Procedure"](#).

>> GO TO 2.

2. PERFORM SELF-DIAGNOSIS With CONSULT

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

Is DTC "C1170" detected?

YES >> Replace the ABS actuator and electric unit (control unit).

C1170 VARIANT CODING

[WITH VDC (ESP)]

< DTC/CIRCUIT DIAGNOSIS >

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> INSPECTION END

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< DTC/CIRCUIT DIAGNOSIS >

C1197 VACUUM SENSOR**DTC Description**

INFOID:0000000010723708

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

- Harness or connector
- Brake vacuum sensor
- Vacuum piping
- ABS actuator and electric unit (control unit)

FAIL-SAFE

Electrical vacuum assistance of brake booster is suspended.

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 "C1197" detected?

YES >> Proceed to [BRC-170, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723709

1. CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.

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

2. PERFORM SELF-DIAGNOSIS (1)

Ⓐ With CONSULT

1. Connect the brake vacuum sensor harness connector.
2. Connect the ABS actuator and electric unit (control unit) harness connector.
3. Turn the ignition switch ON.
4. Perform self-diagnosis for "ABS".

Is DTC "C1197" detected?

YES >> GO TO 3.

NO >> INSPECTION END

3. CHECK BRAKE BOOSTER AND CHECK VALVE

< DTC/CIRCUIT DIAGNOSIS >

1. Turn the ignition switch OFF.
2. Check the brake booster and the check valve.
 - LHD models: Refer to [BR-38, "Inspection and Adjustment"](#).
 - RHD models: Refer to [BR-100, "Inspection and Adjustment"](#).

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace the brake booster or the check valve.

- LHD models: Refer to [BR-36, "Removal and installation"](#).
- RHD models: Refer to [BR-99, "Removal and installation"](#).

4. PERFORM SELF-DIAGNOSIS (2)

With CONSULT

1. Erase self-diagnosis result for "ABS".
2. Turn the ignition switch ON.
3. Perform self-diagnosis for "ABS".

Is DTC "C1197" detected?

YES >> GO TO 5.
NO >> INSPECTION END

5. CHECK VACUUM PIPING

1. Turn the ignition switch OFF.
2. Check the vacuum piping.
 - LHD models
 - MR20DD: Refer to [BR-40, "MR20DD : Inspection"](#).
 - QR25DE: Refer to [BR-41, "QR25DE : Inspection"](#).
 - R9M: Refer to [BR-42, "R9M : Inspection"](#).
 - RHD models: Refer to [BR-102, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace the vacuum piping.

- LHD models
 - MR20DD: Refer to [BR-40, "MR20DD : Removal and Installation"](#).
 - QR25DE: Refer to [BR-41, "QR25DE : Removal and Installation"](#).
 - R9M: Refer to [BR-42, "R9M : Removal and Installation"](#).
- RHD models: Refer to [BR-102, "Removal and Installation"](#).

6. PERFORM SELF-DIAGNOSIS (3)

With CONSULT

1. Erase self-diagnosis result for "ABS".
2. Turn the ignition switch ON.
3. Perform self-diagnosis for "ABS".

Is DTC "C1197" detected?

YES >> GO TO 7.
NO >> INSPECTION END

7. CHECK TERMINAL

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

Is the inspection result normal?

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

8. PERFORM SELF-DIAGNOSIS (4)

With CONSULT

< DTC/CIRCUIT DIAGNOSIS >

1. Connect the brake vacuum sensor harness connector.
2. Connect the ABS actuator and electric unit (control unit) harness connector.
3. Erase self-diagnosis result for "ABS".
4. Turn the ignition switch ON.
5. Perform self-diagnosis for "ABS".

Is DTC "C1197" detected?

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

9. CHECK BRAKE VACUUMSENSOR CIRCUIT

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

Brake vacuum sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
E31	1	E36	12	Existed
	2		24	
	3		5	

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

Brake vacuum sensor		—	Continuity
Connector	Terminal		
E31	1	Ground	Not existed
	2		
	3		

Is the inspection result normal?

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

10. REPLACE BRAKE VACUUM SENSORWith CONSULT

1. Connect the ABS actuator and electric unit (control unit) harness connector.
2. Connect the brake vacuum sensor harness connector.
3. Replace the brake vacuum sensor.
 - LHD models: Refer to [BR-36, "Removal and installation"](#).
 - RHD models: Refer to [BR-99, "Removal and installation"](#).
4. Erase self-diagnosis result for "ABS".
5. Turn the ignition switch OFF, and wait 10 seconds or more.
6. Start the engine.
7. Perform self-diagnosis for "ABS".

Is DTC "C1197" detected?

YES >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> INSPECTION END

< DTC/CIRCUIT DIAGNOSIS >

C1198 VACUUM SENSOR**DTC Description**

INFOID:0000000010723710

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1198	VACUUM SEN CIR (Vacuum sensor circuit)	<ul style="list-style-type: none"> 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.

POSSIBLE CAUSE

- Harness or connector
- Brake vacuum sensor
- ABS actuator and electric unit (control unit)

FAIL-SAFE

Electrical vacuum assistance of brake booster is suspended.

BRC

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 "C1198" detected?

YES >> Proceed to [BRC-173, "Diagnosis Procedure"](#).NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723711

1. CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.

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

2. PERFORM SELF-DIAGNOSIS (1)

With CONSULT

1. Connect the brake vacuum sensor harness connector.
2. Connect the ABS actuator and electric unit (control unit) harness connector.
3. Turn the ignition switch ON.
4. Perform self-diagnosis for "ABS".

Is DTC "C1198" detected?

YES >> GO TO 3.

NO >> INSPECTION END

3. CHECK TERMINAL

< DTC/CIRCUIT DIAGNOSIS >

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. PERFORM SELF-DIAGNOSIS (2)

With CONSULT

1. Connect the brake vacuum sensor harness connector.
2. Connect the ABS actuator and electric unit (control unit) harness connector.
3. Erase self-diagnosis result for "ABS".
4. Turn the ignition switch ON.
5. Perform self-diagnosis for "ABS".

Is DTC "C1198" detected?

YES >> GO TO 5.

NO >> INSPECTION END

5. CHECK BRAKE VACUUM SENSOR CIRCUIT

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

Brake vacuum sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
E31	1	E36	12	Existed
	2		24	
	3		5	

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

Brake vacuum sensor		—	Continuity
Connector	Terminal		
E31	1	Ground	Not existed
	2		
	3		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6. REPLACE BRAKE VACUUM SENSOR

With CONSULT

1. Connect the ABS actuator and electric unit (control unit) harness connector.
2. Connect the brake vacuum sensor harness connector.
3. Replace the brake vacuum sensor.
 - LHD models: Refer to [BR-36, "Removal and installation"](#).
 - RHD models: Refer to [BR-99, "Removal and installation"](#).
4. Erase self-diagnosis result for "ABS".
5. Turn the ignition switch OFF, and wait 10 seconds or more.
6. Start the engine.
7. Perform self-diagnosis for "ABS".

C1198 VACUUM SENSOR

[WITH VDC (ESP)]

< DTC/CIRCUIT DIAGNOSIS >

Is DTC "C1198" detected?

YES >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> INSPECTION END

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< DTC/CIRCUIT DIAGNOSIS >

C1199 BRAKE BOOSTER**DTC Description**

INFOID:0000000010723712

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

- Harness or connector
- Brake vacuum sensor
- 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**

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

Is DTC "C1199" detected?YES >> Proceed to [BRC-176, "Diagnosis Procedure"](#).NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723713

1. CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.

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

2. PERFORM SELF-DIAGNOSIS (1)**With CONSULT**

1. Connect the brake vacuum sensor harness connector.
2. Connect the ABS actuator and electric unit (control unit) harness connector.
3. Turn the ignition switch ON.
4. Perform self-diagnosis for "ABS".

Is DTC "C1199" detected?

YES >> GO TO 3.

NO >> INSPECTION END

3. CHECK BRAKE BOOSTER AND CHECK VALVE

1. Turn the ignition switch OFF.
2. Check the brake booster and the check valve.
 - LHD models: Refer to [BR-38, "Inspection and Adjustment"](#).

< DTC/CIRCUIT DIAGNOSIS >

- RHD models: Refer to [BR-100, "Inspection and Adjustment"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace the brake booster or the check valve.

- LHD models: Refer to [BR-36, "Removal and installation"](#).

- RHD models: Refer to [BR-99, "Removal and installation"](#).

4. PERFORM SELF-DIAGNOSIS (2)

With CONSULT

1. Erase self-diagnosis result for "ABS".
2. Connect the brake vacuum sensor harness connector.
3. Connect the ABS actuator and electric unit (control unit) harness connector.
4. Turn the ignition switch ON.
5. Perform self-diagnosis for "ABS".

Is DTC "C1199" detected?

YES >> GO TO 5.

NO >> INSPECTION END

5. CHECK VACUUM PIPING

1. Turn the ignition switch OFF.
2. Check the vacuum piping.

- LHD models
 - MR20DD: Refer to [BR-40, "MR20DD : Inspection"](#).
 - QR25DE: Refer to [BR-41, "QR25DE : Inspection"](#).
 - R9M: Refer to [BR-42, "R9M : Inspection"](#).
- RHD models: Refer to [BR-102, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace the vacuum piping.

- LHD models
 - MR20DD: Refer to [BR-40, "MR20DD : Removal and Installation"](#).
 - QR25DE: Refer to [BR-41, "QR25DE : Removal and Installation"](#).
 - R9M: Refer to [BR-42, "R9M : Removal and Installation"](#).
- RHD models: Refer to [BR-102, "Removal and Installation"](#).

6. PERFORM SELF-DIAGNOSIS (3)

With CONSULT

1. Erase self-diagnosis result for "ABS".
2. Connect the brake vacuum sensor harness connector.
3. Connect the ABS actuator and electric unit (control unit) harness connector.
4. Turn the ignition switch ON.
5. Perform self-diagnosis for "ABS".

Is DTC "C1199" detected?

YES >> GO TO 7.

NO >> INSPECTION END

7. CHECK TERMINAL

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

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8. PERFORM SELF-DIAGNOSIS (4)

< DTC/CIRCUIT DIAGNOSIS >

⑧ With CONSULT

1. Connect the brake vacuum sensor harness connector.
2. Connect the ABS actuator and electric unit (control unit) harness connector.
3. Erase self-diagnosis result for "ABS".
4. Turn the ignition switch ON.
5. Perform self-diagnosis for "ABS".

Is DTC "C1199" detected?

YES >> GO TO 9.

NO >> INSPECTION END

9.CHECK BRAKE VACUUM SENSOR CIRCUIT

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

Brake vacuum sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
E31	1	E36	12	Existed
	2		24	
	3		5	

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

Brake vacuum sensor		—	Continuity
Connector	Terminal		
E31	1	Ground	Not existed
	2		
	3		

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace error-detected parts.

10.REPLACE BRAKE VACUUM SENSOR

⑧ With CONSULT

1. Connect the ABS actuator and electric unit (control unit) harness connector.
2. Connect the brake vacuum sensor harness connector.
3. Replace the brake vacuum sensor.
 - LHD models: Refer to [BR-36, "Removal and installation"](#).
 - RHD models: Refer to [BR-99, "Removal and installation"](#).
4. Erase self-diagnosis result for "ABS".
5. Turn the ignition switch OFF, and wait 10 seconds or more.
6. Start the engine.
7. Perform self-diagnosis for "ABS".

Is DTC "C1199" detected?

YES >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> INSPECTION END

< DTC/CIRCUIT DIAGNOSIS >

C119A VACUUM SENSOR**DTC Description**

INFOID:0000000010723714

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

- Harness or connector
- Brake vacuum sensor
- ABS actuator and electric unit (control unit)

FAIL-SAFE

Electrical vacuum assistance of brake booster is suspended.

DTC CONFIRMATION PROCEDURE

BRC

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 [BRC-179, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723715

1. CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.

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

2. PERFORM SELF-DIAGNOSIS

With CONSULT

1. Connect the brake vacuum sensor harness connector.
2. Connect the ABS actuator and electric unit (control unit) harness connector.
3. Turn the ignition switch ON.
4. Perform self-diagnosis for "ABS".

Is DTC "C119A" detected?

YES >> GO TO 3.

NO >> INSPECTION END

3. CHECK BRAKE VACUUM SENSOR POWER SUPPLY

1. Turn the ignition switch OFF.

C119A VACUUM SENSOR

[WITH VDC (ESP)]

< DTC/CIRCUIT DIAGNOSIS >

2. Disconnect the brake vacuum sensor harness connector.
3. Check the voltage between brake vacuum sensor harness connector and ground.

Brake vacuum sensor		—	Voltage
Connector	Terminal		
E31	3	Ground	Approx. 0 V

4. Turn the ignition switch ON.

CAUTION:

Start the engine.

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

Brake vacuum sensor		—	Voltage
Connector	Terminal		
E31	3	Ground	4.75 – 5.25 V

Is the inspection result normal?

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

4. CHECK BRAKE VACUUM SENSOR POWER SUPPLY CIRCUIT

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

Brake vacuum sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
E31	3	E36	5	Existed

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

Brake vacuum sensor		—	Continuity
Connector	Terminal		
E31	3	Ground	Not existed

Is the inspection result normal?

YES >> Check the ABS actuator and electric unit (control unit) power supply system. Refer to [BRC-188, "Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

5. CHECK BRAKE VACUUM SENSOR GROUND CIRCUIT

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

Brake vacuum sensor		—	Continuity
Connector	Terminal		
E31	2	Ground	Not existed

Is the inspection result normal?

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

6. CHECK TERMINAL

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

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

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< DTC/CIRCUIT DIAGNOSIS >

C1B60 CHASSIS CONTROL SYSTEM

DTC Description

INFOID:0000000010723716

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1B60	EXTERNAL CONTROL MODULE (External control module)	When a malfunction is detected in chassis control system.

POSSIBLE CAUSE

- Harness or connector
- Chassis control module
- ABS actuator and electric unit (control unit)

FAIL-SAFE

The following functions are suspended.

- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

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 "C1B60" detected?

YES >> Proceed to [BRC-182, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723717

1. CHECK CHASSIS CONTROL SYSTEM

With CONSULT

Perform self-diagnosis for "CHASSIS CONTROL".

Is any DTC detected?

YES >> Check the DTC. Refer to [DAS-204, "DTC Index"](#).

NO >> GO TO 2.

2. CHECK CONNECTOR AND TERMINALS

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

Is the inspection result normal?

YES >> GO TO 3.

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts, securely lock the connector, and GO TO 3.

3. PERFORM SELF-DIAGNOSIS

With CONSULT

1. Connect the chassis control module harness connector.
2. Connect the ABS actuator and electric unit (control unit) harness connector.
3. Erase self-diagnosis result for "ABS".
4. Turn the ignition switch OFF to ON.
5. Perform self-diagnosis for "ABS".

Is any DTC "C1B60" or "U1000" detected?

YES ("C1B60")>>Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

YES ("U1000")>>Refer to [LAN-17, "Trouble Diagnosis Flow Chart"](#).

NO >> INSPECTION END

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< DTC/CIRCUIT DIAGNOSIS >

U1000 CAN COMM CIRCUIT

DTC Description

INFOID:0000000010723718

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

- CAN communication system malfunction

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function*
- EBD function*
- Brake limited slip differential (BLSD) function
- Brake assist function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

*: When a malfunction detected in CAN communication [between ABS actuator and electric unit (control unit) and chassis control module]

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 "U1000" detected?

YES >> Proceed to [BRC-184, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723719

Proceed to [LAN-17, "Trouble Diagnosis Flow Chart"](#).

< DTC/CIRCUIT DIAGNOSIS >

U1002 SYSTEM COMM (CAN)**DTC Description**

INFOID:0000000010723720

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
U1002	SYSTEM COMM(CAN) (CAN system communication)	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or less.

POSSIBLE CAUSE

- CAN communication line
- ABS actuator and electric unit (control unit)

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function*
- EBD function*
- Brake limited slip differential (BLSD) function
- Brake assist function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

*: When a malfunction detected in CAN communication [between ABS actuator and electric unit (control unit) and chassis control module]

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 "U1002" detected?

YES >> Proceed to [BRC-185, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723721

CAUTION:

- Never apply 7.0 V or more to the measurement terminal.
- Use a tester with open terminal voltage of 7.0 V or less.
- Turn the ignition switch OFF and disconnect the battery cable from the negative terminal when checking the harness.

1. CHECK CAN DIAGNOSIS SUPPORT MONITOR

With CONSULT

1. Select "ABS" and "CAN Diagnosis Support Monitor" in order with CONSULT.

< DTC/CIRCUIT DIAGNOSIS >

2. Check the malfunction history between each control unit connected to ABS actuator and electric unit (control unit).

Check the result of "PAST"?

All items are "OK">>>Refer to [GI-44, "Intermittent Incident"](#).

"TRANSMIT DIAG" is other than "OK">>>GO TO 2.

"METER/M&A" is other than "OK">>>GO TO 3.

A control unit other than "ABS" and "METER/M&A" are anything other than "OK">>>GO TO 4.

2.CHECK TRANSMITTING SIDE UNIT

Check the ABS actuator and electric unit (control unit) harness connector terminals (14) and (26) for damage or loose connection.

Is the inspection result normal?

YES >> Erase self-diagnosis results. Then perform self-diagnosis for "ABS" with CONSULT.

NO >> Recheck terminals for damage or loose connection. Refer to [LAN-7, "Precautions for Harness Repair"](#).

3.CHECK COMBINATION METER

- Check damage or loose connection between the ABS actuator and electric unit (control unit) harness connector terminal (14) and combination meter harness connector terminal (42).
- Check damage or loose connection between the ABS actuator and electric unit (control unit) harness connector terminal (26) and combination meter harness connector terminal (41).

Is the inspection result normal?

YES >> Erase self-diagnosis results for "METER/M&A". Then perform self-diagnosis for "METER/M&A" with CONSULT.

NO >> Recheck terminals for damage or loose connection. Refer to [LAN-7, "Precautions for Harness Repair"](#).

4.CHECK APPLICABLE CONTROL UNIT

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

Is the inspection result normal?

YES >> Erase self-diagnosis results. Then perform self-diagnosis for applicable control unit with CONSULT.

NO >> Recheck terminals for damage or loose connection. Refer to [LAN-7, "Precautions for Harness Repair"](#).

< DTC/CIRCUIT DIAGNOSIS >

U1010 CONTROL UNIT (CAN)**DTC Description**

INFOID:0000000010723722

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
U1010	CONTROL UNIT (CAN) (Control unit [CAN communication])	When detecting error during the initial diagnosis of CAN controller of ABS actuator and electric unit (control unit).

POSSIBLE CAUSE

- ABS actuator and electric unit (control unit)

FAIL-SAFE

The following functions are suspended.

- VDC function
- TCS function
- ABS function *
- EBD function *
- Brake limited slip differential (BLSD) function
- Brake assist function
- Brake force distribution function
- hill start assist function
- Advanced hill descent control function (4WD models with gasoline engine)
- Active trace control function (control of chassis control module)
- Active ride control function (control of chassis control module)

*: When a malfunction detected in CAN communication [between ABS actuator and electric unit (control unit) and chassis control module]

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 "C1010" detected?

YES >> Proceed to [BRC-187, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010723723

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

Check the ABS actuator and electric unit (control unit) harness connector for disconnection and deformation.

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit).

• LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).

• RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000010723724

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

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	28	Ground	Approx. 0 V

4. Turn the ignition switch ON.

CAUTION:

Never start engine.

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	28	Ground	10 – 16 V

Is the inspection result normal?

YES >> GO TO 4.

NO (With stop / start system)>>GO TO 2.

NO (Without stop / start system)>>GO TO 3.

2. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) IGNITION POWER SUPPLY CIRCUIT (WITH STOP / START SYSTEM)

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#60).
3. Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (28) and 10A fuse (#60).

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.

NO >> Repair or replace error-detected parts.

3. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) IGNITION POWER SUPPLY CIRCUIT (WITHOUT STOP / START SYSTEM)

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#21).
3. Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (28) and 10A fuse (#21).

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.

NO >> Repair or replace error-detected parts.

4. CHECK ABS MOTOR AND ABS MOTOR RELAY POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	1	Ground	10 – 16 V

3. Turn the ignition switch ON.

CAUTION:

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

Never start engine.

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	1	Ground	10 – 16 V

Is the inspection result normal?

YES >> GO TO 7.

NO (R9M engine models)>>GO TO 5.

NO (except for R9M engine models)>>GO TO 6.

5.CHECK ABS MOTOR AND ABS MOTOR RELAY POWER SUPPLY CIRCUIT (R9M ENGINE MODELS)

- Turn the ignition switch OFF.
- Check the 40A fusible link (#M).
- Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (1) and 40A fusible link (#M).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply.

NO >> Repair or replace error-detected parts.

6.CHECK ABS MOTOR AND ABS MOTOR RELAY POWER SUPPLY CIRCUIT (EXCEPT FOR R9M ENGINE MODELS)

- Turn the ignition switch OFF.
- Check the 40A fusible link (#K).
- Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (1) and 40A fusible link (#K).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply.

NO >> Repair or replace error-detected parts.

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

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	25	Ground	10 – 16 V

- Turn the ignition switch ON.

CAUTION:

Never start engine.

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E36	25	Ground	10 – 16 V

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 8.

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

- Turn the ignition switch OFF.
- Check the 30A fusible link (#G).

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POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

3. Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminal (25) and 30A fusible link (#G).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply.
NO >> Repair or replace error-detected parts.

9.CHECK GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	13	Ground	
	38		Existed

Is the inspection result normal?

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

10.CHECK TERMINAL

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace error-detected parts.

< DTC/CIRCUIT DIAGNOSIS >

VDC (ESP) OFF SWITCH

Component Function Check

INFOID:0000000010723728

1. CHECK VDC OFF SWITCH OPERATION

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [BRC-191, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010723729

1. CHECK VDC OFF SWITCH CIRCUIT

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

ABS actuator and electric unit (control unit)		VDC OFF switch		Continuity
Connector	Terminal	Connector	Terminal	
E36	15	M5	1	Existed

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	15	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK VDC OFF SWITCH GROUND CIRCUIT

Check the continuity between VDC OFF switch harness connector and ground.

VDC OFF switch		—	Continuity
Connector	Terminal		
M5	2	Ground	Existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3. CHECK VDC OFF SWITCH

Check the VDC OFF switch. Refer to [BRC-192, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace the VDC OFF switch. Refer to [BRC-223, "Removal and Installation"](#).

4. CHECK VDC OFF SWITCH SIGNAL

With CONSULT

1. Connect the ABS actuator and electric unit (control unit) harness connector.
2. Connect the VDC OFF switch harness connector.
3. Select "ABS", "DATA MONITOR" and "OFF SW" according to this order. Check VDC OFF switch signal.

VDC (ESP) OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 5.

5.CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit).

• LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).

• RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:0000000010723730

1.CHECK VDC OFF SWITCH

1. Turn the ignition switch OFF.
2. Remove the VDC OFF switch. Refer to [BRC-223, "Removal and Installation"](#).
3. Check continuity between terminals of VDC OFF switch connector.

VDC OFF switch	Condition	Continuity
Terminal		
1 – 2	When VDC OFF switch is pressed	Existed
	When VDC OFF switch is not pressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the VDC OFF switch. Refer to [BRC-223, "Removal and Installation"](#).

HILL DESCENT CONTROL (DOWNHILL DRIVE SUPPORT) SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

HILL DESCENT CONTROL (DOWNHILL DRIVE SUPPORT) SWITCH

Component Function Check

INFOID:0000000010723731

1. CHECK HILL DESCENT CONTROL SWITCH OPERATION

Check that hill descent control indicator lamp in combination meter turns ON/OFF/Blinking when hill descent control switch is operated.

- ON: hill descent control switch is ON and the operational conditions are satisfied
- Blinking: hill descent control switch is ON and the operational conditions are not satisfied
- OFF: hill descent control switch is OFF

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [BRC-193. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010723732

1. CHECK HILL DESCENT CONTROL SWITCH CIRCUIT

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

ABS actuator and electric unit (control unit)		hill descent control switch		Continuity
Connector	Terminal	Connector	Terminal	
E36	9	M183	1	Existed

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E36	9	Ground	Existed

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK HILL DESCENT CONTROL SWITCH GROUND CIRCUIT

Check the continuity between hill descent control switch harness connector and the ground.

hill descent control switch		—	Continuity
Connector	Terminal		
M183	3	Ground	Existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3. CHECK HILL DESCENT CONTROL SWITCH

Check the hill descent control switch. Refer to [BRC-194. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace the hill descent control switch. Refer to [BRC-224. "Removal and Installation"](#).

4. CHECK HILL DESCENT CONTROL SWITCH SIGNAL

HILL DESCENT CONTROL (DOWNHILL DRIVE SUPPORT) SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

With CONSULT

1. Connect the ABS actuator and electric unit (control unit) harness connector.
2. Connect the hill descent control switch harness connector.
3. Select "ABS", "DATA MONITOR" and "DDS SW" according to this order. Check hill descent control switch signal.

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 5.

5. CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to [BRC-217, "LHD : Removal and Installation".](#)

NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:000000010723733

1. CHECK HILL DESCENT CONTROL SWITCH

1. Turn the ignition switch OFF.
2. Remove the hill descent control switch. Refer to [BRC-224, "Removal and Installation".](#)
3. Check the continuity between hill descent control switch connector terminals.

hill descent control switch	Condition	Continuity
Terminal		
1 – 3	hill descent control switch is ON	Existed
	hill descent control switch is OFF	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the hill descent control switch. Refer to [BRC-224, "Removal and Installation".](#).

< DTC/CIRCUIT DIAGNOSIS >

A

ABS WARNING LAMP

B

Component Function Check

INFOID:0000000010723734

C

1. CHECK ABS WARNING LAMP FUNCTION

D

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

E

CAUTION:**Never start engine.**

BRC

Is the inspection result normal?

G

H

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J

K

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P

YES >> INSPECTION END

Q

NO >> Proceed to [BRC-195, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010723735

R

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

Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to [BRC-188, "Diagnosis Procedure"](#).

S

Is the inspection result normal?

T

U

V

W

X

Y

Z

YES >> GO TO 2.

AA

NO >> Repair or replace error-detected parts.

2. PERFORM SELF-DIAGNOSIS

BB

 With CONSULT

CC

Perform self-diagnosis for "ABS".

DD

Is any DTC detected?

EE

YES >> Check the DTC. Refer to [BRC-84, "DTC Index"](#).

FF

NO >> GO TO 3.

3. CHECK ABS WARNING LAMP SIGNAL

GG

 With CONSULT

HH

1. Turn the ignition switch OFF to ON, and wait for 10 seconds or more.

II

CAUTION:

JJ

Never start engine.

2. Select "ABS", "DATA MONITOR" and "ABS WARN LAMP" according to this order.

KK

3. Check that data monitor displays "On" for approx. 1 second after ignition switch is turned ON and then changes to "Off".

LL

Is the inspection result normal?

MM

YES >> Replace the combination meter. refer to [MWI-151, "Removal and Installation"](#).

NN

NO >> Replace the ABS actuator and electric unit (control unit).

OO

• LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).

PP

• RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

< DTC/CIRCUIT DIAGNOSIS >

BRAKE WARNING LAMP**Component Function Check**

INFOID:0000000010723736

1. CHECK BRAKE WARNING LAMP FUNCTION (1)

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

Is the inspection result normal?

YES >> GO TO 2.

NO >> Proceed to [BRC-196, "Diagnosis Procedure"](#).

2. CHECK BRAKE WARNING LAMP FUNCTION (2)

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 the brake fluid level switch system. Refer to [BRC-157, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010723737

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

Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to [BRC-188, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. PERFORM SELF-DIAGNOSIS

With CONSULT

Perform self-diagnosis for "ABS".

Is any DTC detected?

YES >> Check the DTC. Refer to [BRC-84, "DTC Index"](#).

NO >> GO TO 3.

3. CHECK BRAKE WARNING LAMP SIGNAL

With CONSULT

1. Turn the ignition switch OFF to ON, and wait for 10 seconds or more.

CAUTION:

Never start engine.

2. Select "ABS", "DATA MONITOR" and "EBD WARN LAMP" according to this order.

3. Check that data monitor displays "On" for approx. 1 second after ignition switch is turned ON and then changes to "Off".

Is the inspection result normal?

YES >> Replace the combination meter. refer to [MWI-151, "Removal and Installation"](#).

NO >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).

- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

< DTC/CIRCUIT DIAGNOSIS >

VDC (ESP) WARNING LAMP

Component Function Check

INFOID:0000000010723738

1. CHECK VDC WARNING LAMP FUNCTION

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

CAUTION:

Never start engine.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [BRC-197, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010723739

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

Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to [BRC-188, "Diagnosis Procedure"](#).

BRC

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. PERFORM SELF-DIAGNOSIS

With CONSULT

Perform self-diagnosis for "ABS".

Is any DTC detected?

YES >> Check the DTC. Refer to [BRC-84, "DTC Index"](#).

NO >> GO TO 3.

3. CHECK VDC WARNING LAMP SIGNAL

With CONSULT

1. Turn the ignition switch OFF to ON, and wait for 10 seconds or more.

CAUTION:

Never start engine.

2. Select "ABS", "DATA MONITOR" and "SLIP/VDC LAMP" according to this order.

3. Check that data monitor displays "On" for approx. 1 second after ignition switch is turned ON and then changes to "Off".

Is the inspection result normal?

YES >> Replace the combination meter. refer to [MWI-151, "Removal and Installation"](#).

NO >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).

- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

VDC (ESP) OFF INDICATOR LAMP

Component Function Check

INFOID:0000000010723740

1. CHECK VDC OFF INDICATOR LAMP FUNCTION (1)

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

CAUTION:

Never start engine.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Proceed to [BRC-198, "Diagnosis Procedure"](#).

2. CHECK VDC OFF INDICATOR LAMP FUNCTION (2)

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Check VDC OFF switch system. Refer to [BRC-191, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010723741

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

Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to [BRC-188, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK VDC OFF INDICATOR LAMP SIGNAL (1)

With CONSULT

1. Turn the ignition switch ON.

CAUTION:

Never start engine.

2. Select "ABS", "DATA MONITOR" and "OFF LAMP" according to this order.

3. Check that data monitor displays "On" for approx. 1 second after ignition switch is turned ON, and then changes to "Off".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).

- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

3. CHECK VDC OFF INDICATOR LAMP SIGNAL (2)

With CONSULT

Check that data monitor displays "On" or "Off" each time when VDC OFF switch is operated.

Is the inspection result normal?

YES >> Replace the combination meter. Refer to [MWI-151, "Removal and Installation"](#).

NO >> Check the VDC OFF switch system. Refer to [BRC-191, "Diagnosis Procedure"](#).

HILL START ASSIST (UPHILL START SUPPORT) INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

HILL START ASSIST (UPHILL START SUPPORT) INDICATOR LAMP

Component Function Check

INFOID:0000000011004422

1. CHECK HILL START ASSIST INDICATOR LAMP FUNCTION (1)

Check that hill start assist indicator lamp in combination meter turn ON when hill start assist function is satisfied to operational conditions.

NOTE:

About satisfied to operational conditions, refer to [BRC-62, "hill start assist \(UPHILL START SUPPORT\) FUNCTION : System Description"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Proceed to [BRC-199, "Diagnosis Procedure"](#).

2. CHECK HILL START ASSIST INDICATOR LAMP FUNCTION (2)

Check that hill start assist indicator lamp in combination meter blinks when hill start assist function is operating conditions.

NOTE:

About operating conditions, refer to [BRC-62, "hill start assist \(UPHILL START SUPPORT\) FUNCTION : System Description"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [BRC-199, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000011004423

1. CHECK COMBINATION METER

Check the combination meter.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK HILL START ASSIST INDICATOR LAMP FUNCTION (1)

Check that hill start assist indicator lamp in combination meter turn ON when hill start assist function is satisfied to operational conditions.

NOTE:

About satisfied to operational conditions, refer to [BRC-62, "hill start assist \(UPHILL START SUPPORT\) FUNCTION : System Description"](#).

>> GO TO 3.

3. CHECK HILL START ASSIST INDICATOR LAMP FUNCTION (2)

Check that hill start assist indicator lamp in combination meter blinks when hill start assist function is operating conditions.

NOTE:

About operating conditions, refer to [BRC-62, "hill start assist \(UPHILL START SUPPORT\) FUNCTION : System Description"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

4. CHECK CHASSIS CONTROL MODULE

Check the chassis control module.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

HILL START ASSIST (UPHILL START SUPPORT) INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

5.CHECK HILL START ASSIST INDICATOR LAMP FUNCTION (3)

Check that hill start assist indicator lamp in combination meter turn ON when hill start assist function is satisfied to operational conditions.

NOTE:

About satisfied to operational conditions, refer to [BRC-62, "hill start assist \(UPHILL START SUPPORT\) FUNCTION : System Description"](#).

>> GO TO 6.

6.CHECK HILL START ASSIST INDICATOR LAMP FUNCTION (4)

Check that hill start assist indicator lamp in combination meter blinks when hill start assist function is operating conditions.

NOTE:

About operating conditions, refer to [BRC-62, "hill start assist \(UPHILL START SUPPORT\) FUNCTION : System Description"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 7.

7.PERFORM SELF-DIAGNOSIS

With CONSULT

Perform self-diagnosis for "ABS".

Is DTC detected?

YES >> Check the DTC. Refer to [BRC-84, "DTC Index"](#).

NO >> Replace the ABS actuator and electric unit (control unit).

• LHD: Refer to [BRC-217, "LHD : Removal and Installation"](#).

• RHD: Refer to [BRC-220, "RHD : Removal and Installation"](#).

HILL DECENT CONTROL (DOWNSHILL DRIVE SUPPORT) INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

[WITH VDC (ESP)]

HILL DECENT CONTROL (DOWNSHILL DRIVE SUPPORT) INDICATOR LAMP

Component Function Check

INFOID:0000000010723742

1. CHECK HILL DESCENT CONTROL INDICATOR LAMP FUNCTION (1)

Check that hill descent control indicator lamp in combination meter turns ON for approx. 1 second after ignition switch is turned ON.

CAUTION:

Never start engine.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Proceed to [BRC-201, "Diagnosis Procedure"](#).

2. CHECK HILL DESCENT CONTROL INDICATOR LAMP FUNCTION (2)

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Check hill descent control switch system. Refer to [BRC-193, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000010723743

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

Perform the trouble diagnosis for ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to [BRC-188, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. PERFORM SELF-DIAGNOSIS

With CONSULT

Perform self-diagnosis for "ABS".

Is any DTC detected?

YES >> Check the DTC. Refer to [BRC-84, "DTC Index"](#).

NO >> Replace the combination meter. Refer to [MWI-151, "Removal and Installation"](#).

SYMPTOM DIAGNOSIS

EXCESSIVE OPERATION FREQUENCY

Description

INFOID:0000000010723744

VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function or advanced hill descent control function (4WD models with gasoline engine) operates in excessive operation frequency.

Diagnosis Procedure

INFOID:0000000010723745

1. CHECK BRAKING FORCE

Check brake force using a brake tester.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check the brake system.

2. CHECK FRONT AXLE AND REAR AXLE

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

• Front axle

- 2WD models: Refer to [FAX-9, "Inspection"](#).

- 4WD models: Refer to [FAX-70, "Inspection"](#).

• Rear axle

- 2WD models: Refer to [RAX-6, "Inspection"](#).

- 4WD models: Refer to [RAX-16, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3. CHECK WHEEL SENSOR

Check the wheel sensor.

• Check installation and damage of wheel sensor.

• Check connection of wheel sensor harness connector.

• Check terminal of wheel sensor harness connector.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace the wheel sensor.

• Front wheel sensor: Refer to [BRС-212, "FRONT WHEEL SENSOR : Removal and Installation"](#).

• Rear sensor rotor: Refer to [BRС-214, "REAR WHEEL SENSOR : Removal and Installation"](#).

4. CHECK SENSOR ROTOR

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

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace the sensor rotor.

• Front sensor rotor: Refer to [BRС-216, "FRONT SENSOR ROTOR : Removal and Installation"](#).

• Rear sensor rotor: Refer to [BRС-216, "REAR SENSOR ROTOR : Removal and Installation"](#).

5. CHECK WARNING LAMP TURN OFF

- Check that VDC warning lamp and ABS warning lamp turn OFF approx. 1 second after ignition switch is turned ON.
- Check that VDC warning lamp and ABS warning lamp turn OFF after engine started or driving.

CAUTION:

Brake warning lamp turns ON when parking brake is operated (parking brake switch is ON) (without electric parking brake system) or brake fluid is less than the specified level (brake fluid level switch is ON).

Is the inspection result normal?

EXCESSIVE OPERATION FREQUENCY

< SYMPTOM DIAGNOSIS >

[WITH VDC (ESP)]

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

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UNEXPECTED BRAKE PEDAL REACTION

Description

INFOID:0000000010723746

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

Diagnosis Procedure

INFOID:0000000010723747

1. CHECK FRONT AXLE AND REAR AXLE

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

- Front axle
 - 2WD models: Refer to [FAX-9, "Inspection"](#).
 - 4WD models: Refer to [FAX-70, "Inspection"](#).
- Rear axle
 - 2WD models: Refer to [RAX-6, "Inspection"](#).
 - 4WD models: Refer to [RAX-16, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2. CHECK DISC ROTOR

Check the disc rotor.

- Front
 - LHD models: Refer to [BR-17, "DISC ROTOR : Inspection and Adjustment"](#).
 - RHD models: Refer to [BR-81, "DISC ROTOR : Inspection and Adjustment"](#).
- Rear
 - LHD models: Refer to [BR-19, "DISC ROTOR : Inspection and Adjustment"](#).
 - RHD models: Refer to [BR-83, "DISC ROTOR : Inspection and Adjustment"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Refinish or replace the disc rotor.

3. CHECK BRAKE FLUID LEAKAGE

Check the fluid leakage.

- Front
 - LHD models: Refer to [BR-27, "FRONT : Inspection"](#).
 - RHD models: Refer to [BR-77, "Inspection"](#).
- Rear
 - LHD models: Refer to [BR-31, "REAR : Inspection"](#).
 - RHD models: Refer to [BR-94, "REAR : Inspection"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK BRAKE PEDAL

Check the each item of brake pedal.

- LHD models: Refer to [BR-11, "Inspection and Adjustment"](#).
- RHD models: Refer to [BR-75, "Inspection and Adjustment"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Adjust the each item of brake pedal.

- LHD models: Refer to [BR-11, "Inspection and Adjustment"](#).
- RHD models: Refer to [BR-75, "Inspection and Adjustment"](#).

5. CHECK BRAKING FORCE

Check the brake force using a brake tester.

Is the inspection result normal?

YES >> GO TO 6.

UNEXPECTED BRAKE PEDAL REACTION

< SYMPTOM DIAGNOSIS >

[WITH VDC (ESP)]

NO >> Check each components of brake system.

6. CHECK BRAKE PERFORMANCE

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

Is the inspection result normal?

YES >> Normal

NO >> Check each components of brake system.

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THE BRAKING DISTANCE IS LONG

Description

INFOID:0000000010723748

Brake stopping distance is long when ABS function is operated.

Diagnosis Procedure

INFOID:0000000010723749

CAUTION:

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

1.CHECK BRAKING FORCE

Check the brake force using a brake tester.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check each components of brake system.

2.CHECK BRAKE PERFORMANCE

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

Is the inspection result normal?

YES >> Normal

NO >> Check each components of brake system.

< SYMPTOM DIAGNOSIS >

DOES NOT OPERATE

Description

INFOID:0000000010723750

VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function, or advanced hill descent control function (4WD models with gasoline engine) does not operate.

Diagnosis Procedure

INFOID:0000000010723751

CAUTION:

VDC function, ABS function and EBD function never operate when the vehicle speed is 10 km/h (6.2 MPH) or less.

1. CHECK WARNING LAMP

- Check that ABS warning lamp and VDC warning lamp turn ON and turn OFF approx. 1 second after ignition switch is turned ON or driving.
- Check that brake warning lamp turn ON and turn OFF after engine start or driving.

CAUTION:

Brake warning lamp turns ON when parking brake is operated (parking brake switch is ON) (without electric parking brake system) 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.

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BRAKE PEDAL VIBRATION OR OPERATION SOUND OCCURS

< SYMPTOM DIAGNOSIS >

[WITH VDC (ESP)]

BRAKE PEDAL VIBRATION OR OPERATION SOUND OCCURS

Description

INFOID:0000000010723752

- 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 more]

Diagnosis Procedure

INFOID:0000000010723753

1. SYMPTOM CHECK 1

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

Do vibrations occur?

YES >> GO TO 2.
NO >> Check the brake pedal.

- LHD models: Refer to [BR-22, "Inspection and Adjustment"](#).
- RHD models: Refer to [BR-86, "Inspection and Adjustment"](#).

2. SYMPTOM CHECK 2

Check that motor sound from ABS actuator and electric unit (control unit) occurs when the engine starts.

Does the operation sound occur?

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

3. SYMPTOM CHECK 3

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

Does the symptom occur?

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

< SYMPTOM DIAGNOSIS >

VEHICLE JERKS DURING**Description**

INFOID:0000000010723754

The vehicle jerks when VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function or advanced hill descent control function (4WD models with gasoline engine) operates.

Diagnosis Procedure

INFOID:0000000010723755

1. CHECK SYMPTOM

Check that the vehicle jerks when VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function or advanced hill descent control function operates.

Is the inspection result normal?

YES >> Normal
NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS (1)

BRC

 With CONSULT

Perform self-diagnosis for "ABS".

Is DTC detected?

YES >> Check the DTC.
NO >> GO TO 3.

3. CHECK CONNECTOR With CONSULT

1. Turn the ignition switch OFF.
2. Disconnect the ABS actuator and electric unit (control unit) harness connector.
3. Check the connector terminal for deformation, disconnection and looseness.
4. Connect the ABS actuator and electric unit (control unit) 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. PERFORM SELF-DIAGNOSIS (2) With CONSULT

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

Is DTC detected?

YES >> Check the DTC.
NO >> Replace the ABS actuator and electric unit (control unit).

- LHD models: Refer to [BRC-217, "LHD : Removal and Installation"](#).
- RHD models: Refer to [BRC-220, "RHD : Removal and Installation"](#).

VDC (ESP) WARNING LAMP, ABS WARNING LAMP AND BRAKE WARNING LAMP TURN ON

< SYMPTOM DIAGNOSIS >

[WITH VDC (ESP)]

VDC (ESP) WARNING LAMP, ABS WARNING LAMP AND BRAKE WARNING LAMP TURN ON

Description

INFOID:0000000010737210

ABS warning lamp and Brake warning lamp turn ON for a moment when restarting the engine. (Vehicles with the stop / start system)

Diagnosis Procedure

INFOID:0000000010737211

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

With CONSULT

1. Start the engine.

CAUTION:

The vehicle must be in a stopped state.

2. Connect booster battery (12V) and jumper cable to battery cable.
3. Select "ACTIVE TEST" in "ENGINE".
4. Select "AUTO STOP START" in "ACTIVE TEST".
5. Touch "Start".

CAUTION:

- Since the engine runs with the hood open, special care must be taken when performing the work.
- If the idling stop state cannot be developed.
 - M/T models: Refer to [EC-848, "STOP/START SYSTEM : System Description \(M/T models\)"](#).
 - CVT models: Refer to [EC-856, "STOP/START SYSTEM : System Description \(CVT models\)"](#).

6. Check the ABS warning lamp state and the brake warning lamp state when "Cancel" is touched under the idling stop state.

Are the ABS warning lamp and the brake warning lamp OFF?

YES >> Check the battery. Refer to [PG-120, "R9M : Work Flow"](#).

NO >> GO TO 2.

2. PERFORM THE SELF-DIAGNOSIS

With CONSULT

1. Turn the ignition switch OFF → ON.

CAUTION:

- Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
- Start the engine.

2. Repeat step 1 two or more times.
3. Perform self-diagnosis for "ABS".

Is any DTC detected?

YES >> Check the DTC. Refer to [BRC-84, "DTC Index"](#).

NO >> INSPECTION END

NORMAL OPERATING CONDITION

[WITH VDC (ESP)]

< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

Description

INFOID:0000000010723756

Symptom	Result
Brake pedal slightly vibrates and operation sound (motor sound and sound from suspension) occurs when VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function or advanced hill descent control function (4WD models with gasoline engine) operates.	This is not a malfunction, because it is caused by VDC function, TCS function, ABS function, EBD function, brake limited slip differential (BLSD) function, brake assist function, brake force distribution function, hill start assist function and advanced hill descent control function (4WD models with gasoline engine) that are normally operated.
Brake stopping distance may become longer than models without ABS function depending on the road conditions, when ABS function is operated on slippery road like rough road, gravel road or snowy road.	
Brake pedal vibrates and operation sound occurs during sudden acceleration and cornering, when VDC function, TCS function, brake limited slip differential (BLSD) function, brake assist function or brake force distribution function is operated.	
Brake pedal vibrates and motor sound from the engine room occurs, when the engine starts or the vehicle starts just after starting the engine.	This is not a malfunction, because it is caused by operation check of ABS actuator and electric unit (control unit).
Acceleration may be felt insufficient depending on the road conditions.	
TCS function may operate momentarily, while driving on a road where friction coefficient varies, or when downshifting, or fully depressing accelerator pedal.	This is not a malfunction, because it is 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, brake limited slip differential (BLSD) function, brake assist function and brake force distribution function may not normally operate, when driving on a special road the is extremely slanted (bank in a circuit course).	In this case, restart the engine on a normal road. If the normal condition is restored, there is no malfunction. In that case, erase "ABS" self-diagnosis result memory with CONSULT.
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, brake assist function and brake force distribution function are OFF (VDC OFF switch is pressed and VDC OFF indicator lamp is in ON status).	
The vehicle speed does not increase, when the accelerator pedal is depressed while the vehicle is on a 2-wheel chassis dynamometer for speedometer check.	This is normal. (When checking the vehicle on a chassis dynamometer, operate VDC OFF switch so that TCS function is OFF.)
Flow sound of brake fluid from engine room occurs when hill start assist function operates.	This is not a malfunction, because it is caused by hill start assist function that is normally operated.

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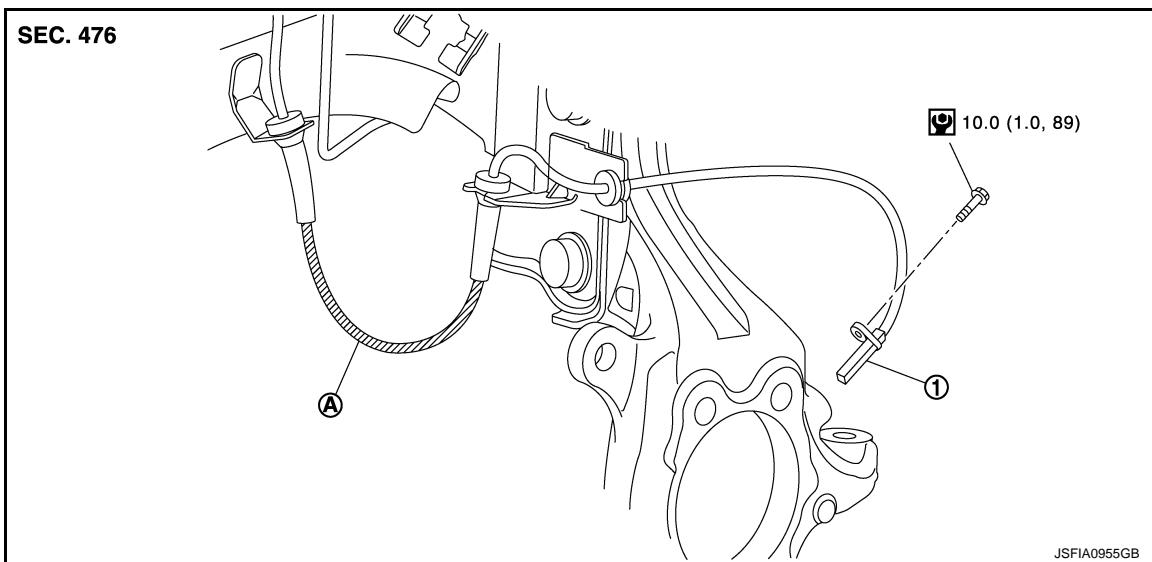
REMOVAL AND INSTALLATION

WHEEL SENSOR

FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

INFOID:0000000010723757



① Front LH wheel sensor

Ⓐ Identification line

: N·m (kg·m, in·lb)

NOTE:

Front RH wheel sensor is symmetrically opposite of LH.

FRONT WHEEL SENSOR : Removal and Installation

INFOID:0000000010723758

REMOVAL

1. Remove tires. Refer to [WT-61, "Removal and Installation"](#).
2. Remove the mudguard (front). Refer to [EXT-30, "FRONT MUDGUARD : 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.

4. 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.

- 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.

WHEEL SENSOR

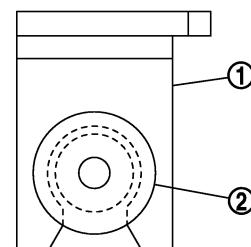
< REMOVAL AND INSTALLATION >

[WITH VDC (ESP)]

- Never twist front wheel sensor harness when installing front wheel sensor. Check that grommet ② is fully inserted to bracket ①. Check that front wheel sensor harness is not twisted after installation.

CAUTION:

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



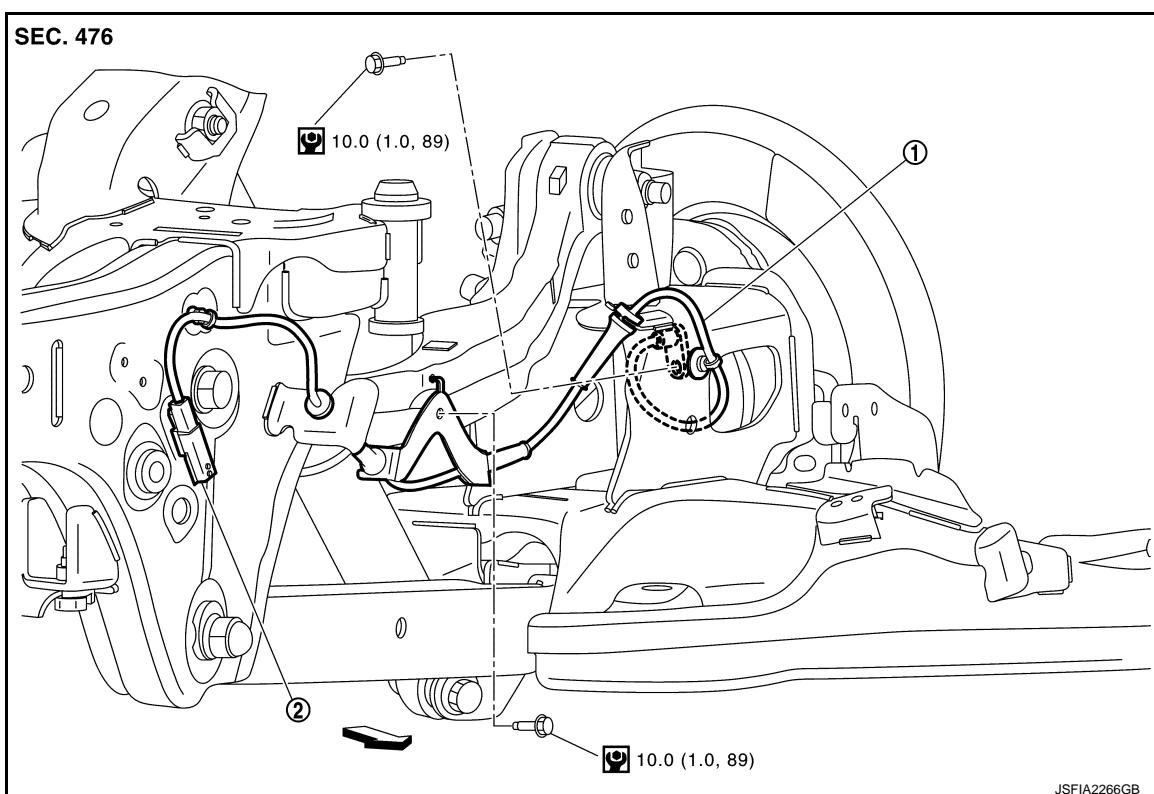
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REAR WHEEL SENSOR

REAR WHEEL SENSOR : Exploded View

INFOID:0000000010723759

2WD



① Rear LH wheel sensor

② Rear LH wheel sensor harness connector

◀: Vehicle front

█: N·m (kg·m, in·lb)

NOTE:

Rear RH wheel sensor is symmetrically opposite of LH.

4WD

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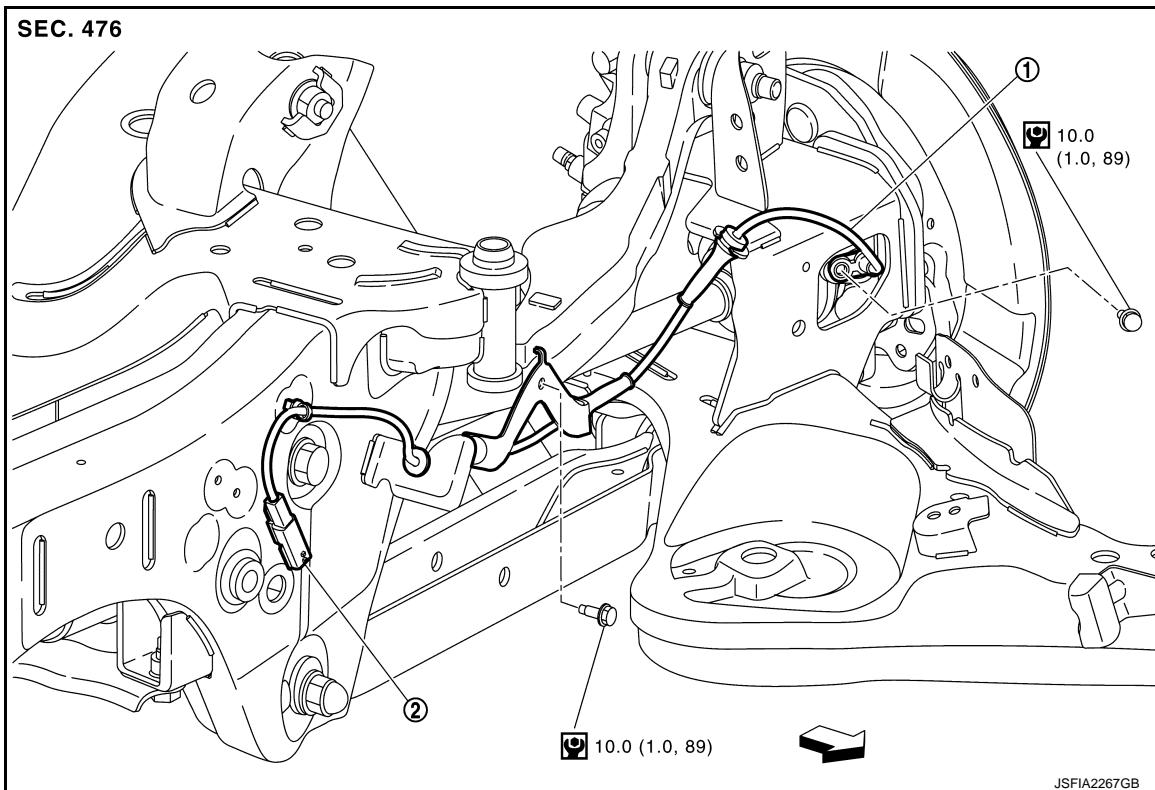
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WHEEL SENSOR

< REMOVAL AND INSTALLATION >

[WITH VDC (ESP)]



① Rear LH wheel sensor

② Rear LH wheel sensor harness connector

◀: Vehicle front

█: N·m (kg-m, in-lb)

NOTE:

Rear RH wheel sensor is symmetrically opposite of LH.

REAR WHEEL SENSOR : Removal and Installation

INFOID:0000000010723760

REMOVAL

1. Remove rear wheel sensor from rear wheel hub assembly. (2WD)

CAUTION:

Never rotate or pull rear wheel sensor as much as possible, when pulling out.

2. Remove rear wheel sensor from axle housing. (4WD)

CAUTION:

Never rotate or pull rear wheel sensor as much as possible, when pulling out.

3. Remove rear wheel sensor harness from the vehicle.

CAUTION:

Never twist and never pull rear wheel sensor harness, when removing.

INSTALLATION

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

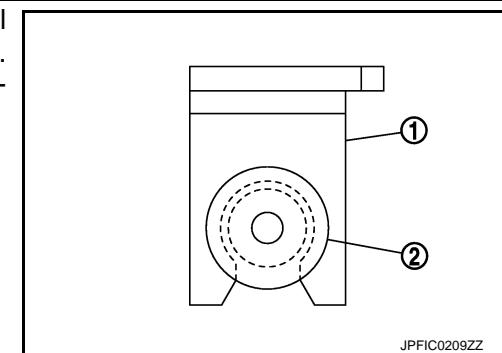
- Check that there is no foreign material like iron powder or damage on inner surface of rear wheel sensor mounting hole of rear final drive and sensor rotor. Install after cleaning when there are foreign material like iron powder, or replace when there is a malfunction.

WHEEL SENSOR

< REMOVAL AND INSTALLATION >

[WITH VDC (ESP)]

- Never twist rear wheel sensor harness when installing rear wheel sensor. Check that grommet ② is fully inserted to bracket ①. Check that rear wheel sensor harness is not twisted after installation.



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SENSOR ROTOR

FRONT SENSOR ROTOR

FRONT SENSOR ROTOR : Removal and Installation

INFOID:000000010723761

REMOVAL

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

- 2WD: Refer to [FAX-11, "Removal and Installation"](#).
- 4WD: Refer to [FAX-72, "Removal and Installation"](#).

INSTALLATION

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

- 2WD: Refer to [FAX-72, "Removal and Installation"](#).
- 4WD: Refer to [FAX-72, "Removal and Installation"](#).

REAR SENSOR ROTOR

REAR SENSOR ROTOR : Removal and Installation

INFOID:000000010723762

REMOVAL

2WD

Replace wheel hub as a assembly when replacing because sensor rotor cannot be disassembled. Refer to [RAX-7, "Removal and Installation"](#).

4WD

1. Remove drive shaft. Refer to [RAX-22, "Removal and Installation"](#).
2. Remove sensor rotor from rear drive shaft. Refer to [RAX-22, "Removal and Installation"](#).

INSTALLATION

Installation is the reverse order of removal.

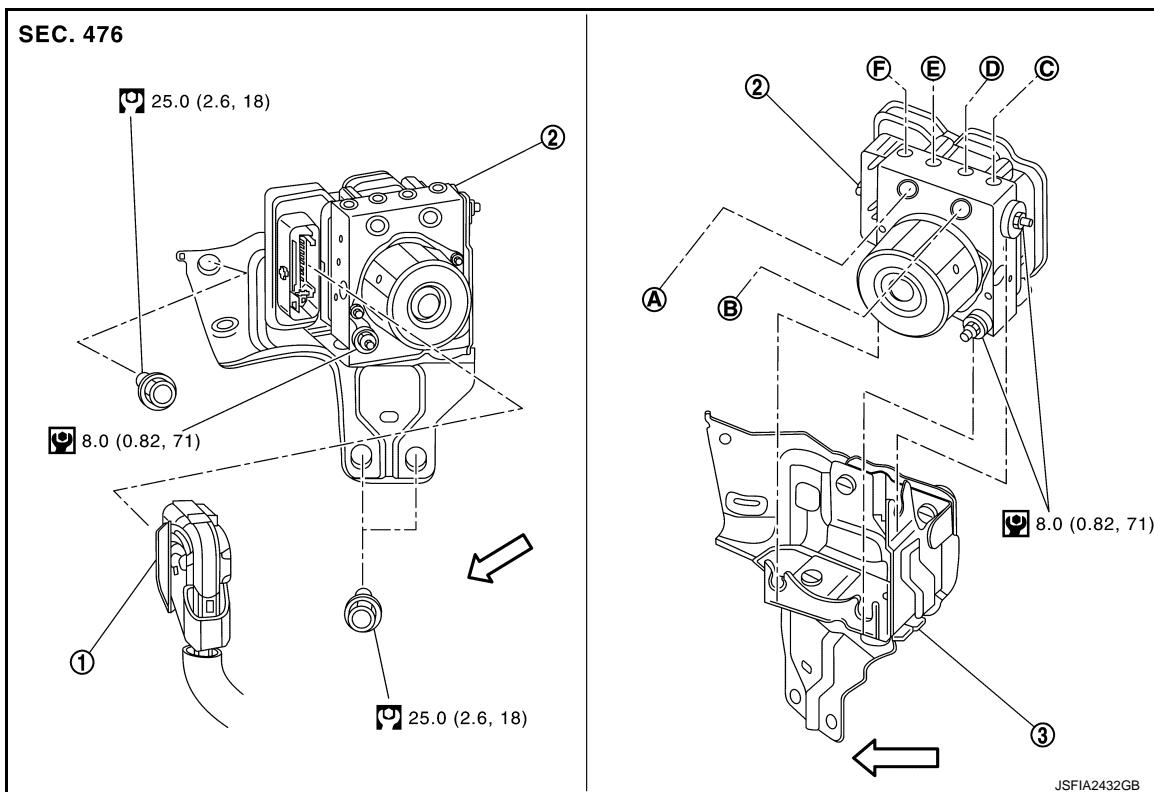
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

LHD

LHD : Exploded View

INFOID:0000000010723763

LHD



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

② ABS actuator and electric unit (control unit)

③ Bracket

Ⓐ To master cylinder secondary side

Ⓑ To master cylinder primary side

Ⓒ To rear LH caliper

Ⓓ To front RH caliper

Ⓔ To front LH caliper

Ⓕ To rear RH caliper

←: Vehicle front

Nm: N·m (kg·m, ft·lb)

Nm: N·m (kg·m, in·lb)

LHD : Removal and Installation

INFOID:0000000010723764

REMOVAL

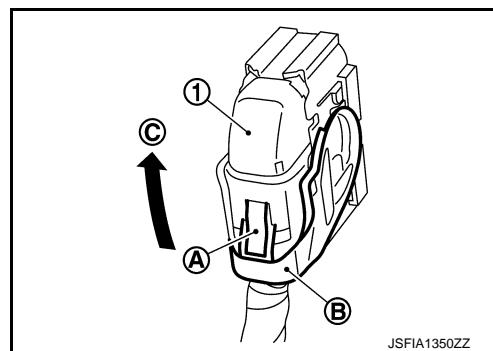
1. Disconnect the battery cable from negative terminal. Refer to [BRC-9, "Precautions for Removing Battery Terminal"](#).
2. Drain brake fluid. Refer to [BR-13, "Draining"](#).
3. Remove the engine cover. Refer to [EM-306, "Removal and Installation"](#).
4. Remove the cowl top cover. Refer to [EXT-25, "Removal and Installation"](#).
5. Remove the cowl top extension. Refer to [EXT-25, "Removal and Installation"](#).

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< REMOVAL AND INSTALLATION >

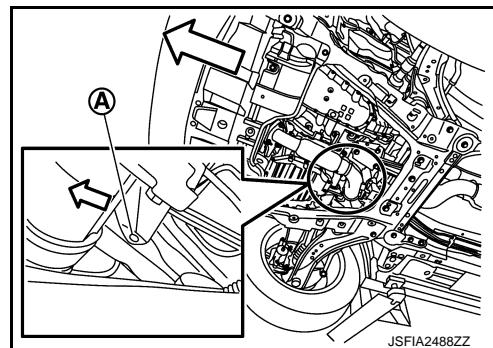
[WITH VDC (ESP)]

6. Disconnect ABS actuator and electric unit (control unit) harness connector ①, follow the procedure below.
 - a. Push the pawl Ⓐ.
 - b. Move the lever Ⓑ in the direction Ⓒ until locked.
 - c. Disconnect ABS actuator and electric unit (control unit) harness connector.



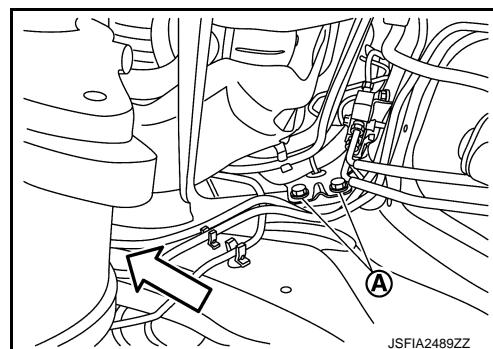
7. Loosen flare nut of brake tube using a flare nut wrench, and then remove brake tube between master cylinder and ABS actuator and electric unit (control unit). Refer to [BR-32, "Removal and Installation"](#).
8. Lift up the vehicle.
9. Remove clip Ⓐ at the heat insulator lower side to make working space.

◀ : Vehicle front



10. Remove bolts Ⓐ at the ABS actuator and electric unit (control unit) bracket lower side.

◀ : Vehicle front



11. Lift down the vehicle.
12. Remove the clip Ⓐ of the air compressor high-pressure pipe to make working space.

◀ : Vehicle front

13. Remove the bolt Ⓑ at the ABS actuator and electric unit (control unit) bracket upper side, then remove the ABS actuator and electric unit as a set with bracket.

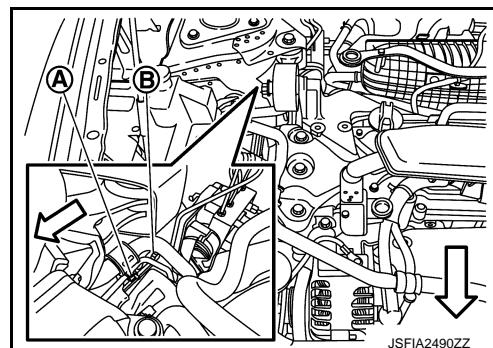
CAUTION:

- 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.

14. Remove bracket from ABS actuator and electric unit (control unit).

INSTALLATION

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

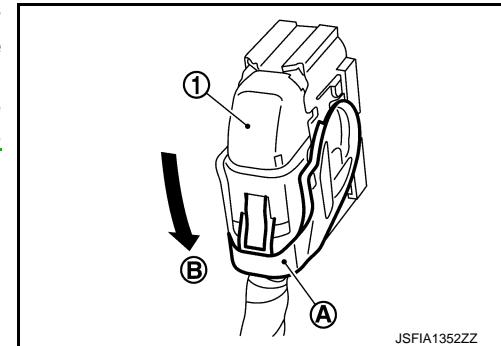


ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

[WITH VDC (ESP)]

< REMOVAL AND INSTALLATION >

- When replacing ABS actuator and electric unit (control unit), remove the inlet hole protector for brake tube just before performing.
- When installing brake tube, tighten to the specified torque using a flare nut torque wrench so that flare nut and brake tube are not damaged. Refer to [BR-32, "Exploded View"](#).
- Never remove and install actuator by holding actuator harness.
- Bleed air from brake piping after installation. Refer to [BR-14, "Bleeding Brake System"](#).
- Never apply excessive impact to actuator, such as by dropping it.
- After installing the ABS actuator and electric unit (control unit) harness connector ①, move the lever Ⓐ in the direction Ⓑ to secure the locking.
- When replacing the ABS actuator and electric unit (control unit), be sure to perform the configuration. Refer to [BRC-104, "Work Procedure"](#).

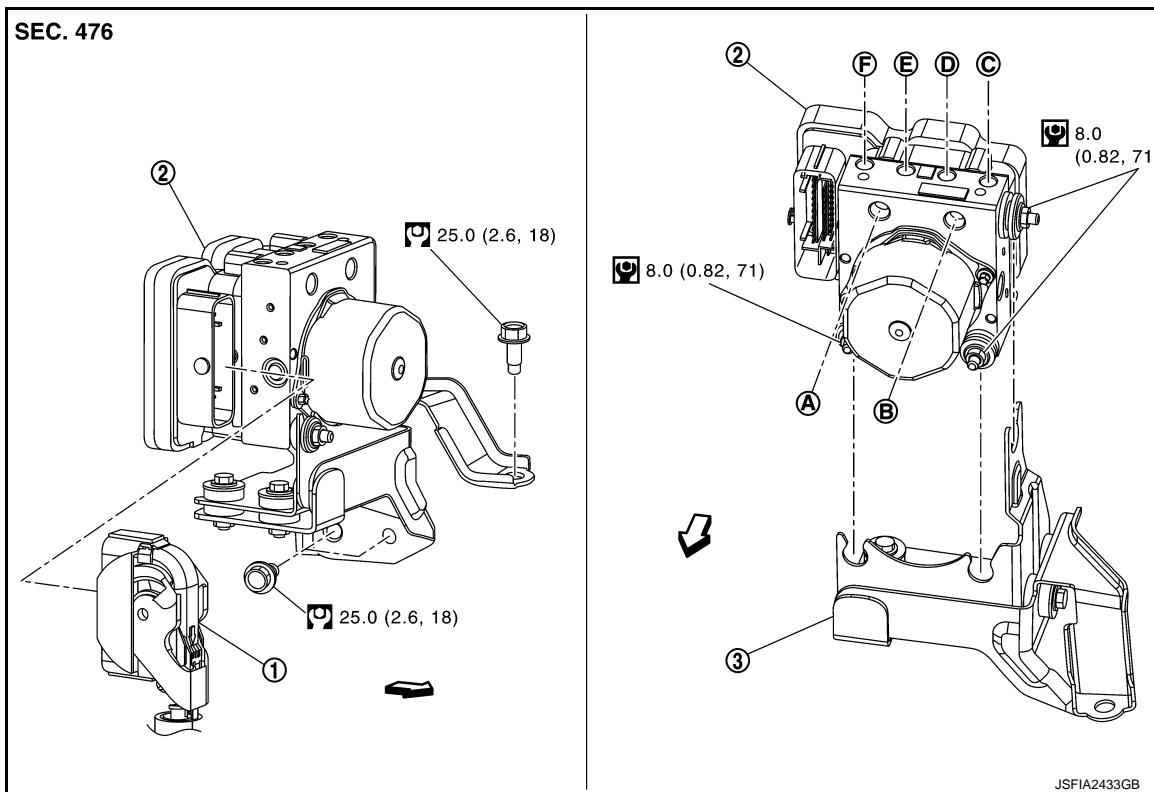


RHD

RHD : Exploded View

INFOID:0000000010723765

RHD



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

② ABS actuator and electric unit (control unit)

③ Bracket

Ⓐ To master cylinder secondary side

Ⓑ To master cylinder primary side

Ⓒ To rear LH caliper

Ⓓ To front RH caliper

Ⓔ To front LH caliper

Ⓕ To rear RH caliper

←: Vehicle front

扭矩: N·m (kg·m, ft·lb)

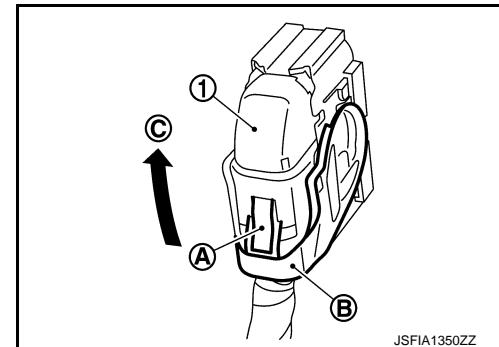
扭矩: N·m (kg·m, in·lb)

RHD : Removal and Installation

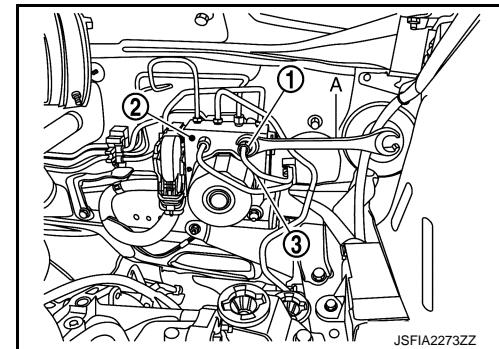
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REMOVAL

1. Disconnect the battery cable from negative terminal. Refer to [BRC-9, "Precautions for Removing Battery Terminal"](#).
2. Drain brake fluid. Refer to [BR-77, "Draining"](#).
3. Remove air duct and air cleaner body. Refer to [EM-308, "Removal and Installation"](#).
4. Disconnect ABS actuator and electric unit (control unit) harness connector ①, follow the procedure below.
 - a. Push the pawl ④.
 - b. Move the lever ⑤ in the direction ⑥ until locked.
 - c. Disconnect ABS actuator and electric unit (control unit) harness connector.



5. Loosen flare nut ① of brake tube using a flare nut wrench, and then remove brake tube ③ between master cylinder and ABS actuator and electric unit (control unit) ②. Refer to [BR-95, "Exploded View"](#).



6. 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.

7. 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.

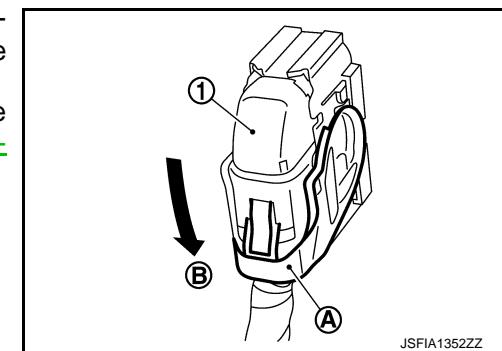
- When replacing ABS actuator and electric unit (control unit), remove the inlet hole protector for brake tube just before performing.
- When installing brake tube, tighten to the specified torque using a flare nut torque wrench so that flare nut and brake tube are not damaged. Refer to [BR-95, "Exploded View"](#).
- Never remove and install actuator by holding actuator harness.
- Bleed air from brake piping after installation. Refer to [BR-78, "Bleeding Brake System"](#).
- Never apply excessive impact to actuator, such as by dropping it.

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

[WITH VDC (ESP)]

< REMOVAL AND INSTALLATION >

- After installing the ABS actuator and electric unit (control unit) harness connector ①, move the lever Ⓐ in the direction Ⓑ to secure the locking.
- When replacing the ABS actuator and electric unit (control unit), be sure to perform the configuration. Refer to [BRC-104, "Work Procedure"](#).



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STEERING ANGLE SENSOR

Removal and Installation

INFOID:000000010723767

REMOVAL

1. Remove spiral cable assembly. Refer to [SR-23, "Removal and Installation"](#).
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 installed, or replaced. Refer to [BR-99, "Work Procedure"](#).

VDC (ESP) OFF SWITCH

Removal and Installation

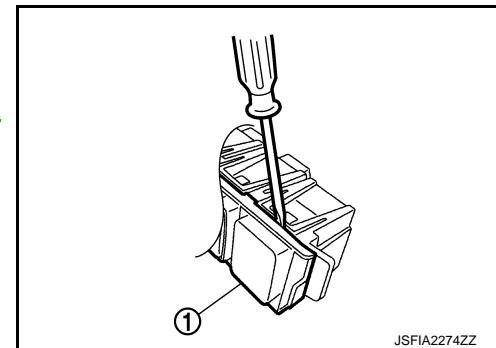
INFOID:0000000010723768

REMOVAL

1. Remove lower instrument panel.
 - For LHD, refer to [IP-14, "Removal and Installation"](#).
 - For RHD, refer to [IP-41, "Removal and Installation"](#).
2. Remove switch bracket.
 - For LHD, refer to [IP-14, "Removal and Installation"](#).
 - For RHD, refer to [IP-41, "Removal and Installation"](#).
3. Remove VDC OFF switch ① from switch bracket while pushing the pawl.

NOTE:

For design of VDC OFF switch, refer to [BRC-48, "VDC \(ESP\) FUNCTION : System Description"](#).



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INSTALLATION

Installation is the reverse order of removal.

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HILL DESCENT CONTROL (DOWNHILL DRIVE SUPPORT) SWITCH

Removal and Installation

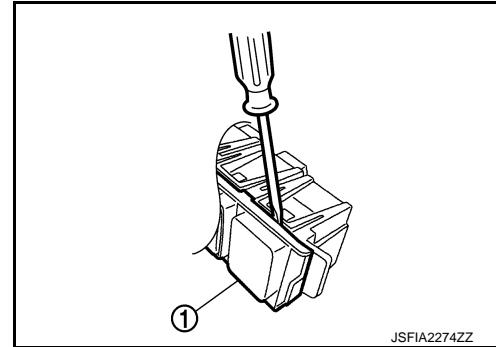
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REMOVAL

1. Remove center console switch panel.
 - For LHD, refer to [IP-25, "Removal and Installation"](#).
 - For RHD, refer to [IP-52, "Removal and Installation"](#).
2. Remove switch bracket.
3. Remove hill descent control switch ① from switch bracket while pushing the pawl.

NOTE:

For design of hill descent control switch, refer to [BRC-28, "hill descent control \(Downhill Drive Support\) Switch"](#).



JSFIA2274ZZ

INSTALLATION

Installation is the reverse order of removal.

PRECAUTION

PRECAUTIONS

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

INFOID:0000000010930903

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

WARNING:

Always observe the following items for preventing accidental activation.

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

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

WARNING:

Always observe the following items for preventing accidental activation.

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

Precautions for Removing Battery Terminal

INFOID:0000000010930904

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.
- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing "How to disconnect 12V battery terminal" described below.

NOTE:

Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage may occur.

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

NOTE:

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

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

NOTE:

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

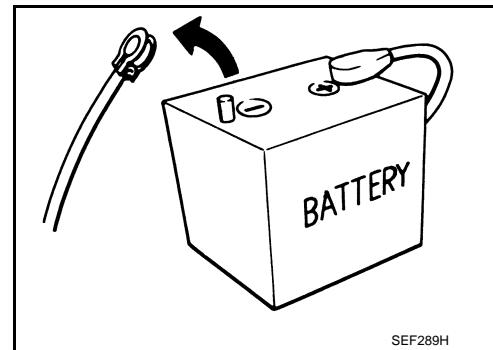
HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.

For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

1. Open the hood.



SEF289H

PRECAUTIONS

< PRECAUTION >

[FORWARD EMERGENCY BRAKING]

2. Turn key switch to the OFF position with the driver side door opened.
3. Get out of the vehicle and close the driver side door.
4. Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes
K9K engine	: 4 minutes
M9R engine	: 4 minutes
R9M engine	: 4 minutes
V9X engine	: 4 minutes

CAUTION:

While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

5. Remove 12V battery terminal.

CAUTION:

After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

1. Unlock the door with intelligent key or remote keyless entry.

NOTE:

At this moment, ACC power is supplied.

2. Open the driver side door.
3. Open the hood.
4. Close the driver side door.
5. Wait at least 3 minutes.

CAUTION:

While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

6. Remove 12V battery terminal.

CAUTION:

After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

Precautions for FEB System Service

INFOID:000000010721662

CAUTION:

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

PREPARATION

< PREPARATION >

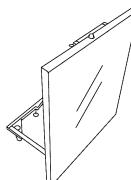
[FORWARD EMERGENCY BRAKING]

PREPARATION

PREPARATION

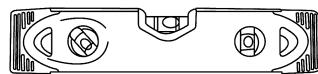
Special Service Tools

INFOID:0000000010836772

Tool number (Kent-Moore No.) Tool name	Description
KV99112700 (→) ICC target board	 JSOI A1012ZZ Uses for radar alignment

Commercial Service Tools

INFOID:0000000010836765

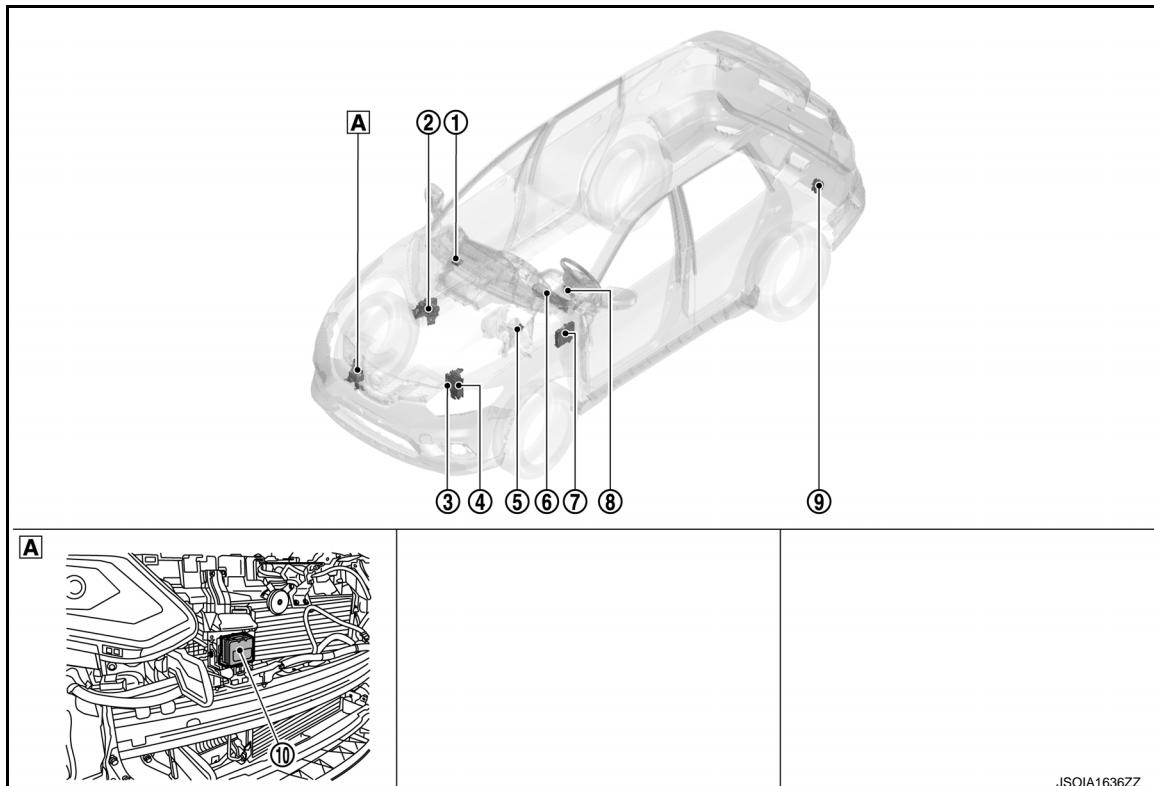
Tool name	Description
Spirit level	 JSOI A1620ZZ Uses for distance sensor initial vertical alignment.

SYSTEM DESCRIPTION**COMPONENT PARTS**

Component Parts Location

INFOID:0000000010721663

LHD MODELS



A Back side of front bumper

JSOIA1636ZZ

No.	Component parts	Function
①	Chassis control unit	<ul style="list-style-type: none"> Brake fluid pressure control signal is received from distance sensor via chassis communication. Brake fluid pressure control signal is transmitted to ABS actuator electric unit (control unit) via CAN communication. Refer to DAS-166, "Component Parts Location" for detailed installation location.
②	ABS actuator and electric unit (control unit)	<ul style="list-style-type: none"> Vehicle speed signal and the operation statuses of the VDC, TCS and ABS systems, etc. are transmitted to the distance sensor via CAN communication. Refer to BRC-14, "Component Parts Location" for detailed installation location.
③	TCM	<ul style="list-style-type: none"> CVT control related signal is transmitted to distance sensor via CAN communication. Refer to TM-235, "CVT CONTROL SYSTEM : Component Parts Location" for detailed installation location. (Gasoline engine models) Refer to TM-466, "CVT CONTROL SYSTEM : Component Parts Location" for detailed installation location. (Diesel engine models)

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[FORWARD EMERGENCY BRAKING]

No.	Component parts	Function
④	ECM	<ul style="list-style-type: none"> When Forward Emergency Braking operates, an engine torque down request signal is received from the distance sensor. Refer to EC-28, "ENGINE CONTROL SYSTEM : Component Parts Location" for detailed installation location. (MR20DD engine models) Refer to EC-440, "Component Parts Location" for detailed installation location. (QR25DE engine models) Refer to EC-812, "Component Parts Location" for detailed installation location. (R9M engine models)
⑤	Stop lamp switch	Stop lamp switch is installed at the upper part of the brake pedal and detects a brake operation performed by the driver.
⑥	Combination meter	<ul style="list-style-type: none"> Performs the following operations using the signals received from the distance sensor via the CAN communication <ul style="list-style-type: none"> Description: Displays the FEB operation status System display and warning: BRC-238, "Menu Displayed by Pressing Each Switch" Refer to MWI-7, "METER SYSTEM : Component Parts Location" for detailed installation location.
⑦	BCM	<ul style="list-style-type: none"> Stop lamp switch signal is transmitted to the distance sensor via CAN communication. Refer to BCS-6, "BODY CONTROL SYSTEM : Component Parts Location" for detailed installation location.
⑧	Steering angle sensor	Steering angle sensor signal is transmitted to distance sensor via CAN communication.
⑨	Sonar control unit	<ul style="list-style-type: none"> While Forward Emergency Braking is operating, when the system wants to recommend an operation to the driver, and when the system is canceled, a buzzer sounds due to a sonar output request from the distance sensor. Refer to SN-8, "Component Parts Location" for detailed installation location. (With Park Assist) Refer to SN-119, "Component Parts Location" for detailed installation location. (Without Park Assist)
⑩	Distance sensor	Distance sensor detects radar reflected from a vehicle ahead by irradiating radar forward and calculates a distance from the vehicle ahead and relative speed, based on the detected signal.

RHD MODELS

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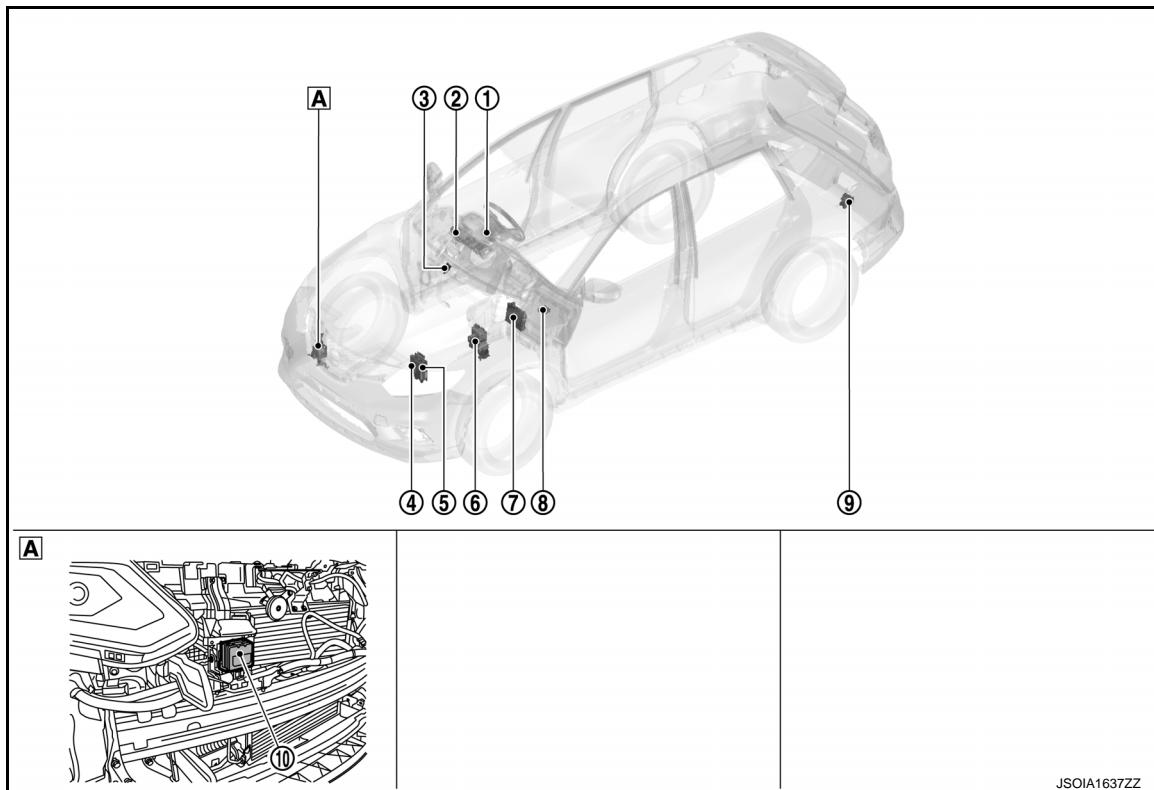
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COMPONENT PARTS

< SYSTEM DESCRIPTION >

[FORWARD EMERGENCY BRAKING]



JSOIA1637ZZ

A Back side of front bumper

No.	Component parts	Function
①	Steering angle sensor	Steering angle sensor signal is transmitted to distance sensor via CAN communication.
②	Combination meter	<ul style="list-style-type: none"> Performs the following operations using the signals received from the distance sensor via the CAN communication Description: Displays the FEB operation status System display and warning: BRC-238, "Menu Displayed by Pressing Each Switch" Refer to MWI-7, "METER SYSTEM : Component Parts Location" for detailed installation location.
③	Stop lamp switch	Stop lamp switch is installed at the upper part of the brake pedal and detects a brake operation performed by the driver.
④	TCM	<ul style="list-style-type: none"> CVT control related signal is transmitted to distance sensor via CAN communication. Refer to TM-235, "CVT CONTROL SYSTEM : Component Parts Location" for detailed installation location. (Gasoline engine models) Refer to TM-466, "CVT CONTROL SYSTEM : Component Parts Location" for detailed installation location. (Diesel engine models)
⑤	ECM	<ul style="list-style-type: none"> When Forward Emergency Braking operates, an engine torque down request signal is received from the distance sensor. Refer to EC-28, "ENGINE CONTROL SYSTEM : Component Parts Location" for detailed installation location. (MR20DD engine models) Refer to EC-440, "Component Parts Location" for detailed installation location. (QR25DE engine models) Refer to EC-812, "Component Parts Location" for detailed installation location. (R9M engine models)
⑥	ABS actuator and electric unit (control unit)	<ul style="list-style-type: none"> Vehicle speed signal and the operation statuses of the VDC, TCS and ABS systems, etc. are transmitted to the distance sensor via CAN communication. Refer to BRC-14, "Component Parts Location" for detailed installation location.

COMPONENT PARTS

< SYSTEM DESCRIPTION >

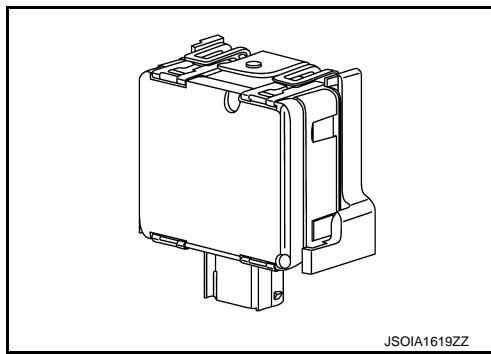
[FORWARD EMERGENCY BRAKING]

No.	Component parts	Function
⑦	BCM	<ul style="list-style-type: none"> Stop lamp switch signal is transmitted to the distance sensor via CAN communication. Refer to BCS-6. "BODY CONTROL SYSTEM : Component Parts Location" for detailed installation location.
⑧	Chassis control unit	<ul style="list-style-type: none"> Brake fluid pressure control signal is received from distance sensor via chassis communication. Brake fluid pressure control signal is transmitted to ABS actuator electric unit (control unit) via CAN communication. Refer to DAS-166. "Component Parts Location" for detailed installation location.
⑨	Sonar control unit	<ul style="list-style-type: none"> While Forward Emergency Braking is operating, when the system wants to recommend an operation to the driver, and when the system is canceled, a buzzer sounds due to a sonar output request from the distance sensor. Refer to SN-8. "Component Parts Location" for detailed installation location. (With Park Assist) Refer to SN-119. "Component Parts Location" for detailed installation location. (Without Park Assist)
⑩	Distance sensor	Distance sensor detects radar reflected from a vehicle ahead by irradiating radar forward and calculates a distance from the vehicle ahead and relative speed, based on the detected signal.

Distance Sensor

INFOID:000000010727967

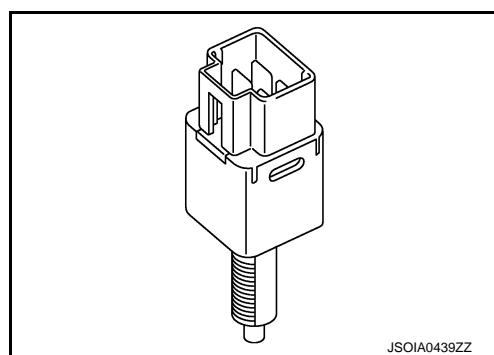
- Distance sensor is installed on the back of the front bumper and detects a vehicle ahead by using millimeter waves.
- Distance sensor detects radar reflected from a vehicle ahead by irradiating radar forward and calculates a distance from the vehicle ahead and relative speed, based on the detected signal.
- When judging the danger of crash according to the distance from the vehicle ahead and the relative speed, the distance sensor transmits a signal to ABS actuator and electric unit (control unit).



Stop Lamp Switch

INFOID:000000010727968

- Stop lamp switch is installed at the upper part of the brake pedal and detects a brake operation performed by the driver.
- Stop lamp switch is turned ON, when depressing the brake pedal.
- Stop lamp switch signal is input to BCM. Stop lamp switch signals are transmitted from BCM to distance sensor via CAN communication.

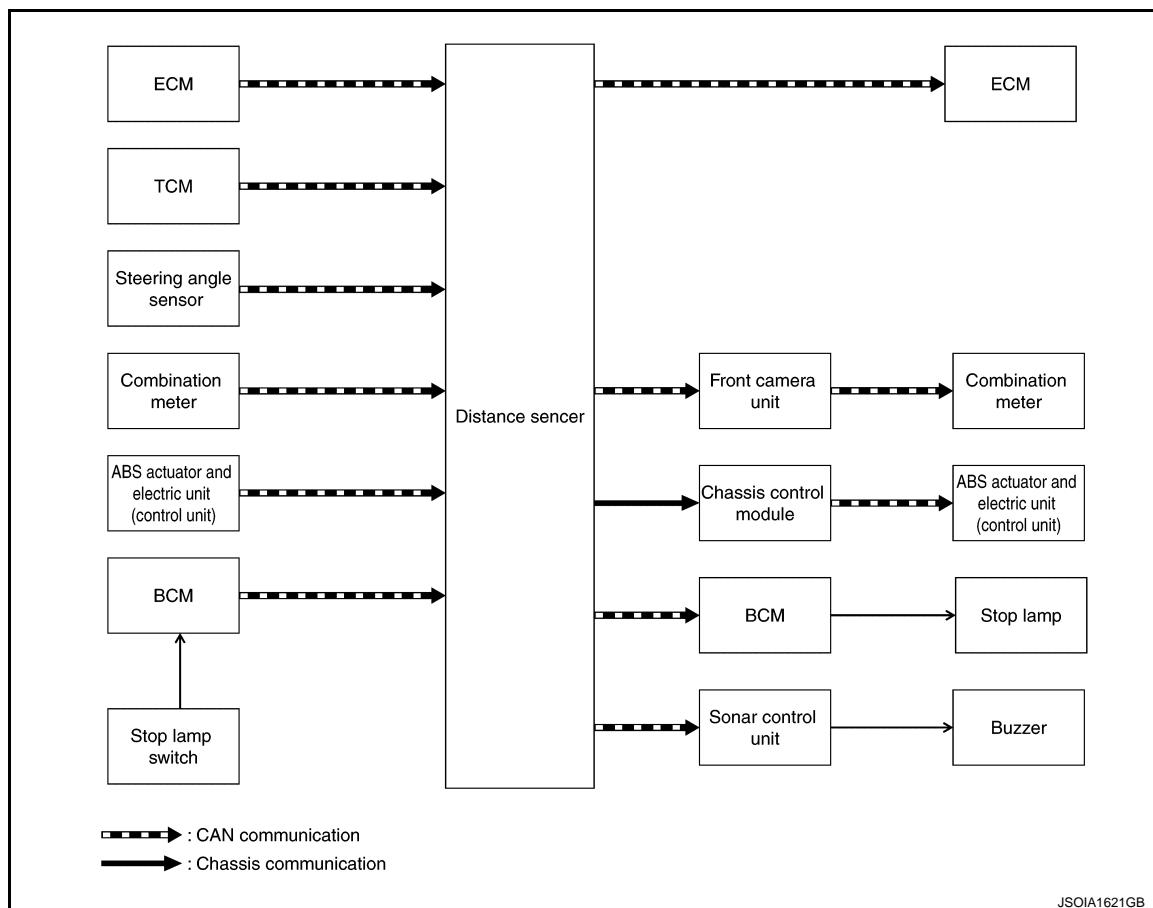


SYSTEM

System Description

INFOID:000000010721664

SYSTEM DIAGRAM



DISTANCE SENSOR INPUT/OUTPUT SIGNAL ITEM

Input Signal Item

Transmit unit	Signal name		Description
ECM	CAN communication	Closed throttle position signal	Receives idle position state (ON/OFF)
		Accelerator pedal position signal	Receives accelerator pedal position (angle)
		Engine speed signal	Receives engine speed
TCM	CAN communication	Input speed signal	Receives the number of revolutions of input shaft
		Current gear position signal	Receives a current gear position
		Shift position signal	Receives a selector lever position
		Output shaft revolution signal	Receives the number of revolutions of output shaft
BCM	CAN communication	Stop lamp switch signal	Receives an operational state of the brake pedal

SYSTEM

< SYSTEM DESCRIPTION >

[FORWARD EMERGENCY BRAKING]

Transmit unit	Signal name	Description
ABS actuator and electric unit (control unit)	ABS malfunction signal	Receives a malfunction state of ABS
	ABS operation signal	Receives an operational state of ABS
	ABS warning lamp signal	Receives an ON/OFF state of ABS warning lamp
	TCS malfunction signal	Receives a malfunction state of TCS
	TCS operation signal	Receives an operational state of TCS
	VDC OFF switch signal	Receives an ON/OFF state of VDC
	VDC malfunction signal	Receives a malfunction state of VDC
	VDC operation signal	Receives an operational state of VDC
	Vehicle speed signal (ABS)	Receives wheel speeds of four wheels
	Yaw rate signal	Receives yaw rate acting on the vehicle
Steering angle sensor	CAN communication	Steering angle sensor signal
Combination meter	CAN communication	System selection signal
Stop lamp switch	Stop lamp switch signal	Transmits a operational state of the brake pedal to the BCM

Output Signal Item

Reception unit	Signal name	Description	
ECM	CAN communication	Engine torque down request signal	Transmits a signal to control the engine torque.
ABS actuator and electric unit (control unit)	CAN communication	Brake fluid pressure control signal	Transmits a brake fluid pressure control signal to activates the brake via chassis control module
Combination meter	CAN communication	Vehicle ahead detection indicator signal	Transmits a signal to display a state of the system on the information display via front camera unit
		FEB system display signal	
		FEB warning signal	
BCM	CAN communication	Stop lamp drive signal	Transmits a signal to active the stop lamp.
Sonar control unit	CAN communication	Buzzer drive signal	Transmits a buzzer signal to active the buzzer

DESCRIPTION

- Forward emergency braking (FEB) system can assist the driver when there is a risk of a forward collision with the vehicle ahead in the traveling lane.
- FEB system operate at speeds above approximately 5km/h (3 MPH).

FUNCTION DESCRIPTION

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

FEB Operating Condition

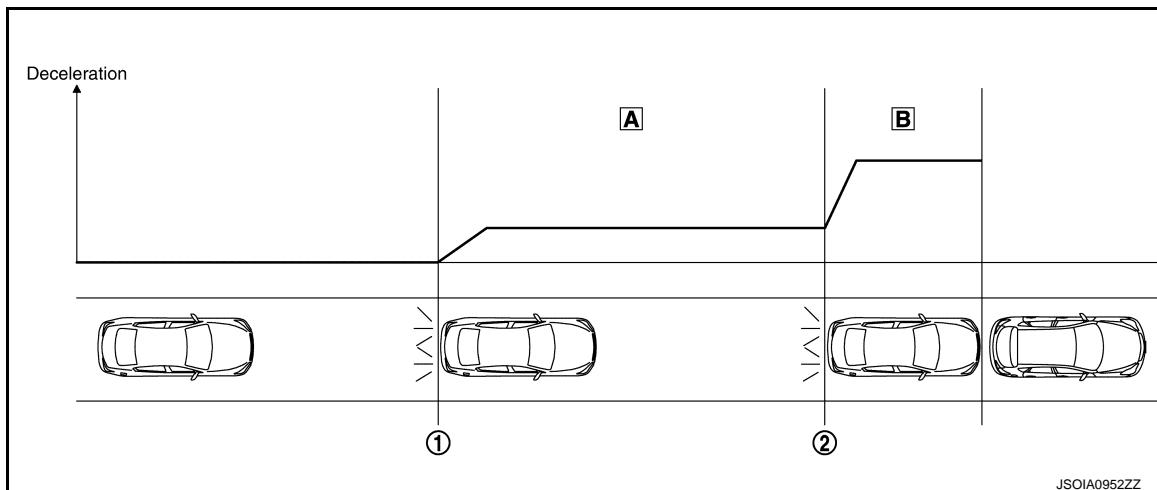
- FEB setting is ON (FEB warning lamp OFF)
- Vehicle speed: Approximately 5km/h and above

SYSTEM

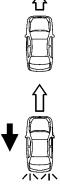
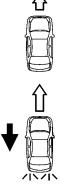
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[FORWARD EMERGENCY BRAKING]

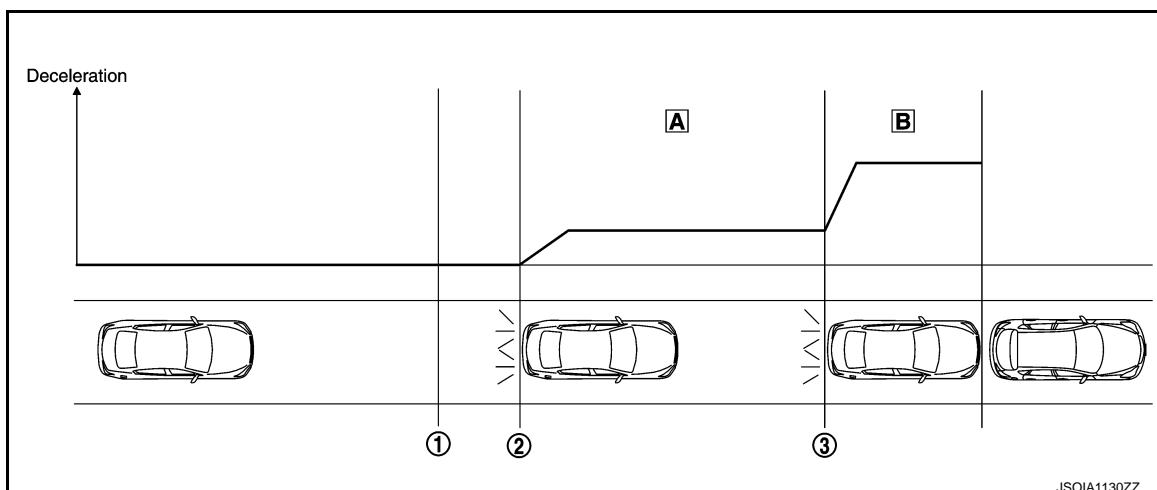
CVT models



① Start of warning and partial brake ② Start of harder brake
A Partial brake **B** Harder brake

Situation		Brake	Warning
No obstacle approached		No operation	—
①	Start of warning and partial brake	Partial brake  JSOIA0222ZZ	<ul style="list-style-type: none"> • Sounds the buzzer • Blinks vehicle ahead indicator
②	Start of harder brake	Harder brake  JSOIA0222ZZ	<ul style="list-style-type: none"> • Sounds the buzzer (Higher pitched buzzer) • Indicates FEB warning

M/T models



SYSTEM

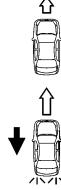
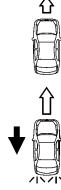
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[FORWARD EMERGENCY BRAKING]

① Start of warning
A Partial brake

② Start of partial brake
B Harder brake

③ Start of harder brake

Situation		Brake	Warning
No obstacle approached		No operation	—
①	Start of warning	No operation	<ul style="list-style-type: none"> • Sounds the buzzer • Blinks vehicle ahead indicator
②	Start of partial brake	Partial brake  JSOIA0222ZZ	<ul style="list-style-type: none"> • Sounds the buzzer (Higher pitched buzzer) • Indicates FEB warning
③	Start of harder brake	Harder brake  JSOIA0222ZZ	<ul style="list-style-type: none"> • Sounds the buzzer (Higher pitched buzzer) • Indicates FEB warning

CAUTION:

It is the driver's responsibility to stay alert, drive safely and be in control of the vehicle at all times. As there is a performance limit, it may not provide a warning or brake in certain conditions.

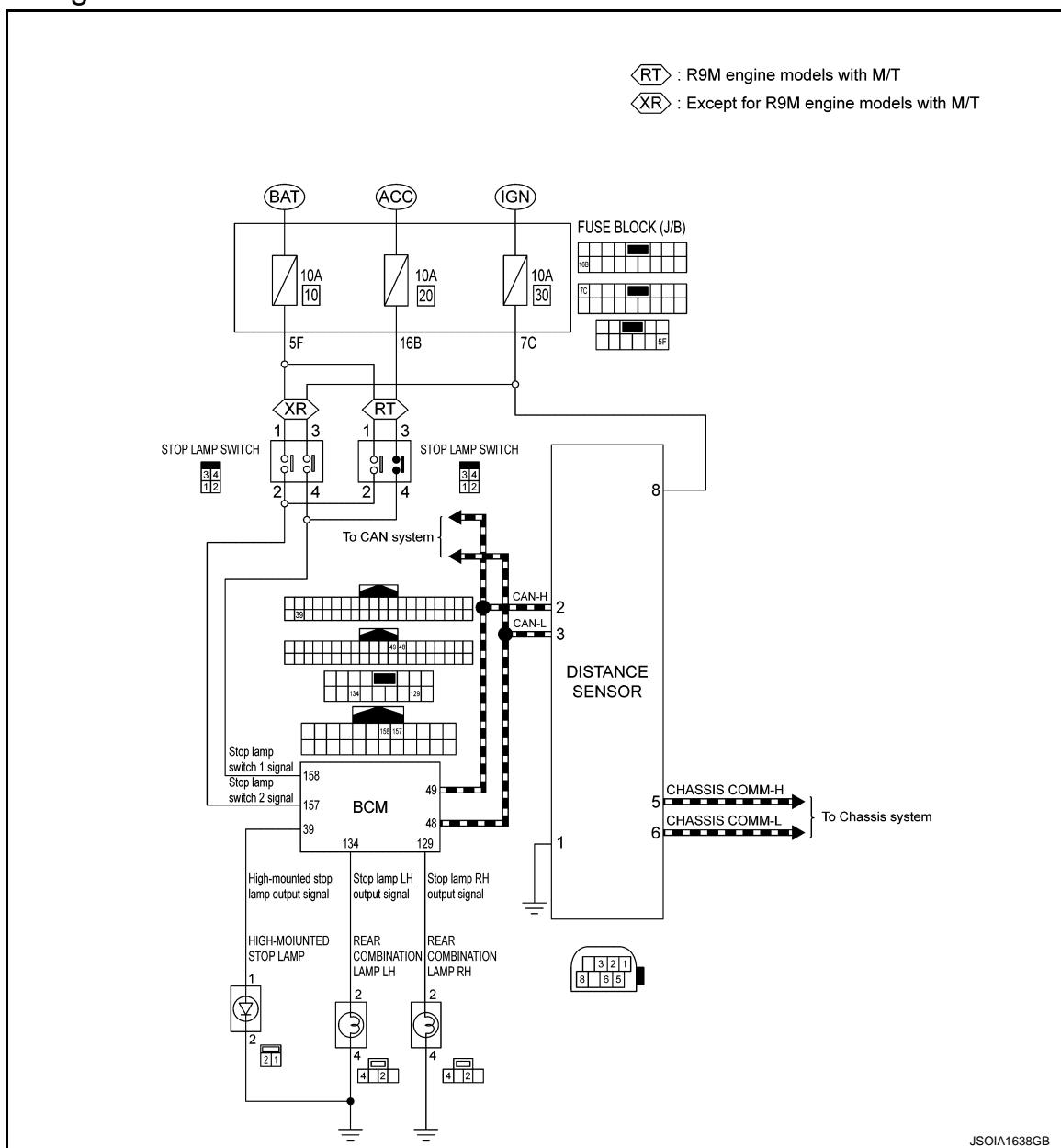
SYSTEM

< SYSTEM DESCRIPTION >

[FORWARD EMERGENCY BRAKING]

Circuit Diagram

INFOID:0000000010727972



Fail-safe (Distance Sensor)

INFOID:0000000010930906

If a malfunction occurs in the distance sensor cancels control, sounds a beep, and turns ON the FEB system warning and warning lamp.

System	Buzzer	Warning lamp/Indicator lamp	Description
Forward Emergency Braking (FEB)	Beep	<ul style="list-style-type: none"> FEB system display: Yellow FEB warning lamp: On 	Cancel

WARNING/INDICATOR/CHIME LIST

SYSTEM

< SYSTEM DESCRIPTION >

[FORWARD EMERGENCY BRAKING]

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

INFOID:000000010727970

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Name	Design	Layout/Function
FEB warning lamp		For layout, refer to MWI-10, "METER SYSTEM : Design".
		For function, refer to MWI-36, "WARNING LAMPS/INDICATOR LAMPS : FEB Warning Lamp".

OPERATION

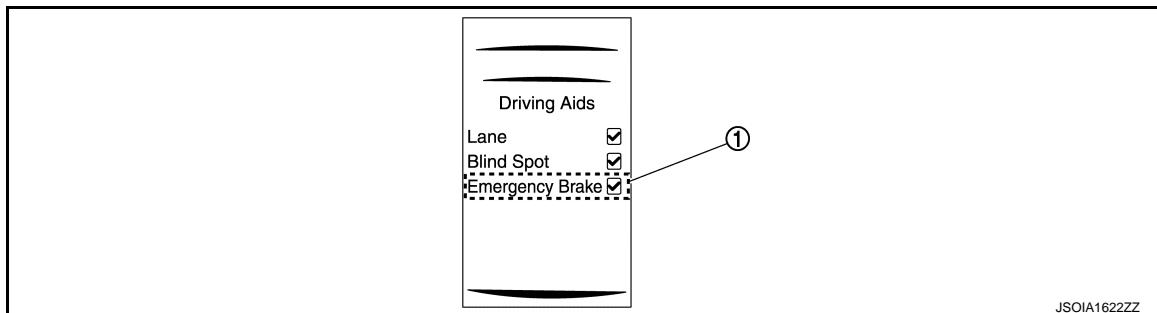
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[FORWARD EMERGENCY BRAKING]

OPERATION

Switch Name and Function

INFOID:0000000010721665

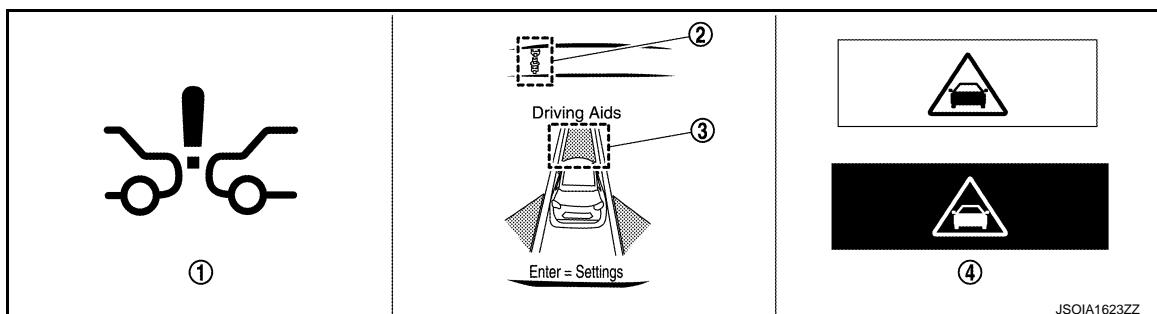


No.	Switch name	Description
①	FEB system setting screen (Information display)	The setting of FEB system can be switched between ON and OFF

Menu Displayed by Pressing Each Switch

INFOID:0000000010721666

SYSTEM DISPLAY



No.	Switch name	Description
①	FEB warning lamp	<ul style="list-style-type: none">• FEB warning lamp indicates that an abnormal condition is present in FEB system• When the FEB system turns OFF, the FEB warning lamp will illuminate.
②	FEB system indicator (Warning systems indicator)	<ul style="list-style-type: none">• Indicates that FEB system is ON• Blinks when approaching vehicle ahead
③	FEB system indicator "Forward" position	<ul style="list-style-type: none">• Indicates that FEB system is ON• Blinks when approaching vehicle ahead
④	FEB warning	Displays immediately before the harder brake operates

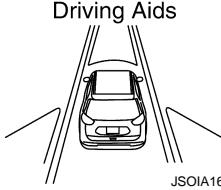
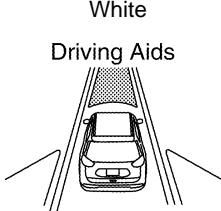
DISPLAY AND WARNING

Setting Display

OPERATION

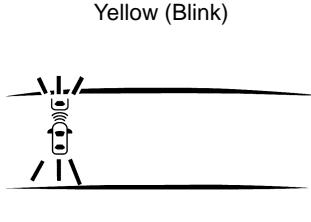
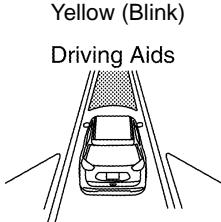
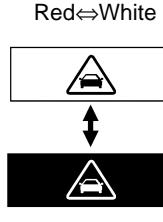
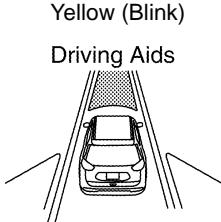
< SYSTEM DESCRIPTION >

[FORWARD EMERGENCY BRAKING]

System status	Condition	Display on combination meter	Display on combination meter	FEB warning lamp	Buzzer
		Upper part	Middle part		
FEB OFF	—	—	 Driving Aids JSOIA1624ZZ		—
FEB ON	System ON	 White JSOIA1428ZZ	 Driving Aids JSOIA1625ZZ	OFF	—

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Warning Operation

System status	Action	Display on combination meter	Display on combination meter	FEB warning lamp	Buzzer
		Upper part	Middle part		
There is a possibility of a collision with the vehicle ahead	Partial brake	 Yellow (Blink) JSOIA1290ZZ	 Yellow (Blink) Driving Aids JSOIA1625ZZ		Short continuous beeps
An obstacle ahead is avoided due to the system applying braking.	Harder brake	 Red↔White JSOIA1477ZZ	 Yellow (Blink) Driving Aids JSOIA1625ZZ		Continuous beeps

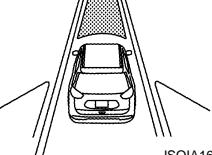
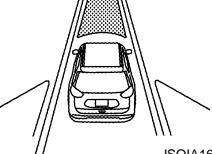
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Warning Display

OPERATION

< SYSTEM DESCRIPTION >

[FORWARD EMERGENCY BRAKING]

System status	Condition	Display on combination meter	Display on combination meter	FEB warning lamp	Master warning lamp	Buzzer
		Upper part	Middle part			
FEB system malfunction	The FEB system is automatically canceled.*	<p>Yellow (Blink)</p>  <p>JSOI A1290ZZ</p>	<p>Yellow</p> <p>Driving Aids</p>  <p>JSOI A1625ZZ</p>			Yellow Beep
Dirt around the distance sensor		<p>Yellow (Blink)</p>  <p>JSOI A1290ZZ</p>	<p>Yellow</p> <p>Driving Aids</p>  <p>JSOI A1625ZZ</p>			Yellow Beep

NOTE:

*: The system operates if the ignition switch is turned OFF⇒ON after the condition improves

HANDLING PRECAUTION

Description

INFOID:0000000010721667

PRECAUTIONS FOR FORWARD EMERGENCY BRAKING

- The forward emergency braking system is a supplemental aid to the driver. It is not a replacement for the driver's attention to traffic conditions or responsibility to drive safely. It cannot prevent accidents due to carelessness or dangerous driving techniques.
- The forward emergency braking system does not function in all driving, traffic, weather and road conditions.
- The radar sensor has some performance limitations. If a stationary vehicle is in the vehicle's path, the forward emergency braking system will not function when the vehicle is driven at speeds over approximately 80 km/h (50 MPH).
- The distance sensor does not detect the following objects:
 - Pedestrians, animals, or obstacles in the roadway
 - Oncoming vehicles
 - Crossing vehicles
- The distance sensor may not detect a vehicle ahead in the following conditions:
 - Dirt, ice, snow or other material covering the radar sensor.
 - Interference by other radar sources.
 - Snow or road spray from traveling vehicles.
 - If the vehicle ahead is narrow (e.g. motorcycle)
 - When driving on a steep downhill slope or roads with sharp curves.
 - When towing a trailer.
- In some road or traffic conditions, the forward emergency braking system may unexpectedly apply partial braking. When acceleration is necessary, continue to depress the accelerator pedal to override the system.
- Braking distances increase on slippery surfaces.
- Excessive noise will interfere with the warning chime sound, and the chime may not be heard.
- The system is designed to automatically check the sensor's functionality, within certain limitations. The system may not detect some forms of obstruction of the sensor area of the front bumper such as ice, snow, stickers, for example. In these cases, the system may not be able to warn the driver properly. Be sure that check, clean and clear the sensor area of the front bumper regularly.

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DIAGNOSIS SYSTEM (DISTANCE SENSOR)

< SYSTEM DESCRIPTION >

[FORWARD EMERGENCY BRAKING]

DIAGNOSIS SYSTEM (DISTANCE SENSOR)

CONSULT Function (LASER/RADAR)

INFOID:0000000010981498

APPLICATION ITEMS

CONSULT performs the following functions via CAN communication with Distance sensor.

Diagnosis mode	Description
Self Diagnostic Result	Displays malfunctioning system memorized in Distance sensor.
Data Monitor	Displays real-time input/output data of Distance sensor.
Active Test	Distance sensor activates outputs to components.
Work Support	It can monitor the adjustment direction indication in order to perform the radar alignment operation smoothly.
ECU Identification	Displays Distance sensor part number.
CAN Diag Support Monitor	Monitor the reception status of CAN communication viewed from Distance sensor.

SELF DIAGNOSTIC RESULT

Refer to [BRC-247, "DTC Index"](#).

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.

Monitored item [Unit]	Description
VHCL SPEED SE [km/h]	Vehicle speed signal received from ABS actuator and electric unit (control unit) via CAN communication.
YAW RATE [deg/s]	Yaw rate signal received from ABS actuator and electric unit (control unit) via CAN communication.
PWR SUP MONI [V]	Indicates IGN voltage input by Distance sensor.
DISTANCE [m]	Indicates the distance from the vehicle ahead.
RELATIVE SPD [m/s]	Indicates the relative speed of the vehicle ahead.
RADAR OFFSET [m]	NOTE: The item is indicated, but not used.
RADAR HEIGHT [m]	NOTE: The item is indicated, but not used.
STEERING ANGLE [deg]	The steering angle is displayed.
STRG ANGLE SPEED [deg/s]	The steering angle speed is displayed.
L/R ADJUST [deg]	Indicates a horizontal correction value of the radar.
U/D ADJUST [deg]	Indicates a vertical correction value of the radar.
FCW SYSTEM ON [On/Off]	NOTE: The item is indicated, but not used.
FCW SELECT [On/Off]	NOTE: The item is indicated, but not used.
PFCW SYSTEM ON [On/Off]	NOTE: The item is indicated, but not used.

DIAGNOSIS SYSTEM (DISTANCE SENSOR)

< SYSTEM DESCRIPTION >

[FORWARD EMERGENCY BRAKING]

Monitored item [Unit]	Description
PFCW SELECT [On/Off]	NOTE: The item is indicated, but not used.
FEB SW [On/Off]	Indicates [On/Off] status of FEB system
FEB SELECT [On/Off]	Indicates an ON/OFF state of the FEB system.
BRAKE SW [On/Off]	Indicates [On/Off] status as judged from brake pedal position switch signal (BCM transmits brake pedal position switch signal through CAN communication)
IDLE SW [On/Off]	Indicates [On/Off] status of idle switch read from distance sensor through CAN communication (ECM transmits On/Off status through CAN communication)
THRTL SENSOR [On/Off]	NOTE: The item is indicated, but not used.
VEHICLE AHEAD DETECT [On/Off]	Indicates [On/Off] status of vehicle ahead detection indicator output
STATIC OBSTACLE DETECT [On/Off]	Indicates [On/Off] status of static obstacle detection
BUZZER O/P [On/Off]	Indicates [On/Off] status of warning chime output
FUNC ITEM (FCW) [Without FCW/With FCW]	NOTE: The item is indicated, but not used.
FUNC ITEM (PFCW) [Without P-FCW/With- PFCW]	NOTE: The item is indicated, but not used.
FUNC ITEM (FEB) [Without FCA/With FCA]	Indicates systems which can be set to ON/OFF by selecting FEB.
FUNC ITEM (ICC) [Without ICC/With ICC]	NOTE: The item is indicated, but not used.
PRESS ORDER [bar]	Indicates status as judged from brake fluid pressure signal [ABS actuator and electric unit (control unit) transmits brake fluid pressure signal through CAN communication].

WORK SUPPORT

Work support items	Description
MILLIWAVE RADAR ADJUST	Outputs millimeter waves, calculates dislocation of the millimeter waves, and indicates adjustment direction.
FEB OPERATION MILEAGE	The mileage information for FEB operation is displayed.

Distance sensor alignment

Refer to [BRC-262, "Description"](#).

ACTIVE TEST

Test item	Description
BRAKE ACTUATOR	Activates the brake by an arbitrary operation
ICC BUZZER	This test is able to check FEB warning chime operation [On/Off] in the combination meter.
METER LAMP	This test is able to check FEB warning indicator operation [On/Off] in the combination meter information display.

ECU DIAGNOSIS INFORMATION

DISTANCE SENSOR

Reference Value

INFOID:0000000010721668

VALUES ON THE DIAGNOSIS TOOL

NOTE:

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

Monitor item	Condition		Value/Status
VHCL SPEED SE	While driving		Value of vehicle speed signal (wheel speed)
YAW RATE	While driving	Vehicle stopped	0.0
		Vehicle turning right	Positive value
		Vehicle turning left	Negative value
PWR SUP MONI	Ignition switch ON		Power supply voltage value of distance sensor
DISTANCE	Drive the vehicle and activate the vehicle-to-vehicle distance control mode	When a vehicle ahead is detected	Displays the distance from the preceding vehicle
		When a vehicle ahead is not detected	0.0
RELATIVE SPD	Drive the vehicle and activate the vehicle-to-vehicle distance control mode	When a vehicle ahead is detected	Displays the relative speed
		When a vehicle ahead is not detected	0.0
LASER OFFSET	NOTE: The item is indicated, but not used		—
LASER HEIGHT	NOTE: The item is indicated, but not used		—
STEERING ANGLE	Ignition switch ON	When setting the steering wheel in straight-ahead position	0.0
		When turning the steering wheel 90° rightward	+90
		When turning the steering wheel 90° leftward	-90
STRG ANGLE SPEED	Ignition switch ON	At the time of turning the steering wheel	Steering wheel turning speed is displayed
L/R ADJUST	Ignition switch ON	At the completion of radar alignment adjustment	Horizontal correction value is displayed
U/D ADJUST	Ignition switch ON	At the completion of radar alignment adjustment	Vertical correction value is displayed
FCW SYSTEM ON	Engine running	When the FEB system is ON	On
		When the FEB system is OFF	Off
FCW SELECT	Ignition switch ON	FEB system set with the information display is ON	On
		FEB system set with the information display is OFF	Off
PFCW SYSTEM ON	NOTE: The item is indicated, but not used		Off
PFCW SELECT	NOTE: The item is indicated, but not used		Off

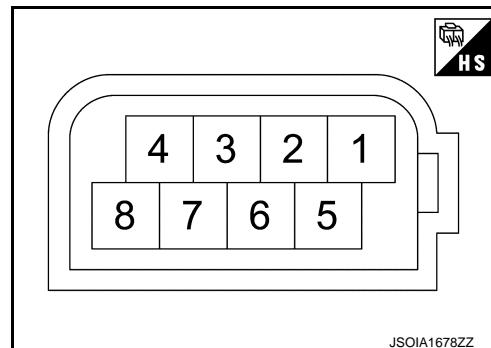
DISTANCE SENSOR

< ECU DIAGNOSIS INFORMATION >

[FORWARD EMERGENCY BRAKING]

Monitor item	Condition		Value/Status
FEB SW	Engine running	FEB system ON	On
		FEB system OFF	Off
FEB SELECT	Ignition switch ON	FEB system set with the information display is ON	On
		FEB system set with the information display is OFF	Off
BRAKE SW	Ignition switch ON	When brake pedal is depressed	On
		When brake pedal is not depressed	Off
STOP LAMP SW	Ignition switch ON	When brake pedal is depressed	On
		When brake pedal is not depressed	Off
IDLE SW	Engine running	Idling	On
		Except idling (depress accelerator pedal)	Off
THRTL SENSOR	NOTE: The item is indicated, but not used		Off
VEHICLE AHEAD DETECT	Drive the vehicle	When a vehicle ahead is detected (vehicle ahead detection indicator ON)	On
		When a vehicle ahead is not detected (vehicle ahead detection indicator OFF)	Off
STATIC OBSTACLE DETECT	Drive the vehicle	When a vehicle static obstacle is detected	On
		When a vehicle static obstacle is not detected	Off
BUZZER O/P	Engine running	When the buzzer of the FEB system operates	On
		When the buzzer of the FEB system not operates	Off
FUNC ITEM (FCW)	Engine running	FEB system set with the integral switch ON	On
		FEB system set with the integral switch OFF	Off
FUNC ITEM (PFCW)	NOTE: The item is indicated, but not used		Off
FUNC ITEM (FEB)	Engine running	FEB system set with the integral switch ON	On
		FEB system set with the integral switch OFF	Off
FUNC ITEM (ICC)	NOTE: The item is indicated, but not used		Off
PRESS ORDER	When brake pedal is depressed	Approx. 0 bar	
	When brake pedal is not depressed	0 – 255 bar	

TERMINAL LAYOUT



PHYSICAL VALUES

DISTANCE SENSOR

< ECU DIAGNOSIS INFORMATION >

[FORWARD EMERGENCY BRAKING]

Terminal No. (Wire color)		Description		Condition	Standard value	Reference val- ue
+	-	Signal name	Input/ Output			
1 (B)	Ground	Ground	—	Ignition switch ON	0 - 0.1 V	Approx. 0 V
2 (L)	—	CAN communication-H	—	—	—	—
3 (R)	—	CAN communication-L	—	—	—	—
5 (L)	—	CHASSIS communication-H	—	—	—	—
6 (W)	—	CHASSIS communication-L	—	—	—	—
8 (P)	1 (B)	Ignition power supply	Input	Ignition switch ON	10 - 16 V	Battery voltage

Fail-safe (Distance Sensor)

INFOID:000000010721669

If a malfunction occurs in the distance sensor cancels control, sounds a beep, and turns ON the FEB system warning and warning lamp.

System	Buzzer	Warning lamp/Indicator lamp	Description
Forward Emergency Braking (FEB)	Beep	<ul style="list-style-type: none"> • FEB system display: Yellow • FEB warning lamp: On 	Cancel

DTC Inspection Priority Chart

INFOID:000000010721670

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

Priority	Detected items (DTC)
1	<ul style="list-style-type: none"> • U1000: CAN COMM CIRCUIT • U1010: CONTROL UNIT (CAN)
2	<ul style="list-style-type: none"> • C10B7: YAW RATE SENSOR • C1A01: POWER SUPPLY CIR • C1A02: POWER SUPPLY CIR 2 • C1A03: VHCL SPEED SE CIRC • C1A04: ABS/TCS/VDC CIRC • C1A05: BRAKE SW/STOP L SW • C1A07: CVT CIRCUIT • C1A12: LASER BEAM OFF CNTR • C1A14: ECM CIRCUIT • C1A15: GEAR POSITION • C1A16: RADAR STAIN • C1A17: ICC SENSOR MALF • C1A18: LASER AIMING INCMP • C1A21: UNIT HIGH TEMP • C1A24: NP RANGE • C1A26: ECD MODE MALF • C1A39: STRG SEN CIR • C1B5D: FEB OPE COUNT LIMIT • U0121: VDC CAN CIR 2 • U0126: STRG SEN CAN CIR 1 • U0401: ECM CAN CIR 1 • U0415: VDC CAN CIR 1 • U0428: STRG SEN CAN CIR 2 • U1527: CCM CAN CIR 1 • U153F: CCM CAN CIR 2

DISTANCE SENSOR

< ECU DIAGNOSIS INFORMATION >

[FORWARD EMERGENCY BRAKING]

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INFOID:000000010721671

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DTC	CONSULT display	Reference
CONSULT		
C10B7	YAW RATE SENSOR	BRC-269, "DTC Logic"
C1A01	POWER SUPPLY CIR	BRC-270, "DTC Logic"
C1A02	POWER SUPPLY CIR 2	BRC-270, "DTC Logic"
C1A03	VHCL SPEED SE CIRC	BRC-271, "DTC Logic"
C1A04	ABS/TCS/VDC CIRC	BRC-273, "DTC Logic"
C1A05	BRAKE SW/STOP L SW	BRC-274, "DTC Logic"
C1A07	CVT CIRCUIT	BRC-276, "DTC Logic"
C1A12	LASER BEAM OFF CNTR	BRC-277, "DTC Logic"
C1A14	ECM CIRCUIT	BRC-278, "DTC Logic"
C1A15	GEAR POSITION	BRC-279, "DTC Logic"
C1A16	RADAR STAIN	BRC-281, "DTC Logic"
C1A17	ICC SENSOR MALF	BRC-283, "DTC Logic"
C1A18	LASER AIMING INCMP	BRC-284, "DTC Logic"
C1A21	UNIT HIGH TEMP	BRC-285, "DTC Logic"
C1A24	NP RANGE	BRC-286, "DTC Logic"
C1A26	ECD MODE MALF	BRC-288, "DTC Logic"
C1A39	STRG SEN CIR	BRC-289, "DTC Logic"
C1B5D	FEB OPE COUNT LIMIT	BRC-290, "DTC Logic"
U0121	VDC CAN CIR 2	BRC-291, "DTC Logic"
U0126	STRG SEN CAN CIR 1	BRC-292, "DTC Logic"
U0401	ECM CAN CIR 1	BRC-293, "DTC Logic"
U0415	VDC CAN CIR 1	BRC-294, "DTC Logic"
U0428	STRG SEN CAN CIR 2	BRC-295, "DTC Logic"
U1000	CAN COMM CIRCUIT	BRC-296, "DTC Logic"
U1010	CONTROL UNIT (CAN)	BRC-297, "DTC Logic"
U1527	CCM CAN CIR 1	BRC-298, "DTC Logic"
U153F	CCM CAN CIR 2	BRC-299, "DTC Logic"

FORWARD EMERGENCY BRAKING

< WIRING DIAGRAM >

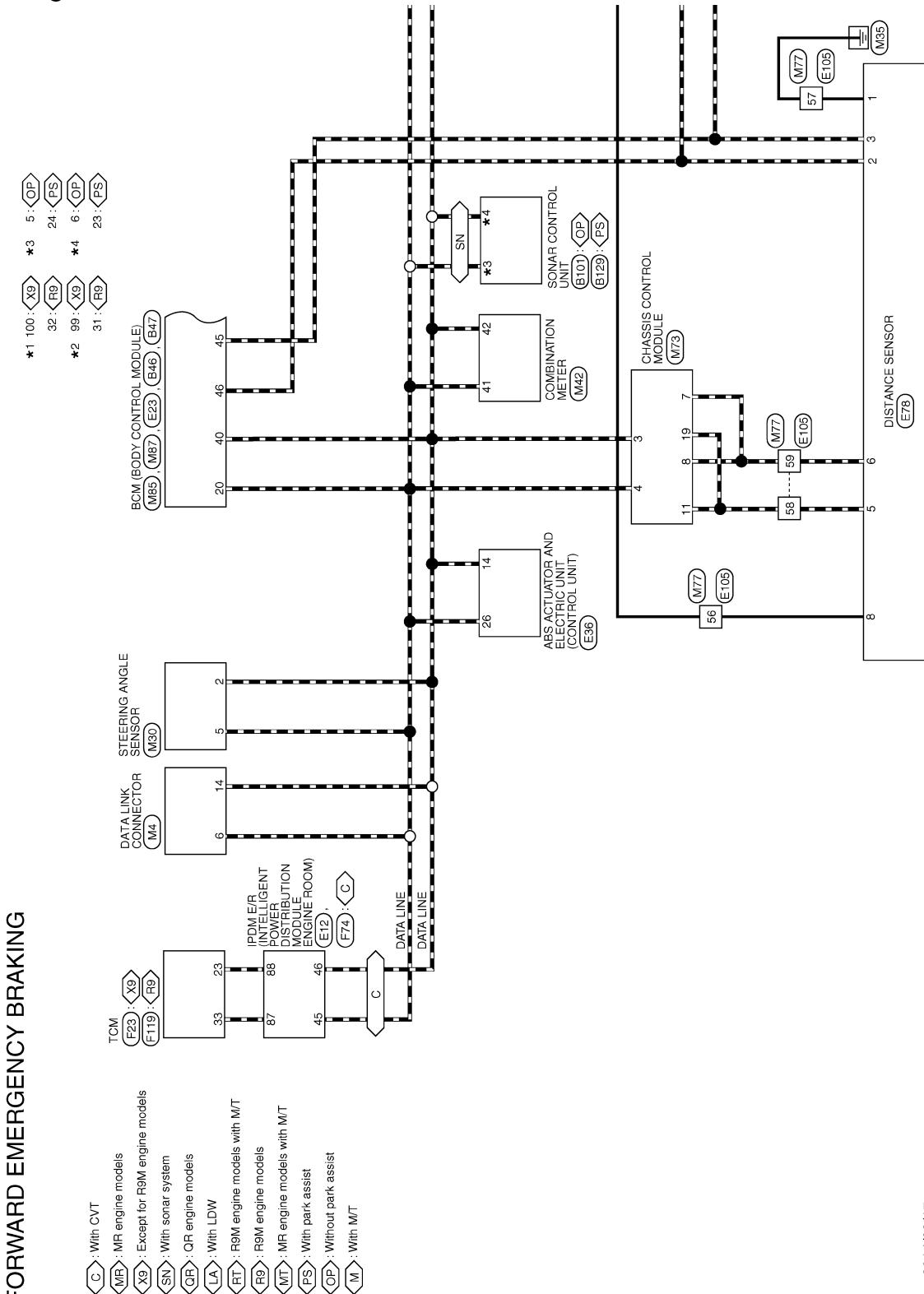
[FORWARD EMERGENCY BRAKING]

WIRING DIAGRAM

FORWARD EMERGENCY BRAKING

Wiring Diagram

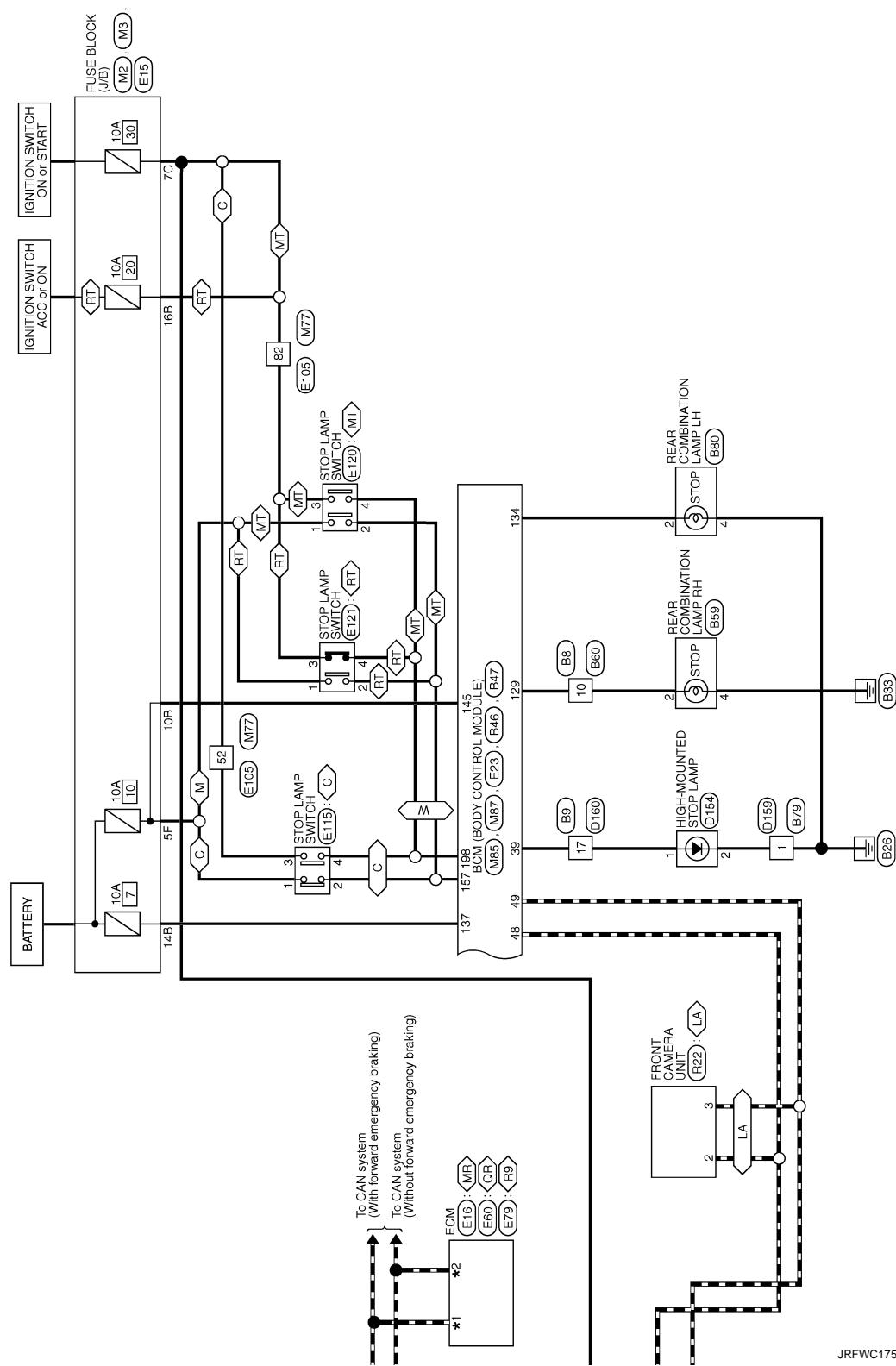
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FORWARD EMERGENCY BRAKING

[FORWARD EMERGENCY BRAKING]

< WIRING DIAGRAM >



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FORWARD EMERGENCY BRAKING

< WIRING DIAGRAM >

[FORWARD EMERGENCY BRAKING]

FORWARD EMERGENCY BRAKING

Connector No.	B101	Connector No.	B129
Connector Name	SONAR CONTROL UNIT	Connector Name	WIRE TO WIRE
Connector Type	TR24FW-NH	Connector Type	MO24M/C
			
Terminal Color Of No.	Wire	Signal Name [Specification]	
1	B	1. LG CENTER SENSOR SIGNAL FRONT RH	
2	G	2. Y FRONT BUZZER POWER SUPPLY	
3	W	3. R CORNER SENSOR SIGNAL FRONT LH	
4	V	4. V CENTER SENSOR SIGNAL FRONT LH	
5	L	5. CANH	
6	P	6. CANL	
9	V	9. V CENTER SENSOR SIGNAL REAR RH	
10	LG	10. LG CORNER SENSOR SIGNAL REAR RH	
11	SB	11. SB FRONT SENSOR POWER SUPPLY	
12	BR	12. BR IGNITION POWER SUPPLY	
13	P	13. P FRONT SENSOR GROUND	
14	P	14. P REAR SENSOR GROUND	
15	B	15. B REAR SENSOR GROUND	
16	V	16. V SONAR SYSTEM OFF-SWITCH SIGNAL	
17	SB	17. SB SONAR SYSTEM OFF-SWITCH INDICATOR SIGNAL	
18	L/L	18. L/L FRONT BUZZER DRIVE SIGNAL	
19	Y	19. Y BUZZER POWER SUPPLY	
20	L/G	20. L/G REAR BUZZER DRIVE SIGNAL	
21	G	21. G CENTER SENSOR SIGNAL REAR LH	
22	R	22. R CORNER SENSOR SIGNAL REAR LH	
23	SB	23. SB REAR SENSOR POWER SUPPLY	
			
Terminal Color Of No.	Wire	Signal Name [Specification]	
1	Y	1. 14 15 16 17 18 20 21 22 23 24	
2	W	2. 2 6 7 9 10 13	
3	W	3. 1 2 3 4 5 12 13	
4	W	4. 6 7 8 9 10 11 12 13	
5	W	5. 1 2 3 4 5 12 13	
6	W	6. 1 2 3 4 5 12 13	
7	W	7. 1 2 3 4 5 12 13	
8	W	8. 1 2 3 4 5 12 13	
9	W	9. 1 2 3 4 5 12 13	
10	W	10. 1 2 3 4 5 12 13	
11	W	11. 1 2 3 4 5 12 13	
12	W	12. 1 2 3 4 5 12 13	
13	W	13. 1 2 3 4 5 12 13	
14	W	14. 1 2 3 4 5 12 13	
15	W	15. 1 2 3 4 5 12 13	
16	W	16. 1 2 3 4 5 12 13	
17	W	17. 1 2 3 4 5 12 13	
18	W	18. 1 2 3 4 5 12 13	
19	W	19. 1 2 3 4 5 12 13	
20	W	20. 1 2 3 4 5 12 13	
21	W	21. 1 2 3 4 5 12 13	
22	W	22. 1 2 3 4 5 12 13	
23	W	23. 1 2 3 4 5 12 13	
24	W	24. 1 2 3 4 5 12 13	
25	W	25. 1 2 3 4 5 12 13	
26	W	26. 1 2 3 4 5 12 13	
27	W	27. 1 2 3 4 5 12 13	
28	W	28. 1 2 3 4 5 12 13	
29	W	29. 1 2 3 4 5 12 13	
30	W	30. 1 2 3 4 5 12 13	

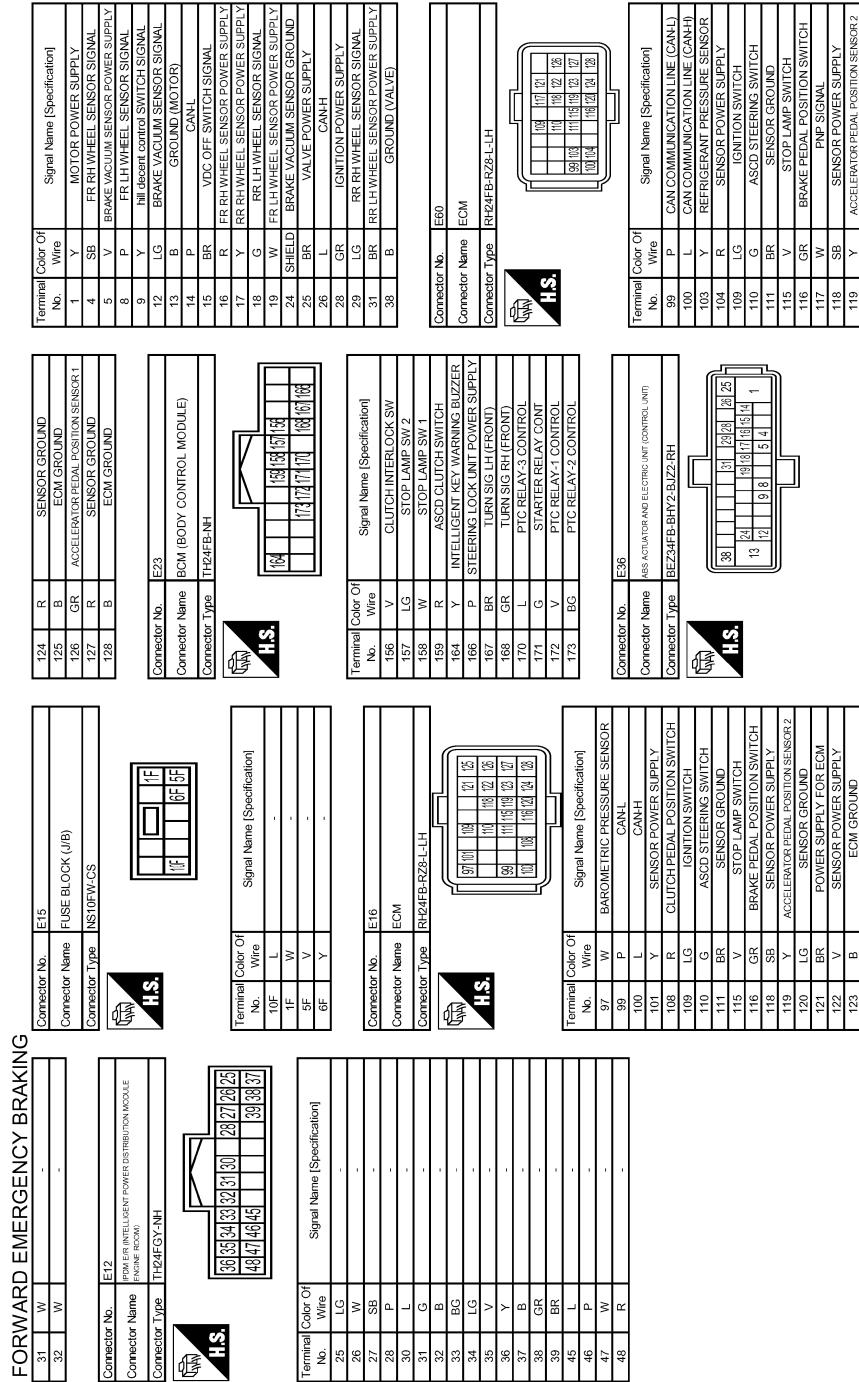
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FORWARD EMERGENCY BRAKING

[FORWARD EMERGENCY BRAKING]

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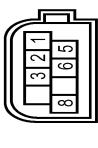
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FORWARD EMERGENCY BRAKING

< WIRING DIAGRAM >

[FORWARD EMERGENCY BRAKING]

FORWARD EMERGENCY BRAKING

Connector No.	Signal Name [Specification]	Terminal Color Of Wire	Signal Name [Specification]
120	LG	SENSOR GROUND	POWER SUPPLY FOR ECM
121	BR	POWER SUPPLY FOR ECM	6 G
122	V	SENSOR POWER SUPPLY	8 B
123	BR	ECM GROUND	9 L
124	W	SENSOR GROUND	10 L
126	GR	ACCELERATOR PEDAL POSITION SENSOR 1	11 V
127	R	SENSOR GROUND	12 P
128	BR	ECM GROUND	16 BG
Connector No.			STOP LAMP SWITCH (With M/T)
Connector Name	DISTANCE SENSOR		
Connector Type	AAZ0RFB		
			

Connector No.	Signal Name [Specification]	Terminal Color Of Wire	Signal Name [Specification]
36	LG	POWER SUPPLY FOR ECM	37 V
38	G	ECM GROUND	39 BR
39	BR	FUEL LEVEL AND WATER INLET LEVEL SENSOR	40 L
40	L	SENSOR GROUND	41 P
41	P	ACCELERATOR PEDAL POSITION SENSOR 2	47 GR
47	GR	STOP LAMP SWITCH (With M/T)	48 SB
48	SB	BRAKE PEDAL POSITION SWITCH (With M/T)	51 P
51	P	ASCD IGNITION SWITCH	52 L
52	L	ASCD STEERING SWITCH	53 W
53	W	SENSOR GROUND (ASCD STEERING SWITCH)	54 Y
54	Y	BR	55 BR
55	BR	FUEL PUMP CONTROL MODULE (COMMAND)	56 P
56	P	FUEL PUMP CONTROL MODULE (WARNING)	57 B
57	B	V	58 L
58	L	SPEED LIMITER MAIN SWITCH	59 W
59	W	CLUTCH PEDAL POSITION SWITCH	60 G
60	G	CLUTCH INTERLOCK SWITCH	61 BR
61	BR	ASCD MAIN SWITCH	62 V
62	V	CANL	63 BR
63	BR	CANH	64 GR
64	GR		65 LG
65	LG		66 BG
66	BG		67 L
67	L		68 R
68	R		71 V
71	V		72 L
72	L		73 R
73	R		76 L
76	L		77 V
77	V		78 LG
78	LG		79 SHIELD
79	SHIELD		80 GR
80	GR		82 Y
82	Y		83 SB
83	SB		84 L
84	L		85 G
85	G		86 Y
86	Y		87 B
87	B		88 B
88	B		91 R
91	R		92 BR
92	BR		93 W
93	W		96 GR
96	GR		97 R
97	R		98 V
98	V		99 Y
99	Y		32 W
32	W		33 SB
33	SB		34 LG
34	LG		35 BG
35	BG		

Connector No.	Signal Name [Specification]	Terminal Color Of Wire	Signal Name [Specification]
1	B	GROUND	2 W
2	L	CANH	5 V
3	R	CANL	8 L
5	L	CHASSIS COMM-H	9 LG
6	W	CHASSIS COMM-L	10 W
8	P	IGNITION	20 W
21	W		21 B
22	SHIELD		24 B
31	Y		32 W
32	W		33 SB
33	SB		34 LG
34	LG		35 BG
35	BG		

Connector No.	Signal Name [Specification]	Terminal Color Of Wire	Signal Name [Specification]
36	LG	POWER SUPPLY FOR ECM	37 V
38	G	ECM GROUND	39 BR
39	BR	FUEL LEVEL AND WATER INLET LEVEL SENSOR	40 L
40	L	SENSOR GROUND	41 P
41	P	ACCELERATOR PEDAL POSITION SENSOR 2	47 GR
47	GR	STOP LAMP SWITCH (With M/T)	48 SB
48	SB	BRAKE PEDAL POSITION SWITCH (With M/T)	51 P
51	P	ASCD IGNITION SWITCH	52 L
52	L	ASCD STEERING SWITCH	53 W
53	W	SENSOR GROUND (ASCD STEERING SWITCH)	54 Y
54	Y	BR	55 BR
55	BR	FUEL PUMP CONTROL MODULE (COMMAND)	56 P
56	P	FUEL PUMP CONTROL MODULE (WARNING)	57 B
57	B	V	58 L
58	L	SPEED LIMITER MAIN SWITCH	59 W
59	W	CLUTCH PEDAL POSITION SWITCH	60 G
60	G	CLUTCH INTERLOCK SWITCH	61 BR
61	BR	ASCD MAIN SWITCH	62 V
62	V	CANL	63 BR
63	BR	CANH	64 GR
64	GR		65 LG
65	LG		66 BG
66	BG		67 L
67	L		68 R
68	R		71 V
71	V		72 L
72	L		73 R
73	R		76 L
76	L		77 V
77	V		78 LG
78	LG		79 SHIELD
79	SHIELD		80 GR
80	GR		82 Y
82	Y		83 SB
83	SB		84 L
84	L		85 G
85	G		86 Y
86	Y		87 B
87	B		88 B
88	B		91 R
91	R		92 BR
92	BR		93 W
93	W		96 GR
96	GR		97 R
97	R		98 V
98	V		99 Y
99	Y		32 W
32	W		33 SB
33	SB		34 LG
34	LG		35 BG
35	BG		

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FORWARD EMERGENCY BRAKING

< WIRING DIAGRAM >

[FORWARD EMERGENCY BRAKING]

FORWARD EMERGENCY BRAKING

Terminal No.	Color Of Wire	Signal Name (Specification)	Terminal Color Of No.	Color Of Wire	Signal Name (Specification)
1	V	-	1	P	ELECTRIC OIL PUMP RELAY
2	LG	-	2	GR	- (With M620i engine or R6 engine)
3	Y	-	4	Y	- (With Q625i Engine)
4	W	-	5	BR	-
			6	G	RANGE SWITCH
			7	V	P RANGE SWITCH
			11	LG	SENSOR GROUND
			12	BR	CVT FLUID TEMPERATURE SENSOR
			14	V	G SENSOR
			16	SB	SECONDARY PRESSURE SENSOR
			17	R	PRIMARY PRESSURE SENSOR

		GROUND		TERMINAL COLOR OF WIRE		SIGNAL NAME [SPECIFICATION]	
7	V	P RANGE SWITCH	BG	-	-	41	B
9	BG	SENSOR GROUND	LG	-	-	42	B
10	LG	CYCLE FLUID TEMPERATURE SENSOR	V	-	-	45	V
11	BR	SECONDARY PRESSURE SENSOR	Y	-	-	46	V
12	SB	PRIMARY PRESSURE SENSOR	Y	-	-	47	BG
13	R	CANHL	W	-	-	48	BG
14	P	INPUT SPEED SENSOR	BR	-	-	14C	R
15	LG	SENSOR POWER SUPPLY	V	-	-	15C	L
16	BR	LINE PRESSURE SOLENOID VALVE	SB	-	-	16C	LAW
17	GR	CANH	Y	-	-	1C	R
18	Y	OUTPUT SPEED SENSOR	Y	-	-	2C	G
19	Y	PRIMARY SPEED SENSOR	Y	-	-	3C	Y
20	Y	GR	Y	-	-	4C	LG

FORWARD EMERGENCY BRAKING

[FORWARD EMERGENCY BRAKING]

< WIRING DIAGRAM >

FORWARD EMERGENCY BRAKING		IGN	
5C	GR	10	SB
6C	L/R	11	L
7C	Y	12	B
8C	BR	13	GND
8C	L/R	14	CHASSIS COMM-H
9C	L	15	CHASSIS COMM-H
Connector No.	M42	16	IGN
Connector Name	COMBINATION METER	17	WIRE TO WIRE
Connector Type	TH2FW-NH	18	WIRE TO WIRE
Connector No.	M4	19	WIRE TO WIRE
Connector Name	DATA LINK CONNECTOR	20	WIRE TO WIRE
Connector Type	BD16FW	21	WIRE TO WIRE
Terminal Color Of No.	11	22	WIRE TO WIRE
Wire	12	23	WIRE TO WIRE
41	13	24	WIRE TO WIRE
L	14	25	WIRE TO WIRE
42	15	26	WIRE TO WIRE
P	16	27	WIRE TO WIRE
43	17	28	WIRE TO WIRE
W	18	29	WIRE TO WIRE
44	19	30	WIRE TO WIRE
LAB	20	31	WIRE TO WIRE
45	21	32	WIRE TO WIRE
LG	22	33	WIRE TO WIRE
46	23	34	WIRE TO WIRE
LA/R	24	35	WIRE TO WIRE
47	25	36	WIRE TO WIRE
IGNITION SIGNAL (Without ISS)	26	37	WIRE TO WIRE
48	27	38	WIRE TO WIRE
AV COMMUNICATION SIGNAL (H)	28	39	WIRE TO WIRE
49	29	40	WIRE TO WIRE
AV COMMUNICATION SIGNAL (L)	30	41	WIRE TO WIRE
50	31	42	WIRE TO WIRE
BG	32	43	WIRE TO WIRE
51	33	44	WIRE TO WIRE
L/L	34	45	WIRE TO WIRE
52	35	46	WIRE TO WIRE
B	36	47	WIRE TO WIRE
BR	37	48	WIRE TO WIRE
53	38	49	WIRE TO WIRE
W	39	50	WIRE TO WIRE
54	40	51	WIRE TO WIRE
55	41	52	WIRE TO WIRE
56	42	53	WIRE TO WIRE
57	43	54	WIRE TO WIRE
58	44	55	WIRE TO WIRE
59	45	56	WIRE TO WIRE
W	46	57	WIRE TO WIRE
60	47	58	WIRE TO WIRE
L/R	48	59	WIRE TO WIRE
P	49	60	WIRE TO WIRE
V	50	61	WIRE TO WIRE
61	51	62	WIRE TO WIRE
62	52	63	WIRE TO WIRE
63	53	64	WIRE TO WIRE
64	54	65	WIRE TO WIRE
Y	55	66	WIRE TO WIRE
GR	56	67	WIRE TO WIRE
BG	57	68	WIRE TO WIRE
L	58	69	WIRE TO WIRE
70	59	71	WIRE TO WIRE
71	60	72	WIRE TO WIRE
V	61	73	WIRE TO WIRE
72	62	74	WIRE TO WIRE
L	63	75	WIRE TO WIRE
76	64	76	WIRE TO WIRE
V	65	77	WIRE TO WIRE
78	66	78	WIRE TO WIRE
LG	67	79	WIRE TO WIRE
SHIELD	68	80	WIRE TO WIRE
-	69	81	WIRE TO WIRE
-	70	82	WIRE TO WIRE
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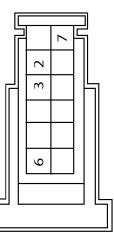
FORWARD EMERGENCY BRAKING

< WIRING DIAGRAM >

[FORWARD EMERGENCY BRAKING]

FORWARD EMERGENCY BRAKING

Terminal No.	Color	Signal Name [Specification]	73	LG	COMBI SW INPUT 5
137	Wife	BAT POWER SUPPLY (FUSE)	74	Y	COMBI SW OUTPUT 5
138	SB	INT ROOM LAMP CONT	75	BG	SECURITY IND LAMP CONT
139	LB	PASSENGER DOOR UNLOCK OUTPUT	76	G	COMBI SW INPUT 3
141	V	FRONT DOOR LOCK OUTPUT	77	GR	COMBI SW INPUT 4
143	LG	POWER SUPPLY (FR DOOR LK ACT)	78	V	COMBI SW INPUT 1
144	BG	POWER SUPPLY (FR TURN SIGNAL)	79	W	COMBI SW INPUT 2
145	GR	POWER SUPPLY (STOF LAMP)	80	SB	DOOR UNLOCK SW
146	B	GROUND			
147	B	GROUND			
148	G	DRIVER DOOR UNLOCK OUTPUT			
149	W	FRONT DOOR SUPERLOCK OUTPUT			
151	R	POWER SUPPLY (REAR DOOR LK ACT)			
152	LG	POWER SUPPLY (FR WIPER)			



Terminal No.	Color Of Wire	Signal Name [Specification]
2	L	CAN-H
3	R	CAN-L
6	R	IGNITION/POWER SUPPLY
7	B	GROUND

Terminal No.	Color Of	Signal Name (Specification)
41	V	STEERING LOCK (INT'L POWER SUP)
42	LA/G	TURN SIG (LH SIDE)
43	LA/Y	TURN SIG (RH SIDE)
44	R	INTERIOR ROOM LAMP RELAY CC
45		CANH
46	L	CANH
47	G	LIGHT & RAIN SENSOR
48	R	CANH
49	BIG	CANL
50		DOOR LOCK SW
51	Y	HAZARD SW
52		DONGLE
55	P	CVT SHIFT DETECT (DETENT SW)
57		HEADLAMP WASHER SW
60	R	POWER WINDOW RELAY CON
63	G	REAR WINDOW DEFOGGER RELAY CC
64	LA/R	ACC-RELAY CON
65	BR:	IGN RELAY (FB) CON CUTOUT
67	Y	BLOWER RELAY CON
68	LA/W	IGN RELAY (FB) CON CUTOUT

JRFWC1763GB

< BASIC INSPECTION >

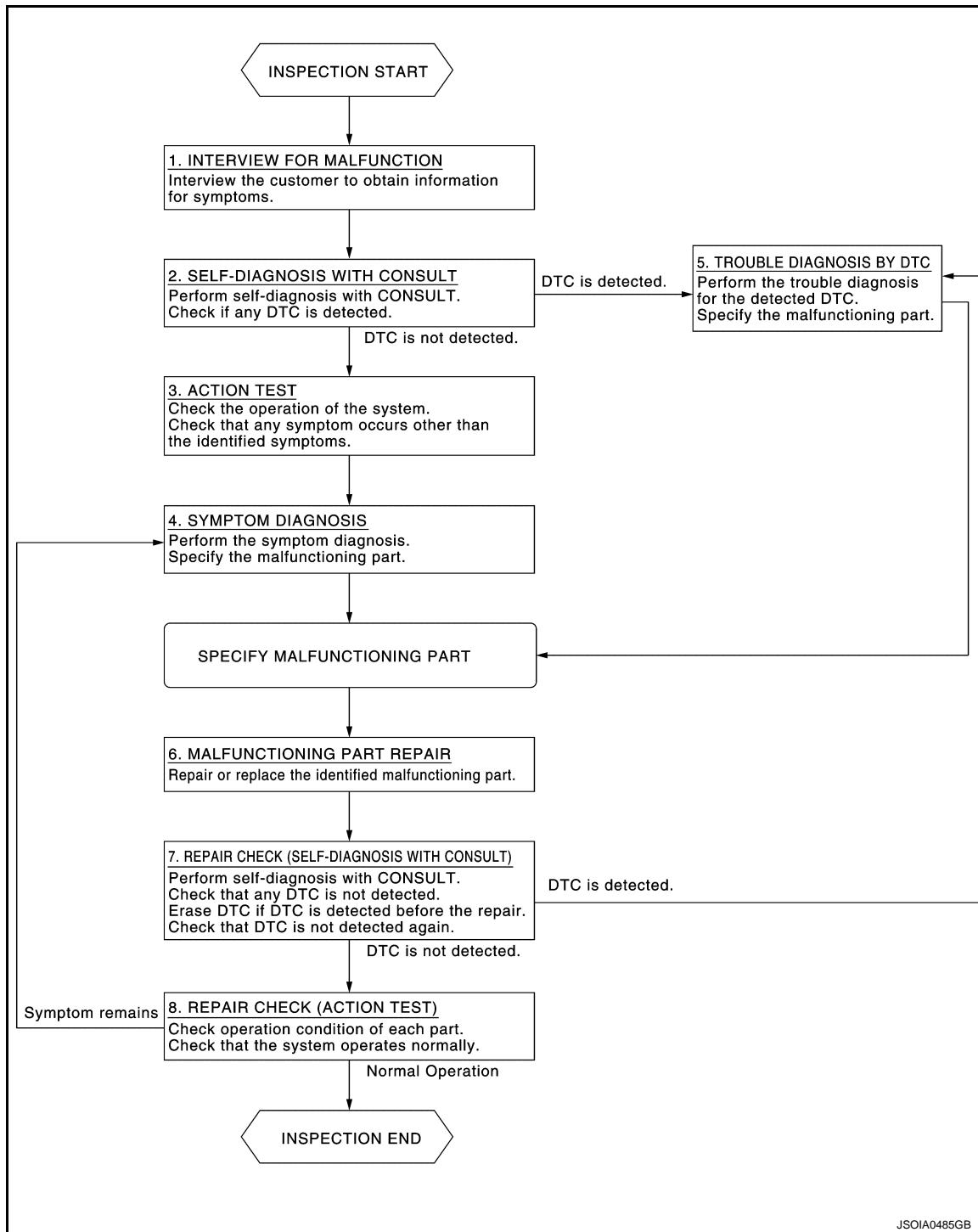
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:000000010721828

OVERALL SEQUENCE



JSOI0485GB

DETAILED FLOW

1. INTERVIEW FOR MALFUNCTION

It is also important to clarify the customer concerns before starting the inspection. Interview the customer about the concerns carefully and understand the symptoms fully.

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

DIAGNOSIS AND REPAIR WORK FLOW

[FORWARD EMERGENCY BRAKING]

< BASIC INSPECTION >

NOTE:

The customers are not professionals. Never assume that "maybe the customer means..." or "maybe the customer mentioned this symptom".

>> GO TO 2.

2. SELF-DIAGNOSIS WITH CONSULT

1. Perform "All DTC Reading" with CONSULT.
2. Check if the DTC is detected on the "Self-Diagnostic Results" of "LASER/RADAR"

Is any DTC detected?

YES >> GO TO 5.
NO >> GO TO 3.

3. ACTION TEST

Perform the FEB system action test to check the system operation. Check if any other malfunctions occur.

>> GO TO 4.

4. SYMPTOM DIAGNOSIS

Perform the applicable diagnosis according to the diagnosis chart by symptom. Refer to [BRC-301, "Symptom Table"](#).

>> GO TO 6.

5. TROUBLE DIAGNOSIS BY DTC

1. Check the DTC in the "Self-Diagnostic Results".
2. Perform trouble diagnosis for the detected DTC. Refer to [BRC-247, "DTC Index"](#).

>> GO TO 6.

6. MALFUNCTIONING PART REPAIR

Repair or replace the identified malfunctioning parts.

>> GO TO 7.

7. REPAIR CHECK (SELF-DIAGNOSIS WITH CONSULT)

1. Erases self-diagnosis results.
2. Perform "All DTC Reading" again after repairing or replacing the specific items.
3. Check if any DTC is detected in self-diagnosis results of "LASER/RADAR".

Is any DTC detected?

YES >> GO TO 5.
NO >> GO TO 8.

8. REPAIR CHECK (ACTION TEST)

Perform the following system action test. Check that the malfunction symptom is solved or no other symptoms occur.

Is there a malfunction symptom?

YES >> GO TO 4.
NO >> Inspection End.

ADDITIONAL SERVICE WHEN REPLACING DISTANCE SENSOR

< BASIC INSPECTION >

[FORWARD EMERGENCY BRAKING]

ADDITIONAL SERVICE WHEN REPLACING DISTANCE SENSOR

Description

INFOID:0000000010721834

A

Always perform the following after removing and installing or replacing the distance sensor:

1. Distance sensor initial vertical alignment
2. Distance sensor alignment

CAUTION:

The system does not operate normally unless the distance sensor is aligned properly.

Work Procedure

INFOID:0000000010721835

D

1.DISTANCE SENSOR INITIAL VERTICAL ALIGNMENT

Perform the distance sensor initial vertical alignment. Refer to [BRC-260, "Description"](#).

E

>> GO TO 2.

2.DISTANCE SENSOR ALIGNMENT

BRC

Perform the distance sensor alignment. Refer to [BRC-262, "Description"](#).

G

>> Work End.

H

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DISTANCE SENSOR INITIAL VERTICAL ALIGNMENT

Description

INFOID:0000000010721838

OUTLINE OF DISTANCE SENSOR INITIAL ALIGNMENT PROCEDURE

Always perform the distance sensor initial vertical alignment before distance sensor alignment.

NOTE:

If initial vertical alignment is not performed, the distance sensor adjustment may not be performed.

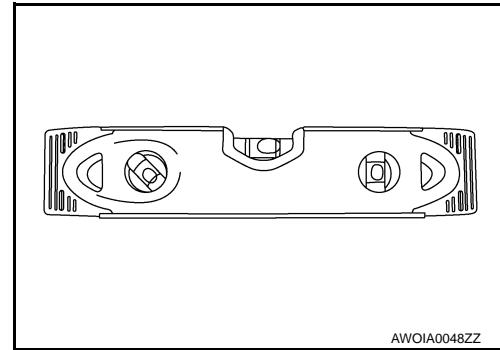
1. Required tools, refer to [BRC-260, "Required Tools"](#).
2. Preparation, refer to [BRC-260, "Preparation"](#).
3. Distance sensor initial vertical alignment, refer to [BRC-260, "Distance Sensor Initial Vertical Alignment"](#).

Required Tools

INFOID:0000000010721839

The following tool is necessary to perform the distance sensor initial vertical alignment:

- Spirit level.



AWOIA0048ZZ

Preparation

INFOID:0000000010721840

1. PREPARATION FOR DISTANCE SENSOR INITIAL VERTICAL ALIGNMENT PROCEDURE

1. Verify correct vehicle suspension height. Refer to [FSU-24, "Wheelarch Height"](#).
2. Repair or replace any damaged body components.
3. Verify proper tire inflation pressures. Refer to [WT-66, "Tire Air Pressure"](#).
4. Remove any accumulations of mud, snow or ice from the vehicle underbody.
5. Verify that there is no load in the vehicle (cargo or passenger).
6. Place the vehicle on a known level horizontal surface such as a wheel or frame alignment rack to achieve satisfactory sensor vertical alignment results.
7. Remove front fascia. Refer to [EXT-15, "Removal and Installation"](#).

>> Refer to [BRC-260, "Distance Sensor Initial Vertical Alignment"](#).

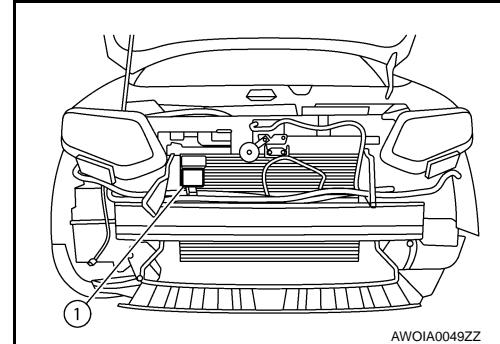
Distance Sensor Initial Vertical Alignment

INFOID:0000000010721841

NOTE:

The distance sensor initial vertical alignment procedure must be performed anytime the distance sensor is removed and reinstalled.

1. The distance sensor ① is located near the right front head lamp behind the front bumper fascia.



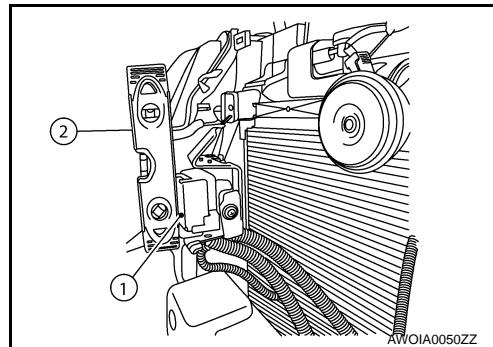
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DISTANCE SENSOR INITIAL VERTICAL ALIGNMENT

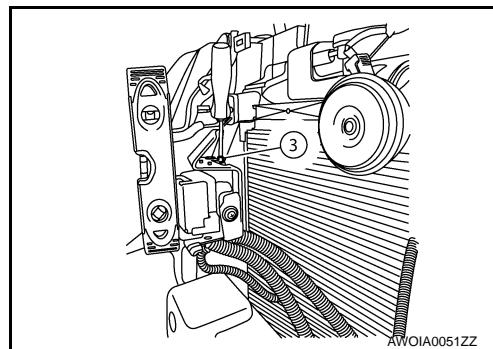
< BASIC INSPECTION >

[FORWARD EMERGENCY BRAKING]

2. Place the spirit level ② against the face of the distance sensor ①.



3. Turn the distance sensor adjustment screw ③ to level the sensor.



4. Insure the distance sensor electrical connector located on the bottom of the sensor is connected.
5. Reinstall the front bumper fascia. Refer to [EXT-15, "Removal and Installation"](#).
6. Perform the distance sensor alignment procedure. Refer to [BRC-262, "Description"](#).

NOTE:

With the front grill left removed, radar adjustment becomes easier.

DISTANCE SENSOR ALIGNMENT

Description

INFOID:0000000010721842

OUTLINE OF RADAR ALIGNMENT PROCEDURE

- A 4-wheel vehicle alignment must be performed before proceeding with radar alignment procedure.
- Always perform the radar alignment after removing and installing or replacing the distance sensor.

WARNING:

Radio waves could adversely affect electric medical equipment. Those who use a pacemaker should contact the electric medical equipment manufacturer for the possible influences before use.

CAUTION:

The system does not operate normally unless the radar alignment is performed. Always perform it.

1. Preparation, refer to [BRC-262, "Work Procedure \(Preparation\)"](#).
2. Set the ICC sensor target board (SST: KV99112700) to the correct position in front of the vehicle. Refer to [BRC-264, "Work Procedure \(Setting The ICC Target Board\)"](#).
3. Set the radar alignment mode ("MILLIWAVE RADAR ADJUST" on "Work support") with CONSULT, and then perform the adjustment according to the display. Refer to [BRC-266, "Work Procedure \(Radar Alignment\)"](#).

CAUTIONARY POINT FOR RADAR ALIGNMENT PROCEDURE

CAUTION:

- For radar alignment procedure, choose a level location with a few meter of working space in front and surrounding the vehicle.
- Vehicle must be stationary and unoccupied during the whole alignment procedure.
- Any slight vibration during the alignment procedure can cause the test to fail. If this happens, you will have to restart the alignment process.
- The ignition switch must be in the ON position.
- The battery voltage must not fall below 12 volts during the whole alignment procedure. Failure to maintain adequate battery voltage will cause the test to fail. If this happens, you will have to restart the alignment process.
- The ICC target board must be set in front of the vehicle facing the sensor.
- Adjust the radar alignment with CONSULT. (The radar alignment procedure cannot be adjusted without CONSULT.)
- Never enter the vehicle during radar alignment.
- Never block the area between the radar and the ICC target board at any time during the alignment process.
- Accurate steering wheel setting is crucial. Once set, do not disturb the steering wheel for the remainder of the alignment procedure.
- For proper system operation and adjustment, all vehicle wheels must be of the same size.

Work Procedure (Preparation)

INFOID:0000000010721843

1. ADVANCE PREPARATION FOR RADAR ALIGNMENT

1. Adjust all tire pressure to the specified value.
2. Empty the vehicle. (Remove any luggage from the passenger compartment, trunk room, etc.)
3. Fully fill the fuel tank, and then check that the coolant and oils are filled up to correct level.
4. Shift the selector lever to "P" position, and release the parking brake. (CVT models)
5. Shift the selector lever to "N" position, and release the parking brake. (M/T models)

CAUTION:

Apply wheel chocks or other tire blocks to the wheels to prevent the vehicle from moving.

DISTANCE SENSOR ALIGNMENT

< BASIC INSPECTION >

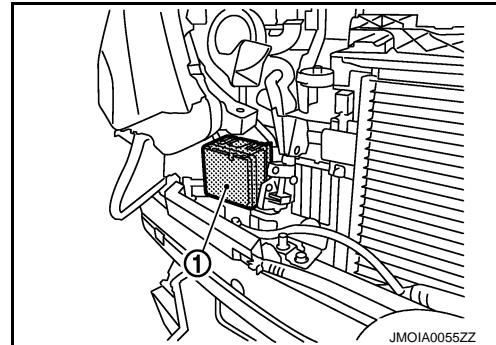
[FORWARD EMERGENCY BRAKING]

6. Clean the right front side of the fascia in front of the distance sensor ①.

NOTE:

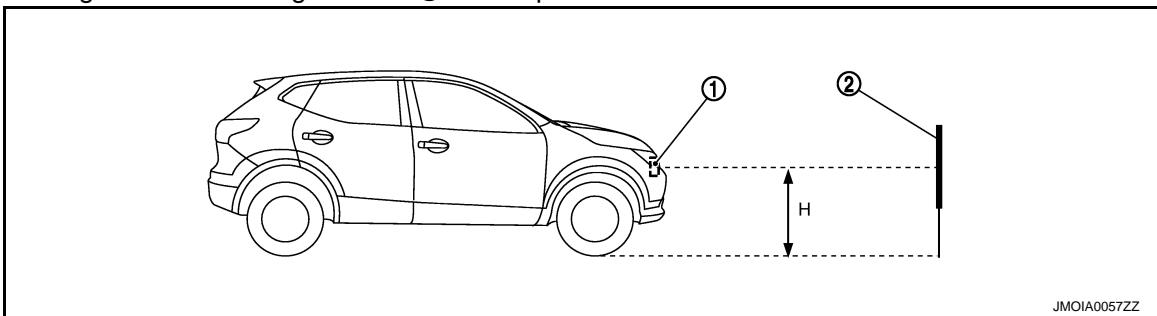
Check the distance sensor surface is clean.

>> GO TO 2.



2. PREPOSITION TARGET BOARD

Adjust the height of the ICC target board ② center position.



H : 693 mm (27.28 in)

① : Distance sensor

NOTE:

Adjusting the ICC target board height may not allow the center to reach to H. In this case, raise the height to upper limit of the adjustment range.

CAUTION:

To prevent damage to ICC target board, use a weight to protect the board from falling.

>> GO TO 3.

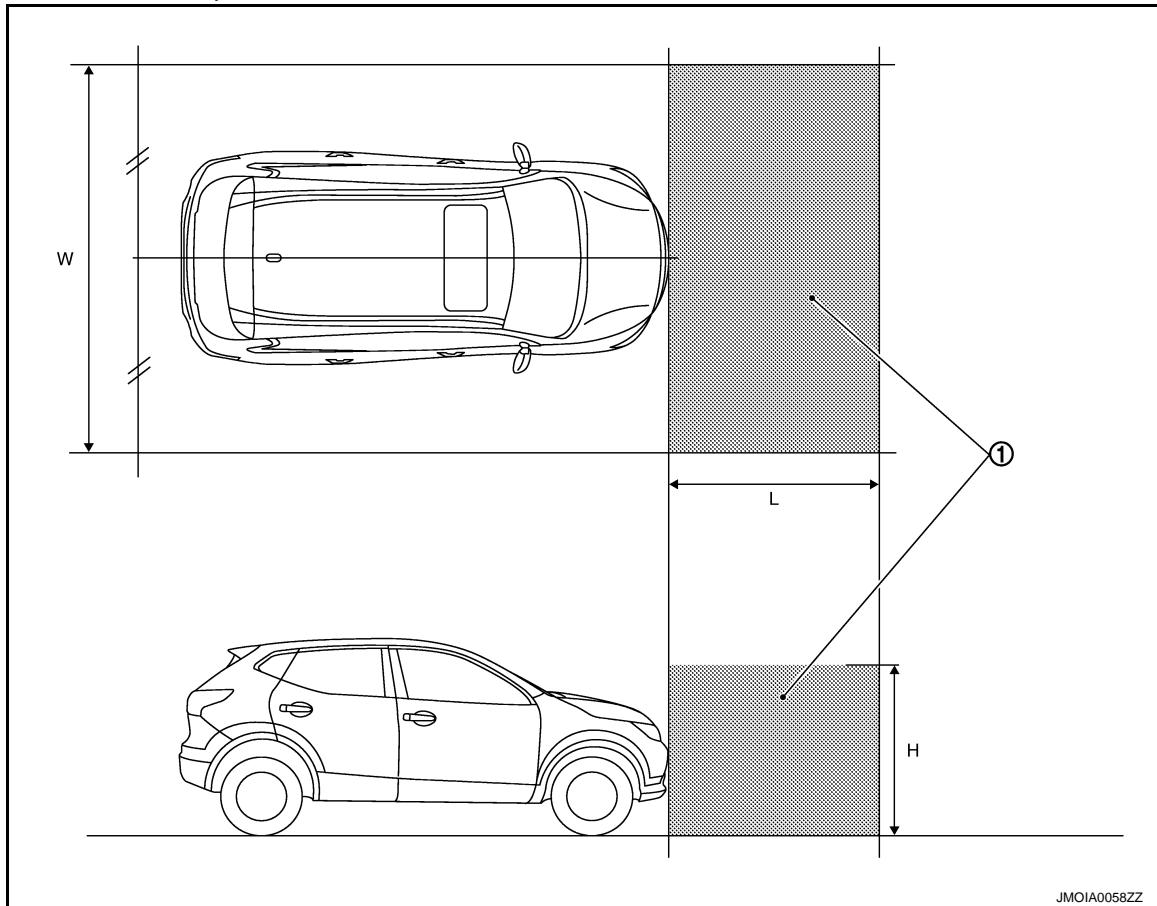
3. RADAR ALIGNMENT OPERATION AREA

DISTANCE SENSOR ALIGNMENT

< BASIC INSPECTION >

[FORWARD EMERGENCY BRAKING]

Position the vehicle in a place that is level and where ① area can be secured.



W : 3,000 mm (118.11 in)

L : 2,000 mm (78.74 in)

H : 2,000 mm (78.74 in)

NOTE:

① is a no object zone.

>> Go to [BRC-264, "Work Procedure \(Setting The ICC Target Board\)".](#)

Work Procedure (Setting The ICC Target Board)

INFOID:000000010721844

DESCRIPTION

Accurate adjustment of the radar alignment requires that the ICC target board be accurately positioned.

CAUTION:

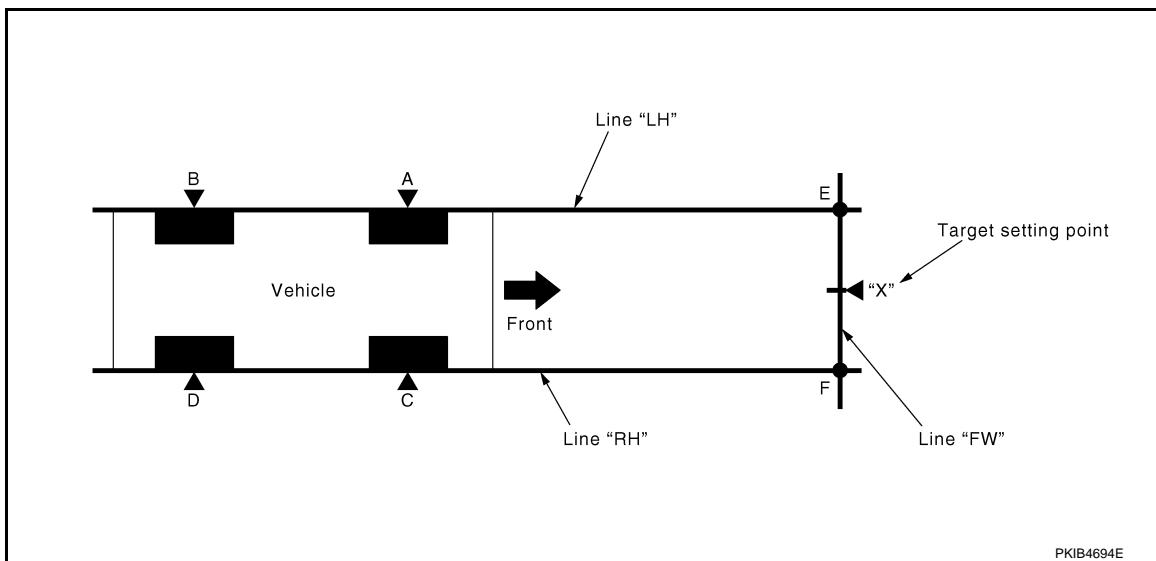
If the radar alignment is adjusted with the ICC target board in the incorrect position, the FEB system does not function normally.

1. PREPARATION OF SETTING ICC TARGET BOARD (1)

DISTANCE SENSOR ALIGNMENT

< BASIC INSPECTION >

[FORWARD EMERGENCY BRAKING]



"A" – "E" ("C" – "F") : 2,040 mm (80.00 in)

1. Mark points "A", "B", "C" and "D" at the center of the lateral surface of each wheels.

NOTE:

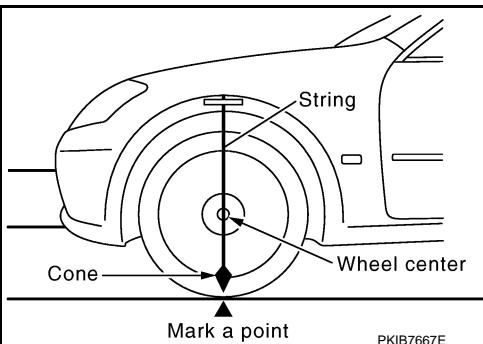
Hang a string with a cone from the fender so as to pass through the center of wheel, and then mark a point at the center of the lateral surface of the wheel.

2. Draw line "LH" passing through points "A" and "B" on the left side of vehicle.

NOTE:

Approximately 2 m (6.56 ft) or more from the front end of vehicle.

3. Mark point "E" on the line "LH" at the positions 2,040 mm (80.00 in) from point "A".



4. Draw line "RH" passing through points "C" and "D" on the right side of vehicle in the same way as step 2.

NOTE:

Approximately 2 m (6.56 ft) or more from the front end of vehicle.

5. Mark point "F" on the line "RH" at the positions 2,040 mm (80.00 in) from point "C".

6. Draw line "FW" passing through the points "E" and "F" on the front side of vehicle.

7. Mark point "X" at the center of point "E" and "F" on the line "FW".

CAUTION:

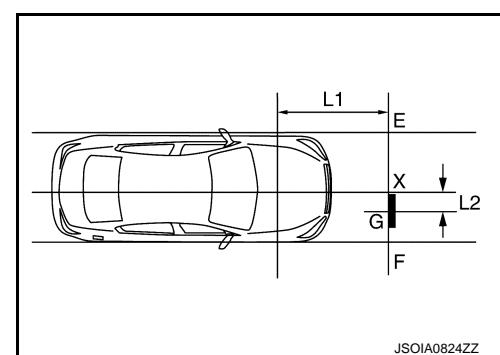
Make sure that "E" to "X" is equal to "F" to "X".

8. With point "X" as the starting point, mark point "G" on "F" point side 291 mm.

L1 : 2,040 mm (80.00 in)

L2 : 291 mm (11.46 in)

>> GO TO 2.



2. SETTING ICC TARGET BOARD

Place the center of ICC target board on point "G" at line "E-F" and install the ICC target board.

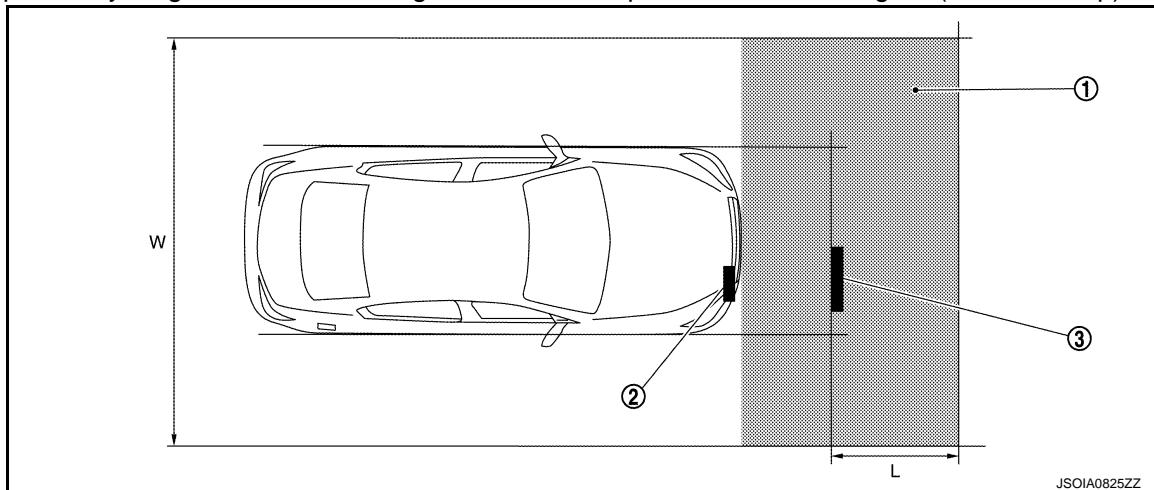
CAUTION:

For performing the radar alignment correctly, securely install (ICC target board) to be parallel with the "E-F" line.

>> GO TO 3.

3.CHECK THE ICC TARGET BOARD INSTALLATION AREA

Do not place anything other than ICC target board in the space shown in the figure (view from top).



① No object zone

W. 3,000 mm (118.11 in)

② Distance sensor

L. 1,000 mm (39.37 in)

③ ICC target board

INFOID:0000000010721845

>> Go to [BRC-266, "Work Procedure \(Radar Alignment\)".](#)**Work Procedure (Radar Alignment)****DESCRIPTION**

The radar alignment is performed automatically with CONSULT.

CAUTION:**Perform all necessary work for radar alignment until the adjustment completes as shown in the procedure. If the procedure does not complete, the FEB system is inoperable.****1. PERFORM RADAR ALIGNMENT**

1. Start the engine.
2. Connect CONSULT and select "Work support" of "LASER/RADAR".
3. Select "MILLIWAVE RADAR ADJUST" after the "Work support" screen is displayed.

NOTE:

Confirm the following items;

- The target should be accurately placed.
- The vehicle should be stopped.

4. Select "Start" after the "MILLIWAVE RADAR ADJUST" screen is displayed.

NOTE:

If the adjustment screen does not appear or an error appears within approximately 10 seconds after "MILLIWAVE RADAR ADJUST" is selected, the following causes are possible.

- The ICC target board is not installed in the correct position.
- Adequate space is not secured around the ICC target board.
- The radar alignment procedure exceeds its proper installation range.
 - Deformation of vehicle body.
 - Deformation of unit.
 - Deformation of bracket.
- The area is not suitable for the adjustment work.
- Right front side of fascia (distance sensor view) is not clean.
- The FEB warning lamp illuminates.

>> GO TO 2.

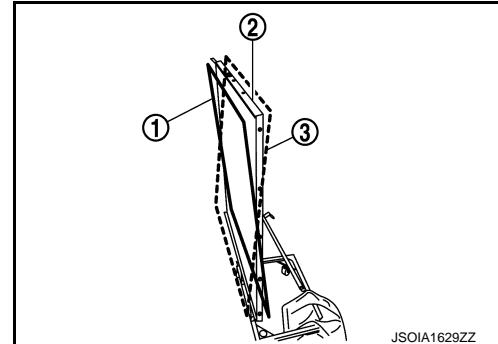
DISTANCE SENSOR ALIGNMENT

< BASIC INSPECTION >

[FORWARD EMERGENCY BRAKING]

2. RADAR ALIGNMENT

- Once the radar alignment procedure is started, you will be prompted by the CONSULT for the next instruction is displayed on the CONSULT screen.
- Follow all the following instructions requested by CONSULT:
 - Adjust ICC target board to position ① (top tilted toward vehicle)
 - Adjust ICC target board to position ② (vertical position)
 - Adjust ICC target board to position ③ (top tilted away from vehicle)



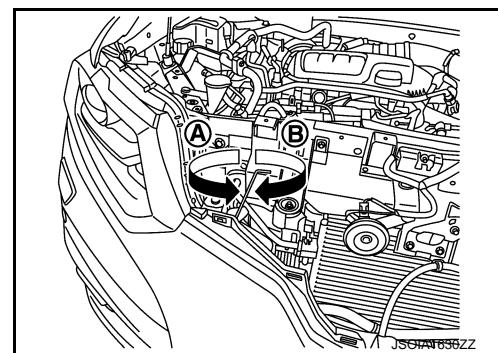
- Following instructions to perform physical adjustment to the sensor which may include turning the screw driver by a specified number of turns counter-clockwise Ⓐ or clockwise Ⓑ as specified on CONSULT.

CAUTION:

After the position 3 reading and during manual adjustment, it is OK to stand in front of the side of the fascia (distance sensor view). Otherwise be careful not to cover the right front side of the fascia (distance sensor view) with a hand or any other body part during adjustment.

NOTE:

Reading on the CONSULT is not real-time and not automatically update while turning the tool. To check the angle, end the alignment and restart the procedure.



>> ALIGNMENT END

NOTE:

If front grill is left removed, it must be installed.

ACTION TEST**Description**

INFOID:000000010721856

- Perform action test to verify the customer's concern.
- Perform action test and check the system operation after system diagnosis.

Inspection Procedure

INFOID:000000010721857

1.CHECK FEB SYSTEM SETTING

1. Start the engine.
2. Check that the FEB system setting can be enabled/disabled on the vehicle information display.
3. Turn OFF the ignition switch and wait for 30 seconds or more.
4. Check that the previous setting is saved when the engine starts again.

>> GO TO 2.

2.CHECK FEB SYSTEM

1. Enable the setting of the FEB system on the vehicle information display.
2. Check FEB warning lamp is OFF.

>> Inspection End.

DT/CIRCUIT DIAGNOSIS

C10B7 YAW RATE SENSOR

DTC Logic

INFOID:0000000010727798

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C10B7	YAW RATE SENSOR (Yaw rate sensor)	Yaw rate/side/decel G sensor calibration incorrect.

POSSIBLE CAUSE

- Calibration of yaw rate/side/decel G sensor not performed.
- Interruption in yaw rate/side/decel G sensor calibration.

FAIL-SAFE

FEB system is canceled.

BRC

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

- Start the engine.
- Turn the FEB system ON.
- Perform "All DTC Reading" with CONSULT.
- Check if the "C10B7" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "C10B7" detected as the current malfunction?

YES >> Refer to [BRC-269, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010727799

1. PERFORM YAW RATE/SIDE/DECCEL G SENSOR CALIBRATION

- Perform calibration of yaw rate/side/decel G sensor. Refer to [BRC-102, "Work Procedure"](#).
- Erase DTCs using CONSULT.
- Perform "Self Diagnostic Result" of "LASER/RADAR" using CONSULT.

Are any DTCs detected?

YES >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

NO >> Inspection End.

C1A01 POWER SUPPLY CIRCUIT 1, C1A02 POWER SUPPLY CIRCUIT 2**DTC Logic**

INFOID:0000000010766405

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A01	POWER SUPPLY CIR (Power supply circuit)	The battery voltage sent to distance sensor remains less than 7.9 V for 5 seconds
C1A02	POWER SUPPLY CIR 2 (Power supply circuit 2)	The battery voltage sent to distance sensor remains more than 19.3 V for 5 seconds

POSSIBLE CAUSE

- Connector, harness, fuse
- Distance sensor

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE**1. PERFORM DTC CONFIRMATION PROCEDURE**

1. Start the engine.
2. Turn the FEB system ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "C1A01" or "C1A02" is detected as the current malfunction in "Self Diagnostic Result" of "RADAR".

Is "C1A01" or "C1A02" detected as the current malfunction?YES >> Refer to [BRC-270, "Diagnosis Procedure"](#).NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010766406

1. CHECK DISTANCE SENSOR POWER SUPPLY AND GROUND CIRCUITCheck power supply and ground circuit of distance sensor. Refer to [BRC-300, "Diagnosis Procedure"](#).Is the inspection result normal?YES >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

NO >> Repair or replace the malfunctioning parts.

C1A03 VEHICLE SPEED SENSOR**DTC Logic**

INFOID:0000000010766623

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A03	VHCL SPEED SE CIRC (Vehicle speed sensor circuit)	If the vehicle speed signal (wheel speed) from ABS actuator and electric unit (control unit) and the A/T vehicle speed sensor signal (output shaft revolution signal) from TCM, received by the distance sensor via CAN communication, are inconsistent

POSSIBLE CAUSE

- Wheel speed sensor
- ABS actuator and electric unit (control unit)
- Vehicle speed sensor A/T (output speed sensor)
- TCM
- Distance sensor

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE**1. CHECK DTC PRIORITY**

If DTC "C1A03" is displayed with DTC "U1000" or "C1A04", first diagnose the DTC "U1000" or "C1A04".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable.

- U1000: Refer to [BRC-296, "DTC Logic"](#)
- C1A04: Refer to [BRC-273, "DTC Logic"](#)

NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Drive the vehicle at 30 km/h (19 MPH) or more.

CAUTION:**Always drive safely.**

4. Stop the vehicle.
5. Perform "All DTC Reading" with CONSULT.
6. Check if the "C1A03" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "C1A03" detected as the current malfunction?YES >> Refer to [BRC-271, "Diagnosis Procedure"](#).NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010766624

1. CHECK DTC PRIORITY

If DTC "C1A03" is displayed with DTC "U1000" or "C1A04", first diagnose the DTC "U1000" or "C1A04".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable.

- U1000: Refer to [BRC-296, "DTC Logic"](#)
- C1A04: Refer to [BRC-273, "DTC Logic"](#)

NO >> GO TO 2.

2. CHECK DATA MONITOR

1. Start the engine.

C1A03 VEHICLE SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[FORWARD EMERGENCY BRAKING]

2. Drive the vehicle.
3. Check that the value of "VHCL SPD AT" is almost the same as the value of "VHCL SPEED SE" in "DATA MONITOR" of "LASER/RADAR".

CAUTION:

Be careful of the vehicle speed.

Is the inspection result normal?

YES >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation".](#)
NO >> GO TO 3.

3. CHECK TCM SELF-DIAGNOSIS RESULTS

1. Perform "All DTC Reading".
2. Check if any DTC is detected in "Self Diagnostic Result" of "TRANSMISSION".

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [BRC-247, "DTC Index".](#)
NO >> GO TO 4.

4. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in "Self Diagnostic Result" of "ABS".

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [BRC-247, "DTC Index".](#)
NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation".](#)

< DTC/CIRCUIT DIAGNOSIS >

C1A04 ABS/TCS/VDC SYSTEM**DTC Logic**

INFOID:0000000010766625

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A04	ABS/TCS/VDC CIRC (ABS/TCS/VDC circuit)	If a malfunction occurs in the VDC/TCS/ABS system

POSSIBLE CAUSE

ABS actuator and electric unit (control unit)

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE**1. CHECK DTC PRIORITY**

BRC

If DTC "C1A04" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

G

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).
NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

H

1. Start the engine.
2. Turn the FEB system ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "C1A04" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

I

Is "C1A04" detected as the current malfunction?

J

YES >> Refer to [BRC-273, "Diagnosis Procedure"](#).
NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).
NO-2 >> Confirmation after repair: INSPECTION END

K

Diagnosis Procedure

INFOID:0000000010766626

L

1. CHECK DTC PRIORITY

M

If DTC "C1A04" is displayed with DTC "U1000", first diagnose the DTC "U1000".

N

Is applicable DTC detected?

O

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).
NO >> GO TO 2.

P

2. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in "Self Diagnostic Result" of "ABS".

Is any DTC detected?

Q

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [BRC-188, "Diagnosis Procedure"](#).
NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

C1A05 BRAKE SW/STOP LAMP SW**DTC Logic**

INFOID:0000000010766627

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A05	BRAKE SW/STOP L SW (Brake switch/Stop lamp switch)	Stop lamp switch signal received from BCM is abnormal

POSSIBLE CAUSE

- Stop lamp switch circuit
- Stop lamp switch
- Incorrect stop lamp switch installation
- BCM

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE**1. CHECK DTC PRIORITY**

If DTC "C1A05" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).

NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "C1A05" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "C1A05" detected as the current malfunction?YES >> Refer to [BRC-274, "Diagnosis Procedure"](#).NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010766628

1. CHECK DTC PRIORITY

If DTC "C1A05" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).

NO >> GO TO 2.

2. CHECK STOP LAMP

Check the stop lamp when brake pedal is depressed/not depressed.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check the stop lamp. Refer to [EXL-176, "Symptom Table"](#) (LED headlamp) or [EXL-361, "Symptom Table"](#) (Halogen headlamp)**3. CHECK STOP LAMP CIRCUIT**

1. Turn ignition switch ON.
2. Perform "STOP LAMP" on "Active test" of "BCM-HEADLAMP" with CONSULT.

Is the inspection result normal?

YES >> GO TO 4.

C1A05 BRAKE SW/STOP LAMP SW

[FORWARD EMERGENCY BRAKING]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Check the stop lamp circuit. Refer to [EXL-176, "Symptom Table"](#) (LED headlamp) or [EXL-361, "Symptom Table"](#) (Halogen headlamp)

A

4. PERFORM SELF-DIAGNOSIS OF CHASSIS CONTROL MODULE

1. Perform "All DTC Reading".
2. Check if any DTC is detected in "Self Diagnostic Result" of "CHASSIS CONTROL". Refer to [DAS-204, "DTC Index"](#).

B

Is any DTC detected?

C

YES >> Repair or replace the malfunctioning parts identified by the self-diagnosis result.

D

NO >> GO TO 5.

E

5. PERFORM SELF-DIAGNOSIS OF ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

1. Perform "All DTC Reading".
2. Check if any DTC is detected in "Self Diagnostic Result" of "ABS". Refer to [BRC-84, "DTC Index"](#).

F

Is any DTC detected?

G

YES >> Repair or replace the malfunctioning parts identified by the self-diagnosis result.

H

NO >> GO TO 6.

I

6. PERFORM SELF-DIAGNOSIS OF BCM

BRC

1. Perform "All DTC Reading".
2. Check if any DTC is detected in "Self Diagnostic Result" of "BCM". Refer to [BCS-78, "DTC Index"](#).

J

Is any DTC detected?

K

YES >> Repair or replace the malfunctioning parts identified by the self-diagnosis result.

L

NO >> GO TO 7.

M

7. PERFORM SELF-DIAGNOSIS OF DISTANCE SENSOR

N

Check if any DTC is detected in "Self Diagnostic Result" of "LASER/RADAR". Refer to [BRC-247, "DTC Index"](#).

O

Is any DTC detected?

P

YES >> Repair or replace the malfunctioning parts identified by the self-diagnosis result.

Q

NO >> INSPECTION END

R

C1A07 CVT

DTC Logic

INFOID:0000000010927801

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition
C1A07	CVT CIRCUIT (CVT circuit)	If CVT is malfunctioning

POSSIBLE CAUSE

- Transmission assembly
- TCM

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1. CHECK DTC PRIORITY

If DTC "C1A07" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).

NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn ON FEB system and drive.

CAUTION:

Always drive safely.

3. Stop the vehicle.
4. Perform "All DTC Reading" with CONSULT.
5. Check if the "C1A07" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "C1A07" detected as the current malfunction?

YES >> Refer to [BRC-276, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010927802

1. CHECK DTC PRIORITY

If DTC "C1A07" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).

NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS OF TCM

Check if any DTC is detected in "Self Diagnostic Result" of "TRANSMISSION".

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [TM-288, "DTC Index"](#) (Gasoline engine models) or [TM-529, "DTC Index"](#) (Diesel engine models).

NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

< DTC/CIRCUIT DIAGNOSIS >

C1A12 RADAR OFF-CENTER**DTC Logic**

INFOID:0000000010766413

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A12	RADAR OFF-CENTER (Radar off-center)	Radar of distance sensor is off the aiming point

POSSIBLE CAUSE

Radar is off the aiming point

FAIL-SAFE

The following systems are canceled.

- Vehicle-to-vehicle distance control mode
- Distance Control Assist (DCA)
- Forward Emergency Braking (FEB)
- Predictive Forward Collision Warning (PFCW)

A

B

C

D

E

BRC

DTC CONFIRMATION PROCEDURE**1. PERFORM DTC CONFIRMATION PROCEDURE**

1. Start the engine.
2. Turn the FEB system ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "C1A12" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "C1A12" detected as the current malfunction?

G

H

I

J

YES >> Refer to [BRC-277, "Diagnosis Procedure"](#).

K

L

M

N

O

P

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010766414

1. ADJUST RADAR AIMING

1. Adjust the radar beam aiming with CONSULT. Refer to [BRC-262, "Description"](#).
2. Perform "All DTC Reading".
3. Check if the "C1A12" is detected in "Self Diagnostic Result" of "LASER/RADAR".

Is "C1A12" detected?

K

L

M

N

O

P

YES >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

NO >> INSPECTION END

C1A14 ECM

DTC Logic

INFOID:0000000010766629

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A14	ECM CIRCUIT (ECM circuit)	If ECM is malfunctioning

POSSIBLE CAUSE

- Accelerator pedal position sensor
- ECM
- Distance sensor

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1. CHECK DTC PRIORITY

If DTC "C1A14" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).
 NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Operate the FEB system and drive.

CAUTION:
Always drive safely.

3. Stop the vehicle.
4. Perform "All DTC Reading" with CONSULT.
5. Check if the "C1A14" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "C1A14" detected as the current malfunction?

YES >> Refer to [BRC-278, "Diagnosis Procedure"](#).
 NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).
 NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010766630

1. CHECK DTC PRIORITY

If DTC "C1A14" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).
 NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS OF ECM

Check if any DTC is detected in "Self Diagnostic Result" of "ENGINE".

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [EC-109, "DTC Index"](#) (MR20DD) or [EC-517, "DTC Index"](#) (QR25DE) or [EC-908, "DTC Index"](#) (R9M).
 NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

C1A15 GEAR POSITION**DTC Logic**

INFOID:0000000010766632

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A15	GEAR POSITION (Gear position)	A mismatch between an current gear position signal transmitted from TCM via ECM and a gear position calculated by the distance sensor continues for approximately 11 minutes or more

POSSIBLE CAUSE

- Input speed sensor
- Vehicle speed sensor A/T (output speed sensor)
- TCM

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

BRC

1. CHECK DTC PRIORITY

If DTC "C1A15" is displayed with DTC "U1000", "C1A03" or "C1A04" first diagnose the DTC "U1000", "C1A03" or "C1A04"

Is applicable DTC detected?

YES >> Perform diagnosis of applicable.

- U1000: Refer to [BRC-296, "DTC Logic"](#)
- C1A03: Refer to [BRC-271, "DTC Logic"](#)
- C1A04: Refer to [BRC-273, "DTC Logic"](#)

NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Drive the vehicle at 10 km/h (6 MPH) or faster for approximately 15 minutes or more.

CAUTION:
Always drive safely.

4. Stop the vehicle.
5. Perform "All DTC Reading" with CONSULT.
6. Check if "C1A15" is detected as the current malfunction in the "Self Diagnostic Result" of "LASER/RADAR".

Is "C1A15" detected as the current malfunction?YES >> Refer to [BRC-279, "Diagnosis Procedure"](#).NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010766633

1. CHECK DTC PRIORITY

If DTC "C1A15" is displayed with DTC "U1000", "C1A03" or "C1A04" first diagnose the DTC "U1000", "C1A03" or "C1A04"

Is applicable DTC detected?

YES >> Perform diagnosis of applicable.

- U1000: Refer to [BRC-296, "DTC Logic"](#)
- C1A03: Refer to [BRC-271, "DTC Logic"](#)
- C1A04: Refer to [BRC-273, "DTC Logic"](#)

NO >> GO TO 2.

2. CHECK VEHICLE SPEED SIGNAL

C1A15 GEAR POSITION

< DTC/CIRCUIT DIAGNOSIS >

[FORWARD EMERGENCY BRAKING]

Check that "VHCL SPEED SE" operates normally in "DATA MONITOR" of "LASER/RADAR".

CAUTION:

Be careful of the vehicle speed.

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 7.

3. CHECK GEAR POSITION

Check that "GEAR" operates normally in "DATA MONITOR" of "LASER/RADAR".

CAUTION:

Be careful of the vehicle speed.

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK GEAR POSITION SIGNAL

Check that "GEAR" operates normally in "DATA MONITOR" of "TRANSMISSION".

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 6.

5. CHECK INPUT SPEED SENSOR SIGNAL

Check that "INPUT SPEED" operates normally in "DATA MONITOR" of "TRANSMISSION".

Is the inspection result normal?

YES >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

NO >> GO TO 6.

6. CHECK TCM SELF-DIAGNOSIS RESULTS

1. Perform "All DTC Reading".

2. Check if any DTC is detected in "Self Diagnostic Result" of "TRANSMISSION".

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [TM-288, "DTC Index"](#) (Gasoline engine models) or [TM-529, "DTC Index"](#) (Diesel engine models).

NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

7. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS RESULTS

1. Perform "All DTC Reading".

2. Check if any DTC is detected in "Self Diagnostic Result" of "ABS".

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [BRC-84, "DTC Index"](#).

NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

< DTC/CIRCUIT DIAGNOSIS >

C1A16 RADAR BLOCKED**DTC Logic**

INFOID:0000000010766415

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A16	RADAR BLOCKED (Radar blocked)	Inclusion of dirt or stains on the distance sensor area of the front bumper

NOTE:

DTC "C1A16" may be detected under the following conditions. (Explain to the customer about the difference between the contamination detection function and the indication when the malfunction is detected and tell them "This is not malfunction".)

- When contamination or foreign materials adhere to the distance sensor area of the front bumper
- When driving while it is snowing or when frost forms on the distance sensor area of the front bumper
- When distance sensor area of the front bumper is temporarily fogged

POSSIBLE CAUSE

- Stain or foreign materials is deposited
- Cracks or scratches exist

BR**FAIL-SAFE**

FEB system is canceled.

G**DTC CONFIRMATION PROCEDURE****1. PERFORM DTC CONFIRMATION PROCEDURE**

1. Start the engine.
2. Turn the FEB system ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "C1A16" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "C1A16" detected as the current malfunction?

YES >> Refer to [BR-281, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

J**Diagnosis Procedure**

INFOID:0000000010766416

1. VISUAL CHECK 1

Check the contamination and foreign matter on the distance sensor area of the front bumper.

Does contamination or foreign materials adhere?

YES >> Wipe out the contamination and foreign matter on the distance sensor area of the front bumper.
NO >> GO TO 2.

L**2. VISUAL CHECK 2**

1. Remove the front bumper. Refer to [EXT-15, "Removal and Installation"](#).
2. Check distance sensor for contamination and foreign matter.

M**Does contamination or foreign matter adhere?**

YES >> Wipe out the contamination and foreign matter from the distance sensor.
NO >> GO TO 3.

N**3. VISUAL CHECK 3**

Check distance sensor for cracks and scratches.

Is it found?**O**

YES >> Replace the distance sensor. Refer to [BR-304, "Removal and Installation"](#).
NO >> GO TO 4.

P

< DTC/CIRCUIT DIAGNOSIS >

4. PERFORM RADAR ALIGNMENT

1. Adjust the radar alignment with CONSULT. Refer to [BRC-262, "Description"](#).
2. Perform FEB system action test to check the operation status. Refer to [BRC-268, "Description"](#).
3. Perform "All DTC Reading".
4. Check the "C1A16" is detected in "Self Diagnostic Result" of "LASER/RADAR".

Is "C1A16" detected?YES >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

NO >> GO TO 5.

5. INTERVIEW

1. Ask if there is any trace of contamination or foreign materials adhering to the distance sensor area of the front bumper.
2. Ask if distance sensor area of the front bumper was frosted during driving or if vehicle was driven in snow.
3. Ask if distance sensor area of the front bumper was temporarily fogged. (Windshield glass may also tend to fog, etc.)

Is any of above conditions seen?

YES >> Explain to the customer about the difference between the contamination detection function and the indication when the malfunction is detected and tell them "This is not malfunction".

NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

< DTC/CIRCUIT DIAGNOSIS >

C1A17 DISTANCE SENSOR**DTC Logic**

INFOID:0000000010727824

DTC DETECTION LOGIC**NOTE:**

If DTC C1A17 is displayed with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to [BRC-296, "DTC Logic".](#)

DTC	Trouble diagnosis name	DTC detecting condition
C1A17	ICC SENSOR MALF (ICC sensor malfunction)	Distance sensor is malfunctioning.

POSSIBLE CAUSE

Distance sensor

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE**1. PERFORM DTC CONFIRMATION PROCEDURE**

1. Turn the ignition switch OFF.
2. Wait for 10 minutes or more.
3. Start the engine.
4. Turn the FEB system ON.
5. Perform "All DTC Reading" with CONSULT.
6. Check if the "C1A17" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "C1A17" detected as the current malfunction?YES >> Refer to [BRC-285, "Diagnosis Procedure".](#)NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident".](#)

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010727825

1. REPLACE DISTANCE SENSOR>> Replace distance sensor. Refer to [BRC-304, "Removal and Installation".](#)

C1A18 RADAR AIMING INCMP**DTC Logic**

INFOID:0000000010727826

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A18	LASER AIMING INCMP (Laser aiming incomplete)	Distance sensor not adjusted.

POSSIBLE CAUSE

- Distance sensor aiming adjustment not performed.
- Distance sensor aiming adjustment interrupted.

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE**1. PERFORM DTC CONFIRMATION PROCEDURE**

1. Turn the ignition switch OFF.
2. Wait for 10 minutes or more.
3. Start the engine.
4. Turn the FEB system ON.
5. Perform "All DTC Reading" with CONSULT.
6. Check if the "C1A18" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "C1A18" detected as the current malfunction?YES >> Refer to [BRC-285, "Diagnosis Procedure"](#).NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010727827

1. ADJUST DISTANCE SENSOR

Perform distance sensor Initial vertical alignment and distance sensor alignment.

>> Refer to [BRC-260, "Description"](#) and [BRC-262, "Description"](#).

< DTC/CIRCUIT DIAGNOSIS >

C1A21 UNIT HIGH TEMP**DTC Logic**

INFOID:0000000010766427

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A21	UNIT HIGH TEMP (Unit high temperature)	Temperature detected by the temperature sensor integrated in distance sensor remains more than 105 °C (221 °F) for 5 seconds or more

POSSIBLE CAUSE

Temperature around the distance sensor becomes extremely low or high

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE**1. PERFORM DTC CONFIRMATION PROCEDURE****BRC**

1. Turn the ignition switch OFF.
2. Wait for 10 minutes or more.
3. Start the engine.
4. Turn the FEB system ON.
5. Perform "All DTC Reading" with CONSULT.
6. Check if the "C1A21" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "C1A21" detected as the current malfunction?YES >> Refer to [BRC-285, "Diagnosis Procedure"](#).NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010766428

1. CHECK ENGINE COOLING SYSTEM

Check for any malfunctions in engine cooling system.

Is engine cooling system normal?YES >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

NO >> Repair engine cooling system.

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C1A24 NP RANGE

DTC Logic

INFOID:000000010766634

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A24	NP RANGE (NP range)	A mismatch between a shift position signal transmitted from TCM via ECM and an current gear position signal continues for 60 seconds or more

POSSIBLE CAUSE

- TCM
- Transmission range switch

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1. CHECK DTC PRIORITY

If DTC "C1A24" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).

NO >> GO TO 2.

2. CHECK DTC REPRODUCE (1)

1. Start the engine.
2. Turn the FEB system ON.
3. Wait for approximately 5 minutes or more after shifting the selector lever to "P" position.
4. Perform "All DTC Reading" with CONSULT.
5. Check if the "C1A24" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "C1A24" detected as the current malfunction?

YES >> Refer to [BRC-286, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3. CHECK DTC REPRODUCE (2)

1. Wait for approximately 5 minutes or more after shifting the selector lever to "N" position.
2. Perform "All DTC Reading".
3. Check if the "C1A24" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "C1A24" detected as the current malfunction?

YES >> Refer to [BRC-286, "Diagnosis Procedure"](#).NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:000000010766635

1. CHECK DTC PRIORITY

If DTC "C1A24" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).

NO >> GO TO 2.

2. CHECK TCM DATA MONITOR

Check that "SLCT LVR POSI" operates normally in "DATA MONITOR" of "TRANSMISSION".

Is the inspection result normal?

YES >> GO TO 3.

< DTC/CIRCUIT DIAGNOSIS >

NO >> Perform diagnosis for transmission range switch circuit and repair or replace the malfunctioning parts. Refer to [TM-322, "Diagnosis Procedure"](#) (Gasoline engine models) or [TM-568, "Diagnosis Procedure"](#) (Diesel engine models).

3. PERFORM TCM SELF-DIAGNOSIS

1. Perform "All DTC Reading".
2. Check if any DTC is detected in "Self Diagnostic Result" of "TRANSMISSION".

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [TM-288, "DTC Index"](#) (Gasoline engine models) or [TM-529, "DTC Index"](#) (Diesel engine models).

NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

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C1A26 ECD MODE MALFUNCTION

< DTC/CIRCUIT DIAGNOSIS >

[FORWARD EMERGENCY BRAKING]

C1A26 ECD MODE MALFUNCTION

DTC Logic

INFOID:000000010766636

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A26	ECD MODE MALF (ECD mode malfunction)	If an abnormal condition occurs with ECD system

POSSIBLE CAUSE

ABS actuator and electric unit (control unit)

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1. CHECK DTC PRIORITY

If DTC "C1A26" is displayed with DTC "U1000", "U0415" or "U0121" first diagnose the DTC "U1000", "U0415" or "U0121"

Is applicable DTC detected?

YES >> Perform diagnosis of applicable.

- U1000: Refer to [BRC-296, "DTC Logic"](#)
- U0415: Refer to [BRC-294, "DTC Logic"](#)
- U0121: Refer to [BRC-291, "DTC Logic"](#)

NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Wait for approximately 1 minute after turning the FEB system ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "C1A26" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "C1A26" detected as the current malfunction?

YES >> Refer to [BRC-288, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:000000010766637

1. CHECK DTC PRIORITY

If DTC "C1A26" is displayed with DTC "U1000", "U0415" or "U0121" first diagnose the DTC "U1000", "U0415" or "U0121"

Is applicable DTC detected?

YES >> Perform diagnosis of applicable.

- U1000: Refer to [BRC-296, "DTC Logic"](#)
- U0415: Refer to [BRC-294, "DTC Logic"](#)
- U0121: Refer to [BRC-291, "DTC Logic"](#)

NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS OF ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Check if any DTC is detected in "Self Diagnostic Result" of "ABS".

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [BRC-84, "DTC Index"](#).

NO >> Replace distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

C1A39 STEERING ANGLE SENSOR**DTC Logic**

INFOID:0000000010766639

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1A39	STRG SEN CIR (Steering angle sensor circuit)	If the steering angle sensor is malfunction

POSSIBLE CAUSE

Steering angle sensor

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE**1. CHECK DTC PRIORITY**

If DTC "C1A39" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).
NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "C1A39" is detected as the current malfunction in self-diagnosis results of "LASER/RADAR".

Is "C1A39" detected as the current malfunction?

YES >> Refer to [BRC-289, "Diagnosis Procedure"](#).
NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010766640

1. CHECK DTC PRIORITY

If DTC "C1A39" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).
NO >> GO TO 2.

2. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in "Self Diagnostic Result" of "ABS".

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [BRC-84, "DTC Index"](#).
NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

C1B5D FEB OPE COUNT LIMIT**DTC Logic**

INFOID:0000000010766641

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
C1B5D	FEB OPE COUNT LIMIT (Forward Emergency Braking operation count limit)	FEB system operated 3 times within ignition switch ON.

NOTE:

If "C1B5D" detected, perform the FEB system action test and check FEB system operates normally.

POSSIBLE CAUSE

FEB system operated 3 times within ignition switch ON.

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE**1. PERFORM FEB SYSTEM ACTION TEST**

Perform the FEB system action test.

Is there any malfunction symptom?

YES >> Refer to [BRC-290, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010766642

1. DTC CHECK SELF-DIAGNOSIS RESULTS

1. Turn ignition switch OFF.
2. Turn ignition switch ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "C1B5D" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is C1B5D detected as current malfunction?

YES >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

NO >> Perform FEB system action test. Refer to [BRC-268, "Description"](#).

< DTC/CIRCUIT DIAGNOSIS >

U0121 VDC CAN 2**DTC Logic**

INFOID:0000000010766643

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U0121	VDC CAN CIR2 (VDC CAN circuit2)	If distance sensor detects an error signal that is received from ABS actuator and electric unit (control unit) via CAN communication

POSSIBLE CAUSE

ABS actuator and electric unit (control unit)

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE**1. CHECK DTC PRIORITY**

If DTC "U0121" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).
NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "U0121" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "U0121" detected as the current malfunction?

YES >> Refer to [BRC-291, "Diagnosis Procedure"](#).
NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010766644

1. CHECK DTC PRIORITY

If DTC "U0121" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).
NO >> GO TO 2.

2. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in "Self Diagnostic Result" of "ABS".

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [BRC-84, "DTC Index"](#).
NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

< DTC/CIRCUIT DIAGNOSIS >

U0126 STRG SEN CAN 1**DTC Logic**

INFOID:000000010766645

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U0126	STRG SEN CAN CIR1 (Steering sensor CAN circuit1)	If distance sensor detects an error signal that is received from steering angle sensor via CAN communication

POSSIBLE CAUSE

Steering angle sensor

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE**1. CHECK DTC PRIORITY**

If DTC "U0126" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).
NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "U0126" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "U0126" detected as the current malfunction?

YES >> Refer to [BRC-292, "Diagnosis Procedure"](#).
NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:000000010766646

1. CHECK DTC PRIORITY

If DTC "U0126" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).
NO >> GO TO 2.

2. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in "Self Diagnostic Result" of "ABS".

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [BRC-84, "DTC Index"](#).
NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

U0401 ECM CAN 1

DTC Logic

INFOID:0000000010766647

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U0401	ECM CAN CIR1 (ECM CAN circuit1)	If distance sensor detects an error signal that is received from ECM via CAN communication

POSSIBLE CAUSE

ECM

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1. CHECK DTC PRIORITY

If DTC "U0401" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).
NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "U0401" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "U0401" detected as the current malfunction?

YES >> Refer to [BRC-293, "Diagnosis Procedure"](#).
NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010766648

1. CHECK DTC PRIORITY

If DTC "U0401" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).
NO >> GO TO 2.

2. CHECK ECM SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in "Self Diagnostic Result" of "ENGINE".

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [EC-109, "DTC Index"](#) (MR20DD) or [EC-517, "DTC Index"](#) (QR25DE) or [EC-908, "DTC Index"](#) (R9M).
NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

U0415 VDC CAN 1

DTC Logic

INFOID:0000000010766649

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U0415	VDC CAN CIR1 (VDC CAN circuit1)	If distance sensor detects an error signal that is received from ABS actuator and electric unit (control unit) via CAN communication

POSSIBLE CAUSE

ABS actuator and electric unit (control unit)

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1. CHECK DTC PRIORITY

If DTC "U0415" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).
 NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "U0415" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "U0415" detected as the current malfunction?

YES >> Refer to [BRC-294, "Diagnosis Procedure"](#).
 NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).
 NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010766650

1. CHECK DTC PRIORITY

If DTC "U0415" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).
 NO >> GO TO 2.

2. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in "Self Diagnostic Result" of "ABS".

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [BRC-84, "DTC Index"](#).
 NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

< DTC/CIRCUIT DIAGNOSIS >

U0428 STRG SEN CAN 2**DTC Logic**

INFOID:0000000010766651

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U0428	STRG SEN CAN CIR2 (Steering sensor CAN circuit2)	If distance sensor detects an error signal that is received from steering angle sensor via CAN communication

POSSIBLE CAUSE

Steering angle sensor

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE**1. CHECK DTC PRIORITY**

If DTC "U0428" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).
NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "U0428" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "U0428" detected as the current malfunction?

YES >> Refer to [BRC-295, "Diagnosis Procedure"](#).
NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010766652

1. CHECK DTC PRIORITY

If DTC "U0428" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).
NO >> GO TO 2.

2. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in "Self Diagnostic Result" of "ABS".

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [BRC-84, "DTC Index"](#).
NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

U1000 CAN COMM CIRCUIT

DTC Logic

INFOID:0000000010766408

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U1000	CAN COMM CIRCUIT (CAN communication circuit)	If distance sensor is not transmitting or receiving CAN communication signal for 2 seconds or more

POSSIBLE CAUSE

ITS communication system

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "U1000" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "U1000" detected as the current malfunction?

YES >> Refer to [BRC-296, "Diagnosis Procedure"](#).

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010766409

1. PERFORM THE SELF-DIAGNOSIS

1. Turn the ignition switch ON.
2. Turn the FEB system ON, and then wait for 2 seconds or more.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "U1000" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "U1000" detected as the current malfunction?

YES >> Refer to [LAN-17, "Trouble Diagnosis Flow Chart"](#).

NO >> INSPECTION END

U1010 CONTROL UNIT (CAN)**DTC Logic**

INFOID:0000000010766411

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U1010	CONTROL UNIT (CAN) [Control unit (CAN)]	If distance sensor detects malfunction by CAN controller initial diagnosis

POSSIBLE CAUSE

Distance sensor

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE**1. PERFORM DTC CONFIRMATION PROCEDURE**

BRC

1. Start the engine.
2. Turn the FEB system ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "U1010" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "U1010" detected as the current malfunction?YES >> Refer to [BRC-297, "Diagnosis Procedure"](#).NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010766412

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn the FEB system ON.
2. Perform "All DTC Reading" with CONSULT.
3. Check if the "U1010" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "U1010" detected as the current malfunction?YES >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

NO >> INSPECTION END

U1527 CCM CAN 1

DTC Logic

INFOID:0000000010927797

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U1527	CCM CAN CIR 1 (Chassis control module CAN circuit 1)	Distance sensor detects that chassis control module has a malfunction.

POSSIBLE CAUSE

Chassis control module

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1. CHECK DTC PRIORITY

If DTC "U1527" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [DAS-204, "DTC Index"](#).

NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine.
2. Turn the FEB system ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "U1527" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "U1527" detected as the current malfunction?

YES >> Refer to [BRC-298, "Diagnosis Procedure"](#).NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010927798

1. CHECK DTC PRIORITY

If DTC "U1527" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).

NO >> GO TO 2.

2. CHECK SELF-DIAGNOSIS RESULTS

Check if any DTC is detected in "Self Diagnostic Result" of "CHASSIS CONTROL MODULE".

Is any DTC detected?

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [DAS-204, "DTC Index"](#).NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

U153F CCM CAN 2

DTC Logic

INFOID:0000000010927799

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition
U153F	CCM CAN CIR 2 (Chassis control module CAN circuit 2)	Distance sensor detects an error signal that is received from chassis control module via CAN communication

POSSIBLE CAUSE

Chassis control module

FAIL-SAFE

FEB system is canceled.

DTC CONFIRMATION PROCEDURE

1. CHECK DTC PRIORITY

BRC

If DTC "U153F" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

G

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).

NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

H

1. Start the engine.
2. Turn the FEB system ON.
3. Perform "All DTC Reading" with CONSULT.
4. Check if the "U153F" is detected as the current malfunction in "Self Diagnostic Result" of "LASER/RADAR".

Is "U153F" detected as the current malfunction?

J

YES >> Refer to [BRC-299, "Diagnosis Procedure"](#).

K

NO-1 >> To check malfunction symptom before repair: Refer to [GI-44, "Intermittent Incident"](#).

L

NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010927800

1. CHECK DTC PRIORITY

M

If DTC "U153F" is displayed with DTC "U1000", first diagnose the DTC "U1000".

Is applicable DTC detected?

N

YES >> Perform diagnosis of applicable. Refer to [BRC-296, "DTC Logic"](#).

O

NO >> GO TO 2.

2. CHECK CHASSIS CONTROL MODULE SELF-DIAGNOSIS RESULTS

P

Check if any DTC is detected in "Self Diagnostic Result" of "CHASSIS CONTROL".

Is any DTC detected?

Q

YES >> Perform diagnosis on the detected DTC and repair or replace the malfunctioning parts. Refer to [DAS-204, "DTC Index"](#).

R

NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[FORWARD EMERGENCY BRAKING]

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000010731072

1. CHECK FUSES

Check if any of the following fuses are blown:

Signal name	Fuse No.
Ignition power supply	30

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace the blown fuse after repairing the affected circuit if a fuse is blown.

2. CHECK DISTANCE SENSOR POWER SUPPLY CIRCUIT

Check voltage between distance sensor harness connector and ground.

Terminal		Condition	Voltage (Approx.)
(+)	(-)		
Distance sensor	Connector	Ground	Ignition switch
			OFF 0 V
E78	8		ON Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair the distance sensor power supply circuit.

3. CHECK DISTANCE SENSOR GROUND CIRCUIT

1. Turn the ignition switch OFF.

2. Disconnect the distance sensor connector.

3. Check for continuity between distance sensor harness connector and ground.

Distance sensor		Ground	Continuity
Connector	Terminal		
E78	1		Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair the distance sensor ground circuit.

SYMPTOM DIAGNOSIS

DRIVER ASSISTANCE SYSTEM SYMPTOMS

Symptom Table

INFOID:0000000010727978

Before performing diagnosis, check that it is not a symptom caused by normal operation. Refer to [BRC-232, "System Description"](#).

Symptom	Confirmation item	Inspection item/Reference page
FEB system display does not illuminate	All of system display does not illuminate	System settings cannot be turned ON/OFF Refer to BRC-302, "Diagnosis Procedure"
	Other information display is not illuminated	Combination meter Refer to MWI-105, "DTC Index"
FEB warning lamp does not illuminate	All of system display does not illuminate	System settings cannot be turned ON/OFF Refer to BRC-302, "Diagnosis Procedure"
	Other information display is not illuminated	Combination meter Refer to MWI-105, "DTC Index"
FEB warning buzzer is not sounding (Warning display is functioning normally)	—	Chime does not sound. Refer to SN-109, "Symptom Table" (Without Park Assist) or SN-235, "Symptom Table" (Without Park Assist).

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SYSTEM SETTINGS CANNOT BE TURNED ON/OFF

< SYMPTOM DIAGNOSIS >

[FORWARD EMERGENCY BRAKING]

SYSTEM SETTINGS CANNOT BE TURNED ON/OFF

Symptom Table

INFOID:0000000010721673

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
FEB system does not turn ON/OFF	BRC-302, "Diagnosis Procedure"

Description

INFOID:0000000010721674

FEB system does not turn on/off.

- FEB warning lamp does not illuminate even if the steering switch is operated when FEB warning lamp is not illuminated.
- FEB warning lamp does not turn off even if the steering switch is operated when FEB warning lamp is illuminated.

NOTE:

The system ON/OFF condition will be memorized even if the ignition switch turns OFF.

Diagnosis Procedure

INFOID:0000000010721675

1. PERFORM THE SELF-DIAGNOSIS

1. Perform "All DTC Reading" with CONSULT.
2. Check if the DTC is detected in self-diagnosis results for "LASER/RADAR" with CONSULT.

Is any DTC detected?

YES >> GO TO 5.
NO >> GO TO 2.

2. STEERING SWITCH INSPECTION

1. Turn ignition switch ON.
2. Check that "FEB SELECT" operates normally in "" for "LASER/RADAR" with CONSULT.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

3. FEB WARNING LAMP

1. Select the active test item "" for "LASER/RADAR" with CONSULT.
2. Check if the FEB warning lamp illuminates when the test item is operated.

Is the inspection result normal?

YES >> Refer to [BRC-257, "Work Flow"](#).
NO >> GO TO 4.

4. CHECK DATA MONITOR OF COMBINATION METER

Check that "BA W/L" operates normally in "" for "METER/M&A" with CONSULT, when the FEB setting ON by steering switch.

Is the inspection result normal?

YES >> Replace the combination meter. [MWI-151, "Removal and Installation"](#).
NO >> Replace the distance sensor. Refer to [BRC-304, "Removal and Installation"](#).

5. REPAIR OR REPLACE MALFUNCTIONING PARTS

Repair or replace malfunctioning parts.

>> GO TO 6.

6. CHECK FEB SYSTEM

SYSTEM SETTINGS CANNOT BE TURNED ON/OFF

< SYMPTOM DIAGNOSIS >

[FORWARD EMERGENCY BRAKING]

Check that FEB warning lamp turned ON↔OFF, when operating steering switch.

>> INSPECTION END

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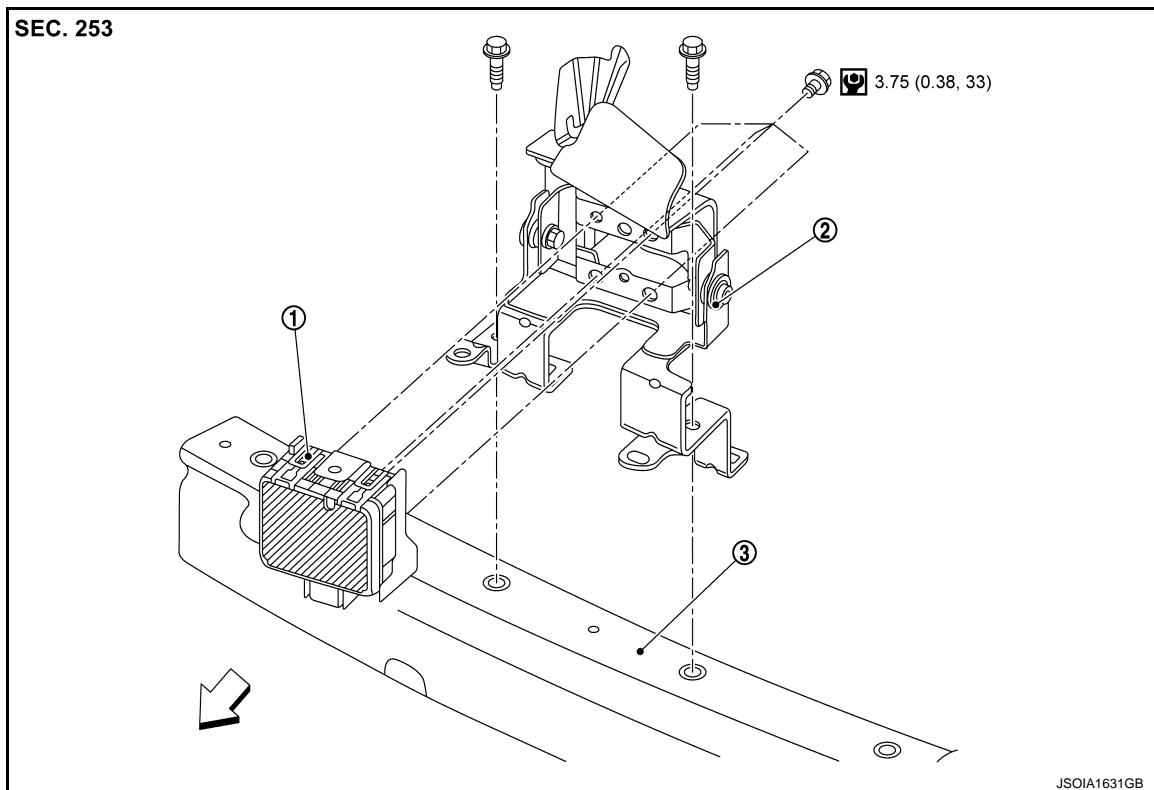
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REMOVAL AND INSTALLATION

DISTANCE SENSOR

Exploded View

INFOID:0000000010744025



① Distance sensor

② Distance sensor bracket

③ Front bumper reinforce

: N·m (kg·m, in·lb)

Removal and Installation

INFOID:0000000010744026

REMOVAL

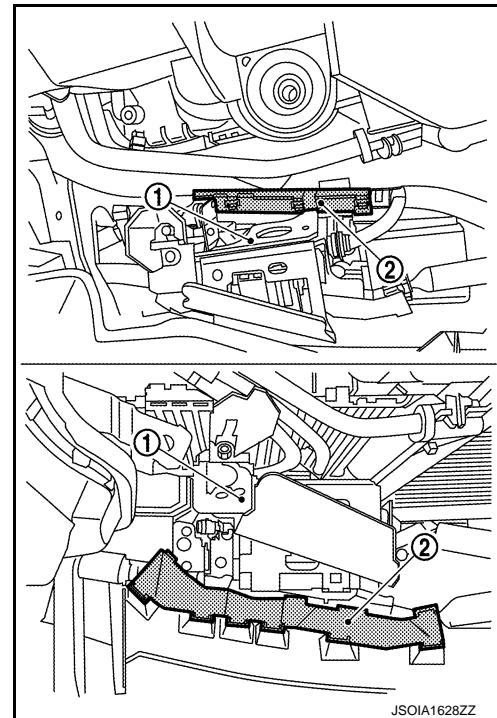
1. Remove front bumper fascia. Refer to [EXT-15, "Removal and Installation"](#).
2. Disconnect distance sensor connector.

DISTANCE SENSOR

< REMOVAL AND INSTALLATION >

[FORWARD EMERGENCY BRAKING]

3. Remove harness protectors ② from distance sensor bracket ①.



4. Remove distance sensor bracket mounting bolts to remove distance sensor with bracket from front bumper reinforce.
- CAUTION:**
Never give an impact to the distance sensor.
5. Remove distance sensor mounting bolts to remove distance sensor from distance sensor bracket.
- CAUTION:**
Never give an impact to the distance sensor.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

Perform additional service when replacing distance sensor. Refer to [BRC-259, "Work Procedure"](#).