SECTION BRC
BRAKE CONTROL SYSTEM

CONTENTS

VDC/TCS/ABS

PRECAUTION

PRECAUTIONS

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

INFOID:0000000014392583

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

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper repair, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SR section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

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

WARNING:

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery or batteries, and wait at least three minutes before performing any service.**

Precaution for Work

INFOID:0000000014392584

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with a new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components:

- Water soluble dirt:

- Dip a soft cloth into lukewarm water, wring the water out of the cloth and wipe the dirty area.
- Then rub with a soft, dry cloth.

- Oily dirt:

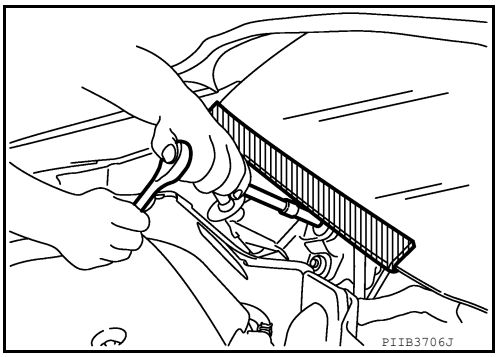
- Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%) and wipe the dirty area.
- Then dip a cloth into fresh water, wring the water out of the cloth and wipe the detergent off.
- Then rub with a soft, dry cloth.

- Do not use organic solvent such as thinner, benzene, alcohol or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000014392585

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



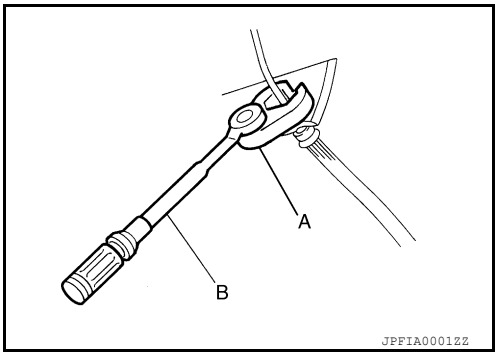
Precaution for Brake System

INFOID:0000000014392586

WARNING:

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

- Brake fluid use refer to MA-13, "VK56VD Gasoline Engine : Fluids and Lubricants" or MA-62, "Cummins 5.0L Engine : Fluids and Lubricants".
- Do not reuse drained brake fluid.
- Do not spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Always confirm the specified tightening torque when installing the brake pipes.
- After pressing the brake pedal more deeply or harder than normal driving, such as air bleeding, check each item of brake pedal. Adjust brake pedal if it is outside the standard value.
- Do not use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.
- Tighten the brake tube flare nut to the specified torque with a flare nut crowfoot (A) and torque wrench (B).
- Always connect the battery terminal when moving the vehicle.
- Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) harness connector or the battery negative terminal before performing the work.
- Check that no brake fluid leakage is present after replacing the parts.



Precaution for Brake Control System

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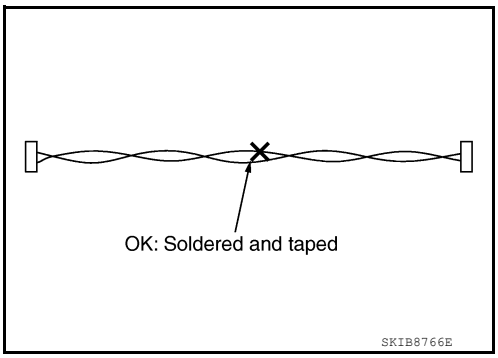
- Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC function, TCS function, ABS function, EBD function, hill start assist function or brake limited slip differential (BLSD) function operates. This is not a malfunction because it is caused by VDC function, TCS function,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

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

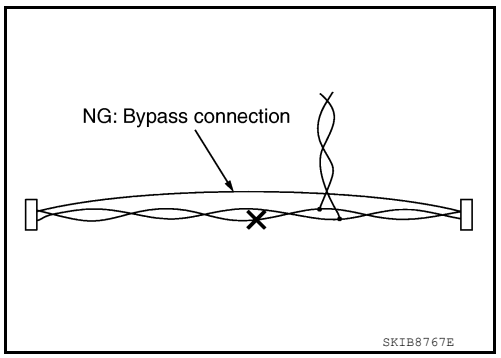
Precaution for Harness Repair

INFOID:0000000014392588

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



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



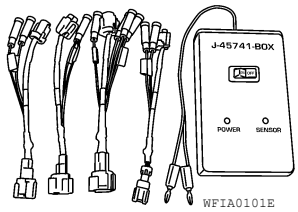
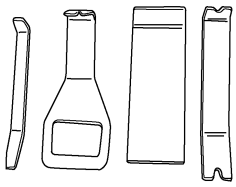
PREPARATION

PREPARATION

Special Service Tool

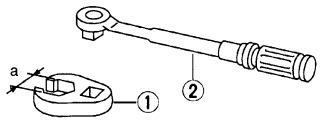
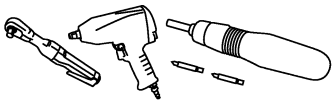
INFOID:0000000014392589

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

Tool number (TechMate No.) Tool name	Description
KV991J0080 (J-45741-A) ABS active wheel sensor tester  WFIA0101E	Checking operation of ABS active wheel sensors
— (J-46534) Trim Tool Set  AWJIA0483ZZ	Removing trim components

Commercial Service Tool

INFOID:0000000014392590

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

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

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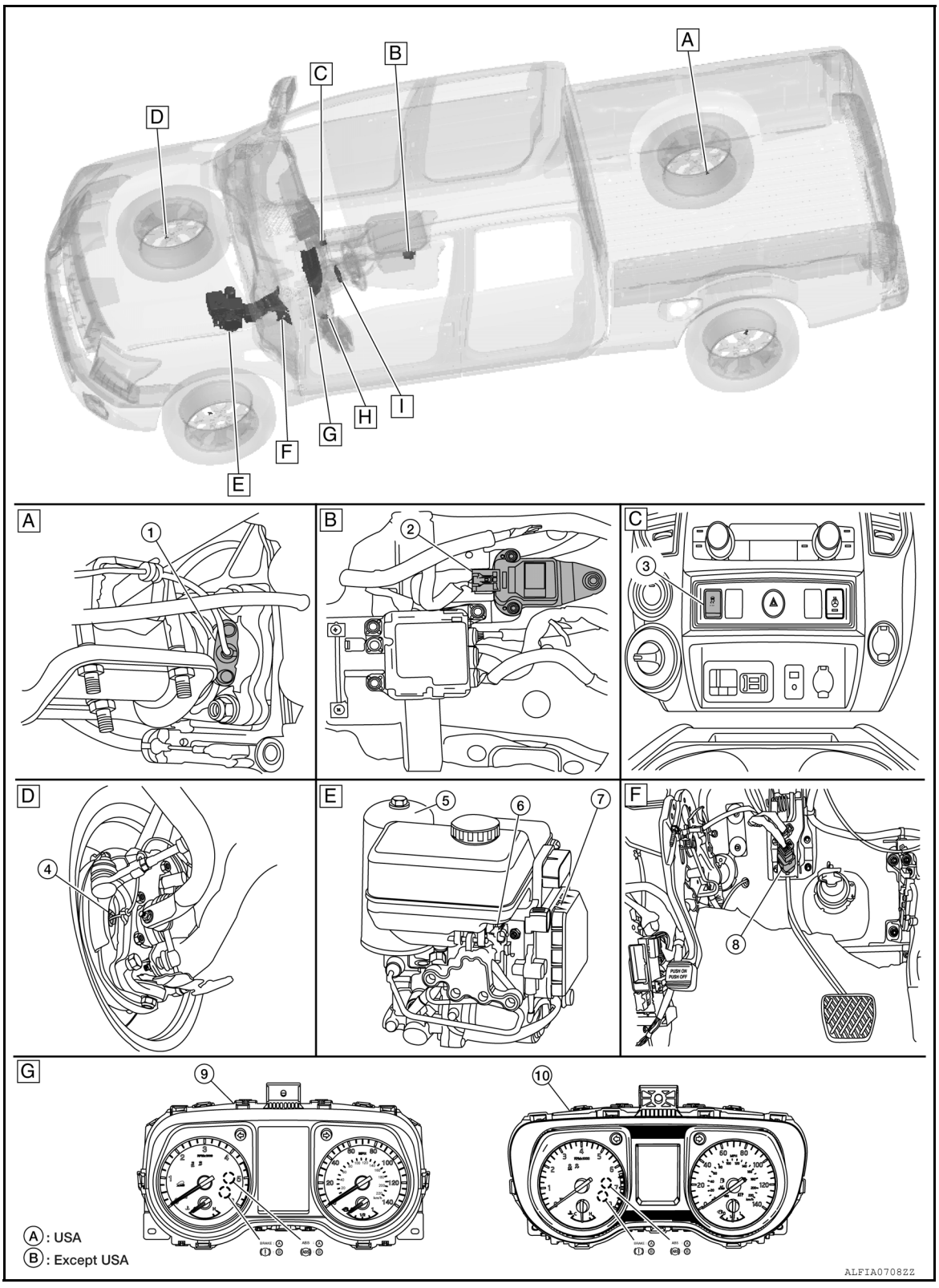
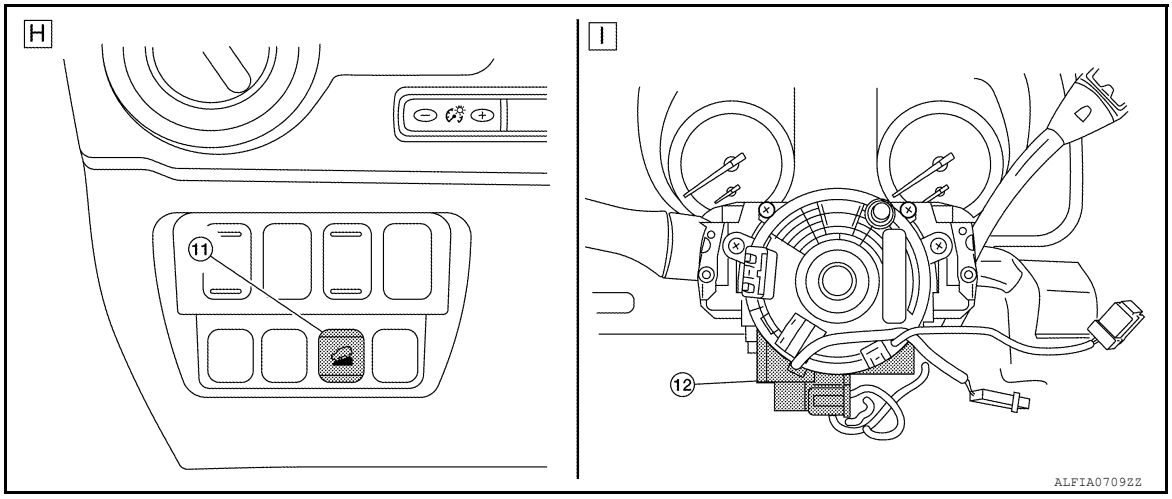




A. Right rear wheel area
B. Center console area (view with center console finisher removed)
C. Center of instrument panel
D. Right front wheel area
E. Left side of engine compartment (view with ABS actuator and electric unit (control unit) removed)
F. Brake pedal area (view with instrument panel removed)
G. Left side of instrument panel (view with combination meter removed)
H. Left side of instrument panel
I. Steering column area (view with steering wheel removed)

Component Description

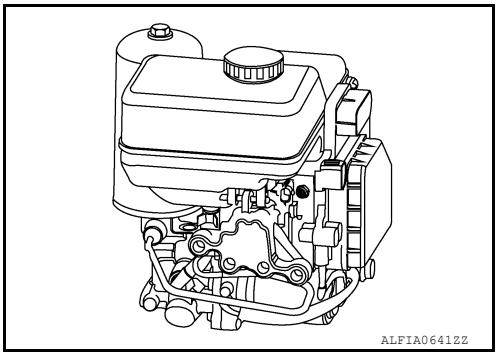
INFOID:0000000014392592

No.	Component	Function
1.	Rear wheel sensor RH	BRC-11, "Wheel Sensor and Sensor Rotor"
2.	Yaw rate/side/decel G sensor	BRC-12, "Yaw Rate/Side/Decel G Sensor"
3.	VDC OFF switch	BRC-13, "VDC OFF Switch"
4.	Front wheel sensor RH	BRC-11, "Wheel Sensor and Sensor Rotor"
5.	Accumulator	BRC-10, "ABS Actuator and Electric Unit (Control Unit)"
6.	Brake fluid level switch	BRC-12, "Brake Fluid Level Switch"
7.	ABS actuator and electric unit (control unit)	BRC-10, "ABS Actuator and Electric Unit (Control Unit)"
8.	Stop lamp switch	BRC-12, "Stop Lamp Switch"
9.	Combination meter (Type A)	MWI-8, "METER SYSTEM : Component Parts Location"
10.	Combination meter (Type B)	
11.	Hill descent control switch	BRC-12, "Brake Fluid Level Switch"
12.	Steering angle sensor	BRC-12, "Steering Angle Sensor"

ABS Actuator and Electric Unit (Control Unit)

INFOID:0000000014392593

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



ELECTRIC UNIT (CONTROL UNIT)

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

ACTUATOR

The following components are integrated with ABS actuator:

Motor/Accumulator Assembly

Pump
- Operates the pump drive according to signals from ABS actuator and electric unit (control unit) by the motor.

Motor
- Operates the motor drive according to signals from ABS actuator and electric unit (control unit).

Accumulator
- The accumulator accumulates brake fluid conveyed by the motor and pump.

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

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

ABS IN Valve and ABS OUT Valve
Increases, holds or decreases the fluid pressure of each caliper according to signals from ABS actuator and electric unit (control unit).

Cut Valve 1, Cut Valve 2
Shuts off the ordinary brake line from master cylinder to signals from ABS actuator and electric unit (control unit).

Suction Valve 1
Suction valve 1 switches the brake path to convey accumulator pressure to the front system, according to a signal transmitted from the ABS actuator and electric unit (control unit).

Suction Valve 2
Suction valve 2 releases accumulator pressure, according to a signal transmitted from the ABS actuator and electric unit (control unit).

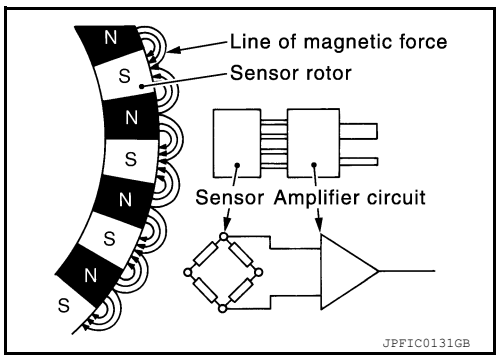
Accumulator Pressure Sensor
The accumulator pressure sensor detects brake fluid pressure accumulated in the accumulator and conveys the detected result to the ABS actuator and electric unit (control unit).

Master Cylinder Pressure Sensor
Detects the brake fluid pressure of master cylinder part and transmits a signal to ABS actuator and electric unit (control unit).

Wheel Sensor and Sensor Rotor

INFOID:0000000014392594

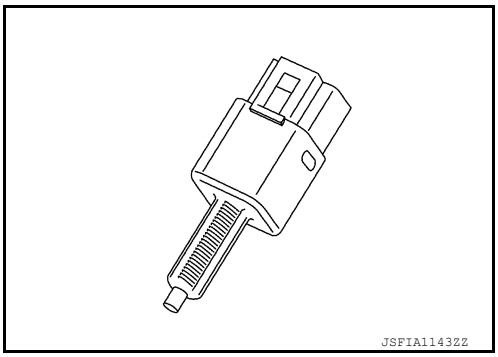
NOTE:
- Wheel sensor and sensor rotor is integrated in wheel hub assembly.
- Never measure resistance and voltage value using a tester because sensor is active sensor.
- Downsize and weight reduction is aimed. IC for detection portion and magnet for sensor rotor are adopted.
- Power supply is supplied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



Stop Lamp Switch

INFOID:0000000014392595

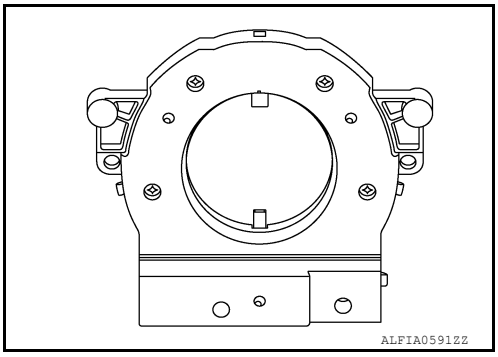
Detects the operation status of brake pedal and transmits converted electric signal to ABS actuator and electric unit (control unit).



Steering Angle Sensor

INFOID:0000000014392596

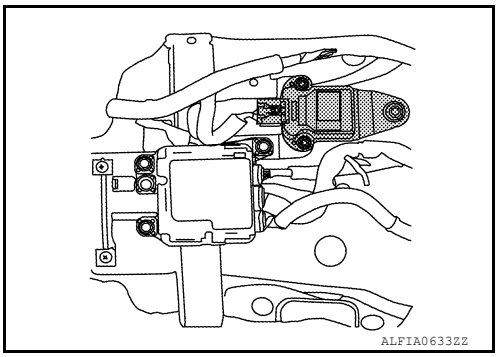
Detects the following information and transmits steering angle signal to ABS actuator and electric unit (control unit) via CAN communication:
- Steering wheel rotation amount
- Steering wheel rotation angular velocity
- Steering wheel rotation direction



Yaw Rate/Side/Decel G Sensor

INFOID:0000000014392597

Calculates the following information that affects the vehicle and transmits a signal to ABS actuator and electric unit (control unit) via communication lines:
- Vehicle rotation angular velocity (yaw rate signal)
- Vehicle lateral acceleration (side G signal) / longitudinal acceleration (decel G signal)



Brake Fluid Level Switch

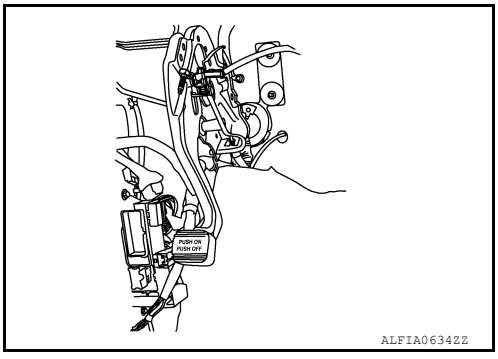
INFOID:0000000014392598

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

Parking Brake Switch

INFOID:0000000014392599

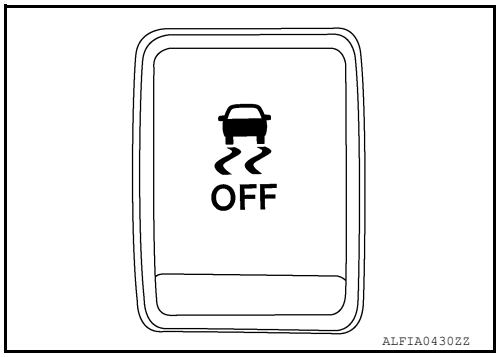
Detects the operation status of parking brake switch and transmits converted electric signal from combination meter to ABS actuator and electric unit (control unit).



VDC OFF Switch

INFOID:0000000014392600

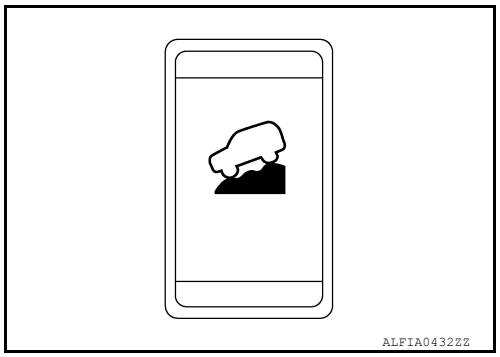
- The operation of the VDC OFF switch enables the arbitrary switching of the VDC function between stop status and standby status. The status of the function is indicated by the VDC OFF indicator lamp. (ON: Non-operational status, OFF: Standby status)
- VDC function
- TCS function
- VDC OFF indicator lamp turns OFF (standby status) when the engine is started again after it is stopped once while VDC OFF indicator lamp is ON (non-operational status).



Hill Descent Control Switch

INFOID:0000000014392601

- The hill descent control system will help maintain vehicle speed on steeper downhill grades. Hill descent control will provide braking allowing the driver to concentrate on steering while reducing the burden and accelerator operation.



SYSTEM
VDC/TCS/ABS

VDC/TCS/ABS : System Diagram

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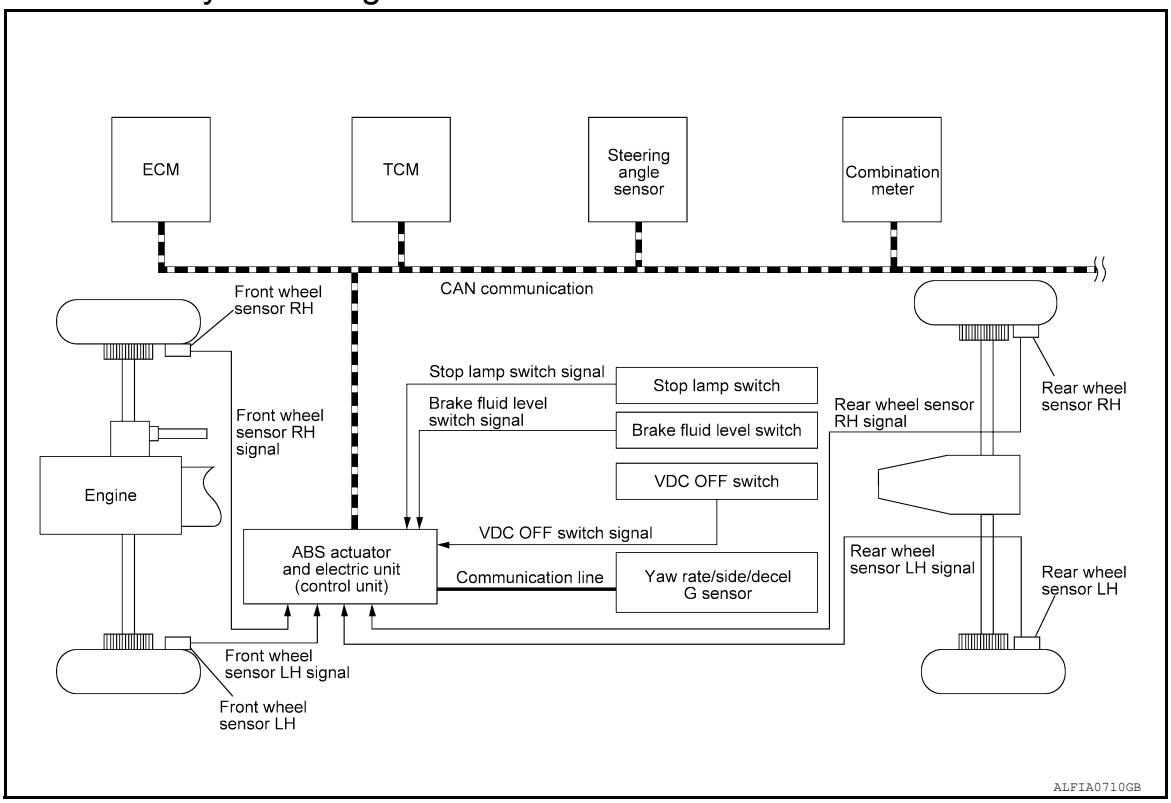


VDC/TCS/ABS : System Description

INFOID:0000000014392603

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

INPUT AND OUTPUT SIGNALS

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

Component	Signal description
Yaw rate/side/decel G sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line[*1]: • Yaw rate signal • Side G sensor signal • Decel G sensor signal
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Accelerator pedal position signal • Engine speed signal Mainly receives the following signal from ABS actuator and electric unit (control unit) via CAN communication: • Target throttle position signal
TCM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Shift position signal • Current gear position signal

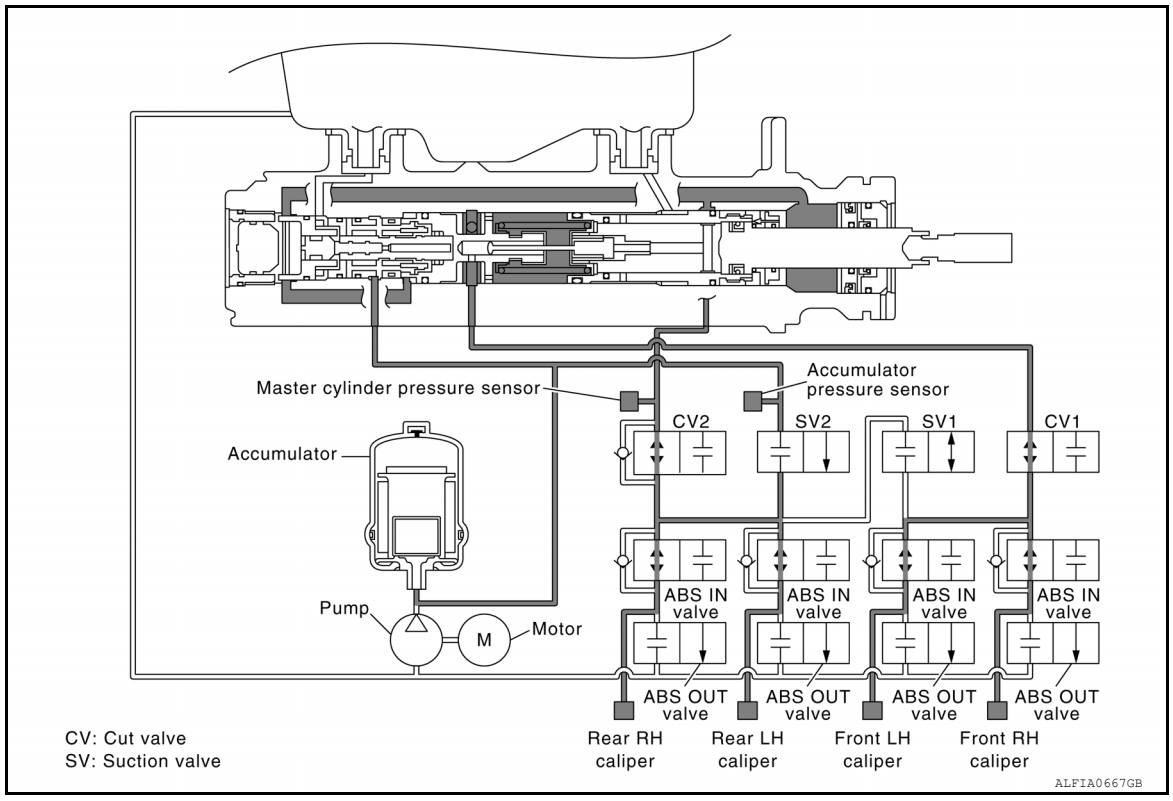
Component	Signal description
Steering angle sensor	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Steering angle sensor signal
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication: • ABS warning lamp signal • Brake warning lamp signal • SLIP indicator lamp signal • VDC OFF indicator lamp

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

VALVE OPERATION

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

When Ordinary Brake Is Applied



Name	Not activated	When depressing brake pedal
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 caliper (fluid pressure)	—	Pressure increases

Front RH caliper

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

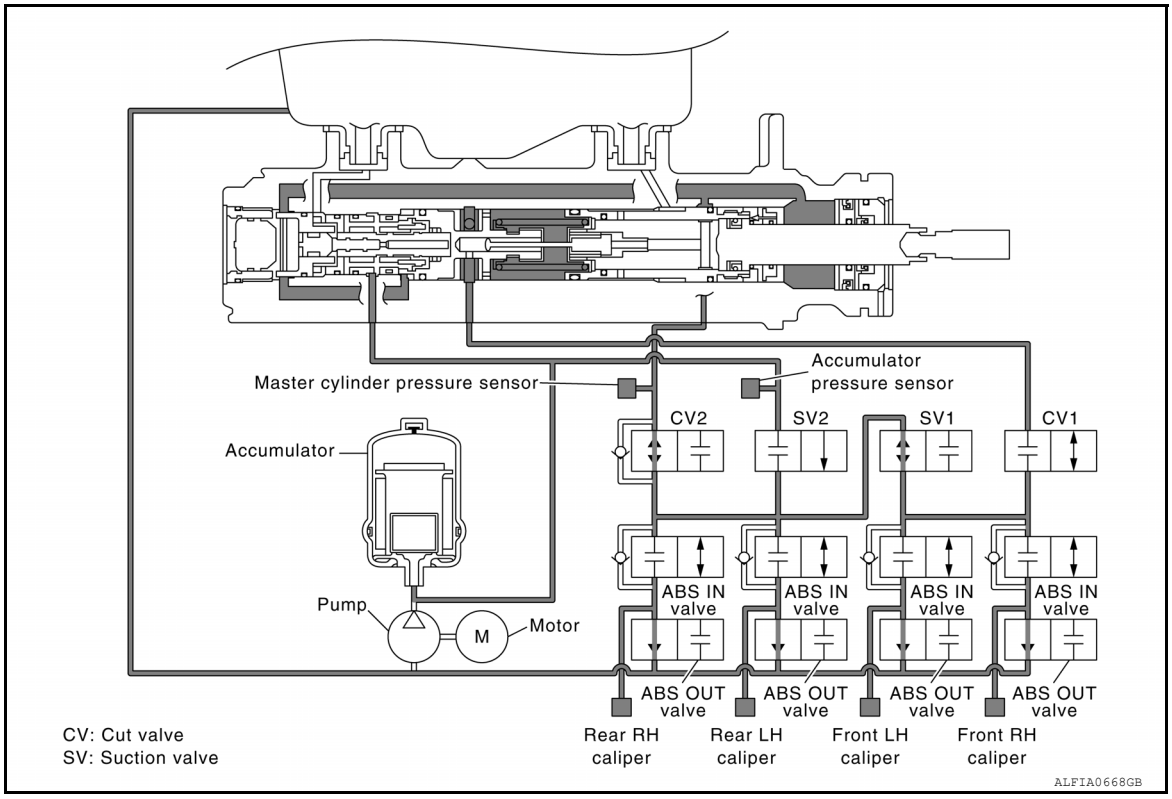
Front LH caliper

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

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

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

ABS Is Operating (When Pressure Increases)



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

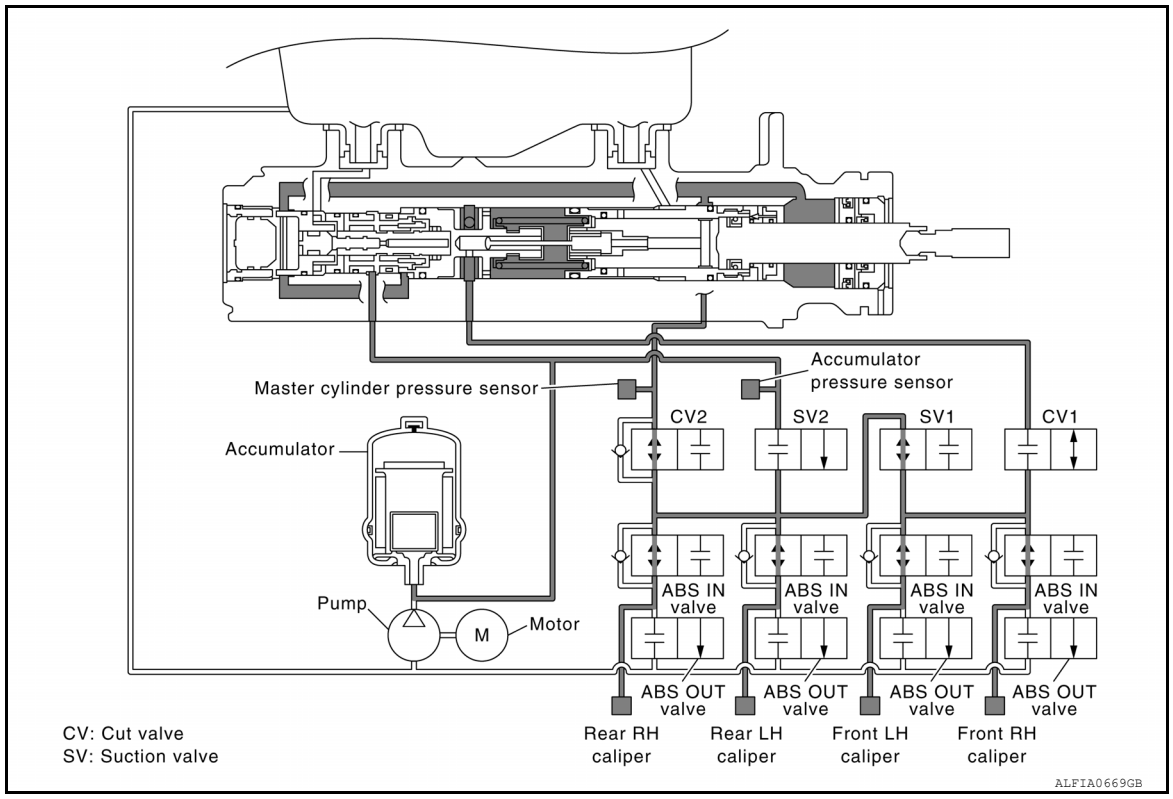
Front RH caliper
• Pressurized brake fluid from accumulator is supplied to front RH caliper through master cylinder part, cut valve 2, suction valve 1 and ABS IN valve.

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

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

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

ABS Is Operating (When Pressure Holds)



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

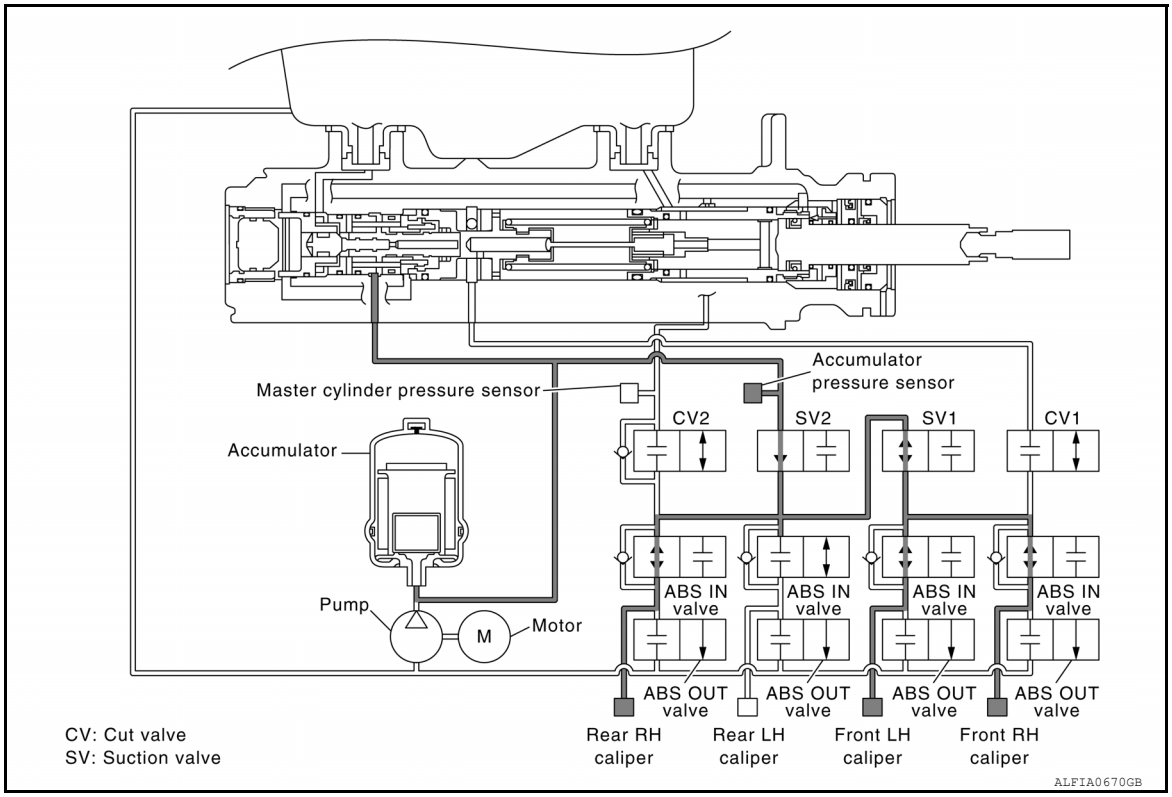
Front RH caliper
- ABS IN valve is close, fluid pressure of front RH caliper is holds.

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

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

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

ABS Is Operating (When Pressure Decreases)



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

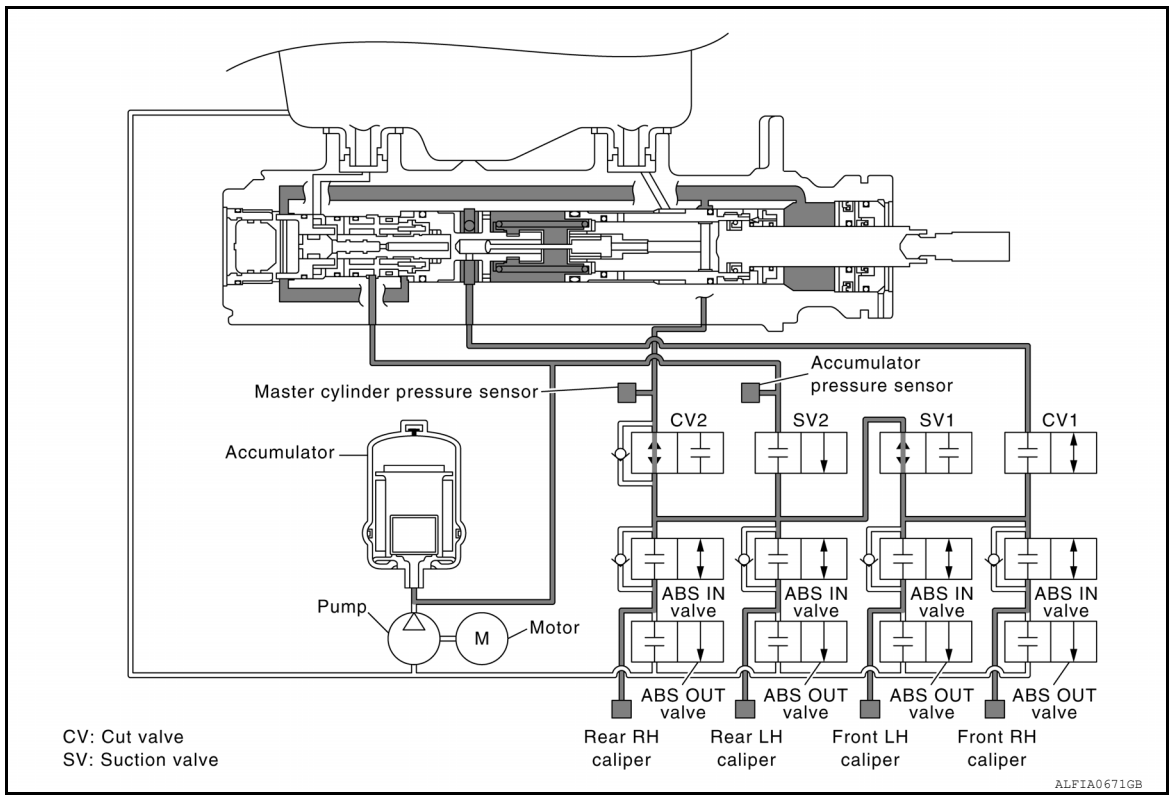
Front RH caliper
• Being returned to reservoir tank through ABS OUT valve, fluid pressure of front RH caliper is decreased.

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

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

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

VDC Is Operating (When Pressure Increases)



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

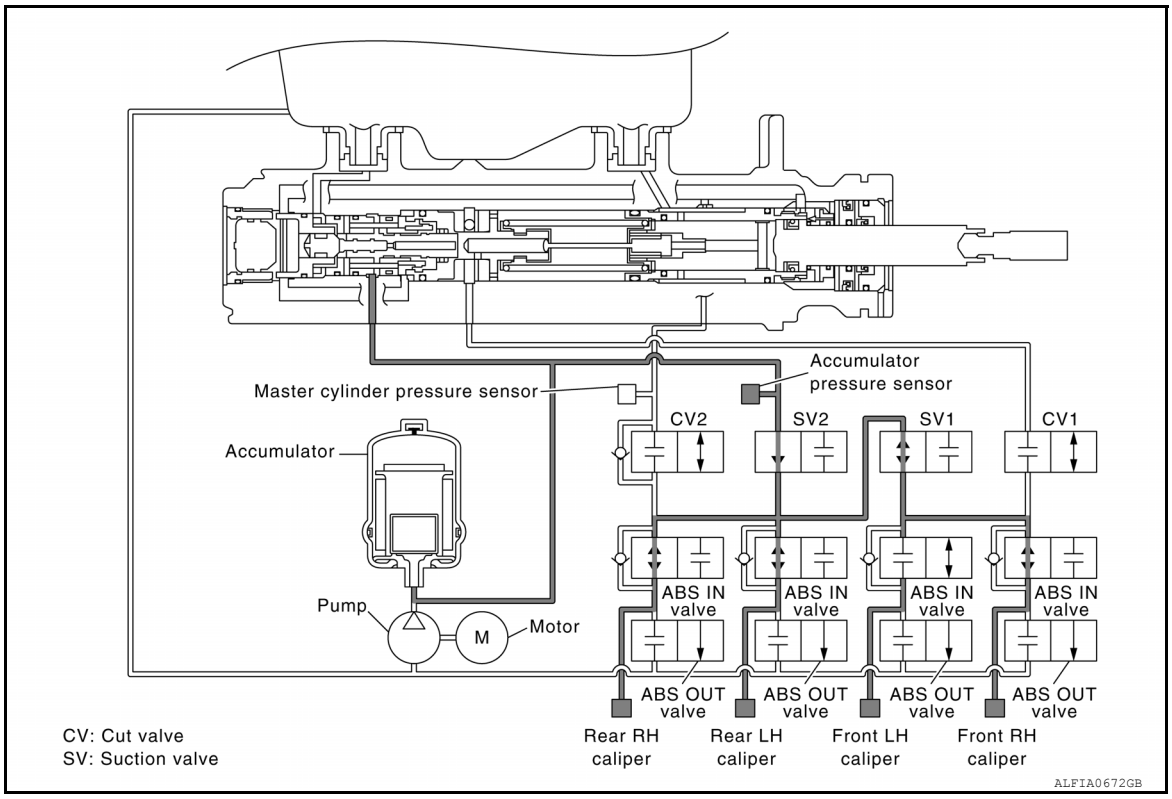
Front RH caliper
- Pressurized brake fluid from accumulator is supplied to front RH caliper through suction valve 2, suction valve 1 and ABS IN valve. When not increasing, ABS IN valve is closed and brake fluid is not supplied to front RH caliper.

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

Rear RH caliper
- Pressurized brake fluid from accumulator is supplied to rear RH caliper through suction valve 2 and ABS IN valve. When not increasing, ABS IN valve is closed and brake fluid is not supplied to rear RH caliper.

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

VDC Is Operating (When Pressure Holds)



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

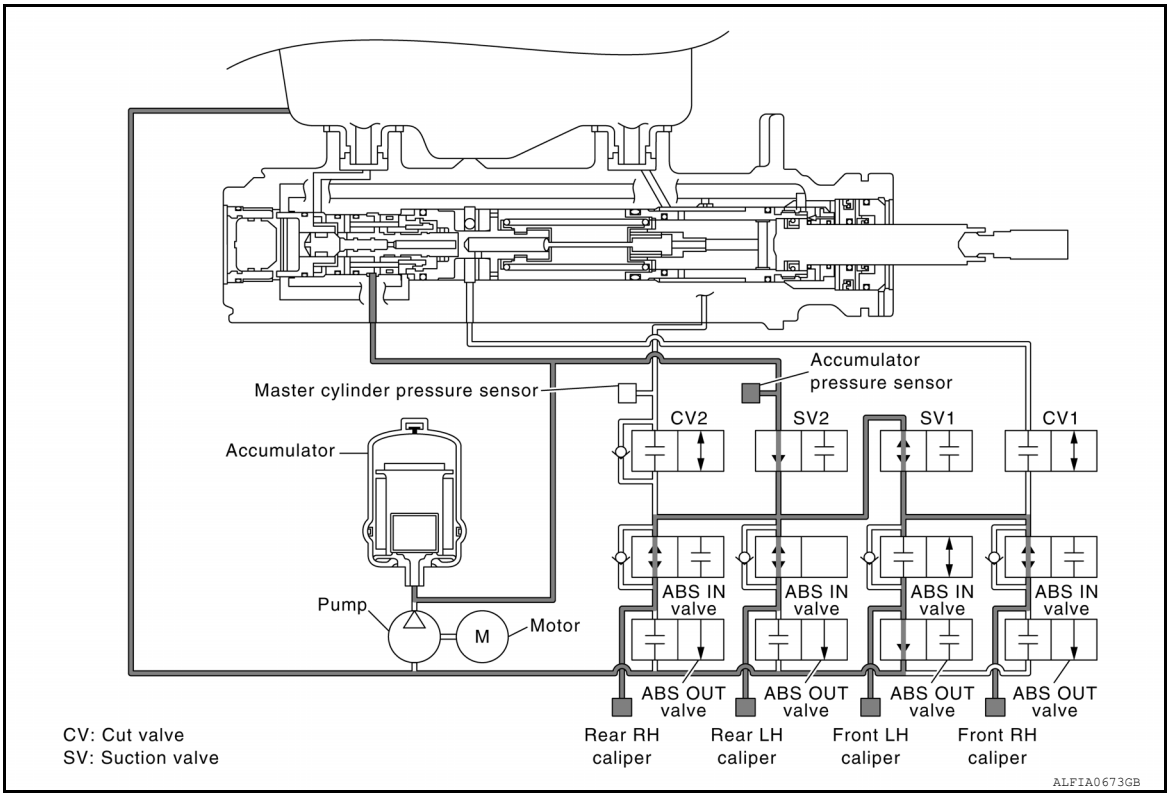
Front RH caliper
- ABS IN valve is close, fluid pressure of front RH caliper is holds.

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

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

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

VDC Is Operating (When Pressure Decreases)



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

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

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

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

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

Component Parts and Function

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

CONDITION FOR TURN ON THE WARNING LAMP

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

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

Brake Warning Lamp
- Turns ON at the same time as ABS warning lamp and VDC warning lamp when EBD function, motor/accumulator assembly or motor system is malfunctioning.
- Turns ON when ignition switch turns ON and turns OFF when the system is normal, for bulb check purposes.

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

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

VDC Warning Lamp

- Turns ON when either VDC function, TCS function, ABS function or EBD function, hill start assist function or brake limited slip differential (BLSD) function is malfunctioning.
- Turns ON when ignition switch turns ON and turns OFF when the system is normal, for bulb check purposes.

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

CONDITION FOR TURN ON THE INDICATOR LAMP

VDC OFF Indicator Lamp

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

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

*: Models with 4WD system

CONDITION FOR TURN ON THE INDICATOR LAMP

VDC OFF indicator lamp

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

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

CONDITION FOR TURN ON THE INDICATOR LAMP

Hill descent indicator lamp
- Turns ON by the hill descent switch.
- Turns ON when ignition switch turns ON and turns OFF when the system is normal, for bulb check purposes.

Condition (status)	Hill Descent indicator lamp
Ignition switch OFF.	OFF
For approx. 1 seconds after the ignition switch is turned ON.	ON
Approx. 1 seconds after ignition switch is turned ON (when the system is in normal operation).	OFF
When hill descent switch is ON.	ON
When hill descent control switch is on, but the system is not engaged.	Blinking

VDC/TCS/ABS : Fail-safe

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VDC AND TCS FUNCTION

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

ABS FUNCTION

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

NOTE:

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

EBD FUNCTION

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

DTC	Malfunction detected condition	Fail-safe condition
C1101	When an open circuit is detected in rear wheel sensor RH circuit.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • EBD function (only when both rear wheels are malfunctioning) • BLSD function
C1102	When an open circuit is detected in rear wheel sensor LH circuit.	
C1103	When an open circuit is detected in front wheel sensor RH circuit.	
C1104	When an open circuit is detected in front wheel sensor LH circuit.	
C1105	• When power supply voltage of rear wheel sensor RH is low. • When distance between rear wheel sensor RH and rear wheel sensor RH rotor is large. • When installation of rear wheel sensor RH or rear wheel sensor RH rotor is not normal.	
C1106	• When power supply voltage of rear wheel sensor LH is low. • When distance between rear wheel sensor LH and rear wheel sensor LH rotor is large. • When installation of rear wheel sensor LH or rear wheel sensor LH rotor is not normal.	
C1107	• When power supply voltage of front wheel sensor RH is low. • When distance between front wheel sensor RH and front wheel sensor RH rotor is large. • When installation of front wheel sensor RH or front wheel sensor RH rotor is not normal.	
C1108	• When power supply voltage of front wheel sensor LH is low. • When distance between front wheel sensor LH and front wheel sensor LH rotor is large. • When installation of front wheel sensor LH or front wheel sensor LH rotor is not normal.	
C1109	• When ignition voltage is 10 V or less. • When ignition voltage is 16 V or more.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • EBD function • BLSD function
C1111	• When a malfunction is detected in motor or motor relay. • When a low pressure malfunction is detected in accumulator. • When a malfunction is detected in accumulator pressure sensor.	
C1115	When difference in wheel speed between any wheel and others is detected while the vehicle is driven, because of installation of tires other than specified.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • BLSD function
C1116	• When stop lamp switch signal is not input when brake pedal is depressed. • When stop lamp switch signal is not input when stop lamp relay operates.	
C1118	When a malfunction is detected in transfer control unit.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • BLSD function
C1120	When a malfunction is detected in front LH ABS IN valve.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • EBD function • BLSD function

DTC	Malfunction detected condition	Fail-safe condition
C1121	When a malfunction is detected in front LH ABS OUT valve.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • EBD function • BLSD function
C1122	When a malfunction is detected in front RH ABS IN valve.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • EBD function • BLSD function
C1123	When a malfunction is detected in front RH ABS OUT valve.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • EBD function • BLSD function
C1124	When a malfunction is detected in rear LH ABS IN valve.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • EBD function • BLSD function
C1125	When a malfunction is detected in rear LH ABS OUT valve.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • EBD function • BLSD function
C1126	When a malfunction is detected in rear RH ABS IN valve.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • EBD function • BLSD function

DTC	Malfunction detected condition	Fail-safe condition
C1127	When a malfunction is detected in rear RH ABS OUT valve.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • EBD function • BLSD function
C1130	When a malfunction is detected in ECM system.	The following functions are suspended: • VDC function • TCS function • Hill start assist function • BLSD function
C1140	When a malfunction is detected in actuator relay.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • EBD function • BLSD function
C1142	When a malfunction is detected in master cylinder pressure sensor.	The following functions are suspended. • VDC function • TCS function • Hill start assist function • Hill descent control function • BLSD function
C1143	When a malfunction is detected in steering angle sensor.	
C1144	When neutral position adjustment of steering angle sensor is not complete.	
C1145	• When a malfunction is detected in yaw rate signal. • When yaw rate signal is not continuously received for 2 seconds or more.	
	• When side G signal is not continuously received for 2 seconds or more. • When decel G signal is not continuously received for 2 seconds or more.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • BLSD function
C1146	When a malfunction is detected in side/decel G signal.	
C1155	• When brake fluid level low signal is detected. • When an open circuit is detected in brake fluid level switch circuit.	
C1160	When calibration of yaw rate/side/decel G sensor is not complete.	
C1164	When a malfunction is detected in cut valve 1.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • EBD function • BLSD function
C1165	When a malfunction is detected in cut valve 2.	
C1166	When a malfunction is detected in suction valve 1.	
C1167	When a malfunction is detected in suction valve 2.	
C1170	When the information in ABS actuator and electric unit (control unit) is not the same.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • BLSD function

DTC	Malfunction detected condition	Fail-safe condition
C1187	When a malfunction is detected in the differential lock control unit.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • BLSD function
C118E	When performing excessive brake pedal operation with the vehicle stopped. [When accumulator fluid pressure reaches 11.43 MPa (114 bar, 116.6 kg/cm^2, 1657 psi) after reaching 17.3 MPa (173 bar, 176.5 kg/cm^2, 2509 psi.]	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • Hill start assist function • BLSD function
U1000	When CAN communication signal is not continuously received for 2 seconds or more.	The following functions are suspended: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • BLSD function

PROTECTION FUNCTION

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

DTC	• SLIP indicator lamp • ABS warning lamp • Brake warning lamp	Condition	Description protection function
C118E	ON	When temporary decrease in accumulator fluid pressure is detected. **NOTE:** System is not malfunctioning.	The following functions are suspended temporarily: • VDC function • TCS function • ABS function • Hill start assist function • Hill descent control function • EBD function • BLSD function

NOTE:
DTC “C1111” is detected in “Self Diagnostic Result” mode of “ABS” when the accumulator system has a malfunction.

VDC/TCS/ABS : VDC Function

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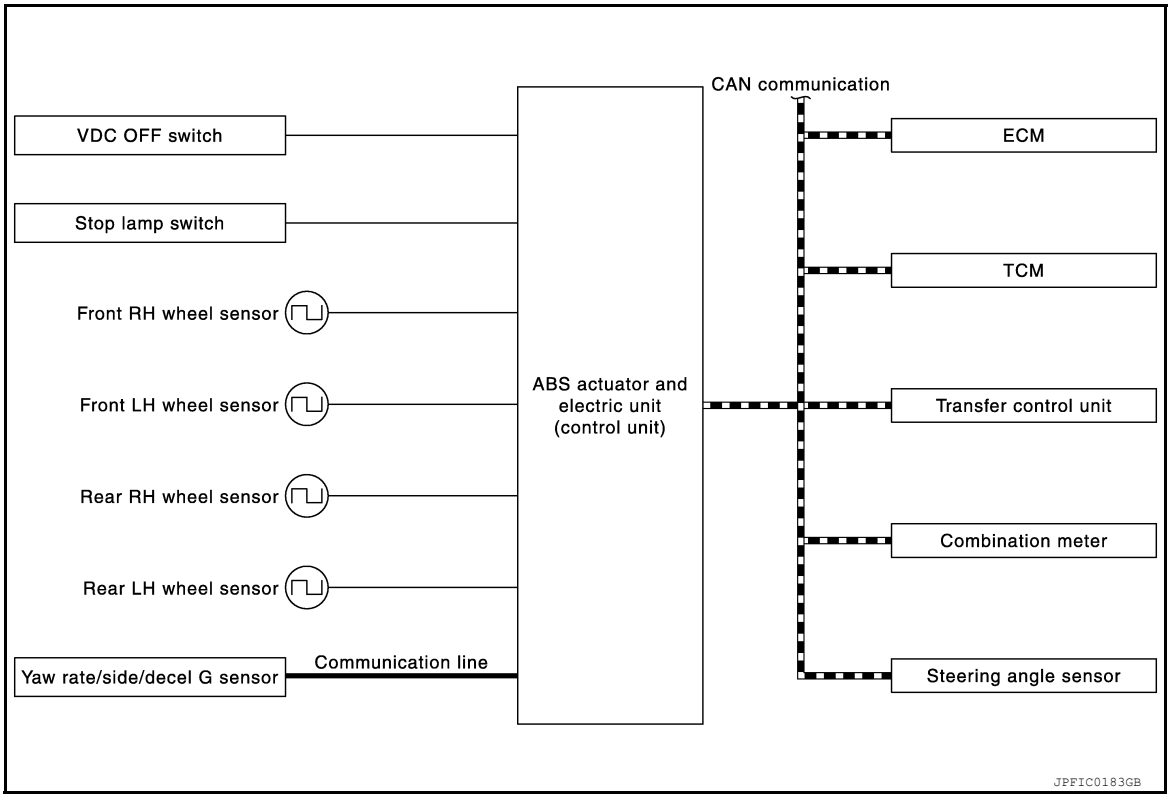
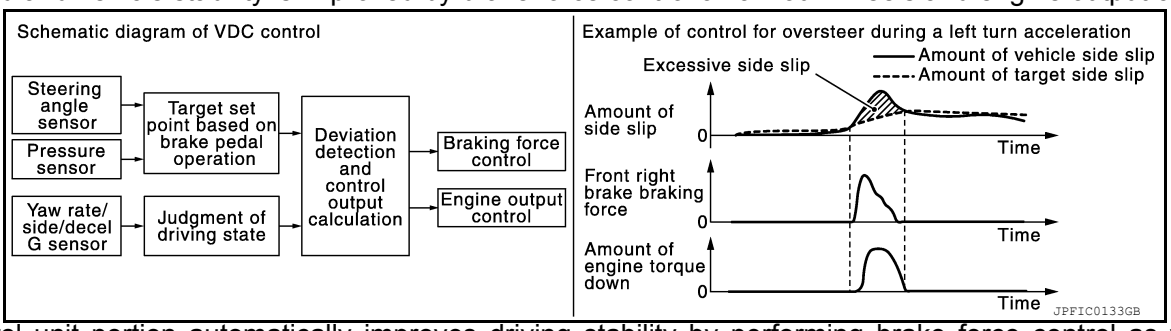
SYSTEM DIAGRAM



SYSTEM DESCRIPTION

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



- Control unit portion automatically improves driving stability by performing brake force control as well as engine output control, by transmitting drive signal to actuator portion according to difference between target side slip amount and vehicle side slip amount.
- VDC function can be switched to non-operational status (OFF) by operating VDC OFF switch. In this case, VDC OFF indicator lamp turns ON.
- SLIP indicator lamp is blinking while VDC function is in operation and indicates to the driver that the function is in operation.
- Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC function operates. This is not a malfunction because it is caused by VDC function that is normally operated.
- CONSULT can be used to diagnose the system diagnosis.
- Fail-safe function is adopted. When a malfunction occurs in VDC function, the control is suspended for VDC function and TCS function. The vehicle status becomes the same as models without VDC function and TCS

function. However, ABS function and EBD function are operated normally. Refer to BRC-24, "VDC/TCS/ABS : Fail-safe".

- VDC will not operate when the 4WD mode is in “4LO”.

INPUT AND OUTPUT SIGNALS

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

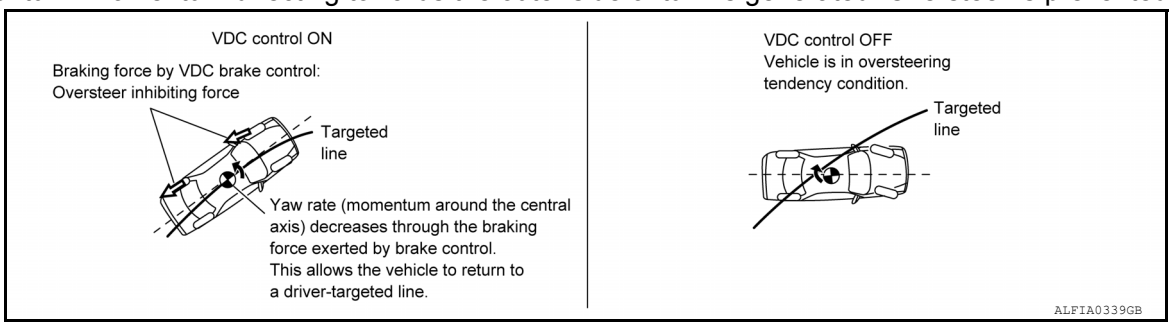
Component	Signal description
Yaw rate/side/decel G sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line*1: • Yaw rate signal • Side G sensor signal • Decel G sensor signal
ECM	Mainly transmits the following signals to ABS actuator and electric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

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

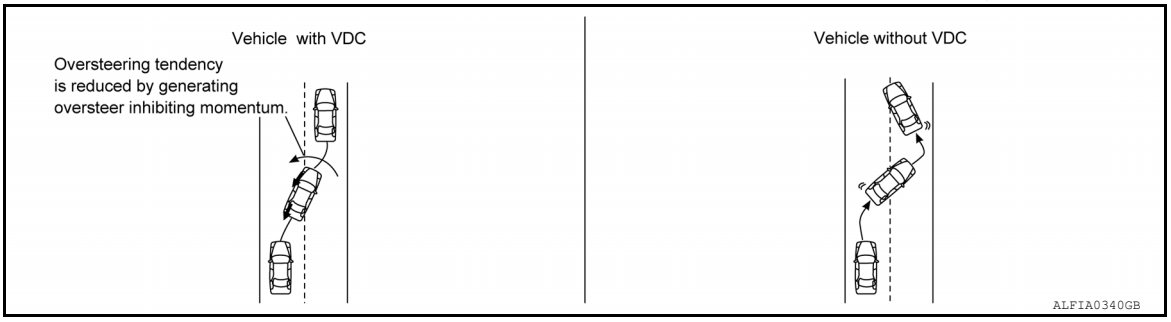
OPERATION CHARACTERISTICS

VDC Function That Prevents Oversteer Tendency

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

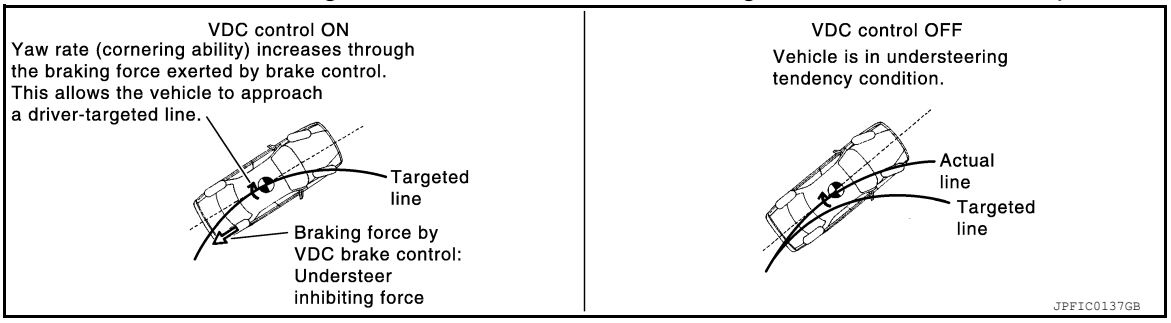


- Changing driving lane on a slippery road, when oversteer tendency is judged large, engine output is controlled as well as brake force (brake fluid pressure) of four wheels. Oversteer tendency decreases.

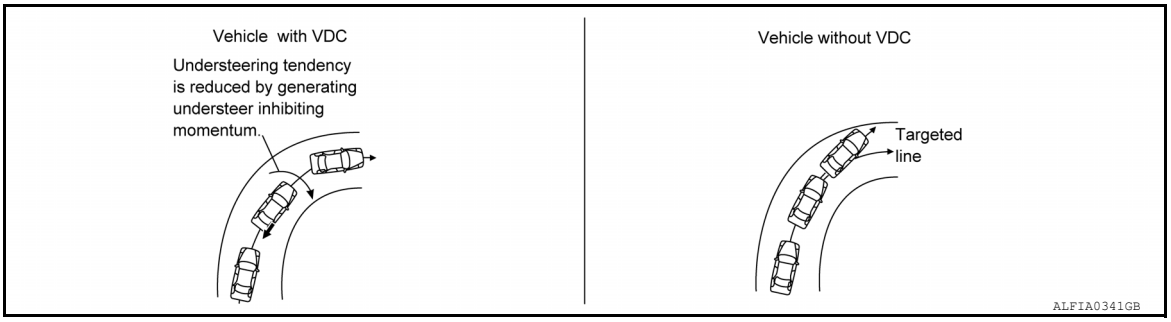


VDC Function That Prevents Understeer Tendency

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



- Applying braking during 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.



VDC/TCS/ABS : TCS Function

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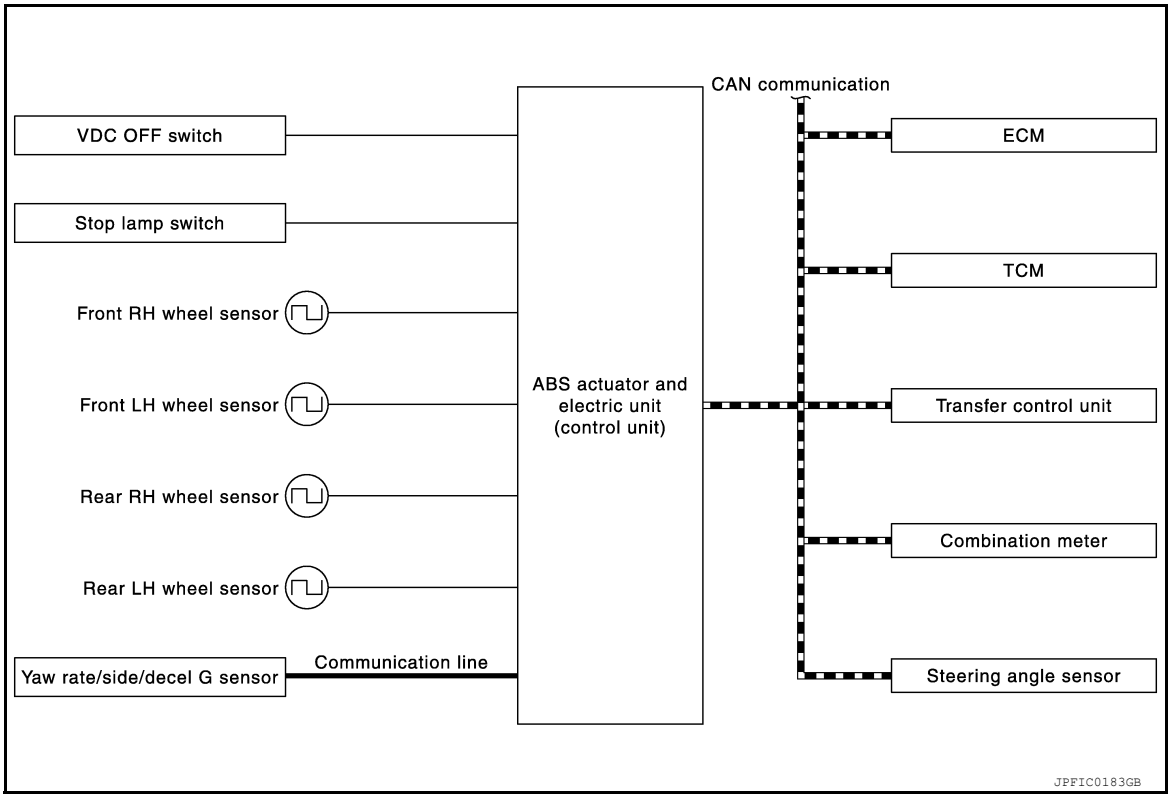
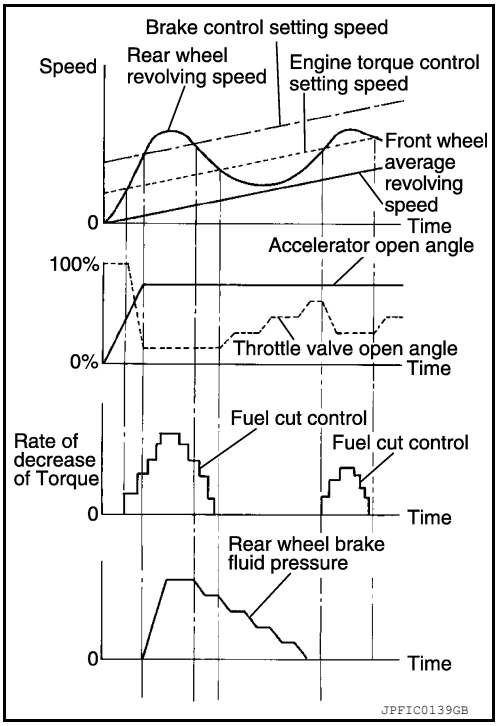
SYSTEM DIAGRAM



SYSTEM DESCRIPTION

- Wheel spin status of drive wheel is detected by wheel sensor of four wheels. Engine output and transmission shift status is controlled so that slip rate of drive wheels is in appropriate level. When wheel spin occurs on drive wheel, ABS actuator and electric unit (control unit) perform brake force control of LH and RH drive wheels (apply brake force by increasing brake fluid pressure of drive wheel) and decrease engine torque by engine torque control. Wheel spin amount decreases. Engine torque is controlled to appropriate level.
- TCS function can be switched to non-operational status (OFF) by operating VDC OFF switch. In this case, VDC OFF indicator lamp turns ON.
- TCS function will not operate when 4WD mode is in “4LO”.
- SLIP indicator lamp is blinking while TCS function is in operation and indicates to the driver that the function is in operation.
- Slight vibrations are felt on the brake pedal and the operation noises occur, when TCS function operates. This is not a malfunction because it is caused by TCS function that is normally operated.
- CONSULT can be used to diagnose the system diagnosis.
- Fail-safe function is adopted. When a malfunction occurs in TCS function, the control is suspended for VDC function and TCS function. The vehicle status becomes the same as models without VDC function and TCS function. However, ABS function, BLSD and EBD function are operated normally. Refer to BRC-55, "DTC Index".



INPUT AND OUTPUT SIGNALS

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

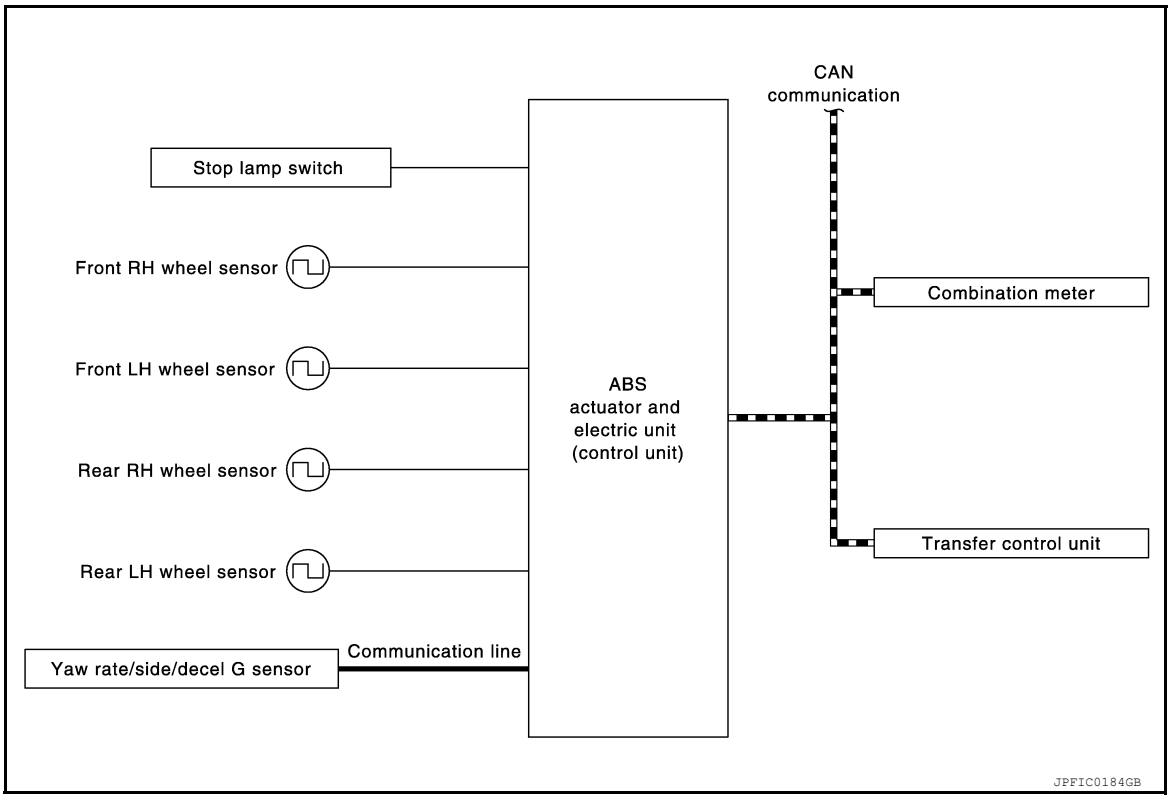
Component	Signal description
Yaw rate/side/decel G sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line*1: • Yaw rate signal • Side G sensor signal • Decel G sensor signal
ECM	Mainly transmits the following signals to ABS actuator and electric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

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

VDC/TCS/ABS : ABS Function

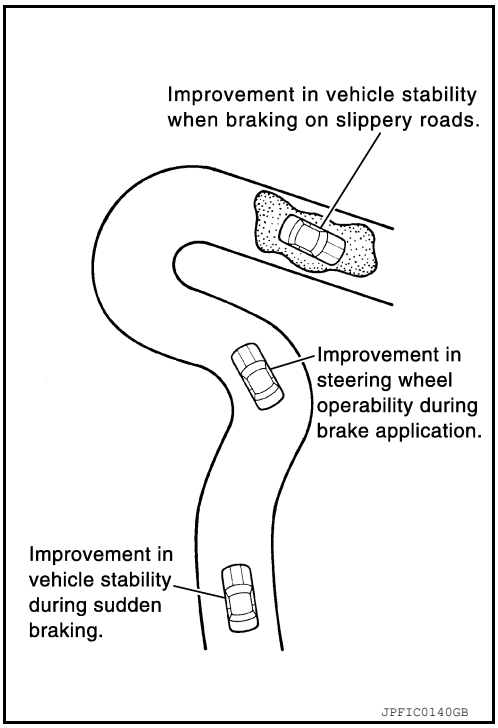
INFOID:0000000014392607

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

- By preventing wheel lock through brake force (brake fluid pressure) control that is electronically controlled by detecting wheel speed during braking, stability during emergency braking is improved so that obstacles can be easily bypassed by steering operation.
- During braking, control units calculate wheel speed and pseudo-vehicle speed, and transmits pressure increase, hold or decrease signals to actuator portion according to wheel slip status.
- The following effects are obtained by preventing wheel lock during braking:
- Vehicle tail slip is prevented during braking when driving straight.
- Understeer and oversteer tendencies are moderated during braking driving on a corner.
- Obstacles may be easily bypassed by steering operation during braking.
- Slight vibrations are felt on the brake pedal and the operation noises occur, when ABS function operates. This is not a malfunction because it is caused by ABS function that is normally operated.
- CONSULT can be used to diagnose the system diagnosis.
- Fail-safe function is adopted. When a malfunction occurs in ABS function, the control is suspended for VDC function and TCS function. The vehicle status becomes the same as models without VDC function, TCS function and ABS function. However, EBD function is operated normally. Refer to BRC-51, "Fail-safe".



NOTE:

- To stop vehicle efficiently, ABS does not operate and ordinary brake operates at low speed [approx. 5 to 10 km/h (3.1 to 6.2 MPH) or less, but differs subject to road conditions).
- Self-diagnosis is performed immediately after engine starts and when vehicle initially is driven [by vehicle speed approx. 15 km/h (9.3 MPH)]. Motor sounds are generated during self-diagnosis. In addition, brake pedal may feel heavy when depressing brake pedal lightly. These symptoms are not malfunctions.

INPUT AND OUTPUT SIGNALS

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

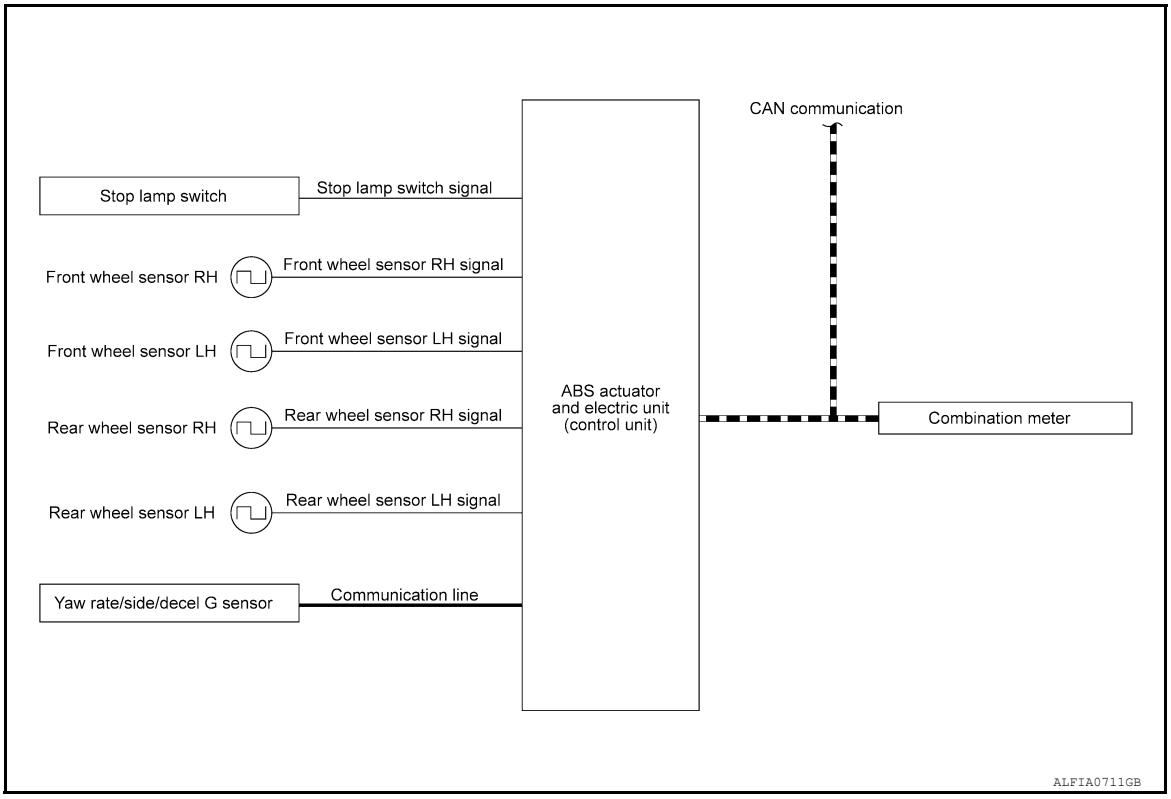
Component	Signal description
Yaw rate/side/decel G sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line*1: • Yaw rate signal • Side G sensor signal • Decel G sensor signal
Transfer control unit*2	Mainly receives the following signal from ABS actuator and electric unit (control unit) via CAN communication: • ABS warning lamp signal
Combination meter	Mainly receives the following signal from ABS actuator and electric unit (control unit) via CAN communication: • ABS warning lamp signal

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

VDC/TCS/ABS : EBD Function

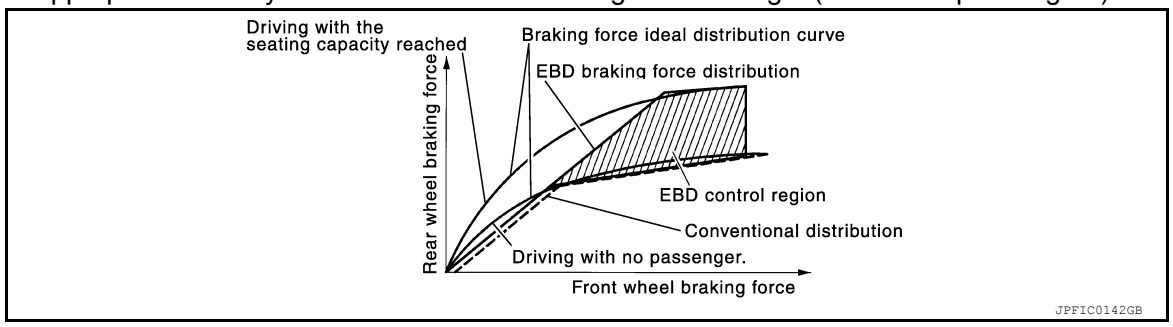
INFOID:0000000014392608

SYSTEM DIAGRAM

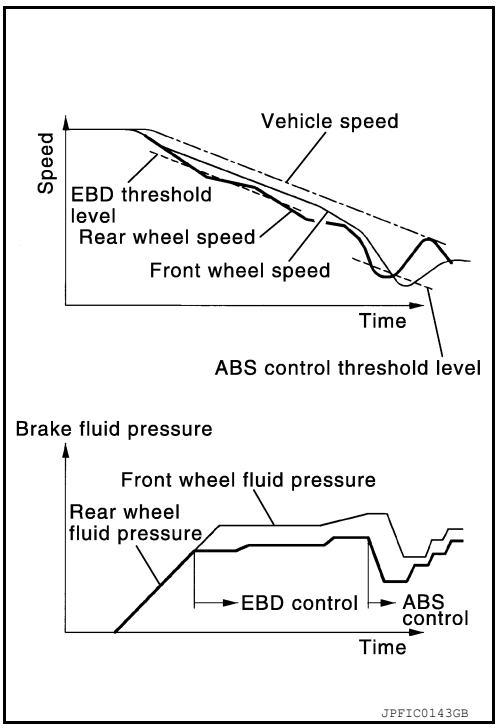


SYSTEM DESCRIPTION

- By preventing rear wheel slip increase through rear wheel brake force (brake fluid pressure) control that is electronically controlled when slight skip on front and rear wheels is 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 and EBD function. The vehicle status becomes the same as models without VDC function, TCS function, ABS function and EBD function. Refer to BRC-51, "Fail-safe".



INPUT AND OUTPUT SIGNALS

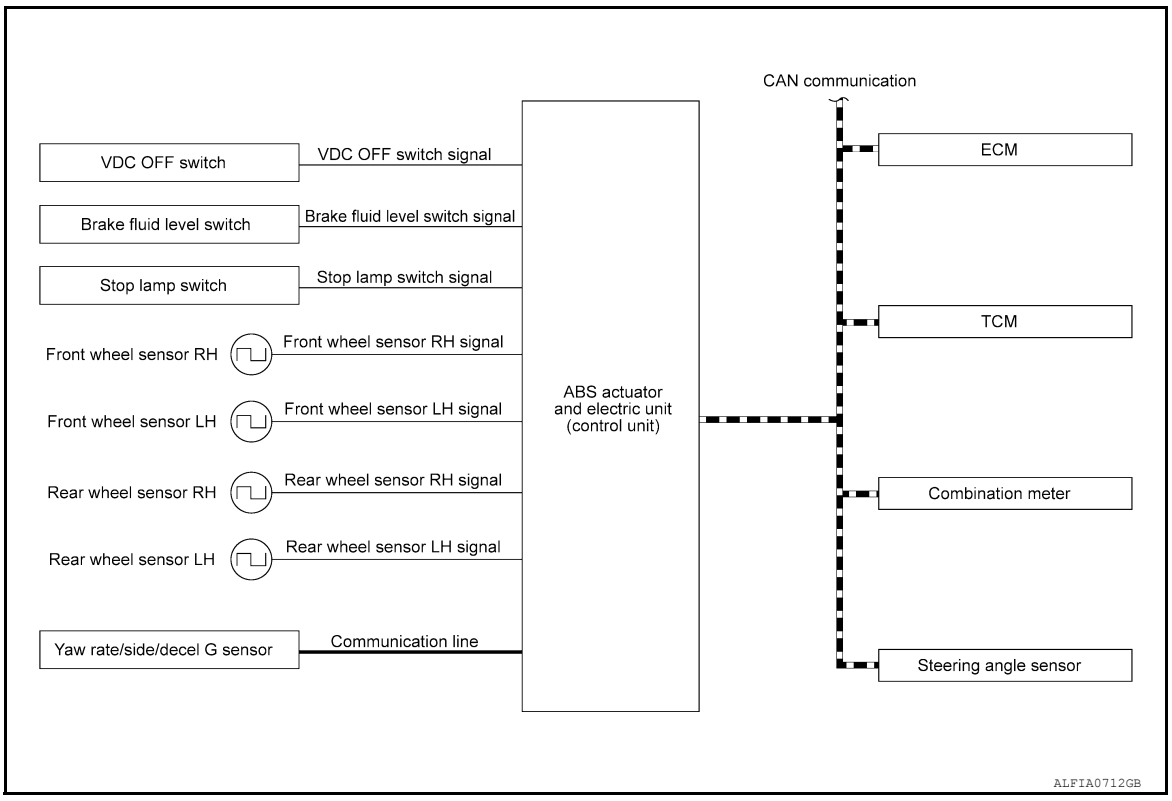
Major signal transmission between each unit via communication lines is shown in the following table.

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

VDC/TCS/ABS : TSA Function

INFOID:0000000014392609

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

- Trailer Sway Assist reduces sway caused by the trailer's side to side oscillation. TSA function detects oscillation status using each sensor when trailer sway is occurring and improves vehicle stability by brake control and engine output control during driving.
- Oscillation amount is calculated according to steering operation amount from steering angle sensor and brake operation amount from pressure sensor. By comparing this information with trailer sway amount that is calculated from yaw rate/side/decel G-sensor and wheel sensor information, vehicle driving conditions (conditions of understeer or oversteer) are judged and trailer stability is improved by brake force control on all 4 wheels and engine output control of the towing vehicle.
- TSA function can be switched to non-operational status (OFF) by operating VDC OFF switch. In this case, VDC OFF indicator lamp turns ON.
- SLIP indicator lamp is blinking while TSA 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 TSA function operates. This is not a malfunction because it is caused by TSA function that is normally operated.
- CONSULT can be used to diagnose the system diagnosis.
- Fail-safe function is adopted. When a malfunction occurs in VDC function, the control is suspended for VDC function, TSA function and TCS function. The vehicle status becomes the same as models without VDC function, TSA and TCS function. However, ABS function and EBD function are operated normally. Refer to BRC-51, "Fail-safe".

INPUT AND OUTPUT SIGNALS

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

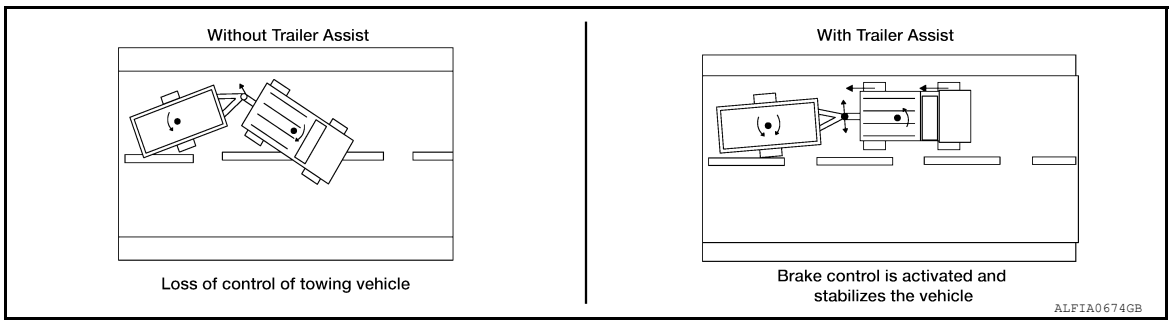
Component	Signal description
Yaw rate/side/decel G sensor	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via communication line*1: • Yaw rate signal • Side G sensor signal • Decel G sensor signal
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Accelerator pedal position signal • Engine speed signal Mainly receives the following signal from ABS actuator and electric unit (control unit) via CAN communication: • Target throttle position signal
TCM	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Shift position signal
Steering angle sensor	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Steering angle sensor signal
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication: • SLIP indicator lamp signal • VDC OFF indicator lamp

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

OPERATION CHARACTERISTICS

Trailer Sway Assist Function Prevents Tow vehicle and trailer oscillation.

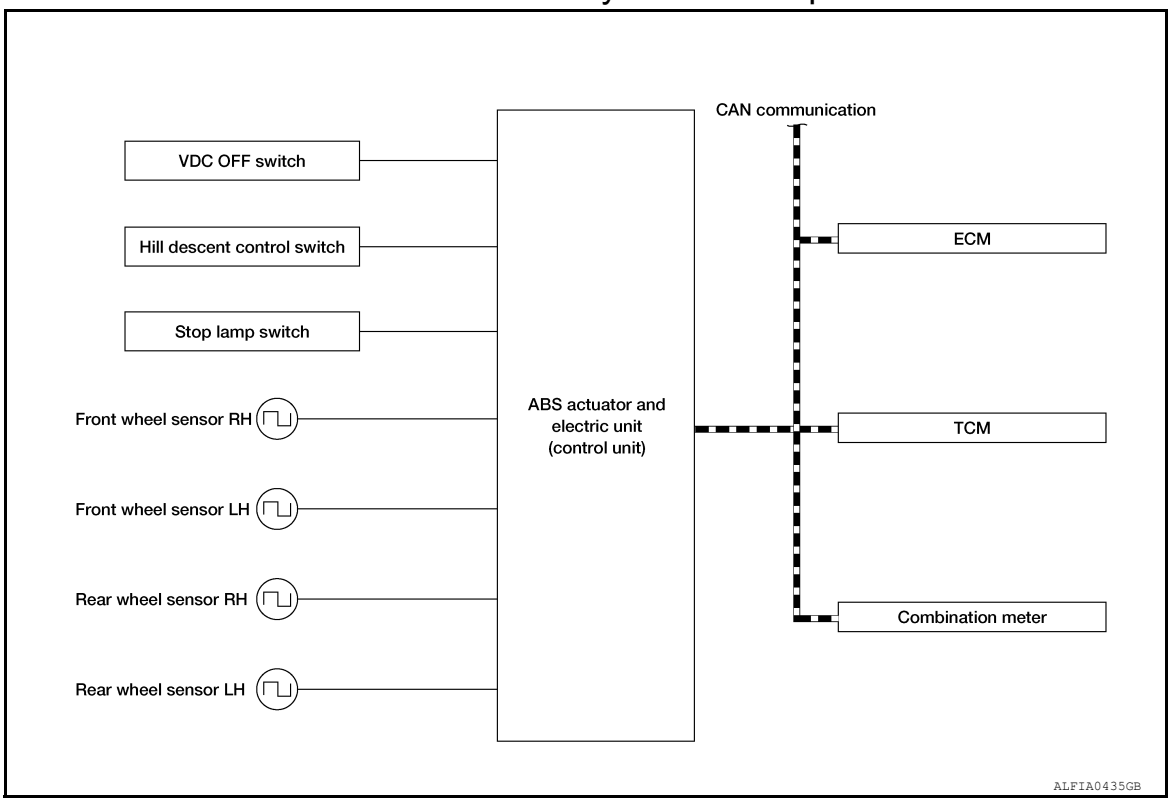
- During oscillation, brake force (brake fluid pressure) is applied on front wheel and rear wheel on the outer side of oscillation. Momentum directing towards the outer side of oscillation is generated. Trailer sway is reduced.



HILL DESCENT CONTROL FUNCTION

HILL DESCENT CONTROL FUNCTION : System Description

INFOID:0000000014392610



HILL DESCENT CONTROL FUNCTION : System Diagram

- The hill descent control system will help maintain vehicle speed when driving on steeper downhill grades. Hill descent control will provide braking allowing the driver to concentrate on steering while reducing the burden of brake and accelerator operation.
- To operate the system, push the hill descent control switch. The hill descent control indicator in the combination meter will turn on
- Hill start assist function is only for the start aid. It maintains the brake fluid pressure for approx. 2 seconds after releasing the brake pedal, and then decreases the pressure gradually. If the vehicle starts by the accelerator operation, the brake is released automatically and a smooth start can be performed.
- Fail-safe function is adopted. When a malfunction occurs in hill start assist function, the control is suspended for VDC function, TCS function, hill start assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function and Brake force distribution function. However, ABS function and EBD function are operated normally. Refer to BRC-51, "Fail-safe".

INPUT SIGNAL AND OUTPUT SIGNAL

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

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

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

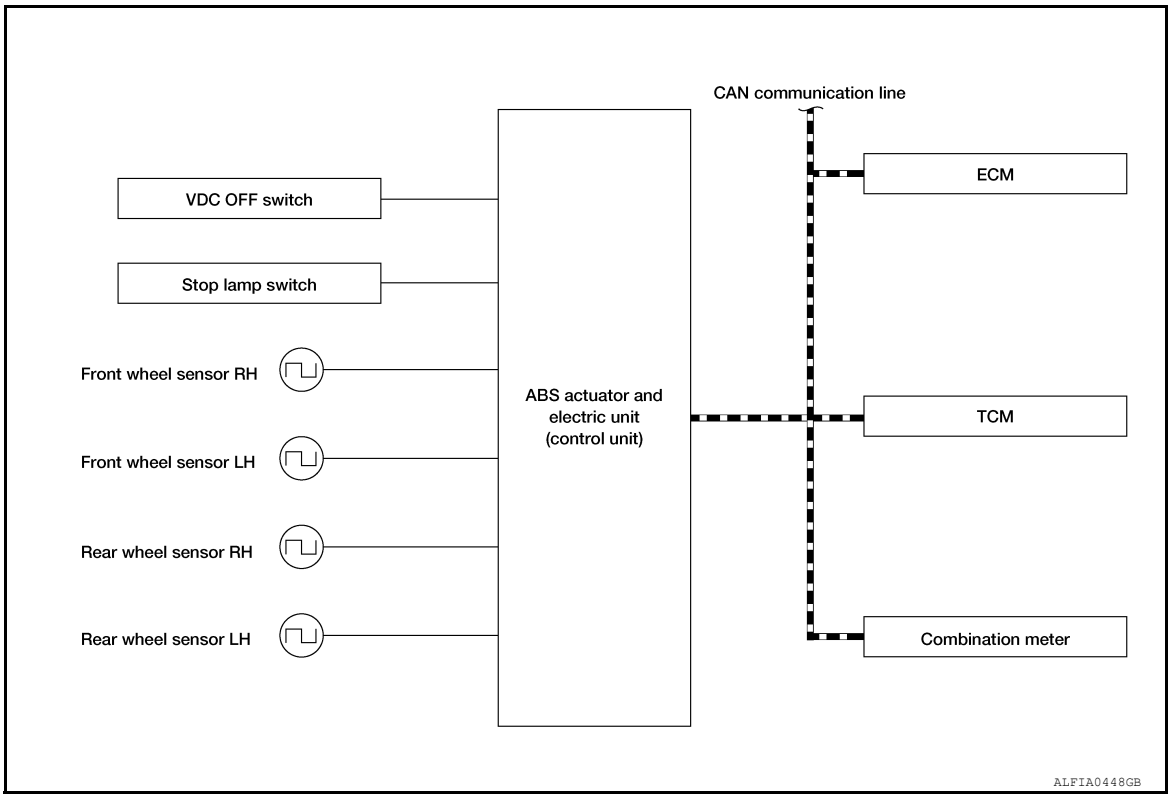
HILL START ASSIST FUNCTION

HILL START ASSIST FUNCTION : System Description

INFOID:0000000014392611

- This function maintains brake fluid pressure so that the vehicle does not move backwards, even if brake pedal is released to depress accelerator pedal to start the vehicle while it is stopped on an uphill slope by depressing brake pedal.
- This function operates when the vehicle is in stop status on a uphill slope of slope ratio 10% or more and selector lever is in the position other than P or N.
- Hill start assist function is only for the start aid. It maintains the brake fluid pressure for approx. 2 seconds after releasing the brake pedal, and then decreases the pressure gradually. If the vehicle can start by the accelerator operation, the brake is released automatically and a smooth start can be performed.
- Fail-safe function is adopted. When a malfunction occurs in hill start assist function, the control is suspended for VDC function, TCS function, Brake assist function, hill start assist function and Brake force distribution function. The vehicle status becomes the same as models without VDC function, TCS function, Brake assist function, Hill start assist function and Brake force distribution function. However, ABS function and EBD function are operated normally. Refer to BRC-51, "Fail-safe".

SYSTEM DIAGRAM



INPUT SIGNAL AND OUTPUT SIGNAL

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

Component	Signal description
ECM	Mainly transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication: • Accelerator pedal position signal • Engine speed signal • Engine torque signal Mainly receive: the following signal from ABS actuator and electric unit (control unit) via CAN communication: • Engine torque request signal
TCM	Mainly transmits the following signal to ABS actuator and electric unit (control unit) via CAN communication: • Current gear position signal
Combination meter	Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication: • Brake fluid level switch signal • Parking brake switch signal Mainly receives the following signals from ABS actuator and electric unit (control unit) via CAN communication: • VDC warning lamp signal • VDC OFF indicator lamp signal

BRAKE LIMITED SLIP DIFFERENTIAL (BLSD) FUNCTION

BRAKE LIMITED SLIP DIFFERENTIAL (BLSD) FUNCTION : System Description

INFOID:0000000014392612

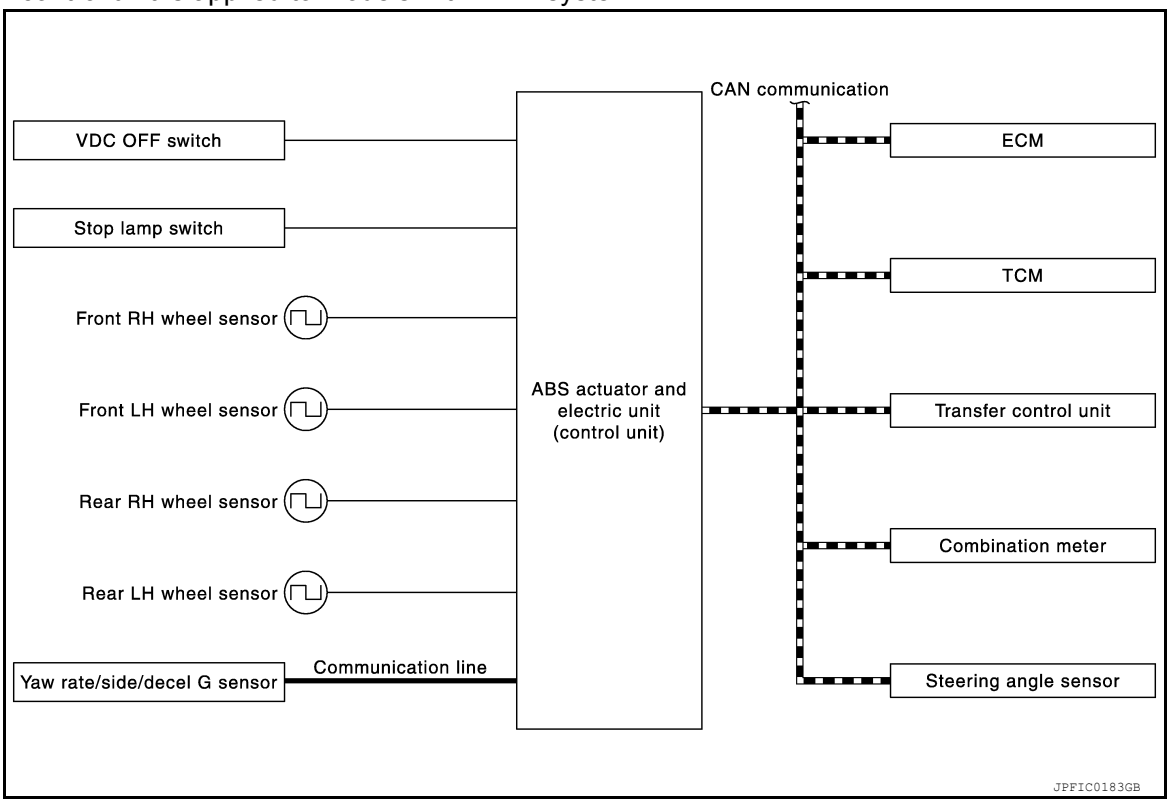
- LH and RH driving wheel spin is always monitored. If necessary, appropriate brake force is independently applied to LH or RH driving wheel so that one-sided wheel spin is avoided and traction is maintained. Mainly starting ability is improved.
- Brake limited slip differential (BLSD) function operates 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, hill start assist function and brake limited slip differential (BLSD) function. The vehicle status becomes the same as models without VDC function, TCS function, hill start assist function and brake limited slip differential (BLSD) function. However, ABS function and EBD function are operated normally. Refer to BRC-51, "Fail-safe".

SYSTEM DIAGRAM

NOTE:

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



INPUT SIGNAL AND OUTPUT SIGNAL

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

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

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

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

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

CONSULT Function (ABS)

INFOID:0000000014392613

FUNCTION

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

Direct Diagnostic Mode	Description
Ecu Identification	The ABS actuator and electric unit (control unit) part number is displayed.
Self Diagnostic Result	The ABS actuator and electric unit (control unit) self diagnostic results are displayed.
Data Monitor	The ABS actuator and electric unit (control unit) input/output data is displayed in real time.
Active Test	The ABS actuator and electric unit (control unit) activates outputs to test components.
Function Test	This mode displays self diagnostic results of ABS system with either an “OK” or “NG”.
Work support	The settings for ABS actuator and electric unit (control unit) functions can be changed.
CAN Diag Support Monitor	The result of transmit/receive diagnosis of CAN communication is displayed.

ECU IDENTIFICATION

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

SELF DIAGNOSTIC RESULT

Operation Procedure

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

How To Erase Self-diagnostic Result

1. After erasing DTC memory, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute as the final inspection, and make sure that the ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp turn OFF.
   CAUTION:
   If memory cannot be erased, perform applicable diagnosis.
   NOTE:
   - When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp, SLIP indicator lamp and brake warning lamp will not turn OFF even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
   - Brake warning lamp will turn ON in case of parking brake operation (when switch is ON) or brake fluid level switch operation (when brake fluid is insufficient).
   - VDC OFF switch should not stay in ON position.

Display Item List

Refer to BRC-55, "DTC Index".

DATA MONITOR

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

Item (Unit)	Data monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
DECEL G-SEN (G)	×	×	×	Longitudinal acceleration (G) detected by decel G-sensor is displayed.
FR RH IN SOL (On/Off)	–	×	×	Front RH IN ABS solenoid (On/Off) status is displayed.
FR RH OUT SOL (On/Off)	–	×	×	Front RH OUT ABS solenoid (On/Off) status is displayed.
FR LH IN SOL (On/Off)	–	×	×	Front LH IN ABS solenoid (On/Off) status is displayed.
FR LH OUT SOL (On/Off)	–	×	×	Front LH OUT ABS solenoid (On/Off) status is displayed.
RR RH IN SOL (On/Off)	–	×	×	Rear RH IN ABS solenoid (On/Off) status is displayed.
RR RH OUT SOL (On/Off)	–	×	×	Rear RH OUT ABS solenoid (On/Off) status is displayed.
RR LH IN SOL (On/Off)	–	×	×	Rear LH IN ABS solenoid (On/Off) status is displayed.
RR LH OUT SOL (On/Off)	–	×	×	Rear LH OUT ABS solenoid (On/Off) status is displayed.
EBD WARN LAMP (On/Off)	–	–	×	Brake warning lamp (On/Off) status is displayed.
STOP LAMP SW (On/Off)	×	×	×	Stop lamp switch (On/Off) status is displayed.
MOTOR RELAY (On/Off)	–	×	×	ABS motor relay signal (On/Off) status is displayed.
ACTUATOR RLY (On/Off)	–	×	×	ABS actuator relay signal (On/Off) status is displayed.
ABS WARN LAMP (On/Off)	–	×	×	ABS warning lamp (On/Off) status is displayed.
OFF LAMP (On/Off)	–	×	×	VDC OFF Lamp (On/Off) status is displayed.
OFF SW (On/Off)	×	×	×	VDC OFF switch (On/Off) status is displayed.
SLIP/VDC LAMP (On/Off)	–	×	×	SLIP indicator lamp (On/Off) status is displayed.
BATTERY VOLT (V)	×	×	×	Voltage (V) supplied to ABS actuator and electric unit (control unit) is displayed.
GEAR (1, 2, 3, 4, 5)	×	×	×	Gear position (1, 2, 3, 4, 5) judged by transmission range switch signal is displayed.
ENGINE SPEED (rpm)	×	×	×	Engine speed (rpm) judged by CAN communication signal is displayed.
YAW RATE SEN (d/s)	×	×	×	Yaw rate (d/s) detected by yaw rate sensor is displayed.
R POSI SIG (On/Off)	–	–	×	Reverse shift position (On/Off) judged by transmission range switch signal.
N POSI SIG (On/Off)	–	–	×	Shift position judged by transmission range switch signal.
CV1 (On/Off)	–	–	×	Front side switch-over solenoid valve (cut valve) (On/Off) status is displayed.
CV2 (On/Off)	–	–	×	Rear side switch-over solenoid valve (cut-valve) (On/Off) status is displayed.

Item (Unit)	Data monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
SV1 (On/Off)	–	–	×	Front side switch-over solenoid valve (suction valve) (On/Off) status is displayed.
SV2 (On/Off)	–	–	×	Rear side switch-over solenoid valve (suction valve) (On/Off) status is displayed.
STOP LAMP SW2 (On/Off)	–	–	×	Stop lamp switch (On/Off) status is displayed.
ACCEL POS SIG (%)	×	–	×	Throttle valve open/close status judged by CAN communication signal is displayed.
SIDE G-SENSOR (m/s^2)	×	–	×	Transverse acceleration detected by side G-sensor is displayed.
STR ANGLE SIG (deg)	×	–	×	Steering angle detected by steering angle sensor is displayed.
PRESS SENSOR (bar)	–	–	×	Brake pressure detected by pressure sensor is displayed.
ACCUM PRESS SEN (bar)	–	–	×	Accumulator pressure detected by accumulator pressure sensor is displayed.
EBD SIGNAL (On/Off)	–	–	×	EBD operation (On/Off) status is displayed.
ABS SIGNAL (On/Off)	–	–	×	ABS operation (On/Off) status is displayed.
TCS SIGNAL (On/Off)	–	–	×	TCS operation (On/Off) status is displayed.
VDC SIGNAL (On/Off)	–	–	×	VDC operation (On/Off) status is displayed.
EBD FAIL SIG (On/Off)	–	–	×	EBD fail signal (On/Off) status is displayed.
ABS FAIL SIG (On/Off)	–	–	×	ABS fail signal (On/Off) status is displayed.
TCS FAIL SIG (On/Off)	–	–	×	TCS fail signal (On/Off) status is displayed.
VDC FAIL SIG (On/Off)	–	–	×	VDC fail signal (On/Off) status is displayed.
CRANKING SIG (On/Off)	–	–	×	The input state of the key SW START position signal is displayed.
FLUID LEV SW (On/Off)	×	–	×	Brake fluid level switch (On/Off) status is displayed.
PARK BRAKE SW (On/Off)	×	–	×	Park brake switch (On/Off) status is displayed.
DLOCK SW	–	–	×	Displays differential lock mode switch position.
DLOCK CHG SW	–	–	×	Displays condition of differential lock position switch.
STP ON RLY (On/Off)	–	–	×	Stop lamp relay signal (On/Off) status is displayed.
DDS SW (Note 1) (On/Off)	–	–	×	Hill descent control switch status (On/Off) status is displayed.
DDS SIG (Note 1) (On/Off)	–	–	×	Hill descent control operation (On/Off) status is displayed.
USS SIG (Note 2) (On/Off)	–	–	×	Hill start assist operation (On/Off) status is displayed.

×: Applicable

–: Not applicable

NOTE:
- 1: The CONSULT will display DSS (Downhill Drive Support) when referring to Hill Descent Control system.
- 2: The CONSULT will display USS (Uphill Start Support) when referring to Hill Start Assist system.

ACTIVE TEST

The active test is used to determine and identify details of a malfunction, based on self-diagnosis test result sand data obtained in the DATA MONITOR. In response to instructions from CONSULT-III, 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*
FR LH SOL	FRLH IN SOL	Off	On*	On*
	FR LH OUT SOL	Off	Off	On*
RR RH SOL	RR RH IN SOL	Off	On*	On*
	RR RH OUT SOL	Off	Off	On*
RR LH SOL	RR LH IN SOL	Off	On*	On*
	RR LH OUT SOL	Off	Off	On*

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

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

When “Up”, “ACT KEEP” or “ACT UP” 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 SOL (ACT)	FR RH IN SOL	Off	Off	On*
	FR RH OUT SOL	Off	Off	Off
	CV1	Off	On*	On*
	SV1	Off	Off	On*
FR LH SOL (ACT)	FR LH IN SOL	Off	Off	On*
	FR LH OUT SOL	Off	Off	Off
	CV1	Off	On*	On*
	SV1	Off	Off	On*

Test item	Display Item	Display		
		Up	ACT KEEP	ACT UP
RR RH SOL (ACT)	RR RH IN SOL	Off	Off	On*
	RR RH OUT SOL	Off	Off	Off
	CV2	Off	On*	On*
	SV2	Off	Off	On*
RR LH SOL (ACT)	RR LH IN SOL	Off	Off	On*
	RR LH OUT SOL	Off	Off	Off
	CV2	Off	On*	On*
	SV2	Off	Off	On*

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

Stop Lamp ON Relay
When “On” or “Off” is selected on display screen, the following items are displayed when system is normal.

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

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

FUNCTION TEST

Self diagnostic results of the ABS system are displayed with an “OK” or “NG”.

WORK SUPPORT

Conditions	Description
ST ANGLE SENSOR ADJUSTMENT	Steering angle sensor neutral position adjustment can be performed. Refer to BRC-70, "Description".
DECEL G SEN CALIBRATION	Decel G sensor calibration can be performed. Refer to BRC-72, "Description".

ECU DIAGNOSIS INFORMATION

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000014392614

VALUES ON THE DIAGNOSIS TOOL

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
FR LH SENSOR	Wheel speed	0 [km/h (MPH)]	Vehicle stopped
		Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
FR RH SENSOR	Wheel speed	0 [km/h (MPH)]	Vehicle stopped
		Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
RR LH SENSOR	Wheel speed	0 [km/h (MPH)]	Vehicle stopped
		Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
RR RH SENSOR	Wheel speed	0 [km/h (MPH)]	Vehicle stopped
		Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
DECEL G-SEN	Longitudinal acceleration detected by Decel G-Sensor	Vehicle stopped	Approx. 0 G
		During acceleration	Positive value
		During deceleration	Negative value
FR RH IN SOL	Operation status of each solenoid valve	Active	ON
		Inactive	OFF
FR RH OUT SOL	Operation status of each solenoid valve	Active	ON
		Inactive	OFF
FR LH IN SOL	Operation status of each solenoid valve	Active	ON
		Inactive	OFF
FR LH OUT SOL	Operation status of each solenoid valve	Active	ON
		Inactive	OFF
RR RH IN SOL	Operation status of each solenoid valve	Active	ON
		Inactive	OFF
RR RH OUT SOL	Operation status of each solenoid valve	Active	ON
		Inactive	OFF
RR LH IN SOL	Operation status of each solenoid valve	Active	ON
		Inactive	OFF
RR LH OUT SOL	Operation status of each solenoid valve	Active	ON
		Inactive	OFF
EBD WARN LAMP	EBD warning lamp (Note 2)	When EBD warning lamp is ON	ON
		When EBD warning lamp is OFF	OFF
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is depressed	ON
		When brake pedal is released	OFF

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	ON
		When the motor relay and motor are not operating	OFF
ACTUATOR RLY	Actuator relay operation	When the actuator relay active	ON
		When the actuator relay is inactive	OFF
ABS WARN LAMP	ABS warning lamp (Note 2)	When ABS warning lamp is ON	ON
		When ABS warning lamp is OFF	OFF
OFF LAMP	VDC OFF indicator lamp (Note 2)	When VDC OFF indicator lamp is ON	ON
		When VDC OFF indicator lamp is OFF	OFF
OFF SW	VDC OFF switch ON/OFF	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	ON
		VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	OFF
SLIP/VDC LAMP	SLIP indicator lamp (Note 2)	When SLIP indicator lamp is ON or blinking	ON
		When SLIP indicator lamp is OFF	OFF
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
GEAR	Gear position determined by TCM	1st gear	1
		2nd gear	2
		3rd gear	3
		4th gear	4
		5th gear	5
		6th gear	6
ENGINE SPEED	With engine running	With engine stopped	0 rpm
		Engine running	Almost in accordance with tachometer display
YAW RATE SEN	Yaw rate detected by yaw rate/side/decel G sensor	When vehicle is stopped	Approx. 0 d/s
		When vehicle is turning	−75 to 75 d/s
R POSI SIG	Transmission range switch signal ON/OFF condition	A/T shift position = R position	ON
		A/T shift position = other than R position	OFF
N POSI SIG	Transmission range switch signal ON/OFF condition	A/T shift position = N position	ON
		A/T shift position = other than N position	OFF
4WD MODE MON	4WD shift switch condition	When 4WD shift switch is 2WD position	2WD
		When 4WD shift switch is 4H position	4H
		When 4WD shift switch is 4LO position	4LO
CV1	Cut valve 1	When cut valve 1 is open	ON
		When cut valve 1 is closed	OFF
CV2	Cut valve 2	When cut valve 2 is open	ON
		When cut valve 2 is closed	OFF
SV1	Suction valve 1	When suction valve 1 is open	ON
		When suction valve 1 is closed	OFF
SV2	Suction valve 2	When suction valve 2 is open	ON
		When suction valve 2 is closed	OFF

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
STOP LAMP SW2	Stop lamp switch signal status	When brake pedal is depressed	ON
		When brake pedal is released	OFF
ACCEL POS SIG	Throttle actuator opening/closing is displayed (linked with accelerator pedal)	Accelerator pedal not depressed (ignition switch is ON)	0 %
		Accelerator pedal depressed (ignition switch is ON)	0 - 100 %
SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle stopped	Approx. 0 m/s^2
		Vehicle turning right	Negative value (m/s^2)
		Vehicle turning left	Positive value (m/s^2)
STR ANGLE SIG	Steering angle detected by steering angle sensor	When driving straight	0±2.5°
		When steering wheel is turned to the left by 90°	Approx. –90°
		When steering wheel is turned to the right by 90°	Approx. +90°
PRESS SENSOR	Brake fluid pressure detected by pressure sensor	With ignition switch turned ON and brake pedal released	0 bar
		With ignition switch turned ON and brake pedal depressed	0 to 255 bar (Pressure increased according to pedal effort.)
ACCUM PRESS SEN	Accumulator pressure	With ignition switch turned ON and brake pedal released	Approx. 0 bar
		With ignition switch turned ON and brake pedal depressed	0 to 210 bar
EBD SIGNAL	EBD operation	EBD is active	ON
		EBD is inactive	OFF
ABS SIGNAL	ABS operation	ABS is active	ON
		ABS is inactive	OFF
TCS SIGNAL	TCS operation	TCS is active	ON
		TCS is inactive	OFF
VDC SIGNAL	VDC operation	VDC is active	ON
		VDC is inactive	OFF
EBD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	ON
		EBD is normal	OFF
ABS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	ON
		ABS is normal	OFF
TCS FAIL SIG	TCS fail-safe signal	In TCS fail-safe	ON
		TCS is normal	OFF
VDC FAIL SIG	VDC fail-safe signal	In VDC fail-safe	ON
		VDC is normal	OFF
CRANKING SIG	Crank operation	Crank is active	ON
		Crank is inactive	OFF
FLUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch is ON	ON
		When brake fluid level switch is OFF	OFF

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
PARK BRAKE SW	Parking brake switch signal status	Parking brake applied	ON
		Parking brake released	OFF
D-LOCK SW SIG (On/Off)	Differential lock mode switch status	Differential lock control switch is ON	ON
		Differential lock control switch is OFF	OFF
D-LOCK SIG (On/Off)	Differential lock condition	Differential lock is active	ON
		Differential lock is inactive	OFF
STP ON RLY	Stop lamp relay signal	When stop lamp relay is ON	ON
		When stop lamp relay is OFF	OFF
DDS SW (Note 3)	Downhill Drive Support switch status	Hill descent control switch ON	ON
		Hill descent control switch OFF	OFF
DDS SIG (Note 3)	Downhill Drive Support operation status	When hill descent control is active	ON
		When hill descent control is inactive	OFF
USS SIG (Note 4)	Hill start assist operation status	When hill start assist is active	ON
		When hill start assist not active	OFF

NOTE:

- 1: Confirm tire pressure is normal.
- 2: ON and OFF timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-147, "Component Function Check".
- Brake warning lamp: Refer to BRC-148, "Component Function Check".
- SLIP indicator lamp: Refer to BRC-150, "Component Function Check".
- VDC OFF indicator lamp: Refer to BRC-149, "Component Function Check".
- 3: The CONSULT will display DDS (Downhill Drive Support) when referring to the Hill Descent Control system.
- 4: The CONSULT will display USS (Uphill Start Support) when referring to the HIll Start Assist system.

Fail-safe

INFOID:0000000014392615

VDC AND TCS FUNCTION

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

ABS FUNCTION

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

NOTE:

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

EBD FUNCTION

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

DTC	Malfunction detected condition	Fail-safe condition
C1101	When an open circuit is detected in rear wheel sensor RH circuit.	The following functions are suspended: • VDC function • TCS function • hill start assist function • hill descent control function • EBD function (only when both rear wheels are malfunctioning) • BLSD function
C1102	When an open circuit is detected in rear wheel sensor LH circuit.	
C1103	When an open circuit is detected in front wheel sensor RH circuit.	
C1104	When an open circuit is detected in front wheel sensor LH circuit.	
C1105	• When power supply voltage of rear wheel sensor RH is low. • When distance between rear wheel sensor RH and rear wheel sensor RH rotor is large. • When installation of rear wheel sensor RH or rear wheel sensor RH rotor is not normal.	
C1106	• When power supply voltage of rear wheel sensor LH is low. • When distance between rear wheel sensor LH and rear wheel sensor LH rotor is large. • When installation of rear wheel sensor LH or rear wheel sensor LH rotor is not normal.	
C1107	• When power supply voltage of front wheel sensor RH is low. • When distance between front wheel sensor RH and front wheel sensor RH rotor is large. • When installation of front wheel sensor RH or front wheel sensor RH rotor is not normal.	
C1108	• When power supply voltage of front wheel sensor LH is low. • When distance between front wheel sensor LH and front wheel sensor LH rotor is large. • When installation of front wheel sensor LH or front wheel sensor LH rotor is not normal.	
C1109	• When ignition voltage is 10 V or less. • When ignition voltage is 16 V or more.	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • hill start assist function • hill descent control function • BLSD function
C1111	• When a malfunction is detected in motor or motor relay. • When a low pressure malfunction is detected in accumulator. • When a malfunction is detected in accumulator pressure sensor.	
C1115	When difference in wheel speed between any wheel and others is detected while the vehicle is driven, because of installation of tires other than specified.	The following functions are suspended: • VDC function • TCS function • ABS function • hill start assist function • hill descent control function • BLSD function
C1116	• When stop lamp switch signal is not input when brake pedal is depressed.	
C1118	When a malfunction is detected in transfer control unit.	
C1120	When a malfunction is detected in front LH ABS IN valve.	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • hill start assist function • hill descent control function • BLSD function
C1121	When a malfunction is detected in front LH ABS OUT valve.	
C1122	When a malfunction is detected in front RH ABS IN valve.	
C1123	When a malfunction is detected in front RH ABS OUT valve.	
C1124	When a malfunction is detected in rear LH ABS IN valve.	
C1125	When a malfunction is detected in rear LH ABS OUT valve.	
C1126	When a malfunction is detected in rear RH ABS IN valve.	
C1127	When a malfunction is detected in rear RH ABS OUT valve.	
C1130	When a malfunction is detected in ECM system.	The following functions are suspended: • VDC function • TCS function • hill start assist function • hill descent control function • BLSD function

DTC	Malfunction detected condition	Fail-safe condition
C1140	When a malfunction is detected in actuator relay.	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • hill start assist function • hill descent control function • BLSD function
C1142	When a malfunction is detected in master cylinder pressure sensor.	The following functions are suspended: • VDC function • TCS function • BLSD function
C1143	When a malfunction is detected in steering angle sensor.	
C1144	When neutral position adjustment of steering angle sensor is not complete.	
C1145	• When a malfunction is detected in yaw rate signal. • When yaw rate signal is not continuously received for 2 seconds or more.	
	• When side G signal is not continuously received for 2 seconds or more. • When decel G signal is not continuously received for 2 seconds or more.	The following functions are suspended: • VDC function • TCS function • ABS function • hill start assist function • hill descent control function • BLSD function
C1146	When a malfunction is detected in side/decel G signal.	
C1155	• When brake fluid level low signal is detected. • When an open circuit is detected in brake fluid level switch circuit.	
C1160	When calibration of yaw rate/side/decel G sensor is not complete.	
C1164	When a malfunction is detected in cut valve 1.	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • hill start assist function • hill descent control function • BLSD function
C1165	When a malfunction is detected in cut valve 2.	
C1166	When a malfunction is detected in suction valve 1.	
C1167	When a malfunction is detected in suction valve 2.	
C1170	When the information in ABS actuator and electric unit (control unit) is not the same.	The following functions are suspended: • VDC function • TCS function • ABS function • hill start assist function • hill descent control function • BLSD function
C1187	When a malfunction is detected in differential lock control unit system.	
C118E	When performing excessive brake pedal operation with the vehicle stopped. [When accumulator fluid pressure reaches 11.43 MPa (114 bar, 116.6 kg/cm^2, 1657 psi) after reaching 17.3 MPa (173 bar, 176.5 kg/cm^2, 2509 psi.]	The following functions are suspended: • VDC function • TCS function • ABS function • EBD function • hill start assist function • hill descent control function • BLSD function
U1000	When CAN communication signal is not continuously received for 2 seconds or more.	The following functions are suspended: • VDC function • TCS function • ABS function • hill start assist function • hill descent control function • BLSD function

PROTECTION FUNCTION

The SLIP indicator lamp, ABS warning lamp and brake warning lamp turn ON and DTC “C118E” may be detected in self-diagnosis result of “ABS” when the brake pedal is excessively operated, such as air bleeding. This is not a system malfunction because this occurs due to the temporary decrease in accumulator fluid pres-

sure. The system returns to normal condition when the accumulator fluid pressure reaches the specified pressure with the ignition switch ON and the SLIP indicator lamp, ABS warning lamp, and brake warning lamp turned OFF. After these steps, erase self-diagnosis results for “ABS” with CONSULT.

DTC	• SLIP indicator lamp • ABS warning lamp • Brake warning lamp	Condition	Description protection function
C118E	ON	When temporary decrease in accumulator fluid pressure is detected. **NOTE:** System is not malfunctioning.	The following functions are suspended temporarily: • VDC function • TCS function • ABS function • EBD function • hill start assist function • hill descent control function • BLSD function

NOTE:
DTC “C1111” is detected in self-diagnosis results of “ABS” when the accumulator system has a malfunction.

DTC Inspection Priority Chart

INFOID:0000000014392616

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

Priority	Detected item (DTC)
1	• U1000 CAN COMM CIRCUIT
2	• C1170 VARIANT CODING
3	• C1118 4WD SYSTEM • C1130 ENGINE SIGNAL 1 • C1144 ST ANG SEN SIGNAL
4	• C1109 BATTERY VOLTAGE [ABNORMAL] • C1111 PUMP MOTOR • C1140 ACTUATOR RLY
5	• C1101 RR RH SENSOR-1 • C1102 RR LH SENSOR-1 • C1103 FR RH SENSOR-1 • C1104 FR LH SENSOR-1 • C1105 RR RH SENSOR-2 • C1106 RR LH SENSOR-2 • C1107 FR RH SENSOR-2 • C1108 FR LH SENSOR-2 • C1115 ABS SENSOR [ABNORMAL SIGNAL] • C1116 STOP LAMP SW • C1120 FR LH IN ABS SOL • C1121 FR LH OUT ABS SOL • C1122 FR RH IN ABS SOL • C1123 FR RH OUT ABS SOL • C1124 RR LH IN ABS SOL • C1125 RR LH OUT ABS SOL • C1126 RR RH IN ABS SOL • C1127 RR RH OUT ABS SOL • C1142 PRESS SEN CIRCUIT • C1143 ST ANG SEN CIRCUIT • C1145 YAW RATE SENSOR • C1146 SIDE G-SEN CIRCUIT • C1160 DECEL G SEN SET • C1164 CV 1 • C1165 CV 2 • C1166 SV 1 • C1167 SV 2 • C1187 DIFLOCK CONT
6	• C1155 BR FLUID LEVEL LOW • C118E ACCUMULATOR PRESS

DTC Index

INFOID:0000000014392617

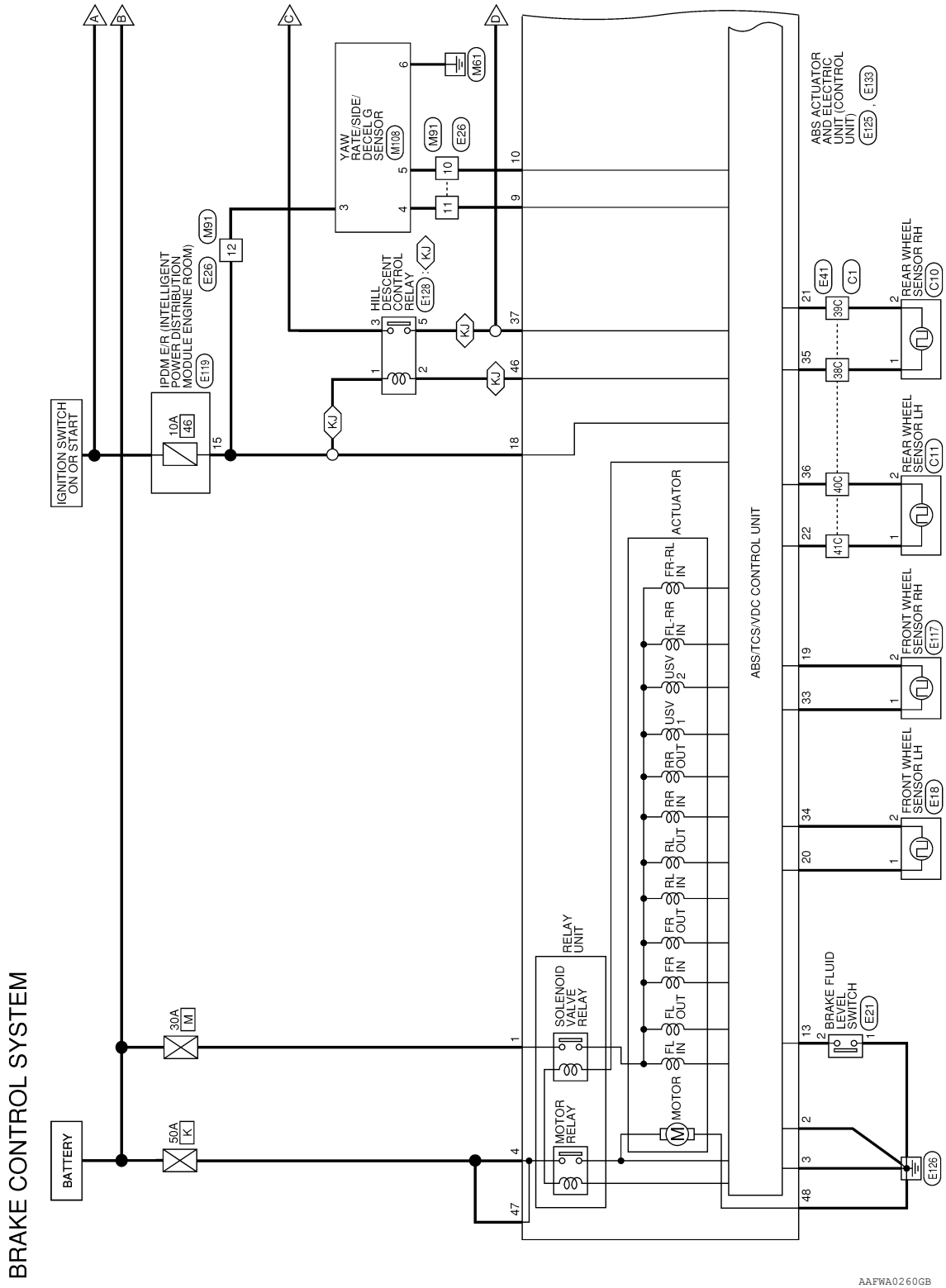
DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	BRC-75, "Diagnosis Procedure"
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	BRC-80, "Diagnosis Procedure"
C1106	RR LH SENSOR-2	
C1107	FR RH SENSOR-2	
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-86, "Diagnosis Procedure"
C1111	PUMP MOTOR	BRC-88, "Diagnosis Procedure"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-91, "Diagnosis Procedure"
C1116	STOP LAMP SW	BRC-99, "Diagnosis Procedure"
C1118	4WD SYSTEM	BRC-104, "Diagnosis Procedure"
C1120	FR LH IN ABS SOL	BRC-106, "Diagnosis Procedure"
C1121	FR LH OUT ABS SOL	BRC-108, "Diagnosis Procedure"
C1122	FR RH IN ABS SOL	BRC-106, "Diagnosis Procedure"
C1123	FR RH OUT ABS SOL	BRC-108, "Diagnosis Procedure"
C1124	RR LH IN ABS SOL	BRC-106, "Diagnosis Procedure"
C1125	RR LH OUT ABS SOL	BRC-108, "Diagnosis Procedure"
C1126	RR RH IN ABS SOL	BRC-106, "Diagnosis Procedure"
C1127	RR RH OUT ABS SOL	BRC-108, "Diagnosis Procedure"
C1130	ENGINE SIGNAL 1	BRC-109, "Diagnosis Procedure"
C1140	ACTUATOR RLY	BRC-111, "Diagnosis Procedure"
C1142	PRESS SEN CIRCUIT	BRC-113, "Diagnosis Procedure"
C1143	ST ANG SEN CIRCUIT	BRC-116, "Diagnosis Procedure"
C1144	ST ANG SEN SIGNAL	BRC-120, "Diagnosis Procedure"
C1145	YAW RATE SENSOR	BRC-123, "Diagnosis Procedure"
C1146	SIDE G-SEN CIRCUIT	
C1155	BR FLUID LEVEL LOW	BRC-126, "Diagnosis Procedure"
C1160	DECEL G SEN SET	BRC-130, "Diagnosis Procedure"
C1164	CV 1	BRC-132, "Diagnosis Procedure"
C1165	CV 2	
C1166	SV 1	BRC-134, "Diagnosis Procedure"
C1167	SV 2	
C1170	VARIANT CODING	BRC-136, "Diagnosis Procedure"
C1187	DIFLOCK CONT	BRC-137, "Diagnosis Procedure"
C118E	ACCUMULATOR PRESS	BRC-138, "Diagnosis Procedure"
U1000	CAN COMM CIRCUIT	BRC-139, "Diagnosis Procedure"

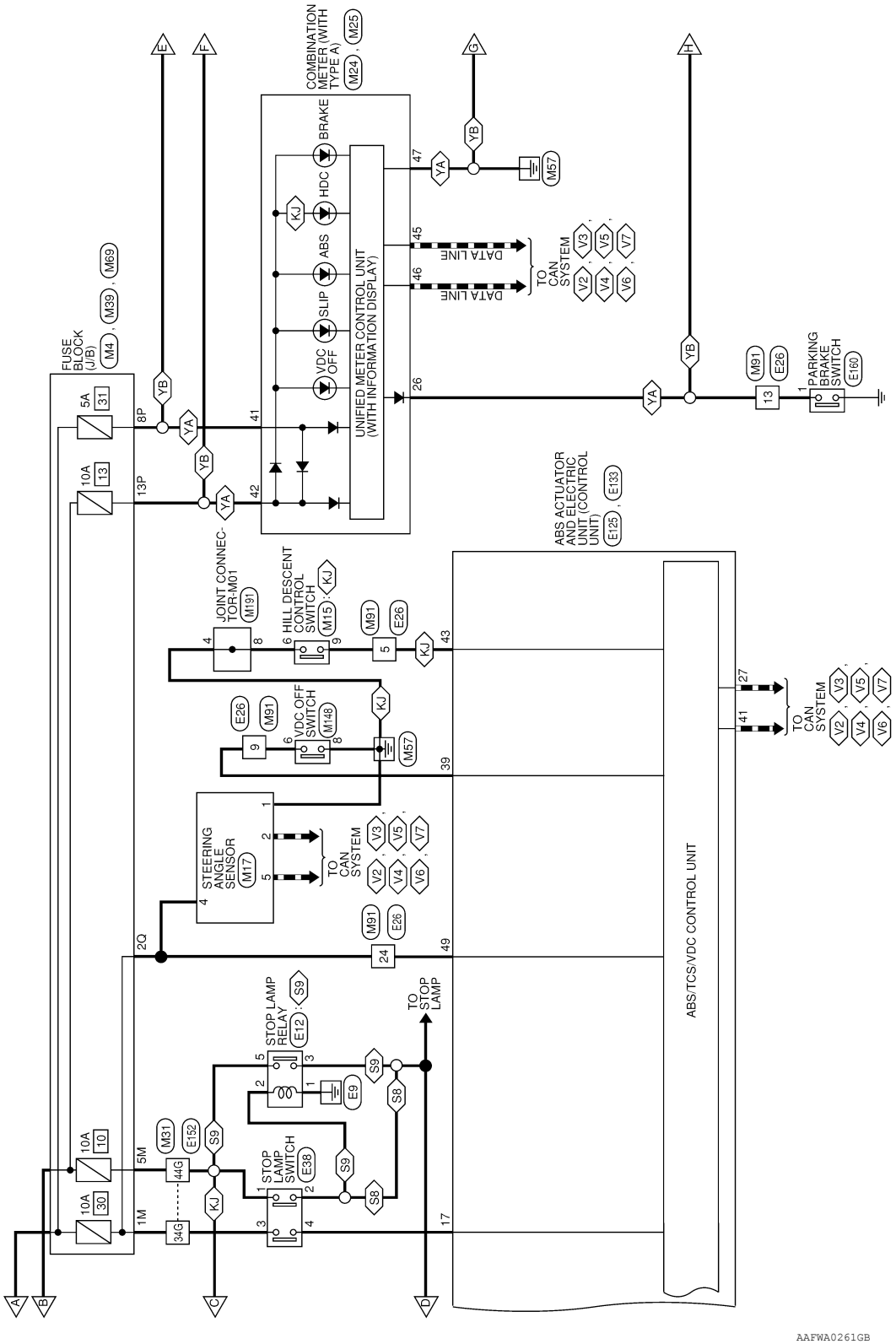
WIRING DIAGRAM

BRAKE CONTROL SYSTEM

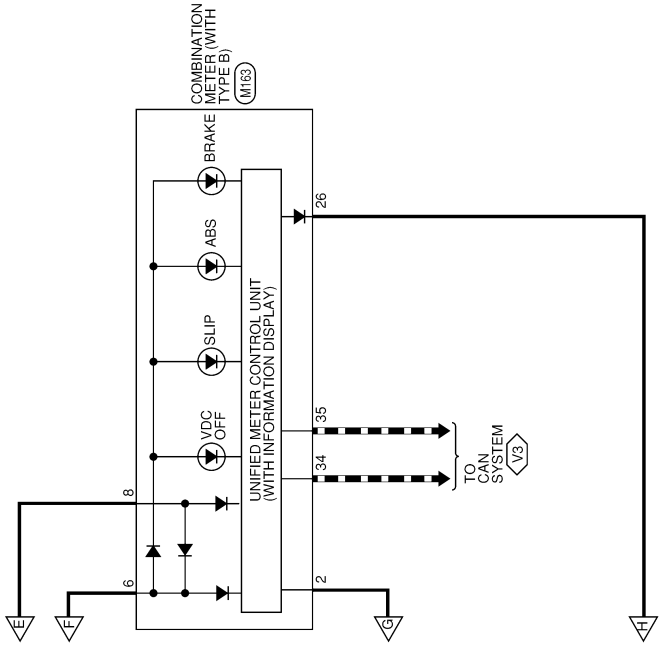
Wiring Diagram

INFOID:0000000014392618




COMBINATION METER (WITH TYPE A) (M24), (M25)
UNIFIED METER CONTROL UNIT (WITH INFORMATION DISPLAY)
BRAKE
HDC
ABS
SLIP
VDC OFF
DATA LINE
TO CAN SYSTEM
FUSE BLOCK (J/B) (M4), (M39), (M69)
PARKING BRAKE SWITCH (E160)
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (E125), (E133)
ABS/TCS/VDC CONTROL UNIT
JOINT CONNECTOR-M01 (M191)
HILL DESCENT CONTROL SWITCH (M15)
VDC OFF SWITCH (M148)
STEERING ANGLE SENSOR (M17)
STOP LAMP RELAY (E12)
STOP LAMP SWITCH (E38)
TO STOP LAMP
AAFWA0261GB

: CAN COMMUNICATION LINE FOR DIAGNOSIS
KJ : WITH HILL DESCENT CONTROL
S8 : WITH LED REAR COMBINATION LAMPS
S9 : WITHOUT LED REAR COMBINATION LAMPS
V2 : WITH VK56VD WITH DRIVER ASSISTANCE SYSTEM
V3 : WITH VK56VD AND WITHOUT DRIVER ASSISTANCE SYSTEM
V4 : CAN GATEWAY SYSTEM WITH Cummins 5.0L
V5 : WITH Cummins 5.0L AND WITHOUT NAVIGATION
V6 : WITH Cummins 5.0L AND WITH NAVIGATION WITH BLIND SPOT WARNING SYSTEMS
V7 : WITH Cummins 5.0L AND WITH NAVIGATION WITHOUT BLIND SPOT WARNING SYSTEMS
YA : WITH TYPE A
YB : WITH TYPE B



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BRAKE CONTROL SYSTEM CONNECTORS

Connector No.	C1
Connector Name	WIRE TO WIRE
Connector Type	RK26FGY-RS20-X6
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1C	Y/V	TO ENGINE ROOM HARNESS
2C	W/L	TO ENGINE ROOM HARNESS
3C	B	TO ENGINE ROOM HARNESS
4C	BR/W	TO ENGINE ROOM HARNESS
5C	BR/Y	TO ENGINE ROOM HARNESS
6C	Y	TO ENGINE ROOM HARNESS
7C	G/R	TO ENGINE ROOM HARNESS - (WITH CUMMINS 5.0L)
7C	R	TO ENGINE ROOM HARNESS - (WITH VK56VD)
8C	B	TO ENGINE ROOM HARNESS - (WITH CUMMINS 5.0L)
8C	O/B	TO ENGINE ROOM HARNESS - (WITH VK56VD)
9C	W/L	TO ENGINE ROOM HARNESS - (WITH CUMMINS 5.0L)
9C	SB	TO ENGINE ROOM HARNESS - (WITH VK56VD)
10C	GR/R	TO ENGINE ROOM HARNESS - (WITH CUMMINS 5.0L)
10C	GR	TO ENGINE ROOM HARNESS - (WITH VK56VD)
11C	B	TO ENGINE ROOM HARNESS - (WITH CUMMINS 5.0L)
11C	R/W	TO ENGINE ROOM HARNESS - (WITH VK56VD)
12C	Y	TO ENGINE ROOM HARNESS
13C	B	TO ENGINE ROOM HARNESS
14C	BG	TO ENGINE ROOM HARNESS
15C	Y	TO ENGINE ROOM HARNESS
16C	B	TO ENGINE ROOM HARNESS
17C	V	TO ENGINE ROOM HARNESS
18C	BG	TO ENGINE ROOM HARNESS
19C	L	TO ENGINE ROOM HARNESS
20C	W	TO ENGINE ROOM HARNESS
21C	LG	TO ENGINE ROOM HARNESS
22C	SHIELD	TO ENGINE ROOM HARNESS
23C	G/B	TO ENGINE ROOM HARNESS
24C	G/B	TO ENGINE ROOM HARNESS
25C	W	TO ENGINE ROOM HARNESS
26C	B	TO ENGINE ROOM HARNESS
27C	LG	TO ENGINE ROOM HARNESS
28C	G/W	TO ENGINE ROOM HARNESS
29C	R/LG	TO ENGINE ROOM HARNESS
30C	R/L	TO ENGINE ROOM HARNESS
31C	B	TO ENGINE ROOM HARNESS
32C	R	TO ENGINE ROOM HARNESS
33C	L/W	TO ENGINE ROOM HARNESS
34C	L	TO ENGINE ROOM HARNESS
35C	R/W	TO ENGINE ROOM HARNESS
36C	L	TO ENGINE ROOM HARNESS
37C	Y	TO ENGINE ROOM HARNESS
38C	GR	TO ENGINE ROOM HARNESS
39C	R	TO ENGINE ROOM HARNESS
40C	P	TO ENGINE ROOM HARNESS
41C	V	TO ENGINE ROOM HARNESS
42C	LG/B	TO ENGINE ROOM HARNESS
43C	Y/B	TO ENGINE ROOM HARNESS
44C	R	TO ENGINE ROOM HARNESS
45C	G	TO ENGINE ROOM HARNESS
46C	BR	TO ENGINE ROOM HARNESS
47C	B	TO ENGINE ROOM HARNESS
48C	Y/R	TO ENGINE ROOM HARNESS
49C	R/Y	TO ENGINE ROOM HARNESS - (WITH CUMMINS 5.0L)
49C	V	TO ENGINE ROOM HARNESS - (WITH VK56VD)
50C	B	TO ENGINE ROOM HARNESS - (WITH CUMMINS 5.0L)
50C	B/Y	TO ENGINE ROOM HARNESS - (WITH VK56VD)
51C	V	TO ENGINE ROOM HARNESS - (WITH CUMMINS 5.0L)
51C	B	TO ENGINE ROOM HARNESS - (WITH VK56VD)
52C	V/W	TO ENGINE ROOM HARNESS

Connector No.	C10
Connector Name	REAR WHEEL SENSOR RH
Connector Type	RH02FGY
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1	GR	RR SENS +
2	R	RR SENS -

Connector No.	C11
Connector Name	REAR WHEEL SENSOR LH
Connector Type	RH02FB
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	V	RL SENS +
2	P	RL SENS -

Connector No.	E12
Connector Name	STOP LAMP RELAY
Connector Type	MS02FL-M2-LC
Connector Color	BLUE

H.S.

Terminal No.	Color of Wire	Signal Name
1	B	GROUND
2	W	RELAY CONTROL
3	R/G	STOP LAMPS
5	R/Y	BATTERY

Connector No.	E18
Connector Name	FRONT WHEEL SENSOR LH
Connector Type	RH02FB
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	SB	FL SENS +
2	LG	FL SENS -

Connector No.	E21
Connector Name	BRAKE FLUID LEVEL SWITCH
Connector Type	RH02FB
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	B	GND
2	P/B	LBL

Terminal No.	Color of Wire	Signal Name

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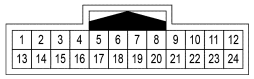
BRAKE CONTROL SYSTEM CONNECTORS

Connector No.	E26
Connector Name	WIRE TO WIRE
Connector Type	TH24MW-NH
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
1	LG/B	TO MAIN HARNESS
2	R/W	TO MAIN HARNESS
3	Y/R	TO MAIN HARNESS
4	G/R	TO MAIN HARNESS
5	G/W	TO MAIN HARNESS
6	P	TO MAIN HARNESS
7	O	TO MAIN HARNESS
8	R	TO MAIN HARNESS
9	G	TO MAIN HARNESS
10	LG	TO MAIN HARNESS
11	BR	TO MAIN HARNESS
12	GR	TO MAIN HARNESS
13	G	TO MAIN HARNESS
14	BR	TO MAIN HARNESS
15	–	TO MAIN HARNESS
16	–	TO MAIN HARNESS
17	W	TO MAIN HARNESS
18	–	TO MAIN HARNESS
19	Y/R	TO MAIN HARNESS
20	G/W	TO MAIN HARNESS
21	–	TO MAIN HARNESS
22	–	TO MAIN HARNESS
23	–	TO MAIN HARNESS
24	O/L	TO MAIN HARNESS

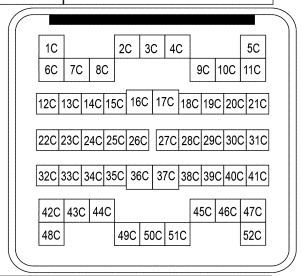
Connector No.	E38
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	R/Y	BATTERY
2	W	RELAY CONT - (WITHOUT LED REAR COMBINATION LAMPS)
2	R/G	STOP LAMPS - (WITH LED REAR COMBINATION LAMPS)
3	GR	IGNITION
4	R/B	STOP 2

Connector No.	E41
Connector Name	WIRE TO WIRE
Connector Type	RK26MGY-RS20-X6
Connector Color	GRAY

H.S.



Terminal No.	Color of Wire	Signal Name
1C	Y/V	TO CHASSIS HARNESS
2C	W/L	TO CHASSIS HARNESS
3C	B	TO CHASSIS HARNESS
4C	BR/W	TO CHASSIS HARNESS
5C	BR/Y	TO CHASSIS HARNESS
6C	Y	TO CHASSIS HARNESS
7C	G/R	TO CHASSIS HARNESS - (WITH CUMMINS 5.0L)
7C	R	TO CHASSIS HARNESS - (WITH VK56VD)
8C	B	TO CHASSIS HARNESS - (WITH CUMMINS 5.0L)
8C	O/B	TO CHASSIS HARNESS - (WITH VK56VD)
9C	W/L	TO CHASSIS HARNESS - (WITH CUMMINS 5.0L)
9C	SB	TO CHASSIS HARNESS - (WITH VK56VD)
10C	GR/R	TO CHASSIS HARNESS - (WITH CUMMINS 5.0L)
10C	GR	TO CHASSIS HARNESS - (WITH VK56VD)
11C	B	TO CHASSIS HARNESS - (WITH CUMMINS 5.0L)
11C	R/W	TO CHASSIS HARNESS - (WITH VK56VD)
12C	Y	TO CHASSIS HARNESS
13C	B	TO CHASSIS HARNESS
14C	BG	TO CHASSIS HARNESS
15C	Y	TO CHASSIS HARNESS
16C	B	TO CHASSIS HARNESS
17C	V	TO CHASSIS HARNESS
18C	BG	TO CHASSIS HARNESS
19C	L	TO CHASSIS HARNESS
20C	BG	TO CHASSIS HARNESS
21C	B	TO CHASSIS HARNESS
22C	SHIELD	TO CHASSIS HARNESS
23C	G/B	TO CHASSIS HARNESS
24C	G/Y	TO CHASSIS HARNESS
25C	W	TO CHASSIS HARNESS
26C	B	TO CHASSIS HARNESS
27C	LG	TO CHASSIS HARNESS
28C	G/W	TO CHASSIS HARNESS
29C	R/G	TO CHASSIS HARNESS - (WITHOUT BULB CHECK)
29C	G/R	TO CHASSIS HARNESS - (WITH BULB CHECK)
30C	R/L	TO CHASSIS HARNESS
31C	B	TO CHASSIS HARNESS
32C	R	TO CHASSIS HARNESS
33C	L/W	TO CHASSIS HARNESS
34C	L	TO CHASSIS HARNESS
35C	R/W	TO CHASSIS HARNESS
36C	L	TO CHASSIS HARNESS
37C	Y	TO CHASSIS HARNESS
38C	BR	TO CHASSIS HARNESS
39C	R	TO CHASSIS HARNESS
40C	P	TO CHASSIS HARNESS
41C	V	TO CHASSIS HARNESS
42C	G/B	TO CHASSIS HARNESS
43C	Y/B	TO CHASSIS HARNESS
44C	R	TO CHASSIS HARNESS
45C	G	TO CHASSIS HARNESS
46C	BR	TO CHASSIS HARNESS
47C	B	TO CHASSIS HARNESS
48C	Y/R	TO CHASSIS HARNESS
49C	R/Y	TO CHASSIS HARNESS - (WITH CUMMINS 5.0L)
49C	V	TO CHASSIS HARNESS - (WITH VK56VD)
50C	B	TO CHASSIS HARNESS - (WITH CUMMINS 5.0L)
50C	B/Y	TO CHASSIS HARNESS - (WITH VK56VD)
51C	V	TO CHASSIS HARNESS - (WITH CUMMINS 5.0L)
51C	B	TO CHASSIS HARNESS - (WITH VK56VD)
52C	B	TO CHASSIS HARNESS - (WITHOUT FFV)
52C	L	TO CHASSIS HARNESS - (WITH FFV)
52C	V/W	TO CHASSIS HARNESS

Connector No.	E117
Connector Name	FRONT WHEEL SENSOR RH
Connector Type	RH02FB
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	LG	FR SENS +
2	V	FR SENS -

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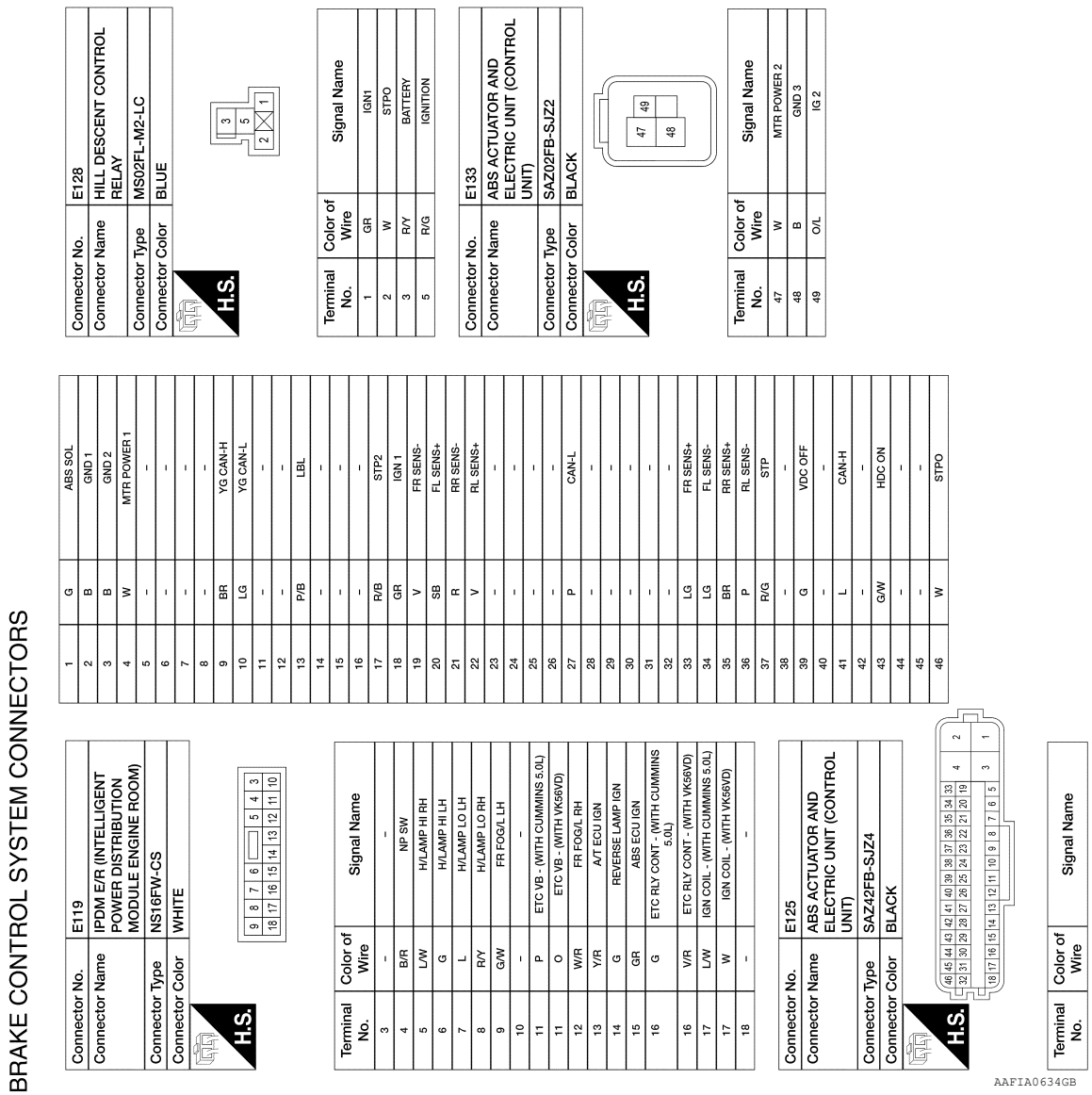
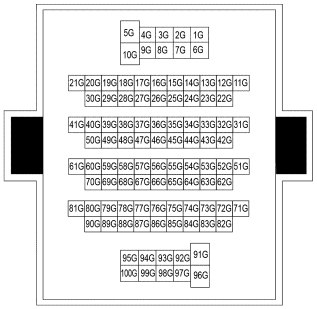
BRAKE CONTROL SYSTEM CONNECTORS



BRAKE CONTROL SYSTEM CONNECTORS

Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
1G	G	TO MAIN HARNESS
2G	B/R	TO MAIN HARNESS
3G	W/B	TO MAIN HARNESS
4G	BR/W	TO MAIN HARNESS
5G	BR	TO MAIN HARNESS
6G	P	TO MAIN HARNESS - (WITH VK56VD)
6G	R/W	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
7G	Y	TO MAIN HARNESS
8G	G	TO MAIN HARNESS
9G	R	TO MAIN HARNESS
10G	W	TO MAIN HARNESS
11G	R/G	TO MAIN HARNESS
12G	W/B	TO MAIN HARNESS
13G	BR	TO MAIN HARNESS
14G	Y/B	TO MAIN HARNESS
15G	G/W	TO MAIN HARNESS
16G	G	TO MAIN HARNESS
17G	G/Y	TO MAIN HARNESS
18G	G/Y	TO MAIN HARNESS
19G	Y/V	TO MAIN HARNESS
20G	G/Y	TO MAIN HARNESS
21G	B/Y	TO MAIN HARNESS
22G	G/R	TO MAIN HARNESS
23G	Y/R	TO MAIN HARNESS
24G	G/B	TO MAIN HARNESS
25G	R/W	TO MAIN HARNESS
26G	R	TO MAIN HARNESS
27G	LG	TO MAIN HARNESS
28G	G/B	TO MAIN HARNESS
29G	G/B	TO MAIN HARNESS
30G	BR/Y	TO MAIN HARNESS
31G	P	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
31G	R	TO MAIN HARNESS - (WITH VK56VD)
32G	P	TO MAIN HARNESS
33G	Y/L	TO MAIN HARNESS
34G	GR	TO MAIN HARNESS
35G	G/R	TO MAIN HARNESS
36G	SB	TO MAIN HARNESS
37G	R/W	TO MAIN HARNESS
38G	BR	TO MAIN HARNESS
39G	BR	TO MAIN HARNESS
40G	–	TO MAIN HARNESS
41G	R/G	TO MAIN HARNESS
42G	O	TO MAIN HARNESS
43G	B	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
43G	G	TO MAIN HARNESS - (WITH VK56VD)
44G	R/Y	TO MAIN HARNESS
45G	G	TO MAIN HARNESS
46G	LG	TO MAIN HARNESS
47G	R	TO MAIN HARNESS
48G	W	TO MAIN HARNESS
49G	–	TO MAIN HARNESS
50G	BR	TO MAIN HARNESS
51G	R	TO MAIN HARNESS
52G	L	TO MAIN HARNESS
53G	W	TO MAIN HARNESS
54G	W	TO MAIN HARNESS
55G	G	TO MAIN HARNESS
56G	W	TO MAIN HARNESS
57G	Y	TO MAIN HARNESS
58G	BG	TO MAIN HARNESS
59G	BG	TO MAIN HARNESS
60G	BG	TO MAIN HARNESS
61G	B	TO MAIN HARNESS
62G	W	TO MAIN HARNESS
63G	R	TO MAIN HARNESS
64G	W/L	TO MAIN HARNESS
65G	W/R	TO MAIN HARNESS
66G	BG	TO MAIN HARNESS
67G	BG	TO MAIN HARNESS
68G	B	TO MAIN HARNESS
69G	Y	TO MAIN HARNESS
70G	L	TO MAIN HARNESS
71G	R/W	TO MAIN HARNESS
72G	L/W	TO MAIN HARNESS
73G	SHIELD	TO MAIN HARNESS
74G	W	TO MAIN HARNESS
75G	R	TO MAIN HARNESS
76G	R/G	TO MAIN HARNESS
77G	G	TO MAIN HARNESS
78G	W	TO MAIN HARNESS
79G	–	TO MAIN HARNESS
80G	R	TO MAIN HARNESS
81G	L	TO MAIN HARNESS
82G	R	TO MAIN HARNESS
83G	L	TO MAIN HARNESS
84G	L	TO MAIN HARNESS
85G	W/B	TO MAIN HARNESS
86G	B/R	TO MAIN HARNESS
87G	W/B	TO MAIN HARNESS
88G	P	TO MAIN HARNESS
89G	L	TO MAIN HARNESS
90G	G	TO MAIN HARNESS
91G	G	TO MAIN HARNESS
92G	V/W	TO MAIN HARNESS
93G	BR	TO MAIN HARNESS
94G	G	TO MAIN HARNESS
95G	G	TO MAIN HARNESS
96G	W	TO MAIN HARNESS
97G	R	TO MAIN HARNESS
98G	W/B	TO MAIN HARNESS
99G	BR	TO MAIN HARNESS
100G	GR/W	TO MAIN HARNESS

Connector No.	E160
Connector Name	PARKING BRAKE SWITCH
Connector Type	P01FB-A
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	G	PKB SW

Connector No.	M4
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS16FW-CS
Connector Color	WHITE

H.S.

7P	6P	5P	4P		3P	2P	1P		
16P	15P	14P	13P	12P	11P	10P	9P	8P	

Terminal No.	Color of Wire	Signal Name
1P	R	IGNITION
2P	Y	IGNITION
3P	G	IGNITION RELAY OUT
4P	B/W	RR DEF RLY
5P	B/W	RR DEF RLY
6P	O	RR DEF RLY OUT
7P	G	IGNITION
8P	W	IGNITION
9P	L	BATTERY
10P	–	–
11P	–	–
12P	–	–
13P	R	BATTERY
14P	Y	BATTERY
15P	Y/LG	BATTERY
16P	W	BLOWER FAN RELAY OUT

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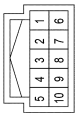
BRAKE CONTROL SYSTEM CONNECTORS

Connector No.	M15
Connector Name	HILL DESCENT CONTROL SWITCH
Connector Type	TH10FGY-NH
Connector Color	GRAY

H.S.



Terminal No.	Color of Wire	Signal Name
1	–	–
2	L	ILLUMINATION +
3	–	–
4	GR	ILLUMINATION -
5	–	–
6	B	GND
7	–	–
8	–	–
9	G	HDC ON
10	–	–

Connector No.	M24
Connector Name	COMBINATION METER (WITH TYPE A)
Connector Type	TH40FW-NH
Connector Color	WHITE

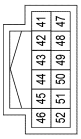
H.S.

Terminal No.	Color of Wire	Signal Name
1	B	GND(STRG/SATELLITE SW GND)
2	–	–
3	–	–
4	–	–
5	–	–
6	–	–
7	V	SECURITY
8	–	–
9	BG	AS BELT SW (W/O ODS)
10	LG	TOW MODE SW
11	BR	CHG
12	BR	LED HEAD LAMP (R)
13	W	LED HEAD LAMP (L)
14	R	ACC SW
15	W	OUTSIDE TEMP SENSOR (WITH VK56VD)
16	O	AIR BAG
17	–	–
18	P	TRIP RESET SW
19	–	–
20	R	OUTSIDE TEMP GND (WITH VK56VD)
21	–	–
22	P	STRG SW A
23	R	STRG SW B
24	W	WASHER SW
25	–	–
26	G	PKB SW
27	P/L	AS BELT SW (WITH ODS)
28	O/B	DR BELT SW
29	–	–
30	–	–
31	–	–
32	BR	AT SHIFT UP
33	V/W	AT SHIFT DOWN
34	–	–
35	–	–
36	W	ILL UP SW

37	R	ILL DOWN SW
38	G	8P/R OUTPUT
39	–	–
40	–	–

Connector No.	M25
Connector Name	COMBINATION METER (WITH TYPE A)
Connector Type	TH12FW-NH
Connector Color	WHITE

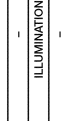
H.S.



Terminal No.	Color of Wire	Signal Name
41	W	IGN
42	R	BAT
43	Y/V	FUEL SENSOR GND
44	GR	ILL CONT OUTPUT
45	P	CAN-L
46	L	CAN-H
47	B	G1
48	BR/Y	FUEL SENSOR
49	–	–
50	–	–
51	LG	M CAN-L
52	SB	M CAN-H

Connector No.	M17
Connector Name	STEERING ANGLE SENSOR
Connector Type	TH08FW-NH
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
1	B	STRG ANGLE SENS GND
2	P	CAN-L
3	–	–
4	O/L	STRG ANGLE SENS POWER
5	L	CAN-H
6	–	–
7	–	–
8	–	–

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BRAKE CONTROL SYSTEM CONNECTORS

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1G	G	TO ENGINE ROOM HARNESS
2G	B/R	TO ENGINE ROOM HARNESS
3G	W	TO ENGINE ROOM HARNESS
4G	BR/W	TO ENGINE ROOM HARNESS
5G	–	TO ENGINE ROOM HARNESS
6G	R/W	TO ENGINE ROOM HARNESS
7G	Y	TO ENGINE ROOM HARNESS
8G	G	TO ENGINE ROOM HARNESS
9G	R	TO ENGINE ROOM HARNESS
10G	W	TO ENGINE ROOM HARNESS
11G	R/G	TO ENGINE ROOM HARNESS
12G	W/B	TO ENGINE ROOM HARNESS
13G	BR	TO ENGINE ROOM HARNESS
14G	Y/B	TO ENGINE ROOM HARNESS
15G	G/W	TO ENGINE ROOM HARNESS
16G	G	TO ENGINE ROOM HARNESS
17G	O	TO ENGINE ROOM HARNESS
18G	G/Y	TO ENGINE ROOM HARNESS
19G	Y/V	TO ENGINE ROOM HARNESS
20G	G/Y	TO ENGINE ROOM HARNESS
21G	B/Y	TO ENGINE ROOM HARNESS
22G	G/R	TO ENGINE ROOM HARNESS
23G	Y/R	TO ENGINE ROOM HARNESS
24G	G/B	TO ENGINE ROOM HARNESS
25G	R/W	TO ENGINE ROOM HARNESS
26G	R	TO ENGINE ROOM HARNESS
27G	LG	TO ENGINE ROOM HARNESS
28G	G/B	TO ENGINE ROOM HARNESS
29G	G/B	TO ENGINE ROOM HARNESS
30G	BR/Y	TO ENGINE ROOM HARNESS
31G	R	TO ENGINE ROOM HARNESS
32G	R	TO ENGINE ROOM HARNESS
33G	Y/L	TO ENGINE ROOM HARNESS
34G	GR	TO ENGINE ROOM HARNESS
35G	G/R	TO ENGINE ROOM HARNESS
36G	SB	TO ENGINE ROOM HARNESS
37G	R/W	TO ENGINE ROOM HARNESS
38G	BR	TO ENGINE ROOM HARNESS
39G	BR	TO ENGINE ROOM HARNESS
40G	–	TO ENGINE ROOM HARNESS
41G	R/G	TO ENGINE ROOM HARNESS
42G	O	TO ENGINE ROOM HARNESS
43G	G	TO ENGINE ROOM HARNESS
44G	R/Y	TO ENGINE ROOM HARNESS
45G	G	TO ENGINE ROOM HARNESS
46G	LG	TO ENGINE ROOM HARNESS
47G	R	TO ENGINE ROOM HARNESS
48G	W	TO ENGINE ROOM HARNESS
49G	–	TO ENGINE ROOM HARNESS
50G	BR	TO ENGINE ROOM HARNESS
51G	R	TO ENGINE ROOM HARNESS
52G	L	TO ENGINE ROOM HARNESS
53G	W	TO ENGINE ROOM HARNESS
54G	W	TO ENGINE ROOM HARNESS
55G	G	TO ENGINE ROOM HARNESS
56G	W	TO ENGINE ROOM HARNESS
57G	Y	TO ENGINE ROOM HARNESS
58G	BG	TO ENGINE ROOM HARNESS
59G	BG	TO ENGINE ROOM HARNESS
60G	BG	TO ENGINE ROOM HARNESS
61G	O	TO ENGINE ROOM HARNESS
62G	W	TO ENGINE ROOM HARNESS
63G	O	TO ENGINE ROOM HARNESS
64G	W/L	TO ENGINE ROOM HARNESS
65G	W/R	TO ENGINE ROOM HARNESS
66G	BG	TO ENGINE ROOM HARNESS
67G	O	TO ENGINE ROOM HARNESS
68G	B	TO ENGINE ROOM HARNESS
69G	Y	TO ENGINE ROOM HARNESS
70G	L	TO ENGINE ROOM HARNESS
71G	R/W	TO ENGINE ROOM HARNESS
72G	L/W	TO ENGINE ROOM HARNESS
73G	SHIELD	TO ENGINE ROOM HARNESS
74G	W	TO ENGINE ROOM HARNESS
75G	R	TO ENGINE ROOM HARNESS
76G	R/G	TO ENGINE ROOM HARNESS
77G	BG	TO ENGINE ROOM HARNESS
78G	P	TO ENGINE ROOM HARNESS
79G	–	TO ENGINE ROOM HARNESS
80G	R	TO ENGINE ROOM HARNESS
81G	L	TO ENGINE ROOM HARNESS
82G	R	TO ENGINE ROOM HARNESS
83G	L	TO ENGINE ROOM HARNESS
84G	L	TO ENGINE ROOM HARNESS
85G	W	TO ENGINE ROOM HARNESS
86G	B/R	TO ENGINE ROOM HARNESS
87G	W	TO ENGINE ROOM HARNESS
88G	G	TO ENGINE ROOM HARNESS
89G	P	TO ENGINE ROOM HARNESS
90G	G	TO ENGINE ROOM HARNESS
91G	P	TO ENGINE ROOM HARNESS
92G	V/W	TO ENGINE ROOM HARNESS
93G	BR	TO ENGINE ROOM HARNESS
94G	B	TO ENGINE ROOM HARNESS
95G	G	TO ENGINE ROOM HARNESS
96G	R	TO ENGINE ROOM HARNESS
97G	R	TO ENGINE ROOM HARNESS
98G	W/B	TO ENGINE ROOM HARNESS
99G	R	TO ENGINE ROOM HARNESS
100G	GR/W	TO ENGINE ROOM HARNESS

Connector No.	M39
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS08FW-CS
Connector Color	WHITE

H.S.

3Q		2Q	1Q
8Q	7Q	6Q	5Q	4Q

Terminal No.	Color of Wire	Signal Name
1Q	–	–
2Q	O/L	IGNITION
3Q	–	–
4Q	–	–
5Q	–	–
6Q	R/W	BATTERY
7Q	R/W	IGNITION
8Q	–	–

Connector No.	M69
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS10FW-CS
Connector Color	WHITE

H.S.

4M	3M		2M	1M
10M	9M	8M	7M	6M	5M

Terminal No.	Color of Wire	Signal Name
1M	GR	IGNITION
2M	–	–
3M	–	–
4M	–	–
5M	R/Y	BATTERY
6M	R/W	TAIL LAMP 2
7M	–	–
8M	–	–
9M	–	–
10M	W/R	IGNITION

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BRAKE CONTROL SYSTEM CONNECTORS

Connector No.	M91
Connector Name	WIRE TO WIRE
Connector Type	TH24FW-NH
Connector Color	WHITE

H.S.

12	11	10	9	8	7	6	5	4	3	2	1
24	23	22	21	20	19	18	17	16	15	14	13

Terminal No.	Color of Wire	Signal Name
1	G/W	TO ENGINE ROOM HARNESS
2	R/W	TO ENGINE ROOM HARNESS
3	Y/R	TO ENGINE ROOM HARNESS
4	G/R	TO ENGINE ROOM HARNESS
5	G	TO ENGINE ROOM HARNESS
6	P	TO ENGINE ROOM HARNESS
7	O	TO ENGINE ROOM HARNESS
8	R	TO ENGINE ROOM HARNESS
9	G	TO ENGINE ROOM HARNESS
10	LG	TO ENGINE ROOM HARNESS
11	BR	TO ENGINE ROOM HARNESS
12	GR	TO ENGINE ROOM HARNESS
13	G	TO ENGINE ROOM HARNESS
14	BR	TO ENGINE ROOM HARNESS
15	–	TO ENGINE ROOM HARNESS
16	–	TO ENGINE ROOM HARNESS
17	W	TO ENGINE ROOM HARNESS
18	–	TO ENGINE ROOM HARNESS
19	Y/R	TO ENGINE ROOM HARNESS
20	G/W	TO ENGINE ROOM HARNESS
21	–	TO ENGINE ROOM HARNESS
22	–	TO ENGINE ROOM HARNESS
23	–	TO ENGINE ROOM HARNESS
24	O/L	TO ENGINE ROOM HARNESS

Connector No.	M108
Connector Name	YAW RATE/SIDE/DECEL G SENSOR
Connector Type	SAZ06FB
Connector Color	BLACK

H.S.

1	2	3	4	5	6

Terminal No.	Color of Wire	Signal Name
1	–	–
2	–	–
3	GR	IGNITION
4	BR	CAN H
5	LG	CAN L
6	B	GND

Connector No.	M148
Connector Name	VDC OFF SWITCH
Connector Type	TH08FB-NH
Connector Color	BLACK

H.S.

4	3	2	1
8	7	6	5

Terminal No.	Color of Wire	Signal Name
1	L	ILLUMINATION +
2	–	–
3	–	–
4	GR	ILLUMINATION -
5	–	–
6	G	VDC OFF
7	–	–
8	B	GND

Connector No.	M163
Connector Name	COMBINATION METER (WITH TYPE B)
Connector Type	TH40FW-NH
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name
1	B	GND (ILL)
2	B	GND (CIRCUIT)
3	B	GND (POWER)
4	–	–
5	–	–
6	R	BAT
7	V	SECURITY
8	W	IGN
9	BG	AS BELT SW (W/O ODS)
10	LG	TOW MODE SW
11	BR	CHG
12	B	SATELLITE SW GND
13	B	STRG SW GND
14	R	ACC
15	W	OUTSIDE TEMP SENSOR
16	O	AIR BAG
17	–	–
18	P	TRIP RESET SW
19	–	–
20	R	OUTSIDE TEMP GND
21	–	–
22	P	STRG SW A
23	R	STRG SW B
24	W	WASHER SW
25	–	–
26	G	PKB SW
27	P/L	AS BELT SW (WITH ODS)
28	O/B	DR BELT SW
29	–	–
30	Y/V	FUEL SENSOR GND
31	BR/Y	FUEL SENSOR
32	BR	AT SHIFT UP
33	V/W	AT SHIFT DOWN
34	L	CAN-H
35	P	CAN-L
36	W	ILL UP SW
37	R	ILL DOWN SW
38	G	8P/R OUTPUT
39	–	–
40	GR	ILL CONT OUT

Connector No.	M191
Connector Name	JOINT CONNECTOR-M01
Connector Type	NH24FW-J
Connector Color	WHITE

H.S.

4	3	2	1
8	7	6	5
12	11	10	9
16	15	14	13
20	19	18	17
24	23	22	21

Terminal No.	Color of Wire	Signal Name
1	–	–
2	B	GND
3	B	GND
4	B	GROUND
5	–	–
6	B	GND
7	B	GND
8	B	GND
9	–	–
10	B	GND
11	B	GND
12	B	GND
13	B	GND
14	B	GND
15	B	GND
16	–	–
17	B	GND
18	B	GND
19	SHIELD	GROUND
20	B	GND
21	B	GND
22	B	GND
23	B	GROUND
24	B	GROUND

AAFIA0638GB

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000014392619

DETAILED FLOW

1.INTERVIEW THE CUSTOMER

Clarify customer concerns before inspection. First of all, perform an interview utilizing BRC-67, "Diagnostic Work Sheet" and reproduce the symptom as well as fully understand it. Ask customer about his/her concerns carefully. Check symptoms by driving vehicle with customer, if necessary.

CAUTION:

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

>> GO TO 2.

2.CHECK SYMPTOM

Reproduce the symptom that is indicated by the customer, based on the information from the customer obtained in the interview. Also check that the symptom is not caused by fail-safe mode. Refer to BRC-51, "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 THE SELF-DIAGNOSIS

CONSULT

1. Turn the ignition switch OFF → ON.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
2. Perform “Self Diagnostic Result” mode of “ABS”.

Is DTC detected?

YES >> Record or print Self Diagnostic Results and Freeze Frame Data (FFD). GO TO 4.
NO >> GO TO 6.

4.RECHECK THE SYMPTOM

CONSULT

1. Erase “Self Diagnostic Result” mode of “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   CAUTION:
   Be sure to wait of 10 seconds after turning ignition switch OFF or ON.
3. Perform DTC confirmation procedures for the malfunctioning system.
   NOTE:
   If some DTCs are detected at the some time, determine the order for performing the diagnosis based on BRC-54, "DTC Inspection Priority Chart".

Is DTC detected?

YES >> GO TO 5.
NO >> Check harness and connectors based on the information obtained in the interview. Refer to GI-47, "Intermittent Incident".

5.REPAIR OR REPLACE MALFUNCTIONING COMPONENT

1. Repair or replace malfunctioning components.
2. Reconnect component or connector after repairing or replacing.
3. When DTC is detected, erase “Self Diagnostic Result” mode of “ABS”.
   CAUTION:

- **Turn the ignition switch OFF → ON → OFF after erasing Self Diagnostic Result.**
- **Be sure to wait of 10 seconds after turning ignition switch OFF or ON.**

>> GO TO 7.

6. IDENTIFY MALFUNCTIONING SYSTEM BY SYMPTOM DIAGNOSIS

Identify malfunctioning system based on symptom diagnosis and perform inspection.

Can the malfunctioning system be identified?

YES >> GO TO 7.
NO >> Check harness and connectors based on the information obtained in the interview. Refer to GI-47, "Intermittent Incident".

7. FINAL CHECK

CONSULT
1. Select “Data Monitor” mode of “ABS”
2. Check the reference values. Refer to BRC-48, "Reference Value".
3. Recheck the symptom and check that the symptom is not reproduced on the same conditions.

Is the symptom reproduced?

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

Diagnostic Work Sheet

INFOID:0000000014392620

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		☐ Does not operate ( ) function			
		☐ Warning lamp for ( ) turns ON.			
		☐ Noise ☐ Vibration			
		☐ Other ( )			
First occurrence		☐ Recently ☐ Other ( )			
Frequency of occurrence		☐ Always ☐ Under a certain conditions of ☐ Sometimes (time(s)/day)			
Climate conditions		☐ Irrelevant			
	Weather	☐ Fine ☐ Cloud ☐ Rain ☐Snow ☐ Others ( )			
	Temperature	☐ Hot ☐Warm ☐ Cool ☐ Cold ☐ Temperature [Approx. °C (°F)]			
	Relative humidity	☐ High ☐ Moderate ☐ Low			
Road conditions		☐ Urban area ☐ Suburb area ☐ Highway ☐ Mountainous road (uphill or downhill) ☐ Rough road			
Operating condition, etc.		☐Irrelevant ☐When engine starts ☐ During idling ☐ During driving ☐ During acceleration ☐ At constant speed driving ☐ During deceleration ☐ During cornering (right curve or left curve) ☐ When steering wheel is steered (to right or to left)			

Interview sheet

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

Memo

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

Description

INFOID:0000000014392621

After replacing the ABS actuator and electric unit (control unit), perform the following procedures:
- Neutral position adjustment for the steering angle sensor
- Calibration of the decel G sensor

Work Procedure

INFOID:0000000014392622

1.PERFORM THE NEUTRAL POSITION ADJUSTMENT FOR THE STEERING ANGLE SENSOR

Perform the neutral position adjustment for the steering angle sensor.

>> Refer to BRC-70, "Work Procedure", GO TO 2.

2.PERFORM CALIBRATION OF THE DECEL G SENSOR

Perform calibration of the decel G sensor.

>> Refer to BRC-72, "Work Procedure".

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Description

INFOID:0000000014392623

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

×: Required –: Not required

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

Work Procedure

INFOID:0000000014392624

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

CAUTION:

To adjust neutral position of steering angle sensor, make sure to use CONSULT.
(Adjustment cannot be done without CONSULT).

1.ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

>> GO TO 2.

2.PERFORM THE NEUTRAL POSITION ADJUSTMENT FOR THE STEERING ANGLE SENSOR

1. On the CONSULT screen, touch “Work support” and “ST ANGLE SENSOR ADJUSTMENT” in order.
2. Touch “Start”.
   CAUTION:
   Do not touch steering wheel while adjusting steering angle sensor.
3. After approximately 10 seconds, touch “End”.
   NOTE:
   After approximately 60 seconds, it ends automatically.
4. Turn ignition switch OFF, then turn it ON again.
   CAUTION:
   Be sure to perform above operation.

>> GO TO 3.

3.CHECK DATA MONITOR

1. Run vehicle with front wheels in straight-ahead position, then stop.
2. Select “Data Monitor” mode. Then make sure “STR ANGLE SIG” is within 0±2.5°.

Is the steering angle within the specified range?

YES >> GO TO 4.
NO >> Perform the neutral position adjustment for the steering angle sensor again, GO TO 1

4.ERASE THE SELF-DIAGNOSIS MEMORY

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

- ABS actuator and electric unit (control unit): Refer to BRC-43, "CONSULT Function (ABS)".
- ECM: Refer to EC-805, "CONSULT Function" (Cummins 5.0L) or EC-94, "CONSULT Function" (VK56VD).

Are the memories erased?

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

CALIBRATION OF DECEL G SENSOR

Description

INFOID:0000000014392625

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

×: Required –: Not required

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

Work Procedure

INFOID:0000000014392626

CALIBRATION OF DECEL G SENSOR

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

1.ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

>> GO TO 2.

2.PERFORM CALIBRATION OF DECEL G SENSOR

1. On the CONSULT screen, touch “Work support” and “DECEL G SEN CALIBRATION” in order.
2. Touch “Start”.
3. After approximately 10 seconds, touch “End”.
   NOTE:
   After approximately 60 seconds, it ends automatically.
4. Turn ignition switch OFF, then turn it ON again.
   CAUTION:
   Be sure to perform above operation.

>> GO TO 3.

3.CHECK DATA MONITOR

1. Run vehicle with front wheels in straight-ahead position, then stop.
2. Select “Data Monitor”. Then make sure “DECEL G SEN” is within ± 0.05G.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Perform calibration of decel G sensor again, GO TO 1.

4.ERASE THE SELF-DIAGNOSIS MEMORY

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

- ABS actuator and electric unit (control unit): Refer to BRC-43, "CONSULT Function (ABS)".
- ECM: Refer to EC-805, "CONSULT Function" (Cummins 5.0L) or EC-94, "CONSULT Function" (VK56VD).

Are the memories erased?

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

DTC/CIRCUIT DIAGNOSIS

C1101, C1102, C1103, C1104 WHEEL SENSOR

DTC Description

INFOID:0000000014392627

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • Wheel sensor • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • Vehicle was not driven after previous repair

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

CONSULT
1. Start the engine.
2. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
3. Stop the vehicle.
4. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
5. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
6. Repeat step 4 to 5 two or more times.
7. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

YES-1 >> “C1101”, “C1102”, “C1103” or “C1104” is displayed by “CRNT”: Proceed to BRC-75, "Diagnosis Procedure".

YES-2 >> “C1101”, “C1102”, “C1103” and “C1104” are displayed by “PAST”: Inspection End. (Erase the memory of “Self Diagnostic Result” mode of “ABS”.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392628

CAUTION:
Never check between wheel sensor harness connector terminals.

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)

CONSULT
1. Replace the wheel sensor.
- Front: Refer to BRC-160, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-162, "REAR WHEEL SENSOR : Removal and Installation".
2. Erase “Self Diagnostic Result” mode of “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
4. Start the engine.
5. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
6. Stop the vehicle.
7. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
8. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
9. Repeat step 7 to 8 two or more times.
10. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1101”, “C1102”, “C1103” or “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 5.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 4.

4.PERFORM SELF DIAGNOSTIC RESULT (1)

CONSULT
1. Erase “Self Diagnostic Result” mode of “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. Start the engine.
4. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:

Vehicle must be driven after repair or replacement to erase the previous DTCs.
5. Stop the vehicle.
6. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
7. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
8. Repeat step 6 to 7 two or more times.
9. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

YES >> GO TO 5.
NO >> Inspection End.

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-165, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair / replace harness, connector, fuse, or fusible link.

6. CHECK TERMINAL

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

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair / replace harness, connector, or terminal, and GO TO 7.

7. PERFORM SELF DIAGNOSTIC RESULT (2)

CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase “Self Diagnostic Result” mode of “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
5. Start the engine.
6. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
7. Stop the vehicle.
8. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
9. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
10. Repeat step 8 to 9 two or more times.
11. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

YES >> GO TO 8.
NO >> Inspection End.

8. CHECK WHEEL SENSOR HARNESS

1. Turn the ignition switch OFF.

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

- Measurement connector and terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E125	20	E18 (Front LH wheel)	1	Yes
	33	E117 (Front RH wheel)		
	22	C11 (Rear LH wheel)		
	35	C10 (Rear RH wheel)		

- Measurement connector and terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E125	34	E18 (Front LH wheel)	2	Yes
	19	E117 (Front RH wheel)		
	36	C11 (Rear LH wheel)		
	21	C10 (Rear RH wheel)		

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair / replace harness or connector, and GO TO 9.

9. PERFORM SELF DIAGNOSTIC RESULT (3)

CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase “Self Diagnostic Result” mode of “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
5. Start the engine.
6. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
7. Stop the vehicle.
8. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
9. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
10. Repeat step 8 to 9 two or more times.
11. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

YES >> GO TO 10.
NO >> Inspection End.

10. CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Disconnect ABS actuator and electric unit (control unit) harness connector.
2. Disconnect wheel sensor harness connector.
3. Connect ABS active wheel sensor tester KV991J0080 (J-45741-A) to wheel sensor using appropriate adapter.

4. Turn the ABS active wheel sensor tester power switch ON.
   NOTE:
   The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.
5. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash ON and OFF to indicate an output signal.
   NOTE:
   If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> GO TO 11.

11. REPLACE WHEEL SENSOR

CONSULT
1. Replace the wheel sensor.
- Front: Refer to BRC-160, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-162, "REAR WHEEL SENSOR : Removal and Installation".
2. Erase “Self Diagnostic Result” mode of “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
4. Start the engine.
5. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
6. Stop the vehicle.
7. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
8. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
9. Repeat step 7 to 8 two or more times.
10. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1101”, “C1102”, “C1103” or “C1104” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Inspection End.

C1105, C1106, C1107, C1108 WHEEL SENSOR

DTC Description

INFOID:0000000014392629

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1105	RR RH SENSOR-2 (Rear RH wheel sensor-2)	• When power supply voltage of rear RH wheel sensor is low. • When distance between rear RH wheel sensor and rear RH wheel sensor rotor is large. • When installation of rear RH wheel sensor or rear RH wheel sensor rotor is not normal.
C1106	RR LH SENSOR-2 (Rear LH wheel sensor-2)	• When power supply voltage of rear LH wheel sensor is low. • When distance between rear LH wheel sensor and rear LH wheel sensor rotor is large. • When installation of rear LH wheel sensor or rear LH wheel sensor rotor is not normal.
C1107	FR RH SENSOR-2 (Front RH wheel sensor-2)	• When power supply voltage of front RH wheel sensor is low. • When distance between front RH wheel sensor and front RH wheel sensor rotor is large. • When installation of front RH wheel sensor or front RH wheel sensor rotor is not normal.
C1108	FR LH SENSOR-2 (Front LH wheel sensor-2)	• When power supply voltage of front LH wheel sensor is low. • When distance between front LH wheel sensor and front LH wheel sensor rotor is large. • When installation of front LH wheel sensor or front LH wheel sensor rotor is not normal.

POSSIBLE CAUSE

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

PAST DTC	CRNT DTC
• Harness or connector • Wheel sensor • Sensor rotor • Tire size • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • Wheel sensor • Sensor rotor • ABS actuator and electric unit (control unit) • Tire size • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • Vehicle was not driven after previous repair

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

CONSULT
1. Start the engine.
2. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
3. Stop the vehicle.
4. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
5. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
6. Repeat step 4 to 5 two or more times.
7. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES-1 >> “C1105”, “C1106”, “C1107” or “C1108” is displayed by “CRNT”: Proceed to BRC-80, "Diagnosis Procedure".
YES-2 >> “C1105”, “C1106”, “C1107” and “C1108” are displayed by “PAST”: Inspection End. (Erase the memory of “Self Diagnostic Result” mode of “ABS”.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392630

CAUTION:
Never check between wheel sensor harness connector terminals.

1.CHECK WHEEL HUB ASSEMBLY

Check that there is no excessive looseness in wheel hub assembly.
- Front: Refer to FSU-6, "Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace the wheel hub assembly, and GO TO 2.
- Front: Refer to FSU-29, "Removal and Installation".

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-140, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness, connector, fuse, or fusible link.

3.CHECK TIRE

1. Turn the ignition switch OFF.
2. Check the tire air pressure, wear and size. Refer to WT-65, "Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Adjust air pressure or replace tire, and GO TO 4.

4.CHECK DATA MONITOR (1)

CONSULT
1. Erase “Self Diagnostic Result” mode of “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the 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 5.
NO >> GO TO 6.

5.PERFORM SELF DIAGNOSTIC RESULT (1)

CONSULT
1. Stop the vehicle.

2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Repeat step 2 to 3 two or more times.
5. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> GO TO 6.
NO >> Inspection End.

6.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-160, "FRONT WHEEL SENSOR : Removal and Installation".**
   - **Rear: Refer to BRC-162, "REAR WHEEL SENSOR : Removal and Installation".**

Is the inspection result normal?

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

7.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Disconnect ABS actuator and electric unit (control unit) harness connector.
2. Disconnect wheel sensor harness connector.
3. Connect ABS active wheel sensor tester KV991J0080 (J-45741-A) to wheel sensor using appropriate adapter.
4. Turn the ABS active wheel sensor tester power switch ON.
   NOTE:
   The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.
5. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash ON and OFF to indicate an output signal.
   NOTE:
   If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

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

8.REPLACE WHEEL SENSOR (1)

CONSULT
1. Replace the wheel sensor.
- Front: Refer to BRC-160, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-162, "REAR WHEEL SENSOR : Removal and Installation".
2. Erase “Self Diagnostic Result” mode of “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
4. Start the engine.
5. 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.
   NOTE:

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

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the 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 8.
NO >> GO TO 20.

9.PERFORM SELF DIAGNOSTIC RESULT (2)

CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Repeat step 2 to 3 two or more times.
5. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> GO TO 20.
NO >> Inspection End.

10.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 12.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 10.

11.CHECK DATA MONITOR (2)

CONSULT
1. Erase “Self Diagnostic Result” mode of “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the 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 11.
NO >> GO TO 12.

12.PERFORM SELF DIAGNOSTIC RESULT (3)

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

4. Repeat step 2 to 3 two or more times.
5. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> GO TO 12.
NO >> Inspection End.

13. CHECK TERMINAL

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

Is the inspection result normal?

YES >> GO TO 15.
NO >> Repair / replace harness, connector, or terminal, and GO TO 13.

14. CHECK DATA MONITOR (3)

CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase “Self Diagnostic Result” mode of “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the 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 14.
NO >> GO TO 15.

15. PERFORM SELF DIAGNOSTIC RESULT (4)

CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Repeat step 2 to 3 two or more times.
5. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> GO TO 15.
NO >> Inspection End.

16. CHECK WHEEL SENSOR HARNESS

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E125	20, 34	Ground	No
	33, 19		
	22, 36		
	35, 21		

Is the inspection result normal?

YES >> GO TO 16.
NO >> Repair / replace harness or connector, and GO TO 16.

17. CHECK DATA MONITOR (4)

CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase “Self Diagnostic Result” mode of “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the 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 17.
NO >> GO TO 18.

18. PERFORM SELF DIAGNOSTIC RESULT (5)

CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Repeat step 2 to 3 two or more times.
5. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> GO TO 18.
NO >> Inspection End.

19. REPLACE WHEEL SENSOR (2)

CONSULT
1. Replace the wheel sensor.
- Front: Refer to BRC-160, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-162, "REAR WHEEL SENSOR : Removal and Installation".
2. Erase “Self Diagnostic Result” mode of “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.

4. Start the engine.
5. 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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the 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 19.
NO >> GO TO 20.

20. PERFORM SELF DIAGNOSTIC RESULT (6)

CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Repeat step 2 to 3 two or more times.
5. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> GO TO 20.
NO >> Inspection End.

21. REPLACE SENSOR ROTOR

CONSULT
1. Replace the sensor rotor.
- Front: Refer to BRC-160, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-162, "REAR WHEEL SENSOR : Removal and Installation".
2. Erase “Self Diagnostic Result” mode of “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
4. Start the engine.
5. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
6. Stop the vehicle.
7. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
8. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
9. Repeat step 7 to 8 two or more times.
10. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1105”, “C1106”, “C1107” or “C1108” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Inspection End.

C1109 POWER AND GROUND SYSTEM

DTC Description

INFOID:0000000014392631

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • Charge system	• Harness or connector • ABS actuator and electric unit (control unit) • IPDM E/R • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • Charge system

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

CONSULT

1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1109” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-86, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: Inspection End. (Erase the memory of “Self Diagnostic Result” mode of “ABS”.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392632

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 2.

2. PERFORM SELF DIAGNOSTIC RESULT

1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1109” detected?

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

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-140, "Diagnosis Procedure".

Is the inspection result normal?

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

4. CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

DTC Description

INFOID:0000000014392633

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • Motor/accumulator assembly

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

CONSULT

1. Turn the ignition switch OFF → ON, and wait 30 seconds.
2. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
3. Stop the vehicle.
4. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
5. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
6. Repeat step 4 to 5 two or more times.
7. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1111” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-88, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: Inspection End. (Erase the memory of “Self Diagnostic Result” mode of “ABS”.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392634

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 2.

2. PERFORM SELF DIAGNOSTIC RESULT

CONSULT
1. Turn the ignition switch OFF → ON, and wait 30 seconds.
2. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
3. Stop the vehicle.
4. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
5. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
6. Repeat step 4 to 5 two or more times.
7. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1111” detected?

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

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-140, "Diagnosis Procedure".

Is the inspection result normal?

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

4. ERASE SELF DIAGNOSTIC RESULT (1)

CONSULT
1. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
2. Stop the vehicle.
3. Erase “Self Diagnostic Result” mode of “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.

>> Inspection End.

5. CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness or connector, and GO TO 6.

6. ERASE SELF-DIAGNOSIS RESULT (2)

CONSULT
1. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

2. Stop the vehicle.
3. Erase “Self Diagnostic Result” mode of “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.

>> Inspection End.

C1115 WHEEL SENSOR

DTC Description

INFOID:0000000014392635

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 the vehicle is driven, because of installation of other tires than specified.

POSSIBLE CAUSE

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

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

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

CONSULT
1. Start the engine.
2. Drive the vehicle at approx. 50 km/h (19 MPH) or more for approx. 2 minutes.
3. Stop the vehicle.
4. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
5. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
6. Repeat step 4 to 5 two or more times.
7. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1115” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-91, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: Inspection End. (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392636

CAUTION:

Never check between wheel sensor harness connector terminals.

1.CHECK TIRE

Check the tire air pressure, wear and size. Refer to WT-65, "Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Adjust air pressure or replace tire and GO TO 2.

2.CHECK DATA MONITOR (1)

CONSULT
1. Erase “Self Diagnostic Result” mode of “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
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” mode recording speed to “10 msec”.
5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the 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 3.
NO >> GO TO 4.

3.PERFORM SELF DIAGNOSTIC RESULT (1)

CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Repeat step 2 to 3 two or more times.
5. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1115” detected?

YES >> GO TO 4.
NO >> Inspection End.

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-140, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair / replace harness, connector, fuse, or fusible link.

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-160, "FRONT WHEEL SENSOR : Removal and Installation".**
- **Rear: Refer to BRC-162, "REAR WHEEL SENSOR : Removal and Installation".**

Is the inspection result normal?

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

6. REPLACE WHEEL SENSOR (1)

CONSULT
1. Replace the wheel sensor.
- Front: Refer to BRC-160, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-162, "REAR WHEEL SENSOR : Removal and Installation".
2. Erase “Self Diagnostic Result” mode of “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
4. Start the engine.
5. 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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the 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 DIAGNOSTIC RESULT (2)

CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Repeat step 2 to 3 two or more times.
5. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1115” detected?

YES >> GO TO 8.
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 / replace harness or connector, securely lock the connector, and GO TO 9.

9. CHECK DATA MONITOR (2)

CONSULT
1. Erase “Self Diagnostic Result” mode of “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the 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 DIAGNOSTIC RESULT (3)

CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Repeat step 2 to 3 two or more times.
5. Select “Self Diagnostic Result” mode of “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 wheel sensor harness connector and check each wheel sensor pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair / replace harness, connector, or terminal, and GO TO 12.

12. CHECK DATA MONITOR (3)

CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase “Self Diagnostic Result” mode of “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the 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 DIAGNOTSTIC RESULT (4)

CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Repeat step 2 to 3 two or more times.
5. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1115” detected?

YES >> GO TO 14.
NO >> Inspection End.

14. CHECK WHEEL SENSOR HARNESS

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

- Measurement connector and terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E125	20	E18 (Front LH wheel)	1	Yes
	33	E117 (Front RH wheel)		
	22	C11 (Rear LH wheel)		
	35	C10 (Rear RH wheel)		

- Measurement connector and terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	
E125	34	E18 (Front LH wheel)	2	Yes
	19	E117 (Front RH wheel)		
	36	C11 (Rear LH wheel)		
	21	C10 (Rear RH wheel)		

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		
E125	20, 34	Ground	No
	33, 19		
	22, 36		
	35, 21		

Is the inspection result normal?

YES >> GO TO 15.
NO >> Repair / replace harness or connector, and GO TO 15.

15. CHECK DATA MONITOR (4)

CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
3. Erase “Self Diagnostic Result” mode of “ABS”.
4. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
5. Start the engine.
6. Select “ABS” and “Data Monitor” mode, 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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the 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 DIAGNOSTIC RESULT (5)

CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Repeat step 2 to 3 two or more times.
5. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1115” detected?

YES >> GO TO 17.
NO >> Inspection End.

17. REPLACE WHEEL SENSOR (2)

CONSULT
1. Replace the wheel sensor.
- Front: Refer to BRC-160, "FRONT WHEEL SENSOR : Removal and Installation".
- Rear: Refer to BRC-162, "REAR WHEEL SENSOR : Removal and Installation".
2. Erase “Self Diagnostic Result” mode of “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
4. Start the engine.
5. 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.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.

Note the difference at 50 km/h (31 MPH) between the wheel speed detected by the 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 DIAGNOSTIC RESULT(6)

CONSULT
1. Stop the vehicle.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Repeat step 2 to 3 two or more times.
5. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1115” detected?

YES >> GO TO 19.
NO >> Inspection End.

19. REPLACE SENSOR ROTOR

CONSULT
1. Replace the sensor rotor.
- Front: Refer to BRC-164, "FRONT SENSOR ROTOR : Removal and Installation - Front Sensor Rotor".
- Rear: Refer to BRC-164, "REAR SENSOR ROTOR : Removal and Installation - Rear Sensor Rotor".
2. Erase “Self Diagnostic Result” mode of “ABS”.
3. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
4. Start the engine.
5. Drive the vehicle at approx. 50 km/h (31 MPH) or more for approx. 2 minutes.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
6. Stop the vehicle.
7. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
8. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
9. Repeat step 7 to 8 two or more times.
10. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1115” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Inspection End.

C1116 STOP LAMP SWITCH

DTC Description

INFOID:0000000014392637

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

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

PAST DTC	CRNT DTC
• Harness or connector • Stop lamp switch signal circuit	• Harness or connector • Stop lamp switch • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • Stop lamp relay (if equipped)

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

CONSULT

1. Turn the ignition switch OFF, and wait 10 seconds or more.
2. Start the engine.
   NOTE:
   Stop the vehicle.
3. Wait 1 minute or more.
   NOTE:
   Never depress brake pedal.
4. Depress brake pedal by 100 mm (3.94 in) or more, and maintain at that position for a minimum of 1 minute or more.
5. Release brake pedal, and wait 1 minute or more.
6. Repeat step 4 to 5 ten or more times.
7. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
8. Start the engine.
   NOTE:
   Wait at least 10 seconds after starting the engine.
9. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1116” detected?

YES-1 >> “C1116” is displayed as “CRNT”: Proceed to BRC-99, "Diagnosis Procedure".
YES-2 >> “C1116” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-49, "Circuit Inspection".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392638

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

1.INTERVIEW FROM THE CUSTOMER

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

Is there such a history?

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

2.PERFORM SELF-DIAGNOSIS

CONSULT
1. Erase “Self Diagnostic Result” of “ABS”
2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. Start the engine.
   NOTE:
   Stop the vehicle.
4. Depress the brake pedal several times.
5. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
6. Start the engine.
   NOTE:
   Wait at least 10 seconds after starting the engine.
7. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1116” detected?

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

3.STOP LAMP FOR ILLUMINATION

Depress brake pedal and check that stop lamp turns ON.

Does stop lamp turn ON?

YES >> GO TO 5.
NO >> Check the stop lamp system. Refer to BRC-99, "Diagnosis Procedure". GO TO 4.

4.CHECK DATA MONITOR (1)

CONSULT
1. Erase “Self Diagnostic Result” of “ABS”
2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. Start the engine.
   NOTE:
   Stop the vehicle.
4. Select “Data Monitor” mode of “ABS”, check “STOP LAMP SW”. Check that data monitor displays “On” or “Off” when brake pedal is depressed or released. Refer to BRC-48, "Reference Value".
5. Select “Data Monitor” mode of “ABS”, check “PRESS SENSOR”. Check that data monitor displays “5 bar” or less when brake pedal is depressed. Refer to BRC-48, "Reference Value".

Is the inspection result normal?

YES >> Inspection End.
NO >> GO TO 5.

5.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 stop lamp switch harness connector for disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair / replace harness or connector, and GO TO 6.

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to BRC-86, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair / replace harness, connector, fuse, or fusible link.

7.CHECK STOP LAMP SWITCH CLEARANCE

1. Turn the ignition switch OFF.
2. Check the stop lamp switch clearance. Refer to BR-10, "Inspection".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Adjust stop lamp switch clearance. Refer to BR-10, "Adjustment". GO TO 8.

8.CHECK DATA MONITOR (2)

CONSULT
1. Erase “Self Diagnostic Result” of “ABS”
2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. Start the engine.
   NOTE:
   Stop the vehicle.
4. Select “Data Monitor” mode of “ABS”, check “STOP LAMP SW”. Check that data monitor displays “On” or “Off” when brake pedal is depressed or released. Refer to BRC-48, "Reference Value".
5. Select “Data Monitor” mode of “ABS”, check “PRESS SENSOR”. Check that data monitor displays “5 bar” or less when brake pedal is depressed. Refer to BRC-48, "Reference Value".

Is the inspection result normal?

YES >> Inspection End.
NO >> GO TO 9.

9.CHECK STOP LAMP SWITCH

Check the stop lamp switch. Refer to BRC-102, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace the stop lamp switch. Refer to BR-21, "Exploded View". GO TO 10.

10.CHECK DATA MONITOR (3)

CONSULT
1. Erase “Self Diagnostic Result” of “ABS”
2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. Start the engine.
   NOTE:
   Start the vehicle.
4. Select “Data Monitor” mode of “ABS”, check “STOP LAMP SW”. Check that data monitor displays “On” or “Off” when brake pedal is depressed or released. Refer to BRC-48, "Reference Value".
5. Select “Data Monitor” mode of “ABS”, check “PRESS SENSOR”. Check that data monitor displays “5 bar” or less when brake pedal is depressed. Refer to BRC-48, "Reference Value".

Is the inspection result normal?

YES >> Inspection End.
NO >> GO TO 11.

11. CHECK CONNECTOR AND TERMINAL

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

Is the inspection result normal?

YES >> GO TO 13.
NO >> Repair / replace harness, connector, or terminal, and GO TO 12.

12. CHECK DATA MONITOR (4)

CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect stop lamp switch harness connector.
3. Erase “Self Diagnostic Result” of “ABS”
4. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
5. Start the engine.
   NOTE:
   Stop the vehicle.
6. Select “Data Monitor” mode of “ABS”, check “STOP LAMP SW”. Check that data monitor displays “On” or “Off” when brake pedal is depressed or released. Refer to BRC-48, "Reference Value".
7. Select “Data Monitor” mode of “ABS”, check “PRESS SENSOR”. Check that data monitor displays “5 bar” or less when brake pedal is depressed. Refer to BRC-48, "Reference Value".

Is the inspection result normal?

YES >> Inspection End.
NO >> GO TO 13.

13. CHECK STOP LAMP SWITCH CIRCUIT (1)

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

ABS actuator and electric unit (control unit)		—	Condition	Voltage (Approx.)
Connector	Terminal			
E125	17	Ground	Brake pedal depressed	10 – 16 V
			Brake pedal not depressed	0 V

4. Turn the ignition switch ON.
5. Check the voltage between ABS actuator and electric unit (control unit) harness connector and ground.

ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E125	17	Ground	Brake pedal depressed	10 – 16 V
			Brake pedal not depressed	0 V

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness or connector, and GO TO 14.

14. CHECK STOP LAMP SWITCH CIRCUIT (2)

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

ABS actuator and electric unit (control unit)		Stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E125	17	E38	4	Yes

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E125	17	Ground	No

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness or connector, and GO TO 16.

15. CHECK DATA MONITOR (5)

CONSULT
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect stop lamp switch harness connector.
3. Erase “Self Diagnostic Result” of “ABS”
4. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
5. Start the engine.
   NOTE:
   Stop the vehicle.
6. Select “Data Monitor” mode of “ABS”, check “STOP LAMP SW”. Check that data monitor displays “On” or “Off” when brake pedal is depressed or released. Refer to BRC-48, "Reference Value".
7. Select “Data Monitor” mode of “ABS”, check “PRESS SENSOR”. Check that data monitor displays “5 bar” or less when brake pedal is depressed. Refer to BRC-48, "Reference Value".

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

Component Inspection

INFOID:0000000014392639

1. CHECK STOP LAMP SWITCH

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

Stop lamp switch	Condition	Continuity
Terminal		
2 – 1	When stop lamp switch is released (When brake pedal is depressed)	Yes
4 – 3	When stop lamp switch is pressed (When brake pedal is released)	No

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace the stop lamp switch. Refer to BR-21, "Exploded View".

C1118 TRANSFER CONTROL UNIT

DTC Logic

INFOID:0000000014392640

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

CONSULT
1. Turn the ignition switch OFF to ON.
2. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1118” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-104, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000014392641

1.CHECK TRANSFER CONTROL UNIT SYSTEM

CONSULT
Select “Self Diagnostic Result” mode of “ALL MODE AWD/4WD”.

Is any DTC detected?

YES >> Check the DTC.
NO >> GO TO 2.

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

CONSULT.
1. Erase “Self Diagnostic Result” mode of “ABS”.
2. Turn the ignition switch OFF.
3. Start the engine and drive the vehicle for a short period of time.
4. Check that the 4WD warning lamp turns OFF.
5. After the vehicle stops, select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1118” detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-165, "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:0000000014392642

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1120”, “C1122”, “C1124” or “C1126” detected?

YES-1 >> “C1120”, “C1122”, “C1124” or “C1126” is displayed by “CRNT”: Proceed to BRC-106, "Diagnosis Procedure".
YES-2 >> “C1120”, “C1122”, “C1124” or “C1126” is displayed by “PAST”: Inspection End (Erase the memory of “Self Diagnostic Result” mode of “ABS”.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392643

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 2.

2.PERFORM SELF DIAGNOSTIC RESULT

CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1120”, “C1122”, “C1124” or “C1126” detected?

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

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-140, "Diagnosis Procedure".

Is the inspection result normal?

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

4.CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM

DTC Description

INFOID:0000000014392644

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1121”, “C1123”, “C1125” or “C1127” detected?

YES-1 >> “C1121”, “C1123”, “C1125” or “C1127” is displayed by “CRNT”: Proceed to BRC-108, "Diagnosis Procedure".
YES-2 >> “C1121”, “C1123”, “C1125” and “C1127” are displayed by “PAST”: Inspection End (Erase the memory of “Self Diagnostic Result” mode of “ABS”.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392645

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 2.

2.SELECT SELF DIAGNOSTIC RESULT

1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1121”, “C1123”, “C1125” or “C1127” detected?

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

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-140, "Diagnosis Procedure".

Is the inspection result normal?

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

4.CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1130 ENGINE SIGNAL

DTC Description

INFOID:0000000014392646

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • CAN communication line	• Harness or connector • ECM • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • CAN communication line

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1130” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-109, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: Inspection End (Erase the memory of “Self Diagnostic Result” mode of “ABS”.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392647

1.CHECK ENGINE SYSTEM

CONSULT
Select “Self Diagnostic Result” mode of “ENGINE”.

Is DTC detected?

YES >> Check the DTC. Refer to EC-837, "DTC Index" (Cummins 5.0L) or EC-136, "DTC Index" (VK56VD).
NO >> GO TO 2.

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-165, "Removal and Installation".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness, connector, fuse, or fusible link.

3.CHECK CONNECTOR AND TERMINAL

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

Is the inspection result normal?

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

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

CONSULT
1. Connect ECM harness connector.
2. Connect ABS actuator and electric unit (control unit) harness connector.
3. Erase “Self Diagnostic Result” mode of “ABS”.
4. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
5. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
6. Repeat step 4 to 5 two or more times.
7. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1130” or “U1000”detected?

YES (“C1130”)>>GO TO 1.
YES (“U1000”)>>Refer to LAN-53, "Trouble Diagnosis Flow Chart".
NO >> Inspection End.

C1140 ACTUATOR RELAY SYSTEM

DTC Description

INFOID:0000000014392648

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1140” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-111, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: Inspection End (Erase the memory of “Self Diagnostic Result” mode of “ABS”.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392649

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 2.

2.PERFORM SELF DIAGNOSTIC RESULT

CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1140” detected?

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

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-140, "Diagnosis Procedure".

Is the inspection result normal?

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

4.CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1142 PRESS SENSOR

DTC Description

INFOID:0000000014392650

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

PAST DTC	CRNT DTC
• Harness or connector • Air inclusion in the brake piping • Stop lamp switch system • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector (Pressure sensor external type) • Stop lamp switch system • ABS actuator and electric unit (control unit) • Brake system • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • Air inclusion in the brake piping

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1142” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-113, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: Inspection End (Erase the memory of self-diagnosis results.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392651

1.CHECK STOP LAMP SWITCH SYSTEM

Check the stop lamp switch system. Refer to BRC-102, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace stop lamp switch system.

2.CHECK BRAKE FLUID LEAKAGE

Check the brake fluid leakage. Refer to BR-12, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace brake fluid leakage part.

3.CHECK BRAKE PIPING

Check the brake piping.
- Front: Refer to BR-26, "FRONT : Inspection".
- Rear: Refer to BR-31, "REAR : Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace brake piping.
- Front: Refer to BR-25, "FRONT : Removal and Installation".
- Rear: Refer to BR-30, "REAR : Removal and Installation".

4.CHECK BRAKE PEDAL

Check the brake pedal.
- Brake pedal height: Refer to BR-10, "Inspection".
- Brake pedal assembly: Refer to BR-10, "Inspection" and BR-10, "Adjustment".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust the brake pedal height or replace brake pedal assembly.
- Adjust the brake pedal: Refer to BR-10, "Inspection" and BR-10, "Adjustment".
- Replace the brake pedal: Refer to BR-21, "Removal and Installation".

5.CHECK BRAKE HYDRAULIC BOOSTER ASSEMBLY

Check the brake hydraulic booster assembly. Refer to BR-16, "Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace brake hydraulic booster assembly. Refer to BR-33, "Removal and Installation".

6.CHECK FRONT DISC BRAKE

Check the front disc brake.
- BR-17, "DISC BRAKE ROTOR : Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace front disc brake.
- Refer to BR-43, "DISC BRAKE ROTOR : Removal and Installation".

7.CHECK REAR DISC BRAKE

Check the rear disc brake.
- Refer to BR-50, "DISC BRAKE ROTOR : Exploded View".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace rear disc brake.
- Refer to BR-50, "DISC BRAKE ROTOR : Removal and Installation".

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-140, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair / replace harness, connector, fuse, or fusible link.

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

CONSULT
1. Erase “Self Diagnostic Result” mode of “ABS”.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Repeat step 2 to 3 two or more times.
5. Start the engine and drive the vehicle for a short period of time.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
6. Stop the vehicle.
7. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1142” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NO >> Check the ABS actuator and electric unit (control unit) harness connector and terminal for damage, looseness and disconnection. Repair / replace harness, connector, or terminal.

C1143 STEERING ANGLE SENSOR

DTC Description

INFOID:0000000014392652

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

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

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

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

CONSULT

1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1143” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-116, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: Inspection End.
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392653

1.ADJUST THE NEUTRAL POSITION OF STEERING ANGLE SENSOR

CONSULT

Perform neutral position adjustment of steering angle sensor. Refer to BRC-70, "Description".

>> GO TO 2.

2.PERFORM SELF DIAGNOSTIC RESULT (1)

CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1143” detected?

YES-1 >> “CRNT” is displayed: GO TO 3.
YES-2 >> “PAST” is displayed: Inspection End (Erase the memory of self-diagnosis results.)
NO >> Inspection End.

3.CHECK CONNECTOR

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

Is the inspection result normal?

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

4.PERFORM SELF DIAGNOSTIC RESULT (2)

CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1143” detected?

YES >> GO TO 5.
NO >> Inspection End.

5.CHECK STEERING ANGLE SENSOR POWER SUPPLY

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

Steering angle sensor		—	Voltage (Approx.)
Connector	Terminal		
M17	4	Ground	0 V

4. Turn the ignition switch ON.
   NOTE:
   Start the engine.
5. Check the voltage between steering angle sensor harness connector and ground.

Steering angle sensor		—	Voltage (Approx.)
Connector	Terminal		
M17	4	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. CHECK STEERING ANGLE SENSOR POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#30).
3. Disconnect Fuse block (J/B) harness connector.
4. Check the continuity between steering angle sensor harness connector and IPDM E/R harness connector.

Steering angle sensor		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
M17	4	M39	2Q	Yes

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

Steering angle sensor		—	Continuity
Connector	Terminal		
M17	4	Ground	No

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.
NO >> Repair / replace harness, connector, or fuse.

7. CHECK STEERING ANGLE SENSOR GROUND CIRCUIT

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

Steering angle sensor		—	Continuity
Connector	Terminal		
M17	1	Ground	Yes

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair / replace harness or connector.

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-140, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair / replace harness, connector, fuse, or fusible link.

9. CHECK TERMINAL

1. Check the steering angle sensor pin terminals for damage or loose connection with harness connector.
2. Check the fuse block (J/B) pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

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

10. CHECK CAN COMMUNICATION LINE

Check the CAN communication line. Refer to LAN-53, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair / replace harness or connector. Refer to LAN-41, "Precautions for Harness Repair".

11. CHECK DATA MONITOR

CONSULT
1. Select “Data Monitor” mode of “ABS”, and check “STR ANGLE SIG”.
2. Check that the indication changes with the steering angle when the steering wheel is turned left/right from the neutral position. Refer to BRC-48, "Reference Value".

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NO >> Replace the steering angle sensor. Refer to BRC-168, "Removal and Installation".

C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

DTC Description

INFOID:0000000014392654

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

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

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

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

CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1144” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-120, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: Inspection End (Erase the memory of “Self Diagnostic Result” mode of “ABS”.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392655

1.ADJUST THE NEUTRAL POSITION OF STEERING ANGLE SENSOR

Perform neutral position adjustment of steering angle sensor. Refer to BRC-70, "Description".

>> GO TO 2.

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

CONSULT
1. Turn the ignition switch OFF.

NOTE:
Wait at least 10 seconds after turning ignition switch OFF.

2. Start the engine.

NOTE:
Wait at least 10 seconds after start the engine.

3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1144” detected?

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

3.CHECK STEERING ANGLE SENSOR SYSTEM

1. Turn the ignition switch OFF.
2. Check the steering angle sensor system. Refer to BRC-116, "Diagnosis Procedure".

Is the inspection result normal?

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

4.CHECK DATA MONITOR

CONSULT

1. Select “ABS”, “Data Monitor” and “STR ANGLE SIG” in this order.
2. Check that the indication changes with the steering angle when the steering wheel is turned left/right from the neutral position. Refer to BRC-48, "Reference Value".

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Replace the steering angle sensor. Refer to BRC-168, "Removal and Installation".

C1145, C1146 YAW RATE/SIDE G SENSOR

DTC Description

INFOID:0000000014392656

DTC DETECTION LOGIC

DTC	Display item (Trouble diagnosis content)	Malfunction detected condition
C1145	YAW RATE SENSOR (Yaw rate sensor circuit)	• When a malfunction is detected in yaw rate signal. • When a signal line of yaw rate/side/decel G sensor is open or shorted. • When power supply voltage of yaw rate/side/decel G sensor is in following state. - Yaw rate/side/decel G sensor power supply voltage: 4.8 V ≥ yaw rate/side/decel G sensor power supply voltage - Yaw rate/side/decel G sensor power supply voltage: 5.2 V ≤ yaw rate/side/decel G sensor power supply voltage
C1146	SIDE G-SEN CIRCUIT (Side G sensor circuit)	When a malfunction is detected in side G signal.

POSSIBLE CAUSE

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

DTC	PAST DTC	CRNT DTC
C1145 C1146	• Harness or connector (External type) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector (External type) • Yaw rate/side/decel G sensor (External type) • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system (External type) • Fuse (External type) • Fusible link (External type) • Battery (External type)

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

CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic” mode of “ABS”.

Is DTC “C1145” or “C1146” detected?

YES-1 >> “C1145”, or “C1146” is displayed by “CRNT”: Proceed to BRC-123, "Diagnosis Procedure".
YES-2 >> “C1145”, and “C1146” are displayed by “PAST”: Inspection End (Erase the memory of “Self Diagnostic” mode of “ABS”.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392657

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to BRC-86, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair / replace harness, connector, fuse, or fusible link.

2. 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 yaw rate/side/decel G sensor harness connector for disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 3.

3. PERFORM SELF-DIAGNOSIS

CONSULT

1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Select “Self Diagnostic Result” of “ABS”.

Is DTC “C1145” or “C1146” detected?

YES >> GO TO 4.
NO >> Inspection End.

4. CHECK YAW RATE/SIDE/DECEL G SENSOR POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) harness connector.
3. Disconnect yaw rate/side/decel G sensor harness connector.
4. Check the continuity between yaw rate/side/decel G sensor harness connector and ABS actuator and electric unit (control unit) harness connector.

Yaw rate/side/decel G sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
M108	3	E125	18	Yes

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair / replace harness or connector.

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

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

Yaw rate/side/decel G sensor		–	Continuity
Connector	Terminal		
M108	6	Ground	Yes

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair / replace harness or connector.

6.CHECK YAW RATE/SIDE/DECEL G SENSOR SIGNAL CIRCUIT

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

Yaw rate/side/decel G sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
M108	4	E125	9	Yes
	5		10	

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair / replace harness or connector.

7.CHECK YAW RATE/SIDE/DECEL G SENSOR CIRCUIT

Check the continuity between each terminal of yaw rate/side/decel G sensor harness connector.

Yaw rate/side/decel G sensor		Continuity
Connector	Terminal	
M108	6 – 5	No
	6 – 4	
	6 – 3	
	3 – 4	
	3 – 5	
	4 – 5	

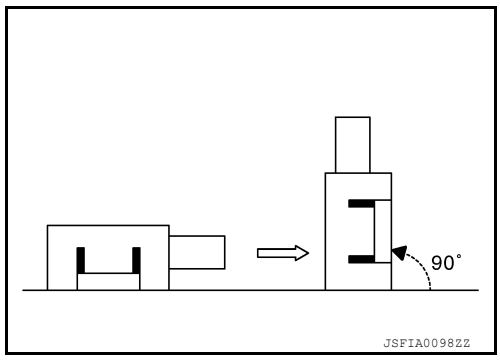
Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair / replace harness or connector.

8.CHECK YAW RATE/SIDE/DECEL G SENSOR (1)

CONSULT

1. Connect yaw rate/side/decel G sensor harness connector.
2. Connect ABS actuator and electric unit (control unit) harness connector.
3. Turn the ignition switch ON.
   NOTE:
   Never start the engine.
4. Select “Data Monitor” mode of “ABS”, check “DECEL G-SEN”.
5. Move yaw rate/side/decel G sensor as shown in the figure to check the output before and after moving the sensor.



Condition	DATA MONITOR
Horizontal	Approx. 0 G
Vertical	Approx. +1 G

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace the yaw rate/side/decel G sensor. Refer to BRC-169, "Removal and Installation".

9.CHECK YAW RATE/SIDE/DECEL G SENSOR (2)

1. Turn the ignition switch OFF.
2. Connect following terminals using a test harness installed between yaw rate/side/decel G sensor and harness connector.

Yaw rate/side/decel G sensor	Harness connector	
	Connector	Terminal
3	M108	3
4		4
5		5
6		6

3. Turn the ignition switch ON.
NOTE:
Never start the engine.
4. Check the voltage between yaw rate/side/decel G sensor harness connector terminals.
CAUTION:
Never short out the terminals while measuring voltages.

Yaw rate/side/decel G sensor		Voltage
Connector	Terminal	
M108	4 – 6	2.5 – 4.5 V
	5 – 6	0.5 – 2.5 V

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NO >> Replace the yaw rate/side/decel G sensor. Refer to BRC-169, "Removal and Installation".

C1155 BRAKE FLUID LEVEL SWITCH

DTC Description

INFOID:0000000014392658

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

PAST DTC	CRNT DTC
• Harness or connector • Brake fluid level is low	• Harness or connector • ABS actuator and electric unit (control unit) • Brake fluid level switch • Combination meter • Unified meter and A/C amp. • IPDM E/R • Brake fluid level is low

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

CONSULT

1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1155” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-126, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: Inspection End (Erase the memory of “Self Diagnostic Result” mode of “ABS”.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392659

1.CHECK BRAKE FLUID LEVEL

1. Turn the ignition switch OFF.
2. Check the brake fluid level. Refer to BR-12, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Refill brake fluid. Refer to BR-12, "Drain and Refill". GO TO 2.

2. PERFORM SELF DIAGNOSTIC RESULT (1)

CONSULT
1. Erase “Self Diagnostic Result” mode of “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Repeat step 2 to 3 two or more times.
5. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1155” detected?

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

3. CHECK CONNECTOR

1. Turn the ignition switch OFF.
2. Check the combination meter harness connector for disconnection or looseness.
3. Check the brake fluid level switch harness connector for disconnection or looseness.

Is the inspection result normal?

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

4. PERFORM SELF DIAGNOSTIC RESULT (2)

CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1155” detected?

YES >> GO TO 5.
NO >> Inspection End.

5. CHECK BRAKE FLUID LEVEL SWITCH

Check the brake fluid level switch. Refer to BR-51, "Exploded View".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace the reservoir tank. Refer to BR-52, "Disassembly and Assembly". GO TO 6.

6. PERFORM SELF DIAGNOSTIC RESULT (3)

CONSULT
1. Erase “Self Diagnostic Result” mode of “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Repeat step 2 to 3 two or more times.
5. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1155” detected?

YES >> GO TO 7.
NO >> Inspection End.

7.CHECK CONNECTOR AND TERMINAL

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

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair / replace harness, connector, or terminal, and GO TO 8.

8.PERFORM SELF DIAGNOSTIC RESULT (4)

CONSULT
1. Erase “Self Diagnostic Result” mode of “ABS”.
2. Turn the ignition switch OFF → ON → OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF or ON.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
4. Repeat step 2 to 3 two or more times.
5. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1155” detected?

YES >> GO TO 9.
NO >> Inspection End.

9.CHECK BRAKE FLUID LEVEL SWITCH CIRCUIT

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

Brake fluid level switch		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
E21	2	M125	13	Yes

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

Brake fluid level switch		—	Continuity
Connector	Terminal		
E21	2	Ground	No

Is the inspection result normal?

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

10.CHECK BRAKE FLUID LEVEL SWITCH GROUND CIRCUIT

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

Brake fluid level switch		—	Continuity
Connector	Terminal		
E21	1	Ground	Yes

Is the inspection result normal?

YES >> GO TO 11.

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

11. CHECK COMBINATION METER

Check the combination meter. Refer to MWI-27, "CONSULT Function (METER/M&A)" (Type A) or MWI-131, "CONSULT Function (METER/M&A)" (Type B).

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NO >> Repair or replace combination meter. Refer to MWI-108, "Removal and Installation" (Type A) or MWI-187, "Removal and Installation" (Type B).

Component Inspection

INFOID:0000000014392660

1. CHECK BRAKE FLUID LEVEL SWITCH

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

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace the reservoir tank. Refer to BR-52, "Disassembly and Assembly".

C1160 INCOMPLETE DECEL G SENSOR CALIBRATION

DTC Description

INFOID:0000000014392661

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Incomplete calibration of decel G sensor • 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

CONSULT

1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic” mode of “ABS”.

Is DTC “C1160” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-130, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: Inspection End (Erase the memory of “Self Diagnostic” mode of “ABS”.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392662

1.CALIBRATION OF DECEL G SENSOR

Perform calibration of decel G sensor. Refer to BRC-70, "Work Procedure".

>> GO TO 2.

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

CONSULT

1. Turn the ignition switch OFF.

NOTE:
Wait at least 10 seconds after turning ignition switch OFF.

2. Start the engine.

NOTE:
Wait at least 10 seconds after start the engine.

3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1160” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NO >> Inspection End.

C1164, C1165 CV SYSTEM

DTC Description

INFOID:0000000014392663

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

CONSULT

1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1164” or “C1165” detected?

YES-1 >> “C1164” or “C1165” is displayed by “CRNT”: Proceed to BRC-132, "Diagnosis Procedure".
YES-2 >> “C1164” and “C1165” are displayed by “PAST”: Inspection End (Erase the memory of “Self Diagnostic Result” mode of “ABS”.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392664

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 2.

2.PERFORM SELF DIAGNOSTIC RESULT

CONSULT
Select “Self Diagnostic Result” mode of “ABS” again.

Is DTC “C1164” or “C1165” detected?

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

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-140, "Diagnosis Procedure".

Is the inspection result normal?

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

4.CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1166, C1167 SV SYSTEM

DTC Description

INFOID:0000000014392665

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

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

PAST DTC	CRNT DTC
• Harness or connector • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Harness or connector • ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

CONSULT

1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1166” or “C1167” detected?

YES-1 >> “C1166” or “C1167” is displayed by “CRNT”: Proceed to BRC-134, "Diagnosis Procedure".
YES-2 >> “C1166” and “C1167” is displayed by “PAST”: Inspection End. (Erase the memory of “Self Diagnostic Result” mode of “ABS”.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392666

1.CHECK CONNECTOR

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair / replace harness or connector, securely lock the connector, and GO TO 2.

2.PERFORM SELF DIAGNOSTIC RESULT

CONSULT
Select “Self Diagnostic Result” mode of “ABS” again.

Is DTC “C1166” or “C1167” detected?

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

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuit. Refer to BRC-140, "Diagnosis Procedure".

Is the inspection result normal?

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

4.CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

C1170 VARIANT CODING

DTC Description

INFOID:0000000014392667

DTC DETECTION LOGIC

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

POSSIBLE CAUSE

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

PAST DTC	CRNT DTC
—	• ABS actuator and electric unit (control unit) • ABS actuator and electric unit (control unit) is not configured.

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

CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1170” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-136, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: Inspection End (Erase “Self Diagnostic Result” mode of “ABS”)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392668

1.CHECK SELF-DIAGNOSIS RESULTS

CONSULT
Replace the ABS actuator and electric unit (control unit) even if other DTC are displayed along with “C1170” in self-diagnosis for “ABS”.

>> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

C1187 DIFFERENTIAL LOCK CONTROL UNIT

DTC Logic

INFOID:0000000014392669

DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1187	DIFLOCK CONT	When a malfunction is detected in differential lock control unit system.	• Differential lock control unit • ABS actuator and electric unit (control unit) • CAN communication line

DTC CONFIRMATION PROCEDURE

1.CHECK DTC DETECTION

CONSULT.
1. Turn the ignition switch OFF to ON.
2. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1187” detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-104, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000014392670

1.CHECK DIFFERENTIAL LOCK CONTROL UNIT SYSTEM

CONSULT
Select “Self Diagnostic Result” mode of “DIFF LOCK”.

Is any DTC detected?

YES >> Check the DTC.
NO >> GO TO 2.

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

CONSULT
1. Erase “Self Diagnostic Result” of “ABS”.
2. Turn the ignition switch OFF.
3. Start the engine and drive the vehicle for a short period of time.
4. After the vehicle stops, select “Self Diagnostic Result” mode of “ABS”.

Is DTC “C1118” detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Check pin terminals and connection of each harness connector for abnormal conditions. Repair or replace error-detected parts.

C118E ACCUMULATOR

DTC Logic

INFOID:0000000014392671

DTC DETECTION LOGIC

CAUTION:

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

DTC	Display Item	Malfunction detected condition	Possible causes
C118E	ACCUMULATOR PRESS	When performed excessive brake pedal operation.	—

Diagnosis Procedure

INFOID:0000000014392672

1.ERASE SELF-DIAGNOSIS RESULT

CAUTION:

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

CONSULT

1. Erase “Self Diagnostic Result” mode of “ABS”.
2. Turn the ignition switch OFF.
3. Depress brake pedal to full stroke 20 times or more.
4. Start the engine, and then wait 2 minutes or more.
5. Check VDC warning lamp, ABS warning lamp and brake warning lamp turns OFF.
6. Select “Self Diagnostic Result” mode of “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-55, "DTC Index".
NO >> Inspection End.

U1000 CAN COMM CIRCUIT

DTC Description

INFOID:0000000014392673

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

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

PAST DTC	CRNT DTC
• Harness or connector • CAN communication line	CAN communication system malfunction

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

CONSULT
1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after start the engine.
3. Repeat step 1 to 2 two or more times.
4. Select “Self Diagnostic Result” mode of “ABS”.

Is DTC “U1000” detected?

YES-1 >> “CRNT” is displayed: Proceed to BRC-139, "Diagnosis Procedure".
YES-2 >> “PAST” is displayed: Inspection End (Erase the memory of “Self Diagnostic Result” mode of “ABS”.)
NO-1 >> To check malfunction symptom before repair: Refer to GI-47, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000014392674

Proceed to LAN-53, "Trouble Diagnosis Flow Chart".

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000014392675

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

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

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E125	18	Ground	0 V

4. Turn the ignition switch ON
   NOTE:
   Start the engine.
5. Check the voltage between ABS actuator and electric unit (control unit) harness connectors and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E125	18	Ground	Battery voltage

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check the 10A fuses (46).
3. Disconnect fuse block (J/B) harness connector.
4. Disconnect IPDM E/R harness connector.
5. Check the continuity between ABS actuator and electric unit (control unit) harness connector and fuse block (J/B).

ABS actuator and electric unit (control unit)		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
E125	18	E119	15	Yes

6. Check the continuity between ABS actuator and electric unit (control unit) harness connectors and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E125	18	Ground	No

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply.
NO >> Repair / replace harness, connector, or fuse.

3.CHECK MOTOR AND MOTOR RELAY POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E125	4	Ground	Battery voltage

3. Turn the ignition switch ON.
NOTE:
Start the engine.
4. Check the voltage between ABS actuator and electric unit (control unit) harness connectors and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E125	4	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.
2. Check the 50A fusible link (K).
3. Check the continuity and short circuit between ABS actuator and electric unit (control unit) harness connector terminals 4 and 47 and 50A fusible link (F).

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply.
NO >> Repair / replace harness, connector, or fusible link.

5. CHECK ACTUATOR RELAY, ABS IN VALVE, ABS OUT VALVE POWER SUPPLY

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

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E125	1	Ground	Battery voltage

3. Turn the ignition switch ON
NOTE:
Start the engine.
4. Check the voltage between ABS actuator and electric unit (control unit) harness connector and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E125	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. CHECK ACTUATOR RELAY, ABS IN VALVE, ABS OUT VALVE POWER SUPPLY CIRCUIT

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for battery power supply.
NO >> Repair / replace harness, connector, or fusible link.

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

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

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E125	2	Ground	Yes
	3		

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair / replace harness, connector, or terminal.

8.CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair / replace harness, connector, or terminal.

PARKING BRAKE SWITCH

Component Function Check

INFOID:0000000014392676

1.CHECK PARKING BRAKE SWITCH OPERATION

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

Is the inspection result normal?

YES >> Inspection End.
NO >> Proceed to diagnosis procedure. Refer to BRC-143, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000014392677

Regarding Wiring Diagram information, refer to BRC-56, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect combination meter connector M24 (Type A) or M163 (Type B) and parking brake switch connector.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

2.CHECK PARKING BRAKE SWITCH

Check parking brake switch. Refer to PB-5, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace parking brake switch. Refer to PB-12, "Removal and Installation".

3.CHECK PARKING BRAKE SWITCH SIGNAL

CONSULT.

1. Connect combination meter connector M24 (Type A) or M163 (Type B) and parking brake switch connector.
2. Turn ignition switch ON.
3. In “Data Monitor” mode select “PARK BRAKE SW” and check parking brake switch signal.

Condition	DATA MONITOR
Depress parking brake	On
Release parking brake	Off

Is the inspection result normal?

YES >> Refer to MWI-77, "Work flow".
NO >> GO TO 4.

4.CHECK PARKING BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector M24 (Type A) or M163 (Type B) and parking brake switch connector.
3. Check continuity between parking brake switch connector E160 terminal 1 and combination meter connector M24 (Type A) terminal 26 or M163 (Type B) terminal 26.

Parking brake switch		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
E160	1	M24 (Type A)	26	Yes
		M162 (Type B)		

4. Check continuity between parking brake switch connector M11 terminal 1 and ground.

Parking brake switch		—	Continuity
Connector	Terminal		
E160	1	Ground	No

Is the inspection result normal?

YES >> Replace combination meter. Refer to MWI-108, "Removal and Installation" (Type A) MWI-187, "Removal and Installation" (Type B).
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000014392678

1. CHECK PARKING BRAKE SWITCH

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

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

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace parking brake switch. Refer to PB-12, "Removal and Installation".

VDC OFF SWITCH

Component Function Check

INFOID:0000000014392679

1.CHECK VDC OFF SWITCH OPERATION

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

Is the inspection result normal?

YES >> Inspection End.
NO >> Proceed to diagnosis procedure. Refer to BRC-145, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000014392680

Regarding Wiring Diagram information, refer to BRC-56, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector E125 and VDC OFF switch connector.
3. Check connectors and terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2
NO >> Repair or replace as necessary.

2.CHECK VDC OFF SWITCH

Check VDC OFF switch. Refer to BRC-13, "VDC OFF Switch".

Is the inspection result normal?

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

3.CHECK VDC OFF SWITCH SIGNAL

CONSULT.

1. Connect ABS actuator and electric unit (control unit) connector E125 and VDC OFF switch connector.
2. Turn ignition switch ON.
3. In “Data Monitor” mode select “OFF SW” and check VDC OFF switch signal.

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

Is the inspection result normal?

YES >> Refer to BRC-66, "Work Flow".
NO >> GO TO 4.

4.CHECK VDC OFF SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector E125 and VDC OFF switch connector.
3. Check continuity between ABS actuator and electric unit (control unit) connector E125 terminal 39 and VDC OFF switch connector M148 terminal 6.

ABS actuator and electric unit (control unit)		VDC OFF switch		Continuity
Connector	Terminal	Connector	Terminal	
E125	39	M148	6	Yes

4. Check continuity between ABS actuator and electric unit (control unit) connector terminal E125 terminal 39 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E125	39	Ground	No

Is the inspection result normal?

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

5.CHECK VDC OFF SWITCH GROUND CIRCUIT

Check continuity between VDC OFF switch connector M148 terminal 8 and ground.

VDC OFF switch		—	Continuity
Connector	Terminal		
M148	8	Ground	Yes

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000014392681

1.CHECK VDC OFF SWITCH

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

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

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace VDC OFF switch.

ABS WARNING LAMP

Component Function Check

INFOID:0000000014392682

1.CHECK ABS WARNING LAMP FUNCTION

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

Is the inspection result normal?

YES >> Inspection End.
NO >> Proceed to diagnosis procedure. Refer to BRC-147, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000014392683

1.PERFORM THE SELF-DIAGNOSIS

CONSULT.
Select “Self Diagnostic Result” mode of “ABS”.

Are any DTCs detected?

YES >> Refer to BRC-55, "DTC Index".
NO >> GO TO 2.

2.CHECK COMBINATION METER

Check if indication and operation of combination meter are normal. Refer to MWI-14, "METER SYSTEM : System Description" (Type A) or MWI-120, "METER SYSTEM : System Description" (Type B).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-108, "Removal and Installation" (Type A) or MWI-187, "Removal and Installation" (Type B).

BRAKE WARNING LAMP

Component Function Check

INFOID:0000000014392684

1.CHECK BRAKE WARNING LAMP FUNCTION (1)

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Proceed to diagnosis procedure. Refer to BRC-148, "Diagnosis Procedure".

2.CHECK BRAKE WARNING LAMP FUNCTION (2)

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check parking brake switch system. Refer to PB-5, "Inspection".

Diagnosis Procedure

INFOID:0000000014392685

1.PERFORM THE SELF-DIAGNOSIS

CONSULT.
Select “Self Diagnostic Result” mode of “METER/M&A”.

Are any DTCs detected?

YES >> Refer to MWI-36, "DTC Index" (Type A) or MWI-139, "DTC Index" (Type B).
NO >> GO TO 2.

2.CHECK COMBINATION METER

Check if indication and operation of combination meter are normal. Refer to MWI-14, "METER SYSTEM : System Description" (Type A) or MWI-120, "METER SYSTEM : System Description" (Type B).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-108, "Removal and Installation" (Type A) or MWI-187, "Removal and Installation" (Type B).

VDC OFF INDICATOR LAMP

Component Function Check

INFOID:0000000014392686

1.CHECK VDC OFF INDICATOR LAMP FUNCTION (1)

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

Is the inspection result normal?

YES >> Inspection End.
NO >> Proceed to diagnosis procedure. Refer to BRC-149, "Diagnosis Procedure"

Diagnosis Procedure

INFOID:0000000014392687

1.PERFORM THE SELF-DIAGNOSIS

CONSULT.
Select “Self Diagnostic Result” mode of “METER/M&A”.

Are any DTCs detected?

YES >> Refer to BRC-55, "DTC Index" (Type A) or MWI-139, "DTC Index" (Type B).
NO >> GO TO 2.

2.CHECK COMBINATION METER

Check if indication and operation of combination meter are normal. Refer to MWI-14, "METER SYSTEM : System Description" (Type A) or MWI-120, "METER SYSTEM : System Description" (Type B).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-108, "Removal and Installation" (Type A) or MWI-187, "Removal and Installation" (Type B).

SLIP INDICATOR LAMP

Component Function Check

INFOID:0000000014392688

1.CHECK SLIP INDICATOR LAMP FUNCTION

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

Is the inspection result normal?

YES >> Inspection End.
NO >> Proceed to diagnosis procedure. Refer to BRC-150, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000014392689

1.PERFORM THE SELF-DIAGNOSIS

CONSULT.
Select “Self Diagnostic Result” mode of “METER/M&A”.

Are any DTCs detected?

YES >> Refer to MWI-36, "DTC Index" (Type A) or MWI-139, "DTC Index" (Type B).
NO >> GO TO 2.

2.CHECK COMBINATION METER

Check if indication and operation of combination meter are normal. Refer to MWI-14, "METER SYSTEM : System Description" (Type A) or MWI-120, "METER SYSTEM : System Description" (Type B).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-108, "Removal and Installation" (Type A) or MWI-187, "Removal and Installation" (Type B).

SYMPTOM DIAGNOSIS

VDC/TCS/ABS

Symptom Table

INFOID:0000000014392690

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

Symptom	Check item	Reference
Excessive ABS function operation frequency	Brake force distribution	BRC-152, "Diagnosis Procedure"
	Looseness of front and rear axle	
	Wheel sensor and rotor system	
Unexpected pedal reaction	Brake pedal stroke	BRC-153, "Diagnosis Procedure"
	Make sure the braking force is sufficient when the ABS is not operating.	
The braking distance is long	Check stopping distance when the ABS is not operating.	BRC-154, "Diagnosis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-155, "Diagnosis Procedure"
Pedal vibration or ABS operation sound occurs (Note 2)	Brake pedal	BRC-156, "Diagnosis Procedure"
	ABS actuator and electric unit (control unit)	
Vehicle jerks during VDC/TCS/ABS control	ABS actuator and electric unit (control unit)	BRC-157, "Diagnosis Procedure"
	TCM	
	ECM	

NOTE:

- 1: The ABS does not operate when the speed is 10 km/h (6 MPH) or less.
- 2: Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it). However, this is normal:

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

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:0000000014392691

1.CHECK START

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

Is the inspection result normal?

YES >> GO TO 2
NO >> Check brake system.

2.CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles. Refer to front: FSU-6, "Inspection", rear: RSU-5, "Inspection".

Is the inspection result normal?

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

3.CHECK WHEEL SENSOR AND SENSOR ROTOR

Check the following:
- Wheel sensor installation for damage
- Sensor rotor installation for damage
- Wheel sensor connector
- Wheel sensor harness

Is the inspection result normal?

YES >> GO TO 4
NO >>
- Replace wheel sensor BRC-164, "FRONT SENSOR ROTOR : Removal and Installation - Front Sensor Rotor" (front wheel sensor) or BRC-162, "REAR WHEEL SENSOR : Removal and Installation" (rear wheel sensor).
- Replace sensor rotor BRC-164, "FRONT SENSOR ROTOR : Removal and Installation - Front Sensor Rotor" (front sensor rotor) or BRC-164, "REAR SENSOR ROTOR : Removal and Installation - Rear Sensor Rotor" (rear sensor rotor).
- Repair harness.

4.CHECK ABS WARNING LAMP DISPLAY

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

Is the inspection result normal?

YES >> Inspection End.
NO >> Perform self diagnostic result. Refer to BRC-43, "CONSULT Function (ABS)".

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:0000000014392692

1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-10, "Inspection".

Is the stroke too big?

YES >> • Bleed air from brake tube and hose. Refer to BR-13, "Bleeding Brake System".
• Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to brake pedal: BR-10, "Inspection" and BR-10, "Adjustment" or hydraulic booster assembly BR-16, "Inspection".

NO >> GO TO 2

2.CHECK ABS FUNCTION

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

Is the inspection result normal?

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

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:0000000014392693

CAUTION:

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

1.CHECK ABS FUNCTION

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

Is the inspection result normal?

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

ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000014392694

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

1.CHECK ABS WARNING LAMP DISPLAY

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

Is the inspection result normal?

YES >> Inspection End.
NO >> Perform “Self Diagnostic Result” of “ABS”. Refer to BRC-43, "CONSULT Function (ABS)".

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

INFOID:0000000014392695

CAUTION:

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

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

1.SYMPTOM CHECK 1

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

Do symptoms occur?

YES >> GO TO 2
NO >> Inspect the brake pedal.

2.SYMPTOM CHECK 2

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

Do symptoms occur?

YES >> GO TO 3
NO >> Perform “Self Diagnostic Result” of “ABS”. Refer to BRC-43, "CONSULT Function (ABS)".

3.SYMPTOM CHECK 3

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

Do symptoms occur?

YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.
NO >> Inspection End.

VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

Diagnosis Procedure

INFOID:0000000014392696

1.SYMPTOM CHECK

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

Is the inspection result normal?

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

2.CHECK SELF DIAGNOSTIC RESULT

Select “Self Diagnostic Result” mode of “ABS”. Refer to BRC-43, "CONSULT Function (ABS)".

Are self diagnostic results indicated?

YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self diagnostic result again. Refer to BRC-43, "CONSULT Function (ABS)".
NO >> GO TO 3

3.CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminals for deformation, disconnection, looseness, etc.
4. Securely connect connector and perform “Self Diagnostic Result” mode of “ABS”. Refer to BRC-43, "CONSULT Function (ABS)".

Are self diagnostic results indicated?

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

4.CHECK ECM AND TCM SELF DIAGNOSTIC RESULT

1. Select“Self Diagnostic Result” mode of “ECM”. Refer to EC-805, "CONSULT Function" (Cummins 5.0L) or EC-94, "CONSULT Function" (VK56VD).
2. Select “Self Diagnostic Result” mode of “TCM”. Refer to TM-43, "CONSULT Function" (RE6R01A) or TM-317, "CONSULT Function" (RE7R01B).

Are self diagnostic results indicated?

YES >> Check the corresponding items.
- ECM: Refer to EC-837, "DTC Index" (Cummins 5.0L) or EC-136, "DTC Index" (VK56VD).
- TCM: Refer to TM-69, "DTC Index" (RE6R01A) or TM-334, "DTC Index" (RE7R01B) .

NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-165, "Removal and Installation".

NORMAL OPERATING CONDITION

Description

INFOID:0000000014392697

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

REMOVAL AND INSTALLATION

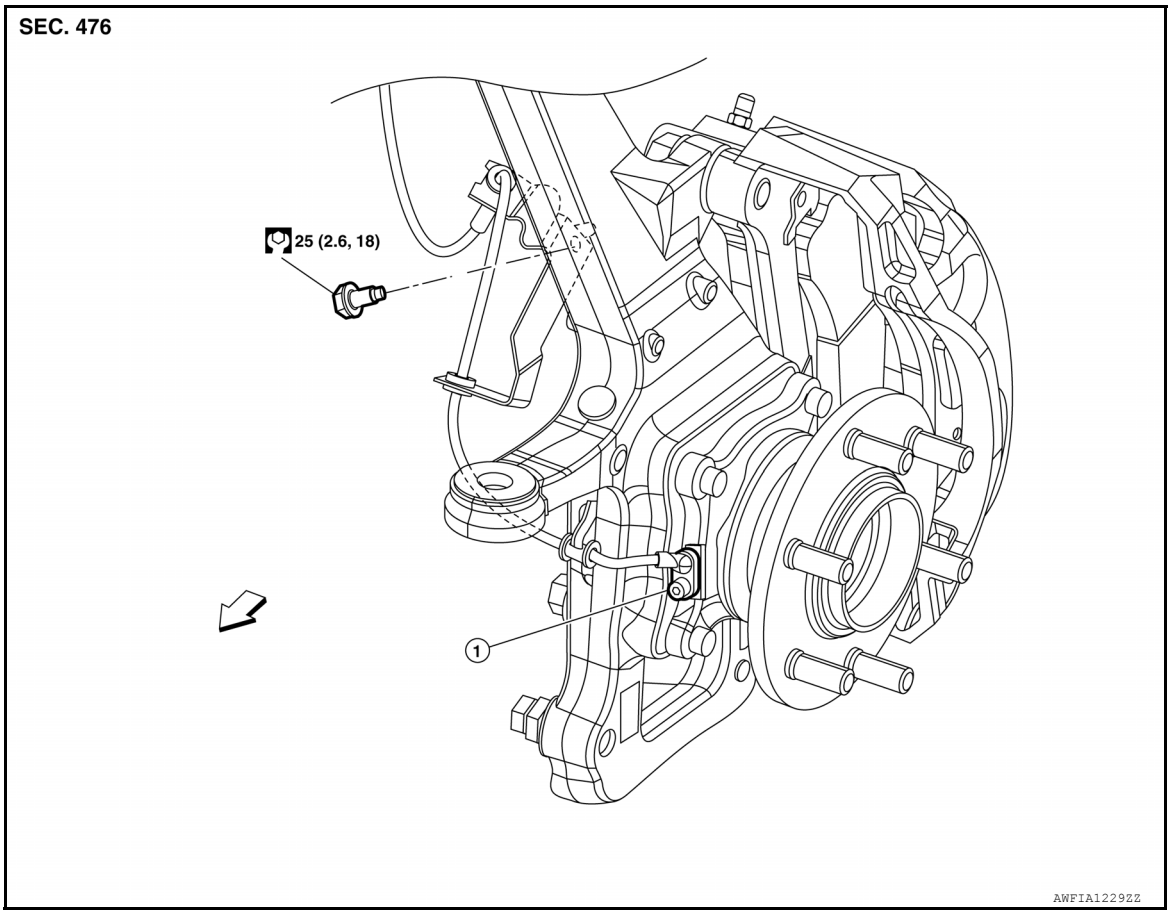
WHEEL SENSOR

FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View

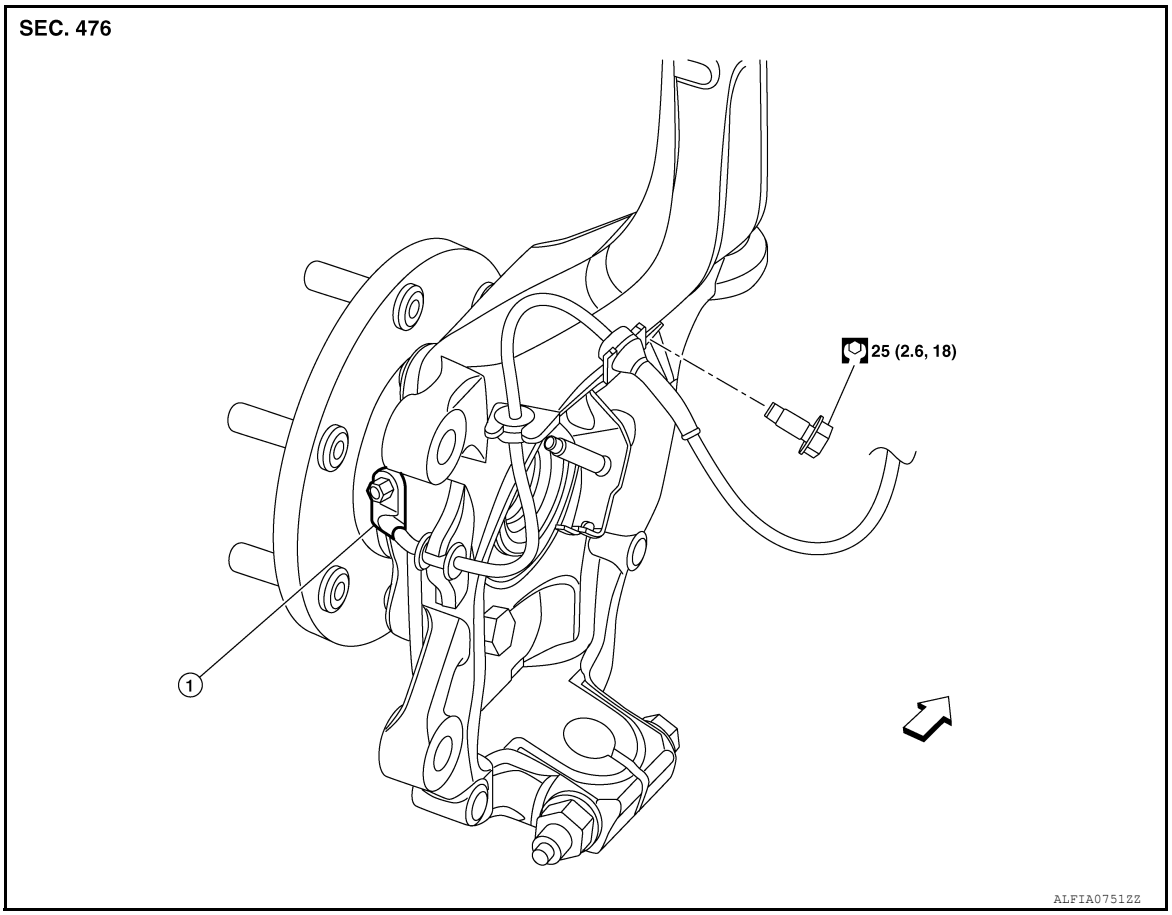
INFOID:0000000014392698

XD Models



1. Front wheel sensor (LH) ⇦ Front

Non-XD Models



1. Front wheel sensor (LH) ⇦ Front

FRONT WHEEL SENSOR : Removal and Installation

INFOID:0000000014392699

CAUTION:
Do not damage front wheel sensor or sensor rotor.

REMOVAL

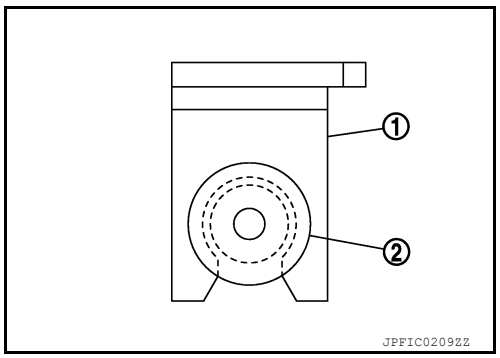
1. Remove the front disc brake rotor. Refer to BR-43, "DISC BRAKE ROTOR : Removal and Installation".
2. Disconnect harness connector from front wheel sensor.
3. Remove front wheel sensor from front wheel sensor brackets and clips.
4. Remove front wheel sensor bolt and remove front wheel sensor.
   CAUTION:
   Pull out front wheel sensor being careful to turn it as little as possible. Do not pull on front wheel sensor harness.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:
- **Before installing, make sure there is no foreign material, such as iron fragments, adhered to pick-up part of front wheel sensor.**
- **When installing, make sure there is no foreign material, such as iron fragments, on and in hole in knuckle for front wheel sensor. Make sure no foreign material has been caught in sensor rotor. Remove any foreign material and clean mount.**

- **Do not twist front wheel sensor harness when installing front wheel sensor. Check that grommet (2) is fully inserted to bracket (1). Check that front wheel sensor harness is not twisted after installation.**

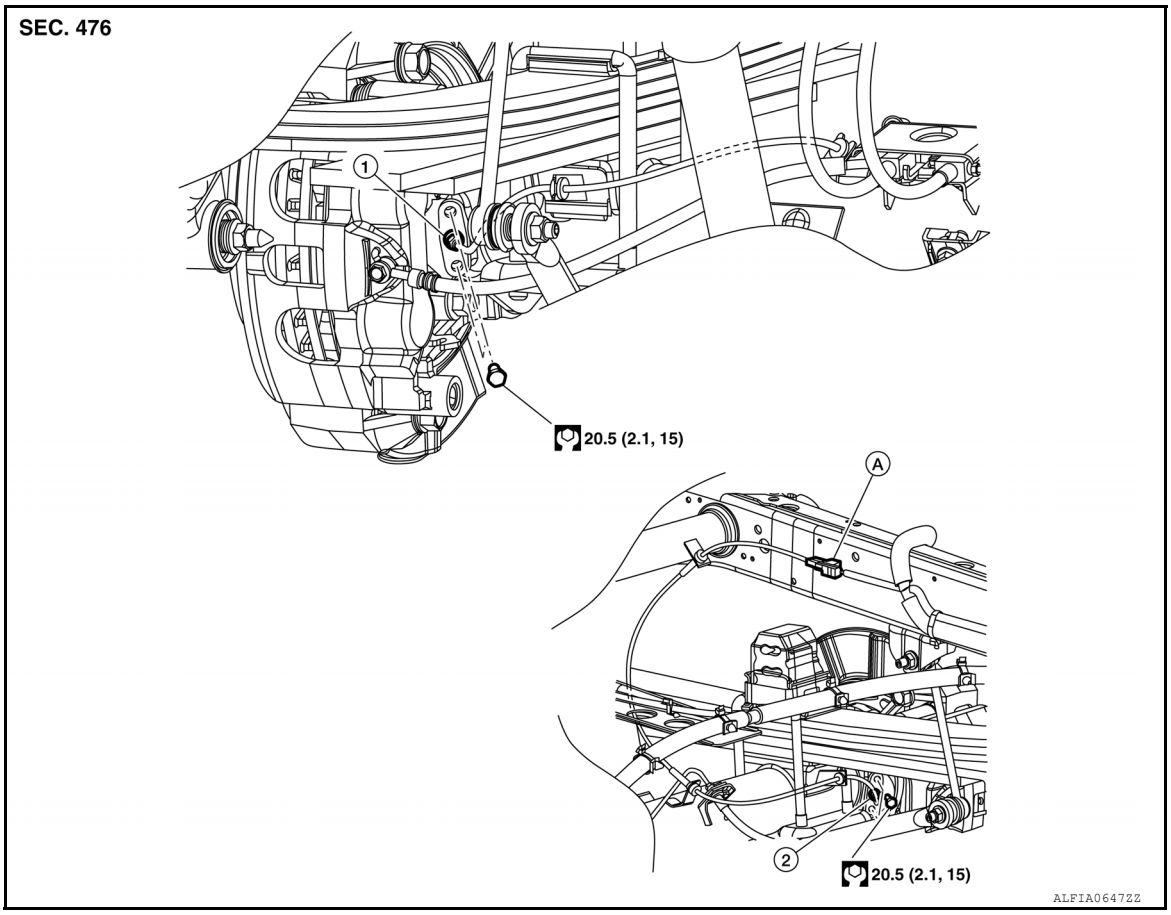


REAR WHEEL SENSOR

REAR WHEEL SENSOR : Exploded View

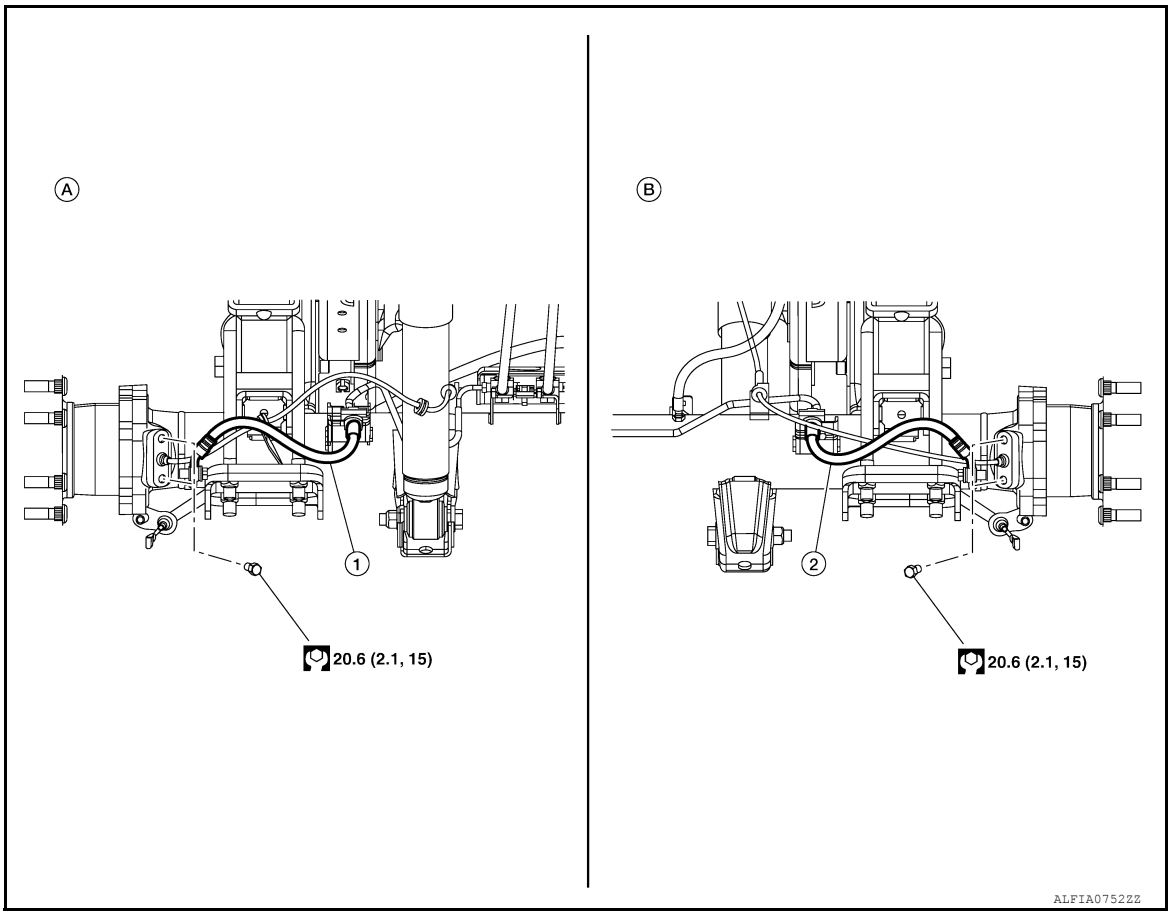
INFOID:0000000014392700

XD Models



1. Rear wheel sensor (LH) 2. Rear wheel sensor (RH) A. Harness connector

Non-XD Models



1. Rear wheel sensor (LH) 2. Rear wheel sensor (RH) A. Left hand side
B. Right hand side

REAR WHEEL SENSOR : Removal and Installation

INFOID:0000000014392701

CAUTION:
Do not damage rear wheel sensor or sensor rotor.

REMOVAL

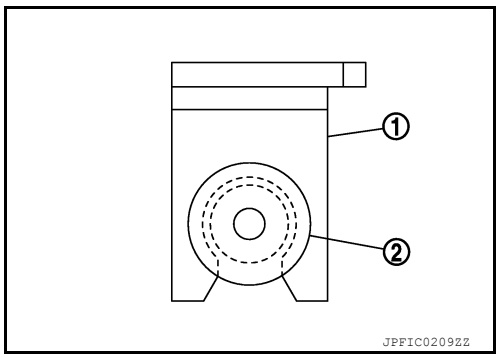
1. Disconnect harness connector from rear wheel sensor.
2. Remove rear wheel sensor from rear wheel sensor brackets and clips.
3. Remove rear wheel sensor bolt and remove rear wheel sensor.
   CAUTION:
   Pull out rear wheel sensor being careful to turn it as little as possible. Do not pull on rear wheel sensor harness.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:
- **Before installing, make sure there is no foreign material, such as iron fragments, adhered to pick-up part of rear wheel sensor.**
- **When installing, make sure there is no foreign material, such as iron fragments, on and in hole in knuckle for rear wheel sensor. Make sure no foreign material has been caught in sensor rotor. Remove any foreign material and clean mount.**

- **Do not twist rear wheel sensor harness when installing rear wheel sensor. Check that grommet (2) is fully inserted to bracket (1). Check that rear wheel sensor harness is not twisted after installation.**



SENSOR ROTOR

FRONT SENSOR ROTOR

FRONT SENSOR ROTOR : Removal and Installation - Front Sensor Rotor

INFOID:0000000014392702

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

REAR SENSOR ROTOR

REAR SENSOR ROTOR : Removal and Installation - Rear Sensor Rotor

INFOID:0000000014392703

The rear wheel sensor rotor is an integral part of the axle shaft and cannot be disassembled. Refer to RAX-6, "Removal and Installation".

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Removal and Installation

INFOID:0000000014392704

The ABS actuator and electric unit (control unit) is serviced as an assembly with the hydraulic booster assembly. Refer to BR-33, "Removal and Installation".

MOTOR/ACCUMULATOR

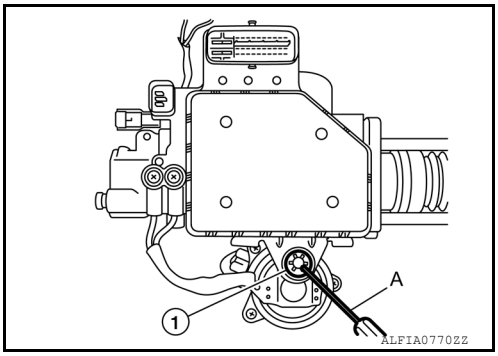
Removal and Installation

INFOID:0000000014392705

REMOVAL

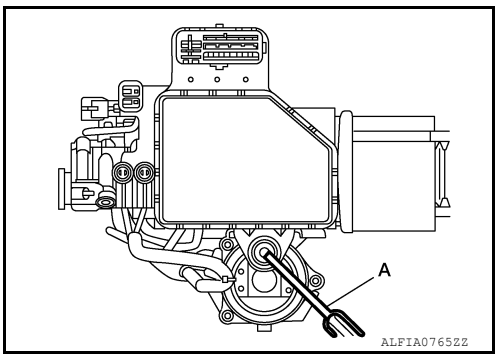
1. Remove the hydraulic booster assembly. Refer to BR-33, "Removal and Installation".
2. Remove the brake tube using flare nut wrench.
   CAUTION:
   Do not scratch the flare nut or the brake tube.
3. Remove the cap and bushing from the brake booster bracket using a suitable tool.
   • XD Models

(A) : Suitable tool
(1) : Cap and bushing



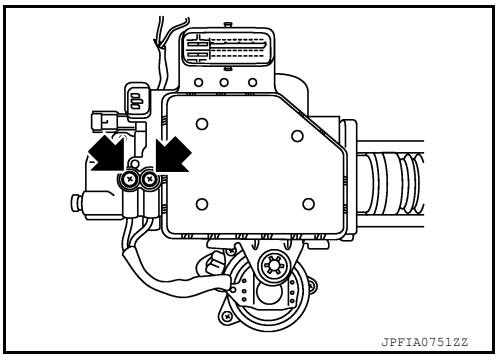
• Non-XD Models

(A) : Suitable tool
(1) : Cap and bushing



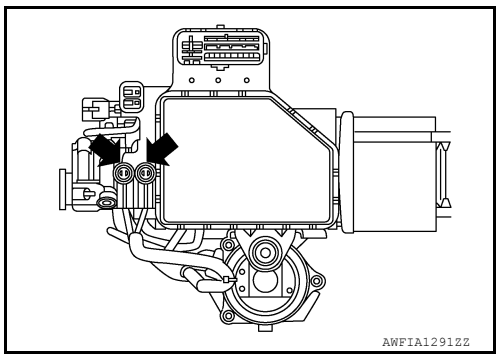
4. Remove grommets and screws and disconnect the harness connector from the brake booster bracket.
   • XD Models

⬅ : Grommets and screws



- Non-XD Models

⬅ : Grommets and screws



5. Remove motor/accumulator assembly from ABS actuator and electric unit (control unit).
6. After replacing motor/accumulator assembly, always follow the accumulator disposal procedure to discard the motor/accumulator assembly. Refer to BR-36, "Disposal".

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **To install, use a flare nut crowfoot and torque wrench.**
- **Always tighten brake tubes to specification when installing.**
- **Do not reuse drained brake fluid.**
- **After installation of the ABS actuator and electric unit (control unit), perform the following.**
- **Refill brake system with new brake fluid. Then bleed the air from the system. Refer to BR-13, "Bleeding Brake System".**
- **Adjust the steering angle sensor. Refer to BRC-70, "Description".**
- **Calibrate the yaw rate/side/decel G sensor. Refer to BRC-72, "Description".**
- **Perform calibration to the ABS actuator and electric unit (control unit). Refer to BRC-69, "Description".**
- **Perform additional service when replacing the ABS actuator and electric unit (control unit). Refer to BRC-69, "Description".**

STEERING ANGLE SENSOR

Removal and Installation

INFOID:0000000014392706

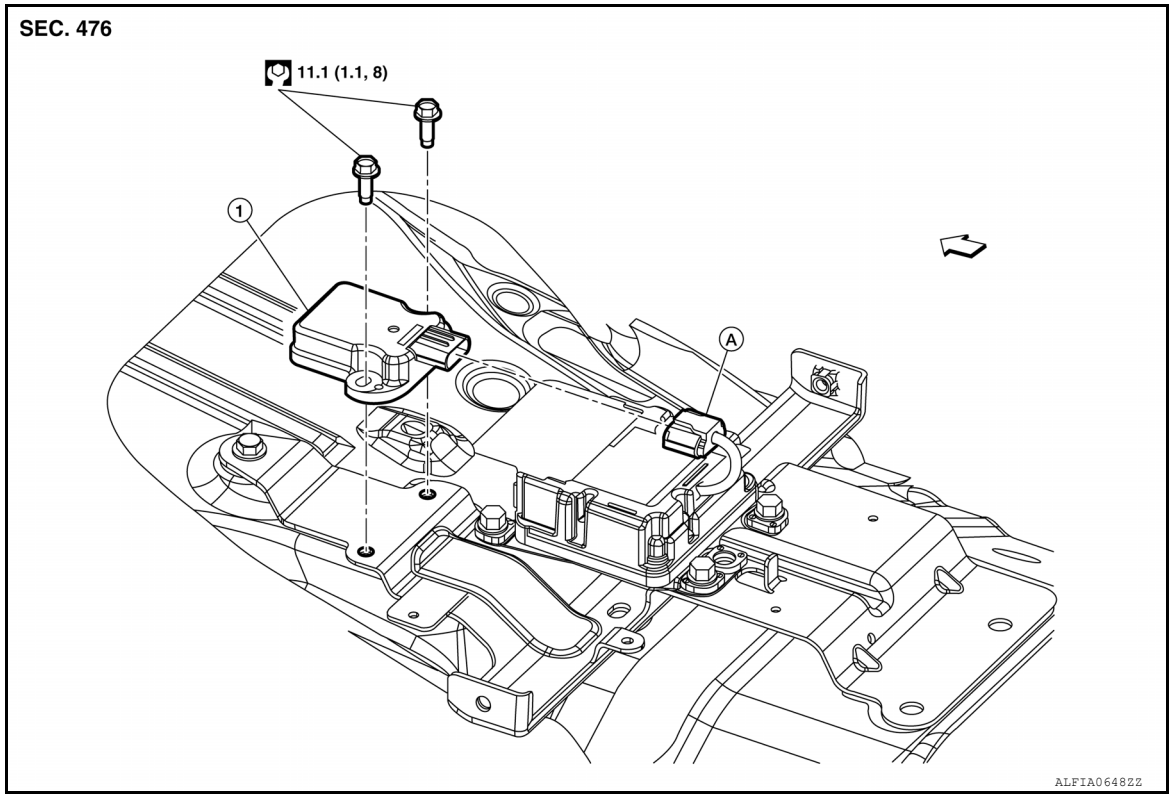
REMOVAL AND INSTALLATION

To remove and install the steering angle sensor, remove and install the spiral cable. Refer to SR-14, "Removal and Installation".

YAW RATE/SIDE/DECEL G SENSOR

Exploded View

INFOID:0000000014392707



1. Yaw rate/side/decel G sensor
A. Harness connector
⇦ Front

Removal and Installation

INFOID:0000000014392708

REMOVAL

1. Remove center console. Refer to IP-24, "Removal and Installation".
2. Remove yaw rate/side/decel G sensor nuts.
   CAUTION:
   - **Do not use power tools to remove the yaw rate/side/decel G sensor.**
   - **Do not drop or strike the yaw rate/side/decel G sensor.**
3. Disconnect harness connector from yaw rate/side/decel G sensor and remove the yaw rate/side/decel G sensor.

INSTALLATION

Installation is in the reverse order of removal.

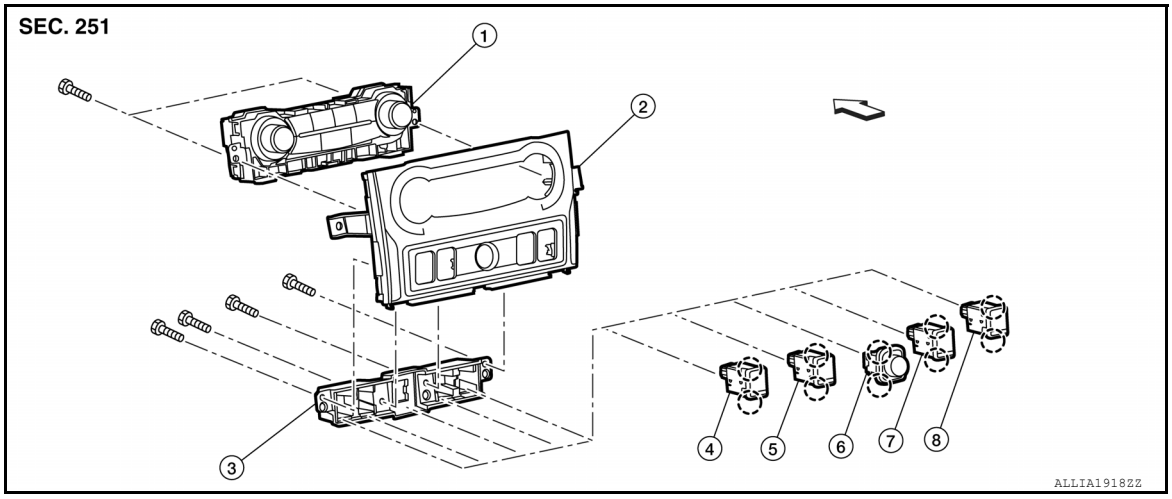
CAUTION:

- **Do not drop or strike the yaw rate/side/decel G sensor.**
- **After installation, calibrate the yaw rate/side/decel G sensor. Refer to BRC-72, "Description".**

VDC OFF SWITCH

Exploded View

INFOID:0000000014392709



1. A/C switch assembly
2. Cluster lid C
3. Switch carrier
4. VDC OFF switch
5. Sonar system off switch (if equipped)
6. Hazard switch
7. Blind spot warning switch (if equipped)
8. Heated steering wheel switch (if equipped)

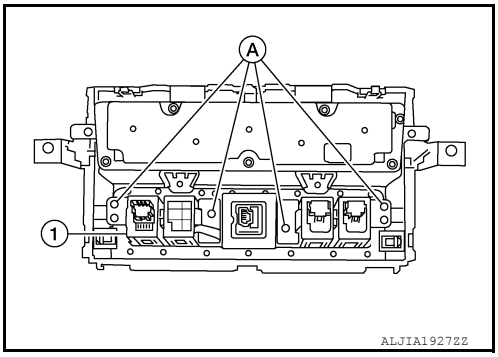
⇦ Front

Removal and Installation

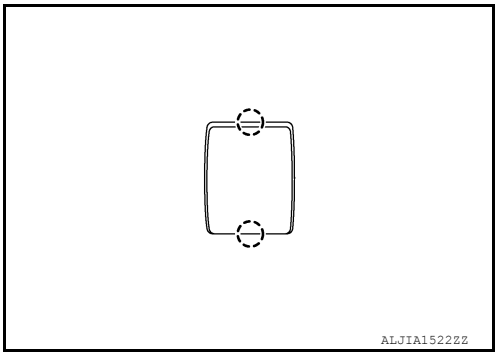
INFOID:0000000014392710

REMOVAL

1. Remove cluster lid C. Refer to IP-20, "Removal and Installation".
2. Remove screws (A) and switch carrier (1) from cluster lid C.



3. Release pawls using suitable tool and remove VDC OFF switch from switch carrier.



: Pawl

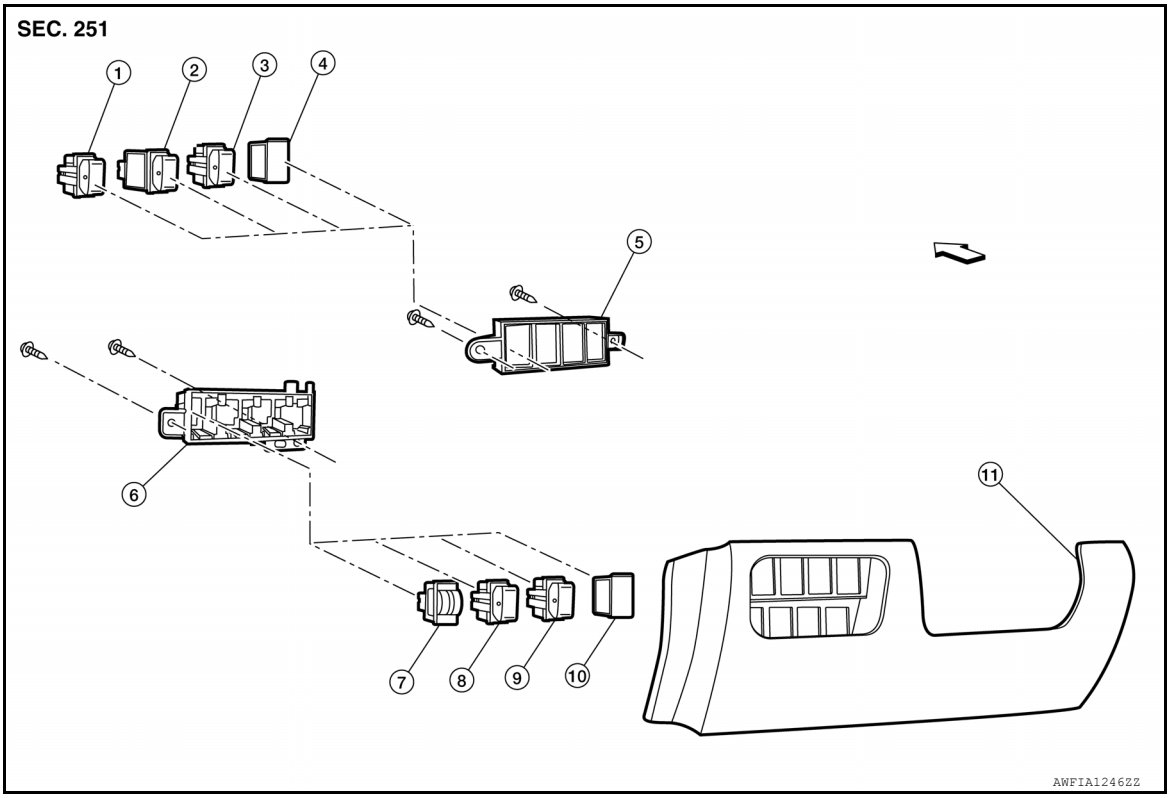
INSTALLATION

Installation is in the reverse order of removal.

HILL DESCENT CONTROL SWITCH

Exploded View

INFOID:0000000014392711



1.	Front fog lamp switch (if equipped)	2.	AC 120v outlet main switch (if equipped)	3.	Cargo lamp switch
4.	Mask	5.	Upper switch carrier	6.	Lower switch carrier
7.	Headlamp aiming switch (if equipped)	8.	Differential lock mode switch (if equipped)	9.	Hill descent control switch
10.	Mask	11.	Instrument lower panel LH	⇦	Front

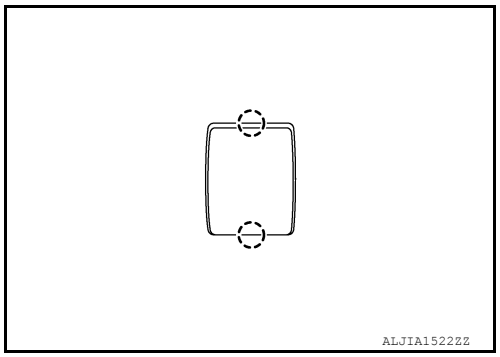
Removal and Installation

INFOID:0000000014392712

REMOVAL

1. Remove instrument lower panel LH. Refer to IP-22, "Removal and Installation".
2. Remove screws from lower switch carrier.
3. Remove lower switch carrier from instrument lower panel LH.
4. Release pawls using suitable tool and remove hill descent switch from switch carrier.

◌ : Pawl



INSTALLATION

Installation is in the reverse order of removal.