

# BRC

## SECTION

### BRAKE CONTROL SYSTEM

## CONTENTS

<b>VDC/TCS/ABS</b>	VDC/TCS/ABS : Fail-safe .....	29
<b>PRECAUTION</b> .....	<b>DIAGNOSIS SYSTEM [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]</b> .....	33
<b>PRECAUTIONS</b> .....	CONSULT Function (ABS) .....	33
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" .....	<b>ECU DIAGNOSIS INFORMATION</b> .....	37
Precaution for Brake System .....	<b>ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)</b> .....	37
Precaution for Brake Control .....	Reference Value .....	37
Precaution for CAN System .....	Fail-safe .....	40
Precaution for Work .....	DTC Inspection Priority Chart .....	43
<b>PREPARATION</b> .....	DTC Index .....	44
<b>PREPARATION</b> .....	<b>WIRING DIAGRAM</b> .....	46
Special Service Tool .....	<b>BRAKE CONTROL SYSTEM</b> .....	46
Commercial Service Tool .....	Wiring Diagram .....	46
<b>SYSTEM DESCRIPTION</b> .....	<b>BASIC INSPECTION</b> .....	54
<b>COMPONENT PARTS</b> .....	<b>DIAGNOSIS AND REPAIR WORK FLOW</b> .....	54
Component Parts Location .....	Work Flow .....	54
Component Description .....	Diagnostic Work Sheet .....	55
ABS Actuator and Electric Unit (Control Unit) .....	<b>ADDITIONAL SERVICE WHEN REPLACING ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)</b> .....	56
Wheel Sensor and Sensor Rotor .....	Description .....	56
Stop Lamp Switch .....	<b>ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION</b> .....	57
Steering Angle Sensor .....	Description .....	57
Brake Fluid Level Switch .....	Work Procedure .....	57
Vacuum Sensor .....	<b>CONFIGURATION [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]</b> .....	59
Parking Brake Switch .....	Work Procedure .....	59
VDC OFF Switch .....	<b>DTC/CIRCUIT DIAGNOSIS</b> .....	61
<b>SYSTEM</b> .....		
<b>VDC/TCS/ABS</b> .....		
VDC/TCS/ABS : System Diagram .....		
VDC/TCS/ABS : System Description .....		
VDC/TCS/ABS : VDC Function .....		
VDC/TCS/ABS : TCS Function .....		
VDC/TCS/ABS : ABS Function .....		
VDC/TCS/ABS : EBD Function .....		

<b>C1101, C1102, C1103, C1104 WHEEL SENSOR</b> .....	<b>61</b>	<b>C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT</b> .....	<b>85</b>
DTC Logic .....	61	DTC Logic .....	85
Diagnosis Procedure .....	61	Diagnosis Procedure .....	85
<b>C1105, C1106, C1107, C1108 WHEEL SENSOR</b> .....	<b>63</b>	<b>C1154 PNP SWITCH</b> .....	<b>86</b>
DTC Logic .....	63	Description .....	86
Diagnosis Procedure .....	63	DTC Logic .....	86
<b>C1109 POWER AND GROUND SYSTEM</b> .....	<b>65</b>	Diagnosis Procedure .....	86
DTC Logic .....	65	Special Repair Requirement .....	86
Diagnosis Procedure .....	65	<b>C1155 BR FLUID LEVEL LOW</b> .....	<b>88</b>
<b>C1110, C1153, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)</b> .....	<b>67</b>	DTC Logic .....	88
DTC Logic .....	67	Diagnosis Procedure .....	88
Diagnosis Procedure .....	67	Component Inspection .....	89
<b>C1111 PUMP MOTOR</b> .....	<b>68</b>	<b>C1160 DECEL G SEN SET</b> .....	<b>90</b>
DTC Logic .....	68	DTC Logic .....	90
Diagnosis Procedure .....	68	Diagnosis Procedure .....	90
<b>C1113, C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR</b> .....	<b>70</b>	<b>C1164, C1165, C1166, C1167 CV/SV SYSTEM</b> .....	<b>91</b>
DTC Logic .....	70	DTC Logic .....	91
Diagnosis Procedure .....	70	Diagnosis Procedure .....	91
<b>C1115 ABS SENSOR [ABNORMAL SIGNAL]</b> ..	<b>71</b>	<b>C1197 VACUUM SENSOR</b> .....	<b>93</b>
DTC Logic .....	71	DTC Logic .....	93
Diagnosis Procedure .....	71	Diagnosis Procedure .....	93
<b>C1116 STOP LAMP SWITCH</b> .....	<b>73</b>	<b>C1198 VACUUM SENSOR</b> .....	<b>95</b>
DTC Logic .....	73	DTC Logic .....	95
Diagnosis Procedure .....	73	Diagnosis Procedure .....	95
<b>C1120, C1122, C1124, C1126 ABS IN VALVE SYSTEM</b> .....	<b>75</b>	<b>C1199 BRAKE BOOSTER</b> .....	<b>97</b>
DTC Logic .....	75	DTC Logic .....	97
Diagnosis Procedure .....	75	Diagnosis Procedure .....	97
<b>C1121, C1123, C1125, C1127 ABS OUT VALVE SYSTEM</b> .....	<b>77</b>	<b>C119A VACUUM SENSOR</b> .....	<b>99</b>
DTC Logic .....	77	DTC Logic .....	99
Diagnosis Procedure .....	77	Diagnosis Procedure .....	99
<b>C1130 ENGINE SIGNAL</b> .....	<b>79</b>	<b>U1000 CAN COMM CIRCUIT</b> .....	<b>101</b>
DTC Logic .....	79	DTC Logic .....	101
Diagnosis Procedure .....	79	Diagnosis Procedure .....	101
<b>C1140 ACTUATOR RELAY SYSTEM</b> .....	<b>80</b>	<b>U1002 SYSTEM COMM (CAN)</b> .....	<b>102</b>
DTC Logic .....	80	DTC Logic .....	102
Diagnosis Procedure .....	80	Diagnosis Procedure .....	102
<b>C1142 PRESS SENSOR</b> .....	<b>82</b>	<b>PARKING BRAKE SWITCH</b> .....	<b>103</b>
DTC Logic .....	82	Component Function Check .....	103
Diagnosis Procedure .....	82	Diagnosis Procedure .....	103
<b>C1143 STEERING ANGLE SENSOR</b> .....	<b>83</b>	Component Inspection .....	104
DTC Logic .....	83	<b>VDC OFF SWITCH</b> .....	<b>105</b>
Diagnosis Procedure .....	83	Component Function Check .....	105
		Diagnosis Procedure .....	105
		Component Inspection .....	106
		<b>ABS WARNING LAMP</b> .....	<b>107</b>
		Component Function Check .....	107
		Diagnosis Procedure .....	107

<b>BRAKE WARNING LAMP</b> .....	108	<b>VEHICLE JERKS DURING VDC/TCS/ABS</b>	
Component Function Check .....	108	<b>CONTROL</b> .....	117
Diagnosis Procedure .....	108	Diagnosis Procedure .....	117
<b>VDC OFF INDICATOR LAMP</b> .....	109	<b>NORMAL OPERATING CONDITION</b> .....	118
Description .....	109	Description .....	118
Component Function Check .....	109	<b>REMOVAL AND INSTALLATION</b> .....	119
Diagnosis Procedure .....	109	<b>WHEEL SENSOR</b> .....	119
<b>SLIP INDICATOR LAMP</b> .....	110	Exploded View - Front Wheel Sensor .....	119
Component Function Check .....	110	Removal and Installation - Front Wheel Sensor ...	119
Diagnosis Procedure .....	110	Exploded View - Rear Wheel Sensor .....	120
<b>SYMPTOM DIAGNOSIS</b> .....	111	Removal and Installation - Rear Wheel Sensor ....	120
<b>VDC/TCS/ABS</b> .....	111	<b>SENSOR ROTOR</b> .....	122
Symptom Table .....	111	Removal and Installation - Front Sensor Rotor ....	122
<b>EXCESSIVE ABS FUNCTION OPERATION</b>		Removal and Installation - Rear Sensor Rotor ....	122
<b>FREQUENCY</b> .....	112	<b>ABS ACTUATOR AND ELECTRIC UNIT</b>	
Diagnosis Procedure .....	112	<b>(CONTROL UNIT)</b> .....	123
<b>UNEXPECTED PEDAL REACTION</b> .....	113	Exploded View .....	123
Diagnosis Procedure .....	113	Removal and Installation .....	123
<b>THE BRAKING DISTANCE IS LONG</b> .....	114	<b>VDC OFF SWITCH</b> .....	125
Diagnosis Procedure .....	114	Removal and Installation .....	125
<b>ABS FUNCTION DOES NOT OPERATE</b> .....	115	<b>YAW RATE/SIDE/DECEL G SENSOR</b> .....	126
Diagnosis Procedure .....	115	Removal and Installation .....	126
<b>PEDAL VIBRATION OR ABS OPERATION</b>		<b>STEERING ANGLE SENSOR</b> .....	127
<b>SOUND OCCURS</b> .....	116	Exploded View .....	127
Diagnosis Procedure .....	116	Removal and Installation .....	127

## PRECAUTION

### PRECAUTIONS

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

INFOID:000000008717480

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, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see 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 Airbag Diagnosis Sensor Unit or other Airbag 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 and wait at least 3 minutes before performing any service.

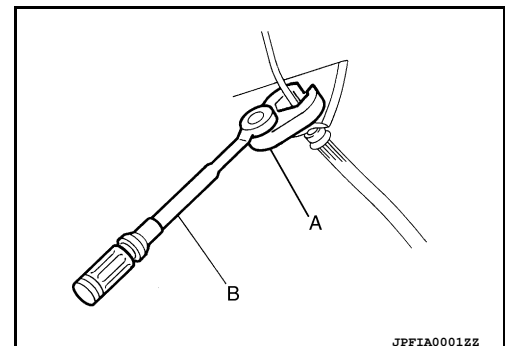
#### Precaution for Brake System

INFOID:000000008717483

#### **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 [BR-8, "Inspection"](#).
- 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 crow-foot (A) and torque wrench (B).
- Always connect the battery terminal when moving the vehicle.
- Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) harness connector or the battery negative terminal before performing the work.
- Check that no brake fluid leakage is present after replacing the parts.



# PRECAUTIONS

< PRECAUTION >

[VDC/TCS/ABS]

## Precaution for Brake Control

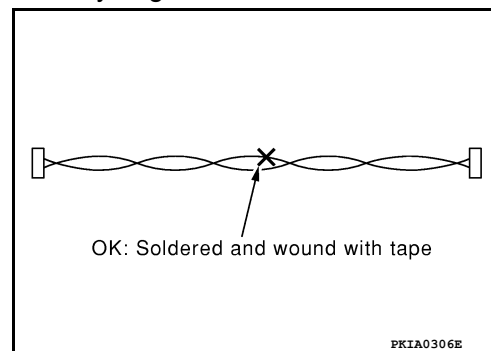
INFOID:000000008490035

- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check booster operation, brake fluid level, and fluid leaks.
- If incorrect tire sizes or types are installed on the vehicle or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna or related wiring near control module, ABS function may have a malfunction or error.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits or improper wiring.
- If the following components are replaced with non-genuine components or modified, the VDC OFF indicator lamp and SLIP indicator lamp may turn on or the VDC system may not operate properly. Components related to suspension (shock absorbers, struts, springs, bushings, etc.), tires, wheels (exclude specified size), components related to brake system (pads, rotors, calipers, etc.), components related to engine (muffler, ECM, etc.), components related to body reinforcement (roll bar, tower bar, etc.).
- Driving with broken or excessively worn suspension components, tires or brake system components may cause the VDC OFF indicator lamp and the SLIP indicator lamp to turn on, and the VDC system may not operate properly.
- When the TCS or VDC is activated by sudden acceleration or sudden turn, some noise may occur. The noise is a result of the normal operation of the TCS and VDC.
- When driving on roads which have extreme slopes (such as mountainous roads) or high banks (such as sharp curves on a freeway), the VDC may not operate normally, or the VDC warning lamp and the SLIP indicator lamp may turn on. This is not a problem if normal operation can be resumed after restarting the engine.
- Sudden turns (such as spin turns, acceleration turns), drifting, etc. with VDC turned off may cause the yaw rate/side/decel G sensor to indicate a problem. This is not a problem if normal operation can be resumed after restarting the engine.

## Precaution for CAN System

INFOID:000000008490036

- Do not apply voltage of 7.0V or higher to terminal to be measured.
- Maximum open terminal voltage of tester in use must be less than 7.0V.
- Before checking harnesses, turn ignition switch OFF and disconnect battery negative cable.
- Area to be repaired must be soldered and wrapped with tape. Make sure that fraying of twisted wire is within 110 mm (4.33 in).

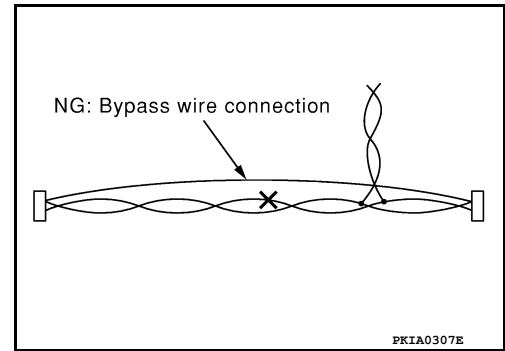


# PRECAUTIONS

## < PRECAUTION >

[VDC/TCS/ABS]

- Do not make a bypass connection to repaired area. (If the circuit is bypassed, characteristics of twisted wire will be lost.)



## Precaution for Work

INFOID:000000008703841

- 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.

# PREPARATION

< PREPARATION >

[VDC/TCS/ABS]

## PREPARATION

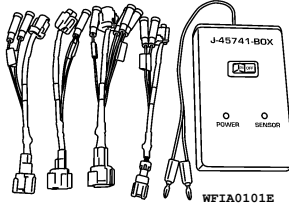
### PREPARATION

#### Special Service Tool

INFOID:000000008490037

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

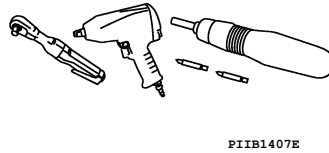
Tool number (Kent-Moore No.) Tool name	Description
— (J-45741) ABS active wheel sensor tester	Checking operation of ABS active wheel sensor



#### Commercial Service Tool

INFOID:000000008703767

Tool name	Description
Power tool	Loosening nuts, screws and bolts

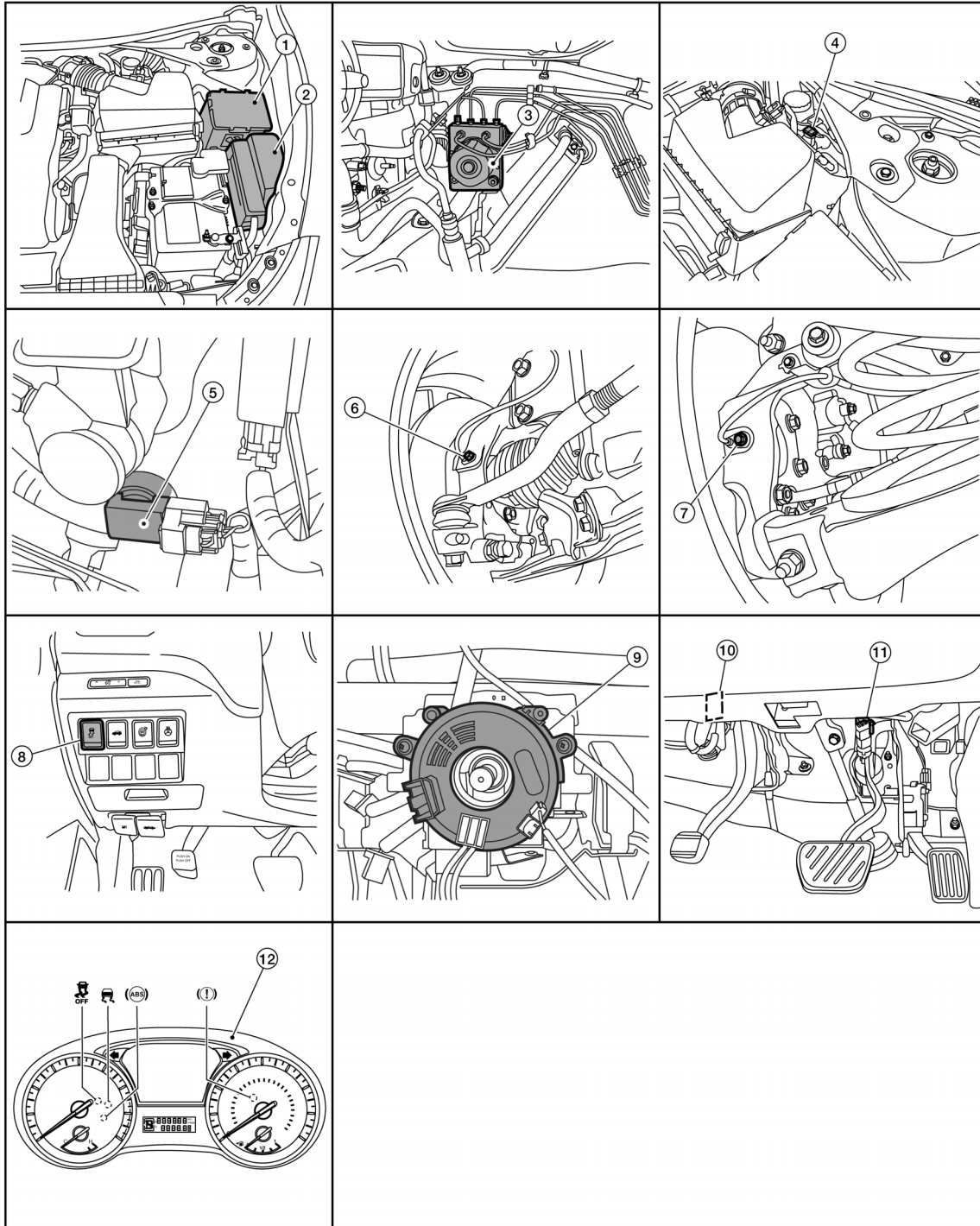


## SYSTEM DESCRIPTION

### COMPONENT PARTS

#### Component Parts Location

INFOID:000000008490039



ALFIA0301ZZ

- |                             |  |  |
|-----------------------------|--|--|
| 1. IPDM E/R                 | 2. Fuse, fusible link and relay box (stop lamp relay)      | 3. ABS actuator and electric unit (control unit) |
| 4. Brake fluid level switch | 5. Vacuum sensor (attached to lower side of brake booster) | 6. Front wheel sensor LH (RH similar)            |



# COMPONENT PARTS

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

- |                                      |                      |  |
|--------------------------------------|----------------------|--|
| 7. Rear wheel sensor LH (RH similar) | 8. VDC OFF switch    | 9. Steering angle sensor<br>(view with steering wheel removed) |
| 10. Parking brake switch             | 11. Stop lamp switch | 12. Combination meter  |

## Component Description

INFOID:000000008490040

Component	Reference/Function
ABS actuator and electric unit (control unit)	<a href="#">BRC-9. "ABS Actuator and Electric Unit (Control Unit)"</a>
Wheel sensor	<a href="#">BRC-10. "Wheel Sensor and Sensor Rotor"</a>
Stop lamp switch	<a href="#">BRC-10. "Stop Lamp Switch"</a>
Steering angle sensor	<a href="#">BRC-10. "Steering Angle Sensor"</a>
Vacuum sensor	<a href="#">BRC-10. "Vacuum Sensor"</a>
VDC OFF switch	<a href="#">BRC-11. "VDC OFF Switch"</a>
Brake fluid level switch	<a href="#">BRC-10. "Brake Fluid Level Switch"</a>
Parking brake switch	<a href="#">BRC-11. "Parking Brake Switch"</a>
ABS warning lamp	<a href="#">BRC-12. "VDC/TCS/ABS : System Description"</a>
Brake warning lamp	
VDC OFF indicator lamp	
SLIP indicator lamp	
ECM	Transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• Accelerator pedal position signal</li> <li>• Engine speed signal</li> <li>• Target throttle position signal</li> </ul>
TCM	Transmits the current gear position signal to ABS actuator and electric unit (control unit) via CAN communication.

## ABS Actuator and Electric Unit (Control Unit)

INFOID:000000008490041

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

### ELECTRIC UNIT (CONTROL UNIT)

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

### ACTUATOR

The following components are integrated with ABS actuator.

#### Pump

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

#### Motor

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

#### Motor Relay

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

#### Actuator Relay (Main Relay)

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

#### ABS IN Valve

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

#### ABS OUT Valve

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

#### Cut Valve 1, Cut Valve 2

Shuts off the ordinary brake line from master cylinder, when VDC function and TCS function are activated.

## COMPONENT PARTS

### < SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

#### Suction Valve 1, Suction Valve 2

Supplies the brake fluid from master cylinder to the pump, when VDC function and TCS function are activated.

#### Return Check Valve

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

#### Reservoir

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

#### Yaw rate/side/decel G sensor

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

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

#### Pressure Sensor

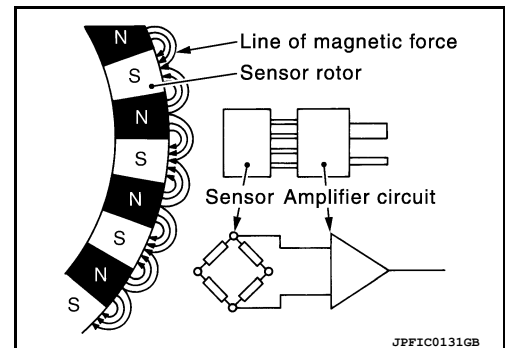
Detects the brake fluid pressure and transmits signal to ABS actuator and electric unit (control unit).

### Wheel Sensor and Sensor Rotor

INFOID:0000000008490042

#### NOTE:

- Wheel sensor of front wheel is installed on steering knuckle.
- Sensor rotor of front wheel is integrated in wheel hub assembly.
- Wheel sensor of rear wheel is installed on back plate of rear brake.
- Sensor rotor of rear wheel is installed on rear brake drum.
- 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:0000000008490043

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

### Steering Angle Sensor

INFOID:0000000008490044

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

### Brake Fluid Level Switch

INFOID:0000000008490046

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

### Vacuum Sensor

INFOID:0000000008620071

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

Parking Brake Switch

INFOID:000000008490047

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

VDC OFF Switch

INFOID:000000008490045

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

A  
B  
C  
D  
E  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

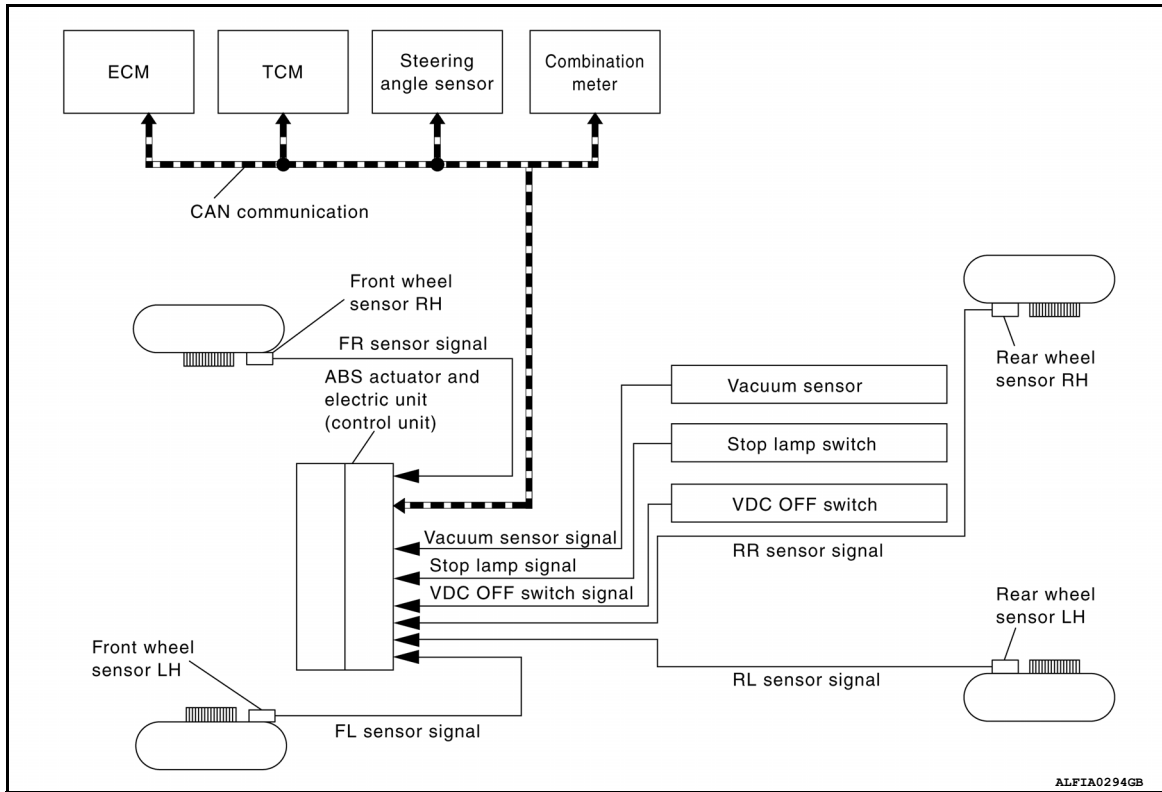
BRC

## SYSTEM

### VDC/TCS/ABS

#### VDC/TCS/ABS : System Diagram

INFOID:000000008490048



#### VDC/TCS/ABS : System Description

INFOID:000000008490049

- 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, TCS, ABS and EBD functions.
- Fail-safe function is available for each function and is activated by each function when system malfunction occurs.

#### INPUT SIGNAL AND OUTPUT SIGNAL

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

# SYSTEM

< SYSTEM DESCRIPTION >

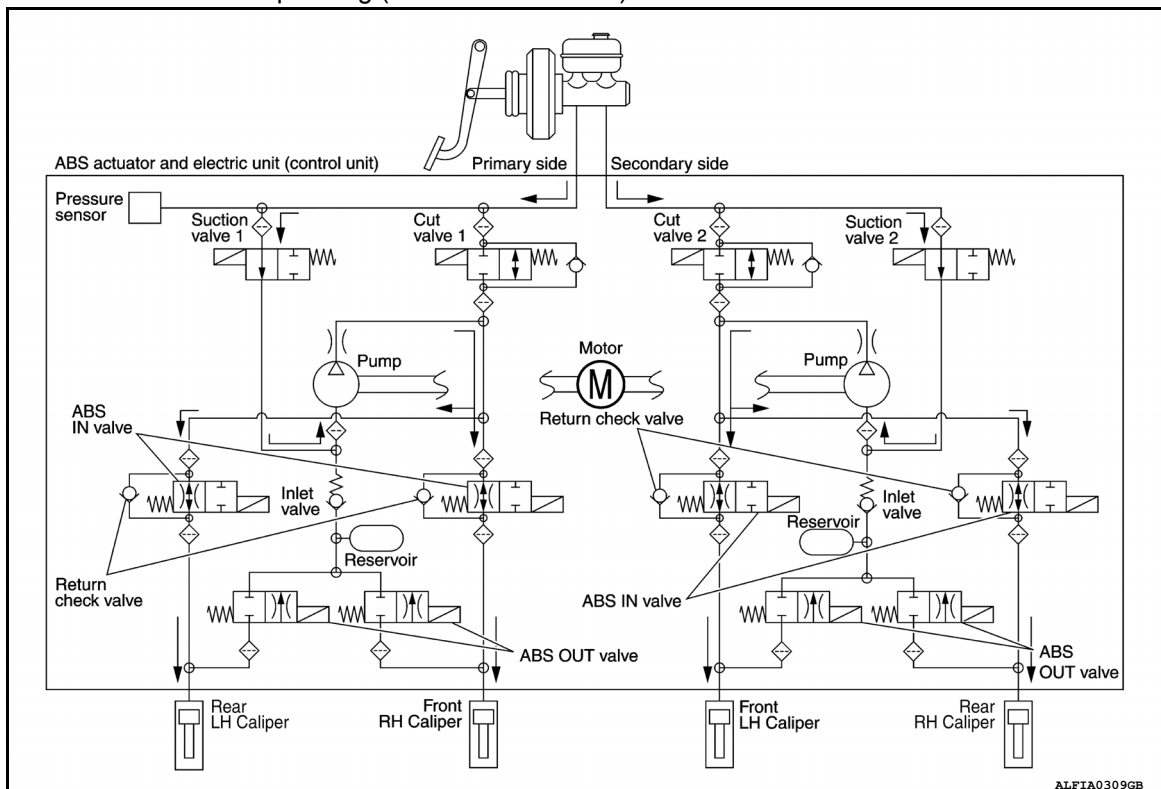
[VDC/TCS/ABS]

Component	Signal description
Steering angle sensor	Transmits the steering angle sensor signal to ABS actuator and electric unit (control unit) via CAN communication.
ECM	Transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• Accelerator pedal position signal</li> <li>• Engine speed signal</li> <li>• Target throttle position signal</li> </ul>
TCM	Transmits the current gear position signal to ABS actuator and electric unit (control unit) via CAN communication.
Combination meter	Transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• Brake fluid level switch signal</li> <li>• Parking brake switch signal</li> </ul> Receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• ABS warning lamp signal</li> <li>• Brake warning lamp signal</li> <li>• VDC OFF indicator lamp signal</li> <li>• SLIP indicator lamp signal</li> </ul>

## VALVE OPERATION (VDC AND TCS FUNCTIONS)

The control unit built in the ABS actuator and electric unit (control unit) controls fluid pressure of the brake calipers by operating each valve.

VDC and TCS Functions are Operating (Pressure Increases)



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

# SYSTEM

## < SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

Name	Not activated	Pressure increases
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each brake caliper (fluid pressure)	—	Pressure increases

### Front RH brake caliper

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

### Front LH brake caliper

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

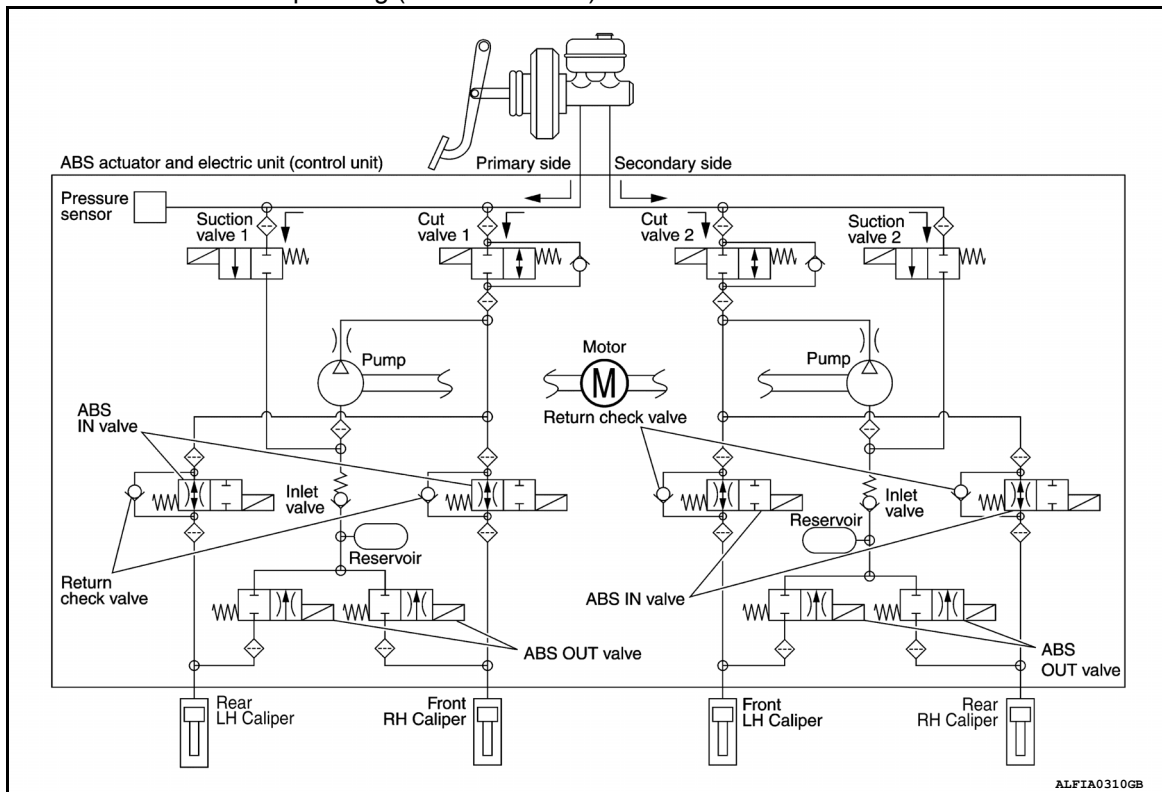
### Rear RH brake caliper

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

### Rear LH brake caliper

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

## VDC and TCS Functions Start Operating (Pressure Holds)



Name	Not activated	Pressure holds
Cut valve 1	Power supply is not supplied (open)	Power supply is supplied (close)
Cut valve 2	Power supply is not supplied (open)	Power supply is supplied (close)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)

# SYSTEM

## < SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

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

### Front RH brake caliper

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

### Front LH brake caliper

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

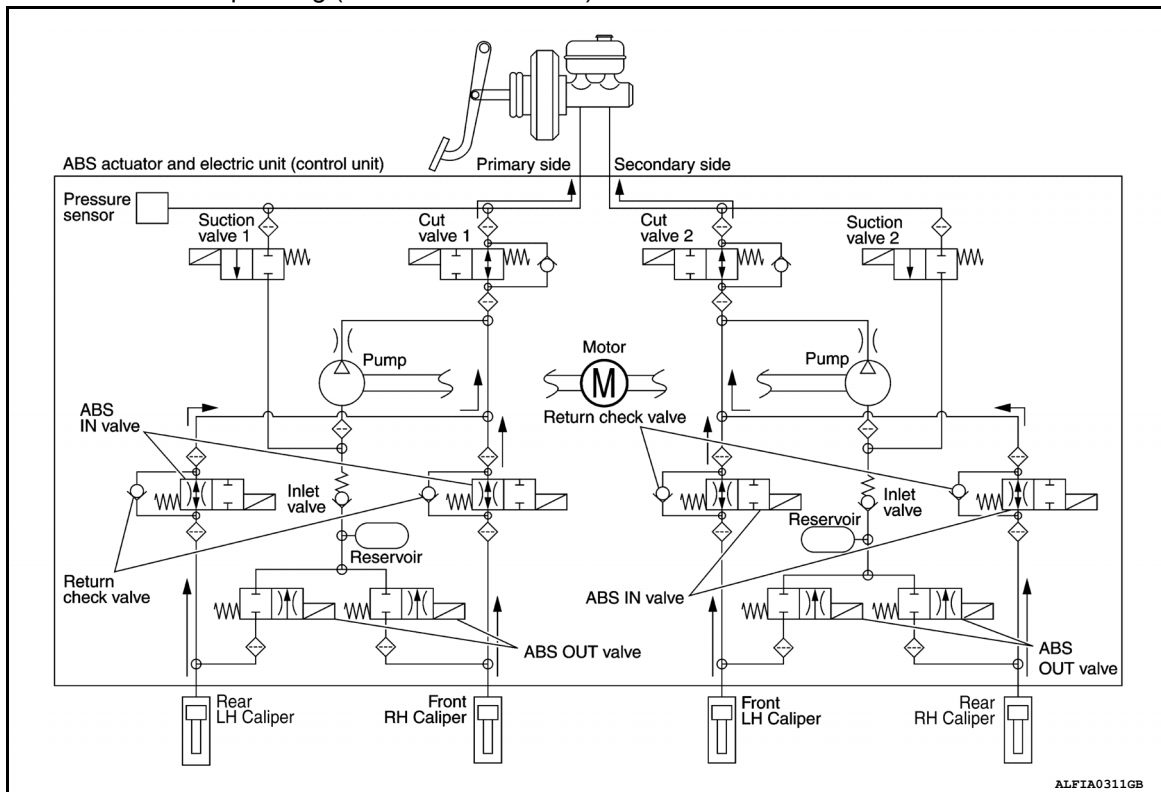
### Rear RH brake caliper

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

### Rear LH brake caliper

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

## VDC and TCS Functions Operating (Pressure Decreases)



Name	Not activated	During pressure decreases
Cut valve 1	Power supply is not supplied (open)	Power supply is not supplied (open)
Cut valve 2	Power supply is not supplied (open)	Power supply is not supplied (open)
Suction valve 1	Power supply is not supplied (close)	Power supply is not supplied (close)
Suction valve 2	Power supply is not supplied (close)	Power supply is not supplied (close)

# SYSTEM

## < SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

Name	Not activated	During pressure decreases
ABS IN valve	Power supply is not supplied (open)	Power supply is not supplied (open)
ABS OUT valve	Power supply is not supplied (close)	Power supply is not supplied (close)
Each brake caliper (fluid pressure)	—	Pressure decreases

### Front RH brake caliper

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

### Front LH brake caliper

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

### Rear RH brake caliper

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

### Rear LH brake caliper

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

## Component Parts and Function

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

## VALVE OPERATION (ABS AND EBD FUNCTIONS)

The control unit built into the ABS actuator and electric unit (control unit) controls fluid pressure of the brake calipers by operating each valve.

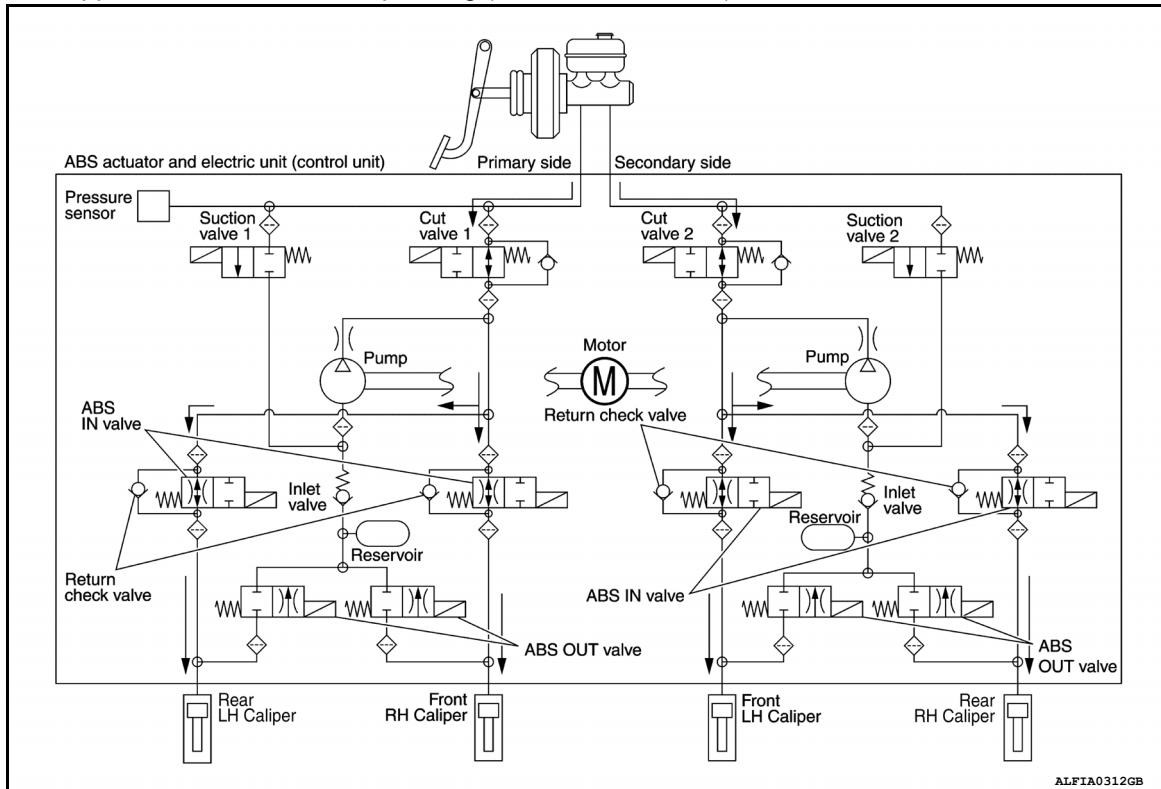


# SYSTEM

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

Brake Pedal Applied or ABS Function Operating (Pressure Increases)



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

Front RH brake caliper

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

Front LH brake caliper

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

Rear RH brake caliper

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

Rear LH brake caliper

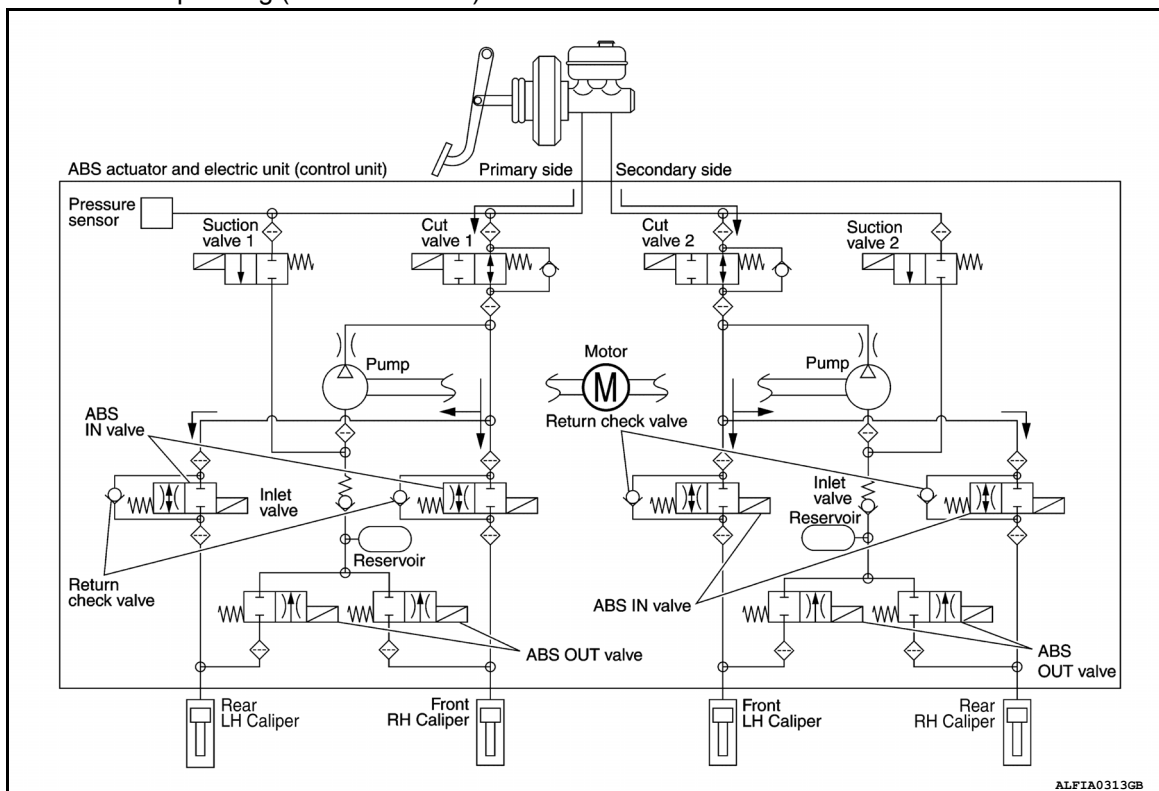
- When the cut valve 1 and the ABS IN valve opens, brake fluid is supplied to the rear LH brake caliper from the master cylinder through the ABS IN valve. Brake fluid does not flow into the reservoir because the ABS OUT valve is closed.

# SYSTEM

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

ABS Function Starts Operating (Pressure Holds)



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

Front RH brake caliper

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

Front LH brake caliper

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

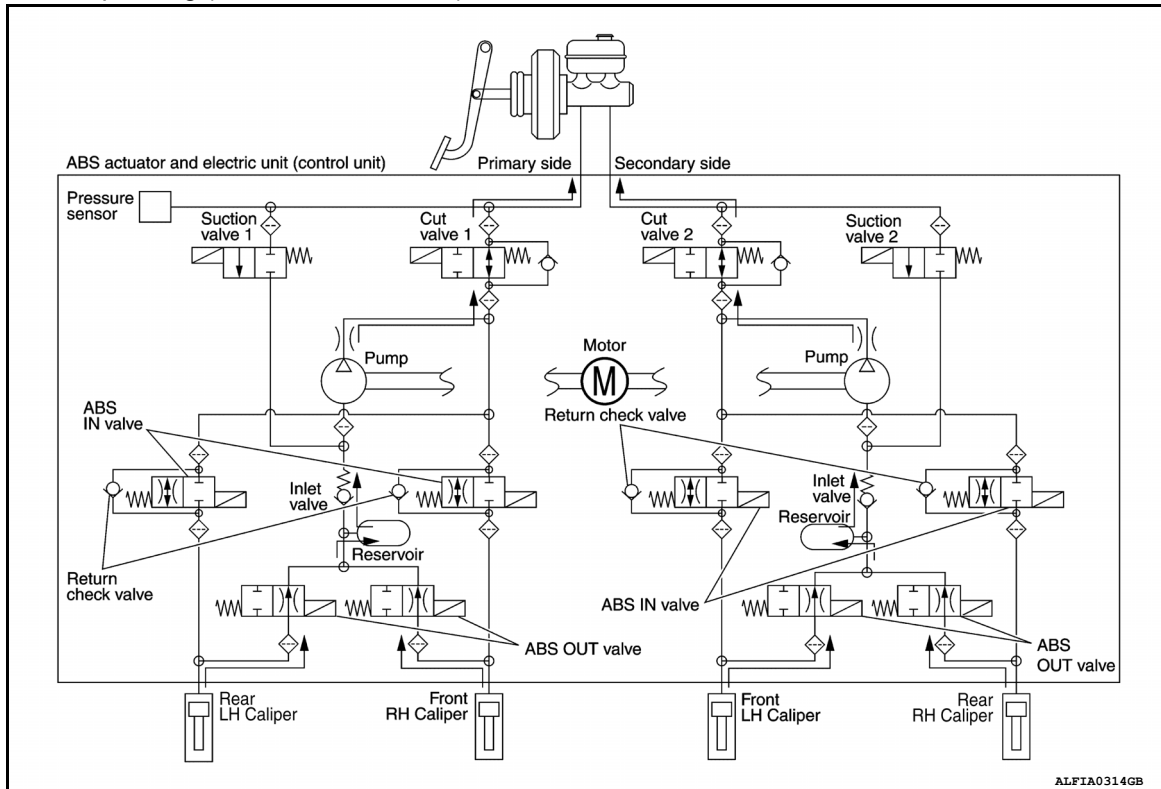
Rear RH brake caliper

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

Rear LH brake caliper

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

## ABS Function Operating (Pressure Decreases)



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

### Front RH brake caliper

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

### Front LH brake caliper

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

### Rear RH brake caliper

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

### Rear LH brake caliper

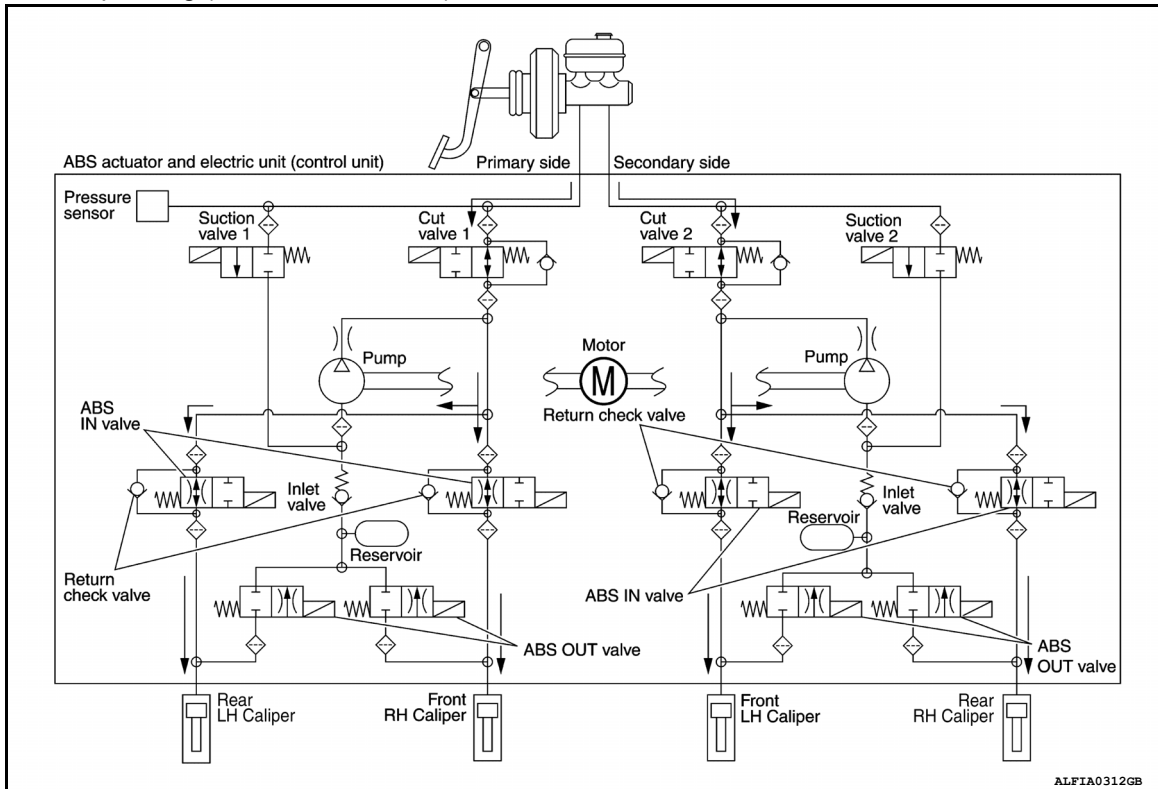
- Since the ABS IN valve is closed and the ABS OUT valve is opened, fluid pressure applied on the rear LH brake caliper is supplied to the reservoir through the ABS OUT valve. This fluid pressure decreases when sent to the master cylinder by the pump.

# SYSTEM

## < SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

### ABS Function Operating (Pressure Increases)



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

#### Front RH brake caliper

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

#### Front LH brake caliper

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

#### Rear RH brake caliper

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

#### Rear LH brake caliper

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

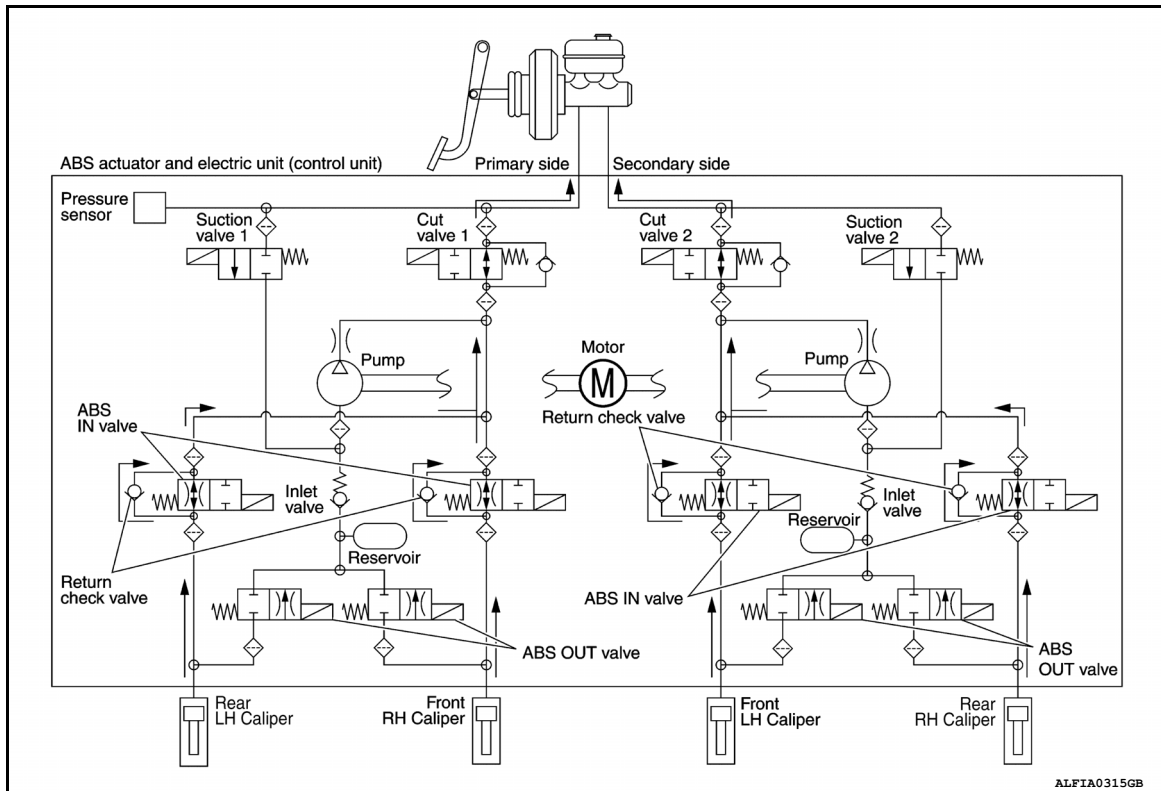
# SYSTEM

## < SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

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

### Brake Release



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

#### Front RH brake caliper

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

#### Front LH brake caliper

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

#### Rear RH brake caliper

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

#### Rear LH brake caliper

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

### Component Parts and Function

# SYSTEM

## < SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

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

## CONDITIONS FOR INDICATOR LAMP ILLUMINATION

- Turns ON when VDC and TCS functions 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	SLIP indicator lamp
Ignition switch OFF	OFF	OFF
For approx. 1 second after the ignition switch is turned ON	ON	ON
Approx. 1 second after ignition switch is turned ON (when the system is in normal operation)	OFF	OFF
When VDC OFF switch is ON (VDC function and TCS function are OFF)	ON	OFF
VDC function is malfunctioning	OFF	ON
TCS function is malfunctioning	OFF	ON

## CONDITIONS FOR WARNING LAMP ILLUMINATION

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

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

# SYSTEM

< SYSTEM DESCRIPTION >

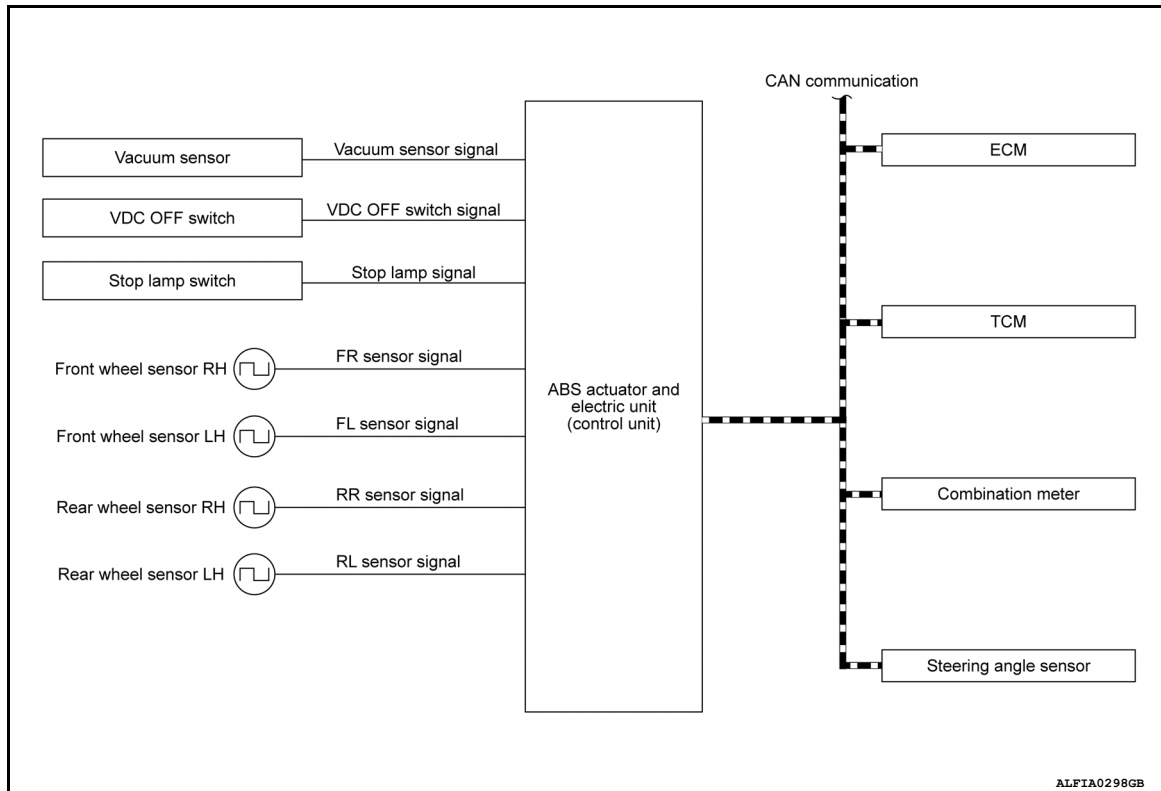
[VDC/TCS/ABS]

Condition (status)	ABS warning lamp	Brake warning lamp
Brake limited slip differential (BLSD) function is malfunctioning	OFF	OFF
VDC function is operating	OFF	OFF
TCS function is operating	OFF	OFF

## VDC/TCS/ABS : VDC Function

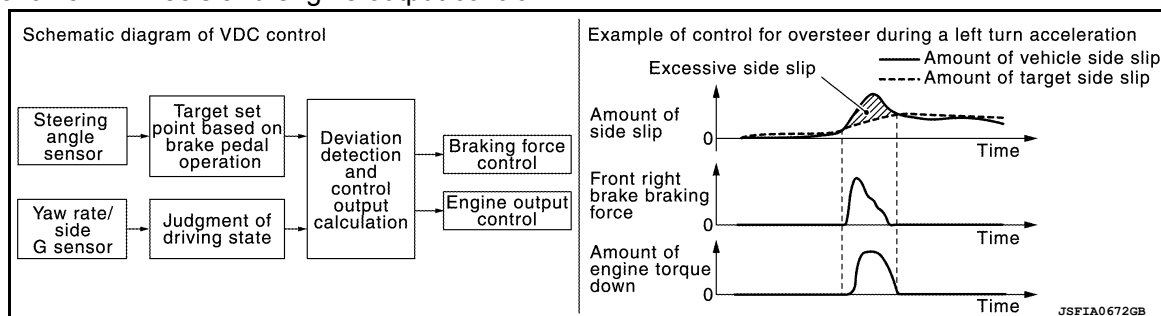
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## SYSTEM DIAGRAM



## SYSTEM DESCRIPTION

- Side slip or tail slip may occur while driving on a slippery road or intending 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. By comparing this information with vehicle side slip amount that is calculated from information from yaw rate/side G sensor and wheel sensor, vehicle driving conditions (conditions of understeer or oversteer) are judged and vehicle stability is improved by brake force control on all 4 wheels and engine output control.



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

# SYSTEM

## < SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

- Brake force control function at braking hard detects driver's brake operations with the pressure sensor, judges a brake booster's maximum brake power function by using information from the vacuum sensor, and enhances more powerful braking force by controlling brakes of four wheels.
- VDC warning lamp blinks while VDC function is in operation and indicates to the driver that the function is in operation.
- CONSULT can be used to diagnose the system.
- Fail-safe function is adopted. When a malfunction occurs in VDC function, the control is suspended for VDC function and TCS function. However, ABS function and EBD function operate normally. Refer to [BRC-40](#), "Fail-safe".

## INPUT SIGNAL AND OUTPUT SIGNAL

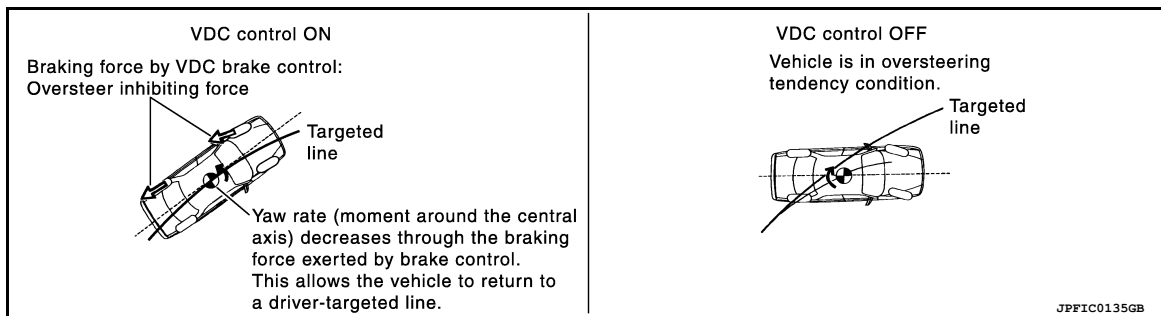
Major signal transmission between each unit via communication lines is shown in the following table.

Component	Signal description
ECM	Transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• Acceleration pedal position signal</li> <li>• Engine speed signal</li> <li>• Target throttle position signal</li> </ul>
TCM	Transmits the current gear position signal to ABS actuator and electric unit (control unit) via CAN communication.
Steering angle sensor	Transmits the steering angle sensor signal to ABS actuator and electric unit (control unit) via CAN communication.
Combination meter	Transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• Brake fluid level switch signal</li> <li>• parking brake switch signal</li> </ul> Receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• VDC OFF indicator lamp signal</li> <li>• SLIP indicator lamp signal</li> </ul>

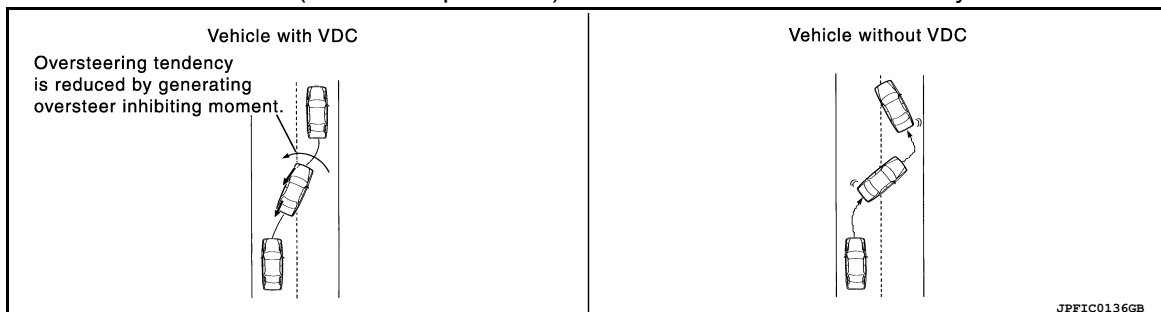
## OPERATION CHARACTERISTICS

### VDC Function That Prevents Oversteer Tendency

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



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





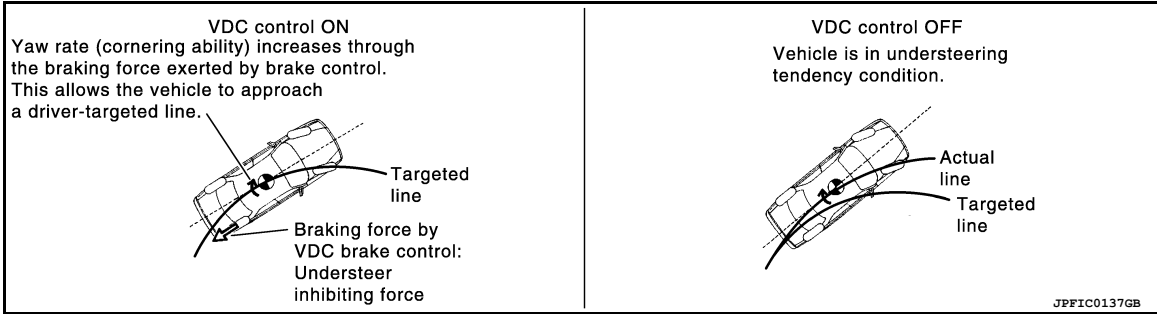
# SYSTEM

## < SYSTEM DESCRIPTION >

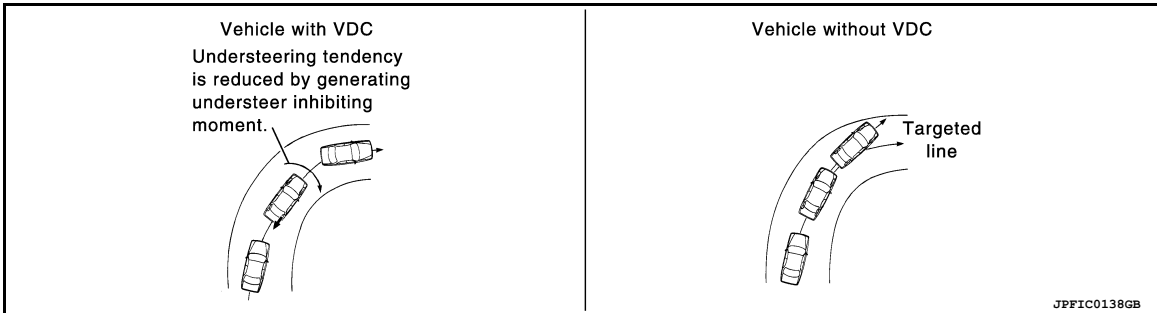
[VDC/TCS/ABS]

### VDC Function That Prevents Understeer Tendency

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



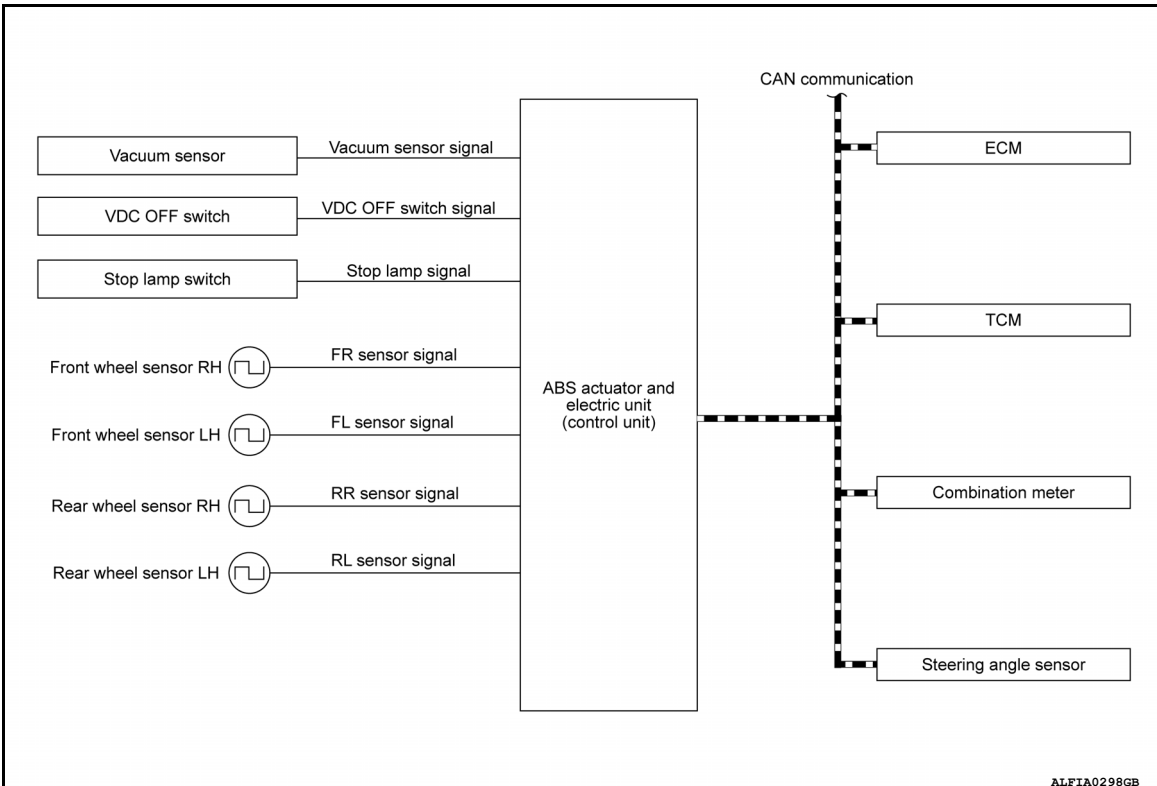
- Applying brakes during cornering on a slippery road, when there may be a tendency to understeer, engine output is controlled as well as brake force (brake fluid pressure) of 4 wheels. Understeer tendency decreases.



### VDC/TCS/ABS : TCS Function

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### SYSTEM DIAGRAM



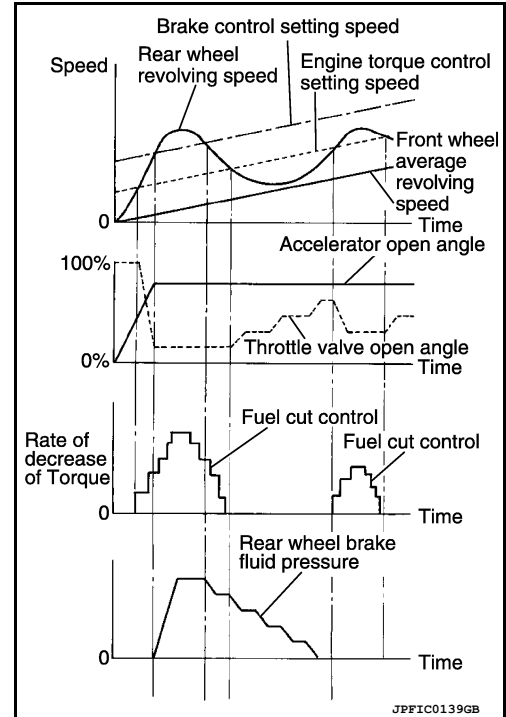
### SYSTEM DESCRIPTION

# SYSTEM

## < SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

- Wheel spin status of drive wheel is detected by wheel sensor of 4 wheels. Engine output and transmission shift status is controlled so that slip rate of drive wheels is in appropriate level. When wheel spin occurs on drive wheel, ABS actuator and electric unit (control unit) perform brake force control of LH and RH drive wheels (apply brake force by increasing brake fluid pressure of drive wheel) and decrease engine torque by engine torque control. Wheel spin amount decreases. Engine torque is controlled to appropriate level.
- TCS function can be switched to non-operational status (OFF) by operating VDC OFF switch. In this case, VDC OFF indicator lamp turns ON.
- SLIP indicator lamp blinks while TCS function is in operation and indicates to the driver that the function is in operation.
- CONSULT can be used to diagnose the system.
- Fail-safe function is adopted. When a malfunction occurs in TCS function, the control is suspended for VDC function and TCS function. However, ABS function and EBD function operate normally. Refer to [BRC-40, "Fail-safe"](#).



## INPUT SIGNAL AND OUTPUT SIGNAL

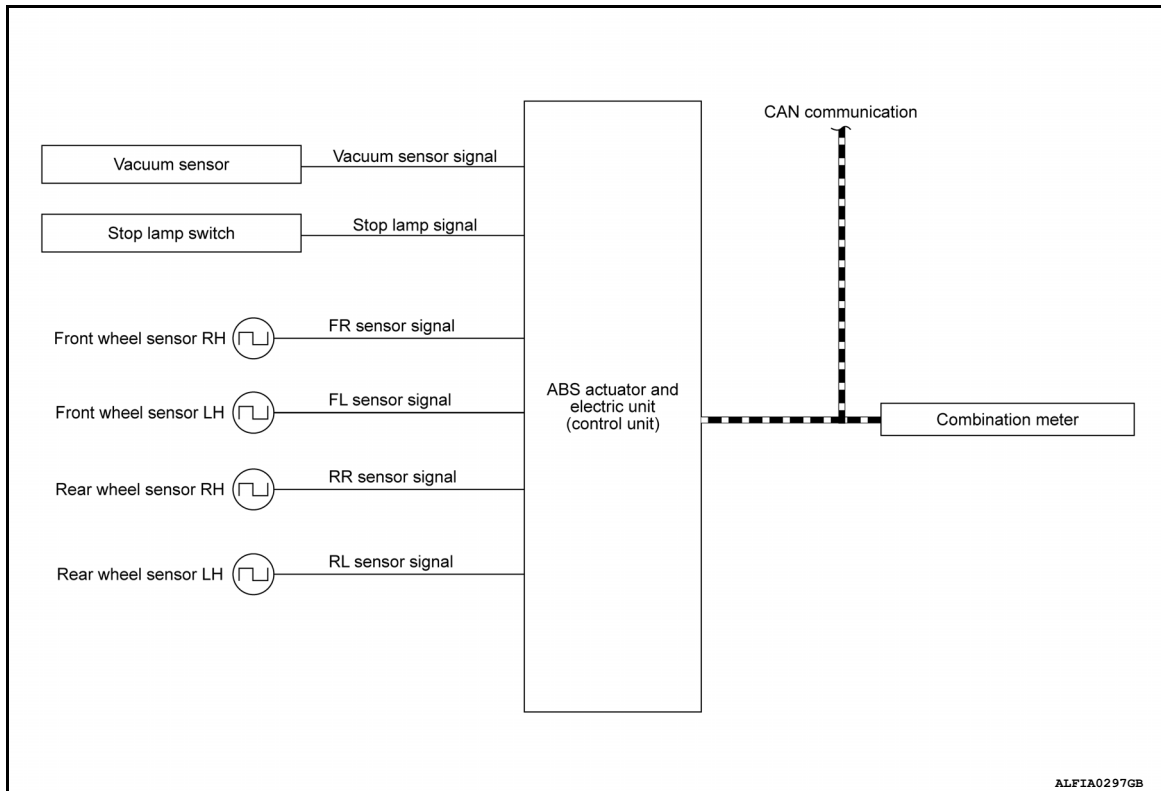
Major signal transmission between each unit via communication lines is shown in the following table.

Component	Signal description
ECM	Transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• Accelerator pedal position signal</li> <li>• Engine speed signal</li> <li>• Target throttle position signal</li> </ul>
TCM	Transmits the current gear position signal to ABS actuator and electric unit (control unit) via CAN communication.
Steering angle sensor	Transmits the steering angle sensor signal to ABS actuator and electric unit (control unit) via CAN communication.
Combination meter	Transmits the following signals to ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• Brake fluid level switch signal</li> <li>• Parking brake switch signal</li> </ul> Receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• VDC OFF indicator lamp signal</li> <li>• SLIP indicator lamp signal</li> </ul>

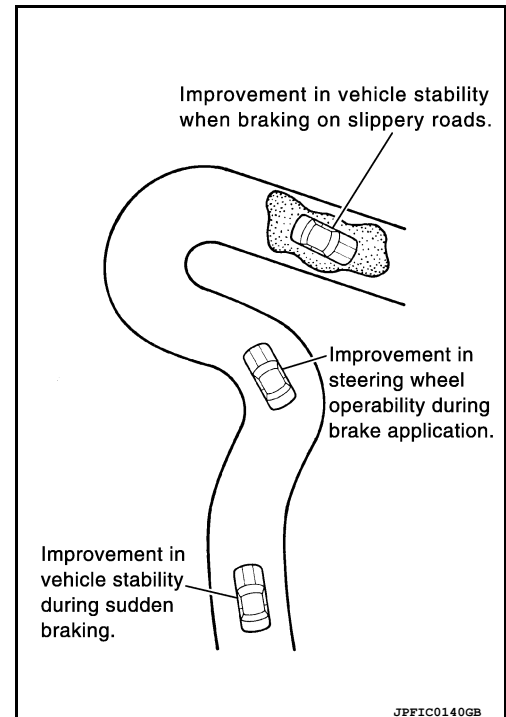
## VDC/TCS/ABS : ABS Function

INFOID:000000008490052

### SYSTEM DIAGRAM



- 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 speeds, and transmit 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 while cornering.
  - Obstacles may be easily bypassed by steering operation during braking.
- CONSULT can be used to diagnose the system.
- Fail-safe function is adopted. When a malfunction occurs in ABS function, the control is suspended for VDC function, TCS function and ABS function. However, EBD function operates normally. Refer to [BRC-29, "VDC/TCS/ABS : Fail-safe"](#).



### INPUT SIGNAL AND OUTPUT SIGNAL

# SYSTEM

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

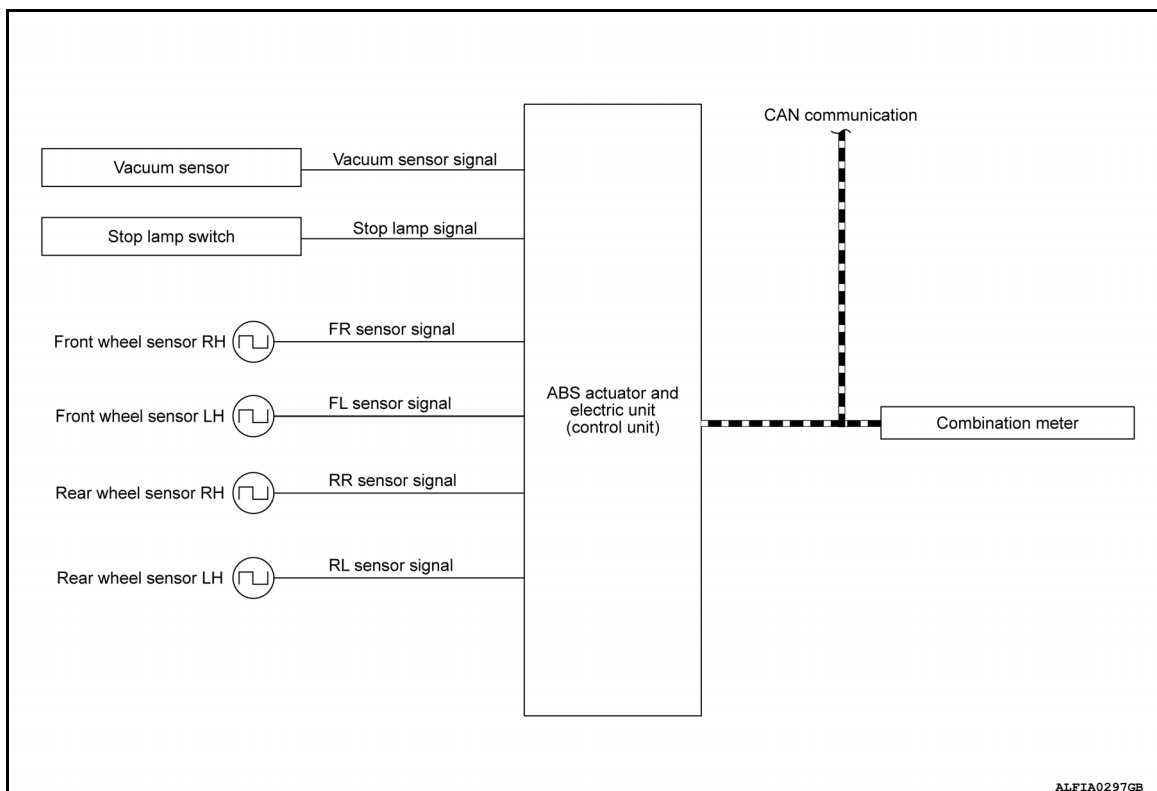
Major signal transmission between each unit via communication lines is shown in the following table.

Component	Signal description
Combination meter	Receives the following signals from ABS actuator and electric unit (control unit) via CAN communication. <ul style="list-style-type: none"> <li>• VDC warning lamp signal</li> <li>• ABS warning lamp signal</li> </ul>

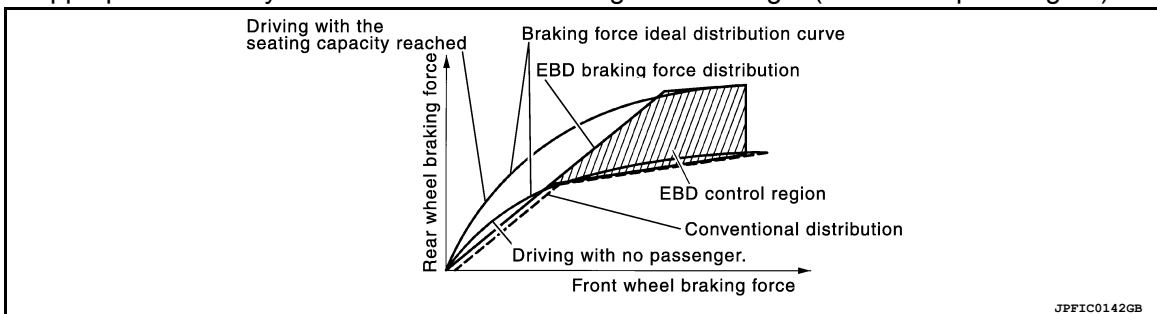
## VDC/TCS/ABS : EBD Function

INFOID:000000008490053

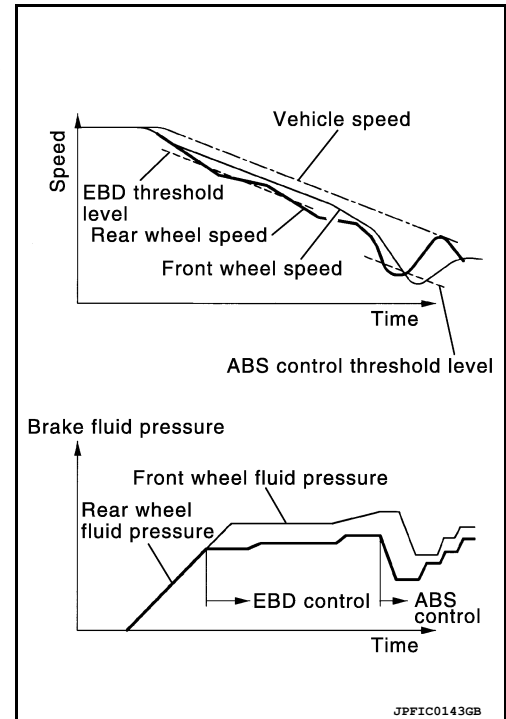
## SYSTEM DIAGRAM



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



- During braking, control unit portion compares slight slip on front and rear wheels by wheel sensor signal, transmits drive signal to actuator portion when rear wheel slip exceeds front wheel slip for the specified value or more, and controls rear wheel brake force (brake fluid pressure) so that increase of rear wheel slip is prevented and slips on front wheel and rear wheel are nearly equalized. ABS control is applied when slip on each wheel increases and wheel speed is the threshold value of ABS control or less.
- CONSULT can be used to diagnose the system.
- Fail-safe function is adopted. When a malfunction occurs in EBD function, the control is suspended for VDC function, TCS function, ABS function and EBD function. Refer to [BRC-29, "VDC/TCS/ABS : 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
Combination meter	<p>Receives the following signals from ABS actuator and electric unit (control unit) via CAN communication.</p> <ul style="list-style-type: none"> <li>ABS warning lamp signal</li> <li>Brake warning lamp signal</li> <li>SLIP indicator lamp signal</li> </ul>

### VDC/TCS/ABS : Fail-safe

INFOID:0000000008490054

#### VDC AND TCS FUNCTIONS

VDC warning lamp in combination meter turns ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC and TCS functions. However, ABS and EBD functions operate 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, TCS and ABS functions. However, EBD functions operate normally.

#### 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, TCS, ABS and EBD functions.

# SYSTEM

## < SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

DTC	Malfunction detected condition	Fail-safe condition
C1101	When an open circuit is detected in rear RH wheel sensor circuit.	<p>The following functions are suspended:</p> <ul style="list-style-type: none"> <li>• VDC</li> <li>• ABS</li> <li>• EBD (only when both rear wheels are malfunctioning)</li> </ul>
C1102	When an open circuit is detected in rear LH wheel sensor circuit.	
C1103	When an open circuit is detected in front RH wheel sensor circuit.	
C1104	When an open circuit is detected in front LH wheel sensor circuit.	
C1105	<ul style="list-style-type: none"> <li>• When a short circuit is detected in rear RH wheel sensor circuit.</li> <li>• When power supply voltage of rear RH wheel sensor is in following state.</li> <li>- Rear RH wheel sensor power supply voltage: <math>7.2\text{ V} \geq</math> Rear RH wheel sensor power supply voltage</li> <li>• When distance between rear RH wheel sensor and rear RH wheel sensor rotor is large.</li> <li>• When installation of rear RH wheel sensor or rear RH wheel sensor rotor is not normal.</li> </ul>	
C1106	<ul style="list-style-type: none"> <li>• When a short circuit is detected in rear LH wheel sensor circuit.</li> <li>• When power supply voltage of rear LH wheel sensor is in following state.</li> <li>- Rear LH wheel sensor power supply voltage: <math>7.2\text{ V} \geq</math> Rear LH wheel sensor power supply voltage</li> <li>• When distance between rear LH wheel sensor and rear LH wheel sensor rotor is large.</li> <li>• When installation of rear LH wheel sensor or rear LH wheel sensor rotor is not normal.</li> </ul>	
C1107	<ul style="list-style-type: none"> <li>• When a short circuit is detected in front RH wheel sensor circuit.</li> <li>• When power supply voltage of front RH wheel sensor is in following state.</li> <li>- Front RH wheel sensor power supply voltage: <math>7.2\text{ V} \geq</math> Front RH wheel sensor power supply voltage</li> <li>• When distance between front RH wheel sensor and front RH wheel sensor rotor is large.</li> <li>• When installation of front RH wheel sensor or front RH wheel sensor rotor is not normal.</li> </ul>	
C1108	<ul style="list-style-type: none"> <li>• When a short circuit is detected in front LH wheel sensor circuit.</li> <li>• When power supply voltage of front LH wheel sensor is in following state.</li> <li>- Front LH wheel sensor power supply voltage: <math>7.2\text{ V} \geq</math> Front LH wheel sensor power supply voltage</li> <li>• When distance between front LH wheel sensor and front LH wheel sensor rotor is large.</li> <li>• When installation of front LH wheel sensor or front LH wheel sensor rotor is not normal.</li> </ul>	
C1109	<ul style="list-style-type: none"> <li>• When ignition power supply voltage is in following state.</li> <li>- Ignition power supply voltage: <math>10\text{ V} \geq</math> Ignition power supply voltage.</li> <li>- Ignition power supply voltage: <math>16\text{ V} \leq</math> Ignition power supply voltage.</li> </ul>	<p>The following functions are suspended:</p> <ul style="list-style-type: none"> <li>• VDC</li> <li>• TCS</li> <li>• ABS</li> <li>• EBD</li> </ul>
C1110	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	
C1111	When a malfunction is detected in motor or motor relay.	<p>The following functions are suspended:</p> <ul style="list-style-type: none"> <li>• VDC</li> <li>• TCS</li> <li>• ABS</li> </ul>
C1113	When a malfunction is detected in longitudinal G signal.	<p>The following functions are suspended:</p> <ul style="list-style-type: none"> <li>• VDC</li> <li>• TCS</li> </ul>
C1115	When difference in wheel speed between any wheel and others is detected when the vehicle is driven, because of installation of tires other than specified.	<p>The following functions are suspended:</p> <ul style="list-style-type: none"> <li>• VDC</li> <li>• TCS</li> <li>• ABS</li> <li>• EBD</li> </ul>

# SYSTEM

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

DTC	Malfunction detected condition	Fail-safe condition	
C1116	When stop lamp switch signal is not input when brake pedal operates.	The following functions are suspended: • VDC • TCS	A
C1120	When a malfunction is detected in front LH ABS IN valve.	The following functions are suspended: • VDC • TCS • ABS • EBD	B
C1121	When a malfunction is detected in front LH ABS OUT valve.		
C1122	When a malfunction is detected in front RH ABS IN valve.		C
C1123	When a malfunction is detected in front RH ABS OUT valve.		
C1124	When a malfunction is detected in rear LH ABS IN valve.		D
C1125	When a malfunction is detected in rear LH ABS OUT valve.		
C1126	When a malfunction is detected in rear RH ABS IN valve.		E
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 • TCS	BRC
C1140	When a malfunction is detected in actuator relay.	The following functions are suspended: • VDC • TCS • ABS • EBD	G
C1142	When a malfunction is detected in VDC pressure sensor.	The following functions are suspended: • VDC • TCS	H
C1143	When a malfunction is detected in steering angle sensor.		
C1144	When neutral position adjustment of steering angle sensor is not complete.		I
C1145	When a malfunction is detected in yaw rate signal, or signal line of yaw rate/side/decel G sensor is open or shorted.		J
C1146	When a malfunction is detected in side G signal, or signal line of yaw rate/side/decel G sensor is open or shorted.		
C1153	When ABS actuator and electric unit (control unit) is malfunctioning. (Pressure increase is too much or too little.)	The following functions are suspended: • VDC • TCS • ABS	K
C1155	When brake fluid level low signal is detected.	The following functions are suspended: • VDC • TCS	L
C1160	When calibration of yaw rate/side/decel G sensor is not complete.	The following functions are suspended: • VDC • TCS • ABS • EBD	M
C1164	When a malfunction is detected in cut valve 1.		
C1165	When a malfunction is detected in cut valve 2.		N
C1166	When a malfunction is detected in suction valve 1.		
C1167	When a malfunction is detected in suction valve 2.		O
C1170	When the information in ABS actuator and electric unit (control unit) is not the same.	The following functions are suspended: • VDC • TCS • ABS	P
C1197	When a malfunction is detected in vacuum sensor.	Electrical vacuum assistance of brake booster is suspended.	
C1198	• When an open circuit is detected in vacuum sensor circuit. • When a short circuit is detected in vacuum sensor circuit. • When a malfunction is detected in vacuum sensor noise.		
C1199	When brake booster vacuum is approx. 0 kPa (0 mmHg) during engine running.		

## SYSTEM

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

DTC	Malfunction detected condition	Fail-safe condition
C119A	When a malfunction is detected in supply power voltage of vacuum sensor.	Electrical vacuum assistance of brake booster is suspended.
U1000	When CAN communication signal is not continuously transmitted or received for 2 seconds or more.	The following functions are suspended: <ul style="list-style-type: none"><li>• VDC</li><li>• TCS</li></ul>
U1002	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or less.	



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

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

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

### CONSULT Function (ABS)

INFOID:0000000008490055

#### 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.
Work support	The settings for ABS actuator and electric unit (control unit) functions can be changed.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication is displayed.
Configuration	<ul style="list-style-type: none"><li>• Read and save the vehicle specification (TYPE ID).</li><li>• Write the vehicle specification (TYPE ID) when replacing ABS actuator and electric unit (control unit).</li></ul>

#### 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 driven 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 of 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-44, "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.

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

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

Item (Unit)	Data monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
RR RH SENSOR (km/h, mph)	×	×	×	Wheel speed (km/h, mph) calculated by rear wheel sensor RH signal is displayed.
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.
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.
SLCT LVR POSI	×	×	×	Current gear position judged from current gear position 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)	—	—	×	Neutral position (On/Off) judged by transmission range switch signal.
P POSI SIG (On/Off)	—	—	×	Park position (On/Off) judged by transmission range switch signal.
ACCEL POS SIG (%)	×	—	×	Throttle valve open/close status judged by CAN communication signal is displayed.

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

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

Item (Unit)	Data monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
SIDE G-SENSOR (m/s <sup>2</sup> )	×	—	×	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.
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.
USV[FL-RR] (On/Off)	—	—	×	Primary side USV solenoid valve (On/Off) status is displayed.
USV[FR-RL] (On/Off)	—	—	×	Secondary side USV solenoid valve (On/Off) status is displayed.
HSV[FL-RR] (On/Off)	—	—	×	Primary side HSV solenoid valve (On/Off) status is displayed.
HSV[FR-RL] (On/Off)	—	—	×	Secondary side HSV solenoid valve (On/Off) status is displayed.
V/R OUTPUT (On/Off)	—	—	×	Valve relay operation signal (On/Off) status is displayed.
M/R OUTPUT (On/Off)	—	—	×	Motor relay operation signal (On/Off) status is displayed.
ENGINE RPM (tr/min)	×	—	×	Engine speed judged by CAN communication signal is displayed.

×: Applicable

—: Not applicable

## ACTIVE TEST

### CAUTION:

- Do not perform active test while driving vehicle.
- Make sure to completely bleed air from brake system.
- The active test cannot be performed with the ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp or brake warning lamp on.

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

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

- **ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp turn on during active test.**

## NOTE:

- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal.
- "TEST IS STOPPED" is displayed 10 seconds after operation start.
- After "TEST IS STOPPED" is displayed, to perform test again, touch BACK.

Test Item

ABS MOTOR

- Touch "On" and "Off" on screen. Make sure motor relay and actuator relay operate as shown in table below.

Operation	On	Off
MOTOR RELAY	On	Off
ACTUATOR RLY	On	On

## WORK SUPPORT

Conditions	Description
ST ANGLE SENSOR ADJUSTMENT	Steering angle sensor neutral position adjustment can be performed. Refer to <a href="#">BRC-57. "Work Procedure"</a> .

## CONFIGURATION

Configuration includes the following functions.

Function		Description
Read/Write Configuration	Before replacing ECU	Allows the reading of vehicle specification (Type ID) written in ABS actuator and electric unit (control unit) to store the specification in CONSULT.
	After replacing ECU	Allows the writing of vehicle information (Type ID) stored in CONSULT into the ABS actuator and electric unit (control unit).
Manual Configuration		Allows the writing of vehicle specification (Type ID) into the ABS actuator and electric unit (control unit) by hand.

## CAUTION:

Use "Manual Configuration" only when "TYPE ID" of ABS actuator and electric unit (control unit) cannot be read.

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

## ECU DIAGNOSIS INFORMATION

### ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

#### Reference Value

INFOID:000000008490056

#### VALUES ON THE DIAGNOSIS TOOL

#### CAUTION:

The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short-circuited.

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 ( $\pm 10\%$ or less)	Vehicle running (Note 1)
FR RH SENSOR	Wheel speed	0 [km/h, mph]	Vehicle stopped
		Nearly matches the speed meter display ( $\pm 10\%$ or less)	Vehicle running (Note 1)
RR LH SENSOR	Wheel speed	0 [km/h, mph]	Vehicle stopped
		Nearly matches the speed meter display ( $\pm 10\%$ or less)	Vehicle running (Note 1)
RR RH SENSOR	Wheel speed	0 [km/h, mph]	Vehicle stopped
		Nearly matches the speed meter display ( $\pm 10\%$ or less)	Vehicle running (Note 1)
DECEL G-SEN	Longitudinal acceleration detected by decel G sensor	Vehicle stopped	Approx. 0 G
		Vehicle running	-1.7 to 1.7 G
FR RH IN SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR RH OUT SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR LH IN SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
FR LH OUT SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
RR RH IN SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR RH OUT SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH IN SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH OUT SOL	Operation status of all solenoid valves	Actuator (solenoid valve) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	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	Brake pedal operation	When brake pedal is depressed	On
		When brake pedal is not depressed	Off
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 is operating	On
		When the actuator relay is not operating	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
SLIP/VDC LAMP	SLIP indicator lamp (Note 2)	When SLIP indicator lamp is ON	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	Manual mode gear position determined by TCM	1st gear 2nd gear 3rd gear 4th gear 5th gear	1 2 3 4 5
SLCT LVR POSI	Selector lever position.	Vehicle stopped	N/P
YAW RATE SEN	Yaw rate detected by yaw rate/side G sensor	Vehicle stopped	Approx. 0 d/s
		Vehicle turning	-75 to 75 d/s

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
R POSI SIG	Transmission range switch signal ON/OFF condition	CVT shift position = R position	On
		CVT shift position = other than R position	Off
N POSI SIG	Transmission range switch signal ON/OFF condition	CVT shift position = N position	On
		CVT shift position = other than N position	Off
P POSI SIG	Transmission range switch signal ON/OFF condition	CVT shift position = P position	On
		CVT shift position = other than P position	Off
ACCEL POS SIG	Throttle actuator opening/closing is displayed (linked with accelerator pedal)	Accelerator pedal not depressed (ignition switch is ON)	0 %
		Depress accelerator pedal (ignition switch is ON)	0 - 100 %
SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle stopped	Approx. 0 m/s <sup>2</sup>
		Vehicle turning right	Negative value (m/s <sup>2</sup> )
		Vehicle turning left	Positive value (m/s <sup>2</sup> )
STR ANGLE SIG	Steering angle detected by steering angle sensor	Straight-ahead	Approx. 0°
		Steering wheel turned	-720 to 720°
PRESS SENSOR	Brake fluid pressure detected by pressure sensor	With ignition switch turned ON and brake pedal released	Approx. 0 bar
		With ignition switch turned ON and brake pedal depressed	-40 to 300 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	When brake fluid level switch ON	On
		When brake fluid level switch OFF	Off
PARK BRAKE SW	Parking brake switch	Parking brake switch is active	On
		Parking brake switch is inactive	Off

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# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
USV[FL-RR]	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (when in fail-safe mode)	On
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	Off
USV[FR-RL]	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (when in fail-safe mode)	On
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	Off
HSV[FL-RR]	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (when in fail-safe mode)	On
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	Off
HSV[FR-RL]	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (when in fail-safe mode)	On
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	Off
V/R OUTPUT	Solenoid valve relay activated	When the solenoid valve relay is active (when ignition switch OFF)	On
		When the solenoid valve relay is not active (in the fail-safe mode)	Off
M/R OUTPUT	Actuator motor and motor relay activated	When the actuator motor and motor relay are active ("ACTIVE TEST" with CONSULT)	On
		When the actuator motor and motor relay are inactive	Off
ENGINE RPM	With engine running	With engine stopped	0 rpm
		Engine running	Almost in accordance with tachometer display

Note 1: Confirm tire pressure is normal.

Note 2: On and off timing for warning lamps and indicator lamps.

- Refer to [BRC-23, "VDC/TCS/ABS : VDC Function"](#).
- Refer to [BRC-25, "VDC/TCS/ABS : TCS Function"](#).
- Refer to [BRC-27, "VDC/TCS/ABS : ABS Function"](#).
- Refer to [BRC-28, "VDC/TCS/ABS : EBD Function"](#).

## Fail-safe

INFOID:000000008490057

## VDC AND TCS FUNCTIONS

VDC warning lamp in combination meter turns ON when a malfunction occurs in system [ABS actuator and electric unit (control unit)]. The control is suspended for VDC and TCS functions. However, ABS and EBD functions operate normally.



# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

## 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, TCS and ABS functions. However, EBD functions operate normally.

## 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, TCS, ABS and EBD functions.

DTC	Malfunction detected condition	Fail-safe condition
C1101	When an open circuit is detected in rear RH wheel sensor circuit.	<p>The following functions are suspended:</p> <ul style="list-style-type: none"> <li>• VDC</li> <li>• ABS</li> <li>• EBD (only when both rear wheels are malfunctioning)</li> </ul>
C1102	When an open circuit is detected in rear LH wheel sensor circuit.	
C1103	When an open circuit is detected in front RH wheel sensor circuit.	
C1104	When an open circuit is detected in front LH wheel sensor circuit.	
C1105	<ul style="list-style-type: none"> <li>• When a short circuit is detected in rear RH wheel sensor circuit.</li> <li>• When power supply voltage of rear RH wheel sensor is in following state.</li> <li>- Rear RH wheel sensor power supply voltage: <math>7.2\text{ V} \geq</math> Rear RH wheel sensor power supply voltage</li> <li>• When distance between rear RH wheel sensor and rear RH wheel sensor rotor is large.</li> <li>• When installation of rear RH wheel sensor or rear RH wheel sensor rotor is not normal.</li> </ul>	
C1106	<ul style="list-style-type: none"> <li>• When a short circuit is detected in rear LH wheel sensor circuit.</li> <li>• When power supply voltage of rear LH wheel sensor is in following state.</li> <li>- Rear LH wheel sensor power supply voltage: <math>7.2\text{ V} \geq</math> Rear LH wheel sensor power supply voltage</li> <li>• When distance between rear LH wheel sensor and rear LH wheel sensor rotor is large.</li> <li>• When installation of rear LH wheel sensor or rear LH wheel sensor rotor is not normal.</li> </ul>	
C1107	<ul style="list-style-type: none"> <li>• When a short circuit is detected in front RH wheel sensor circuit.</li> <li>• When power supply voltage of front RH wheel sensor is in following state.</li> <li>- Front RH wheel sensor power supply voltage: <math>7.2\text{ V} \geq</math> Front RH wheel sensor power supply voltage</li> <li>• When distance between front RH wheel sensor and front RH wheel sensor rotor is large.</li> <li>• When installation of front RH wheel sensor or front RH wheel sensor rotor is not normal.</li> </ul>	
C1108	<ul style="list-style-type: none"> <li>• When a short circuit is detected in front LH wheel sensor circuit.</li> <li>• When power supply voltage of front LH wheel sensor is in following state.</li> <li>- Front LH wheel sensor power supply voltage: <math>7.2\text{ V} \geq</math> Front LH wheel sensor power supply voltage</li> <li>• When distance between front LH wheel sensor and front LH wheel sensor rotor is large.</li> <li>• When installation of front LH wheel sensor or front LH wheel sensor rotor is not normal.</li> </ul>	
C1109	<ul style="list-style-type: none"> <li>• When ignition power supply voltage is in following state.</li> <li>- Ignition power supply voltage: <math>10\text{ V} \geq</math> Ignition power supply voltage.</li> <li>- Ignition power supply voltage: <math>16\text{ V} \leq</math> Ignition power supply voltage.</li> </ul>	
C1110	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	
C1111	When a malfunction is detected in motor or motor relay.	

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

DTC	Malfunction detected condition	Fail-safe condition
C1113	When a malfunction is detected in longitudinal G signal.	The following functions are suspended: • VDC • TCS
C1115	When difference in wheel speed between any wheel and others is detected when the vehicle is driven, because of installation of tires other than specified.	The following functions are suspended: • VDC • TCS • ABS • EBD
C1116	When stop lamp switch signal is not input when brake pedal operates.	The following functions are suspended: • VDC • TCS
C1120	When a malfunction is detected in front LH ABS IN valve.	The following functions are suspended: • VDC • TCS • ABS • EBD
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 • TCS
C1140	When a malfunction is detected in actuator relay.	The following functions are suspended: • VDC • TCS • ABS • EBD
C1142	When a malfunction is detected in VDC pressure sensor.	The following functions are suspended: • VDC • TCS
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, or signal line of yaw rate/side/decel G sensor is open or shorted.	
C1146	When a malfunction is detected in side G signal, or signal line of yaw rate/side/decel G sensor is open or shorted.	
C1153	When ABS actuator and electric unit (control unit) is malfunctioning. (Pressure increase is too much or too little.)	The following functions are suspended: • VDC • TCS • ABS
C1155	When brake fluid level low signal is detected.	The following functions are suspended: • VDC • TCS
C1160	When calibration of yaw rate/side/decel G sensor is not complete.	The following functions are suspended: • VDC function • TCS function • Brake force distribution function

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

DTC	Malfunction detected condition	Fail-safe condition
C1164	When a malfunction is detected in cut valve 1.	The following functions are suspended: • VDC • TCS • ABS • EBD
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 • TCS • ABS
C1197	When a malfunction is detected in vacuum sensor.	Electrical vacuum assistance of brake booster is suspended.
C1198	• When an open circuit is detected in vacuum sensor circuit. • When a short circuit is detected in vacuum sensor circuit. • When a malfunction is detected in vacuum sensor noise.	
C1199	When brake booster vacuum is approx. 0 kPa (0 mmHg) during engine running.	
C119A	When a malfunction is detected in supply power voltage of vacuum sensor.	Electrical vacuum assistance of brake booster is suspended.
U1000	When CAN communication signal is not continuously transmitted or received for 2 seconds or more.	The following functions are suspended: • VDC • TCS
U1002	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or less.	

## DTC Inspection Priority Chart

INFOID:000000008490058

When multiple DTCs are displayed simultaneously, check each one using the following priority list.

Priority	Detected item (DTC)
1	• U1000 CAN COMM CIRCUIT • U1002 SYSTEM COMM(CAN)
2	• C1110 CONTROLLER FAILURE • C1153 EMERGENCY BRAKE • C1170 VARIANT CORDING
3	• C1130 ENGINE SIGNAL 1 • C1144 ST ANG SEN SIGNAL
4	• C1109 BATTERY VOLTAGE [ABNORMAL] • C1111 PUMP MOTOR • C1140 ACTUATOR RLY

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

Priority	Detected item (DTC)
5	<ul style="list-style-type: none"> <li>• C1101 RR RH SENSOR-1</li> <li>• C1102 RR LH SENSOR-1</li> <li>• C1103 FR RH SENSOR-1</li> <li>• C1104 FR LH SENSOR-1</li> <li>• C1105 RR RH SENSOR-2</li> <li>• C1106 RR LH SENSOR-2</li> <li>• C1107 FR RH SENSOR-2</li> <li>• C1108 FR LH SENSOR-2</li> <li>• C1115 ABS SENSOR [ABNORMAL SIGNAL]</li> <li>• C1116 STOP LAMP SW</li> <li>• C1120 FR LH IN ABS SOL</li> <li>• C1121 FR LH OUT ABS SOL</li> <li>• C1122 FR RH IN ABS SOL</li> <li>• C1123 FR RH OUT ABS SOL</li> <li>• C1124 RR LH IN ABS SOL</li> <li>• C1125 RR LH OUT ABS SOL</li> <li>• C1126 RR RH IN ABS SOL</li> <li>• C1127 RR RH OUT ABS SOL</li> <li>• C1142 PRESS SEN CIRCUIT</li> <li>• C1143 ST ANG SEN CIRCUIT</li> <li>• C1145 YAW RATE SENSOR</li> <li>• C1146 SIDE G-SEN CIRCUIT</li> <li>• C1160 DECEL G SEN SET</li> <li>• C1164 CV1</li> <li>• C1165 CV2</li> <li>• C1166 SV1</li> <li>• C1167 SV2</li> <li>• C1197 VACUUM SENSOR</li> <li>• C1198 VACUUM SEN CIR</li> <li>• C1199 BRAKE BOOSTER</li> <li>• C119A VACUUM SEN VOLT</li> </ul>
6	<ul style="list-style-type: none"> <li>• C1155 BR FLUID LEVEL LOW</li> </ul>

## DTC Index

INFOID:000000008490059

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	<a href="#">BRC-61, "DTC Logic"</a>
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	<a href="#">BRC-63, "DTC Logic"</a>
C1106	RR LH SENSOR-2	
C1107	FR RH SENSOR-2	
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	<a href="#">BRC-65, "DTC Logic"</a>
C1110	CONTROLLER FAILURE	<a href="#">BRC-67, "DTC Logic"</a>
C1111	PUMP MOTOR	<a href="#">BRC-68, "DTC Logic"</a>
C1115	ABS SENSOR [ABNORMAL SIGNAL]	<a href="#">BRC-71, "DTC Logic"</a>
C1116	STOP LAMP SW	<a href="#">BRC-73, "DTC Logic"</a>
C1120	FR LH IN ABS SOL	<a href="#">BRC-75, "DTC Logic"</a>
C1121	FR LH OUT ABS SOL	<a href="#">BRC-77, "DTC Logic"</a>
C1122	FR RH IN ABS SOL	<a href="#">BRC-75, "DTC Logic"</a>
C1123	FR RH OUT ABS SOL	<a href="#">BRC-77, "DTC Logic"</a>
C1124	RR LH IN ABS SOL	<a href="#">BRC-75, "DTC Logic"</a>

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

DTC	Items (CONSULT screen terms)	Reference
C1125	RR LH OUT ABS SOL	<a href="#">BRC-77, "DTC Logic"</a>
C1126	RR RH IN ABS SOL	<a href="#">BRC-75, "DTC Logic"</a>
C1127	RR RH OUT ABS SOL	<a href="#">BRC-77, "DTC Logic"</a>
C1130	ENGINE SIGNAL 1	<a href="#">BRC-79, "DTC Logic"</a>
C1140	ACTUATOR RLY	<a href="#">BRC-80, "DTC Logic"</a>
C1142	PRESS SEN CIRCUIT	<a href="#">BRC-82, "DTC Logic"</a>
C1143	ST ANG SEN CIRCUIT	<a href="#">BRC-83, "DTC Logic"</a>
C1144	ST ANG SEN SIGNAL	<a href="#">BRC-85, "DTC Logic"</a>
C1145	YAW RATE SENSOR	<a href="#">BRC-70, "DTC Logic"</a>
C1146	SIDE G-SEN CIRCUIT	
C1153	EMERGENCY BRAKE	<a href="#">BRC-67, "DTC Logic"</a>
C1155	BR FLUID LEVEL LOW	<a href="#">BRC-88, "DTC Logic"</a>
C1160	DECEL G SEN SET	<a href="#">BRC-90, "DTC Logic"</a>
C1164	CV 1	<a href="#">BRC-91, "DTC Logic"</a>
C1165	CV 2	
C1166	SV 1	
C1167	SV 2	
C1170	VARIANT CORDING	<a href="#">BRC-67, "DTC Logic"</a>
C1197	VACUUM SENSOR	<a href="#">BRC-93, "DTC Logic"</a>
C1198	VACUUM SEN CIR	<a href="#">BRC-95, "DTC Logic"</a>
C1199	BRAKE BOOSTER	<a href="#">BRC-97, "DTC Logic"</a>
C119A	VACUUM SEN VOLT	<a href="#">BRC-99, "DTC Logic"</a>
U1000	CAN COMM CIRCUIT	<a href="#">BRC-101, "DTC Logic"</a>
U1002	SYSTEM COMM(CAN)	<a href="#">BRC-102, "DTC Logic"</a>

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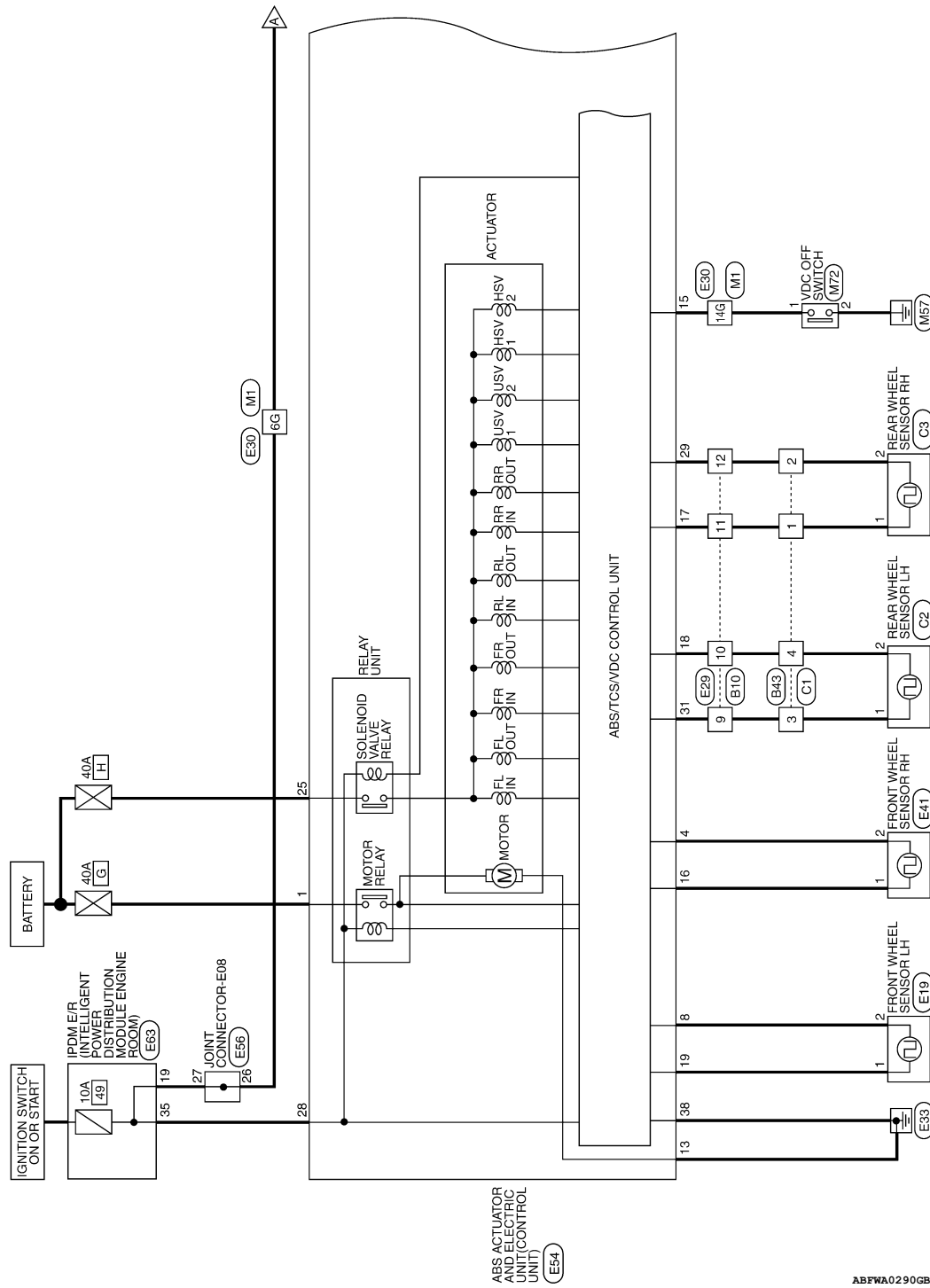
## WIRING DIAGRAM

### BRAKE CONTROL SYSTEM

#### Wiring Diagram

INFOID:000000008490060

#### BRAKE CONTROL SYSTEM

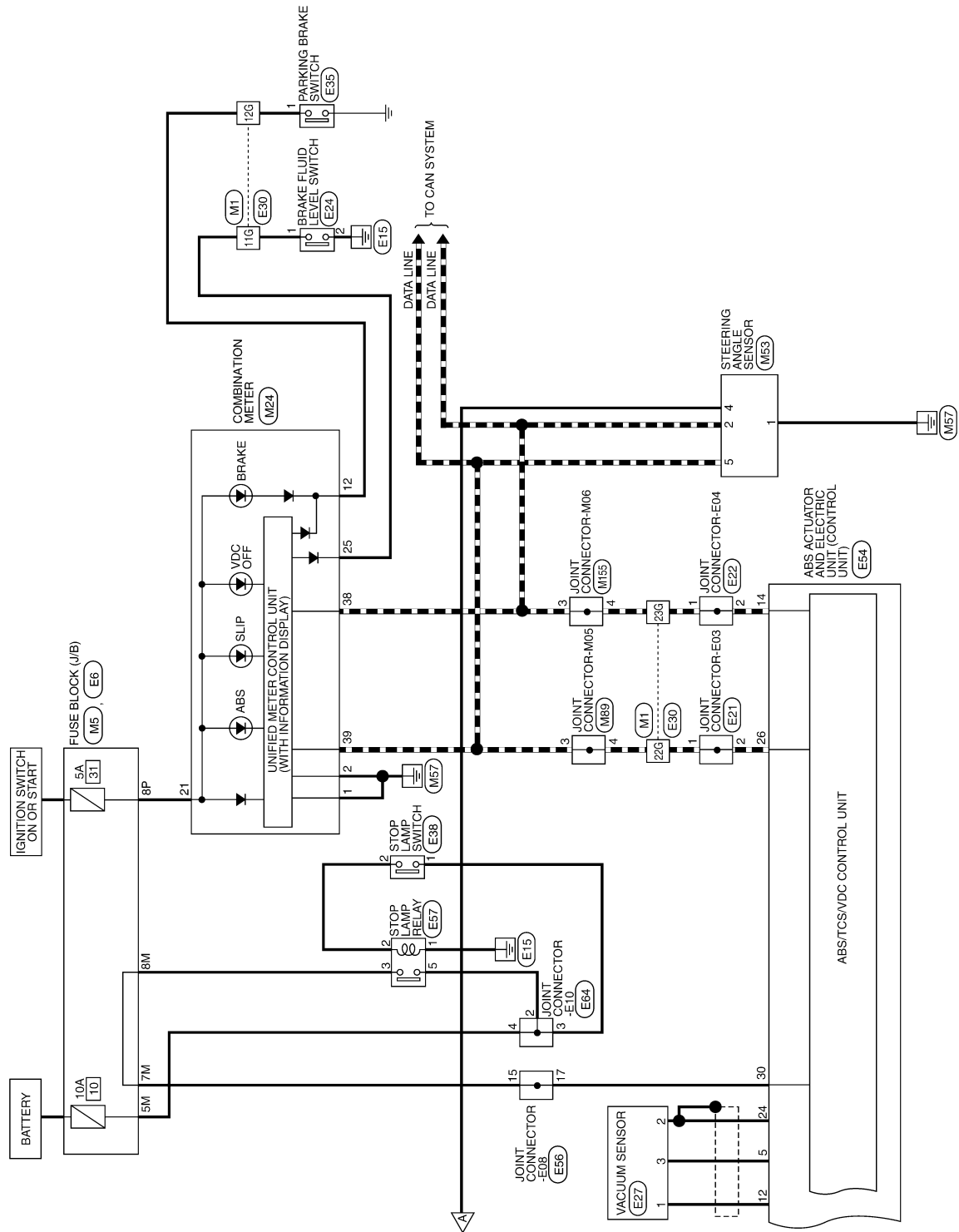


ABFWA0290GB

# BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[VDC/TCS/ABS]



ABFWA0291GB

# BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[VDC/TCS/ABS]

## BRAKE CONTROL SYSTEM CONNECTORS

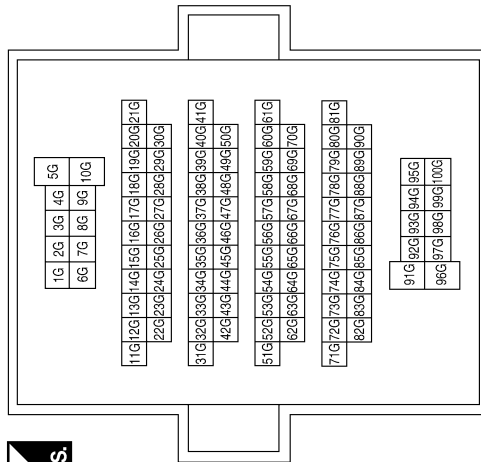
Connector No.	M5
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE



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

Terminal No.	Color of Wire	Signal Name
8P	BR	-

Terminal No.	Color of Wire	Signal Name
6G	G	-
11G	BR	-
12G	G	-
14G	LG	-
22G	L	-
23G	P	-



Connector No.	M53
Connector Name	STEERING ANGLE SENSOR
Connector Color	WHITE



1	2	3	4
5	6	7	8

Terminal No.	Color of Wire	Signal Name
1	B	-
2	P	-
4	G	-
5	L	-

Terminal No.	Color of Wire	Signal Name
1	B	GND1
2	B	GND2
12	G	PKB
21	BR	IGN
25	BR	BRAKE OIL SW
38	P	CAN-L
39	L	CAN-H

Connector No.	M24
Connector Name	COMBINATION METER
Connector Color	WHITE



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

ABFIA0570GB



# BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[VDC/TCS/ABS]

Connector No.	M155
Connector Name	JOINT CONNECTOR-M06
Connector Color	WHITE



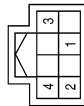
Terminal No.	Color of Wire	Signal Name
3	P	-
4	P	-

Connector No.	M89
Connector Name	JOINT CONNECTOR-M05
Connector Color	WHITE



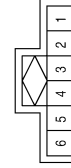
Terminal No.	Color of Wire	Signal Name
3	L	-
4	L	-

Connector No.	M72
Connector Name	VDC OFF SWITCH
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	LG	-
2	B	-

Connector No.	E21
Connector Name	JOINT CONNECTOR-E03
Connector Color	GRAY



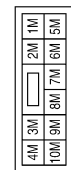
Terminal No.	Color of Wire	Signal Name
1	L	-
2	L	-

Connector No.	E19
Connector Name	FRONT WHEEL SENSOR LH
Connector Color	GRAY



Terminal No.	Color of Wire	Signal Name
1	BR	-
2	Y	-

Connector No.	E6
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
5M	G	-
7M	L	-
8M	W	-

A  
B  
C  
D  
E  
BRC  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

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# BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[VDC/TCS/ABS]

Connector No.	E27
Connector Name	VACUUM SENSOR
Connector Color	BLACK



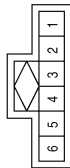
Terminal No.	Color of Wire	Signal Name
1	W	-
2	SHIELD	-
3	B	-

Connector No.	E24
Connector Name	BRAKE FLUID LEVEL SWITCH
Connector Color	GRAY



Terminal No.	Color of Wire	Signal Name
1	BG	-
2	GR	-

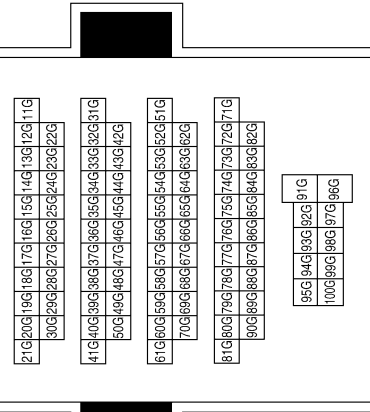
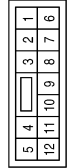
Connector No.	E22
Connector Name	JOINT CONNECTOR-E04
Connector Color	GRAY



Terminal No.	Color of Wire	Signal Name
1	P	-
2	P	-

Terminal No.	Color of Wire	Signal Name
6G	BR	-
11G	BG	-
12G	LG	-
14G	V	-
22G	L	-
23G	P	-

Connector No.	E30
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
9	BR	-
10	LG	-
11	L	-
12	Y	-

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# BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

[VDC/TCS/ABS]

Connector No.	E41
Connector Name	FRONT WHEEL SENSOR RH
Connector Color	GRAY



Terminal No.	Color of Wire	Signal Name
1	SB	-
2	V	-

Connector No.	E38
Connector Name	STOP LAMP SWITCH
Connector Color	WHITE



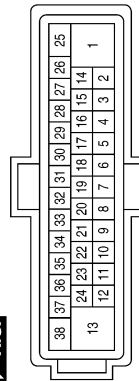
Terminal No.	Color of Wire	Signal Name
1	G	-
2	R	-

Connector No.	E35
Connector Name	PARKING BRAKE SWITCH
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	LG	-

Connector No.	E54
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	W	UB (MR)
2	-	-
3	-	-
4	V	DS FR
5	B	U5V EXT

Terminal No.	Color of Wire	Signal Name
6	-	-
7	-	-
8	Y	DS FL
9	-	-
10	-	-
11	-	-
12	W	VAC
13	B	MGND
14	P	CAN-L
15	V	VDC OFF
16	SB	DP FR
17	L	DP RR
18	LG	DS RL
19	BR	DP FL
20	-	-
21	-	-
22	-	-
23	-	-

Terminal No.	Color of Wire	Signal Name
24	SHIELD	GND EXT
25	R	UB (VR)
26	L	CAN-H
27	-	-
28	BR	WAV
29	Y	DS RR
30	L	BLS
31	BR	DP RL
32	-	-
33	-	-
34	-	-
35	-	-
36	-	-
37	-	-
38	B	GND



ABFIA0573GB

# BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >



[VDC/TCS/ABS]

Connector No.	E63
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE


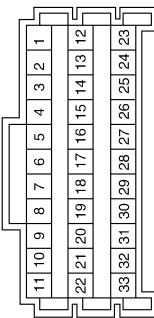
Terminal No.	Color of Wire	Signal Name
19	BR	SUB ECU
35	BR	ABS ECU

Connector No.	E57
Connector Name	STOP LAMP RELAY
Connector Color	BLUE



Terminal No.	Color of Wire	Signal Name
1	B	-
2	R	-
3	W	-
5	G	-

Connector No.	E56
Connector Name	JOINT CONNECTOR-E08
Connector Color	WHITE


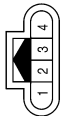
Terminal No.	Color of Wire	Signal Name
15	L	-
17	R	-
26	BR	-
27	BR	-

Connector No.	C2
Connector Name	REAR WHEEL SENSOR LH
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	G	-
2	R	-

Connector No.	C1
Connector Name	WIRE TO WIRE
Connector Color	BLACK

Terminal No.	Color of Wire	Signal Name
1	B	-
2	W	-
3	G	-
4	R	-

Connector No.	E64
Connector Name	JOINT CONNECTOR-E10
Connector Color	WHITE

Terminal No.	Color of Wire	Signal Name
2	G	-
3	G	-
4	G	-

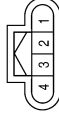
ABFIA0574GB

# BRAKE CONTROL SYSTEM

< WIRING DIAGRAM >

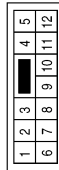
[VDC/TCS/ABS]

Connector No.	B43
Connector Name	WIRE TO WIRE
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	L	-
2	Y	-
3	BR	-
4	LG	-

Connector No.	B10
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
9	BR	-
10	LG	-
11	L	-
12	Y	-

Connector No.	C3
Connector Name	REAR WHEEL SENSOR RH
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	B	-
2	W	-

A  
B  
C  
D  
E  
BRC  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

ABFIA0575GB

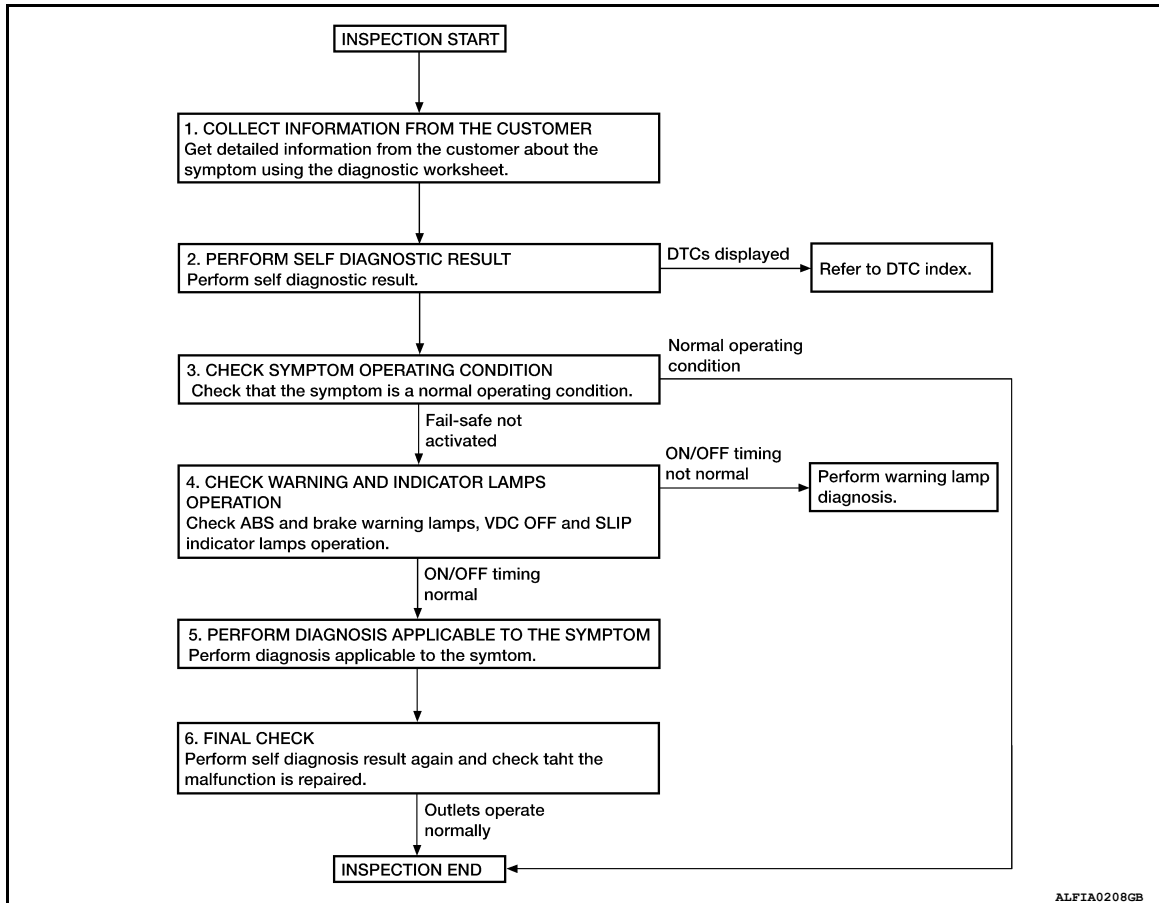
## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORK FLOW

#### Work Flow

INFOID:000000008688512

#### OVERALL SEQUENCE



#### DETAILED FLOW

##### 1.COLLECT INFORMATION FROM THE CUSTOMER

Get detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnostic worksheet. Refer to [BRC-55, "Diagnostic Work Sheet"](#).

>> GO TO 2.

##### 2.PERFORM SELF DIAGNOSTIC RESULT

Perform self diagnostic result. Refer to [BRC-33, "CONSULT Function \(ABS\)"](#).

Are any DTCs displayed?

YES >> Refer to [BRC-44, "DTC Index"](#).

NO >> GO TO 3.

##### 3.CHECK SYMPTOM OPERATING CONDITION

Check that the symptom is a normal operating condition. Refer to [BRC-118, "Description"](#).

Is the symptom a normal operating condition?

YES >> Inspection End.

NO >> GO TO 4.

##### 4.CHECK WARNING AND INDICATOR LAMPS OPERATION

# DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

[VDC/TCS/ABS]

Check ABS and brake warning lamps, and VDC OFF and SLIP indicator lamps operation. Refer to [MWI-9. "METER SYSTEM : System Description"](#).

Is ON/OFF timing normal?

YES >> GO TO 5.

NO >> Perform warning lamp diagnosis. Refer to [BRC-107. "Component Function Check"](#) (ABS warning lamp), [BRC-108. "Component Function Check"](#) (brake warning lamp), [BRC-109. "Component Function Check"](#) (VDC OFF indicator lamp) or [BRC-110. "Component Function Check"](#) (SLIP indicator lamp).

## 5.PERFORM DIAGNOSIS APPLICABLE TO THE SYMPTOM

Perform diagnosis applicable to the symptom. Refer to [BRC-111. "Symptom Table"](#).

>> GO TO 6.

## 6.FINAL CHECK

Perform self diagnostic result again, and check that the malfunction is repaired. After checking, erase the self diagnosis memory. Refer to [BRC-33. "CONSULT Function \(ABS\)"](#).

>> Inspection End.

## Diagnostic Work Sheet

INFOID:000000008688513

Customer name MR/MS	Model & Year	VIN	
Engine #	Trans.	Mileage	
Incident Date	Manuf. Date	In Service Date	
Symptoms	<input type="checkbox"/> Noise and vibration (from engine compartment) <input type="checkbox"/> Noise and vibration (from axle)	<input type="checkbox"/> Warning / Indicator activate	<input type="checkbox"/> Firm pedal operation Large stroke pedal operation
	<input type="checkbox"/> TCS does not work (Front wheels slip when accelerating)	<input type="checkbox"/> ABS does not work (Wheels lock when braking)	<input type="checkbox"/> Lack of sense of acceleration
Engine conditions	<input type="checkbox"/> When starting <input type="checkbox"/> After starting		
Road conditions	<input type="checkbox"/> Low friction road ( <input type="checkbox"/> Snow <input type="checkbox"/> Gravel <input type="checkbox"/> Other ) <input type="checkbox"/> Bumps / potholes		
Driving conditions	<input type="checkbox"/> Full-acceleration <input type="checkbox"/> High speed cornering <input type="checkbox"/> Vehicle speed: Greater than 10 km/h (6 MPH) <input type="checkbox"/> Vehicle speed: 10 km/h (6 MPH) or less <input type="checkbox"/> Vehicle is stopped		
Applying brake conditions	<input type="checkbox"/> Suddenly <input type="checkbox"/> Gradually		
Other conditions	<input type="checkbox"/> Operation of electrical equipment <input type="checkbox"/> Shift change <input type="checkbox"/> Other descriptions		

ALFIA0308GB

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

< BASIC INSPECTION >

[VDC/TCS/ABS]

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

#### Description

INFOID:000000008490140

- When replacing the ABS actuator and electric unit (control unit), calibration of the ABS actuator and electric unit (control unit) is required. Refer to [BRC-59. "Work Procedure"](#).
- When replacing the ABS actuator and electric unit (control unit), perform steering angle sensor neutral position adjustment. Refer to [BRC-57. "Work Procedure"](#).



# ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

< BASIC INSPECTION >

[VDC/TCS/ABS]

## ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

### Description

INFOID:0000000008688514

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:0000000008688515

#### 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

- On the CONSULT screen, touch "WORK SUPPORT" and "ST ANG SEN ADJUSTMENT" in order.
- Touch "START".

##### **CAUTION:**

**Do not touch steering wheel while adjusting steering angle sensor.**

- After approximately 10 seconds, touch "END".

##### **NOTE:**

After approximately 60 seconds, it ends automatically.

- Turn ignition switch OFF, then turn it ON again.

##### **CAUTION:**

**Be sure to perform above operation.**

>> GO TO 3.

#### 3.CHECK DATA MONITOR

- Run vehicle with front wheels in straight-ahead position, then stop.
- Select "DATA MONITOR". Then make sure "STR ANGLE SIG" is within  $0 \pm 2.5^\circ$ .

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.

## ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

< BASIC INSPECTION >

[VDC/TCS/ABS]

- ABS actuator and electric unit (control unit): Refer to [BRC-33, "CONSULT Function \(ABS\)"](#).
- ECM: Refer to [EC-77, "CONSULT Function"](#) (QR25DE) or [EC-600, "CONSULT Function"](#) (VQ35DE).

Are the memories erased?

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

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

< BASIC INSPECTION >

[VDC/TCS/ABS]

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

### Work Procedure

INFOID:000000008499739

#### CAUTION:

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

### 1.CHECKING TYPE ID (1)

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

Is “Type ID” displayed?

YES >> Print out “Type ID” and GO TO 2.

NO >> “Configuration” is not required for ABS actuator and electric unit (control unit). Replace in the usual manner. Refer to [BRC-123, "Removal and Installation"](#).

### 2.CHECKING TYPE ID (2)

 CONSULT Configuration

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

Is “Type ID” displayed?

YES >> GO TO 3.

NO >> GO TO 7.

### 3.VERIFYING TYPE ID (1)

 CONSULT Configuration

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

#### NOTE:

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

>> GO TO 4.

### 4.SAVING TYPE ID

 CONSULT Configuration

Save “Type ID” on CONSULT.

>> GO TO 5.

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

Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

#### CAUTION:

Never perform the following work items:

- Air bleeding

>> GO TO 6.

### 6.WRITING (AUTOMATIC WRITING)

 CONSULT Configuration

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

#### NOTE:

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

< BASIC INSPECTION >

[VDC/TCS/ABS]

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

>> GO TO 9.

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

Replace ABS actuator and electric unit (control unit). Refer to [BRC-123. "Removal and Installation"](#).

### CAUTION:

Never perform the following work items:

- Air bleeding

>> GO TO 8.

## 8. WRITING (MANUAL WRITING)

### CONSULT Configuration

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

### NOTE:

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

>> GO TO 9.

## 9. VERIFYING TYPE ID (2)

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

### NOTE:

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

>> GO TO 10.

## 10. CHECKING VDC WARNING LAMP

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

### CAUTION:

Never start the engine.

Is the inspection result normal?

YES >> GO TO 11.

NO >> Perform the self-diagnosis of "ABS". Refer to [BRC-33. "CONSULT Function \(ABS\)"](#).

## 11. PERFORMING SUPPLEMENTARY WORK

1. Perform the air bleeding. Refer to [BR-14. "Bleeding Brake System"](#).
2. Perform the self-diagnosis of all systems.
3. Erase self-diagnosis results.

>> End of work.

# C1101, C1102, C1103, C1104 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## DTC/CIRCUIT DIAGNOSIS

### C1101, C1102, C1103, C1104 WHEEL SENSOR

#### DTC Logic

INFOID:000000008490067

#### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1101	RR RH SENSOR-1	When an open circuit is detected in rear wheel sensor RH circuit.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Wheel sensor</li><li>• ABS actuator and electric unit (control unit)</li></ul>
C1102	RR LH SENSOR-1	When an open circuit is detected in rear wheel sensor LH circuit.	
C1103	FR RH SENSOR-1	When an open circuit is detected in front wheel sensor RH circuit.	
C1104	FR LH SENSOR-1	When an open circuit is detected in front wheel sensor LH circuit.	

#### DTC CONFIRMATION PROCEDURE

##### 1.CHECK SELF DIAGNOSTIC RESULT

Ⓐ With CONSULT.

1. Start engine and drive vehicle at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
2. Perform self diagnostic result.

Is DTC C1101, C1102, C1103 or C1104 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-61, "Diagnosis Procedure"](#).  
NO >> Inspection End.

#### Diagnosis Procedure

INFOID:000000008490068

Regarding Wiring Diagram information, refer to [BRC-46, "Wiring Diagram"](#).

#### CAUTION:

**Do not check between wheel sensor terminals.**

##### 1.CONNECTOR INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) connector E54 and wheel sensor connector of wheel with DTC.
2. 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 WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
2. Turn on the ABS active wheel sensor tester power switch.

#### 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.

3. 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 3.

## C1101, C1102, C1103, C1104 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

NO >> Replace the wheel sensor. Refer to [BRC-119, "Removal and Installation - Front Wheel Sensor"](#) or [BRC-120, "Removal and Installation - Rear Wheel Sensor"](#).

### 3. CHECK WIRING HARNESS FOR OPEN CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) connector E54 and wheel sensor connector of wheel with DTC.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	Yes
Front LH	E54	8	E19	2	
		19		1	
Front RH		4	E41	2	
16		1			
Rear LH		18	C2	2	
		31		1	
Rear RH		29	C3	2	
		17		1	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Repair the circuit.

# C1105, C1106, C1107, C1108 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1105, C1106, C1107, C1108 WHEEL SENSOR

### DTC Logic

INFOID:000000008490069

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1105	RR RH SENSOR-2	<ul style="list-style-type: none"><li>When power supply voltage of rear wheel sensor RH is low.</li><li>When distance between rear wheel sensor RH and rear wheel sensor RH rotor is large.</li><li>When installation of rear wheel sensor RH or rear wheel sensor RH rotor is not normal.</li></ul>	<ul style="list-style-type: none"><li>Harness or connector</li><li>Wheel sensor</li><li>ABS actuator and electric unit (control unit)</li><li>Sensor rotor</li></ul>
C1106	RR LH SENSOR-2	<ul style="list-style-type: none"><li>When power supply voltage of rear wheel sensor LH is low.</li><li>When distance between rear wheel sensor LH and rear wheel sensor LH rotor is large.</li><li>When installation of rear wheel sensor LH or rear wheel sensor LH rotor is not normal.</li></ul>	
C1107	FR RH SENSOR-2	<ul style="list-style-type: none"><li>When power supply voltage of front wheel sensor RH is low.</li><li>When distance between front wheel sensor RH and front wheel sensor RH rotor is large.</li><li>When installation of front wheel sensor RH or front wheel sensor RH rotor is not normal.</li></ul>	
C1108	FR LH SENSOR-2	<ul style="list-style-type: none"><li>When power supply voltage of front wheel sensor LH is low.</li><li>When distance between front wheel sensor LH and front wheel sensor LH rotor is large.</li><li>When installation of front wheel sensor LH or front wheel sensor LH rotor is not normal.</li></ul>	

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF DIAGNOSTIC RESULT

Ⓐ With CONSULT.

- Start engine and drive vehicle at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
- Perform self diagnostic result.

Is DTC C1105, C1106, C1107 or C1108 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-63, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008490070

Regarding Wiring Diagram information, refer to [BRC-46, "Wiring Diagram"](#).

#### CAUTION:

**Do not check between wheel sensor terminals.**

#### 1.CONNECTOR INSPECTION

- Disconnect ABS actuator and electric unit (control unit) connector E54 and wheel sensor connector of wheel with DTC.
- Check terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

- YES >> GO TO 2.  
NO >> Repair or replace as necessary.

#### 2.CHECK WHEEL SENSOR OUTPUT SIGNAL

## C1105, C1106, C1107, C1108 WHEEL SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
2. Turn on the ABS active wheel sensor tester power switch.

**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.

3. 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 3.

NO >> Replace the wheel sensor. Refer to [BRC-119, "Removal and Installation - Front Wheel Sensor"](#) or [BRC-120, "Removal and Installation - Rear Wheel Sensor"](#).

### 3.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to [FAX-7, "Inspection"](#) (front) or [RAX-5, "On-vehicle Service"](#) (rear).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace as necessary. Refer to [FAX-9, "Removal and Installation"](#) (front) or [RAX-6, "Removal and Installation"](#) (rear).

### 4.CHECK WIRING HARNESS FOR SHORT CIRCUIT

Check continuity between wheel sensor connector terminals and ground of wheel with DTC.

Wheel Sensor			Ground	Continuity
Wheel	Connector	Terminal		
Front LH	E19	1	—	No
		2		
Front RH	E41	1		
		2		
Rear LH	C2	1		
		2		
Rear RH	C3	1		
		2		

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Repair the circuit.



# C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1109 POWER AND GROUND SYSTEM

### DTC Logic

INFOID:000000008490071

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1109	BATTERY VOLTAGE [ABNORMAL]	<ul style="list-style-type: none"><li>When ignition voltage is 10 V or less.</li><li>When ignition voltage is 16 V or more.</li></ul>	<ul style="list-style-type: none"><li>Harness or connector</li><li>ABS actuator and electric unit (control unit)</li><li>Fuse</li><li>Ignition power supply system</li><li>Battery</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF DIAGNOSTIC RESULT

Ⓐ With CONSULT.

- Turn the ignition switch ON.
- Perform self diagnostic result.

Is DTC C1109 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-65, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008490072

Regarding Wiring Diagram information, refer to [BRC-46, "Wiring Diagram"](#).

#### 1.CONNECTOR INSPECTION

- Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connectors.
- 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 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) IGNITION POWER SUPPLY CIRCUIT

Check voltage between ABS actuator and electric unit (control unit) connector E54 terminal 28 and ground.

ABS actuator and electric unit (control unit)		Ground	Condition	Voltage
Connector	Terminal			
E54	28	—	Ignition switch ON	Battery voltage
			Ignition switch OFF	0V

Is the inspection result normal?

- YES >> GO TO 3  
NO >> Repair or replace malfunctioning components.

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

- Turn ignition switch OFF.
- Check continuity between ABS actuator and electric unit (control unit) connector E33 terminals 13, 38 and ground.

## C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E54	13	Ground	Yes
	38		

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Repair or replace malfunctioning components.

# C1110, C1153, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) [VDC/TCS/ABS]

< DTC/CIRCUIT DIAGNOSIS >

## C1110, C1153, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

### DTC Logic

INFOID:0000000008490073

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1110	CONTROLLER FAILURE	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	• ABS actuator and electric unit (control unit)
C1153	EMERGENCY BRAKE	When ABS actuator and electric unit (control unit) is malfunctioning. (Pressure increase is too much or too little)	
C1170	VARIANT CODING	In a case where VARIANT CODING is different.	

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CONTROLLER FAILURE
EMERGENCY BRAKE
VARIANT CODING

Is above displayed on the self-diagnosis display?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-67, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:0000000008490074

#### 1.REPLACE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

##### **CAUTION:**

Replace ABS actuator and electric unit (control unit) when self diagnostic result shows items other than those applicable.

- >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

# C1111 PUMP MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1111 PUMP MOTOR

### DTC Logic


INFOID:000000008490075

#### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1111	PUMP MOTOR	<ul style="list-style-type: none"><li>When a malfunction is detected in motor or motor relay.</li><li>When a low pressure malfunction is detected in accumulator.</li><li>When a malfunction is detected in accumulator pressure sensor.</li></ul>	<ul style="list-style-type: none"><li>Harness or connector</li><li>ABS actuator and electric unit (control unit)</li><li>Fusible link</li><li>Battery power supply system</li><li>Motor/accumulator assembly</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1.CHECK SELF DIAGNOSTIC RESULT

 With CONSULT.

1. Turn ignition switch OFF.
2. Depress brake pedal 20 times or more.
3. Start the engine and wait for 3 minutes or more.
4. Perform self diagnostic result.

Is DTC C1111 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-68, "Diagnosis Procedure"](#).  
NO >> Inspection End.

#### Diagnosis Procedure

INFOID:000000008490076

Regarding Wiring Diagram information, refer to [BRC-46, "Wiring Diagram"](#).

##### 1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connectors.
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 ABS MOTOR AND MOTOR RELAY BATTERY POWER SUPPLY

Check voltage between ABS actuator and electric unit (control unit) connector E54 terminal 1 and ground.

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E54	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Repair or replace malfunctioning components.

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

Check continuity between ABS actuator and electric unit (control unit) connector E54 terminals 13, 38 and ground.

C1111 PUMP MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E54	13	Ground	Yes
	38		

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).
- NO >> Repair or replace malfunctioning components.

BRC

## C1113, C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

### C1113, C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

#### DTC Logic

INFOID:000000008490095

#### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1113	G SENSOR	When a malfunction is detected in longitudinal G sensor signal.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Yaw rate/side/decel G sensor</li><li>• ABS actuator and electric unit (control unit)</li><li>• Ignition power supply system</li><li>• Fuse</li></ul>
C1145	YAW RATE SENSOR	<ul style="list-style-type: none"><li>• When a malfunction is detected in yaw rate signal.</li><li>• When yaw rate signal is not continuously received for 2 seconds or more.</li><li>• When side G signal is not continuously received for 2 seconds or more.</li><li>• When decel G signal is not continuously received for 2 seconds or more.</li></ul>	
C1146	SIDE G-SEN CIRCUIT	When a malfunction is detected in side/decel G signal.	

#### DTC CONFIRMATION PROCEDURE

##### 1. CHECK SELF DIAGNOSTIC RESULT

Ⓔ With CONSULT.

1. Turn ignition switch OFF to ON.
2. Perform self diagnostic result.

Is DTC C1113, C1145 or C1146 detected?

YES >> Proceed to diagnosis procedure. Refer to [BRC-70, "Diagnosis Procedure"](#).

NO >> Inspection End.

#### Diagnosis Procedure

INFOID:000000008490096

##### 1. REPLACE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Replace ABS actuator and electric unit (control unit).

>> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

# C1115 ABS SENSOR [ABNORMAL SIGNAL]

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1115 ABS SENSOR [ABNORMAL SIGNAL]

### DTC Logic

INFOID:000000008490077

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1115	ABS SENSOR [ABNORMAL SIGNAL]	When difference in wheel speed between any wheel and others is detected while the vehicle is driven, because of installation of tires other than specified.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Wheel sensor</li><li>• Sensor rotor</li><li>• ABS actuator and electric unit (control unit)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF DIAGNOSTIC RESULT

☞With CONSULT.

1. Start engine and drive vehicle at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
2. Perform self diagnostic result.

Is DTC C1115 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-71, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008490078

Regarding Wiring Diagram information, refer to [BRC-46, "Wiring Diagram"](#).

#### CAUTION:

**Do not check between wheel sensor terminals.**

#### 1.CONNECTOR INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) connector E54 and wheel sensor connector of wheel with DTC.
2. Check terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

- YES >> GO TO 2.  
NO >> Repair or replace as necessary.

#### 2.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
2. Turn on the ABS active wheel sensor tester power switch.

##### 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.

3. 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 3.  
NO >> Replace the wheel sensor. Refer to [BRC-119, "Removal and Installation - Front Wheel Sensor"](#) or [BRC-120, "Removal and Installation - Rear Wheel Sensor"](#).

#### 3.CHECK TIRES

Check the inflation pressure, wear and size of each tire.

Is the inspection result normal?

## C1115 ABS SENSOR [ABNORMAL SIGNAL]

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

YES >> GO TO 4.

NO >> Adjust tire pressure, or replace tire(s).

### 4.CHECK WIRING HARNESS FOR SHORT CIRCUIT

Check continuity between wheel sensor connector terminals and ground of wheel with DTC.

Wheel Sensor			Ground	Continuity
Wheel	Connector	Terminal		
Front LH	E19	1	—	No
		2		
Front RH	E41	1		
		2		
Rear LH	C2	1		
		2		
Rear RH	C3	1		
		2		

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair the circuit.

### 5.CHECK WIRING HARNESS FOR OPEN CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) connector E54 and wheel sensor connector of wheel with DTC.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	Yes
Front LH	E54	8	E19	2	
		19		1	
Front RH		4	E41	2	
16		1			
Rear LH		18	C2	2	
		31		1	
Rear RH		29	C3	2	
		17		1	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Repair the circuit.



# C1116 STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1116 STOP LAMP SWITCH

### DTC Logic

INFOID:000000008490079

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1116	STOP LAMP SW	When stop lamp switch circuit is open.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Stop lamp switch</li><li>• ABS actuator and electric unit (control unit)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
STOP LAMP SW

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to [BRC-73, "Diagnosis Procedure"](#).

NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008490080

Regarding Wiring Diagram information, refer to [BRC-46, "Wiring Diagram"](#).

#### 1.CONNECTOR INSPECTION

1. Disconnect stop lamp relay connector and ABS actuator and electric unit (control unit) connector.
2. Check terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace as necessary.

#### 2.CHECK STOP LAMP SWITCH CIRCUIT

1. Connect stop lamp relay connector.
2. Check voltage between ABS actuator and electric unit (control unit) connector E54 terminal 30 and ground.

ABS actuator and electric unit (control unit)		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
E54	30	—	Brake pedal depressed	Battery voltage
			Brake pedal released	0V

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> GO TO 3.

#### 3.CHECK STOP LAMP RELAY CIRCUIT FOR OPEN

1. Disconnect stop lamp relay connector.
2. Check continuity between ABS actuator and electric unit (control unit) connector E54 terminal 30 and stop lamp relay connector E57 terminal 3.

## C1116 STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and electric unit (control unit)		Stop lamp relay		Continuity
Connector	Terminal	Connector	Terminal	
E54	30	E57	3	Yes

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace as necessary.

### 4.CHECK STOP LAMP RELAY CIRCUIT FOR SHORT

Check continuity between ABS actuator and electric unit (control unit) connector E54 terminal 30 and ground.

ABS actuator and electric unit (control unit)		Ground	Continuity
Connector	Terminal		
E54	30	—	No

Is the inspection result normal?

YES >> Refer to [EXL-85, "Work Flow"](#).

NO >> Repair harness or connectors.

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

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

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

### DTC Logic


INFOID:000000008490081

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1120	FR LH IN ABS SOL	When a malfunction is detected in front LH ABS IN valve.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• ABS actuator and electric unit (control unit)</li><li>• Fusible link</li><li>• Battery power supply system</li></ul>
C1122	FR RH IN ABS SOL	When a malfunction is detected in front RH ABS IN valve.	
C1124	RR LH IN ABS SOL	When a malfunction is detected in rear LH ABS IN valve.	
C1126	RR RH IN ABS SOL	When a malfunction is detected in rear RH ABS IN valve.	

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF DIAGNOSTIC RESULT

 With CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.

Is DTC C1120, C1122, C1124 or C1126 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-75, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008490082

Regarding Wiring Diagram information, refer to [BRC-46, "Wiring Diagram"](#).

#### 1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check connector 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 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) BATTERY POWER SUPPLY

Check voltage between ABS actuator and electric unit (control unit) connector E54 terminal 25 and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E54	25	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Repair or replace malfunctioning components.

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

Check continuity between ABS actuator and electric unit (control unit) connector E54 terminals 13, 38 and ground.

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

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E54	13	Ground	Yes
	38		

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Repair or replace malfunctioning components.

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

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

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

### DTC Logic

INFOID:000000008490083

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1121	FR LH OUT ABS SOL	When a malfunction is detected in front LH ABS OUT valve.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• ABS actuator and electric unit (control unit)</li><li>• Fusible link</li><li>• Battery power supply system</li></ul>
C1123	FR RH OUT ABS SOL	When a malfunction is detected in front RH ABS OUT valve.	
C1125	RR LH OUT ABS SOL	When a malfunction is detected in rear LH ABS OUT valve.	
C1127	RR RH OUT ABS SOL	When a malfunction is detected in rear RH ABS OUT valve.	

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF DIAGNOSTIC RESULT

④ With CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.

Is DTC C1121, C1123, C1125 or C1127 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-77, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008490084

Regarding Wiring Diagram information, refer to [BRC-46, "Wiring Diagram"](#).

#### 1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check connector 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 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) BATTERY POWER SUPPLY

Check voltage between ABS actuator and electric unit (control unit) connector E54 terminal 25 and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E54	25	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Repair or replace malfunctioning components.

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

Check continuity between ABS actuator and electric unit (control unit) connector E54 terminals 13, 38 and ground.

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

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E54	13	Ground	Yes
	38		

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Repair or replace malfunctioning components.

## C1130 ENGINE SIGNAL

## DTC Logic


INFOID:000000008490085

## DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1130	ENGINE SIGNAL 1	When a malfunction is detected in ECM system.	<ul style="list-style-type: none"> <li>ECM</li> <li>ABS actuator and electric unit (control unit)</li> <li>CAN communication line</li> </ul>

## DTC CONFIRMATION PROCEDURE

## 1. CHECK SELF DIAGNOSTIC RESULT

 With CONSULT.

- Turn ignition switch ON.
- Perform self diagnostic result.


Is DTC C1130 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-79, "Diagnosis Procedure"](#).  
 NO >> Inspection End.

## Diagnosis Procedure

INFOID:000000008490086

## 1. CHECK SELF DIAGNOSTIC RESULT FOR ENGINE SYSTEM


 With CONSULT.

Perform self diagnostic result. Refer to [EC-77, "CONSULT Function"](#) (QR25DE) or [EC-600, "CONSULT Function"](#) (VQ35DE).

Are any ECM DTCs detected?

- YES >> Refer to [EC-105, "DTC Index"](#) (QR25DE) or [EC-630, "DTC Index"](#) (VQ35DE).  
 NO >> GO TO 2.

## 2. CHECK SELF DIAGNOSTIC RESULT FOR ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

 With CONSULT.

- Perform self diagnostic result and erase DTCs.
- Turn ignition switch OFF.
- Start engine and drive vehicle for a short period of time.
- Check that malfunction indicator lamp (MIL) turns OFF.
- Stop vehicle and perform self diagnostic result.

Is DTC C1130 detected?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).  
 NO >> Check pin terminals and connection of connectors for abnormal conditions. Repair or replace malfunctioning components.

# C1140 ACTUATOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1140 ACTUATOR RELAY SYSTEM

### DTC Logic

INFOID:000000008490087

#### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1140	ACTUATOR RLY	When a malfunction is detected in actuator relay.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• ABS actuator and electric unit (control unit)</li><li>• Fusible link</li><li>• Battery power supply system</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1.CHECK SELF DIAGNOSTIC RESULT

④ With CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.

Is DTC C1140 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-80, "Diagnosis Procedure"](#).  
NO >> Inspection End.

#### Diagnosis Procedure

INFOID:000000008490088

Regarding Wiring Diagram information, refer to [BRC-46, "Wiring Diagram"](#).

##### 1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check connector 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 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) BATTERY POWER SUPPLY

Check voltage between ABS actuator and electric unit (control unit) connector E54 terminal 25 and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E54	25	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Repair or replace malfunctioning components.

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

Check continuity between ABS actuator and electric unit (control unit) connector E54 terminals 13, 38 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E54	13	Ground	Yes
	38		



C1140 ACTUATOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

Is the inspection result normal?

- YES
- >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).
- NO
- >> Repair or replace malfunctioning components.

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## C1142 PRESS SENSOR

## DTC Logic

INFOID:000000008490089

## DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1142	PRESS SEN CIRCUIT	When a malfunction is detected in master cylinder pressure sensor.	<ul style="list-style-type: none"> <li>• Stop lamp switch system</li> <li>• ABS actuator and electric unit (control unit)</li> <li>• Brake system</li> </ul>

## DTC CONFIRMATION PROCEDURE

## 1. CHECK SELF DIAGNOSTIC RESULT

Ⓔ With CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.

Is DTC C1142 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-82, "Diagnosis Procedure"](#).  
 NO >> Inspection End.

## Diagnosis Procedure

INFOID:000000008490090

## 1. CHECK STOP LAMP SWITCH SYSTEM

Check stop lamp switch system. Refer to [BRC-73, "Diagnosis Procedure"](#).Is the inspection result normal?

- YES >> GO TO 2.  
 NO >> Repair or replace malfunctioning components.

## 2. CHECK BRAKE FLUID LEAKAGE

Check brake fluid leakage. Refer to [BR-8, "Inspection"](#).Is the inspection result normal?

- YES >> GO TO 3.  
 NO >> Repair or replace malfunctioning components.

## 3. CHECK BRAKE PEDAL

Check brake pedal. Refer to [BR-13, "Inspection and Adjustment"](#).Is the inspection result normal?

- YES >> GO TO 4.  
 NO >> Repair or replace malfunctioning components.

## 4. CHECK SELF DIAGNOSTIC RESULT

Ⓔ With CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.
3. Erase DTCs.
4. Start engine and drive vehicle for a short period of time.
5. Turn ignition switch ON.
6. Perform self diagnostic result.

Is DTC C1142 detected?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).  
 NO >> Inspection End.

# C1143 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1143 STEERING ANGLE SENSOR

### DTC Logic


INFOID:000000008490091

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1143	ST ANG SEN CIRCUIT	When a malfunction is detected in steering angle sensor.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Steering angle sensor</li><li>• ABS actuator and electric unit (control unit)</li><li>• Fuse</li><li>• Ignition power supply system</li><li>• CAN communication line</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF DIAGNOSTIC RESULT

 With CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.

Is DTC C1143 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-83, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008490092

Regarding Wiring Diagram information, refer to [BRC-46, "Wiring Diagram"](#).

#### 1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) and steering angle sensor connectors.
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 STEERING ANGLE SENSOR MOUNTING CONDITION

Check steering angle sensor mounting condition.

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Repair or replace malfunctioning components.

#### 3.CHECK STEERING ANGLE SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect steering angle sensor connector.
3. Turn ignition switch ON.
4. Check voltage between steering angle sensor connector M53 terminal 4 and ground.

Steering angle sensor		—	Voltage (Approx.)
Connector	Terminal		
M53	4	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 5.

## C1143 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

NO >> GO TO 4.

### 4.CHECK STEERING ANGLE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector E63.
3. Check continuity between steering angle sensor connector M53 terminal 4 and IPDM E/R connector E63 terminal 19.

Steering angle sensor		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
M53	4	E63	19	Yes

4. Check continuity between steering angle sensor connector M53 terminal 4 and ground.

Steering angle sensor		—	Continuity
Connector	Terminal		
M53	4	Ground	No

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to [PG-19, "Wiring Diagram — Ignition Power Supply —"](#).

NO >> Repair or replace malfunctioning components.

### 5.CHECK STEERING ANGLE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between steering angle sensor connector M53 terminal 1 and ground.

Steering angle sensor		—	Continuity
Connector	Terminal		
M53	1	Ground	Yes

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace malfunctioning components.

### 6.CHECK CAN COMMUNICATION LINE

Check "STRG BRANCH LINE CIRCUIT". Refer to [LAN-73, "Diagnosis Procedure"](#) (type 1) or [LAN-89, "Diagnosis Procedure"](#) (type 2).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Repair or replace malfunctioning components.

# C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1144 INCOMPLETE STEERING ANGLE SENSOR ADJUSTMENT

### DTC Logic

INFOID:000000008490093

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1144	ST ANG SEN SIGNAL	When neutral position adjustment of steering angle sensor is not complete.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Steering angle sensor</li><li>• ABS actuator and electric unit (control unit)</li><li>• Incomplete neutral position adjustment of steering angle sensor</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF DIAGNOSTIC RESULT

Ⓔ With CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.

Is DTC C1144 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-85, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008490094

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

Perform neutral position adjustment of steering angle sensor. Refer to [BRC-57, "Work Procedure"](#).

>> GO TO 2.

#### 2.CHECK SELF DIAGNOSTIC RESULT

Ⓔ With CONSULT.

Perform self diagnostic result.

Is DTC C1144 detected?

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

#### 3.CHECK STEERING ANGLE SENSOR SYSTEM

Check steering angle sensor system. Refer to [BRC-83, "Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).  
NO >> Repair or replace malfunctioning components.

# C1154 PNP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1154 PNP SWITCH

### Description

INFOID:0000000008619894

The transmission range switch signal is transmitted to the ABS actuator and electric unit (control unit) using the CAN communication lines.

### DTC Logic

INFOID:0000000008619895

### DTC DETECTION LOGIC

DTC	Display	Condition	Possible Cause
C1154	PNP POS SIG	Transmission range switch signal or communication line between the ABS actuator and electric unit (control unit) and TCM is open or shorted.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Transmission range switch</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF DIAGNOSTIC RESULT

④ With CONSULT.

1. Turn the ignition switch OFF to ON.
2. Perform self diagnostic result.

Is DTC C1154 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-86. "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:0000000008619896

#### 1.CHECK DATA MONITOR

Select "SLCT LVR POSI" in "Data Monitor" and check transmission range switch signal.

Selector lever position	SLCT LVR POSI (Data monitor)
P position	P
R position	R
N position	N
D position	D

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123. "Removal and Installation"](#).  
NO >> GO TO 2

#### 2.CHECK TRANSMISSION RANGE SWITCH

Perform transmission range switch inspection. Refer to [TM-179. "Inspection"](#) (RE0F10D) or [TM-379. "Inspection"](#) (RE0F10E).

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123. "Removal and Installation"](#).  
NO >> Repair or replace malfunctioning components.

### Special Repair Requirement

INFOID:0000000008619897

#### 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to [BRC-57. "Work Procedure"](#).

## C1154 PNP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

>> END

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# C1155 BR FLUID LEVEL LOW

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1155 BR FLUID LEVEL LOW

### DTC Logic

INFOID:000000008490097

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1155	BR FLUID LEVEL LOW	Brake fluid level is low or communication line between the ABS actuator and electric unit (control unit) and brake fluid level switch is open or shorted.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Brake fluid level switch</li></ul>

#### DTC CONFIRMATION PROCEDURE

##### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BR FLUID LEVEL LOW

Is above displayed on the self-diagnosis display?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-88, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008490098

Regarding Wiring Diagram information, refer to [BRC-46, "Wiring Diagram"](#).

#### NOTE:

Check brake fluid level in brake reservoir tank before starting inspection.

##### 1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect combination meter and brake fluid level switch connectors.
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 BRAKE FLUID LEVEL SWITCH

Perform the brake fluid level switch component inspection. Refer to [BRC-89, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Replace brake fluid level switch. Refer to [BR-25, "Exploded View"](#).

##### 3.CHECK BRAKE FLUID LEVEL SWITCH HARNESS

1. Check continuity between combination meter connector M24 terminal 25 and brake fluid level switch connector E24 terminal 1.

Combination meter		Brake fluid level switch		Continuity
Connector	Terminal	Connector	Terminal	
M24	25	E24	1	Yes

2. Check continuity between combination meter connector and ground.



# C1155 BR FLUID LEVEL LOW

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

Combination meter		—	Continuity
Connector	Terminal		
M24	25	Ground	No

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace malfunctioning components.

## 4.CHECK BRAKE FLUID LEVEL SWITCH GROUND CIRCUIT

Check continuity between brake fluid level switch connector E24 terminal 2 and ground.

Brake fluid level switch		—	Continuity
Connector	Terminal		
E24	2	Ground	No

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#)

NO >> Repair or replace malfunctioning components.

## Component Inspection

INFOID:0000000008490099

## 1.CHECK BRAKE FLUID LEVEL SWITCH

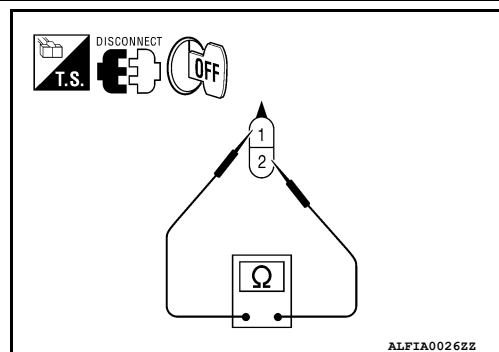
1. Turn ignition switch OFF.
2. Disconnect brake fluid level switch connector.
3. Check continuity between brake fluid level switch terminals 1 and 2.

Brake fluid level switch terminals	Condition	Continuity
1— 2	Brake fluid reservoir full	No
	Brake fluid reservoir empty	Yes

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace brake fluid level switch. Refer to [BR-25, "Exploded View"](#).



# C1160 DECEL G SEN SET

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1160 DECEL G SEN SET

### DTC Logic

INFOID:0000000008619886

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1160	DECEL G SEN SET	When calibration of yaw rate/side/decel G sensor is not complete.	<ul style="list-style-type: none"><li>• Yaw rate/side/decel G sensor</li><li>• Harness or connector</li><li>• ABS actuator and electric unit (control unit)</li><li>• Decel G sensor calibration is not performed</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSTIC RESULT

①With CONSULT.

1. Turn ignition switch OFF to ON.
2. Perform self-diagnostic result.

Is DTC C1160 detected?

YES >> Proceed to diagnosis procedure. Refer to [BRC-90, "Diagnosis Procedure"](#).

NO >> Inspection End.

### Diagnosis Procedure

INFOID:0000000008619887

#### 1.DECAL G SENSOR CALIBRATION

Perform decel G sensor calibration. Refer to [BRC-59, "Work Procedure"](#).

>> GO TO 2.

#### 2.CHECK SELF-DIAGNOSTIC RESULT

①With CONSULT.

Perform self-diagnostic result.

Is DTC C1160 detected?

YES >> GO TO 3.

NO >> Inspection End.

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

Check yaw rate/side/decel G sensor system. Refer to [BRC-70, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Repair or replace malfunctioning components.

# C1164, C1165, C1166, C1167 CV/SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1164, C1165, C1166, C1167 CV/SV SYSTEM

### DTC Logic


INFOID:000000008490100

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1164	CV 1	When a malfunction is detected in cut valve 1.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• ABS actuator and electric unit (control unit)</li><li>• Fusible link</li><li>• Battery power supply system</li></ul>
C1165	CV 2	When a malfunction is detected in cut valve 2.	
C1166	SV 1	When a malfunction is detected in suction valve 1.	
C1167	SV 2	When a malfunction is detected in suction valve 2.	

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF DIAGNOSTIC RESULT

 With CONSULT.

1. Turn ignition switch OFF to ON.
2. Perform self diagnostic result.

Is DTC C1164, C1165, C1166 or C1167 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-91. "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008490101

Regarding Wiring Diagram information, refer to [BRC-46. "Wiring Diagram"](#).

#### 1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check connector 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 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) BATTERY POWER SUPPLY

Check voltage between ABS actuator and electric unit (control unit) connector E54 terminal 25 and ground.

ABS actuator and electric unit (control unit)		—	Voltage (Approx.)
Connector	Terminal		
E54	25	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Repair or replace malfunctioning components.

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

Check continuity between ABS actuator and electric unit (control unit) connector E53 terminals 13, 38 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E54	13	Ground	Yes
	38		

## **C1164, C1165, C1166, C1167 CV/SV SYSTEM**

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

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Is the inspection result normal?

- YES    >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).
- NO     >> Repair or replace malfunctioning components.

# C1197 VACUUM SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1197 VACUUM SENSOR

### DTC Logic

INFOID:000000008619878

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1197	VACUUM SENSOR	When a malfunction is detected in vacuum sensor.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Vacuum sensor (brake booster)</li><li>• Vacuum piping</li><li>• ABS actuator and electric unit (control unit)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSTIC RESULT

☞ With CONSULT.

1. Turn the ignition switch ON.
2. Perform self-diagnostic result.

Is DTC C1197 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-93, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008619879

Regarding Wiring Diagram information, refer to [BRC-46, "Wiring Diagram"](#).

#### 1.CHECK BRAKE BOOSTER

1. Turn the ignition switch OFF.
2. Check brake booster. Refer to [BR-10, "Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.  
NO >> Replace brake booster. Refer to [BR-27, "Removal and installation"](#).

#### 2.CHECK VACUUM PIPING

Check vacuum piping. Refer to [BR-29, "Exploded View- QR25DE"](#) or [BR-30, "Exploded View- VQ35DE"](#).

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Replace vacuum piping. Refer to [BR-30, "Removal and Installation"](#).

#### 3.CHECK VACUUM SENSOR CIRCUIT

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

Vacuum sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
E27	1	E54	12	Yes
	2		24	
	3		5	

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

## C1197 VACUUM SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

Vacuum sensor		—	Continuity
Connector	Terminal		
E27	1	Ground	No
	2		
	3		

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace malfunctioning components.

### 4.CHECK TERMINAL

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

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace malfunctioning components.

### 5.REPLACE VACUUM SENSOR

Ⓔ With CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Replace vacuum sensor. Refer to [BR-27, "Exploded View"](#).

**CAUTION:**

**Always replace brake booster because vacuum sensor cannot be disassembled.**

3. Erase self-diagnosis result for "ABS".
4. Turn the ignition switch OFF.
5. Start engine.
6. Perform self-diagnosis for "ABS".

Is DTC "C1197" detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Inspection End.

# C1198 VACUUM SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1198 VACUUM SENSOR

### DTC Logic

INFOID:0000000008619880

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1198	VACUUM SEN CIR	<ul style="list-style-type: none"><li>When an open circuit is detected in vacuum sensor circuit.</li><li>When a short circuit is detected in vacuum sensor circuit.</li><li>When a malfunction is detected in vacuum sensor noise.</li></ul>	<ul style="list-style-type: none"><li>Harness or connector</li><li>Vacuum sensor (brake booster)</li><li>ABS actuator and electric unit (control unit)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSTIC RESULT

ⓘ With CONSULT.

- Turn the ignition switch ON.
- Perform self-diagnostic result.

Is DTC C1198 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-95, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:0000000008619881

Regarding Wiring Diagram information, refer to [BRC-46, "Wiring Diagram"](#).

#### 1.CHECK VACUUM SENSOR CIRCUIT

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

Vacuum sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
E27	1	E54	12	Yes
	2		24	
	3		5	

- Check continuity between vacuum sensor harness connector and ground.

Vacuum sensor		—	Continuity
Connector	Terminal		
E27	1	Ground	No
	2		
	3		

Is the inspection result normal?

- YES >> GO TO 2.  
NO >> Repair or replace malfunctioning components.

#### 2.CHECK TERMINAL

## C1198 VACUUM SENSOR

[VDC/TCS/ABS]

### < DTC/CIRCUIT DIAGNOSIS >

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

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace malfunctioning components.

### 3. REPLACE VACUUM SENSOR

#### With CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Replace vacuum sensor. Refer to [BR-27, "Exploded View"](#).

#### **CAUTION:**

**Always replace brake booster because vacuum sensor cannot be disassembled.**

3. Erase self-diagnosis result for "ABS".
4. Turn the ignition switch OFF.
5. Start engine.
6. Perform self-diagnosis for "ABS".

#### Is DTC "C1198" detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Inspection End.



# C1199 BRAKE BOOSTER

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C1199 BRAKE BOOSTER

### DTC Logic

INFOID:0000000008619882

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1199	BRAKE BOOSTER	When brake booster vacuum is approx. 0 kPa (0 mm-Hg) during engine running.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Vacuum sensor (brake booster)</li><li>• Vacuum piping</li><li>• ABS actuator and electric unit (control unit)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSTIC RESULT

☞ With CONSULT.

1. Turn the ignition switch ON.
2. Perform self-diagnostic result.

Is DTC C1199 detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-97, "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:0000000008619883

Regarding Wiring Diagram information, refer to [BRC-46, "Wiring Diagram"](#).

#### 1.CHECK BRAKE BOOSTER

1. Turn the ignition switch OFF.
2. Check brake booster. Refer to [BR-10, "Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 2.  
NO >> Replace brake booster. Refer to [BR-27, "Removal and installation"](#).

#### 2.CHECK VACUUM PIPING

Check vacuum piping. Refer to [BR-29, "Exploded View- QR25DE"](#) or [BR-30, "Exploded View- VQ35DE"](#).

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Replace vacuum piping. Refer to [BR-30, "Removal and Installation"](#).

#### 3.CHECK VACUUM SENSOR CIRCUIT

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

Vacuum sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
E27	1	E54	12	Yes
	2		24	
	3		5	

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

## C1199 BRAKE BOOSTER

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

Vacuum sensor		—	Continuity
Connector	Terminal		
E27	1	Ground	No
	2		
	3		

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace malfunctioning components.

### 4.CHECK TERMINAL

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

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace malfunctioning components.

### 5.REPLACE VACUUM SENSOR

Ⓔ With CONSULT

1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Replace vacuum sensor. Refer to [BR-27, "Exploded View"](#).

#### **CAUTION:**

**Always replace brake booster because vacuum sensor cannot be disassembled.**

3. Erase self-diagnosis result for "ABS".
4. Turn the ignition switch OFF.
5. Start engine.
6. Perform self-diagnosis for "ABS".

Is DTC "C1199" detected?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Inspection End.

# C119A VACUUM SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## C119A VACUUM SENSOR

### DTC Logic

INFOID:0000000008619884

### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C119A	VACUUM SEN VOLT	When a malfunction is detected in supply power voltage of vacuum sensor.	<ul style="list-style-type: none"><li>• Harness or connector</li><li>• Vacuum sensor (brake booster)</li><li>• ABS actuator and electric unit (control unit)</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSTIC RESULT

Ⓐ With CONSULT.

1. Turn the ignition switch ON.
2. Perform self-diagnostic result.

Is DTC C119A detected?

- YES >> Proceed to diagnosis procedure. Refer to [BRC-99. "Diagnosis Procedure"](#).  
NO >> Inspection End.

### Diagnosis Procedure

INFOID:0000000008619885

Regarding Wiring Diagram information, refer to [BRC-46. "Wiring Diagram"](#).

#### 1.CHECK VACUUM SENSOR POWER SUPPLY

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

Vacuum sensor		—	Voltage (Approx.)
Connector	Terminal		
E27	3	Ground	0 V

4. Turn the ignition switch ON.  
**CAUTION:**  
**Never start engine.**
5. Check voltage between vacuum sensor harness connector and ground.

Vacuum sensor		—	Voltage (Approx.)
Connector	Terminal		
E27	3	Ground	4.75 V – 5.25 V

Is the inspection result normal?

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

#### 2.CHECK VACUUM SENSOR POWER SUPPLY CIRCUIT

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

## C119A VACUUM SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

Vacuum sensor		ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal	Connector	Terminal	
E27	3	E54	5	Yes

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

Vacuum sensor		—	Continuity
Connector	Terminal		
E27	3	Ground	No

Is the inspection result normal?

YES >> Perform diagnosis of ABS actuator and electric unit (control unit) power supply and ground circuit.

Refer to [BRC-65, "Diagnosis Procedure"](#).

NO >> Repair or replace malfunctioning components.

### 3.CHECK VACUUM SENSOR GROUND CIRCUIT

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

Vacuum sensor		—	Continuity
Connector	Terminal		
E27	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace malfunctioning components.

### 4.CHECK TERMINAL

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Repair or replace malfunctioning components.

# U1000 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## U1000 CAN COMM CIRCUIT

### DTC Logic

INFOID:0000000008490102

### DTC DETECTION LOGIC

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

### Diagnosis Procedure

INFOID:0000000008490103

#### 1.CHECK DTC DETECTION

Ⓔ With CONSULT.

1. Turn ignition switch ON.
2. Perform self diagnostic result.

Is DTC U1000 detected?

- YES >> Proceed to diagnosis procedure. Refer to [LAN-18. "Trouble Diagnosis Flow Chart"](#).  
NO >> Refer to [GI-47. "Intermittent Incident"](#).

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## U1002 SYSTEM COMM (CAN)

### DTC Logic

INFOID:000000008490104

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1002	SYSTEM COMM(CAN)	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or less.	<ul style="list-style-type: none"> <li>CAN communication line</li> <li>ABS actuator and electric unit (control unit)</li> </ul>


### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. DTC REPRODUCTION PROCEDURE

 With CONSULT

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

Is DTC "U1002" detected?

- YES >> Proceed to [BRC-102, "Diagnosis Procedure"](#).  
 NO >> Inspection End.

### Diagnosis Procedure

INFOID:000000008490105

#### CAUTION:

- Never apply 7.0 V or more to the measurement terminal.
- Use a tester with open terminal voltage of 7.0 V or less.
- Turn the ignition switch OFF and disconnect the battery cable from the negative terminal when checking the harness.

#### 1. CHECK CAN DIAGNOSIS SUPPORT MONITOR

- Select "ABS" and "CAN Diagnosis Support Monitor" in order with CONSULT.
- Check malfunction history between each control unit connected to ABS actuator and electric unit (control unit).

Check the result of "PAST"?

All items are "OK">>Refer to [GI-47, "Intermittent Incident"](#).

"TRANSMIT DIAG" is other than "OK">>GO TO 2.

A control unit other than ABS actuator and electric unit (control unit) is anything other than "OK">>GO TO 3.

#### 2. CHECK TRANSMITTING SIDE UNIT

Check the ABS actuator and electric unit (control unit) harness connector terminals 14 and 26 for damage or loose connection.

Is the inspection result normal?

- YES >> Erase self-diagnosis results. Then perform self-diagnosis for "ABS" with CONSULT.  
 NO >> Recheck terminals for damage or loose connection.

#### 3. CHECK APPLICABLE CONTROL UNIT

Check damage or loose connection of each CAN communication line harness connector terminals.

Is the inspection result normal?

- YES >> Erase self-diagnosis results. Then perform self-diagnosis for applicable control unit with CONSULT.  
 NO >> Recheck terminals for damage or loose connection.

# PARKING BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## PARKING BRAKE SWITCH

### Component Function Check

INFOID:000000008490106

#### 1.CHECK PARKING BRAKE SWITCH OPERATION

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Proceed to diagnosis procedure. Refer to [BRC-103, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000008490107

Regarding Wiring Diagram information, refer to [BRC-46, "Wiring Diagram"](#).

#### 1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect combination meter and parking brake switch connectors.
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 [BRC-104, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace parking brake switch. Refer to [PB-7, "Exploded View"](#).

#### 3.CHECK PARKING BRAKE SWITCH SIGNAL

☞With CONSULT.

1. Connect combination meter connector and parking brake switch connectors.
2. Turn ignition switch ON.
3. In "DATA MONITOR" select "PARK BRAKE SW" and check parking brake switch signal.

Condition	DATA MONITOR
Actuate parking brake	On
Release parking brake	Off

Is the inspection result normal?

YES >> Refer to [BRC-54, "Work Flow"](#).

NO >> GO TO 4.

#### 4.CHECK PARKING BRAKE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter and parking brake switch connectors.
3. Check continuity between combination meter connector M24 terminal 12 and parking brake switch connector E35 terminal 1.

Combination meter		Parking brake switch		Continuity
Connector	Terminal	Connector	Terminal	
M24	12	E35	1	Yes

4. Check continuity between combination meter connector and ground.

## PARKING BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

Combination meter		—	Continuity
Connector	Terminal		
M24	12	Ground	No

Is the inspection result normal?

- YES >> Replace combination meter. Refer to [MWI-81, "Removal and Installation"](#).  
NO >> Repair or replace malfunctioning components.

### Component Inspection

INFOID:000000008490108

#### 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 actuated	Yes
		Parking brake released	No

Is the inspection result normal?

- YES >> Inspection End.  
NO >> Replace parking brake switch. Refer to [PB-7, "Exploded View"](#).



# VDC OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## VDC OFF SWITCH

### Component Function Check

INFOID:000000008490109

#### 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-105, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000008490110

Regarding Wiring Diagram information, refer to [BRC-46, "Wiring Diagram"](#).

#### 1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) and VDC OFF switch connectors.
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-106, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace VDC OFF switch. Refer to [BRC-125, "Removal and Installation"](#).

#### 3.CHECK VDC OFF SWITCH SIGNAL

☞With CONSULT.

1. Connect ABS actuator and electric unit (control unit) and VDC OFF switch connectors.
2. Turn ignition switch ON.
3. In "DATA MONITOR" select "OFF SW" and check VDC OFF switch signal.

Condition	DATA MONITOR
VDC OFF switch is pressed and released	On
VDC OFF switch is pressed and released again	Off

Is the inspection result normal?

YES >> Refer to [BRC-54, "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) and VDC OFF switch connectors.
3. Check continuity between ABS actuator and electric unit (control unit) connector E54 terminal 15 and VDC OFF switch connector M72 terminal 1.

ABS actuator and electric unit (control unit)		VDC OFF switch		Continuity
Connector	Terminal	Connector	Terminal	
E54	15	M72	1	Yes

4. Check continuity between ABS actuator and electric unit (control unit) connector terminal E54 terminal 15 and ground.

## VDC OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E54	15	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 M72 terminal 2 and ground.

VDC OFF switch		—	Continuity
Connector	Terminal		
M72	2	Ground	Yes

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Repair or replace malfunctioning components.

## Component Inspection

INFOID:000000008490111

### 1.CHECK VDC OFF SWITCH

1. Turn ignition switch OFF.
2. Disconnect VDC OFF switch connector.
3. Check continuity between terminals of VDC OFF switch connector.

VDC OFF switch terminals	Condition	Continuity
1 – 2	VDC OFF switch pressed	Yes
	VDC OFF switch released	No

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace VDC OFF switch. Refer to [BRC-125, "Removal and Installation"](#).

# ABS WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## ABS WARNING LAMP

### Component Function Check

INFOID:0000000008490112

#### 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-107, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:0000000008490113

#### 1.PERFORM THE SELF-DIAGNOSIS

 With CONSULT.

Perform self diagnostic result.

Are any DTCs detected?

YES >> Refer to [BRC-44, "DTC Index"](#).

NO >> GO TO 2.

#### 2.CHECK COMBINATION METER

Check if indication and operation of combination meter are normal. Refer to [MWI-9, "METER SYSTEM : System Description"](#).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Replace combination meter. Refer to [MWI-81, "Removal and Installation"](#).

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BRAKE WARNING LAMP

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## Component Function Check

INFOID:000000008490114

**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-108, "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 [BRC-103, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000008490115

**1.PERFORM THE SELF-DIAGNOSIS**

Ⓔ With CONSULT.

Perform self diagnostic result.

Are any DTCs detected?

YES >> Refer to [MWI-27, "DTC Index"](#).

NO >> GO TO 2.

**2.CHECK COMBINATION METER**

Check if indication and operation of combination meter are normal. Refer to [MWI-9, "METER SYSTEM : System Description"](#).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Replace combination meter. Refer to [MWI-81, "Removal and Installation"](#).

# VDC OFF INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

## VDC OFF INDICATOR LAMP

### Description

INFOID:000000008769724

×: ON –: OFF

Condition	VDC OFF indicator lamp
Ignition switch OFF	–
For 2 seconds after turning ON ignition switch	×
2 seconds later after turning ON ignition switch	–
VDC OFF switch turned ON. (VDC function is OFF.)	×
VDC/TCS function is malfunctioning.	–
ABS function is malfunctioning.	–
EBD function is malfunctioning.	–

### Component Function Check

INFOID:000000008490116

#### 1.CHECK VDC OFF INDICATOR LAMP FUNCTION

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-109, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000008490117

#### 1.PERFORM THE SELF-DIAGNOSIS

 With CONSULT.

Perform self diagnostic result.

Are any DTCs detected?

YES >> Refer to [BRC-44, "DTC Index"](#).

NO >> GO TO 2.

#### 2.CHECK COMBINATION METER

Check if indication and operation of combination meter are normal. Refer to [MWI-9, "METER SYSTEM : System Description"](#).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Replace combination meter. Refer to [MWI-81, "Removal and Installation"](#).

## SLIP INDICATOR LAMP

### Component Function Check

INFOID:000000008490118

#### 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-110, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000008490119

#### 1.PERFORM THE SELF-DIAGNOSIS

 With CONSULT.

Perform self diagnostic result.

Are any DTCs detected?

YES >> Refer to [BRC-44, "DTC Index"](#).

NO >> GO TO 2.

#### 2.CHECK COMBINATION METER

Check if indication and operation of combination meter are normal. Refer to [MWI-9, "METER SYSTEM : System Description"](#).

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

NO >> Replace combination meter. Refer to [MWI-81, "Removal and Installation"](#).

## SYMPTOM DIAGNOSIS

## VDC/TCS/ABS

## Symptom Table

INFOID:000000008490120

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	<a href="#">BRC-112, "Diagnosis Procedure"</a>
	Looseness of front and rear axle	
	Wheel sensor and rotor system	
Unexpected pedal reaction	Brake pedal stroke	<a href="#">BRC-113, "Diagnosis Procedure"</a>
	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.	<a href="#">BRC-114, "Diagnosis Procedure"</a>
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	<a href="#">BRC-115, "Diagnosis Procedure"</a>
Pedal vibration or ABS operation sound occurs (Note 2)	Brake pedal	<a href="#">BRC-116, "Diagnosis Procedure"</a>
	ABS actuator and electric unit (control unit)	
Vehicle jerks during VDC/TCS/ABS control	ABS actuator and electric unit (control unit)	<a href="#">BRC-117, "Diagnosis Procedure"</a>
	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

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

## EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

### Diagnosis Procedure

INFOID:000000008490121

#### 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: [FAX-7. "Inspection"](#), rear: [RAX-5. "On-vehicle Service"](#).

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-119. "Removal and Installation - Front Wheel Sensor"](#) or [BRC-120. "Removal and Installation - Rear Wheel Sensor"](#).
- Replace sensor rotor [BRC-122. "Removal and Installation - Front Sensor Rotor"](#) or [BRC-122. "Removal and Installation - 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-33. "CONSULT Function \(ABS\)"](#).



# UNEXPECTED PEDAL REACTION

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

## UNEXPECTED PEDAL REACTION

### Diagnosis Procedure

INFOID:000000008490122

#### 1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to [BR-13, "Inspection and Adjustment"](#).

Is the stroke too big?

- YES >> • Bleed air from brake line and hose. Refer to [BR-14, "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-13, "Inspection and Adjustment"](#) or brake booster assembly [BR-10, "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. Reconnect connector after inspection.

Is the inspection result normal?

- YES >> Inspection End.  
NO >> Check brake system.

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BRC

## THE BRAKING DISTANCE IS LONG

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

### THE BRAKING DISTANCE IS LONG

#### Diagnosis Procedure

INFOID:000000008490123

#### **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, reconnect connector.

Is the inspection result normal?

- YES    >> Inspection End.  
NO     >> Check brake system.

# ABS FUNCTION DOES NOT OPERATE

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

## ABS FUNCTION DOES NOT OPERATE

### Diagnosis Procedure

INFOID:000000008490124

#### 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. Refer to [BRC-33, "CONSULT Function \(ABS\)"](#).

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BRC

# PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

## PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

### Diagnosis Procedure

INFOID:000000008490125

#### 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. Refer to [BRC-33. "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

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

## VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

### Diagnosis Procedure

INFOID:000000008490126

#### 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

Perform self diagnostic result of ABS actuator and electric unit (control unit). Refer to [BRC-33, "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-33, "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 reconnect connector and perform ABS actuator and electric unit (control unit) self diagnostic result. Refer to [BRC-33, "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. Perform ECM self diagnostic result. Refer to [EC-77, "CONSULT Function" \(QR25DE\)](#) or [EC-600, "CONSULT Function" \(VQ35DE\)](#).
2. Perform TCM self diagnostic result. Refer to [TM-43, "CONSULT Function" \(RE0F10D\)](#) or [TM-247, "CONSULT Function" \(RE0F10E\)](#).

Are self diagnostic results indicated?

YES >> Check the corresponding items.

• ECM: Refer to [EC-105, "DTC Index" \(QR25DE\)](#) or [EC-630, "DTC Index" \(VQ35DE\)](#).

• TCM: Refer to [TM-60, "DTC Index" \(RE0F10D\)](#) or [TM-264, "DTC Index" \(RE0F10E\)](#).

NO >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-123, "Removal and Installation"](#).

## NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

[VDC/TCS/ABS]

### NORMAL OPERATING CONDITION

#### Description

INFOID:000000008490127

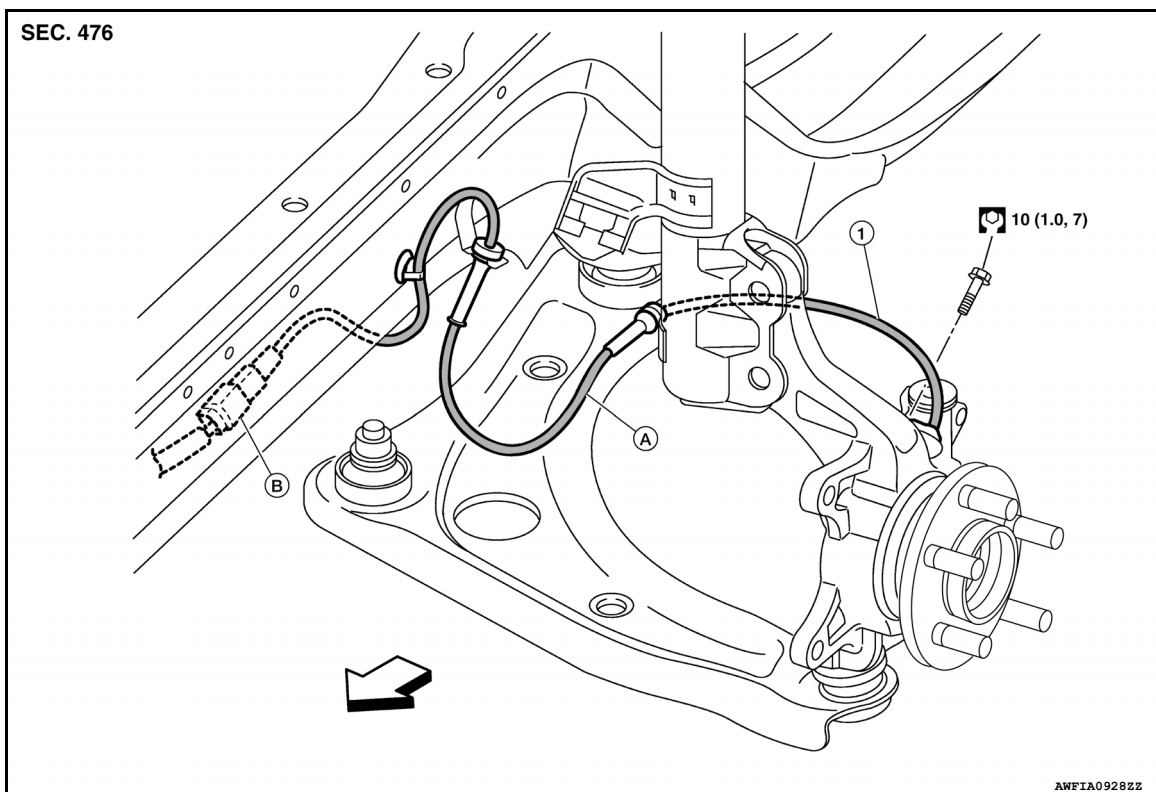
Symptom	Result
Slight vibrations are felt on the brake pedal and operation noises occur when VDC, TCS or ABS is activated.	This is a normal condition due to the VDC, TCS or ABS activation.
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (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 in the brake pedal.	This is normal, because TCS places the highest priority on the optimum traction (stability).
TCS may activate momentarily if wheel speed changes when driving where road 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 driving on a 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

## Exploded View - Front Wheel Sensor

INFOID:000000008702636



1. Front wheel sensor

A. Color line (slant line)

B. Front wheel sensor harness connector

Front

## Removal and Installation - Front Wheel Sensor

INFOID:000000008702637

**CAUTION:**

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

## REMOVAL

1. Remove the front wheel and tires using power tool. Refer to [WT-52, "Adjustment"](#).
2. Partially remove the fender protector to gain access to the wheel sensor harness connector. Refer to [EXT-26, "FENDER PROTECTOR : Removal and Installation"](#).
3. Disconnect the front wheel sensor harness connector.
4. Remove the front wheel sensor from the strut bracket and body brackets.
5. Remove the front wheel sensor hold down bolt and remove the front wheel sensor.

## INSTALLATION

# WHEEL SENSOR

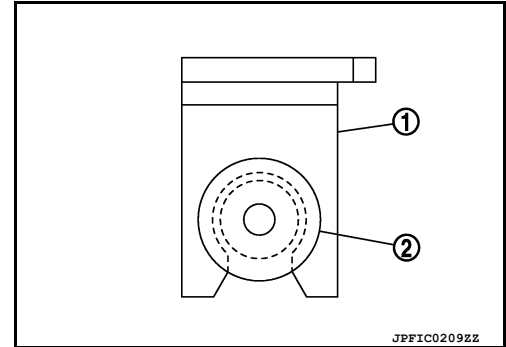
## < REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

Installation is in the reverse order of the removal.

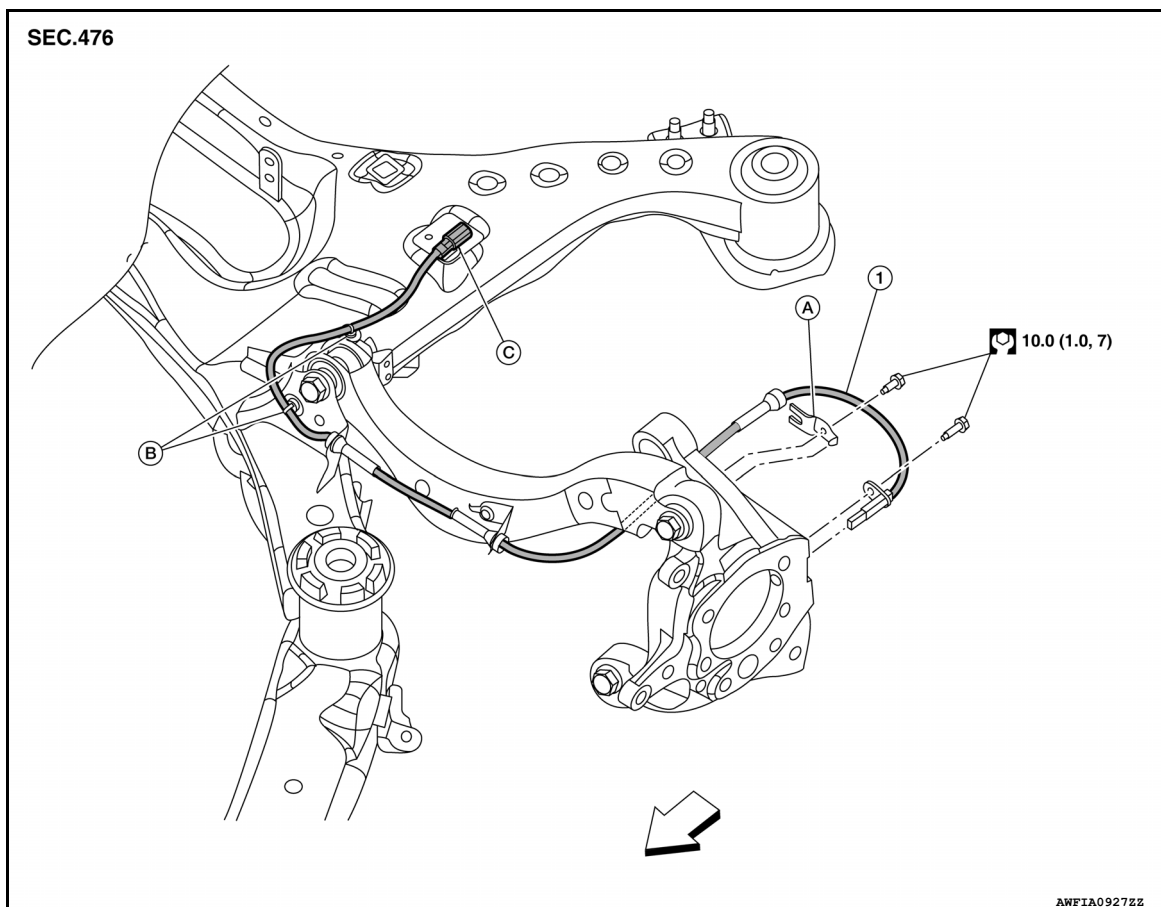
### CAUTION:

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



## Exploded View - Rear Wheel Sensor

INFOID:000000008702638



1. Rear wheel sensor      A. Rear wheel sensor bracket      B. Clip  
C. Rear wheel sensor harness connector      ↗ Front

## Removal and Installation - Rear Wheel Sensor

INFOID:000000008702639

### CAUTION:

- Be careful not to damage wheel sensor edge and sensor rotor teeth.
- When removing the front or rear wheel hub, first remove the wheel sensor from the wheel hub. Failure to do so may result in damage to the wheel sensor wires making the sensor inoperative.



## WHEEL SENSOR

### < REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

- Pull out the wheel sensor, being careful to turn it as little as possible. Do not pull on the wheel sensor harness.
- Before installation, check if foreign objects such as iron fragments are adhered to the pick-up part of the sensor or to the inside of the hole in the wheel hub for the wheel sensor, or if a foreign object is caught in the surface of the mating surface for the sensor rotor. Fix as necessary and then install the wheel sensor.

### REMOVAL

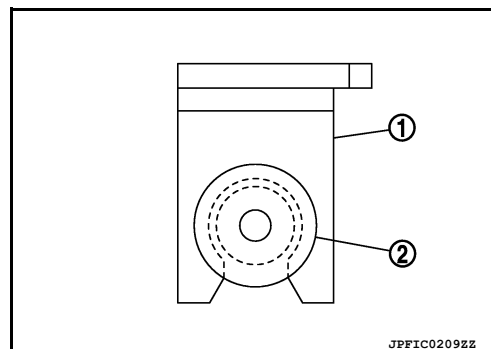
1. Remove the rear wheel and tires using power tool. Refer to [WT-52. "Adjustment"](#).
2. Disconnect the rear wheel sensor harness connector.
3. Remove the rear wheel sensor from the sensor brackets and clips.
4. Remove the rear wheel sensor hold down bolt and remove the rear wheel sensor.

### INSTALLATION

Installation is in the reverse order of the removal.

#### CAUTION:

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



## SENSOR ROTOR

---

### Removal and Installation - Front Sensor Rotor

INFOID:0000000008671067

The front wheel sensor rotor is an integral part of the wheel hub and bearing assembly and cannot be disassembled. Refer to [FAX-9, "Removal and Installation"](#).

### Removal and Installation - Rear Sensor Rotor

INFOID:0000000008671068

The rear wheel sensor rotor is an integral part of the wheel hub and bearing assembly and cannot be disassembled. Refer to [RAX-6, "Removal and Installation"](#).

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

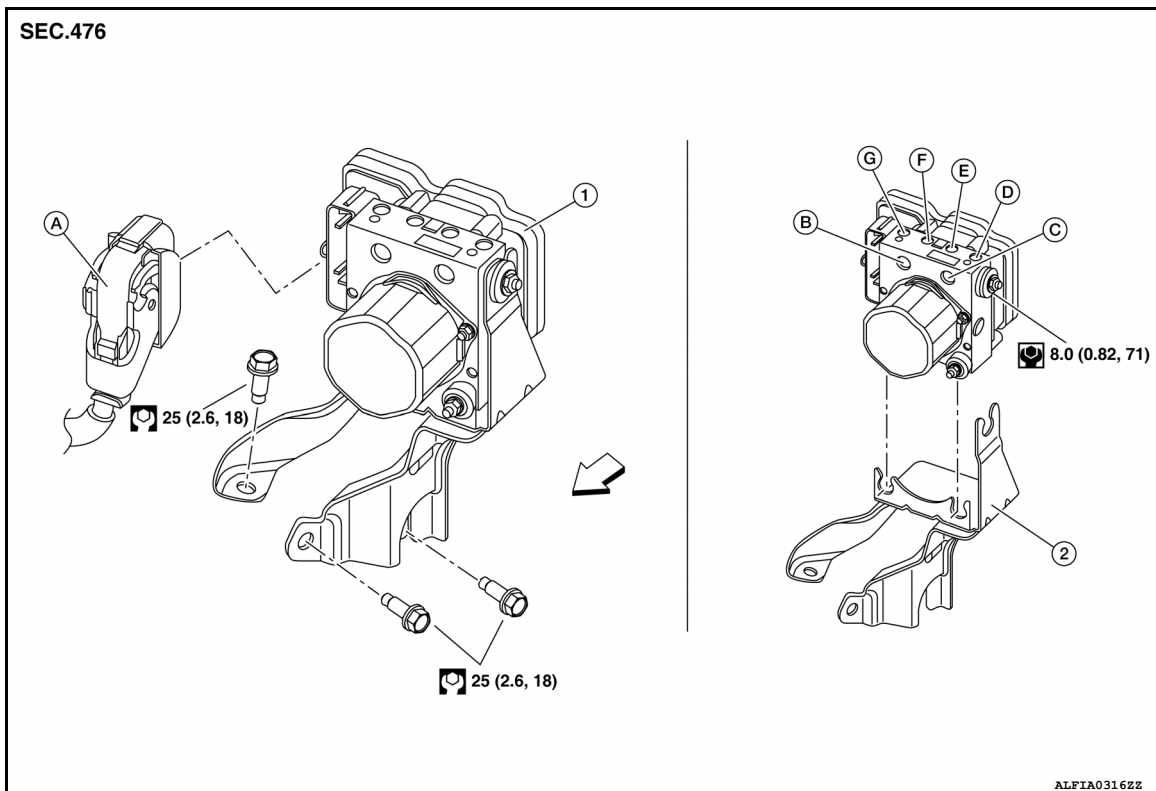
< REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

### Exploded View

INFOID:000000008753122



- |   |   |  |
|---|---|--|
| 1. ABS actuator and electric unit (control unit)                    | 2. Bracket  | A. ABS actuator and electric unit (control unit) harness connector |
| B. To master cylinder secondary side<br>23 N-m (2.3 kg-m, 17 ft-lb) | C. To master cylinder primary side<br>23 N-m (2.3 kg-m, 17 ft-lb) | D. To rear LH<br>16.2 N-m (1.7kg-m, 12 ft-lb)                      |
| E. To front RH<br>16.2 N-m (1.7kg-m, 12 ft-lb)                      | F. To front LH<br>16.2 N-m (1.7kg-m, 12 ft-lb)                    | G. To rear RH<br>16.2 N-m (1.7kg-m, 12 ft-lb)                      |
- ⇐ Front

### Removal and Installation

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#### CAUTION:

- When replacing the ABS actuator and electric unit (control unit), the calibration of the ABS actuator and electric unit (control unit) is required. Refer to [BRC-56, "Description"](#).
- Before servicing, disconnect the battery cable from negative terminal.
- To remove brake tubes, use a suitable tool (flare nut wrench) to prevent flare nuts and brake tubes from being damaged. To install, use suitable tool (flare nut torque wrench).
- Do not apply excessive impact to ABS actuator and electric unit (control unit), such as by dropping it.
- Do not remove and install ABS actuator and electric unit (control unit) by holding harness.
- After work is completed, bleed air from brake tubes. Refer to [BR-14, "Bleeding Brake System"](#).
- After installing harness connector on the ABS actuator and electric unit (control unit), make sure connector is securely locked.

#### NOTE:

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

#### REMOVAL

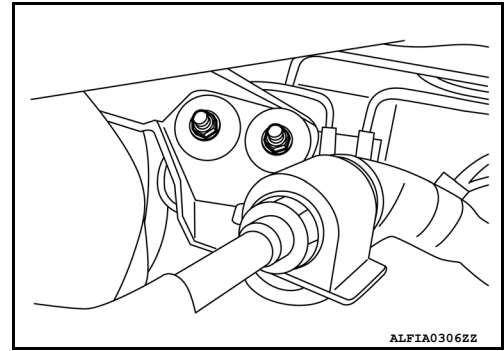
1. Disconnect battery cable from negative terminal. Refer to [PG-72, "Removal and Installation \(Battery\)"](#).
2. Remove cowl top and cowl top extensions. Refer to [EXT-24, "Removal and Installation"](#).

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

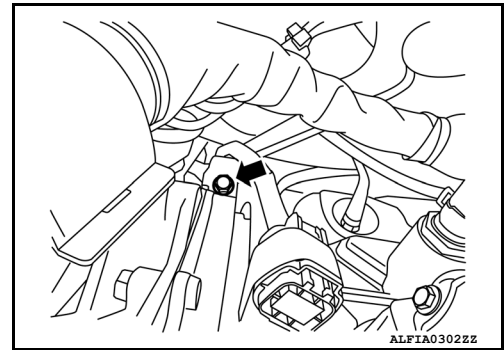
< REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

3. Remove the power steering line hold down bracket.



4. Disconnect ABS actuator and electric unit (control unit) harness connector and place aside.
5. Loosen brake tube flare nuts using a suitable tool, then remove brake tubes from ABS actuator and electric unit (control unit) and place aside. Refer to [BRC-123, "Exploded View"](#).
6. Remove the harness bracket mounting bolt and place aside.



7. Remove ABS actuator and electric unit (control unit) and bracket as an assembly.
8. Remove bracket from ABS actuator and electric unit (control unit), if necessary.

### INSTALLATION

Installation is in the reverse order of removal.

#### **CAUTION:**

If ABS actuator and electronic unit (control unit) is replaced, after installation, adjust position of steering angle sensor. Refer to [BRC-57, "Work Procedure"](#).

## VDC OFF SWITCH

< REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

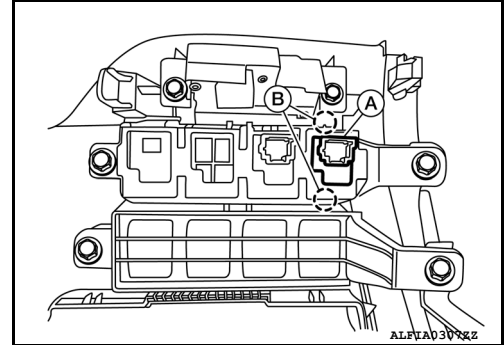
### VDC OFF SWITCH

#### Removal and Installation

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#### REMOVAL

1. Remove the instrument lower panel LH. Refer to [IP-21. "Removal and Installation"](#).
2. Remove the switch plate mounting screws and remove the switch plate.
3. Release pawls (B) using suitable tool and remove the VDC OFF switch (A).



#### INSTALLATION

Installation is in the reverse order of removal.

## YAW RATE/SIDE/DECEL G SENSOR

< REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

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### YAW RATE/SIDE/DECEL G SENSOR

#### Removal and Installation

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The yaw rate/side/decel G sensor is an integral part of the ABS actuator and electrical control unit (control unit) and cannot be disassembled. Refer to [BRC-123, "Removal and Installation"](#).

# STEERING ANGLE SENSOR

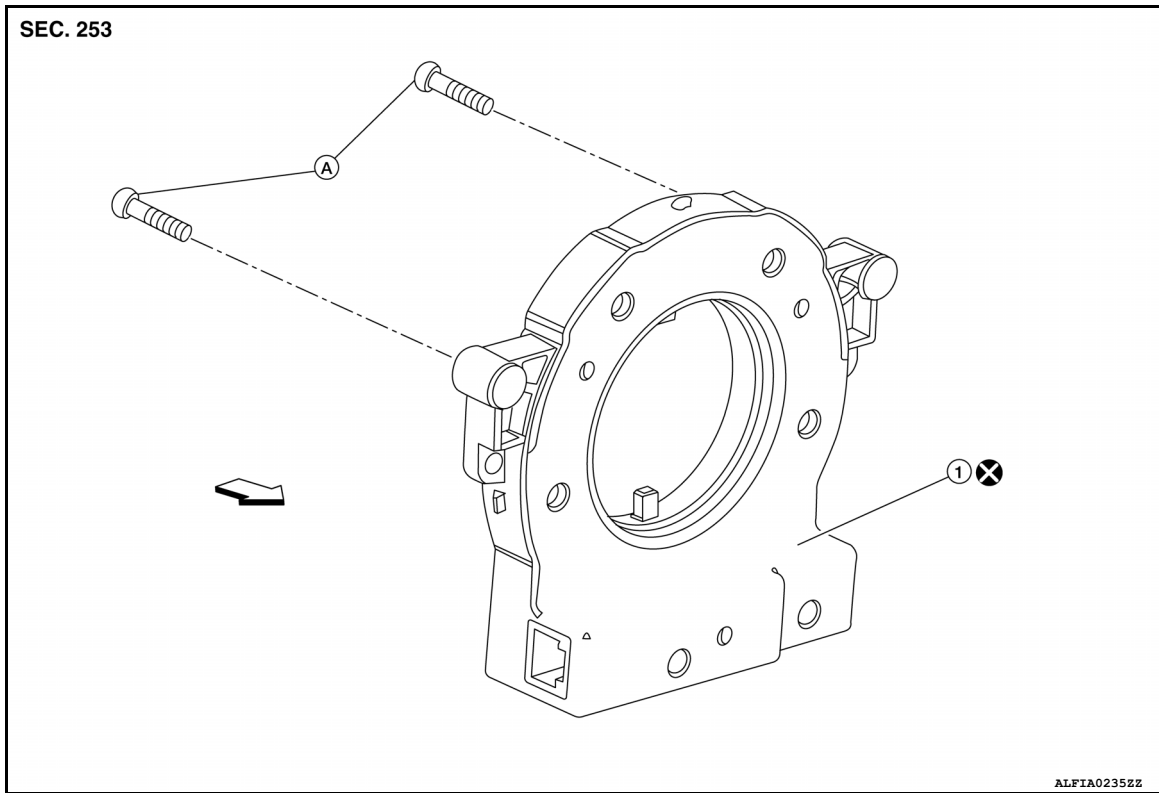
< REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

## STEERING ANGLE SENSOR

### Exploded View

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1. Steering angle sensor

A. Screw

← Front

### Removal and Installation

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#### REMOVAL

1. Remove spiral cable assembly. Refer to [SR-15, "Removal and Installation"](#).
2. Remove the two screws and the steering angle sensor from spiral cable.

#### INSTALLATION

Installation is in the reverse order of removal.

#### CAUTION:

- Do not reuse steering angle sensor.
- Perform the neutral position adjustment of the steering angle sensor. Refer to [BRC-57, "Work Procedure"](#).