

# SECTION **BRC**

## BRAKE CONTROL SYSTEM

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## PRECAUTIONS

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### Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

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The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS 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 SRS 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 for Battery Service

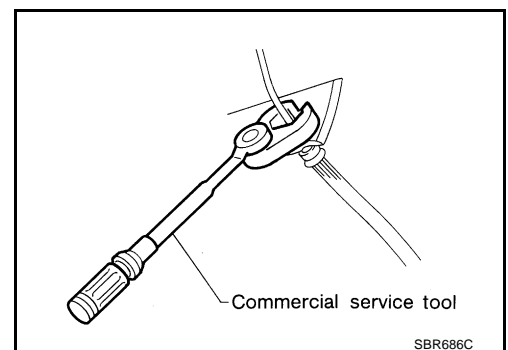
AFS002I5

Before disconnecting the battery, lower both the driver and passenger windows. This will prevent any interference between the window edge and the vehicle when the door is opened/closed. During normal operation, the window slightly raises and lowers automatically to prevent any window to vehicle interference. The automatic window function will not work with the battery disconnected.

### Precautions for Brake System

AFS0013A

- Recommended fluid is brake fluid “DOT 3”.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas such as body. If brake fluid is splashed, wipe it off and flush area with water immediately.
- Never use mineral oils such as gasoline or kerosene to clean. They will ruin rubber parts and cause improper operation.
- Using a flare nut wrench, securely tighten brake tube flare nuts.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Before working, turn ignition switch OFF and disconnect connectors of VDC actuator and control unit or battery negative terminal.
- When installing brake piping, be sure to check torque.



### Precautions for Brake Control

AFS0011C

- During ABS operation, brake pedal lightly vibrates and a mechanical noise may be heard. This is normal.
- Just after starting vehicle after ignition switch ON, brake pedal may vibrate or 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 diagnostic servicing. Besides electrical system inspection, check booster operation, brake fluid level, and oil leaks.
- If tire size and type are used in an improper combination, or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna, or antenna lead-in wire (including 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, and improper wiring.
- If the following components are replaced with non-genuine components or converted, 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 Absorber, Strut, Spring, Bush, etc.), Tires, wheels (exclude specified size), components related to brake (Pad, Rotor, Caliper, etc.), Components related to engine (Muffler, ECM, etc.), Components related to body reinforcement (Roll bar, Tower bar, etc.).
- Driving in the condition of breakage or excessive wear of the suspension, tires or components related to the brakes 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 if the brake pedal is used. 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 OFF indicator lamp may turn on. However, 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. When VDC function is OFF (VDC SW ON) may cause the yaw rate/side G -sensor system indicate a problem. However this is not a problem if normal operation can be resumed after restarting the engine.

# PREPARATION

[VDC/TCS/ABS]

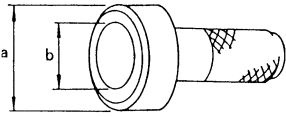
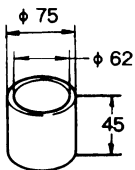
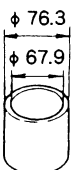
## PREPARATION

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### Special Service Tools

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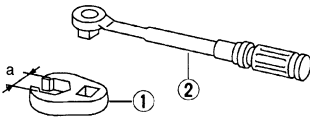
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST3072000 (J25405) Drift a: 76.5mm (3.012 in) dia. b: 55.0mm (2.17 in) dia.	 <p>Installing rear sensor rotor.</p> <p style="text-align: right;">ZZC0760D</p>
ST27863000 (—) Drift	 <p>Installing rear sensor rotor.</p> <p style="text-align: right;">ZZC1307D</p>
KV40104710 (—) Drift	 <p>Installing rear sensor rotor.</p> <p style="text-align: right;">ZZC1082D</p>

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### Commercial Service Tools

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Tool name	Description
1.Flare nut crowfoot a:10mm (0.39 in), 12mm(0.47 in) 2.Torque wrench	 <p>Removing and installing each brake piping</p> <p style="text-align: right;">S-NT360</p>

### ON-VEHICLE SERVICE

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### Adjustment of Steering Angle Sensor Neutral Position

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In case of doing work that applies to the list below, make sure to adjust neutral position of steering angle sensor before running vehicle.

Situation	Adjustment of Steering Angle Sensor Neutral Position
Removing/Installing VDC/TCS/ABS control unit	-
Replacing VDC/TCS/ABS control unit	-
Removing/Installing steering angle sensor	×
Removing/Installing steering components	×
Removing/Installing suspension components	×
Removing/Installing the same tire to the same position	-
Change 4 tires to new ones	-
Change some of 4 tires to new ones (not 4 tires)	-
Tire rotation	-
Adjusting wheel alignment	×

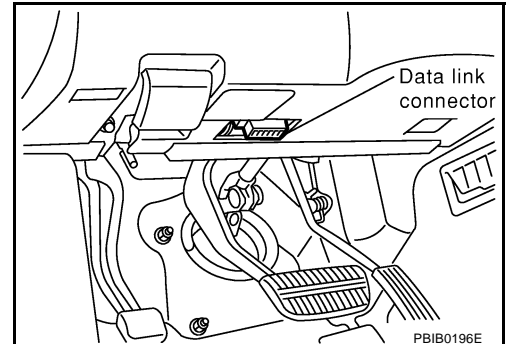
×: Required

-: Not required

**CAUTION:**

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

1. Stop vehicle with front wheels in straight-ahead position.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector on vehicle, and turn ignition switch ON (do not start engine).
3. Touch "ABS", "WORK SUPPORT" and "ST ANGLE SENSOR ADJUSTMENT" on CONSULT-II screen in this order.



4. Touch "START".

**CAUTION:**

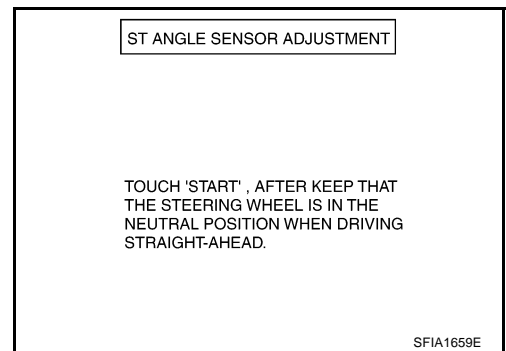
**Do not touch steering wheel while adjusting steering angle sensor.**

5. After approximately 10 seconds, touch "END". (After approximately 60 seconds, it ends automatically.)
6. Turn ignition switch OFF, then turn it ON again.

**CAUTION:**

**Be sure to carry out above operation.**

7. Run vehicle with front wheels in straight-ahead position, then stop.
8. Select "DATA MONITOR", "ECU INPUT SIGNALS", and "STEERING ANGLE SIGNAL" on CONSULT-II screen. Then check that "STEERING ANGLE SIGNAL" is within  $0 \pm 2.5$  deg. If value is more than specification, repeat steps 1 to 5.
9. Erase memory of VDC/TCS/ABS control unit and ECM.
10. Turn ignition switch to OFF.

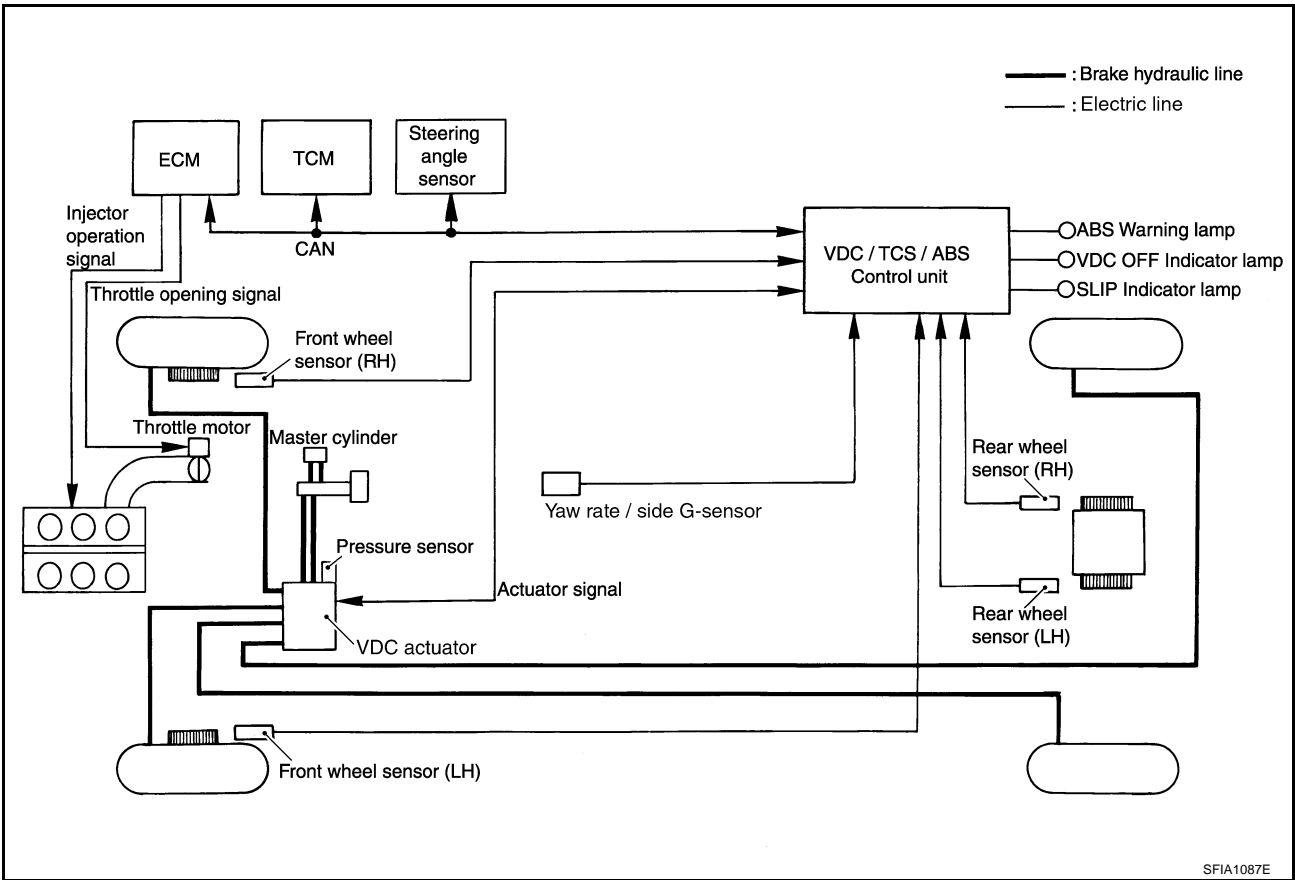


GENERAL INFORMATION

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System Diagram

AFS001KW



VDC Function

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- In addition to the TCS/ABS function, the driver steering amount and brake operation amount are detected from the steering angle sensor and pressure sensor, and the vehicle's driving status (amount of under-steering / over-steering) is determined from information from the yaw rate sensor/side G sensor, wheel sensor, etc., and this information is used to improve vehicle stability by controlling the braking and engine power to all four wheels.
- The SLIP indicator lamp flashes to inform the driver of VDC operation.
- During VDC operation, the body and brake pedal lightly vibrate and mechanical noises may be heard. This is normal.
- The ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp might turn on when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is on a turn table or a ship while the engine is running. In this case, restart the engine on a normal road, and if the ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp turn off, there is no problem.

TCS Function

AFS001KY

- The wheel spin of the drive wheels is detected by the VDC/TCS/ABS control unit from the wheel speed signals from the four wheels, so if wheel spin occurs, the rear wheel right and left brake fluid pressure control and engine fuel cut are conducted while the throttle value is restricted to reduce the engine torque and decrease the amount of wheel spin. In addition, the degree the throttle is opened is controlled to achieve the optimum engine torque.
- Depending on road circumstances, the driver may have a sluggish feel. This is normal, because the optimum traction has the highest priority under TCS operation.
- TCS may be activated any time the vehicle suddenly accelerates, suddenly downshifts, or is driven on a road with a varying surface friction coefficient.
- During TCS operation, it informs a driver of system operation by flashing SLIP indicator lamp.

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## ABS Function

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- The Anti-Lock Brake System is a function that detects wheel revolution while braking, and it improves handling stability during sudden braking by electrically preventing 4 wheel lock. Maneuverability is also improved for avoiding obstacles.
- If the electrical system breaks down, then the Fail-Safe function starts, the ABS becomes inoperative, and the ABS warning lamp turns on.
- Electrical System Diagnosis by CONSULT-II is available.

## EBD Function

AFS001L0

- Electronic Brake Distributor is a function that detects subtle slippages between the front and rear wheels during braking, and it improves handling stability by electronically controlling the Brake Fluid Pressure which results in reduced rear wheel slippage.

## Fail-Safe Function

AFS001L1

### VDC / TCS SYSTEM

In case of Throttle Control System trouble, the VDC OFF indicator lamp and SLIP indicator lamp or only VDC OFF indicator lamp are turned on, and the condition of the vehicle is the same as the condition of vehicles without VDC / TCS equipment. In case of trouble to the Throttle Control System, the ABS control continues to operate normally without VDC/ TCS control.

### CAUTION:

**If the Fail-Safe function is activated, then perform the Self Diagnosis for VDC/TCS/ABS control system.**

### ABS, EBD SYSTEM

In case of electrical problems with the ABS, the ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp will turn on. Simultaneously, the VDC/ TCS/ABS become one of the following conditions of the Fail-Safe function.

1. For ABS trouble, only the EBD is activated and the condition of the vehicle is the same condition of vehicles without TCS/ABS equipment.
2. For EBD trouble, the EBD and ABS become inoperative, and the condition of the vehicle is the same as the condition of vehicles without TCS/ABS, EBD equipment.

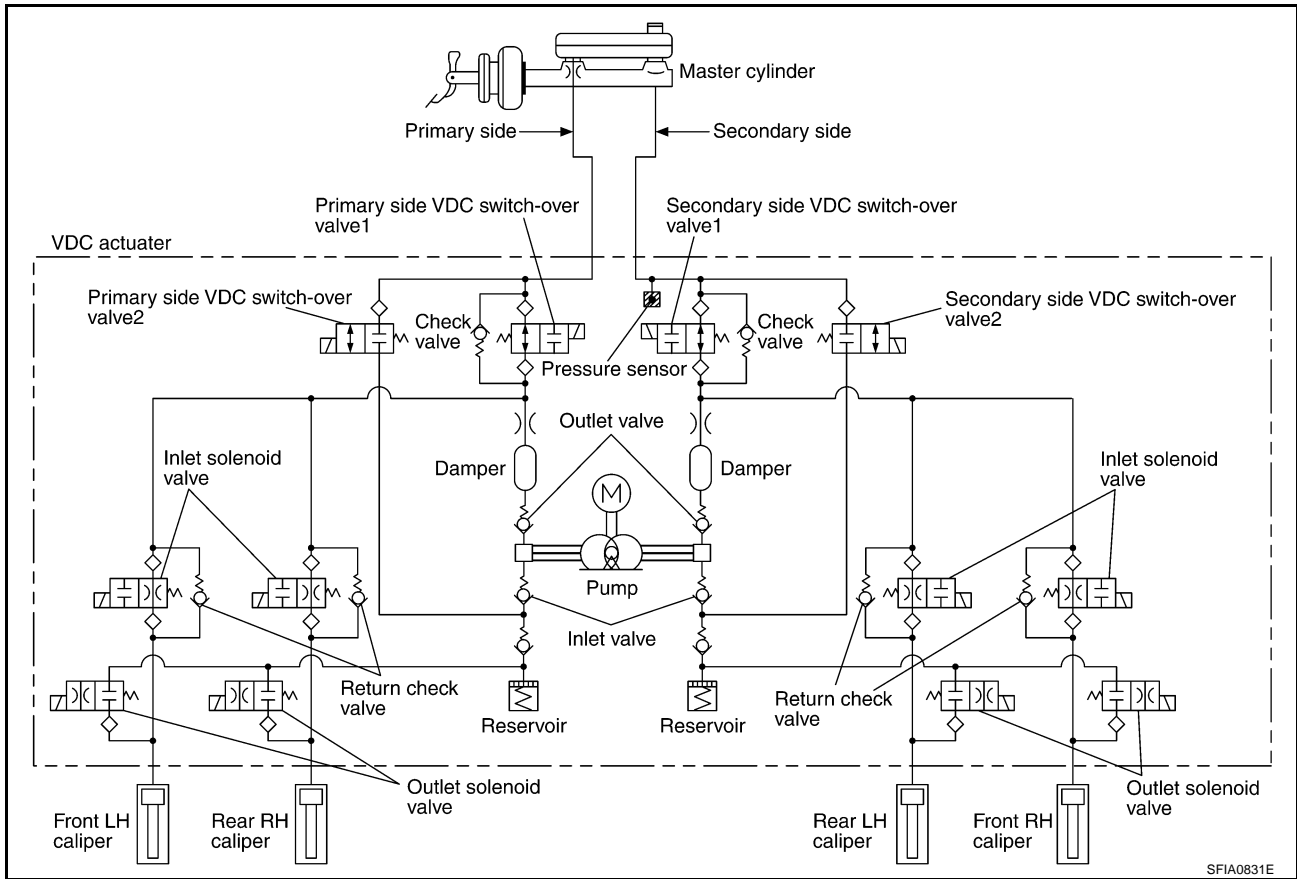
### NOTE:

In condition 1 described above, an ABS Self Diagnosis sound may be heard. That is a normal condition because a self diagnosis for "Key Switch ON" and "the First Starting" are being performed.



Hydraulic Circuit Diagram

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## CAN COMMUNICATION

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### System Description

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CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. Refer to [LAN-4, "CAN Communication Unit"](#)

## TROUBLE DIAGNOSIS

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## How to Proceed With Diagnosis

### BASIC CONCEPT

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- Most important point to perform diagnosis is to understand systems (control and mechanism) in vehicle thoroughly.

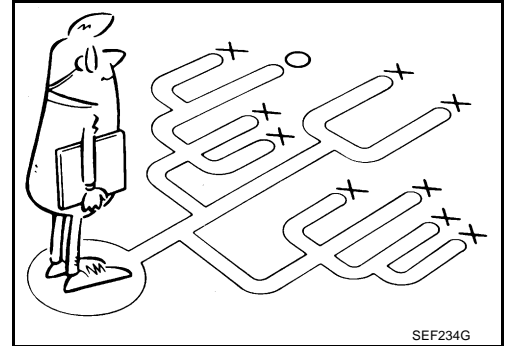
- It is also important to clarify customer complaints before inspection.

First of all, reproduce symptom, and understand it fully.

Ask customer about his/her complaints carefully. In some cases, it will be necessary to check symptom by driving vehicle with customer.

**NOTE:**

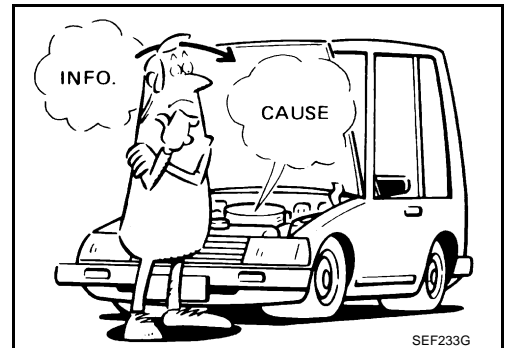
Customers are not professionals. Do not assume "maybe customer means..." or "maybe customer mentioned this symptom".



- It is essential to check symptoms right from beginning in order to repair a malfunction completely.

For an intermittent malfunction, it is important to reproduce symptom based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake suspected harness or connector by hand. When repairs are performed without any symptom check, no one can judge if malfunction has actually been eliminated.

- After diagnosis, make sure to carry out "erase memory". Refer to [BRC-25, "Operation Procedure"](#) .
- For an intermittent malfunction, move harness or harness connector by hand to check poor contact or false open circuit.
- Always read "GI General Information" to confirm general precautions. Refer to [GI-4, "General Precautions"](#) .



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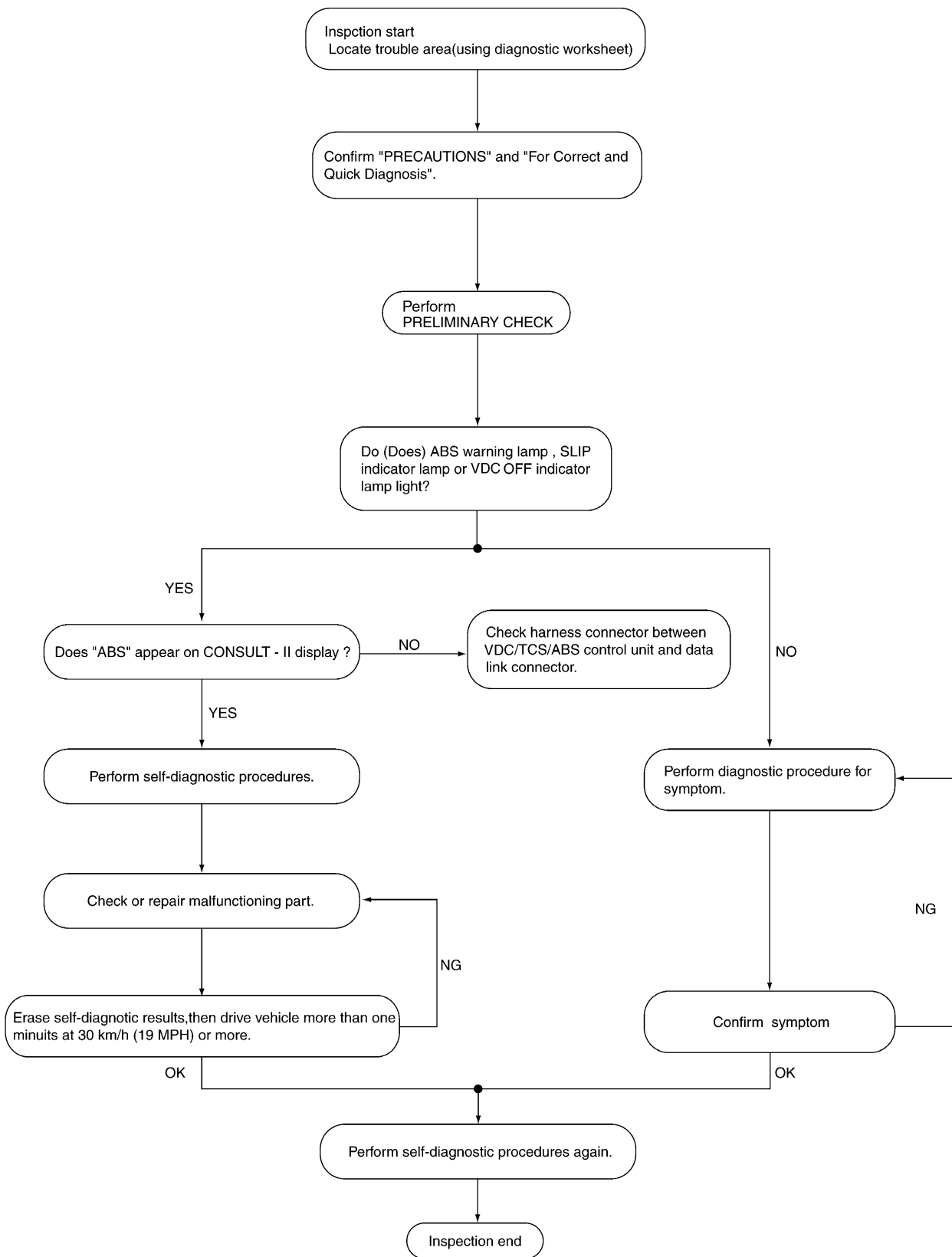
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# TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

## DIAGNOSIS FLOWCHART



SFIA0951E

# TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

## ASKING COMPLAINTS

- Complaints against malfunction vary depending on each person. It is important to clarify customer complaints.
- Ask customer about what symptoms are present and under what conditions. Use information to reproduce symptom while driving.
- It is also important to use diagnosis sheet so as not to miss information.

KEY POINTS	
<b>WHAT</b> .....	Vehicle model
<b>WHEN</b> .....	Date, Frequencies
<b>WHERE</b> .....	Road conditions
<b>HOW</b> .....	Operating conditions, Weather conditions, Symptoms

SBR339B

## EXAMPLE OF DIAGNOSIS SHEET

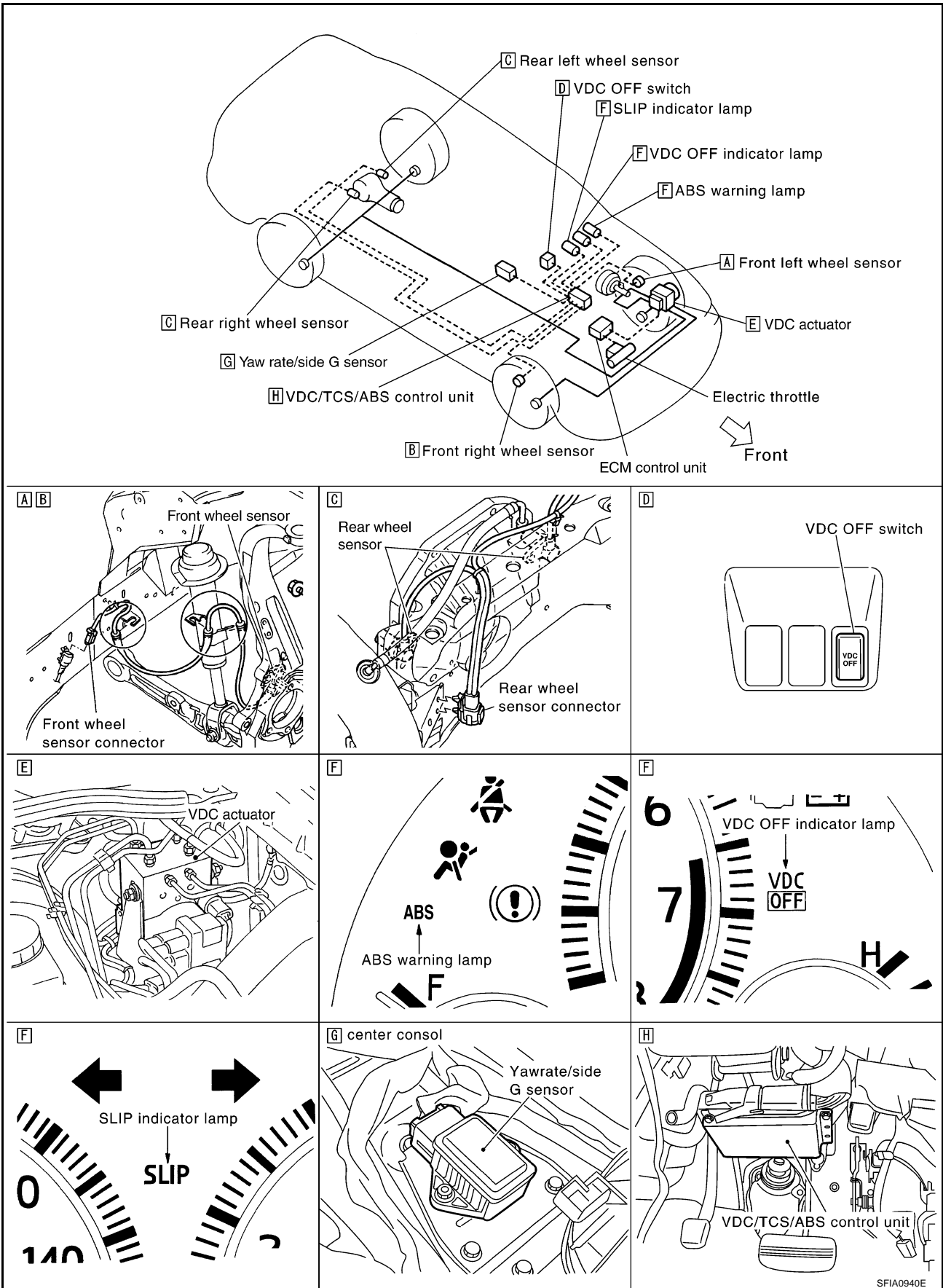
Customer name MR/MS	Model & Year		VIN
Engine #	Trans.		Mileage
Incident Date	Manuf. Date		In Service Date
Symptoms	<input type="checkbox"/> Noise and vibration (from engine compartment) <input type="checkbox"/> Noise and vibration (from axle)	<input type="checkbox"/> Warning / Indicator activate	<input type="checkbox"/> Firm pedal operation Large stroke pedal operation
	<input type="checkbox"/> TCS does not work (Rear wheels slip when accelerating)	<input type="checkbox"/> ABS does not work. (wheels slip 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		

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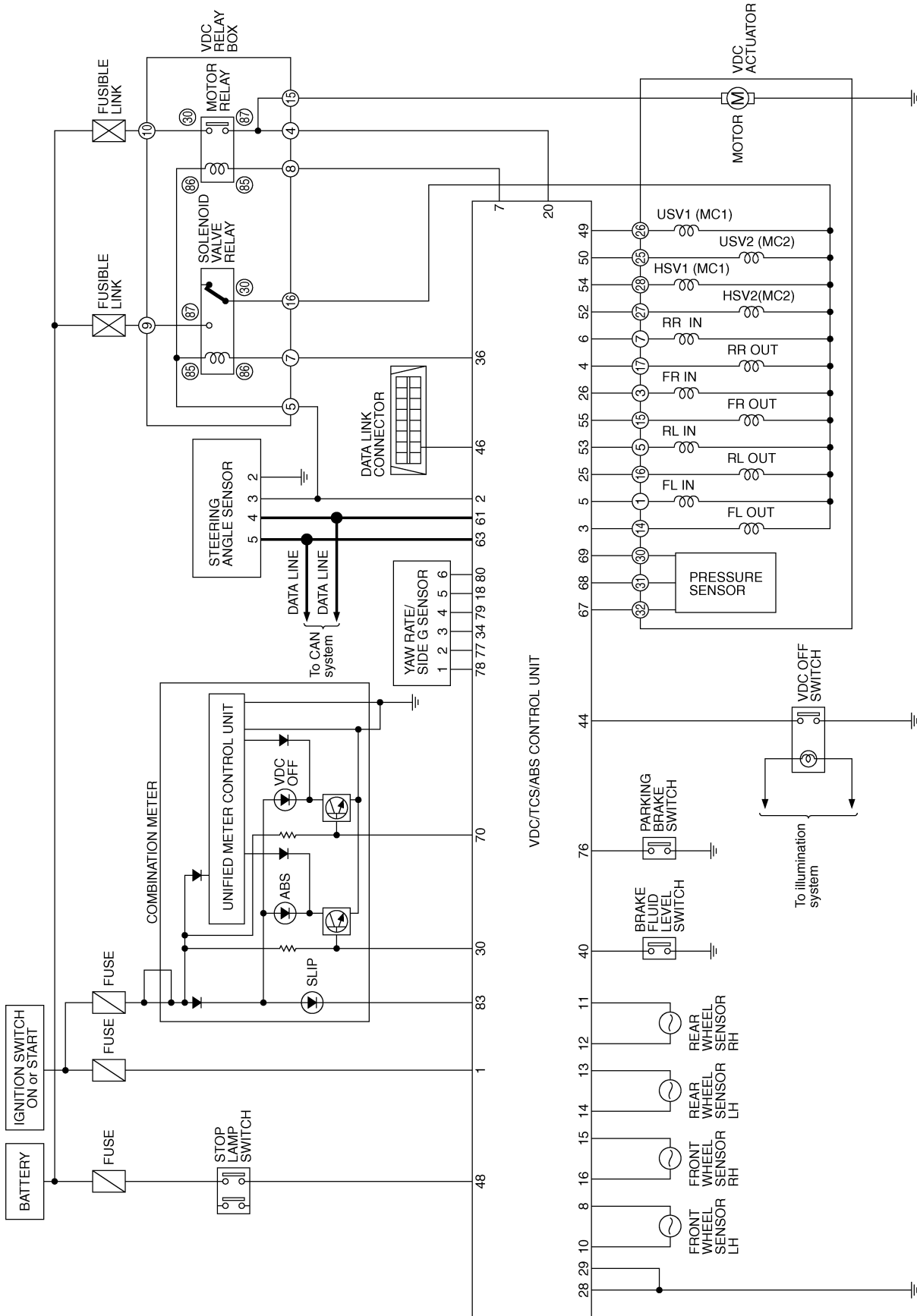
### Component Installation Location



Schematic

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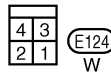
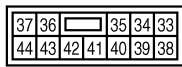
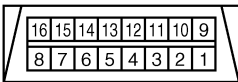
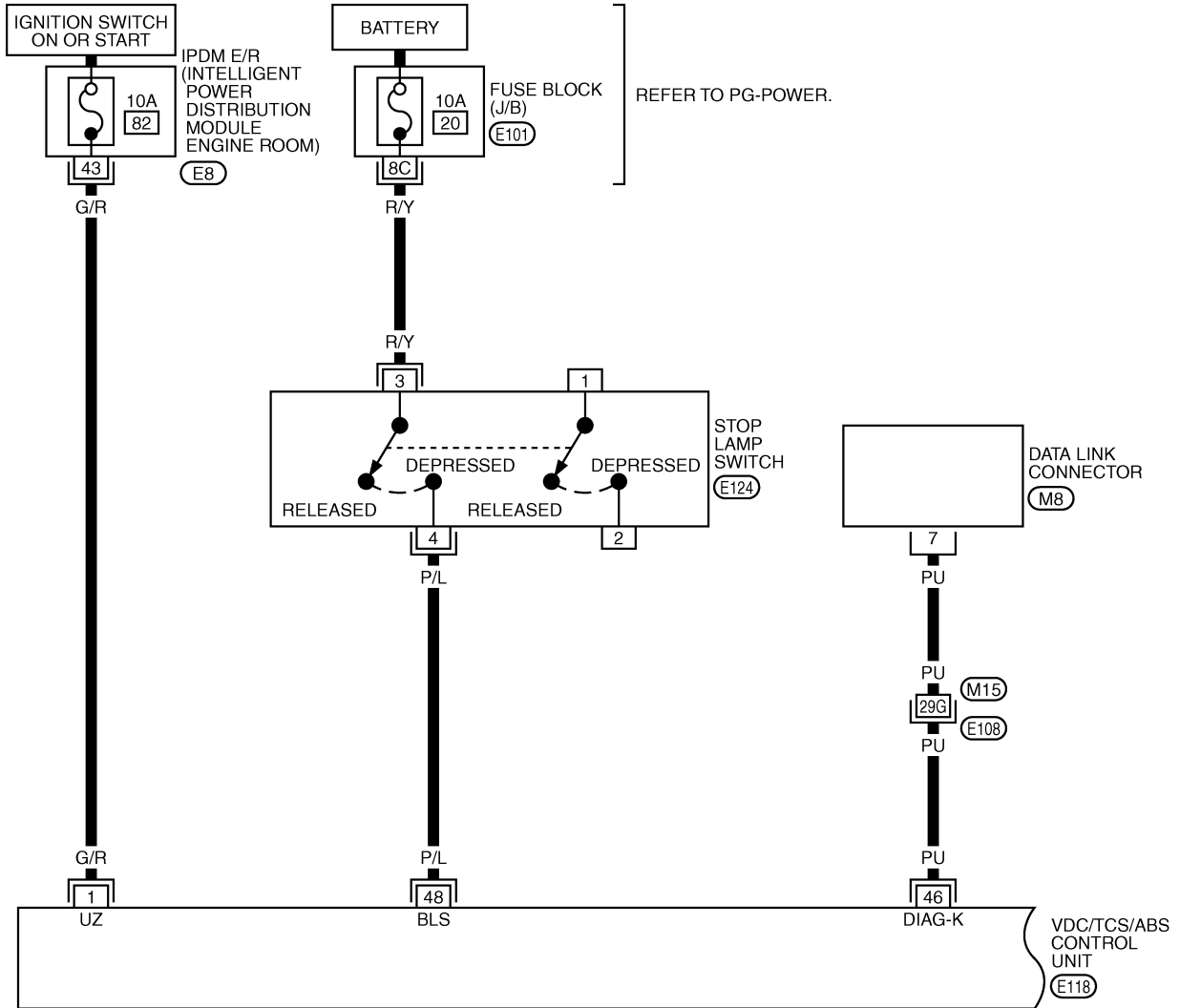
# TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

## Wiring Diagram — VDC —

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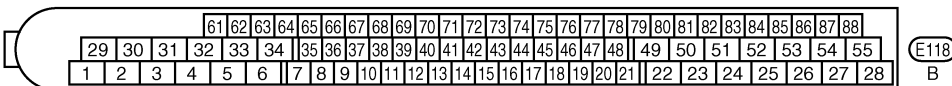
BRC-VDC-01



REFER TO THE FOLLOWING.

(E108) -SUPER MULTIPLE JUNCTION (SMJ)

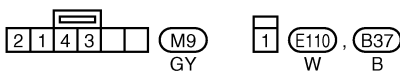
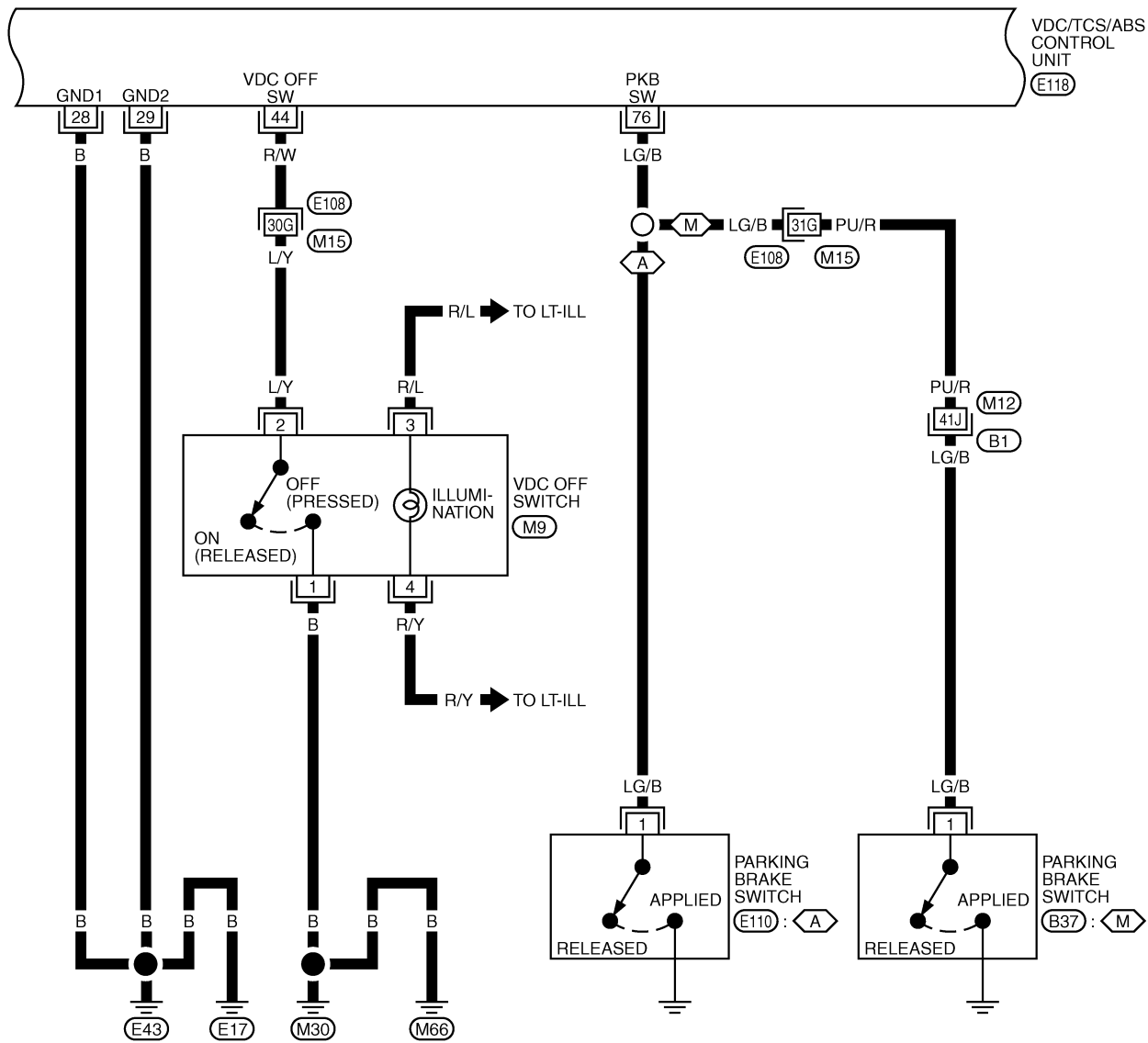
(E101) -FUSE BLOCK-JUNCTION BOX (J/B)



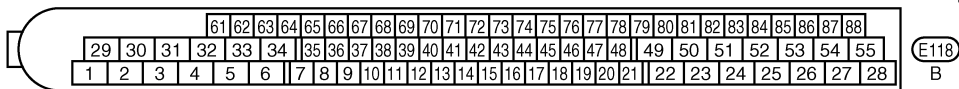


### BRC-VDC-02

A : WITH A/T  
M : WITH M/T



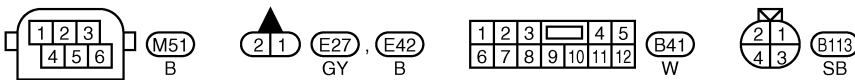
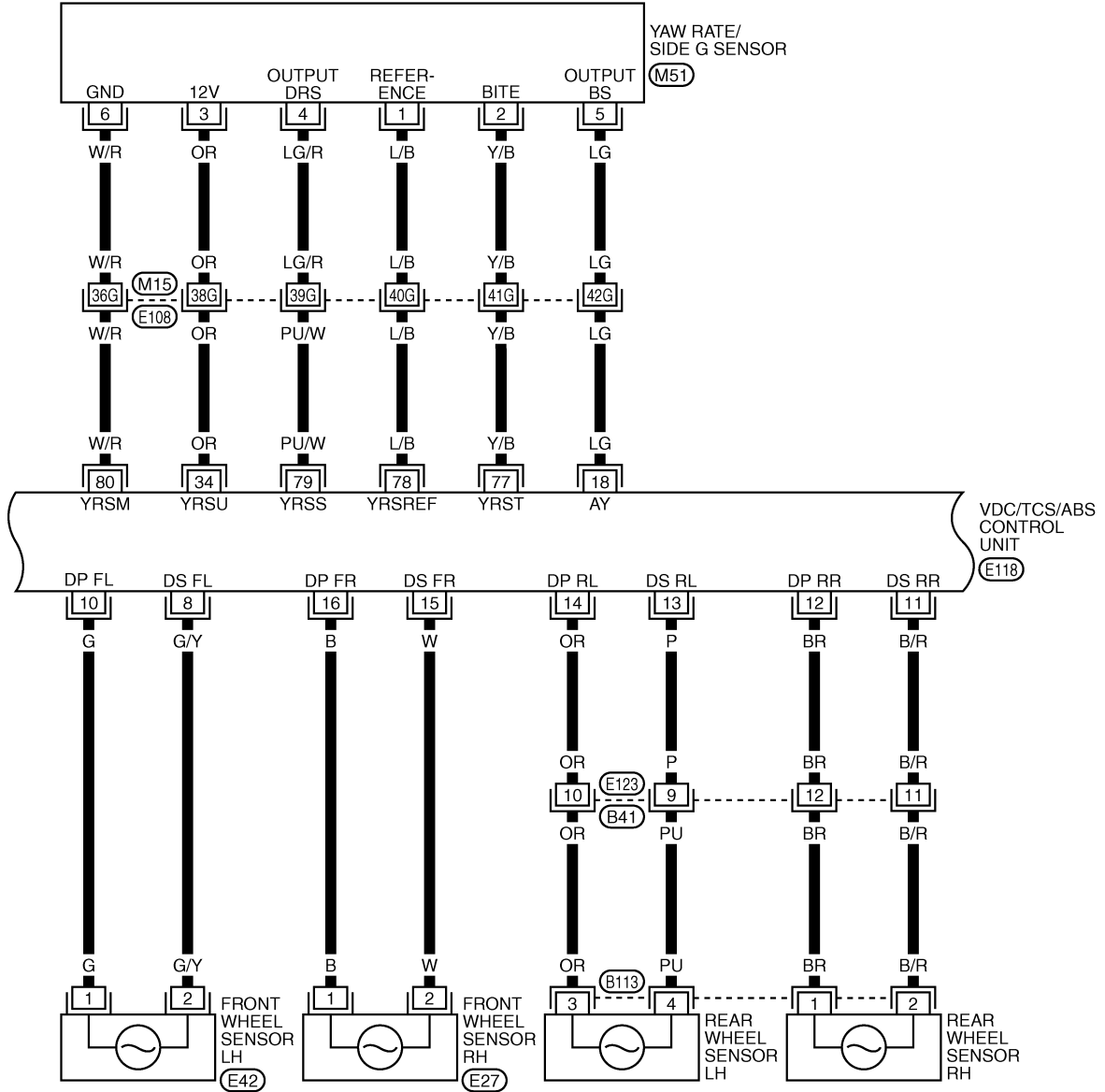
REFER TO THE FOLLOWING.  
 (E108), (B1) -SUPER MULTIPLE JUNCTION (SMJ)



# TROUBLE DIAGNOSIS

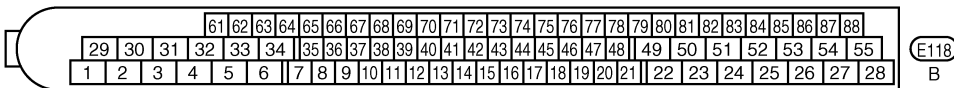
[VDC/TCS/ABS]

BRC-VDC-03



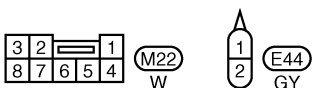
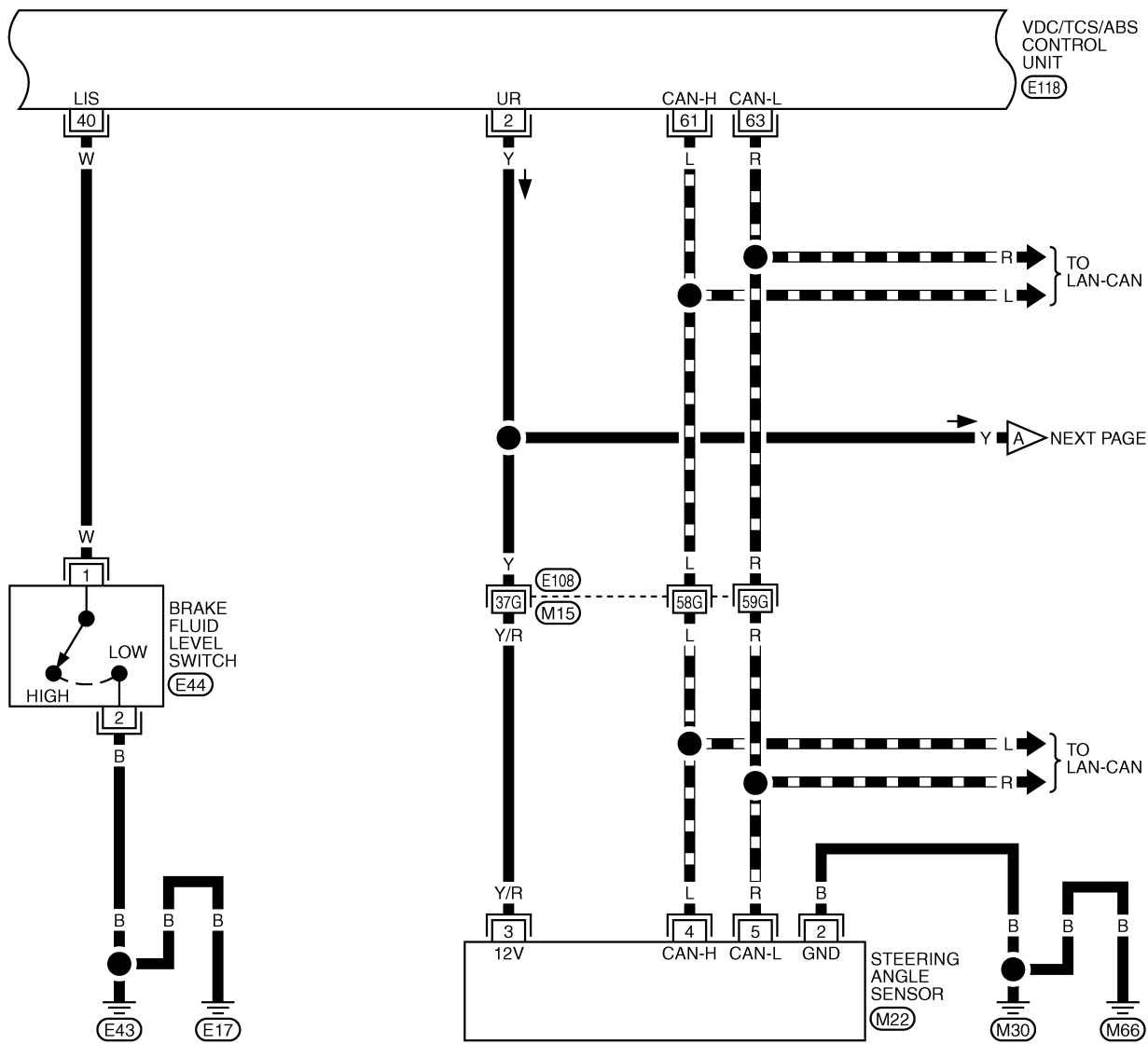
REFER TO THE FOLLOWING.

E108 -SUPER MULTIPLE JUNCTION (SMJ)

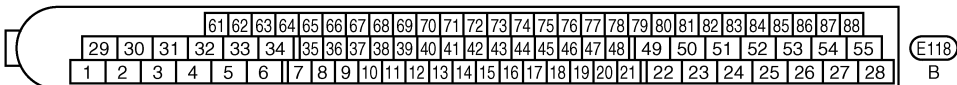


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▬ : DATA LINE



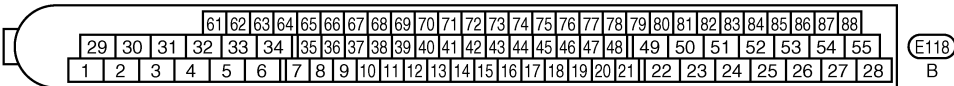
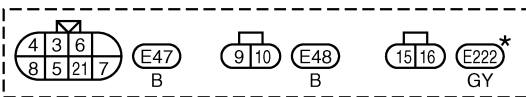
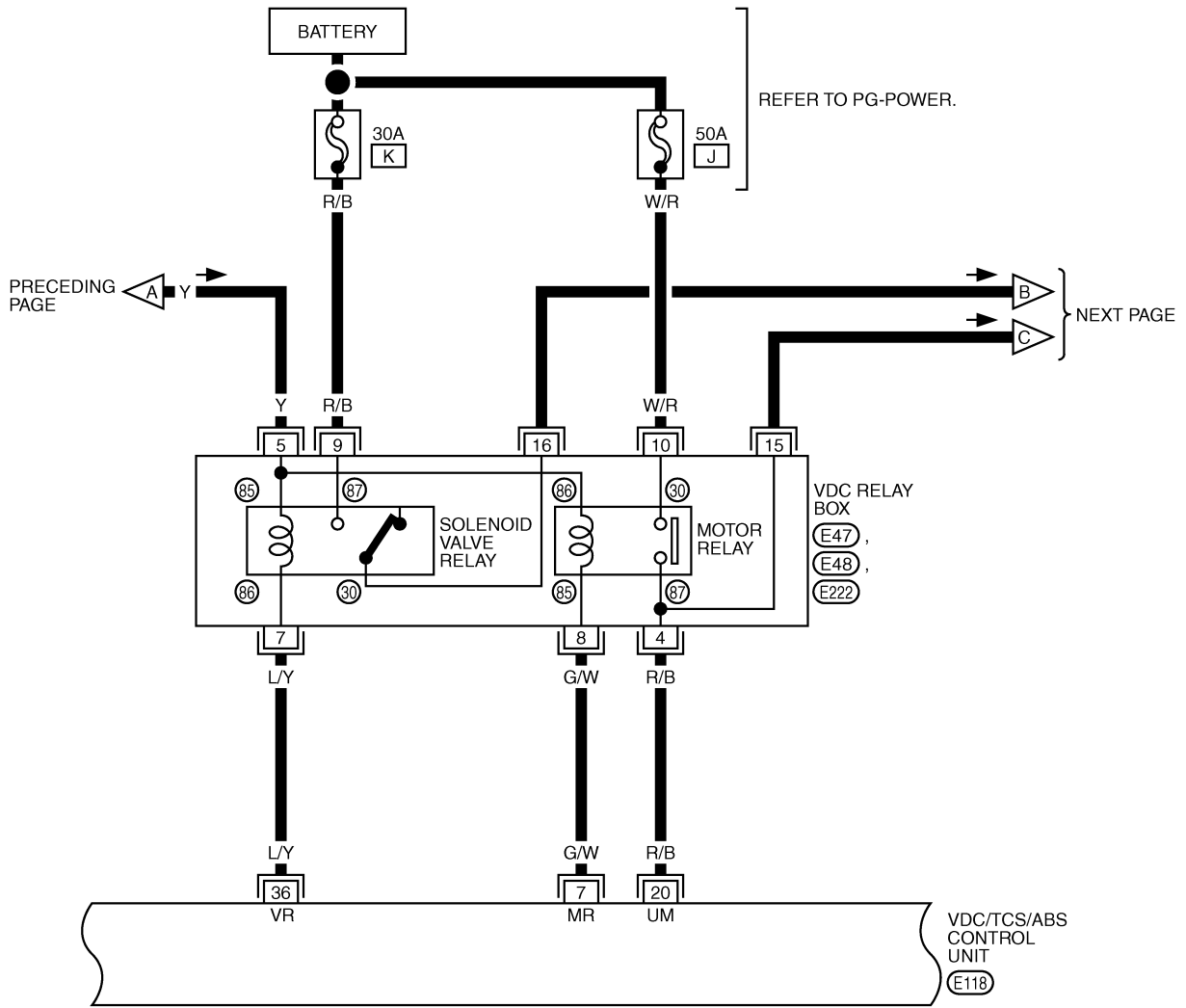
REFER TO THE FOLLOWING.  
 (E108) -SUPER MULTIPLE JUNCTION (SMJ)



# TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

BRC-VDC-05



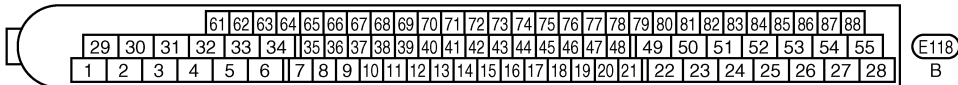
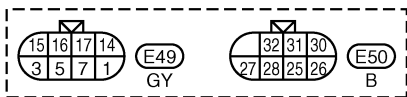
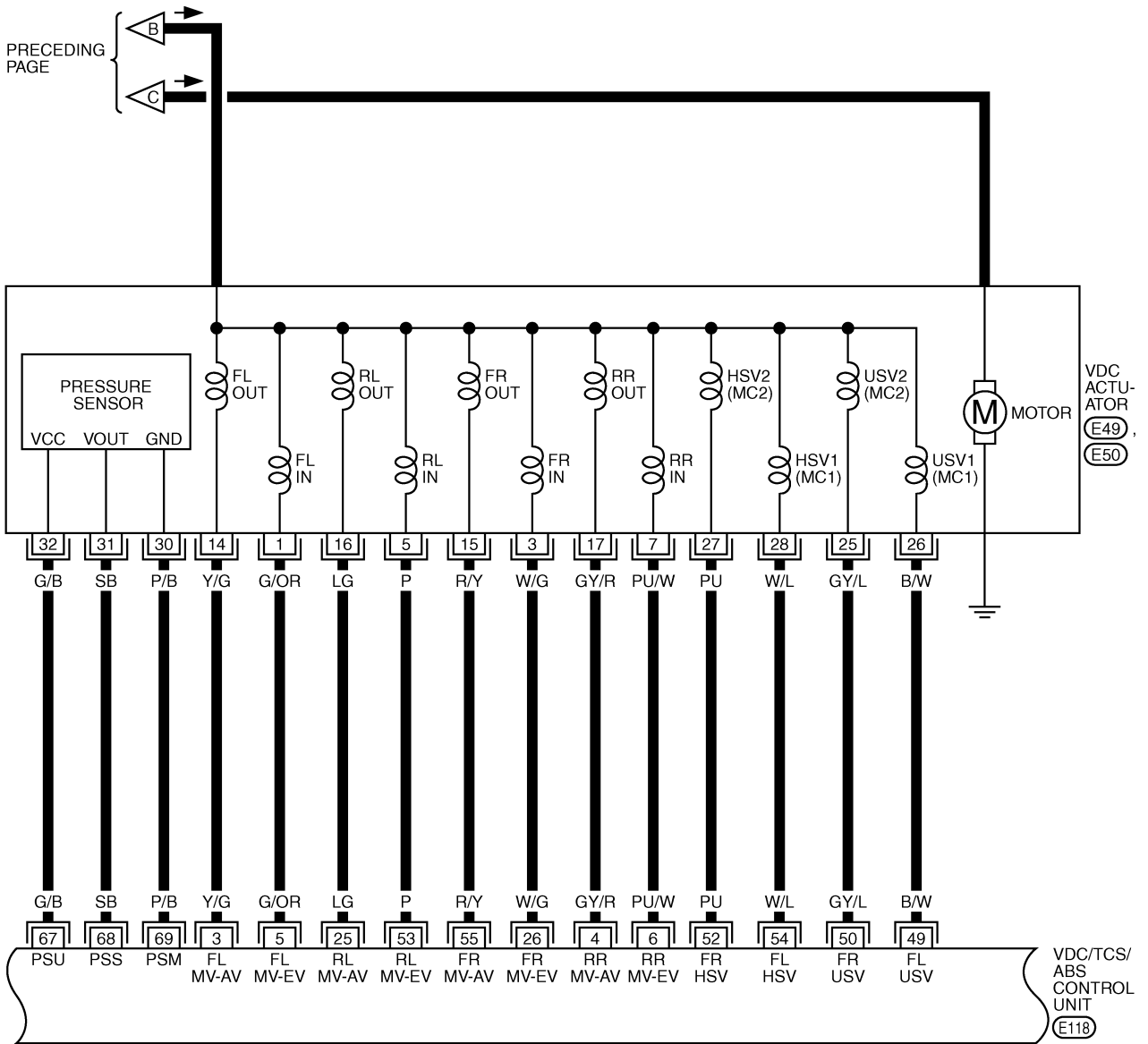
\*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

TFWT0065E

# TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

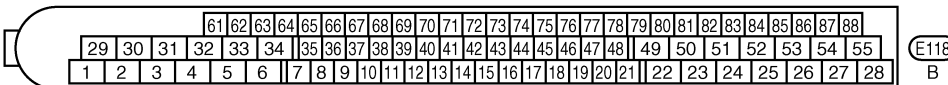
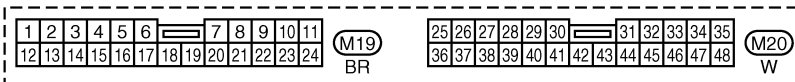
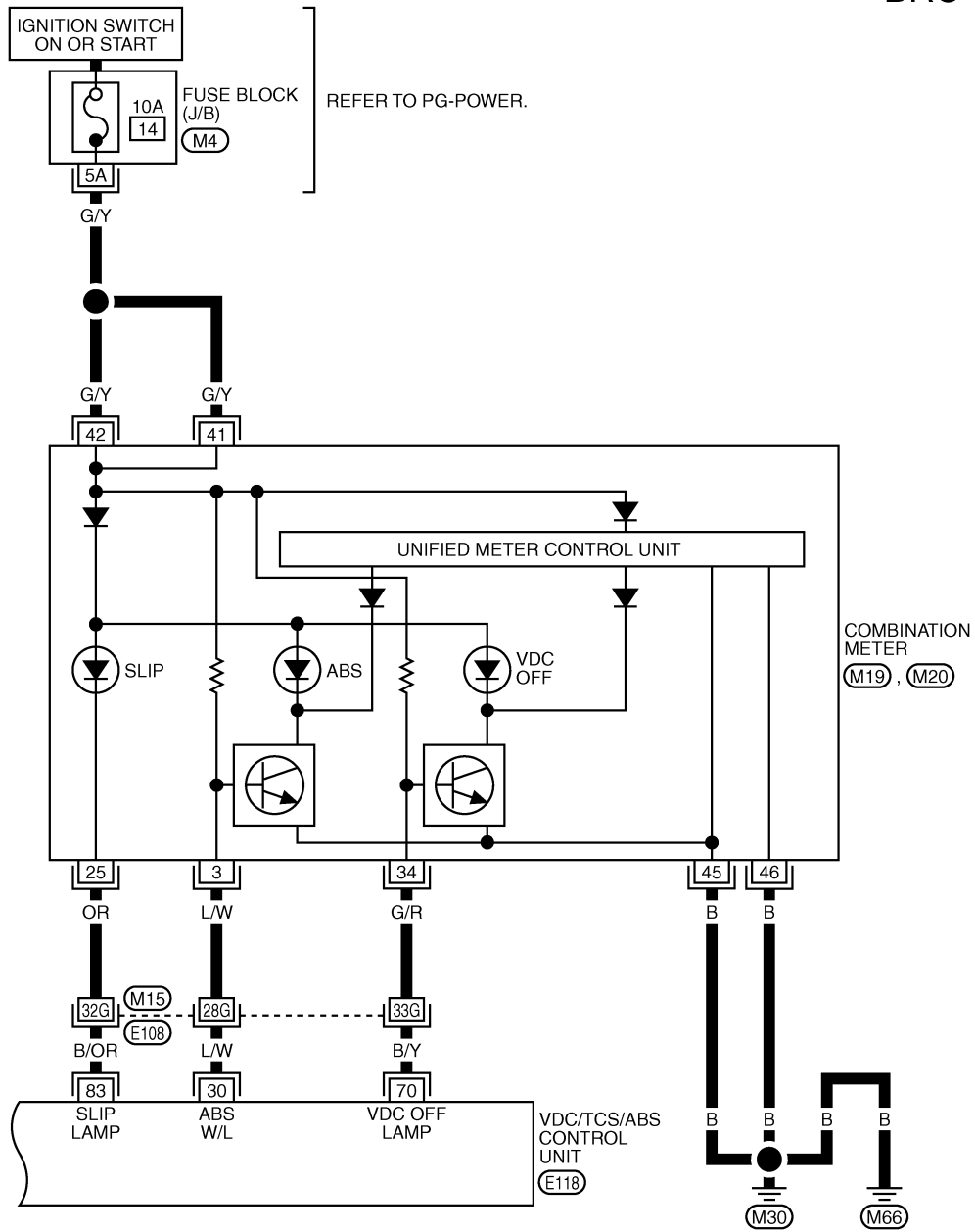
BRC-VDC-06



# TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

BRC-VDC-07



REFER TO THE FOLLOWING.

- (E108) -SUPER MULTIPLE JUNCTION (SMJ)
- (M4) -FUSE BLOCK-JUNCTION BOX (J/B)

# TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

## Control Unit Input/Output Signal Standard STANDARDS BY CONSULT-II

AFS0013S

### CAUTION:

Items displayed are data calculated by the control unit and may indicate normal operation even if output circuit (harness) is open or shorted.

Monitor item	Display content	Data monitor		Note: Error inspection checklist
		Condition	Reference value in normal operation	
GEAR (FOR A/T MODELS)	A/T gear position	1:1st gear 2:2nd gear 3:3rd gear 4:4th gear 5:5th gear		—
SLCT LVR POSI (FOR A/T MODELS)	A/T shift position	P: P position R: R position N: N position D: D position		
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]	<a href="#">BRC-37, "Inspection 1 Wheel Sensor System"</a>
		Vehicle running (Note 1)	Almost in accordance with speedometer display (within ±10%)	
ACCEL POS SIG	Throttle actuator opening/closing is displayed (linked with accelerator pedal).	Accelerator pedal not depressed (ignition switch is ON)	0%	Communication circuit between VDC/TCS/ABS control unit and ECM
		Depress accelerator pedal (ignition switch is ON)	0 to 100%	
ENGINE RPM	With engine running	With engine stopped	0 rpm	Engine speed signal circuit
		Engine running	Almost in accordance with tachometer display	
STR ANGLE SIG	Steering angle detected by steering angle sensor	Straight-ahead	Approx. 0 deg	<a href="#">BRC-41, "Inspection 5 Steering Angle Sensor System"</a>
		Steering wheel turned	– 720 to 720 deg	
YAW RATE SEN	Yaw rate detected by yaw rate sensor	Vehicle stopped	Approx. 0 d/s	<a href="#">BRC-42, "Inspection 6 Yaw Rate / Side G Sensor System"</a>
		Vehicle running	– 70 to 70 d/s	
SIDE G-SENSOR	Transverse G detected by side G-sensor	Vehicle stopped	Approx. 0 m/s <sup>2</sup>	<a href="#">BRC-42, "Inspection 6 Yaw Rate / Side G Sensor System"</a>
		Vehicle running	– 24.3 to 24.1 m/s <sup>2</sup>	
PRESS SENSOR	Brake fluid pressure detected by pressure sensor	With ignition switch turned ON and brake pedal released	Approx. 0 bar	<a href="#">BRC-39, "Inspection 4 Pressure Sensor System"</a>
		With ignition switch turned ON and brake pedal depressed	– 40 to 300 bar	
BATTERY VOLT	Battery voltage supplied to VDC/TCS/ABS control unit	Ignition switch ON	10 to 16V	<a href="#">BRC-51, "Inspection 11 VDC/TCS/ABS Control Unit Power and Ground Systems"</a>
STOP LAMP SW	Brake pedal operation	Brake pedal depressed	ON	<a href="#">BRC-50, "Inspection 10 Stop Lamp Switch System"</a>
		Brake pedal not depressed	OFF	
PARK BRAKE SW	Parking brake status	Parking brake depressed	ON	Parking brake switch circuit
		Parking brake not depressed	OFF	

# TROUBLE DIAGNOSIS

**[VDC/TCS/ABS]**

Monitor item	Display content	Data monitor		Note: Error inspection checklist
		Condition	Reference value in normal operation	
OFF SW	VDC OFF switch ON/OFF status	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	ON	<a href="#">BRC-54. "VDC OFF SWITCH"</a>
		VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	OFF	
ABS WARN LAMP	ABS warning lamp ON condition (Note 2)	ABS warning lamp ON	ON	<a href="#">BRC-36. "BASIC INSPECTION 3 ABS WARNING LAMP. VDC OFF INDICATOR LAMP. SLIP INDICATOR LAMP INSPECTION"</a>
		ABS warning lamp OFF	OFF	
MOTOR RELAY	Operation status of motor and motor relay	Ignition switch ON or engine running (ABS not operated)	OFF	<a href="#">BRC-47. "Inspection 8. ABS Motor and Motor Relay System"</a>
		Ignition switch ON or engine running (ABS operated)	ON	
ACTUATOR RLY	Solenoid valve relay operation status	Vehicle stopped (Ignition switch ON)	OFF	<a href="#">BRC-49. "Inspection 9. Solenoid Valve Relay System"</a>
		Vehicle stopped (Engine running)	ON	
OFF LAMP	VDC OFF indicator lamp status (Note 3)	When VDC OFF indicator lamp is ON	ON	<a href="#">BRC-36. "BASIC INSPECTION 3 ABS WARNING LAMP. VDC OFF INDICATOR LAMP. SLIP INDICATOR LAMP INSPECTION"</a>
		When VDC OFF indicator lamp is OFF	OFF	
SLIP LAMP	SLIP indicator lamp status (Note 4)	When SLIP indicator lamp is ON	ON	<a href="#">BRC-36. "BASIC INSPECTION 3 ABS WARNING LAMP. VDC OFF INDICATOR LAMP. SLIP INDICATOR LAMP INSPECTION"</a>
		When SLIP indicator lamp is OFF	OFF	
FR IN SOL FR OUT SOL RR IN SOL RR OUT SOL	Solenoid valve operation	Actuator (solenoid) is active ("ACTIVE TEST" with CONSULT-II) or actuator relay is inactive (in fail-safe mode).	ON	<a href="#">BRC-44. "Inspection 7. Solenoid and VDC Change-Over Valve System"</a>
		When actuator (solenoid) is not active and actuator relay is active (ignition switch ON).	OFF	
FLUID LEV SW	ON/OFF status of brake fluid level sensor	When brake fluid level sensor ON	ON	<a href="#">BRC-53. "Inspection 13. Brake Fluid Level Sensor System"</a>
		When brake fluid level sensor OFF	OFF	
USV HSV	VDC switch-over valve status	During actuator change-over valve operation or during a fail-safe	ON	<a href="#">BRC-44. "Inspection 7. Solenoid and VDC Change-Over Valve System"</a>
		When the actuator relay operates and the actuator change-over valve does not operate	OFF	

Note 1: Confirm tire pressure is normal.

Note 2: ON/OFF timing of ABS warning lamp

ON: After ignition switch is turned ON, or when a malfunction is detected.

OFF: After ignition switch is turned ON (when system is in normal operation).

Note 3: ON/OFF timing of VDC OFF indicator lamp

ON: Ately 1 seconds after ignition switch is turned ON, or when a malfunction is detected and VDC OFF switch is ON.



OFF: After ignition switch is turned ON (when system is in normal operation.) And when VDC OFF switch is OFF.

Note 4: SLIP indicator lamp ON/OFF timing

ON: After ignition switch is turned ON, or when a malfunction is detected and VDC/TCS function is activated while driving.

OFF: After ignition switch is turned ON (when system is in normal operation) and VDC/TCS function is not activated.

Flashing: VDC/TCS function is active during driving

## CONSULT-II Functions CONSULT-II MAIN FUNCTION

AFS0013T

In a diagnosis function (main function), there are "WORK SUPPORT", "SELF-DIAGNOSTIC RESULTS", "DATA MONITOR", "CAN DIAG SUPPORT MNTR", "ACTIVE TEST", "FUNCTION TEST", "ECU PART NUMBER".

Diagnostic test mode	Function	Reference
WORK SUPPORT	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-II.	<a href="#">BRC-6, "Adjustment of Steering Angle Sensor Neutral Position"</a>
SELF-DIAGNOSTIC RESULTS	Self-diagnostic results can be read and erased quickly.	<a href="#">BRC-25, "SELF-DIAGNOSIS"</a>
DATA MONITOR	Input/Output data in the VDC/TCS/ABS control unit can be read.	<a href="#">BRC-28, "DATA MONITOR"</a>
CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of communication can be read.	<a href="#">LAN-4, "CAN Communication Unit"</a>
ACTIVE TEST	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the VDC/TCS/ABS control unit and also shifts some parameters in a specified range.	<a href="#">BRC-30, "ACTIVE TEST"</a>
FUNCTION TEST	Conducted by CONSULT-II instead of a technician to determine whether each system is "OK" or "NG".	—
ECU PART NUMBER	VDC/TCS/ABS control unit part number can be read.	—

## SELF-DIAGNOSIS

### Description

If a malfunction is detected in system, ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp on meter turn on. In this case, perform self-diagnosis as follows:

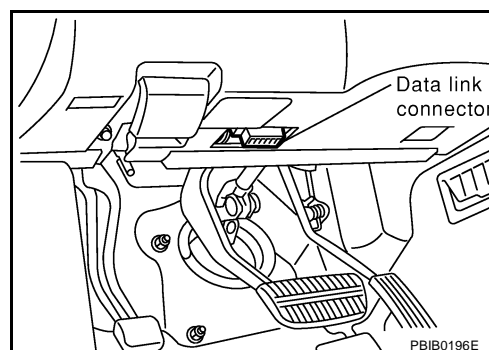
### Operation Procedure

1. Ignition switch is turned OFF
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector (data link connector is on lower instrument cover).
3. Start engine and drive at approximately 30 km/h (19 MPH) for approximately 1 minute.
4. After stopping vehicle, with engine still idling, touch "START", "ABS", and "SELF-DIAG RESULTS" on CONSULT-II screen in this order.

### CAUTION:

**Just after starting engine, or turning ignition switch ON, "ABS" may not be displayed on system selection screen even if "START" is touched. In this case, start self-diagnosis again from step 1. If it cannot be shown after several attempts, VDC/TCS/ABS control unit may have malfunctioned. Repair or replace control unit.**

5. Self-diagnosis result is displayed. (If necessary, touch "PRINT" to print self-diagnosis result.)
  - When "NO FAILURE" is shown, check ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp. Refer to [BRC-36, "BASIC INSPECTION 3 ABS WARNING LAMP, VDC OFF INDICATOR LAMP, SLIP INDICATOR LAMP INSPECTION"](#).
  - CONSULT-II self-diagnosis results are displayed without regard to occurrence timing. In some cases later ones (timing value is small) appear on next screen.



# TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

6. Go to appropriate "Inspection" chart according to "Display Item List", and repair or replace as necessary.
7. Start engine and drive at approximately 30 km/h (19 MPH) for approximately 1 minute.

**CAUTION:**

- Check again to make sure that there is no malfunction on other parts.

8. Turn ignition switch OFF to prepare for erasing memory.
9. Start engine and touch "START", "ABS", "SELF-DIAGNOSIS RESULTS", and "ERASE MEMORY" on CONSULT-II screen in this order to erase memory.

**CAUTION:**

If memory cannot be erased, go to step 6.

10. For the final inspection, drive vehicle at approximately 30 km/h (19 MPH) and check that ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp stay off.

**CAUTION:**

VDC "OFF" switch should not stay in the "ON" position.

## Display Item List

Malfunction system	Malfunction detecting condition	Check system	
FR LH SENSOR- 1	Circuit of front LH wheel sensor is open	<a href="#">BRC-37, "Inspection 1 Wheel Sensor System"</a> Note 1	
RR RH SENSOR- 1	Circuit of rear RH wheel sensor is open		
FR RH SENSOR- 1	Circuit of front RH wheel sensor is open		
RR LH SENSOR- 1	Circuit of rear LH wheel sensor is open		
FR LH SENSOR- 2	Circuit of front LH wheel sensor is shorted, or sensor power voltage is unusual. Control unit cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.		
RR RH SENSOR- 2	Circuit of rear RH wheel sensor is shorted, or sensor power voltage is unusual. Control unit cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.		
FR RH SENSOR- 2	Circuit of front RH wheel sensor is shorted, or sensor power voltage is unusual. Control unit cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.		
RR LH SENSOR- 2	Circuit of rear LH wheel sensor is shorted, or sensor power voltage is unusual. Control unit cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.		
MAIN RELAY	During solenoid valve relay operation with OFF, when actuator relay turns ON or when control line for relay is shorted to ground.		<a href="#">BRC-49, "Inspection 9 Solenoid Valve Relay System"</a>
	During solenoid valve relay operation with ON, when actuator relay turns OFF or when control line for relay is open.		
STOP LAMP SW	Stop lamp switch circuit is open.	<a href="#">BRC-50, "Inspection 10 Stop Lamp Switch System"</a>	
PRESS SEN CIRCUIT	Pressure sensor signal line is open or shorted, or pressure sensor is malfunctioning.	<a href="#">BRC-39, "Inspection 4 Pressure Sensor System"</a>	
ST ANGLE SEN CIRCUIT	Neutral position of steering angle sensor is dislocated, or steering angle sensor is malfunctioning.	<a href="#">BRC-41, "Inspection 5 Steering Angle Sensor System"</a>	
YAW RATE SENSOR	Yaw rate sensor has generated an error, or yaw rate sensor signal line is open or shorted.	<a href="#">BRC-42, "Inspection 6 Yaw Rate / Side G Sensor System"</a>	

# TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Malfunction system	Malfunction detecting condition	Check system	
FR LH IN ABS SOL	Circuit of front LH IN ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.	<a href="#">BRC-44. "Inspection 7 Solenoid and VDC Change-Over Valve System"</a>	
FR LH OUT ABS SOL	Circuit of front LH OUT ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.		
RR RH IN ABS SOL	Circuit of rear RH IN ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.		
RR RH OUT ABS SOL	Circuit of rear RH OUT ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.		
FR RH IN ABS SOL	Circuit of front RH IN ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.		
FR RH OUT ABS SOL	Circuit of front RH OUT ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.		
RR LH IN ABS SOL	Circuit of rear LH IN ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.		
RR LH OUT ABS SOL	Circuit of rear LH OUT ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.		
PRIMARY SIDE USV CIRCUIT	Circuit of primary-side VDC switch-over valve 1 is open or shorted, or control line is open or shorted to power supply or ground.		<a href="#">BRC-44. "Inspection 7 Solenoid and VDC Change-Over Valve System"</a>
SECONDARY SIDE USV CIRCUIT	Circuit of secondary-side VDC switch-over valve 1 is open or shorted, or control line is open or shorted to power supply or ground.		
PRIMARY SIDE HSV CIRCUIT	Circuit of primary-side VDC switch-over valve 2 is open or shorted, or control line is open or shorted to power supply or ground.		
SECONDARY SIDE HSV CIRCUIT	Circuit of secondary-side VDC switch-over valve 2 is open or shorted, or control line is open or shorted to power supply or ground.		
PUMP MOTOR ACTUATOR RLY	During actuator motor operation with ON, when actuator motor turns OFF or when control line for actuator motor relay is open.	<a href="#">BRC-47. "Inspection 8 ABS Motor and Motor Relay System"</a>	
	During actuator motor operation with OFF, when actuator motor turns ON or when control line for relay is shorted to ground.		
LOW POWER VOLTAGE	VDC/TCS/ABS control unit power voltage is too low.	<a href="#">BRC-51. "Inspection 11 VDC/TCS/ABS Control Unit Power and Ground Systems"</a>	
ST ANGLE SEN SIGNAL	Neutral position correction of steering angle sensor is not finished.	<a href="#">BRC-6. "Adjustment of Steering Angle Sensor Neutral Position"</a>	
ST ANG SEN COM CIR	CAN communication line or steering angle sensor has generated an error.	<a href="#">BRC-53. "Inspection 14 CAN Communication System"</a>	
SIDE G-SEN CIRCUIT	Side G-sensor is malfunctioning, or signal line of side G-sensor is open or shorted.	<a href="#">BRC-42. "Inspection 6 Yaw Rate / Side G Sensor System"</a>	
EMERGENCY BRAKE	VDC/TCS/ABS control unit malfunction (pressure increase is too much or too little.)	<a href="#">BRC-52. "Inspection 12 VDC/TCS/ABS Control Unit 2"</a>	
CONTROLLER FAILURE	Internal malfunction of VDC/TCS/ABS control unit	<a href="#">BRC-39. "Inspection 3 VDC/TCS/ABS Control Unit 1"</a>	

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# TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Malfunction system	Malfunction detecting condition	Check system
SHIFT POSITION ERROR (FOR A/T MODELS)	P-position switch stuck to ON or TCM internal malfunction, VDC/TCS/ABS control unit internal malfunction.	<a href="#">BRC-54, "Inspection 15 When "SHIFT POSITION ERROR" Appears in Self-Diagnosis Results Display (For A/T Models)"</a>
CAN COMM CIRCUIT	<ul style="list-style-type: none"> <li>● CAN communication line is open or shorted.</li> <li>● VDC/TCS/ABS control unit internal malfunction</li> <li>● Battery voltage for EMC is suddenly interrupted for approximately 0.5 seconds or more.</li> </ul>	<a href="#">BRC-53, "Inspection 14 CAN Communication System" Note 2</a>
BR FLUID LEVEL LOW	<ul style="list-style-type: none"> <li>● Brake fluid level drops or communication line between VDC/TCS/ABS control unit and brake fluid level sensor is open or shorted.</li> </ul>	<a href="#">BRC-53, "Inspection 13 Brake Fluid Level Sensor System"</a>
ENGINE SIGNAL 1-4, 6	<ul style="list-style-type: none"> <li>● Major engine component is malfunctioning.</li> </ul>	<a href="#">BRC-39, "Inspection 2 Engine System"</a>

Note 1. If wheel sensor 2 for each wheel is indicated, check control unit power supply voltage in addition to wheel sensor circuit check.

Note 2. If multiple malfunctions are detected including CAN communication line [U1000], perform diagnosis for CAN communication line first.

## DATA MONITOR

- For details of data monitor function, refer to "CONSULT-II Instruction Manual".

## Operation Procedure

1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector.
3. Turn ignition switch ON.
4. Touch "START" on display.
5. Touch "ABS" on display.

### NOTE:

Just after starting engine, or turning ignition switch ON, "ABS" may not be displayed on system selection screen even if "START" is touched. In this case, start again from step 1.

6. Touch "DATA MONITOR".
7. Return to monitor item selection screen, and touch any of "CONTROL UNIT INPUT ITEM", "MAIN ITEM" or "ITEM MENU SELECTION". Refer to [BRC-28, "Display Item List"](#).
8. Touch "START".
9. Screen of data monitor is displayed.

## Display Item List

ITEM (UNIT)	MONITOR ITEM SELECTION			REMARKS
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
GEAR (for A/T models)	×	×	×	Gear position judged by PNP switch signal is displayed.
SLCT LVR POSI (for A/T models)	×	×	×	Shift position judged by PNP switch signal.
FR RH SENSOR [km/h]	×	×	×	Wheel speed calculated by front RH wheel sensor signal is displayed.
FR LH SENSOR [km/h]	×	×	×	Wheel speed calculated by front LH wheel sensor signal is displayed.
RR RH SENSOR [km/h]	×	×	×	Wheel speed calculated by rear RH wheel sensor signal is displayed.

# TROUBLE DIAGNOSIS

**[VDC/TCS/ABS]**

ITEM (UNIT)	MONITOR ITEM SELECTION			REMARKS
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
RR LH SENSOR [km/h]	×	×	×	Wheel speed calculated by rear LH wheel sensor signal is displayed.
BATTERY VOLT [V]	×	×	×	Voltage supplied to VDC/TCS/ABS control unit is displayed.
ACCEL POS SIG [%]	×	-	×	Throttle actuator opening/closing status judged by CAN communication signal is displayed.
ENGINE RPM [rpm]	×	-	×	Engine speed judged by CAN communication signal is displayed.
CAN COM START [ON/OFF]	-	-	×	Communication status of CAN communication is displayed.
STR ANGLE SIG [deg]	×	-	×	Steering angle detected by steering angle sensor is displayed.
YAW RATE SEN [d/s]	×	×	×	Yaw rate detected by yaw rate sensor is displayed.
SIDE G-SENSOR [m/s <sup>2</sup> ]	×	-	×	Transverse acceleration detected by side G-sensor is displayed.
PRESS SENSOR [bar]	×	-	×	Brake fluid pressure detected by pressure sensor is displayed.
STOP LAMP SW [ON/OFF]	×	×	×	Stop lamp switch (ON/OFF) status is displayed.
PARK BRAKE SW [ON/OFF]	×	-	×	Parking brake switch (ON/OFF) status is displayed.
OFF SW [ON/OFF]	×	×	×	VDC OFF switch (ON/OFF) status is displayed.
ABS WARN LAMP [ON/OFF]	-	×	×	ABS warning lamp (ON/OFF) status is displayed.
VDC WARN LAMP [ON/OFF]	-	×	×	VDC warning lamp (ON/OFF) status is displayed.
SLIP LAMP [ON/OFF]	-	×	×	SLIP indicator lamp (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.
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.
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.
OFF LAMP [ON/OFF]	-	×	×	VDC OFF indicator lamp (ON/OFF) status is displayed.

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# TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

ITEM (UNIT)	MONITOR ITEM SELECTION			REMARKS
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
MOTOR RELAY [ON/OFF]	–	×	×	ABS motor relay (ON/OFF) status is displayed.
ACTUATOR RLY [ON/OFF]	–	×	×	Solenoid valve relay (ON/OFF) status is displayed.
FLUID LEV SW [ON/OFF]	×	–	×	Brake fluid level sensor (ON/OFF) status is displayed.

×:Applicable

–:Not applicable

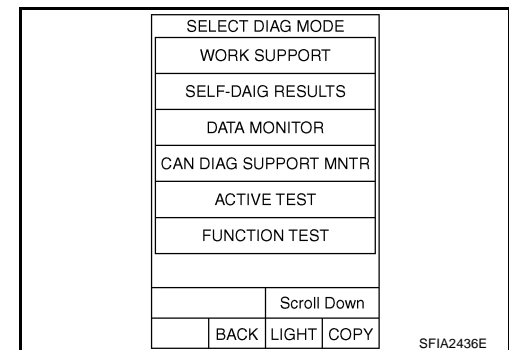
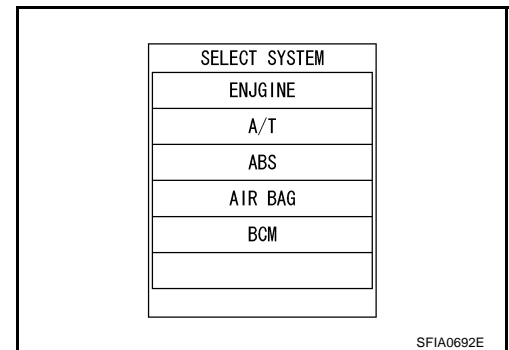
## ACTIVE TEST

### Operation Procedure

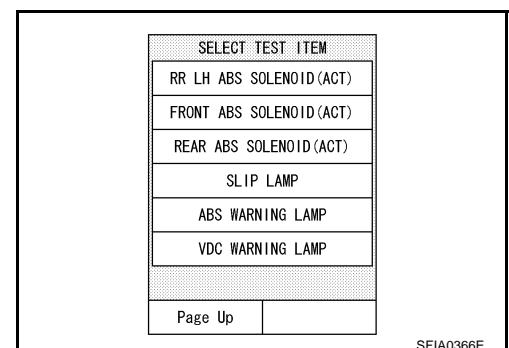
#### CAUTION:

- Do not perform active test while driving the vehicle.
- Make sure to completely bleed air from brake system.
- Active test cannot be performed when ABS warning lamp is on.

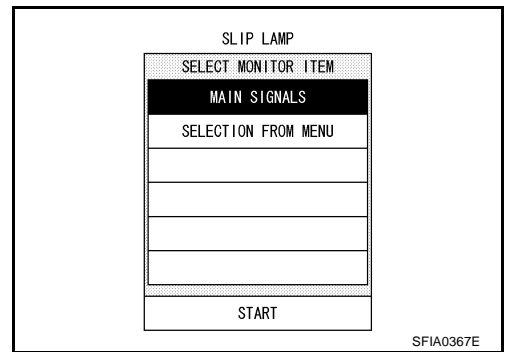
1. Connect CONSULT-II and CONSULT-II CONVERTER to connector to data link connector and start the engine.
2. Touch “START” on the display.
3. Touch “ABS” and “ACTIVE TEST”.



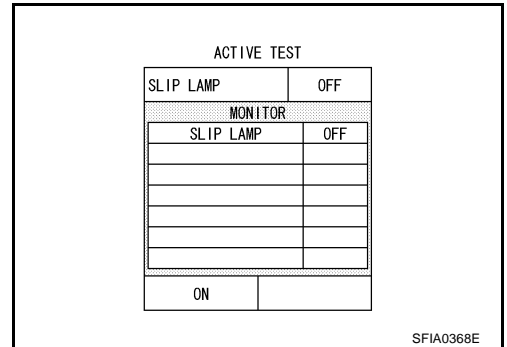
4. Test item selection screen is displayed.
5. Touch necessary test item.



6. Touch "START" with "MAIN SIGNALS" line inverted.



7. Active test screen is displayed.

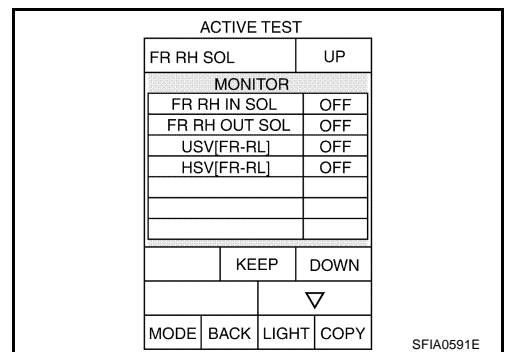


### Test Item

- Solenoid valve
- VDC OFF indicator lamp
- ABS motor
- SLIP indicator lamp
- ABS warning lamp
- ASCD signal

### Solenoid Valve

1. To perform active test of ABS functions, select major items for each test item. To perform active test of VDC/TCS functions, select item menu for each test item.
2. For ABS solenoid valve, touch "UP", "KEEP", and "DOWN". For ABS solenoid valve (ACT), touch "UP," "ACT UP," and "ACT KEEP". Use screen monitor to check that solenoid valve operates as shown in Solenoid Valve Operation Chart. Refer to "Solenoid Valve Operation Chart".



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

BRC

# TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

## Solenoid Valve Operation Chart

Operation		Solenoid valve			Solenoid valve (ACT)		
		UP	KEEP	DOWN	UP	ACT UP	ACT KEEP
Front RH ABS S/V	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	USV [FR-RL]	OFF	OFF	OFF	OFF	ON	ON
	HSV [FR-RL]	OFF	OFF	OFF	OFF	ON*	OFF
Front LH ABS S/V	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	USV [FL-RR]	OFF	OFF	OFF	OFF	ON	ON
	HSV [FL-RR]	OFF	OFF	OFF	OFF	ON*	OFF
Rear RH ABS S/V	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	USV [FL-RR]	OFF	OFF	OFF	OFF	ON	ON
	HSV [FL-RR]	OFF	OFF	OFF	OFF	ON*	OFF
Rear LH ABS S/V	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	USV [FR-RL]	OFF	OFF	OFF	OFF	ON	ON
	HSV [FR-RL]	OFF	OFF	OFF	OFF	ON*	OFF

\*: ON for 1 to 2 seconds after the touch, and then OFF

**NOTE:**

- If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.
- "TEST STOP" is displayed approximately 10 seconds after operation starts.
- To conduct a retest after "TEST STOP" is displayed, touch "BACK" and conduct the test from the step 6.

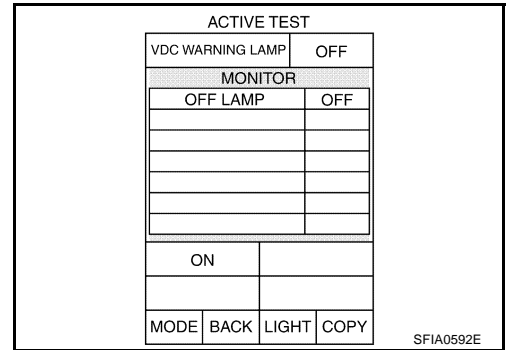
### VDC OFF Indicator Lamp

Touch "ON" and "OFF" on the screen. Check that VDC OFF indicator lamp operates as shown in table below.

Operation	ON	OFF
VDC OFF lamp	ON	OFF

**NOTE:**

If "OFF" is touched on screen during active test, VDC OFF indicator lamp, SLIP indicator lamp, and ABS warning lamp all turn ON for a moment. This is normal.



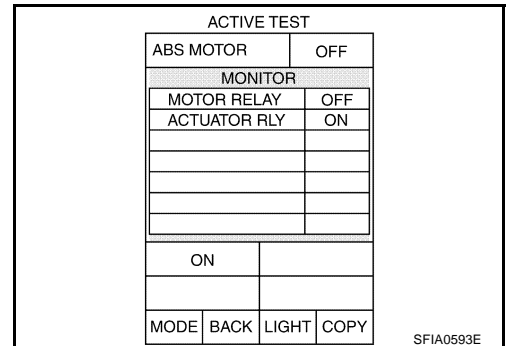
### ABS Motor

Touch "ON" and "OFF" on the screen. Check that motor relay operates as shown in table below.

Operation	ON	OFF
Actuator relay	ON	ON
Motor relay	ON	OFF

**NOTE:**

- If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.
- "TEST STOP" is displayed approximately 10 seconds after operation starts.





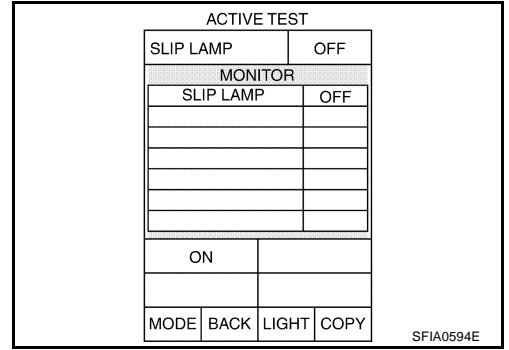
**SLIP Indicator Lamp**

Touch "ON" and "OFF" on the screen. Check that SLIP indicator lamp operates as shown in table below.

Operation	ON	OFF
SLIP lamp	ON	OFF

**NOTE:**

If "OFF" is touched on screen during active test, VDC OFF indicator lamp, SLIP indicator lamp, and ABS warning lamp all turn ON for a moment. This is normal.



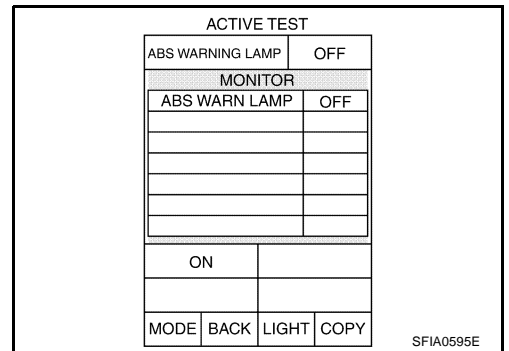
**ABS Warning Lamp**

Touch "ON" and "OFF" on the screen. Check that ABS warning lamp operates as shown in table below.

Operation	ON	OFF
ABS warning lamp	ON	OFF

**NOTE:**

If "OFF" is touched on screen during active test, VDC OFF indicator lamp, SLIP indicator lamp, and ABS warning lamp all turn ON for a moment. This is normal.



**ASCD Signal**

Touch "ON" and "OFF" on the screen. Check that ASCD signal is as shown in table below.

Operation	ON	OFF
ASCD signal	ON	OFF

A  
B  
C  
D  
E  
G  
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K  
L  
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BRC

### For Fast and Accurate Diagnosis

#### PRECAUTIONS FOR DIAGNOSIS

- Before performing diagnosis, always read General Information (GI) to confirm general precautions. Refer to [GI-4, "General Precautions"](#) .
- If VDC/TCS/ABS control unit, steering angle sensor, steering system parts, suspension system parts, or tires have been replaced, or if alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to [BRC-6, "Adjustment of Steering Angle Sensor Neutral Position"](#) .
- When replacing VDC/TCS/ABS control unit, be sure labels on control units are the same color.
- After diagnosis is finished, be sure to erase memory. Refer to [BRC-25, "Operation Procedure"](#) .
- When checking continuity and voltage between units, be sure to check for disconnection, looseness, bend, or collapse of connector terminals. If any non-standard condition is found, repair or replace connector terminals.
- For intermittent symptoms, possible cause is malfunction in harness, harness connector, or terminals. Move harness, harness connector, and terminals to check for poor connections.
- If a circuit tester is used for the check, be careful not to forcibly extend any connector terminal.
- To use CONSULT-II to perform self-diagnosis of VDC/TCS/ABS control unit, active tests, or work support, first stop work, then connect CONSULT-II and select "ABS".
- CONSULT-II self-diagnosis results are displayed without regard to occurrence timing. In some cases later ones (timing value is small) appear on the next screen.
- While self-diagnosis results of CONSULT-II shows an error, if CONSULT-II active test is performed, an engine system error may be indicated. In this case, start engine to resume the normal screen.
- VDC/TCS/ABS system electronically controls brake operation and engine output. The following symptoms may be caused by normal operations:

Symptom	Symptom description	Result
Motor operation noise	This is noise of motor inside VDC actuator. Slight noise may occur during VDC, TCS, and ABS operation.	Normal
	Just after the engine starts, the motor operating noise may be heard. This is a normal status of the system operation check.	
System operation check noise	When the engine starts, slight "click" noise may be heard from engine compartment. This is normal and is part of system operation check.	Normal
TCS operation (SLIP indicator lamp ON)	TCS may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when downshifting, or when fully depressing accelerator pedal.	Normal Cancel the VDC/TCS function for the inspection on a chassis dynamometer.
	For inspection of speedometer or other instruments, press VDC OFF SW to turn VDC/TCS function off.	
	When accelerator pedal is depressed on a chassis dynamometer (fixed front-wheel type), vehicle speed will not increase. This is not normal. It is result of TCS being activated by stationary front wheels. Warning lamp may also illuminate to indicate "sensor system error". This is also normal, and is the result of the stationary front wheels being detected. To be certain, restart engine, and drive vehicle at 30 km/h (19MPH) or above. Check that warning lamp does not illuminate.	
ABS operation (Longer stopping distance)	On roads with low friction coefficients, such as snowy roads or gravel roads, vehicles with ABS may require a longer stopping distance. Therefore, when driving on such roads, avoid overconfidence and keep speed sufficiently low.	Normal
Insufficient feeling of acceleration	Depending on road conditions, driver may feel that feeling of acceleration is insufficient. This is because traction control, which controls engine and brakes to achieve optimal traction, has the highest priority (for safety). As a result, there may be times when acceleration is slightly less than usual for the same accelerator pedal operation.	Normal

# TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

## ON and OFF Timing for ABS Warning Lamp, VDC OFF Indicator Lamp, and SLIP Indicator Lamp

×: ON    -: OFF

Condition	ABS warning lamp	VDC OFF indicator lamp	SLIP indicator lamp	Remarks
Ignition SW OFF	-	-	-	—
For Approx. 1 seconds after ignition SW is turned ON	×	×	×	—
Approx. 1 seconds after ignition switch ON	-	-	-	Turns OFF 2 seconds after engine starts.
VDC OFF SW is turned ON. (VDC function is OFF.)	-	×	-	—
There is a VDC/TCS/ABS error.	×	×	×	—
	×	×	-	There is a VDC/TCS/ABS control unit error. (Power or ground malfunction)
When VDC/TCS is not functioning normally.	-	×	×	—

A

B

C

D

E

**BRC**

G

H

I

J

K

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M

**Basic Inspection****BASIC INSPECTION 1 BRAKE FLUID AMOUNT, LEAKS, AND BRAKE PADS INSPECTION**

1. Check fluid level in the brake reservoir tank. If fluid level is low, refill brake fluid.
2. Check the brake piping and around VDC actuator for leaks. If there is leaking or oozing fluid, check the following items.
  - If VDC actuator connection is loose, tighten the piping to the specified torque and re-conduct the leak inspection to make sure there are no leaks.
  - If there is damage to the connection flare nut or VDC actuator screw, replace the damaged part and re-conduct the leak inspection to make sure there are no leaks.
  - When there is fluid leaking or oozing from a part other than VDC actuator connection, if fluid is just oozing out, use a clean cloth to wipe off the oozing fluid and re-check for leaks. If fluid is still oozing out, replace the damaged part.
  - When there is fluid leaking or oozing at VDC actuator, if fluid is just oozing out, use a clean cloth to wipe off the oozing fluid and re-check for leaks. If fluid is still oozing out, replace TCS/ABS actuator body.

**CAUTION:**

**ABS actuator body cannot be disassembled.**

3. Check the brake pad degree of wear. Refer to [BR-23, "PAD WEAR INSPECTION"](#) (CLZ25VD TYPE), [BR-30, "PAD WEAR INSPECTION"](#) (OPB27VA TYPE) in "Front Disc Brake" and [BR-37, "PAD WEAR INSPECTION"](#) (AD14VE TYPE), [BR-43, "PAD WEAR INSPECTION"](#) (OPB13VB TYPE) in "Rear Disc Brake".

**BASIC INSPECTION 2 POWER SYSTEM TERMINAL LOOSENESS AND BATTERY INSPECTION**

Make sure battery positive cable, negative cable and ground connection are not loose. In addition, check the battery voltage to make sure it has not dropped.

**BASIC INSPECTION 3 ABS WARNING LAMP, VDC OFF INDICATOR LAMP, SLIP INDICATOR LAMP INSPECTION**

1. Make sure ABS warning lamp, VDC OFF indicator lamp (when VDC OFF switch is OFF), and SLIP indicator lamp turns ON when the ignition switch is turned ON. If they do not, check VDC OFF indicator lamp and then VDC OFF switch. Refer to [BRC-54, "VDC OFF SWITCH"](#). Check CAN communications. Refer to "CAN Communication Inspection". If there are no errors with VDC OFF switch and CAN communication system, check combination meter. Refer to [DI-4, "COMBINATION METERS"](#).
2. Make sure the lamp turns off after the ignition switch is turned on. If the lamp does not turn off, conduct self-diagnosis.
3. With the engine running, make sure VDC OFF indicator lamp turns on and off when VDC OFF switch is turned on and off. If the indicator lamp status does not correspond to switch operation, check the VDC OFF switch system. Refer to [BRC-54, "VDC OFF SWITCH"](#).
4. Make sure ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp turn off 2 seconds after engine is started. If ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp have not turned off 10 seconds after engine has been started, conduct self-diagnosis of ABS actuator and electric unit.
5. After conducting the self-diagnosis, be sure to erase the error memory. Refer to [BRC-25, "Operation Procedure"](#).

**Inspection 1 Wheel Sensor System**

AFS001L4

**INSPECTION PROCEDURE**

After using the CONSULT-II SELF-DIAG RESULTS to determine the location of the malfunctioning wheel sensor, check all areas to determine the component to be replaced.

**CAUTION:**

- Do not measure the resistance value and also voltage between sensor terminal with tester etc., because sensor is an active sensor.
- Do not expand terminal of connector with a/the tester terminal stick, when it does the inspection with tester.

**1. TIRE INSPECTION**

Check air pressure, wear, and size.

Are air pressure, wear, and size within the standard values?

YES >> GO TO 2.

NO >> Adjust air pressure, or replace tire.

**2. SENSOR AND SENSOR ROTOR INSPECTION**

- Check the condition of the sensor mount (for looseness, etc.).
- Check the surface of front sensor rotor rubber for damage.
- Check rear sensor rotor for damage.

OK or NG

OK >> GO TO 3.

NG >> Repair the sensor mount or replace sensor rotor.

**3. SELF-DIAGNOSIS RESULT CHECK**

Check self-diagnosis results.

Self-diagnosis results
FR RH SENSOR-1,-2
FR LH SENSOR- 1,-2
RR RH SENSOR-1,-2
RR LH SENSOR-1,- 2

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 4.

NO >> Inspection End

**4. CONNECTOR INSPECTION**

1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector and the malfunctioning wheel sensor connector E42 (FR - LH), E27 (FR - RH) or B113 (RR - RH, LH). Check terminal to see if it is deformed, disconnected, loose, etc., and replace it if any non-standard condition is found.
2. Reconnect the connectors, drive at a speed of approximately 30 km/h (19 MPH) for approximately 1minute, and conduct self-diagnosis.

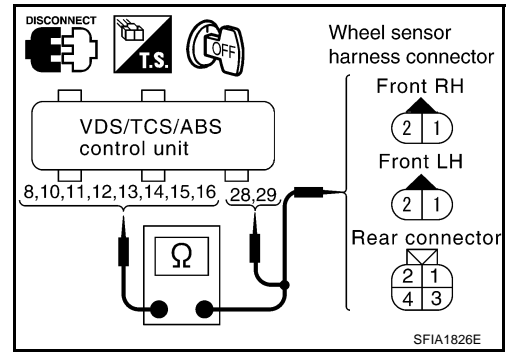
OK or NG

OK >> Connector terminal contact is loose, damaged, open or shorted.

NG >> GO TO 5.

**5. WHEEL SENSOR HARNESS INSPECTION**

1. Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E42 (FR - LH), E27 (FR - RH) or B113 (RR - RH, LH) and VDC/TCS/ABS control unit connector.
2. Check the continuity between terminals. (Also check the continuity when the steering wheel is turned right and left and when the sensor harness inside the wheel well is moved.)



Wheel	Power system		Signal system		Ground system	
	VDC/TCS/ABS control unit (harness connector E118)	Wheel sensor (harness connector)	VDC/TCS/ABS control unit (harness connector E118)	Wheel sensor (harness connector)	VDC/TCS/ABS control unit (harness connector E118) (signal)	VDC/TCS/ABS control unit (harness connector E118) (ground)
Front RH (E27)	16 (B)	1 (B)	15 (W)	2 (W)	15 (W), 16 (B)	28 (B), 29 (B)
Front LH (E42)	10 (G)	1 (G)	8 (G/Y)	2 (G/Y)	8 (G/Y), 10 (G)	
Rear RH (B113)	12 (BR)	1 (BR)	11 (B/R)	2 (B/R)	11 (B/R), 12 (BR)	
Rear LH (B113)	14 (OR)	3 (OR)	13 (P)	4 (PU)	13 (P), 14 (OR)	

- Power system** : Continuity should exist.
- Signal system** : Continuity should exist.
- Ground system** : Continuity should not exist.

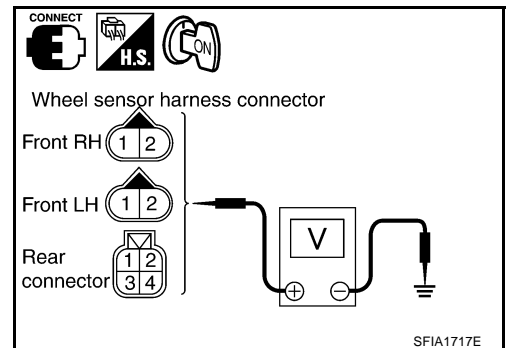
OK or NG

- OK >> GO TO 6.
- NG >> Repair harness and connector between VDC/TCS/ABS control unit and wheel sensor.

**6. CHECKING WHEEL SENSOR POWER SUPPLY**

1. Connect VDC/TCS/ABS control unit connector.
2. Turn ignition switch ON and check the voltage between Wheel sensor harness connector E42 terminal 1 (G), E27 terminal 1 (B), B113 terminal 1 (BR) or 3 (OR) and body ground.

**Voltage** : 8V or more



OK or NG

- OK >> Replace wheel sensor.
- NG >> Replace VDC/TCS/ABS control unit.

**Inspection 2 Engine System**

AFS001L5

## INSPECTION PROCEDURE

**1. SELF-DIAGNOSIS RESULT CHECK**

Check self-diagnosis results.

Self-diagnosis results

ENGINE SIGNAL 1

ENGINE SIGNAL 2

ENGINE SIGNAL 3

ENGINE SIGNAL 4

ENGINE SIGNAL 5

ENGINE SIGNAL 6

Is the above displayed in the self-diagnosis display items?

YES &gt;&gt; GO TO 2.

NO &gt;&gt; Inspection End

**2. ENGINE SYSTEM INSPECTION**

1. Conduct an ECM self-diagnosis and repair or replace any non-standard items. Re-conduct the ECM self-diagnosis.
2. Re-conduct the VDC/TCS/ABS control unit self-diagnosis.

OK or NG

OK &gt;&gt; Inspection End

NG &gt;&gt; Repair or replace any non-standard items. Re-conduct the self-diagnosis.

**Inspection 3 VDC/TCS/ABS Control Unit 1**

AFS001L6

## INSPECTION PROCEDURE

**1. SELF-DIAGNOSIS RESULT CHECK**

Check self-diagnosis results.

Self-diagnosis results

ABS CONTROLLER

Is the above displayed in the self-diagnosis display items?

YES &gt;&gt; Replace VDC/TCS/ABS control unit. Re-conduct the self-diagnosis.

NO &gt;&gt; Inspection End

**Inspection 4 Pressure Sensor System**

AFS001L7

## INSPECTION PROCEDURE

**1. SELF-DIAGNOSIS RESULT CHECK**

Check self-diagnosis results.

Self-diagnosis results

PRESS SEN SYSTEM

Is the above displayed in the self-diagnosis display items?

YES &gt;&gt; GO TO 2.

NO &gt;&gt; Inspection End

**2. CONNECTOR INSPECTION**

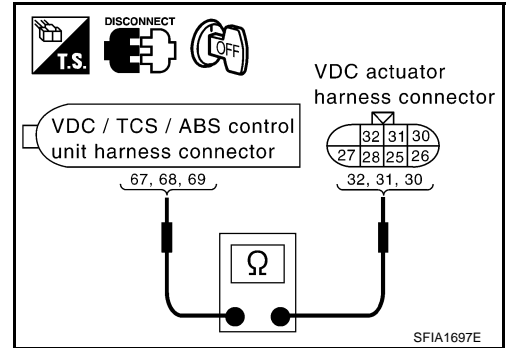
1. Turn ignition switch OFF and disconnect VDC actuator (pressure sensor) connector E50 and VDC/TCS/ABS control unit connector, check terminals for deformation, disconnection, looseness, and so on. If there is an error, repair or replace terminal.
2. Reconnect the connectors and Re-conduct VDC/TCS/ABS control unit self-diagnosis.

OK or NG

- OK >> The connector terminal contact is loose, damaged, open or shorted.
- NG >> GO TO 3.

**3. PRESSURE SENSOR HARNESS INSPECTION**

1. Turn ignition switch OFF and disconnect VDC actuator (pressure sensor) connector E50 and VDC/TCS/ABS control unit connector.
2. Check the continuity between VDC/TCS/ABS control unit harness connector E118 and VDC actuator (pressure sensor) harness connector E50.



VDC/TCS/ABS control unit (Harness connector E118)	VDC actuator (pressure sensor) (Harness connector E50)	Continuity
69 (P/B)	30 (P/B)	Continuity should exist.
68 (SB)	31 (SB)	
67 (G/B)	32 (G/B)	

OK or NG

- OK >> GO TO 4.
- NG >> If the open or short in harness, repair or replace harness.

**4. PRESSURE SENSOR INSPECTION**

1. Connect VDC actuator (pressure sensor) connector E50 and VDC/TCS/ABS control unit connector.
2. Use "Data Monitor" to check the pressure sensor value.

Condition	Data monitor display
When brake pedal is depressed.	Positive value
When brake pedal is released.	Approx. 0 bar

OK or NG

- OK >> Perform VDC/TCS/ABS control unit self-diagnosis again.
- NG >> If pressure sensor is damaged or malfunctioning, replace VDC actuator (pressure sensor it built in).



**Inspection 5 Steering Angle Sensor System**

INSPECTION PROCEDURE

**1. SELF-DIAGNOSIS RESULT CHECK**

Check self-diagnosis results.

Self-diagnosis results
Steering angle sensor system

Is the above displayed in the self-diagnosis item?

- YES >> GO TO 2.
- NO >> Inspection End

**2. CONNECTOR INSPECTION**

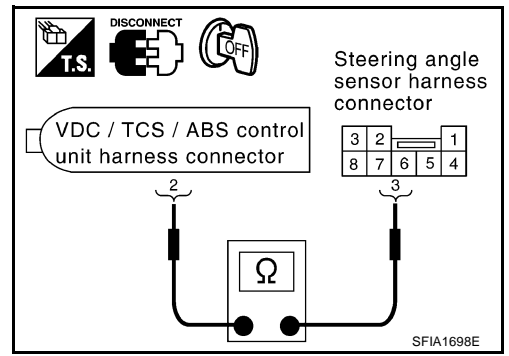
1. Disconnect the steering angle sensor connector and VDC/TCS/ABS control unit connector and check the terminals for deformation, disconnection, looseness, and so on. If there is an error, repair or replace the terminal.
2. Reconnect the connectors and Re-conduct a VDC/TCS/ABS control unit self-diagnosis.

OK or NG

- OK >> The connector terminal contact is loose, damaged, open or shorted.
- NG >> GO TO 3.

**3. STEERING ANGLE SENSOR HARNESS INSPECTION**

1. Check the CAN communication system. Refer to [BRC-53, "Inspection 14 CAN Communication System"](#) .
2. Turn off the ignition switch and disconnect the steering angle sensor connector and VDC/TCS/ABS control unit connector.
3. Check the continuity between VDC/TCS/ABS control unit harness connector E118 terminal 2 (Y) and steering angle sensor harness connector M22 terminal 3 (Y/R).



VDC/TCS/ABS control unit (Harness connector E118)	Steering angle sensor (Harness connector M22)	Continuity
2 (Y)	3 (Y/R)	Continuity should exist.

OK or NG

- OK >> GO TO 4.
- NG >> If the open or short in harness, repair or replace the harness.

## 4. DATA MONITOR CHECK

1. Connect the steering angle sensor and VDC/TCS/ABS control unit connectors.
2. Conduct "Data Monitor" of the "STEERING ANGLE SIGNAL" to check if the status is normal.

Steering condition	Data monitor
Straight-ahead	-5deg - +5deg
Turn wheel to the right by 90°.	Approx. + 90deg
Turn wheel to the left by 90°.	Approx. -90deg

### OK or NG

- OK >> Re-conduct the VDC/TCS/ABS control unit self-diagnosis.  
 NG >> Replace spiral cable (steering angle sensor) and adjust neutral position of steering angle sensor.  
 Refer to [BRC-6, "Adjustment of Steering Angle Sensor Neutral Position"](#).

## Inspection 6 Yaw Rate / Side G Sensor System

AFS001L9

### CAUTION:

Sudden turns (such as spin turns, acceleration turns), drifting, etc. When VDC function is OFF (VDC SW ON) may cause the yaw rate/side G - sensor system indicate a problem. However this is not a problem if normal operation can be resumed after restarting the engine.

### INSPECTION PROCEDURE

#### 1. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
YAW RATE SENSOR
SIDE SENSOR

### CAUTION:

When on a turntable, such as at a parking structure entrance, or when on a moving object with the engine running, the VDC OFF indicator lamp might turn on and the self-diagnosis using the CONSULT-II the yaw rate sensor system might be displayed, but in this case there is no problem with the yaw rate sensor system. As soon as the vehicle leaves the turntable or moving object, restart the engine to return the system to normal. And after doing spin turns or acceleration turns with VDC "OFF" (VDC OFF switch "ON"), too, the results will return to a normal state by re-starting vehicle.

Is the above displayed in the self-diagnosis display items?

- YES >> GO TO 2.  
 NO >> Inspection End

#### 2. CONNECTOR INSPECTION

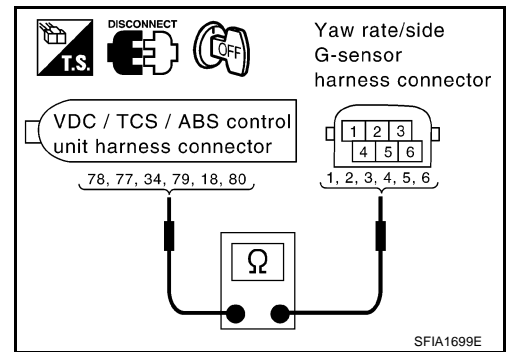
1. Turn ignition switch OFF and disconnect yaw rate/side G sensor connector and VDC/TCS/ABS control unit connector and check the terminals for deformation, disconnection, looseness, and so on. If there is an error, repair or replace the terminal.
2. Reconnect the connectors and Re-conduct a VDC/TCS/ABS control unit self-diagnosis.

### OK or NG

- OK >> The connector terminal contact is loose, damaged, open or shorted.  
 NG >> GO TO 3.

## 3. YAW RATE/SIDE G SENSOR HARNESS INSPECTION

1. Turn ignition switch OFF and disconnect yaw rate/side G sensor connector and VDC/TCS/ABS control unit connector.
2. Check the continuity between the VDC/TCS/ABS control unit harness connector E118 and the yaw rate/side G sensor harness connector M51.



VDC/TCS/ABS control unit (Harness connector E118)	Yaw rate/side G sensor (Harness connector M51)	Continuity
78 (L/B)	1 (L/B)	<b>Continuity should exist.</b>
77 (Y/B)	2 (Y/B)	
34 (OR)	3 (OR)	
79 (PU/W)	4 (LG/R)	
18 (LG)	5 (LG)	
80 (W/R)	6 (W/R)	

OK or NG

OK >> GO TO 4.

NG >> If the open or short in harness, repair or replace the harness.

## 4. YAW RATE/SIDE G SENSOR INSPECTION

1. Connect the yaw rate/side G-sensor and VDC/TCS/ABS control unit connectors.
2. Use "Data Monitor" to check if the yaw rate/side G-sensor are normal.

Vehicle status	Yaw rate sensor (Data monitor standard)	Side G sensor (Data monitor standard)
When stopped	- 4 to +4deg/s	- 1.1 to +1.1 m/s <sup>2</sup>
Right hand turn	Negative value	Negative value
Left turn	Positive value	Positive value

OK or NG

OK >> Inspection End

NG >> Replace the malfunctioning yaw rate/side G-sensor, and then re-conduct the VDC/TCS/ABS control unit self-diagnosis.

**Inspection 7 Solenoid and VDC Change-Over Valve System**

AFS001LA

## INSPECTION PROCEDURE

**1. SELF-DIAGNOSIS RESULT CHECK**

Check self-diagnosis results.

Self-diagnosis results
FR LH IN ABS SOL
FR LH OUT ABS SOL
RR RH IN ABS SOL
RR RH OUT ABS SOL
FR RH IN ABS SOL
FR RH OUT ABS SOL
RR LH IN ABS SOL
RR LH OUT ABS SOL
Primary side USV circuit
Secondary side USV circuit
Primary side HSV circuit
Secondary side HSV circuit

Is the above displayed in the self-diagnosis display items?

- YES >> GO TO 2.  
NO >> Inspection End

**2. CONNECTOR INSPECTION**

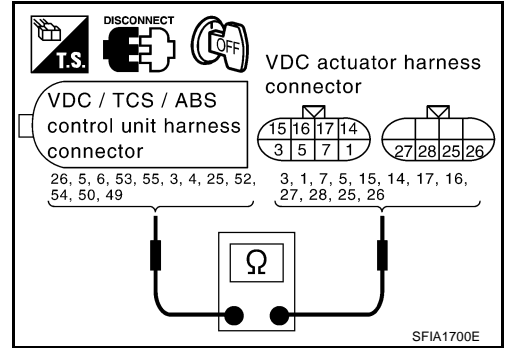
1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector and solenoid connector E49 and E50 and check the terminals for deformation, disconnection, looseness, and so on. If there is an error, repair or replace terminal.
2. Securely reconnect the connectors and conduct self-diagnosis.

OK or NG

- OK >> The connector terminal contact is loose, damaged, open or shorted.  
NG >> GO TO 3.

## 3. CHECKING SOLENOID HARNESS

1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector and VDC actuator connector E49 and E50.
2. Check continuity between VDC/TCS/ABS control unit harness connector E118 and VDC actuator harness connector E49 and E50.



VDC/TCS/ABS control unit (Harness connector E118)	VDC actuator (Harness connector E49 and E50)	Continuity
26 (W/G)	3 (W/G)	Continuity should exist.
5 (G/OR)	1 (G/OR)	
6 (PU/W)	7 (PU/W)	
53 (P)	5 (P)	
55 (R/Y)	15 (R/Y)	
3 (Y/G)	14 (Y/G)	
4 (GY/R)	17 (GY/R)	
25 (LG)	16 (LG)	
52 (PU)	27 (PU)	
54 (W/L)	28 (W/L)	
50 (GY/L)	25 (GY/L)	
49 (B/W)	26 (B/W)	

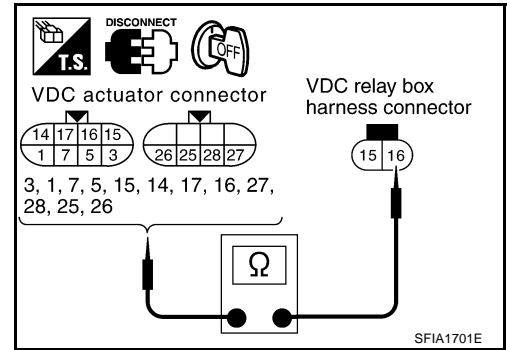
OK or NG

OK >> GO TO 4.

NG >> Open or short in harness between VDC/TCS/ABS control unit and VDC actuator

## 4. CHECKING ACTUATOR SOLENOID

1. Turn ignition switch OFF and disconnect VDC relay box connector E222 and VDC actuator connector E49 and E50.
2. Check resistance of VDC actuator solenoid.



VDC actuator (Actuator side connector)	VDC relay box (Harness connector E222)	Resistance value
7	16	6.0 - 11 Ω
3	16	6.0 - 11 Ω
5	16	6.0 - 11 Ω
1	16	6.0 - 11 Ω
17	16	3.0 - 5.0 Ω
15	16	3.0 - 5.0 Ω
16	16	3.0 - 5.0 Ω
14	16	3.0 - 5.0 Ω
27	16	3.0 - 5.0 Ω
28	16	3.0 - 5.0 Ω
25	16	6.0 - 11 Ω
26	16	6.0 - 11 Ω

**OK or NG**

- OK >> Perform VDC/TCS/ABS control unit self-diagnosis again.  
 NO >> Replace VDC actuator assembly.

**Inspection 8 ABS Motor and Motor Relay System**

INSPECTION PROCEDURE

**1. SELF-DIAGNOSIS RESULT CHECK**

Check self-diagnosis results.

Self-diagnosis results
Pump motor, motor relay system

Is the above displayed in the self-diagnosis display items?

- YES >> GO TO 2.
- NO >> Inspection End

**2. CONNECTOR INSPECTION**

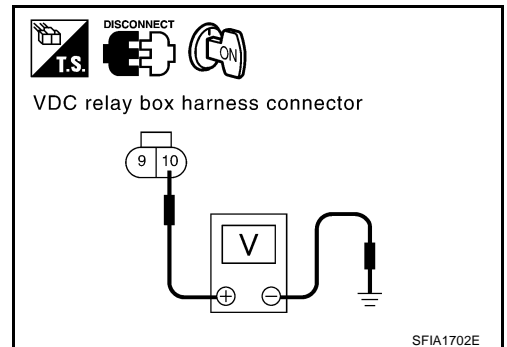
1. Turn ignition switch OFF and disconnect VDC relay box connector E47, E48, E222 and VDC/TCS/ABS control unit connector and check the terminals for deformation, disconnection, looseness, and so on. If there is an error, repair or replace terminal.
2. Securely reconnect the connectors and conduct self-diagnosis.

OK or NG

- OK >> The connector terminal contact is loose, damaged, open or shorted.
- NG >> GO TO 3.

**3. ABS MOTOR AND MOTOR RELAY POWER SYSTEM INSPECTION**

1. Disconnect VDC relay box connector E48.
2. Turn ignition switch ON and check the voltage between VDC relay box harness connector E48 terminal 10(W/R) and the ground.



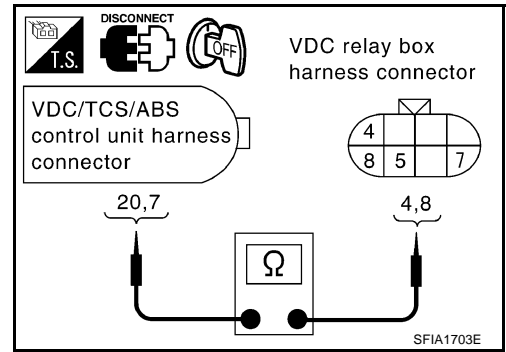
VDC relay box (Harness connector E48)	Body ground	Voltage
10 (W/R)	—	Battery voltage (approx. 12V)

OK or NG

- OK >> GO TO 4.
- NG >> The circuit between battery and VDC relay box terminal 10 (W/R) is open or shorted. Repair the circuit.

**4. ABS MOTOR AND MOTOR RELAY HARNESS INSPECTION**

1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector and VDC relay box connector E47.
2. Check the continuity between VDC/TCS/ABS control unit harness connector E118 and VDC relay box harness connector E47.

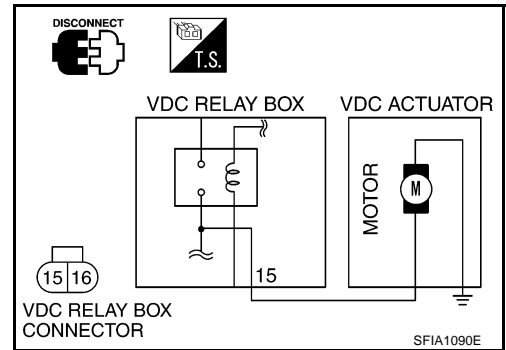


VDC/TCS/ABS control unit (Harness connector E118)	VDC relay box (Harness connector E47)	Continuity
20 (R/B)	4 (R/B)	Continuity should exist.
7 (G/W)	8 (G/W)	

3. Check if the actuator motor operates when a 12V voltage is applied to VDC relay box connector E222 terminal 15.

**CAUTION:**

Operate actuator motor for 4 seconds or less to prevent heat generation.



OK or NG

OK >> GO TO 5.

NG >> Actuator motor or actuator motor circuit open or short in harness. Repair or replace actuator motor or actuator motor circuit harness.

**5. ABS MOTOR RELAY INSPECTION**

ABS motor relay independent inspection. Refer to [BRC-55, "VDC RELAY BOX"](#).

OK or NG

OK >> Replace VDC actuator assembly.

NG >> Replace VDC relay box.



**Inspection 9 Solenoid Valve Relay System**

INSPECTION PROCEDURE

**1. SELF-DIAGNOSIS RESULT CHECK**

Check self-diagnosis results.

Self-diagnosis results
MAIN RELAY

Is the above displayed in the self-diagnosis display items?

- YES >> GO TO 2.
- NO >> Inspection End

**2. CONNECTOR INSPECTION**

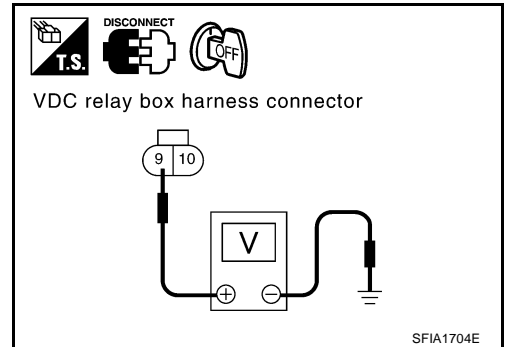
1. Disconnect VDC relay box connector E47, E48, E222 and VDC/TCS/ABS control unit connector and check terminals for deformation, disconnection, looseness, and so on. If there is an error, repair or replace terminal.
2. Securely reconnect the connectors and Re-conduct self-diagnosis.

OK or NG

- OK >> The connector terminal contact is loose, damaged, open or shorted.
- NG >> GO TO 3.

**3. SOLENOID VALVE RELAY POWER SYSTEM INSPECTION**

1. Turn ignition switch OFF and disconnect VDC relay box connector E48.
2. Turn ignition switch ON and check the voltage between VDC relay box harness connector E48 terminal 9 (R/B) and ground.



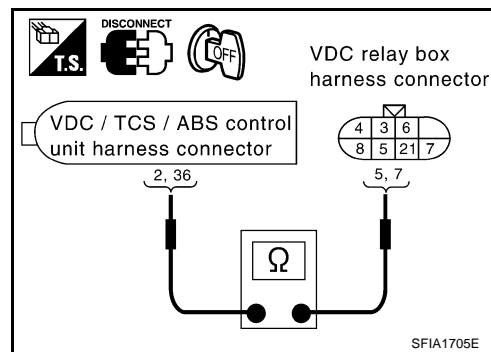
VDC relay box (Harness Connector E48)	Body ground	Voltage
9 (R/B)	—	Battery voltage (approx. 12V)

OK or NG

- OK >> GO TO 4.
- NG >> The circuit between battery and relay unit terminal 9 (R/B) is open or shorted. Repair the circuit.

### 4. SOLENOID VALVE RELAY HARNESS INSPECTION

1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector and VDC relay box connector E47 and steering angle sensor connector.
2. Check the continuity between VDC/TCS/ABS control unit connector E118 and VDC relay box connector E47.



VDC/TCS/ABS control unit (Harness connector E118)	VDC relay box (Harness connector E47)	Continuity
2 (Y)	5 (Y)	<b>Continuity should exist.</b>
36 (L/Y)	7 (L/Y)	

OK or NG

- OK >> GO TO 5.
- NG >> Open or short in harness. Repair or replace harness.

### 5. SOLENOID VALVE RELAY INSPECTION

Independently check solenoid valve relay. Refer to [BRC-55, "VDC RELAY BOX"](#) .

OK or NG

- OK >> Replace VDC actuator assembly.
- NG >> Replace VDC relay box.

## Inspection 10 Stop Lamp Switch System

AFS001LD

### INSPECTION PROCEDURE

#### 1. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
STOP LAMP SW

Is the above displayed in the self-diagnosis display items?

- YES >> GO TO 2.
- NO >> Inspection End

#### 2. CONNECTOR INSPECTION

1. Disconnect stop lamp switch connector and VDC/TCS/ABS control unit connector and check terminals for deformation, disconnection, looseness, and so on. If there is an error, repair or replace terminal.
2. Securely reconnect connectors.
3. Start engine.
4. Repeat pumping brake pedal carefully several times, then perform self-diagnosis again.

OK or NG

- OK >> Connector terminal contact is loose, damaged, open or shorted.
- NG >> GO TO 3.

**3. STOP LAMP SWITCH INSPECTION**

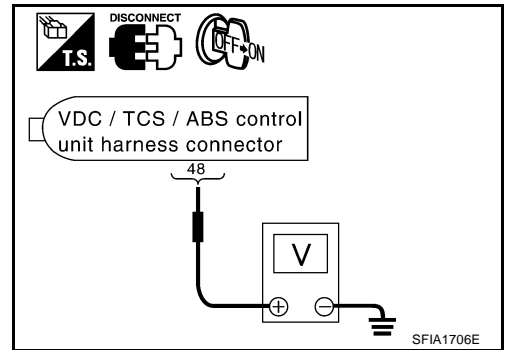
1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector.
2. Turn ignition switch ON and check the voltage between VDC/TCS/ABS control unit harness connector E118 terminal 48 (P/L) and ground.

**48 (P/L) - Ground**

**Brake pedal depressed:**

**Battery voltage (approx. 12V)**

**Brake pedal not depressed : Approx. 0V**



OK or NG

- OK >> Connect connectors and conduct a VDC/TCS/ABS control unit self-diagnosis.
- NG >> Open or short in harness. Repair or replace harness.

**Inspection 11 VDC/TCS/ABS Control Unit Power and Ground Systems**

AFS001LE

BRC

INSPECTION PROCEDURE

**1. SELF-DIAGNOSIS RESULT CHECK**

Check self-diagnosis results.

Self-diagnosis results
LOW POWER VOLTAGE

Is the above displayed in the self-diagnosis item?

- YES >> GO TO 2.
- NO >> Inspection End

**2. CONNECTOR INSPECTION**

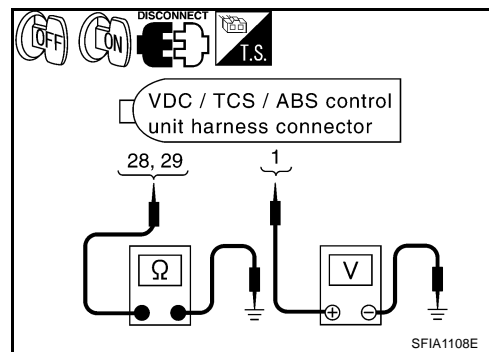
1. Disconnect VDC/TCS/ABS control unit connector and check terminal for deformation, disconnection, looseness, and so on. If there is an error, repair or replace terminal.
2. Securely reconnect connector and Re-conduct self-diagnosis.

OK or NG

- OK >> Connector terminal contact is loose, damaged, open or shorted.
- NG >> GO TO 3.

### 3. VDC/TCS/ABS CONTROL UNIT POWER AND GROUND CIRCUIT INSPECTION

1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector.
2. With the ignition switch turned on and off, check the voltage and continuity between VDC/TCS/ABS control unit harness connector E118 and ground.



Signal name	VDC/TCS/ABS control unit (Harness connector E118)	Ground	Measured value
Power supply	1 (G/R)	—	Battery voltage (Approx. 12V)
Ground	28 (B)	—	Continuity should exist.
	29 (B)	—	Continuity should exist.

OK or NG

- OK >> Check battery (terminal looseness, low voltage, etc.) For any non-standard condition. If any non-standard condition exists, recharge or replace battery as necessary.
- NG >> The corresponding harness circuit is open or shorted. Repair the circuit.

### Inspection 12 VDC/TCS/ABS Control Unit 2

AFS001LF

#### INSPECTION PROCEDURE

#### 1. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
EMERGENCY BRAKE

When any item other than “emergency brake” is indicated in self-diagnosis display, follow the instructions below.

#### **CAUTION:**

**“Emergency brake” is indicated when control unit itself is detected as an error. If this display item is indicated, replace control unit.**

Is the above displayed in the self-diagnosis display items?

- YES >> Replace VDC/TCS/ABS control unit and re-conduct the self-diagnosis.
- NO >> Inspection End

### Inspection 13 Brake Fluid Level Sensor System

AFS001LG

#### INSPECTION PROCEDURE

#### 1. SELF-DIAGNOSIS RESULT CHECK

1. Check the brake reservoir tank fluid level. If the level is low, add brake fluid.
2. Erase the self-diagnosis results and check the self-diagnosis results.

Self-diagnosis results

BRAKE FLUID LEVEL LOW

Is the above displayed in the self-diagnosis display items?

- YES >> GO TO 2.  
 NO >> Inspection End

#### 2. CONNECTOR INSPECTION

1. Disconnect brake fluid level sensor connector and VDC/TCS/ABS control unit connector and check terminal for deformation, disconnection, looseness, and so on. If there is any non-standard condition, repair or replace terminal.
2. Securely reconnect connectors and Re-conduct self-diagnosis.

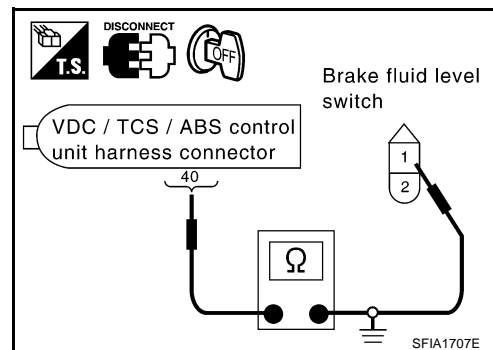
OK or NG

- OK >> The connector terminal contact is loose, damaged, open or shorted.  
 NG >> GO TO 3.

#### 3. CHECK HARNESS BETWEEN BRAKE FLUID LEVEL SENSOR AND VDC/TCS/ABS CONTROL UNIT

1. Turn ignition switch OFF and disconnect brake fluid level sensor connector and VDC/TCS/ABS control unit connectors.
2. Check the continuity between brake fluid level sensor harness connector E44 and VDC/TCS/ABS control unit connector E118.

VDC/TCS/ABS control unit (Harness connector E118)	Brake fluid level sensor (Harness connector E44)	Continuity
40 (W)	1 (W)	Continuity should exist.
40 (W)	Ground	Continuity should not exist.
Ground	2 (B)	continuity should exist.



OK or NG

- OK >> Connect connectors and conduct a VDC/TCS/ABS control unit self-diagnosis.  
 NG >> If the open or short in harness, repair or replace harness.

### Inspection 14 CAN Communication System

AFS001LH

#### INSPECTION PROCEDURE

#### 1. CHECK CONNECTOR

1. Turn ignition switch OFF, disconnect the VDC/TCS/ABS control unit connector, and check the terminal for deformation, disconnection, looseness, and so on. If there is a malfunction, repair or replace the terminal.
2. Reconnect connector to perform self-diagnosis.

Is "CAN COMM CIRCUIT" displayed in the self-diagnosis display items?

- YES >> Print out the self-diagnostic results, and refer to [LAN-2, "Precautions When Using CONSULT-II"](#) .  
 NO >> Connector terminal connection is loose, damaged, open, or shorted.

**Inspection 15 When “SHIFT POSITION ERROR” Appears in Self-Diagnosis Results Display (For A/T Models)**

AFS001LI

Inspection Procedure

**1. CHECKING SELF-DIAGNOSIS RESULTS**

Check self-diagnosis results.

Self-diagnosis results
Shift position error

Does “SHIFT POSITION ERROR” appear in self-diagnosis results display?

- YES >> GO TO 2.
- NO >> Inspection is completed.

**2. DATA MONITOR CHECK**

1. Connect CONSULT-II. Start engine.
2. In “DATA MONITOR” select “ITEM MENU” and then check P position.

Selector lever position	SLCT LVR POSI (data monitor)
P position	P
R position.	R
D position	D

OK or NG

- OK >> Perform VDC/TCS/ABS control unit self-diagnosis again.
- NG >> GO TO 3.

**3. CHECKING A/T PNP SWITCH**

Perform the A/T PNP switch inspection. Refer to [AT-111, "DTC P0705 PARK/NEUTRAL POSITION SWITCH"](#)

Do any self-diagnosis items appear?

- YES >> Repair the indicated items and perform VDC/TCS/ABS control unit self-diagnosis again.
- NO >> Perform VDC/TCS/ABS control unit self-diagnosis again.

**Inspecting Components**

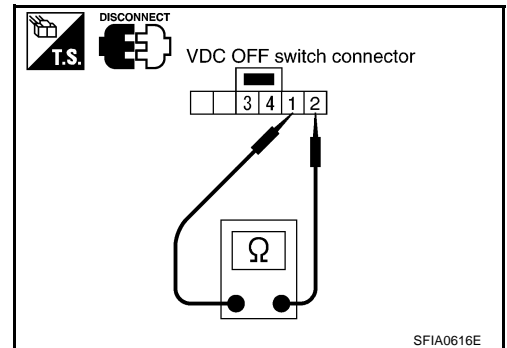
**VDC OFF SWITCH**

AFS0014C

- Disconnect VDC OFF switch connector M9. Check continuity between terminal No. 1 and terminal No. 2.

**No. 1 to No. 2:**

**Pressing the switch will establish continuity, releasing it will break continuity.**



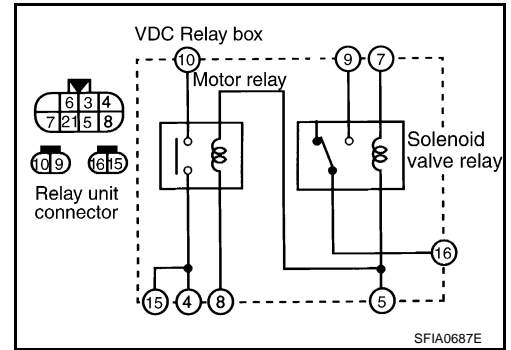
SFIA0616E

# TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

## VDC RELAY BOX

Disconnect VDC relay box connector E47, E48 and E222. Check continuity, resistance value, and insulation between any pair of terminals in VDC relay box.



## Continuity, Resistance

Item	VDC relay box								Condition		
	16	2	4	1	9	4	15	10		5	7
Solenoid valve relay	○ — x — ○							Open (0V) ○ — ○			Between terminal No. 5 and No. 7 Open (0V)
	○ — 12V — ○							○ — 12V — ○			Between terminal No. 5 and No. 7 Add 12V
Motor relay	○ — ○										—
	○ — x — ○							Open (0V) ○ — ○			Between terminal No. 5 and No. 8 Open (0V)
	○ — 12V — ○							○ — 12V — ○			Between terminal No. 5 and No. 8 Add 12V
Relay coil								Approx. 100 Ω ○ — Ω — ○ Approx. 80 Ω ○ — Ω — ○			—

○ — ○ : Conductivity      ○ — ○ : Open between terminals (0V)      Approx. 100 Ω  
 ○ — x — ○ : Not conductivity      ○ — 12V — ○ : Add 12V between terminals      ○ — Ω — ○ : Resistance between terminals is 100 Ω

SFIA0582E

## VDC ACTUATOR

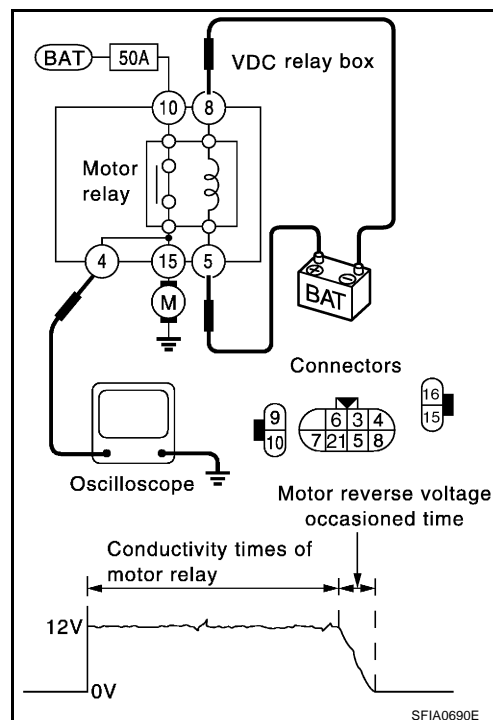
### Actuator Operation Inspection

- Turn ignition switch ON, apply a voltage of 12V between relay box terminal 5 and 8, use an oscilloscope to measure the motor voltage at this time (between terminal 15 and ground), and check the motor reverse voltage occurrence time when operation is stopped.

**Motor counter-electromotive force duration:**  
**0.1 second or more**

**CAUTION:**

- The above check should be performed after motor relay unit inspection to make sure relay operates normally.
- To prevent overheating, do not drive actuator motor more than 4 seconds.
- The motor reverse voltage occurrence time is standard when the battery voltage is 12V and the air temperature is 20°C (68°F), and this time is a little shorter when the battery voltage is low or the air temperature is low.



## Symptom 1 Excessive ABS Function Operation Frequency

AFS0011E

### 1. INSPECTION START

Check brake force distribution.

OK or NG

- OK >> GO TO 2.
- NG >> Check brake system

### 2. FRONT AND REAR AXLE INSPECTION

Make sure there is no excessive play in the front and rear axles.

OK or NG

- OK >> GO TO 3.
- NG >> Repair.

### 3. WHEEL SENSOR INSPECTION

Wheel Sensor Inspection

- Sensor mount and damage inspection
- Sensor rotor mount and damage inspection
- Sensor connector connection inspection
- Sensor harness inspection

OK or NG

- OK >> GO TO 4.
- NG >> Sensor or sensor rotor replacement

### 4. ABS WARNING LAMP DISPLAY CHECK

Make sure the warning lamp turns off . After the ignition switch is turned on or when driving.

OK or NG

- OK >> Normal
- NG >> Perform self-diagnosis. Refer to [BRC-25, "SELF-DIAGNOSIS"](#) .



**Symptom 2 Unexpected Pedal Reaction**

AFS0011F

**1. BRAKE PEDAL STROKE INSPECTION**

Check brake pedal stroke.

Is the stroke too big?

YES >> ● Bleed air from the brake piping.

- Check the brake pedal, brake booster, and master cylinder mount for play, looseness, and brake system for fluid leaks, etc. If any malfunctions are found, make repair.

NO >> GO TO 2.

**2. PERFORMANCE CHECK**

Disconnect the VDC/TCS/ABS control unit connector E118 and make sure the braking force is sufficient when the ABS is not operating. After the inspection, reconnect the connector.

OK or NG

OK >> GO TO 3. Refer to [BRC-56, "Symptom 1 Excessive ABS Function Operation Frequency"](#) .

NG >> Check brake system.

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

**BRC**

### Symptom 3 The Braking Distance Is Long

AFS001G

**CAUTION:**

On slippery road surfaces, the stopping distance might be longer with the ABS operating than when the ABS is not operating.

#### 1. PERFORMANCE CHECK

Disconnect VDC/TCS/ABS control unit connector E118 to deactivate ABS. In this condition, check stopping distance. After inspection, connect connector.

OK or NG

- OK >> ● Bleed air from the brake piping.  
● Check brake system.

NG >> GO TO 3. Refer to [BRC-56, "Symptom 1 Excessive ABS Function Operation Frequency"](#).

### Symptom 4 The ABS Function Does Not Operate

AFS001H

**CAUTION:**

The ABS does not operate when the speed is 10 km/h (6 MPH) or less.

#### 1. ABS WARNING LAMP DISPLAY CHECK

Make sure the warning lamp turns off after the ignition switch is turned on or when driving.

OK or NG

- OK >> GO TO 3. Wheel Sensor Inspection in [BRC-56, "Symptom 1 Excessive ABS Function Operation Frequency"](#).

NG >> Perform self-diagnosis. Refer to [BRC-25, "SELF-DIAGNOSIS"](#).

**Symptom 5 Pedal Vibration or ABS Operation Sound Occurs**

AFS001II

**CAUTION:**

Under the following conditions, when brake pedal is lightly depressed (just place a foot on it), ABS is activated and vibration is felt. However, this is normal.

- When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [50 mm (1.97 in) or more]
- When pulling away just after starting engine (at approximately 10 km/h (6MPH) or higher)

**1. SYMPTOM CHECK 1**

Check if pedal vibration or operation sound occurs when the engine is started.

OK or NG

OK >> GO TO 2.

NG >> Perform self-diagnosis. Refer to [BRC-25, "SELF-DIAGNOSIS"](#).

**2. SYMPTOM CHECK 2**

Check the symptom when electrical component (headlamps, etc.) Switches are operated.

Does the symptom occur when the electrical component (head lamp, etc.) Switches are operated?

YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit (or its wiring), and if there is, move it farther away.

NO >> GO TO 3. Wheel Sensor Inspection in [BRC-56, "Symptom 1 Excessive ABS Function Operation Frequency"](#).

**Symptom 6 Vehicle Jerks During VDC/TCS/ABS Control**

AFS001IJ

**1. ENGINE SPEED SIGNAL INSPECTION**

Conduct CONSULT-II VDC/TCS/ABS control unit "Data Monitor".

Is engine speed at idle 400 rpm or higher?

YES >> GO TO 3.

NO >> GO TO 2.

**2. ECM SELF-DIAGNOSIS RESULT ITEM CHECK**

Perform ECM self-diagnosis.

Are self-diagnosis items displayed?

YES >> Check the corresponding items. Refer to [EC-71, "TROUBLE DIAGNOSIS"](#) in "Engine Control (EC section)".

NO >> GO TO 3.

**3. SYMPTOM CHECK 1**

Check if the vehicle jerks during VDC/TCS/ABS control.

OK or NG

OK >> Inspection End

NG >> ● GO TO 4 (A/T models).  
● GO TO 5 (M/T models).

**4. A/T SELF-DIAGNOSIS RESULTS ITEM CHECK**

Perform A/T self-diagnosis.

OK or NG

OK >> GO TO 5.

NG >> Check the corresponding items. Refer to [AT-42, "TROUBLE DIAGNOSIS"](#) in "A/T".

---

## 5. SYMPTOM CHECK 2

---

Check if the vehicle jerks during VDC/TCS/ABS control.

OK or NG

- OK >> Inspection End  
NG >> GO TO 6.

---

## 6. SELF-DIAGNOSIS RESULT ITEM INSPECTION 1

---

Conduct self-diagnosis of the VDC/TCS/ABS control unit.

Are self-diagnosis items displayed?

- YES >> Check the corresponding items, make repairs, and re-conduct the VDC/TCS/ABS control unit self-diagnosis.  
NO >> GO TO 7.

---

## 7. CONNECTOR INSPECTION

---

1. Disconnect the VDC/TCS/ABS control unit E118 and the ECM connectors, check the terminals for deformation, disconnection, looseness, and so on. If there is an error, repair or replace the connector.
2. Securely reconnect the connector and conduct self-diagnosis.

OK or NG

- OK >> If the connector terminal contact is loose, damaged, open or shorted, repair or replace the connector terminal.  
NG >> GO TO 8.

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## 8. SELF-DIAGNOSIS RESULT ITEM INSPECTION 2

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Re-conduct the VDC/TCS/ABS control unit self-diagnosis.

Are self-diagnosis items displayed?

- YES >> Repair or replace any non-standard items.  
NO >> GO TO 9.

---

## 9. INSPECTION OF CIRCUIT BETWEEN VDC/TCS/ABS CONTROL UNIT AND THE ECM

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Check the CAN communication system. Refer to [BRC-53, "Inspection 14 CAN Communication System"](#).

OK or NG

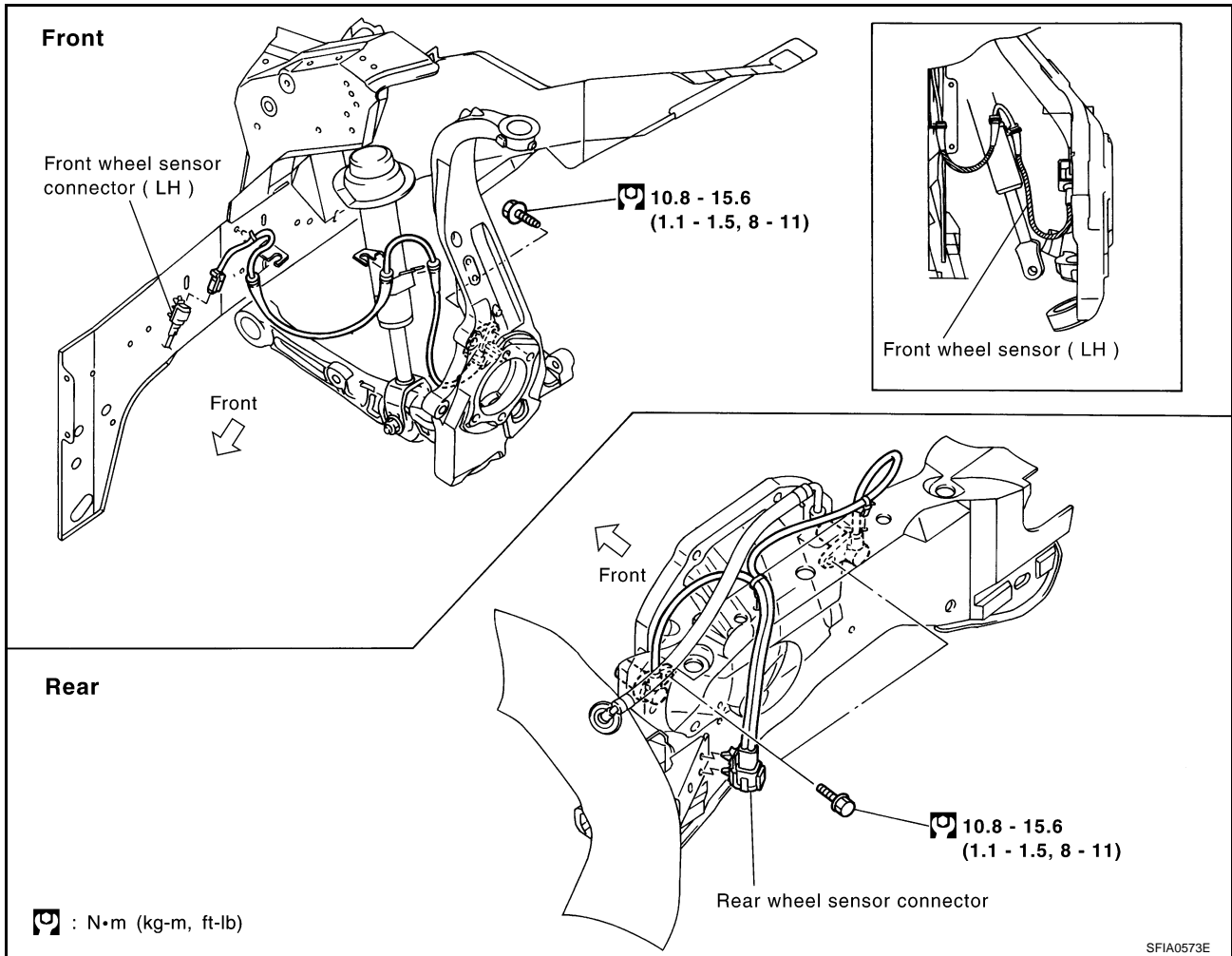
- OK >> Inspection End  
NG >> Connect the connectors, and re-conduct the VDC/TCS/ABS control unit self-diagnosis.

## WHEEL SENSORS

PFP:47910

### Removal and Installation

AFS0014L



### REMOVAL

Pay attention to the following when removing sensor.

#### CAUTION:

- As much as possible, avoid rotating sensor when removing it. Pull sensors out without pulling on sensor harness.
- Take care to avoid damaging sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to sensor wiring and loss of sensor function.

### INSTALLATION

Pay attention to the following when installing sensor. Tighten installation bolts and nuts to specified torques.

- When installing, check that there is no foreign material such as iron chips on pick-up and mounting hole of the sensor. Check that no foreign material has been caught in the sensor rotor motor. Remove any foreign material and clean the mount.
- When installing front sensor, be sure to press rubber grommets in until they lock at the three locations shown in diagram (2 at shock absorbers and 1 at body panel). When installed, harness must not be twisted. White line on harness (shaded part) must be visible from front.

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

**VDC/TCS/ABS CONTROL UNIT**

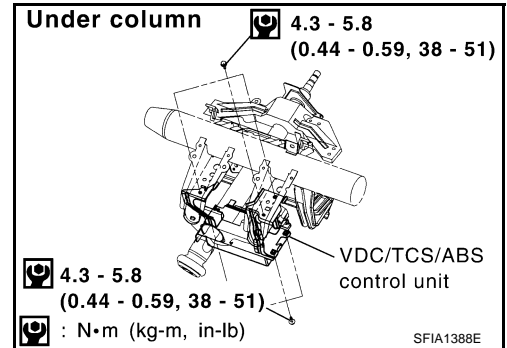
PFP:47660

**Removal and Installation**

AFS0014M

**REMOVAL**

1. Remove driver-side lower instrument panel. Refer to [IP-12, "\(C\) Instrument Lower Driver Panel"](#).
2. Remove VDC/TCS/ABS control unit.

**INSTALLATION**

Install in the reverse order of removal.

## SENSOR ROTOR

PFP:47970

### Removal and Installation

AFS00164

#### Front

Refer to [FAX-4, "FRONT WHEEL HUB AND KNUCKLE"](#) in "FAX" section.

#### Rear

- Follow procedure below to remove rear sensor rotor.
- Remove side flange. Refer to [RFD-8, "SIDE OIL SEAL"](#) in "RFD" section.
- Using a bearing replacer (suitable tool) and puller (suitable tool), remove sensor rotor from the side flange.

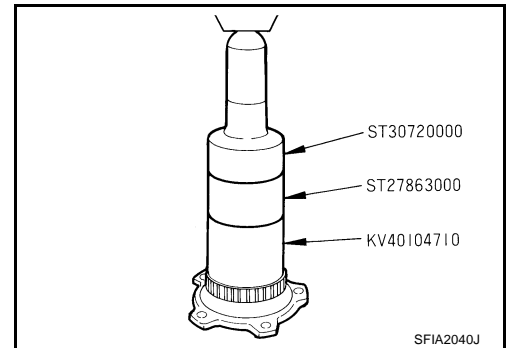
### INSTALLATION

#### Front

Refer to [FAX-4, "FRONT WHEEL HUB AND KNUCKLE"](#) in "FAX" section.

#### Rear

- Follow procedure below to install rear sensor rotor.
- Using a drift (special service tool), press rear sensor rotor onto the side flange.
- Install side flange. Refer to [RFD-8, "SIDE OIL SEAL"](#) .in "RFD" section.



A  
B  
C  
D  
E  
G  
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I  
J  
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M

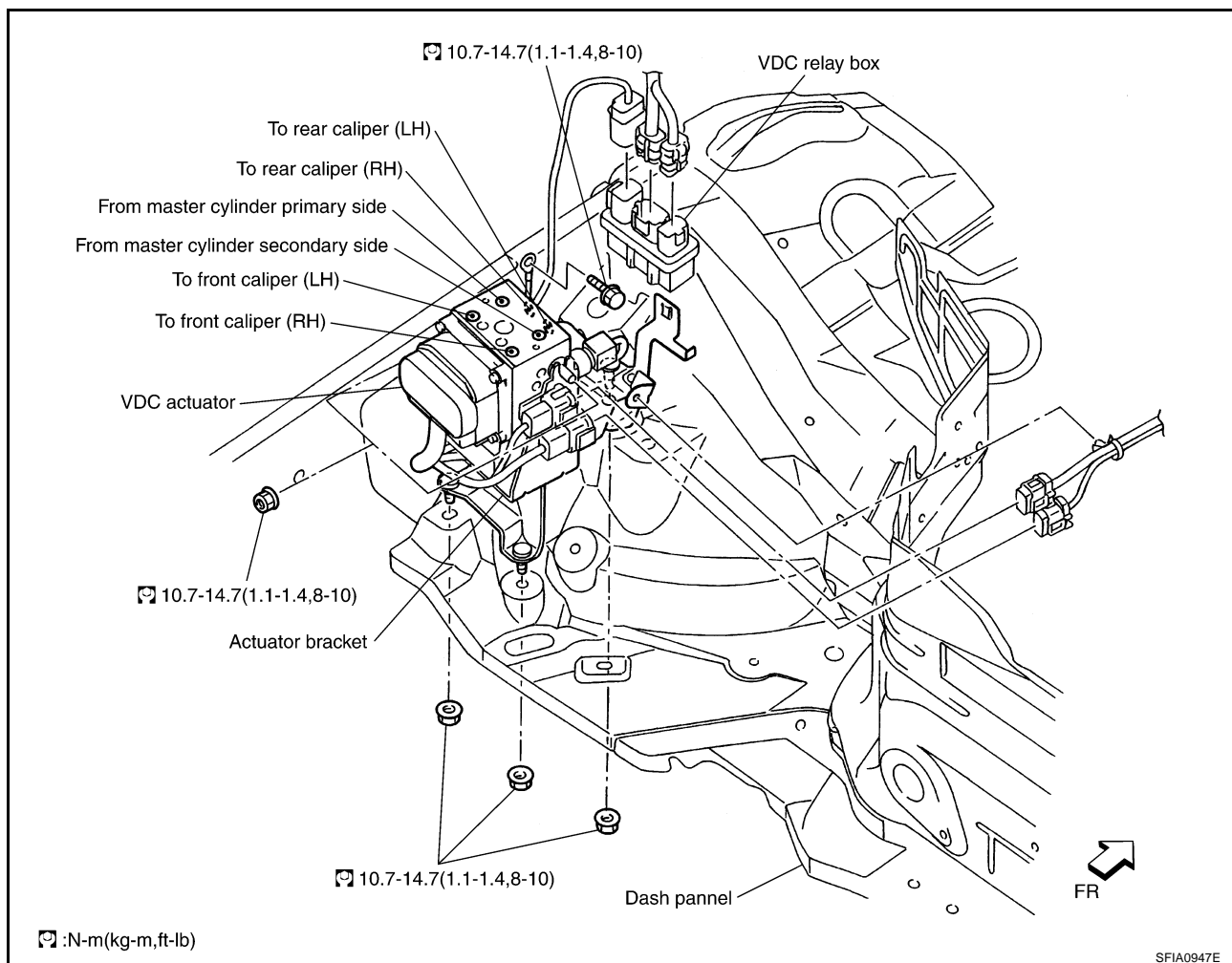
**BRC**

## VDC/TCS/ABS ACTUATOR

PFP:47660

## Removal and Installation

AFS00140



Pay attention to the following when removing actuator.

**CAUTION:**

- Before servicing, disconnect battery cables.
- To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use a flare nut crowfoot and torque wench (commercial service tool).
- Do not remove and install actuator by holding harness.
- After work is completed, bleed air from brake piping. Refer to [BR-10, "Bleeding Brake System"](#).
- Be sure to securely connect the ground cable.

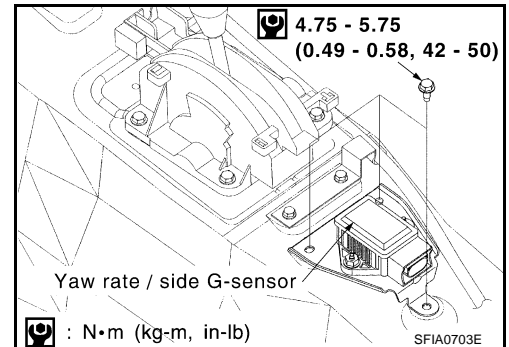


**G SENSOR****Removal and Installation****REMOVAL****A/T Models**

1. Remove center console. Refer to [IP-15, "\(U\) Center Console \(A/T Models\)"](#) .
2. Disconnect harness connector.
3. Remove installation bolts. Remove yaw rate/side G-sensor.

**CAUTION:**

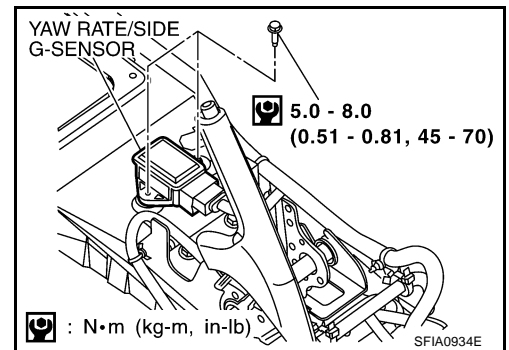
**Do not drop or strike the yaw rate/side G-sensor, because it has little endurance to impact.**

**M/T Models**

1. Remove center console. Refer to [IP-15, "\(V\) Center Console \(M/T Models\)"](#) .
2. Disconnect harness connector.
3. Remove installation bolts. Remove yaw rate/side G-sensor.

**CAUTION:**

**Do not drop or strike the yaw rate/side G-sensor, because it has little endurance to impact.**

**INSTALLATION**

To install, follow procedure for removal in reverse order.

**CAUTION:**

**Do not drop or strike the yaw rate/side G-sensor, because it has little endurance to impact.**

## STEERING ANGLE SENSOR

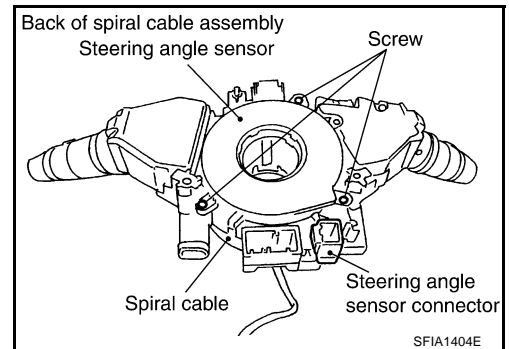
PFP:25554

### Removal and Installation

AFS00267

#### REMOVAL

1. Remove spiral cable assembly. Refer to [SRS-39, "SPIRAL CABLE"](#) .
2. Remove steering angle sensor from spiral cable assembly.



#### INSTALLATION

Install in the reverse order of removal.

#### NOTE:

After work, make sure to adjust neutral position of steering angle sensor. Refer to [BRC-6, "Adjustment of Steering Angle Sensor Neutral Position"](#) .