

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.

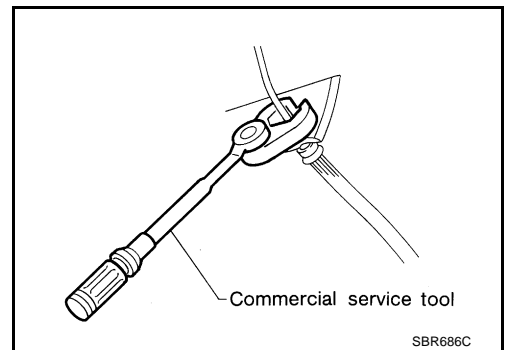
WARNING:

- 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 Brake System

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- Recommended fluid is brake fluid “DOT 3”.
- Do not 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.
- Do not 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 VDC/TCS/ABS control unit or battery negative terminal.
- When installing brake piping, be sure to check torque.



Precautions for Brake Control

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- 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 room. 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 fluid 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 VDC/TCS/ABS control unit, ABS function may have a malfunction or error.

PRECAUTIONS

[VDC/TCS/ABS]

-
- 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, 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 suspension, tires or components related to brakes may cause VDC OFF indicator lamp and 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 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 VDC OFF indicator lamp may turn on. However, this is not a malfunction, if normal operation can be resumed after restarting engine.
 - Sudden turns (such as spin turns, acceleration turns), drifting, etc. When VDC function is OFF (VDC OFF switch ON) may cause yaw rate/side G-sensor system to indicate a malfunction. However, this is not a malfunction, if normal operation can be resumed after restarting engine. Then erase memory of self-diagnosis.

PREPARATION

[VDC/TCS/ABS]

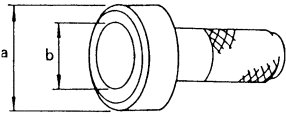
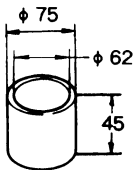
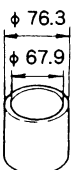
PREPARATION

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Special Service Tools

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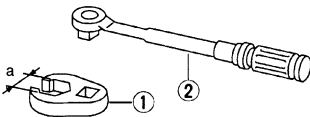
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST3072000 (J25405) Drift a: 76.5 mm (3.012 in) dia. b: 55.0 mm (2.17 in) dia.	 Installing rear sensor rotor ZZC0760D
ST27863000 (—) Drift	 Installing rear sensor rotor ZZC1307D
KV40104710 (—) Drift	 Installing rear sensor rotor ZZC1082D

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Commercial Service Tools

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Tool name	Description
1. Flare nut crowfoot a: 10 mm (0.39 in), 12 mm (0.47 in) 2. Torque wrench	 Removing and installing each brake piping S-NT360

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	×

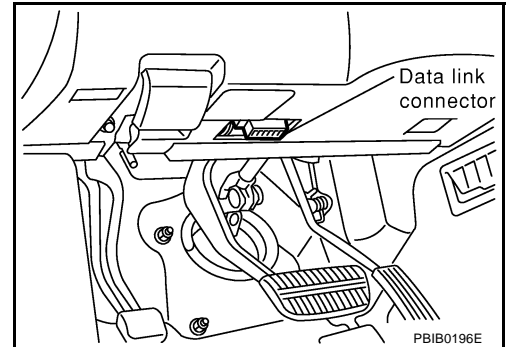
×: Required

–: 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 the CONSULT-II screen in the order of “ABS”, “WORK SUPPORT” and “ST ANG SENSOR ADJUSTMENT”.



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:

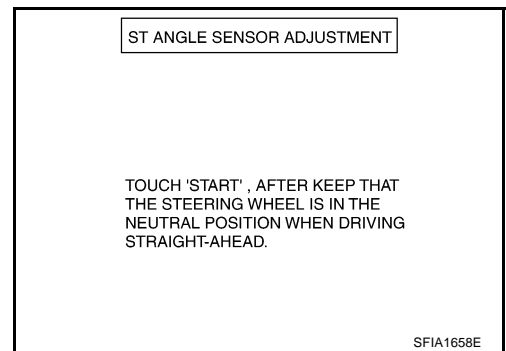
Be sure to perform above operation.

7. Run vehicle with front wheels in straight-ahead position, then stop.

8. Select “DATA MONITOR”, “ECU INPUT SIGNALS”, and “STR ANGLE SIG” on CONSULT-II screen. Then make sure “STR ANGLE SIG” is within 0±2.5 deg. If value is more than specification, repeat steps 3 to 7.

9. Erase memory of VDC/TCS/ABS control unit and ECM.

10. Turn ignition switch OFF.



GENERAL INFORMATION

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**Fail-Safe
ABS SYSTEM**

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If a malfunction occurs in electrical system, ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp in combination meter turn on. In this condition, the fail-safe function puts VDC/TCS/ABS and EBD into one of the following conditions.

1. Only EBD operates. Same condition as that of models without VDC/TCS/ABS.
2. VDC/TCS/ABS and EBD do not operate. All 4 wheels operate as normal brakes.

NOTE:

In step 1 shown above, self-diagnosis when turn ignition switch ON and when vehicle starts at initial time is carried out. ABS self-diagnosis noise may be heard as usual.

VDC/TCS SYSTEM

If a malfunction occurs in electrical system, VDC OFF indicator lamp and SLIP indicator lamp in combination meter turn on. In this condition, VDC/TCS will be deactivated and it becomes equal to that of models without VDC/TCS. However, ABS is controlled normally.

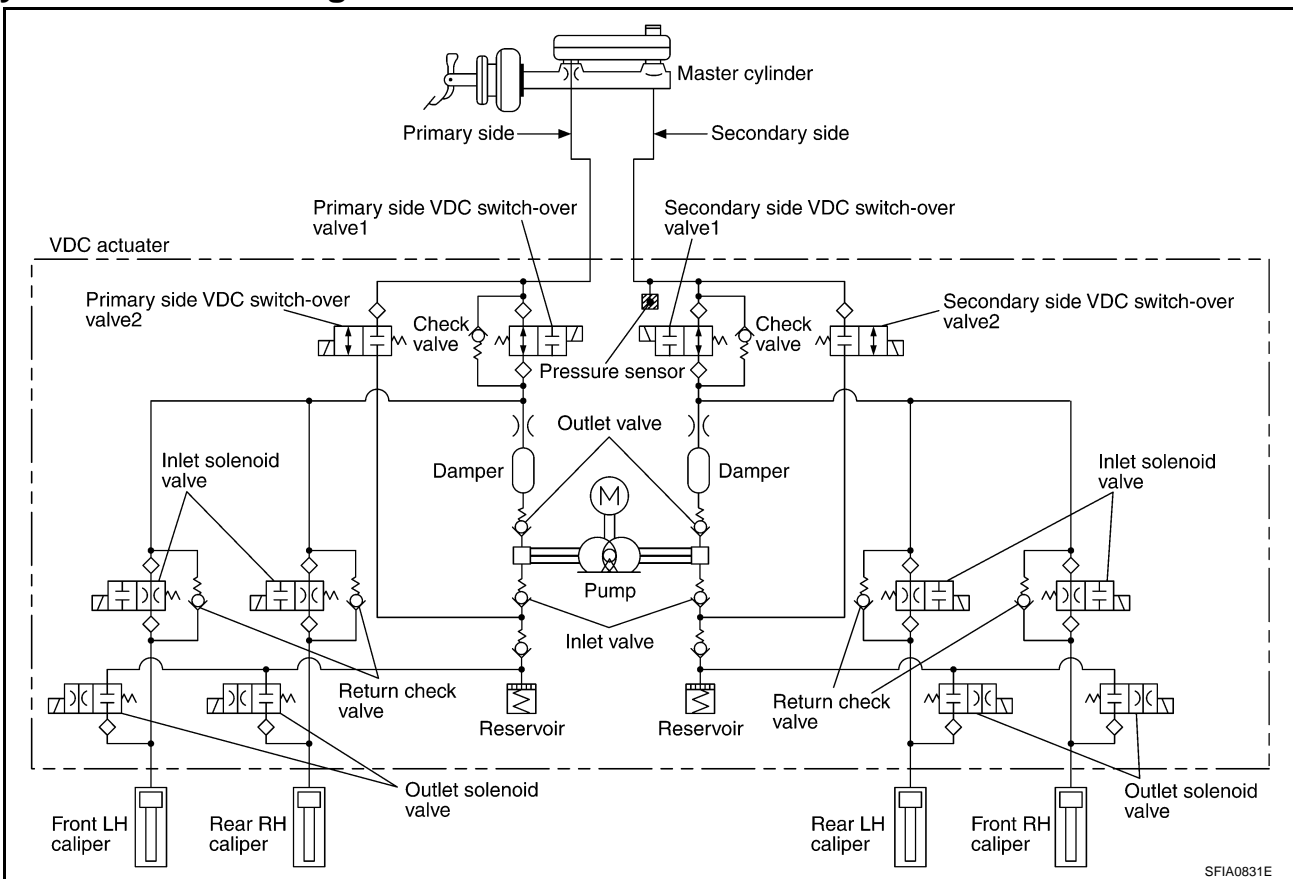
If a malfunction occurs in throttle control system, VDC/TCS control will be deactivated and only ABS control will operate normally.

CAUTION:

If fail-safe mode is initiated, carry out self-diagnosis for VDC/TCS/ABS control system.

Hydraulic Circuit Diagram

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ABS Function

AFS0003Y

1. During ABS operation, brake pedal lightly vibrates and a mechanical noise may be heard. This is normal.
2. When starting engine, or just after starting vehicle, brake pedal may vibrate or motor operating noises may be heard from engine room. This is a normal status of operation check.
3. Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.
4. EBD is integrated in VDC/TCS/ABS system.

TCS Function

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1. VDC/TCS/ABS control unit detects a spin at drive wheels by comparing wheel speed signals from all 4 wheels. At this time, output from control unit controls brake fluid pressure to both LH and RH rear wheels while cutting fuel to engine and closing throttle valve to reduce engine torque. Furthermore, throttle position is continuously controlled to insure appropriate engine torque at all times.
2. Depending on road circumstances, driver may have a sluggish feel. This is normal, because optimum traction has highest priority under TCS operation.
3. When vehicle is passing through a road where surface friction coefficient varies, downshifting or depressing accelerator pedal fully may activate TCS temporarily.
4. During TCS operation, it informs driver of system operation by flashing SLIP indicator lamp.

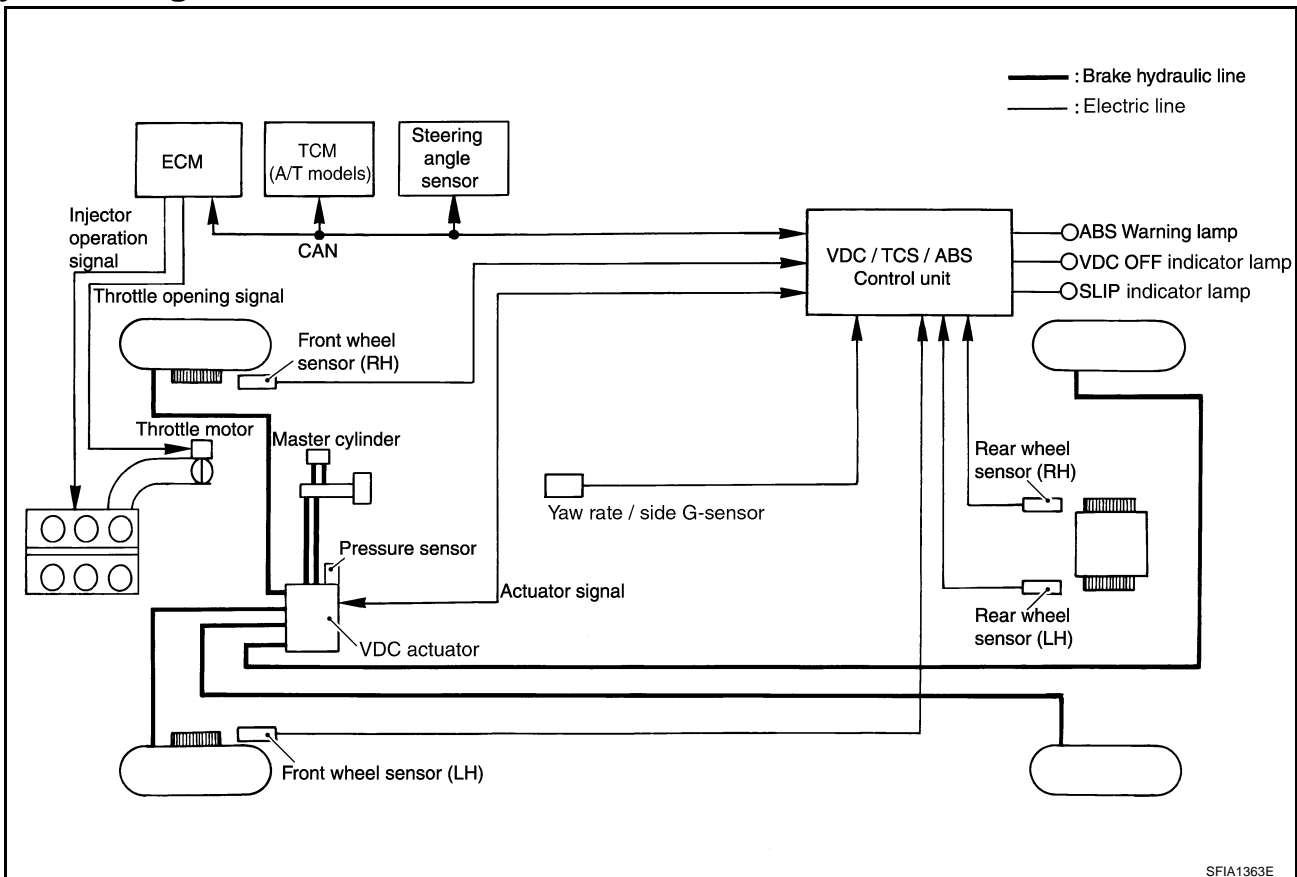
VDC Function

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1. In addition to TCS/ABS function, VDC detects driver's steering operation amount and brake pedal travel from steering angle sensor and pressure sensor. Using information from yaw rate/side G-sensor and wheel sensor, VDC judges driving condition (conditions of under steer and over steer) to improve stability by controlling brake application to 4 wheels and engine output.
2. SLIP indicator lamp flashes to inform driver of VDC operation.
3. During VDC operation, body and brake pedal lightly vibrate and mechanical noises may be heard. This is normal.
4. If vehicle is rotated on turn table, or rolled and rocked on ship, ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp may turn on. In this case, start engine on normal road again. If ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp turn off after restart, it is normal.
5. When driving in steep slope such as bank, ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp may turn on. In this case, start engine on normal road again. If ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp turn off after restart, it is normal.

System Diagram

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CAN COMMUNICATION

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System Description

AFS0028H

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"](#).

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TROUBLE DIAGNOSIS

How to Perform Trouble Diagnoses BASIC CONCEPT

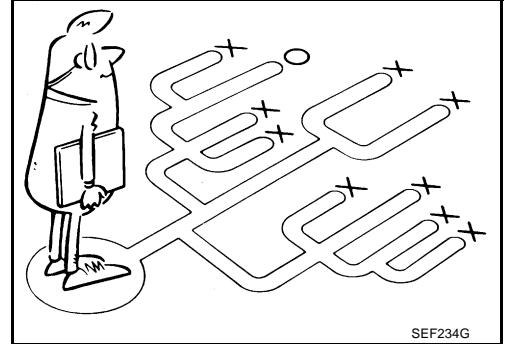
- Most important point to perform diagnostic is to understand systems (control and mechanism) in vehicle thoroughly.

- 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:

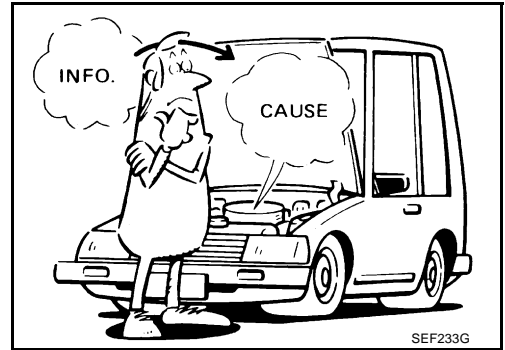
Customers are not professionals. Do not assume “maybe customer means...” or “maybe customer mentioned this symptom”.



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

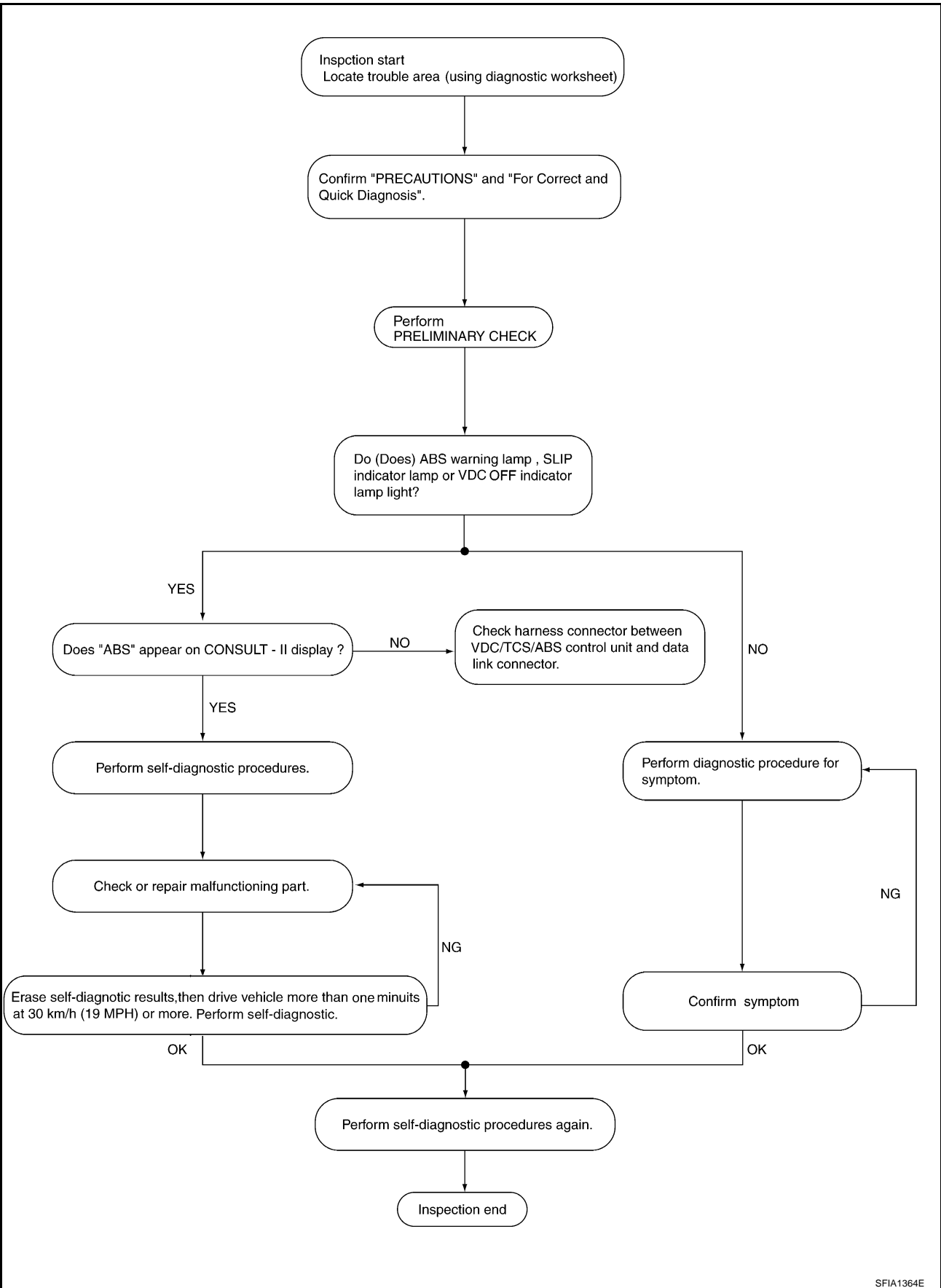
For an intermittent malfunction, it is important to reproduce symptom based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake suspected harness or connector by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

- After diagnostic, make sure to perform “ERASE MEMORY”. Refer to [BRC-24, "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"](#).



DIAGNOSIS FLOW CHART

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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 diagnostic sheet so as not to miss information.

KEY POINTS

WHAT Vehicle model
WHEN Date, Frequencies
WHERE Road conditions
HOW Operating conditions,
 Weather conditions,
 Symptoms

SBR339B

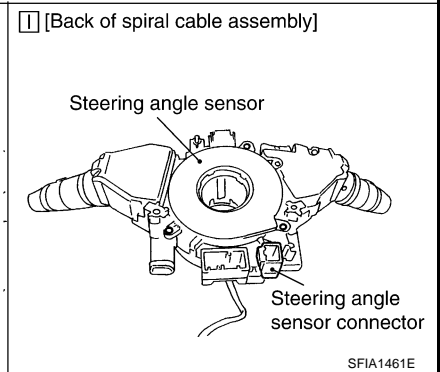
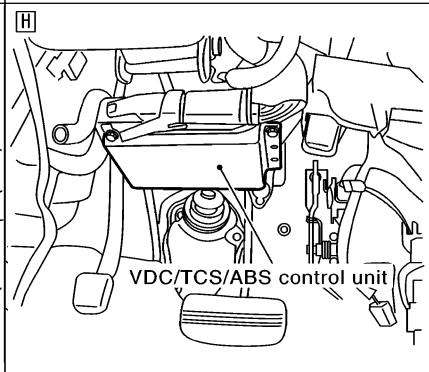
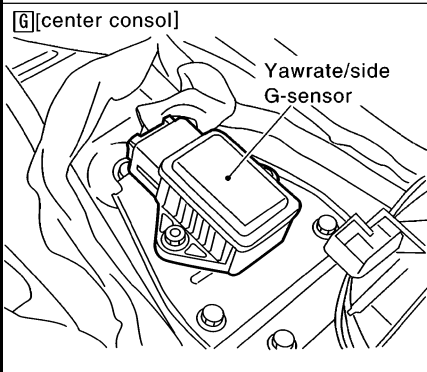
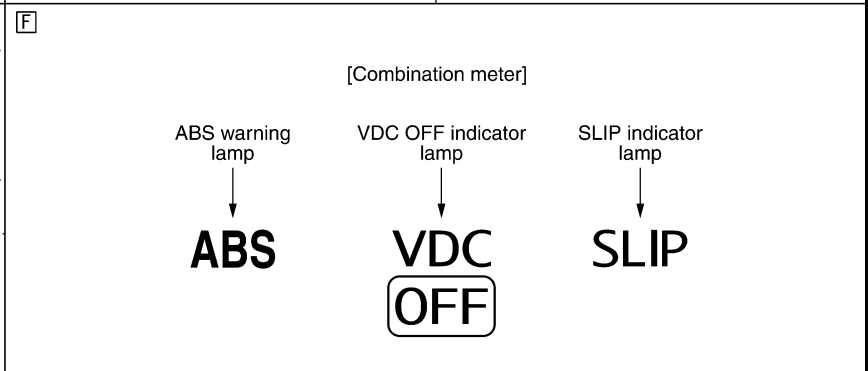
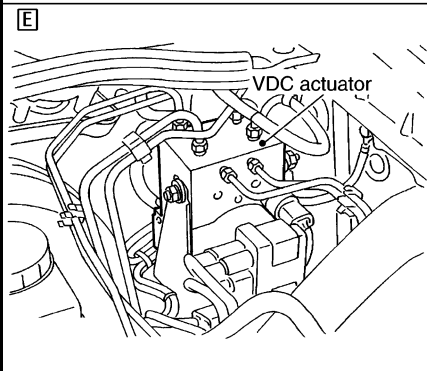
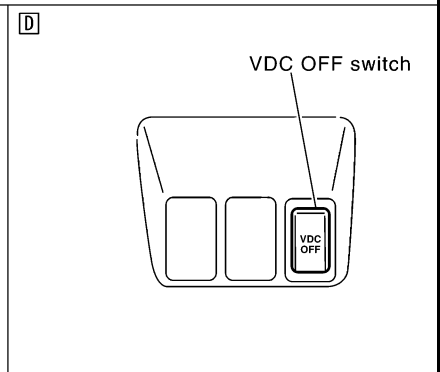
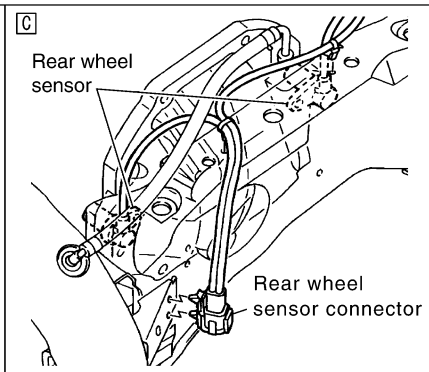
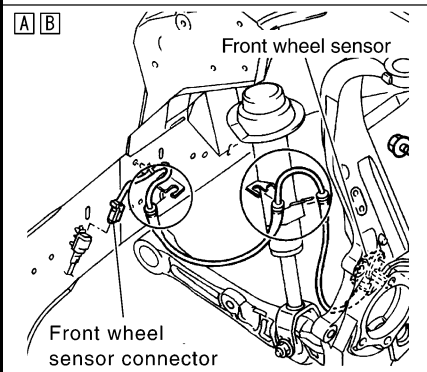
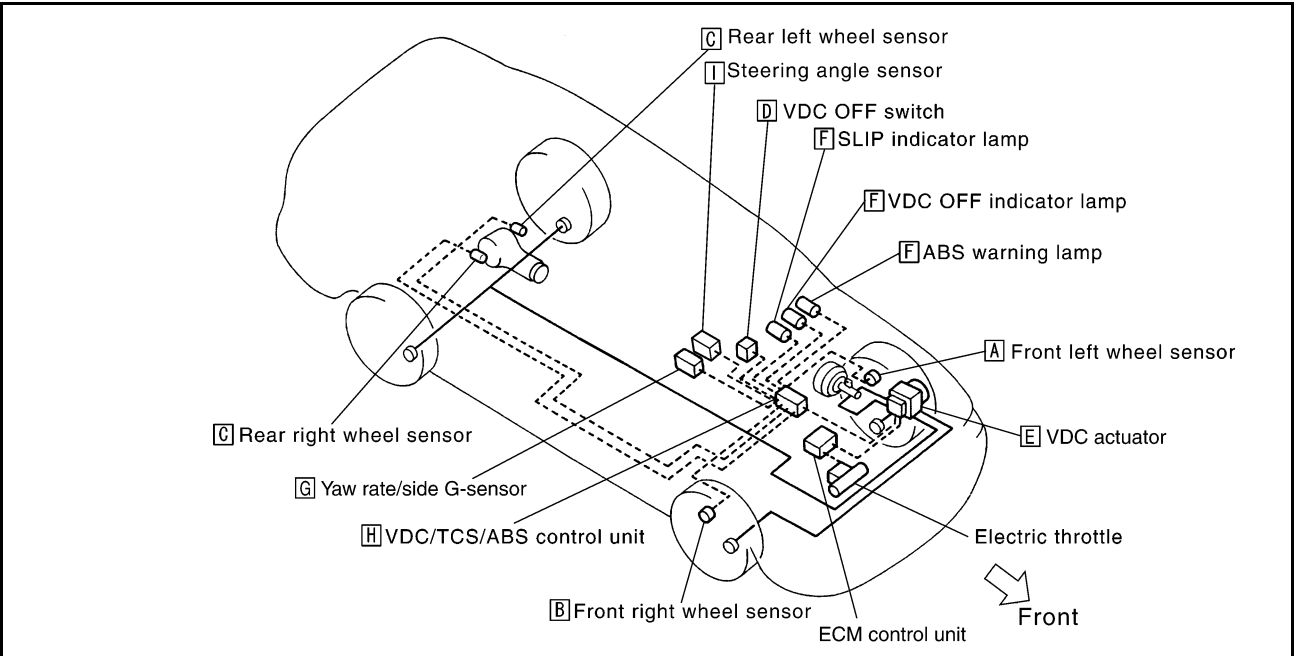
EXAMPLE OF DIAGNOSIS SHEET

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 <input type="checkbox"/> 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 Parts Location

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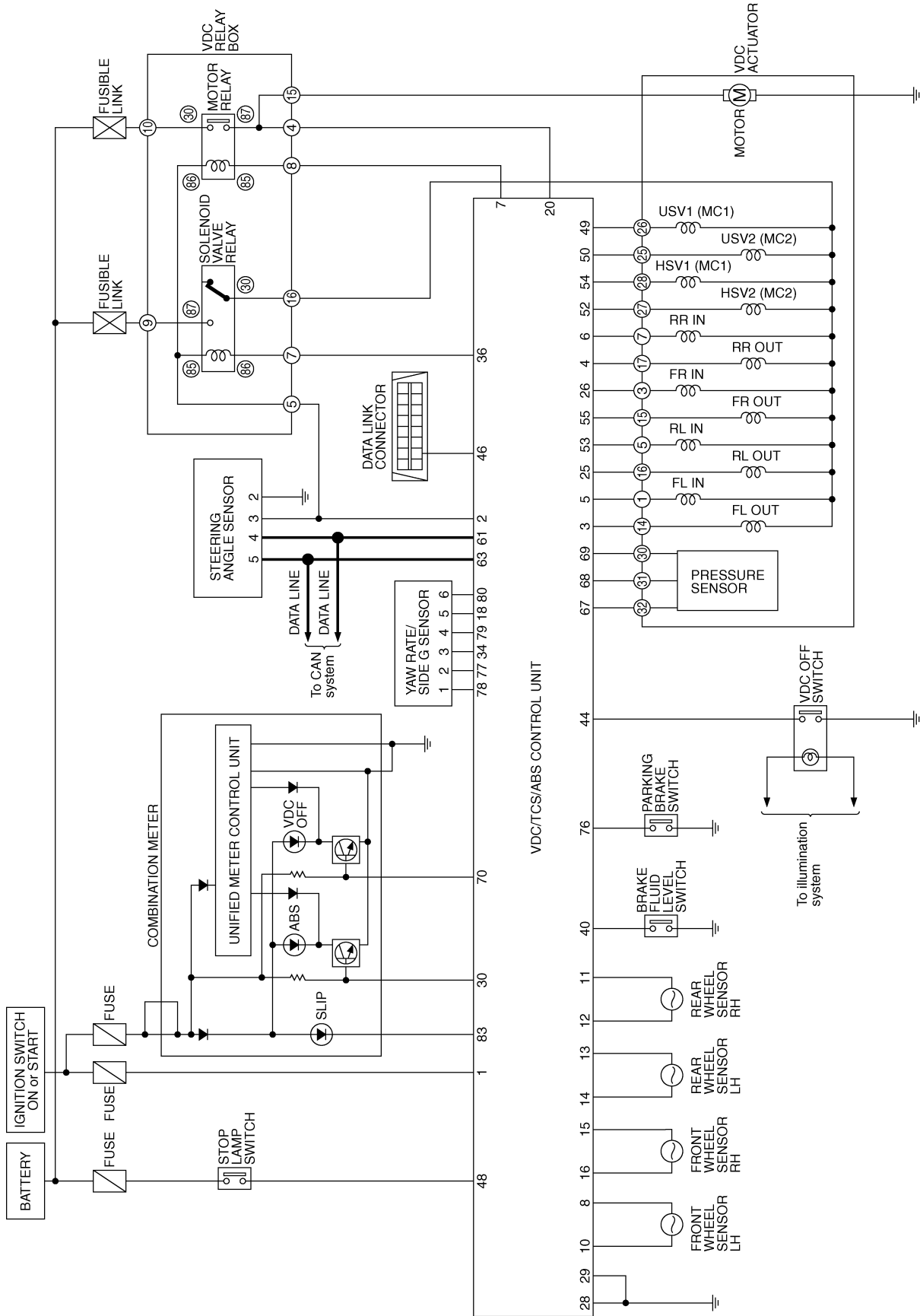


TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Schematic

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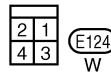
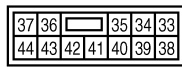
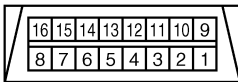
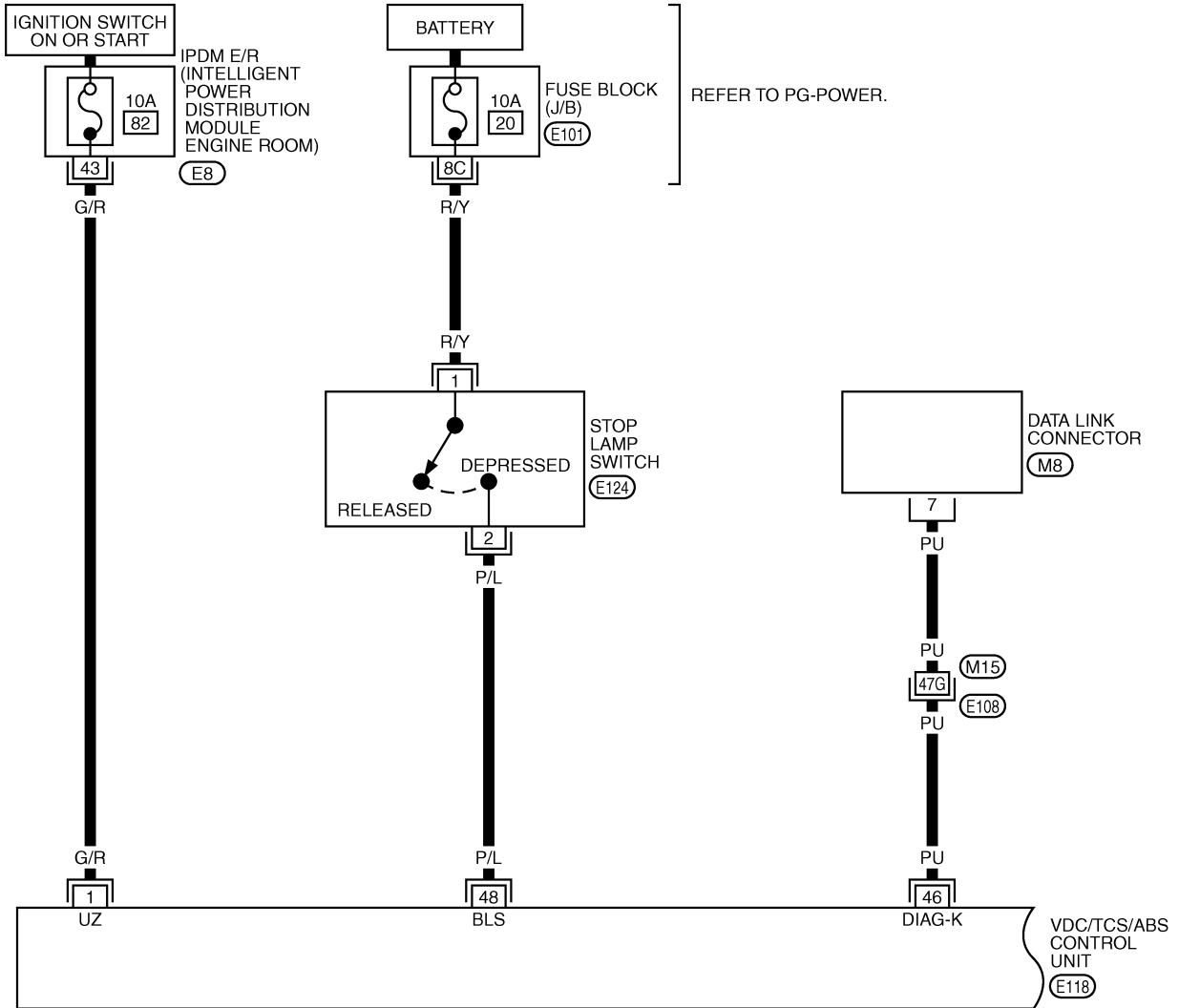
TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Wiring Diagram — VDC —

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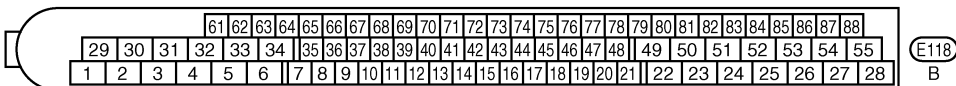
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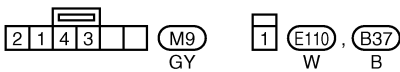
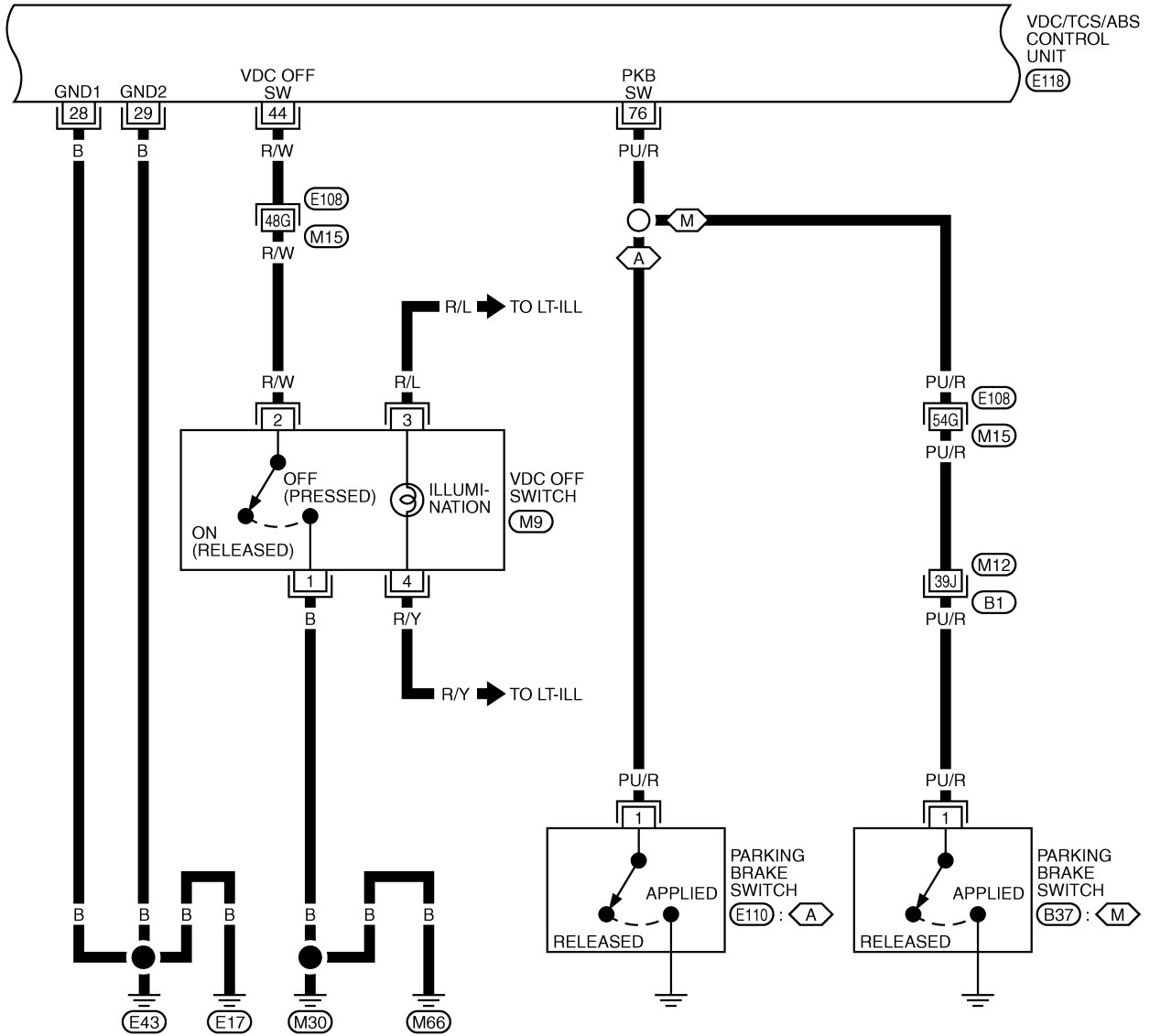
E108 -SUPER MULTIPLE JUNCTION (SMJ)

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

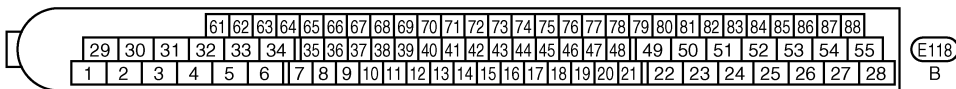


BRC-VDC-02

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



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

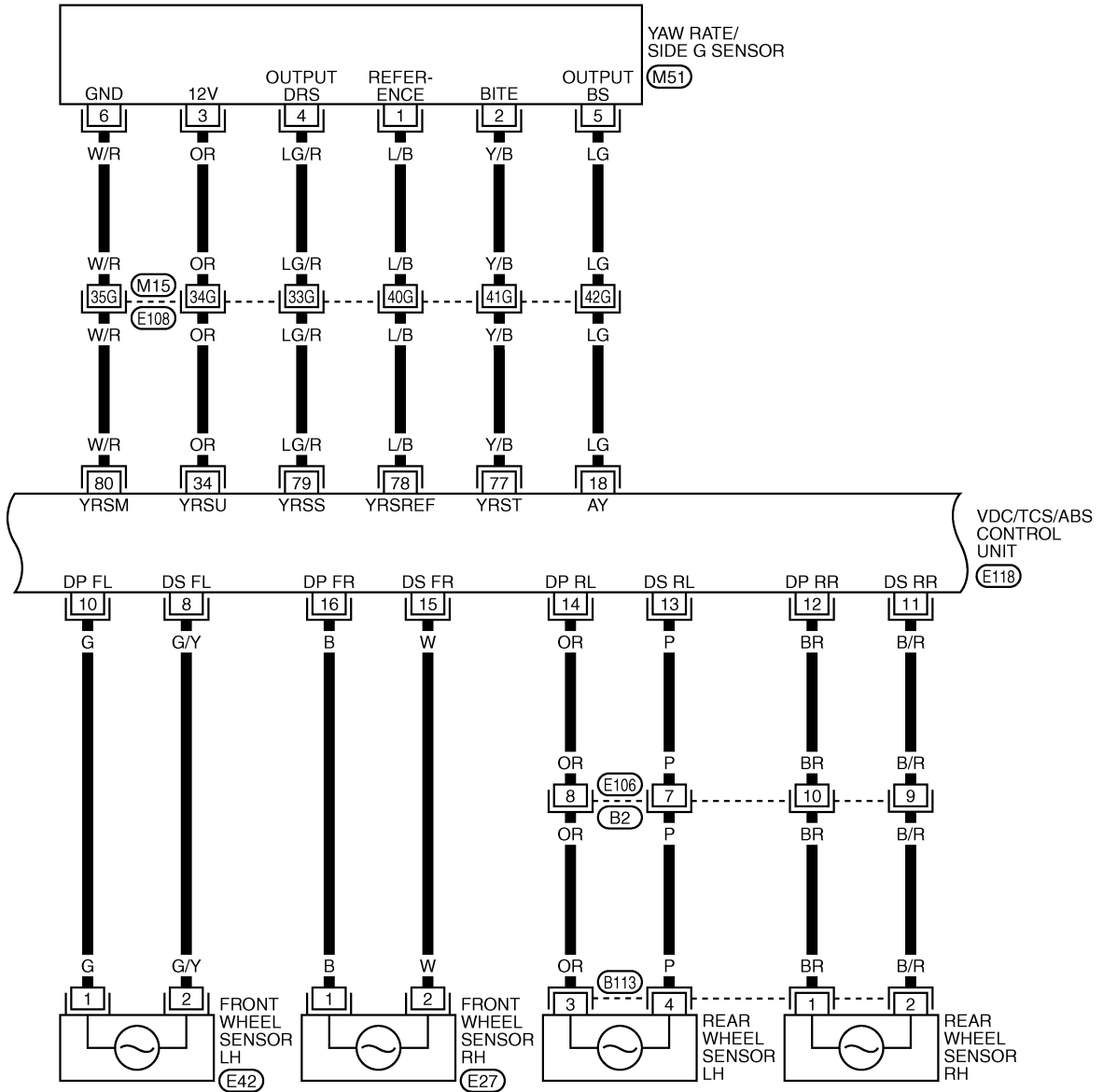


TROUBLE DIAGNOSIS

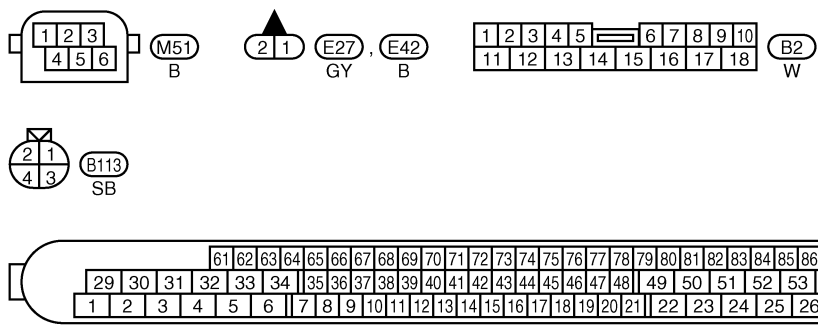
[VDC/TCS/ABS]

BRC-VDC-03

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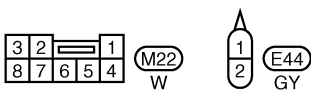
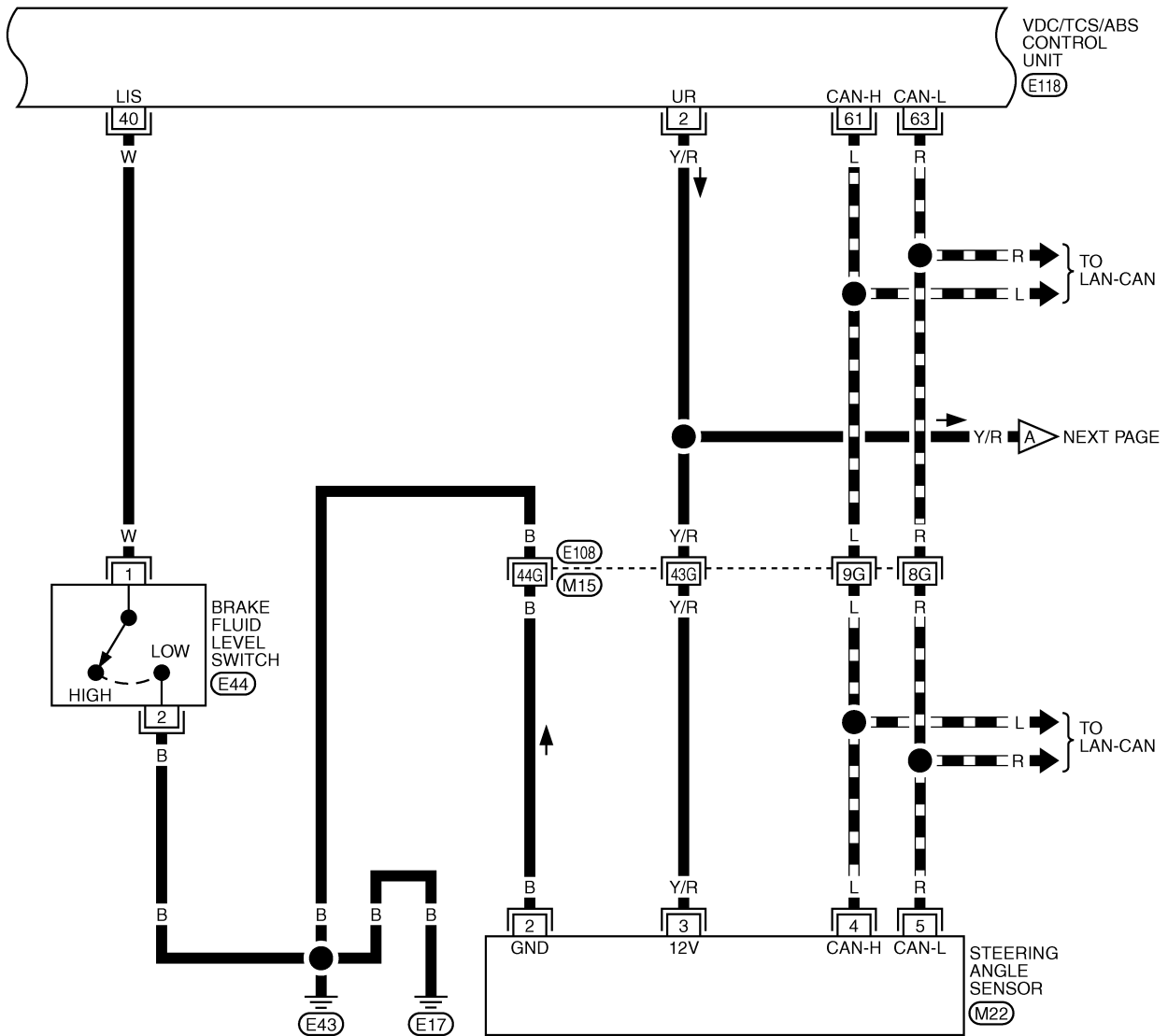


BRC



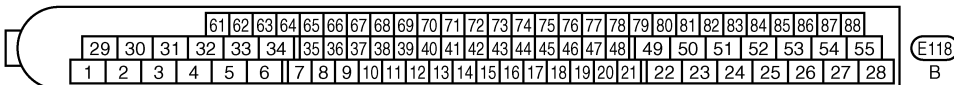
REFER TO THE FOLLOWING.
 (E108) -SUPER MULTIPLE JUNCTION (SMJ)

▬ : DATA LINE

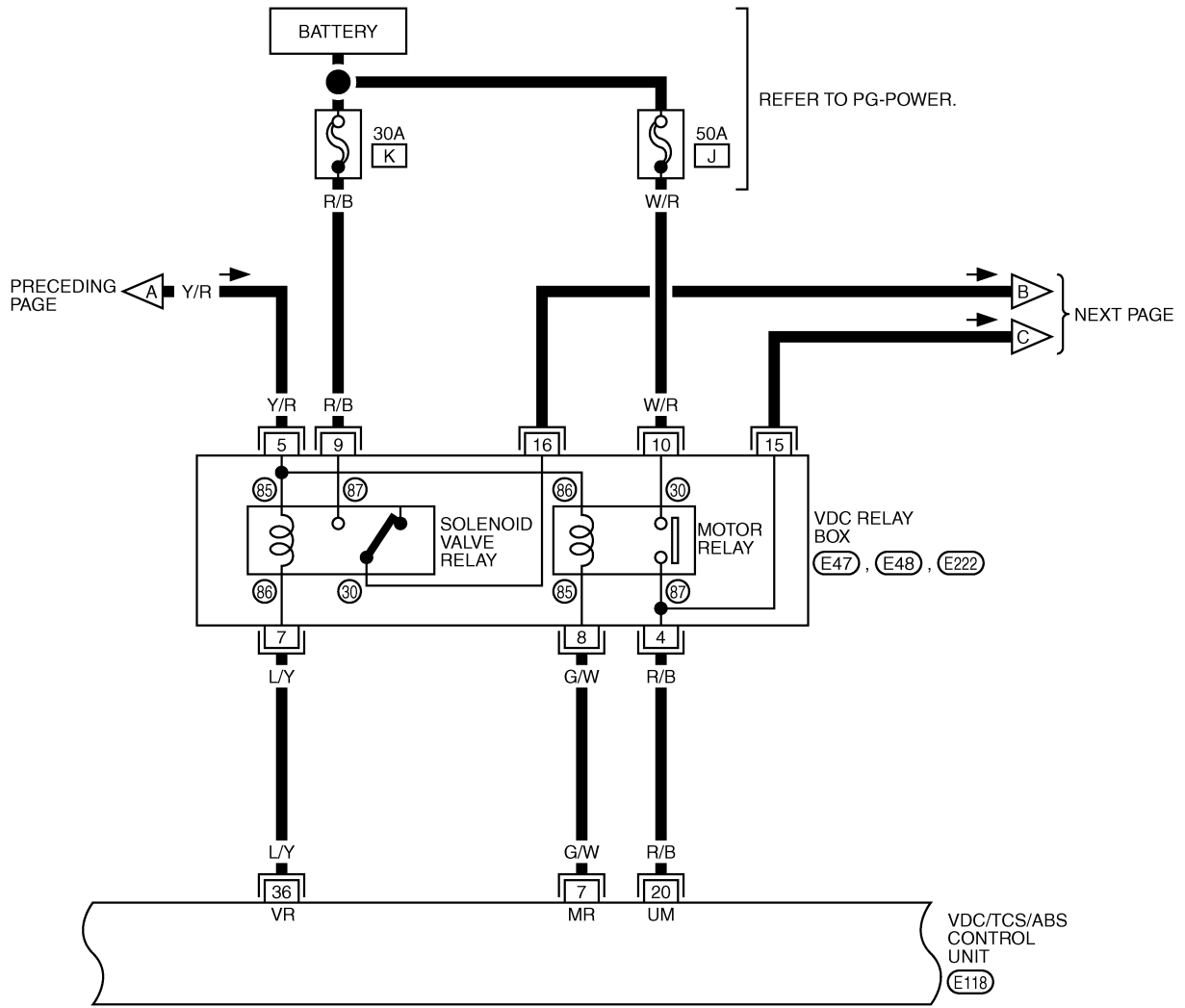


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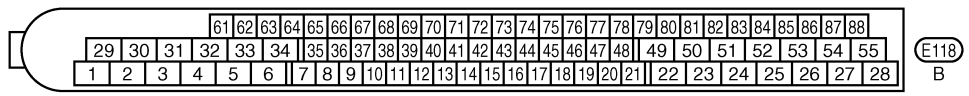
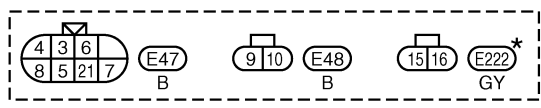
(E108) -SUPER MULTIPLE JUNCTION (SMJ)



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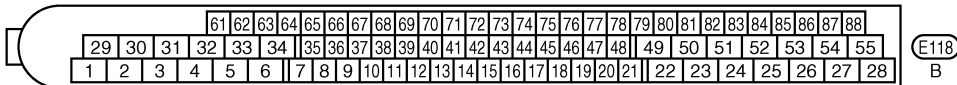
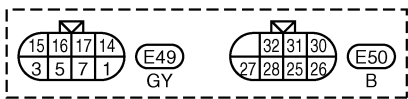
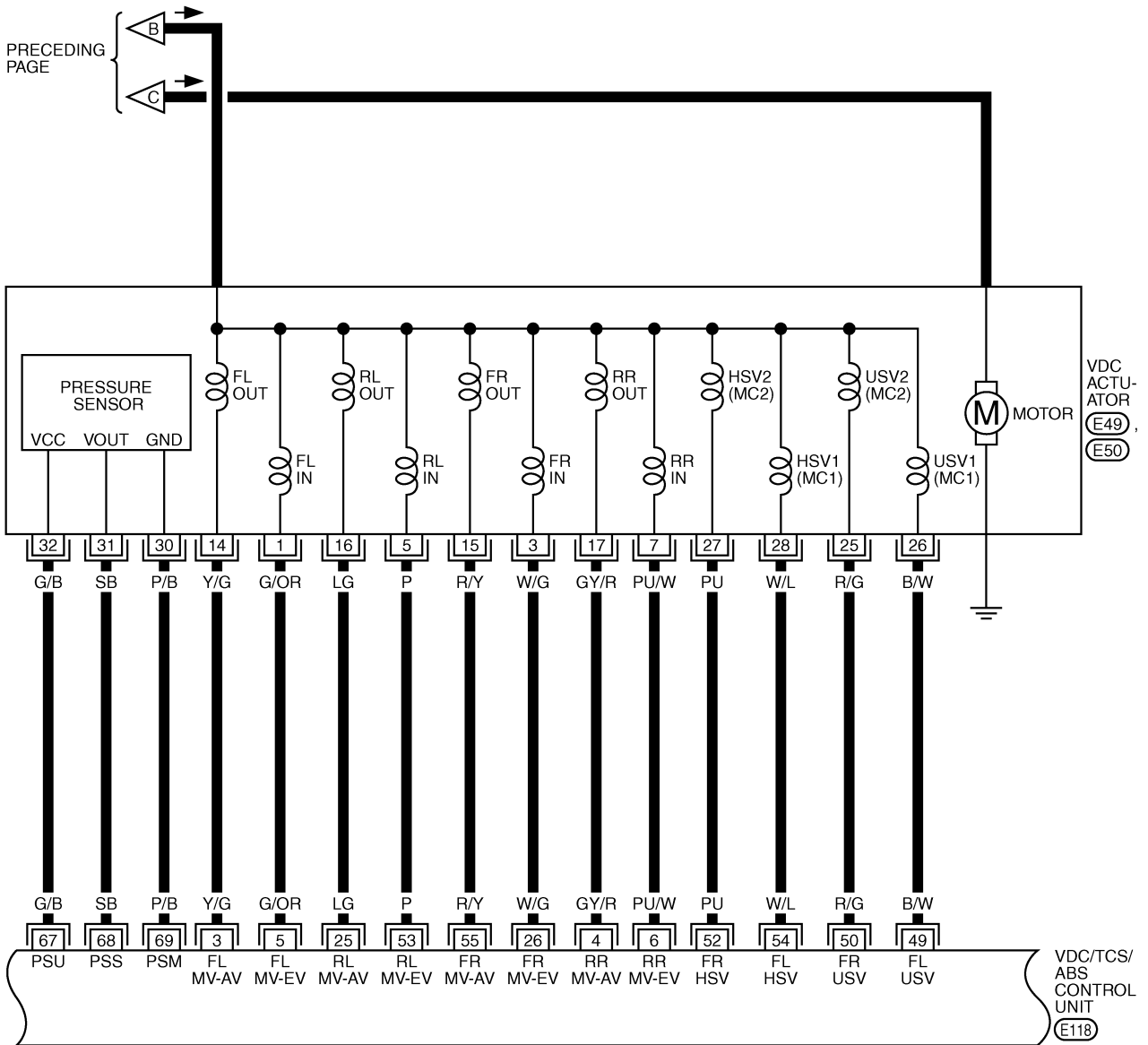


*: THIS CONNECTOR IS NOT SHOWN IN "HARNES LAYOUT", PG SECTION.

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

BRC-VDC-06



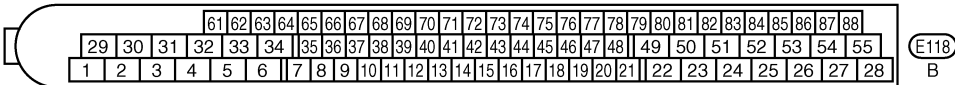
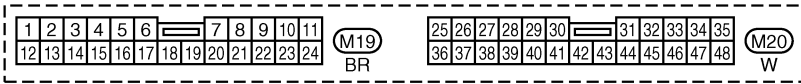
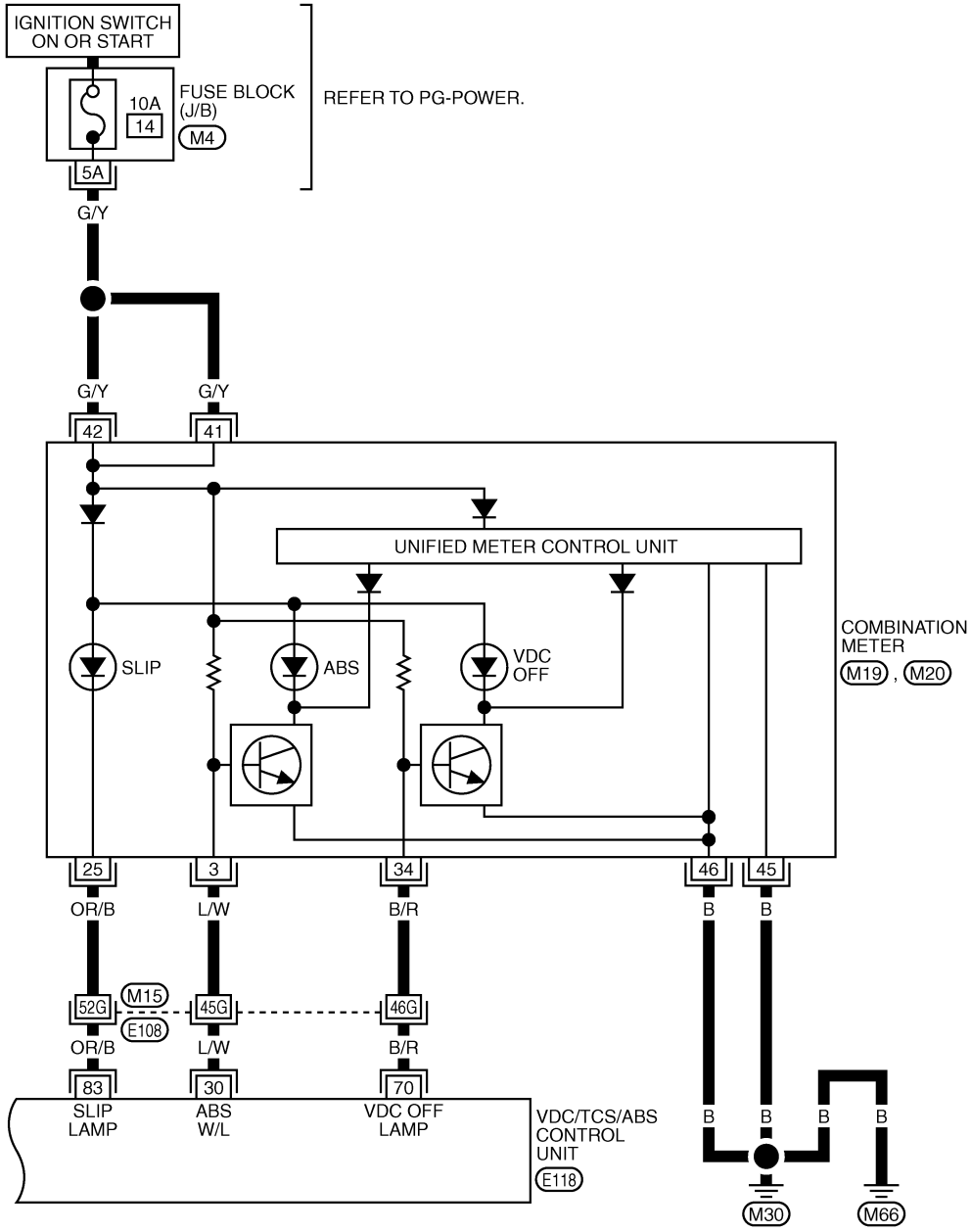
TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

BRC-VDC-07

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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

AFS00045

CAUTION:

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

Monitor item	Display item	DATA MONITOR		Check item
		Condition	Reference value in normal operation	
SLCT LVR POSI	Shift position determined by the A/T PNP switch signal	Indicate each shift position (M/T models normally remain at ##)		PNP switch circuit AT-112
GEAR	Gear position determined by TCM	1:1st gear (M/T models: normally remain at 1) 2:2nd gear 3:3rd gear 4:4th gear 5:5th gear		—
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]	Wheel sensor circuit [Inspection 1] BRC-36
		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 - 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	Steering angle sensor and circuit [Inspection 5] BRC-41
		Steering wheel turned	-720 to 720 deg	
YAW RATE SEN	Yaw rate detected by yaw rate sensor	Vehicle stopped	Approx. 0 d/s	Yaw rate sensor and circuit [Inspection 6] BRC-42
		Vehicle running	-70 to 70 d/s	
SIDE G-SENSOR	Transverse G detected by side G-sensor	Vehicle stopped	Approx. 0 m/s ²	Side G-sensor and circuit [Inspection 6] BRC-42
		Vehicle running	-24.3 to 24.1 m/s ²	
PRESS SENSOR	Brake fluid pressure detected by pressure sensor	With ignition switch turned ON and brake pedal released	Approx. 0 bar	Pressure sensor and circuit [Inspection 4] BRC-39
		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 - 16V	VDC/TCS/ABS control unit power supply and ground circuits [Inspection 11] BRC-51
STOP LAMP SW	Brake pedal operation	Brake pedal depressed	ON	Stop lamp switch circuit [Inspection 10] BRC-50
		Brake pedal not depressed	OFF	
PARK BRAKE SW	Parking brake status	Parking brake operated	ON	Parking brake switch circuit
		Parking brake not operated	OFF	

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Monitor item	Display item	DATA MONITOR		Check item
		Condition	Reference value in normal operation	
OFF SWITCH	VDC OFF switch ON/OFF status	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	ON	VDC OFF switch circuit
		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	ABS warning lamp harness
		ABS warning lamp OFF	OFF	
MOTOR RELAY	Operation status of motor and motor relay	When motor relay and motor are operating	ON	ABS motor, motor relay, and motor circuit [Inspection 8] BRC-46
		When motor relay and motor are not operating	OFF	
ACTUATOR RLY	Solenoid valve relay operation status	When solenoid valve relay is operating	ON	Solenoid valve relay and circuit [Inspection 9] BRC-48
		When solenoid valve relay is not operating	OFF	
OFF LAMP	VDC OFF indicator lamp status (Note 3)	When VDC OFF indicator lamp is ON	ON	VDC OFF indicator lamp circuit
		When VDC OFF indicator lamp is OFF	OFF	
SLIP LAMP	SLIP indicator lamp status (Note 4)	When SLIP indicator lamp is ON	ON	SLIP indicator lamp circuit
		When SLIP indicator lamp is OFF	OFF	
IN ABS S/V OUT ABS S/V	Solenoid valve operation	Actuator (solenoid) is active ("ACTIVE TEST" with CONSULT-II) or solenoid valve relay is inactive (in fail-safe mode).	ON	Solenoid and circuit [Inspection 7] BRC-44
		When actuator (solenoid) is not active and solenoid valve relay is active (ignition switch ON).	OFF	
USV HSV	VDC switch-over valve status	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-II) or actuator relay is inactive (when in fail-safe mode).	ON	Switch-over valve and circuit [Inspection 7] BRC-44
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON).	OFF	
FLUID LEV SW	ON/OFF status of brake fluid level switch	When brake fluid level switch ON	ON	Brake fluid level switch, brake warning lamp, and circuit [Inspection 15] BRC-55
		When brake fluid level switch OFF	OFF	
FAIL SIGNAL	Fail signal status	VDC fail TCS fail ABS fail EBD fail	OFF	VDC system TCS system ABS system EBD system

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Note 1: Confirm tire pressure is normal.

Note 2: ON/OFF timing of ABS warning lamp

ON: For approximately 1 seconds after ignition switch is turned ON, or when a malfunction is detected.

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

OFF: Approximately 1 seconds after ignition switch is turned ON (when system is in normal operation) and VDC/TCS function is not activated.

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

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

OFF: Approximately 1 seconds 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: For approximately 1 seconds after ignition switch is turned ON, or when a malfunction is detected.

OFF: Approximately 1 seconds 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

AFS00046

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.	BRC-6, "Adjustment of Steering Angle Sensor Neutral Position"
SELF-DIAGNOSTIC RESULTS	Self-diagnostic results can be read and erased quickly.	BRC-24, "SELF-DIAGNOSIS"
DATA MONITOR	Input/Output data in the VDC/TCS/ABS control unit can be read.	BRC-27, "DATA MONITOR"
CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of communication can be read.	LAN-4, "CAN Communication Unit"
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.	BRC-30, "ACTIVE TEST"
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

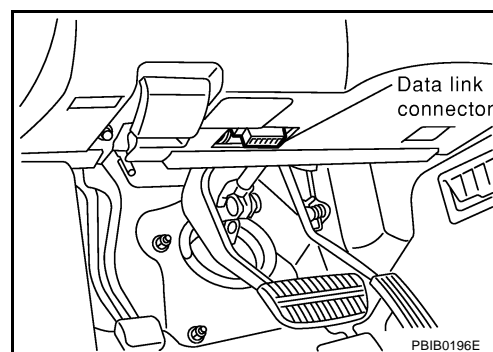
If a malfunction is detected in system, ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp on meter turn on. In this case, perform self-diagnostic as follows:

Operation Procedure

1. Turn ignition switch 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 vehicle 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-diagnostic 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-diagnostic results is displayed. (If necessary, touch "PRINT" to print self-diagnostic results.)

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

- When “NO FAILURE” is shown, check ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp. Refer to [BRC-33, "For Fast and Accurate Diagnosis"](#).
 - CONSULT-II self-diagnostic results are displayed without regard to occurrence timing. In some cases later ones (timing value is small) appear on next screen.
6. Go to appropriate “Inspection” chart according to “Display Item List”, and repair or replace as necessary.
 7. Start engine and drive vehicle 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-DIAG 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. Drive vehicle at approximately 30 km/h (19 MPH) and make sure 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.	Wheel sensor and circuit [Inspection 1] Note 1 BRC-36	
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 solenoid valve relay turns ON or when control line for relay is shorted to ground.		Solenoid valve relay and circuit [Inspection 9] BRC-48
	During solenoid valve relay operation with ON, when solenoid valve relay turns OFF or when control line for relay is open.		
STOP LAMP SW	Stop lamp switch circuit is open.	Stop lamp switch and circuit [Inspection 10] BRC-50	
PRESS SEN CIRCUIT	Pressure sensor signal line is open or shorted, or pressure sensor is malfunctioning.	Pressure sensor and circuit [Inspection 4] BRC-39	
ST ANGLE SEN CIRCUIT	Neutral position of steering angle sensor is dislocated, or steering angle sensor is malfunctioning.	Steering angle sensor and circuit [Inspection 5] BRC-41	
YAW RATE SENSOR	Yaw rate sensor has generated an error, or yaw rate sensor signal line is open or shorted.	Yaw rate/Side G-sensor and circuit [Inspection 6] BRC-42	

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.	Solenoid and circuit [Inspection 7] BRC-44
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.	VDC switch-over valve and circuit [Inspection 7] BRC-44
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.	Actuator motor, motor relay and circuit [Inspection 8] BRC-46
	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.	VDC/TCS/ABS control unit power supply and ground circuits [Inspection 11] BRC-51
ST ANGLE SEN SIGNAL	Neutral position correction of steering angle sensor is not finished.	BRC-6, "Adjustment of Steering Angle Sensor Neutral Position"
ST ANG SEN COM CIR	CAN communication line or steering angle sensor has generated an error.	Steering angle sensor and CAN communication line [Inspection 16] BRC-55]
SIDE G-SEN CIRCUIT	Side G-sensor is malfunctioning, or signal line of side G-sensor is open or shorted.	Yaw rate/Side G-sensor and circuit [Inspection 6] BRC-42
EMERGENCY BRAKE	VDC/TCS/ABS control unit malfunction (pressure increase is too much or too little.)	VDC/TCS/ABS control unit [Inspection 13] BRC-54
CONTROLLER FAILURE	Internal malfunction of VDC/TCS/ABS control unit	VDC/TCS/ABS control unit [Inspection 3] BRC-39
SHIFT POSITION ERROR	P position switch stuck to ON or TCM internal malfunction, VDC/TCS/ABS control unit internal malfunction.	TCM and circuit VDC/TCS/ABS control unit and circuit [Inspection 12] BRC-53

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Malfunction system	Malfunction detecting condition	Check system
CAN COMM CIRCUIT	<ul style="list-style-type: none"> ● CAN communication line is open or shorted. ● VDC/TCS/ABS control unit internal malfunction ● Battery voltage for EMC is suddenly interrupted for approximately 0.5 seconds or more. 	Communication line between VDC/TCS/ABS control unit and other control units [Inspection 16] Note 2 BRC-55
BR FLUID LEVEL LOW	<ul style="list-style-type: none"> ● Brake fluid level drops or communication line between VDC/TCS/ABS control unit and brake fluid level sensor is open or shorted. 	<ul style="list-style-type: none"> ● Communication line between VDC/TCS/ABS control unit and brake fluid sensor, and brake warning lamp ● Reservoir tank fluid level [Inspection 15] BRC-55
ENGINE SIGNAL 1-4,6	<ul style="list-style-type: none"> ● Major engine component is malfunctioning. 	Engine system [Inspection 2] BRC-38

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 diagnostic for CAN communication line first.

DATA MONITOR

- For details of data monitor function, refer to “CONSULT-II operation 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 “ECU INPUT SIGNALS”, “MAIN SIGNALS” or “SELECTION FROM MENU”. Refer to [BRC-27, "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 (A/T model)	×	×	×	Gear position judged by TCM is displayed.
FR RH SENSOR (km/h (MPH))	×	×	×	Wheel speed calculated by front RH wheel sensor signal is displayed.
FR LH SENSOR (km/h (MPH))	×	×	×	Wheel speed calculated by front LH wheel sensor signal is displayed.
RR RH SENSOR (km/h (MPH))	×	×	×	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 (MPH))	×	×	×	Wheel speed calculated by rear LH wheel sensor signal is displayed.
BATTERY VOLT (V)	×	×	×	Voltage supplied to VDC/TCS/ABS control unit is displayed.
SLCT LVR POSI (A/T model)	×	×	×	Shift position judged by PNP switch signal.
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 ²)	×	-	×	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.

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Item (Unit)	Monitor item selection			Remarks
	ECU input signals	Main signals	Selection from menu	
OFF LAMP (ON/OFF)	-	×	×	VDC OFF indicator Lamp (ON/OFF) status is displayed.
MOTOR RELAY (ON/OFF)	-	×	×	ABS motor relay (ON/OFF) status is displayed.
ACTUATOR RLY	-	×	×	Solenoid valve relay (ON/OFF) status is displayed.
USV [FL-RR] (ON/OFF)	-	-	×	Primary-side USV solenoid valve (ON/OFF) status is displayed.
USV [FR-RL] (ON/OFF)	-	-	×	Secondary-side USV solenoid valve (ON/OFF) status is displayed.
HSV [FL-RR] (ON/OFF)	-	-	×	Primary-side HSV solenoid valve (ON/OFF) status is displayed.
HSV [FR-RL] (ON/OFF)	-	-	×	Secondary-side HSV solenoid valve (ON/OFF) status is displayed.
V/R OUTPUT (ON/OFF)	-	-	×	Valve relay operation signal (ON/OFF) status is displayed.
M/R OUTPUT (ON/OFF)	-	-	×	Front motor relay activation signal (ON/OFF) status is displayed.
VDC FAIL SIG (ON/OFF)	-	-	×	VDC fail signal (ON/OFF) status is displayed.
TCS FAIL SIG (ON/OFF)	-	-	×	TCS fail signal (ON/OFF) status is displayed.
ABS FAIL SIG (ON/OFF)	-	-	×	ABS fail signal (ON/OFF) status is displayed.
EBD FAIL SIG (ON/OFF)	-	-	×	EBD fail signal (ON/OFF) status is displayed.
FLUID LEV SW (ON/OFF)	×	-	×	Brake fluid level switch (ON/OFF) status is displayed.
CRANKING SIG	-	-	×	Ignition switch (START) switch signal input status is displayed.
SNOW MODE SW (ON/OFF)	-	-	×	OFF is displayed.
BST OPER SIG (ON/OFF)	-	-	×	OFF is displayed.
M-MODE SIG (ON/OFF)	-	-	×	M-mode (ON/OFF) status judged by CAN communication signal is displayed.
OD OFF SW (ON/OFF)	-	-	×	OD cancel switch (ON/OFF) status judged by CAN communication signal is displayed.
EBD SIGNAL (ON/OFF)	-	-	×	EBD operation (ON/OFF) status is displayed.
ABS SIGNAL (ON/OFF)	-	-	×	ABS operation (ON/OFF) status is displayed.
TCS SIGNAL (ON/OFF)	-	-	×	TCS operation (ON/OFF) status is displayed.
VDC SIGNAL (ON/OFF)	-	-	×	VDC operation (ON/OFF) status is displayed.

×: Applicable
 -: Not applicable

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

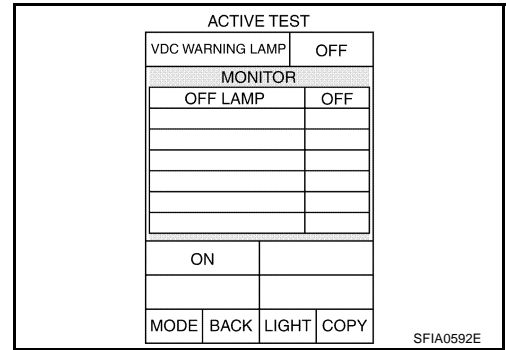
VDC Warning Lamp

Touch "ON" and "OFF" on screen. Make sure VDC OFF indicator lamp operates as shown in table below.

Operation	ON	OFF
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.



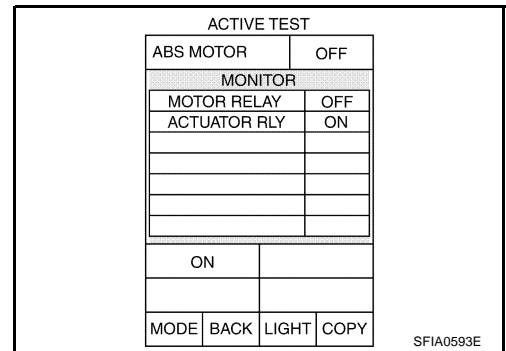
ABS Motor

Touch "ON" and "OFF" on screen. Make sure motor relay operates as shown in table below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RELAY	ON	ON

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.



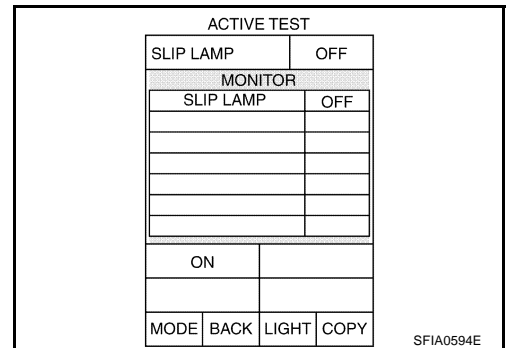
SLIP Lamp

Touch "ON" and "OFF" on screen. Make sure 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.



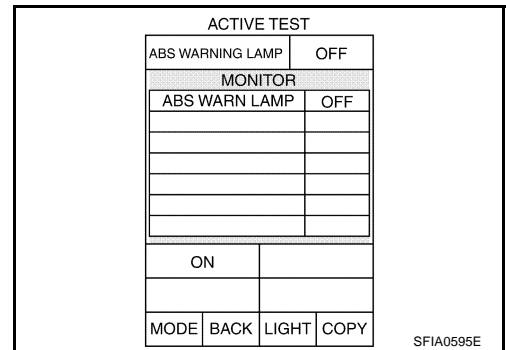
ABS Warning Lamp

Touch "ON" and "OFF" on screen. Make sure ABS warning lamp operates as shown in table below.

Operation	ON	OFF
ABS WARN 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.



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 Steering angle sensor, steering system parts or suspension system parts 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-24, "Operation Procedure"](#) .
- When checking continuity and voltage between units, be sure to check for disconnection, looseness, bend, or collapse of connector terminals. If any malfunction 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-diagnostic results are displayed without regard to occurrence timing. In some cases later ones (timing value is small) appear on next screen.
- While self-diagnostic results of CONSULT-II shows malfunction, if CONSULT-II active test is performed, an engine system error may be indicated. In this case, start engine to resume 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/TCS/ABS actuator. Slight noise may occur during VDC, TCS, and ABS operation.	Normal
	Just after engine starts, the motor operating noise may be heard. This is a normal status of the system operation check.	
System operation check noise	When engine starts, slight "click" noise may be heard from engine room. This is normal and is part of system operation check.	Normal
TCS operation (SLIP 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 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 (19 MPH) or above. Make sure 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.	-	×	×	—

Basic Inspection**BASIC INSPECTION 1: BRAKE FLUID LEVEL AND LEAK INSPECTION**

1. Check fluid level in brake reservoir tank. If fluid level is low, refill brake fluid.
2. Check for leakage in brake piping and around VDC actuator. If leakage or seepage is found, check as follows.
 - If VDC actuator connector is loose, tighten piping to specified torque. Then inspect again and confirm that there is no leakage.
 - If connection flare nuts or screws of VDC actuator are damaged, replace damaged parts. Then inspect again and confirm that there is no leakage.
 - If there is leakage or seepage at any location other than VDC actuator connections, wipe away leakage or seepage with clean cloth. Then inspect again and confirm that there is no leakage.
 - If there is leakage from VDC actuator, wipe away leakage or seepage with clean cloth. Then inspect again. If there is leakage or seepage, replace VDC actuator.

CAUTION:

ABS actuator body cannot be disassembled.

3. Check brake disc rotor and pads. Refer to [BR-22, "FRONT DISC BRAKE"](#) , [BR-29, "REAR DISC BRAKE"](#)

BASIC INSPECTION 2: INSPECTION FOR LOOSENESS OF POWER SYSTEM TERMINALS

Check battery for looseness on battery positive/negative terminals and ground connection. If looseness is detected, tighten piping to the specified torque. Make sure battery voltage does not drop and alternator is normal.

BASIC INSPECTION 3: INSPECTION OF ABS WARNING LAMP, VDC OFF INDICATOR LAMP, AND SLIP INDICATOR LAMP

1. Make sure ABS warning lamp illuminates for approximately 1 seconds when ignition switch is turned ON. If it does not illuminate, inspect ABS warning lamp and circuit, and inspect combination meter.
2. Make sure VDC OFF indicator lamp illuminates for approximately 1 seconds when ignition switch is turned ON. If it does not illuminate, inspect VDC OFF indicator lamp and circuit, and inspect combination meter.
3. Make sure SLIP indicator lamp illuminates for approximately 1 seconds when ignition switch is turned ON. If it does not turn on, check SLIP indicator lamp and circuit.
4. With engine running, turn VDC OFF switch ON and OFF. Make sure VDC OFF indicator lamp turns on and off. If indicator lamp does not turn on and off according to switch operation, inspect VDC OFF switch and circuit.
5. With VDC OFF switch OFF (not operating), make sure VDC OFF indicator lamp turns off 2 seconds after engine starts. If VDC OFF indicator lamp does not turn off after 10 seconds have passed since engine-start, perform self-diagnostic of VDC/TCS/ABS control unit.

Inspection 1: Wheel Sensor System
INSPECTION PROCEDURE

First use CONSULT-II self-diagnostic results to determine positions of malfunctioning wheel sensors. Then inspect parts and determine which parts to replace.

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 tester terminal stick, when it does the inspection with tester.

1. INSPECTION START

Perform self-diagnosis.

OK or NG

- OK >> INSPECTION END
 NG >> GO TO 2.

SELF-DIAG RESULTS	
DTCRESULTS	TIME
RR RH SENSOR-1 [C1101]	0

SFIA0625E

2. CHECK CONNECTOR

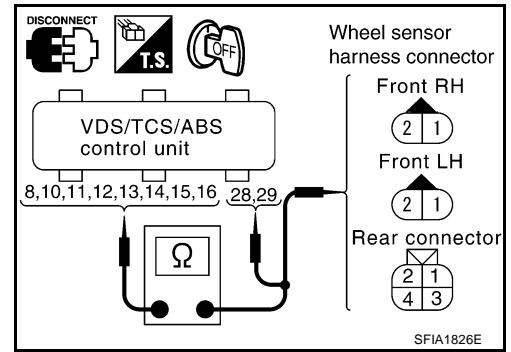
Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector and connector of wheel sensor where malfunction was detected. Check terminals for deformation and connectors for poor contact. Then reconnect connectors. Also make sure interference with other parts has not cut wheel sensor cables.

Drive vehicle at 30 km/h (19 MPH) or above for at least 1.0 minute. Did ABS warning lamp turn off?

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

3. CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector and VDC/TCS/ABS control unit connector.
2. Check the continuity between terminals. (Also check the continuity when steering wheel is turned right and left and when sensor harness inside wheel well is moved.)



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

4. CHECK TIRE

Check air pressure, wear and size.

Are air pressure, wear, and size within standards?

- YES >> GO TO 5.
- NO >> Adjust air pressure or replace tire.

5. CHECK SENSOR ROTOR

Check sensor rotor teeth and surface of rubber for damage.

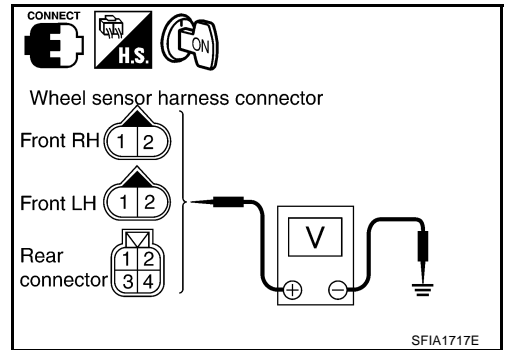
OK or NG

- OK >> GO TO 6.
- NG >> Replace sensor rotor.

6. CHECK WHEEL SENSOR POWER SUPPLY

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

Voltage : 8V or more



OK or NG

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

Inspection 2: Engine System

AFS0004C

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS (1)

Check the self-diagnostic results.

Self-diagnostic results
CONSULT-II display items
Engine system 1
Engine system 2
Engine system 3
Engine system 4
Engine system 5
Engine system 6

Do self-diagnostic results indicate anything other than the above?

- YES >> Perform repair or replacement for the item indicated.
- NO >> GO TO 2.

2. CHECK SELF-DIAGNOSTIC RESULTS (2)

1. Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again.
2. Perform VDC/TCS/ABS control unit self-diagnosis again.

OK or NG

- OK >> INSPECTION END
- NG >> Repair or replace the items indicated. Then perform self-diagnosis again.

Inspection 3: VDC/TCS/ABS Control Unit System

AFS0004D

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
CONSULT-II display items
ABS controller

Does anything other than "ABS CONTROLLER" appear on self-diagnosis display?

- YES >> Repair or replace the items indicated. Then perform self-diagnosis again.
- NO >> Replace VDC/TCS/ABS control unit. Then perform VDC/TCS/ABS control unit self-diagnosis again.

Inspection 4: Pressure Sensor and Circuit Between Pressure sensor and VDC/TCS/ABS Control Unit

AFS0021X

Inspection Procedure

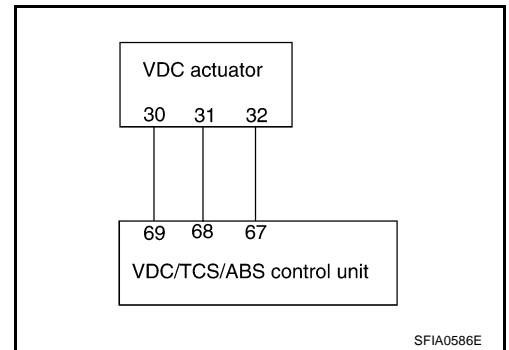
1. CHECK SELF-DIAGNOSTIC RESULTS (1)

Check the self-diagnostic results.

Self-diagnostic results
CONSULT-II display items
Press sensor system

Dose "PRESSURE SENSOR" appear on self-diagnosis display?

- YES >> GO TO 2.
- NO >> INSPECTION END



2. CHECK SELF-DIAGNOSTIC RESULTS (2)

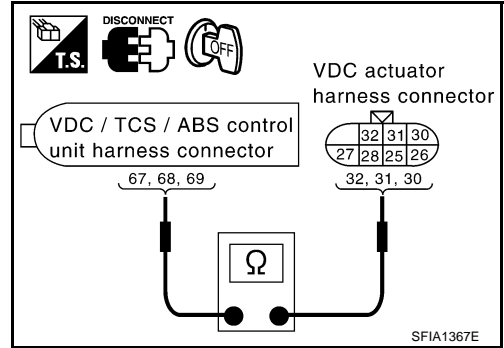
1. Turn ignition switch OFF and disconnect VDC actuator (pressure sensor) connector and VDC/TCS/ABS control unit connector. Then reconnect them securely.
2. Perform VDC/TCS/ABS control unit self-diagnosis again.

OK or NG

- OK >> Poor connection of connectors. Repair or replace suspect connector. Perform self-diagnosis again.
- NO >> GO TO 3.

3. CHECKING PRESSURE SENSOR CIRCUIT

1. Turn ignition switch OFF and disconnect VDC actuator (pressure sensor) connector and VDC/TCS/ABS control unit connector.
2. Check 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)	pressure sensor (VDC actuator harness connector E50)	Continuity
69 (P/B)	30 (P/B)	Yes
68(SB)	31(SB)	Yes
67(G/B)	32(G/B)	Yes

OK or NG

- OK >> GO TO 4.
- NG >> Open or short in harness. Repair or replace the suspect harness.

4. CHECKING PRESSURE SENSOR

1. Connect VDC actuator (pressure sensor) connector and VDC/TCS/ABS control unit connector.
2. Check pressure sensor value on “DATA MONITOR”

Condition	Data monitor display
Brake pedal 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 >> Pressure sensor malfunction. Replace VDC actuator (inside pressure sensor).

Inspection 5: Steering Angle Sensor and Circuit Between Steering Angle Sensor and VDC/TCS/ABS Control Unit

AFS0004F

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS

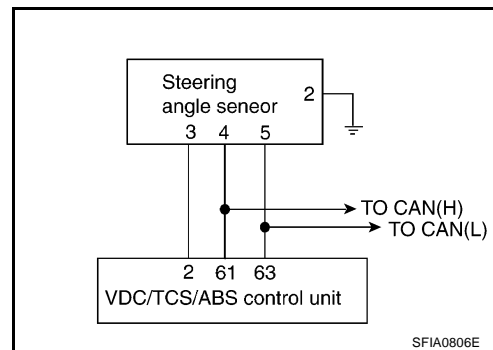
Check the self-diagnostic results.

Self-diagnostic results
CONSULT-II display items
Steering angle sensor system

Also perform Inspection 1 for the CAN communication system.

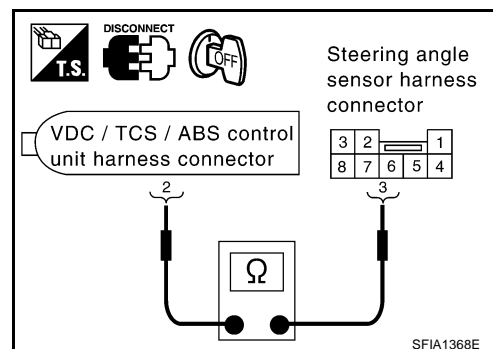
Does "STEERING ANGLE SENSOR" appear on self-diagnosis display?

- YES >> GO TO 2.
- NO >> INSPECTION END



2. CHECK STEERING ANGLE SENSOR CIRCUIT

- Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector and steering angle sensor connector.
- Check continuity between VDC/TCS/ABS control unit harness connector E118 and steering angle sensor harness connector M22.



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

OK or NG

- OK >> GO TO 3.
- NG >> Open or short in harness. Repair or replace the suspect harness.

3. PERFORM DATA MONITOR

1. Connect VDC/TCS/ABS control unit connector and steering angle sensor connector.
2. Perform "DATA MONITOR" for "STR ANGLE SIG". Check if results are normal.

Steering condition	DATA MONITOR
Driving straight	-5 deg to +5 deg
Turned 90°to right	Approx. +90 deg
Turned 90°to left	Approx. -90 deg

OK or NG

- OK >> Perform VDC/TCS/ABS control unit self-diagnosis again.
- NG >> Replace 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 and Circuit Between Yaw Rate/Side G-Sensor and VDC/TCS/ABS Control Unit

AFS0004G

CAUTION:

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

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS (1)

Check the self-diagnostic results.

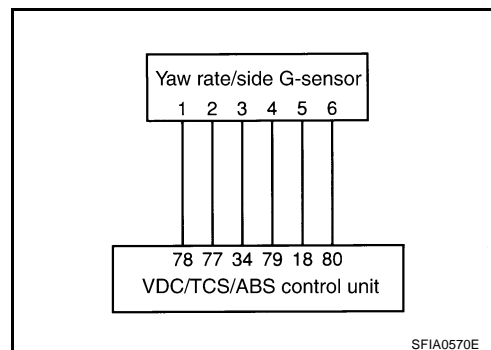
Self-diagnostic results
CONSULT-II display items
Yaw rate sensor system
Side G-sensor system

CAUTION:

If vehicle is on turn-table at entrance to parking garage, or on other moving surface, VDC OFF indicator lamp may illuminate and CONSULT-II self-diagnosis may indicate yaw rate sensor system malfunction. However, in this case there is no malfunction in yaw rate sensor system. Take vehicle off of turn-table or other moving surface, and start engine. Results will return 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.

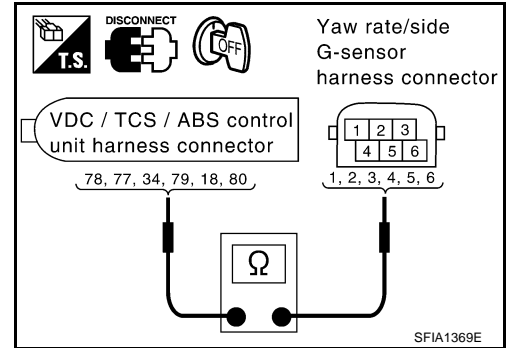
Do "YAW RATE SENSOR SYSTEM" and "SIDE G-SENSOR SYSTEM" appear on self-diagnosis display?

- YES >> GO TO 2.
- NO >> INSPECTION END



2. CHECK SELF-DIAGNOSTIC RESULTS (2)

1. Turn ignition switch OFF and disconnect yaw rate/side G-sensor connector and VDC/TCS/ABS control unit connector.
2. Check continuity between VDC/TCS/ABS control unit harness connector E118 and 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)	Yes
77 (Y/B)	2 (Y/B)	Yes
34 (OR)	3 (OR)	Yes
79 (LG/R)	4 (LG/R)	Yes
18 (LG)	5 (LG)	Yes
80 (W/R)	6 (W/R)	Yes

OK or NG

- OK >> GO TO 3.
 NG >> Open or short in harness. Repair or replace the suspect harness.

3. CHECK YAW RATE/SIDE G-SENSOR CIRCUIT

1. Connect VDC/TCS/ABS control unit connector and yaw rate/side G-sensor connector.
2. Check "DATA MONITOR" for yaw rate /side G-sensor. Make sure results are normal.

Vehicle condition	Yaw rate sensor (Data monitor standard)	Side G-sensor (Data monitor standard)
Stopped	-4 to +4 deg/s	-1.1 to +1.1 m/s ²
Turning right	Negative value	Negative value
Turning left	Positive value	Positive value

OK or NG

- OK >> Perform VDC/TCS/ABS control unit self-diagnosis again.
 NG >> Malfunction of yaw rate/side G-sensor. Replace yaw rate/side G-sensor and perform VDC/TCS/ABS control unit self-diagnosis again.

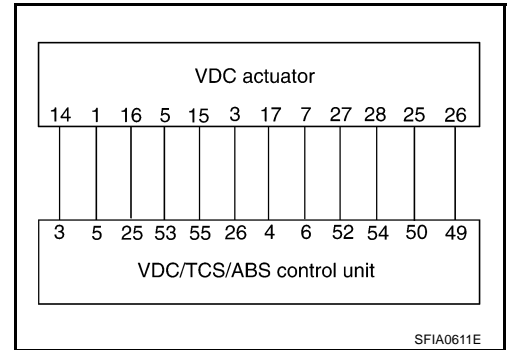
Inspection 7: Solenoid, VDC Switching Valve, and Circuits

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS (1)

Check the self-diagnostic results.

Self-diagnostic results
CONSULT-II display items
Front LH inlet ABS solenoid system
Front LH outlet ABS solenoid system
Rear RH inlet ABS solenoid system
Rear RH outlet ABS solenoid system
Front RH inlet ABS solenoid system
Front RH outlet ABS solenoid system
Rear LH inlet ABS solenoid system
Rear LH outlet ABS solenoid system
Primary USV solenoid system
Secondary USV solenoid system
Primary HSV solenoid system
Secondary HSV solenoid system



Do above items appear on self-diagnostic results display?

- YES >> GO TO 2.
- NO >> INSPECTION END

2. CHECK SELF-DIAGNOSTIC RESULTS (2)

1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector and VDC actuator connectors. Then reconnect them securely.
2. Reconnect connectors securely and perform self-diagnosis again.

Do any self-diagnosis items appear?

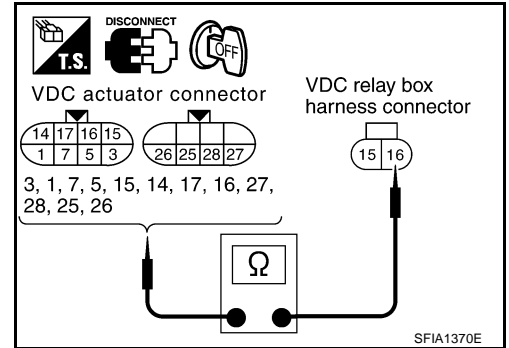
- YES >> GO TO 3.
- NO >> Poor connection. Repair or replace connector.

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

3. CHECK ACTUATOR SOLENOID

1. Turn ignition switch OFF and disconnect VDC relay box connector (E222) and VDC actuator connectors.
2. Check resistance of VDC actuator solenoid.



VDC actuator [Actuator connector (E49 and E50)]	VDC relay box (Harness connector E222)	Resistance value
7	16	6.0 - 11 Ω
3	16	
5	16	
1	16	
17	16	3.0 - 5.0 Ω
15	16	
16	16	
14	16	
27	16	
28	16	
25	16	6.0 - 11 Ω
26	16	

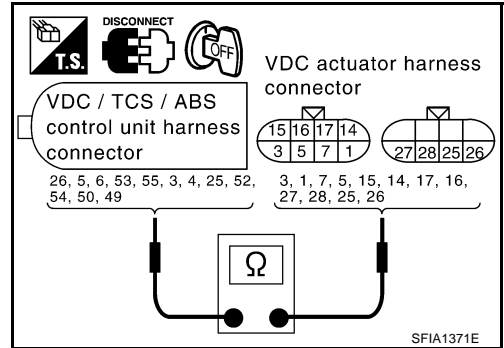
OK or NG

OK >> GO TO 4.

NG >> Check harness open or short between VDC relay box and VDC actuator. If harness is OK replace VDC actuator.

4. CHECK SOLENOID CIRCUIT

1. Disconnect VDC/TCS/ABS control unit and VDC actuator connectors.
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)	Yes
5 (G/OR)	1 (G/OR)	Yes
6 (PU/W)	7 (PU/W)	Yes
53 (P)	5 (P)	Yes
55 (R/Y)	15 (R/Y)	Yes
3 (Y/G)	14 (Y/G)	Yes
4 (GY/R)	17 (GY/R)	Yes
25 (LG)	16 (LG)	Yes
52 (PU)	27 (PU)	Yes
54 (W/L)	28 (W/L)	Yes
50 (R/G)	25 (R/G)	Yes
49 (B/W)	26 (B/W)	Yes

OK or NG

- OK >> Replace VDC actuator.
- NG >> If the open or short in harness, repair or replace harness.

Inspection 8: Actuator Motor, Motor Relay, and Circuit

AFS001C2

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS (1)

Check self-diagnostic results.

Self-diagnostic results
CONSULT-II display items
Pump motor, motor relay system

Do "PUMP MOTOR" and "MOTOR RELAY SYSTEM" appear in self-diagnostic results display?

- YES >> GO TO 2.
- NO >> INSPECTION END

2. CHECK SELF-DIAGNOSTIC RESULTS (2)

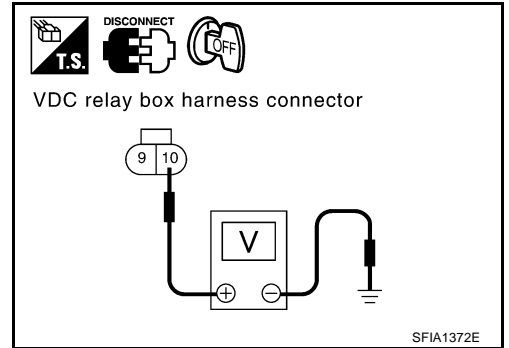
1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector and VDC relay box connectors.
2. Reconnect connectors securely and perform self-diagnosis again.

Do any self-diagnosis items appear?

- YES >> GO TO 3.
 NO >> Poor connection. Repair or replace connector.

3. CHECK ABS MOTOR AND MOTOR RELAY POWER SYSTEM

1. Turn ignition switch OFF and disconnect VDC relay box connector (E48).
2. Check voltage between VDC relay box harness connector E48 and ground.



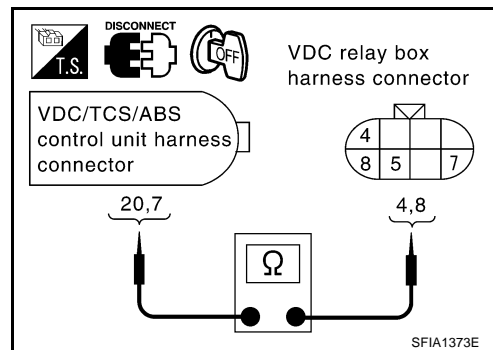
VDC relay box (Harness connector E48)	Ground	Voltage
10 (W/R)	—	Battery voltage (Approx. 12V)

OK or NG

- OK >> GO TO 4.
 NG >> ● Check fuse 50A.
 ● Make sure there is continuity between battery positive terminal and VDC relay box harness connector E48 terminal No. 10 (W/R).

4. CHECK ABS MOTOR AND MOTOR RELAY CIRCUIT

1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector and VDC relay box connector (E47).
2. Check for 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)	Yes
7 (G/W)	8 (G/W)	Yes

OK or NG

OK >> GO TO 5.

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

5. CHECK MOTOR RELAY UNIT

Check motor relay as a unit. Refer to [BRC-56, "VDC RELAY BOX"](#).

OK or NG

OK >> Replace VDC actuator.

NG >> Replace VDC relay box (motor relay).

Inspection 9: Solenoid Valve Relay and Circuit

AFS001C3

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS (1)

Check the self-diagnostic results.

Self-diagnostic results
CONSULT-II display items
Actuator relay circuit

Does "ACTUATOR RELAY CIRCUIT" appear on self-diagnostic results display?

YES >> GO TO 2.

NO >> INSPECTION END

2. CHECK SELF-DIAGNOSTIC RESULTS (2)

1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector and VDC relay box connectors. Then reconnect it securely.
2. Perform VDC/TCS/ABS control unit self-diagnosis again.

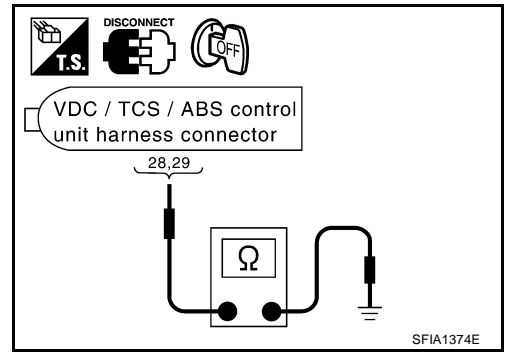
Do any self-diagnosis items appear?

YES >> GO TO 3.

NO >> Poor connection. Repair or replace connector.

3. CHECK VDC/TCS/ABS CONTROL UNIT GROUND CIRCUIT

1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector.
2. Check VDC/TCS/ABS control unit ground circuit.



VDC/TCS/ABS control unit (Harness connector E118)	Ground	Continuity
28 (B)	—	Yes
29 (B)	—	Yes

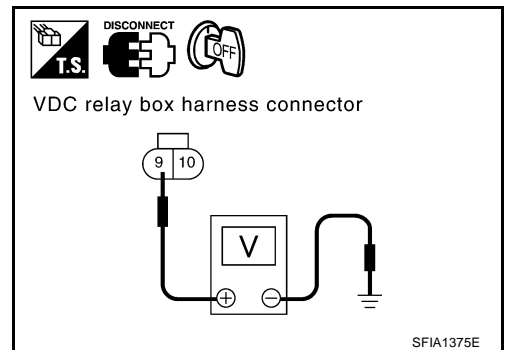
OK or NG

OK >> GO TO 4.

NG >> ● Poor connection of VDC/TCS/ABS control unit, or harness malfunction.

4. CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Disconnect VDC relay box connector (E48).
2. Check voltage between VDC relay box harness connector E48 and ground.



VDC relay box (Harness connector E48)	Ground	Voltage
9 (R/B)	—	Battery voltage (Approx. 12V)

OK or NG

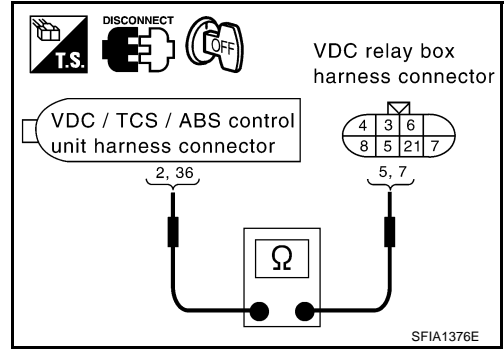
OK >> GO TO 5.

NG >> ● Check fuse 30A.

- Check continuity between battery positive terminal and VDC relay box harness connector E48 terminal No. 9 (R/B). If it is not OK, replace fuse or harness.

5. CHECK ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Disconnect VDC/TCS/ABS control unit connector and VDC relay box connector (E47) and steering angle sensor connector (M22).
2. Check 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
2 (Y/R)	5 (Y/R)	Yes
36 (L/Y)	7 (L/Y)	Yes

OK or NG

- OK >> GO TO 6.
- NG >> Open or short in harness. Repair or replace harness.

6. CHECK SOLENOID VALVE RELAY UNIT

Check solenoid valve relay as a unit. Refer to [BRC-56, "VDC RELAY BOX"](#).

OK or NG

- OK >> Replace VDC actuator.
- NG >> Replace solenoid valve relay.

Inspection 10: Stop Lamp Switch and Circuit

AFS0004K

Inspection Procedure

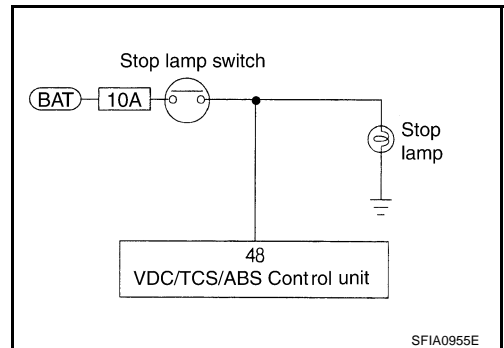
1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
CONSULT-II display items
Stop lamp switch circuit

Does "STOP LAMP SW SYSTEM" appear in self-diagnostic results display?

- YES >> GO TO 2.
- NO >> INSPECTION END



2. CHECK STOP LAMP

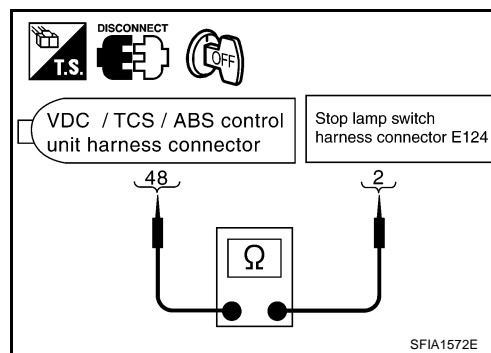
1. Turn ignition switch OFF and disconnect stop lamp switch connector and VDC/TCS/ABS control unit connector.
2. Reconnect connectors securely.
3. Start engine.
4. Repeat pumping brake pedal carefully several times, then perform self-diagnosis.

Do any self-diagnostic items appear?

- YES >> GO TO 3.
 NO >> Poor connection. Repair or replace connector.

3. CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF and disconnect stop lamp switch connector and VDC/TCS/ABS control unit connector.
2. Check continuity between stop lamp switch harness connector E124 and VDC/TCS/ABS control unit harness connector E118.



VDC/TCS/ABS control unit (Harness connector E118)	Stop lamp switch (Harness connector E124)	Continuity
48 (P/L)	2 (P/L)	Yes

OK or NG

- OK >> Perform VDC/TCS/ABS control unit self-diagnosis again.
 NG >> Open or short in harness between VDC/TCS/ABS control unit and stop lamp switch

Inspection 11: VDC/TCS/ABS Control Unit Power Supply Circuit

AFS0004L

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
CONSULT-II display items
Low battery voltage

Does "LOW BATTERY VOLTAGE" appear in self-diagnostic results display?

- YES >> GO TO 2.
 NO >> INSPECTION END

2. INSPECTION START

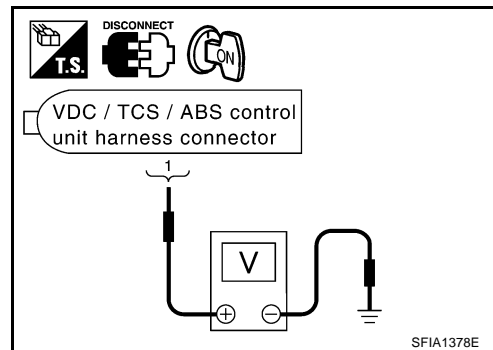
1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector. Then reconnect it securely.
2. Perform self-diagnosis.

Do any self-diagnosis items appear?

- YES >> GO TO 3.
 NO >> Poor connection. Repair or replace connector.

3. CHECK VDC/TCS/ABS CONTROL UNIT POWER SYSTEM (1)

1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector.
2. Turn ignition switch ON (but do not start engine). Check voltage between VDC/TCS/ABS control unit harness connector E118 and ground.



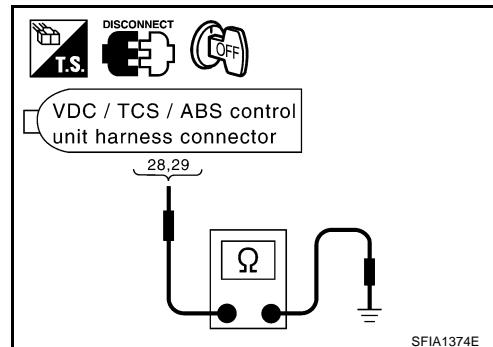
VDC/TCS/ABS control unit (Harness connector E118)	Ground	Voltage
1 (G/R)	—	Battery voltage (Approx. 12V)

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 5.

4. CHECK VDC/TCS/ABS CONTROL UNIT GROUND CIRCUIT

Turn ignition switch OFF and check VDC/TCS/ABS control unit ground circuit.



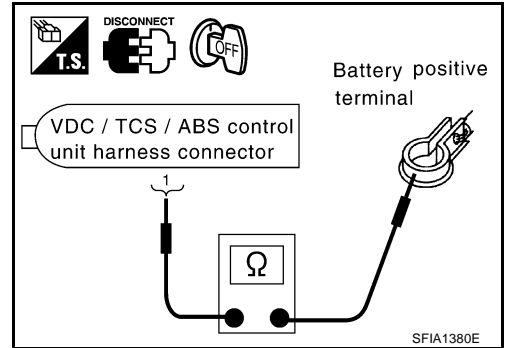
VDC/TCS/ABS control unit (Harness connector E118)	Ground	Continuity
28 (B)	—	Yes
29 (B)	—	Yes

OK or NG

- OK >> Perform VDC/TCS/ABS control unit self-diagnosis again.
- NG >> Poor installation of VDC/TCS/ABS control unit, or harness malfunction

5. CHECK VDC/TCS/ABS CONTROL UNIT POWER SYSTEM (2)

1. Check fuse 10A.
2. Check continuity between battery positive terminal and VDC/TCS/ABS control unit harness connector E118.



VDC/TCS/ABS control unit (Harness connector E118)	Battery positive terminal	Continuity
1 (G/R)	—	Yes

OK or NG

- OK >> Check for non-standard conditions in battery (terminal looseness, low voltage, etc.) And alternator.
- NG >> ● Replace 10A fuse.
● Open or short in harness.

Inspection 12 When “SHIFT POSITION ERROR” Appears in self-Diagnostic results Display (A/T Models)

AFS0004M

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
CONSULT-II display items
Shift position error

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

- YES >> GO TO 2.
NO >> INSPECTION END

2. PERFORM DATA MONITOR

1. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector. Start engine.
2. In “DATA MONITOR” select “MAIN SIGNALS” and then check select lever position.

Select 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. CHECK A/T PARK/NEUTRAL POSITION SWITCH

Perform the A/T park/neutral position switch inspection. Refer to [AT-112, "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.

Inspection 13: When "EMERGENCY BRAKE" Appears on Self-Diagnostic Results Display

AFS0004N

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
CONSULT-II display items
Emergency brake

If anything other than "EMERGENCY BRAKE" appears in self-diagnostic results display, follow the instructions in the note below.

NOTE:

"EMERGENCY BRAKE" is displayed when a malfunction is detected in VDC/TCS/ABS control unit itself. If this display item appears, replace VDC/TCS/ABS control unit.

Does "EMERGENCY BRAKE" appear on self-diagnostic results display?

- >> Replace VDC/TCS/ABS control unit, and perform self-diagnosis again.

Inspection 14: When "STEERING ANGLE SENSOR HAS NOT BEEN CORRECTED" Appears on Self-Diagnostic Results Display

AFS0004O

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS (1)

Check the self-diagnostic results.

Self-diagnostic results
CONSULT-II display items
Steering angle sensor has not been corrected.

Does anything besides "STEERING ANGLE SENSOR HAS NOT BEEN CORRECTED" appear on self-diagnostic results display?

- YES >> Check and repair the indicated items. Then perform self-diagnosis again.
 NO >> Adjust of steering angle sensor neutral position. Then GO TO 2.

2. CHECK SELF-DIAGNOSTIC RESULTS (2)

- Turn ignition switch OFF and ON to erase self-diagnostic results, and perform VDC/TCS/ABS control unit self-diagnosis again.

Does anything appear on self-diagnostic results display?

- YES >> Replace steering angle sensor. Then perform adjustment of neutral position and perform self-diagnosis again. Refer to [BRC-6, "Adjustment of Steering Angle Sensor Neutral Position"](#).
 NO >> INSPECTION END

Inspection 15: Brake Fluid Level in Reservoir Tank, Communication Circuit Between VDC/TCS/ABS Control Unit and Brake Fluid Level Sensor

AFS0004P

Inspection Procedure

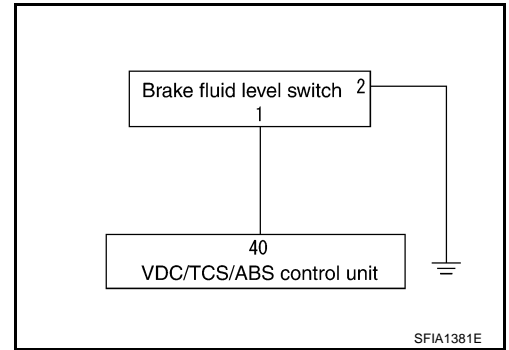
1. CHECK SELF-DIAGNOSTIC RESULTS (1)

Check the self-diagnostic results.

Self-diagnostic results
CONSULT-II display items
Brake fluid level switch

Does brake warning lamp turn on?

- YES >> Check pad for wear. Check brake fluid for leakage.
- NO >> GO TO 2.



2. CHECK SELF-DIAGNOSTIC RESULTS (2)

- Turn ignition switch OFF and disconnect brake fluid level switch connector and VDC/TCS/ABS control unit connector.
- Reconnect connectors securely, then perform VDC/TCS/ABS control unit self-diagnosis again.

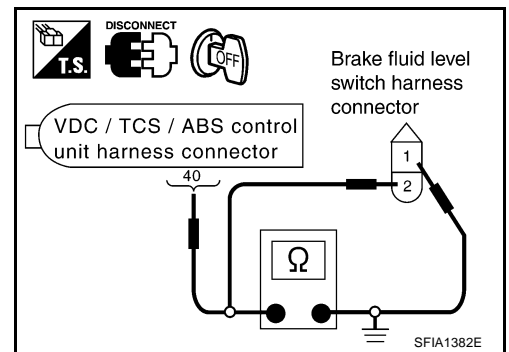
Does anything appear on self-diagnostic results display?

- YES >> GO TO 3.
- NO >> Poor connector connections. Repair or replace connectors.

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

- Turn ignition switch OFF and disconnect brake fluid level switch connector and VDC/TCS/ABS control unit connector.
- Check continuity between brake fluid level switch harness connector E44 and VDC/TCS/ABS control unit harness connector E118.

VDC/TCS/ABS control unit (Harness connector E118)	Brake fluid level switch (Harness connector E44)	Continuity
40 (W)	1 (W)	Yes
40 (W)	Ground	No
Ground	2 (B)	Yes



OK or NG

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

Inspection 16: CAN Communication Lines, VDC/TCS/ABS Control Unit, and Steering Angle Sensor System

AFS0004Q

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 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.
- Reconnect connector to perform self-diagnosis.

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

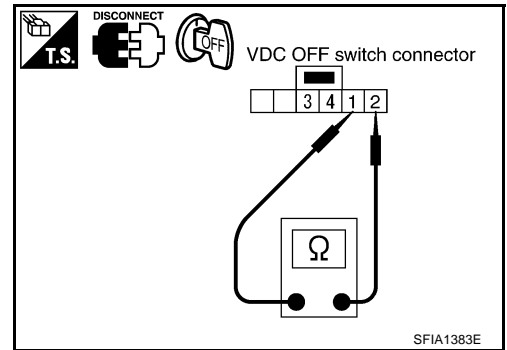
- YES >> Print out the self-diagnostic results, and refer to [LAN-2, "Precautions When Using CONSULT-II"](#).
- NO >> Connector terminal connection is loose, damaged, open, or shorted.

Component Inspection VDC OFF SWITCH

- Turn ignition switch OFF and disconnect VDC OFF switch connector. Check continuity between terminal No. 1 and terminal No. 2.

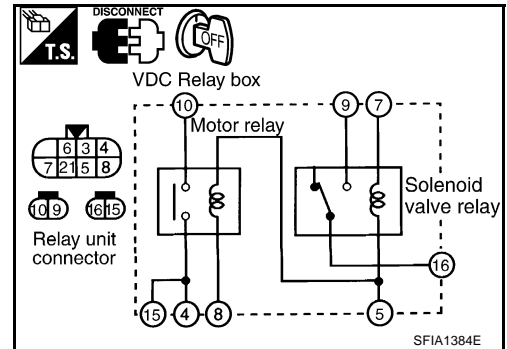
No. 1 to No. 2:

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



VDC RELAY BOX

Turn ignition switch OFF and disconnect VDC relay box connectors. Check continuity, resistance value, and insulation between any pair of terminals in VDC relay box.



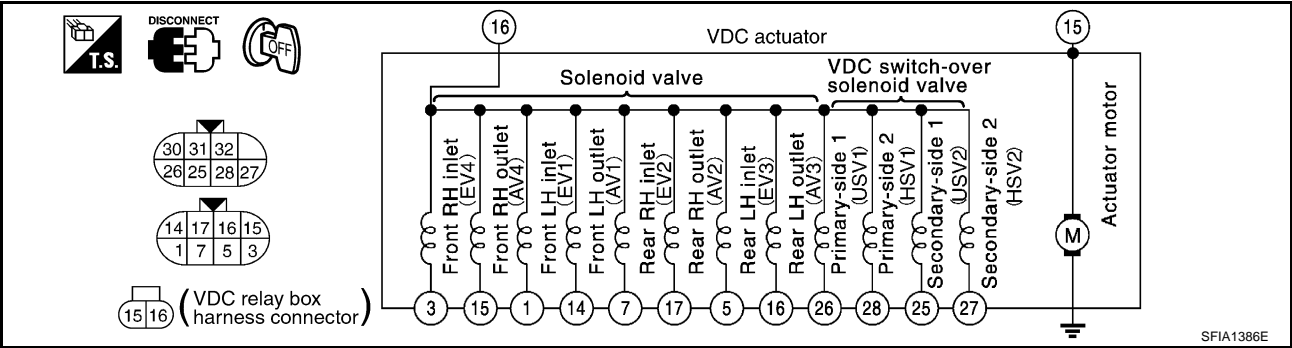
Continuity, Resistance

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

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

VDC ACTUATOR

Disconnect VDC actuator connectors. Check continuity and resistance value between any pair of terminals on VDC actuator.



CAUTION:
Make sure actuator motor is correctly grounded.

Continuity, resistance

Item	VDC actuator connector terminal number (15 and 16 terminals is VDC relay box harness connector)	Condition
	16 3 15 1 14 7 17 5 16 26 25 28 27 15 Body ground	
Solenoid valve	6.0 - 11.0Ω ○—○	Check the resistance
	3.0 - 5.0Ω ○—○	
	6.0 - 11.0Ω ○—○	
	3.0 - 5.0Ω ○—○	
	6.0 - 11.0Ω ○—○	
	3.0 - 5.0Ω ○—○	
	6.0 - 11.0Ω ○—○	
	3.0 - 5.0Ω ○—○	
VDC switch-over solenoid valve	6.0 - 11.0Ω ○—○	Check the resistance
	6.0 - 11.0Ω ○—○	
	3.0 - 5.0Ω ○—○	
	3.0 - 5.0Ω ○—○	
Actuator motor	○—○	—
(Resistance) ○—○ : Continuity: Yes ○—○ : Continuity: Yes		

SFIA1387E

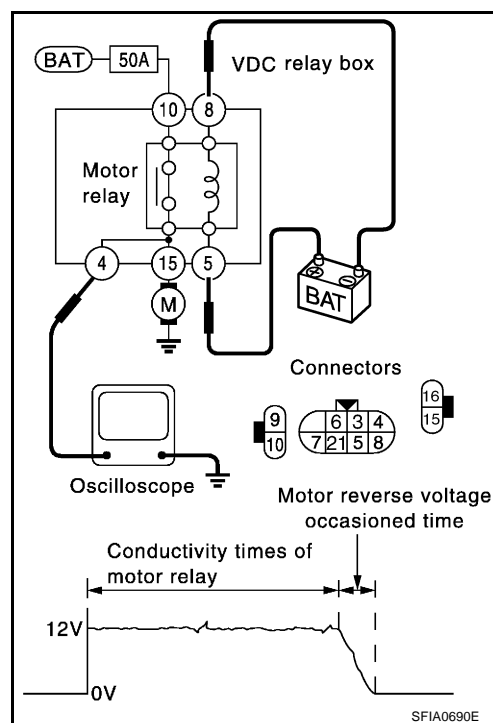
Check Actuator Operation

- Turn ignition switch OFF, apply a voltage of 12V between VDC relay box connector E47 terminal 5 and 8, use an oscilloscope to measure motor voltage at this time (between terminal 4 and ground), and check motor reverse voltage occurrence time when operation is stopped.

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

CAUTION:

- 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.
- Motor reverse voltage occurrence time is standard when battery voltage is 12V and the air temperature is 20°C (68°F), and this time is a little shorter when battery voltage is low or the air temperature is low.



Symptom 1: ABS Works Frequently.

Inspection Procedure

1. INSPECTION START

Perform following inspection for wheel sensor.

- Sensor mounting inspection
- Sensor pick-up inspection for iron chips
- Sensor rotor inspection (e.g. Number of teeth, damaged teeth)
- Sensor connector engagement inspection

OK or NG

- OK >> GO TO 2.
- NG >> Repair wheel sensor and rotor system.

2. CHECK LOOSENESS

Check for looseness of front Axle.

OK or NG

- OK >> GO TO [BRC-58, "Symptom 2: Unexpected Pedal Reaction"](#)
- NG >> Axle inspection and repair

Symptom 2: Unexpected Pedal Reaction

Inspection Procedure

1. CHECK BRAKE PEDAL STROKE

Check brake pedal stroke.

Is stroke excessively long?

- YES >> Check bleeding and brake system.
- NO >> GO TO 2.

2. CHECK PEDAL FORCE

Make sure brake is effective with pedal depressed.

Is pedal heavy, but effective?

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

3. CHECK CONNECTOR AND FUNCTION

Turn ignition switch OFF and disconnect VDC relay box connectors to deactivate ABS function. Make sure brake is effective.

Is brake effective?

- YES >> GO TO 4.
NO >> Check brake line.

4. CHECK ABS WARNING LAMP FOR ILLUMINATION

Make sure ABS warning lamp illuminates.

OK or NG

- OK >> Perform self-diagnosis.
NG >> GO TO 5.

5. CHECK WHEEL SENSOR

Perform following inspection for wheel sensor.

- Sensor mounting inspection
- Check sensor pick-up for adhering iron chips.
- Sensor rotor inspection (e.g. Number of teeth, damaged teeth)
- Sensor connector engagement inspection

OK or NG

- OK >> Normal
NG >> Repair wheel sensor and rotor system.

Symptom 3: Long Stopping Distance

AFS0004U

Inspection Procedure

1. INSPECTION START

Make sure stopping distance increases only on snowy roads and gravel roads.

CAUTION:

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

OK or NG

- OK >> May be longer than for vehicles without ABS.
NG >> GO TO 2.

2. CHECK FUNCTION

Turn ignition switch OFF and disconnect VDC relay box to deactivate ABS function.

Is stopping distance still long?

- YES >> ● Bleed air from brake line.
 ● Check brake line.
NO >> GO TO 3.

3. CHECK ABS WARNING LAMP FOR ILLUMINATION

Make sure ABS warning lamp illuminates.

OK or NG

- OK >> Perform self-diagnostic.
 NG >> GO TO 4.

4. CHECK WHEEL SENSOR

perform following inspection for wheel sensor.

- Sensor mounting inspection
- Sensor pick-up inspection for adhering iron chips.
- Sensor rotor inspection (e.g. Number of teeth, damaged teeth)
- Sensor connector engagement inspection

OK or NG

- OK >> Normal
 NG >> Repair wheel sensor and rotor system.

Symptom 4: ABS Does Not Work.

AFS0004V

CAUTION:

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

Inspection Procedure

1. CHECK ABS WARNING LAMP FOR ILLUMINATION

Make sure ABS warning lamp illuminates.

OK or NG

- OK >> Perform self-diagnosis.
 NG >> GO TO 2.

2. CHECK WHEEL SENSOR

Perform following inspection for wheel sensor.

- Sensor mounting inspection
- Sensor pick-up inspection for adhering iron chips.
- Sensor rotor inspection (e.g. Number of teeth, damaged teeth)
- Sensor connector engagement inspection

OK or NG

- OK >> Normal
 NG >> Repair wheel sensor and rotor system.

Symptom 5: Pedal Vibration and Noise

AFS0004W

Inspection Procedure

1. INSPECTION (1)

Check brake system for pedal vibration or noise at engine start.

OK or NG

- OK >> GO TO 2.
 NG >> Perform self-diagnostic.

2. INSPECTION (2)

Check for vibration during soft braking (just placing foot on pedal).

CAUTION:

ABS may activate in conditions such as those listed below, when wheel speed changes.

- Gear shifting
- Turning at high speed
- Passing through gusts of wind

OK or NG

OK >> GO TO 3.

NG >> Perform self-diagnosis.

3. INSPECTION (3)

Does vibration occur during normal braking?

CAUTION:

In addition to activation for sudden braking, ABS may activate in conditions such as those listed below.

- Roads with low surface μ
- Turning at high speed
- Passing through gusts of wind

OK or NG

OK >> GO TO 4.

NG >> Perform self-diagnosis.

4. INSPECTION (4)

Check for vibration when engine speed is increased while vehicle is stopped.

OK or NG

OK >> GO TO 5.

NG >> ● Perform self-diagnosis.

CAUTION:

Vibration may occur when vehicle is stopped.

5. INSPECTION (5)

Check for vibration when switches of electrical components are operated.

OK or NG

OK >> GO TO 6.

NG >> Check for any wireless devices, antennas, or antenna lead near control unit (including wiring).

6. CHECK ABS WARNING LAMP FOR ILLUMINATION

Make sure ABS warning lamp illuminates.

OK or NG

OK >> Perform self-diagnostic.

NG >> GO TO 7.

A

B

C

D

E

BRC

G

H

I

J

K

L

M

7. CHECK WHEEL SENSOR

Inspect wheel sensor system.

- Sensor mounting inspection
- Sensor pick-up inspection for iron chips (e.g. Number of teeth, damaged teeth)
- Sensor connector engagement inspection
- Inspection of wheel sensor circuit

OK or NG

OK >> Normal

NG >> Repair wheel sensor and rotor system.

Symptom 6: VDC OFF Indicator Lamp Does Not Illuminate

AFS001GC

Inspection Procedure

1. CHECK VDC OFF LAMP POWER SUPPLY CIRCUIT

- Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector.
- Make sure voltage between VDC/TCS/ABS control unit harness terminal and ground is battery voltage (Approx. 12V).

OK or NG

OK >> Malfunction of VDC/TCS/ABS control unit. Repair or replace VDC/TCS/ABS control unit.

NG >> Malfunction in combination meter system. Check combination meter system.

Symptom 7: SLIP Indicator Lamp Does Not Illuminate

AFS0004Y

Inspection Procedure

1. CHECK SLIP LAMP FOR BURNED-OUT

Make sure there is continuity between meter power terminal and SLIP indicator lamp terminal.

OK or NG

OK >> GO TO 2.

NG >> Open or short in SLIP indicator lamp or combination meter circuit

2. CHECK SLIP LAMP POWER SUPPLY CIRCUIT

Turn ignition switch OFF and disconnect combination meter connector. Make sure the voltage between combination meter harness terminal and ground is battery voltage (Approx. 12V).

OK or NG

OK >> GO TO 3.

NG >> ● Check fuse.

- Check harness and connector between fuse block and combination meter.

- Check power system (battery, ignition switch circuit).

3. CHECK SLIP INDICATOR LAMP HARNESS

1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit and combination meter connectors.
2. Check for open circuit or short circuits in harness between combination meter and VDC/TCS/ABS control unit.

OK or NG

OK >> GO TO 4.

NG >> Open or short in harness. Repair or replace harness.

4. CHECK SLIP INDICATOR LAMP CONNECTOR

Check VDC/TCS/ABS control unit and combination meter connectors.

OK or NG

- OK >> Reconnect connectors and perform self-diagnostic. There is an intermediate connector in vehicle harness. Be sure to refer to vehicle wiring diagram when performing inspection.
- NG >> Connector open, shorted or damaged. Repair or replace connector.

Symptom 8: Vehicle Behaves Jerkily During VDC/TCS/ABS Operation.

AFS0004Z

Inspection Procedure

1. CHECK ENGINE SPEED SIGNAL

On CONSULT-II, perform "DATA MONITOR" for VDC/TCS/ABS control unit.

Is engine speed at idle 400 rpm or higher?

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

2. CHECK SELF-DIAGNOSTIC RESULTS (1)

Perform VDC/TCS/ABS control unit self-diagnostic.

Does anything appear on self-diagnostic results display?

- YES >> Check and repair the indicated items. Then perform VDC/TCS/ABS control unit self-diagnostic again.
- NO >> GO TO 3.

3. ECM SELF-DIAGNOSTIC RESULTS

Perform the ECM self-diagnostic.

Is the result of self-diagnostic "CRANKSHAFT POSITION SENSOR"?

- YES >> Repair or replace crankshaft position sensor system.
- NO >> GO TO 4.

4. CHECK SELF-DIAGNOSTIC RESULTS (2)

Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit and ECM connectors. Then reconnect them securely. Perform the self-diagnostic again.

OK or NG

- OK >> Connector open, shorted or damaged. Repair or replace connector.
- NG >> GO TO 5.

5. CHECK SELF-DIAGNOSTIC RESULTS (3)

Perform the A/T self-diagnostic. (M/T model: GO TO 6)

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace indicated part.

6. CHECK SELF-DIAGNOSTIC RESULTS (4)

Perform VDC/TCS/ABS control unit self-diagnostic again.

Does anything appear on self-diagnostic results display?

- YES >> Repair or replace indicated part.
- NO >> GO TO 7.

7. CHECK CIRCUIT BETWEEN VDC/TCS/ABS CONTROL UNIT AND ECM

1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit and ECM connectors.
2. Check for open circuit or short circuits in engine speed signal harness between VDC/TCS/ABS control unit and ECM.
3. Check the VDC/TCS/ABS control unit and ECM connectors.
4. Check the CAN communication system. Refer to [BRC-55, "Inspection 16: CAN Communication Lines, VDC/TCS/ABS Control Unit, and Steering Angle Sensor System"](#) .

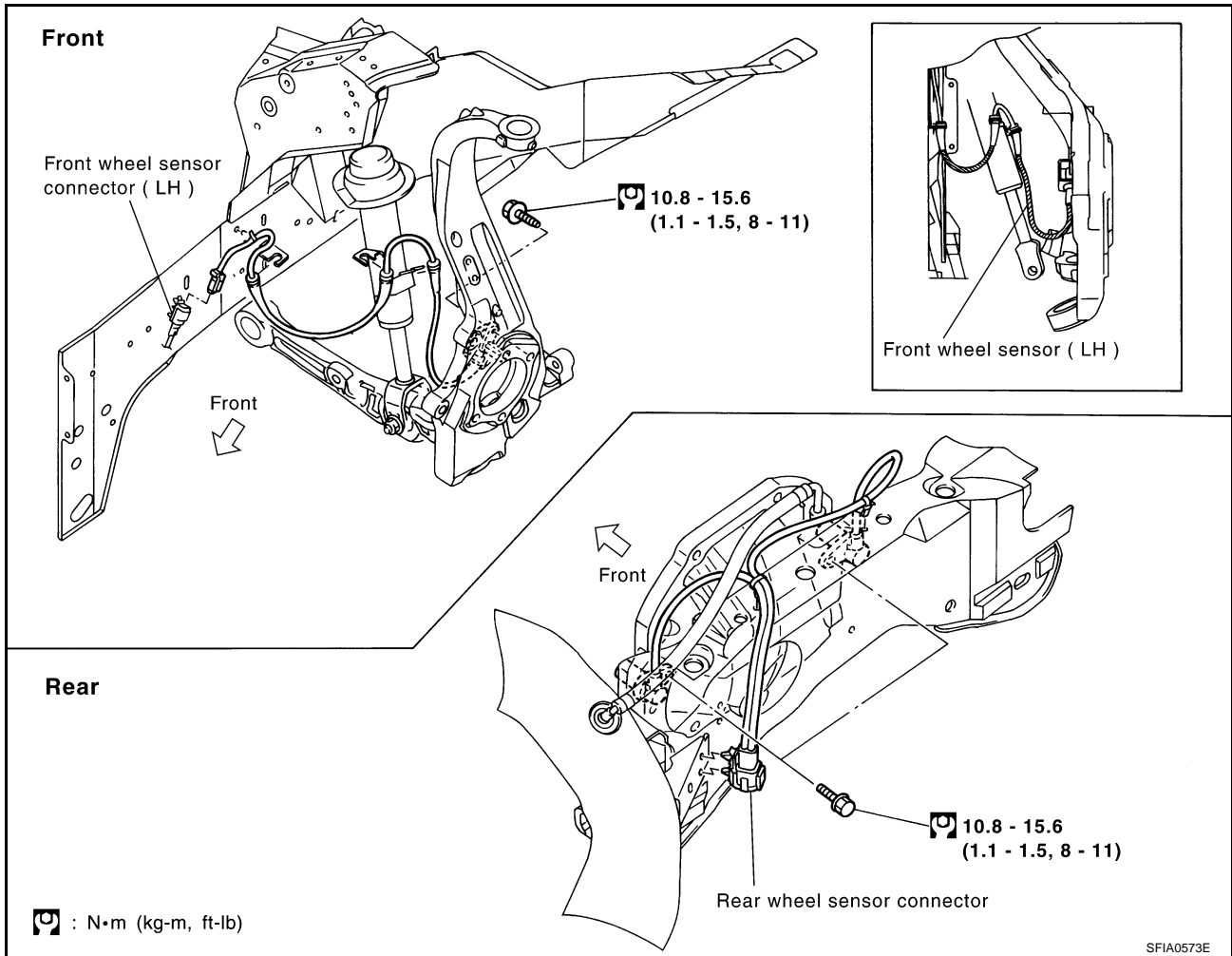
OK or NG

OK >> INSPECTION END

NG >> Reconnect connectors and perform VDC/TCS/ABS control unit self-diagnostic again.

WHEEL SENSOR

Removal and Installation



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 to specified torques.

- When installing, make sure there is no foreign material such as iron chips on pick-up and mounting hole of sensor. Make sure no foreign material has been caught in sensor rotor motor. Remove any foreign material and clean 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.

VDC/TCS/ABS CONTROL UNIT

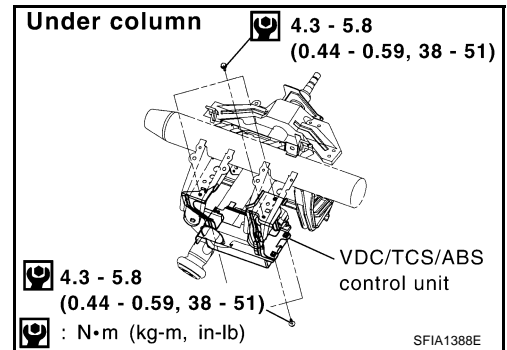
PFP:47660

Removal and Installation

AFS00058

REMOVAL

1. Remove lower instrument panel (drive side). 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

AFS00059

REMOVAL

Front

Sensor rotor cannot be disassembled. To replace sensor rotor, replace hub bearing assembly. Refer to [FAX-4, "REMOVAL"](#) in "Front Axle/Drive Shaft" in "FAX" section.

Rear

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

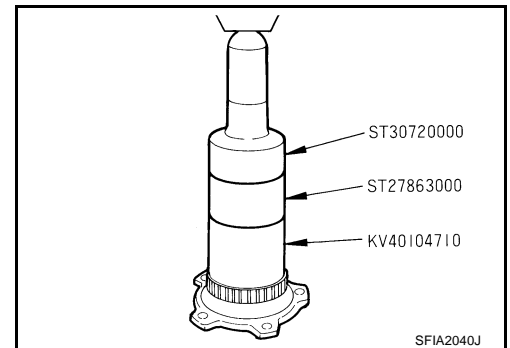
INSTALLATION

Front

Sensor rotor cannot be disassembled. To replace sensor rotor, replace hub bearing assembly. Refer to [FAX-6, "INSTALLATION"](#) in "Front Axle/Drive Shaft" in "FAX" section.

Rear

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



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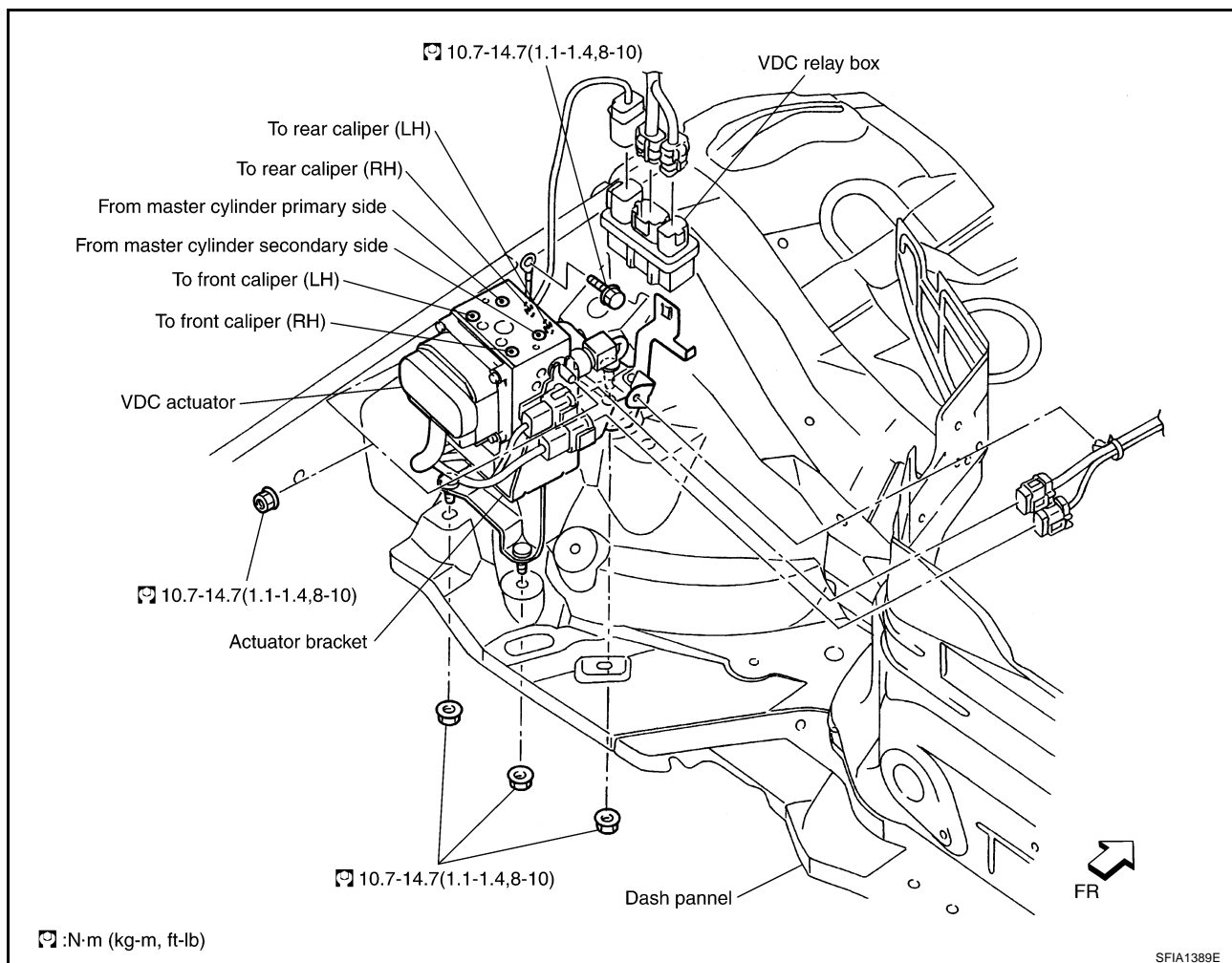
BRC

VDC/TCS/ABS ACTUATOR

PFP:47660

Removal and Installation

AFS00055



Pay attention to the following when removing VDC actuator.

CAUTION:

- Before servicing, disconnect battery negative terminal.
- 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 wrench (commercial service tool).
- Do not remove and install VDC 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 battery negative terminal.

G-SENSOR

Removal and Installation

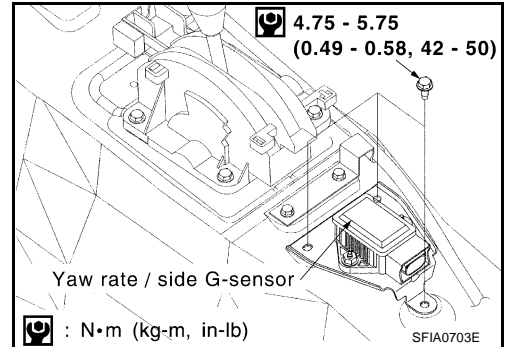
REMOVAL

A/T Model

1. Remove center console. Refer to [IP-14, "\(U\) 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 yaw rate/side G-sensor, because it has little endurance to impact.
- Do not use power tool etc., because yaw rate/side G-sensor is weak for the impact.

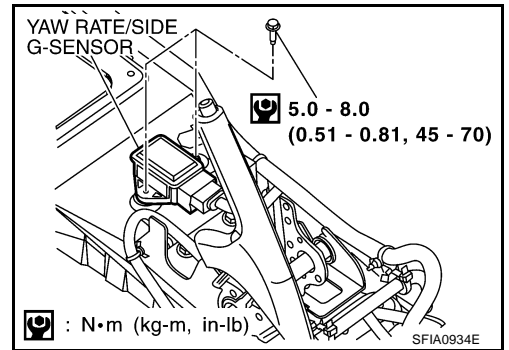


M/T Model

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 yaw rate/side G-sensor, because it has little endurance to impact.
- Do not use power tool etc., because yaw rate/side G-sensor is weak for the impact.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- Do not drop or strike yaw rate/side G-sensor, because it has little endurance to impact.
- Do not use power tool etc., because yaw rate/side G-sensor is weak for the impact.

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STEERING ANGLE SENSOR

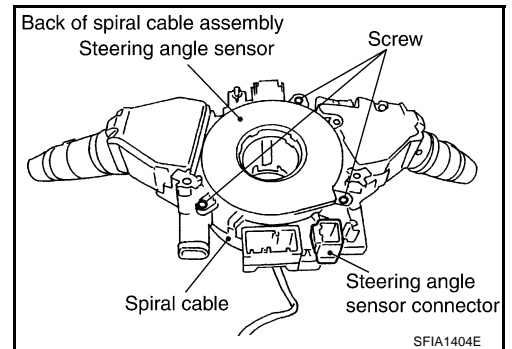
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Removal and Installation

AFS00221

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"](#) .