

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.

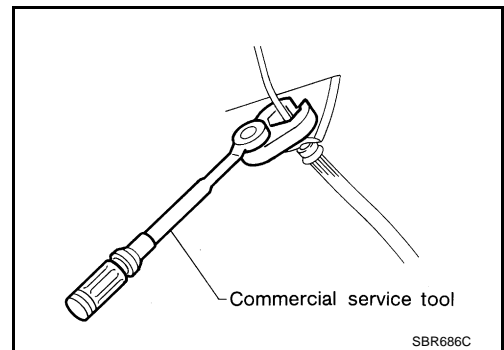
WARNING:

- 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 surface of body. If brake fluid is splashed on painted surfaces of body immediately wipe it off with cloth and then wash it away with water.
- Do not use mineral oils such as gasoline or kerosene to clean. They will ruin rubber parts and cause improper operation.
- Use a flare nut wrench when removing flare nuts, and use a flare nut torque wrench when 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/TCS/ABS control unit or the battery cable from the negative terminal.
- When installing brake piping, be sure to check torque.



WARNING:

Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.

Precautions for Brake Control

AFS001J2

- During ABS operation, brake pedal lightly vibrates and a mechanical sound may be heard. This is normal.
- Just after starting vehicle after turning ignition switch ON, brake pedal may vibrate or motor operating sound may be heard from engine compartment. This is a normal condition 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 brake 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.

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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 sound may occur if brake pedal is used. The sound 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 or VDC OFF indicator lamp and SLIP 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]

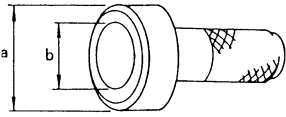
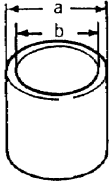
PREPARATION

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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.

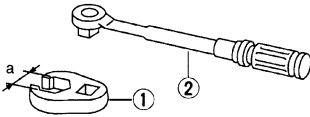
Tool number (Kent-Moore No.) Tool name	Description
<p>ST3072000 (J25405) Drift a: 76.5 mm (3.012 in) dia. b: 55.0 mm (2.17 in) dia.</p>  <p style="text-align: right;">ZZC0760D</p>	Installing rear sensor rotor.
<p>ST27863000 (—) Drift a: 75 mm (2.95 in) dia. b: 62 mm (2.44 in) dia.</p>  <p style="text-align: right;">ZZA0832D</p> <p>KV40104710 (—) Drift a: 76 mm (2.99 in) dia. b: 68.5 mm (2.697 in) dia.</p>	Installing rear sensor rotor.

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Commercial Service Tools

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

ON-VEHICLE SERVICE

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Adjustment of Steering Angle Sensor Neutral Position

AFS0003V

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	×
Change tires to new ones	–
Tire rotation	–
Adjusting wheel alignment	×

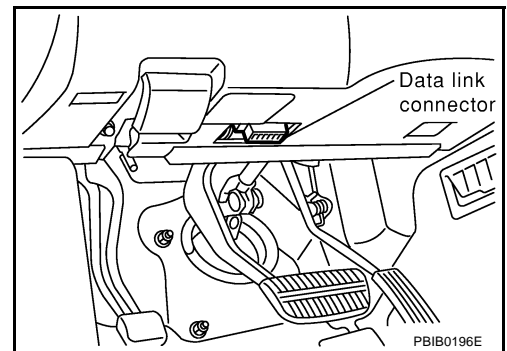
×: Required

–: 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:

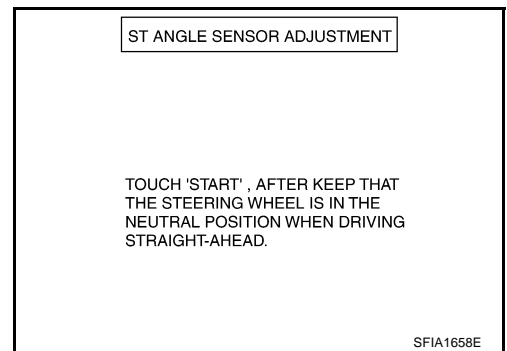
Do not touch steering wheel while adjusting steering angle sensor.

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. VDC/TCS/ABS control unit: Refer to [BRC-26, "Operation Procedure"](#) . ECM: Refer to [EC-96, "TROUBLE DIAGNOSIS"](#) .
10. Turn ignition switch OFF.



GENERAL INFORMATION

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**Fail-Safe
ABS SYSTEM**

AFS0003W

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 turning ignition switch ON and when vehicle starts at initial time is performed. ABS self-diagnosis sound 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.

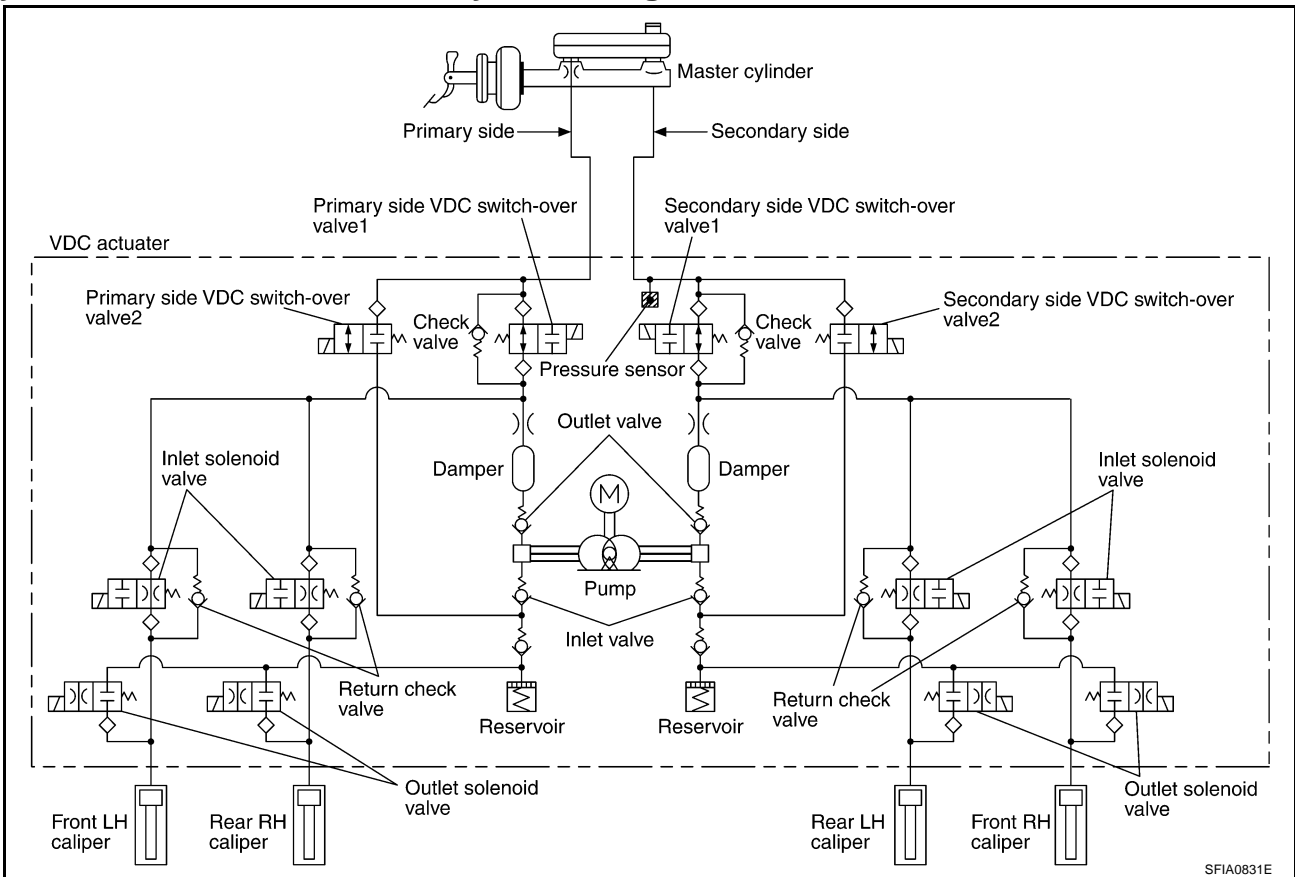
If a malfunction occurs in throttle control system, VDC/TCS control will be deactivated and only ABS control will operate normally.

CAUTION:

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

Hydraulic Pressure Control System Diagram

AFS0003X



ABS Function

AFS0003Y

1. During ABS operation, brake pedal lightly vibrates and a mechanical sound may be heard. This is normal.
2. When starting engine, or just after starting vehicle, brake pedal may vibrate or motor operating sounds 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

AFS0003Z

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 illuminating SLIP indicator lamp.

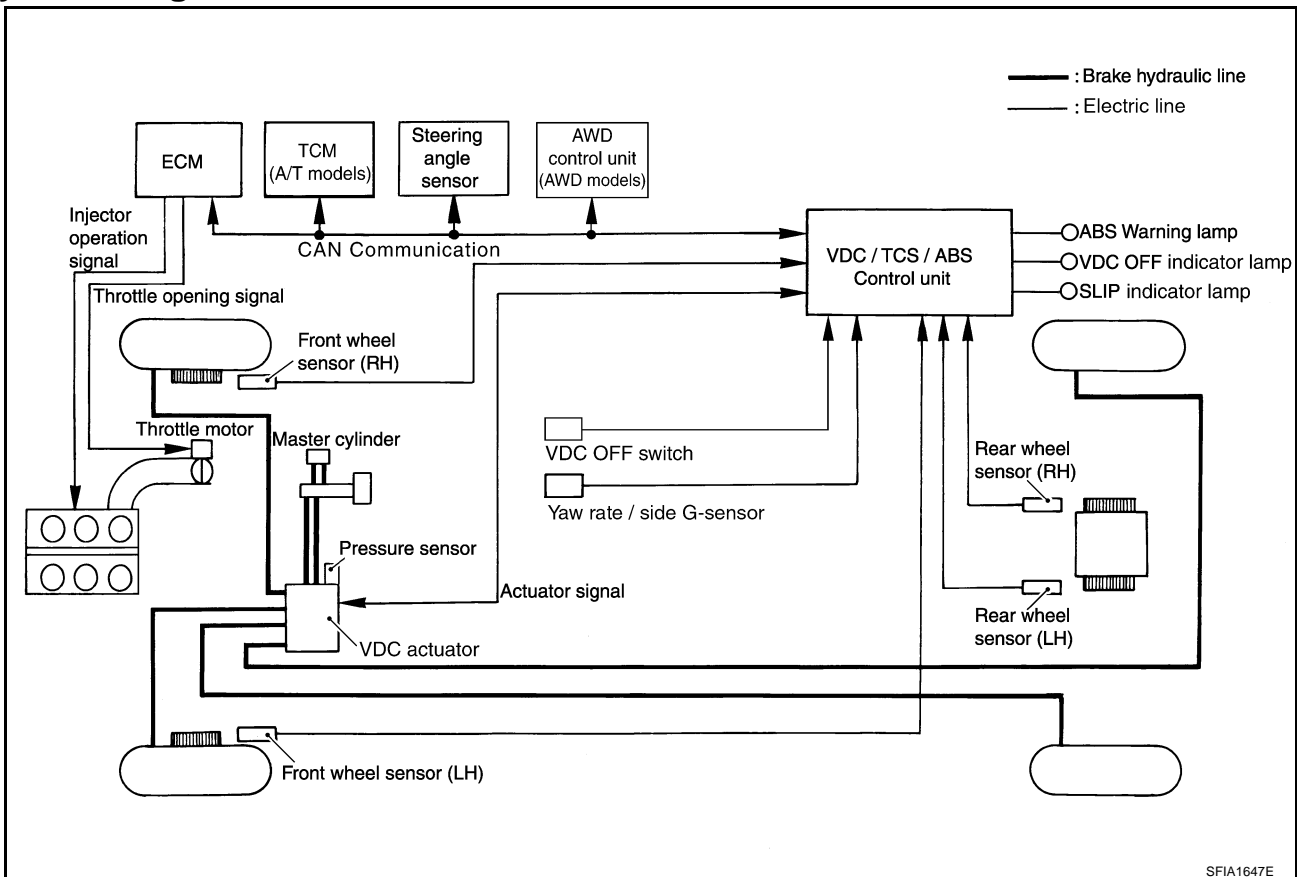
VDC Function

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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 sounds 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-21, "CAN Communication Unit"](#).

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TROUBLE DIAGNOSIS

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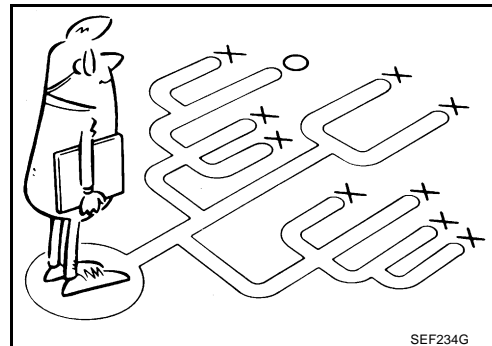
How to Perform Trouble Diagnoses
BASIC CONCEPT

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- 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, they will be necessary to check symptom by driving vehicle with customer.

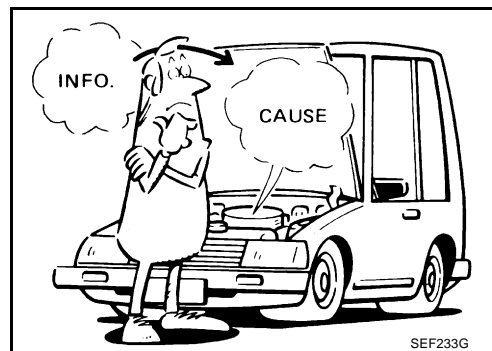
NOTE:

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



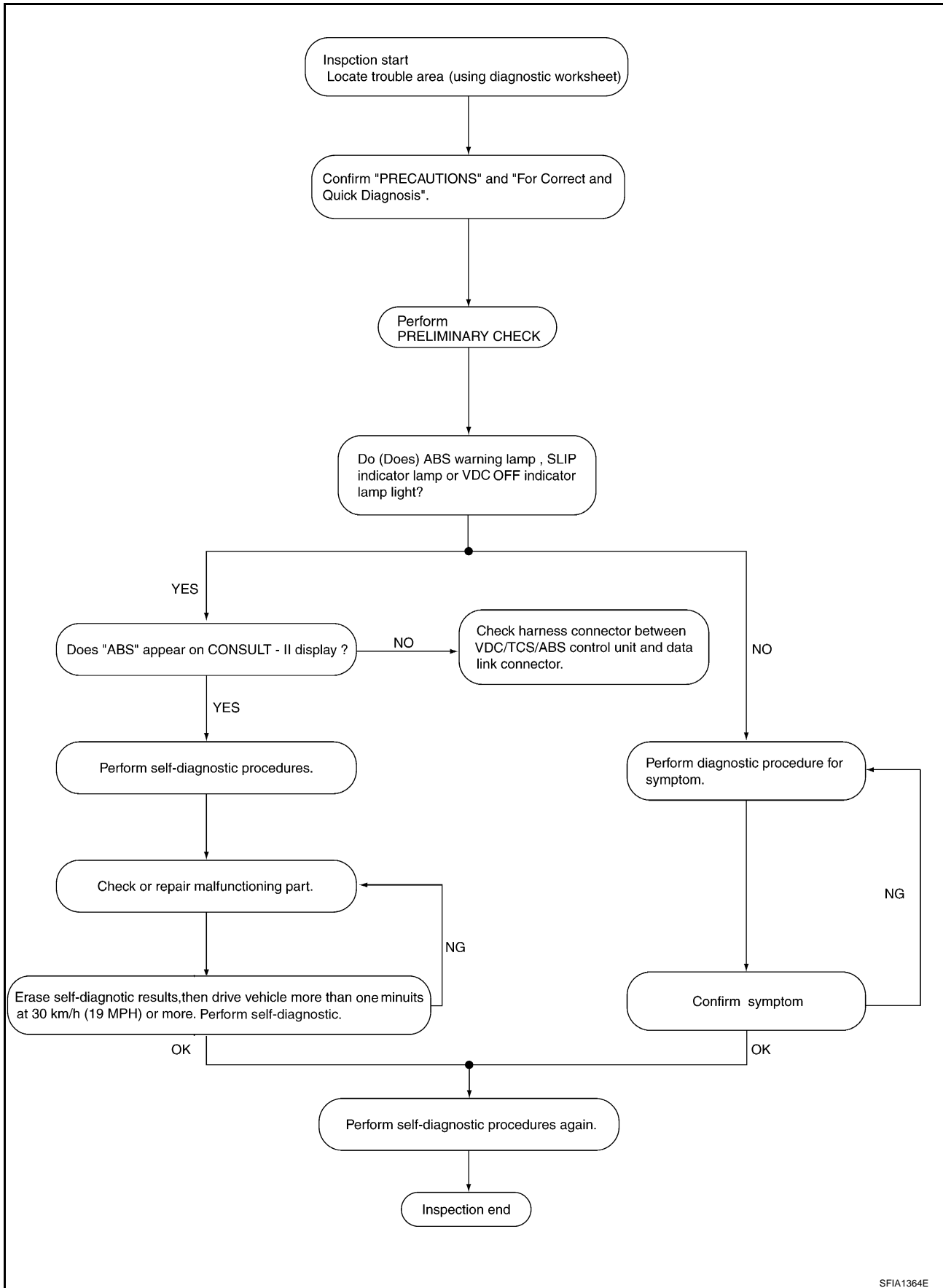
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- It is essential to check symptoms right from beginning in order to repair a malfunction completely.
For an intermittent malfunction, it is important to reproduce symptom based on interview with customer and past examples. Do not perform inspection 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-26, "Operation Procedure"](#).
- For an intermittent malfunction, move harness or harness connector by hand to check poor contact or false open circuit.
- Always read “GI General Information” to confirm general precautions. Refer to [GI-4, "General Precautions"](#).



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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

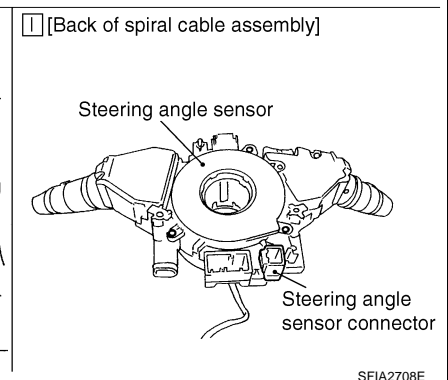
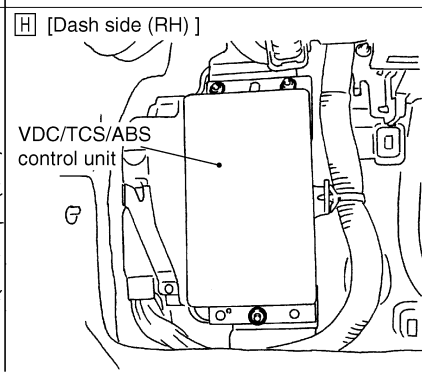
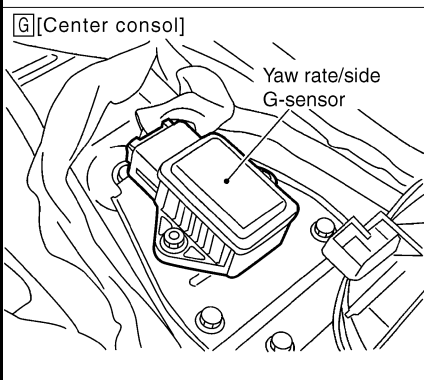
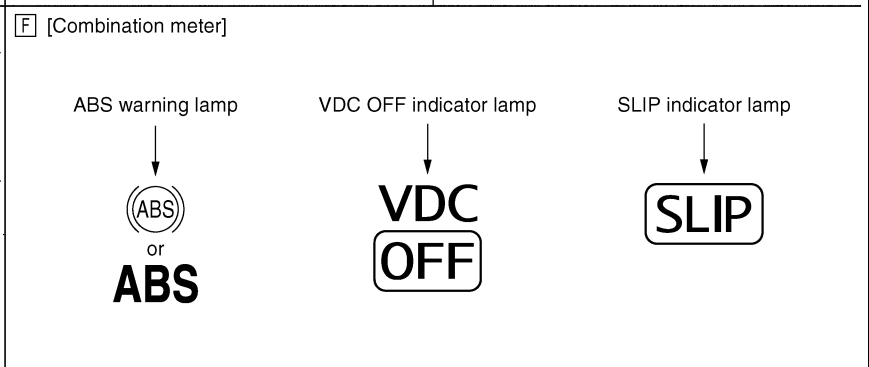
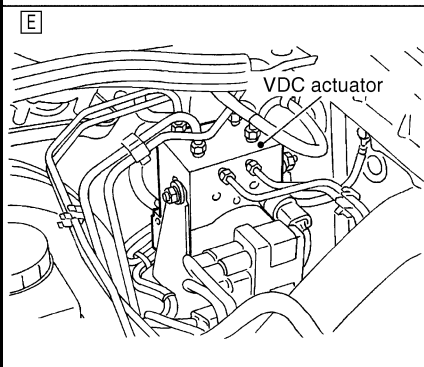
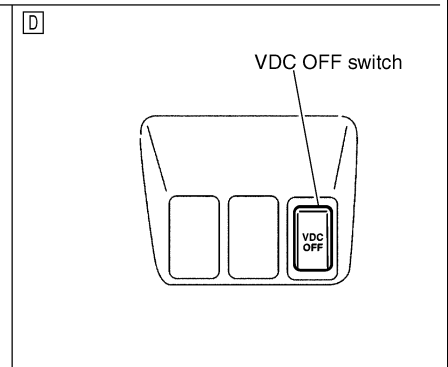
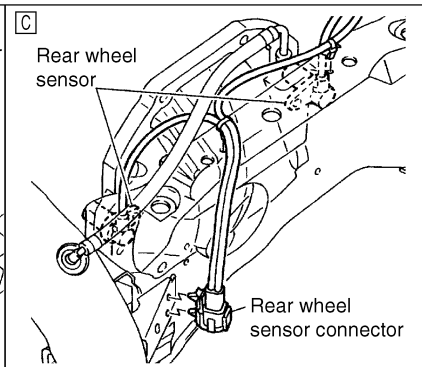
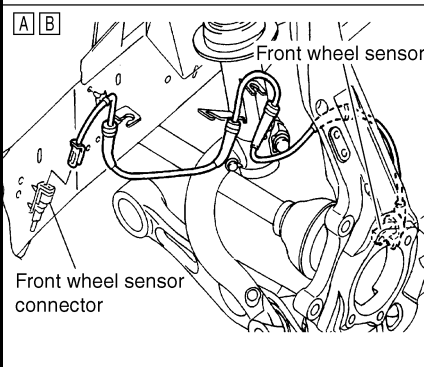
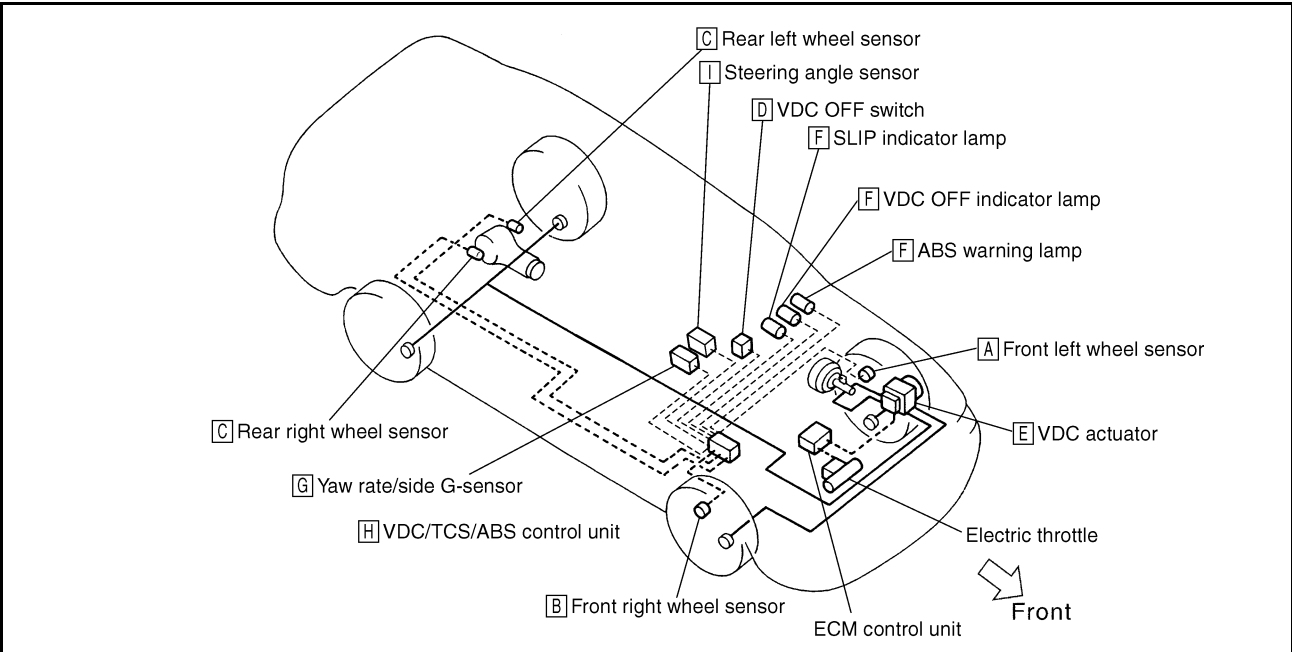
EXAMPLE OF DIAGNOSIS SHEET

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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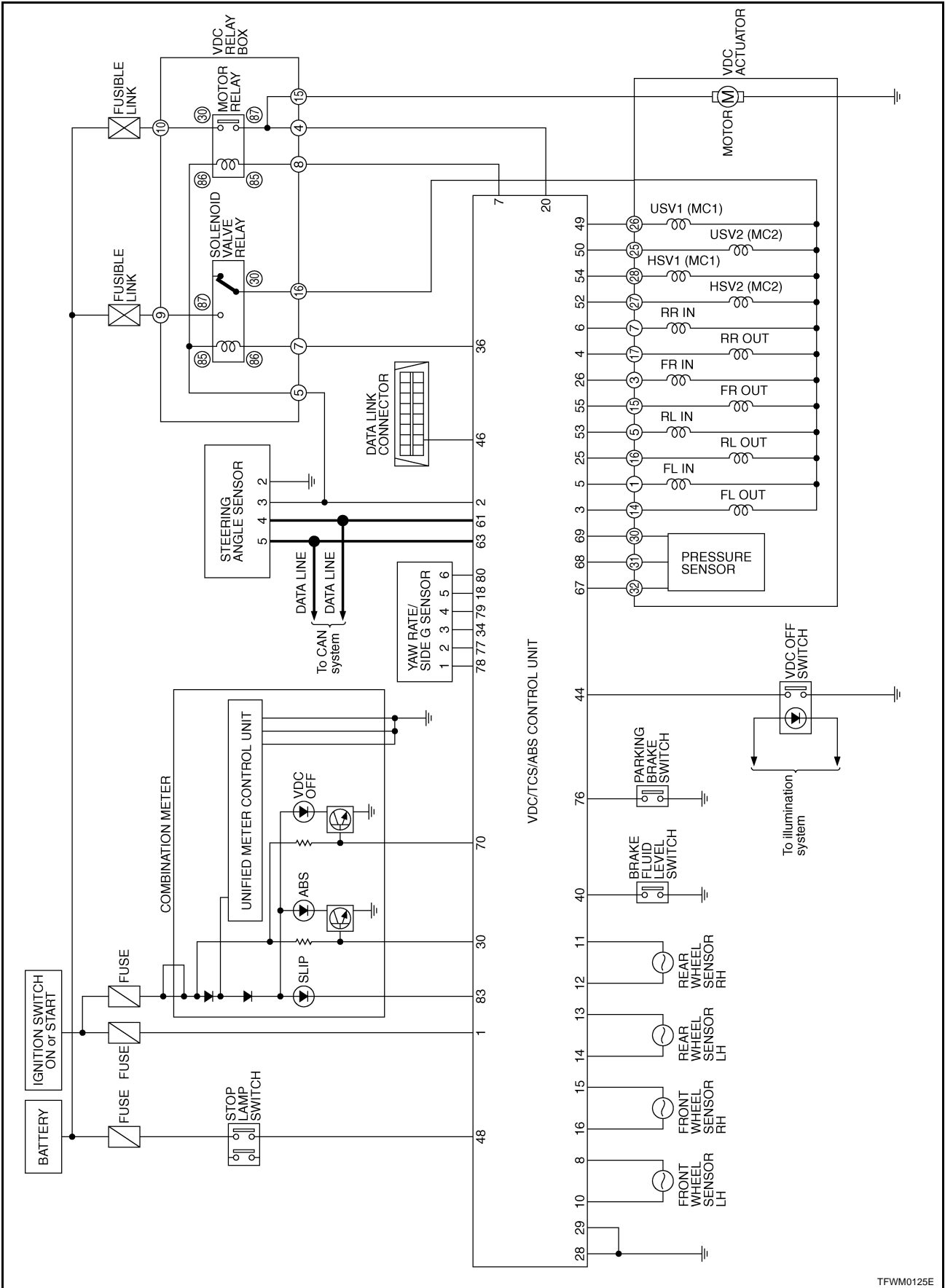
Component Parts Location

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Schematic

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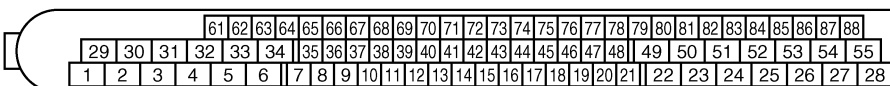
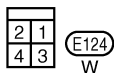
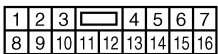
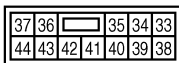
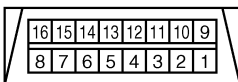
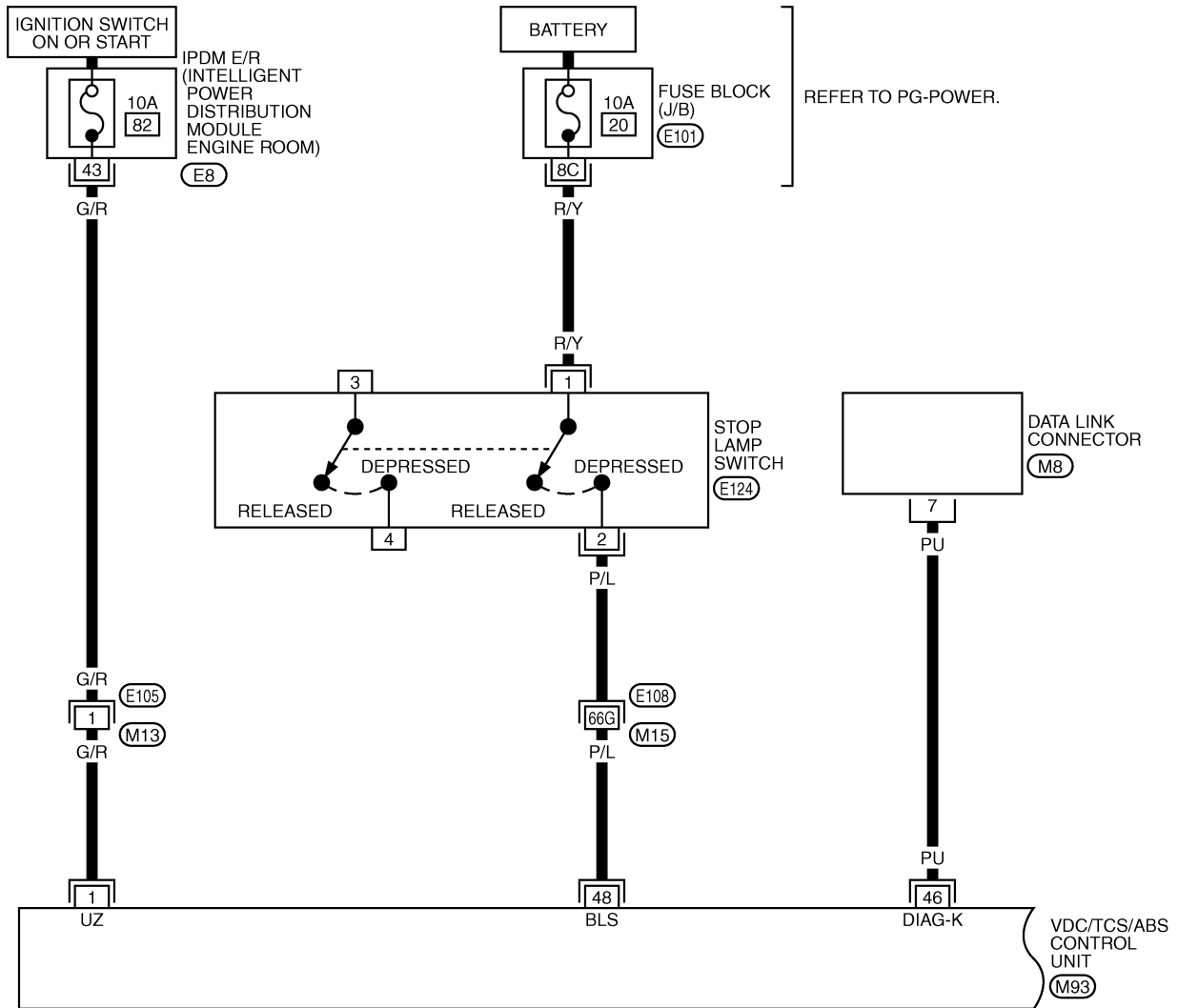
TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Wiring Diagram — VDC —

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BRC-VDC-01



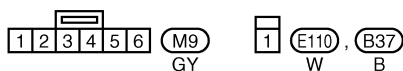
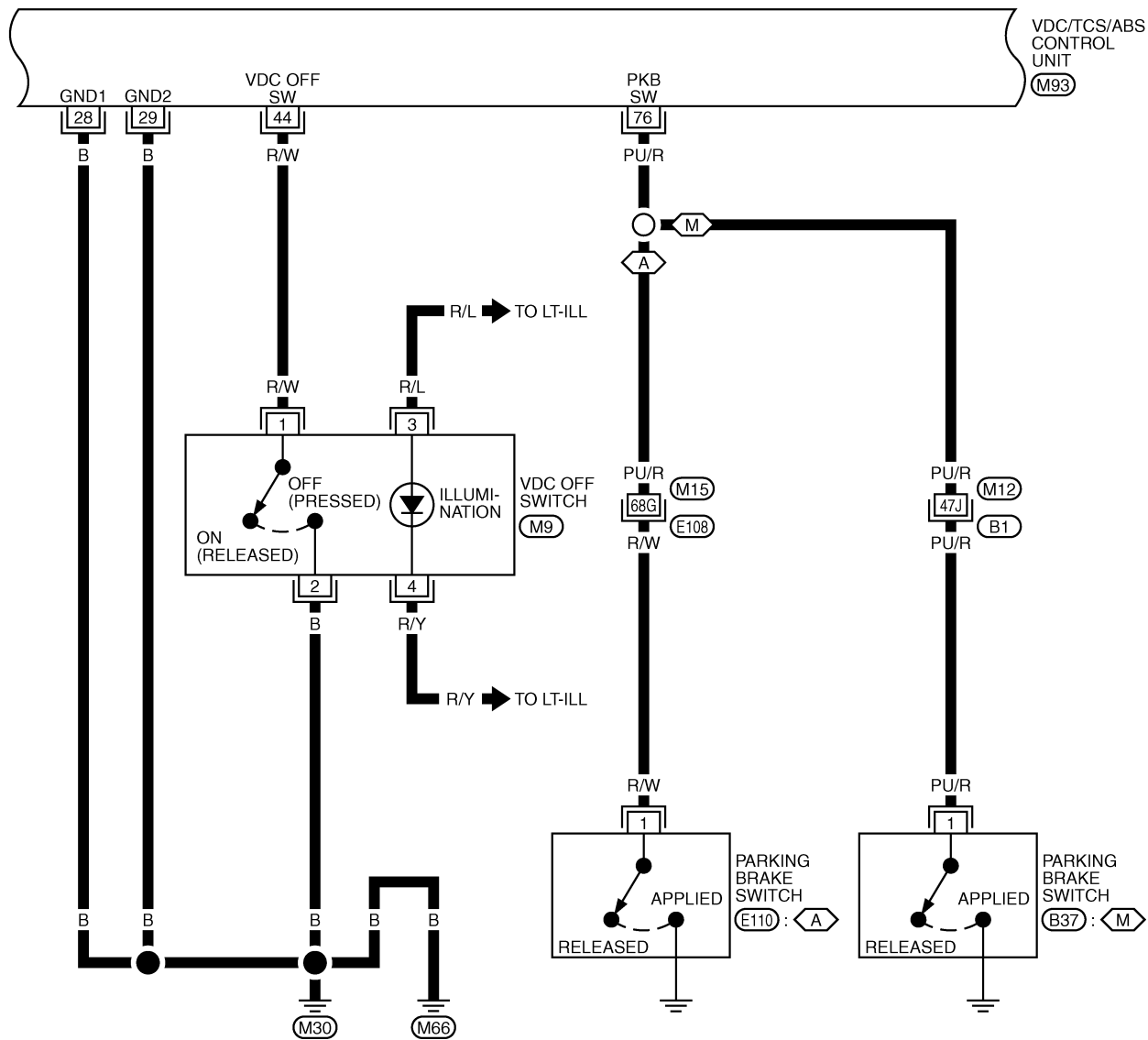
REFER TO THE FOLLOWING.

(E108) -SUPER MULTIPLE JUNCTION (SMJ)

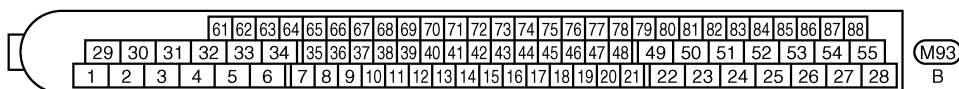
(E101) -FUSE BLOCK-JUNCTION BOX (J/B)

BRC-VDC-02

Ⓐ : WITH A/T
 Ⓜ : WITH M/T



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



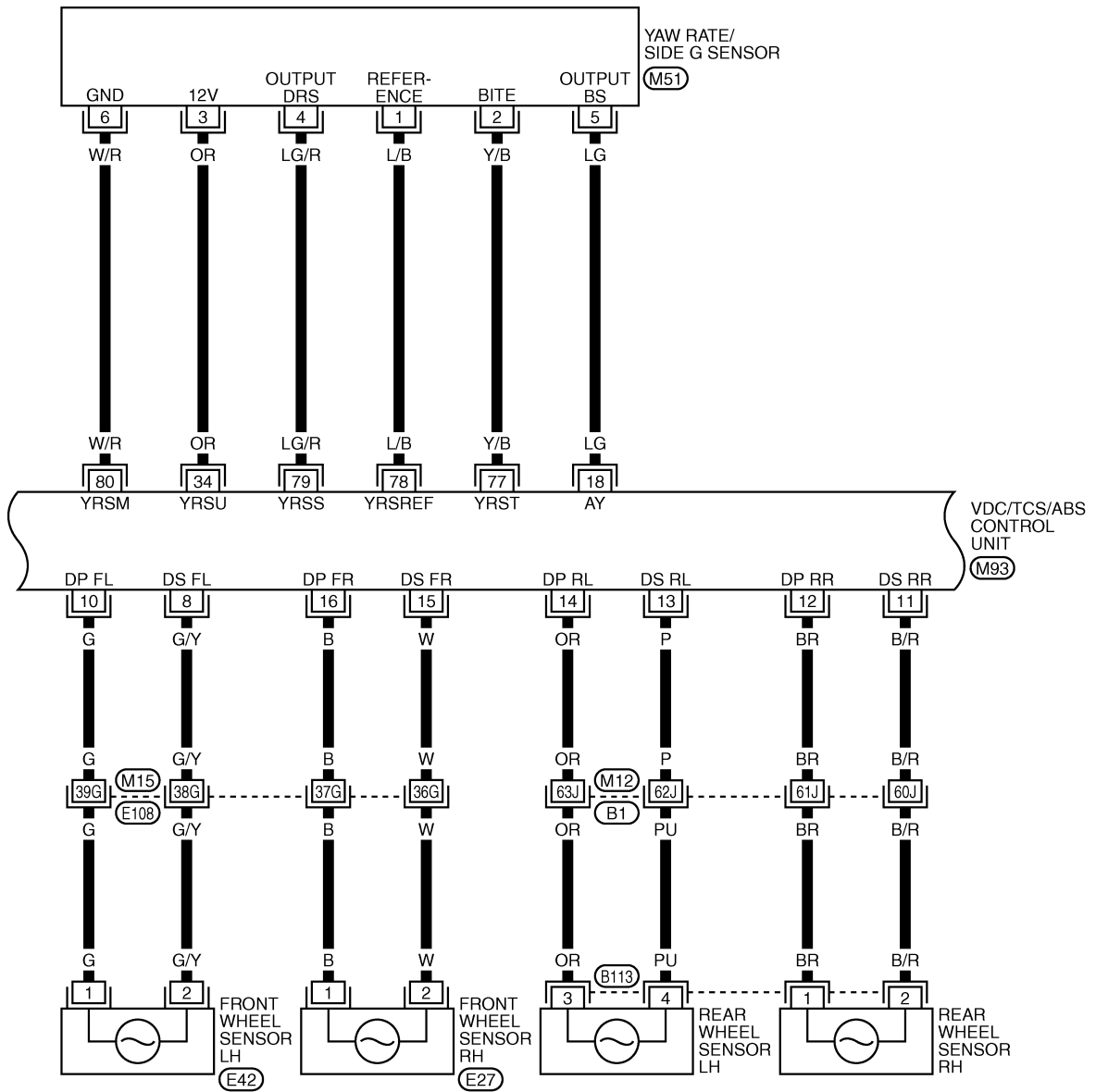
TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

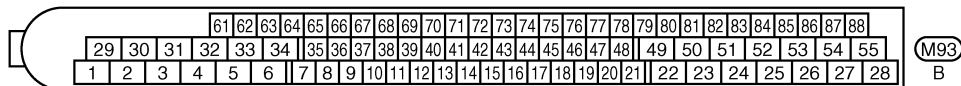
BRC-VDC-03

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



TFWM0185E

BRC-VDC-04

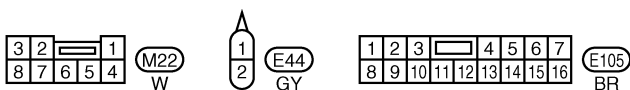
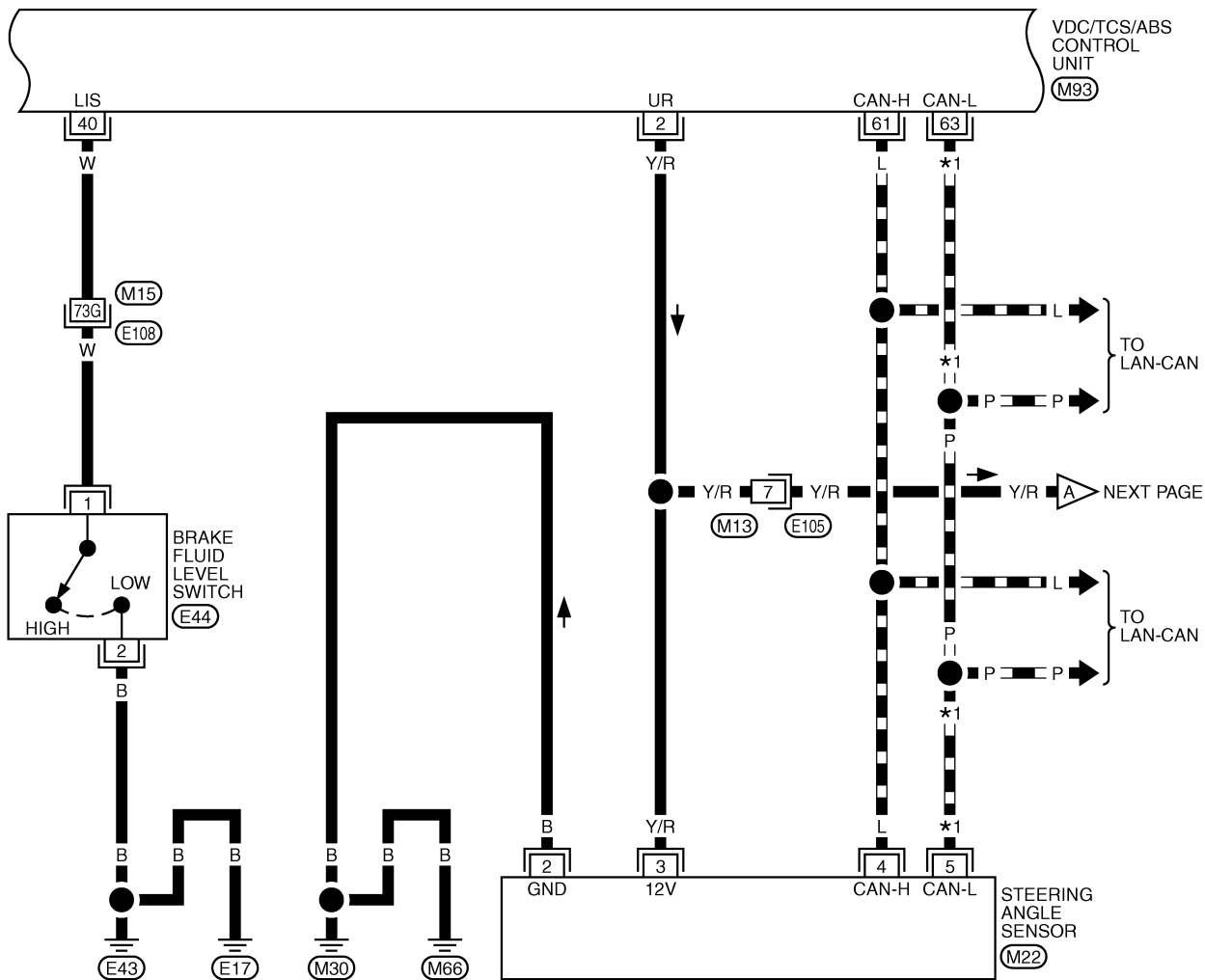
▬ : DATA LINE

⬡ (A) : WITH A/T

⬡ (M) : WITH M/T

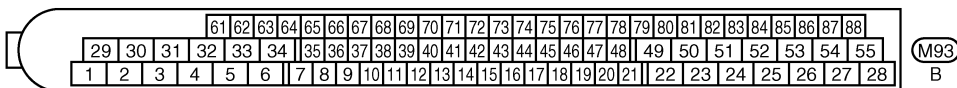
*1 P: ⬡ (A)

R: ⬡ (M)



REFER TO THE FOLLOWING.

⬡ (E108) -SUPER MULTIPLE JUNCTION (SMJ)

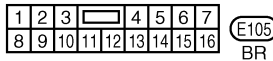
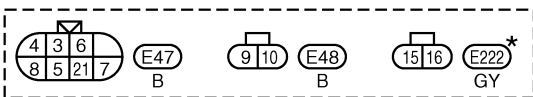
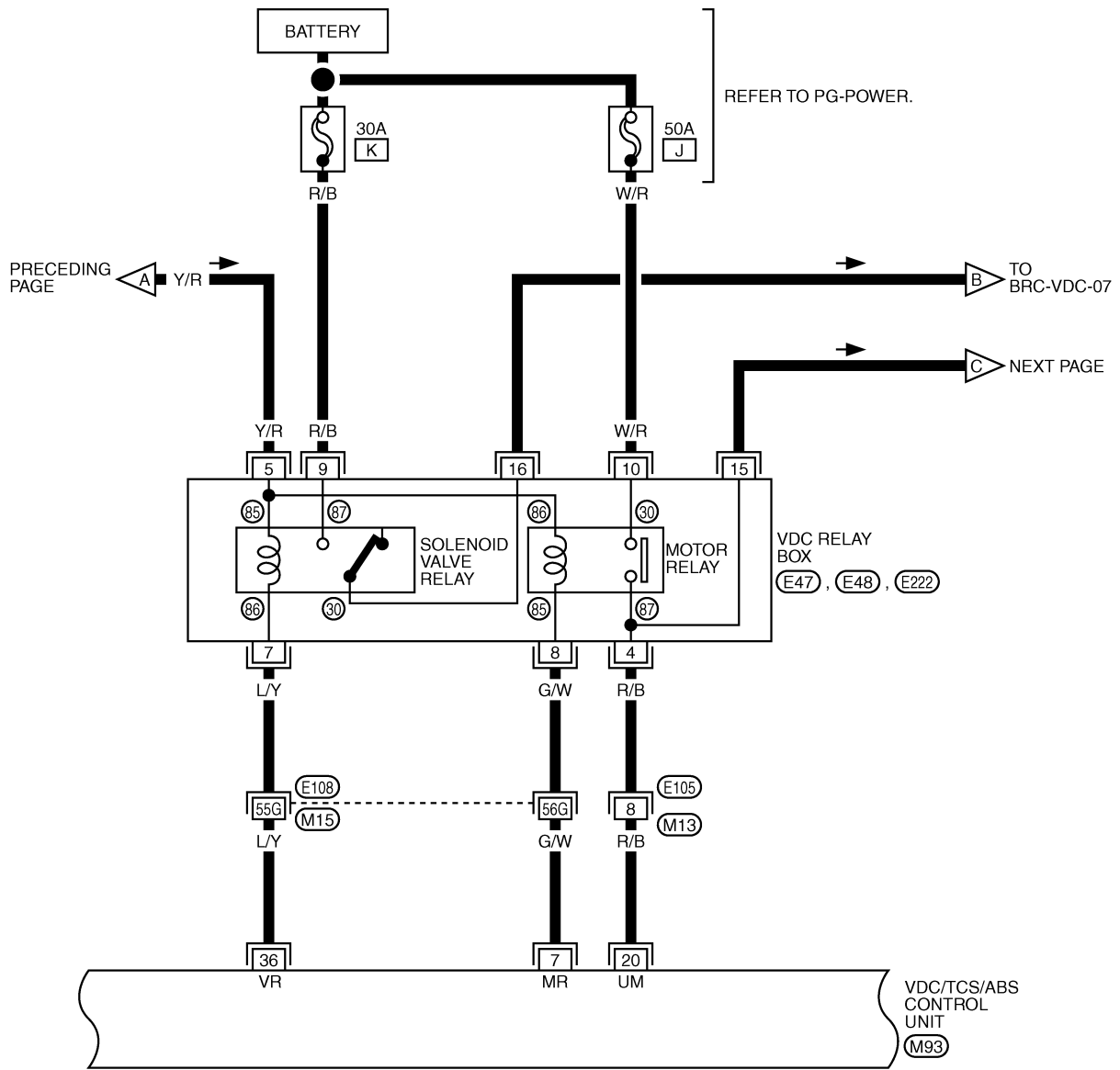


TROUBLE DIAGNOSIS

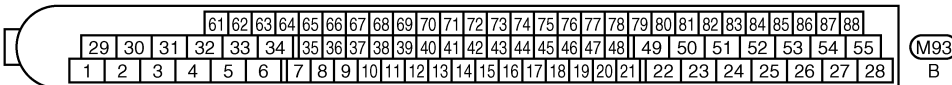
[VDC/TCS/ABS]

BRC-VDC-05

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



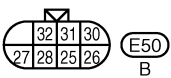
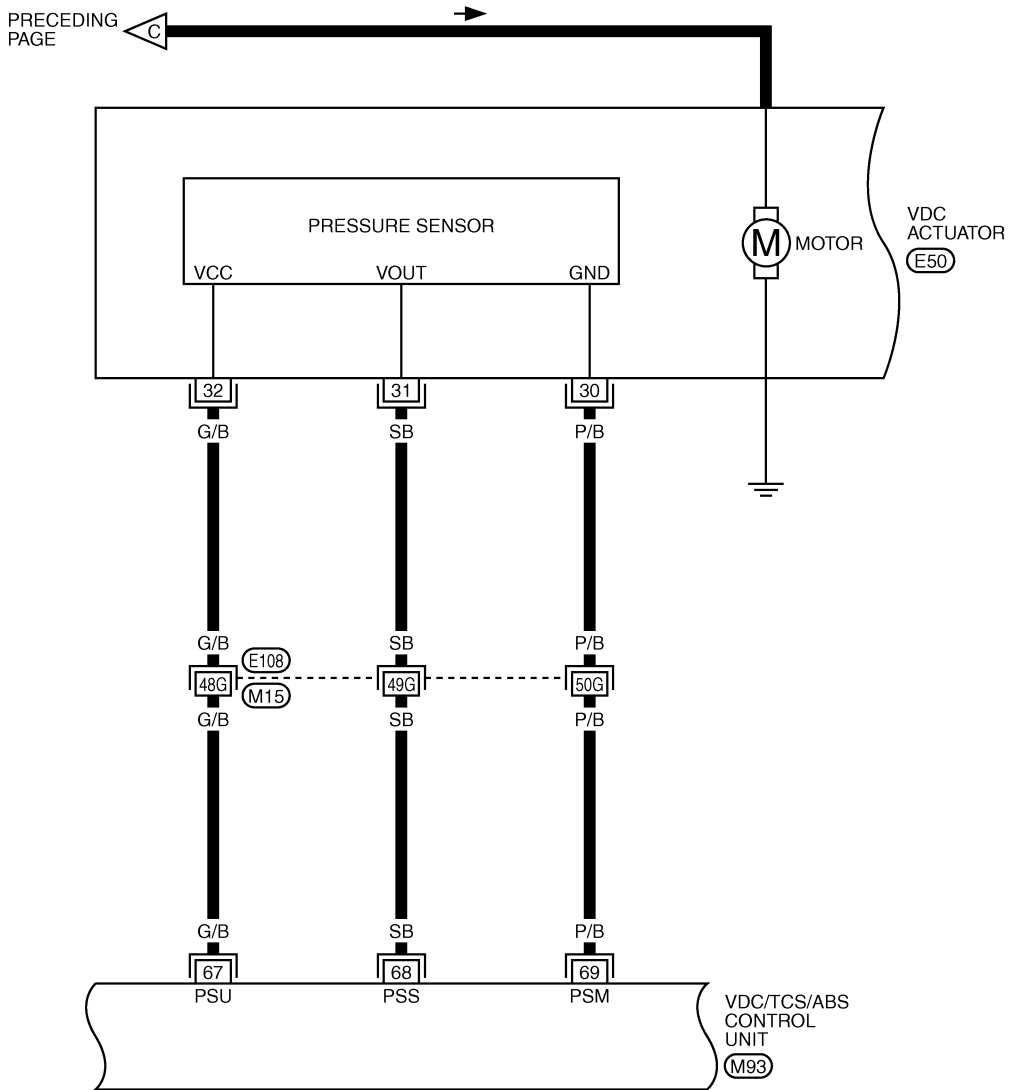
*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

TFWM0130E

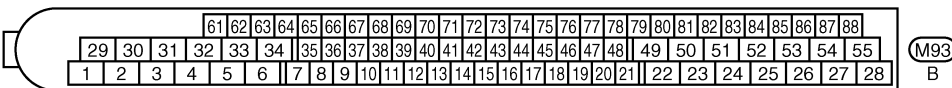
TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

BRC-VDC-06



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

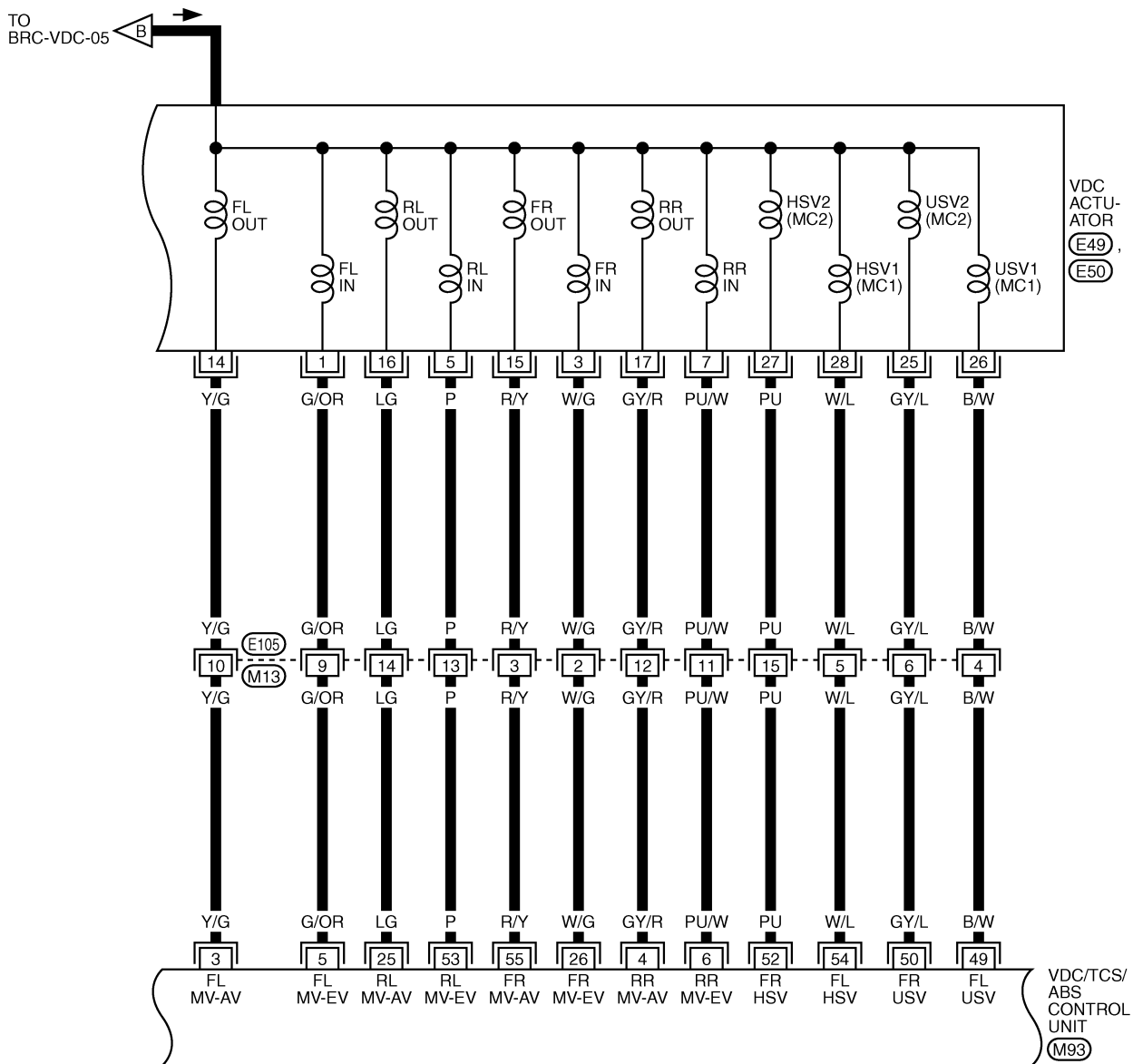


TFWM0131E

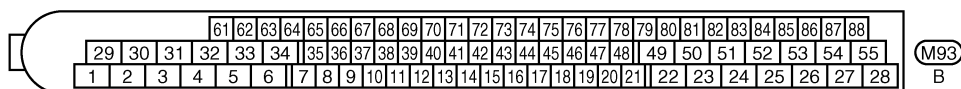
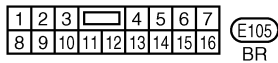
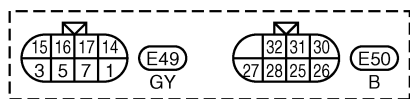
TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

BRC-VDC-07



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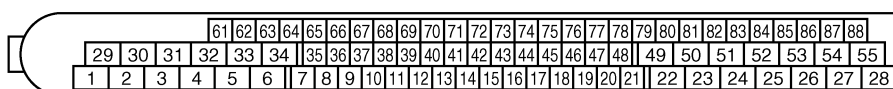
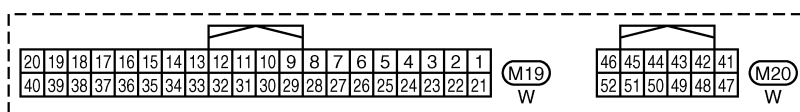
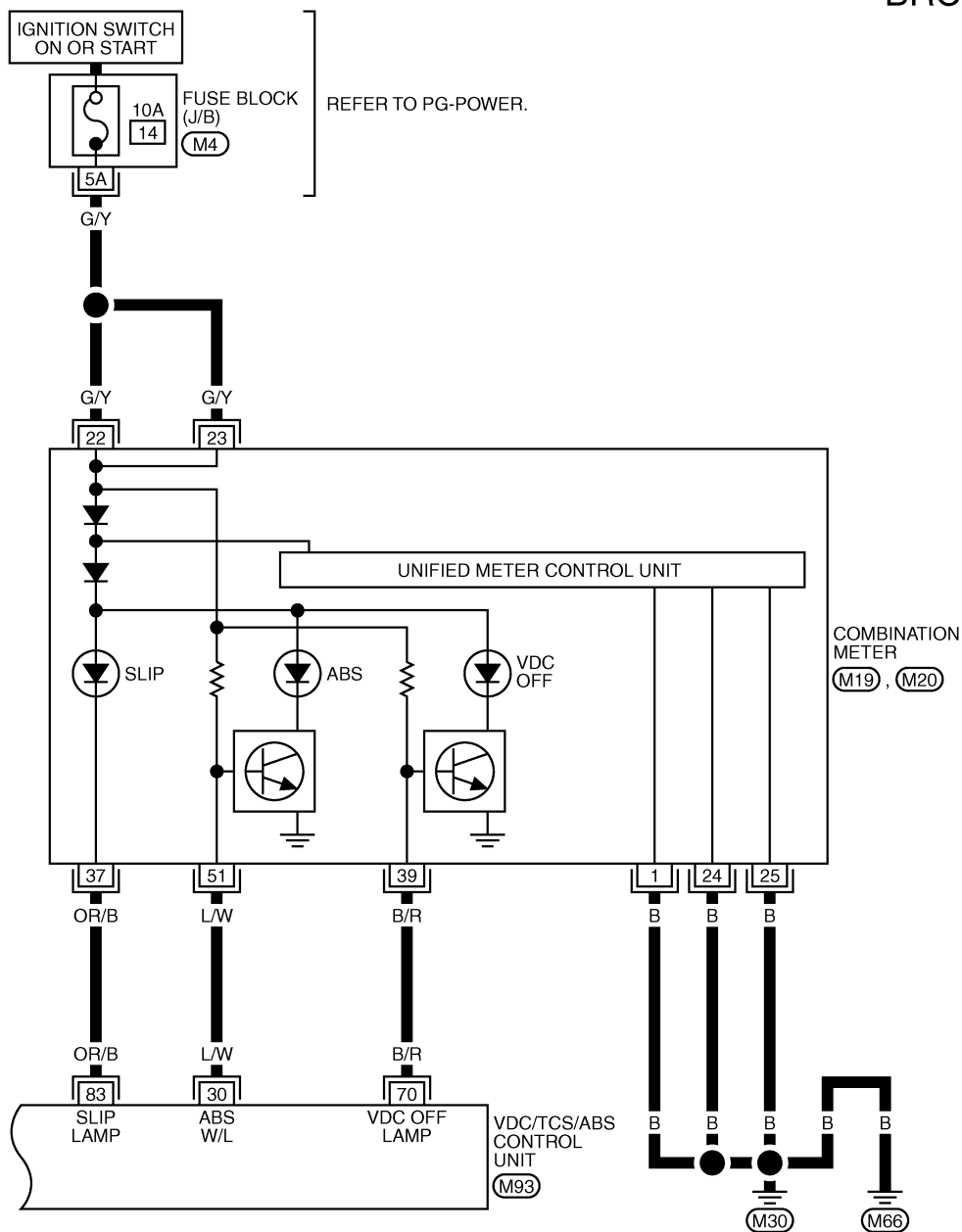


TFWM0132E

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

BRC-VDC-08



REFER TO THE FOLLOWING.
 (M4) -FUSE BLOCK-JUNCTION BOX (J/B)

TFWM0133E

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	Contents	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 ##)		BRC-56, "Inspection 12: When "SHIFT POSITION ERROR" Appears in Self-Diagnostic results Display (A/T Models)"
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]	BRC-38, "Inspection 1: Wheel Sensor Circuit"
		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°	BRC-42, "Inspection 5: Steering Angle Sensor and Circuit Between Steering Angle Sensor and VDC/TCS/ABS Control Unit"
		Steering wheel turned	-720 to 720°	
YAW RATE SEN	Yaw rate detected by yaw rate sensor	Vehicle stopped	Approx. 0 d/s	BRC-44, "Inspection 6: Yaw Rate/Side G Sensor and Circuit Between Yaw Rate/Side G Sensor and VDC/TCS/ABS Control Unit"
		Vehicle running	-70 to 70 d/s	
SIDE G SENSOR	Transverse G detected by side G sensor	Vehicle stopped	Approx. 0 m/s ²	BRC-44, "Inspection 6: Yaw Rate/Side G Sensor and Circuit Between Yaw Rate/Side G Sensor and VDC/TCS/ABS Control Unit"
		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	BRC-40, "Inspection 4: Pressure Sensor and Circuit Between Pressure sensor and VDC/TCS/ABS Control Unit"
		With ignition switch turned ON and brake pedal depressed	-40 to 300 bar	

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Monitor item	Contents	DATA MONITOR		Check item
		Condition	Reference value in normal operation	
BATTERY VOLT	Battery voltage supplied to VDC/TCS/ABS control unit	Ignition switch ON	10 - 16V	BRC-54. "Inspection 11: VDC/TCS/ABS Control Unit Power Supply Circuit"
STOP LAMP SW	Brake pedal operation	Brake pedal depressed	ON	BRC-53. "Inspection 10: Stop Lamp Switch and Circuit"
		Brake pedal not depressed	OFF	
PARK BRAKE SW	Parking brake condition	Parking brake operated	ON	Parking brake switch circuit
		Parking brake not operated	OFF	
OFF SW	VDC OFF switch ON/OFF condition	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	ON	BRC-58. "VDC OFF SWITCH"
		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 condition of motor and motor relay	When motor relay and motor are operating	ON	BRC-48. "Inspection 8: Actuator Motor, Motor Relay, and Circuit"
		When motor relay and motor are not operating	OFF	
ACTUATOR RLY	Solenoid valve relay operation condition	When solenoid valve relay is operating	ON	BRC-51. "Inspection 9: Solenoid Valve Relay and Circuit"
		When solenoid valve relay is not operating	OFF	
OFF LAMP	VDC OFF indicator lamp condition (Note 2)	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 condition (Note 2)	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	BRC-46. "Inspection 7: Solenoid, VDC Switching Valve, and Circuits"
		When actuator (solenoid) is not active and solenoid valve relay is active (ignition switch ON).	OFF	
USV HSV	VDC switch-over valve condition	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-II) or actuator relay is inactive (when in fail-safe mode).	ON	BRC-46. "Inspection 7: Solenoid, VDC Switching Valve, and Circuits"
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON).	OFF	

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Monitor item	Contents	DATA MONITOR		Check item
		Condition	Reference value in normal operation	
V/R OUTPUT	Actuator relay activated (ON/OFF)	When actuator relay is active (engine is running).	ON	BRC-51, "Inspection 9: Solenoid Valve Relay and Circuit"
		When actuator relay is not active (before engine starts and in fail-safe mode).	OFF	
M/R OUTPUT	Actuator motor and motor relay condition (ON/OFF)	When actuator motor and motor relay are active ("ACTIVE TEST" with CONSULT-II).	ON	BRC-48, "Inspection 8: Actuator Motor, Motor Relay, and Circuit"
		When the actuator motor and motor relay are not operating	OFF	
FLUID LEV SW	ON/OFF condition of brake fluid level switch	When brake fluid level switch ON	ON	BRC-57, "Inspection 14: Brake Fluid Level in Reservoir Tank, Communication Circuit Between VDC/TCS/ABS Control Unit and Brake Fluid Level Switch"
		When brake fluid level switch OFF	OFF	
FAIL SIGNAL	Fail signal condition	VDC fail TCS fail ABS fail EBD fail	OFF	VDC system TCS system ABS system EBD system

Note 1: Confirm tire pressure is normal.

Note 2: ON/OFF timing of warning lamp and indicator lamp. Refer to [BRC-35, "ON and OFF Timing for ABS Warning Lamp, VDC OFF Indicator Lamp, and SLIP Indicator Lamp"](#).

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-26, "SELF-DIAGNOSIS"
DATA MONITOR	Input/Output data in the VDC/TCS/ABS control unit can be read.	BRC-29, "DATA MONITOR"
CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of communication can be read.	LAN-15, "CAN Diagnostic Support Monitor"
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-31, "ACTIVE TEST"
FUNCTION TEST	Performed by CONSULT-II instead of a technician to determine whether each system is "OK" or "NG".	Separate volume "CONSULT-II OPERATION MANUAL (FUNCTION TEST)"
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:

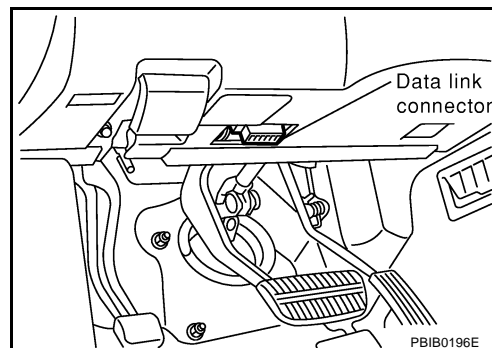
Operation Procedure

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).

CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which perform CAN communication.

3. Turn ignition switch is ON.
4. Start engine and drive vehicle at approximately 30 km/h (19 MPH) for approximately 1 minute.
5. 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.

6. Self-diagnostic results is displayed. (If necessary, touch "PRINT" to print self-diagnostic results.)
 - When "NO FAILURE" is shown, check ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp. Refer to [BRC-35, "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.
7. Go to appropriate "Inspection" chart according to "Display Item List", and repair or replace as necessary.
8. 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.**

9. Turn ignition switch OFF to prepare for erasing memory.
10. 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, re-perform the operation from step 3.

11. 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.

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Display Item List

Display item	Malfunction detecting condition	Check item
FR LH SENSOR- 1	Circuit of front LH wheel sensor is open.	
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.	BRC-38, "Inspection 1: Wheel Sensor Circuit"
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.	
ACTUATOR RELAY	During solenoid valve relay operation with OFF, when solenoid valve relay turns ON or when control line for relay is shorted to ground.	BRC-51, "Inspection 9: Solenoid Valve Relay and Circuit"
	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.	BRC-53, "Inspection 10: Stop Lamp Switch and Circuit"
PRESS SEN CIRCUIT	Pressure sensor signal line is open or shorted, or pressure sensor is malfunctioning.	BRC-40, "Inspection 4: Pressure Sensor and Circuit Between Pressure sensor and VDC/TCS/ABS Control Unit"
ST ANGLE SEN CIRCUIT	Neutral position of steering angle sensor is dislocated, or steering angle sensor is malfunctioning.	BRC-42, "Inspection 5: Steering Angle Sensor and Circuit Between Steering Angle Sensor and VDC/TCS/ABS Control Unit"
YAW RATE SENSOR	Yaw rate sensor has generated an error, or yaw rate sensor signal line is open or shorted.	BRC-44, "Inspection 6: Yaw Rate/Side G Sensor and Circuit Between Yaw Rate/Side G Sensor and VDC/TCS/ABS Control Unit"

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TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Display item	Malfunction detecting condition	Check item
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.	BRC-46, "Inspection 7: Solenoid, VDC Switching Valve, and Circuits"
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.	BRC-46, "Inspection 7: Solenoid, VDC Switching Valve, and Circuits"
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 MOTOR RLY	During actuator motor operation with ON, when actuator motor turns OFF or when control line for actuator motor relay is open.	BRC-48, "Inspection 8: Actuator Motor, Motor Relay, and Circuit"
	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.	BRC-54, "Inspection 11: VDC/TCS/ABS Control Unit Power Supply Circuit"
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.	BRC-58, "Inspection 15: CAN Communication Circuit"
SIDE G SEN CIRCUIT	Side G sensor is malfunctioning, or signal line of side G sensor is open or shorted.	BRC-44, "Inspection 6: Yaw Rate/Side G Sensor and Circuit Between Yaw Rate/Side G Sensor and VDC/TCS/ABS Control Unit"
EMERGENCY BRAKE	VDC/TCS/ABS control unit malfunction (pressure increase is too much or too little.)	BRC-56, "Inspection 13: When "EMERGENCY BRAKE" Appears on Self-Diagnostic Results Display"
CONTROLLER FAILURE	Internal malfunction of VDC/TCS/ABS control unit	BRC-40, "Inspection 3: VDC/TCS/ABS Control Unit Circuit"

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Display item	Malfunction detecting condition	Check item
SHIFT POSITION ERROR	P position switch stuck to ON or TCM internal malfunction, VDC/TCS/ABS control unit internal malfunction.	BRC-56, "Inspection 12: When "SHIFT POSITION ERROR" Appears in Self-Diagnostic results Display (A/T Models)"
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 ECM is suddenly interrupted for approximately 0.5 seconds or more. 	BRC-58, "Inspection 15: CAN Communication Circuit"
BR FLUID LEVEL LOW	Brake fluid level drops or communication line between VDC/TCS/ABS control unit and brake fluid level sensor is open or shorted.	BRC-57, "Inspection 14: Brake Fluid Level in Reservoir Tank, Communication Circuit Between VDC/TCS/ABS Control Unit and Brake Fluid Level Switch"
ENGINE SIGNAL 1-6	Major engine component is malfunctioning.	BRC-40, "Inspection 2: Engine System"

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

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

DATA MONITOR

Operation Procedure

1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector.

CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which perform CAN communication.

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. Touch any of "ECU INPUT SIGNALS", "MAIN SIGNALS" or "SELECTION FROM MENU". Refer to [BRC-29, "Display Item List"](#).
8. Touch "START".
9. Screen of data monitor is displayed.

Display Item List

Display item	SLECT MONITOR ITEM			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)	×	×	×	Wheel speed calculated by front RH wheel sensor signal is displayed.
FR LH SENSOR (km/h)	×	×	×	Wheel speed calculated by front LH wheel sensor signal is displayed.

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Display item	SLECT MONITOR ITEM			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
RR RH SENSOR (km/h)	×	×	×	Wheel speed calculated by rear RH wheel sensor signal is displayed.
RR LH SENSOR (km/h)	×	×	×	Wheel speed calculated by rear LH wheel sensor signal is displayed.
BATTERY VOLT (V)	×	×	×	Voltage supplied to VDC/TCS/ABS control unit is displayed.
SLCT LVR POSI (A/T model)	×	×	×	Shift position judged by PNP switch signal.
ACCEL POS SIG (%)	×	-	×	Throttle actuator opening/closing condition 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 condition of CAN communication is displayed.
STR ANGLE SIG (°)	×	-	×	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) condition is displayed.
PARK BRAKE SW (ON/OFF)	×	-	×	Parking brake switch (ON/OFF) condition is displayed.
OFF SW (ON/OFF)	×	×	×	VDC OFF switch (ON/OFF) condition is displayed.
ABS WARN LAMP (ON/OFF)	-	×	×	ABS warning lamp (ON/OFF) condition is displayed.
SLIP LAMP (ON/OFF)	-	×	×	SLIP indicator lamp (ON/OFF) condition is displayed.
FR LH IN SOL (ON/OFF)	-	×	×	Front LH IN ABS solenoid (ON/OFF) condition is displayed.
FR LH OUT SOL (ON/OFF)	-	×	×	Front LH OUT ABS solenoid (ON/OFF) condition is displayed.
RR RH IN SOL (ON/OFF)	-	×	×	Rear RH IN ABS solenoid (ON/OFF) condition is displayed.
RR RH OUT SOL (ON/OFF)	-	×	×	Rear RH OUT ABS solenoid (ON/OFF) condition is displayed.
FR RH IN SOL (ON/OFF)	-	×	×	Front RH IN ABS solenoid (ON/OFF) condition is displayed.
FR RH OUT SOL (ON/OFF)	-	×	×	Front RH OUT ABS solenoid (ON/OFF) condition is displayed.
RR LH IN SOL (ON/OFF)	-	×	×	Rear LH IN ABS solenoid (ON/OFF) condition is displayed.
RR LH OUT SOL (ON/OFF)	-	×	×	Rear LH OUT ABS solenoid (ON/OFF) condition is displayed.

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Display item	SELECT MONITOR ITEM			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
OFF LAMP (ON/OFF)	–	×	×	VDC OFF indicator Lamp (ON/OFF) condition is displayed.
MOTOR RELAY (ON/OFF)	–	×	×	ABS motor relay (ON/OFF) condition is displayed.
ACTUATOR RLY	–	×	×	Solenoid valve relay (ON/OFF) condition is displayed.
USV [FL-RR] (ON/OFF)	–	–	×	Primary-side USV solenoid valve (ON/OFF) condition is displayed.
USV [FR-RL] (ON/OFF)	–	–	×	Secondary-side USV solenoid valve (ON/OFF) condition is displayed.
HSV [FL-RR] (ON/OFF)	–	–	×	Primary-side HSV solenoid valve (ON/OFF) condition is displayed.
HSV [FR-RL] (ON/OFF)	–	–	×	Secondary-side HSV solenoid valve (ON/OFF) condition is displayed.
V/R OUTPUT (ON/OFF)	–	–	×	Valve relay operation signal (ON/OFF) condition is displayed.
M/R OUTPUT (ON/OFF)	–	–	×	Front motor relay activation signal (ON/OFF) condition is displayed.
VDC FAIL SIG (ON/OFF)	–	–	×	VDC fail signal (ON/OFF) condition is displayed.
TCS FAIL SIG (ON/OFF)	–	–	×	TCS fail signal (ON/OFF) condition is displayed.
ABS FAIL SIG (ON/OFF)	–	–	×	ABS fail signal (ON/OFF) condition is displayed.
EBD FAIL SIG (ON/OFF)	–	–	×	EBD fail signal (ON/OFF) condition is displayed.
FLUID LEV SW (ON/OFF)	×	–	×	Brake fluid level switch (ON/OFF) condition is displayed.
CRANKING SIG	–	–	×	Ignition switch (START) switch signal input condition is displayed.
EBD SIGNAL (ON/OFF)	–	–	×	EBD operation (ON/OFF) condition is displayed.
ABS SIGNAL (ON/OFF)	–	–	×	ABS operation (ON/OFF) condition is displayed.
TCS SIGNAL (ON/OFF)	–	–	×	TCS operation (ON/OFF) condition is displayed.
VDC SIGNAL (ON/OFF)	–	–	×	VDC operation (ON/OFF) condition is displayed.

×: Applicable

–: Not applicable

ACTIVE TEST

Operation Procedure

CAUTION:

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

1. Connect CONSULT-II and CONSULT-II CONVERTER to the data link connector and start engine.

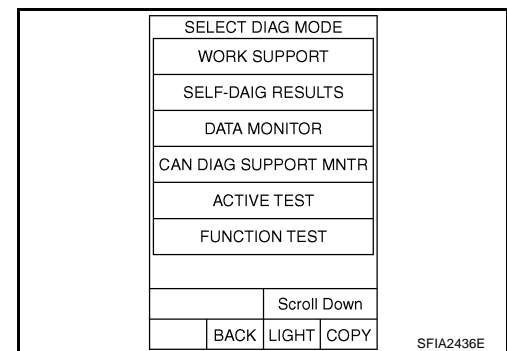
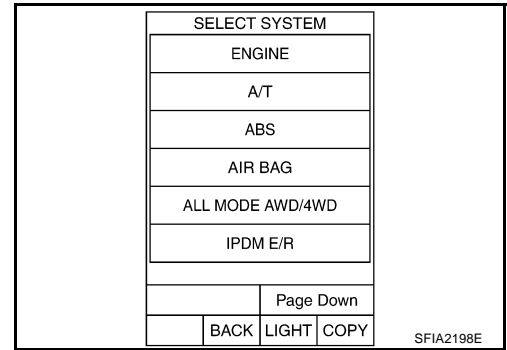
TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

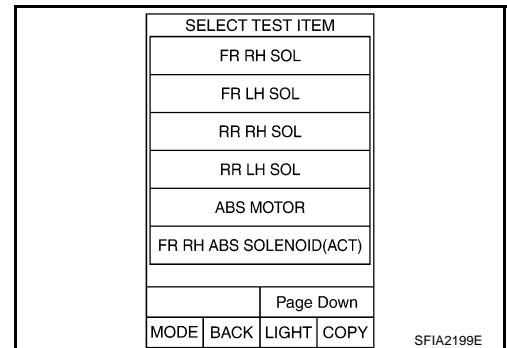
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which perform CAN communication.

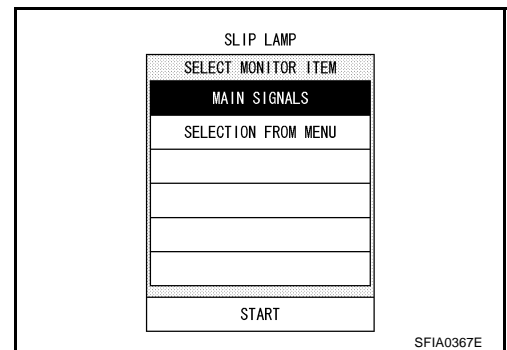
2. Touch "START" on display.
3. Touch "ABS" and "ACTIVE TEST".



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



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



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.

ACTIVE TEST

ABS MOTOR	OFF
MONITOR	
MOTOR RELAY	OFF
ACTUATOR RLY	ON
ON	
MODE	BACK
LIGHT	COPY

SFIA0593E

For Fast and Accurate Diagnosis

PRECAUTIONS FOR DIAGNOSIS

- Before performing diagnosis, always read General Information (GI) to confirm general precautions. Refer to [GI-4, "General Precautions"](#) .
- If VDC/TCS/ABS control unit, steering angle sensor, steering system parts, suspension system parts, or tires have been replaced, or if wheel 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 label on control unit are the same color.
- After diagnosis is finished, be sure to erase memory. Refer to [BRC-26, "Operation Procedure"](#) .
- When checking continuity and voltage between unit, 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 former 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 sound	This is sound of motor inside VDC/TCS/ABS actuator. Slight sound may occur during VDC, TCS, and ABS operation.	Normal
	Just after engine starts, the motor operating sound may be heard. This is a normal condition of the system operation check.	
System operation check sound	When engine starts, slight "click" sound may be heard from engine room. This is normal and is part of system operation check.	Normal
TCS operation (SLIP indicator lamp ON)	TCS may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when downshifting, or when fully depressing accelerator pedal.	Normal Cancel the VDC/TCS function for the inspection on a chassis dynamometer.
	When checking speed meter etc. with a 2-wheel-drive chassis dynamometer, vehicle speed is not increased by pressing down on the accelerator.	
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

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	Brake warning lamp [Note1]
Ignition SW OFF	-	-	-	-
For 1 second after turning ON ignition switch	×	×	×	×[Note 2]

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Condition	ABS warning lamp	VDC OFF indicator lamp	SLIP indicator lamp	Brake warning lamp [Note1]
1 second later after turning ON ignition switch	-	-	-	×[Note 2]
VDC OFF switch turned ON. (VDC function is OFF.)	-	×	-	-
VDC/TCS/ABS error.	×	×	×	-
When VDC/TCS is not functioning normally.	-	×	×	-
EBD error.	×	×	×	×

Note1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).

Note2: After starting engine, brake warning lamp is turned off.

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 is found, check as follows.
 - If the connections at VDC actuator connector are loose, tighten piping to specified torque. Then inspect again and confirm that there is no leakage.
 - If flare nuts or screws of VDC actuator are damaged and loose, replace damaged parts. Then inspect again and confirm that there is no leakage.
 - If there is leakage at any location other than VDC actuator connections, wipe away leakage with clean cloth. Then inspect again and confirm that there is no leakage.
 - If there is leakage from VDC actuator, wipe away leakage with clean cloth. Then inspect again. If there is leakage, replace VDC actuator.

CAUTION:

ABS actuator body cannot be disassembled.

3. Check brake disc rotor and pads. Refer to [BR-29, "DISC ROTOR INSPECTION"](#) (CLZ31VD), [BR-26, "PAD WEAR INSPECTION"](#) (CLZ31VD), [BR-35, "DISC ROTOR INSPECTION"](#) (CAZ25VD), [BR-32, "PAD WEAR INSPECTION"](#) (CLZ25VD), [BR-42, "DISC ROTOR INSPECTION"](#) (AD14VE,AD14VF), [BR-39, "PAD WEAR INSPECTION"](#) (AD14VE,AD14VF).

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, fasten the connections 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 that ABS warning lamp illuminates when ignition switch is turned ON. If it does not illuminate, inspect ABS warning lamp and circuit, and inspect combination meter. Refer to [DI-4, "COMBINATION METERS"](#)
2. Make sure that VDC OFF indicator lamp illuminates when ignition switch is turned ON. If it does not illuminate, inspect VDC OFF indicator lamp and circuit, and inspect combination meter. Refer to [DI-4, "COMBINATION METERS"](#) . If VDC OFF indicator lamp does not illuminate, inspect VDC OFF switch and circuit first time. Refer to [BRC-58, "VDC OFF SWITCH"](#)
3. Make sure that SLIP indicator lamp illuminates when ignition switch is turned ON. If it does not turn on, check SLIP indicator lamp and circuit, and inspect combination meter. Refer to [DI-4, "COMBINATION METERS"](#)
4. With engine running, turn VDC OFF switch ON and OFF. Check that VDC OFF indicator lamp turns ON and OFF. If indicator lamp does not turn ON and OFF in accordance with switch over of VDC OFF switch, inspect VDC OFF switch and circuit. Refer to [BRC-58, "VDC OFF SWITCH"](#)
5. With VDC OFF switch OFF (not operating), make sure that VDC OFF indicator lamp turns off after engine starts. If VDC OFF indicator lamp does not turn OFF after 10 seconds have passed since engine-start, perform self-diagnosis of VDC/TCS/ABS control unit. Refer to [BRC-26, "SELF-DIAGNOSIS"](#) Be sure to erase memory after performing self-diagnosis. Refer to [BRC-26, "Operation Procedure"](#)

Inspection 1: Wheel Sensor Circuit 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. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

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

Is above displayed in the self-diagnosis display item?

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

2. CHECK CONNECTOR

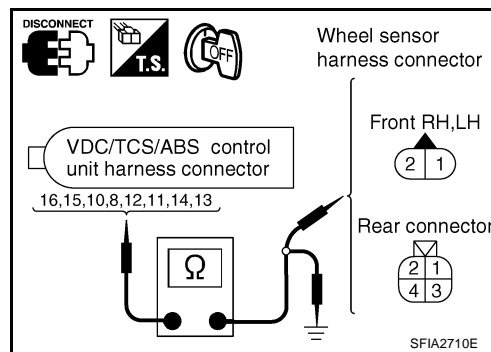
Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector and connector of wheel sensor where malfunction was detected. Check terminals for deformation and connectors for poor contact. Then reconnect connectors. Also make sure interference with other parts has not cut wheel sensor cables.

Drive vehicle at 30 km/h (19 MPH) or above for at least 1minute. Does 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 supply circuit		Signal circuit		Ground circuit	
Wheel	VDC/TCS/ABS control unit (Harness connector M93)	Wheel sensor (Harness connector E27, E42 or B113)	VDC/TCS/ABS control unit (Harness connector M93)	Wheel sensor (Harness connector E27, E42 or B113)	VDC/TCS/ABS control unit (Harness connector M93) (signal)	Ground
Front RH	16 (B)	1 (B)	15 (W)	2 (W)	15 (W), 16 (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 (PU)	13 (P), 14 (OR)	

- Power supply circuit** : Continuity should exist.
- Signal circuit** : Continuity should exist.
- Ground circuit** : Continuity should not exist.

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace harness and connector that have malfunction.

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

1. Replace wheel sensor that resulted in malfunction by self-diagnosis.
2. Reconnect connectors, drive vehicle at 30 km/h (19MPH) or more for approximately 1 minute, and then perform self-diagnosis.

Is above displayed on self-diagnosis display?

- OK >> Wheel sensor has malfunction.
- NG >>
 - Replace VDC/TCS/ABS control unit.
 - Perform to self-diagnosis again, and make sure that the result shows "NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED."

Inspection 2: Engine System

AFS0004C

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS (1)

Check the self-diagnostic results.

Self-diagnostic results
Engine system 1
Engine system 2
Engine system 3
Engine system 4
Engine system 5
Engine system 6

Is above displayed on self-diagnosis display?

- 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 Circuit

AFS0004D

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
CONTROLLER FAILURE

Is above displayed 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
PRESS SEN CIRCUIT

Is above displayed on self-diagnosis display?

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

2. CHECK SELF-DIAGNOSTIC RESULTS (2)

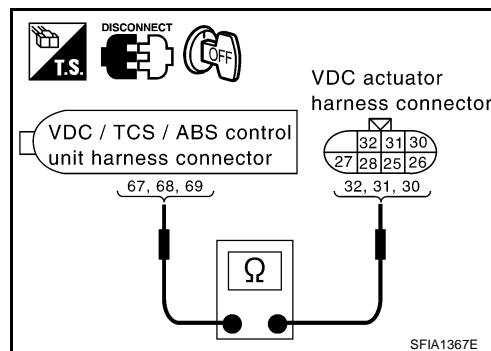
1. Turn ignition switch OFF and disconnect VDC actuator (pressure sensor) connector and VDC/TCS/ABS control unit connector. Then reconnect them securely.
2. Perform VDC/TCS/ABS control unit self-diagnosis again.

OK or NG

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

3. CHECK 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 M93 and VDC actuator (pressure sensor) harness connector E50.



VDC/TCS/ABS control unit (Harness connector M93)	Pressure sensor (VDC actuator harness connector E50)	Continuity
69 (P/B)	30 (P/B)	Yes
68(SB)	31(SB)	
67(G/B)	32(G/B)	

OK or NG

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

4. CHECK 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

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS (1)

Check the self-diagnostic results.

Self-diagnostic results
ST ANGLE SEN CIRCUIT

Is above displayed on self-diagnosis display?

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

2. CHECK SELF-DIAGNOSTIC RESULTS (2)

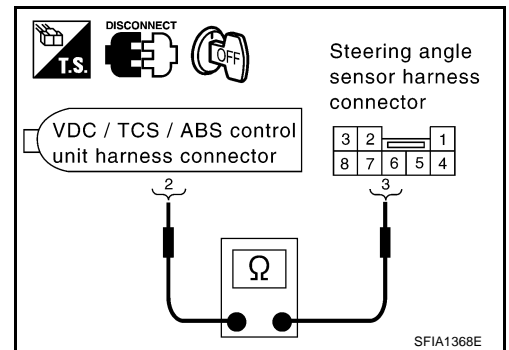
1. Turn ignition switch OFF and disconnect steering angle sensor connector and VDC/TCS/ABS control unit connector. Then reconnect them securely.
2. Perform VDC/TCS/ABS control unit self-diagnosis again.

OK or NG

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

3. CHECK STEERING ANGLE SENSOR CIRCUIT

1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector and steering angle sensor connector.
2. Check continuity between VDC/TCS/ABS control unit harness connector M93 and steering angle sensor harness connector M22.



VDC/TCS/ABS control unit (Harness connector M93)	Steering angle sensor (Harness connector M22)	Continuity
2 (Y/R)	3 (Y/R)	Yes

OK or NG

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

4. 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 to +5°
Turned 90°to right	Approx. +90°
Turned 90°to left	Approx. -90°

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"](#).

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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 indicator lamp is turned on) may cause yaw rate/side G sensor circuit 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
YAW RATE SENSOR
SIDE G-SEN CIRCUIT

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" and "SIDE G-SEN CIRCUIT" 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. Then reconnect them securely.
2. Perform VDC/TCS/ABS control unit self-diagnosis again.

OK or NG

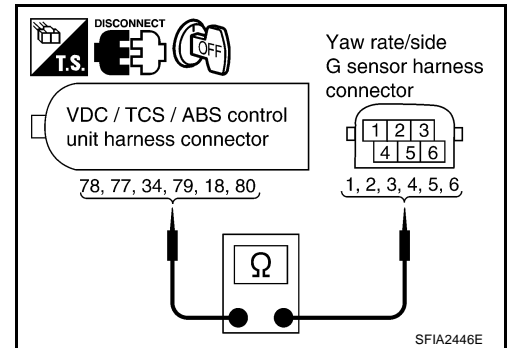
- OK >> Poor connection of connectors. Repair or replace suspect connector. Perform self-diagnosis again.
- NO >> GO TO 3.

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

3. CHECK YAW RATE/SIDE G SENSOR CIRCUIT

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 M93 and yaw rate/side G sensor harness connector M51.



VDC/TCS/ABS control unit (Harness connector M93)	Yaw rate/ Side G sensor (Harness connector M51)	Continuity
78 (L/B)	1 (L/B)	Yes
77 (Y/B)	2 (Y/B)	
34 (OR)	3 (OR)	
79 (LG/R)	4 (LG/R)	
18 (LG)	5 (LG)	
80 (W/R)	6 (W/R)	

OK or NG

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

4. PERFORM DATA MONITOR

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

AFS001J3

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS (1)

Check the self-diagnostic results.

Self-diagnostic results
FR LH IN ABS SOL
FR LH OUT ABS SOL
RR RH IN ABS SOL
RR RH OUT ABS SOL
FR RH IN ABS SOL
FR RH OUT ABS SOL
RR LH IN ABS SOL
RR LH OUT ABS SOL
PRIMARY SIDE USV CIRCUIT
SECONDARY SIDE USV CIRCUIT
PRIMARY SIDE HSV CIRCUIT
SECONDARY SIDE HSV CIRCUIT

Is above displayed 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/TCS/ABS control unit connector and VDC actuator connectors. Then reconnect them securely.
2. Reconnect connectors securely and perform self-diagnosis again.

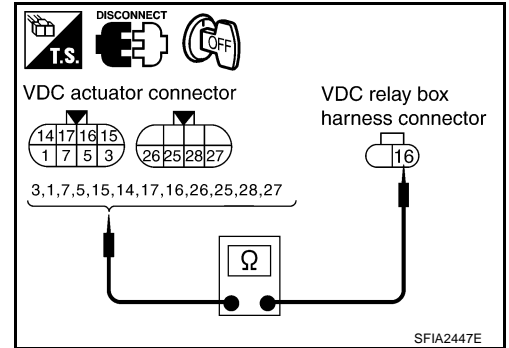
Do any self-diagnosis items appear?

YES >> GO TO 3.

NO >> Poor connection. Repair or replace connector.

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

OK or NG

OK >> GO TO 4.

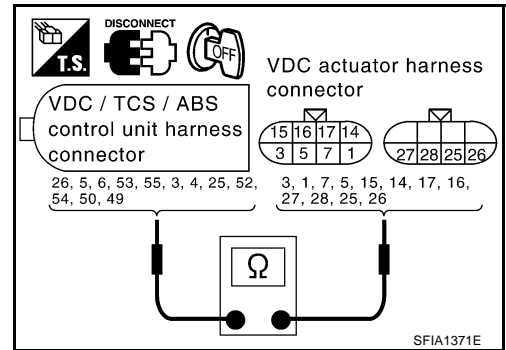
NG >> Check harness open or short between VDC relay box and VDC actuator. If harness is OK, replace VDC actuator.

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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 M93 and VDC actuator harness connector E49 and E50.



Item	VDC/TCS/ABS control unit (Harness connector M93)	VDC actuator (Harness connector E49 and E50)	Continuity
FR LH IN ABS SOL	5 (G/OR)	1 (G/OR)	Yes
FR LH OUT ABS SOL	3 (Y/G)	14 (Y/G)	
RR RH IN ABS SOL	6 (PU/W)	7 (PU/W)	
RR RH OUT ABS SOL	4 (GY/R)	17 (GY/R)	
FR RH IN ABS SOL	26 (W/G)	3 (W/G)	
FR RH OUT ABS SOL	55 (R/Y)	15 (R/Y)	
RR LH IN ABS SOL	53 (P)	5 (P)	
RR LH OUT ABS SOL	25 (LG)	16 (LG)	
PRIMARY SIDE USV CIRCUIT	49 (B/W)	26 (B/W)	
SECONDARY SIDE USV CIRCUIT	50 (R/G)	25 (R/G)	
PRIMARY SIDE HSV CIRCUIT	54 (W/L)	28 (W/L)	
SECONDARY SIDE HSV CIRCUIT	52 (PU)	27 (PU)	

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.

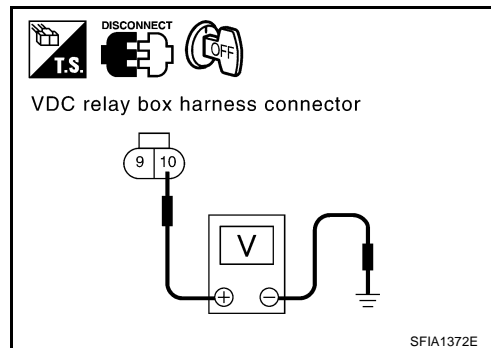
Do any self-diagnosis items appear?

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

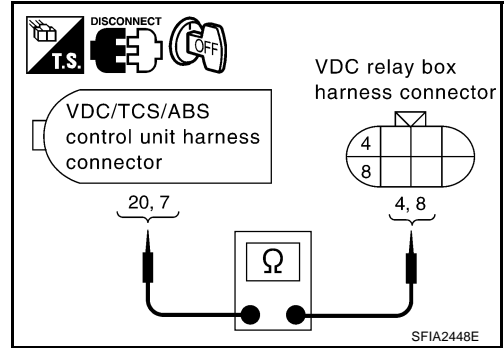
OK >> GO TO 4.

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 M93 and VDC relay box harness connector E47.



VDC/TCS/ABS control unit (Harness connector M93)	VDC relay box (Harness connector E47)	Continuity
20 (R/B)	4 (R/B)	Yes
7 (G/W)	8 (G/W)	

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 ACTUATOR MOTOR

Check if actuator motor operates after energizing approximately 12V to the connector terminal 15 at the VDC relay box harness connector E222.

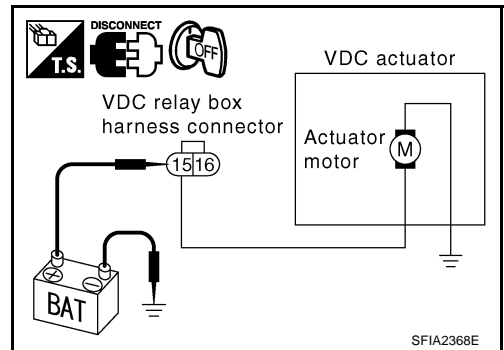
CAUTION:

To prevent overheating, do not drive actuator motor more than 4 seconds.

OK or NG

OK >> GO TO 6.

NG >> Actuator motor or actuator motor circuit open or short in harness. Replace VDC actuator.



6. CHECK MOTOR RELAY UNIT

Check motor relay as a unit. Refer to [BRC-58, "ABS MOTOR RELAY AND ACTUATOR RELAY"](#).

OK or NG

OK >> Replace VDC actuator.

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

Inspection 9: Solenoid Valve Relay and Circuit

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS (1)

Check the self-diagnostic results.

Self-diagnostic results
ACTUATOR RELAY

Is above displayed in the self-diagnosis item?

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

2. CHECK SELF-DIAGNOSTIC RESULTS (2)

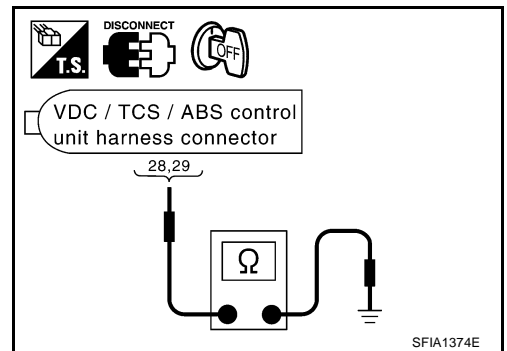
1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector and VDC relay box connectors. Then reconnect it securely.
2. Perform VDC/TCS/ABS control unit self-diagnosis again.

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.



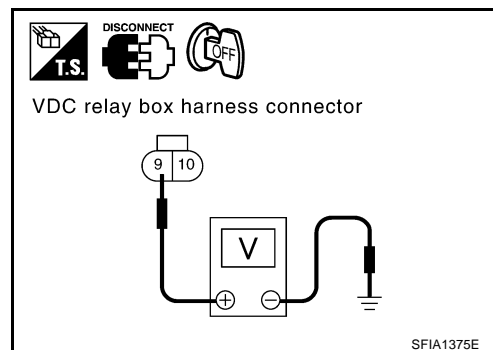
VDC/TCS/ABS control unit (Harness connector M93)	Ground	Continuity
28 (B)	—	Yes
29 (B)		

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

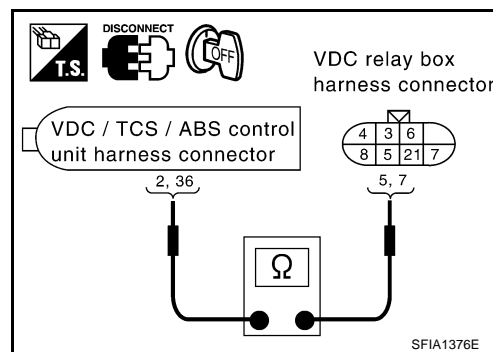
OK >> GO TO 5.

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 M93 and VDC relay box harness connector E47.



VDC/TCS/ABS control unit (Harness connector M93)	VDC relay box (Harness connector E47)	Continuity
2 (Y/R)	5 (Y/R)	Yes
36 (L/Y)	7 (L/Y)	

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-58, "ABS MOTOR RELAY AND ACTUATOR RELAY"](#).

OK or NG

OK >> Replace VDC actuator.

NG >> Replace solenoid valve relay.

Inspection 10: Stop Lamp Switch and Circuit

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
STOP LAMP SW

Is above displayed in the self-diagnosis item?

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

2. CHECK STOP LAMP

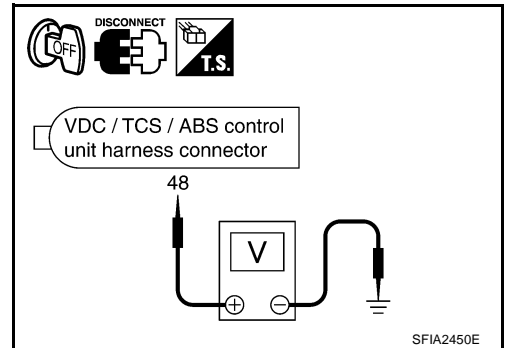
1. Turn ignition switch OFF and disconnect stop lamp switch connector and VDC/TCS/ABS control unit connector.
2. Reconnect connectors securely.
3. Start engine.
4. Repeat pumping brake pedal carefully several times, then perform self-diagnosis.

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 VDC/TCS/ABS control unit harness connector.
2. Check continuity between VDC/TCS/ABS control unit harness connector M93 terminal 48 (P/L) and ground.



VDC/TCS/ABS control unit (Harness connector M93)	Ground	Measurement condition	Voltage (V) (Approx.)
48 (P/L)	—	Brake pedal depressed	12V
		Brake pedal not depressed	0V

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

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
LOW POWER VOLTAGE

Is above displayed in the self-diagnosis item?

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

2. INSPECTION START

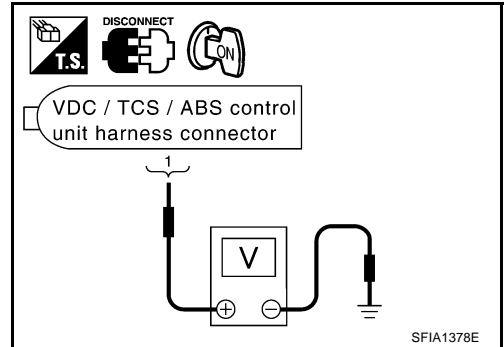
1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector. Then reconnect it securely.
2. Perform self-diagnosis.

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 M93 and ground.



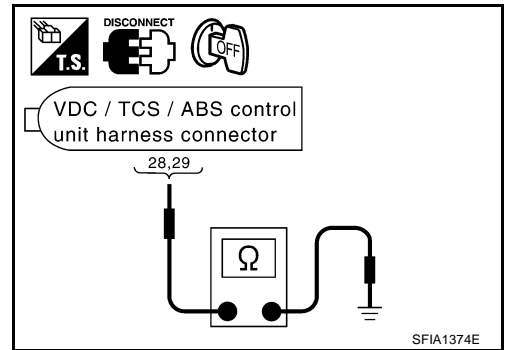
VDC/TCS/ABS control unit (Harness connector M93)	Ground	Voltage
1 (G/R)	—	Battery voltage (Approx. 12V)

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.



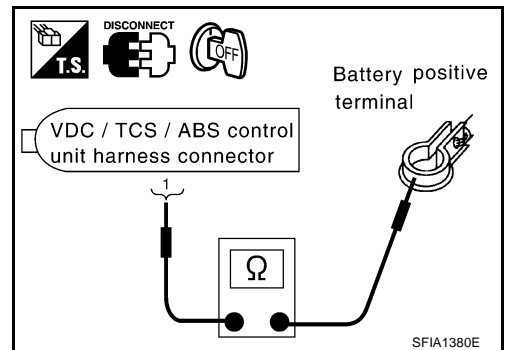
VDC/TCS/ABS control unit (Harness connector M93)	Ground	Continuity
28 (B)	—	Yes
29 (B)		

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 M93.



VDC/TCS/ABS control unit (Harness connector M93)	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
SHIFT POSITION ERROR

Is above displayed in the self-diagnosis item?

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-118, "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
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.

Is above displayed in the self-diagnosis item?

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

Inspection 14: Brake Fluid Level in Reservoir Tank, Communication Circuit Between VDC/TCS/ABS Control Unit and Brake Fluid Level Switch

AFS0004P

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS (1)

Check the self-diagnostic results.

Self-diagnostic results
BR FLUID LEVEL LOW

Is above displayed in the self-diagnosis item?

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

2. CHECK SELF-DIAGNOSTIC RESULTS (2)

1. Turn ignition switch OFF and disconnect brake fluid level switch connector and VDC/TCS/ABS control unit connector.
2. 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.

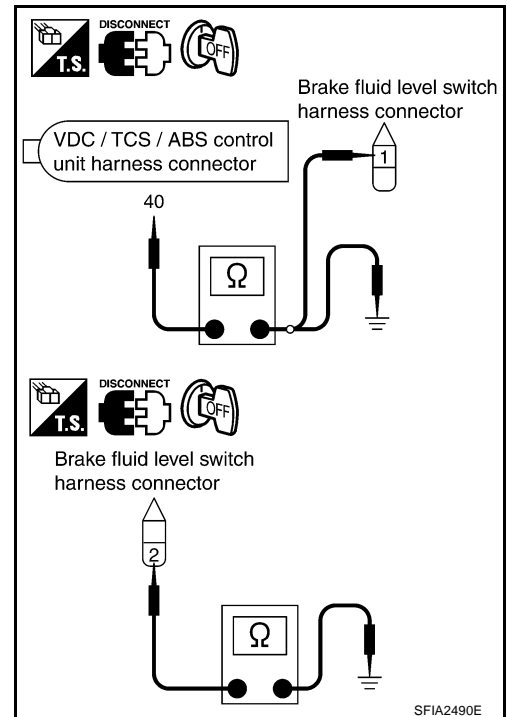
3. CHECK HARNESS BETWEEN BRAKE FLUID LEVEL SENSOR AND VDC/TCS/ABS CONTROL UNIT

1. Turn ignition switch OFF and disconnect brake fluid level switch connector and VDC/TCS/ABS control unit connector.
2. Check continuity between brake fluid level switch harness connector E44 and VDC/TCS/ABS control unit harness connector M93.

VDC/TCS/ABS control unit (Harness connector M93)	Brake fluid level switch (Harness connector E44)	Continuity
40 (W)	1 (W)	Yes
	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.



SFIA2490E

Inspection 15: CAN Communication Circuit

Inspection Procedure

1. CHECK CONNECTOR

1. Turn ignition switch OFF and disconnect VDC/TCS/ABS control unit connector and steering angle sensor connector. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
2. Securely reconnect connectors and perform self-diagnosis.

Self-diagnostic results
CAN COMM CIRCUIT
ST ANG SEN COM CIR

Is above displayed in the self-diagnosis item?

- YES >> Print out self-diagnostic results and go to [LAN-3, "Precautions When Using CONSULT-II"](#) .
- NO >> Connector terminal connection is loose, damaged, open or shorted.

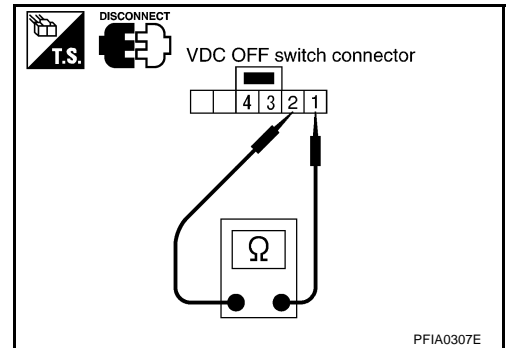
Component Inspection

VDC OFF SWITCH

- Turn ignition switch OFF and disconnect VDC OFF switch connector. Check continuity between terminal 1 and terminal 2.

1 - 2:

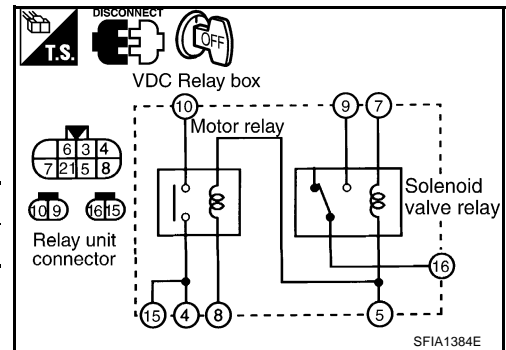
Pressing switch will establish continuity, releasing it will break continuity.



ABS MOTOR RELAY AND ACTUATOR RELAY

- Turn ignition switch OFF and disconnect the VDC relay box connector E47, E48, E222.
- Apply a voltage of 12V between the ABS motor relay terminal 8 (G/W) and the actuator relay terminal 7 (L/Y) and then check the continuity between the following terminals.

ABS motor relay	Between terminal 4 to 10	Continuity should exist.
Actuator relay	Between terminal 9 to 16	Continuity should exist.



VDC/TCS/ABS ACTUATOR

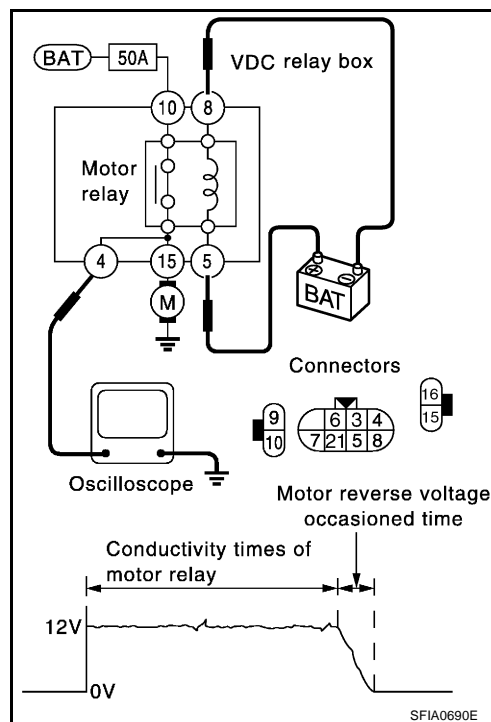
Actuator Operation Inspection

- 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 reverse voltage occurrence time:
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-59, "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 brake 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 the following inspections 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 the following inspections 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 the following inspections:

- 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 Sound

AFS0004W

Inspection Procedure

1. INSPECTION (1)

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

OK or NG

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

2. INSPECTION (2)

Check for vibration during soft braking (just placing foot on brake 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-diagnosis.

NG >> GO TO 7.

7. CHECK WHEEL SENSOR

Perform the following inspections:

- 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 INDICATOR 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 INDICATOR 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 approximately 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-diagnosis. 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-diagnosis.

Does anything appear on self-diagnostic results display?

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

3. ECM SELF-DIAGNOSTIC RESULTS

Perform the ECM self-diagnosis.

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

- YES >> Repair or replace crankshaft position sensor circuit.
 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-diagnosis 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-diagnosis. (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-diagnosis 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-58, "Inspection 15: CAN Communication Circuit"](#).

OK or NG

OK >> INSPECTION END

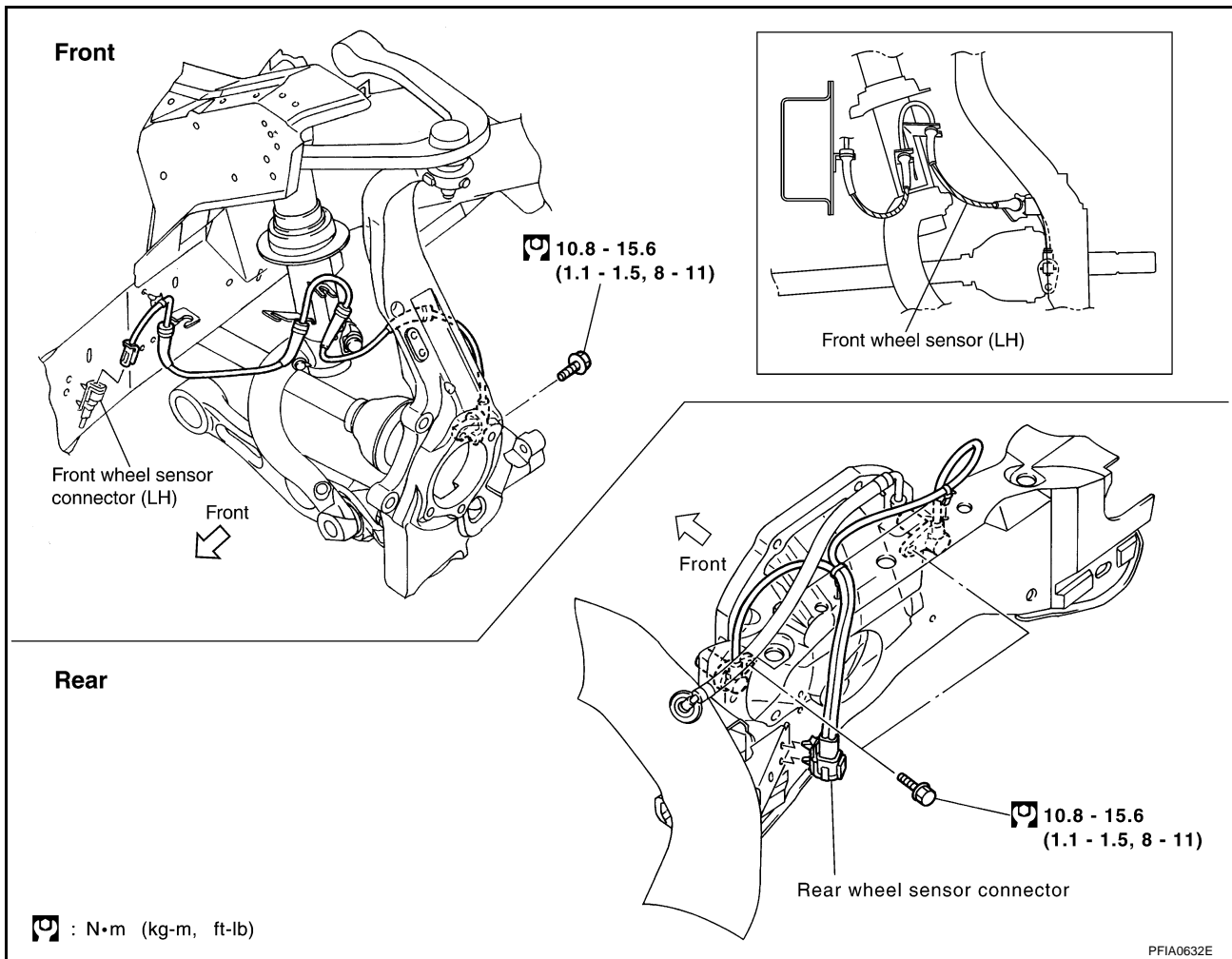
NG >> Reconnect connectors and perform VDC/TCS/ABS control unit self-diagnosis again.

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WHEEL SENSOR

Removal and Installation



REMOVAL

Pay attention to the following when removing sensor.

CAUTION:

- As much as possible, twisting sensor harness 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 wheel 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 wheel sensor, be sure to press rubber grommets in until they are held at the three locations shown in the figure (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

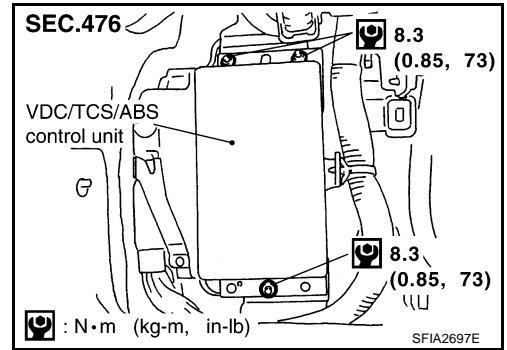
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Removal and Installation

AFS00058

REMOVAL

1. Remove instrument side panel (RH). Refer to [IP-15, "\(U\) Instrument Side Panel \(RH/LH\)"](#) .
2. Remove instrument lower cover. Refer to [IP-14, "\(S\) Instrument Lower Cover"](#) .
3. Remove VDC/TCS/ABS control unit.



INSTALLATION

Installation is the reverse order of removal.

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SENSOR ROTOR

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Removal and Installation

AFS00059

REMOVAL

CAUTION:

Never reuse sensor rotor.

Front

2WD model

- Sensor rotor cannot be disassembled. Remove the sensor rotor as of being integrated to hub bearing assembly. Refer to [FAX-4, "REMOVAL"](#) .

AWD model

- Remove front sensor rotor from drive shaft. Refer to [FAX-21, "Disassembly and Assembly"](#) .

Rear

- Follow procedure below to remove rear sensor rotor.
 - Remove side flange. Refer to [RFD-13, "SIDE OIL SEAL"](#) .
 - Using a bearing replacer (suitable tool) and puller (suitable tool), remove sensor rotor from side flange.

INSTALLATION

Front

2WD model

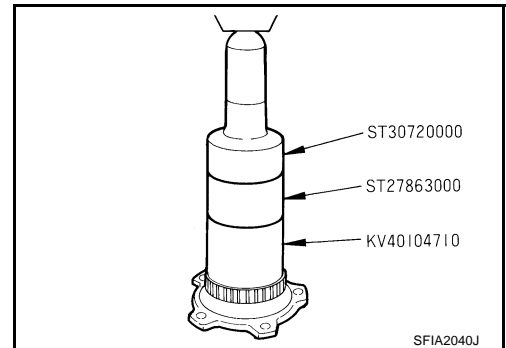
- Sensor rotor cannot be disassembled. Remove the sensor rotor as of being integrated to hub bearing assembly. Refer to [FAX-6, "INSTALLATION"](#) .

AWD model

- Install front sensor rotor to front drive shaft. Refer to [FAX-21, "Disassembly and Assembly"](#) .

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-13, "SIDE OIL SEAL"](#) .

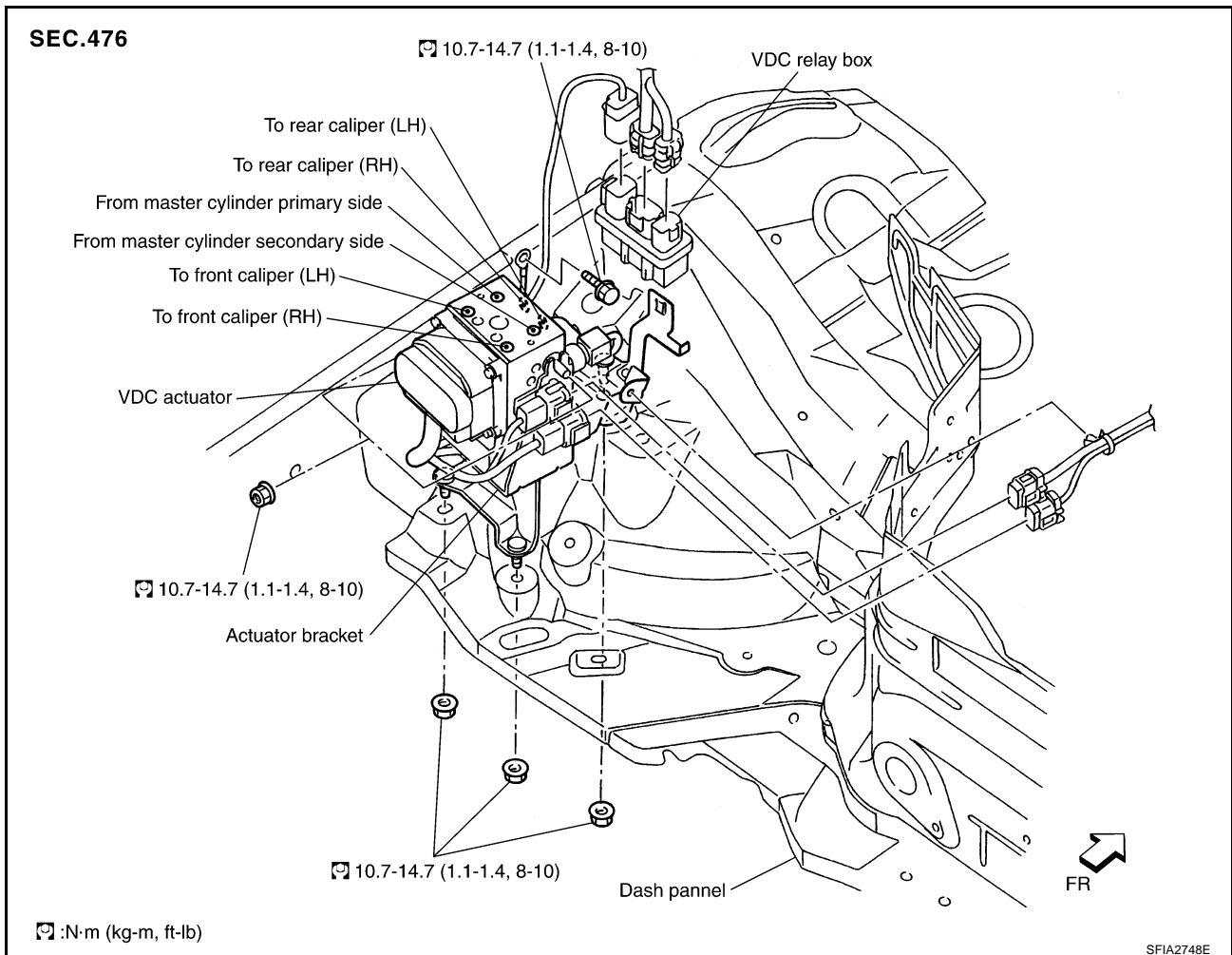


VDC/TCS/ABS ACTUATOR

PFP:47660

Removal and Installation

AFS00055



Pay attention to the following when removing VDC actuator.

CAUTION:

- Before servicing, disconnect the battery cable from the 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 the battery cable to the negative terminal.

G-SENSOR

Removal and Installation

REMOVAL

A/T Model

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

CAUTION:

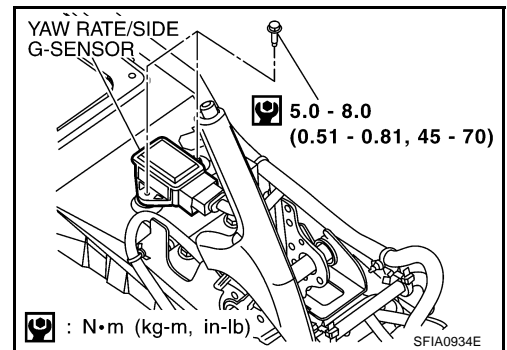
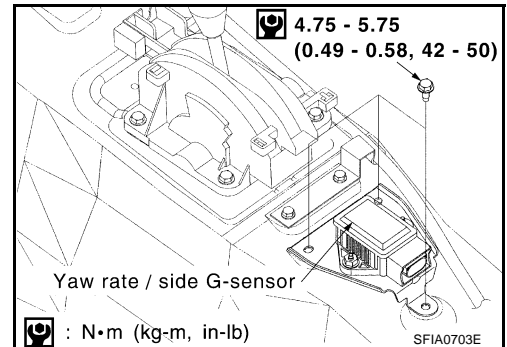
- Do not drop or strike yaw rate/side G sensor, because it has little endurance to impact.
- Do not use power tool etc., because yaw rate/side G sensor is sensitive for the impact.

M/T Model

1. Remove center console. Refer to [IP-15, "\(Y\) Center Console Assembly"](#).
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 sensitive for the impact.



INSTALLATION

Installation is 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.

STEERING ANGLE SENSOR

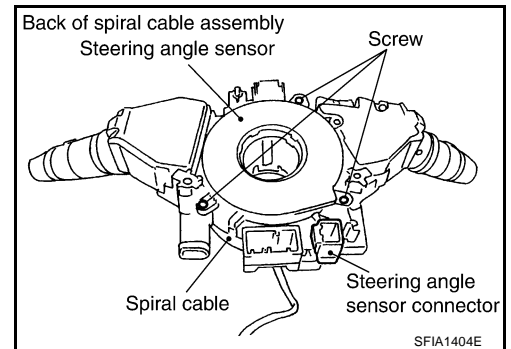
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Removal and Installation

AFS00221

REMOVAL

1. Remove spiral cable assembly. Refer to [SRS-41, "SPIRAL CABLE"](#) .
2. Remove steering angle sensor from spiral cable assembly.



INSTALLATION

Installation is 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"](#) .

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