

SECTION **BRC**

BRAKE CONTROL SYSTEM

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PRECAUTIONS

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

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

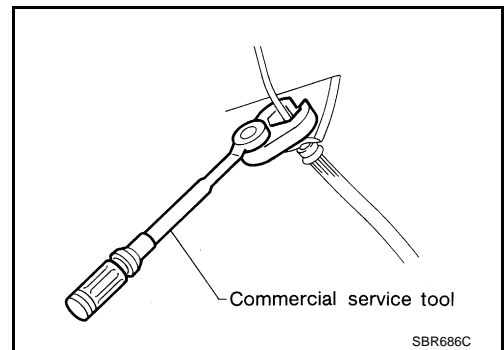
WARNING:

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

Precautions for Brake System

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



Precautions for Brake Control

AFS001JS

- During ABS operation, brake pedal lightly vibrates and a mechanical noise may be heard. This is normal.
- Just after starting vehicle after ignition switch ON, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic servicing. Besides electrical system inspection, check booster operation, brake fluid level, and oil leaks.
- If tire size and type are used in an improper combination, or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna, or antenna lead-in wire (including wiring) near control module, ABS function may have a malfunction or error.

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, the VDC OFF lamp and SLIP lamp may turn on or the VDC system may not operate properly. Components related to suspension (Shock Absorber, Strut, Spring, Bush, etc.), Tires, wheels (exclude specified size), components related to brake (Pad, Rotor, Caliper, etc.), Components related to engine (Muffler, ECM, etc.), Components related to body reinforcement (Roll bar, Tower bar, etc.).
- Driving in the condition of breakage or excessive wear of the suspension, tires or components related to the brakes may cause the VDC OFF lamp and the SLIP lamp to turn on, and the VDC system may not operate properly.
- When the TCS or VDC is activated by sudden acceleration or sudden turn, some noise may occur if the brake pedal is used. The noise is a result of the normal operation of the TCS and VDC.
- When driving on roads which have extreme slopes (such as mountainous roads) or high banks (such as sharp curves on a freeway), the VDC may not operate normally, or the VDC warning lamp may turn on. However, this is not a problem if normal operation can be resumed after restarting the engine.
- Sudden turns (such as spin turns, acceleration turns), drifting, etc. When VDC function is OFF (VDC SW ON) may cause the yaw rate/side G -sensor system indicate a problem. However this is not a problem if normal operation can be resumed after restarting the engine.

Diagnosis Precaution CAN SYSTEM

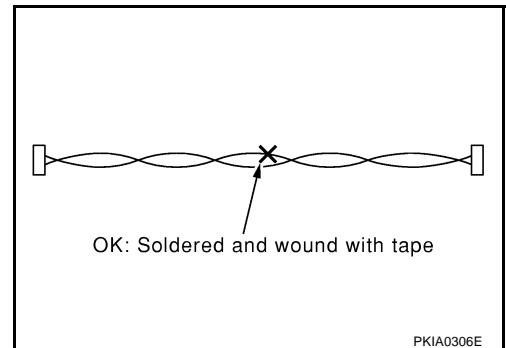
AFS000L1

- Do not apply voltage of 7.0 V or higher to terminal to be measured.
- Maximum open terminal voltage of tester in use shall be 7.0 V or lower.
- Before checking harnesses, turn ignition switch to OFF and disconnect battery negative cable.

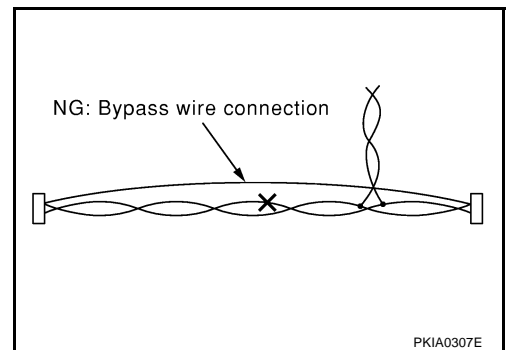
Precaution for Harness Repair CAN SYSTEM

AFS000L2

- Area to be repaired shall be soldered, and wrapped with a tape [be sure that fraying of twisted wire shall be within 110 mm (4.33 in)].



- Do not make a bypass connection to repaired area. (If it is done, branch part will be removed and characteristics of twisted wire will be lost.)



PREPARATION

[VDC/TCS/ABS]

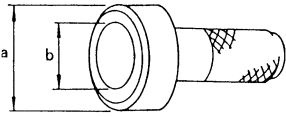
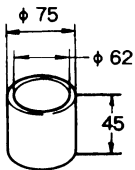
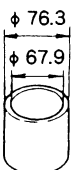
PREPARATION

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Special Service Tools

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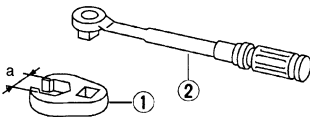
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST3072 000 (J25405) Drift a: 76.5mm (3.012 in) dia. b: 55.0mm (2.17 in) dia.	 <p>Installing rear sensor rotor.</p> <p style="text-align: right;">ZZC0760D</p>
ST2786 3000 (—) Drift	 <p>Installing rear sensor rotor.</p> <p style="text-align: right;">ZZC1307D</p>
KV401 04710 (—) Drift	 <p>Installing rear sensor rotor.</p> <p style="text-align: right;">ZZC1082D</p>

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Commercial Service Tools

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

ON-VEHICLE SERVICE

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Adjustment of Steering Angle Sensor Neutral Position

AFS000L4

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

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

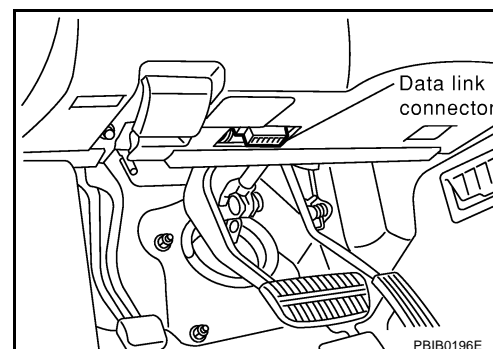
×: Required

-: Not required

CAUTION:

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

1. Stop vehicle with front wheels in straight-ahead position.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector on vehicle, and turn ignition switch ON (do not start engine). Refer to [BRC-29, "CONSULT-II BASIC OPERATION PROCEDURE"](#).
3. Touch "VDC", "WORK SUPPORT" and "ST ANG SEN ADJUSTMENT" on CONSULT-II screen in this order. If "VDC" is not indicated, refer to [BRC-29, "CONSULT-II BASIC OPERATION PROCEDURE"](#).



4. Touch "START".

CAUTION:

Do not touch steering wheel while adjusting steering angle sensor.

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

CAUTION:

Be sure to carry out above operation.

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

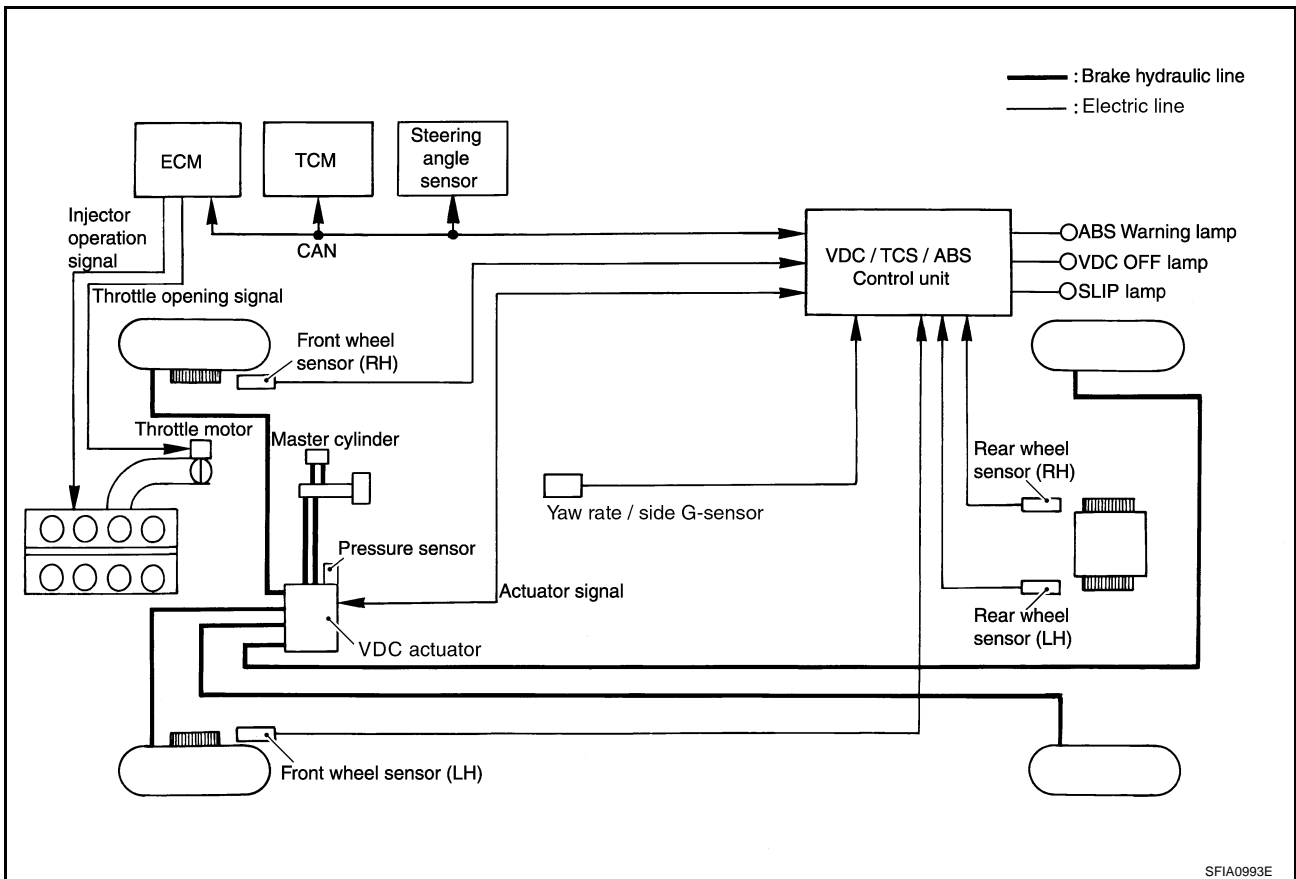


SYSTEM DESCRIPTION

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System Diagram

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VDC Function

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

TCS Function

AFS001JW

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

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ABS Function

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

EBD Function

AFS001JY

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

Fail-Safe Function

AFS001JZ

VDC / TCS SYSTEM

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

CAUTION:

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

ABS, EBD SYSTEM

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

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

NOTE:

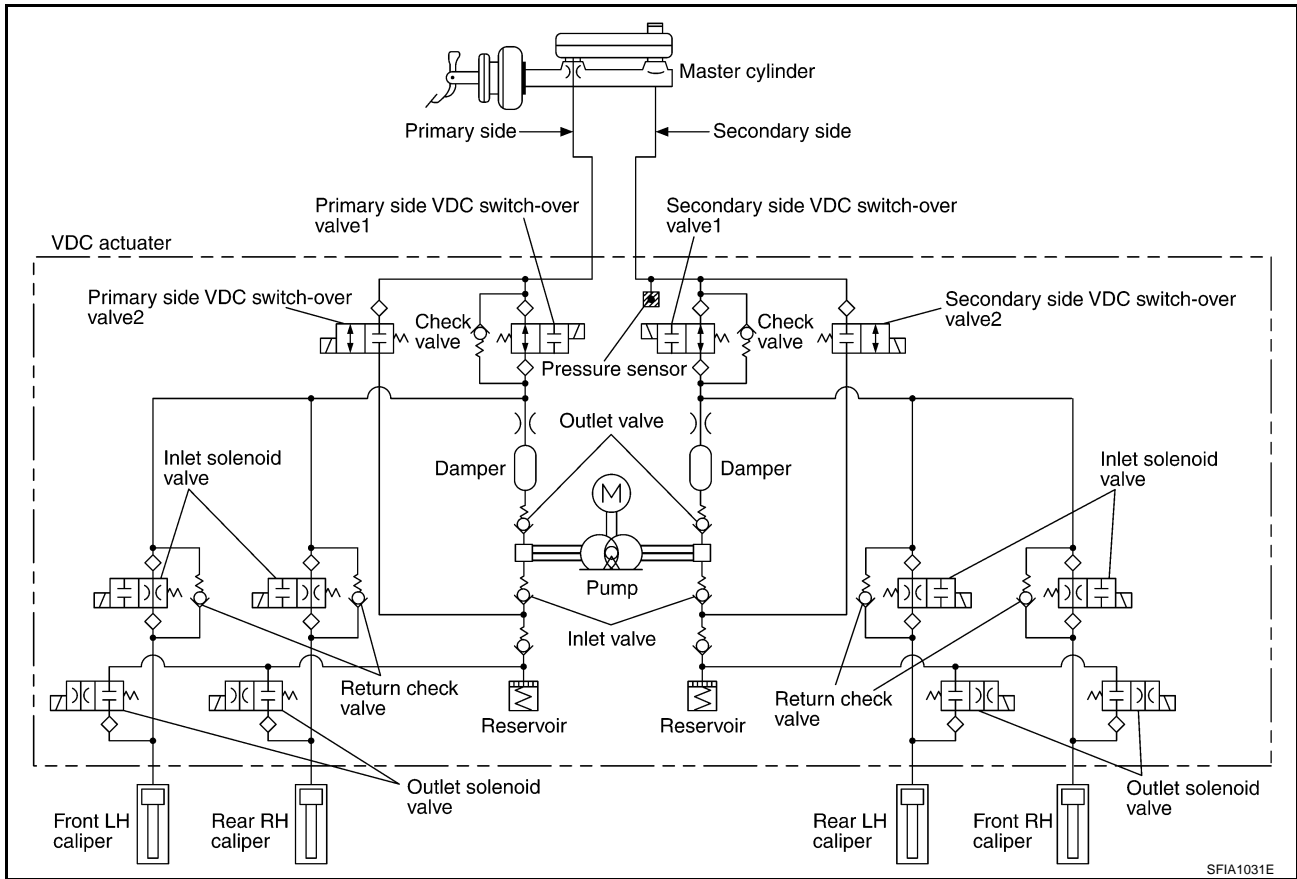
In condition 1 described above, an ABS Self Diagnosis sound may be heard. That is a normal condition because a self diagnosis for "Key Switch ON" and "the First Starting" are being performed.

SYSTEM DESCRIPTION

[VDC/TCS/ABS]

Hydraulic Circuit Diagram

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CAN COMMUNICATION

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System Description

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

CAN Communication Unit

AFS002QX

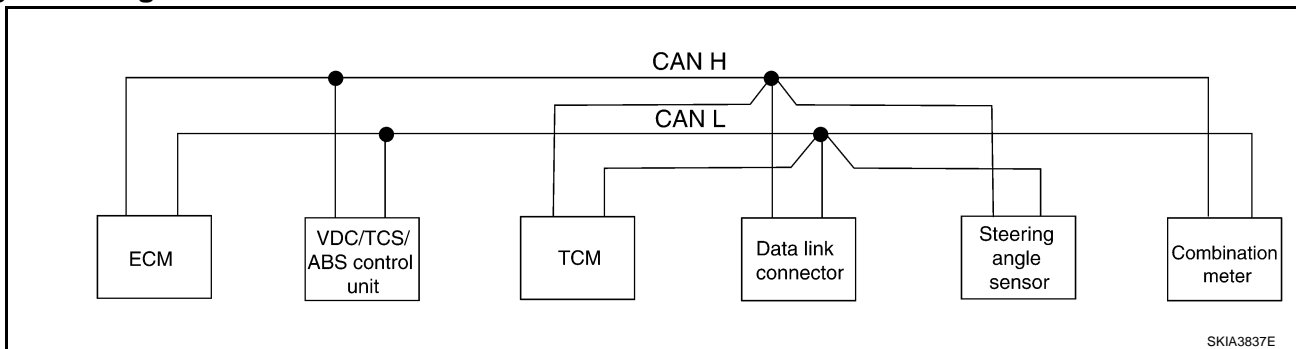
Go to CAN system, when selecting your CAN system type from the following table.

Body type	Sedan	
Axle	2WD	
Engine	VK45DE	
Transmission	A/T	
Brake control	VDC	
ICC system		×
CAN system type	1	2

×: Applicable

TYPE 1

System diagram



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	VDC/TCS/ABS control unit	TCM	Steering angle sensor	Combination meter
Engine speed signal	T	R	R		R
Engine coolant temperature signal	T				R
Accelerator pedal position signal	T	R	R		
Engine torque signal	T	R	R		
Battery voltage signal	T		R		
Closed throttle position signal	T		R		
Wide open throttle position signal	T		R		
Engine and A/T integrated control signal	T		R		
	R		T		
Fuel consumption monitor signal	T				R
A/T CHECK indicator signal			T		R
A/T position indicator signal			T		R
Current gear position signal	R	R	T		R

CAN COMMUNICATION

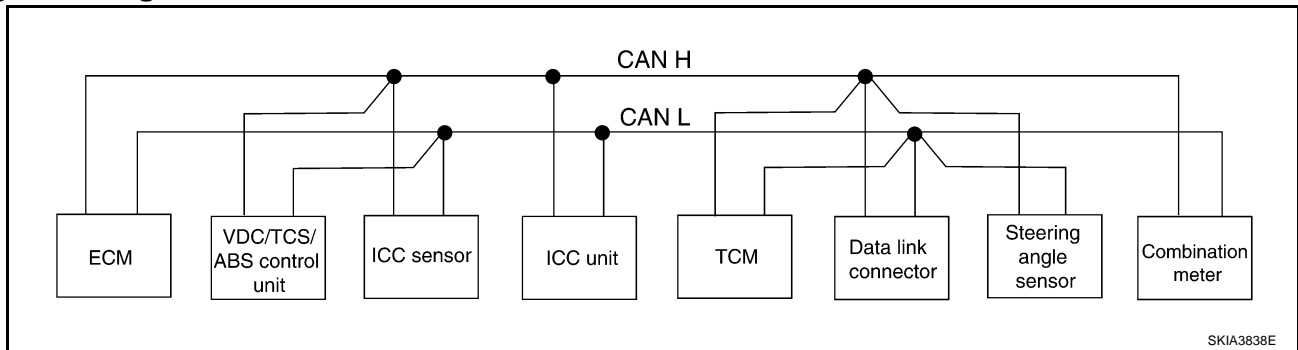
[VDC/TCS/ABS]

Signals	ECM	VDC/TCS/ABS control unit	TCM	Steering angle sensor	Combination meter
Next gear position signal	R	R	T		
Shift change signal	R	R	T		
Shift pattern signal	R		T		
VDC operation signal	R	T			
Stop lamp switch signal			R		T
Steering angle sensor signal		R		T	
Air conditioner switch signal	R				T
Headlamp switch signal	R				T
Rear window defogger switch signal	R				T
OD cancel switch signal		R			T
Vehicle speed signal		T			R
	R		R		T
Output shaft revolution signal	R		T		
ABS operation signal	R	T	R		
TCS operation signal	R	T			
A/T shift schedule change demand signal		T	R		
ASCD operation signal	R		R		T
Overdrive cancel signal	R		R		T
Manual mode signal			R		T
Not manual mode signal			R		T
Manual mode shift up signal			R		T
Manual mode shift down signal			R		T
Manual mode indicator signal			T		R

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TYPE 2

System diagram



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	VDC/TCS/ABS control unit	ICC sensor	ICC unit	TCM	Steering angle sensor	Combination meter
ICC system display signal				T			R
ICC sensor signal			T	R			
ICC operation signal				T	R		
Engine speed signal	T	R		R	R		R
Engine coolant temperature signal	T			R			R
Accelerator pedal position signal	T	R		R	R		

CAN COMMUNICATION

[VDC/TCS/ABS]

Signals	ECM	VDC/TCS/ ABS control unit	ICC sensor	ICC unit	TCM	Steering angle sensor	Combination meter
Engine torque signal	T	R			R		
Battery voltage signal	T				R		
Closed throttle position signal	T			R	R		
Wide open throttle position signal	T				R		
Engine and A/T integrated control signal	T				R		
	R				T		
Fuel consumption monitor signal	T						R
A/T CHECK indicator signal					T		R
A/T position indicator signal					T		R
Current gear position signal	R	R		R	T		R
Next gear position signal	R	R		R	T		
Shift change signal	R	R			T		
Shift pattern signal	R			R	T		
VDC operation signal	R	T		R			
Stop lamp switch signal					R		T
Steering angle sensor signal		R				T	
Air conditioner switch signal	R						T
Headlamp switch signal	R						T
Rear window defogger switch signal	R						T
OD cancel switch signal		R					T
Vehicle speed signal		T		R			R
	R				R		T
Output shaft revolution signal	R			R	T		
ABS operation signal	R	T		R	R		
TCS operation signal	R	T		R			
A/T shift schedule change demand signal		T			R		
Manual mode signal				R	R		T
Not manual mode signal					R		T
Manual mode shift up signal					R		T
Manual mode shift down signal					R		T
Manual mode indicator signal					T		R

TROUBLE DIAGNOSIS

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How to Proceed With Diagnosis

BASIC CONCEPT

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

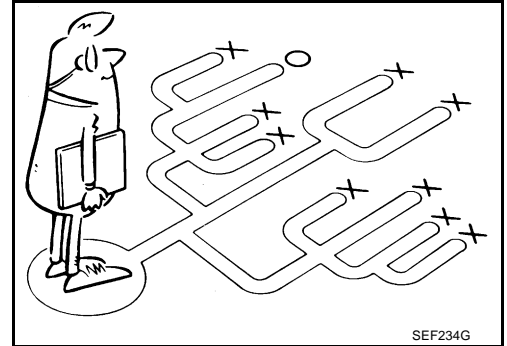
- It is also important to clarify customer complaints before inspection.

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

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

NOTE:

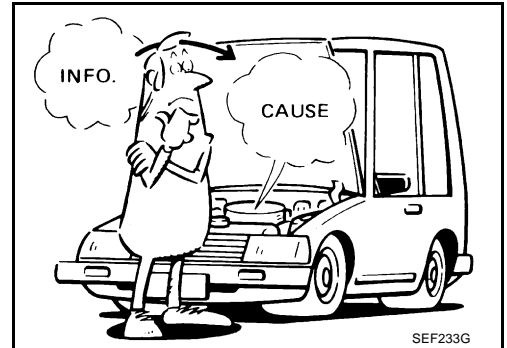
Customers are not professionals. Do not assume "maybe customer means..." or "maybe customer mentioned this symptom".



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

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

- After diagnosis, make sure to carry out "erase memory". Refer to [BRC-29, "SELF-DIAGNOSIS"](#).
- For an intermittent malfunction, move harness or harness connector by hand to check poor contact or false open circuit.
- Always read "GI General Information" to confirm general precautions. Refer to [GI-4, "General Precautions"](#).



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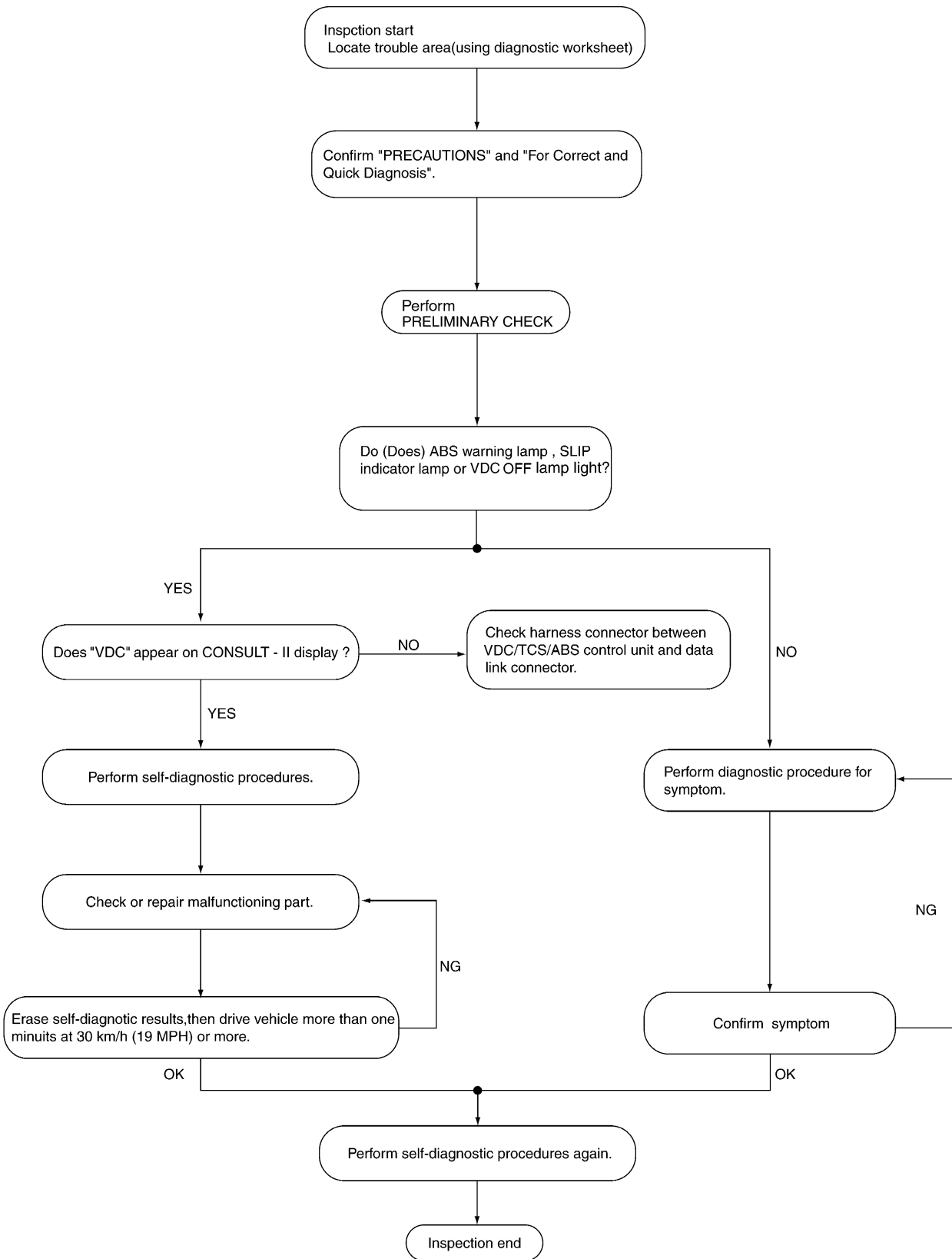
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DIAGNOSIS FLOWCHART



SFIA1084E

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

ASKING COMPLAINTS

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

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

SBR339B

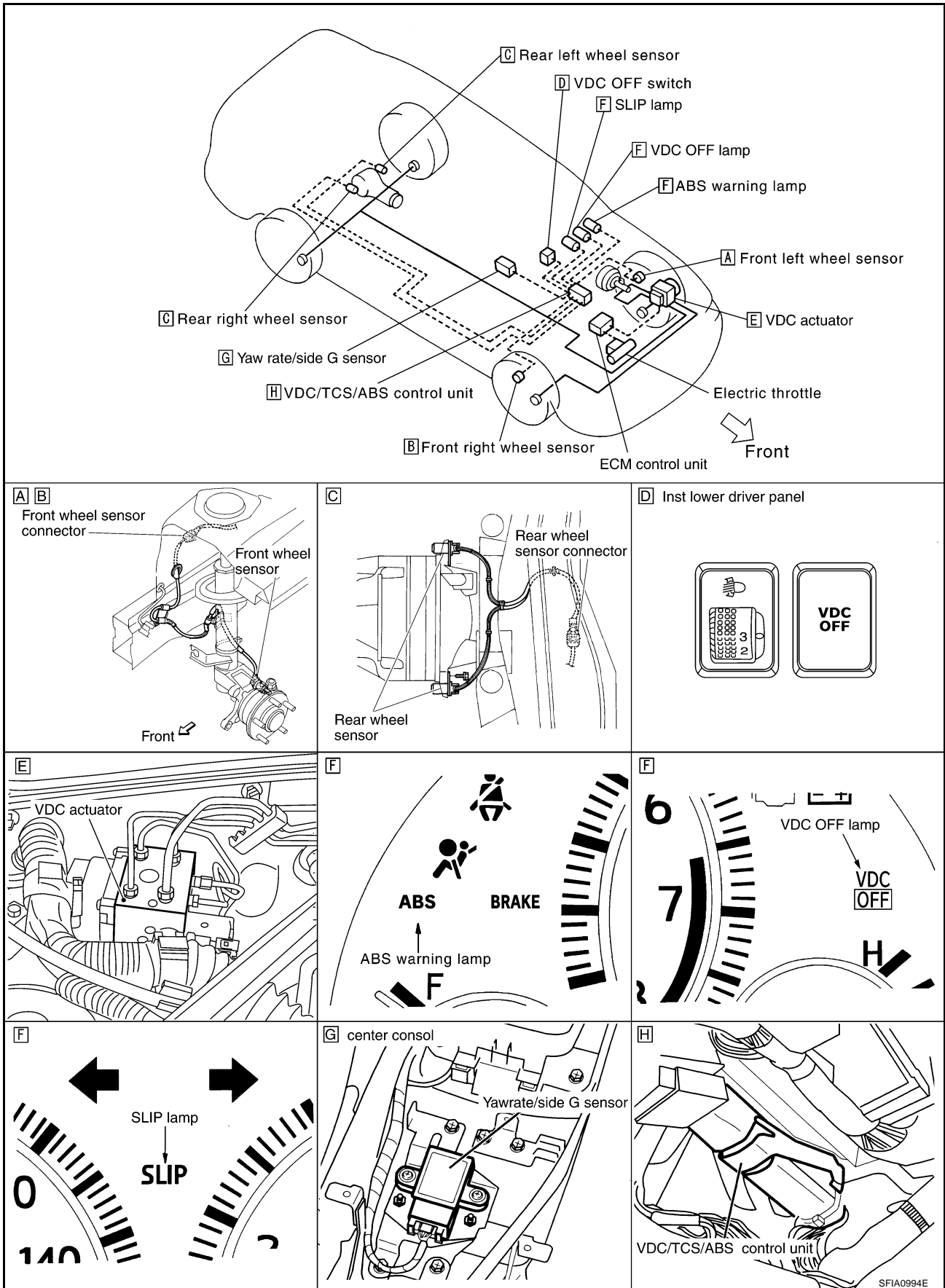
EXAMPLE OF DIAGNOSIS SHEET

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 Large stroke pedal operation
	<input type="checkbox"/> TCS dose not work (Rear wheels slip when accelerating)	<input type="checkbox"/> ABS dose not work. (wheels slip when braking)	<input type="checkbox"/> Lack of sense of acceleration
Engine conditions	<input type="checkbox"/> When starting <input type="checkbox"/> After starting		
Road conditions	<input type="checkbox"/> Low friction road (<input type="checkbox"/> Snow <input type="checkbox"/> Gravel <input type="checkbox"/> Other) <input type="checkbox"/> Bumps / potholes		
Driving conditions	<input type="checkbox"/> Full-acceleration <input type="checkbox"/> High speed cornering <input type="checkbox"/> Vehicle speed: Greater than 10 km/h (6 MPH) <input type="checkbox"/> Vehicle speed: 10 km/h (6 MPH) or less <input type="checkbox"/> Vehicle is stopped		
Applying brake conditions	<input type="checkbox"/> Suddenly <input type="checkbox"/> Gradually		
Other conditions	<input type="checkbox"/> Operation of electrical equipment <input type="checkbox"/> Shift change <input type="checkbox"/> Other descriptions		

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Component Installation Location

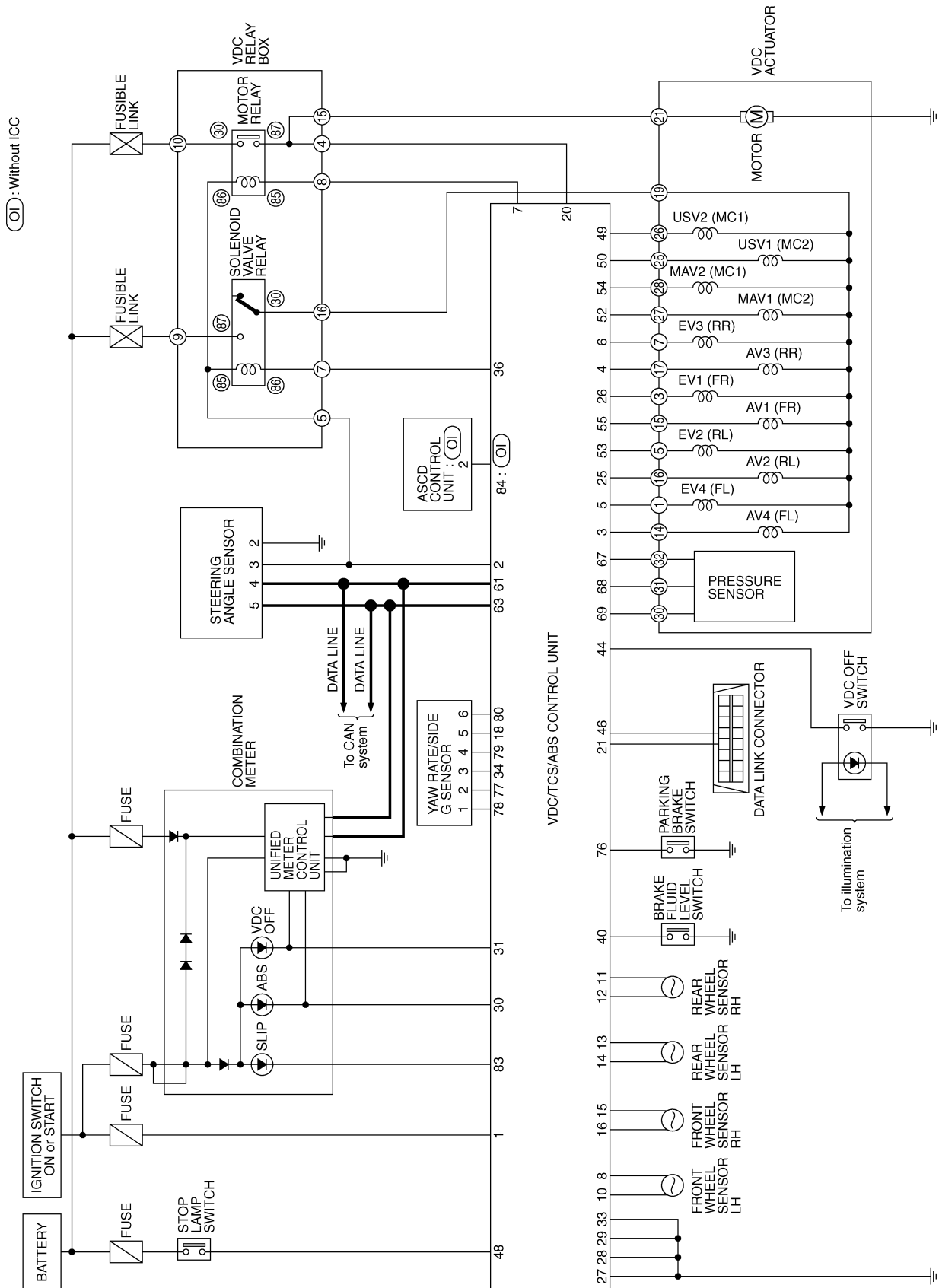


TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Schematic

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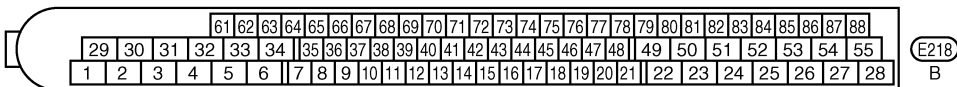
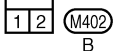
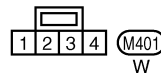
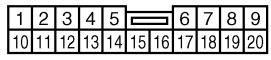
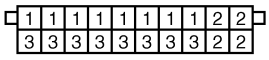
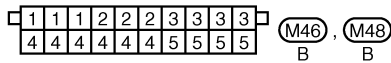
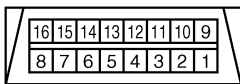
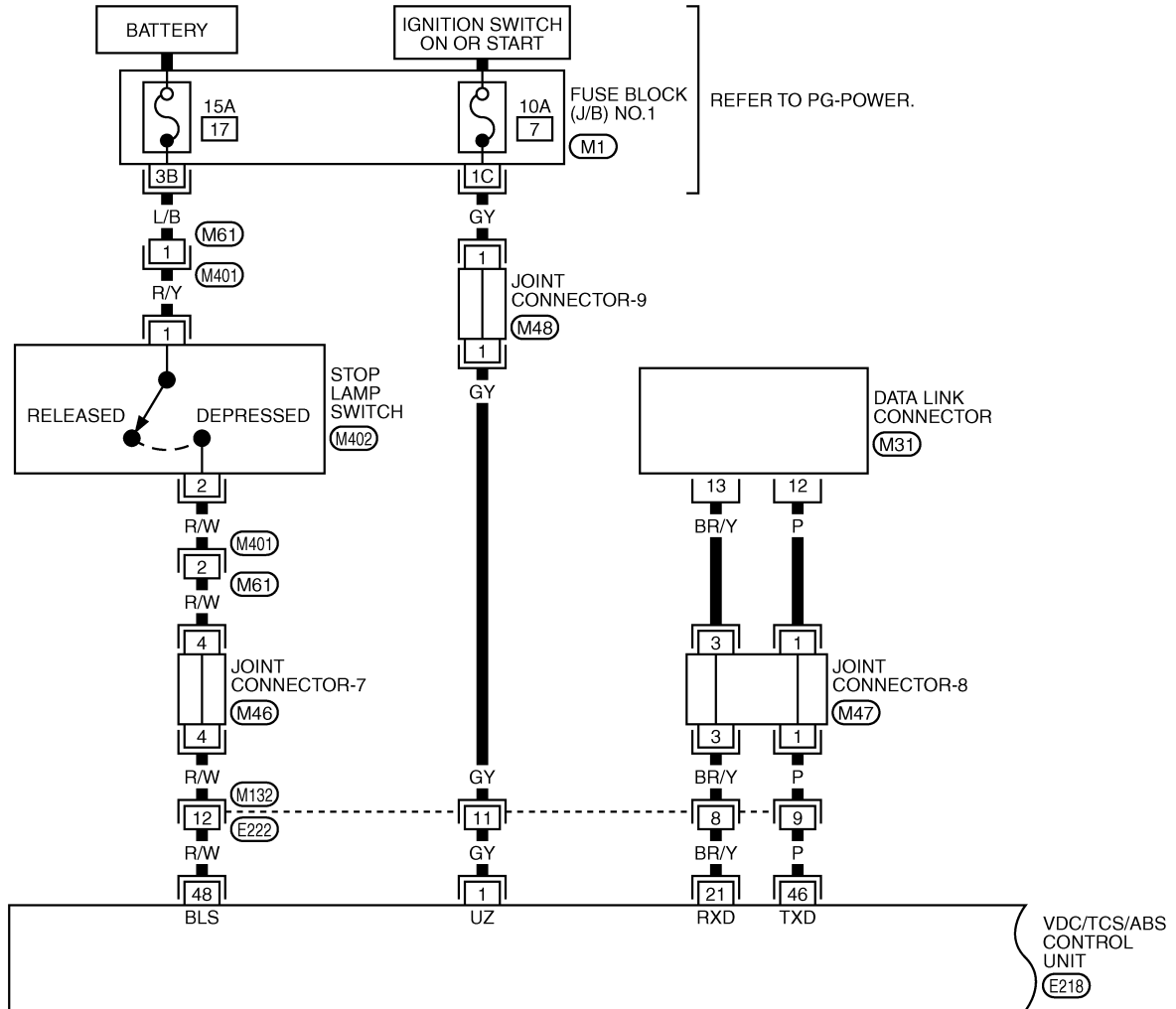
TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Wiring Diagram — VDC —

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BRC-VDC-01



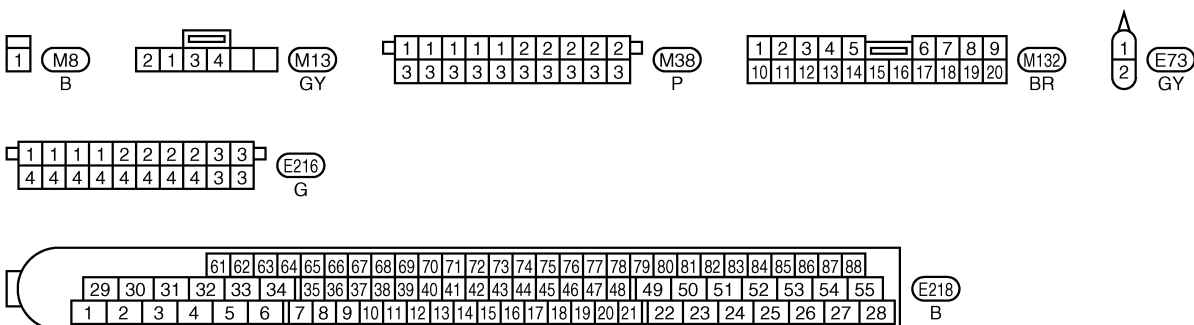
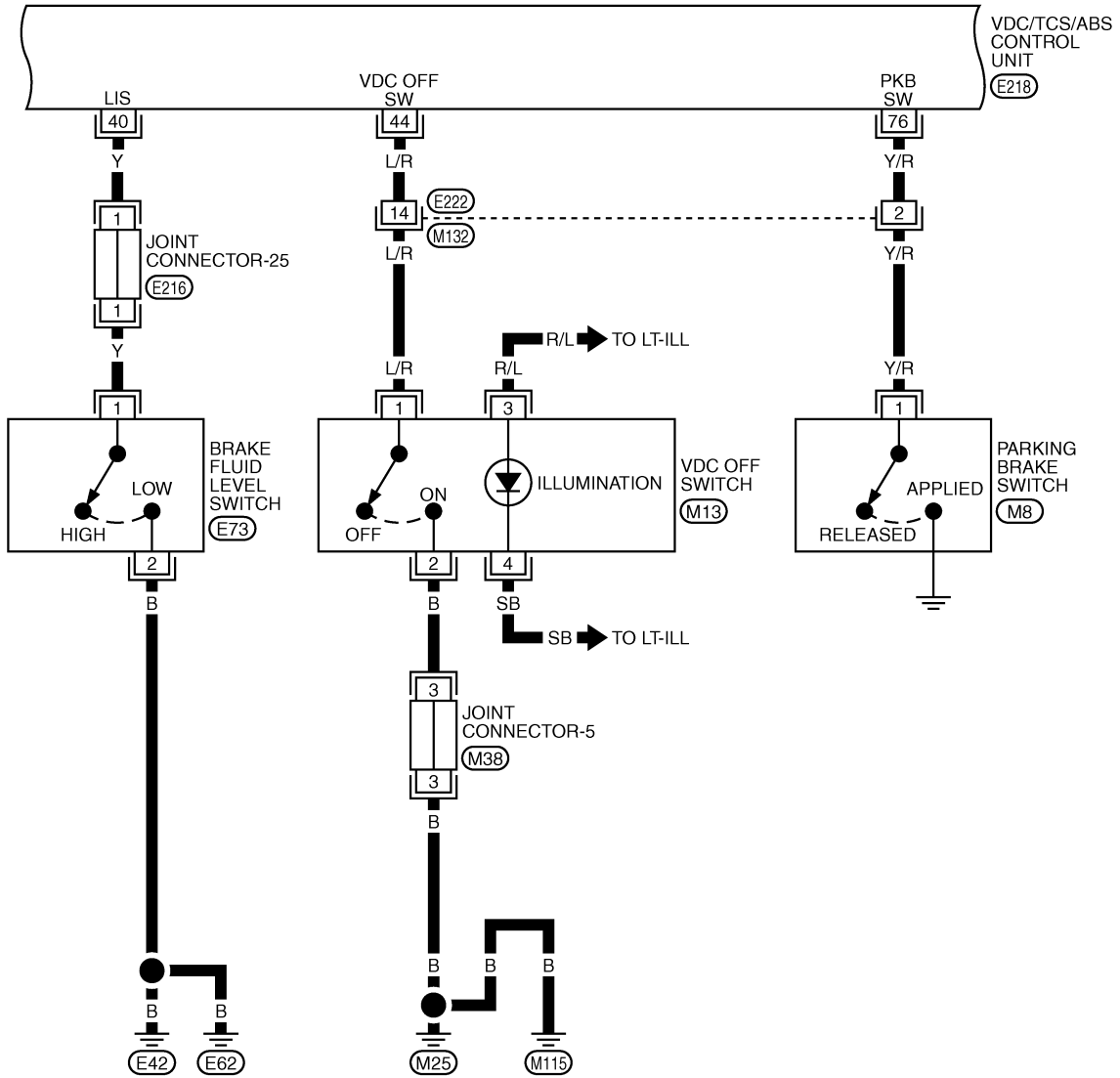
REFER TO THE FOLLOWING.
 (M1) -FUSE BLOCK-JUNCTION BOX (J/B) NO.1

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TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

BRC-VDC-02



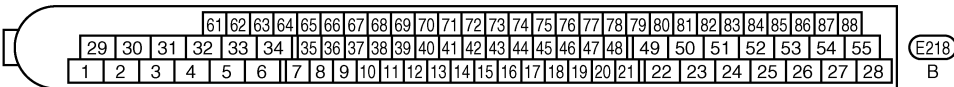
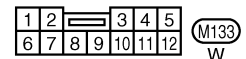
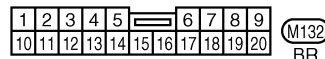
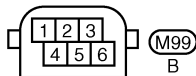
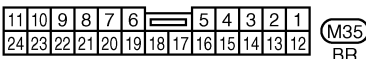
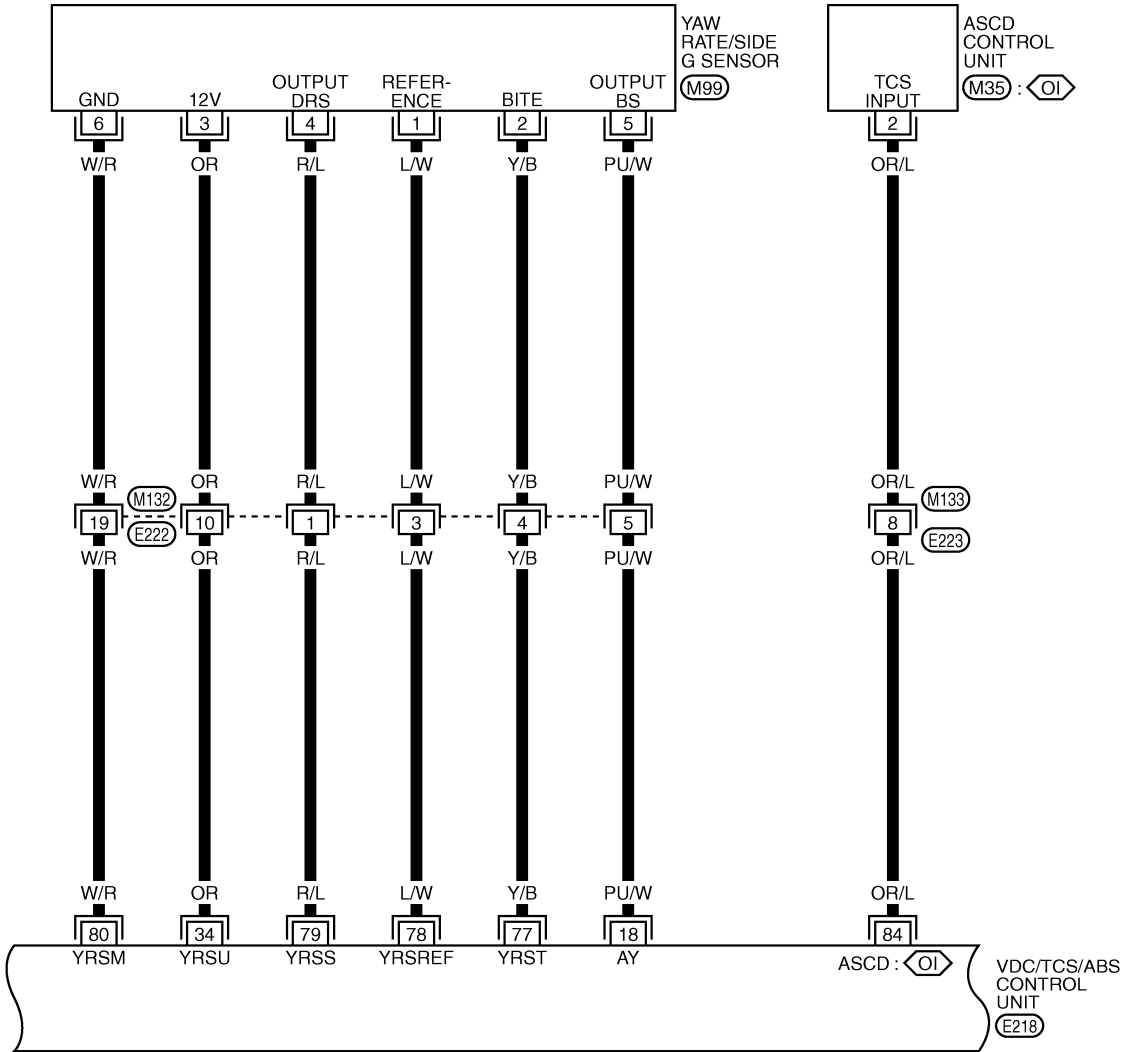
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TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

BRC-VDC-03

 : WITHOUT ICC



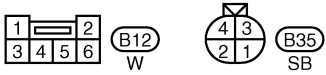
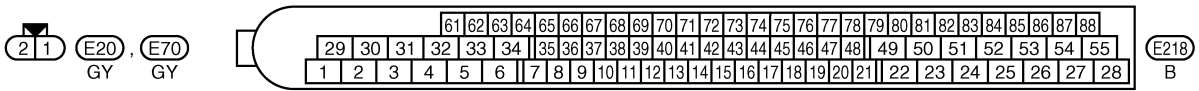
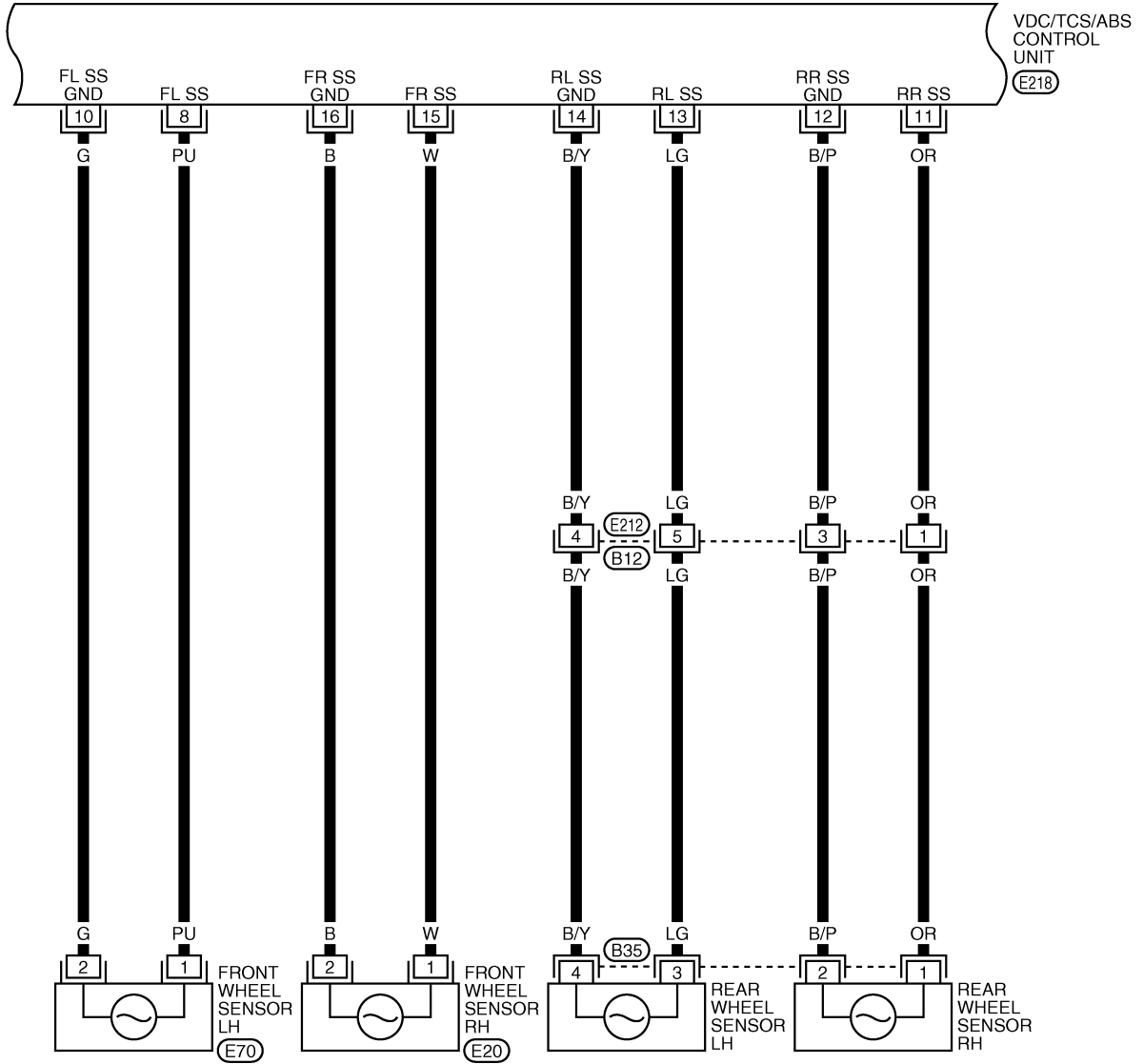
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TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

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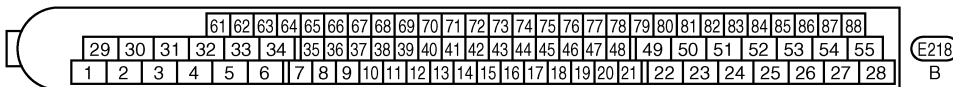
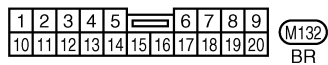
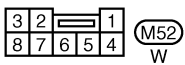
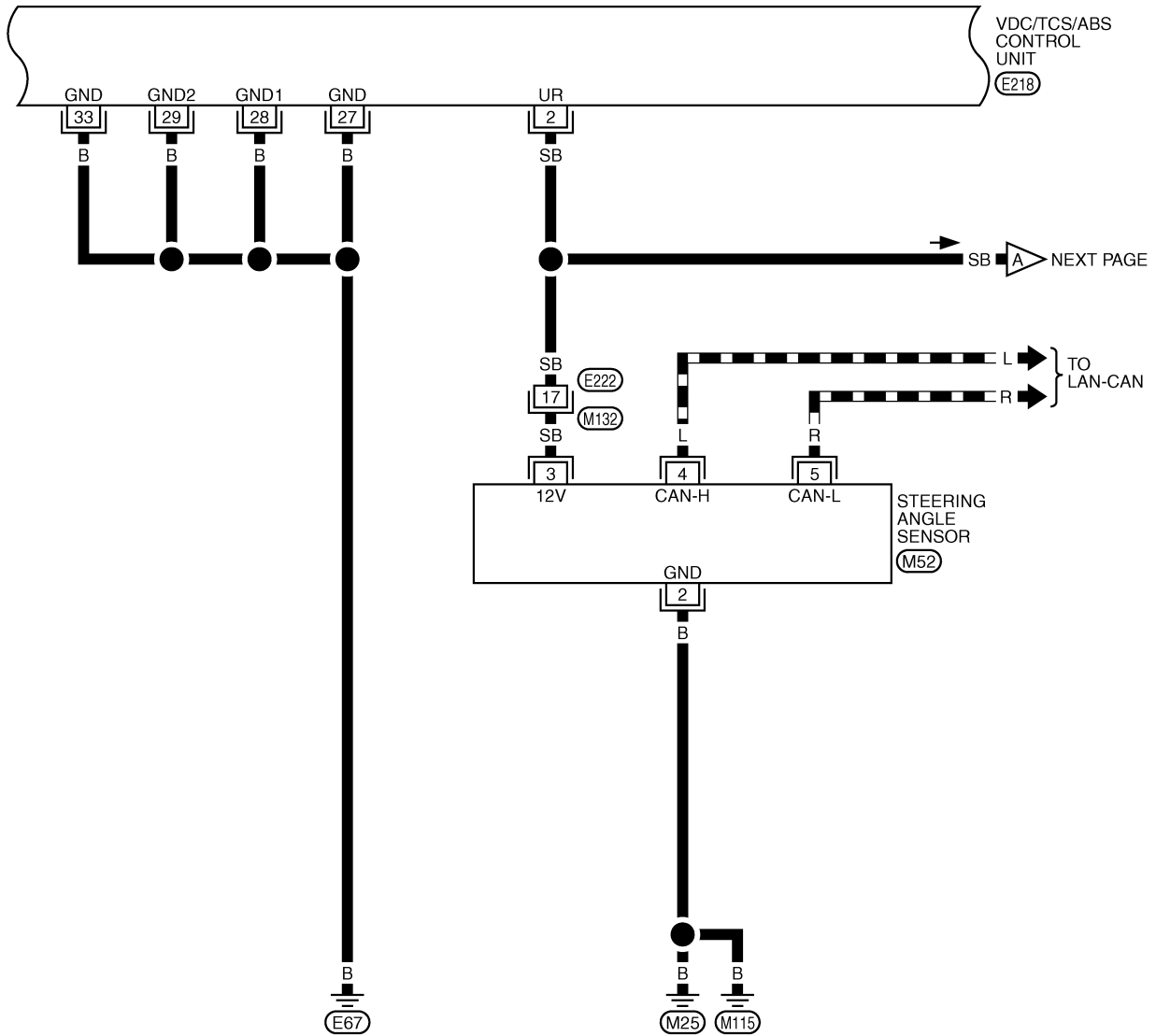
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TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

BRC-VDC-05

▬ : DATA LINE



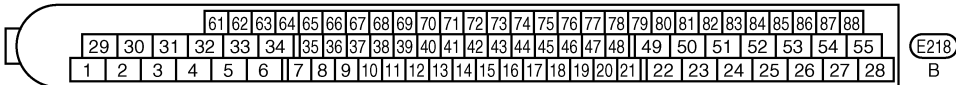
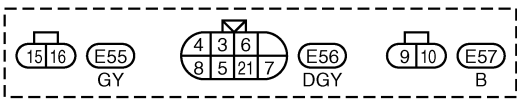
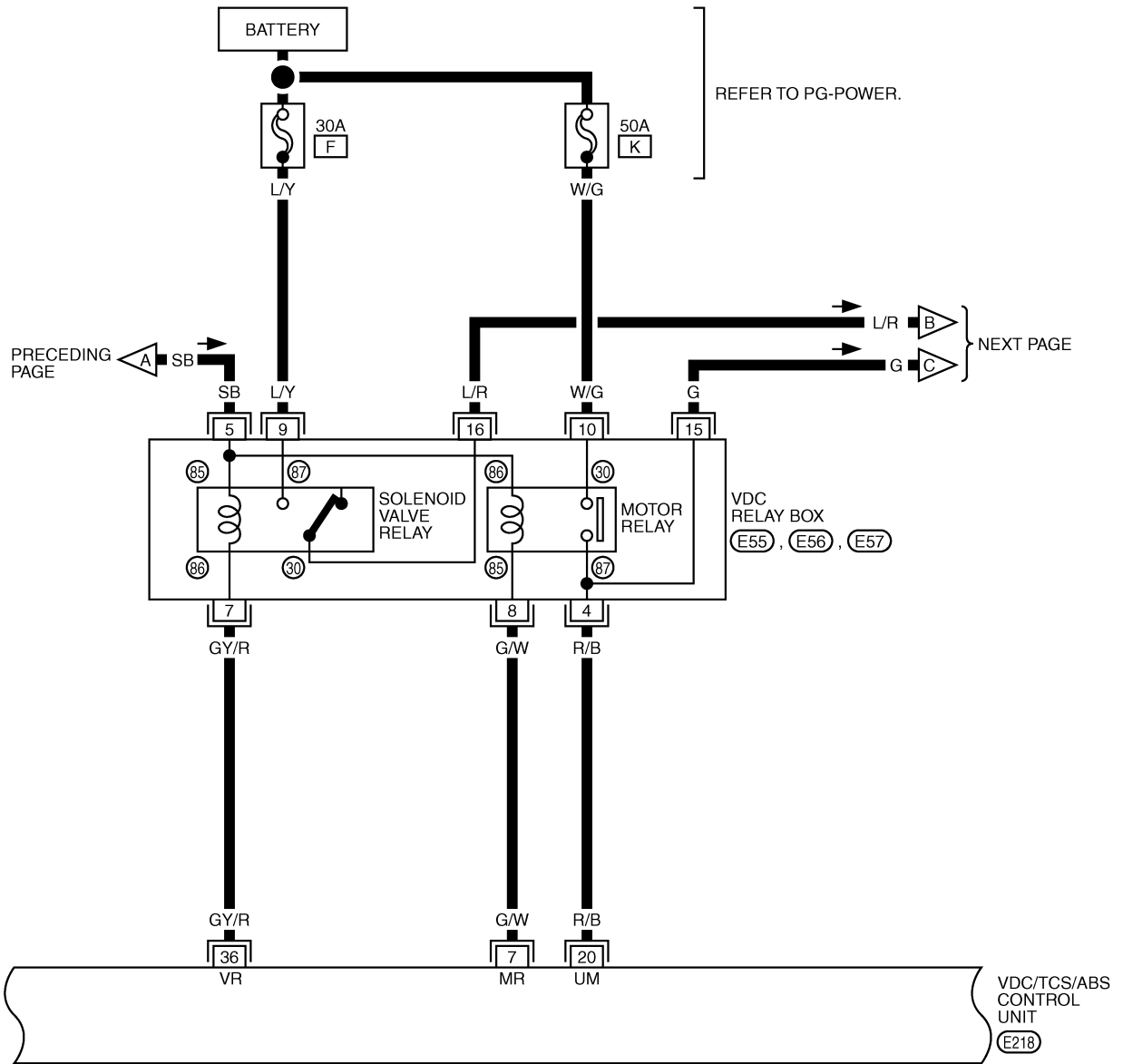
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TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

BRC-VDC-06

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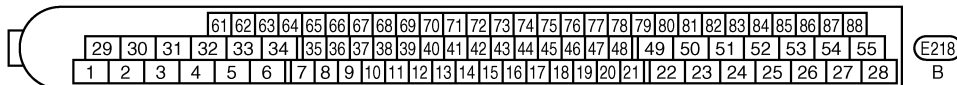
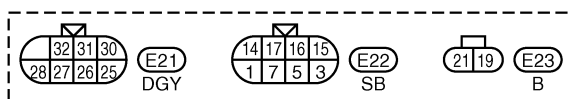
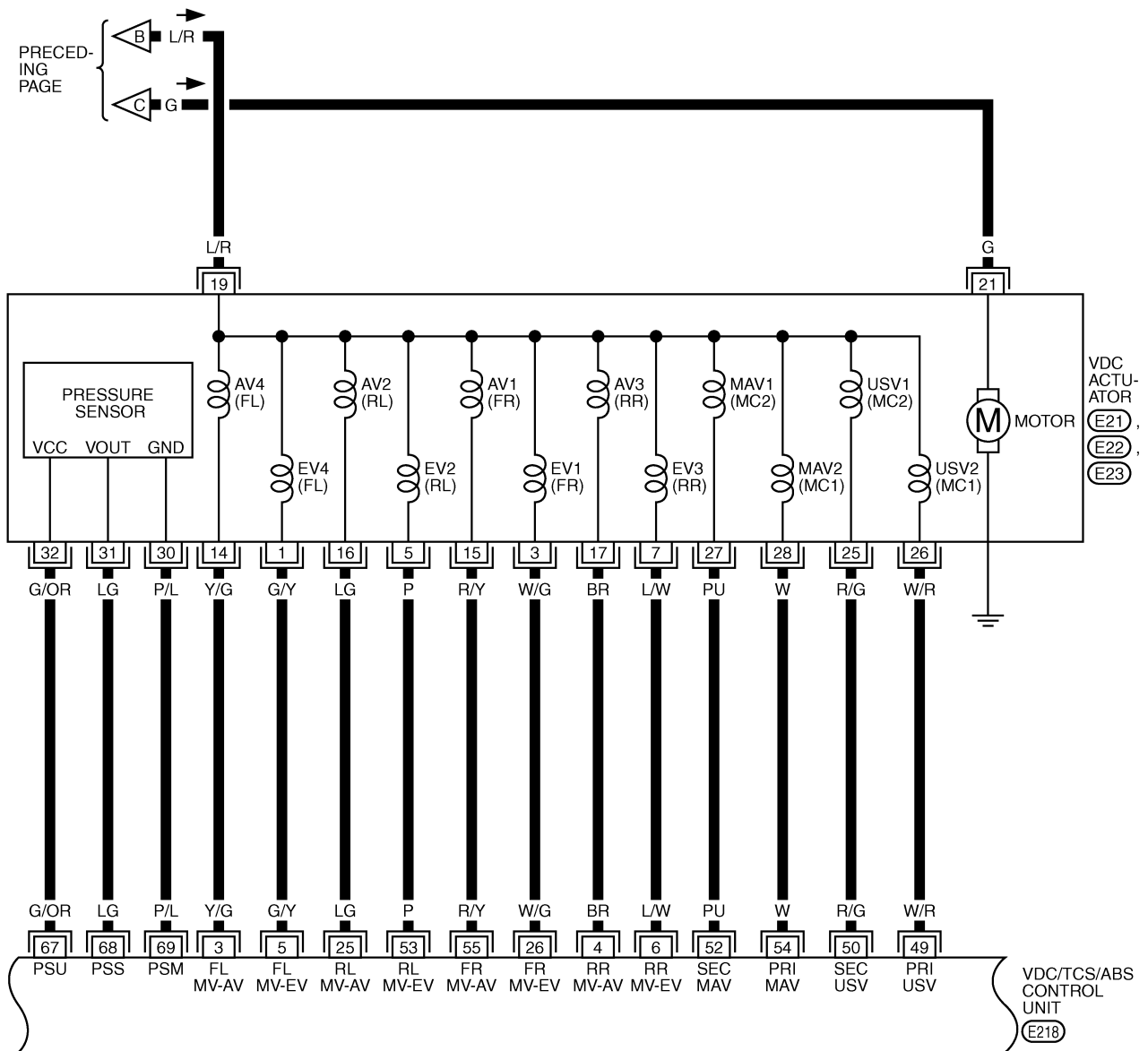


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TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

BRC-VDC-07

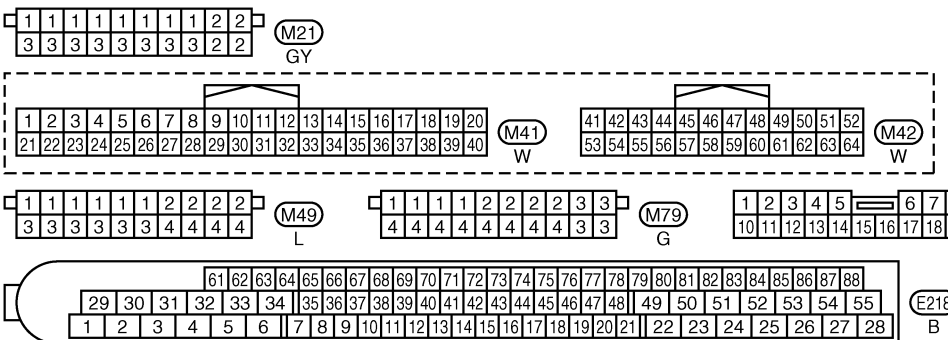
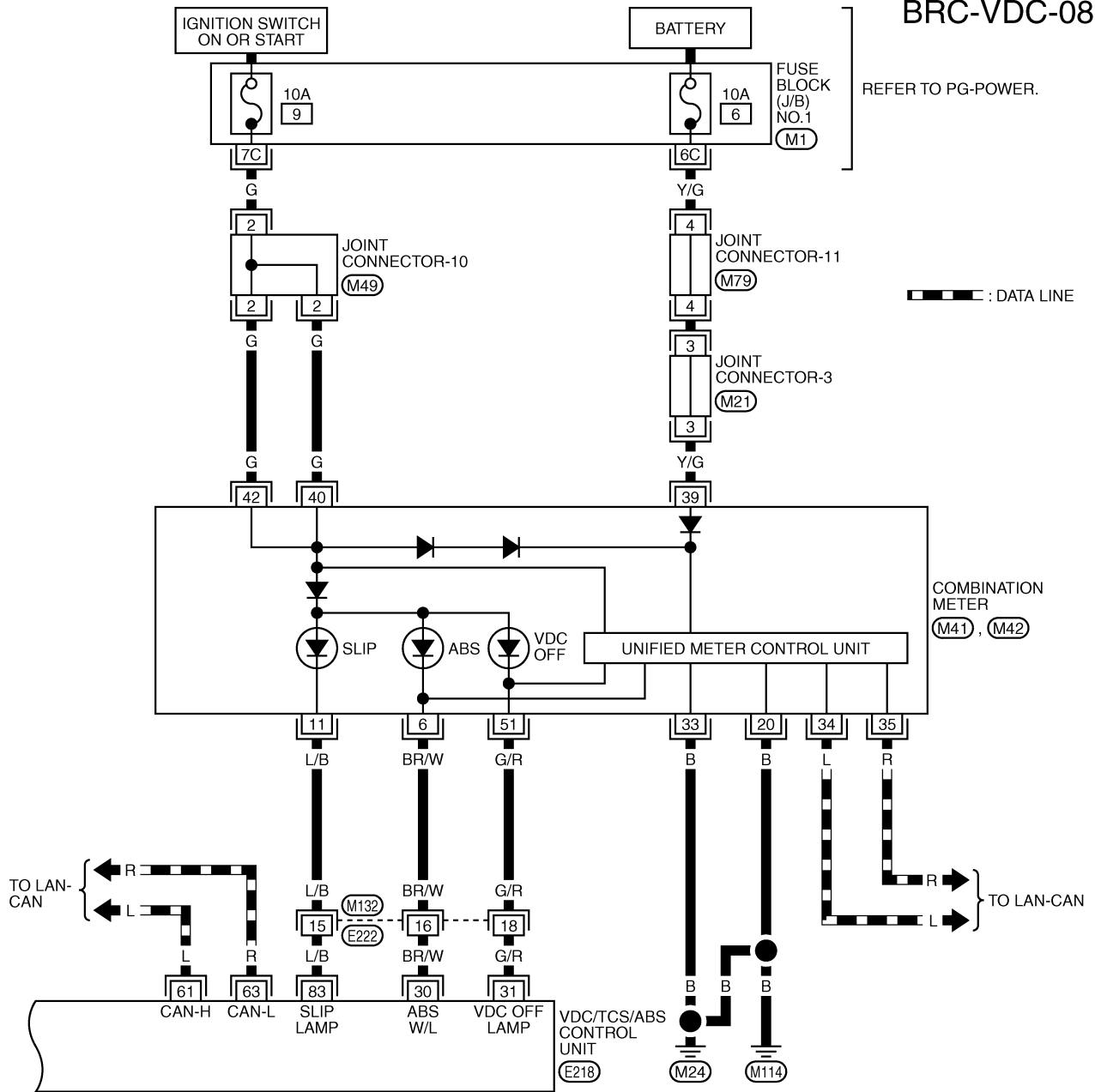


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TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

BRC-VDC-08



REFER TO THE FOLLOWING.
 (M1) - FUSE BLOCK-JUNCTION BOX (J/B) NO.1

TFWA0052E

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Control Unit Input/Output Signal Standard

AFS000LH

REFERENCE VALUE FROM CONSULT-II

CAUTION:

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

Monitor item	Display content	Data monitor		Note: Error inspection checklist
		Condition	Reference value in normal operation	
GEAR POSITION	A/T gear position	1:1st gear 2:2nd gear 3:3rd gear 4:4th gear 5:5th gear		—
VHCL SPEED	Wheel speed	Vehicle stopped	0 [km/h (MPH)]	BRC-41. "Inspection 1 Wheel Sensor System"
		While driving (Note 1)	Nearly matches the speedometer display ($\pm 10\%$ or less)	
THRTL OPENING	Throttle open/close status (linked to the accelerator pedal)	Do not step on the accelerator pedal (When ignition switch is ON)	0%	Communication circuit between VDC/TCS/ABS control unit and ECM
		Step on the accelerator pedal (When ignition switch is ON)	0 to 100%	
ENGINE RPM	Engine running	With engine stopped	0 rpm	Engine speed signal circuit
		Engine running	Almost in accordance with tachometer display	
STEERING ANGLE SIG	Steering angle detected by steering angle sensor	Straight-ahead	Approx. 0 deg	BRC-45. "Inspection 5 Steering Angle Sensor System"
		Steering wheel turned	-720 to 720 deg	
YAW RATE SEN	Yaw rate detected by yaw rate sensor	Vehicle stopped	Approx. 0 d/s	BRC-46. "Inspection 6 Yaw Rate Sensor /Side G Sensor System"
		While driving	-70 to 70 d/s	
SIDE G-SEN	Side G detected by side G-sensor	Vehicle stopped	Approx. 0 m/s ²	BRC-46. "Inspection 6 Yaw Rate Sensor /Side G Sensor System"
		While driving	-24.3 to 24.1 m/s ²	
PRESS SENSOR	Brake fluid pressure detected by pressure sensor	Do not step on the Brake pedal (When ignition switch is ON)	Approx. 0 bar	BRC-43. "Inspection 4 Pressure Sensor System"
		Step on the Brake pedal (When ignition switch is ON)	-40 to 300 bar	
ABS CONT VOLT	Battery voltage supplied to VDC/TCS/ABS control unit	Ignition switch ON	10 to 16V	BRC-55. "Inspection 11 VDC/TCS/ABS Control Unit Power and Ground Systems"
STOP LAMP SW	Brake pedal operation	Brake pedal depressed	ON	BRC-54. "Inspection 10 Stop Lamp Switch System"
		Brake pedal not depressed	OFF	
PARK BRAKE SW	Parking brake status	Parking brake depressed	ON	Parking brake switch circuit
		Parking brake not depressed	OFF	
OFF SW	VDC OFF switch ON/OFF status	VDC OFF switch ON (When the VDC OFF lamp ON)	ON	BRC-59. "VDC OFF SWITCH"
		When VDC OFF switch OFF (When the VDC OFF lamp OFF)	OFF	

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Monitor item	Display content	Data monitor		Note: Error inspection checklist
		Condition	Reference value in normal operation	
ABS WARN LAMP	ABS warning lamp ON condition (Note 2)	ABS warning lamp ON	ON	BRC-40, "BASIC INSPECTION 3 ABS WARNING LAMP, VDC OFF LAMP, SLIP LAMP INSPECTION"
		ABS warning lamp OFF	OFF	
VDC OFF LAMP	VDC OFF lamp on condition (Note 3)	When the VDC OFF lamp ON	ON	BRC-40, "BASIC INSPECTION 3 ABS WARNING LAMP, VDC OFF LAMP, SLIP LAMP INSPECTION"
		When the VDC OFF lamp OFF	OFF	
EV SIGNAL AV SIGNAL	Operation status of all solenoids	When the actuator solenoid operates or during a fail-safe	ON	BRC-48, "Inspection 7 Solenoid and VDC Change-Over Valve System"
		When the solenoid valve relay operates and the actuator solenoid does not operate	OFF	
USV SIGNAL MAV SIGNAL	VDC switch-over valve status	During actuator change-over valve operation or during a fail-safe	ON	BRC-48, "Inspection 7 Solenoid and VDC Change-Over Valve System"
		When the solenoid valve relay operates and the actuator change-over valve does not operate	OFF	
M/R OUTPUT	Actuator motor and motor relay status (ON/OFF)	When actuator motor and motor relay are active ("ACTIVE TEST" with CONSULT-II).	ON	BRC-51, "Inspection 8 ABS Motor and Motor Relay System"
		When the actuator motor and motor relay are not operating	OFF	

Note 1: Confirm tire pressure is normal.

Note 2: ON/OFF timing of ABS warning lamp

ON: Approximately 1 sec. After turning on the ignition switch or when an error is detected.

OFF: Approximately 1 sec. After the ignition switch is turned on (when system is normal).

Note 3: VDC OFF lamp ON/OFF timing

ON: Approximately 1 sec. After the ignition switch is turned on, an error is detected, or the VDC OFF switch is on

OFF: Approximately 1 sec. After the ignition switch is turned on (when system is normal) and the VDC OFF switch is off

CONSULT-II Functions CONSULT-II MAIN FUNCTION

AFS000LI

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-29, "SELF-DIAGNOSIS"
DATA MONITOR	Input/Output data in the VDC/TCS/ABS control unit can be read.	BRC-32, "DATA MONITOR"
CAN DIAG SUPPORT MNTR	The results of transmit / receive diagnostic of CAN communication can be read.	—.

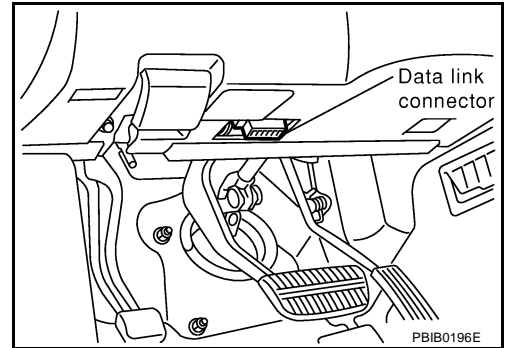
TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

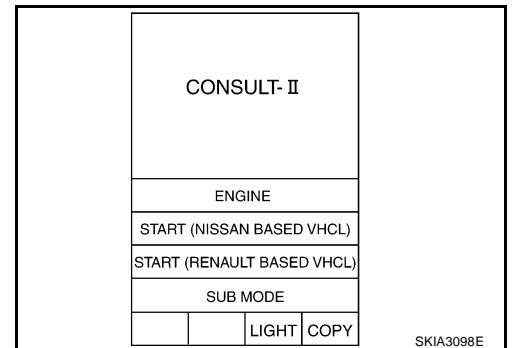
Diagnostic test mode	Function	Reference
ACTIVE TEST	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the VDC/TCS/ABS control unit and also shifts some parameters in a specified range.	BRC-34. "ACTIVE TEST"
FUNCTION TEST	Performed by CONSULT-II instead of a technician to determine whether each system is "OK" or "NG".	—
ECU PART NUMBER	VDC/TCS/ABS control unit part number can be read.	—

CONSULT-II BASIC OPERATION PROCEDURE

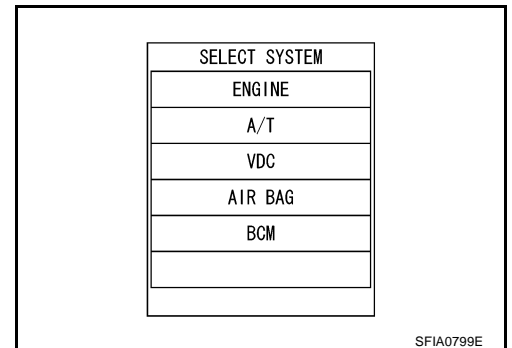
1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to the data link connector.
3. Turn ignition switch ON.



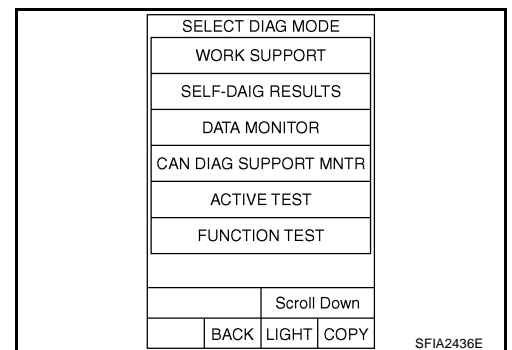
4. Touch "START (NISSAN BASED VHCL)".



5. Touch "VDC" in the "Diagnosis System Selection" screen.
If "VDC" is not indicated, go to [GI-38, "CONSULT-II Data Link Connector \(DLC\) Circuit"](#).



6. Select the required diagnostic location from the "Diagnosis Mode Selection" screen.
For further information, see the CONSULT-II Operation Manual.



SELF-DIAGNOSIS

Description

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

Operation Procedure

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

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TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

3. Turn ignition switch ON.
4. Start engine and drive at approximately 30 km/h (19 MPH) for approximately 1 minute.
5. After stopping the vehicle, with the engine running, touch "START (NISSAN BASED VHCL)", "VDC", "SELF-DIAG RESULTS" in order on the CONSULT-II screen.

CAUTION:

If "START (NISSAN BASED VHCL)" is touched immediately after starting the engine or turning on the ignition switch, "VDC" might not be displayed in the System Selection screen. In this case, repeat the operation from step 1.

6. The self-diagnostic results are displayed. (If necessary, the self-diagnostic results can be printed out by touching "PRINT".)
 - When "NO FAILURE" is displayed, check the ABS warning lamp, VDC OFF lamp, and SLIP lamp.
7. Conduct the appropriate inspection from the display item list, and repair or replace the malfunctioning component.
8. Start engine and drive at approximately 30 km/h (19 MPH) for approximately 1 minute.

CAUTION:

● When a wheel sensor "short-circuit" is detected, if the vehicle is not driven at 30 km/h (19 MPH) for at least 1 minute, the ABS warning lamp will not turn off even if everything is normal.

9. Turn ignition switch OFF to prepare for erasing the memory.
10. Start the engine and touch "START (NISSAN BASED VHCL)", "VDC", "SELF-DIAG RESULTS", "ERASE MEMORY" in order on the CONSULT-II screen to erase the error memory.
If "VDC" is not indicated, go to [GI-38. "CONSULT-II Data Link Connector \(DLC\) Circuit"](#).

CAUTION:

If the error memory is not erased, re-conduct the operation from step 5.

11. For the final inspection, drive at approximately 30 km/h (19 MPH) for approximately 1 minute and confirm that the ABS warning lamp, VDC OFF lamp, and SLIP lamp are off.

Display Item List

Malfunction system	Malfunction detecting condition	Check system	
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-41. "Inspection 1 Wheel Sensor System" (Note 1)
RR RH SENSOR- 2	Circuit of rear RH wheel sensor is shorted, or sensor power voltage is unusual. Control unit cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.		
FR RH SENSOR- 2	Circuit of front RH wheel sensor is shorted, or sensor power voltage is unusual. Control unit cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.		
RR LH SENSOR- 2	Circuit of rear LH wheel sensor is shorted, or sensor power voltage is unusual. Control unit cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.		
MAIN RELAY	During solenoid valve relay operation with OFF, when solenoid valve relay turns ON or when control line for relay is shorted to ground.	BRC-53. "Inspection 9 Solenoid Valve Relay System"	
	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-54. "Inspection 10 Stop Lamp Switch System"	
PRESS SEN CIRCUIT	Pressure sensor signal line is open or shorted, or pressure sensor is malfunctioning.	BRC-43. "Inspection 4 Pressure Sensor System"	

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Malfunction system	Malfunction detecting condition	Check system	
ST ANGLE SEN CIRCUIT	Neutral position of steering angle sensor is dislocated, or steering angle sensor is malfunctioning.	BRC-45, "Inspection 5 Steering Angle Sensor System"	
YAW RATE SENSOR	Yaw rate sensor has generated an error, or yaw rate sensor signal line is open or shorted.	BRC-46, "Inspection 6 Yaw Rate Sensor /Side G Sensor System"	
FR LH IN ABS SOL	Circuit of front LH IN ABS solenoid is open or shorted, or control line is open or shorted to power supply or ground.	BRC-48, "Inspection 7 Solenoid and VDC Change-Over Valve System"	
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-48, "Inspection 7 Solenoid and VDC Change-Over Valve System"
SECONDARY SIDE USV CIRCUIT	Circuit of secondary-side VDC switch-over valve 1 is open or shorted, or control line is open or shorted to power supply or ground.		
PRIMARY SIDE HSV CIRCUIT	Circuit of primary-side VDC switch-over valve 2 is open or shorted, or control line is open or shorted to power supply or ground.		
SECONDARY SIDE HSV CIRCUIT	Circuit of secondary-side VDC switch-over valve 2 is open or shorted, or control line is open or shorted to power supply or ground.		
PUMP MOTOR ACTUATOR RLY	During actuator motor operation with ON, when actuator motor turns OFF or when control line for actuator motor relay is open. During actuator motor operation with OFF, when actuator motor turns ON or when control line for relay is shorted to ground.	BRC-51, "Inspection 8 ABS Motor and Motor Relay System"	
LOW POWER VOLTAGE	VDC/TCS/ABS control unit power voltage is too low.	BRC-55, "Inspection 11 VDC/TCS/ABS Control Unit Power and Ground Systems"	
ST ANGLE SEN SIGNAL	Neutral position correction of steering angle sensor is not finished.	BRC-45, "Inspection 5 Steering Angle Sensor System"	
ST ANG SEN COM CIR	CAN communication line or steering angle sensor has generated an error.	BRC-45, "Inspection 5 Steering Angle Sensor System"	
SIDE G-SEN CIRCUIT	Side G-sensor is malfunctioning, or signal line of side G-sensor is open or shorted.	BRC-46, "Inspection 6 Yaw Rate Sensor /Side G Sensor System"	
EMERGENCY BRAKE	VDC/TCS/ABS control unit malfunction (pressure increase is too much or too little.)	BRC-56, "Inspection 12 VDC/TCS/ABS Control Unit 2"	

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TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Malfunction system	Malfunction detecting condition	Check system
CONTROLLER FAILURE	Internal malfunction of VDC/TCS/ABS control unit	BRC-43, "Inspection 3 VDC/TCS/ABS Control Unit 1"
SHIFT POSITION ERROR	P-position switch stuck to ON or TCM internal malfunction, VDC/TCS/ABS control unit internal malfunction.	BRC-58, "Inspection 15 When "SHIFT POSITION ERROR" Appears in Self-Diagnosis Results Display"
CAN COMM CIRCUIT	<ul style="list-style-type: none"> ● CAN communication line is open or shorted. ● VDC/TCS/ABS control unit internal malfunction ● Battery voltage for EMC is suddenly interrupted for approximately 0.5 seconds or more. 	BRC-58, "Inspection 14 CAN Communication System" (Note 2)
BR FLUID LEVEL LOW	<ul style="list-style-type: none"> ● Brake fluid level drops or communication line between VDC/TCS/ABS control unit and brake fluid level sensor is open or shorted. 	BRC-57, "Inspection 13 Brake Fluid Level Sensor System"
ENGINE SIGNAL 1-4,6	<ul style="list-style-type: none"> ● Major engine component is malfunctioning. 	BRC-43, "Inspection 2 Engine System"

Note 1: After completing repairs of the shorted sensor circuit, when ignition switch is turned ON, ABS warning lamp turns on. Check that ABS warning lamp turns off while driving the vehicle at approximately 30 km/h (19 MPH) for approximately 1 minute according to self-diagnosis procedure. In addition, if wheel sensor 2 is displayed for the wheels, check the wheel sensor circuit and also check the control unit power voltage.

Note 2: When errors are detected in several systems, including the CAN communication system [U1000], troubleshoot the CAN communication system.

DATA MONITOR

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

Operation Procedure

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

NOTE:

Just after starting engine, or turning ignition switch ON, "VDC" may not be displayed on system selection screen even if "START" is touched. In this case, start self-diagnosis again from step 2.

6. Touch "DATA MONITOR".
7. Return to monitor item selection screen, and touch any of "CONTROL UNIT INPUT ITEM", "MAIN ITEM" or "ITEM MENU SELECTION".
8. Touch "START".
9. Screen of data monitor is displayed.

Display Item List

Item (Unit)	Monitor item selection			Remarks
	ECU input signals	Main signals	Selection from menu	
GEAR POSITION	×	×	×	Gear position judged by PNP switch signal is displayed.
VHCL SPEED FR	×	×	×	Wheel speed calculated by front RH wheel sensor signal is displayed.
VHCL SPEED FL	×	×	×	Wheel speed calculated by front LH wheel sensor signal is displayed.
VHCL SPEED RR	×	×	×	Wheel speed calculated by rear RH wheel sensor signal is displayed.

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Item (Unit)	Monitor item selection			Remarks
	ECU input signals	Main signals	Selection from menu	
VHCL SPEED RL	×	×	×	Wheel speed calculated by rear LH wheel sensor signal is displayed.
ABS CONT VOLT (V)	×	×	×	Voltage supplied to VDC/TCS/ABS control unit is displayed.
THRTL OPENING (%)	×	×	×	Throttle valve opening/closing status judged by CAN communication signal is displayed.
ENGINE RPM (rpm)	×	×	×	Engine speed judged by CAN communication signal is displayed.
STR ANGLE SIG (deg)	×	–	×	Steering angle detected by steering angle sensor is displayed.
YAW RATE SEN (d/s)	×	–	×	Yaw rate detected by yaw rate sensor is displayed.
SIDE G-SEN (m/s ²)	×	–	×	Side G acceleration detected by side G-sensor is displayed.
PRESS SENSOR (bar)	×	–	×	Brake fluid pressure detected by pressure sensor is displayed.
STOP LAMP SW (ON/OFF)	×	×	×	Stop lamp switch (ON/OFF) status is displayed.
PARK BRAKE SW (ON/OFF)	×	–	×	Parking brake switch (ON/OFF) status is displayed.
OFF SW (ON/OFF)	×	–	×	VDC OFF switch (ON/OFF) status is displayed.
ABS WARN LAMP (ON/OFF)	–	×	×	ABS warning lamp (ON/OFF) status is displayed.
EV SIGNAL FL (ON/OFF)	–	×	×	Front LH IN ABS solenoid (ON/OFF) status is displayed.
AV SIGNAL FL (ON/OFF)	–	×	×	Front LH OUT ABS solenoid (ON/OFF) status is displayed.
EV SIGNAL RR (ON/OFF)	–	×	×	Rear RH IN ABS solenoid (ON/OFF) status is displayed.
AV SIGNAL RR (ON/OFF)	–	×	×	Rear RH OUT ABS solenoid (ON/OFF) status is displayed.
EV SIGNAL FR (ON/OFF)	–	×	×	Front RH IN ABS solenoid (ON/OFF) status is displayed.
AV SIGNAL FR (ON/OFF)	–	×	×	Front RH OUT ABS solenoid (ON/OFF) status is displayed.
EV SIGNAL RL (ON/OFF)	–	×	×	Rear LH IN ABS solenoid (ON/OFF) status is displayed.
AV SIGNAL RL (ON/OFF)	–	×	×	Rear LH OUT ABS solenoid (ON/OFF) status is displayed.
VDC OFF LAMP (ON/OFF)	–	×	×	OFF Lamp (ON/OFF) status is displayed.
USV SIGNAL P [FL-RR] (ON/OFF)	–	×	×	Primary-side USV solenoid valve (ON/OFF) status is displayed.
USV SIGNAL S [FR-RL] (ON/OFF)	–	×	×	Secondary-side USV solenoid valve (ON/OFF) status is displayed.
MAV SIGNAL P [FL-RR] (ON/OFF)	–	×	×	Primary-side HSV solenoid valve (ON/OFF) status is displayed.

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TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Item (Unit)	Monitor item selection			Remarks
	ECU input signals	Main signals	Selection from menu	
MAV SIGNAL S [FR-RL] (ON/OFF)	–	×	×	Secondary-side HSV solenoid valve (ON/OFF) status is displayed.
M/R OUTPUT (ON/OFF)	–	×	×	Front motor relay activation signal (ON/OFF) status is displayed.

×: Applicable
–: Not applicable

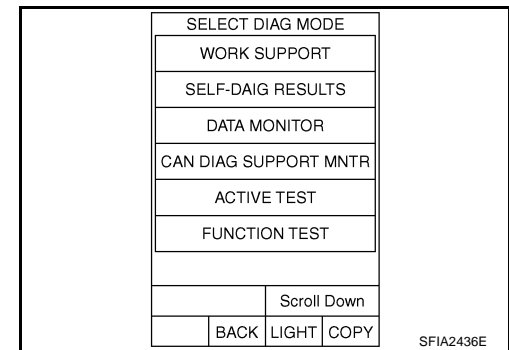
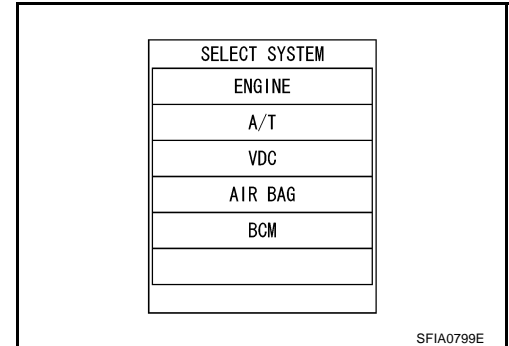
ACTIVE TEST

CAUTION:

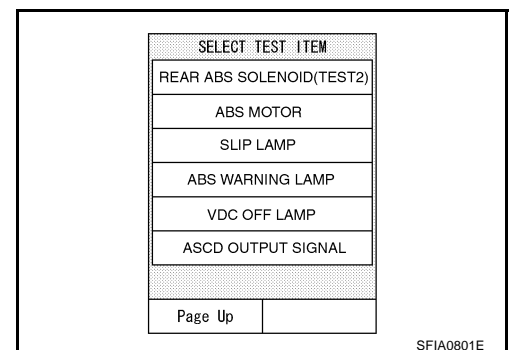
- Do not perform active test while driving the vehicle.
- Make sure to completely bleed air from brake system.
- Active test cannot be performed when ABS warning lamp is on.

Operation Procedure

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



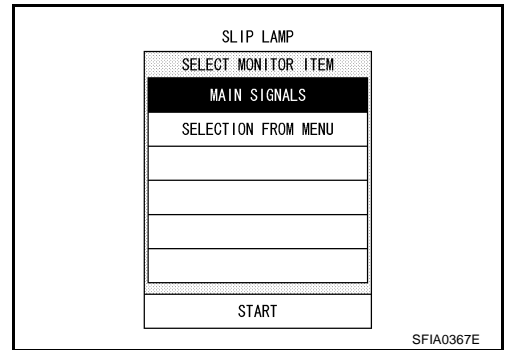
4. Test item selection screen is displayed.
5. Touch necessary test item.



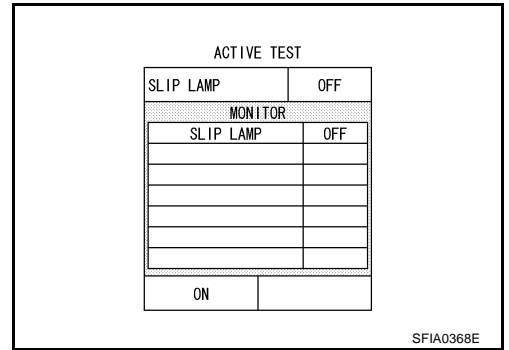
TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

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



7. Active test screen is displayed.



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TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

Test Item

SOLENOID VALVE

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

ACTIVE TEST			
FR RH ABS SOLENOID(TEST1)	UP		
MONITOR			
EV SIGNAL FR	OFF		
AV SIGNAL FR	OFF		
USV SIGNAL S	OFF		
MAV SIGNAL S	OFF		
		KEEP	DOWN
		▽	
MODE	BACK	LIGHT	COPY

SFIA0802E

OPERATION		SOLENOID VALVE			SOLENOID VALVE (ACT)		
		UP	KEEP	DOWN	UP	ACT UP	ACT KEEP
FR RH ABS SOLENOID	EV SIGNAL FR (IN)	OFF	ON	ON	OFF	OFF	OFF
	AV SIGNAL FR (OUT)	OFF	OFF	ON*	OFF	OFF	OFF
	USV SIGNAL S	OFF	OFF	OFF	OFF	ON	ON
	MAV SIGNAL S	OFF	OFF	OFF	OFF	ON*	OFF
FR LH ABS SOLENOID	EV SIGNAL FL (IN)	OFF	ON	ON	OFF	OFF	OFF
	AV SIGNAL FL (OUT)	OFF	OFF	ON*	OFF	OFF	OFF
	USV SIGNAL S	OFF	OFF	OFF	OFF	ON	ON
	MAV SIGNAL S	OFF	OFF	OFF	OFF	ON*	OFF
RR RH ABS SOLENOID	EV SIGNAL RR (IN)	OFF	ON	ON	OFF	OFF	OFF
	AV SIGNAL RR (OUT)	OFF	OFF	ON*	OFF	OFF	OFF
	USV SIGNAL P	OFF	OFF	OFF	OFF	ON	ON
	MAV SIGNAL P	OFF	OFF	OFF	OFF	ON*	OFF
RR LH ABS SOLENOID	EV SIGNAL RL (IN)	OFF	ON	ON	OFF	OFF	OFF
	AV SIGNAL RL (OUT)	OFF	OFF	ON*	OFF	OFF	OFF
	USV SIGNAL P	OFF	OFF	OFF	OFF	ON	ON
	MAV SIGNAL P	OFF	OFF	OFF	OFF	ON*	OFF

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

NOTE:

- When the active test is conducted while depressing the pedal, the pedal depression amount will change, but this is normal.
- Approximately 10 seconds after the operation is begun, "TEST STOP" will be displayed.
- To conduct a retest after "TEST STOP" is displayed, touch "BACK" and conduct the test from the step 6.

VDC OFF LAMP

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

Operation	ON	OFF
VDC OFF lamp	ON	OFF

NOTE:

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

ACTIVE TEST			
VDC WARNING LAMP	OFF		
MONITOR			
VDC OFF LAMP	OFF		
		ON	
MODE	BACK	LIGHT	COPY

SFIA0803E

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

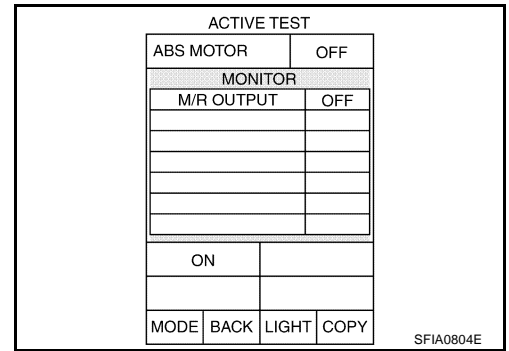
ABS MOTOR

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

Operation	ON	OFF
M/R OUTPUT	ON	OFF

NOTE:

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



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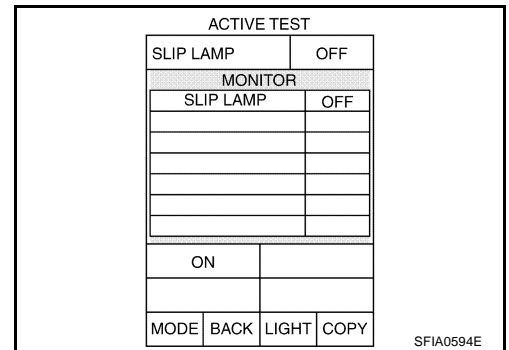
SLIP LAMP

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

Operation	ON	OFF
SLIP lamp	ON	OFF

NOTE:

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



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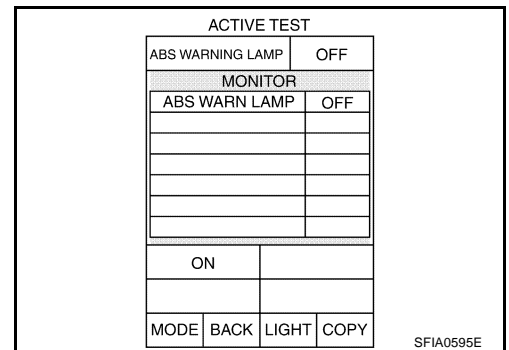
ABS WARNING LAMP

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

Operation	ON	OFF
ABS warning lamp	ON	OFF

NOTE:

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



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ASCD OUTPUT

Touch "ON" and "OFF" on the screen. Make sure that ASCD output is as shown in table below.

Operation	ON	OFF
ASCD output	ON	OFF

M

Correct and Quick Diagnosis DIAGNOSIS PRECAUTIONS

- Before performing the trouble diagnosis, always read the general information (GI) to confirm the general precautions. Refer to [GI-4, "General Precautions"](#) .
- When replacing VDC/TCS/ABS control unit, steering angle sensor, steering system components, suspension system components, or tires, and when adjusting the alignment, be sure to adjust the steering angle sensor neutral position before driving. Refer to [BRC-6, "Adjustment of Steering Angle Sensor Neutral Position"](#) .
- After completing service, always erase the self-diagnosis results. Refer to [BRC-29, "SELF-DIAGNOSIS"](#) .
- When inspection of the continuity or voltage between units is performed, check connector terminals for disconnection, looseness, bend, or collapse. If any non-standard condition is detected, repair or replace applicable part.
- Intermittent errors may be caused by a poor connection in the harness, connector, or terminal. Move harnesses, harness connectors, or terminals by hand to make sure all connections are solid and undamaged.
- If a circuit tester is used for the check, be careful not to forcibly extend any connector terminal.
- VDC/TCS/ABS is a system that uses electronic control to perform brake control and engine power control. Therefore, phenomena like those shown in the following table may occur, but this is because the system is working normally.

Symptom	Symptom description	Result
Motor operation noise	The is a motor operation sound inside VDC actuator, and sometimes there is a slight sound when VDC, TCS, or ABS operates.	Normal
	Just after the engine starts, the motor operating noise may be heard. This is a normal status of the system operation check.	
System operation check noise	When the engine is started, you may barely be able to hear a slight thudding sound from the engine room, but this sound is made by the system operation check and is normal.	Normal
TCS operation (SLIP lamp ON)	TCS may be activated any time the vehicle suddenly accelerates, suddenly downshifts, or is driven on a road with a varying surface friction coefficient.	Normal Cancel the VDC/TCS function for the inspection on a chassis dynamometer.
	When inspecting the speedometer, etc., press VDC OFF switch to turn off TCS function before conducting the work.	
	When accelerator pedal is depressed on a chassis dynamometer (front wheel fixing type), the vehicle speed will not increase. This is normal, because TCS is activated by the stationary front wheels. The warning lamp may also turn on to show "sensor system error" in this case. This is not a malfunction either, because the stationary front wheels are detected. Restart engine, and drive the vehicle at 30 km/h (19 MPH) or higher to check that the warning lamp no longer turns on.	
ABS operation (longer stopping distance)	Stopping distance may be longer for vehicles with ABS when the vehicle drives on rough or snow-covered roads. Use lower speeds when driving on these kinds of roads.	Normal
Sluggish feel	Depending on road circumstances, the driver may have a sluggish feel. This is normal, because under TCS operation optimum traction has the highest priority (safety first). Sometimes the driver has a slight sluggish feel in response to substantial accelerator pedal operation.	Normal

TROUBLE DIAGNOSIS

[VDC/TCS/ABS]

ABS Warning Lamp, VDC OFF Lamp, and SLIP Lamp On/Off Timing

x: ON - : OFF

Condition	ABS warning lamp	VDC OFF lamp	SLIP lamp	Remarks
Ignition switch OFF	-	-	-	—
For approximately "1" second after ignition switch ON	x	x	x	—
After approximately "1" second after ignition switch ON (When system is normal)	-	-	-	The lamps turn off approximately 2 sec. After the engine is started.
When the VDC OFF switch is turned on. (VDC function OFF)	-	x	-	—
VDC/TCS/ABS error	x	x	x	—
	x	x	-	When there is a VDC/TCS/ABS control unit error, the SLIP lamp turns off (when the power or ground circuits return an error).
VDC/TCS error	-	x	x	—

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Basic Inspection

AFS001K4

BASIC INSPECTION 1 BRAKE FLUID AMOUNT, LEAKS, AND BRAKE PADS INSPECTION

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

CAUTION:**ABS actuator body cannot be disassembled.**

3. Check the brake pad degree of wear. Refer to [BR-24, "PAD WEAR INSPECTION"](#) in "Front Disc Brake" and [BR-31, "PAD WEAR INSPECTION"](#) in "Rear Disc Brake".

BASIC INSPECTION 2 POWER SYSTEM TERMINAL LOOSENESS AND BATTERY INSPECTION

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

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

1. Make sure ABS warning lamp, VDC OFF lamp (when VDC OFF switch is OFF), and SLIP lamp turns ON approximately 1 second when the ignition switch is turned ON. If they do not, check the VDC OFF lamp and then VDC OFF switch. Refer to [BRC-59, "VDC OFF SWITCH"](#). Check CAN communications. Refer to "CAN Communication Inspection". If there are no errors with VDC OFF switch and CAN communication system, check combination meter. Refer to [DI-6, "COMBINATION METERS"](#).
2. Make sure the lamp turns off approximately 1 second after the ignition switch is turned on. If the lamp does not turn off, conduct self-diagnosis.
3. With the engine running, make sure VDC OFF lamp turns on and off when VDC OFF switch is turned on and off. If the indicator lamp status does not correspond to switch operation, check the VDC OFF switch system. Refer to [BRC-59, "VDC OFF SWITCH"](#).
4. Make sure ABS warning lamp, VDC OFF lamp, and SLIP lamp turn off 2 seconds after the engine is started. If ABS warning lamp, VDC OFF lamp, and SLIP lamp have not turned off 10 seconds after the engine has been started, conduct self-diagnosis of the ABS actuator and electric unit.
5. After conducting the self-diagnosis, be sure to erase the error memory. Refer to [BRC-29, "SELF-DIAGNOSIS"](#).

Inspection 1 Wheel Sensor System**INSPECTION PROCEDURE**

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

CAUTION:

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

1. TIRE INSPECTION

Check air pressure, wear, and size.

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

YES >> GO TO 2.

NO >> Adjust air pressure, or replace tire.

2. SENSOR AND SENSOR ROTOR INSPECTION

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

OK or NG

OK >> GO TO 3.

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

3. SELF-DIAGNOSIS RESULT CHECK

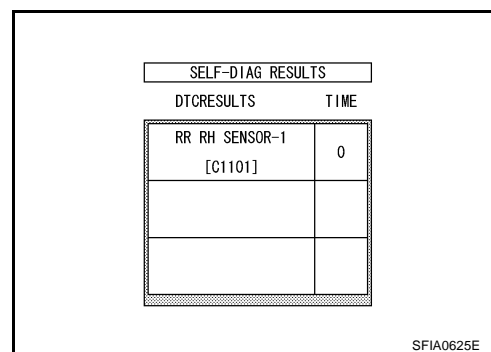
Check self-diagnosis results.

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

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

YES >> GO TO 4.

NO >> Inspection End

**4. CONNECTOR INSPECTION**

1. Disconnect VDC/TCS/ABS control unit connector and the malfunctioning wheel sensor connector E70 (FR - LH) or E20 (FR - RH) or B35 (RR - RH, LH). Check the terminal to see if it is deformed, disconnected, loose, etc., and replace it if any non-standard condition is found.
2. Reconnect the connectors, drive at a speed of approximately 30 km/h (19 MPH) for approximately 1minute, and conduct self-diagnosis.

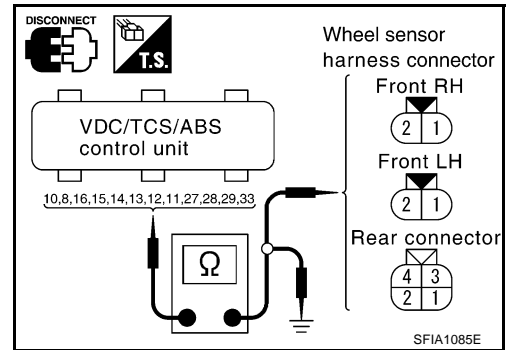
OK or NG

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

NG >> GO TO 5.

5. WHEEL SENSOR HARNESS INSPECTION

- Turn off the ignition switch and disconnect the wheel sensor connector E70 (FR - LH), E20 (FR - RH), B35 (RR - RH, LH) and VDC/TCS/ABS control unit connector.
- Check the continuity between terminals. (Also check the continuity when the steering wheel is turned right and left and when the sensor harness inside the wheel well is moved.)



Wheel	Power system		Signal system		Ground system	
	VDC/TCS/ABS control unit	Wheel sensor	VDC/TCS/ABS control unit	Wheel sensor	VDC/TCS/ABS control unit (signal)	VDC/TCS/ABS control unit (ground)
Front RH	15 (W)	1 (W)	16 (B)	2 (B)	15 (W), 16 (B)	27 (B), 28 (B), 29 (B), 33 (B)
Front LH	8 (PU)	1 (PU)	10 (G)	2 (G)	8 (PU), 10 (G)	
Rear RH	11 (OR)	1 (OR)	12 (B/P)	2 (B/P)	11 (OR), 12 (B/P)	
Rear LH	13 (LG)	3 (LG)	14 (B/Y)	4 (B/Y)	13 (LG), 14 (B/Y)	

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

OK or NG

OK >> GO TO 6.

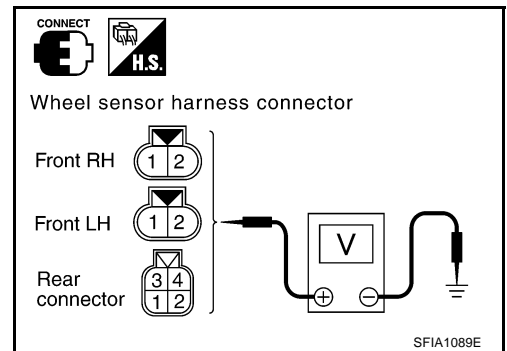
NG >> Repair harness and connector between control unit and wheel sensor.

6. WHEEL SENSOR POWER CIRCUIT INSPECTION

- Connect the wheel sensor connector E70 (FR - LH), E20 (FR - RH), B35 (RR - RH, LH) and VDC/TCS/ABS control unit connector.
- Turn on the ignition switch and check the voltage between the power terminal and the ground.

Voltage

Front RH	1 (W) - Ground	: 8V or more
Front LH	1 (PU) - Ground	: 8V or more
Rear RH	1 (OR) - Ground	: 8V or more
Rear LH	3 (LG) - Ground	: 8V or more



OK or NG

OK >> Replace wheel sensor.

NG >> Replace the VDC/TCS/ABS control unit.

Inspection 2 Engine System

AFS001K6

INSPECTION PROCEDURE

1. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
ENGINE SIGNAL 1
ENGINE SIGNAL 2
ENGINE SIGNAL 3
ENGINE SIGNAL 4
ENGINE SIGNAL 5
ENGINE SIGNAL 6

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

YES >> GO TO 2.

NO >> Inspection End

2. ENGINE SYSTEM INSPECTION

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

OK or NG

OK >> Inspection End

NG >> Repair or replace any non-standard items. Re-conduct the self-diagnosis.

Inspection 3 VDC/TCS/ABS Control Unit 1

AFS001K7

INSPECTION PROCEDURE

1. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
ABS CONTROLLER

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

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

NO >> Inspection End

Inspection 4 Pressure Sensor System

AFS001K8

INSPECTION PROCEDURE

1. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
PRESS SEN SYSTEM

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

YES >> GO TO 2.

NO >> Inspection End

2. CONNECTOR INSPECTION

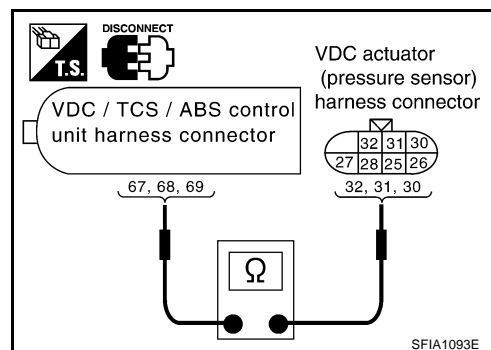
1. Disconnect VDC actuator (pressure sensor) connector E21 and VDC/TCS/ABS control unit connector, check the terminals for deformation, disconnection, looseness, and so on. If there is an error, repair or replace the terminal.
2. Reconnect the connectors and Re-conduct VDC/TCS/ABS control unit self-diagnosis.

OK or NG

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

3. PRESSURE SENSOR HARNESS INSPECTION

1. Turn off the ignition switch and disconnect VDC actuator (pressure sensor) connector E21 and VDC/TCS/ABS control unit connector.
2. Check the continuity between VDC/TCS/ABS control unit harness connector E218 and VDC actuator (pressure sensor) harness connector E21.



VDC/TCS/ABS control unit (Harness connector E218)	VDC actuator (pressure sensor) (Harness connector E21)	Continuity
69 (P/L)	30 (P/L)	Continuity should exist.
68 (LG)	31 (LG)	Continuity should exist.
67 (G/OR)	32 (G/OR)	Continuity should exist.

OK or NG

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

4. PRESSURE SENSOR INSPECTION

1. Connect pressure sensor and VDC/TCS/ABS control unit connectors.
2. Use "Data Monitor" to check the pressure sensor value.

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

OK or NG

- OK >> Inspection End
 NG >> If the pressure sensor is damaged or malfunctioning, replace the VDC actuator (pressure sensor it built in).

Inspection 5 Steering Angle Sensor System

INSPECTION PROCEDURE

1. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
Steering angle sensor system

Is the above displayed in the self-diagnosis item?

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

2. CONNECTOR INSPECTION

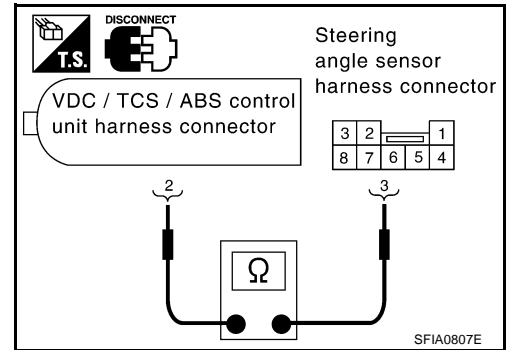
1. Disconnect the steering angle sensor connector and VDC/TCS/ABS control unit connector and check the terminals for deformation, disconnection, looseness, and so on. If there is an error, repair or replace the terminal.
2. Reconnect the connectors and Re-conduct a VDC/TCS/ABS control unit self-diagnosis.

OK or NG

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

3. STEERING ANGLE SENSOR HARNESS INSPECTION

1. Check the CAN communication system. Refer to [BRC-58, "Inspection 14 CAN Communication System"](#) .
2. Turn off the ignition switch and disconnect the steering angle sensor connector and VDC/TCS/ABS control unit connector.
3. Check the continuity between VDC/TCS/ABS control unit harness connector E218 terminal 2 (SB) and steering angle sensor harness connector M52 terminal 3 (SB).



VDC/TCS/ABS control unit (Harness connector E218)	Steering angle sensor (Harness connector M52)	Continuity
2 (SB)	3 (SB)	Continuity should exist.

OK or NG

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

4. DATA MONITOR CHECK

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

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

OK or NG

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

Inspection 6 Yaw Rate Sensor /Side G Sensor System

AFS001KA

CAUTION:

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

INSPECTION PROCEDURE

1. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
YAW RATE SENSOR
SIDE SENSOR

CAUTION:

When on a turntable, such as at a parking structure entrance, or when on a moving object with the engine running, the VDC OFF lamp might turn on and the self-diagnosis using the CONSULT-II the yaw rate sensor system might be displayed, but in this case there is no problem with the yaw rate sensor system. As soon as the vehicle leaves the turntable or moving object, restart the engine to return the system to normal.

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

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

2. CONNECTOR INSPECTION

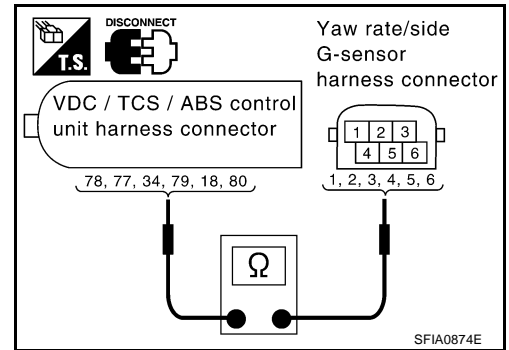
1. Disconnect yaw rate/side G sensor connector and VDC/TCS/ABS control unit connector and check the terminals for deformation, disconnection, looseness, and so on. If there is an error, repair or replace the terminal.
2. Reconnect the connectors and Re-conduct a VDC/TCS/ABS control unit self-diagnosis.

OK or NG

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

3. YAW RATE/SIDE G SENSOR HARNESS INSPECTION

1. Turn off the ignition switch and disconnect yaw rate/side G sensor connector and VDC/TCS/ABS control unit connector.
2. Check the continuity between the VDC/TCS/ABS control unit harness connector E218 and the yaw rate/side G sensor harness connector M99.



VDC/TCS/ABS control unit (Harness connector E218)	Yaw rate/side G sensor (Harness connector M99)	Continuity
78 (L/W)	1 (L/W)	Continuity should exist.
77 (Y/B)	2 (Y/B)	Continuity should exist.
34 (OR)	3 (OR)	Continuity should exist.
79 (R/L)	4 (R/L)	Continuity should exist.
18 (PU/W)	5 (PU/W)	Continuity should exist.
80 (W/R)	6 (W/R)	Continuity should exist.

OK or NG

OK >> GO TO 4.

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

4. YAW RATE/SIDE G SENSOR INSPECTION

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

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

OK or NG

OK >> Inspection End

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

Inspection 7 Solenoid and VDC Change-Over Valve System

AFS001KB

INSPECTION PROCEDURE

1. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

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

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

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

2. CONNECTOR INSPECTION

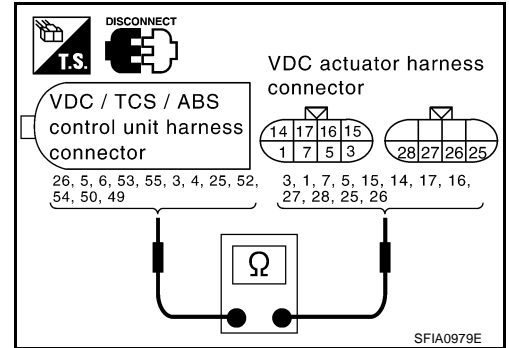
1. Disconnect the VDC/TCS/ABS control unit connector and solenoid connector E21, E22 and E23 and check the terminals for deformation, disconnection, looseness, and so on. If there is an error, repair or replace the terminal.
2. Securely reconnect the connectors and conduct self-diagnosis.

OK or NG

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

3. CHECKING SOLENOID CIRCUIT

1. Disconnect VDC actuator connector E21 and E22.
2. Check continuity between VDC/TCS/ABS control unit harness connector E218 and VDC actuator harness connector E21 and E22.



VDC/TCS/ABS control unit (Harness connector E218)	VDC actuator (Harness connector E21, E22)	Continuity
26 (W/G)	3 (W/G)	Yes
5 (G/Y)	1 (G/Y)	Yes
6 (L/W)	7 (L/W)	Yes
53 (P)	5 (P)	Yes
55 (R/Y)	15 (R/Y)	Yes
3 (Y/G)	14 (Y/G)	Yes
4 (BR)	17 (BR)	Yes
25 (LG)	16 (LG)	Yes
52 (PU)	27 (PU)	Yes
54 (W)	28 (W)	Yes
50 (R/G)	25 (R/G)	Yes
49 (W/R)	26 (W/R)	Yes

OK or NG

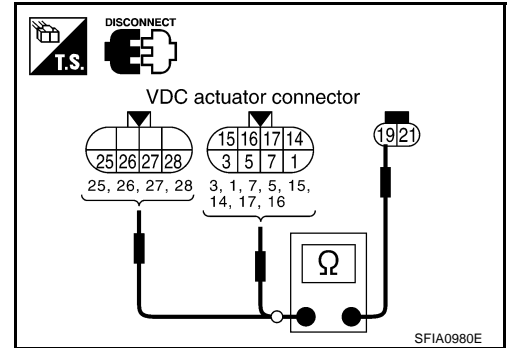
OK >> GO TO 4.

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

A
B
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L
M

4. CHECKING ACTUATOR SOLENOID

1. Disconnect VDC relay box connector E21, E22 and E23.
2. Check resistance of VDC actuator solenoid.



VDC actuator (Actuator side connector)	VDC actuator (Actuator side connector)	Resistance value
7	19	6.0 - 11 Ω
3	19	6.0 - 11 Ω
5	19	6.0 - 11 Ω
1	19	6.0 - 11 Ω
17	19	3.0 - 5.0 Ω
15	19	3.0 - 5.0 Ω
16	19	3.0 - 5.0 Ω
14	19	3.0 - 5.0 Ω
27	19	3.0 - 5.0 Ω
28	19	3.0 - 5.0 Ω
25	19	6.0 - 11 Ω
26	19	6.0 - 11 Ω

OK or NG

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

Inspection 8 ABS Motor and Motor Relay System

INSPECTION PROCEDURE

1. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
Pump motor, motor relay system

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

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

2. CONNECTOR INSPECTION

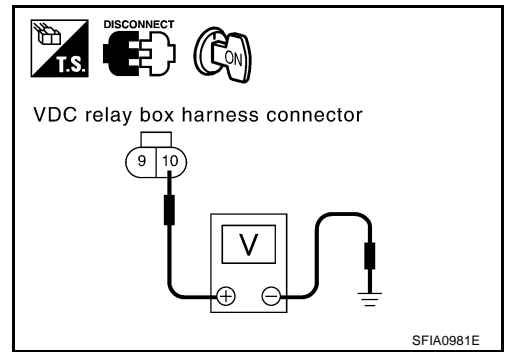
1. Disconnect the VDC relay box connector E55, E56, E57 and VDC/TCS/ABS control unit connector E218 and check the terminals for deformation, disconnection, looseness, and so on. If there is an error, repair or replace the terminal.
2. Securely reconnect the connectors and conduct self-diagnosis.

OK or NG

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

3. ABS MOTOR AND MOTOR RELAY POWER SYSTEM INSPECTION

1. Disconnect the VDC relay box connectors E57.
2. Check the voltage between the VDC relay box harness connector E57 terminal 10(W/G) and the ground.



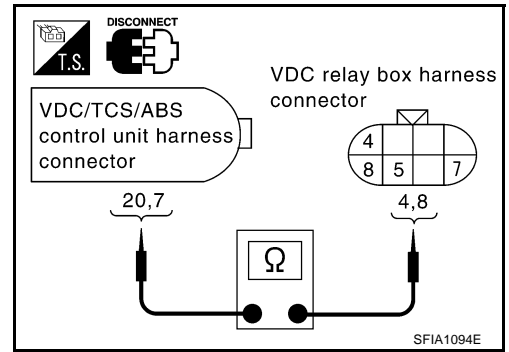
VDC relay box (Harness connector E57)	Body ground	Voltage
10 (W/G)	—	Battery voltage (approx. 12V)

OK or NG

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

4. ABS MOTOR AND MOTOR RELAY HARNESS INSPECTION

1. Turn off the ignition switch and disconnect the VDC/TCS/ABS control unit connector and VDC relay box connector.
2. Check the continuity between the VDC/TCS/ABS control unit harness connector E218 and the VDC relay box harness connector E56.

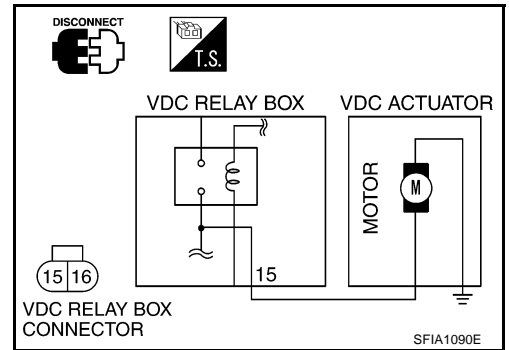


VDC/TCS/ABS control unit (Harness connector E218)	VDC relay box (Harness connector E56)	Continuity
20 (R/B)	4 (R/B)	Continuity should exist.
7 (G/W)	8 (G/W)	Continuity should exist.

3. Check if the actuator motor operates when a 12V voltage is applied to the VDC relay box connector E55 terminal 15.

CAUTION:

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



OK or NG

OK >> GO TO 5.

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

5. ABS MOTOR RELAY INSPECTION

ABS motor relay independent inspection. Refer to [BRC-51, "Inspection 8 ABS Motor and Motor Relay System"](#)

OK or NG

OK >> Replace VDC actuator assembly.

NG >> Replace the VDC relay box.

Inspection 9 Solenoid Valve Relay System

INSPECTION PROCEDURE

1. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results

MAIN RELAY

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

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

2. CONNECTOR INSPECTION

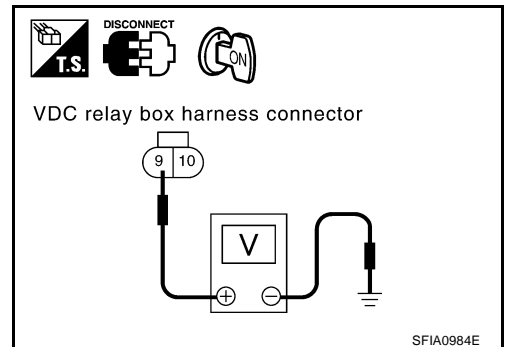
1. Disconnect the VDC relay box connector E55, E56, E57 and VDC/TCS/ABS control unit connector and check the terminals for deformation, disconnection, looseness, and so on. If there is an error, repair or replace the terminal.
2. Securely reconnect the connectors and Re-conduct self-diagnosis.

OK or NG

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

3. SOLENOID VALVE RELAY POWER SYSTEM INSPECTION

1. Turn off the ignition switch and disconnect the VDC relay box connector E57.
2. Check the voltage between the VDC relay box harness connector E57 terminal 9(L/Y) and the ground.



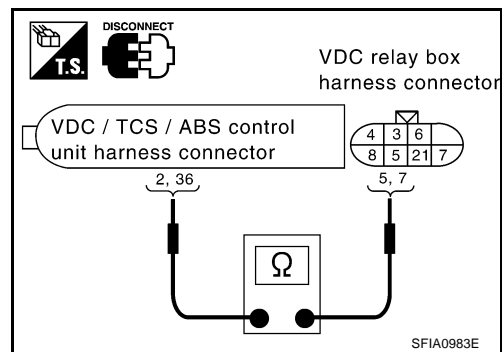
VDC relay box (Harness Connector E57)	Body ground	Voltage
9 (L/Y)	—	Battery voltage (approx. 12V)

OK or NG

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

4. SOLENOID VALVE RELAY HARNESS INSPECTION

1. Disconnect the VDC/TCS/ABS control unit connector and the VDC relay box connector E56 and the steering angle sensor connector.
2. Check the continuity between the VDC/TCS/ABS control unit connector E218 and the VDC relay box connector E56.



VDC/TCS/ABS control unit (Harness connector E218)	VDC relay box (Harness connector E56)	Continuity
2 (SB)	5 (SB)	Continuity should exist.
36 (GY/R)	7 (GY/R)	Continuity should exist.

OK or NG

OK >> GO TO 5.

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

5. SOLENOID VALVE RELAY INSPECTION

Independently check the VDC actuator relay. Refer to [BRC-59, "VDC RELAY BOX"](#).

OK or NG

OK >> Replace VDC actuator assembly.

NG >> Replace the VDC relay box.

Inspection 10 Stop Lamp Switch System

AFS001KE

INSPECTION PROCEDURE

1. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results

STOP LAMP SW

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

YES >> GO TO 2.

NO >> Inspection End

2. CONNECTOR INSPECTION

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

OK or NG

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

NG >> GO TO 3.

3. STOP LAMP SWITCH INSPECTION

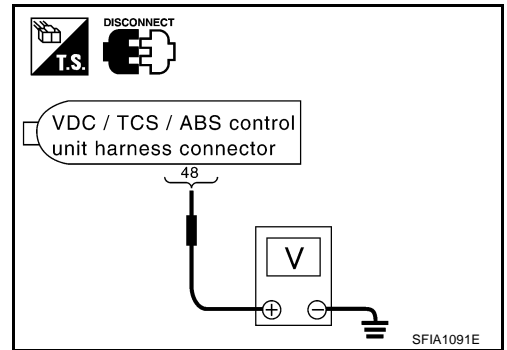
1. Turn off the ignition switch and disconnect the VDC/TCS/ABS control unit connector.
2. Check the voltage between the VDC/TCS/ABS control unit harness connector E218 terminal 48 (R/W) and the ground.

48 (R/W) - Ground

Brake pedal depressed:

Battery voltage (approx. 12V)

Brake pedal not depressed : Approx. 0V



OK or NG

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

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

AFS001KF

BRC

INSPECTION PROCEDURE

1. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results

LOW POWER VOLTAGE

Is the above displayed in the self-diagnosis item?

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

2. CONNECTOR INSPECTION

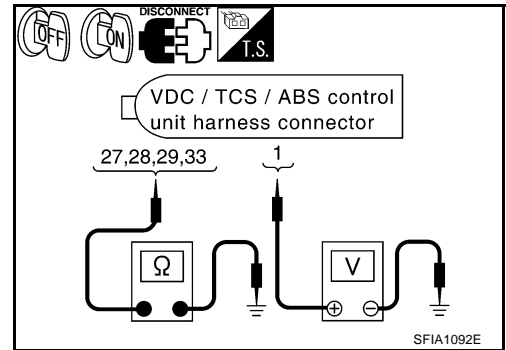
1. Disconnect the VDC/TCS/ABS control unit connector and check the terminal for deformation, disconnection, looseness, and so on. If there is an error, repair or replace the terminal.
2. Securely reconnect the connector and Re-conduct self-diagnosis.

OK or NG

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

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

1. Disconnect the VDC/TCS/ABS control unit connector.
2. With the ignition switch turned on and off, check the voltage and continuity between the VDC/TCS/ABS control unit harness connector E218 and the ground.



Signal name	VDC/TCS/ABS control unit (Harness connector E218)	Ground	Measured value
Power supply	1 (GY)	—	Battery voltage (Approx. 12V)
Ground	27 (B)	—	Continuity should exist.
	29 (B)	—	Continuity should exist.
	29 (B)	—	Continuity should exist.
	33 (B)	—	Continuity should exist.

OK or NG

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

Inspection 12 VDC/TCS/ABS Control Unit 2

AFS001KG

INSPECTION PROCEDURE

1. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
EMERGENCY BRAKE

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

CAUTION:

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

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

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

Inspection 13 Brake Fluid Level Sensor System

INSPECTION PROCEDURE

1. SELF-DIAGNOSIS RESULT CHECK

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

Self-diagnosis results
BRAKE FLUID LEVEL LOW

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

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

2. CONNECTOR INSPECTION

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

OK or NG

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

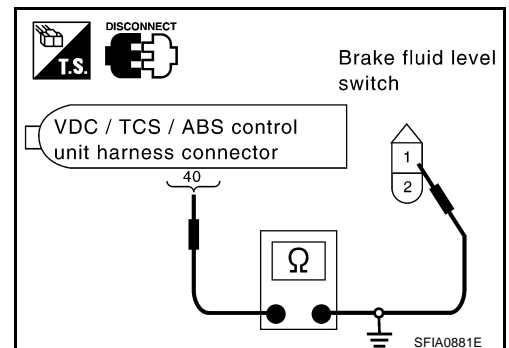
3. CHECK THE HARNESS BETWEEN THE BRAKE FLUID LEVEL SENSOR AND THE VDC/TCS/ABS CONTROL UNIT

1. Turn off the ignition switch and disconnect the brake fluid level sensor connector, VDC/TCS/ABS control unit, connectors.
2. Check the continuity between the brake fluid level sensor harness connector E73 and the VDC/TCS/ABS control unit connector E218.

VDC/TCS/ABS control unit (Harness connector E218)	Brake fluid level sensor (Harness connector E73)	Continuity
40 (Y)	1 (Y)	Continuity should exist.
40 (Y)	Ground	Continuity should not exist.
Ground	2 (B)	continuity should exist.

OK or NG

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



Inspection 14 CAN Communication System

AFS001KI

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-21, "CAN COMMUNICATION"](#) .

NO >> Connector terminal connection is loose, damaged, open or shorted.

Inspection 15 When "SHIFT POSITION ERROR" Appears in Self-Diagnosis Results Display

AFS001KJ

Inspection Procedure

1. CHECKING SELF-DIAGNOSIS RESULTS

Check self-diagnosis results.

Self-diagnosis results

CONSULT-II display items

Shift position error

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

YES >> GO TO 2.

NO >> Inspection is completed.

2. DATA MONITOR CHECK

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

Selector lever position	Position (data monitor)
P position	ON
Other than P position.	OFF

OK or NG

OK >> Perform VDC/TCS/ABS control unit self-diagnosis again.

NG >> GO TO 3.

3. CHECKING A/T PNP SWITCHPerform the A/T PNP switch inspection. Refer to [AT-106, "DTC P0705 PARK/NEUTRAL POSITION SWITCH"](#)Do any self-diagnosis items appear?

YES >> Repair the indicated items and perform VDC/TCS/ABS control unit self-diagnosis again.

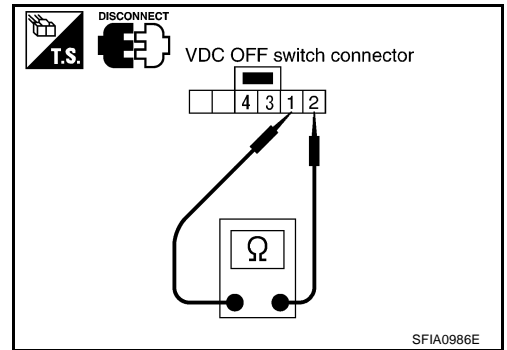
NO >> Perform VDC/TCS/ABS control unit self-diagnosis again.

Inspecting Components

VDC OFF SWITCH

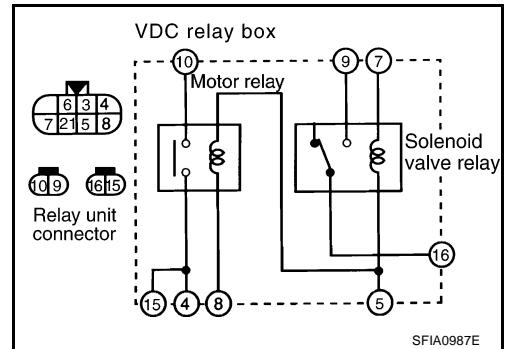
- Disconnect VDC OFF switch connector. Check continuity between terminal No. 1 and terminal No. 2.

No.1 to No.2	
When pressing the switch	: Continuity should exist.
When releasing the switch	: Continuity should not exist.



VDC RELAY BOX

Disconnect VDC relay box connector E55, E56 and E57. Check continuity, resistance value, and insulation between any pair of terminals in the VDC relay box.



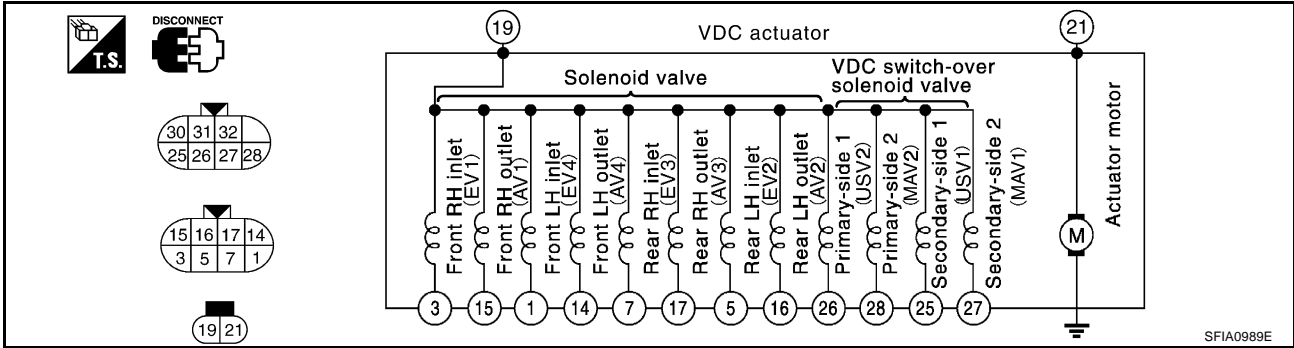
Continuity, Resistance

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

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

VDC ACTUATOR

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



CAUTION:
Make sure actuator motor is correctly grounded.

Continuity, resistance

Item	VDC actuator connector terminal number													Condition
	19	3	15	1	14	7	17	5	16	26	25	28	27	
Solenoid valve	6.0 - 11.0Ω													Check the resistance
	3.0 - 5.0Ω													
	6.0 - 11.0Ω													
	3.0 - 5.0Ω													
	6.0 - 11.0Ω													
	3.0 - 5.0Ω													
	6.0 - 11.0Ω													
	3.0 - 5.0Ω													
VDC switch-over solenoid valve	6.0 - 11.0Ω													Check the resistance
	6.0 - 11.0Ω													
	3.0 - 5.0Ω													
	3.0 - 5.0Ω													
Actuator motor														—
(Resistance) ○—Ω—○ : Continuity: Yes ○—○ : Continuity: Yes														

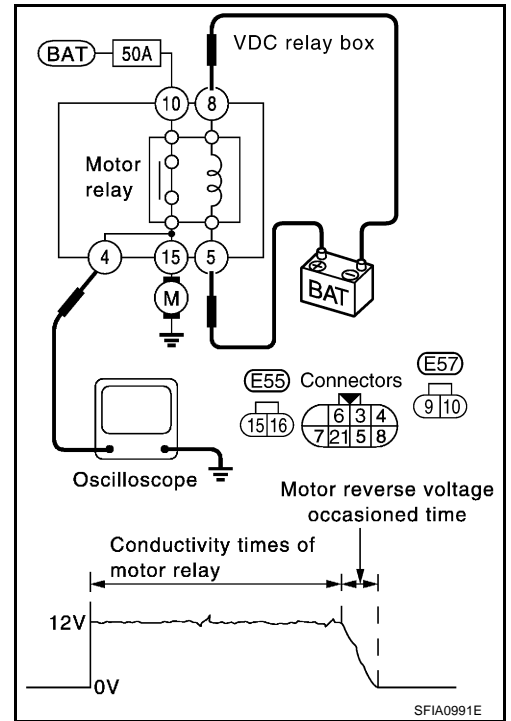
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Actuator Operation Inspection

1. Connect E55 and E57 connectors of VDC relay box.
2. Measure the motor voltage [No. 4 (R/B) terminal to ground] with oscilloscope. Then check the motor reverse voltage occasioned time. The motor reverse voltage occasioned time is more than 0.1 sec.

CAUTION:

- The above check should be performed after motor relay unit inspection to make sure relay operates normally.
- Limit actuator drive motor operation to 4 seconds or less to prevent heating.
- Motor counter electromotive force duration is based on the time at an ambient temperature of 20°C with 12V battery voltage. If the battery voltage or the ambient temperature is lower, the time will be slightly shorter.



Symptom 1 Excessive ABS Function Operation Frequency

AFS001KK

1. INSPECTION START

Check brake force distribution.

OK or NG

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

2. FRONT AND REAR AXLE INSPECTION

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

OK or NG

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

3. WHEEL SENSOR INSPECTION

Wheel Sensor Inspection

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

OK or NG

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

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4. ABS WARNING LAMP DISPLAY CHECK

Make sure the warning lamp turns off approximately 1 sec. After the ignition switch is turned on or when driving.

OK or NG

OK >> Normal

NG >> Perform self-diagnosis. Refer to [BRC-29, "SELF-DIAGNOSIS"](#) .

Symptom 2 Unexpected Pedal Reaction

AFS001KL

1. BRAKE PEDAL STROKE INSPECTION

Check brake pedal stroke.

Is the stroke too big?

YES >> ● Bleed air from the brake piping.

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

NO >> GO TO 2.

2. PERFORMANCE CHECK

Disconnect the VDC relay box connector and make sure the braking force is sufficient when the ABS is not operating. After the inspection, reconnect the connector.

OK or NG

OK >> GO TO 3. Refer to [BRC-61, "Symptom 1 Excessive ABS Function Operation Frequency"](#) .

NG >> Check brake system.

Symptom 3 The Braking Distance Is Long

AFS001KM

CAUTION:

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

1. PERFORMANCE CHECK

Disconnect VDC relay box connector to deactivate ABS. In this condition, check stopping distance. After inspection, connect connector.

OK or NG

OK >> ● Bleed air from the brake piping.

- Check brake system.

NG >> GO TO 3. Refer to [BRC-61, "Symptom 1 Excessive ABS Function Operation Frequency"](#)

Symptom 4 The ABS Function Does Not Operate

AFS001KN

CAUTION:

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

1. ABS WARNING LAMP DISPLAY CHECK

Make sure the warning lamp turns off approximately 1 second after the ignition switch is turned on or when driving.

OK or NG

OK >> GO TO 3. Wheel Sensor Inspection in [BRC-61, "Symptom 1 Excessive ABS Function Operation Frequency"](#) .

NG >> Perform self-diagnosis. Refer to [BRC-29, "SELF-DIAGNOSIS"](#) .

Symptom 5 Pedal Vibration or ABS Operation Sound Occurs

AFS001KO

CAUTION:

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

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

1. SYMPTOM CHECK 1

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

OK or NG

OK >> GO TO 2.

NG >> Perform self-diagnosis. Refer to [BRC-29, "SELF-DIAGNOSIS"](#).

2. SYMPTOM CHECK 2

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

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

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

NO >> GO TO 3. Wheel Sensor Inspection in [BRC-61, "Symptom 1 Excessive ABS Function Operation Frequency"](#).

Symptom 6 Vehicle Jerks During VDC/TCS/ABS Control

AFS001KP

1. ENGINE SPEED SIGNAL INSPECTION

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

Is engine speed at idle 400 rpm or higher?

YES >> GO TO 3.

NO >> GO TO 2.

2. ECM SELF-DIAGNOSIS RESULT ITEM CHECK

Perform ECM self-diagnosis.

Are self-diagnosis items displayed?

YES >> Check the corresponding items. Refer to [EC-74, "TROUBLE DIAGNOSIS"](#) in "Engine Control (EC section)".

NO >> GO TO 3.

3. SYMPTOM CHECK 1

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

OK or NG

OK >> Inspection End

NG >> GO TO 4.

4. A/T SELF-DIAGNOSIS RESULTS ITEM CHECK

Perform A/T self-diagnosis.

OK or NG

OK >> GO TO 5.

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

5. SYMPTOM CHECK 2

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

OK or NG

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

6. SELF-DIAGNOSIS RESULT ITEM INSPECTION 1

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

Are self-diagnosis items displayed?

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

7. CONNECTOR INSPECTION

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

OK or NG

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

8. SELF-DIAGNOSIS RESULT ITEM INSPECTION 2

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

Are self-diagnosis items displayed?

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

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

Check the CAN communication system. Refer to [BRC-58, "Inspection 14 CAN Communication System"](#).

OK or NG

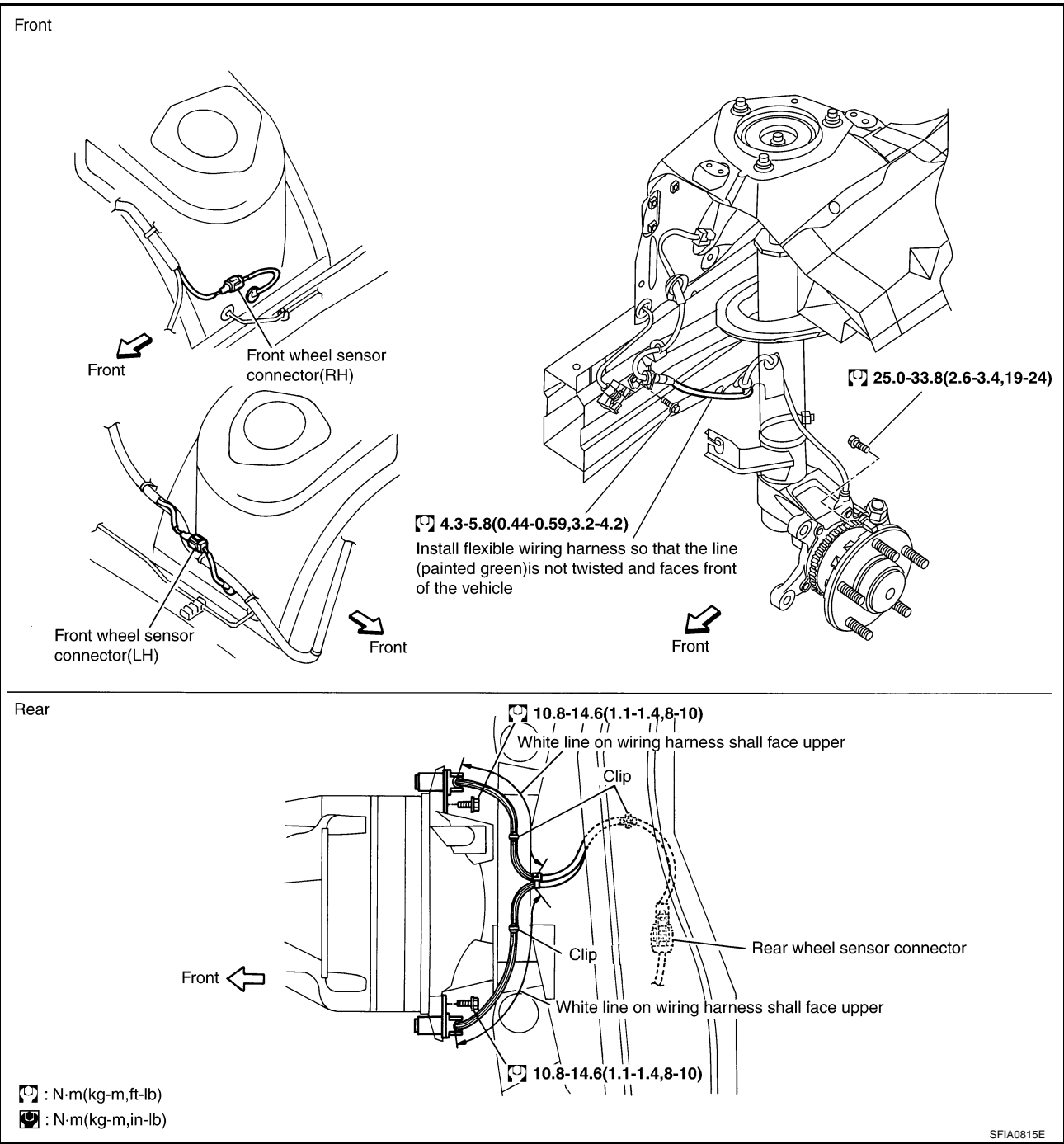
- OK >> Inspection End
NG >> Connect the connectors, and re-conduct the VDC/TCS/ABS control unit self-diagnosis.

WHEEL SENSORS

PF1:47910

Removal and Installation

AFS000MA



REMOVAL

Pay attention to the following when removing sensor.

CAUTION:

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

INSTALLATION

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

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WHEEL SENSORS

[VDC/TCS/ABS]

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

VDC/TCS/ABS CONTROL UNIT

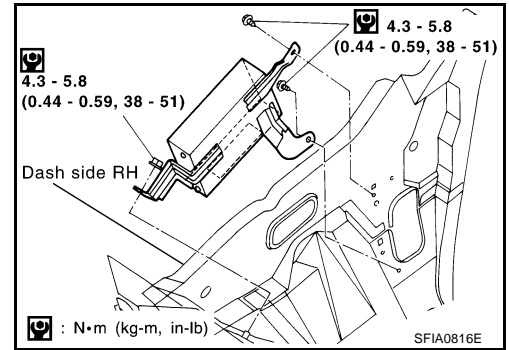
PFP:47660

Removal and Installation

AFS000MB

REMOVAL

1. Remove instrument lower panel, glove box and instrument assist panel. Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#).
2. Remove VDC/TCS/ABS control unit.



INSTALLATION

Install in the reverse order of removal.

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SENSOR ROTOR

PFP:47970

Removal and Installation

AFS000MC

REMOVAL

Front

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

Rear

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

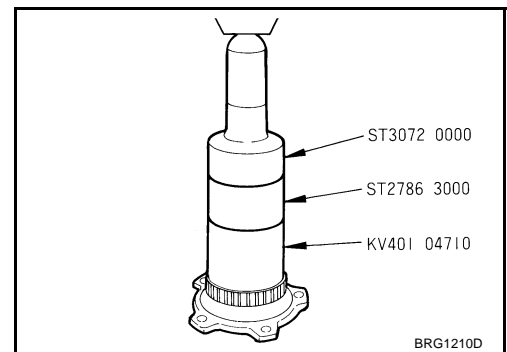
INSTALLATION

Front

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

Rear

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

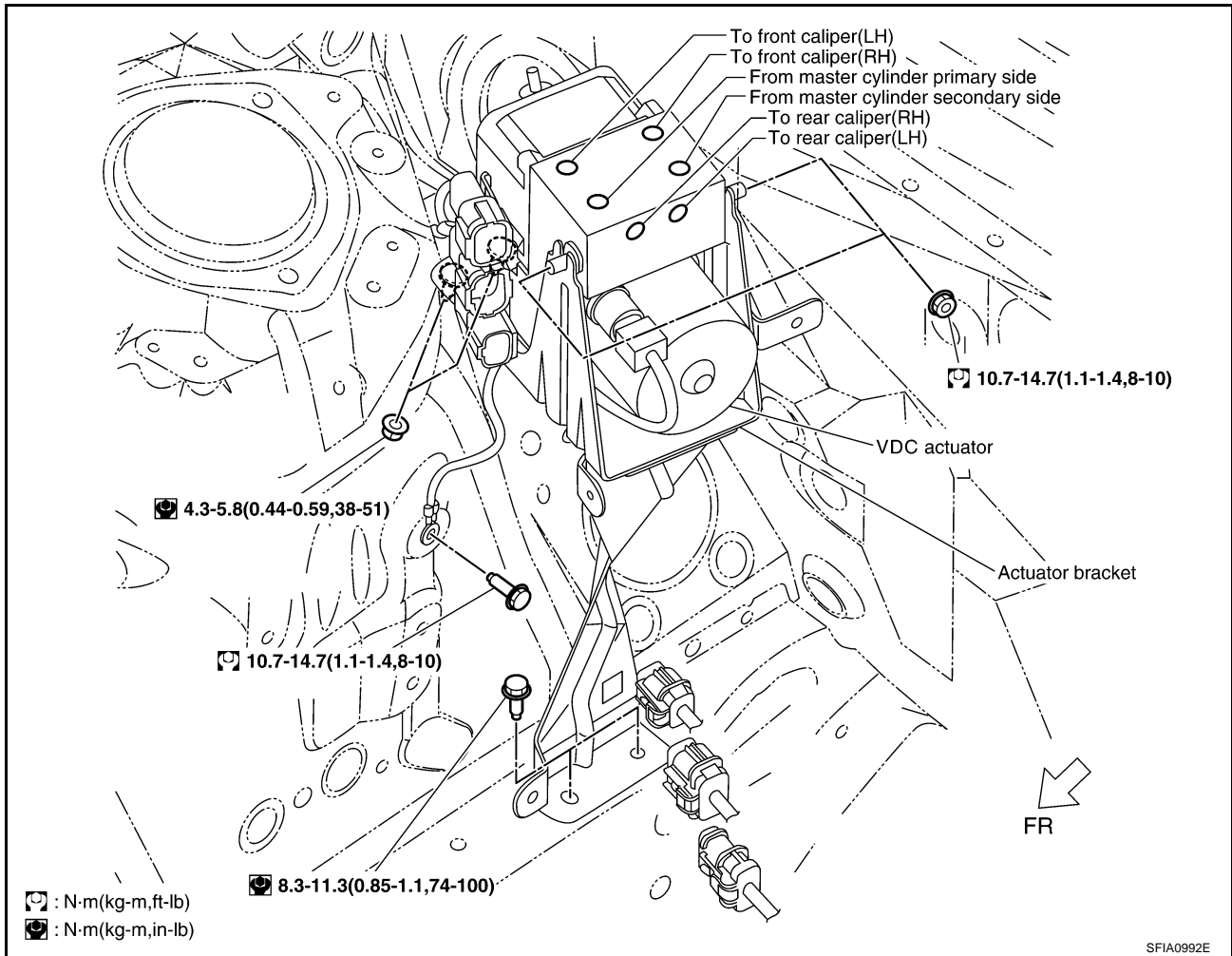


VDC/TCS/ABS ACTUATOR

PFP:47660

Removal and Installation

AFS000MD



Pay attention to the following when removing actuator.

CAUTION:

- Before servicing, disconnect battery cables.
- To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use a flare nut wrench (commercial service tool).
- Do not remove and install actuator by holding harness.
- After work is completed, bleed air from brake piping. Refer to [BR-9, "Bleeding Brake System"](#).
- Be sure to securely connect the ground cable.

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G SENSOR

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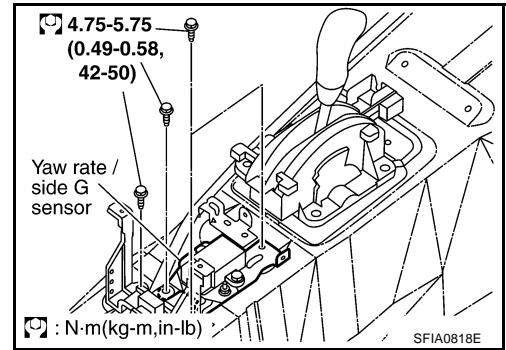
Removal and Installation**REMOVAL**

AFS000ME

1. Remove center console. Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#).
2. Disconnect harness connector.
3. Remove installation bolts. Remove yaw rate/side G-sensor.

CAUTION:

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

**INSTALLATION**

To install, follow procedure for removal in reverse order.

CAUTION:

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

STEERING ANGLE SENSOR

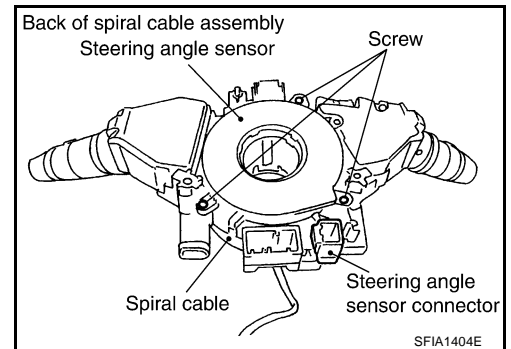
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Removal and Installation

AFS00265

REMOVAL

1. Remove spiral cable assembly. Refer to [SRS-40, "SPIRAL CABLE"](#) .
2. Remove steering angle sensor from spiral cable assembly.



INSTALLATION

Install in the reverse order of removal.

NOTE:

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

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