

BRC

SECTION

BRAKE CONTROL SYSTEM

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PRECAUTIONS

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Precautions for Battery Service

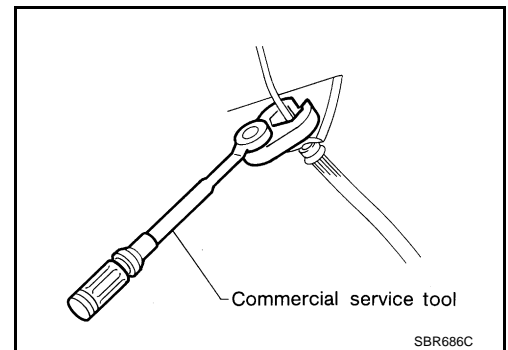
AFS0016F

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

Precautions for Brake System

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- Recommended fluid is brake fluid "DOT 3".
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas such as body. If brake fluid is splashed, wipe it off and flush area with water immediately.
- Never use mineral oils such as gasoline or kerosene to clean. They will ruin rubber parts and cause improper operation.
- Using a flare nut crowfoot and a 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 ABS actuator and electric unit (control unit) connector or battery negative terminal.
- When installing brake piping, be sure to check torque.



Precautions for Brake Control

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

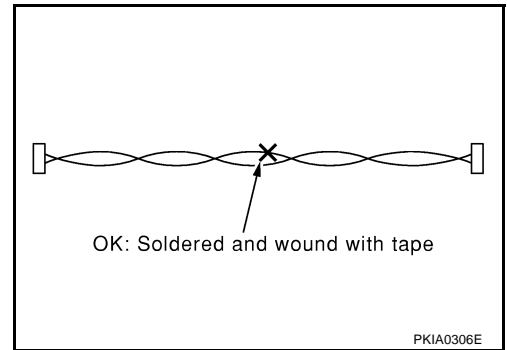
Diagnosis Precaution CAN SYSTEM

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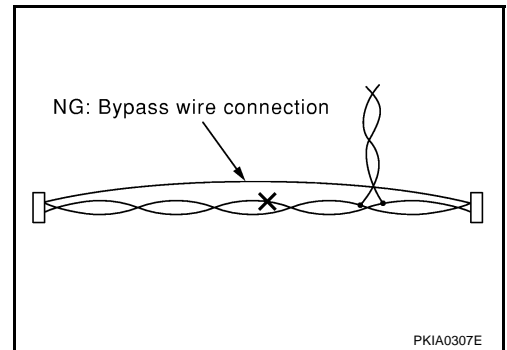
- Do not apply voltage of 7.0V or higher to terminal to be measured.
- Maximum open terminal voltage of tester in use shall be 7.0V or lower.
- Before checking harnesses, turn ignition switch to OFF and disconnect battery negative terminal.

Precaution for Harness Repair CAN SYSTEM

- 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

[TCS/ABS]

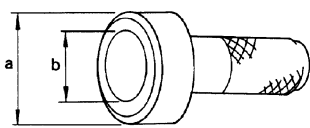
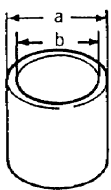
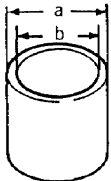
PREPARATION

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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.

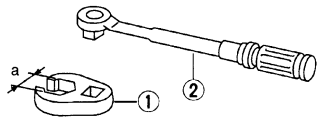
Tool number (Kent-Moore No.) Tool name	Description
ST3072 0000 (J 25405) Drift a: 77 mm (0.03 in) dia. b: 55 mm (2.17 in) dia.	 <p style="text-align: center;">ZZA0701D</p>
ST2786 3000 (—) Drift a: 75 mm (2.95 in) dia. b: 62 mm (2.44 in) dia.	 <p style="text-align: center;">ZZA0832D</p>
KV401 04710 (—) a: 76 mm (2.99 in) dia. b: 68.5 mm (2.697 in) dia.	 <p style="text-align: center;">ZZA0832D</p>

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Commercial Service Tools

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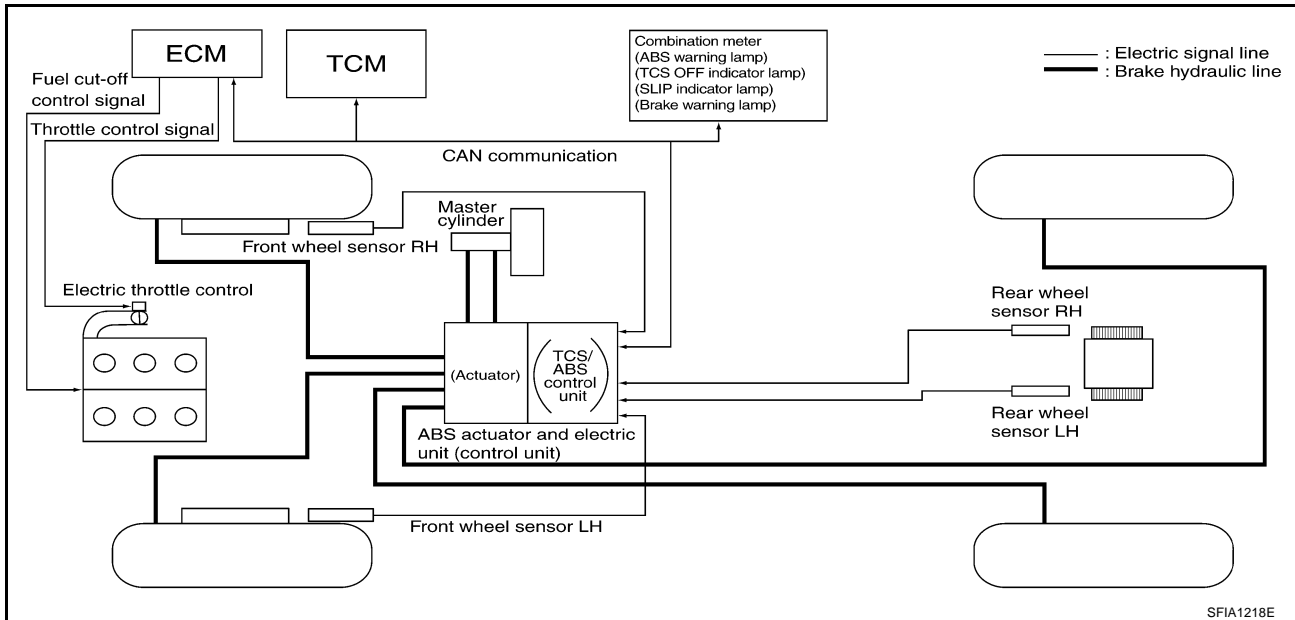
Tool name	Description
1. Flare nut crowfoot a: 10 mm (0.39 in) 2. Torque wrench	 <p style="text-align: center;">S-NT360</p>

SYSTEM DESCRIPTION

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System Diagram

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TCS Function

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- The wheel spin occurrence of the drive wheels is detected by ABS actuator and electric unit (control unit) using the wheel speed signals from all four wheels, so when wheel spin occurs, the amount of wheel spin is reduced by controlling the hydraulic brakes on the right and left rear wheels, cutting the fuel to engine, and partially closing throttle valve to reduce the engine torque. The throttle opening is also controlled to obtain the optimum engine torque.
- Depending on road circumstances, the driver may have a sluggish feel. This is normal, because the optimum traction has the highest priority under TCS operation.
- TCS may be activated any time the vehicle suddenly accelerates, suddenly downshifts, or is driven on a road with a varying surface friction coefficient.
- During TCS operation, it informs a driver of system operation by flashing SLIP indicator lamp.

ABS Function

AFS000YQ

- 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 ABS warning lamp turns on.
- Electrical System Diagnosis by CONSULT-II is available.

EBD Function

AFS0010E

- Electronic Brake Distributor is a function that detects subtle slippages between 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.
- In case of electrical system break down, the Fail-Safe function is activated, the EBD and ABS becomes inoperative, and ABS warning lamp and brake warning lamp are turned on.
- Electrical System Diagnosis by CONSULT-II is available.

Fail-Safe Function
TCS SYSTEM

AFS000YR

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

CAUTION:

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

ABS, EBD SYSTEM

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

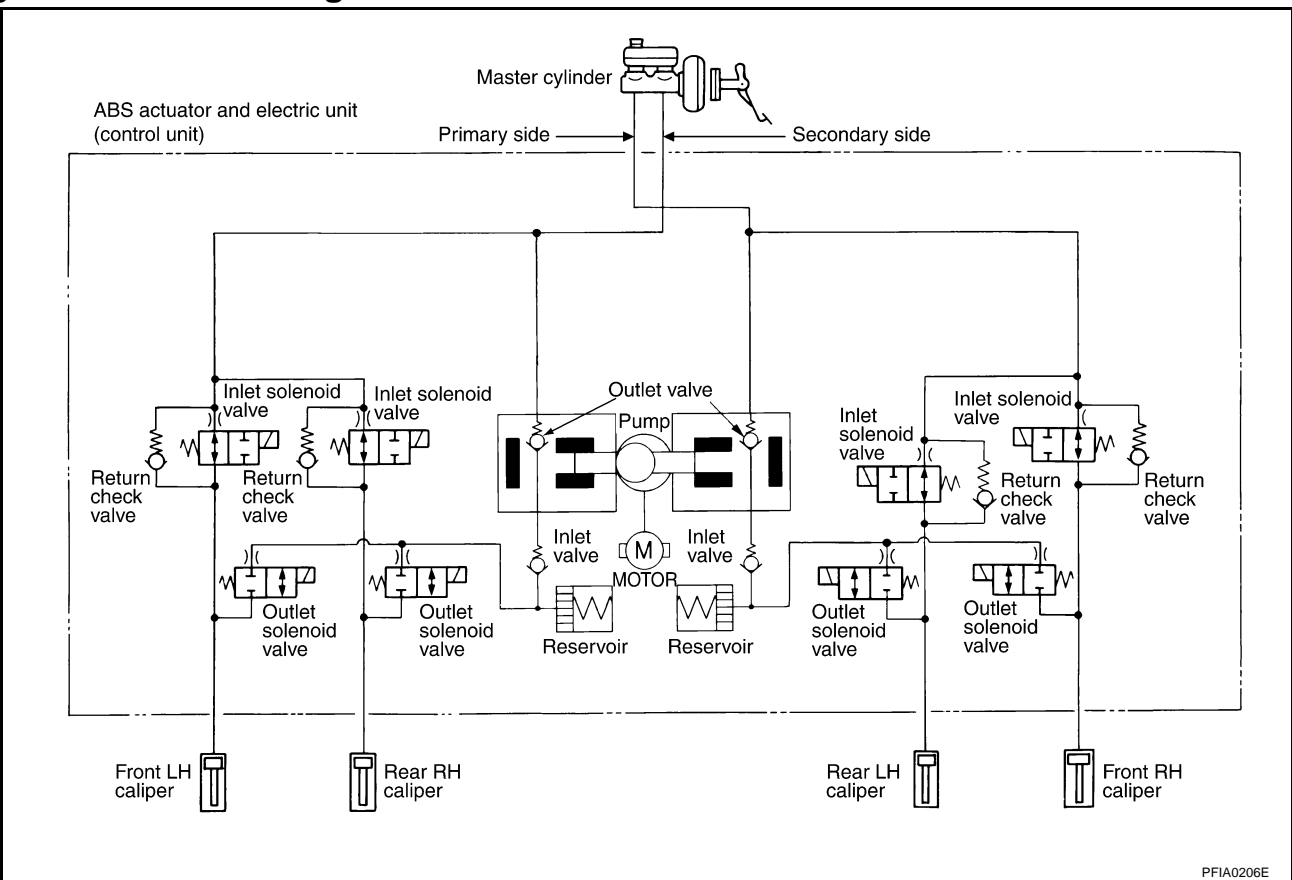
1. For ABS trouble, only the EBD is activated and the condition of the vehicle is the same condition of vehicles without TCS/ABS equipment.
2. For EBD trouble, the EBD and ABS become inoperative, and the condition of the vehicle is the same as the condition of vehicles without TCS/ABS, EBD equipment.

NOTE:

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

Hydraulic Circuit Diagram

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CAN COMMUNICATION

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System Description

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

TROUBLE DIAGNOSIS

PFP:00004

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.

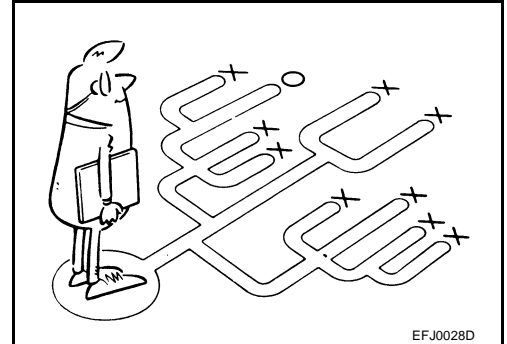
- It is also important to clarify customer complaints before inspection.

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".

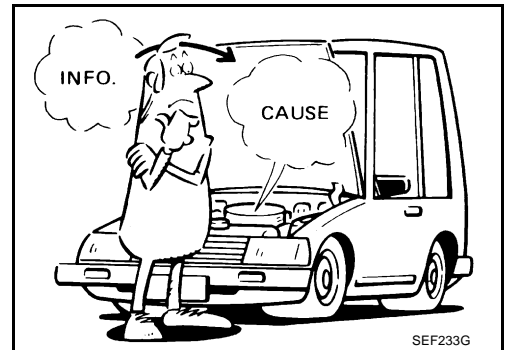


EFJ0028D

- 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-22, "Operation Procedure"](#).
- For an intermittent malfunction, move harness or harness connector by hand to check poor contact or false open circuit.
- Always read "GI General Information" to confirm general precautions. Refer to [GI-4, "General Precautions"](#)



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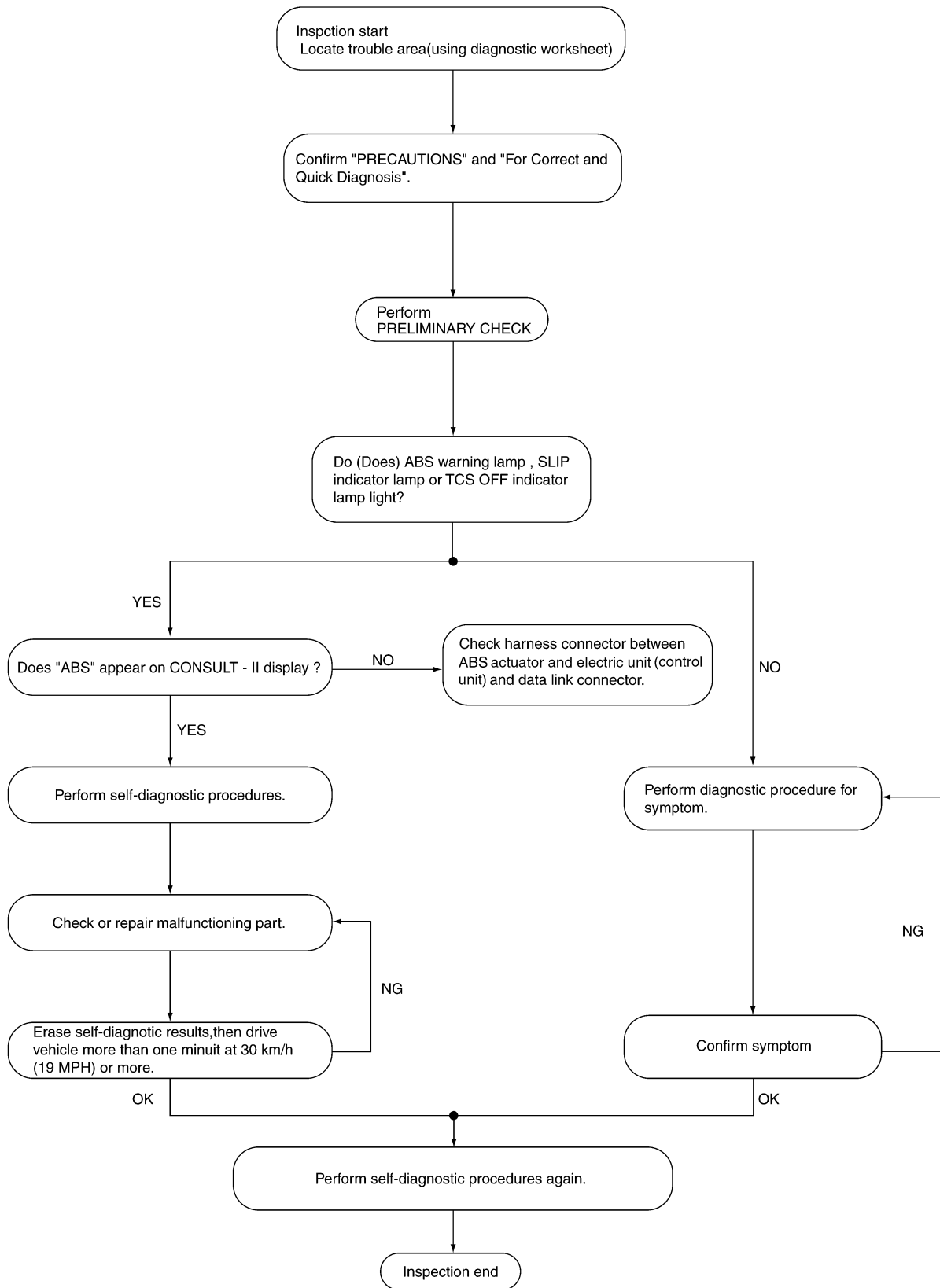
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TROUBLE DIAGNOSIS

[TCS/ABS]

DIAGNOSIS FLOWCHART



SFIA0952E

TROUBLE DIAGNOSIS

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

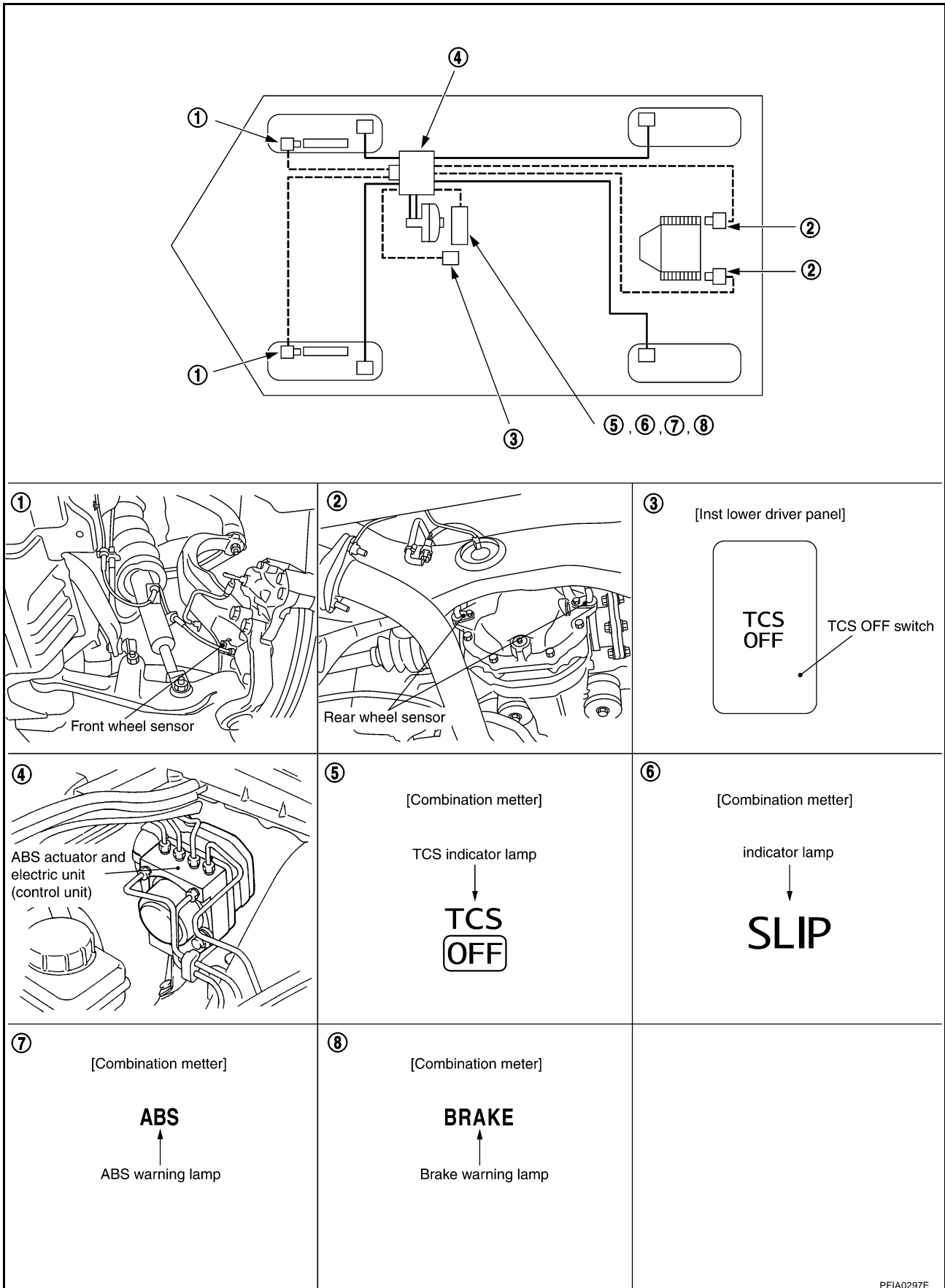
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Component Parts Location

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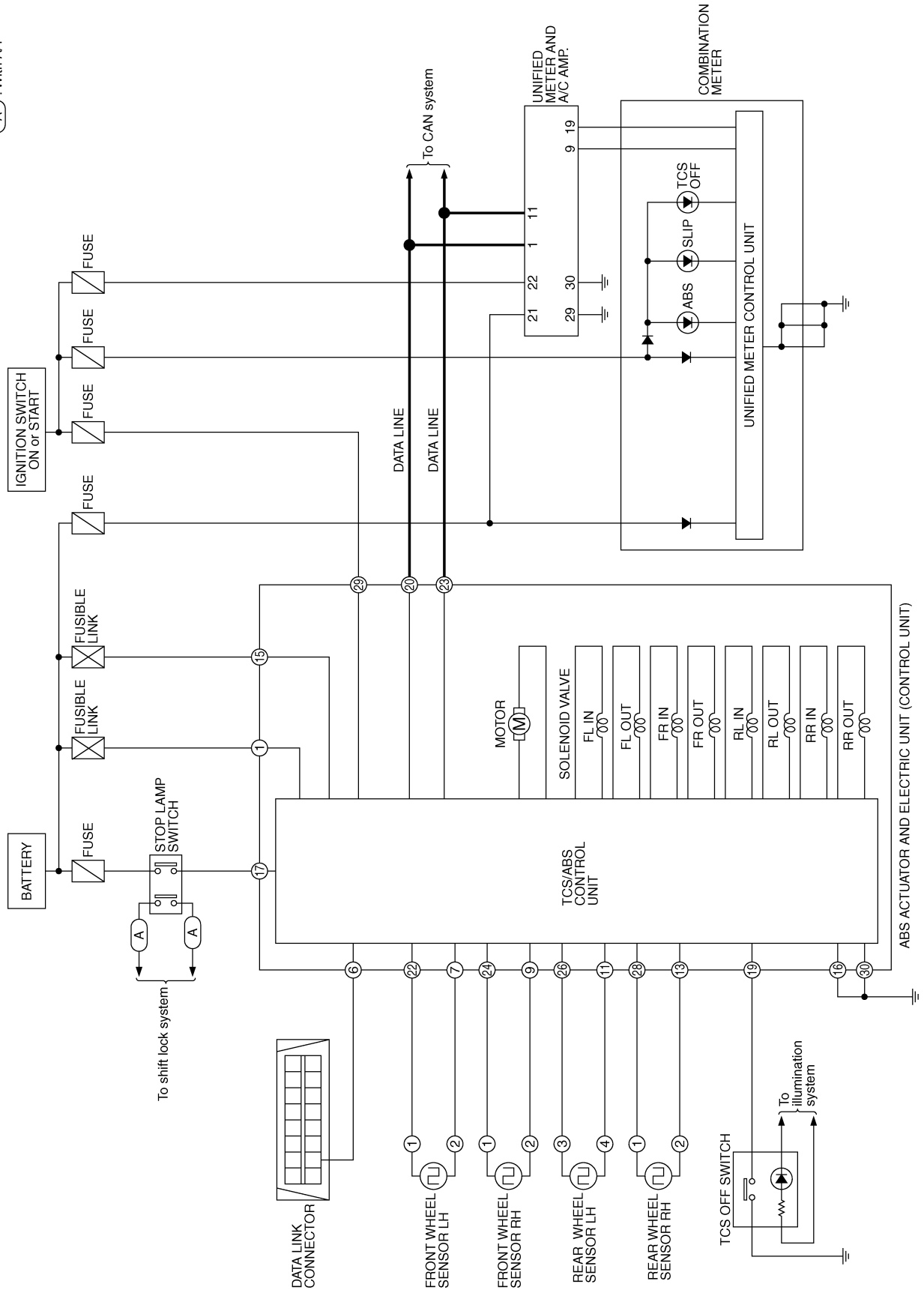
TROUBLE DIAGNOSIS

[TCS/ABS]

Schematic— TCS —

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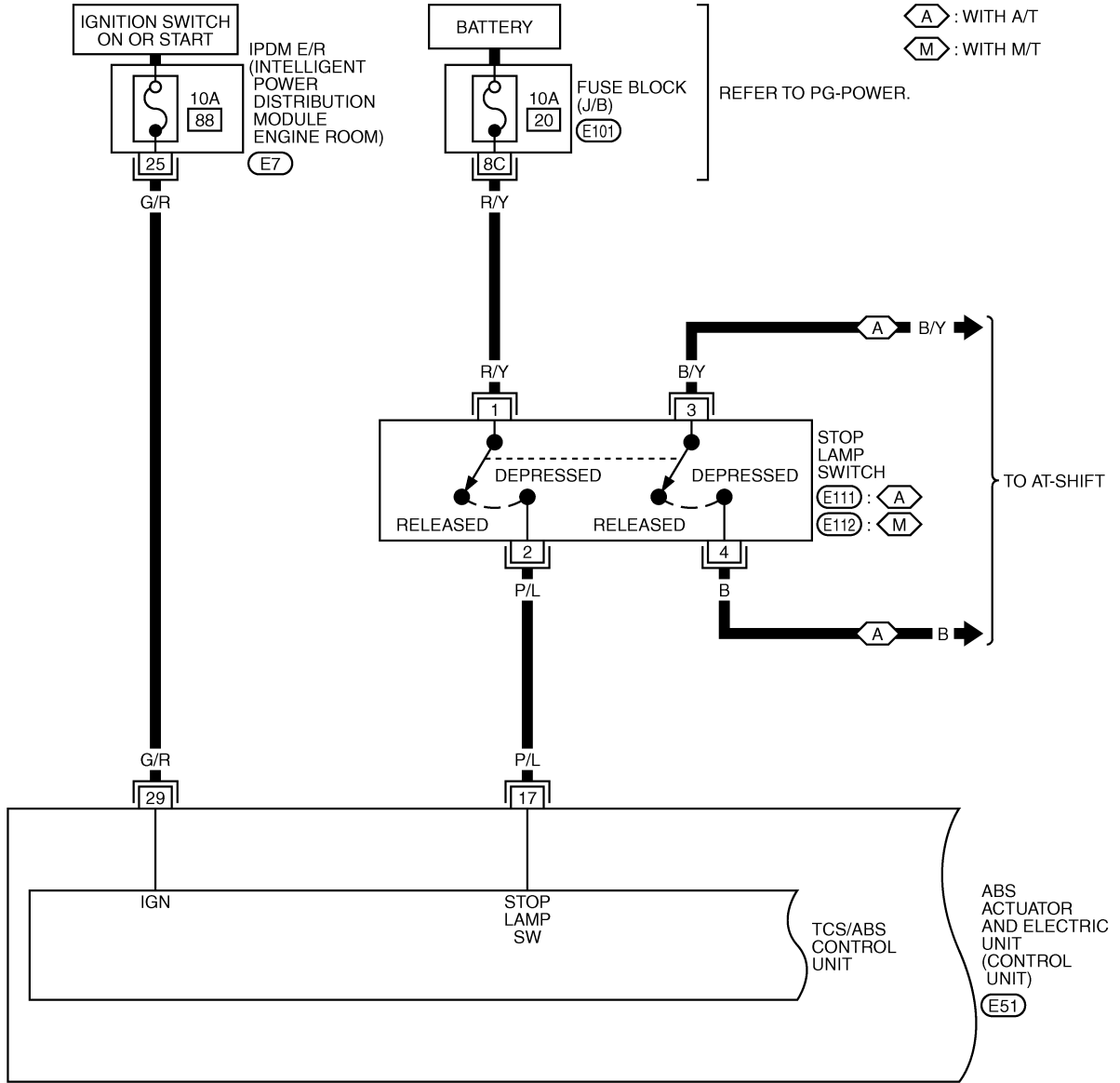
TROUBLE DIAGNOSIS

[TCS/ABS]

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Wiring Diagram — TCS —

BRC-TCS-01



21	20	19	18	17
28	27	26	25	24
23	22			



15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
30	29	28	27	26	25	24	23	22	21	20	19	18	17	16



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REFER TO THE FOLLOWING.

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

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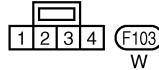
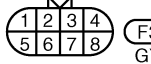
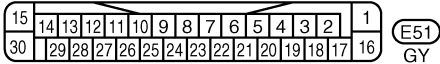
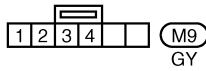
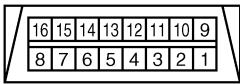
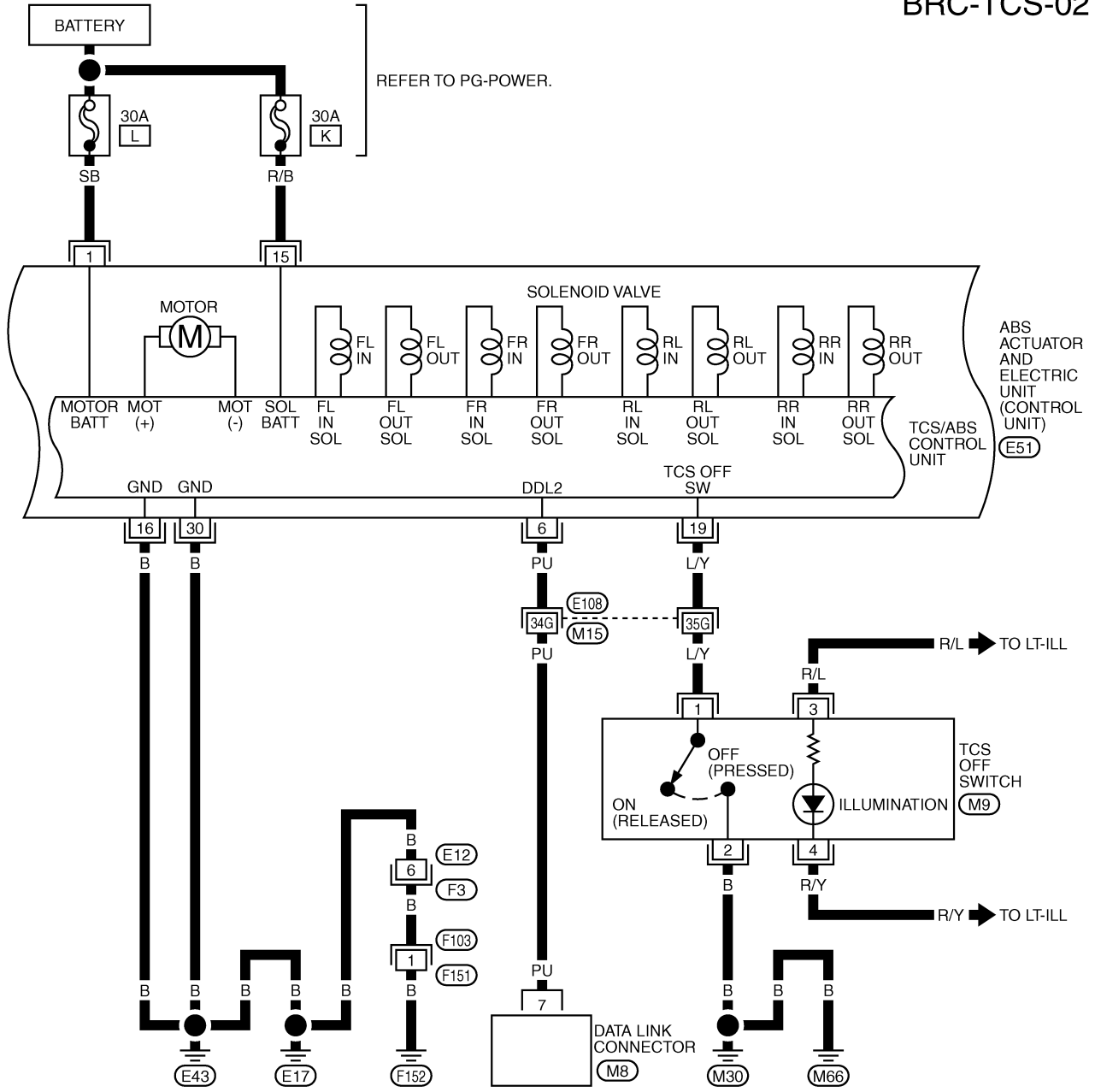
TROUBLE DIAGNOSIS

[TCS/ABS]

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

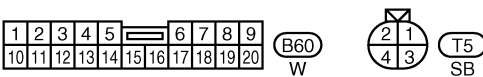
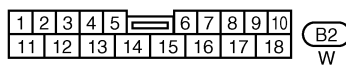
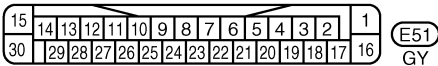
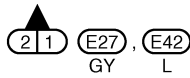
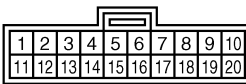
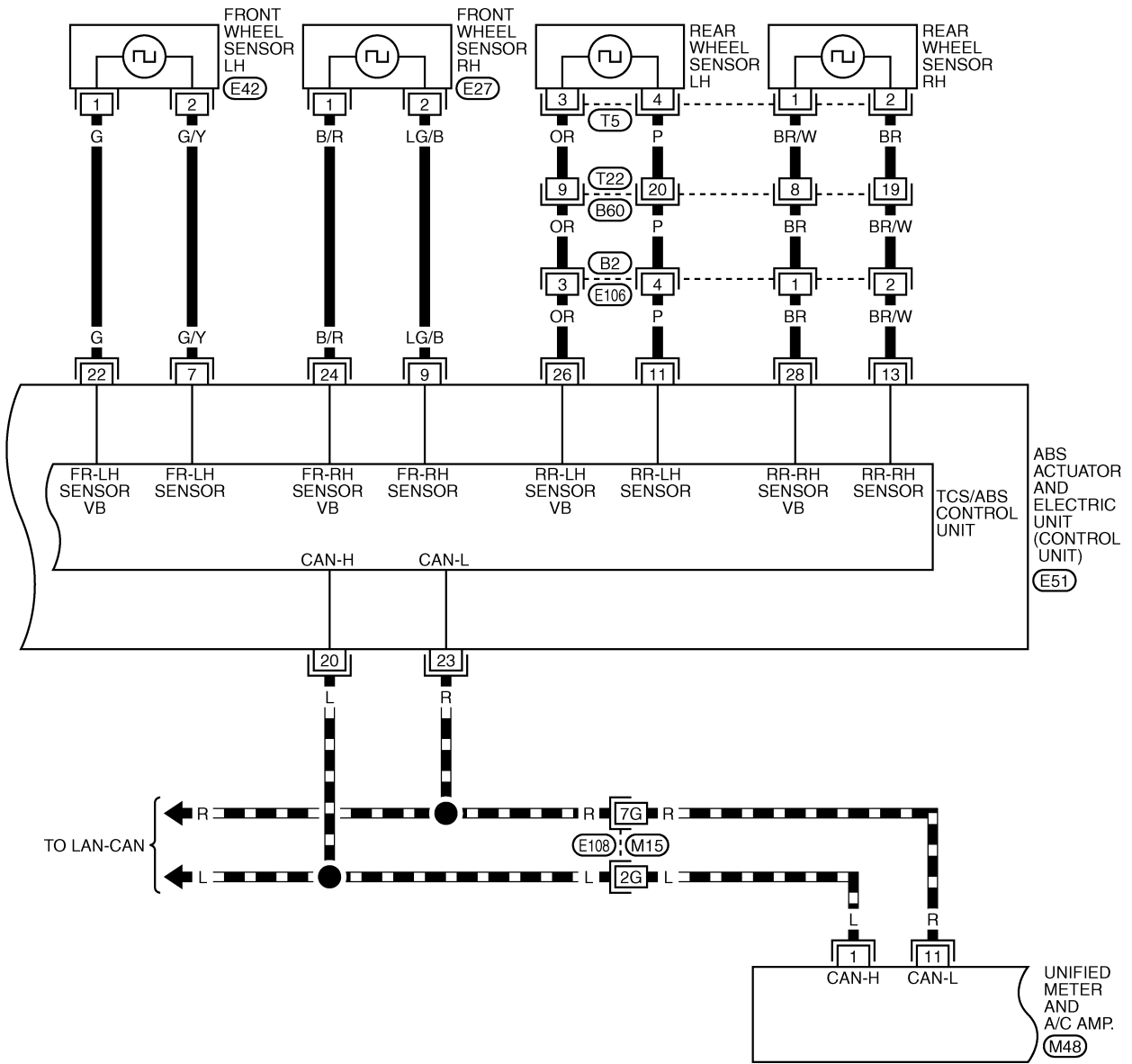
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TROUBLE DIAGNOSIS

[TCS/ABS]

BRC-TCS-03

▬ : DATA LINE



REFER TO THE FOLLOWING.

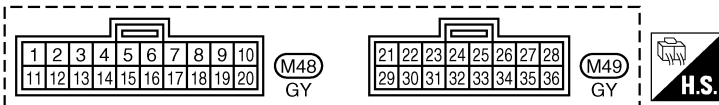
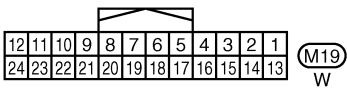
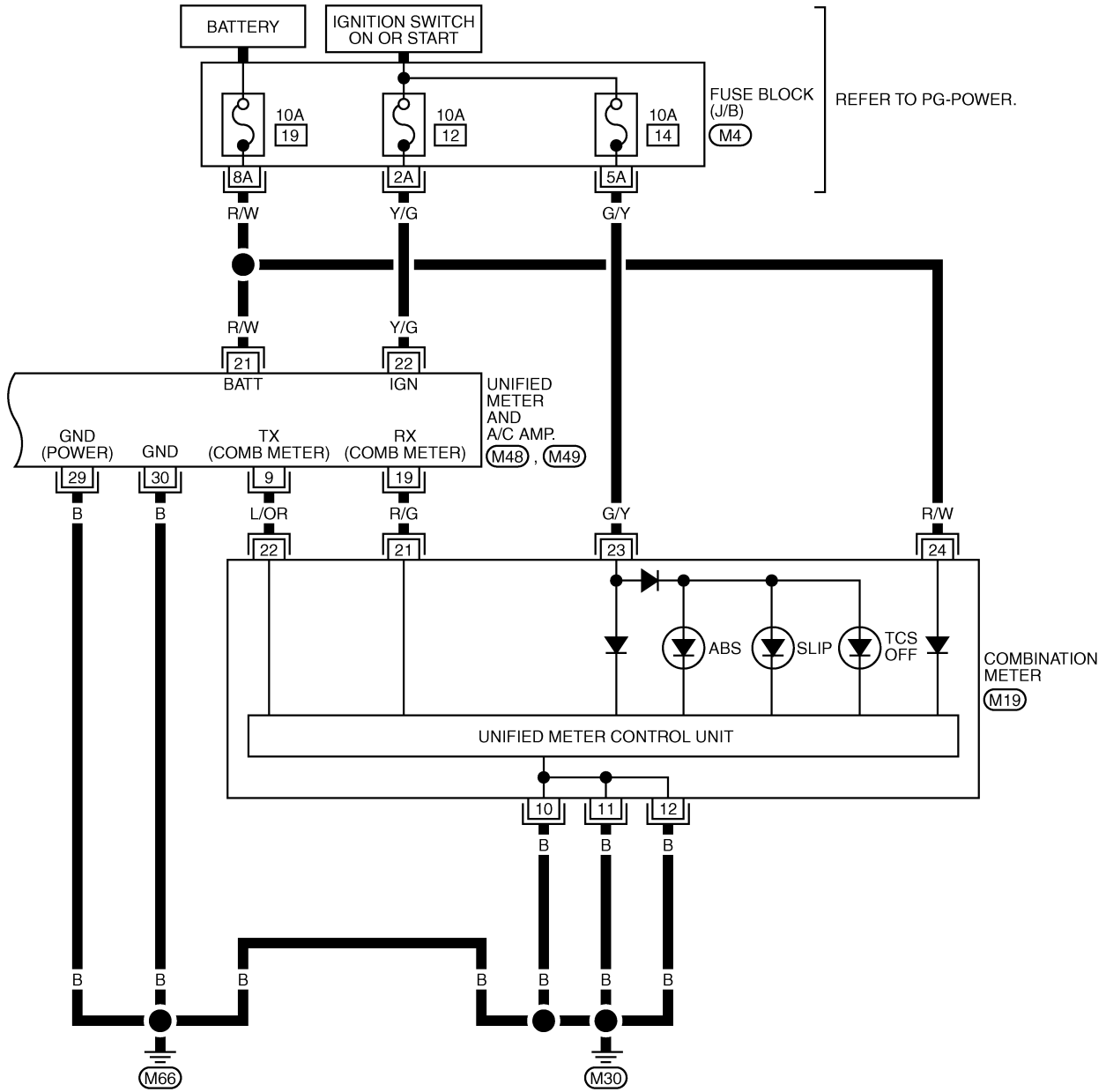
(E108) -SUPER MULTIPLE JUNCTION (SMJ)

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TROUBLE DIAGNOSIS

[TCS/ABS]

BRC-TCS-04



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

TFWT0041E

TROUBLE DIAGNOSIS

[TCS/ABS]

Control Unit Input/Output Signal Standard

AFS000YT

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		Reference: Error inspection checklist
		Condition	Reference values for normal operation	
WHEEL SENSOR	Wheel speed calculated using signals from all four wheel sensors	Vehicle stopped	0 km/h (0 MPH)	BRC-31, "Inspection 1 Wheel Sensor System"
		While driving (Note 1)	Nearly matches the speedometer display ($\pm 10\%$ or less)	
IN ABS S/V OUT ABS S/V	Operation status of all solenoids	When the actuator solenoid operates or during a fail-safe	ON	---
		When the actuator relay operates and the actuator solenoid does not operate	OFF	
EBD WARNING LAMP	Brake warning lamp on condition (Note 2)	Brake warning lamp ON	ON	BRC-30, "BASIC INSPECTION 3 ABS WARNING LAMP, TCS OFF INDICATOR LAMP, SLIP INDICATOR LAMP INSPECTION"
		Brake warning lamp OFF	OFF	
STOP LAMP SWITCH	Brake pedal operation	Brake pedal depressed	ON	BRC-36, "Inspection 6 Stop Lamp Switch System"
		Brake pedal not depressed	OFF	
ABS MOTOR RELAY	Motor and motor relay operation status	When motor relay and motor are operating	ON	BRC-34, "Inspection 5 Actuator Relay or Motor Relay Power System"
		When motor relay and motor are not operating	OFF	
ABS ACTUATOR RELAY	Actuator relay operation status	When actuator relay is operating	OFF	BRC-34, "Inspection 5 Actuator Relay or Motor Relay Power System"
		When actuator relay is not operating	ON	
ABS WARNING LAMP	ABS warning lamp on condition (Note 2)	ABS warning lamp ON	ON	BRC-30, "BASIC INSPECTION 3 ABS WARNING LAMP, TCS OFF INDICATOR LAMP, SLIP INDICATOR LAMP INSPECTION"
		ABS warning lamp OFF	OFF	
OFF LAMP	TCS OFF indicator lamp on condition (Note 3)	TCS OFF indicator lamp ON	ON	BRC-30, "BASIC INSPECTION 3 ABS WARNING LAMP, TCS OFF INDICATOR LAMP, SLIP INDICATOR LAMP INSPECTION"
		TCS OFF indicator lamp OFF	OFF	
OFF SWITCH	TCS switch ON-OFF status	TCS OFF switch ON (TCS OFF indicator lamp ON)	ON	BRC-37, "TCS OFF SWITCH"
		TCS OFF switch OFF (TCS OFF indicator lamp OFF)	OFF	

TROUBLE DIAGNOSIS

[TCS/ABS]

Monitor item	Display Content	Data monitor		Reference: Error inspection checklist
		Condition	Reference values for normal operation	
SLIP LAMP	SLIP indicator lamp on condition (Note 4)	SLIP indicator lamp ON	ON	BRC-30. "BASIC INSPECTION 3 ABS WARNING LAMP, TCS OFF INDICATOR LAMP, SLIP INDICATOR LAMP INSPECTION"
		SLIP indicator lamp OFF	OFF	
BATTERY VOLTAGE	Battery voltage supplied to TCS/ABS control unit	Ignition switch ON	10 - 16V	BRC-33. "Inspection 4 ABS Actuator and Electric Unit (Control Unit) Power and Ground Systems"
GEAR	Determined gear shift position from the A/T PNP switch signal	Driving	1 - 5 ● Differs depending on the transmission status. (M/T vehicles are always left in 1.)	—
ENGINE SPEED	Engine running	With engine stopped	0 rpm	Engine speed signal system
		With engine running	Almost in accordance with tachometer display	
N POSITION SIGNAL	Determined gear shift position from the A/T PNP switch signal (Note 5)	N position	ON	—
		Other than N position	OFF	
P POSITION SIGNAL	Determined gear shift position from the A/T PNP switch signal (Note5)	P position	ON	—
		Other than P position	OFF	
FAIL SIGNAL	Fail signal status	During TCS fail-safe During ABS fail-safe During EBD fail-safe	OFF	TCS system ABS system EBD system
ACCELERATOR POSITION SIGNAL	Open/close condition of throttle valve (linked with accelerator pedal).	Accelerator pedal not depressed (ignition switch is ON)	0 %	Communication circuit between TCS/ABS control unit and ECM
		Depress accelerator pedal (ignition switch is ON)	0 to 100 %	

Note 1: Confirm tire pressure is normal.

Note 2: ABS warning lamp ON/OFF timing

ON: For approximately 1 second after ignition switch is turned on or when an error is detected.

OFF: Approximately 1 second after ignition switch is turned on (when system is normal).

Note 3: TCS OFF indicator lamp ON/OFF timing

ON: For approximately 1 second after ignition switch is turned on, when an error is detected, or when TCS OFF switch is on.

OFF: Approximately 1 second after ignition switch is turned on (when system is normal), when TCS OFF switch is off.

Note 4: SLIP indicator lamp ON/OFF timing

ON: For approximately 1 second after ignition switch is turned on or when an error is detected.

OFF: Approximately 1 second after ignition switch is turned on (when system is normal), when TCS function is not operating

Flash: When the TCS function is operating during driving.

Note 5: A/T model.

CONSULT- II Functions CONSULT-II MAIN FUNCTION

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

TROUBLE DIAGNOSIS

[TCS/ABS]

Diagnostic test mode	Function	Reference
SELF-DIAGNOSTIC RESULTS	Self-diagnostic results can be read and erased quickly.	BRC-22. "SELF-DIAGNOSIS"
DATA MONITOR	Input/Output data in the ABS actuator and electric unit (control unit) can be read.	BRC-24. "DATA MONITOR"
CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of communication can be read.	—
ACTIVE TEST	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.	BRC-27. "ACTIVE TEST"
FUNCTION TEST	Conducted by CONSULT-II instead of a technician to determine whether each system is "OK" or "NG".	—
ECU PART NUMBER	ABS actuator and electric unit (control unit) part number can be read.	—

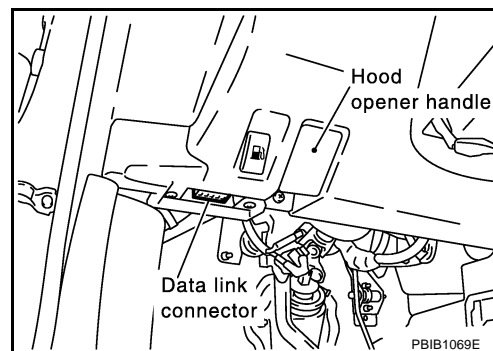
CONSULT-II BASIC OPERATION PROCEDURE

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

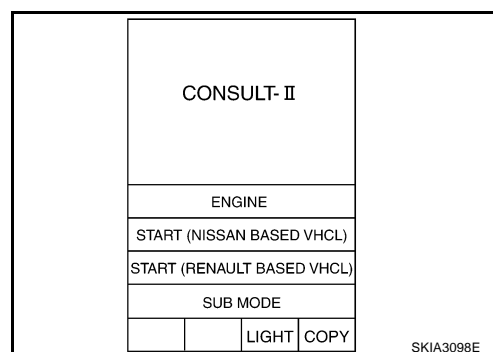
CAUTION:

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

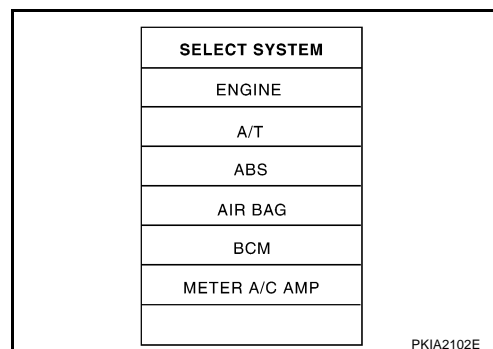
3. Turn ignition switch ON.



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



5. Touch "ABS" in the "Diagnosis System Selection" screen. If "ABS" is not indicated, go to [GI-39. "CONSULT-II Data Link Connector \(DLC\) Circuit"](#).



TROUBLE DIAGNOSIS

[TCS/ABS]

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

SELECT DIAG MODE			
SELF-DAIG RESULTS			
DATA MONITOR			
CAN DIAG SUPPORT MNTR			
ACTIVE TEST			
FUNCTION TEST			
ECU PART NUMBER			
BACK	LIGHT	COPY	
SFIA2435E			

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SELF-DIAGNOSIS**Description**

If an error is detected in the system, ABS warning lamp, TCS OFF indicator lamp and SLIP indicator lamp on the combination 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 data link connector.

CAUTION:

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

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

CAUTION:

If "START (NISSAN BASED VHCL)" is touched immediately after starting engine or turning on the ignition switch, "ABS" 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 ABS warning lamp, TCS OFF indicator lamp, and SLIP indicator 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 vehicle is not driven at 30 km/h (19 MPH) for at least 1 minute, 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 engine and touch "START (NISSAN BASED VHCL)", "ABS", "SELF-DIAG RESULTS", "ERASE MEMORY" in order on the CONSULT-II screen to erase the error memory.
If "ABS" is not indicated, go to [GI-39, "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 ABS warning lamp, TCS OFF indicator lamp, and SLIP indicator lamp are off.

TROUBLE DIAGNOSIS

[TCS/ABS]

Display Item List

Suspect Systems	Malfunction is detected when	Inspection system	
RR RH SENSOR-1	When the circuit in rear RH wheel sensor is open.	BRC-31, "Inspection 1 Wheel Sensor System" (Note 1)	
RR LH SENSOR-1	When the circuit in front LH wheel sensor is open.		
FR RH SENSOR-1	When the circuit in front RH wheel sensor is open.		
FR LH SENSOR-1	When the circuit in rear LH wheel sensor is open.		
FR LH SENSOR-2	When the circuit in front LH wheel sensor is short-circuited. Or when the sensor power voltage is outside the standard. When the distance between wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by control unit.		
RR RH SENSOR-2	When the circuit in rear RH wheel sensor is short-circuited. Or when the sensor power voltage is outside the standard. When the distance between wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by control unit.		
FR RH SENSOR-2	When the circuit in front RH wheel sensor is short-circuited. Or when the sensor power voltage is outside the standard. When the distance between wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by control unit.		
RR LH SENSOR-2	When the circuit in rear LH wheel sensor is short-circuited. Or when the sensor power voltage is outside the standard. When the distance between wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by control unit.		
MAIN RELAY	When control unit detects an error in the actuator relay system.		BRC-34, "Inspection 5 Actuator Relay or Motor Relay Power System"
STOP LAMP SW	When a stop lamp switch open-circuit is detected.		BRC-36, "Inspection 6 Stop Lamp Switch System"
FR LH IN ABS SOL	When control unit detects an error in the front left inlet solenoid system.		—
FR LH OUT ABS SOL	When control unit detects an error in the front left outlet solenoid system.		
RR RH IN ABS SOL	When control unit detects an error in the rear right inlet solenoid system.		
RR RH OUT ABS SOL	When control unit detects an error in the rear right outlet solenoid system.		
FR RH IN ABS SOL	When control unit detects an error in the front right inlet solenoid system.		
FR RH OUT ABS SOL	When control unit detects an error in the front right outlet solenoid system.		
RR LH IN ABS SOL	When control unit detects an error in the rear left inlet solenoid system.		
RR LH OUT ABS SOL	When control unit detects an error in the rear left outlet solenoid system.		
LOW POWER VOLTAGE	When ABS actuator and electric unit power voltage is lower than normal.	BRC-33, "Inspection 4 ABS Actuator and Electric Unit (Control Unit) Power and Ground Systems"	
EMERGENCY BRAKE	When ABS actuator and electric unit malfunctions (pressure increase is too much or too little).	BRC-33, "Inspection 3 ABS Actuator and Electric Unit 1"	
PUMP MOTOR, MOTOR RELAY SYSTEM	When control unit detects an error in motor or motor relay.	BRC-34, "Inspection 5 Actuator Relay or Motor Relay Power System"	

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TROUBLE DIAGNOSIS

[TCS/ABS]

Suspect Systems	Malfunction is detected when	Inspection system
ABS CONTROLLER	When there is an internal error in ABS actuator and electric unit.	BRC-33, "Inspection 3 ABS Actuator and Electric Unit 1"
CAN COMM CIRCUIT	When there is an error in the CAN communication system.	BRC-37, "Inspection 8 CAN Communication System" (Note 2)
ENGINE SIGNAL	When there is an error in an engine system main component	BRC-33, "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 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 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

Operation Procedure

- After turning OFF ignition switch, connect CONSULT-II and CONVERTER to data link connector.

CAUTION:

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

- Touch "START (NISSAN BASED VHCL)", "ABS", "DATA MONITOR" in order on the CONSULT-II screen. If "ABS" is not indicated, go to [GI-39, "CONSULT-II Data Link Connector \(DLC\) Circuit"](#).

CAUTION:

When "START (NISSAN BASED VHCL)" is touched immediately after starting engine or turning on ignition switch, "ABS" might not be displayed in the system selection screen. In this case, repeat the operation from step 2.

- Return to the Monitor Item Selection screen, and touch "C/U INPUT ITEM", "MAIN ITEM" or "ITEM MENU SELECTION". Refer to the following information.
- When "START" is touched, the data monitor screen is displayed.

Display Item List

Item (Unit)	Monitor item selection			Remarks
	Control unit input item	Main items (Monitor Item Selection)	Select Item Menu	
FR LH SENSOR [km/h (MPH)]	×	×	×	Wheel speed calculated by front LH wheel sensor signal is displayed.
FR RH SENSOR [(km/h (MPH)]	×	×	×	Wheel speed calculated by front RH wheel sensor signal is displayed.
RR LH SENSOR [km/h (MPH)]	×	×	×	Wheel speed calculated by Rear LH wheel sensor signal is displayed.
RR RH SENSOR [km/h (MPH)]	×	×	×	Wheel speed calculated by Rear RH wheel sensor signal is displayed.
FR LH IN SOL (ON/OFF)	–	×	×	Front left inlet ABS solenoid valve (ON/OFF) status is displayed.
FR LH OUT SOL (ON/OFF)	–	×	×	Front left outlet ABS solenoid valve (ON/OFF) status is displayed.
RR RH IN SOL (ON/OFF)	–	×	×	Rear right inlet ABS solenoid valve (ON/OFF) status is displayed.

TROUBLE DIAGNOSIS

[TCS/ABS]

Item (Unit)	Monitor item selection			Remarks
	Control unit input item	Main items (Monitor Item Selection)	Select Item Menu	
RR RH OUT SOL (ON/OFF)	-	×	×	Rear right outlet ABS solenoid valve (ON/OFF) status is displayed.
FR RH IN SOL (ON/OFF)	-	×	×	Front right inlet ABS solenoid valve (ON/OFF) status is displayed.
FR RH OUT SOL (ON/OFF)	-	×	×	Front right outlet ABS solenoid valve (ON/OFF) status is displayed.
RR LH IN SOL (ON/OFF)	-	×	×	Rear left rear wheel inside ABS solenoid valve (ON/OFF) status is displayed.
RR LH OUT SOL (ON/OFF)	-	×	×	Rear left outlet ABS solenoid valve (ON/OFF) status is displayed.
EBD WARN LAMP (ON/OFF)	-	×	×	Brake warning lamp (ON/OFF) status is displayed.
STOP LAMP SW (ON/OFF)	×	×	×	Stop lamp switch (ON/OFF) status is displayed.
MOTOR RELAY (ON/OFF)	-	×	×	ABS motor relay (ON/OFF) condition is displayed.
ACTUATOR RLY (ON/OFF)	-	×	×	ABS actuator relay (ON/OFF) status is displayed.
ABS WARN LAMP (ON/OFF)	-	×	×	ABS warning lamp (ON/OFF) status is displayed.
OFF LAMP (ON/OFF)	-	×	×	TCS OFF indicator lamp (ON/OFF) status is displayed.
OFF SW (ON/OFF)	×	×	×	TCS OFF switch (ON/OFF) status is displayed.
SLIP LAMP (ON/OFF)	-	×	×	SLIP indicator lamp (ON/OFF) status is displayed.
BATTERY VOLT (V)	×	×	×	The voltage supplied to the TCS/ABS control unit is displayed.
GEAR	×	×	×	The gear position determined from the A/T PNP switch signal is displayed.
ENGINE SPEED (rpm) (Note2)	×	×	×	Engine speed status determined from the CAN communication signal is displayed.
N POSI SIG (ON/OFF) (Note1)	-	-	×	Shift position determined from the A/T PNP switch signal is displayed.
P POSI SIG (ON/OFF) (Note1)	-	-	×	Shift position determined from the A/T PNP switch signal is displayed.
ACCEL POS SIG (%)	×	-	×	Throttle position status determined from the CAN communication signal is displayed.
EBD SIGNAL (ON/OFF)	-	-	×	EBD operation (ON/OFF) status is displayed.
ABS SIGNAL (ON/OFF)	-	-	×	ABS operation (ON/OFF) status is displayed.

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TROUBLE DIAGNOSIS

[TCS/ABS]

Item (Unit)	Monitor item selection			Remarks
	Control unit input item	Main items (Monitor Item Selection)	Select Item Menu	
TCS SIGNAL (ON/OFF) (Note2)	-	-	×	TCS operation (ON/OFF) status is displayed.
EBD FAIL SIG (ON/OFF)	-	-	×	EBD fail-safe signal (ON/OFF) status is displayed.
ABS FAIL SIG (ON/OFF)	-	-	×	ABS fail-safe signal (ON/OFF) status is displayed.
TCS FAIL SIG (ON/OFF) (Note2)	-	-	×	TCS fail-safe signal (ON/OFF) status is displayed.
CRANKING SIG (ON/OFF) (Note2)	-	-	×	Ignition switch START position signal input status is displayed.
ASCD SIGNAL (ON/OFF)	-	-	×	ASCD (ON/OFF) status is displayed.

×: Applicable

-: Not applicable

(Note1): A/T model.

ACTIVE TEST

CAUTION:

- Do not perform active test while driving.
- Make sure to completely bleed air from the brake system.
- The ABS and brake warning lamps turn on during the active test.

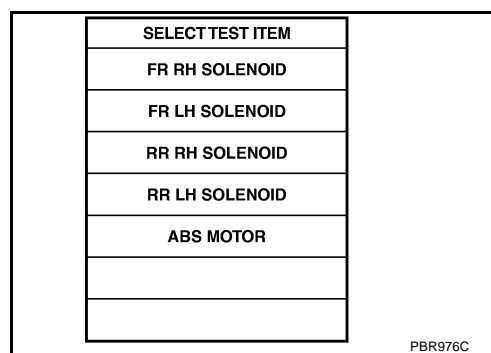
Operation Procedure

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

CAUTION:

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

2. Touch "START (NISSAN BASED VHCL) " on the display screen.
3. Touch "ABS".
If "ABS" is not indicated, go to [GI-39, "CONSULT-II Data Link Connector \(DLC\) Circuit"](#) .
4. Touch "ACTIVE TEST".
5. The test item selection screen is displayed.
6. Touch necessary test item.



7. With the "MAIN ITEM" display shown in reverse, touch "START".
8. The Active Test screen will be displayed, so conduct the following test.

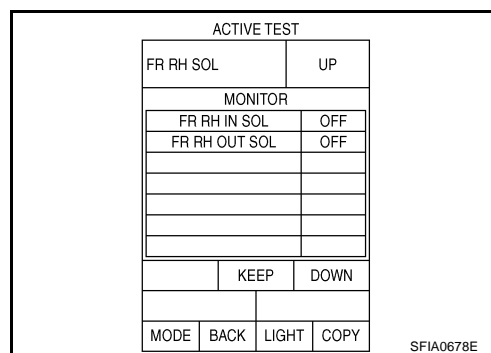
Test Item

Solenoid valve

CAUTION:

The example shown is for the front right wheel. The procedure for the other wheels is the same as given below.

1. For ABS solenoid valve, touch "UP", "KEEP", and "DOWN". Then use screen monitor to check that solenoid valve operates as shown in Solenoid Valve Operation Chart. Refer to "Solenoid Valve Operation Chart".



Operation		ABS solenoid valve		
		UP	KEEP	DOWN
Front RH ABS S/V	ABS inlet S/VAR-FR	OFF	ON	ON
	ABS outlet S/VAR-FR	OFF	OFF	ON*
Front LH ABS S/V	ABS inlet S/VAL-FL	OFF	ON	ON
	ABS outlet S/VAL-FL	OFF	OFF	ON*

TROUBLE DIAGNOSIS

[TCS/ABS]

Operation		ABS solenoid valve		
		UP	KEEP	DOWN
Rear OH ABS S/V	ABS inlet S/VAR-RR	OFF	ON	ON
	ABS outlet S/V-RR	OFF	OFF	ON*
Rear LH ABS S/V	ABS inlet S/V-RL	OFF	ON	ON
	ABS outlet S/V-RL	OFF	OFF	ON*

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

NOTE:

- When the active test is conducted while depressing pedal, 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 from the step 6.

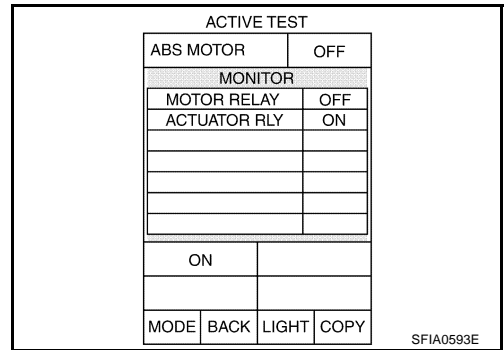
ABS Motor

Touch "ON", "OFF" on the display screen and make sure ABS motor relay is operating as shown in the table below.

Operation	ON	OFF
ABS motor relay	ON	OFF
ABS actuator relay	ON	ON

NOTE:

- When the active test is conducted while depressing pedal, the pedal depression amount will change, but this is normal.
- Approximately 10 seconds after the operation is begun, "TEST STOP" will be displayed.



TROUBLE DIAGNOSIS

[TCS/ABS]

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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"](#).
- After completing service, always erase the self-diagnosis results. Refer to [BRC-19, "CONSULT- II Functions"](#).
- 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 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.
- 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	This is the sound of the motor operating inside ABS actuator and electric unit (control unit), and there may be some low sounds while TCS or ABS is operating.	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 engine is started, you may barely be able to hear a slight thudding sound from engine room, but this sound is made by the system operation check and is normal.	Normal
TCS operation (SLIP indicator lamp ON)	TCS may be activated any time vehicle suddenly accelerates, suddenly downshifts, or is driven on a road with a varying surface friction coefficient.	Normal When conducting the inspection on a chassis dynamometer, cancel the TCS function.
	When inspecting speedometer, etc., press TCS 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 vehicle at 30 km/h (19 MPH) or higher to check that warning lamp no longer turns on.	
ABS operation (longer stopping distance)	Stopping distance may be longer for vehicles with ABS when 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

ABS Warning Lamp, TCS OFF Indicator Lamp, SLIP Indicator Lamp On/Off Timing

x: ON - : OFF

Condition	ABS warning lamp	TCS OFF indicator lamp	SLIP indicator 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)	-	-	-	Turns off 2 second after engine start
When TCS OFF switch is turned on (TCS function off)	-	x	-	-

TROUBLE DIAGNOSIS

[TCS/ABS]

Condition	ABS warning lamp	TCS OFF indicator lamp	SLIP indicator lamp	Remarks
TCS/ABS error	×	×	×	—
	×	×	—	When there is an ABS actuator and electric unit error (power or ground error)
TCS error	—	×	×	—

Basic Inspection

AFS000YX

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

1. Check fluid level in brake reservoir tank. If fluid level is low, refill brake fluid.
2. Check brake piping and around ABS actuator and electric unit (control unit) for leaks. If there is leaking or oozing fluid, check the following items.
 - If ABS actuator and electric unit (control unit) connection is loose, tighten 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 ABS actuator and electric unit (control unit) 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 ABS actuator and electric unit (control unit) connection, if fluid is just oozing out, use a clean cloth to wipe off 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 ABS actuator and electric unit (control unit), if fluid is just oozing out, use a clean cloth to wipe off oozing fluid and re-check for leaks. If fluid is still oozing out, replace ABS actuator and electric unit (control unit) body.

CAUTION:

ABS actuator body cannot be disassembled.

3. Check the brake pad degree of wear. Refer to [BR-20, "PAD WEAR INSPECTION"](#) in "Front Disc Brake" and [BR-26, "PAD WEAR INSPECTION"](#) in "Rear Disc Brake".

BASIC INSPECTION 2 POWER SYSTEM TERMINAL LOOSENESS AND BATTERY INSPECTION

Make sure battery positive terminal, negative terminal 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, TCS OFF INDICATOR LAMP, SLIP INDICATOR LAMP INSPECTION

1. Make sure ABS warning lamp, TCS OFF indicator lamp (when TCS OFF switch is OFF), and SLIP indicator lamp turns ON approximately 1 second when ignition switch is turned ON. If they do not, check the TCS OFF indicator lamp and then TCS OFF switch. Refer to [BRC-37, "TCS OFF SWITCH"](#). Check CAN communications. Refer to "CAN Communication Inspection". If there are no errors with TCS OFF switch and CAN communication system, check combination meter. Refer to [DI-4, "COMBINATION METERS"](#).
2. Make sure the lamp turns off approximately 1 second after ignition switch is turned on. If lamp does not turn off, conduct self-diagnosis.
3. With the engine running, make sure TCS OFF indicator lamp turns on and off when TCS OFF switch is turned on and off. If the indicator lamp status does not correspond to switch operation, check the TCS OFF switch system. Refer to [BRC-37, "TCS OFF SWITCH"](#).
4. Make sure ABS warning lamp, TCS OFF indicator lamp, and SLIP indicator lamp turn off 2 seconds after engine is started. If ABS warning lamp, TCS OFF indicator lamp, and SLIP indicator lamp have not turned off 10 seconds after engine has been started, conduct self-diagnosis of ABS actuator and electric unit (control unit).
5. After conducting the self-diagnosis, be sure to erase the error memory. Refer to [BRC-19, "CONSULT- II Functions"](#).

Inspection 1 Wheel Sensor System

AFS000YY

INSPECTION PROCEDURE

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

CAUTION:

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

1. TIRE INSPECTION

Check air pressure, wear, and size.

Are the 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 rear sensor rotor for damage.

OK or NG

OK >> GO TO 3.

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

3. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

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

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

YES >> GO TO 4.

NO >> Inspection End

4. CONNECTOR INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) connector and the malfunctioning wheel sensor connector E42 (FR - LH), E27 (FR - RH) or T5 (RR - RH, LH). Check terminal to see if it is deformed, disconnected, loose, etc., and replace it if any non-standard condition is found.
2. Reconnect connector, drive at a speed of approximately 30 km/h (19 MPH) for approximately 1 minute, and conduct self-diagnosis.

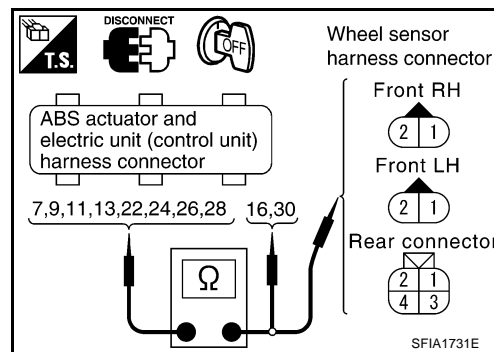
OK or NG

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

NG >> GO TO 5.

5. WHEEL SENSOR HARNESS INSPECTION

1. Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E42 (FR - LH), E27 (FR - RH) or T5 (RR - RH, LH) and ABS actuator and electric unit (control unit) connector.
2. Check the continuity between terminals. (Also check the continuity when steering wheel is turned right and left and when sensor harness inside the wheel well is moved.)



Wheel	Power system		Signal system		Ground system	
	ABS actuator and electric unit (control unit) harness connector E51	Wheel sensor	ABS actuator and electric unit (control unit) harness connector E51	Wheel sensor	ABS actuator and electric unit (control unit) harness connector E51 (Signal)	ABS actuator and electric unit (control unit) harness connector E51 (GND)
Front RH (E27)	24 (B/R)	1 (B/R)	9 (LG/B)	2 (LG/B)	9 (LG/B), 24 (B/R)	16 (B), 30(B)
Front LH (E42)	22 (G)	1 (G)	7 (G/Y)	2 (G/Y)	7 (G/Y), 22 (G)	16(B), 30(B)
Rear RH (T5)	28 (BR)	1 (BR/W)	13 (BR/W)	2 (BR)	13 (BR/W), 28 (BR)	16 (B), 30(B)
Rear LH (T5)	26 (OR)	3 (OR)	11(P)	4 (P)	11 (P), 26 (OR)	16 (B), 30(B)

- 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 or replace harness and connector that have malfunction.

6. CHECK WHEEL SENSOR

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

Is above displayed on self-diagnosis display?

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

Inspection 2 Engine System

AFS000YZ

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 ECM self-diagnosis.
2. Re-conduct ABS actuator and electric unit (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 ABS Actuator and Electric Unit 1

AFS000Z0

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 ABS actuator and electric unit (control unit). Re-conduct the self-diagnosis.

NO >> Inspection End

Inspection 4 ABS Actuator and Electric Unit (Control Unit) Power and Ground Systems

AFS000Z1

INSPECTION PROCEDURE

1. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results

LOW BATTERY VOLTAGE

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

YES >> GO TO 2.

NO >> Inspection End

2. CONNECTOR INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) connector, check terminal to see if it is deformed, disconnected, loose, etc., and if there is an error, repair or replace terminal.
2. Securely reconnect connector and conduct self-diagnosis.

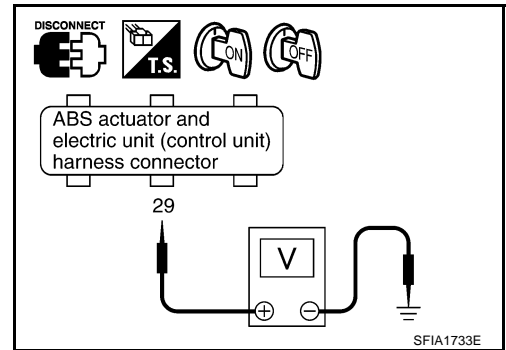
OK or NG

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

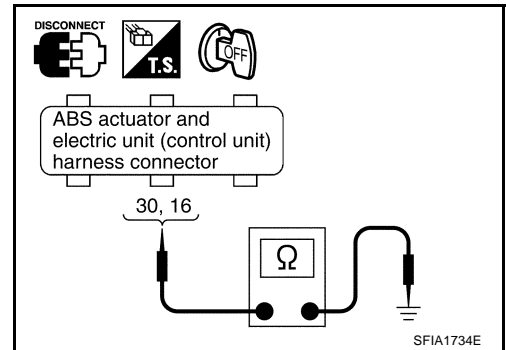
3. ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER AND GROUND CIRCUIT INSPECTION

Disconnect ABS actuator and electric unit (control unit) connector. Check continuity and voltage between connector terminals and ground.

Terminal number	Signal name	Measuring condition	Measured value
29 (G/R)	Power supply	Ignition switch ON	Battery voltage (approx. 12V)
		Ignition switch OFF	Approx. 0V



Terminal number	Signal name	Measuring condition	Measured value
30 (B), 16 (B)	Ground	Ignition switch OFF	Continuity should exist.



OK or NG

- OK >> Check battery (terminal looseness, power drop, etc.) Error. If there is an error, make repairs.
- NG >> Corresponding harness circuit error. Repair the circuit.

Inspection 5 Actuator Relay or Motor Relay Power System

AFS00022

INSPECTION PROCEDURE

1. SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Is the above displayed in the self-diagnosis item?

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

2. CONNECTOR INSPECTION

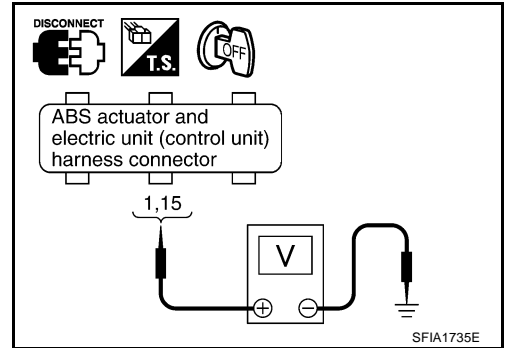
1. Disconnect ABS actuator and electric unit (control unit) connector, check terminal to see if it is deformed, disconnected, loose, etc., and if there is an error, repair or replace terminal.
2. Securely reconnect connector and conduct self-diagnosis.

OK or NG

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

3. ACTUATOR RELAY OR MOTOR RELAY POWER CIRCUIT INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. For actuator relay, measure the voltage between harness connector terminal 1 (SB) and ground. For motor relay, measure the voltage between harness connector terminal 15 (R/B) and ground.



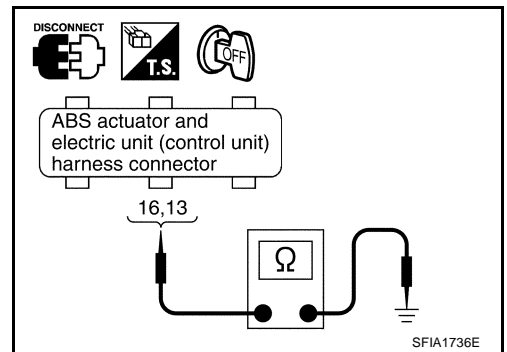
ABS actuator and electric unit (control unit) (Harness connector E51)	Ground	Voltage
1 (SB)	—	Battery voltage (approx. 12V)
15 (R/B)	—	Battery voltage (approx. 12V)

OK or NG

- OK >> GO TO 4
- NG >> Error in the circuit between battery and ABS actuator and electric unit (control unit). Repair the circuit.

4. ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT INSPECTION

Check ABS actuator and electric unit (control unit) ground circuit.



ABS actuator and electric unit (control unit) (Harness connector E51)	Ground	Continuity
16 (B) and 30 (B)	—	Continuity should exist.

OK or NG

- OK >> Replace ABS actuator and electric unit (control unit).
- NG >> Open or short in harness. Repair or replace harness.

Inspection 6 Stop Lamp Switch System

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 item?

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

2. CONNECTOR INSPECTION

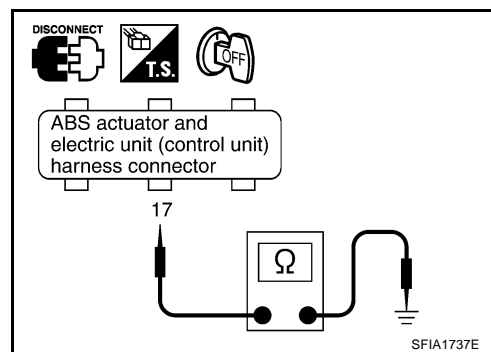
1. Disconnect ABS actuator and electric unit (control unit) connector and stop lamp switch connector E112 (M/T model) or E111 (A/T model), check terminal for deformation, disconnection, looseness, and so on. If there is an error, repair or replace terminal.
2. Securely reconnect connector and conduct self-diagnosis.
3. Start engine
4. Repeat pumping brake pedal carefully several time, 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 CIRCUIT INSPECTION

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector.
2. Check the voltage between ABS actuator and electric unit (control unit) connector terminal and ground.



ABS actuator and electric unit (control unit) (Harness connector E51)	Ground	Measuring condition	Voltage
17 (P/L)	-	Brake pedal depressed	Battery voltage (approx. 12V)
		Brake pedal not depressed	0V

OK or NG

- OK >> Inspection End
 NG >> Open or short in harness between ABS actuator and electric unit (control unit) and stop lamp switch. Repair or replace harness.

Inspection 7 ABS Actuator and Electric Unit (Control Unit) 2

AFS00024

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 ABS actuator and electric unit (control unit).
 NO >> Inspection End

Inspection 8 CAN Communication System

AFS002PW

INSPECTION PROCEDURE

1. CHECK CONNECTOR

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

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

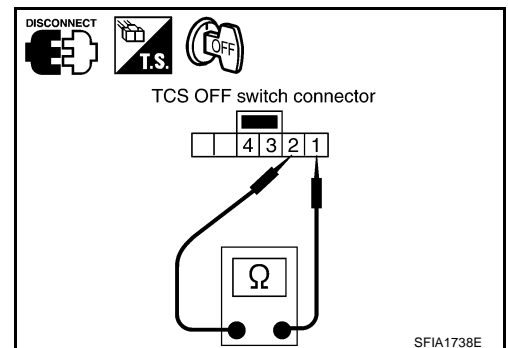
- YES >> Print out the self-diagnostic results, and refer to [LAN-2, "Precautions When Using CONSULT-II"](#) .
 NO >> Connector terminal connection is loose, damaged, open, or shorted.

Component Inspection
TCS OFF SWITCH

AFS00026

- Turn ignition switch OFF, disconnect TCS OFF switch connector, and check the continuity between connector M9 terminals 1 and 2.

- 1 - 2 : Continuity should exist when pushing switch.**
: Continuity should not exist when releasing switch.

**Symptom 1 Excessive ABS Function Operation Frequency**

AFS00027

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 front and rear axles.

OK or NG

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

3. WHEEL SENSOR INSPECTION

Wheel Sensor Inspection

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

OK or NG

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

4. ABS WARNING LAMP DISPLAY CHECK

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

OK or NG

- OK >> Normal
 NG >> Perform self-diagnosis. Refer to [BRC-22, "SELF-DIAGNOSIS"](#) .

Symptom 2 Unexpected Pedal Reaction

AFS00028

1. BRAKE PEDAL STROKE INSPECTION

Check brake pedal stroke.

Is the stroke too big?

- YES >> ● Bleed air from brake piping.
 ● Check brake pedal, brake booster, and master cylinder mount for play, looseness, and brake system for fluid leaks, etc. If any malfunctions are found, make repairs.
- NO >> GO TO 2.

2. PERFORMANCE CHECK

Disconnect ABS actuator and electric unit (control unit) connector, and make sure the braking force is sufficient when the ABS is not operating. After the inspection, reconnect connector.

OK or NG

- OK >> GO TO 3.WHEEL SENSOR INSPECTION in [BRC-37, "Symptom 1 Excessive ABS Function Operation Frequency"](#) .
 NG >> Check brake system.

Symptom 3 The Braking Distance Is Long

AFS00029

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 ABS actuator and electric unit (control unit) connector to deactivate ABS. In this condition, check stopping distance. After inspection, connect connector.

OK or NG

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

- NG >> GO TO 3.WHEEL SENSOR INSPECTION in [BRC-37, "Symptom 1 Excessive ABS Function Operation Frequency"](#).

Symptom 4 The ABS Function Does Not Operate

AFS000ZA

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

OK or NG

- OK >> GO TO 3.WHEEL SENSOR INSPECTION in [BRC-37, "Symptom 1 Excessive ABS Function Operation Frequency"](#).

- NG >> Perform self-diagnosis. Refer to [BRC-19, "CONSULT- II Functions"](#).

Symptom 5 Pedal Vibration or ABS Operation Sound Occurs

AFS000ZB

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 (6 MPH) or higher]

1. SYMPTOM CHECK 1

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

OK or NG

- OK >> GO TO 2.

- NG >> Perform self-diagnosis. Refer to [BRC-22, "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 control unit (or its wiring), and if there is, move it farther away.

- NO >> GO TO 3.WHEEL SENSOR INSPECTION in [BRC-37, "Symptom 1 Excessive ABS Function Operation Frequency"](#).

Symptom 6 The Vehicle Jerks Around During TCS/ABS Control

AFS000ZC

1. ENGINE SPEED SIGNAL INSPECTION

Conduct CONSULT-II ABS actuator and electric unit (control unit) "Data Monitor".

Is the speed during idling 400 rpm or higher?

- YES >> GO TO 3.

- NO >> GO TO 2.

2. ECM SELF-DIAGNOSIS RESULT ITEM CHECK

Perform ECM self-diagnosis.

Are self-diagnosis items displayed?

- YES >> Check the corresponding items. Refer to [EC-71, "TROUBLE DIAGNOSIS"](#) in "Engine Control (EC section)".
- NO >> GO TO 3.

3. SYMPTOM CHECK 1

Check if the vehicle jerks during TCS/ABS control.

OK or NG

- OK >> Inspection End
- NG >> GO TO 4 (M/T models is GO TO 5).

4. A/T SELF-DIAGNOSIS RESULT ITEM CHECK

Perform A/T self-diagnosis.

OK or NG

- OK >> GO TO 5.
- NG >> Check the corresponding items. Refer to [AT-41, "TROUBLE DIAGNOSIS"](#) in "A/T".

5. SYMPTOM CHECK 2

Check if the vehicle jerks during 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 ABS actuator and electric unit (control unit).

Are self-diagnosis items displayed?

- YES >> Check the corresponding items, make repairs, and re-conduct ABS actuator and electric unit (control unit) self-diagnosis.
- NO >> GO TO 7.

7. CONNECTOR INSPECTION

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

OK or NG

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

8. SELF-DIAGNOSIS RESULT ITEM INSPECTION 2

Re-conduct ABS actuator and electric unit (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 ABS ACTUATOR AND ELECTRIC UNIT AND ECM

Check the CAN communication system. Refer to [BRC-37, "Inspection 8 CAN Communication System"](#) .

OK or NG

OK >> Inspection End

NG >> Connect connector and re-conduct ABS actuator and electric unit (control unit) self-diagnosis.

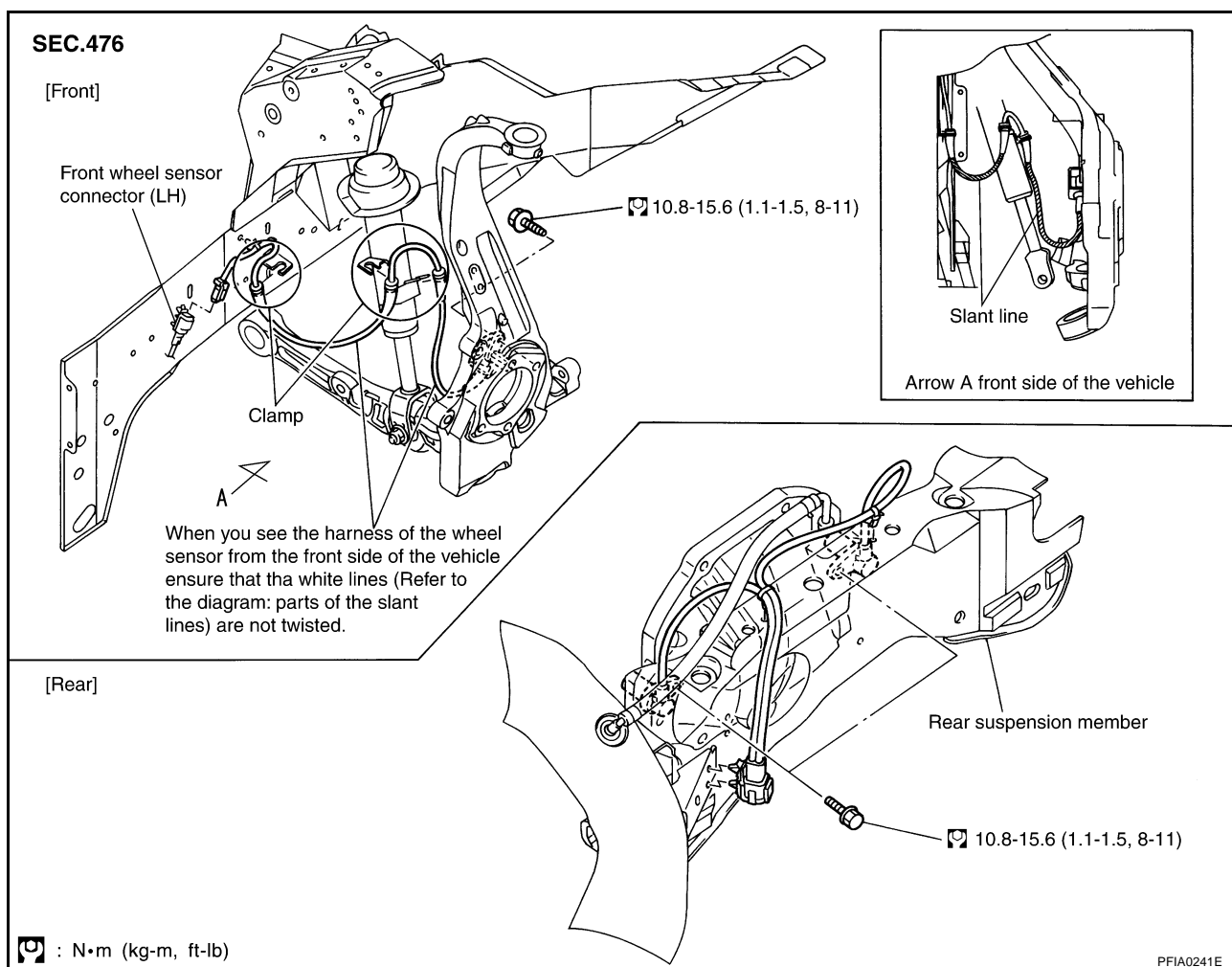
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BRC

WHEEL SENSORS

Removal and Installation

AFS000A9



REMOVAL

Pay attention to the following when removing sensor.

CAUTION:

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

INSTALLATION

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

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

SENSOR ROTOR

PPF:47970

Removal and Installation

AFS0011V

REMOVAL

Front

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

Rear

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

INSTALLATION

Front

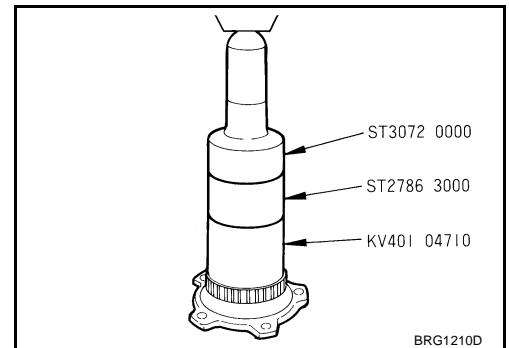
Sensor rotor cannot be disassembled. To replace sensor rotor, replace hub bearing assembly. Refer to [FAX-4, "Removal and Installation"](#) in "Front Axle/Drive Shaft" in "FAX" section.

Rear

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

Number of sensor rotor teeth

Rear : 46



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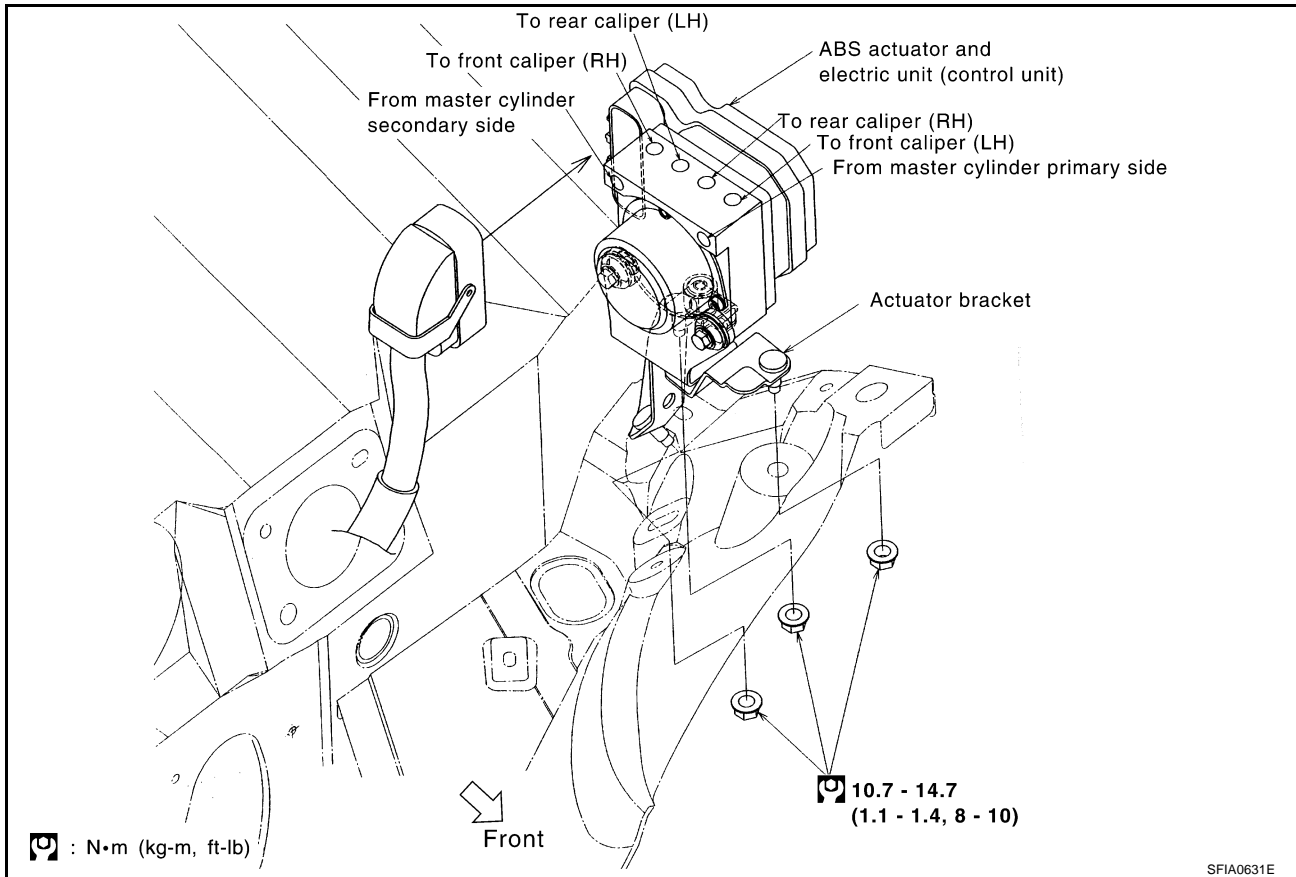
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ABS ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

PFP:47660

Removal and Installation

AFS000AB



Pay attention to the following when removing actuator.

CAUTION:

- Before servicing, disconnect battery negative terminal.
- To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use 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-10, "Bleeding Brake System"](#).