

SECTION **BRC**

BRAKE CONTROL SYSTEM

A
B
C
D
E

CONTENTS

ABS		BRC
PRECAUTIONS	3	
Precautions for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"	3	
Precautions for Brake System	3	
Wiring Diagrams and Trouble Diagnosis	3	
PREPARATION	4	
Special Service Tool	4	
Commercial Service Tools	4	
GENERAL INFORMATION	5	
Description	5	
PURPOSE	5	
OPERATION	5	
Fail Safe	5	
Hydraulic Circuit	5	
System Components	6	
Control Unit	6	
ABS Actuator and Electric Unit (Control Unit)	6	
ABS ACTUATOR OPERATION	6	
Wheel Sensors	7	
TROUBLE DIAGNOSIS	8	
How to Perform Trouble Diagnoses for Quick and Accurate Repair	8	
INTRODUCTION	8	
WORK FLOW	9	
ASKING COMPLAINTS	10	
EXAMPLE OF DIAGNOSIS SHEET	10	
Component Parts and Harness Connector Location	11	
Schematic	12	
Wiring Diagram — ABS —	13	
CONSULT-II Function	16	
CONSULT-II APPLICATION TO ABS	16	
SELF-DIAGNOSIS PROCEDURE	16	
SELF-DIAGNOSTIC RESULTS MODE	18	
DATA MONITOR PROCEDURE	19	
DATA MONITOR MODE	20	
ACTIVE TEST PROCEDURE	20	
ACTIVE TEST MODE	21	
Self-Diagnosis (Without CONSULT-II)	21	
SELF-DIAGNOSIS PROCEDURE	22	
HOW TO READ SELF-DIAGNOSTIC RESULTS (MALFUNCTION CODES)	22	
HOW TO ERASE SELF-DIAGNOSTIC RESULTS (MALFUNCTION CODES)	23	
Preliminary Check	23	
Ground Circuit Check	25	
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND	25	
Malfunction Code Chart (Without CONSULT-II)	25	
Symptom Chart	25	
TROUBLE DIAGNOSIS FOR SELF-DIAGNOSTIC ITEMS	27	
Wheel Sensor or Rotor	27	
DIAGNOSTIC PROCEDURE	27	
ABS Actuator Solenoid Valve or Solenoid Valve Relay	29	
DIAGNOSTIC PROCEDURE	29	
Motor Relay or Motor	32	
DIAGNOSTIC PROCEDURE	32	
Abnormal Battery Voltage	33	
DIAGNOSTIC PROCEDURE	33	
Controller Failure	35	
DIAGNOSTIC PROCEDURE	35	
TROUBLE DIAGNOSES FOR SYMPTOMS	36	
1. ABS Works Frequently	36	
2. Unexpected Pedal Action	36	
3. Long Stopping Distance	37	
4. ABS Does Not Work	37	
5. Pedal Vibration and Noise	38	
6. ABS Warning Lamp Does Not Come On When Ignition Switch Is Turned On	39	
7. ABS Warning Lamp Stays On When Ignition Switch Is Turned On	41	
WHEEL SENSORS	42	
Removal and Installation	42	
SENSOR ROTOR	43	
Removal and Installation	43	
REMOVAL	43	
INSTALLATION	43	

BRC

G
H
I
J
K
L
M

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)...	44
Removal and Installation	44
REMOVAL	44
INSTALLATION	44

TCS/ABS

PRECAUTIONS	45
Precautions for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"	45
Precautions for Brake System	45
Wiring Diagrams and Trouble Diagnosis	45
PREPARATION	46
Special Service Tool	46
Commercial Service Tools	46
GENERAL INFORMATION	47
Description	47
PURPOSE	47
ABS (ANTI-LOCK BRAKE SYSTEM) OPERATION	47
TCS (TRACTION CONTROL SYSTEM) OPERATION	47
Fail Safe	47
Hydraulic Circuit	48
System Components	48
Control Unit	49
ABS FUNCTION	49
TCS FUNCTION	49
ABS Actuator and Electric Unit	49
ABS ACTUATOR OPERATION	49
Wheel Sensors	49
CAN Communication System Description	50
FOR TCS MODELS	50
TROUBLE DIAGNOSIS	52
How to Perform Trouble Diagnoses for Quick and Accurate Repair	52
INTRODUCTION	52
WORK FLOW	53
ASKING COMPLAINTS	54
EXAMPLE OF DIAGNOSIS SHEET	54
Component Parts and Harness Connector Location	55
Schematic	56
Wiring Diagram — TCS —	57
CONSULT-II Function	60
CONSULT-II APPLICATION TO ABS/TCS	60
SELF-DIAGNOSIS PROCEDURE	60
SELF-DIAGNOSTIC RESULTS MODE	62
DATA MONITOR PROCEDURE	63
DATA MONITOR MODE	64
ACTIVE TEST PROCEDURE	65
ACTIVE TEST MODE	66
Self-Diagnosis (Without CONSULT-II)	66

FUNCTION	66
SELF-DIAGNOSIS PROCEDURE	66
HOW TO READ SELF-DIAGNOSTIC RESULTS (MALFUNCTION CODES)	67
HOW TO ERASE SELF-DIAGNOSTIC RESULTS (MALFUNCTION CODES)	68
Preliminary Check	68
Ground Circuit Check	70
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND	70
ABS WARNING LAMP, TCS OFF INDICATOR LAMP, SLIP INDICATOR LAMP ON/OFF TIMING	70
Malfunction Code Chart (Without CONSULT-II)	70
Symptom Chart	71
TROUBLE DIAGNOSIS FOR SELF-DIAGNOSTIC ITEMS	73
CAN Communication Line or ABS Actuator and Electric Unit (Control Unit)	73
DIAGNOSTIC PROCEDURE	73
Wheel Sensor or Rotor	73
DIAGNOSTIC PROCEDURE	73
ABS Actuator Solenoid Valve or Solenoid Valve Relay	76
DIAGNOSTIC PROCEDURE	76
Motor Relay or Motor	79
DIAGNOSTIC PROCEDURE	79
Abnormal Battery Voltage	80
DIAGNOSTIC PROCEDURE	80
Controller Failure	82
DIAGNOSTIC PROCEDURE	82
TROUBLE DIAGNOSES FOR SYMPTOMS	83
1. ABS Works Frequently	83
2. Unexpected Pedal Action	83
3. Long Stopping Distance	84
4. ABS Does Not Work	84
5. Pedal Vibration and Noise	85
6. ABS Warning Lamp Does Not Come On When Ignition Switch Is Turned On	86
7. ABS Warning Lamp Stays On When Ignition Switch Is Turned On	88
8. During ABS/TCS Control, Vehicle Behavior is Jerky.	88
WHEEL SENSORS	90
Removal and Installation	90
SENSOR ROTOR	91
Removal and Installation	91
REMOVAL	91
INSTALLATION	91
ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)...	92
Removal and Installation	92
REMOVAL	92
INSTALLATION	92

PRECAUTIONS

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

EFS0037E

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.

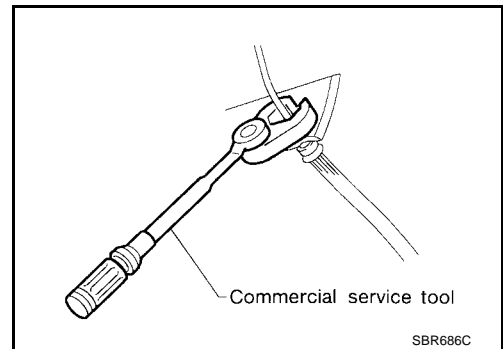
Precautions for Brake System

EFS0026A

CAUTION:

- Recommended fluid is brake fluid “DOT 3”.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.
- Turn the ignition switch OFF and remove the connector of the ABS actuator control unit or the battery terminal before performing the work.
- Always torque brake lines when installing.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

Refer to [BR-23, "Brake Burnishing Procedure"](#)



WARNING:

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

Wiring Diagrams and Trouble Diagnosis

EFS0026B

When you read wiring diagrams, refer to the following:

- [GI-12, "How to Read Wiring Diagrams"](#)
- [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#)

When you perform trouble diagnosis, refer to the following:

- [GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"](#)
- [GI-25, "How to Perform Efficient Diagnosis for an Electrical Incident"](#)

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PREPARATION

[ABS]

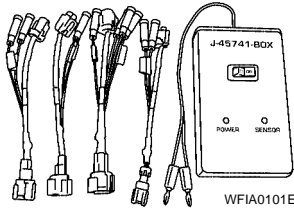
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PREPARATION

Special Service Tool

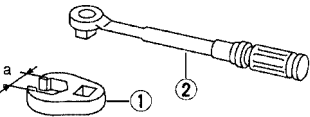
EFS0037F

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

Tool number (Kent-Moore No.) Tool name	Description
<p>(J-45741) ABS active wheel sensor tester</p>  <p style="text-align: right;">WFIA0101E</p>	<p>Checking operation of ABS active wheel sensor</p>

Commercial Service Tools

EFS0037G

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

GENERAL INFORMATION

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EFS0026C

Description
PURPOSE

The ABS consists of electronic and hydraulic components. It allows for control of braking force so that locking of the wheels can be avoided.

The ABS:

- Ensures proper tracking performance through steering wheel operation.
- Enables obstacles to be avoided through steering wheel operation.
- Ensures vehicle stability by preventing flat spins.

OPERATION

- When the vehicle speed is less than 10 km/h (6 MPH) this system does not work.
- The Anti-lock Brake System (ABS) has self-test capabilities. The system turns on the ABS warning lamp for 1 second after turning the ignition switch ON. The system performs another test the first time the vehicle reaches 6 km/h (4 MPH). A mechanical noise may be heard as the ABS performs a self-test. This is a normal part of the self-test feature. If a malfunction is found during this check, the ABS warning lamp will come on.
- During ABS operation, a mechanical noise may be heard. This is a normal condition.

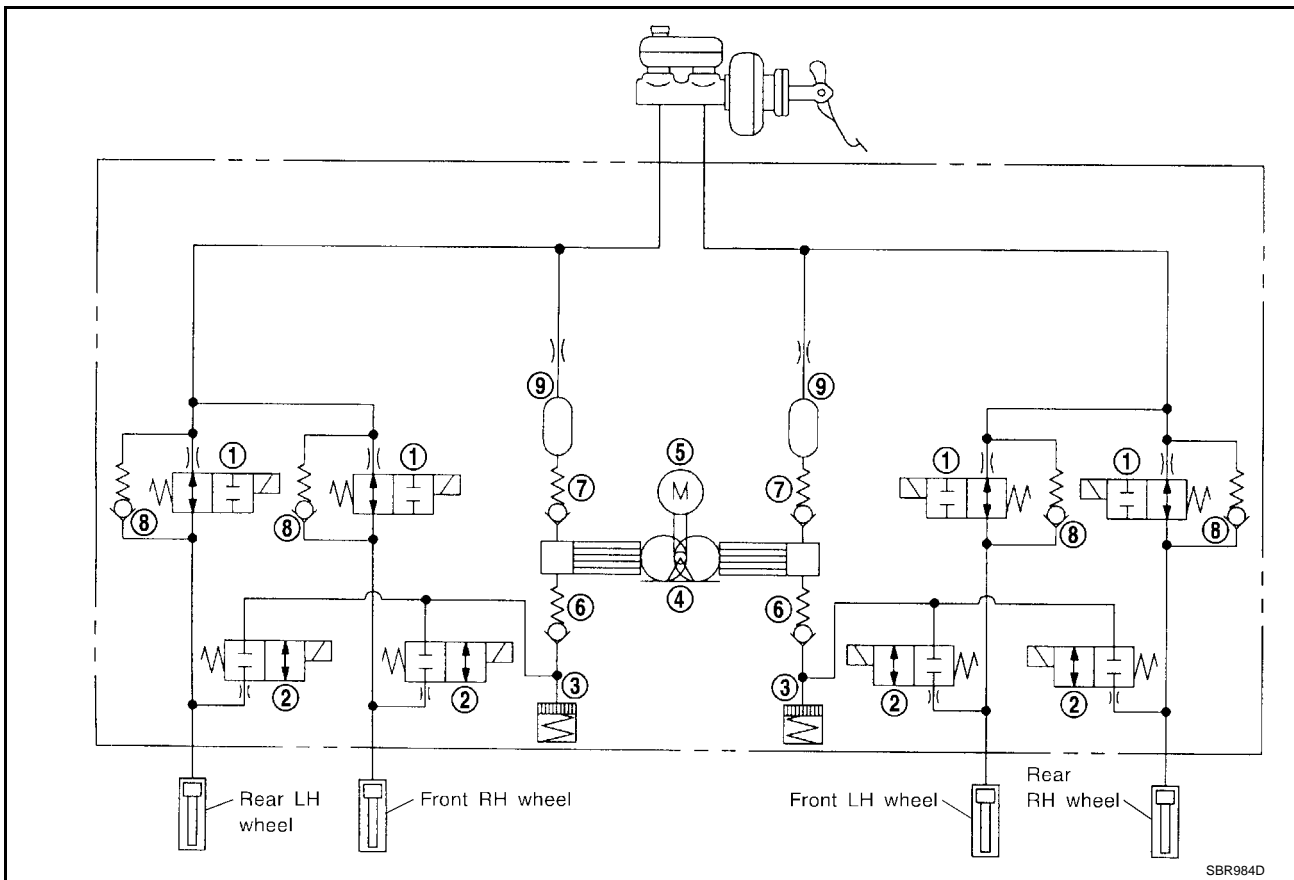
Fail Safe

EFS0026D

If trouble occurs in the ABS, the ABS warning lamp in the combination meter comes on. At the same time, the vehicle stops the ABS control and braking becomes the same as that of a vehicle without ABS.

Hydraulic Circuit

EFS0026E

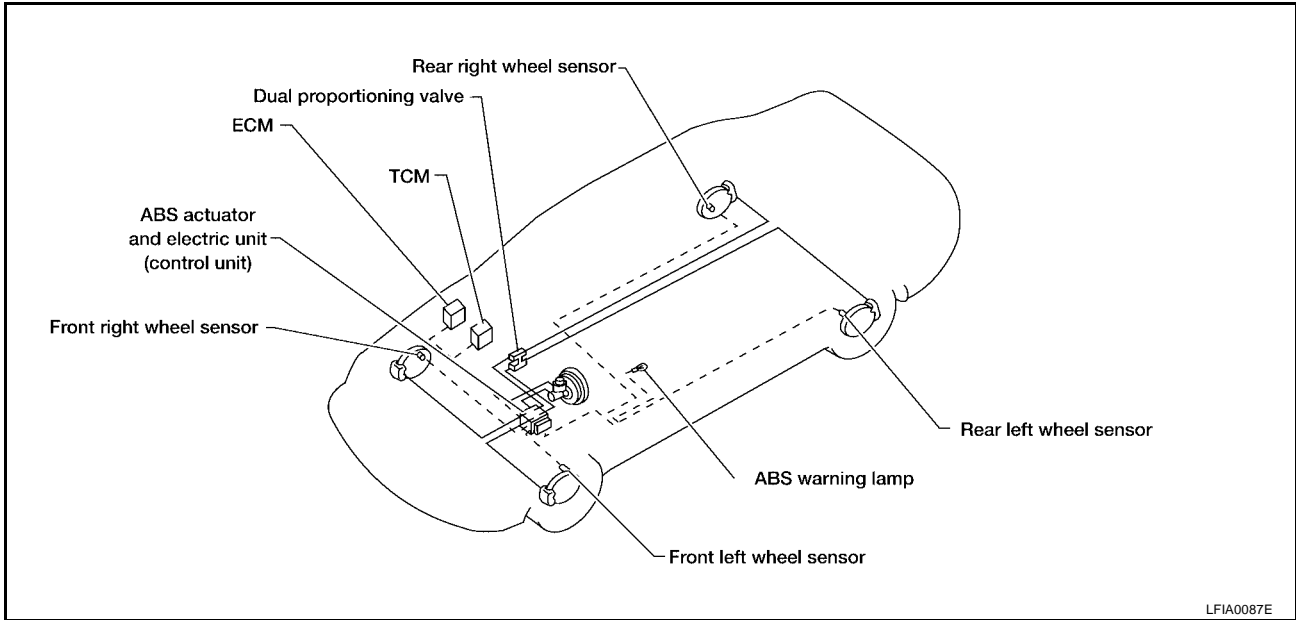


- | | | |
|--------------------------|----------------|-----------------------|
| 1. Inlet solenoid valve | 4. Pump | 7. Outlet valve |
| 2. Outlet solenoid valve | 5. Motor | 8. Bypass check valve |
| 3. Reservoir | 6. Inlet valve | 9. Damper |

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System Components

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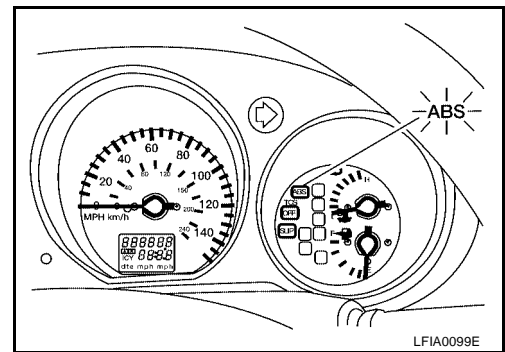


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Control Unit

EFS0026G

The control unit computes the wheel rotating speed by the signal sent from the sensor. Then it supplies a DC current to the actuator solenoid valve. It also controls ON-OFF operation of the valve relay and motor relay. If any electrical malfunction should be detected in the system, the control unit causes the warning lamp to light up. In this condition, the ABS will be deactivated by the control unit, and the vehicle's brake system reverts to normal operation.



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ABS Actuator and Electric Unit (Control Unit)

EFS0026H

The ABS actuator and electric unit (control unit) contains:

- An electric motor and pump
- Two relays
- Eight solenoid valves, each inlet and outlet for
 - LH front
 - RH front
 - LH rear
 - RH rear
- ABS control unit

This components controls the hydraulic circuit and increases, holds or decreases hydraulic pressure to all or individual wheels. The ABS actuator and electric unit (control unit) cannot be disassembled and must be replaced as an assembly.

ABS ACTUATOR OPERATION

	Inlet solenoid valve	Outlet solenoid valve	
Normal brake operation	OFF (Open)	OFF (Closed)	Master cylinder brake fluid pressure is directly transmitted to caliper via the inlet solenoid valve.

GENERAL INFORMATION

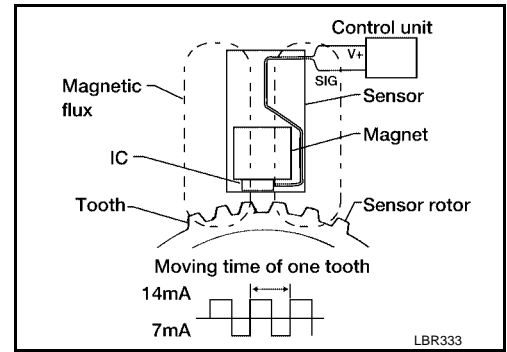
[ABS]

ABS operation	Pressure hold	ON (Closed)	OFF (Closed)	Hydraulic circuit is shut off to hold the caliper brake fluid pressure.
	Pressure decrease	ON (Closed)	ON (Open)	Caliper brake fluid is sent to reservoir via the outlet solenoid valve. Then it is pushed up to the master cylinder by pump.
	Pressure increase	OFF (Open)	OFF (Closed)	Master cylinder brake fluid pressure is transmitted to caliper.

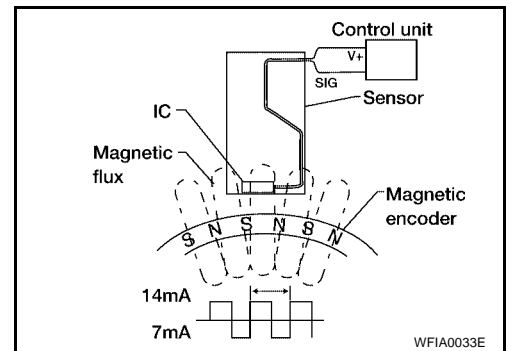
Wheel Sensors

EFS0026I

The front sensor units consist of a gear-shaped sensor rotor and a sensor element. The element contains a magnet around which a coil is wound. The front wheel sensors are installed on the front of the wheel knuckles. As the wheel rotates, the sensor generates a square-wave signal. The frequency increases as the wheel speed increases.



The rear sensor units consist of wheel hubs with a series of internal magnets and a sensor element. The rear wheel sensors are installed on the inner side of the wheel knuckles. As the wheel rotates, the sensor generates a square-wave signal. The frequency increases as the wheel speed increases.



TROUBLE DIAGNOSIS

How to Perform Trouble Diagnoses for Quick and Accurate Repair INTRODUCTION

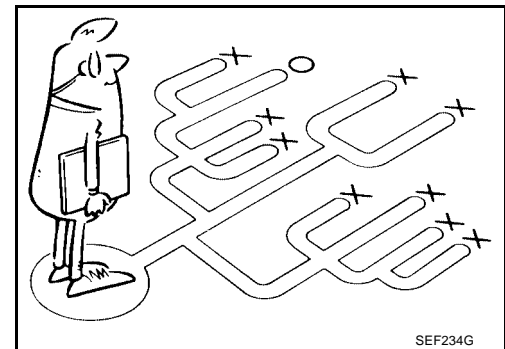
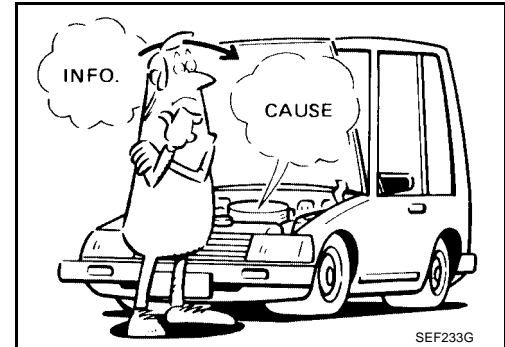
The ABS system has an electronic control unit to control major functions. The control unit accepts input signals from sensors and controls operation of the actuator. It is also important to check for conventional problems such as air leaks in the booster or lines, lack of brake fluid, or other problems with the brake system.

It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electrical connections or faulty wiring. In this case, careful checking of suspicious circuits may help prevent the replacement of good parts.

A visual check only may not find the cause of the problem, so a road test should be performed.

Before undertaking actual checks, take just a few minutes to talk with a customer who approaches with an ABS complaint. The customer is a very good source of information on such problems, especially intermittent ones. Through the talks with the customer, find out what symptoms are present and under what conditions they occur.

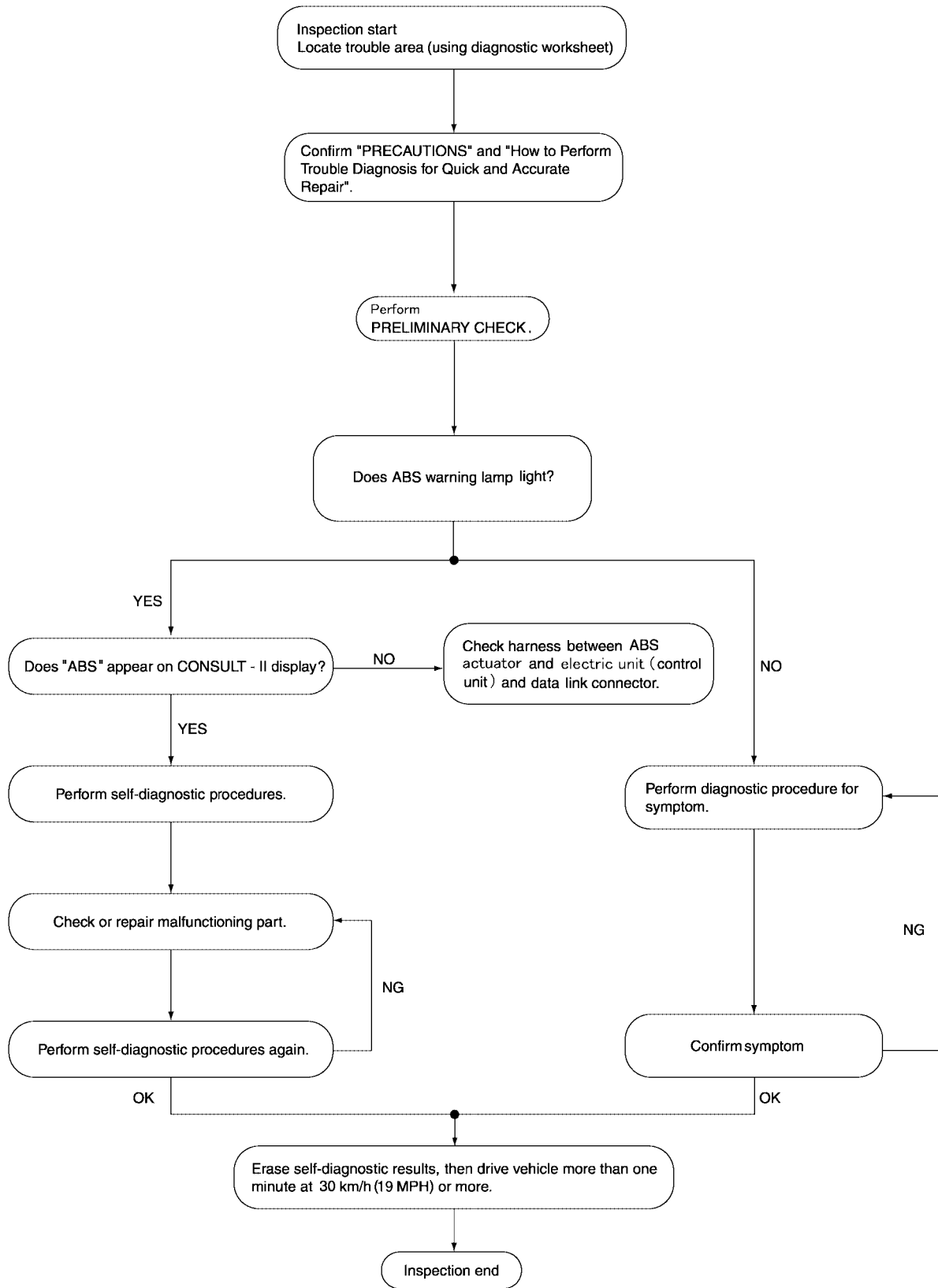
Start your diagnosis by looking for "conventional" problems first. This is one of the best ways to troubleshoot brake problems on an ABS controlled vehicle. Also check related Service Bulletins for information.



TROUBLE DIAGNOSIS

[ABS]

WORK FLOW



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TROUBLE DIAGNOSIS

[ABS]

ASKING COMPLAINTS

- Complaints against a malfunction vary depending on each person. It is important to clarify the customer complaints.
- Ask the customer about what symptoms are present under what conditions. Use the information to reproduce the symptom while driving.
- It is also important to use the diagnosis sheet to understand what type of trouble the customer is having.

KEY POINTS

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

SBR339B

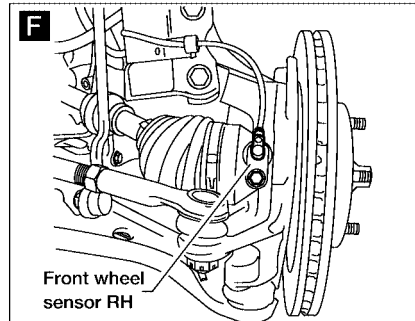
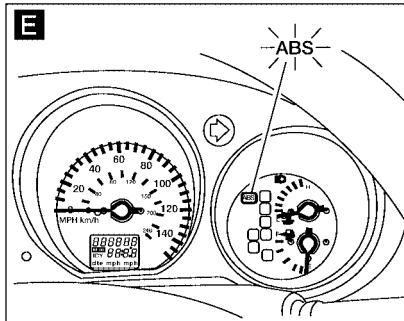
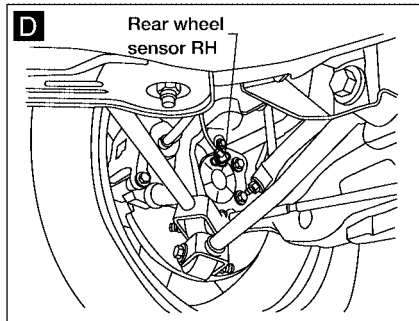
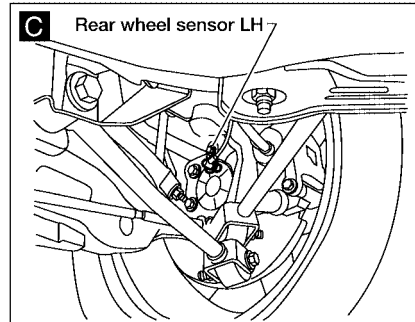
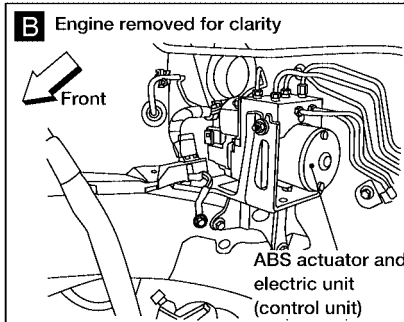
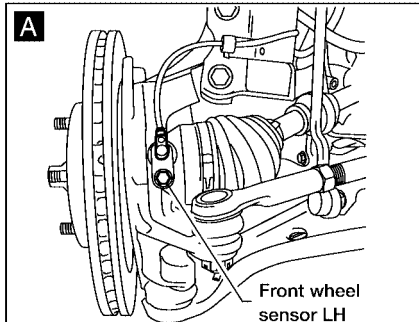
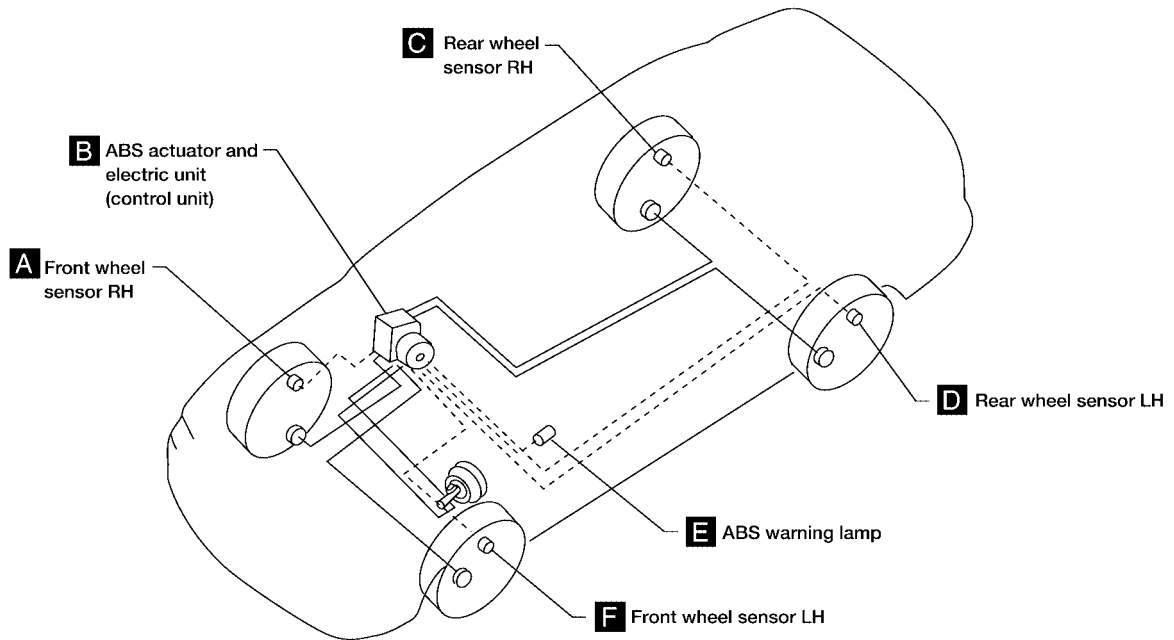
EXAMPLE OF DIAGNOSIS SHEET

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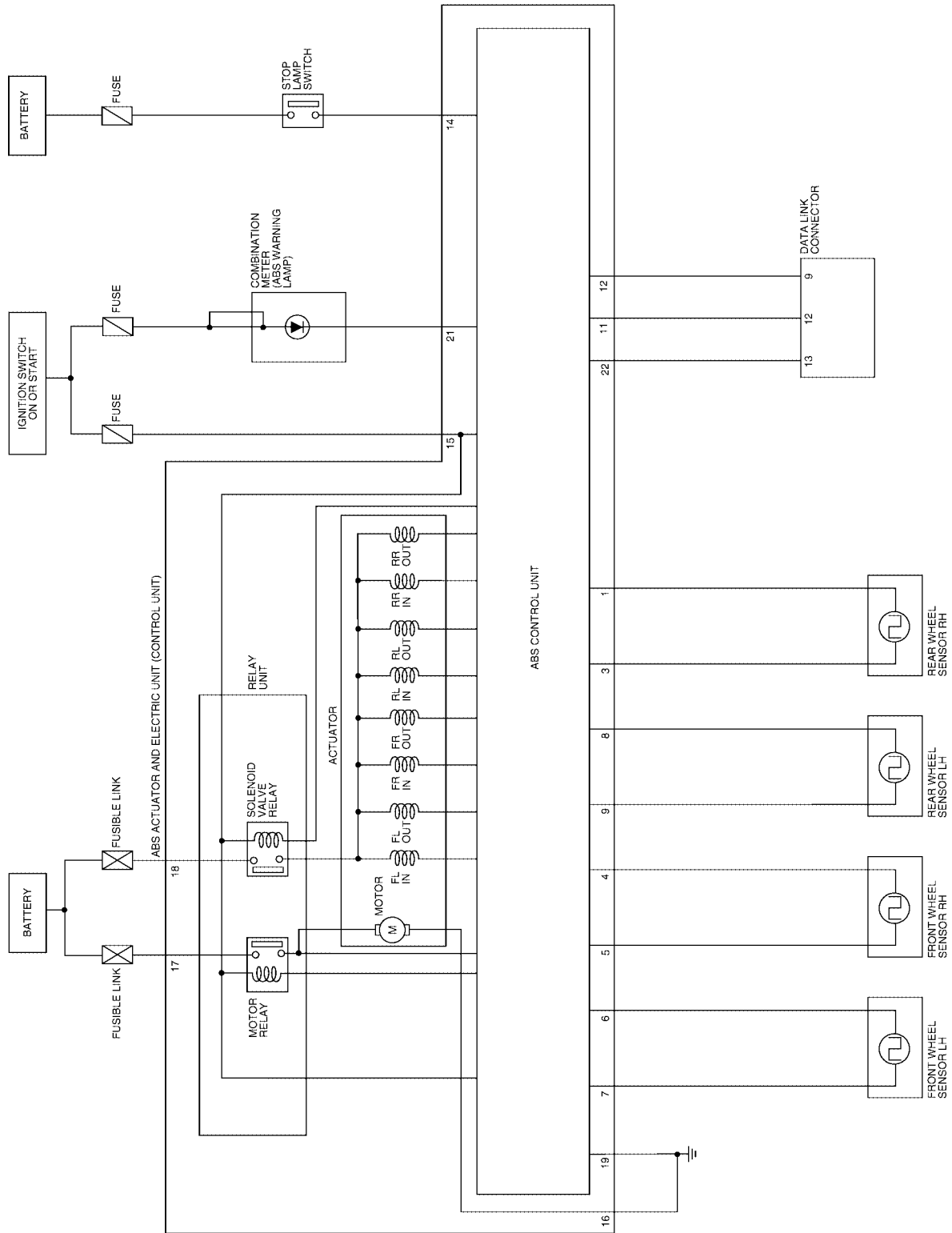
Component Parts and Harness Connector Location

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Schematic



TROUBLE DIAGNOSIS

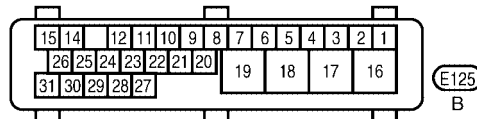
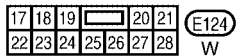
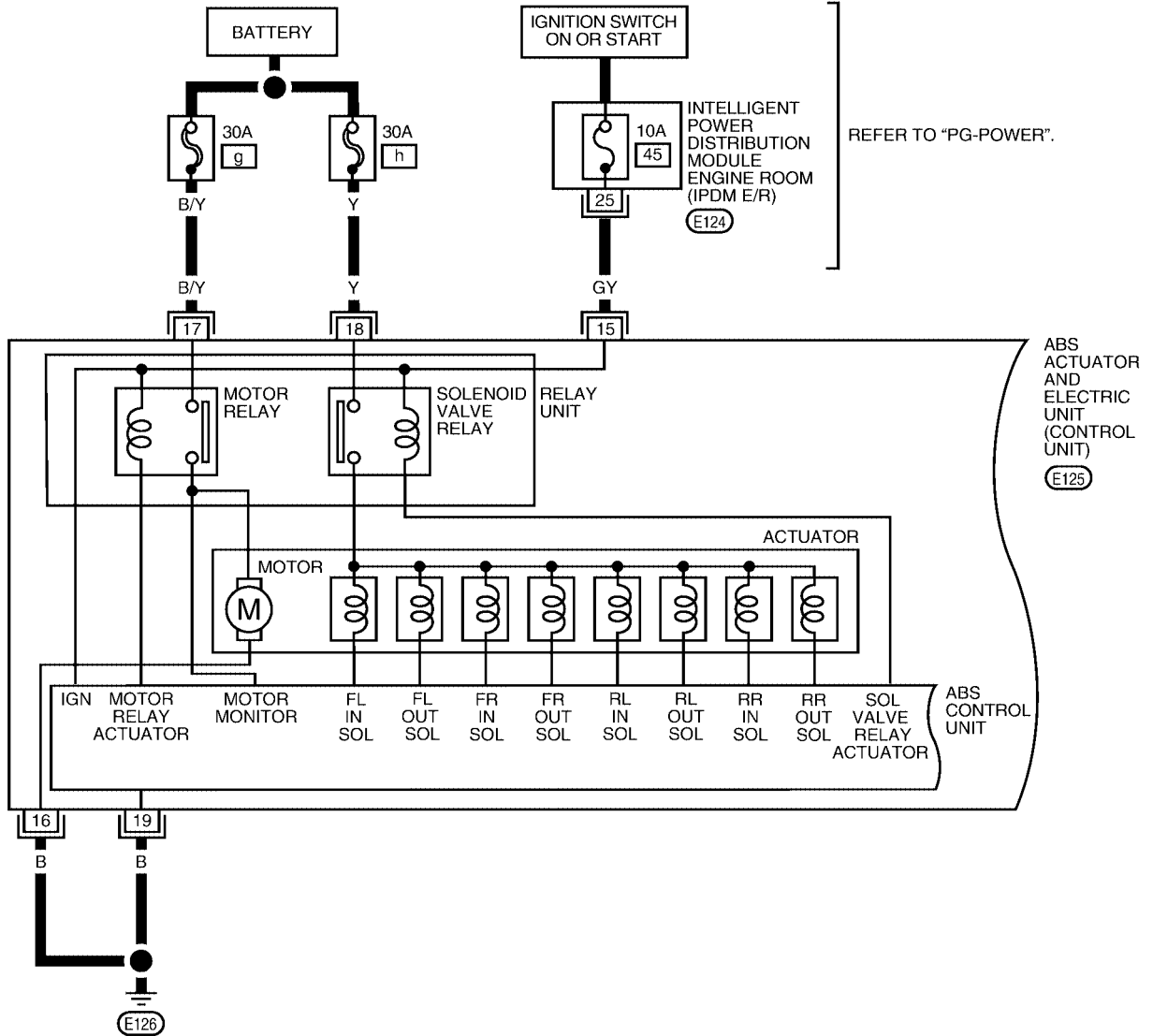
[ABS]

Wiring Diagram — ABS —

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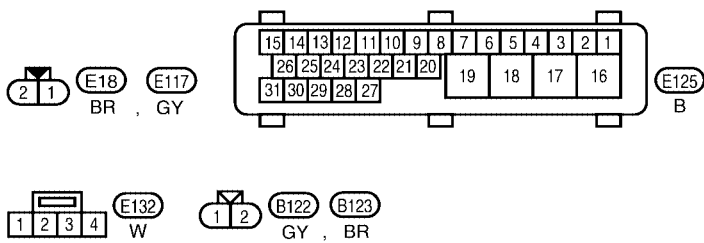
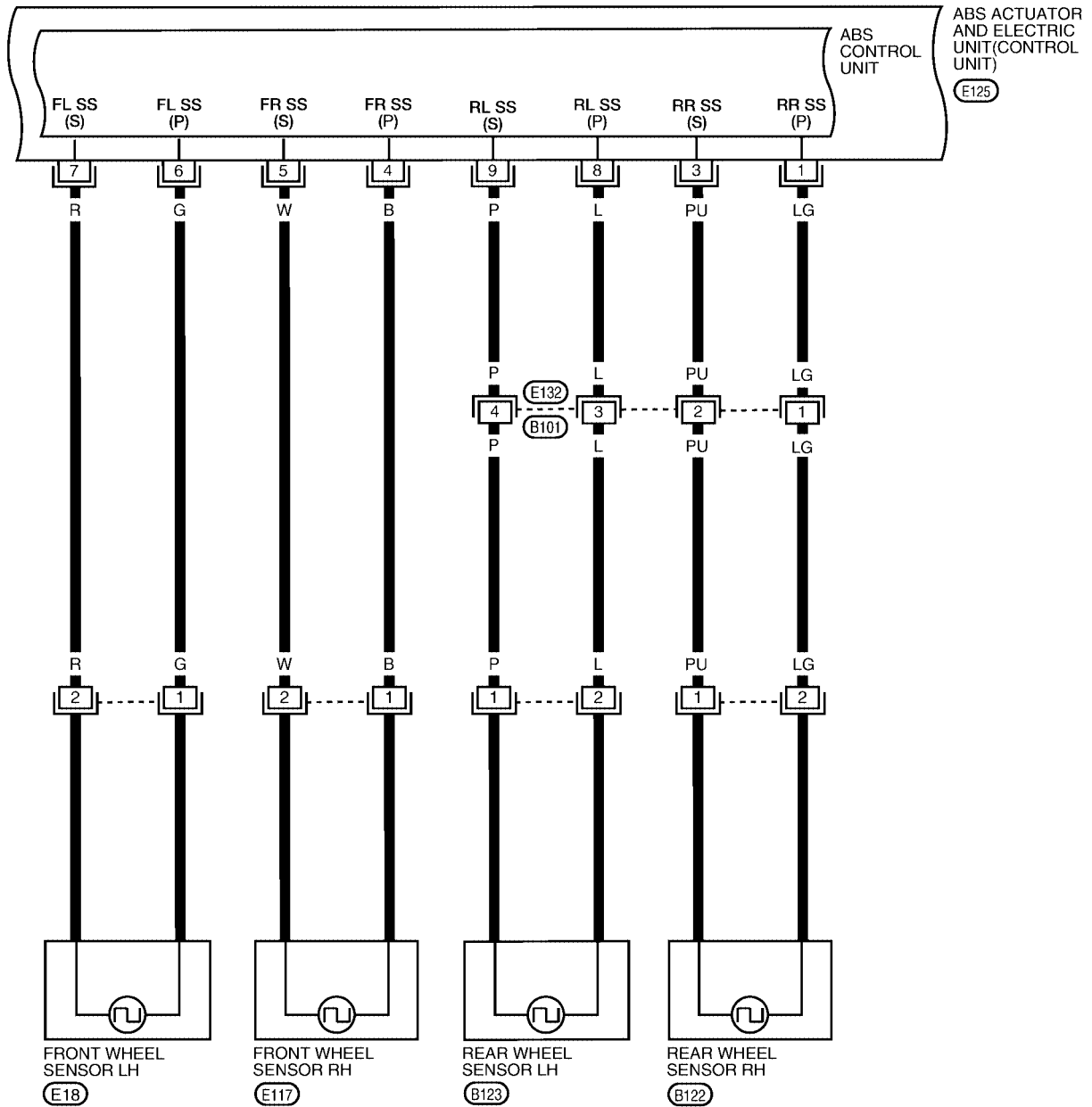


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TROUBLE DIAGNOSIS

[ABS]

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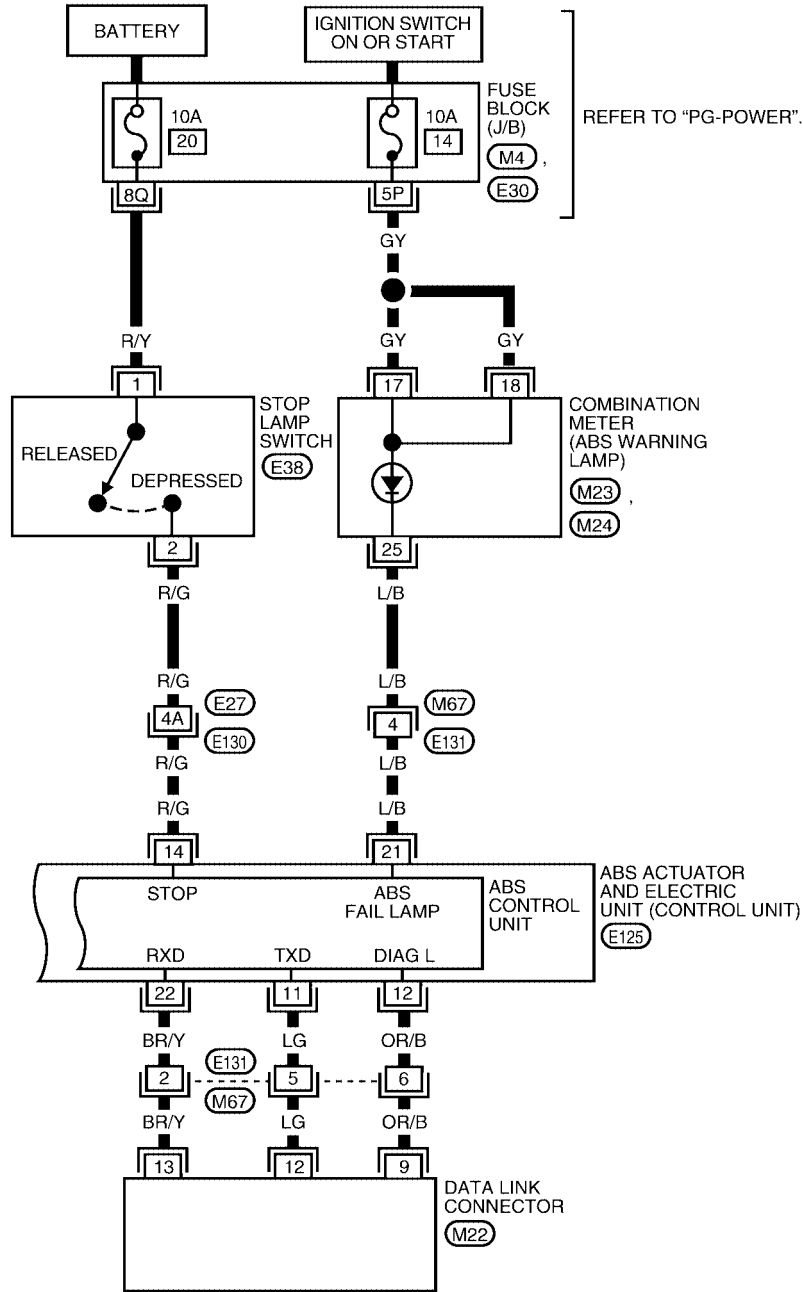


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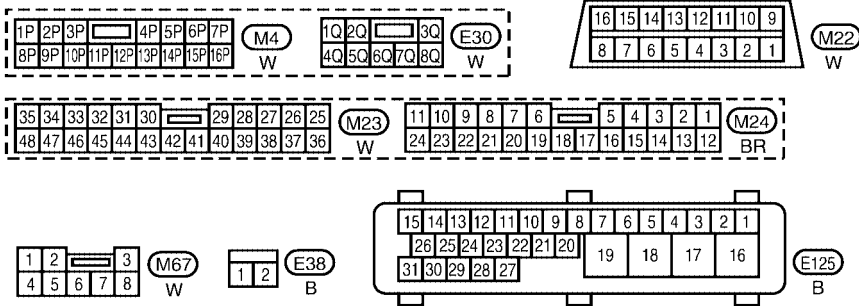
TROUBLE DIAGNOSIS

[ABS]

BRC-ABS-03



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REFER TO THE FOLLOWING.
E130 - SUPER MULTIPLE JUNCTION (SMJ)

LFWA0012E

TROUBLE DIAGNOSIS

[ABS]

EFS0026N

CONSULT-II Function CONSULT-II APPLICATION TO ABS

ITEM	SELF-DIAGNOSTIC RESULTS	DATA MONITOR	ACTIVE TEST
Front right wheel sensor	X	X	—
Front left wheel sensor	X	X	—
Rear right wheel sensor	X	X	—
Rear left wheel sensor	X	X	—
Stop lamp switch	—	X	—
Front right inlet solenoid valve	X	X	X
Front right outlet solenoid valve	X	X	X
Front left inlet solenoid valve	X	X	X
Front left outlet solenoid valve	X	X	X
Rear right inlet solenoid valve	X	X	X
Rear right outlet solenoid valve	X	X	X
Rear left inlet solenoid valve	X	X	X
Rear left outlet solenoid valve	X	X	X
Actuator solenoid valve relay	X	X	—
Actuator motor relay	X	X	X
ABS warning lamp	—	X	—
Battery voltage	X	X	—
Control unit	X	—	—

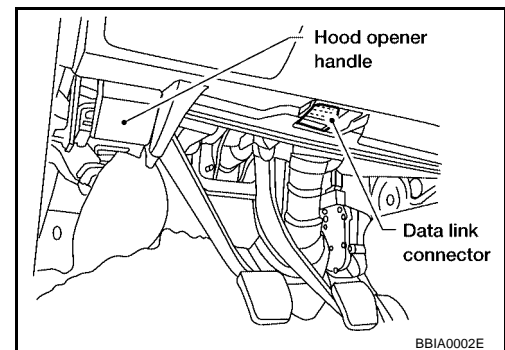
X: Applicable
—: Not applicable

ECU (ABS Control Unit) Part Number Mode

Ignore the ECU part number displayed in the ECU PART NUMBER MODE. Refer to parts catalog to order the ABS actuator and electric unit (control unit).

SELF-DIAGNOSIS PROCEDURE

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

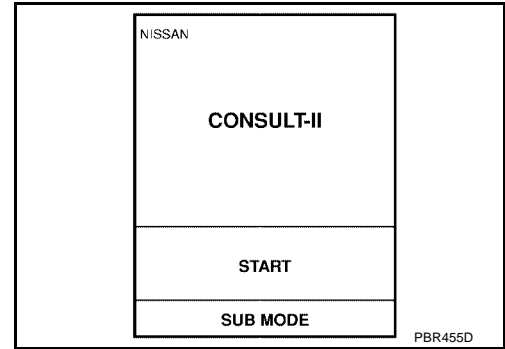


3. Start engine.
4. Drive vehicle over 30 km/h (19 MPH) for at least one minute.

TROUBLE DIAGNOSIS

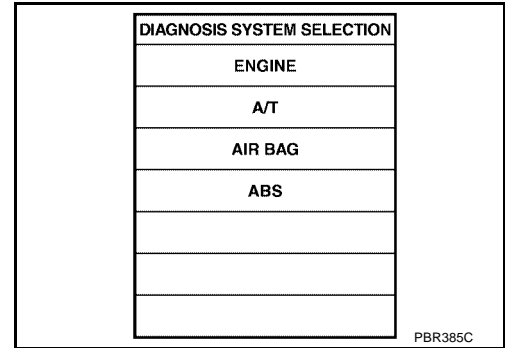
[ABS]

- Stop vehicle with engine running and touch "START" on CONSULT-II screen.



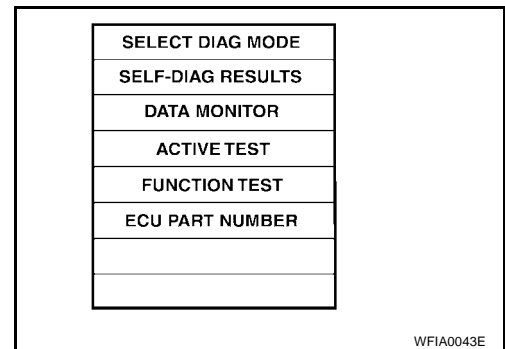
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- Touch "ABS".



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- Touch "SELF-DIAG RESULTS".
 - The screen shows the detected malfunction and how many times the ignition switch has been turned since the malfunction.

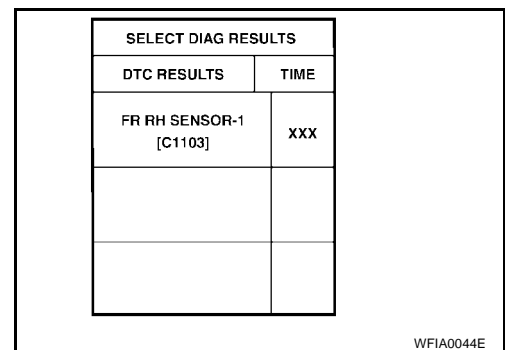


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- Make the necessary repairs following the diagnostic procedures.
- After the malfunctions are repaired, erase the self-diagnostic results stored in the control unit by touching "ERASE".
- Check ABS warning lamp for deactivation after driving vehicle over 30 km/h (19 MPH) for at least one minute.

NOTE:

"SELF-DIAG RESULTS" screen shows the detected malfunction and how many times the ignition switch has been turned since the malfunction.



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TROUBLE DIAGNOSIS

[ABS]

SELF-DIAGNOSTIC RESULTS MODE

Diagnostic item	Diagnosed condition	Diagnostic item is detected when ...	Reference Page	
FR RH SENSOR-1 [C1103]*1	Open	<ul style="list-style-type: none"> ● Circuit for front right wheel sensor is open. 		
FR LH SENSOR-1 [C1104]*1	Open	<ul style="list-style-type: none"> ● Circuit for front left wheel sensor is open. 		
RR RH SENSOR-1 [C1101]*1	Open	<ul style="list-style-type: none"> ● Circuit for rear right wheel sensor is open. 		
RR LH SENSOR-1 [C1102]*1	Open	<ul style="list-style-type: none"> ● Circuit for rear left wheel sensor is open. 		
FR RH SENSOR-2 [C1107]*1	Short	<ul style="list-style-type: none"> ● Circuit for front right wheel sensor is shorted. 		BRC-27
FR LH SENSOR-2 [C1108]*1	Short	<ul style="list-style-type: none"> ● Circuit for front left wheel sensor is shorted. 		
RR RH SENSOR-2 [C1105]*1	Short	<ul style="list-style-type: none"> ● Circuit for rear right wheel sensor is shorted. 		
RR LH SENSOR-2 [C1106]*1	Short	<ul style="list-style-type: none"> ● Circuit for rear left wheel sensor is shorted. 		
ABS SENSOR [C1115]	Abnormal signal	<ul style="list-style-type: none"> ● Teeth damage on sensor rotor or improper installation of wheel sensor. 		
FR RH IN ABS SOL [C1122]	Abnormal (Open, Short)	<ul style="list-style-type: none"> ● Circuit for front right inlet solenoid valve is open or shorted. (An excessively high or low output voltage is entered.) 	BRC-29	
FR LH IN ABS SOL [C1120]	Abnormal (Open, Short)	<ul style="list-style-type: none"> ● Circuit for front left inlet solenoid valve is open or shorted. (An excessively high or low output voltage is entered.) 		
FR RH OUT ABS SOL [C1123]	Abnormal (Open, Short)	<ul style="list-style-type: none"> ● Circuit for front right outlet solenoid valve is open or shorted. (An excessively high or low output voltage is entered.) 		
FR LH OUT ABS SOL [C1121]	Abnormal (Open, Short)	<ul style="list-style-type: none"> ● Circuit for front left outlet solenoid valve is open or shorted. (An excessively high or low output voltage is entered.) 		
RR RH IN ABS SOL [C1126]	Abnormal (Open, Short)	<ul style="list-style-type: none"> ● Circuit for rear right inlet solenoid valve is open or shorted. (An excessively high or low output voltage is entered.) 		
RR LH IN ABS SOL [C1124]	Abnormal (Open, Short)	<ul style="list-style-type: none"> ● Circuit for rear left inlet solenoid valve is open or shorted. (An excessively high or low output voltage is entered.) 		
RR RH OUT ABS SOL [C1127]	Abnormal (Open, Short)	<ul style="list-style-type: none"> ● Circuit for rear right outlet solenoid valve is open or shorted. (An excessively high or low output voltage is entered.) 		
RR LH OUT ABS SOL [C1125]	Abnormal (Open, Short)	<ul style="list-style-type: none"> ● Circuit for rear left outlet solenoid valve is open or shorted. (An excessively high or low output voltage is entered.) 		
MAIN RELAY [C1114]	Abnormal	<ul style="list-style-type: none"> ● Actuator solenoid valve relay is ON, even if control unit sends off signal. ● Actuator solenoid valve relay is OFF, even if control unit sends on signal. 		
PUMP MOTOR [C1111]	Abnormal	<ul style="list-style-type: none"> ● Circuit for actuator motor is open or shorted. ● Actuator motor relay is stuck. 	BRC-32	
BATTERY VOLT [ABNORMAL] [C1109]	High or Low	<ul style="list-style-type: none"> ● Power source voltage supplied to ABS control unit is abnormally high or low. 	BRC-33	
CONTROLLER FAILURE*2 [C1110]	Control Unit	<ul style="list-style-type: none"> ● Function of calculation in ABS control unit has malfunctioned. 	BRC-35	

*1: Be sure to confirm the ABS warning lamp illuminates when the ignition switch is turned ON after repairing the shorted sensor circuit, but the lamp goes out when driving the vehicle over 30 km/h (19 MPH) for one minute in accordance with SELF-DIAGNOSIS PROCEDURE.

*2: When "CONTROLLER FAILURE" is displayed, check to see if the ABS warning lamp is burned out, and check the circuit between the ABS warning lamp and ABS actuator and electric unit (control unit) for open or short. Then check the ABS actuator and electric unit (control unit) and circuit.

DATA MONITOR PROCEDURE

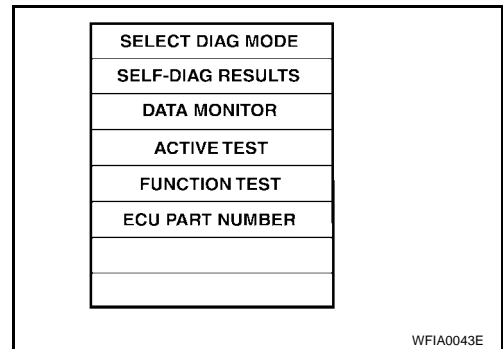
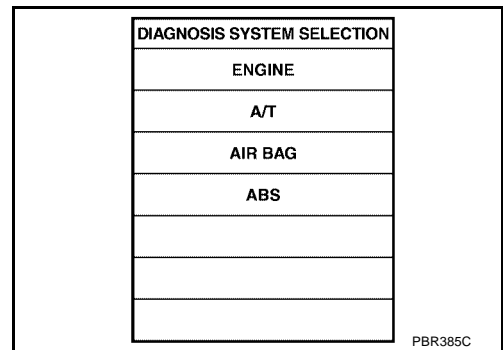
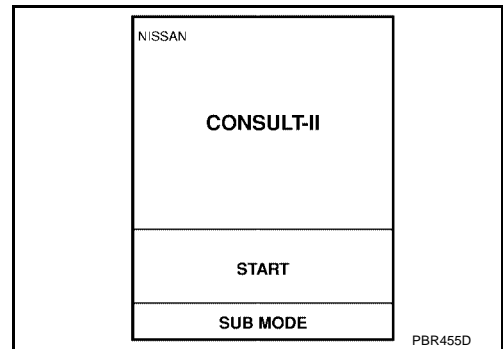
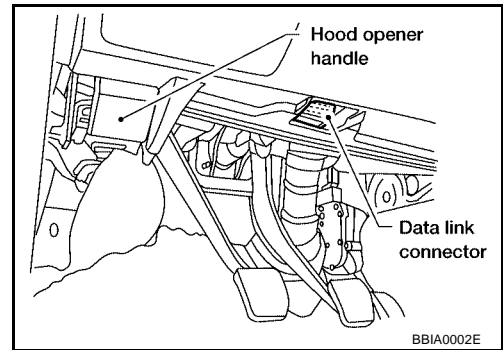
1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector.

3. Turn ignition switch ON.
4. Touch "START" on CONSULT-II screen.

5. Touch "ABS".

6. Touch "DATA MONITOR".

7. Touch "SETTING" on "SELECT MONITOR ITEM" screen.
8. Touch "LONG TIME" on "SET RECORDING COND" screen.
9. Touch "START" on "SELECT MONITOR ITEM".



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TROUBLE DIAGNOSIS

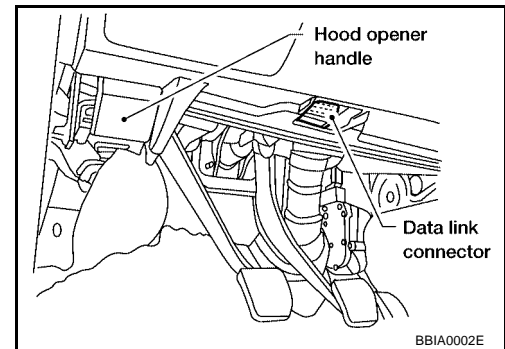
[ABS]

DATA MONITOR MODE

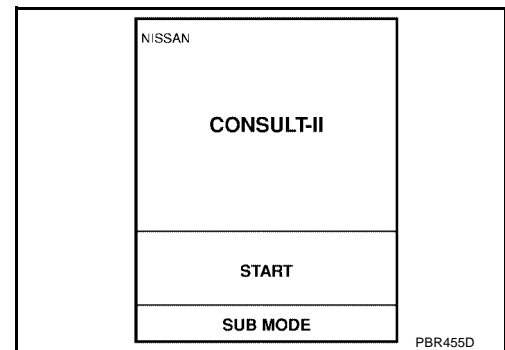
MONITOR ITEM	CONDITION	SPECIFICATION
FR RH SENSOR FR LH SENSOR RR RH SENSOR RR LH SENSOR	Drive vehicle. (Each wheel is rotating.)	Displays computed vehicle speed from wheel sensor signal. Almost the same speed as speedometer.
STOP LAMP SW	Turn ignition switch ON and depress brake pedal.	Depress the pedal: ON Release the pedal: OFF
FR RH IN SOL FR RH OUT SOL FR LH IN SOL FR LH OUT SOL RR RH IN SOL RR RH OUT SOL RR LH IN SOL RR LH OUT SOL	Ignition switch is turned ON or engine is running.	Operating conditions for each solenoid valve are indicated. ABS is not operating: OFF
ACTUATOR RLY	Ignition switch is turned ON or engine is running.	Displays ON/OFF condition of ABS actuator relay. When turning ignition switch ON, ABS actuator relay is operated.
MOTOR RELAY		ABS is not operating: OFF ABS is operating: ON
ABS WARN LAMP		Warning lamp is turned on: ON Warning lamp is turned off: OFF
BATTERY VOLT		Power supply voltage for control unit

ACTIVE TEST PROCEDURE

- When conducting active test, vehicle must be stationary.
 - When ABS warning lamp stays on, never conduct active test.
1. Turn ignition switch OFF.
 2. Connect CONSULT-II to data link connector.



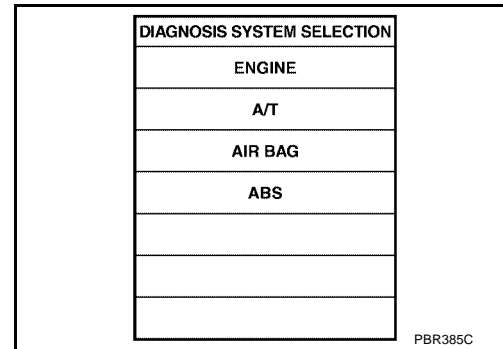
3. Start engine.
4. Touch "START" on CONSULT-II screen.



TROUBLE DIAGNOSIS

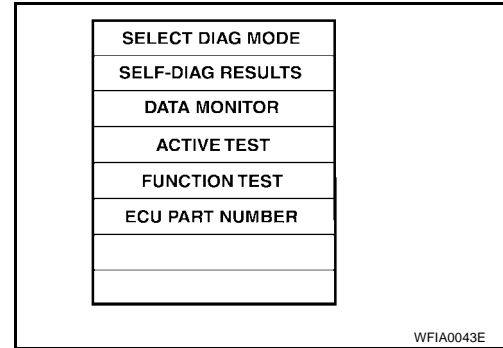
[ABS]

5. Touch "ABS".



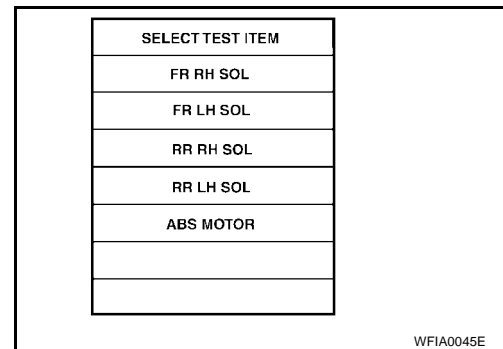
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6. Touch "ACTIVE TEST".



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7. Select active test item by touching screen.



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8. Touch "START".

9. Carry out the active test by touching screen key.

ACTIVE TEST MODE

TEST ITEM	CONDITION	JUDGEMENT		
FR RH SOL FR LH SOL RR RH SOL RR LH SOL	Ignition switch is turned ON.	Brake fluid pressure control operation		
			IN SOL	OUT SOL
		UP (Increase):	OFF	OFF
		KEEP (Hold):	ON	OFF
ABS MOTOR		DOWN (Decrease):	ON	ON
		ABS actuator motor ON: Motor runs OFF: Motor stops		

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NOTE:

Active test will automatically stop ten seconds after the test starts. (TEST IS STOPPED is displayed.)

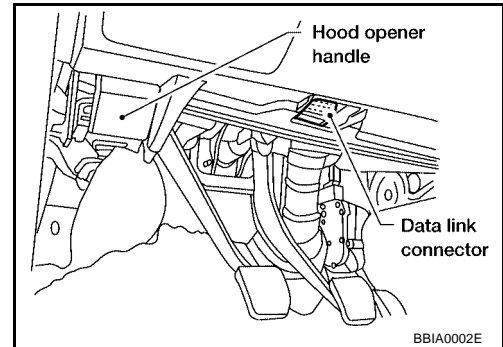
Self-Diagnosis (Without CONSULT-II)

EFS00260

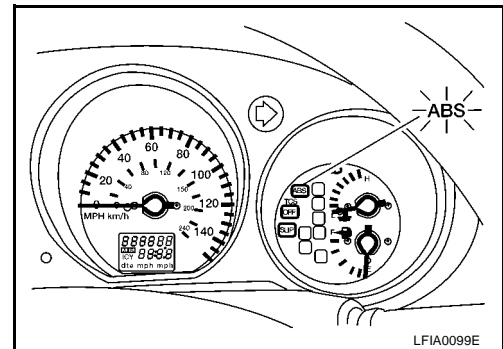
When a problem occurs in the ABS, the ABS warning lamp on the instrument panel comes on. To activate the self-diagnostic results mode, ground the self-diagnostic (check) terminal located on data link connector. The location of the malfunction is indicated by the ABS warning lamp flashing.

SELF-DIAGNOSIS PROCEDURE

1. Drive vehicle over 30 km/h (19 MPH) for at least one minute.
2. Turn ignition switch OFF.
3. Ground terminal "9" of data link connector with a suitable harness.
4. Turn ignition switch ON while grounding terminal "9".
Do not depress brake pedal.
Do not start engine.



5. After 3.0 seconds, the ABS warning lamp starts flashing to indicate the malfunction code No. (See NOTE.)
6. Verify the location of the malfunction with the malfunction code chart. Refer to [BRC-25, "Malfunction Code Chart \(Without CONSULT-II\)"](#). Then make the necessary repairs following the diagnostic procedures.
7. After the malfunctions are repaired, erase the malfunction codes stored in the control unit. Refer to [BRC-23, "HOW TO ERASE SELF-DIAGNOSTIC RESULTS \(MALFUNCTION CODES\)"](#).
8. Rerun the self-diagnostic results mode to verify that the malfunction codes have been erased.



9. Disconnect the check terminal from the ground. The self-diagnostic results mode is now complete.
10. Check ABS warning lamp for deactivation after driving vehicle over 30 km/h (19 MPH) for at least one minute.
11. After making certain that ABS warning lamp does not come on, test the ABS SELF-DIAGNOSIS in a safe area to verify that it functions properly.

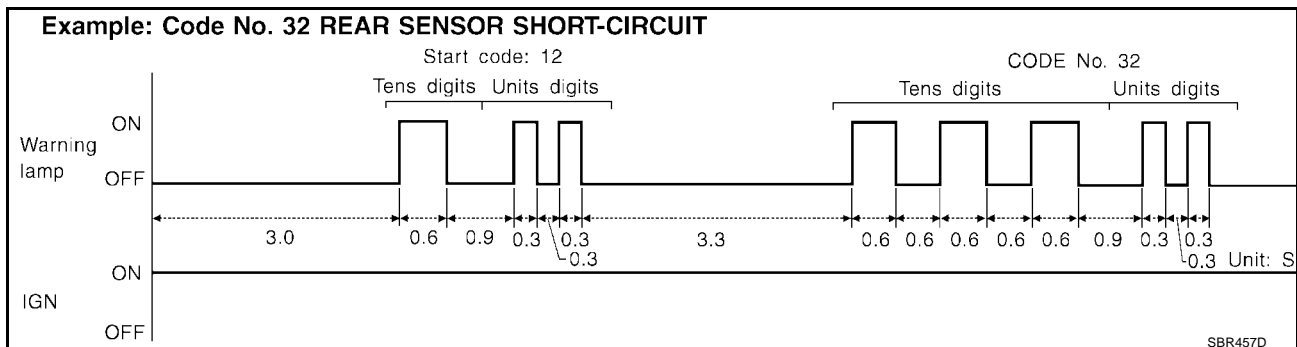
NOTE:

The indication terminates after five minutes.

However, when the ignition switch is turned from OFF to ON, the indication starts flashing again.

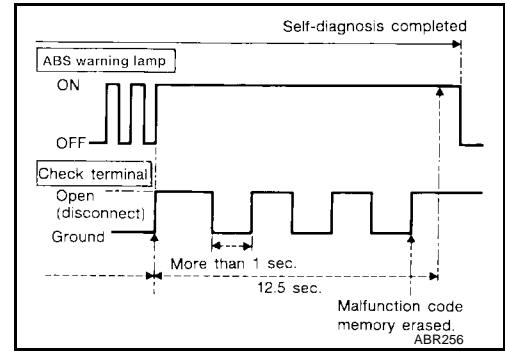
HOW TO READ SELF-DIAGNOSTIC RESULTS (MALFUNCTION CODES)

1. Determine the code No. by counting the number of times the ABS warning lamp flashes on and off.
2. When several malfunctions occur at one time, up to three code numbers can be stored; the latest malfunction will be indicated first.
3. The indication begins with the start code 12. After that a maximum of three code numbers appear in the order of the latest one first. The indication then returns to the start code 12 to repeat (the indication will stay on for five minutes at the most).
4. Refer to [BRC-25, "Malfunction Code Chart \(Without CONSULT-II\)"](#).



HOW TO ERASE SELF-DIAGNOSTIC RESULTS (MALFUNCTION CODES)

1. Disconnect the check terminal from ground (ABS warning lamp will stay lit).
2. Within 12.5 seconds, ground the check terminal 3 times. Each terminal ground must last more than 1 second. The ABS warning lamp goes out after the erase operation has been completed.
3. Perform self-diagnosis again. Refer to [BRC-22, "SELF-DIAGNOSIS PROCEDURE"](#) . Only the start code should appear, no malfunction codes.



Preliminary Check

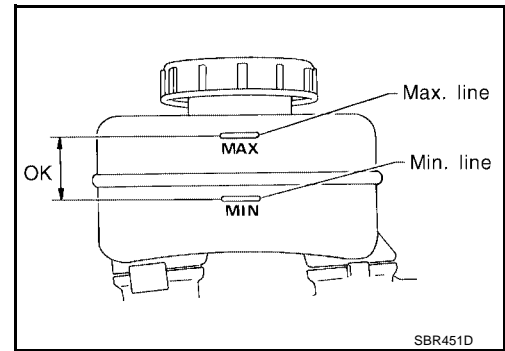
EFS0026P

1. CHECK BRAKE FLUID LEVEL

Low fluid level may indicate brake pad wear or leakage from brake line.

Is brake fluid filled between MAX and MIN lines on reservoir tank and is brake fluid uncontaminated?

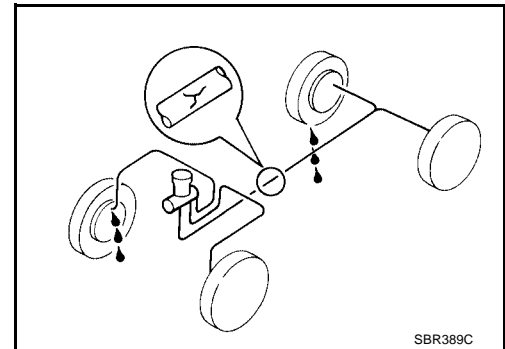
- OK >> GO TO 2.
 NG >> Repair. GO TO 2.



2. CHECK BRAKE LINE

Is leakage present at or around brake lines, tubes or hoses or are any of these parts cracked or damaged?

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

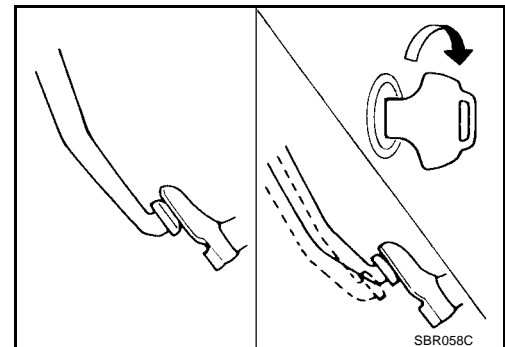


3. CHECK BRAKE BOOSTER OPERATION

Check brake booster for operation and air tightness. Refer to [BR-15, "AIRTIGHT CHECK"](#) .

Is brake booster airtight and functioning properly?

- Yes >> GO TO 4.
 No >> Replace. GO TO 4.



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4. CHECK BRAKE PADS AND ROTORS

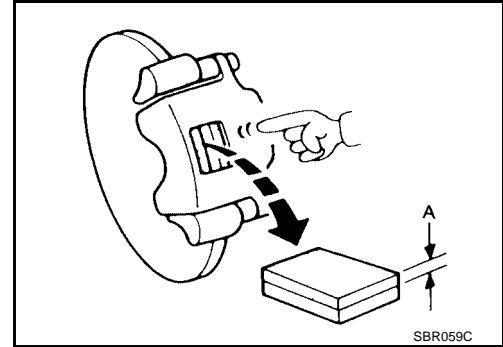
Check brake pads and rotors.

Refer to [BR-18, "FRONT DISC BRAKE"](#) and [BR-24, "REAR DISC BRAKE"](#) .

Are brake pads and rotors functioning properly?

Yes >> GO TO 5.

No >> Replace.



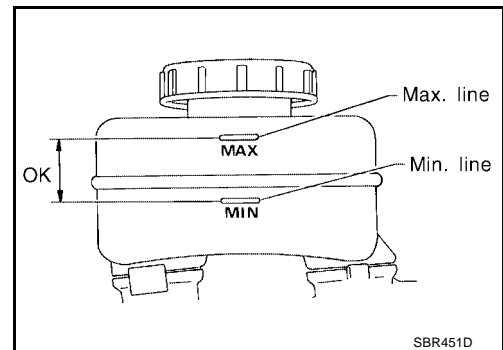
5. RECHECK BRAKE FLUID LEVEL

Check brake fluid level in reservoir tank again.

Is brake fluid filled between MAX and MIN lines on reservoir tank and is brake fluid uncontaminated?

OK >> GO TO 6.

NG >> Fill up brake fluid.

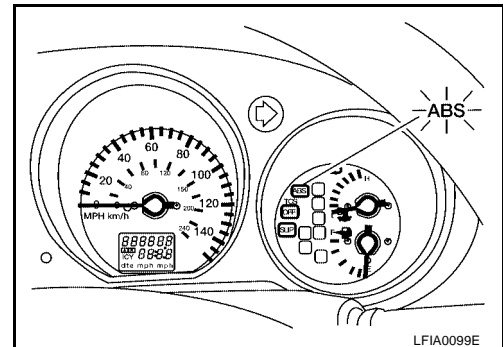


6. CHECK WARNING LAMP ACTIVATION

Does warning lamp turn on when ignition switch is turned ON?

Yes >> GO TO 7.

No >> Check fuse, warning lamp bulb and warning lamp circuit.



7. CHECK WARNING LAMP DEACTIVATION

Does warning lamp turn off when engine is started?

Yes >> GO TO 8.

No >> Go to Self-diagnosis. Refer to [BRC-22, "SELF-DIAGNOSIS PROCEDURE"](#) .

8. DRIVE VEHICLE

Drive vehicle at speeds over 30 km/h (19 MPH) for at least one minute.

Does warning lamp remain off after vehicle has been driven at 30 km/h (19 MPH) for at least one minute?

Yes >> INSPECTION END.

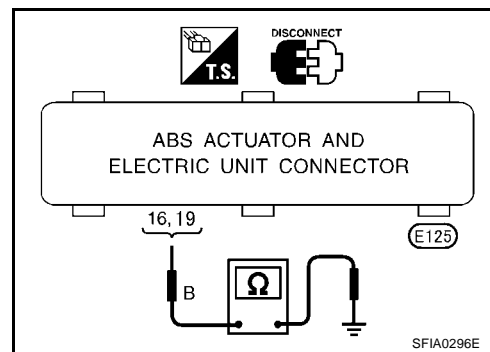
No >> Go to Self-diagnosis. Refer to [BRC-22, "SELF-DIAGNOSIS PROCEDURE"](#) .

Ground Circuit Check

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND

- Check continuity between terminals and ground.

Continuity should exist.



Malfunction Code Chart (Without CONSULT-II)

Code No. (No. of LED flashes)	Malfunctioning part	Reference page
12	Self-diagnosis could not detect any malfunctions.	—
18	Sensor rotor malfunction	BRC-27
21, 22	Front right sensor	BRC-27
25, 26	Front left sensor	BRC-27
31, 32	Rear right sensor	BRC-27
35, 36	Rear left sensor	BRC-27
41	Actuator front right outlet solenoid valve	BRC-29
42	Actuator front right inlet solenoid valve	BRC-29
45	Actuator front left outlet solenoid valve	BRC-29
46	Actuator front left inlet solenoid valve	BRC-29
51	Actuator rear right outlet solenoid valve	BRC-29
52	Actuator rear right inlet solenoid valve	BRC-29
55	Actuator rear left outlet solenoid valve	BRC-29
56	Actuator rear left inlet solenoid valve	BRC-29
57*	Power supply (Abnormal voltage)	BRC-33
61	Actuator motor or motor relay	BRC-32
63	Solenoid valve relay	BRC-29
71	Control unit	BRC-35

*: Under voltage that is too low, the control unit will disable the ABS. It does not set the ABS in fail-safe condition. Instead, the ABS becomes a conventional brake system. After the power supply has resumed, the warning lamp goes off, making it possible for the ABS to be re-engaged.

Symptom Chart

Symptom	Malfunctioning part	Reference page
ABS warning lamp stays on when ignition switch is turned on.	Control unit power supply circuit Warning lamp bulb circuit Control unit or control unit connector Solenoid valve relay stuck Power supply for solenoid valve relay coil	BRC-41
ABS warning lamp stays on, during self-diagnosis.	Control unit	—
ABS warning lamp does not come on when ignition switch is turned on.	Fuse, warning lamp bulb or warning lamp circuit Control unit	BRC-39
ABS warning lamp does not come on during self-diagnosis.	Control unit	—
Pedal vibration and noise	—	BRC-38

TROUBLE DIAGNOSIS

[ABS]

Symptom	Malfunctioning part	Reference page
Long stopping distance	—	BRC-37
Unexpected pedal action	—	BRC-36
ABS does not work.	—	BRC-37
ABS works frequently.	—	BRC-36

TROUBLE DIAGNOSIS FOR SELF-DIAGNOSTIC ITEMS**Wheel Sensor or Rotor
DIAGNOSTIC PROCEDURE**

With CONSULT-II: Malfunction code No. C1101, C1102, C1103, C1104, C1105, C1106, C1107, C1108 or C1115

Without CONSULT-II: Malfunction code No. 21, 22, 25, 26, 31, 32, 35, 36 or 18

NOTE:

Wheel position should be identified by code No. except code No. 18 (sensor rotor).

1. CONNECTOR INSPECTION

1. Disconnect the ABS actuator and electric unit (control unit) connector E125 and wheel sensor of malfunction code. Check the terminals for deformation, disconnection, looseness or damage.

OK or NG

OK >> GO TO 2.

NG >> Repair or replace as necessary.

2. CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Disconnect connector from wheel sensor of malfunction code No.
2. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
3. Turn on the ABS active wheel sensor tester power switch.

NOTE:

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

4. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.

NOTE:

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

Yes >> GO TO 3.

No >> GO TO 6.

3. CHECK TIRE

Check for inflation pressure, wear and size of each tire.

Are tire pressure and size correct and is tire wear within specifications?

Yes >> GO TO 4.

No >> Adjust tire pressure or replace tire(s).

4. CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to [FAX-5, "Front Wheel Bearing"](#) or [RAX-5, "Rear Wheel Bearing"](#).
Is axial end play within specifications?

Yes >> GO TO 5.

No >> Repair as necessary. Refer to [FAX-5, "WHEEL HUB AND KNUCKLE"](#) or [RAX-5, "WHEEL HUB"](#).
Then retest.

5. CHECK SENSOR ROTOR

Check sensor rotor for teeth damage.

OK or NG

OK >> GO TO 6.

NG >> Replace sensor rotor. Refer to [BRC-43, "Removal and Installation"](#).

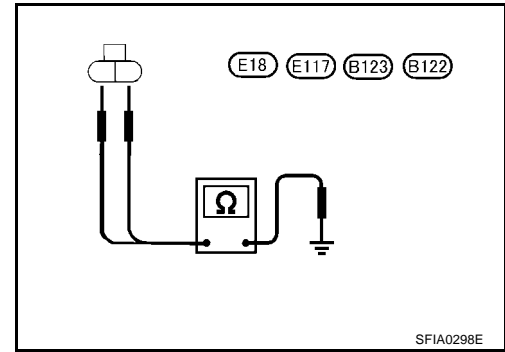
6. CHECK WIRING HARNESS FOR SHORT CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
2. Check resistance between harness connector terminal and ground.

Continuity should not exist.

OK or NG?

- OK >> GO TO 7.
 NG >> Repair the circuit.



7. CHECK WIRING HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
2. Check continuity between both wiring harness ends.

Sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector - terminal	Wire color	Connector - terminal	Wire color	
Front LH	E125 - 6	G	E18 - 1	G	Yes
	E125 - 7	R	E18 - 2	R	
Front RH	E125 - 4	B	E117 - 1	B	
	E125 - 5	W	E117 - 2	W	
Rear LH	E125 - 9	P	B123 - 1	P	
	E125 - 8	L	B123 - 2	L	
Rear RH	E125 - 3	PU	B122 - 1	PU	
	E125 - 1	LG	B122 - 2	LG	

Continuity should exist.

OK or NG?

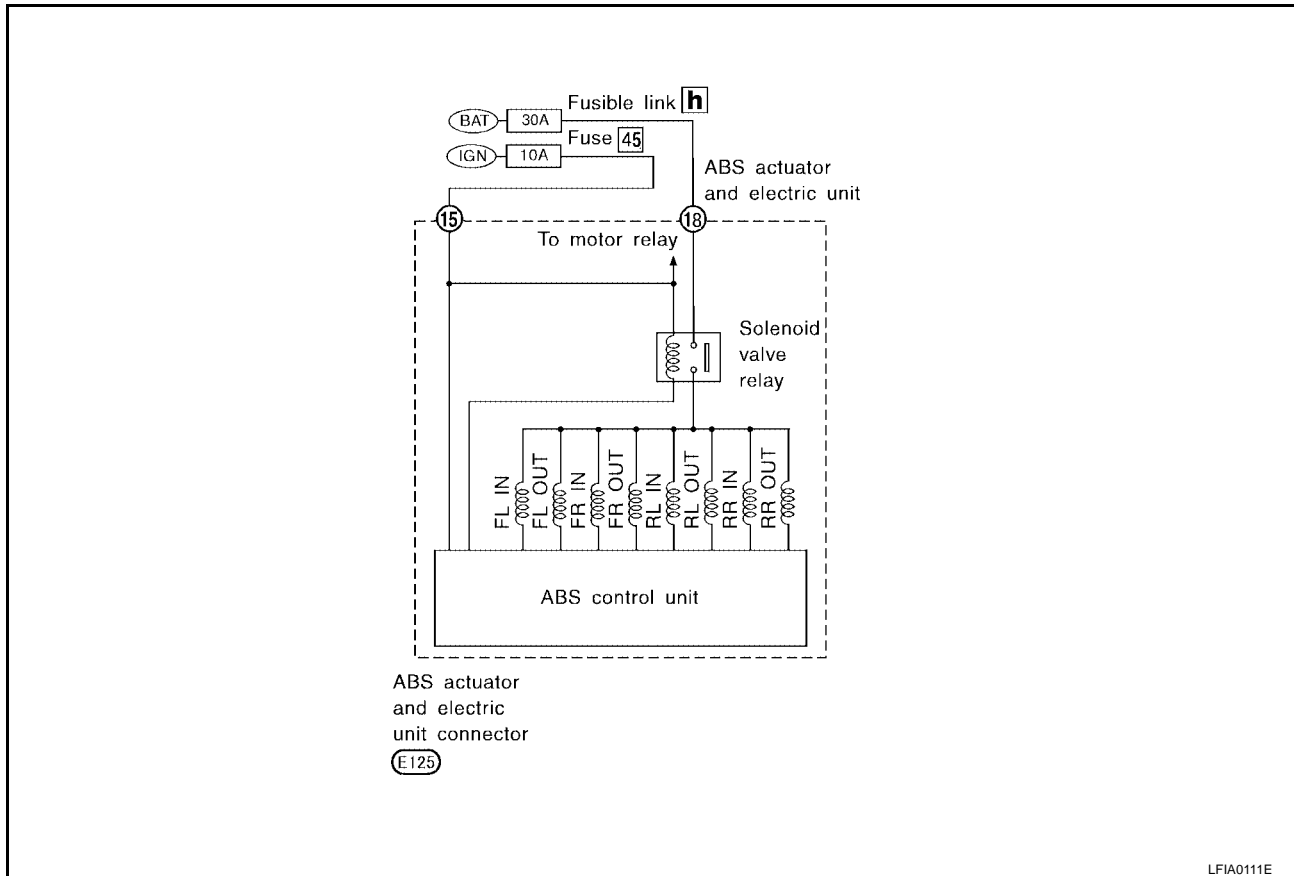
- OK >> Replace the ABS actuator and electric unit (control unit). Refer to [BRC-44, "Removal and Installation"](#) .
 NG >> Repair the circuit.

ABS Actuator Solenoid Valve or Solenoid Valve Relay DIAGNOSTIC PROCEDURE

- ① With CONSULT-II: Malfunction code No. C1114, C1120, C1121, C1122, C1123, C1124, C1125, C1126 or C1127
- ⊗ Without CONSULT-II: Malfunction code No. 41, 42, 45, 46, 51, 52, 55, 56 or 63

1. INSPECTION START

Solenoid valve relay inspection.



>> GO TO 2.

2. CHECK SOLENOID VALVE POWER SUPPLY CIRCUIT

Check 30A [h] fusible link (ABS ACTR) for ABS solenoid valve relay. For fusible link layout, refer to [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#).

Is fusible link OK?

- Yes >> GO TO 3.
- No >> GO TO 7.

3. CHECK FUSE

Check 10A fuse No. 45. For fuse layout, refer to [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#).

Is fuse OK?

- Yes >> GO TO 4.
- No >> GO TO 9.

4. CHECK CONNECTOR

1. Disconnect connectors from ABS actuator and electric unit (control unit). Check terminals for damage or loose connection. Then reconnect connectors.
2. Carry out self-diagnosis again.

Does warning lamp activate again?

- Yes >> GO TO 5.
No >> **INSPECTION END.**

5. CHECK GROUND CIRCUIT

Refer to [BRC-25, "ABS ACTUATOR AND ELECTRIC UNIT \(CONTROL UNIT\) GROUND"](#) .

Is ground circuit OK?

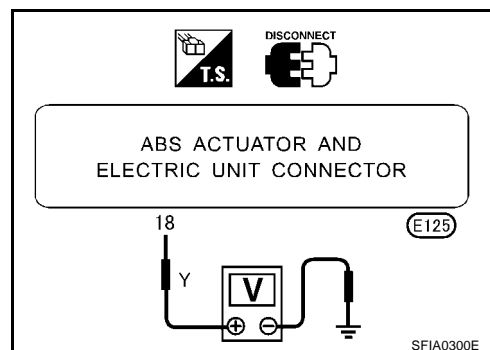
- Yes >> GO TO 6.
No >> Repair harness and connectors.

6. CHECK SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check voltage between ABS actuator and electric unit (control unit) connector terminal 18 and ground.

Does battery voltage exist?

- Yes >> Replace ABS actuator and electric unit (control unit).
No >> Check the following.
- Harness connector E125
 - Harness for open or short between ABS actuator and electric unit (control unit) and fusible link
If NG, repair harness or connectors.



7. REPLACE FUSIBLE LINK

Replace fusible link.

Does the fusible link blow out when ignition switch is turned ON?

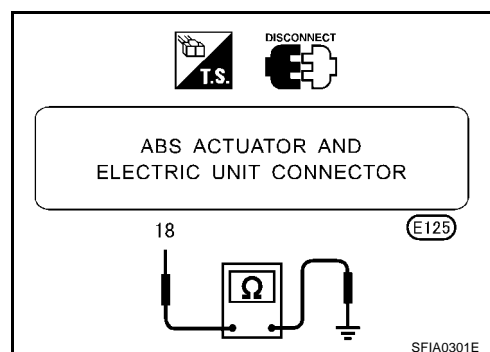
- Yes >> GO TO 8.
No >> **INSPECTION END.**

8. CHECK RELAY UNIT POWER SUPPLY CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between ABS actuator and electric unit (control unit) connector terminal 18 (Y) and ground.

Does continuity exist?

- Yes >> Check the following.
- Harness connector E125
 - Harness for open or short between ABS actuator and electric unit (control unit) and fusible link
If NG, repair harness or connectors.
- No >> ● Replace ABS actuator and electric unit (control unit).
Refer to [BRC-44, "Removal and Installation"](#) .



9. REPLACE FUSE

Replace fuse.

Does the fuse blow out when ignition switch is turned ON?

Yes >> Check the following.

- Harness connector E125
- Harness for open or short between ABS actuator and electric unit (control unit) and fuse
If NG, repair harness or connectors.

No >> **INSPECTION END.**

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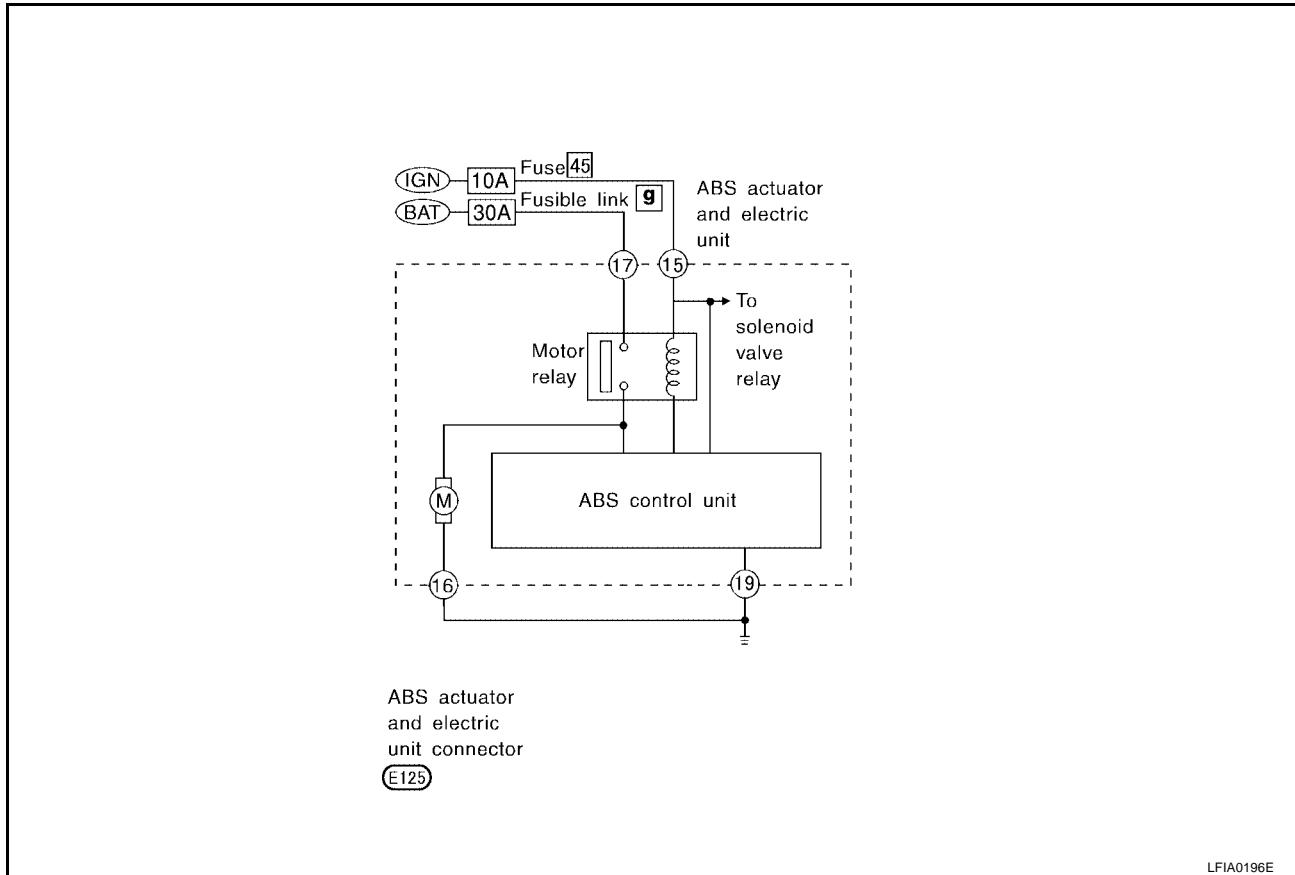
M

Motor Relay or Motor DIAGNOSTIC PROCEDURE

- ① With CONSULT-II: Malfunction code No. C1111
- ⊗ Without CONSULT-II: Malfunction code No. 61

1. INSPECTION START

ABS motor relay inspection.



>> GO TO 2.

2. CHECK MOTOR POWER SUPPLY CIRCUIT

Check 30A [g] fusible link (ABS MTR) for ABS motor relay. For fusible link layout, refer to [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#).

Is fusible link OK?

- Yes >> GO TO 3.
- No >> GO TO 6.

3. CHECK CONNECTOR

1. Disconnect ABS actuator and electric unit (control unit) connector. Check terminals for damage or loose connection. Then reconnect connectors.
2. Carry out self-diagnosis again.

Does warning lamp activate again?

- Yes >> GO TO 4.
- No >> **INSPECTION END.**

4. CHECK MOTOR RELAY POWER SUPPLY CIRCUIT

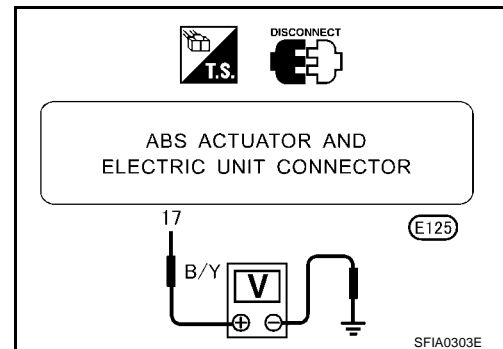
1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check voltage between ABS actuator and electric unit (control unit) connector terminal 17 and ground.

Does battery voltage exist?

Yes >> GO TO 5.

No >> Check the following.

- Harness connector E125
- Harness for open or short between ABS actuator and electric unit (control unit) and fusible link
If NG, repair harness or connectors.



5. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

Refer to [BRC-25, "ABS ACTUATOR AND ELECTRIC UNIT \(CONTROL UNIT\) GROUND"](#).

Is ground circuit OK?

Yes >> Replace ABS actuator and electric unit (control unit).

No >> Check the following.

- Harness connector E125
- Harness for open or short between ABS actuator and electric unit (control unit) and ground
If NG, repair harness or connectors.

6. REPLACE FUSIBLE LINK

Replace fusible link.

Does the fusible link blow out when ignition switch is turned ON?

Yes >> GO TO 7.

No >> **INSPECTION END.**

7. CHECK ABS ACTUATOR MOTOR POWER SUPPLY CIRCUIT

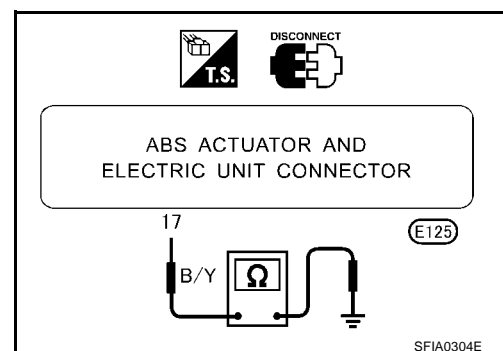
1. Disconnect battery cable and ABS actuator and electric unit (control unit) connector.
2. Check continuity between ABS actuator and electric unit (control unit) connector terminal 17 and ground.

Does continuity exist?

Yes >> Check the following.

- Harness connector E125
- Harness for open or short between ABS actuator and electric unit (control unit) and fusible link
If NG, repair harness or connectors.

No >> Check ABS actuator and electric unit (control unit) pin terminals for damage or the connection of ABS actuator and electric unit (control unit) harness connector. Reconnect ABS actuator and electric unit (control unit) harness connector. Then retest.



Abnormal Battery Voltage DIAGNOSTIC PROCEDURE

EFS0026W

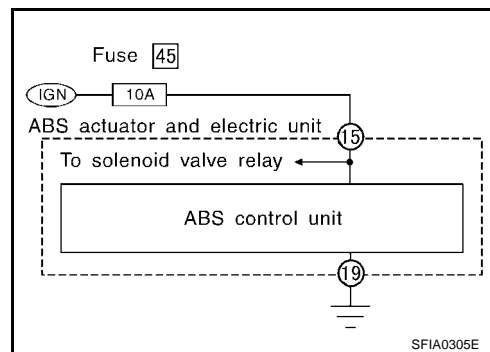
Ⓜ With CONSULT-II: Malfunction code No. C1109

ⓧ Without CONSULT-II: Malfunction code No. 57

1. INSPECTION START

ABS actuator and electric unit (control unit) power supply and ground circuit inspection.

>> GO TO 2.



2. CHECK CONNECTOR

1. Disconnect ABS actuator and electric unit (control unit) connector. Check terminals for damage or loose connections. Then reconnect connector.
2. Carry out self-diagnosis again.

Does warning lamp activate again?

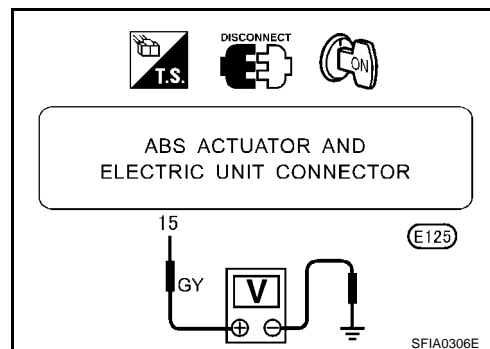
- Yes >> GO TO 3.
 No >> **INSPECTION END.**

3. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check voltage between ABS actuator and electric unit (control unit) connector terminal 15 and ground.

Does battery voltage exist when ignition switch is turned ON?

- Yes >> GO TO 4.
 No >> GO TO 5.



4. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND

Refer to [BRC-25, "ABS ACTUATOR AND ELECTRIC UNIT \(CONTROL UNIT\) GROUND"](#) .

Is ground circuit OK?

- OK >> Check ABS actuator and electric unit (control unit) pin terminals for damage or the connection of ABS actuator and electric unit (control unit) harness connector. Reconnect ABS actuator and electric unit (control unit) harness connector. Then retest.
- NG >> Check the following.
- Harness connector E125
 - Harness for open or short between ABS actuator and electric unit (control unit) and ground
 If NG, repair harness or connectors.

5. CHECK FUSE

Check 10A fuse 45 (Engine control) for ABS actuator and electric unit (control unit). Refer to [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#) .

Is fuse OK?

- Yes >> GO TO 6.
 No >> If fuse is blown, be sure to eliminate cause of problem before installing new fuse.

6. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT

1. Turn ignition switch to ON position.
2. Check continuity between battery and ABS actuator and electric unit (control unit) connector terminal 15.

Does continuity exist?

- Yes >> Check battery. Refer to [SC-4, "BATTERY"](#) .
 No >> Check the following.

- Harness connector E125
- Harness for open or short between ABS actuator and electric unit (control unit) and fuse
If NG, repair harness or connectors.

Controller Failure DIAGNOSTIC PROCEDURE

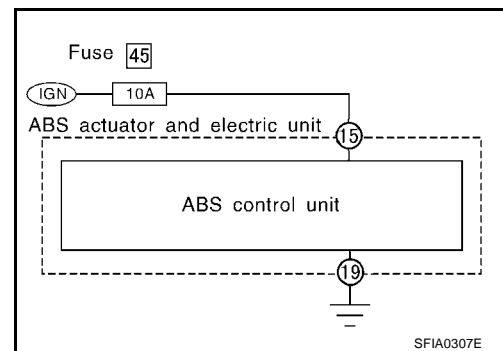
EFS0026X

- With CONSULT-II: Malfunction code No. C1110
 Without CONSULT-II: Malfunction code No. 71

1. INSPECTION START

ABS actuator and electric unit (control unit) power supply and ground circuit inspection

>> GO TO 2.

**2. CHECK CONNECTOR**

1. Disconnect ABS actuator and electric unit (control unit) connector. Check terminals for damage or loose connections. Then reconnect connectors.
2. Carry out self-diagnosis again.

Does warning lamp activate again?

- Yes >> GO TO 3.
 No >> **INSPECTION END.**

3. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT

Check voltage. Refer to [BRC-33, "DIAGNOSTIC PROCEDURE"](#) .

Does battery voltage exist when ignition switch is turned ON?

- Yes >> GO TO 4.
 No >> Repair.

4. CHECK WARNING LAMP INDICATION

Does warning lamp indicate code No. 71 again?

- Yes >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-44, "Removal and Installation"](#) .
 No >> Inspect the system according to the code No.

TROUBLE DIAGNOSES FOR SYMPTOMS**1. ABS Works Frequently****1. CHECK BRAKE FLUID PRESSURE**

Check brake fluid pressure distribution.
Refer to [BR-29, "Inspection"](#) .

Is brake fluid pressure distribution normal?

Yes >> GO TO 2.

No >> Perform Preliminary Check. Refer to [BRC-23, "Preliminary Check"](#) .

2. CHECK WHEEL SENSOR

1. Check wheel sensor connector for terminal damage or loose connections.

2. Perform wheel sensor check.

Refer to [BRC-27, "Wheel Sensor or Rotor"](#) .

Are wheel sensors functioning properly?

Yes >> GO TO 3.

No >> Repair.

3. CHECK FRONT AXLE

Check front and rear axles for excessive looseness. Refer to [FAX-5, "Front Wheel Bearing"](#) or [RAX-5, "Rear Wheel Bearing"](#) .

Are front axles installed properly?

Yes >> Go to [BRC-36, "2. Unexpected Pedal Action"](#) .

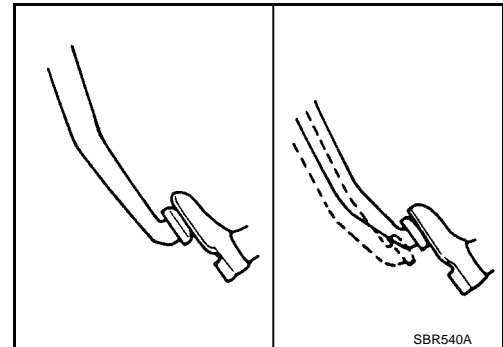
No >> Repair.

2. Unexpected Pedal Action**1. CHECK BRAKE PEDAL STROKE**

Check brake pedal stroke. Is stroke excessively large?

Yes >> Perform Preliminary Check. Refer to [BRC-23, "Preliminary Check"](#) .

No >> GO TO 2.

**2. CHECK CONNECTOR AND PERFORMANCE**

1. Disconnect ABS actuator and electric unit (control unit) connector.

2. Check whether brake is effective.

OK or NG

Yes >> GO TO 3.

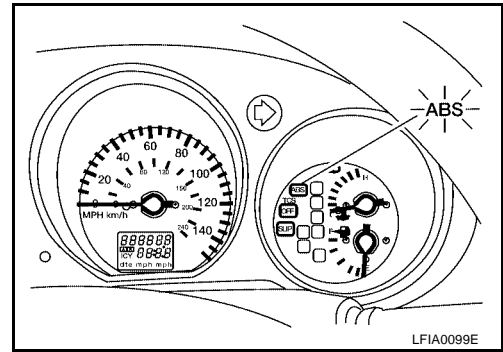
No >> Perform Preliminary Check. Refer to [BRC-23, "Preliminary Check"](#) .

3. CHECK WARNING LAMP INDICATION

Ensure warning lamp remains off while driving.

Is warning lamp turned off?

- Yes >> GO TO 4.
- No >> Carry out self-diagnosis. Refer to [BRC-16. "SELF-DIAGNOSIS PROCEDURE"](#) .



4. CHECK WHEEL SENSOR

1. Check wheel sensor connector for terminal damage or loose connection.
2. Perform wheel sensor mechanical check.

Is wheel sensor mechanism OK?

- Yes >> Check ABS actuator and electric unit (control unit) pin terminals for damage or the connection of ABS actuator and electric unit (control unit) harness connector. Reconnect ABS actuator and electric unit (control unit) harness connector. Then retest.
- No >> Repair.

3. Long Stopping Distance

EFS00270

1. CHECK CONNECTOR AND PERFORMANCE

1. Cancel ABS by disconnecting ABS actuator and electric unit (control unit) connector.
2. Check whether stopping distance is still long.

OK or NG?

- OK >> Perform Preliminary Check and air bleeding.
- NG >> Go to [BRC-36. "2. Unexpected Pedal Action"](#) .

NOTE:

Stopping distance may be longer than vehicles without ABS when road condition is slippery.

4. ABS Does Not Work

EFS00271

1. CHECK WARNING LAMP INDICATION

Does the ABS warning lamp activate?

- Yes >> Carry out self-diagnosis. Refer to [BRC-16. "SELF-DIAGNOSIS PROCEDURE"](#) .
- No >> Go to [BRC-36. "2. Unexpected Pedal Action"](#) .

NOTE:

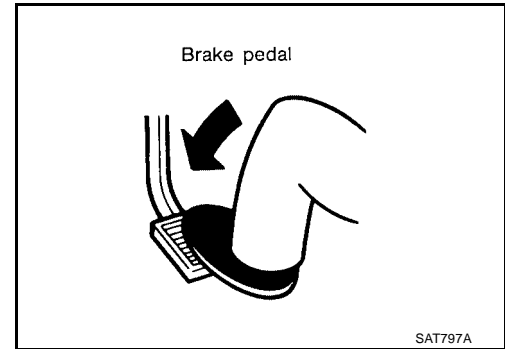
ABS does not work when vehicle speed is under 10 km/h (6 MPH).

5. Pedal Vibration and Noise

1. INSPECTION START

Pedal vibration and noise inspection.

>> GO TO 2.



2. CHECK SYMPTOM

1. Apply brake.
2. Start engine.

Does the symptom appear only when engine is started?

- Yes >> Carry out self-diagnosis. Refer to [BRC-16, "SELF-DIAGNOSIS PROCEDURE"](#) .
 No >> GO TO 3.

3. RECHECK SYMPTOM

Does the symptom appear when electrical equipment switches (such as headlamp) are operated?

- Yes >> **INSPECTION END.**
 No >> Go to [BRC-36, "2. Unexpected Pedal Action"](#) .

NOTE:

ABS may operate and cause vibration under any of the following conditions.

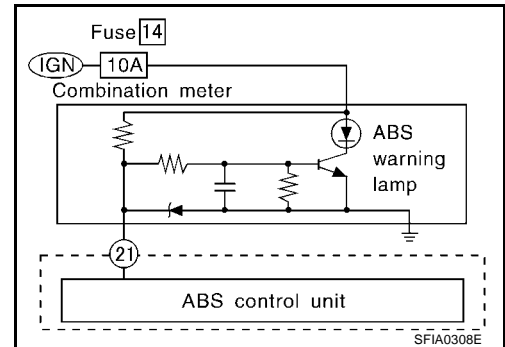
- Applying brake gradually when shifting or operating clutch.
- Low friction (slippery) road.
- High speed cornering.
- Driving over bumps and pot holes.
- Engine speed is over 5,000 rpm with vehicle stopped.

6. ABS Warning Lamp Does Not Come On When Ignition Switch Is Turned On

1. INSPECTION START

Warning lamp circuit inspection.

>> GO TO 2.



2. CHECK FUSE

Check 10A fuse No. 14 for warning lamp. For fuse layout, refer to [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#).

Is fuse OK?

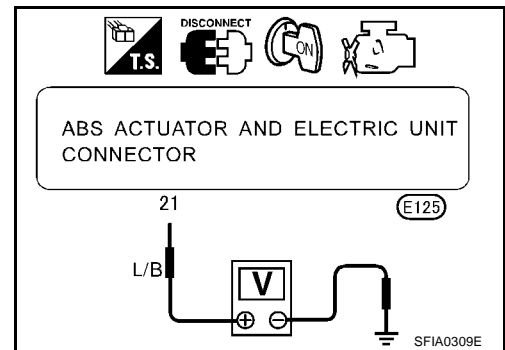
- Yes >> GO TO 3.
- No >> If fuse is blown, be sure to eliminate cause of problem before installing new fuse.

3. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT

1. Install 10A fuse.
2. Remove solenoid valve relay.
3. Disconnect connectors from ABS actuator and electric unit (control unit).
4. Check voltage between ABS actuator and electric unit (control unit) connector terminal 21 and ground after turning ignition switch ON.

Does battery voltage exist after turning ignition switch ON?

- Yes >> GO TO 5.
- No >> GO TO 4.

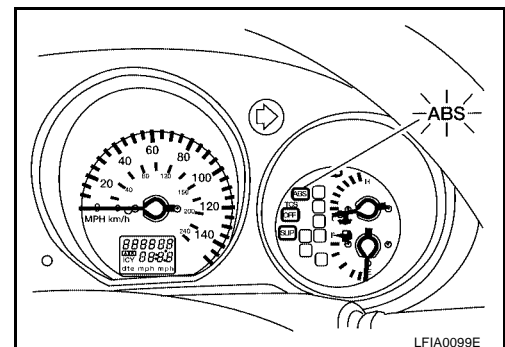


4. CHECK WARNING LAMP INDICATION

Disconnect ABS actuator and electric unit (control unit) connector.

Does the ABS warning lamp activate?

- Yes >> GO TO 6.
- No >> GO TO 5.

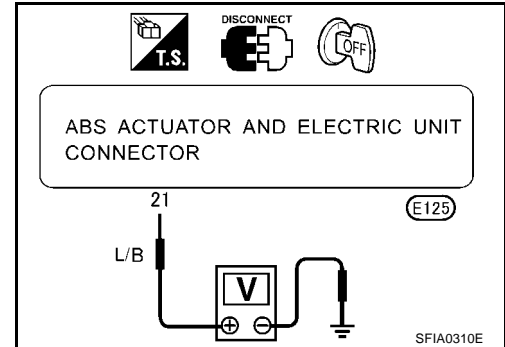


5. CHECK HARNESS FOR SHORT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check voltage between ABS actuator and electric unit (control unit) connector terminal 21 and ground.

Does battery voltage exist?

- Yes >> Check combination meter. Refer to [DI-4, "COMBINATION METERS"](#).
- No >> Repair harness and connectors between fuse and ABS actuator and electric unit (control unit) connector terminal 21.



6. CHECK HARNESS CONNECTOR

Check ABS actuator and electric unit (control unit) pin terminals for damage or connection of ABS actuator and electric unit (control unit) harness connector. Reconnect ABS actuator and electric unit (control unit) harness connector. Then reset.

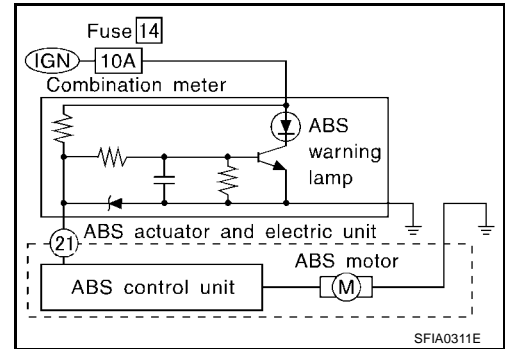
- OK >> **INSPECTION END.**
- NG >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-44, "Removal and Installation"](#)

7. ABS Warning Lamp Stays On When Ignition Switch Is Turned On

1. INSPECTION START

ABS actuator and electric unit (control unit) inspection.

>> GO TO 2.



2. CHECK WARNING LAMP

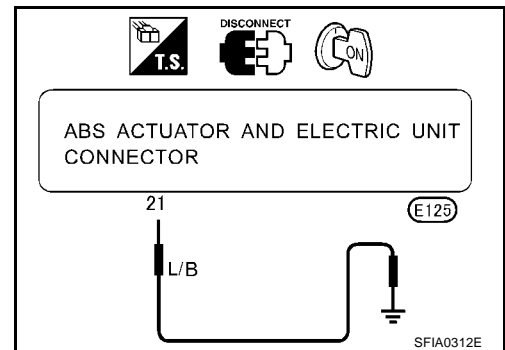
1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Connect suitable wire between ABS actuator and electric unit (control unit) connector terminal 21 and ground.

Does warning lamp activate?

Yes >> GO TO 3.

No >> Repair combination meter. Check the following.

- Harness connector E125
- Harness for open or short between ABS actuator and electric unit (control unit) and fuse. If NG, repair harness or connector.



3. CHECK HARNESS CONNECTOR

Check ABS actuator and electric unit (control unit) pin terminals for damage or the connection of ABS actuator and electric unit (control unit) harness connector. Reconnect ABS actuator and electric unit (control unit) harness connector. Then retest.

OK >> INSPECTION END.

NG >> GO TO 4.

4. CHECK ABS MOTOR GROUND

1. Turn ignition switch OFF.
2. Check continuity between ABS motor and ground.

Does continuity exist?

Yes >> Replace ABS actuator and electric unit (control unit).

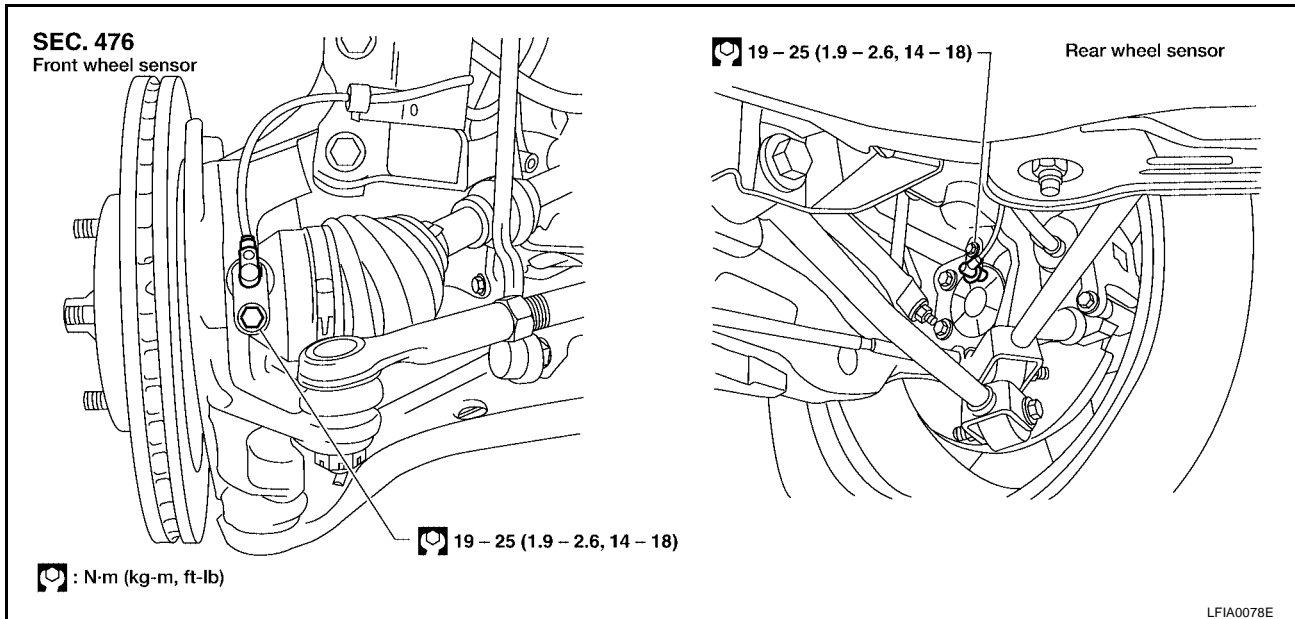
No >> Check the following.

- ABS motor ground harness
- ABS motor ground harness for open or short between ABS motor and ground. If NG, repair harness.

WHEEL SENSORS

Removal and Installation

EFS00275



CAUTION:

Be careful not to damage sensor edge and sensor rotor teeth.

When removing the front or rear wheel hub assembly, first remove the ABS wheel sensor from the assembly. Failure to do so may result in damage to the sensor wires making the sensor inoperative.

CAUTION:

Pull out the sensor being careful to turn it as little as possible. Do not pull on the sensor harness.

Installation should be performed while paying attention to the following, and then tighten mounting bolts and nuts to the specified torque.

- **Check if foreign objects such as iron fragments are adhered to the pick-up part of the sensor or to the inside of the hole for mounting the sensor, or if a foreign object is caught in the surface of the mounting for the rotor. If something wrong is found, fix it and then install the sensor.**

SENSOR ROTOR

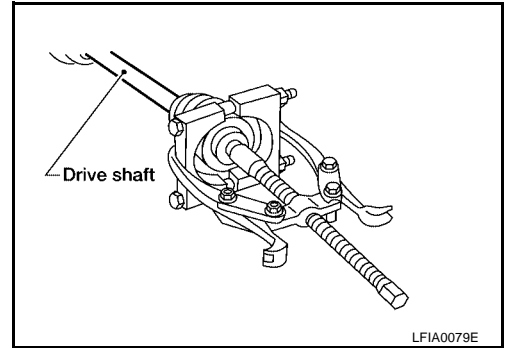
Removal and Installation

NOTE:

The rear wheel sensor rotor is built into the rear wheel hub. For removal and installation procedure, refer to [RAX-6, "Removal and Installation"](#) .

REMOVAL

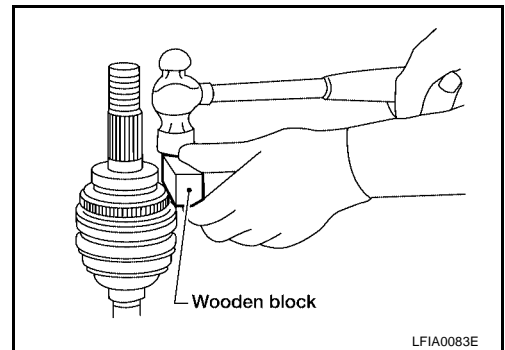
1. Remove the front wheel hub. Refer to [FAX-6, "Removal and Installation"](#) .
2. Remove the sensor rotor using suitable puller.



INSTALLATION

Install the sensor rotor using a hammer and a wooden block.

- Always replace sensor rotor with new one.



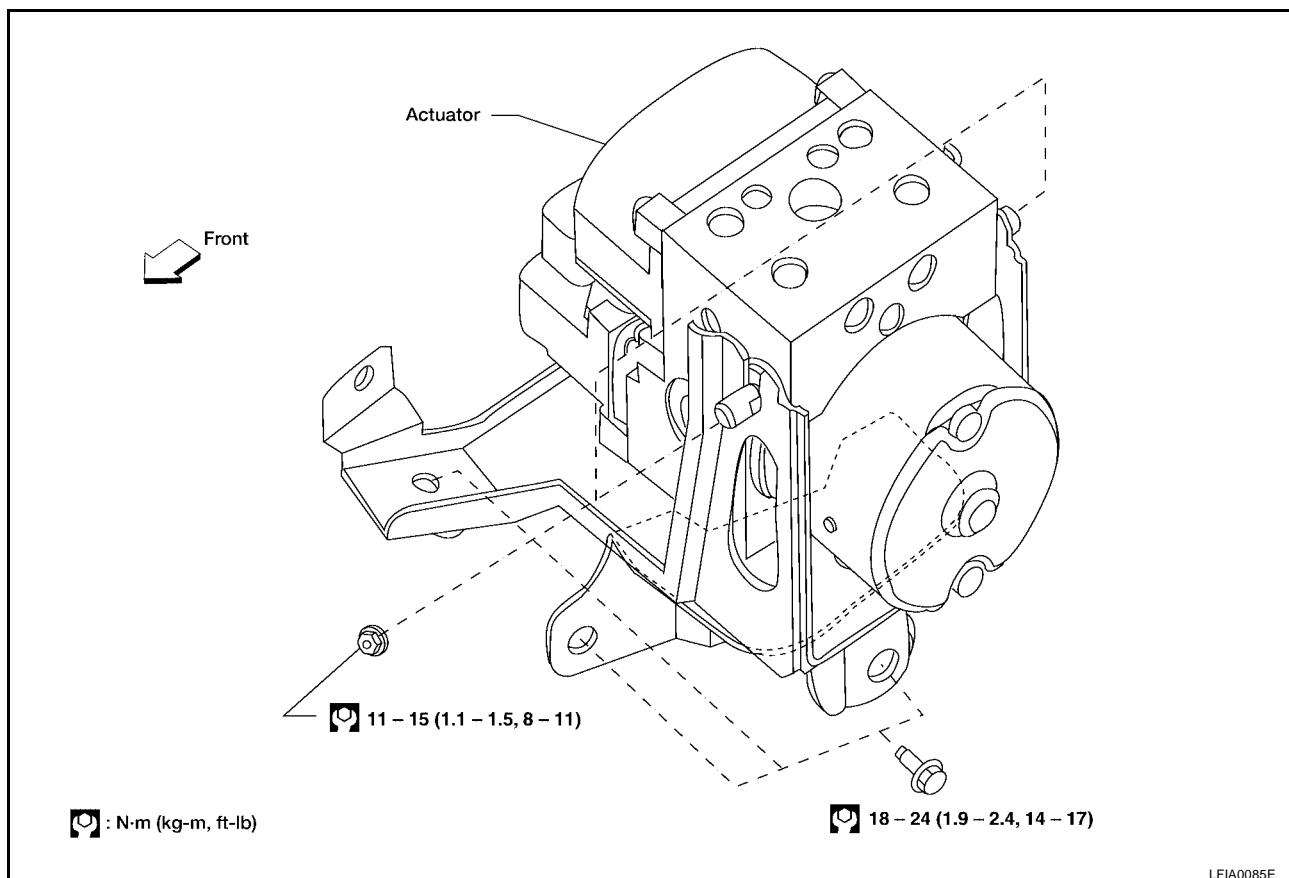
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ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

PF0:47660

Removal and Installation

EFS00277



REMOVAL

1. Disconnect battery cable.
2. Remove windshield wiper motor and linkage assembly. Refer to [WW-27, "REMOVAL"](#).
3. Drain brake fluid. Refer to [BR-8, "Changing Brake Fluid"](#).
4. Disconnect harness connectors from ABS actuator and electric unit (control unit).
5. Disconnect brake pipes.
6. Remove fixing nuts and bolts for ABS actuator and electric unit (control unit) and remove from vehicle.

INSTALLATION

CAUTION:

After installation of ABS actuator and electric unit (control unit), refill brake fluid. Then bleed air from system. Refer to [BR-8, "Bleeding Brake System"](#).

1. Position ABS actuator and electric unit (control unit) in vehicle.
2. Connect brake pipes and fixing nuts temporarily.
3. Tighten fixing nuts, bolts and brake pipes.
4. Connect ABS actuator and electric unit (control unit) harness connectors.
5. Install windshield wiper motor and linkage assembly. Refer to [WW-27, "INSTALLATION"](#).
6. Reconnect battery cable.

PRECAUTIONS

PFP:00001

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

EFS0037H

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.

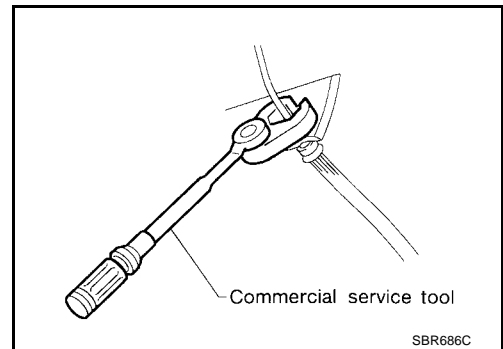
Precautions for Brake System

EFS00279

CAUTION:

- Recommended fluid is brake fluid “DOT 3”.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.
- Turn the ignition switch OFF and remove the connector of the ABS actuator control unit or the battery terminal before performing the work.
- Always torque brake lines when installing.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

Refer to [BR-23, "Brake Burnishing Procedure"](#)



SBR686C

WARNING:

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

Wiring Diagrams and Trouble Diagnosis

EFS0027A

When you read wiring diagrams, refer to the following:

- [GI-12, "How to Read Wiring Diagrams"](#)
- [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#)

When you perform trouble diagnosis, refer to the following:

- [GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"](#)
- [GI-25, "How to Perform Efficient Diagnosis for an Electrical Incident"](#)

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PREPARATION

[TCS/ABS]

PREPARATION

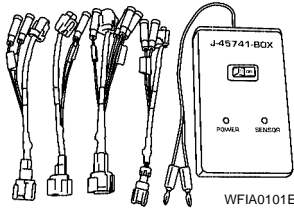
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Special Service Tool

EFS0037I

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

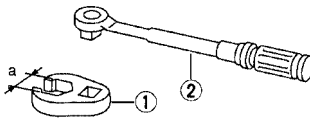
Tool number (Kent-Moore No.) Tool name	Description
(J-45741) ABS active wheel sensor tester	Checking operation of ABS active wheel sensor



Commercial Service Tools

EFS0037J

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



GENERAL INFORMATION

PFP:00000

Description
PURPOSE

EFS0027B

The ABS consists of electronic and hydraulic components. It allows for control of braking force so that locking of the wheels can be avoided.

The ABS:

- Ensures proper tracking performance through steering wheel operation.
- Enables obstacles to be avoided through steering wheel operation.
- Ensures vehicle stability by preventing flat spins.

ABS (ANTI-LOCK BRAKE SYSTEM) OPERATION

- When the vehicle speed is less than 10 km/h (6 MPH) this system does not work.
- The Anti-Lock Brake System (ABS) has self-test capabilities. The system turns on the ABS warning lamp for 1 second after turning the ignition switch ON. The system performs another test the first time the vehicle reaches 6 km/h (4 MPH). A mechanical noise may be heard as the ABS performs a self-test. This is a normal part of the self-test feature. If a malfunction is found during this check, the ABS warning lamp will come on.
- During ABS operation, a mechanical noise may be heard. This is a normal condition.

TCS (TRACTION CONTROL SYSTEM) OPERATION

- This system is designed to limit wheel slip during acceleration by cutting fuel to selected engine cylinders and changing the transmission shift schedule.
The ABS actuator and electric unit (control unit) monitors wheel speed slips through the ABS wheel speed sensors and determines the desired torque reduction needed to minimize wheel spin.
The torque reduction by the ABS actuator and electric unit (control unit) may result in a combination of fuel cutoff and transmission shift timing adjustments.
The torque reduction is sent from the ABS actuator and electric unit (control unit) through the CAN (Controller Area Network) to the ECM and the TCM. The ECM will cut fuel and/or the TCM will change transmission shift schedule to achieve torque reduction.
The TCS will be enabled when the TCS switch is in the ON position (TCS OFF indicator not illuminated), and if the catalytic converter temperature is within the normal operating range.
- During TCS operation, the system informs the driver of system operation by flashing the SLIP indicator lamp.
- This system has a self-diagnostic function. When the ignition switch is initially turned ON, the SLIP indicator lamp and TCS OFF indicator lamp will illuminate. If the ABS/TCS system is operating correctly, both indicator lamps will go out as soon as the engine starts.
- The TCS OFF switch cancels the TCS function. The TCS OFF indicator lamp then illuminates to indicate that the TCS system is not operating.
- This system utilizes a fuel-cut function to control drive torque. If fuel cut continues for an extended period of time during high-speed operation, the catalyst may melt and deteriorate. During continued TCS operation, the system will sometimes suspend the drive torque control function, preventing catalyst damage.

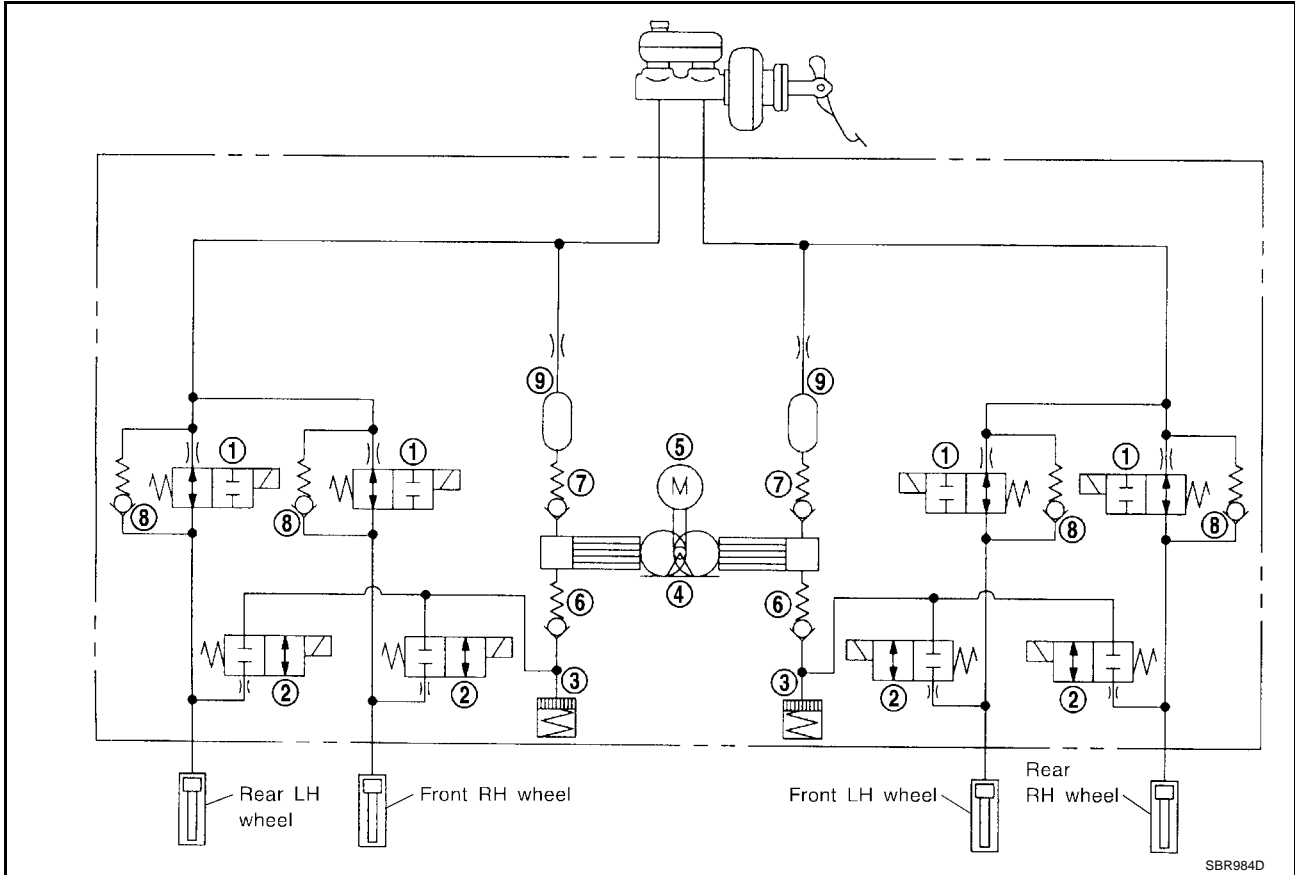
Fail Safe

EFS0027C

If trouble occurs in the ABS, the ABS warning lamp in the meter comes on. At the same time, the vehicle stops the ABS control and braking becomes the same as that of a vehicle without ABS.

Hydraulic Circuit

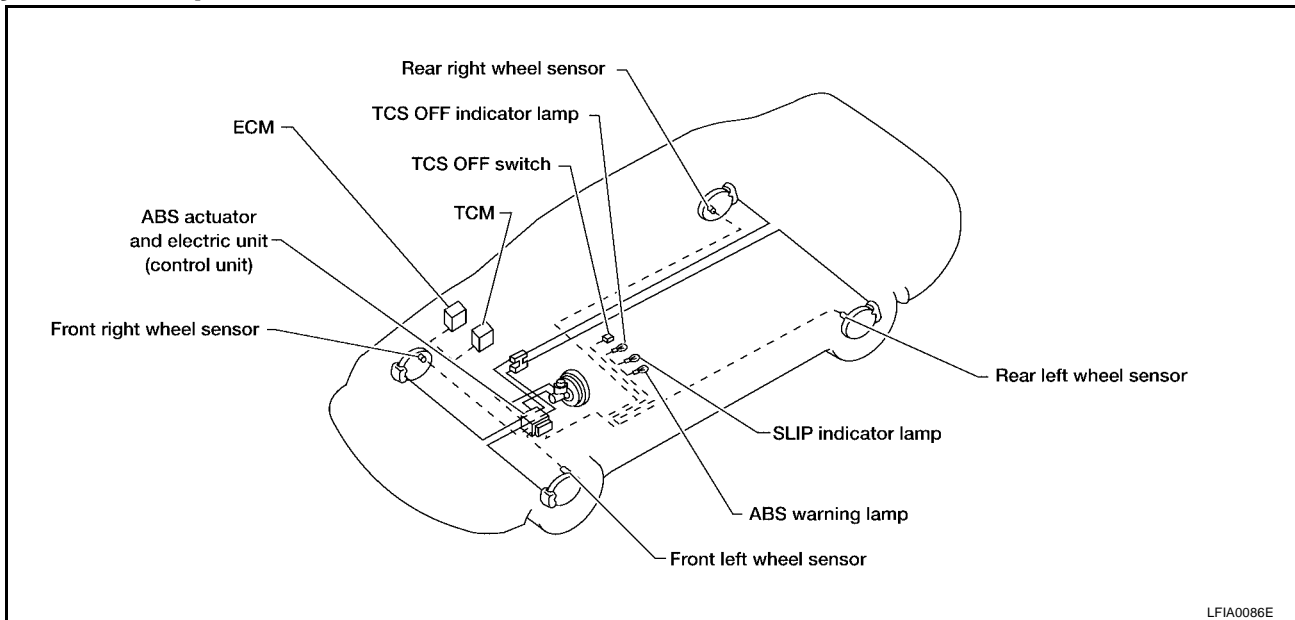
EFS0027D



- | | | |
|--------------------------|----------------|-----------------------|
| 1. Inlet solenoid valve | 4. Pump | 7. Outlet valve |
| 2. Outlet solenoid valve | 5. Motor | 8. Bypass check valve |
| 3. Reservoir | 6. Inlet valve | 9. Damper |

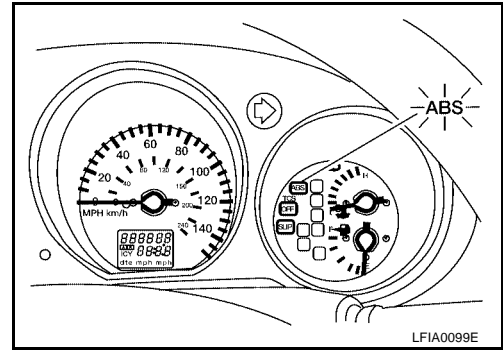
System Components

EFS0027E



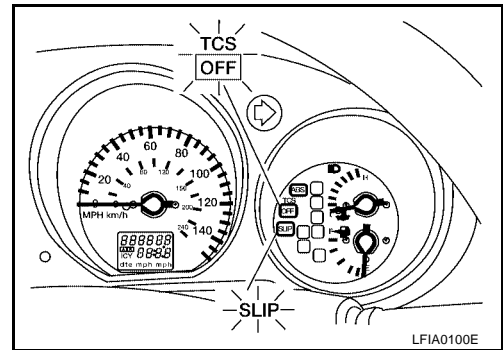
**Control Unit
ABS FUNCTION**

The control unit computes the wheel rotating speed by the signal sent from the sensor. Then it supplies a DC current to the actuator solenoid valve. It also controls ON-OFF operation of the valve relay and motor relay. If any electrical malfunction should be detected in the system, the warning lamp is turned on. In this condition, the ABS will be deactivated, and the vehicle's brake system reverts to normal operation.



TCS FUNCTION

Drive wheel slippage is detected by the 4-wheel rotating speed signal. When the wheel slip becomes excessive, the TCS operates, causing the SLIP indicator lamp to flash. At the same time, a fuel-cut signal to be sent to the ECM and a signal requiring a change in the shift schedule is sent to the TCM. When the TCS OFF switch is used to cancel TCS function, the TCS OFF indicator lamp will light. (TCS does not activate.) In case of a malfunction in the TCS, both the SLIP indicator lamp and the TCS OFF indicator lamp will light, while shutting down the TCS system operation. The vehicle will operate in the same way as a vehicle not equipped with TCS.



ABS Actuator and Electric Unit

The ABS actuator and electric unit (control unit) contains:

- An electric motor and pump
- Two relays
- Eight solenoid valves, each inlet and outlet for
 - LH front
 - RH front
 - LH rear
 - RH rear
- ABS control unit

These components control the hydraulic circuit. The ABS actuator and electric unit (control unit) directs the actuator to increase, hold or decrease hydraulic pressure to all or individual wheels. The ABS actuator and control unit (control unit) cannot be disassembled and must be replaced as an assembly.

ABS ACTUATOR OPERATION

		Inlet solenoid valve	Outlet solenoid valve	
Normal brake operation		OFF (Open)	OFF (Closed)	Master cylinder brake fluid pressure is directly transmitted to caliper via the inlet solenoid valve.
ABS operation	Pressure hold	ON (Closed)	OFF (Closed)	Hydraulic circuit is shut off to hold the caliper brake fluid pressure.
	Pressure decrease	ON (Closed)	ON (Open)	Caliper brake fluid is sent to reservoir via the outlet solenoid valve. Then it is pushed up to the master cylinder by pump.
	Pressure increase	OFF (Open)	OFF (Closed)	Master cylinder brake fluid pressure is transmitted to caliper.

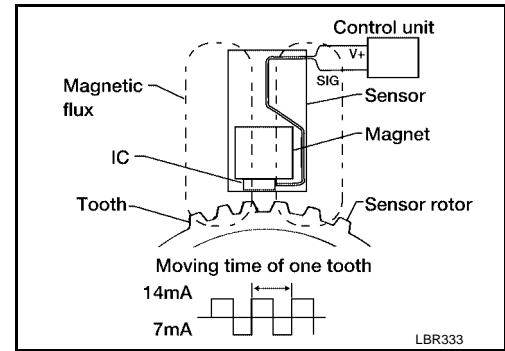
Wheel Sensors

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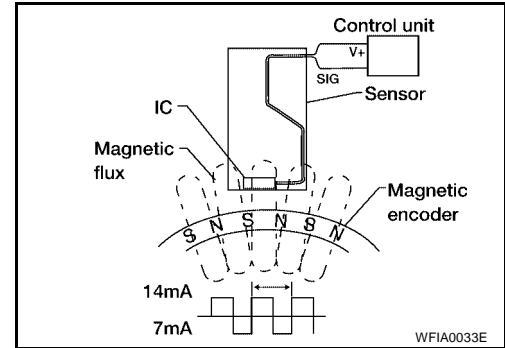
GENERAL INFORMATION

[TCS/ABS]

The front sensor units consist of a gear-shaped sensor rotor and a sensor element. The element contains a magnet around which a coil is wound. The front wheel sensors are installed on the front of the wheel knuckles. As the wheel rotates, the sensor generates a square-wave signal. The frequency increases as the wheel speed increases.



The rear sensor units consist of wheel hubs with a series of internal magnets and a sensor element. The rear wheel sensors are installed on the inner side of the wheel knuckles. As the wheel rotates, the sensor generates a square-wave signal. The frequency increases as the wheel speed increases.



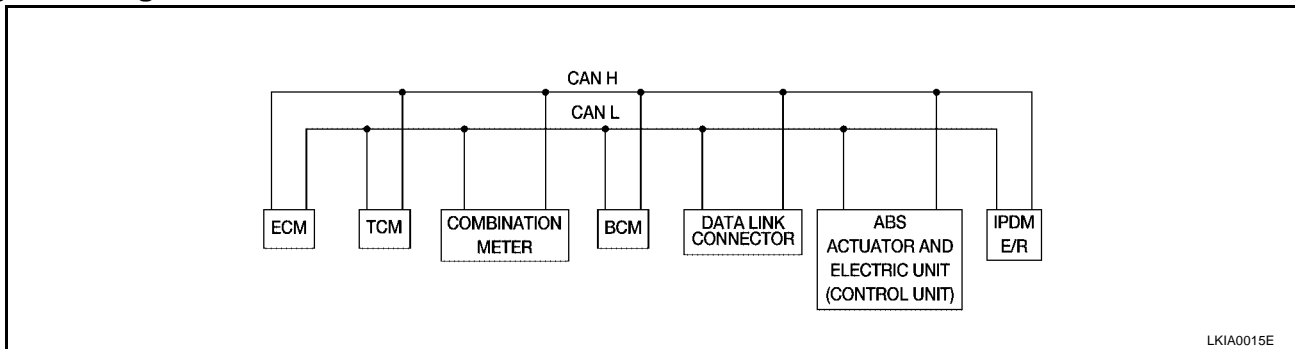
CAN Communication System Description

EFS00271

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.

FOR TCS MODELS

System diagram



LKIA0015E

Input/output signal chart

T: Transmit R: Receive

Signals	ECM	TCM	COMBINATION METER	BCM	ABS/TCS control unit	IPDM E/R
Engine speed signal	T		R		R	
Engine coolant temperature signal	T		R			
Accelerator pedal position signal	T					
Fuel consumption monitor signal	T		R			
A/T warning lamp signal		T	R			
A/T position indicator signal	R	T	R	R(R range only)	R	

GENERAL INFORMATION

[TCS/ABS]

Signals	ECM	TCM	COMBINATION METER	BCM	ABS/TCS control unit	IPDM E/R
ABS operation signal	R				T	
TCS operation signal	R	R			T	
Air conditioner switch signal	R			T		
Air conditioner compressor signal	R					T
A/C compressor request signal	T					R
Cooling fan motor operation signal	R					T
Cooling fan speed request signal	T					R
Position lights request			R	T		R
Position lights status				R		T
Low beam request				T		R
Low beam status	R			R		T
High beam request			R	T		R
High beam status	R			R		T
Front fog lights request				T		R
Front fog light status				R		T
OD cancel switch signal		R	T			R
Brake switch signal		R	T			
Vehicle speed signal	R		T			
	R		T	R		
Oil pressure switch			R			T
Sleep request1			R	T		
Sleep request2				T		R
N range switch signal		R	T			
P range switch signal		R	T			
Seat belt buckle switch signal			T	R		
Door switch signal			R	T		R
Tail lamp request			R	T		R
Turn indicator signal			R	T		
Buzzer output signal			R	T		
Trunk switch signal			R	T		
ASCD main switch signal	T		R			
ASCD cruise signal	T		R			
Wiper operation				R		T
Wiper stop position signal				R		T
Rear window defogger switch signal				T		R
Rear window defogger control signal	R			R		T

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TROUBLE DIAGNOSIS

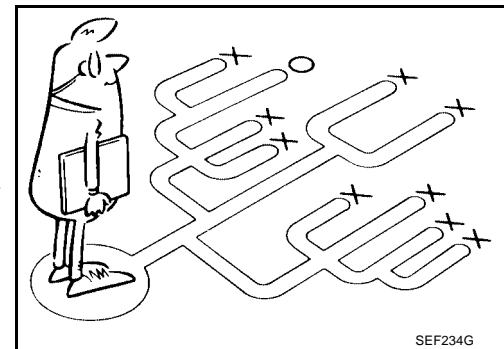
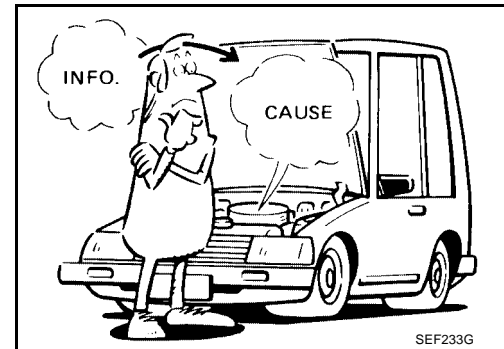
How to Perform Trouble Diagnoses for Quick and Accurate Repair INTRODUCTION

The ABS/TCS system has an electronic control unit to control major functions. The control unit accepts input signals from sensors and controls actuator operation. It is also important to check for conventional problems such as air leaks in the booster or lines, lack of brake fluid, or other problems with the brake system.

It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electrical connections or faulty wiring. In this case, careful checking of suspicious circuits may help prevent the replacement of good parts.

A visual check only may not find the cause of the problem, so a road test should be performed.

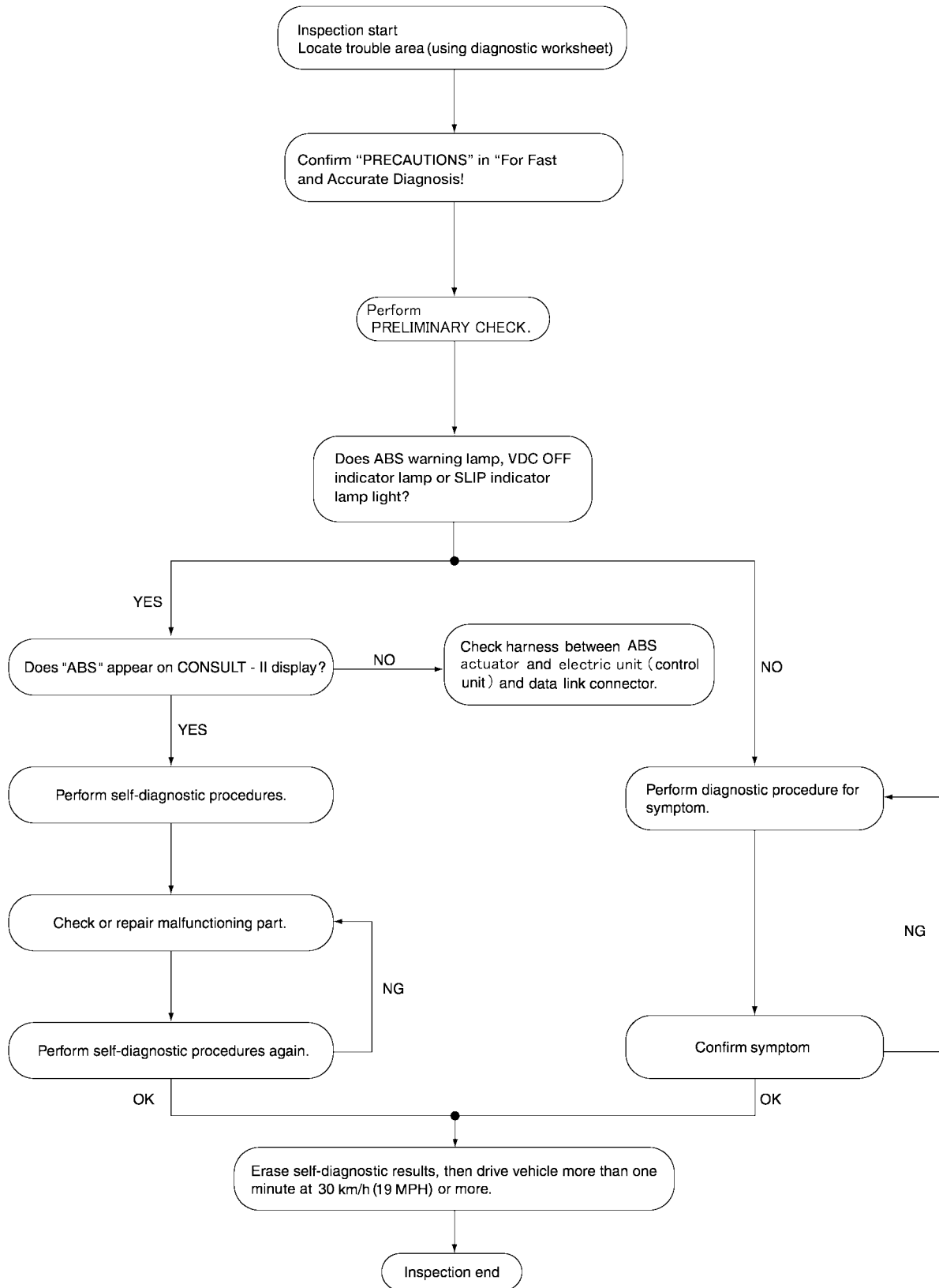
Before undertaking actual checks, take just a few minutes to talk with a customer who approaches with an ABS/TCS complaint. The customer is a very good source of information on such problems, especially intermittent ones. Through the talks with the customer, find out what symptoms are present and under what conditions they occur. Start your diagnosis by looking for "conventional" problems first. This is one of the best ways to troubleshoot brake problems on an ABS/TCS controlled vehicle. Also check related Service Bulletins for information.



TROUBLE DIAGNOSIS

[TCS/ABS]

WORK FLOW



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LFIA0199E

TROUBLE DIAGNOSIS

[TCS/ABS]

ASKING COMPLAINTS

- Complaints against a malfunction vary depending on each person. It is important to clarify the customer complaints.
- Ask the customer about what symptoms are present under what conditions. Use the information to reproduce the symptom while driving.
- It is also important to use the diagnosis sheet to understand what type of trouble the customer is having.

KEY POINTS

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

SBR339B

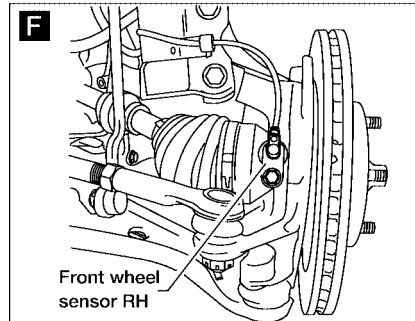
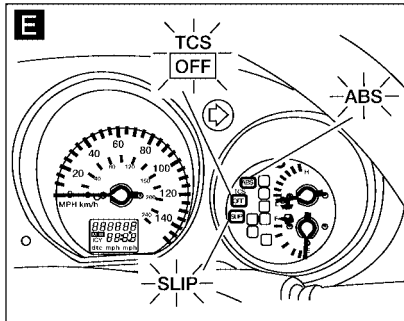
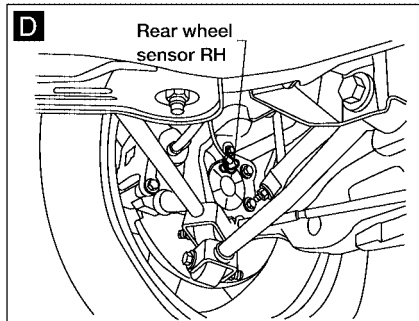
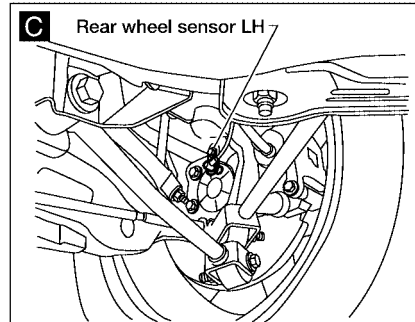
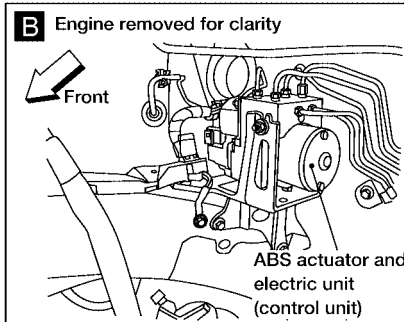
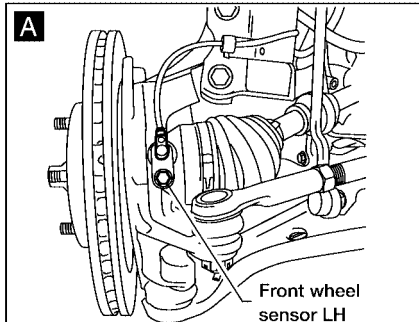
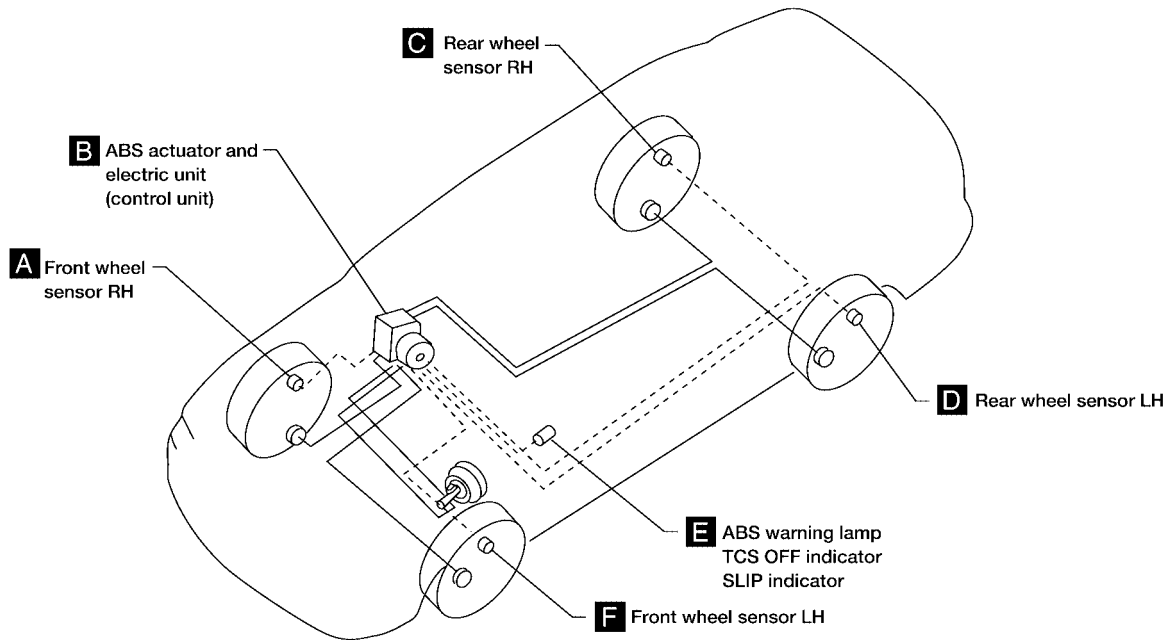
EXAMPLE OF DIAGNOSIS SHEET

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

LFIA0198E

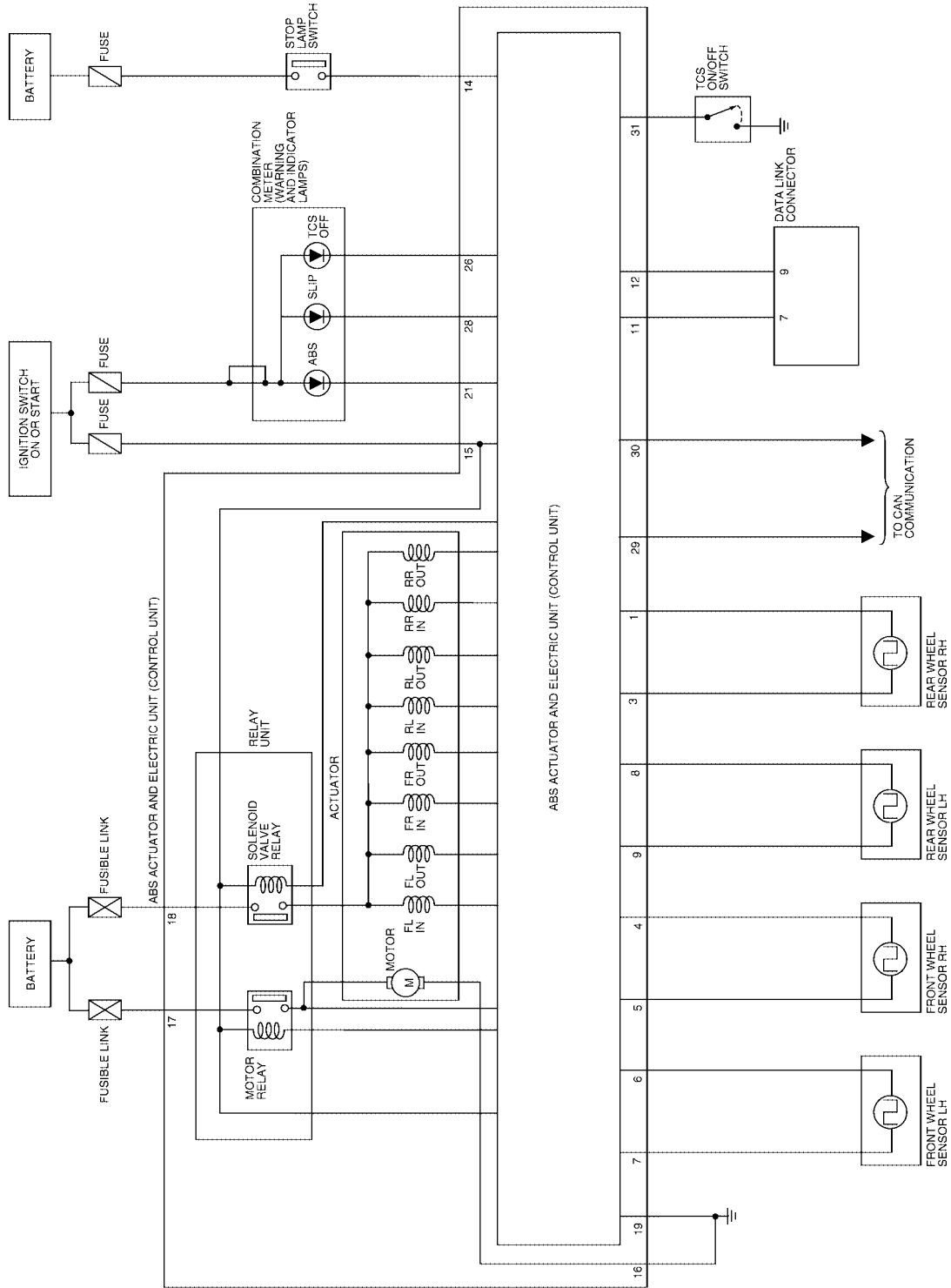
Component Parts and Harness Connector Location

EFS0027K



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Schematic



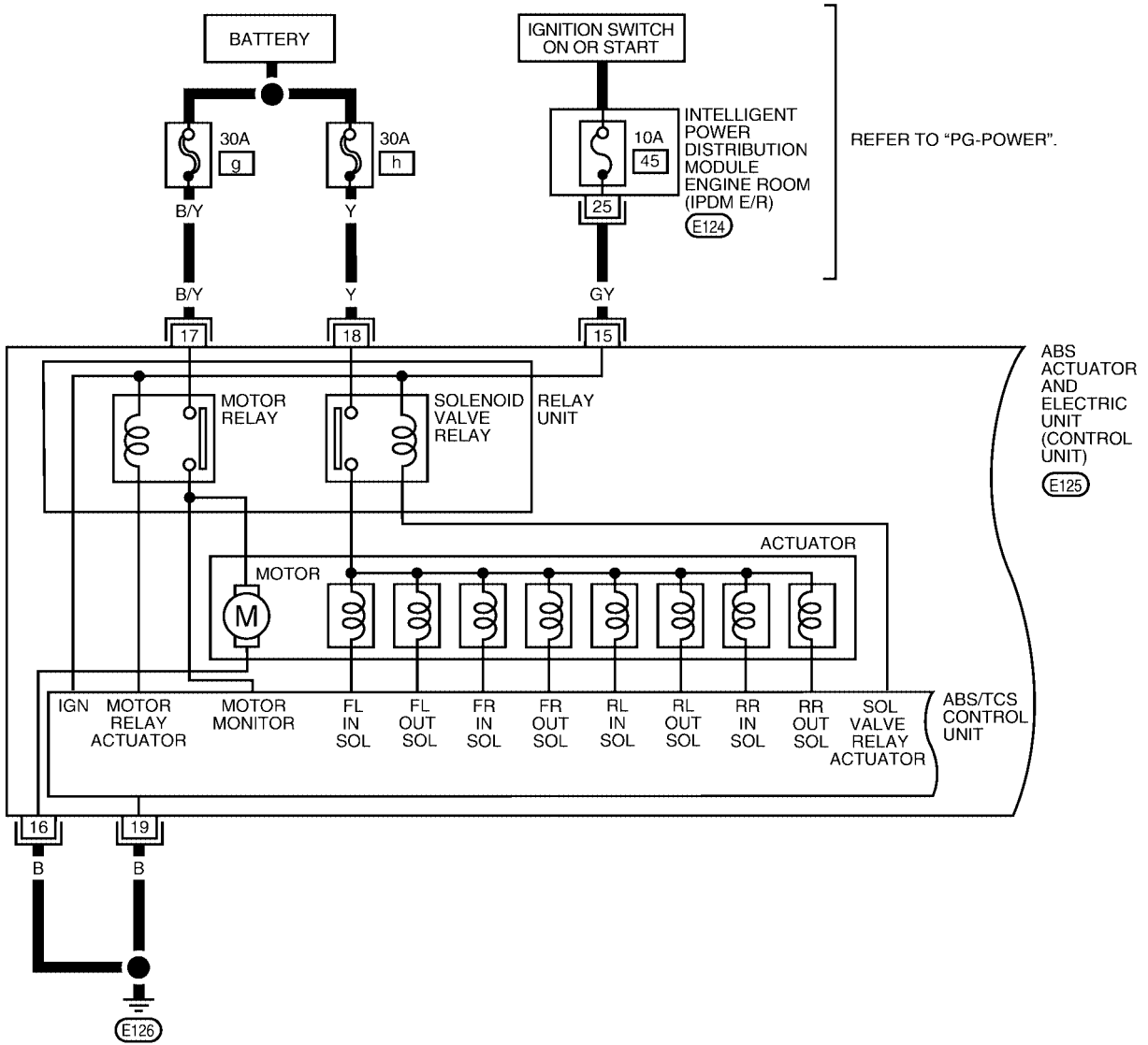
TROUBLE DIAGNOSIS

[TCS/ABS]

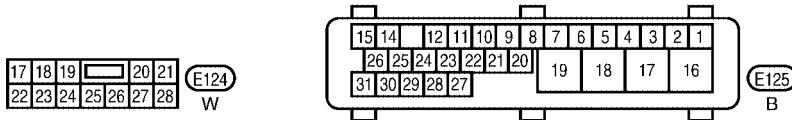
Wiring Diagram — TCS —

EFS0027M

BRC-TCS-01



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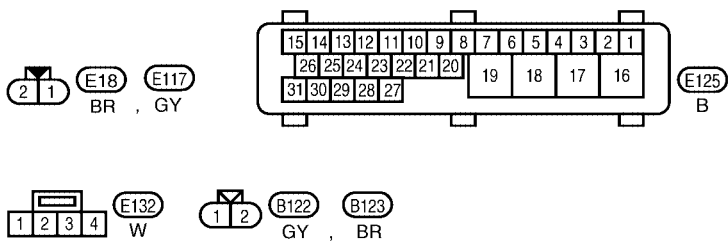
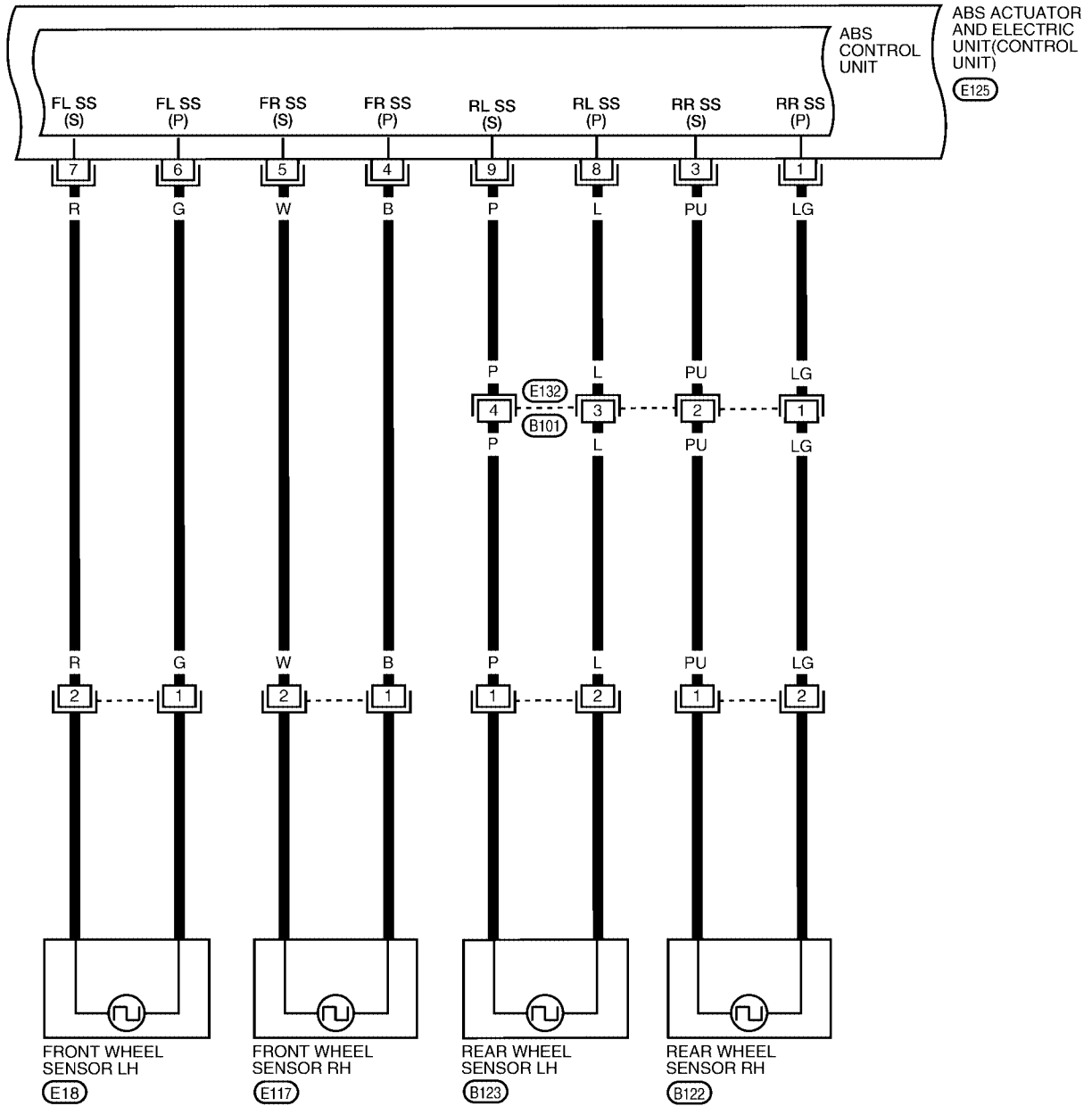


LFWA0014E

TROUBLE DIAGNOSIS

[TCS/ABS]

BRC-TCS-02



LFWA0015E

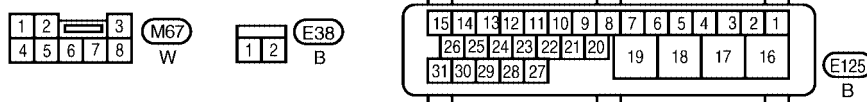
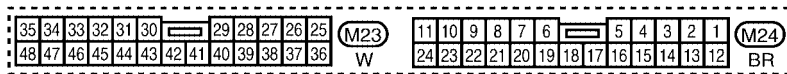
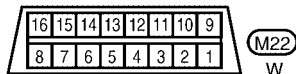
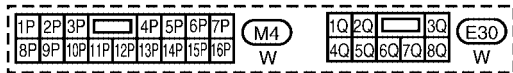
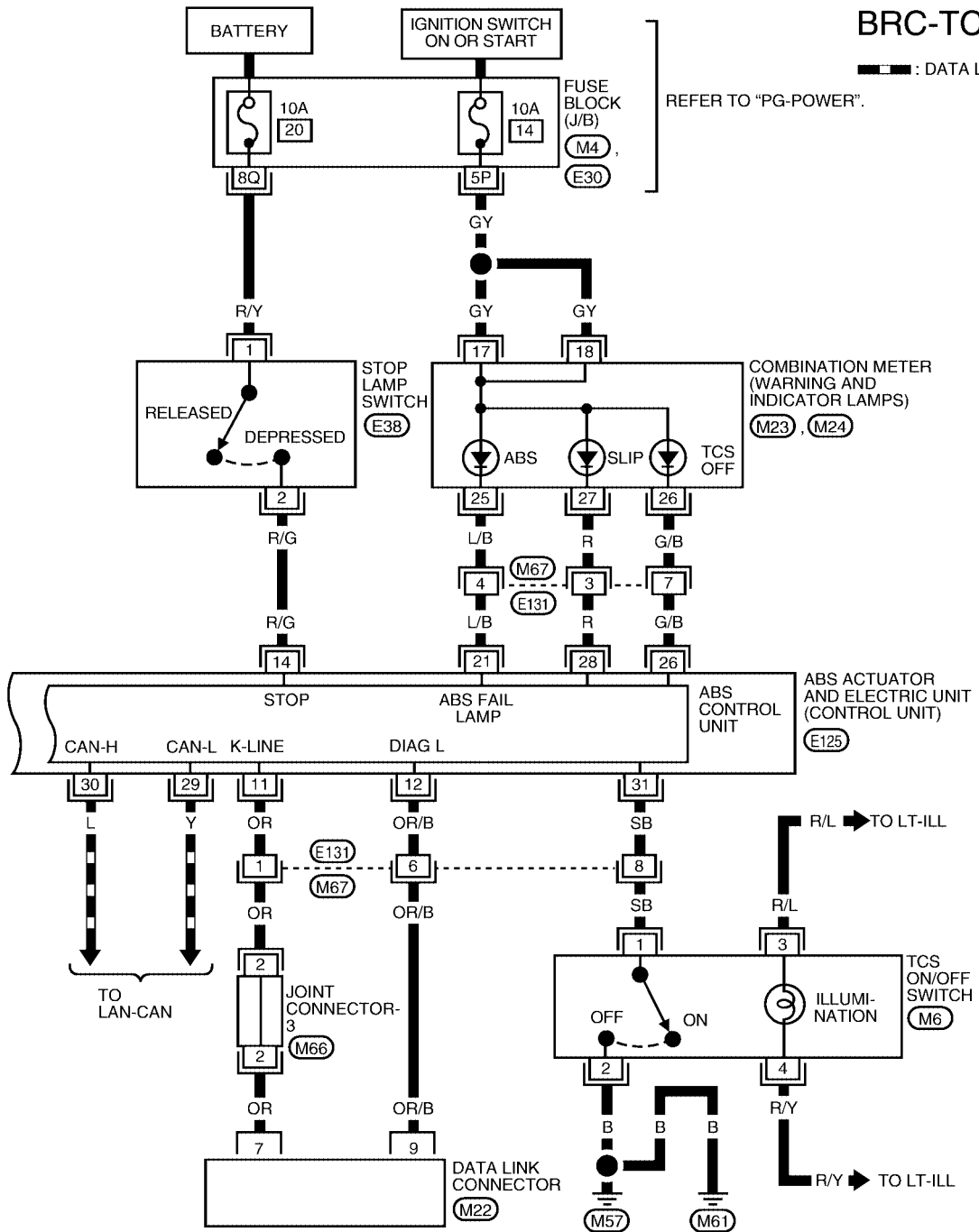
TROUBLE DIAGNOSIS

[TCS/ABS]

BRC-TCS-03

— : DATA LINE

REFER TO "PG-POWER".



REFER TO THE FOLLOWING.

(M66) - JOINT CONNECTOR (J/C)

LFWA0016E

TROUBLE DIAGNOSIS

[TCS/ABS]

EFS0027N

CONSULT-II Function CONSULT-II APPLICATION TO ABS/TCS

ITEM	SELF-DIAGNOSTIC RESULTS	DATA MONITOR	ACTIVE TEST
Front right wheel sensor	X	X	—
Front left wheel sensor	X	X	—
Rear right wheel sensor	X	X	—
Rear left wheel sensor	X	X	—
ABS sensor	X	—	—
Stop lamp switch	—	X	—
Front right inlet solenoid valve	X	X	X
Front right outlet solenoid valve	X	X	X
Front left inlet solenoid valve	X	X	X
Front left outlet solenoid valve	X	X	X
Rear right inlet solenoid valve	X	X	X
Rear right outlet solenoid valve	X	X	X
Rear left inlet solenoid valve	X	X	X
Rear left outlet solenoid valve	X	X	X
Actuator solenoid valve relay	X	X	—
Actuator motor relay	X	X	—
ABS warning lamp	—	X	—
Battery voltage	X	X	—
Control unit	X	—	—
Engine speed signal	X	X	—
ABS motor	X	X	X
A/T gear position signal	—	X	—
TCS OFF indicator lamp	—	X	—
SLIP indicator lamp	—	X	—
ECM	X	—	—
CAN communication circuit	X	—	—

X: Applicable

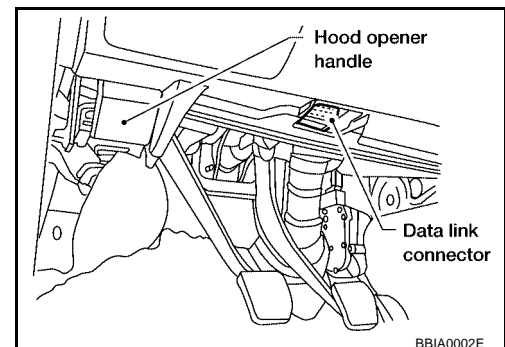
—: Not applicable

ECU (ABS/TCS Control Unit) Part Number Mode

Ignore the ECU part number displayed in the ECU PART NUMBER MODE. Refer to parts catalog to order the ECU.

SELF-DIAGNOSIS PROCEDURE

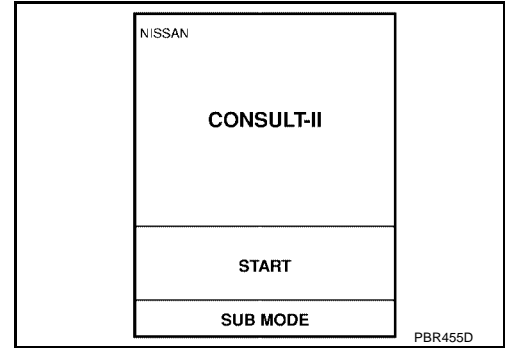
1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector.



TROUBLE DIAGNOSIS

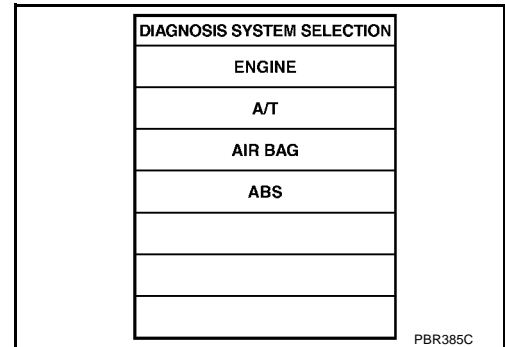
[TCS/ABS]

3. Start engine.
4. Drive vehicle over 30 km/h (19 MPH) for at least one minute.
5. Stop vehicle with engine running and touch "START" on CONSULT-II screen.



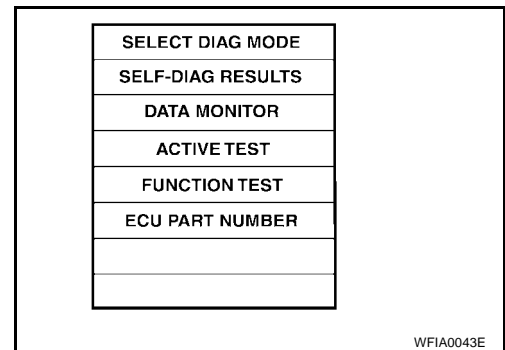
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6. Touch "ABS".



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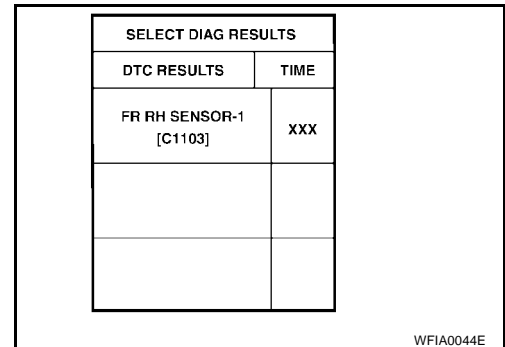
7. Touch "SELF-DIAG RESULTS".
 - The screen shows the detected malfunction and how many times the ignition switch has been turned since the malfunction.



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8. Make the necessary repairs following the diagnostic procedures.
9. After the malfunctions are repaired, erase the self-diagnostic results stored in the control unit by touching "ERASE".
10. Check ABS warning lamp for deactivation after driving vehicle over 30 km/h (19 MPH) for at least one minute.

NOTE:
"SELF-DIAG RESULTS" screen shows the detected malfunction and how many times the ignition switch has been turned since the malfunction.



M

TROUBLE DIAGNOSIS

[TCS/ABS]

SELF-DIAGNOSTIC RESULTS MODE

Diagnostic item	Diagnosed condition	Diagnostic item is detected when...	Reference Page
FR RH SENSOR-1 [C1103]*1	Open	<ul style="list-style-type: none"> ● Circuit for front right wheel sensor is open. 	BRC-73
FR LH SENSOR-1 [C1104]*1	Open	<ul style="list-style-type: none"> ● Circuit for front left wheel sensor is open. 	BRC-73
RR RH SENSOR-1 [C1101]*1	Open	<ul style="list-style-type: none"> ● Circuit for rear right wheel sensor is open. 	BRC-73
RR LH SENSOR-1 [C1102]*1	Open	<ul style="list-style-type: none"> ● Circuit for rear left wheel sensor is open. 	BRC-73
FR RH SENSOR-2 [C1107]*1	Short	<ul style="list-style-type: none"> ● Circuit for front right wheel sensor is shorted. 	BRC-73
FR LH SENSOR-2 [C1108]*1	Short	<ul style="list-style-type: none"> ● Circuit for front left wheel sensor is shorted. 	BRC-73
RR RH SENSOR-2 [C1105]*1	Short	<ul style="list-style-type: none"> ● Circuit for rear right wheel sensor is shorted. 	BRC-73
RR LH SENSOR-2 [C1106]*1	Short	<ul style="list-style-type: none"> ● Circuit for rear left wheel sensor is shorted. 	BRC-73
ABS SENSOR [C1115]	Abnormal signal	<ul style="list-style-type: none"> ● Teeth damage on sensor rotor or improper installation of wheel sensor. 	BRC-73
FR RH IN ABS SOL [C1122]	Abnormal (Open, Short)	<ul style="list-style-type: none"> ● Circuit for front right inlet solenoid valve is open or shorted. (An excessively high or low output voltage is entered.) 	BRC-76
FR LH IN ABS SOL [C1120]	Abnormal (Open, Short)	<ul style="list-style-type: none"> ● Circuit for front left inlet solenoid valve is open or shorted. (An excessively high or low output voltage is entered.) 	BRC-76
FR RH OUT ABS SOL [C1123]	Abnormal (Open, Short)	<ul style="list-style-type: none"> ● Circuit for front right outlet solenoid valve is open or shorted. (An excessively high or low output voltage is entered.) 	BRC-76
FR LH OUT ABS SOL [C1121]	Abnormal (Open, Short)	<ul style="list-style-type: none"> ● Circuit for front left outlet solenoid valve is open or shorted. (An excessively high or low output voltage is entered.) 	BRC-76
RR RH IN ABS SOL [C1126]	Abnormal (Open, Short)	<ul style="list-style-type: none"> ● Circuit for rear right inlet solenoid valve is open or shorted. (An excessively high or low output voltage is entered.) 	BRC-76
RR LH IN ABS SOL [C1124]	Abnormal (Open, Short)	<ul style="list-style-type: none"> ● Circuit for rear left inlet solenoid valve is open or shorted. (An excessively high or low output voltage is entered.) 	BRC-76
RR RH OUT ABS SOL [C1127]	Abnormal (Open, Short)	<ul style="list-style-type: none"> ● Circuit for rear right outlet solenoid valve is open or shorted. (An excessively high or low output voltage is entered.) 	BRC-76
RR LH OUT ABS SOL [C1125]	Abnormal (Open, Short)	<ul style="list-style-type: none"> ● Circuit for rear left outlet solenoid valve is open or shorted. (An excessively high or low output voltage is entered.) 	BRC-76
MAIN RELAY [C1114]	Abnormal	<ul style="list-style-type: none"> ● Actuator solenoid valve relay is ON, even if control unit sends off signal. ● Actuator solenoid valve relay is OFF, even if control unit sends on signal. 	BRC-79
PUMP MOTOR [C1111]	Abnormal	<ul style="list-style-type: none"> ● Circuit for actuator motor is open or shorted. ● Actuator motor relay is stuck. 	BRC-79
BATTERY VOLTAGE [ABNORMAL] [C1109]	High or Low	<ul style="list-style-type: none"> ● Power source voltage supplied to ABS control unit is abnormally high or low. 	BRC-80
CONTROLLER FAILURE*2 [C1110]	Control Unit	<ul style="list-style-type: none"> ● Function of calculation in ABS control unit has malfunctioned. 	BRC-82
ENG SIG 1 [C1130]	Abnormal	<ul style="list-style-type: none"> ● Fuel cut control abnormal. 	BRC-73
ENG SIG 2 [C1131]	Abnormal	<ul style="list-style-type: none"> ● Electric throttle control abnormal. 	BRC-73
ENG SIG 3 [C1132]	Abnormal	<ul style="list-style-type: none"> ● ECM CAN communication abnormal. 	BRC-73

TROUBLE DIAGNOSIS

[TCS/ABS]

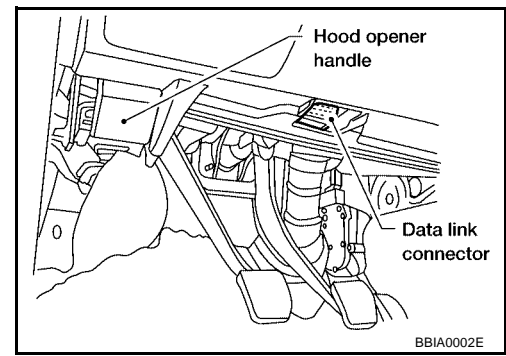
Diagnostic item	Diagnosed condition	Diagnostic item is detected when...	Reference Page
ENG SIG 4 [C1133]	Abnormal	<ul style="list-style-type: none"> ECM communication to ABS actuator and electric unit (control unit) abnormal. 	BRC-73
A/T SYSTEM [C1135]	Abnormal	<ul style="list-style-type: none"> A/T data from TCM abnormal or not present. 	BRC-73
CAN COMM CIRCUIT [U1000]	CAN Communication Failure	<ul style="list-style-type: none"> CAN communication line is open or shorted. 	BRC-73

*1: Be sure to confirm the ABS warning lamp illuminates when the ignition switch is turned ON after repairing the shorted sensor circuit, but the lamp goes out when driving the vehicle over 30 km/h (19 MPH) for one minute in accordance with SELF-DIAGNOSIS PROCEDURE.

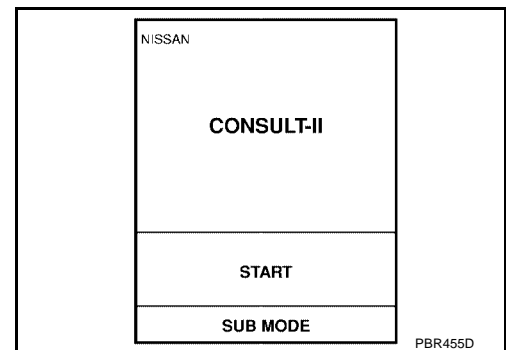
*2: When "CONTROLLER FAILURE" is displayed, check to see if the ABS warning lamp is burned out, and check the circuit between the ABS warning lamp and ABS actuator and electric unit (control unit) for open or short. Then check the ABS actuator and electric unit (control unit) and circuit.

DATA MONITOR PROCEDURE

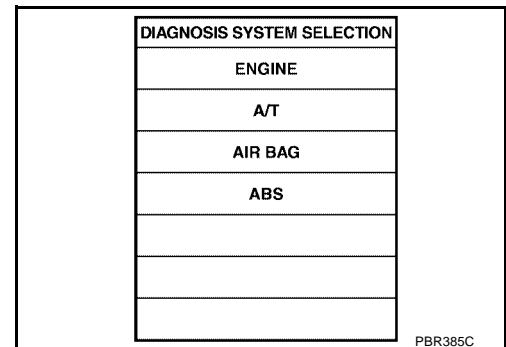
1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector.



3. Turn ignition switch ON.
4. Touch "START" on CONSULT-II screen.



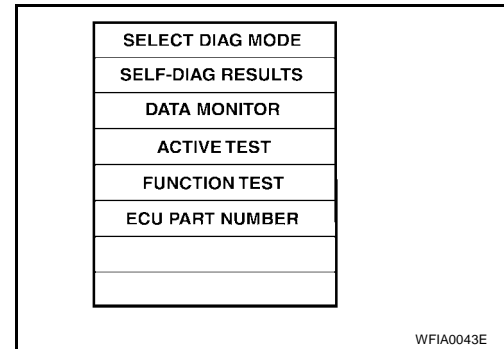
5. Touch "ABS".



TROUBLE DIAGNOSIS

[TCS/ABS]

6. Touch "DATA MONITOR".



7. Touch "SETTING" on "SELECT MONITOR ITEM" screen.

8. Touch "LONG TIME" on "SET RECORDING COND" screen.

9. Touch "START" on "SELECT MONITOR ITEM".

DATA MONITOR MODE

MONITOR ITEM	CONDITION	SPECIFICATION
FR RH SENSOR FR LH SENSOR RR RH SENSOR RR LH SENSOR	Drive vehicle. (Each wheel is rotating.)	Displays computed vehicle speed from wheel sensor signal. Almost the same speed as speedometer.
STOP LAMP SW	Turn ignition switch ON and depress brake pedal.	Depress the pedal: ON Release the pedal: OFF
ENGINE SPEED	Engine is running. (rpm)	Engine speed: 0 - 8,000 (rpm)
FR RH IN SOL FR RH OUT SOL FR LH IN SOL FR LH OUT SOL RR RH IN SOL RR RH OUT SOL RR LH IN SOL RR LH OUT SOL	Ignition switch is turned ON or engine is running.	Operating conditions for each solenoid valve are indicated. ABS is not operating: OFF
ACTUATOR RLY	Ignition switch is turned ON or engine is running.	Displays ON/OFF condition of ABS actuator relay. When turning ignition switch ON, ABS actuator relay is operated.
MOTOR RELAY		ABS is not operating: OFF ABS is operating: ON
ABS WARN LAMP		Warning lamp is turned on: ON Warning lamp is turned off: OFF
BATTERY VOLT		Power supply voltage for control unit
GEAR	A/T gear position signal detected by TCM via ECM is displayed.	Gear position: P, N: N.P 1st: 1 2nd: 2 3rd: 3 4th: 4
OFF SW	ON/OFF condition of signal from TCS switch is displayed.	TCS OFF S/W (all the time switch is pressed): ON TCS OFF S/W (released): OFF
OFF LAMP	<ul style="list-style-type: none"> ● TCS OFF condition is displayed. ● The condition of malfunctioning TCS is displayed. 	TCS OFF indicator "OFF": OFF TCS OFF indicator "ON": ON

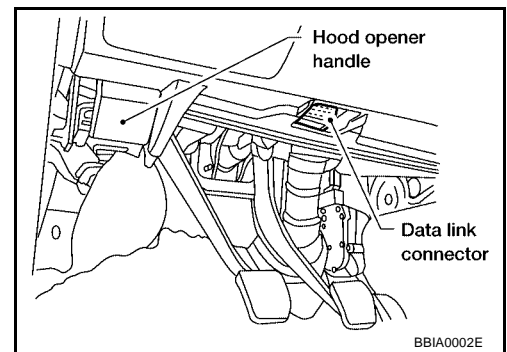
TROUBLE DIAGNOSIS

[TCS/ABS]

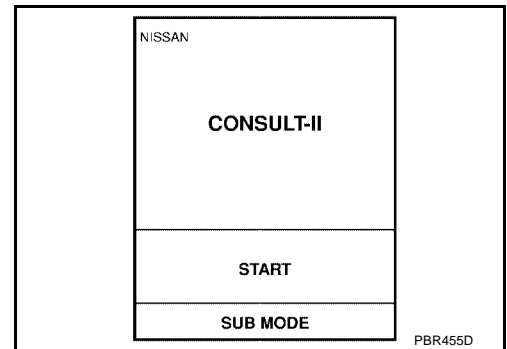
MONITOR ITEM	CONDITION	SPECIFICATION
SLIP LAMP	The TCS functioning state is displayed by detecting rear wheel slip.	SLIP indicator "ON": ON SLIP indicator "OFF": OFF
SLCT LVR POSI	A/T selector lever position is displayed.	Park: P Reverse: R Neutral: N 4th: 4 3rd: 3 2nd: 2 1st: 1

ACTIVE TEST PROCEDURE

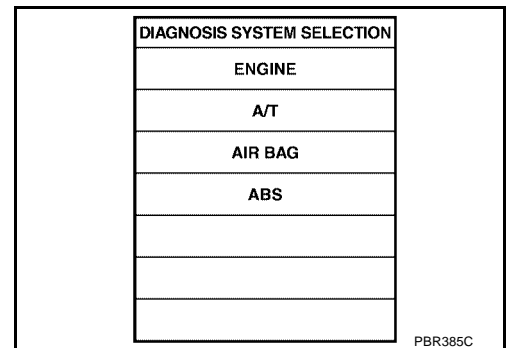
- When conducting active test, vehicle must be stationary.
 - When ABS warning lamp stays on, never conduct active test.
1. Turn ignition switch OFF.
 2. Connect CONSULT-II to data link connector.



3. Start engine.
4. Touch "START" on CONSULT-II screen.



5. Touch "ABS".

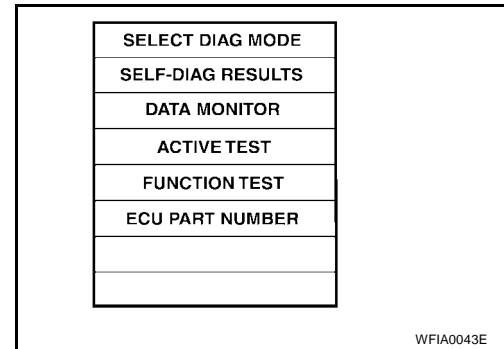


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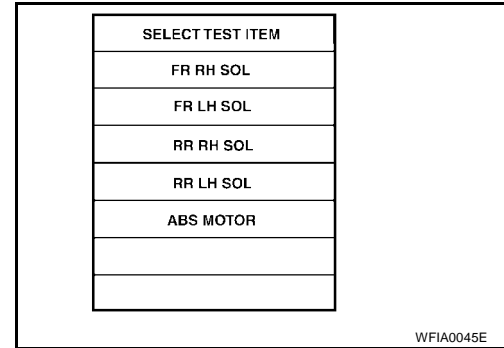
TROUBLE DIAGNOSIS

[TCS/ABS]

6. Touch "ACTIVE TEST".



7. Select active test item by touching screen.



8. Touch "START".

9. Carry out the active test by touching screen key.

ACTIVE TEST MODE

TEST ITEM	CONDITION	JUDGEMENT		
FR RH SOL FR LH SOL RR RH SOL RR LH SOL	Ignition switch is turned ON.	Brake fluid pressure control operation		
			IN SOL	OUT SOL
		UP (Increase):	OFF	OFF
		KEEP (Hold):	ON	OFF
ABS MOTOR		DOWN (Decrease):	ON	ON
		ABS actuator motor ON: Motor runs OFF: Motor stops		

NOTE:

Active test will automatically stop ten seconds after the test starts. (TEST IS STOPPED is displayed.)

Self-Diagnosis (Without CONSULT-II) FUNCTION

EFS00270

- When a problem occurs in the ABS, the ABS warning lamp on the instrument panel comes on. When a problem occurs in the TCS, the TCS OFF indicator lamp and SLIP indicator lamp on the instrument panel come on. To activate the self-diagnostic results mode, ground the self-diagnostic (check) terminal located on data link connector. The location of the malfunction is indicated by the ABS warning lamp or SLIP indicator lamp flashing.

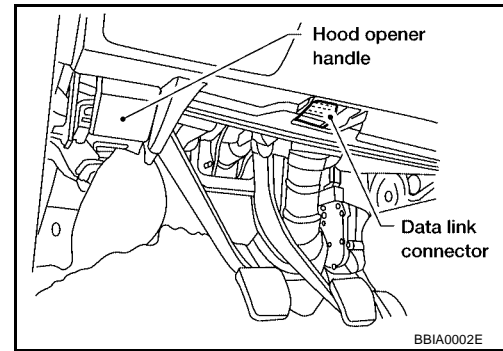
SELF-DIAGNOSIS PROCEDURE

- Drive vehicle over 30 km/h (19 MPH) for at least one minute.
- Turn ignition switch OFF.

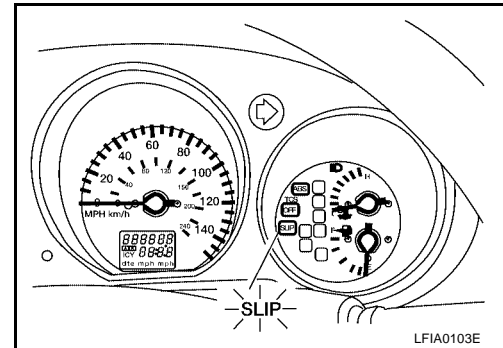
TROUBLE DIAGNOSIS

[TCS/ABS]

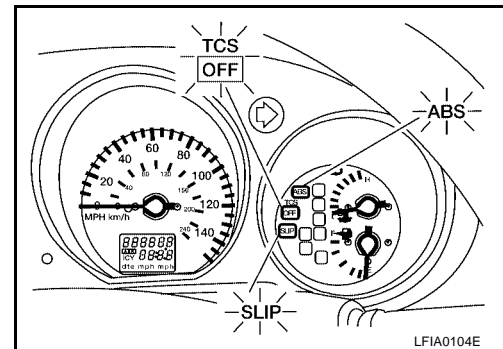
3. Ground terminal "9" of data link connector with a suitable harness.
4. Turn ignition switch ON while grounding terminal "9".
Do not depress brake pedal.
Do not start engine.



5. After 3.0 seconds, the SLIP indicator lamp starts flashing to indicate the malfunction code No. (See NOTE.)
6. Verify the location of the malfunction with the malfunction code chart. Refer to [BRC-62, "SELF-DIAGNOSTIC RESULTS MODE"](#). Then make the necessary repairs following the diagnostic procedures.
7. After the malfunctions are repaired, erase the malfunction codes stored in the control unit. Refer to [BRC-68, "HOW TO ERASE SELF-DIAGNOSTIC RESULTS \(MALFUNCTION CODES\)"](#).
8. Rerun the self-diagnostic results mode to verify that the malfunction codes have been erased.



9. Disconnect the check terminal from the ground. The self-diagnostic results mode is now complete.
10. Check ABS warning lamp, TCS OFF indicator lamp and SLIP indicator lamp for deactivation after driving vehicle over 30 km/h (19 MPH) for at least one minute.
11. After making certain that ABS warning lamp, TCS OFF indicator lamp and SLIP indicator lamp do not come on, test the ABS/TCS SELF-DIAGNOSIS in a safe area to verify that it functions properly.

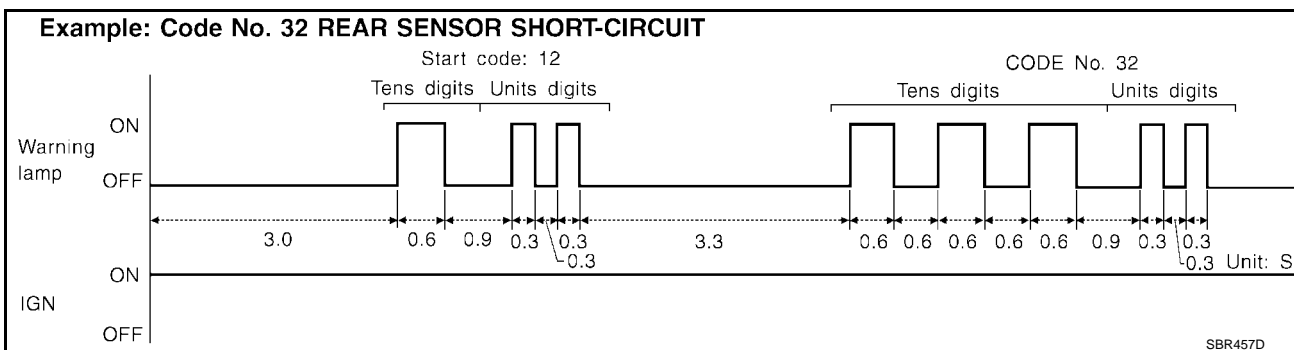


NOTE:

The indication terminates after five minutes. However, when the ignition switch is turned from OFF to ON, the SLIP indication starts flashing again. The TCS OFF indicator lamp and ABS warning lamp remain lighted.

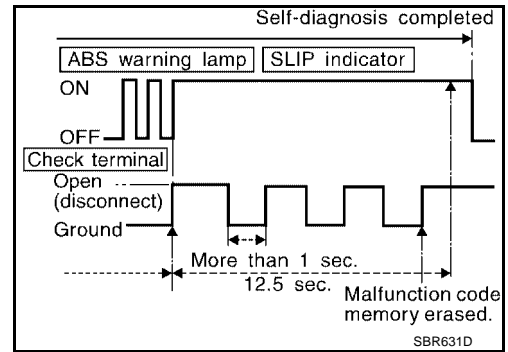
HOW TO READ SELF-DIAGNOSTIC RESULTS (MALFUNCTION CODES)

1. Determine the code No. by counting the number of times the ABS warning lamp or SLIP indicator lamp flashes on and off.
2. When several malfunctions occur at one time, up to three code numbers can be stored; the latest malfunction will be indicated first.
3. The indication begins with the start code 12. After that a maximum of three code numbers appear in the order of the latest one first. The indication then returns to the start code 12 to repeat (the indication will stay on for five minutes at the most).
4. Refer to [BRC-62, "SELF-DIAGNOSTIC RESULTS MODE"](#).



HOW TO ERASE SELF-DIAGNOSTIC RESULTS (MALFUNCTION CODES)

1. Under the self-diagnostic results mode, the malfunction memory erase mode starts when the check terminal is disconnected from the ground.
2. The self-diagnostic results (malfunction codes) can be erased by grounding the check terminal more than three times in succession within 12.5 seconds after the erase mode starts. (Each grounding must be longer than one second.)
The ABS warning lamp or SLIP indicator lamp stays on while the self-diagnosis is in the erase mode, and goes out after the erase operation has been completed.
3. Perform self-diagnosis again. Refer to [BRC-63, "DATA MONITOR PROCEDURE"](#) . Only the start code should appear, no malfunction codes.



After the erase operation is completed, it is necessary to rerun the self-diagnostic mode to verify that malfunction codes no longer appear. Only the start code (12) should be indicated when erase operation is completed and system is functioning normally.

NOTE:

The TCS OFF indicator lamp and ABS warning lamp remain lighted.

Preliminary Check

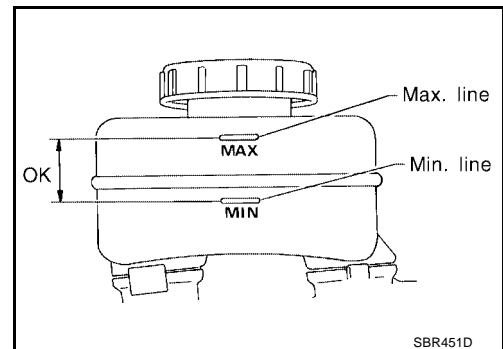
EFS0027P

1. CHECK BRAKE FLUID LEVEL

Low fluid level may indicate brake pad wear or leakage from brake line.

Is brake fluid filled between MAX and MIN lines on reservoir tank and is brake fluid uncontaminated?

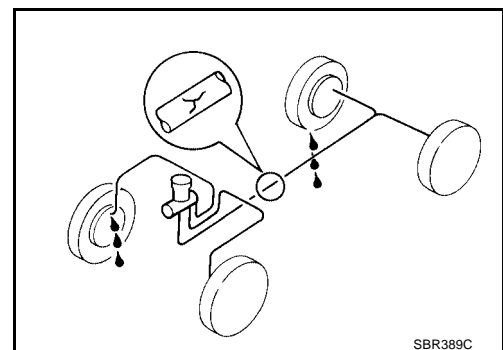
- OK >> GO TO 2.
- NG >> Repair. GO TO 2.



2. CHECK BRAKE LINE

Is leakage present at or around brake lines, tubes or hoses or are any of these parts cracked or damaged?

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

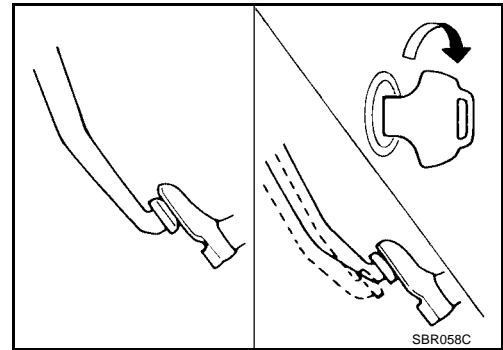


3. CHECK BRAKE BOOSTER OPERATION

Check brake booster for operation and air tightness.
Refer to [BR-15, "AIRTIGHT CHECK"](#) .

Is brake booster airtight and functioning properly?

- Yes >> GO TO 4.
- No >> Replace. GO TO 4.

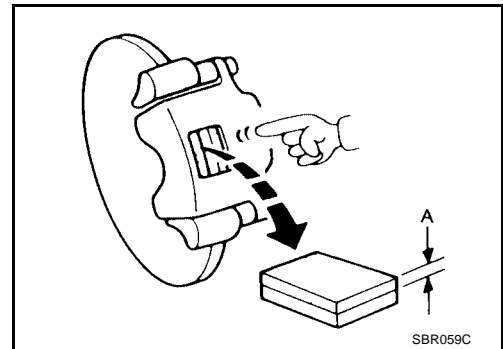


4. CHECK BRAKE PADS AND ROTORS

Check brake pads and rotors.
Refer to [BR-18, "FRONT DISC BRAKE"](#) and [BR-24, "REAR DISC BRAKE"](#) .

Are brake pads and rotors functioning properly?

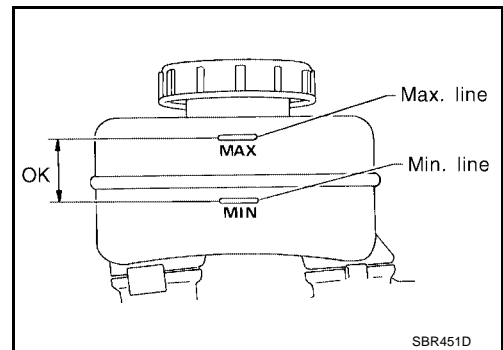
- Yes >> GO TO 5.
- No >> Replace.



5. RECHECK BRAKE FLUID LEVEL

Check brake fluid level in reservoir tank again.
Is brake fluid filled between MAX and MIN lines on reservoir tank and is brake fluid uncontaminated?

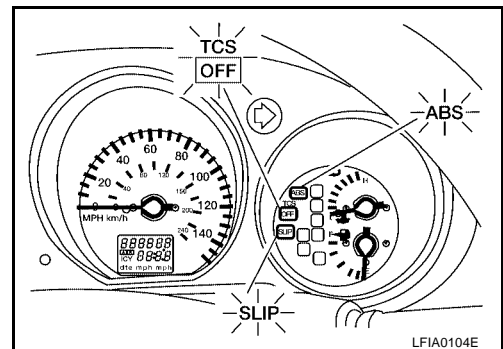
- OK >> GO TO 6.
- NG >> Fill up brake fluid.



6. CHECK WARNING LAMP AND INDICATOR LAMPS ACTIVATION

Do ABS warning lamp, TCS OFF indicator lamp and SLIP indicator lamp turn on when ignition switch is turned ON?

- Yes >> GO TO 7.
- No >> Check fuses, warning lamp bulbs and warning lamp circuits.



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7. CHECK WARNING LAMP AND INDICATOR LAMPS DEACTIVATION

Do lamps turn off when engine is started?

Yes >> GO TO 8.

No >> Go to Self-diagnosis. Refer to [BRC-60, "SELF-DIAGNOSIS PROCEDURE"](#) .

8. DRIVE VEHICLE

Drive vehicle at speeds over 30 km/h (19 MPH) for at least one minute.

Do warning lamp and indicator lamps remain off after vehicle has been driven at 30 km/h (19 MPH) for at least one minute?

Yes >> **INSPECTION END.**

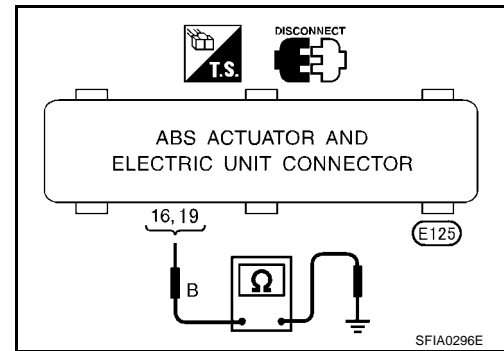
No >> Go to Self-diagnosis. Refer to [BRC-60, "SELF-DIAGNOSIS PROCEDURE"](#) .

Ground Circuit Check ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND

EFS0027Q

- Check continuity between terminals and ground.

Continuity should exist.



ABS WARNING LAMP, TCS OFF INDICATOR LAMP, SLIP INDICATOR LAMP ON/OFF TIMING

x : ON - : Lamp OFF

Condition	ABS warning lamp	TCS OFF indicator lamp	SLIP indicator lamp	Remarks
When the ignition switch is OFF	-	-	-	-
After the ignition switch is turned ON For approx. 0.5 seconds	x	x	x	-
Ignition switch ON Approx. 0.5 seconds later	-	-	-	Lamp goes off approx. 2 seconds after the engine start.
When the TCS OFF switch turns ON (TCS function OFF).	-	x	-	-
TCS/ABS malfunction	x	x	x	-
	x	x	-	When the TCS/ABS control unit is malfunctioning (power supply or ground malfunction).
When the TCS is malfunctioning.	-	x	x	-

Malfunction Code Chart (Without CONSULT-II)

EFS0027R

Code No. (No. of LED flashes)	Malfunctioning part	Reference page
12	Self-diagnosis could not detect any malfunctions.	-
18	Sensor rotor malfunction	BRC-73
21, 22	Front right sensor	BRC-73
25, 26	Front left sensor	BRC-73
31, 32	Rear right sensor	BRC-73
35, 36	Rear left sensor	BRC-73

TROUBLE DIAGNOSIS

[TCS/ABS]

Code No. (No. of LED flashes)	Malfunctioning part	Reference page
41	Actuator front right outlet solenoid valve	BRC-76
42	Actuator front right inlet solenoid valve	BRC-76
45	Actuator front left outlet solenoid valve	BRC-76
46	Actuator front left inlet solenoid valve	BRC-76
51	Actuator rear right outlet solenoid valve	BRC-76
52	Actuator rear right inlet solenoid valve	BRC-76
55	Actuator rear left outlet solenoid valve	BRC-76
56	Actuator rear left inlet solenoid valve	BRC-76
57*	Power supply (Abnormal voltage)	BRC-80
61	Actuator motor or motor relay	BRC-79
63	Solenoid valve relay	BRC-76
71	Control unit	BRC-82
77	CAN communication circuit (CAN initialize, Bus-off, Receive)	BRC-73
83	CAN ATMSG1 receive timeout	BRC-73
84	CAN TRQDNINH fault	BRC-73
86	CAN ETCOK fault	BRC-73
87	CAN FCOK fault	BRC-73
88	CAN CANOK fault	BRC-73

*: Under voltage that is too low, the control unit will disable the ABS. It does not set the ABS in fail-safe condition. Instead, the ABS becomes a conventional brake system. After the power supply has resumed, the warning lamp goes off, making it possible for the ABS to be re-engaged.

Symptom Chart

EFS0027S

Symptom	Malfunctioning part	Reference page
ABS warning lamp stays on when ignition switch is turned on.	Control unit power supply circuit Warning lamp bulb circuit Control unit or control unit connector Solenoid valve relay stuck Power supply for solenoid valve relay coil	BRC-88
ABS warning lamp stays on, during self-diagnosis.	Control unit	—
ABS warning lamp does not come on when ignition switch is turned on.	Fuse, warning lamp bulb or warning lamp circuit Control unit	BRC-86
ABS warning lamp does not come on during self-diagnosis.	Control unit	—
Pedal vibration and noise	—	BRC-85
Long stopping distance	—	BRC-84
Unexpected pedal action	—	BRC-83
ABS does not work.	—	BRC-84
ABS works frequently.	—	BRC-83

- Depending on the malfunction points in the ABS actuator and electric unit (control unit), only the SLIP indicator lamp will turn OFF.
- If an electronic malfunction occurs in the system components, the fail-safe function turns the ABS warning lamp ON.
Depending on the malfunction condition, ABS and EBD operate as follows.
 - ABS is inactive, and EBD is active.
 - Both ABS and EBD are inactive (normal braking status)

TROUBLE DIAGNOSIS

[TCS/ABS]

-
- With the above status, the self-diagnosis when the ignition switch is turned on and the vehicle is initially started is performed. ABS self-diagnosis noise may be heard as usual.

TROUBLE DIAGNOSIS FOR SELF-DIAGNOSTIC ITEMS

PFP:00000

**CAN Communication Line or ABS Actuator and Electric Unit (Control Unit)
DIAGNOSTIC PROCEDURE**

EFS0027T

- With CONSULT-II: Malfunction code No. C1130, C1131, C1132, C1133, C1135 or U1000
- Without CONSULT-II: Malfunction code No. 77, 83, 84, 86, 87 or 88

1. SELF-DIAGNOSIS RESULT CHECK-1

Check the self-diagnosis results.

- | | |
|--|--|
| <input checked="" type="radio"/> Malfunction codes | <input type="radio"/> Diagnostic trouble codes |
| 77, 83, 84, 86, 87 or 88 | C1130, C1131, C1132, C1133,
C1135 or U1000 |

Are any items other than above indicated in self-diagnosis results?

- Yes >> Repair as necessary.
- No >> GO TO 2.

2. CHECK THE HARNESS AND CONNECTOR

1. Disconnect the ABS actuator and electric unit (control unit) harness connector with the ignition switch OFF.
2. Check the ABS actuator and electric unit (control unit) harness and connector for open and shorted circuit.
3. Check the connector housing for disconnected, loose, bent, and collapsed terminals.

Is inspection result OK?

- Yes >> GO TO 3.
- No >> Repair harness or connector. GO TO 3.

3. SELF-DIAGNOSIS RESULT CHECK-2

1. Connect the ABS actuator and electric unit (control unit) connector and turn the ignition switch ON.
2. After erasing the self-diagnosis result, start the engine to perform the self-diagnosis again.

Is inspection result OK?

- Yes >> System is OK.
- No >> Refer to [BRC-50, "CAN Communication System Description"](#) .

**Wheel Sensor or Rotor
DIAGNOSTIC PROCEDURE**

EFS0037K

- With CONSULT-II: Malfunction code No. C1101, C1102, C1103, C1104, C1105, C1106, C1107, C1108 or C1115
- Without CONSULT-II: Malfunction code No. 21, 22, 25, 26, 31, 32, 35, 36 or 18

NOTE:

Wheel position should be identified by code No. except code No. 18 (sensor rotor).

1. CONNECTOR INSPECTION

1. Disconnect the ABS actuator and electric unit (control unit) connector E125 and wheel sensor of malfunction code. Check the terminals for deformation, disconnection, looseness or damage.

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace as necessary.

2. CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Disconnect connector from wheel sensor of malfunction code No.
2. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
3. Turn on the ABS active wheel sensor tester power switch.

NOTE:

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

4. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.

NOTE:

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

- Yes >> GO TO 3.
No >> GO TO 6.

3. CHECK TIRE

Check for inflation pressure, wear and size of each tire.

Are tire pressure and size correct and is tire wear within specifications?

- Yes >> GO TO 4.
No >> Adjust tire pressure or replace tire(s).

4. CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to [FAX-5, "Front Wheel Bearing"](#) or [RAX-5, "Rear Wheel Bearing"](#).

Is axial end play within specifications?

- Yes >> GO TO 5.
No >> Repair as necessary. Refer to [FAX-5, "WHEEL HUB AND KNUCKLE"](#) or [RAX-5, "WHEEL HUB"](#).
Then retest.

5. CHECK SENSOR ROTOR

Check sensor rotor for teeth damage.

OK or NG

- OK >> GO TO 6.
NG >> Replace sensor rotor. Refer to [BRC-43, "Removal and Installation"](#).

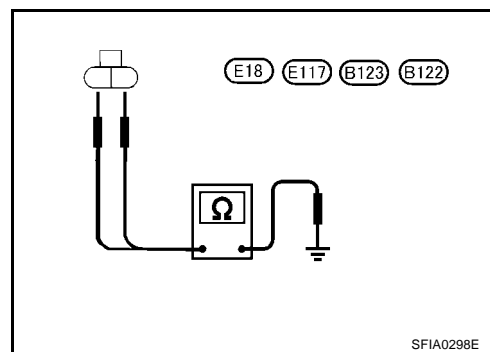
6. CHECK WIRING HARNESS FOR SHORT CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
2. Check resistance between harness connector terminal and ground.

Continuity should not exist.

OK or NG?

- OK >> GO TO 7.
NG >> Repair the circuit.



TROUBLE DIAGNOSIS FOR SELF-DIAGNOSTIC ITEMS

[TCS/ABS]

7. CHECK WIRING HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
2. Check continuity between both wiring harness ends.

Sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector - terminal	Wire color	Connector - terminal	Wire color	
Front LH	E125 - 6	G	E18 - 1	G	Yes
	E125 - 7	R	E18 - 2	R	
Front RH	E125 - 4	B	E117 - 1	B	
	E125 - 5	W	E117 - 2	W	
Rear LH	E125 - 9	P	B123 - 1	P	
	E125 - 8	L	B123 - 2	L	
Rear RH	E125 - 3	PU	B122 - 1	PU	
	E125 - 1	LG	B122 - 2	LG	

Continuity should exist.

OK or NG?

- OK >> Replace the ABS actuator and electric unit (control unit). Refer to [BRC-44, "Removal and Installation"](#).
- NG >> Repair the circuit.

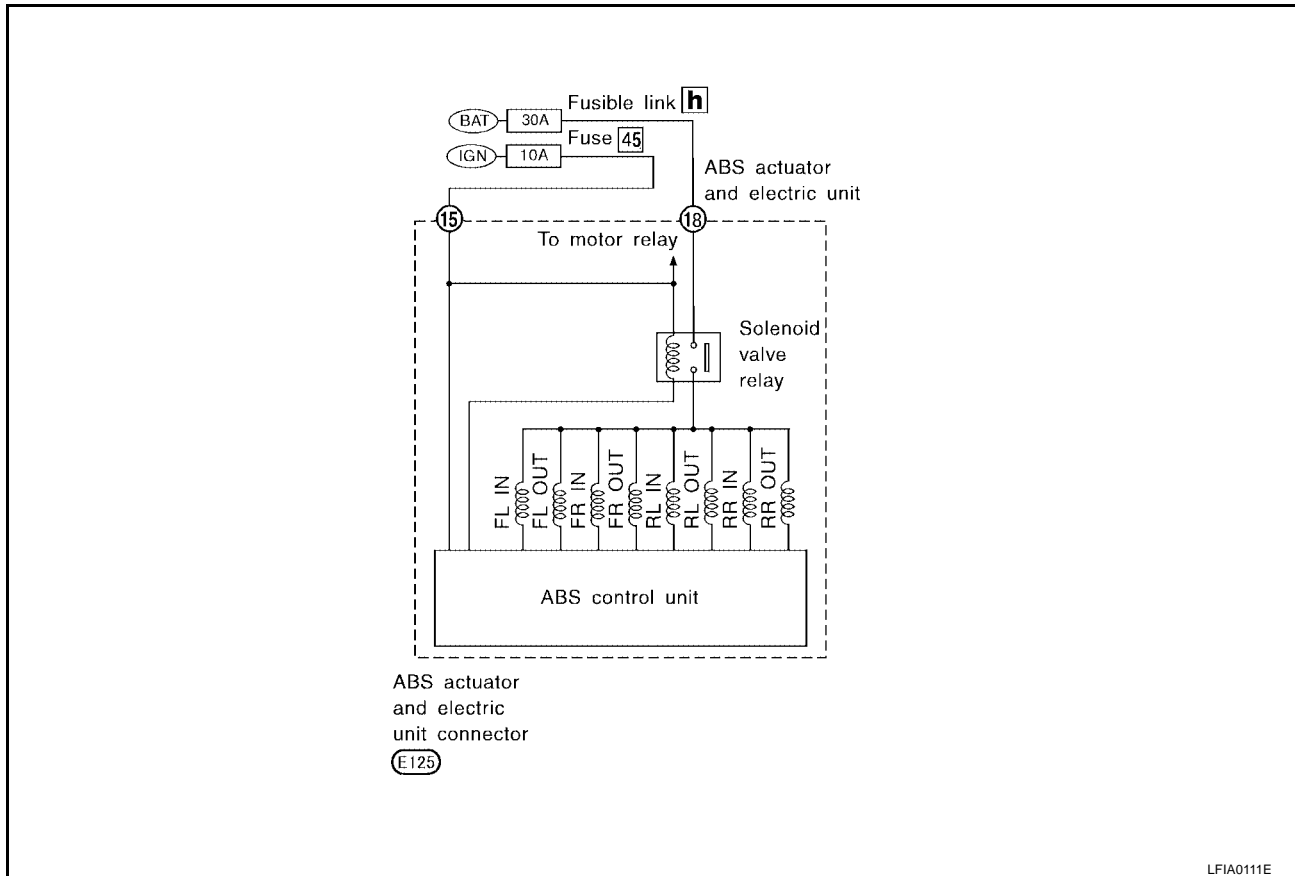
ABS Actuator Solenoid Valve or Solenoid Valve Relay DIAGNOSTIC PROCEDURE

① With CONSULT-II: Malfunction code No. C1114, C1120, C1121, C1122, C1123, C1124, C1125, C1126 or C1127

⊗ Without CONSULT-II: Malfunction code No. 41, 42, 45, 46, 51, 52, 55, 56, or 63

1. INSPECTION START

Solenoid valve relay inspection.



>> GO TO 2.

2. CHECK SOLENOID VALVE POWER SUPPLY CIRCUIT

Check 30A [h] fusible link (ABS ACTR) for ABS solenoid valve relay. For fusible link layout, refer to [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#).

Is fusible link OK?

Yes >> GO TO 3.

No >> GO TO 7.

3. CHECK FUSE

Check 10A fuse No. 45. For fuse layout, refer to [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#).

Is fuse OK?

Yes >> GO TO 4.

No >> GO TO 9.

4. CHECK CONNECTOR

1. Disconnect connectors from ABS actuator and electric unit (control unit). Check terminals for damage or loose connection. Then reconnect connectors.
2. Carry out self-diagnosis again.

Does warning lamp activate again?

- Yes >> GO TO 5.
- No >> **INSPECTION END.**

5. CHECK GROUND CIRCUIT

Refer to [BRC-70, "ABS ACTUATOR AND ELECTRIC UNIT \(CONTROL UNIT\) GROUND"](#) .

Is ground circuit OK?

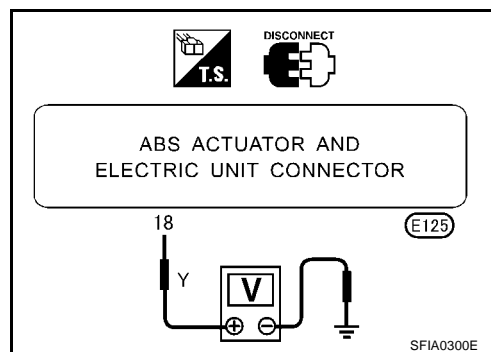
- Yes >> GO TO 6.
- No >> Repair harness and connectors.

6. CHECK SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check voltage between ABS actuator and electric unit (control unit) connector terminal 18 and ground.

Does battery voltage exist?

- Yes >> Replace ABS actuator and electric unit (control unit).
- No >> Check the following.
 - Harness connector E125
 - Harness for open or short between ABS actuator and electric unit (control unit) and fusible link
If NG, repair harness or connectors.



7. REPLACE FUSIBLE LINK

Replace fusible link.

Does the fusible link blow out when ignition switch is turned ON?

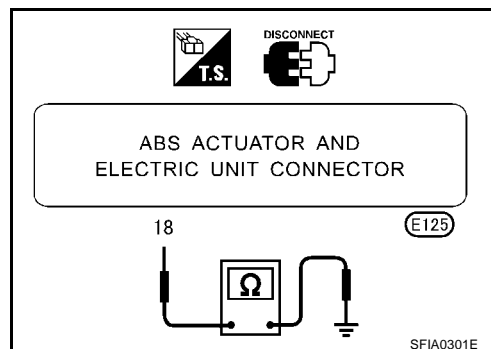
- Yes >> GO TO 8.
- No >> **INSPECTION END.**

8. CHECK RELAY UNIT POWER SUPPLY CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between ABS actuator and electric unit (control unit) connector terminal 18 (Y) and ground.

Does continuity exist?

- Yes >> Check the following.
 - Harness connector E125
 - Harness for open or short between ABS actuator and electric unit (control unit) and fusible link
If NG, repair harness or connectors.
- No >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-92, "Removal and Installation"](#) .



9. REPLACE FUSE

Replace fuse.

Does the fuse blow out when ignition switch is turned ON?

Yes >> Check the following.

- Harness connector E125
- Harness for open or short between ABS actuator and electric unit (control unit) and fuse
If NG, repair harness or connectors.

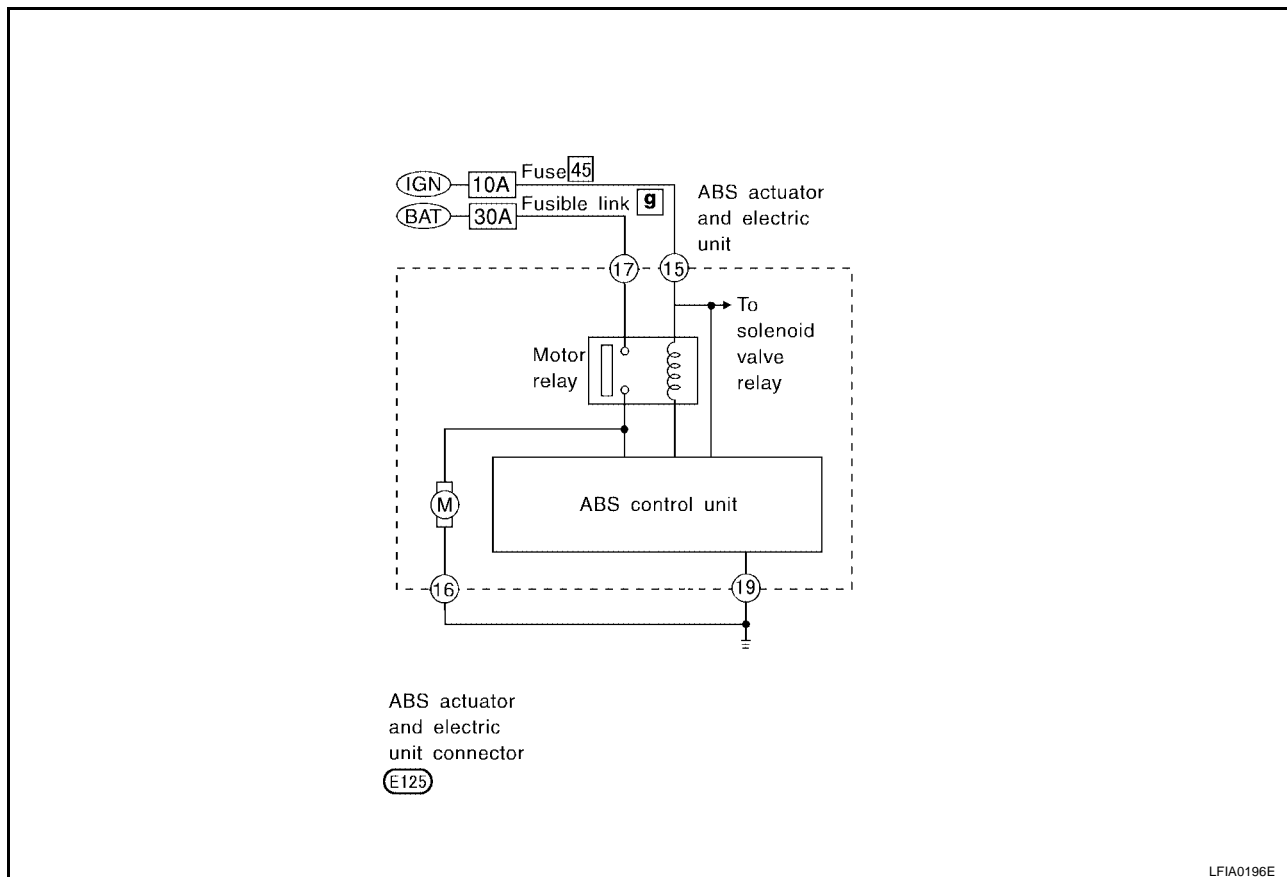
No >> **INSPECTION END.**

Motor Relay or Motor DIAGNOSTIC PROCEDURE

- ① With CONSULT-II: Malfunction code No. C1111
- ② Without CONSULT-II: Malfunction code No. 61

1. INSPECTION START

ABS motor relay inspection.



>> GO TO 2.

2. CHECK MOTOR POWER SUPPLY CIRCUIT

Check 30A [g] fusible link (ABS MTR) for ABS motor relay. For fusible link layout, refer to [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#).

Is fusible link OK?

- Yes >> GO TO 3.
- No >> GO TO 6.

3. CHECK CONNECTOR

1. Disconnect ABS actuator and electric unit (control unit) connector. Check terminals for damage or loose connection. Then reconnect connectors.
2. Carry out self-diagnosis again.

Does warning lamp activate again?

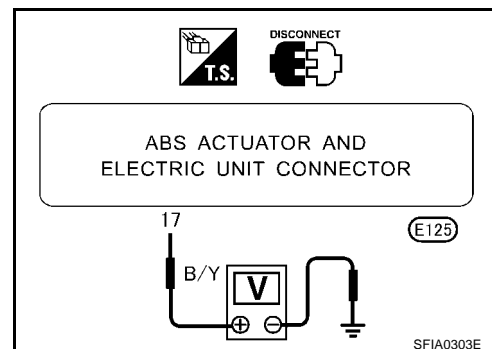
- Yes >> GO TO 4.
- No >> **INSPECTION END.**

4. CHECK MOTOR RELAY POWER SUPPLY CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check voltage between ABS actuator and electric unit (control unit) connector terminal 17 and ground.

Does battery voltage exist?

- Yes >> GO TO 5.
 No >> Check the following.
- Harness connector E125
 - Harness for open or short between ABS actuator and electric unit (control unit) and fusible link.
If NG, repair harness or connectors.



5. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

Refer to [BRC-70, "ABS ACTUATOR AND ELECTRIC UNIT \(CONTROL UNIT\) GROUND"](#) .

Is ground circuit OK?

- Yes >> Replace ABS actuator and electric unit (control unit).
 No >> Check the following.
- Harness connector E125
 - Harness for open or short between ABS actuator and electric unit (control unit) and ground
If NG, repair harness or connectors.

6. REPLACE FUSIBLE LINK

Replace fusible link.

Does the fusible link blow out when ignition switch is turned ON?

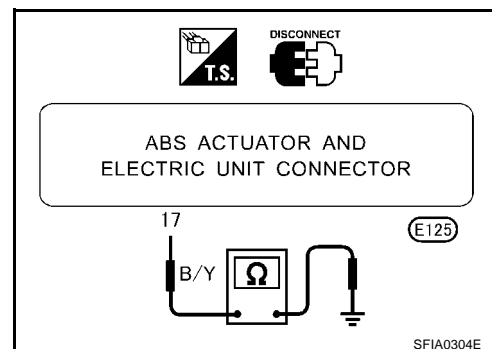
- Yes >> GO TO 7.
 No >> **INSPECTION END.**

7. CHECK ABS ACTUATOR MOTOR POWER SUPPLY CIRCUIT

1. Disconnect battery cable and ABS actuator and electric unit (control unit) connector.
2. Check continuity between ABS actuator and electric unit (control unit) connector terminal 17 and ground.

Does continuity exist?

- Yes >> Check the following.
- Harness connector E125
 - Harness for open or short between ABS actuator and electric unit (control unit) and fusible link
If NG, repair harness or connectors.
- No >> Check ABS actuator and electric unit (control unit) pin terminals for damage or the connection of ABS actuator and electric unit (control unit) harness connector.
Reconnect ABS actuator and electric unit (control unit) harness connector. Then retest.



Abnormal Battery Voltage DIAGNOSTIC PROCEDURE

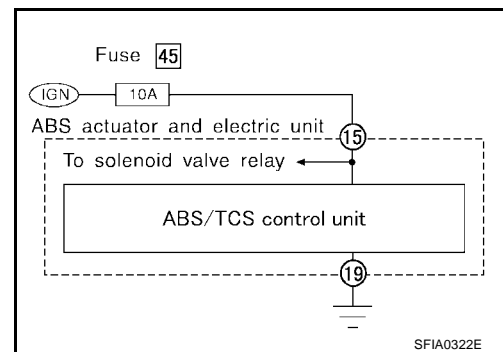
EFS0027X

- Ⓟ With CONSULT-II: Malfunction code No. C1109
- ⓧ Without CONSULT-II: Malfunction code No. 57

1. INSPECTION START

ABS actuator and electric unit (control unit) power supply and ground circuit inspection.

>> GO TO 2.



2. CHECK CONNECTOR

1. Disconnect ABS actuator and electric unit (control unit) connector. Check terminals for damage or loose connections. Then reconnect connector.
2. Carry out self-diagnosis again.

Does warning lamp activate again?

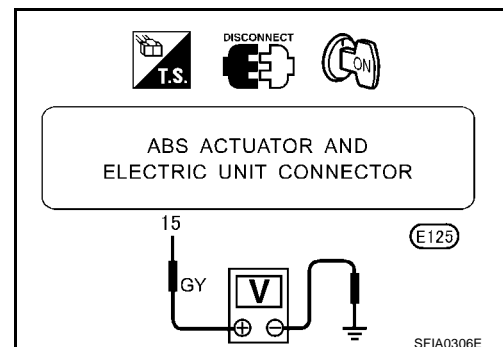
- Yes >> GO TO 3.
No >> **INSPECTION END.**

3. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check voltage between ABS actuator and electric unit (control unit) connector terminal 15 and ground.

Does battery voltage exist when ignition switch is turned ON?

- Yes >> GO TO 4.
No >> GO TO 5.



4. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND

Refer to [BRC-70, "ABS ACTUATOR AND ELECTRIC UNIT \(CONTROL UNIT\) GROUND"](#) .

Is ground circuit OK?

- OK >> Check ABS actuator and electric unit (control unit) pin terminals for damage or the connection of ABS actuator and electric unit (control unit) harness connector. Reconnect ABS actuator and electric unit (control unit) harness connector. Then retest.
- NG >> Check the following.
- Harness connector E125
 - Harness for open or short between ABS actuator and electric unit (control unit) and ground
If NG, repair harness or connectors.

5. CHECK FUSE

Check 10A fuse 45 (Engine control) for ABS actuator and electric unit (control unit). Refer to [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#) .

Is fuse OK?

- Yes >> GO TO 6.
No >> If fuse is blown, be sure to eliminate cause of problem before installing new fuse.

6. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT

1. Turn ignition switch to ON position.
2. Check continuity between battery and ABS actuator and electric unit (control unit) connector terminal 15.

Does continuity exist?

- Yes >> Check battery. Refer to [SC-4, "BATTERY"](#) .
 No >> Check the following.

- Harness connector E125
- Harness for open or short between ABS actuator and electric unit (control unit) and fuse
If NG, repair harness or connectors.

Controller Failure DIAGNOSTIC PROCEDURE

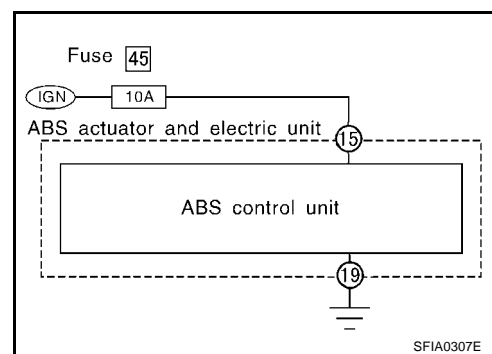
EFS0027Y

- With CONSULT-II: Malfunction code No. C1110
 Without CONSULT-II: Malfunction code No. 71

1. INSPECTION START

ABS actuator and electric unit (control unit) power supply and ground circuit inspection.

>> GO TO 2.

**2. CHECK CONNECTOR**

1. Disconnect ABS actuator and electric unit (control unit) connector.
Check terminals for damage or loose connections. Then reconnect connectors.
2. Carry out self-diagnosis again.

Does warning lamp activate again?

- Yes >> GO TO 3.
 No >> **INSPECTION END.**

3. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT

Check voltage. Refer to [BRC-80, "DIAGNOSTIC PROCEDURE"](#) .

Does battery voltage exist when ignition switch is turned ON?

- Yes >> GO TO 4.
 No >> Repair.

4. CHECK WARNING LAMP INDICATION

Does warning lamp indicate code No. 71 again?

- Yes >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-92, "Removal and Installation"](#)
 No >> Inspect the system according to the code No.

TROUBLE DIAGNOSES FOR SYMPTOMS

PFP:99999

EFS0027Z

1. ABS Works Frequently**1. CHECK BRAKE FLUID PRESSURE**

Check brake fluid pressure distribution.
Refer to [BR-29, "Inspection"](#) .

Is brake fluid pressure distribution normal?

Yes >> GO TO 2.

No >> Perform Preliminary Check. Refer to [BRC-68, "Preliminary Check"](#) .

2. CHECK WHEEL SENSOR

1. Check wheel sensor connector for terminal damage or loose connections.

2. Perform wheel sensor mechanical check.
Refer to [BRC-73, "Wheel Sensor or Rotor"](#) .

Are wheel sensors functioning properly?

Yes >> GO TO 3.

No >> Repair.

3. CHECK FRONT AXLE

Check front and rear axles for excessive looseness. Refer to [FAX-5, "Front Wheel Bearing"](#) or [RAX-5, "Rear Wheel Bearing"](#) .

Are front axles installed properly?

Yes >> Go to [BRC-83, "2. Unexpected Pedal Action"](#) .

No >> Repair.

2. Unexpected Pedal Action

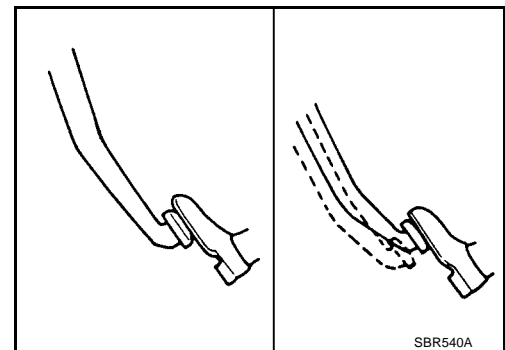
EFS00280

1. CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Is stroke excessively large?

Yes >> Perform Preliminary Check. Refer to [BRC-68, "Preliminary Check"](#) .

No >> GO TO 2.

**2. CHECK CONNECTOR AND PERFORMANCE**

1. Disconnect ABS actuator and electric unit (control unit) connector.

2. Check whether brake is effective.

OK or NG

Yes >> GO TO 3.

No >> Perform Preliminary Check. Refer to [BRC-68, "Preliminary Check"](#) .

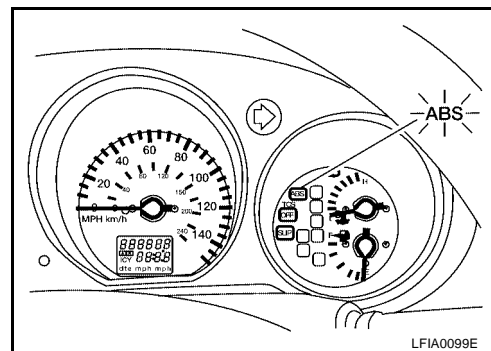
3. CHECK WARNING LAMP INDICATION

Ensure warning lamp remains off while driving.

Is warning lamp turned off?

Yes >> GO TO 4.

No >> Carry out self-diagnosis. Refer to [BRC-60, "SELF-DIAGNOSIS PROCEDURE"](#).



4. CHECK WHEEL SENSOR

1. Check wheel sensor connector for terminal damage or loose connection.

2. Perform wheel sensor mechanical check.

Is wheel sensor mechanism OK?

Yes >> Check ABS actuator and electric unit (control unit) pin terminals for damage and the connection of harness connector. Reconnect ABS actuator and electric unit (control unit) harness connector. Then retest.

No >> Repair.

3. Long Stopping Distance

EFS00281

1. CHECK CONNECTOR AND PERFORMANCE

1. Cancel ABS by disconnecting ABS actuator and electric unit (control unit) connector.

2. Check whether stopping distance is still long.

OK or NG?

OK >> Perform Preliminary Check and air bleeding.

NG >> Go to [BRC-83, "2. Unexpected Pedal Action"](#).

NOTE:

Stopping distance may be longer than vehicles without ABS when road condition is slippery.

4. ABS Does Not Work

EFS00282

1. CHECK WARNING LAMP INDICATION

Does the ABS warning lamp activate?

Yes >> Carry out self-diagnosis. Refer to [BRC-60, "SELF-DIAGNOSIS PROCEDURE"](#).

No >> Go to [BRC-84, "4. ABS Does Not Work"](#).

NOTE:

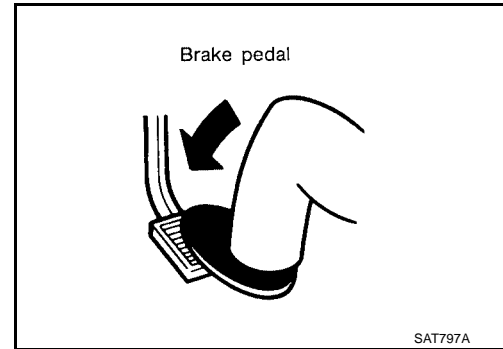
ABS does not work when vehicle speed is under 10 km/h (6 MPH).

5. Pedal Vibration and Noise

1. INSPECTION START

Pedal vibration and noise inspection.

>> GO TO 2.



2. CHECK SYMPTOM

1. Apply brake.
2. Start engine.

Does the symptom appear only when engine is started?

- Yes >> Carry out self-diagnosis. Refer to [BRC-60, "SELF-DIAGNOSIS PROCEDURE"](#) .
 No >> GO TO 3.

3. RECHECK SYMPTOM

Does the symptom appear when electrical equipment switches (such as headlamp) are operated?

- Yes >> **INSPECTION END.**
 No >> Go to [BRC-83, "2. Unexpected Pedal Action"](#) .

NOTE:

ABS may operate and cause vibration under any of the following conditions.

- Applying brake gradually when shifting or operating clutch.
- Low friction (slippery) road.
- High speed cornering.
- Driving over bumps and pot holes.
- Engine speed is over 5,000 rpm with vehicle stopped.

A

B

C

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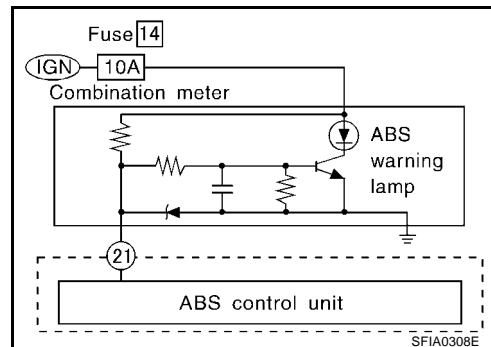
6. ABS Warning Lamp Does Not Come On When Ignition Switch Is Turned On

EFS00284

1. INSPECTION START

Warning lamp circuit inspection.

>> GO TO 2.



2. CHECK FUSE

Check 10A fuse No. 14 for warning lamp. For fuse layout, refer to [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#).

Is fuse OK?

Yes >> GO TO 3

No >> If fuse is blown, be sure to eliminate cause of problem before installing new fuse.

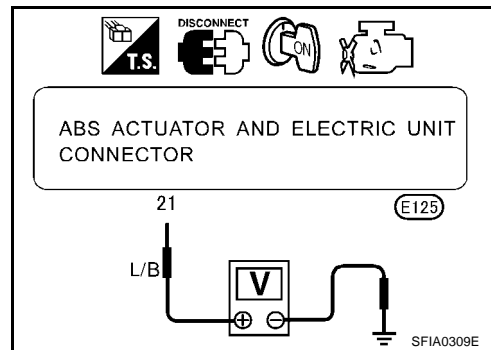
3. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT

1. Install 10A fuse.
2. Remove solenoid valve relay.
3. Disconnect ABS actuator and electric unit (control unit) connector.
4. Check voltage between connector terminal 21 and ground after turning ignition switch ON.

Does battery voltage exist after turning ignition switch ON?

Yes >> GO TO 5.

No >> GO TO 4.



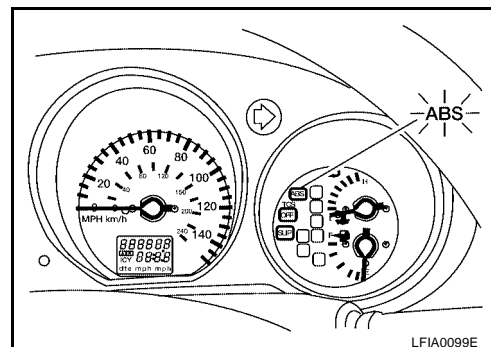
4. CHECK WARNING LAMP INDICATION

Disconnect ABS actuator and electric unit (control unit) connector.

Does the ABS warning lamp activate?

Yes >> GO TO 6.

No >> GO TO 5.

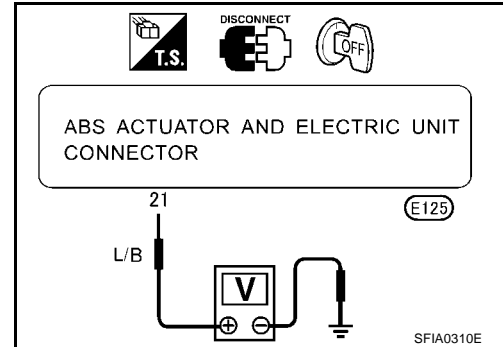


5. CHECK HARNESS FOR SHORT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check voltage between ABS actuator and electric unit (control unit) connector terminal 21 and ground.

Does battery voltage exist?

- Yes >> Check combination meter. Refer to [DI-4, "COMBINATION METERS"](#).
- No >> Repair harness and connectors between fuse and ABS actuator and electric unit (control unit) connector terminal 21.

**6. CHECK HARNESS CONNECTOR**

Check ABS actuator and electric unit (control unit) pin terminals for damage and the connection of harness connector. Reconnect ABS actuator and electric unit (control unit) harness connector. Then reset.

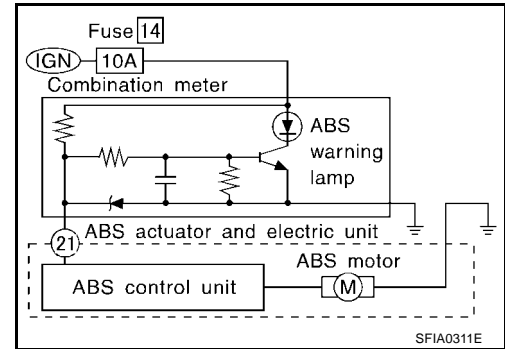
- OK >> **INSPECTION END.**
- NG >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-92, "Removal and Installation"](#)

7. ABS Warning Lamp Stays On When Ignition Switch Is Turned On

1. INSPECTION START

ABS control unit inspection.

>> GO TO 2.



2. CHECK WARNING LAMP

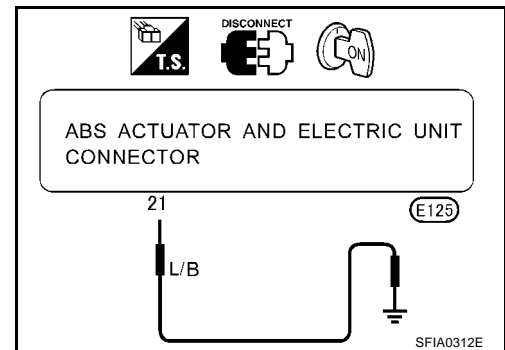
1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Connect suitable wire between ABS actuator and electric unit (control unit) connector terminal 21 and ground.

Does warning lamp activate?

Yes >> GO TO 3.

No >> Repair combination meter. Check the following.

- Harness connector E125
- Harness for open or short between ABS actuator and electric unit (control unit) and fuse
If NG, repair harness or connector.



3. CHECK HARNESS CONNECTOR

Check ABS actuator and electric unit (control unit) pin terminals for damage and the connection of harness connector. Reconnect ABS actuator and electric unit (control unit) harness connector. Then retest.

OK >> **INSPECTION END.**

NG >> GO TO 4.

4. CHECK ABS MOTOR GROUND

1. Turn ignition switch OFF.
2. Check continuity between ABS motor and ground.

Does continuity exist?

Yes >> Replace ABS actuator and electric unit (control unit).

No >> Check the following.

- ABS motor ground harness
- ABS motor ground harness for open or short between ABS motor and ground
If NG, repair harness.

8. During ABS/TCS Control, Vehicle Behavior is Jerky.

1. ENGINE SPEED SIGNAL INSPECTION

Perform data monitor with CONSULT-II for the ABS/TCS control unit.

Is the engine speed at idle 400 rpm or higher?

- Yes >> Condition is normal.
No >> GO TO 2.

2. SELF-DIAGNOSIS RESULT ITEM CHECK 1

Perform the TCS/ABS control unit self-diagnosis.

Is the self-diagnosis result displayed?

- Yes >> After checking and repairing the applicable item, perform the ABS/TCS control unit self-diagnosis again.
No >> GO TO 3.

3. ECM SELF-DIAGNOSIS RESULT ITEM CHECK

Perform the ECM self-diagnosis. Refer to [EC-738, "CONSULT-II INSPECTION PROCEDURE"](#).

Does the self-diagnosis result indicate camshaft position sensor?

- Yes >> Repair or replace the camshaft position sensor system.
No >> GO TO 4.

4. SELF-DIAGNOSIS RESULT ITEM CHECK 2

Disconnect the connectors for the ABS actuator and electric unit (control unit) and ECM, and reconnect them correctly to perform the self-diagnosis again.

Is inspection result OK?

- OK >> Connector malfunction. Repair or replace the connector.
NG >> GO TO 5.

5. SELF-DIAGNOSIS RESULT ITEM CHECK 3

Perform the A/T self-diagnosis.

Is inspection result OK?

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

6. SELF-DIAGNOSIS RESULTS ITEM CHECK 4

Perform the ABS/TCS control unit self-diagnosis again.

Is the self-diagnosis result displayed?

- Yes >> Repair or replace the applicable item.
No >> GO TO 7.

7. CIRCUIT CHECK BETWEEN THE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) AND ECM

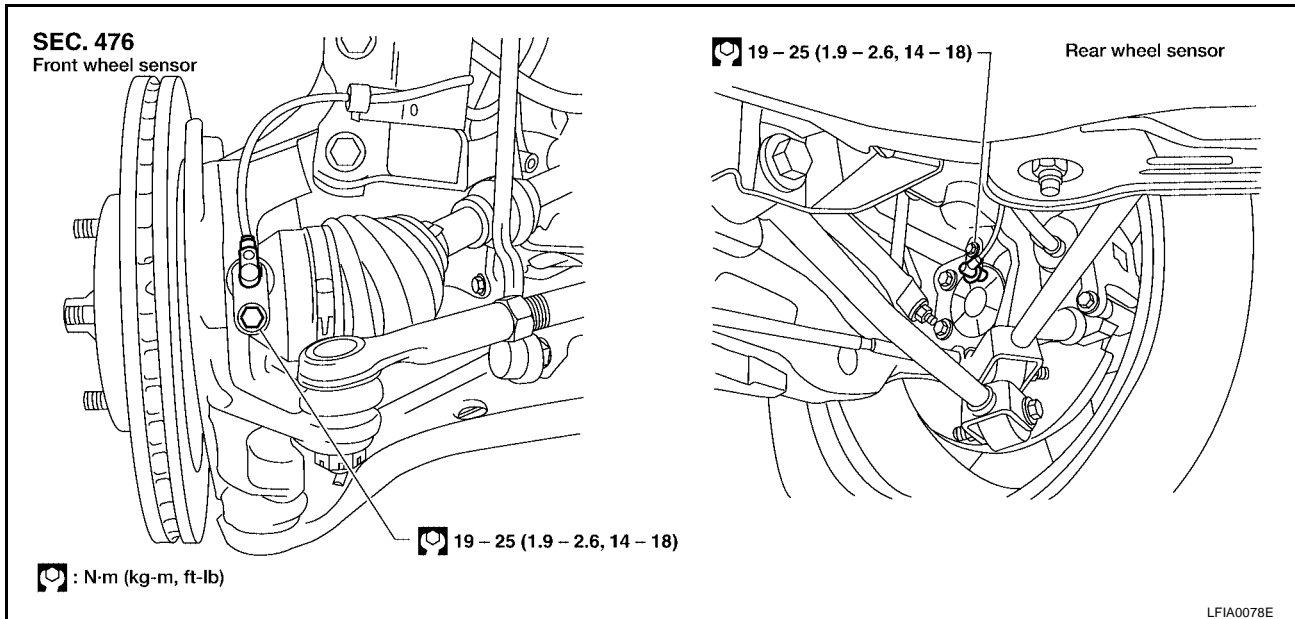
1. Disconnect the connectors for the ABS actuator and electric unit (control unit) and ECM.
2. Check the engine speed signal harness between the ABS actuator and electric unit (control unit) and ECM for an open/shorted circuit.
3. Check the connectors for the ABS actuator and electric unit (control unit) and ECM.

Is inspection result OK?

- OK >> **INSPECTION END.**
NG >> Connect the connectors to perform the ABS actuator and electric unit (control unit) self-diagnosis again.

WHEEL SENSORS

Removal and Installation



CAUTION:

Be careful not to damage sensor edge and sensor rotor teeth.

When removing the front or rear wheel hub assembly, first remove the ABS wheel sensor from the assembly. Failure to do so may result in damage to the sensor wires making the sensor inoperative.

CAUTION:

Pull out the sensor being careful to turn it as little as possible. Do not pull on the sensor harness.

Installation should be performed while paying attention to the following, and then tighten mounting bolts and nuts to the specified torque.

- **Check if foreign objects such as iron fragments are adhered to the pick-up part of the sensor or to the inside of the hole for mounting the sensor, or if a foreign object is caught in the surface of the mounting for the rotor. If something wrong is found, fix it and then install the sensor.**

SENSOR ROTOR

PFP:47970

Removal and Installation

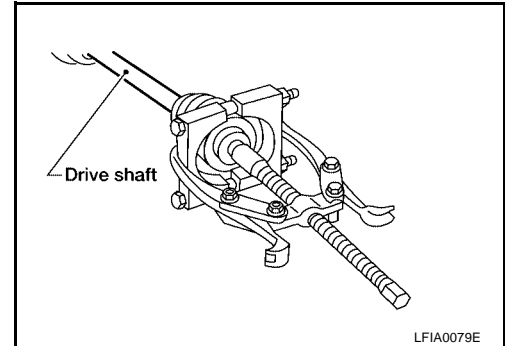
EFS00288

NOTE:

The rear wheel sensor rotor is built into the rear wheel hub. For removal and installation procedure, refer to [RAX-6, "Removal and Installation"](#) .

REMOVAL

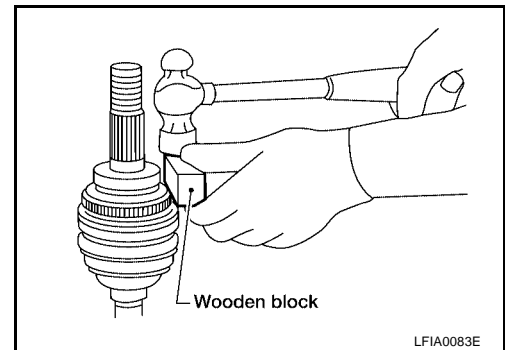
1. Remove the front wheel hub. Refer to [FAX-6, "Removal and Installation"](#) .
2. Remove the sensor rotor using suitable puller.



INSTALLATION

Install the sensor rotor using a hammer and a wooden block.

- Always replace sensor rotor with new one.

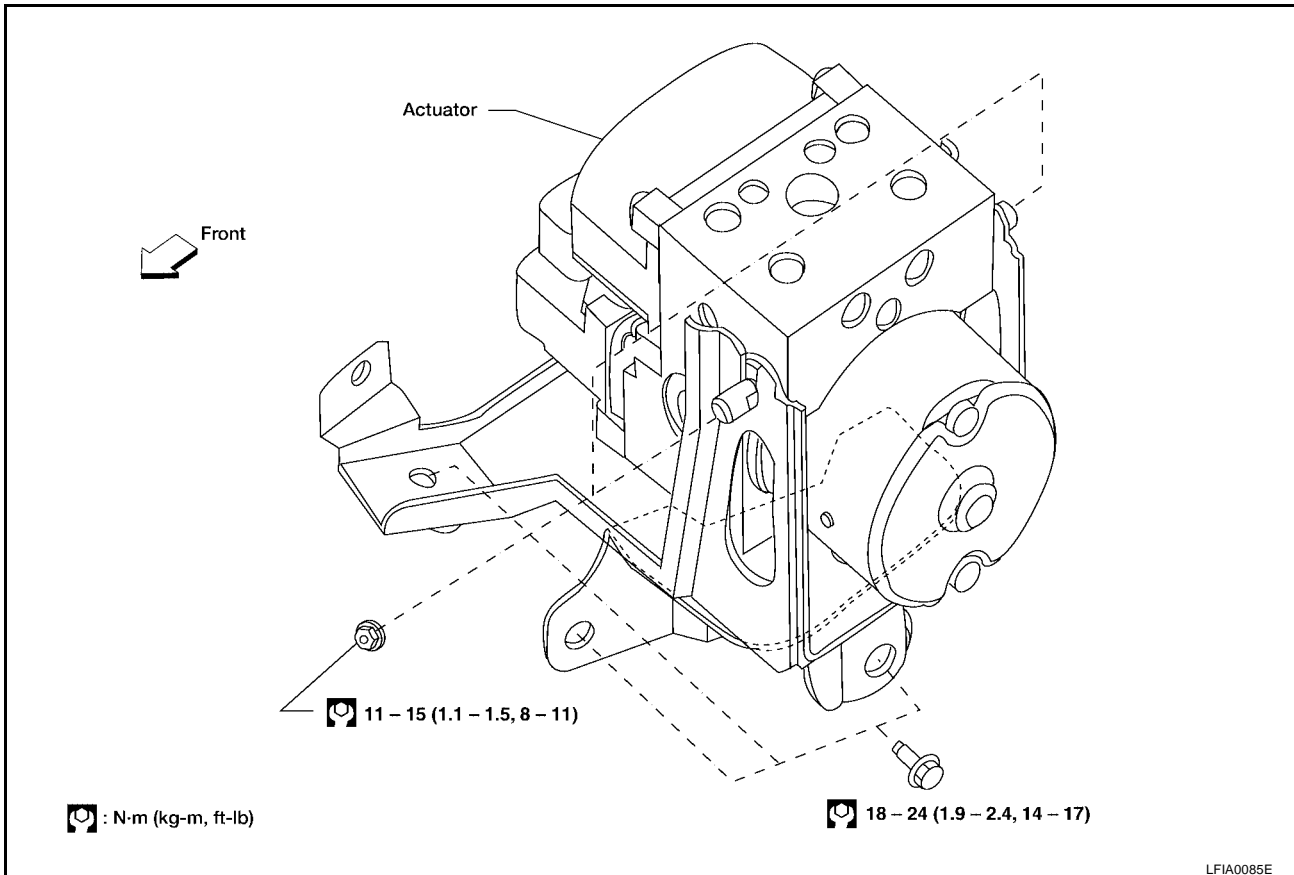


ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

PF:47660

Removal and Installation

EFS00289



REMOVAL

1. Disconnect battery cable.
2. Remove windshield wiper and linkage assembly. Refer to [WW-27, "REMOVAL"](#) .
3. Drain brake fluid. Refer to [BR-8, "Changing Brake Fluid"](#) .
4. Disconnect harness connectors from ABS actuator and electric unit (control unit).
5. Disconnect brake pipes.
6. Remove fixing nuts and bolts for ABS actuator and electric unit (control unit) and remove from vehicle.

INSTALLATION

CAUTION:

After installation of ABS actuator and electric unit (control unit), refill brake fluid. Then bleed air from system. Refer to [BR-8, "Bleeding Brake System"](#) .

1. Position ABS actuator and electric unit (control unit) in vehicle.
2. Connect brake pipes and fixing nuts temporarily.
3. Tighten fixing nuts, bolts and brake pipes.
4. Connect ABS actuator and electric unit (control unit) harness connectors.
5. Install windshield wiper and linkage assembly. Refer to [WW-27, "INSTALLATION"](#) .
6. Reconnect battery cable.