

SECTION **BRC**

BRAKE CONTROL SYSTEM

A
B
C
D
E

CONTENTS

ABS	
PRECAUTIONS	3
Precautions for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"	3
Precautions for Brake System	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
CAN Communication System Description	7
TROUBLE DIAGNOSIS	8
How to Perform Trouble Diagnoses for Quick and Accurate Repair	8
INTRODUCTION	8
WORK FLOW	9
CLARIFY CONCERN	10
EXAMPLE OF DIAGNOSIS SHEET	10
Component Parts and Harness Connector Location	11
Schematic	12
Wiring Diagram — ABS —	13
CONSULT-II Function (ABS)	16
ECU (ABS CONTROL UNIT) PART NUMBER MODE	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)	22
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	26
TROUBLE DIAGNOSIS FOR SELF-DIAGNOSTIC ITEMS	27
CAN Communication Line or ABS Actuator and Electric Unit (Control Unit) (With 5-speed A/T)	27
DIAGNOSTIC PROCEDURE	27
Wheel Sensor or Rotor	27
DIAGNOSTIC PROCEDURE	27
ABS Actuator Solenoid Valve or Solenoid Valve Relay	30
DIAGNOSTIC PROCEDURE	30
Motor Relay or Motor	33
DIAGNOSTIC PROCEDURE	33
Abnormal Battery Voltage	35
DIAGNOSTIC PROCEDURE	35
Controller Failure	36
DIAGNOSTIC PROCEDURE	36
TROUBLE DIAGNOSES FOR SYMPTOMS	38
1. ABS Works Frequently	38
2. Unexpected Pedal Action	38
3. Long Stopping Distance	39
4. ABS Does Not Work	39
5. Pedal Vibration and Noise	40
6. ABS Warning Lamp Does Not Come On When Ignition Switch Is Turned On	41
7. ABS Warning Lamp Stays On When Ignition Switch Is Turned On	42

BRC

G
H
I
J
K
L
M

WHEEL SENSORS	43	ACTIVE TEST PROCEDURE	67
Removal and Installation	43	ACTIVE TEST MODE	68
REMOVAL	43	Self-Diagnosis (Without CONSULT-II)	69
INSTALLATION	43	FUNCTION	69
SENSOR ROTOR	44	SELF-DIAGNOSIS PROCEDURE	69
Removal and Installation	44	HOW TO READ SELF-DIAGNOSTIC RESULTS	
REMOVAL	44	(MALFUNCTION CODES)	69
INSTALLATION	44	HOW TO ERASE SELF-DIAGNOSTIC	
ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)...	45	RESULTS (MALFUNCTION CODES)	70
Removal and Installation	45	Preliminary Check	70
REMOVAL	45	Ground Circuit Check	72
INSTALLATION	45	ABS ACTUATOR AND ELECTRIC UNIT (CON-	
		TROL UNIT) GROUND	72
		ABS WARNING LAMP, TCS OFF INDICATOR	
		LAMP, SLIP INDICATOR LAMP ON/OFF TIMING ..	72
		Malfunction Code Chart (Without CONSULT-II)	72
		Symptom Chart	73
		TROUBLE DIAGNOSIS FOR SELF-DIAGNOSTIC	
		ITEMS	74
		CAN Communication Line or ABS Actuator and	
		Electric Unit (Control Unit)	74
		DIAGNOSTIC PROCEDURE	74
		Wheel Sensor or Rotor	74
		DIAGNOSTIC PROCEDURE	74
		ABS Actuator Solenoid Valve or Solenoid Valve	
		Relay	77
		DIAGNOSTIC PROCEDURE	77
		Motor Relay or Motor	80
		DIAGNOSTIC PROCEDURE	80
		Abnormal Battery Voltage	82
		DIAGNOSTIC PROCEDURE	82
		Controller Failure	83
		DIAGNOSTIC PROCEDURE	83
		TROUBLE DIAGNOSES FOR SYMPTOMS	85
		1. ABS Works Frequently	85
		2. Unexpected Pedal Action	85
		3. Long Stopping Distance	86
		4. ABS Does Not Work	86
		5. Pedal Vibration and Noise	87
		6. ABS Warning Lamp Does Not Come On When	
		Ignition Switch Is Turned On	88
		7. ABS Warning Lamp Stays On When Ignition	
		Switch Is Turned On	89
		8. During ABS/TCS Control, Vehicle Behavior is	
		Jerky	89
		WHEEL SENSORS	91
		Removal and Installation	91
		REMOVAL	91
		INSTALLATION	91
		SENSOR ROTOR	92
		Removal and Installation	92
		REMOVAL	92
		INSTALLATION	92
		ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)...	93
		Removal and Installation	93
		REMOVAL	93
		INSTALLATION	93

TCS/ABS

PRECAUTIONS	47
Precautions for Supplemental Restraint System	
(SRS) "AIR BAG" and "SEAT BELT PRE-TEN-	
SIONER"	47
Precautions for Brake System	47
PREPARATION	48
Special Service Tool	48
Commercial Service Tools	48
GENERAL INFORMATION	49
Description	49
PURPOSE	49
ABS (ANTI-LOCK BRAKE SYSTEM) OPERA-	
TION	49
TCS (TRACTION CONTROL SYSTEM) OPER-	
ATION	49
Fail Safe	49
Hydraulic Circuit	50
System Components	51
Control Unit	51
ABS FUNCTION	51
TCS FUNCTION	51
ABS Actuator and Electric Unit	52
ABS ACTUATOR OPERATION	52
Wheel Sensors	52
CAN Communication System Description	52
TROUBLE DIAGNOSIS	53
How to Perform Trouble Diagnoses for Quick and	
Accurate Repair	53
INTRODUCTION	53
WORK FLOW	54
CLARIFY CONCERN	55
EXAMPLE OF DIAGNOSIS SHEET	55
Component Parts and Harness Connector Location ..	56
Schematic	58
Wiring Diagram — TCS —	59
CONSULT-II Function (ABS)	62
ECU (ABS/TCS CONTROL UNIT) PART NUM-	
BER MODE	62
SELF-DIAGNOSIS PROCEDURE	62
SELF-DIAGNOSTIC RESULTS MODE	64
DATA MONITOR PROCEDURE	65
DATA MONITOR MODE	66

PRECAUTIONS

PFP:00001

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

EFS0046S

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

EFS0046T

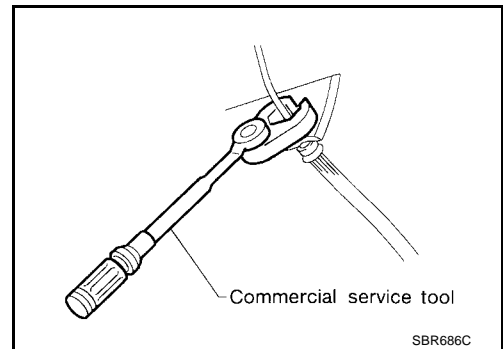
CAUTION:

- Refer to [MA-12, "RECOMMENDED FLUIDS AND LUBRICANTS"](#) for recommended brake fluid.
- 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.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Before working, turn ignition switch OFF and disconnect electrical connector of ABS actuator and electric unit (control unit) or battery terminals.
- 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-26, "Brake Burnishing Procedure"](#) .

WARNING:

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



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PREPARATION

[ABS]

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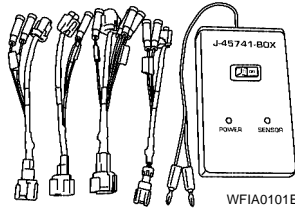
EFS0046V

PREPARATION

Special Service Tool

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

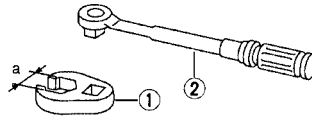
Tool number (Kent-Moore No.) Tool name	Description
<p style="text-align: center;">—</p> <p>(J-45741) ABS active wheel sensor tester</p>	<p>Checking operation of ABS active wheel sensor</p>



Commercial Service Tools

EFS0046W

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



S-NT360

GENERAL INFORMATION

PFP:00000

EFS0046X

Description
PURPOSE

The Anti-lock Brake System (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 ABS has self-test capabilities. The system turns on the ABS warning lamp for 2 seconds 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.

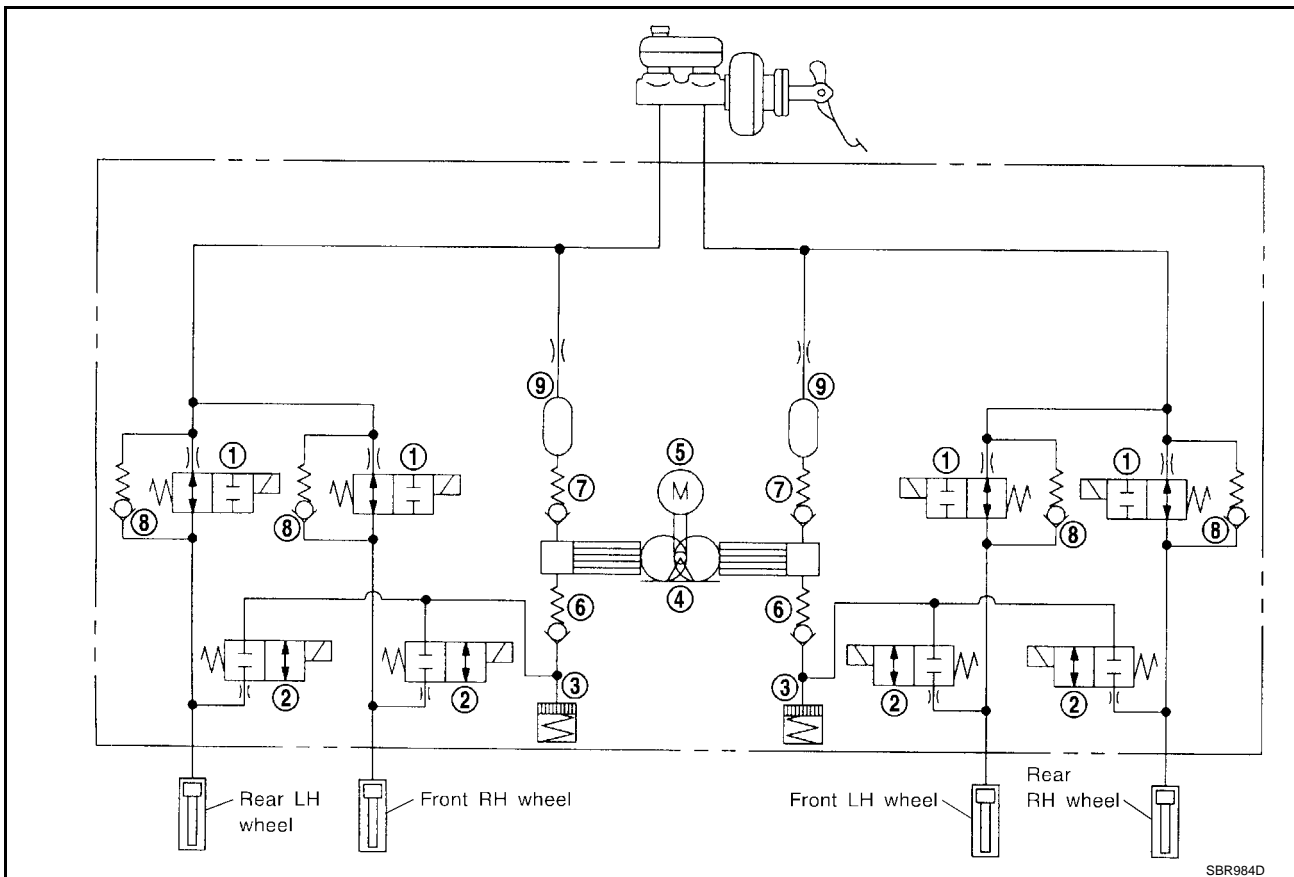
Fail Safe

EFS0046Y

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

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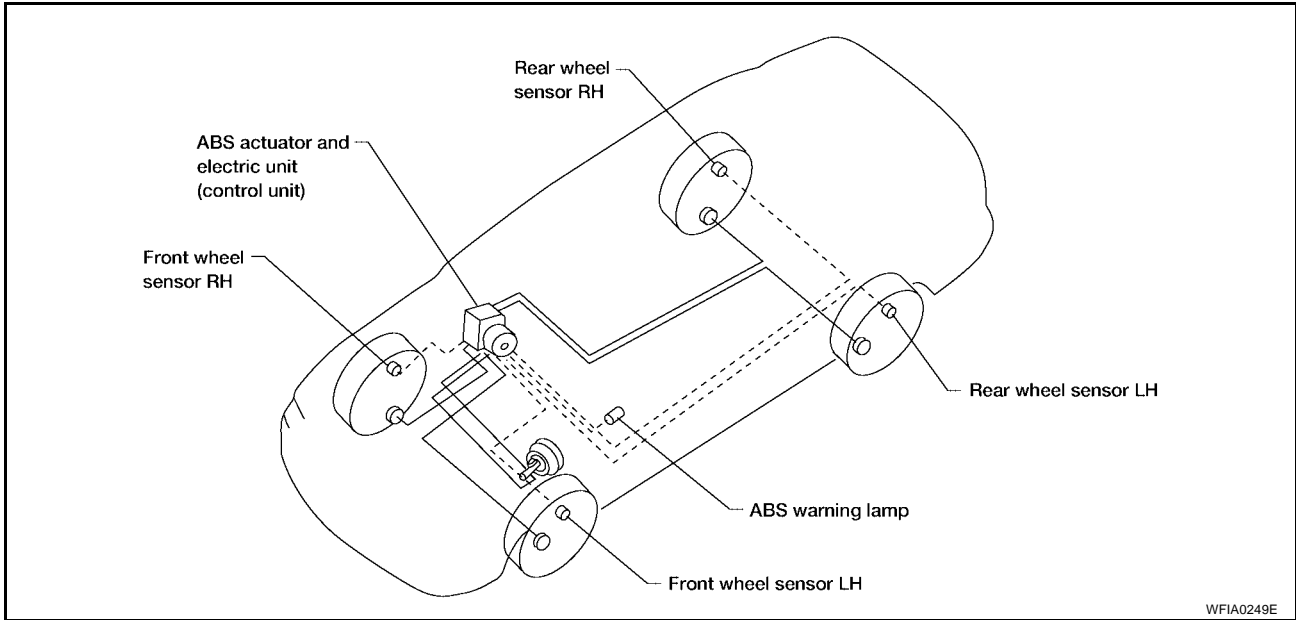


- | | | |
|-------------------------|--------------------------|----------------|
| 1. Inlet solenoid valve | 2. Outlet solenoid valve | 3. Reservoir |
| 4. Pump | 5. Motor | 6. Inlet valve |
| 7. Outlet valve | 8. Bypass check valve | 9. Damper |

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System Components

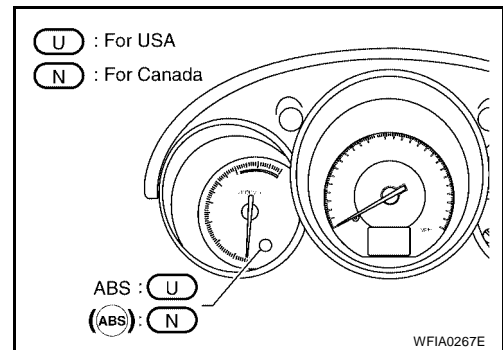
EFS00470



Control Unit

EFS00471

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 solenoid valve relay and motor relay. If any electrical malfunction should be detected in the system, the control unit causes the warning lamp to turn on. In this condition, the ABS will be deactivated by the control unit, and the vehicle's brake system reverts to normal operation.



ABS Actuator and Electric Unit (Control Unit)

EFS00472

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 that 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 the caliper via the inlet solenoid valve.

GENERAL INFORMATION

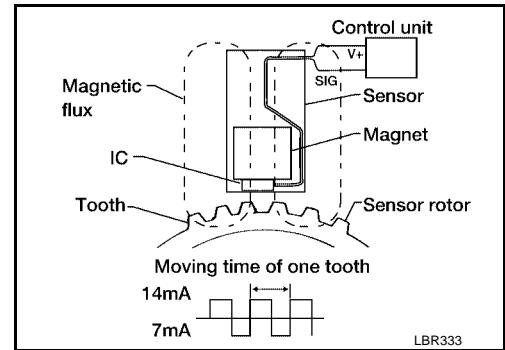
[ABS]

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 the reservoir via the outlet solenoid valve. Then it is pushed up to the master cylinder by the pump.
	Pressure increase	OFF (Open)	OFF (Closed)	Master cylinder brake fluid pressure is transmitted to caliper.

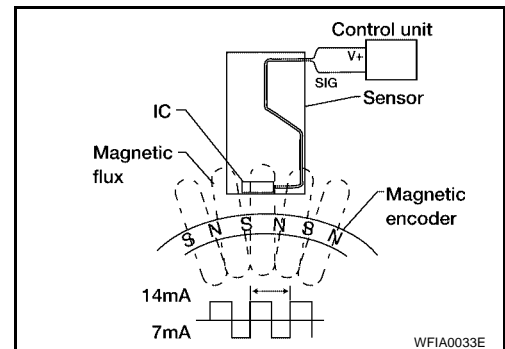
Wheel Sensors

EFS00473

The front wheel sensors 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 wheel sensors 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

EFS0062B

Refer to [LAN-20, "CAN COMMUNICATION"](#).

TROUBLE DIAGNOSIS

How to Perform Trouble Diagnoses for Quick and Accurate Repair INTRODUCTION

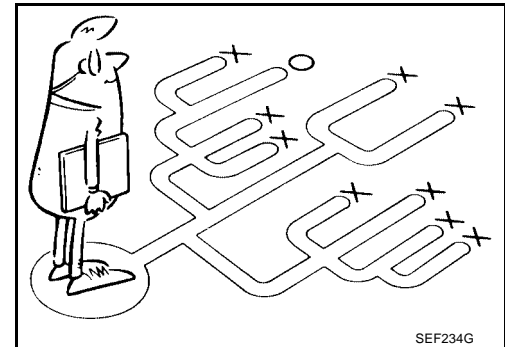
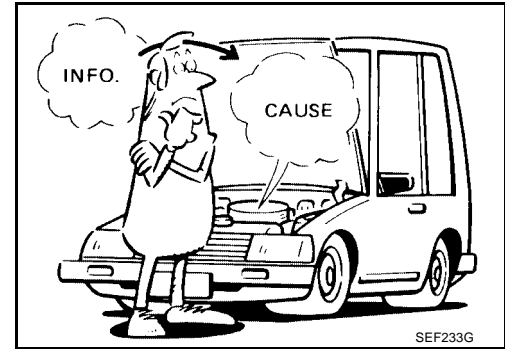
The ABS has an electronic control unit to control major functions. The control unit accepts input signals from sensors and controls operation of the actuator. It is also important to check for conventional problems such as air leaks in the booster or lines, lack of brake fluid, or other problems with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

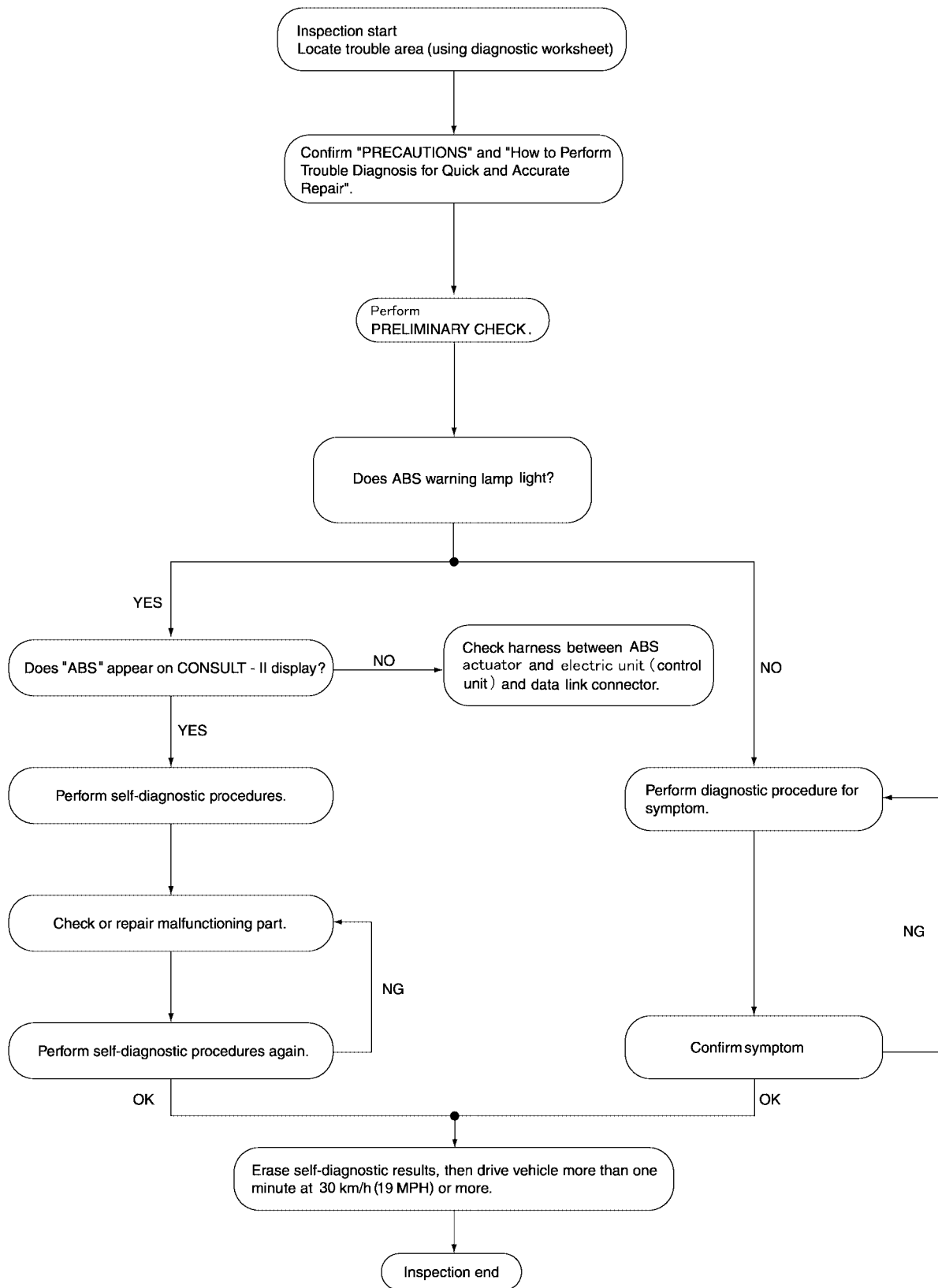
Start your diagnosis by looking for "conventional" problems first. This is one of the best ways to troubleshoot brake problems on an ABS controlled vehicle. Also check related Service Bulletins for information.



TROUBLE DIAGNOSIS

[ABS]

WORK FLOW



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TROUBLE DIAGNOSIS

[ABS]

CLARIFY CONCERN

- A customer's description of a vehicle concern may vary depending on the individual. It is important to clarify the customer's concern.
- 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

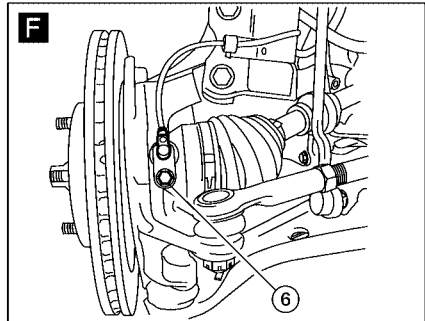
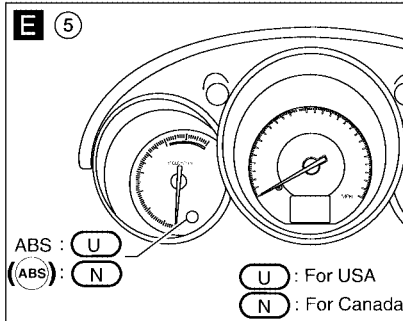
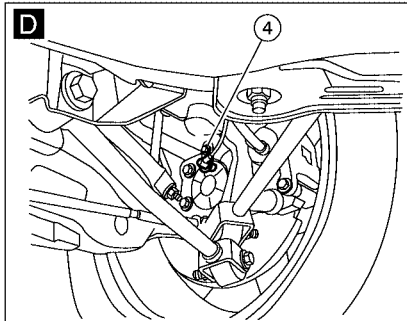
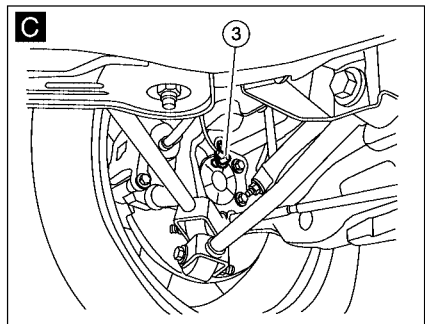
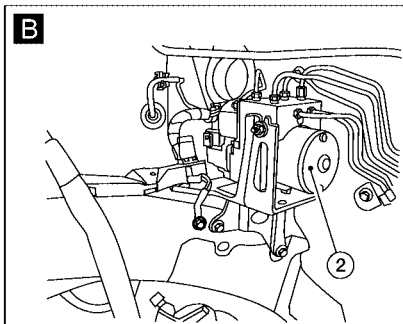
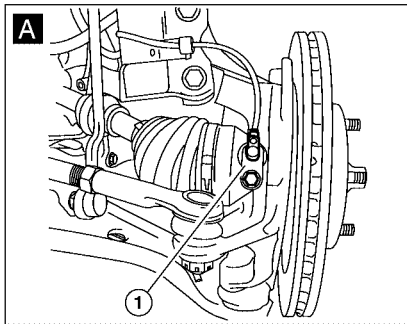
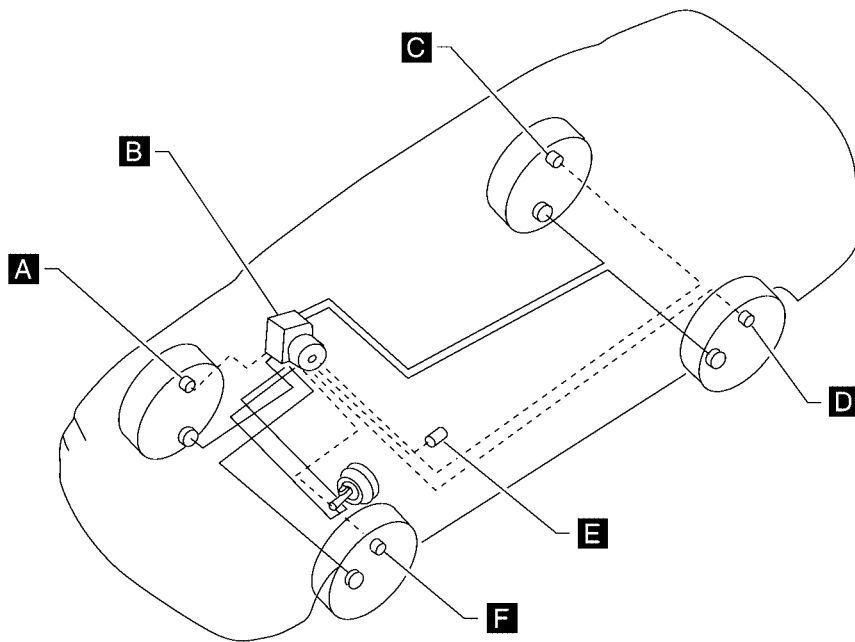
EXAMPLE OF DIAGNOSIS SHEET

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"/> ABS does not work (Wheels lock when braking)	<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

EFS00475



- | | | |
|--------------------------------------|---|-------------------------------------|
| <p>1. Front wheel sensor RH E117</p> | <p>2. ABS actuator and electric unit (control unit) E125 (engine removed for clarity)</p> | <p>3. Rear wheel sensor RH B122</p> |
| <p>4. Rear wheel sensor LH B123</p> | <p>5. Combination meter M24</p> | <p>6. Front wheel sensor LH E18</p> |

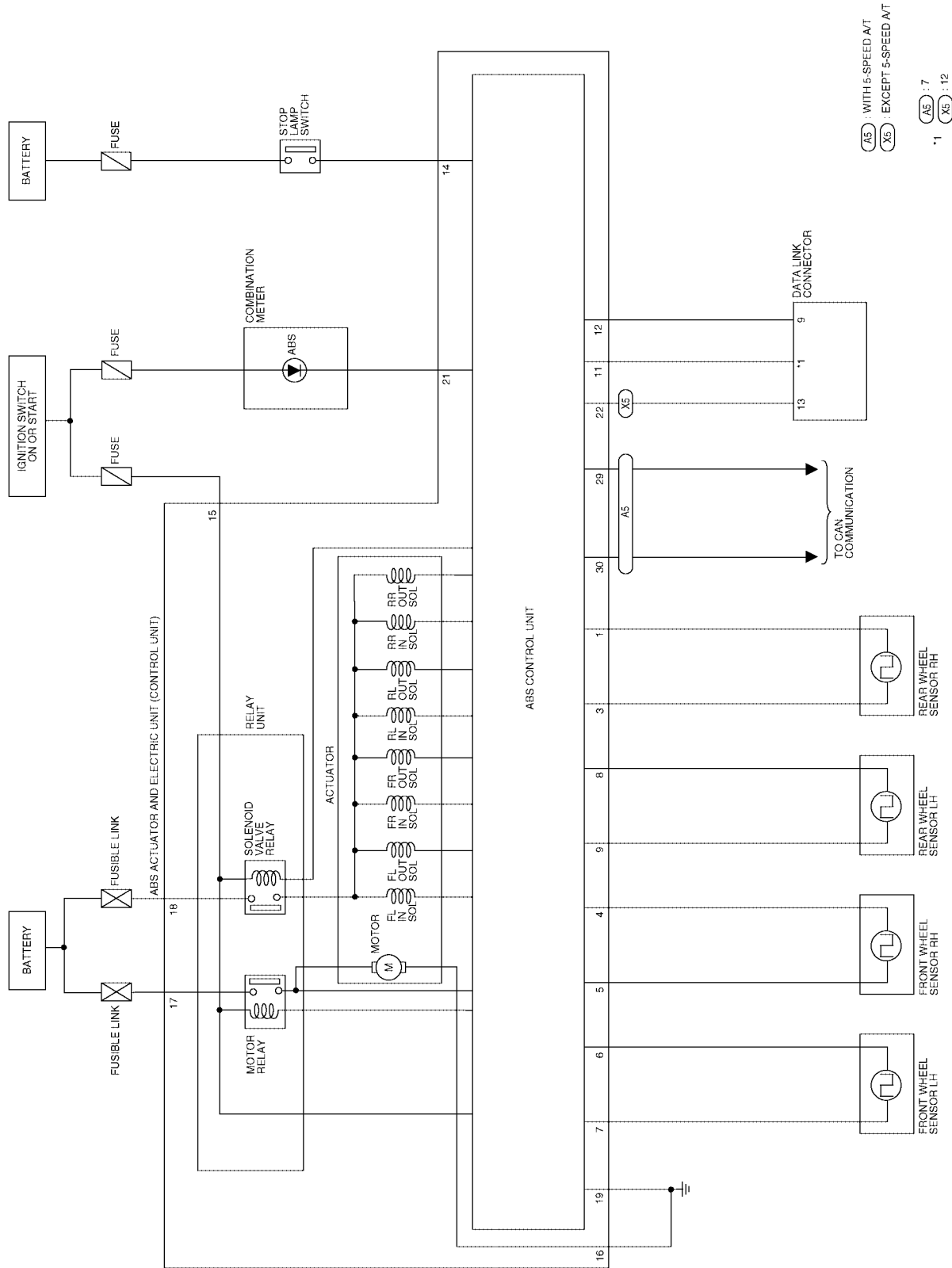
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TROUBLE DIAGNOSIS

[ABS]

EFS00476

Schematic



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TROUBLE DIAGNOSIS

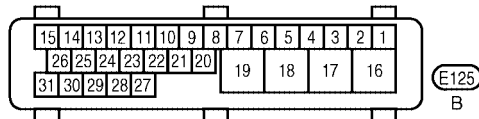
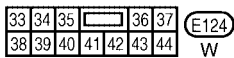
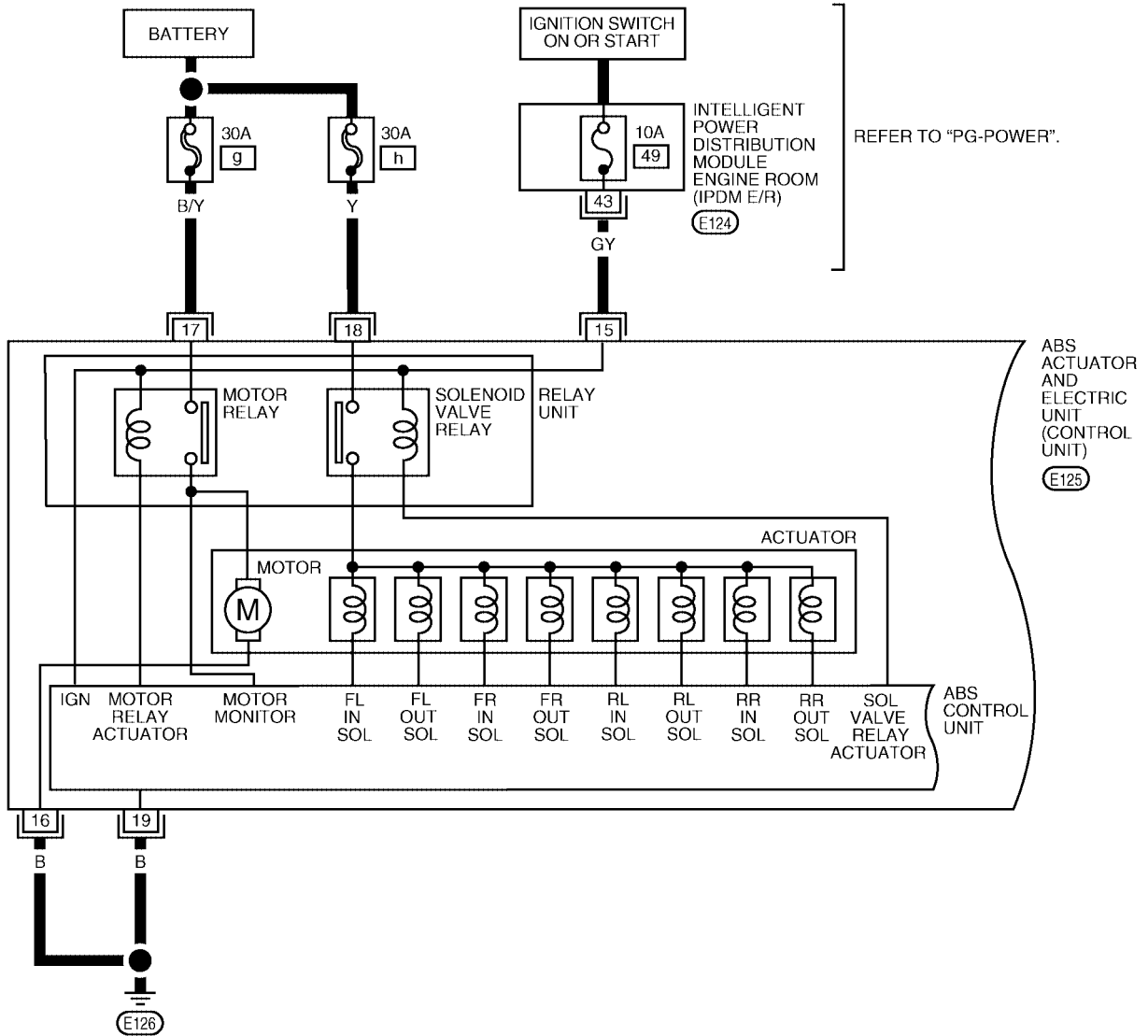
[ABS]

Wiring Diagram — ABS —

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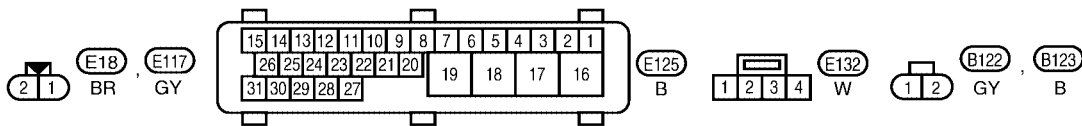
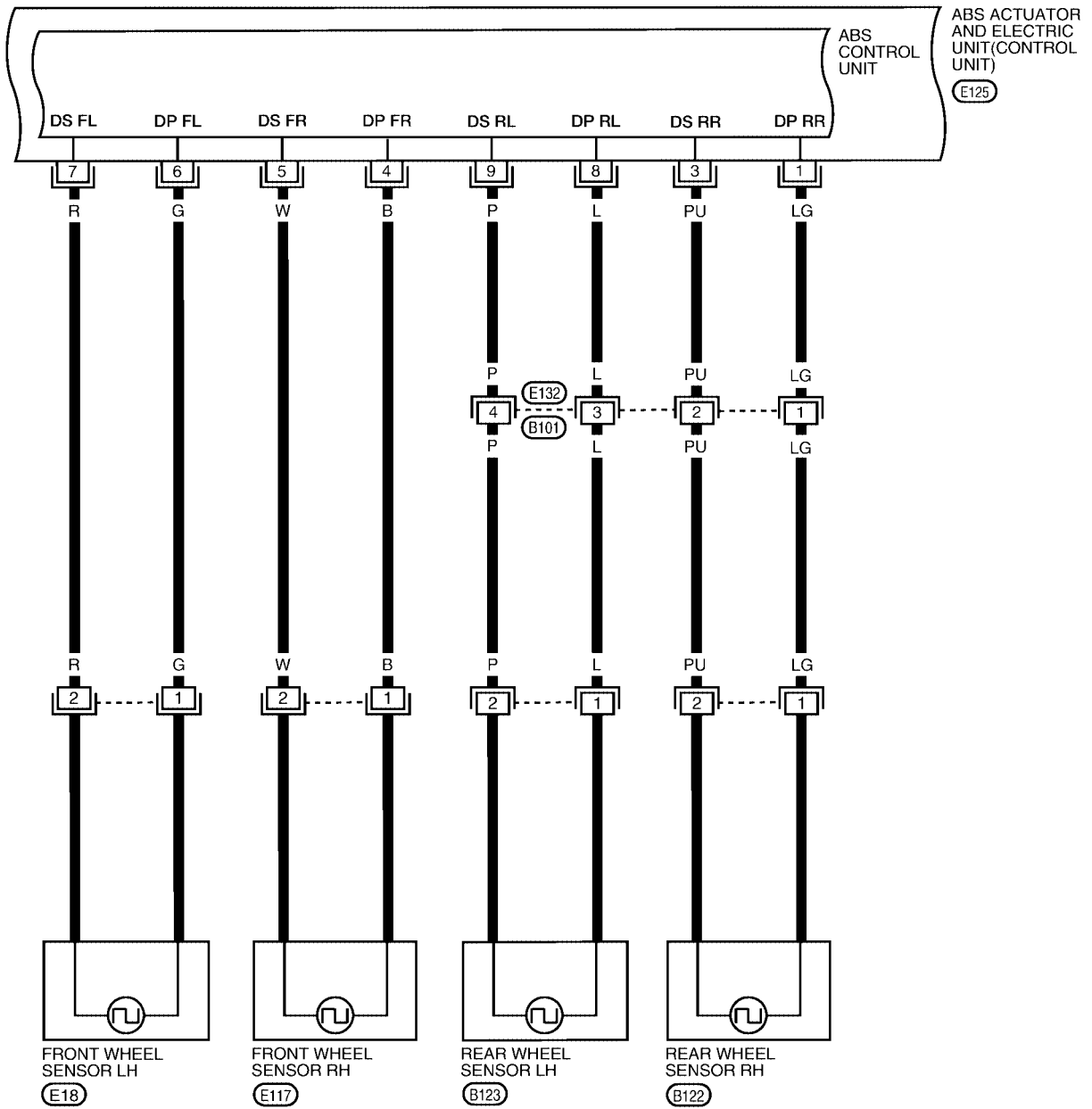


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TROUBLE DIAGNOSIS

[ABS]

BRC-ABS-02

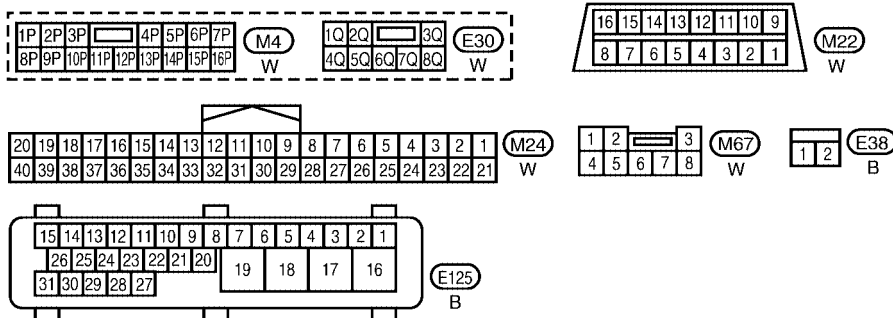
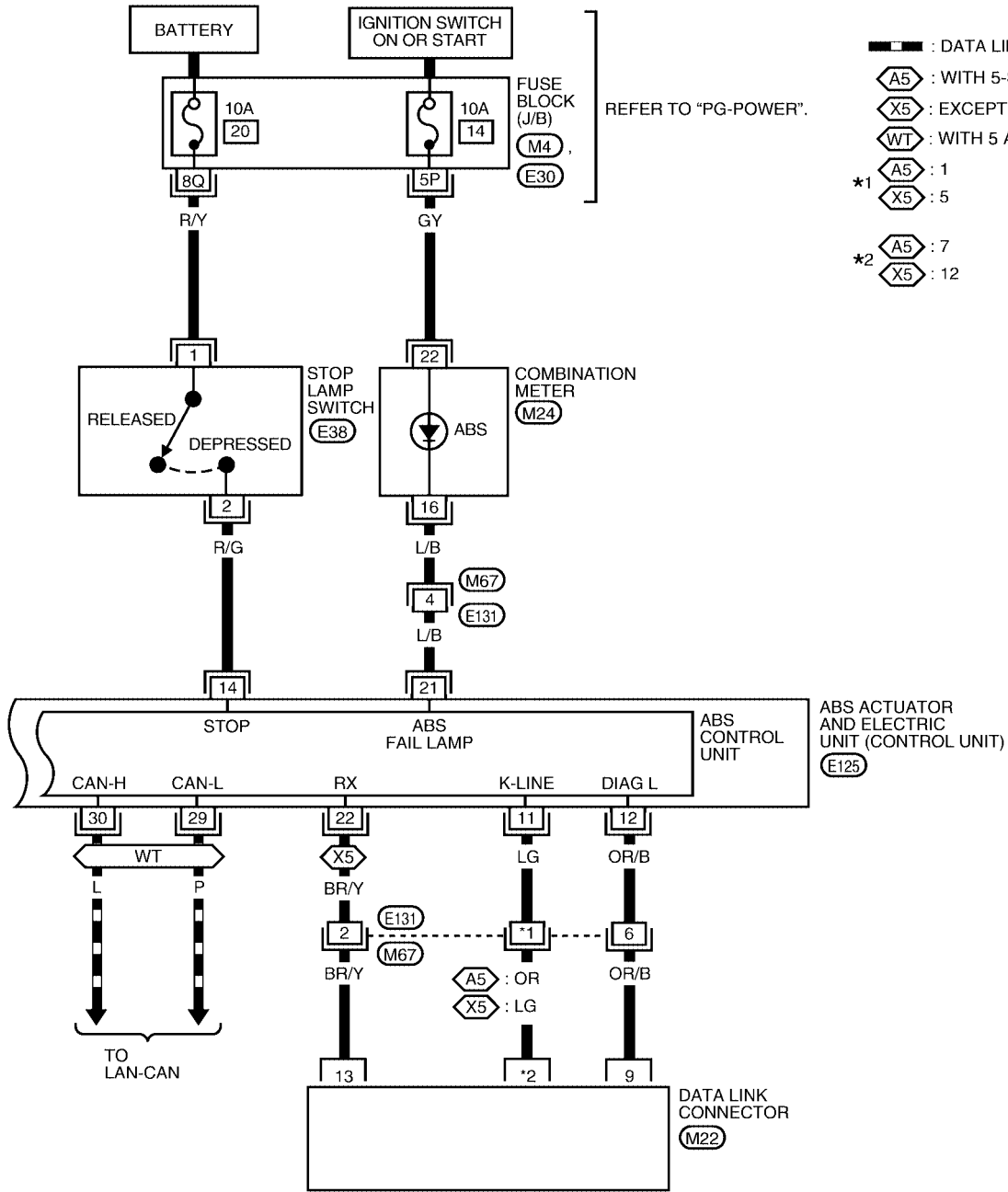


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TROUBLE DIAGNOSIS

[ABS]

BRC-ABS-03



WFWA0301E

CONSULT-II Function (ABS)

CONSULT-II can display each diagnostic item using the diagnostic test modes shown following.

ABS diagnostic mode	Description
WORK SUPPORT	Supports inspection and adjustments. Commands are transmitted to the ABS actuator and electric unit (control unit) for setting the status suitable for required operation, input/output signals are received from the ABS actuator and electric unit (control unit) and received data is displayed.
SELF-DIAG RESULTS	Displays ABS actuator and electric unit (control unit) self-diagnosis results.
DATA MONITOR	Displays ABS actuator and electric unit (control unit) input/output data in real time.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
FUNCTION TEST	Conducted by CONSULT-II instead of a technician to determine whether each system is "OK" or "NG".
ECU PART NUMBER	ABS actuator and electric unit (control unit) part number can be read.

ECU (ABS CONTROL UNIT) PART NUMBER MODE

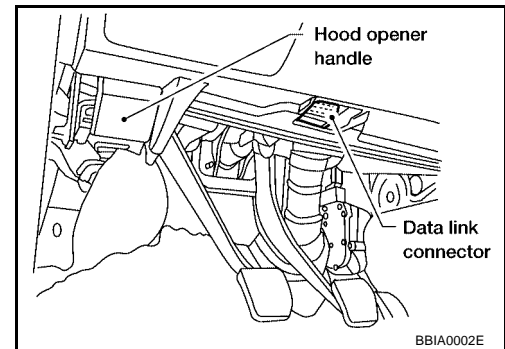
Ignore the ECU part number displayed in the "ECU PART NUMBER" screen. Refer to the parts catalog to order the ABS actuator and electric unit (control unit).

CAUTION:

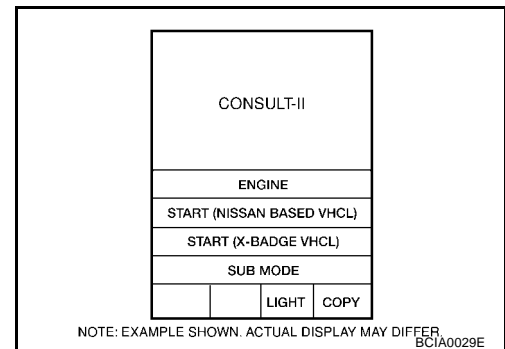
If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carries out CAN communication.

SELF-DIAGNOSIS PROCEDURE

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



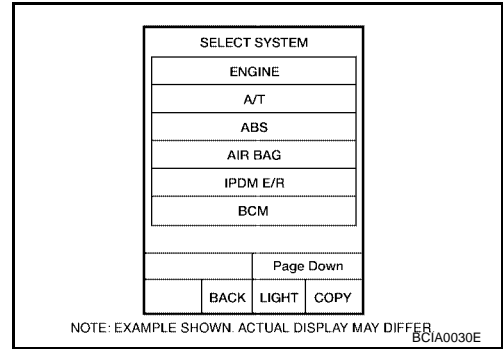
3. Start engine.
4. Drive vehicle over 30 km/h (19 MPH) for at least one minute.
5. Stop vehicle with engine running and touch "START (NISSAN BASED VHCL)" on CONSULT-II screen.



TROUBLE DIAGNOSIS

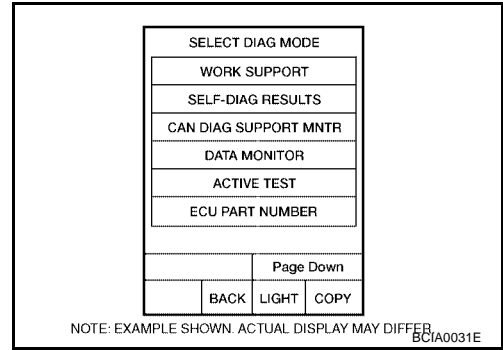
[ABS]

6. Touch "ABS" in the "SELECT SYSTEM" screen.
If "ABS" is not indicated, go to [GI-39, "Consult-II Data Link Connector \(DLC\) Circuit"](#) .



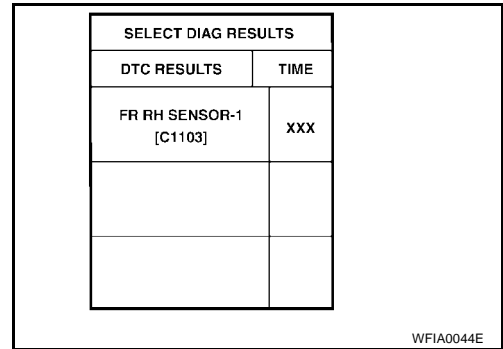
A
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7. Touch "SELF-DIAG RESULTS".
 - The screen shows the detected malfunction and how many times the ignition switch has been turned since the malfunction.



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BRC
G

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.



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TROUBLE DIAGNOSIS

[ABS]

SELF-DIAGNOSTIC RESULTS MODE

Diagnostic item	Diagnosed condition	Diagnostic item is detected when...	Reference Page	
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-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-2 [C1105]*1	Short	<ul style="list-style-type: none"> ● Circuit for rear right wheel sensor is shorted. 		BRC-27
RR LH SENSOR-2 [C1106]*1	Short	<ul style="list-style-type: none"> ● Circuit for rear left wheel sensor is shorted. 		
FR RH SENSOR-2 [C1107]*1	Short	<ul style="list-style-type: none"> ● Circuit for front right wheel sensor is shorted. 		
FR LH SENSOR-2 [C1108]*1	Short	<ul style="list-style-type: none"> ● Circuit for front 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. 		
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. 		
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-30	
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.) 		
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.) 		
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.) 		
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 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.) 		
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 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.) 		
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-35	
CONTROLLER FAILURE*2 [C1110]	Control Unit	<ul style="list-style-type: none"> ● Function of calculation in ABS control unit has malfunctioned. 	BRC-36	
PUMP MOTOR [C1111]	Abnormal	<ul style="list-style-type: none"> ● Circuit for actuator motor is open or shorted. ● Actuator motor relay is stuck. 	BRC-33	
CAN COMM CIRCUIT [U1000] (With 5-speed A/T)	CAN Communication Failure	<ul style="list-style-type: none"> ● CAN communication line is open or shorted. 	BRC-27	

*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.

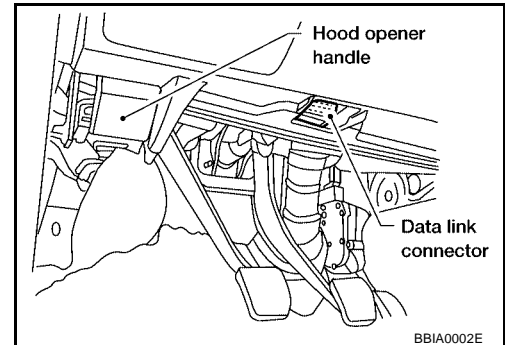
TROUBLE DIAGNOSIS

[ABS]

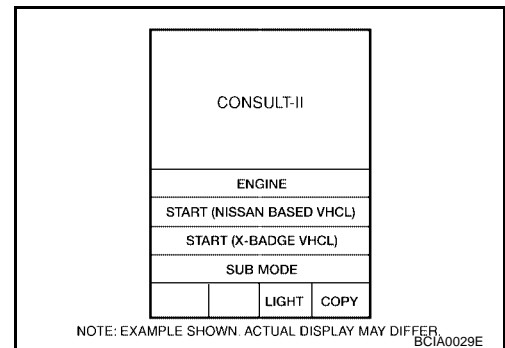
*2: When "CONTROLLER FAILURE" is displayed, check to see if the ABS warning lamp is burned out, and check the circuit between the ABS warning lamp and ABS actuator and electric unit (control unit) for open or short. Then check the ABS actuator and electric unit (control unit) and circuit.

DATA MONITOR PROCEDURE

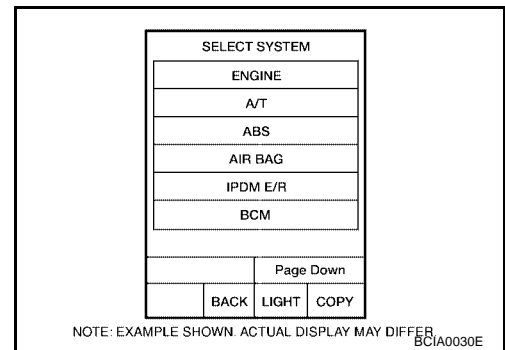
1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector.



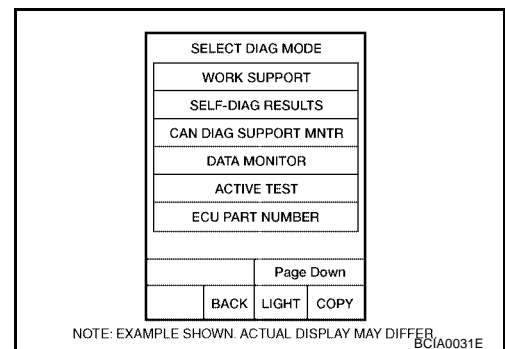
3. Turn ignition switch ON.
4. Touch "START (NISSAN BASED VHCL)" on CONSULT-II screen.



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



6. Touch "DATA MONITOR".



7. Touch "SETTING" on "SELECT MONITOR ITEM" screen.
8. Touch "AUTO TRIG" or "MANU TRIG" on "SET RECORDING CONDITION" screen.

TROUBLE DIAGNOSIS

[ABS]

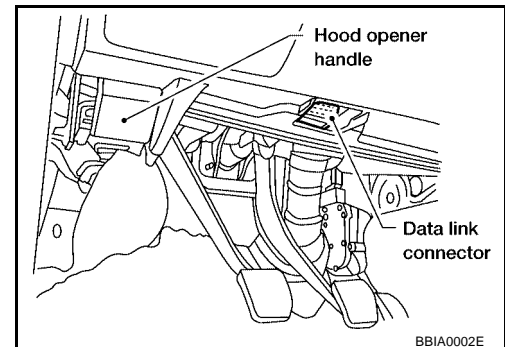
9. Touch "START" on "SELECT MONITOR ITEM".

DATA MONITOR MODE

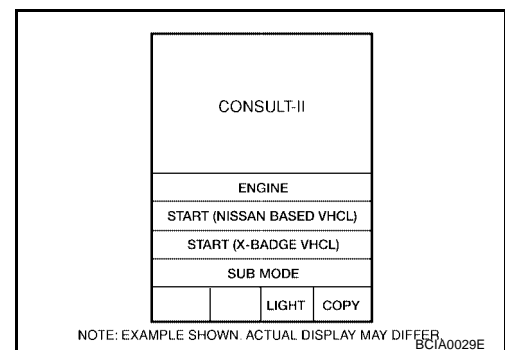
MONITOR ITEM	CONDITION	SPECIFICATION
FR RH SENSOR FR LH SENSOR RR RH SENSOR RR LH SENSOR	Drive vehicle. (Each wheel is rotating.)	Displays computed vehicle speed from wheel sensor signal. Almost the same speed as speedometer.
STOP LAMP SW	Turn ignition switch ON and depress brake pedal.	Depress the pedal: ON Release the pedal: OFF
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 and CONSULT-II CONVERTER to data link connector.



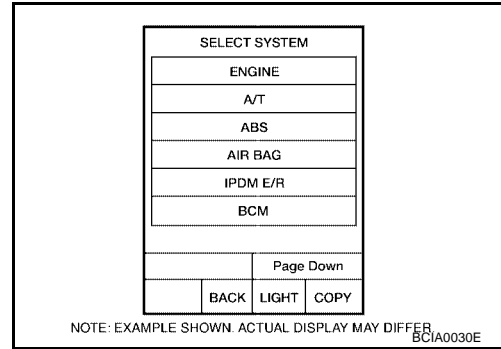
3. Start engine.
4. Touch "START (NISSAN BASED VHCL)" on CONSULT-II screen.



TROUBLE DIAGNOSIS

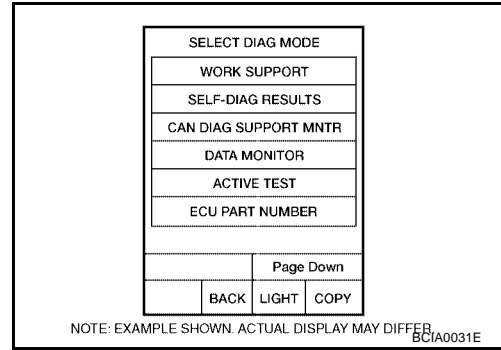
[ABS]

- Touch "ABS" in the "SELECT SYSTEM" screen.
If "ABS" is not indicated, go to [GI-39, "Consult-II Data Link Connector \(DLC\) Circuit"](#).



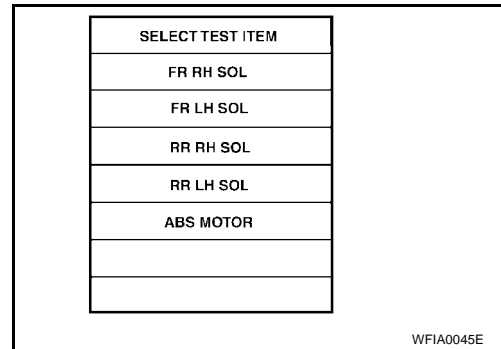
A
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C
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- Touch "ACTIVE TEST".



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- Select active test item by touching screen.



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- Touch "START".
- 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:

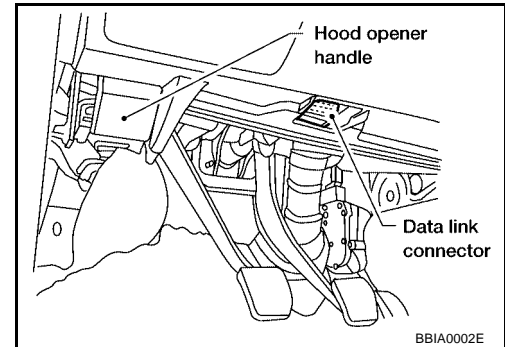
Active test will automatically stop ten seconds after the test starts. (TEST IS STOPPED is displayed.)

Self-Diagnosis (Without CONSULT-II)

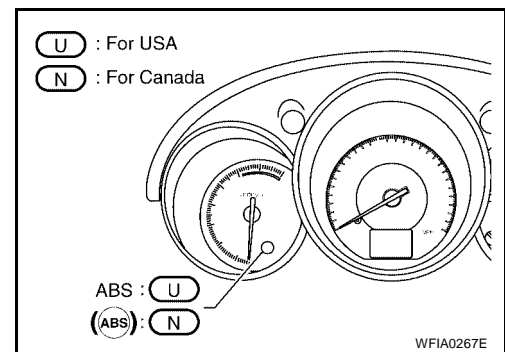
When a problem occurs in the ABS, the ABS warning lamp on the instrument panel comes on. To activate the self-diagnostic results mode, ground the self-diagnostic (check) terminal located on data link connector. The location of the malfunction is indicated by the ABS warning lamp flashing.

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. Repeat the self-diagnostic procedure to verify that the malfunction codes have been erased.



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

NOTE:

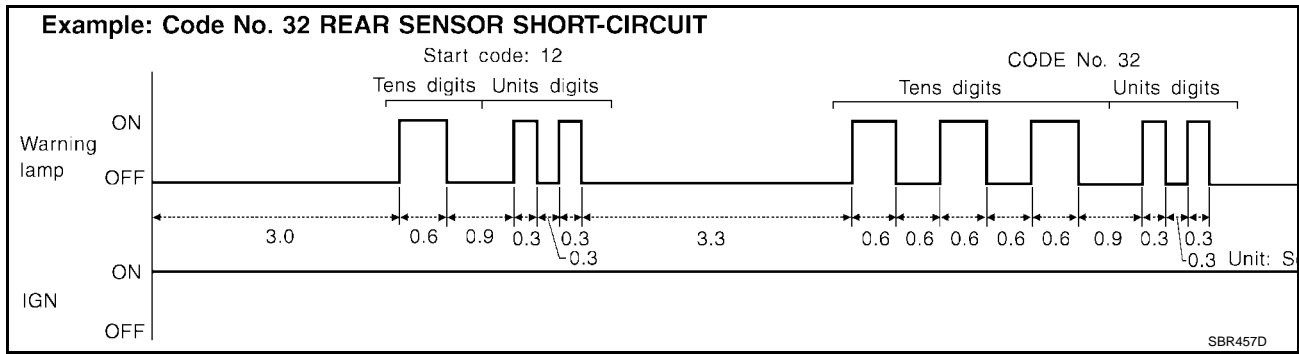
The indication terminates after five minutes.

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

HOW TO READ SELF-DIAGNOSTIC RESULTS (MALFUNCTION CODES)

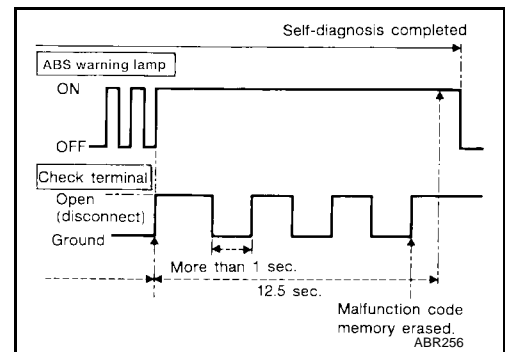
1. Determine the code No. by counting the number of times the ABS warning lamp flashes on and off.
2. When several malfunctions occur at one time, up to three code numbers can be stored; the latest malfunction will be indicated first.
3. The indication begins with the start code 12. After that, a maximum of three code numbers appear in the order of the latest one first. The indication then returns to the start code 12 and the sequence is repeated (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 data link connector terminal 9 from ground (ABS warning lamp will stay lit).
2. Within 12.5 seconds, ground the data link connector terminal 9 three times. Each terminal ground must last more than 1 second. The ABS warning lamp turns off 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.



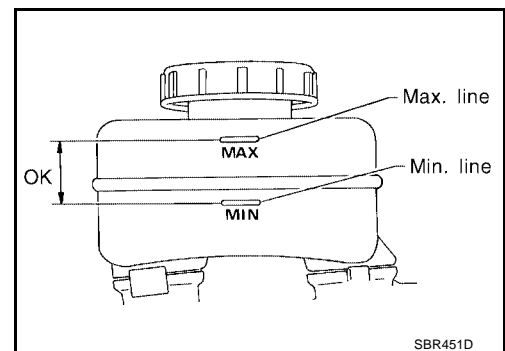
Preliminary Check

1. CHECK BRAKE FLUID LEVEL

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

Is brake fluid filled between MAX and MIN lines on reservoir tank and is brake fluid clean and free of contamination?

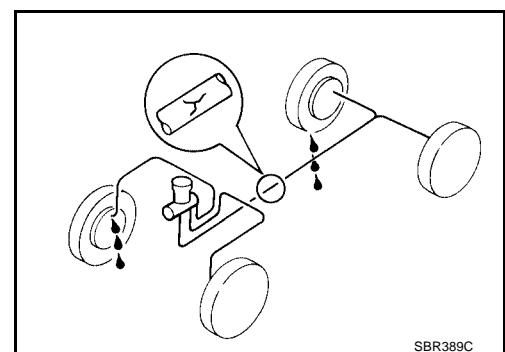
- OK >> GO TO 2.
 NG >> Repair. GO TO 2.



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.

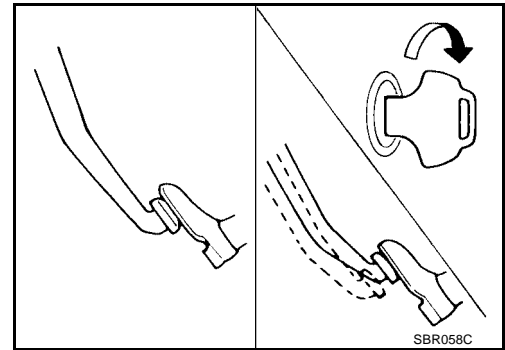


3. CHECK BRAKE BOOSTER OPERATION

Check brake booster for operation and air tightness.
Refer to [BR-17, "AIRTIGHT CHECK"](#) .

Is brake booster airtight and functioning properly?

- YES >> GO TO 4.
- NO >> Replace. GO TO 4.



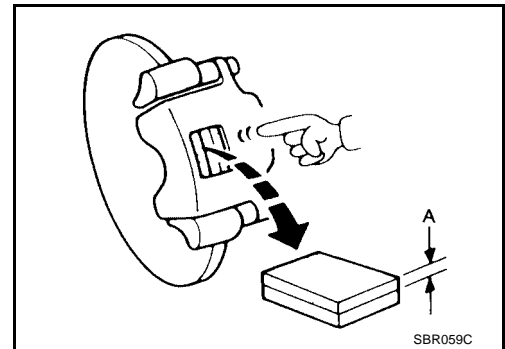
4. CHECK BRAKE PADS AND ROTORS

Check brake pads and rotors.

Refer to [BR-21, "FRONT DISC BRAKE"](#) and [BR-33, "REAR DISC BRAKE"](#) .

Are brake pads and rotors functioning properly?

- YES >> GO TO 5.
- NO >> Replace.

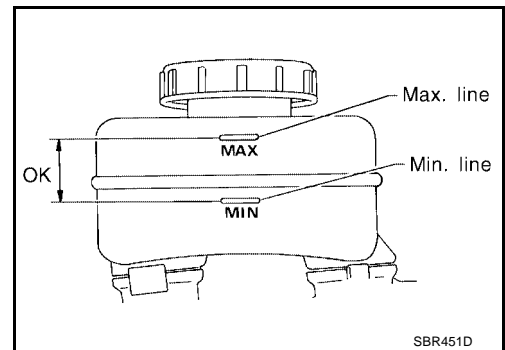


5. RECHECK BRAKE FLUID LEVEL

Check brake fluid level in reservoir tank.

Is brake fluid filled between MAX and MIN lines on reservoir tank and is brake fluid clean and free of contamination?

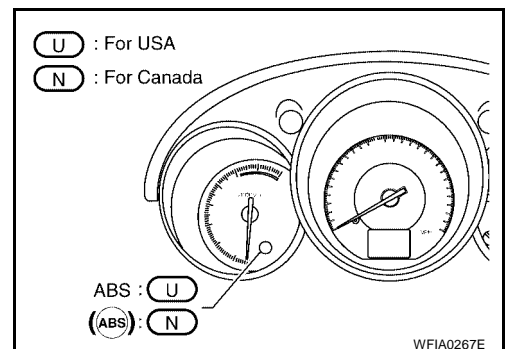
- OK >> GO TO 6.
- NG >> Add brake fluid as necessary.



6. CHECK WARNING LAMP ACTIVATION

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

- YES >> GO TO 7.
- NO >> Check combination meter. Refer to [DI-12, "SELF-DIAGNOSIS FUNCTION"](#) .



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"](#) .

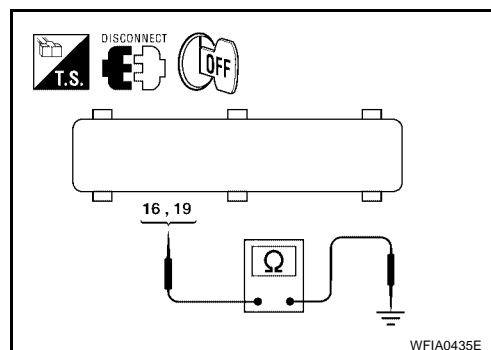
Ground Circuit Check

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND

EFS0047B

- Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 16 and 19 and ground.

Continuity should exist.



BRC

Malfunction Code Chart (Without CONSULT-II)

EFS0047C

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-30
42	Actuator front right inlet solenoid valve	BRC-30
45	Actuator front left outlet solenoid valve	BRC-30
46	Actuator front left inlet solenoid valve	BRC-30
51	Actuator rear right outlet solenoid valve	BRC-30
52	Actuator rear right inlet solenoid valve	BRC-30
55	Actuator rear left outlet solenoid valve	BRC-30
56	Actuator rear left inlet solenoid valve	BRC-30
57*	Power supply (Abnormal voltage)	BRC-35
61	Actuator motor or motor relay	BRC-33
63	Solenoid valve relay	BRC-30
71	Control unit	BRC-36
77 (With 5-speed A/T)	CAN communication circuit (CAN initialize, Bus-off, Receive)	BRC-27

*: 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.

TROUBLE DIAGNOSIS

[ABS]

Symptom Chart

EFS0047D

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-42
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-41
ABS warning lamp does not come on during self-diagnosis.	Control unit	—
Pedal vibration and noise.	—	BRC-40
Long stopping distance.	—	BRC-39
Unexpected pedal action.	—	BRC-38
ABS does not work.	—	BRC-39
ABS works frequently.	—	BRC-38

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 >> If diagnosing a front wheel sensor, GO TO 5. If diagnosing a rear wheel sensor, GO TO 6.

NO >> Repair as necessary. Refer to [FAX-5, "FRONT WHEEL BEARING"](#) or [RAX-5, "WHEEL HUB"](#).
Then retest.

5. CHECK SENSOR ROTOR

Check sensor rotor for tooth damage.

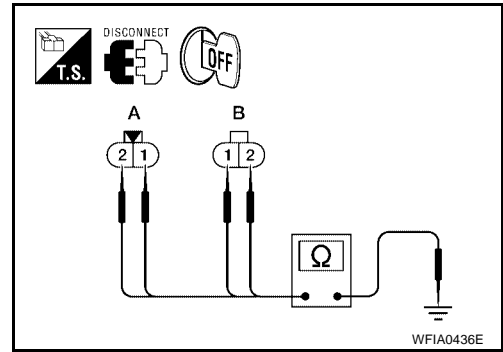
OK or NG

OK >> GO TO 6.

NG >> Replace sensor rotor. Refer to [BRC-44, "Removal and Installation"](#).

6. CHECK WIRING HARNESS FOR SHORT CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector E125 and wheel sensor connector of malfunction code No.
2. Check resistance between wheel sensor harness connector terminals and ground.



Terminals		Continuity
(+)	(-)	
Sensor	Terminal	
Front (A)	1	Ground No
	2	
Rear (B)	1	
	2	

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 E125 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	Connector	Terminal	
Front LH	E125	6	E18	1	Yes
		7		2	
Front RH		4	E117	1	
		5		2	
Rear LH		9	B123	2	
		8		1	
Rear RH	3	B122	2		
	1		1		

Continuity should exist.

OK or NG

- OK >> Replace the ABS actuator and electric unit (control unit). Refer to [BRC-45, "Removal and Installation"](#).
 NG >> Repair the circuit.

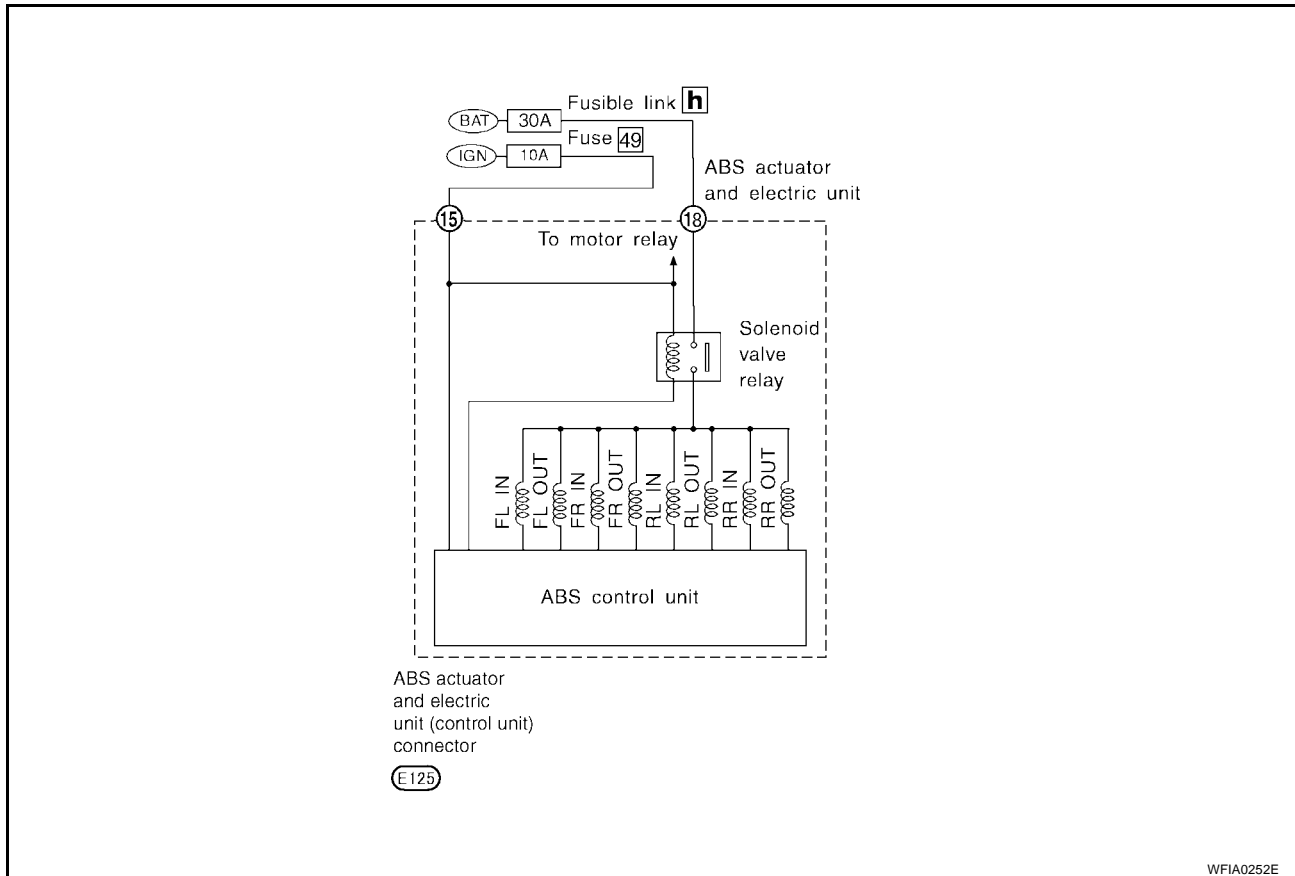
ABS Actuator Solenoid Valve or Solenoid Valve Relay DIAGNOSTIC PROCEDURE

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-4, "POWER SUPPLY ROUTING CIRCUIT"](#).

Is fusible link OK?

YES >> GO TO 3.

NO >> GO TO 7.

3. CHECK FUSE

Check 10A fuse No. 49. For fuse layout, refer to [PG-4, "POWER SUPPLY ROUTING CIRCUIT"](#).

Is fuse OK?

YES >> GO TO 4.

NO >> GO TO 9.

4. CHECK CONNECTOR

1. Disconnect ABS actuator and electric unit (control unit) connector E125. Check terminals for deformation, disconnection, looseness or damage. Then reconnect connector.
2. Repeat self-diagnosis.

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?

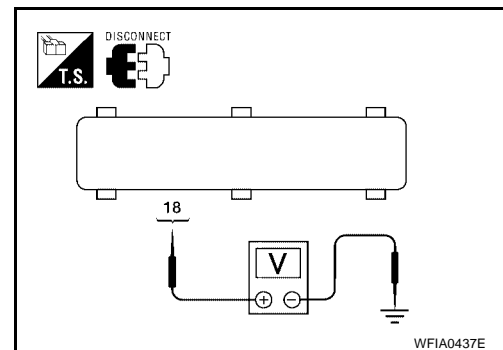
- YES >> GO TO 6.
NO >> Repair harness and connectors.

6. CHECK SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector E125.
2. Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 18 and ground.

Does battery voltage exist?

- YES >> Replace ABS actuator and electric unit (control unit).
Refer to [BRC-45, "Removal and Installation"](#) .
- 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?

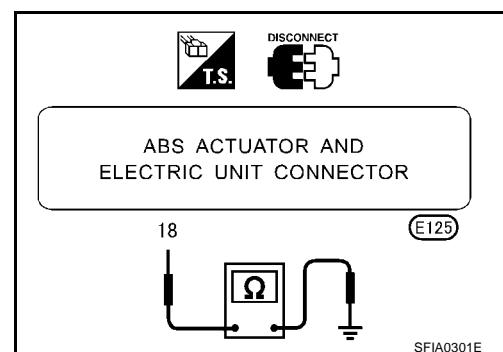
- YES >> GO TO 8.
NO >> Inspection End.

8. CHECK RELAY UNIT POWER SUPPLY CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector E125.
2. Check continuity between ABS actuator and electric unit (control unit) connector E125 terminal 18 and ground.

Does continuity exist?

- YES >> Check the following.
- Harness connector E125
 - Harness for 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-45, "Removal and Installation"](#) .



9. REPLACE FUSE

Replace fuse.

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

YES >> Check the following.

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

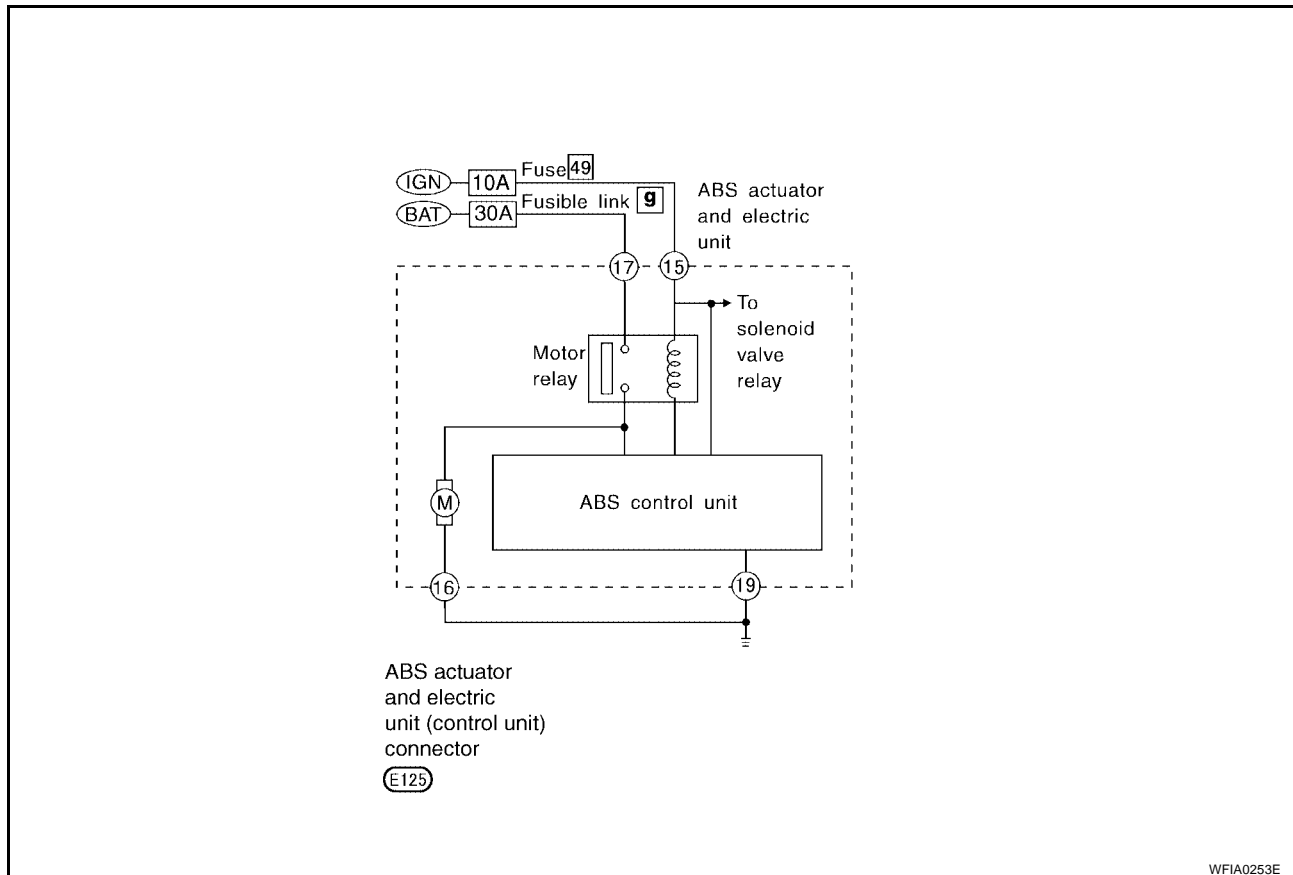
NO >> Inspection End.

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-4, "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 E125. Check terminals for deformation, disconnection, looseness or damage. Then reconnect connectors.
2. Repeat self-diagnosis.

Does warning lamp activate again?

- YES >> GO TO 4.
- NO >> Inspection End.

4. CHECK MOTOR RELAY POWER SUPPLY CIRCUIT

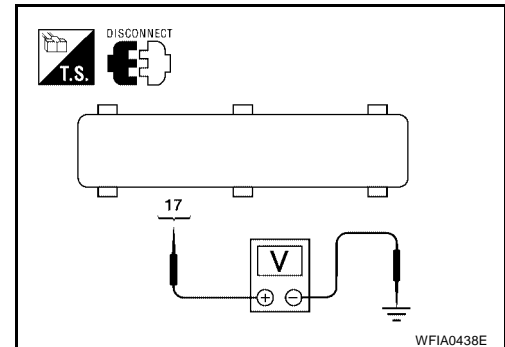
1. Disconnect ABS actuator and electric unit (control unit) connector E125.
2. Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 17 and ground.

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). Refer to [BRC-45, "Removal and Installation"](#)

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 when the ignition switch is turned ON?

YES >> GO TO 7.

NO >> Inspection End.

7. CHECK ABS ACTUATOR MOTOR POWER SUPPLY CIRCUIT

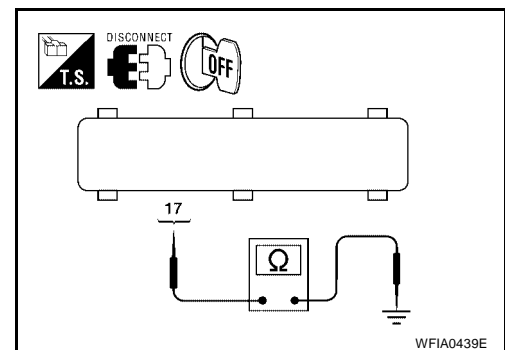
1. Disconnect battery cable and ABS actuator and electric unit (control unit) connector E125.
2. Check continuity between ABS actuator and electric unit (control unit) connector E125 terminal 17 and ground.

Does continuity exist?

YES >> Check the following.

- Harness connector E125
 - Harness for 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 and the connection of ABS actuator and electric unit (control unit) harness connector. Reconnect ABS actuator and electric unit (control unit) harness connector. Then retest.



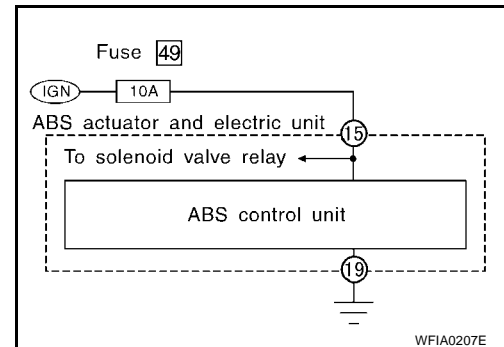
Abnormal Battery Voltage DIAGNOSTIC PROCEDURE

- ① 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 E125. Check terminals for deformation, disconnection, looseness or damage. Then reconnect connector.
2. Repeat self-diagnosis.

Does warning lamp activate again?

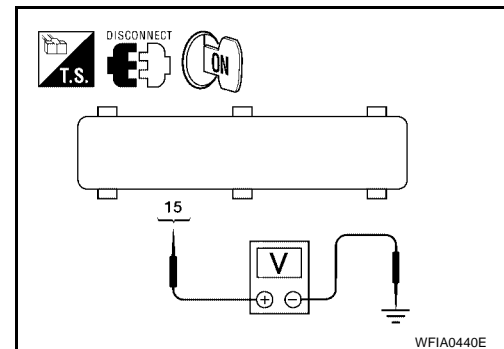
- YES >> GO TO 3.
- NO >> Inspection End.

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

1. Disconnect ABS actuator and electric unit (control unit) connector E125.
2. Check voltage between ABS actuator and electric unit (control unit) connector E125 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?

- YES >> Check ABS actuator and electric unit (control unit) pin terminals for damage and 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 >> 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 49 for ABS actuator and electric unit (control unit). Refer to [PG-4, "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 OFF position.
2. Check continuity between battery and ABS actuator and electric unit (control unit) connector E125 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

EFS0047J

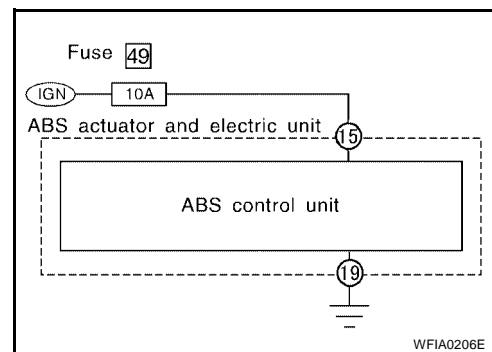
Ⓟ With CONSULT-II: Malfunction code No. C1110

ⓧ 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 E125. Check terminals for deformation, disconnection, looseness or damage. Then reconnect connectors.
2. Repeat self-diagnosis.

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-35, "DIAGNOSTIC PROCEDURE"](#) .

Does battery voltage exist when ignition switch is turned ON?

YES >> GO TO 4.

NO >> Repair.

TROUBLE DIAGNOSIS FOR SELF-DIAGNOSTIC ITEMS

[ABS]

4. SELF-DIAGNOSIS RESULT CHECK

Check the self-diagnosis results.

Malfunction code

71

Diagnostic trouble code

C1110

Are the above items indicated in self-diagnosis results?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-45, "Removal and Installation"](#)

NO >> Inspect the system according to the indicated code No.

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BRC

TROUBLE DIAGNOSES FOR SYMPTOMS

PFP:99999

EFS0047K

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

Check brake fluid pressure distribution.
Refer to [BR-40, "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 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 [BRC-38, "2. Unexpected Pedal Action"](#) .

NO >> Repair as necessary. Refer to [FAX-5, "FRONT WHEEL BEARING"](#) or [RAX-5, "WHEEL HUB"](#) .

2. Unexpected Pedal Action

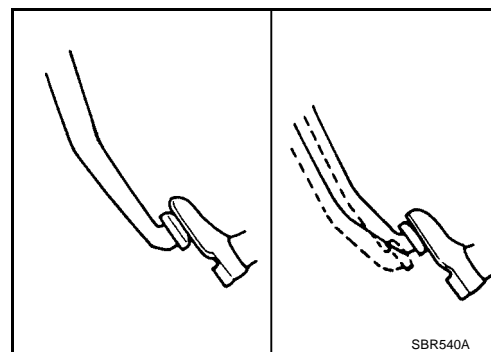
EFS0047L

1. CHECK BRAKE PEDAL TRAVEL

Check brake pedal travel. Is brake pedal travel excessive?

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

NO >> GO TO 2.

**2. CHECK BASE BRAKING SYSTEM PERFORMANCE**

Disconnect the ABS actuator and electric unit (control unit) connector E125 and verify that the braking force is sufficient when the ABS is not operating. After the inspection, reconnect the connector.

NOTE:

Driving the vehicle with the ABS actuator and electric unit (control unit) disconnected may induce DTCs in electrical control units using CAN communication. After the inspection, clear all DTCs.

OK or NG

OK >> GO TO 3.

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

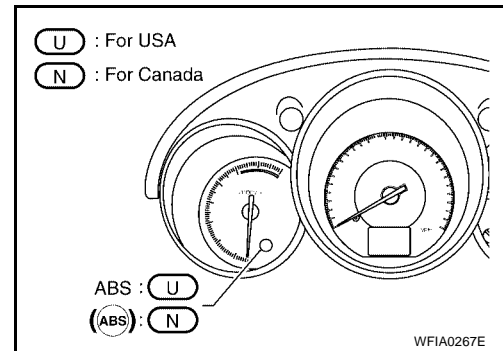
3. CHECK WARNING LAMP INDICATION

Ensure warning lamp remains off while driving.

Is warning lamp turned off?

YES >> GO TO 4.

NO >> Carry out self-diagnosis. Refer to [BRC-22, "SELF-DIAGNOSIS PROCEDURE"](#).



4. CHECK WHEEL SENSORS

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 >> Check ABS actuator and electric unit (control unit) pin terminals for damage and 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 as necessary.

3. Long Stopping Distance

EFS0047M

1. CHECK BASE BRAKING SYSTEM PERFORMANCE

1. Disable ABS by disconnecting ABS actuator and electric unit (control unit) connector E125.

2. Drive vehicle and check to see if stopping distance is still long.

NOTE:

Driving the vehicle with the ABS actuator and electric unit (control unit) disconnected may induce DTCs in electrical control units using CAN communication. After the inspection, clear all DTCs.

Is stopping distance still long?

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

NO >> Go to [BRC-38, "2. Unexpected Pedal Action"](#).

NOTE:

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

4. ABS Does Not Work

EFS0047N

1. CHECK WARNING LAMP INDICATION

Turn ignition switch ON.

Does the ABS warning lamp activate?

YES >> Carry out self-diagnosis. Refer to [BRC-22, "SELF-DIAGNOSIS PROCEDURE"](#).

NO >> Go to [BRC-41, "6. ABS Warning Lamp Does Not Come On When Ignition Switch Is Turned On"](#).

NOTE:

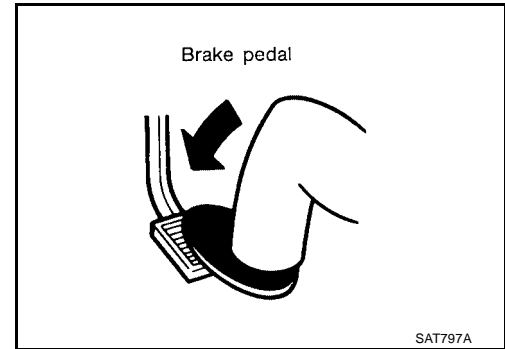
ABS does not work when vehicle speed is under 10 km/h (6 MPH).

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-22, "SELF-DIAGNOSIS PROCEDURE"](#) .
 NO >> GO TO 3.

3. RECHECK SYMPTOM

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

- YES >> Check for radio, antenna or related wiring that is routed too close to the ABS actuator and electric unit (control unit) and reroute as necessary.
 NO >> Go to [BRC-38, "2. Unexpected Pedal Action"](#) .

NOTE:

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

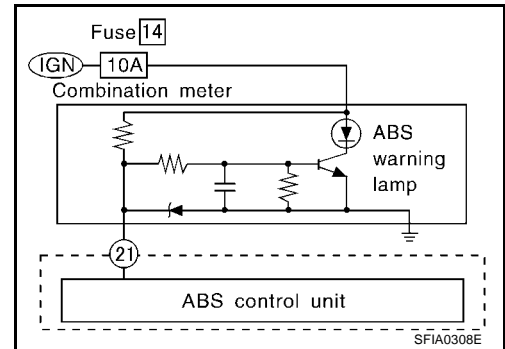
- Applying brake gradually when shifting or operating clutch.
- Low friction (slippery) road.
- High speed cornering.
- Driving over bumps and potholes.

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 ABS warning lamp. For fuse layout, refer to [PG-4, "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.

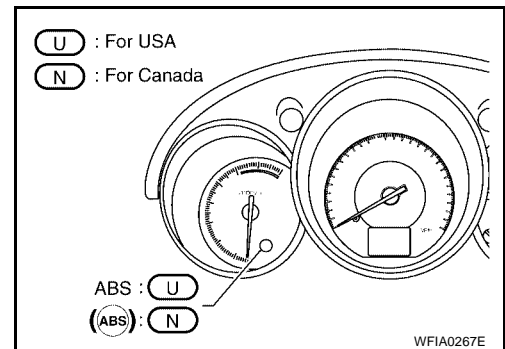
3. CHECK WARNING LAMP ACTIVATION

Disconnect ABS actuator and electric unit (control unit) connector E125.

Does the ABS warning lamp activate?

YES >> Replace ABS actuator and electric unit. Refer to [BRC-45, "Removal and Installation"](#).

NO >> GO TO 4.



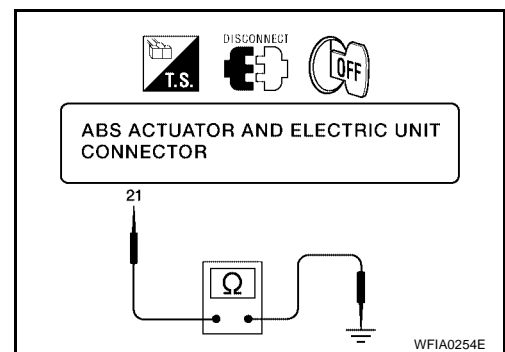
4. CHECK HARNESS FOR SHORT

1. Disconnect ABS actuator and electric unit (control unit) connector E125 and combination meter connector M24.
2. Check continuity between ABS actuator and electric unit (control unit) connector E125 terminal 21 and ground.

Does continuity exist?

YES >> Repair harness or connectors.

NO >> Check combination meter. Refer to [DI-13, "How to Proceed With Trouble Diagnosis"](#).



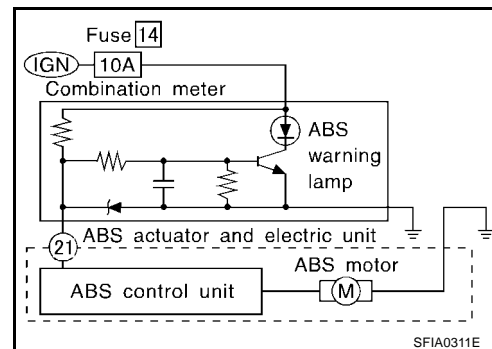
7. ABS Warning Lamp Stays On When Ignition Switch Is Turned On

EFS0047Q

1. INSPECTION START

ABS actuator and electric unit (control unit) inspection.

>> GO TO 2.



2. CHECK WARNING LAMP

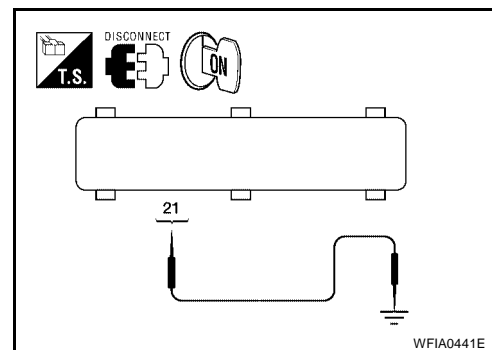
1. Disconnect ABS actuator and electric unit (control unit) connector E125.
2. Connect suitable wire between ABS actuator and electric unit (control unit) connector E125 terminal 21 and ground.
3. Turn ignition switch ON.

Does ABS 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 combination meter.
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 ABS actuator and electric unit (control unit) harness connector. Reconnect ABS actuator and electric unit (control unit) harness connector. Then retest.

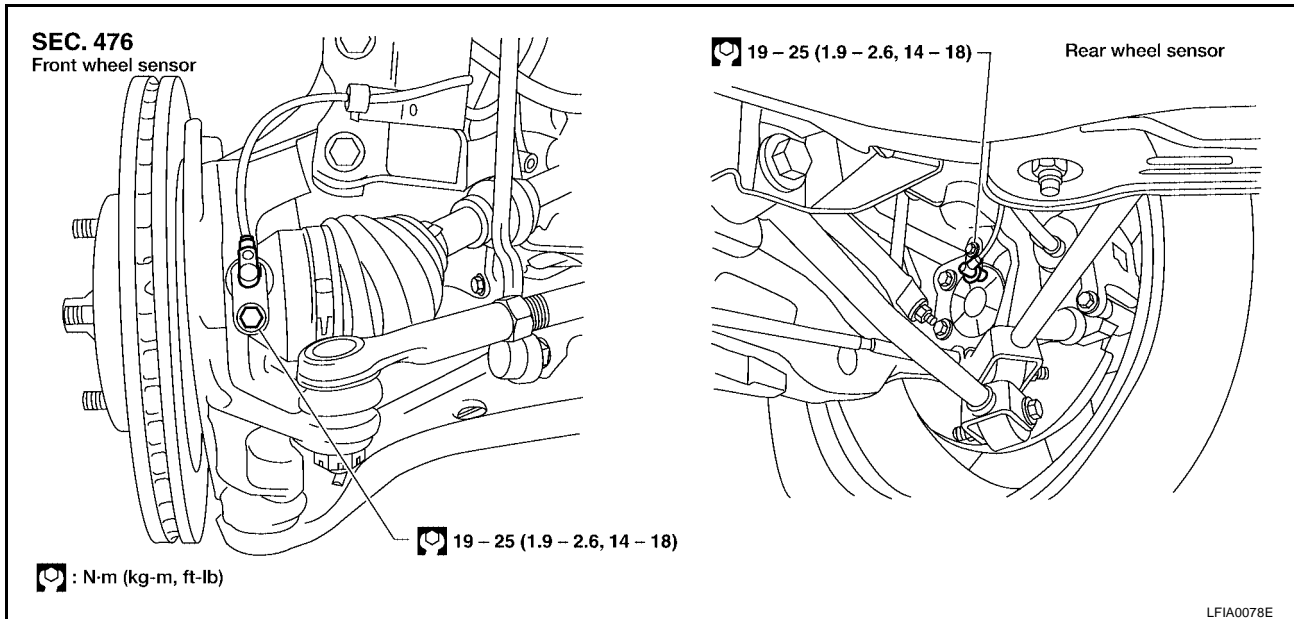
OK or NG

OK >> Inspection End.

NG >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-45, "Removal and Installation"](#)

WHEEL SENSORS

Removal and Installation



CAUTION:

- Be careful not to damage wheel sensor edge and sensor rotor teeth.
- When removing the front or rear wheel hub assembly, first remove the wheel sensor from the assembly. Failure to do so may result in damage to the wheel sensor wires making the sensor inoperative.

CAUTION:

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

REMOVAL

1. Remove wheel and tire.
2. Disconnect wheel sensor harness connector and remove harness wire from mounts.
3. Remove wheel sensor bolt and wheel sensor.

INSTALLATION

Installation is in the reverse order of removal.

- When installing wheel and tire, refer to [WT-7, "Rotation"](#).

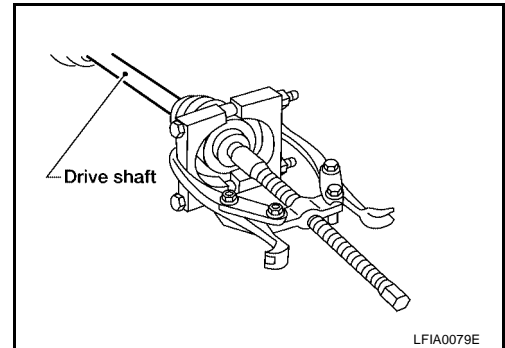
SENSOR ROTOR

Removal and Installation

REMOVAL

Front

1. Remove the front wheel hub. Refer to [FAX-5, "WHEEL HUB AND KNUCKLE"](#).
2. Remove the sensor rotor from the drive shaft using a suitable puller.



Rear

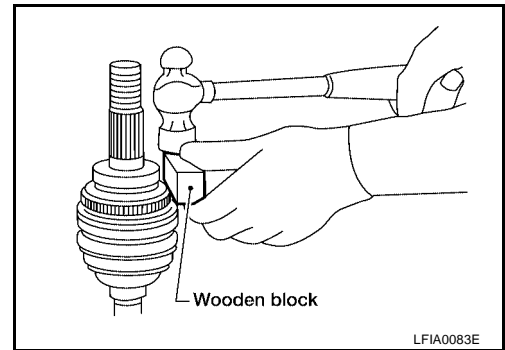
The rear wheel sensor rotor is part of the rear wheel hub. Refer to [RAX-5, "WHEEL HUB"](#).

INSTALLATION

Front

Installation is in the reverse order of removal.

- Install the sensor rotor using a hammer and a wooden block.
- Always replace sensor rotor with new one.



Rear

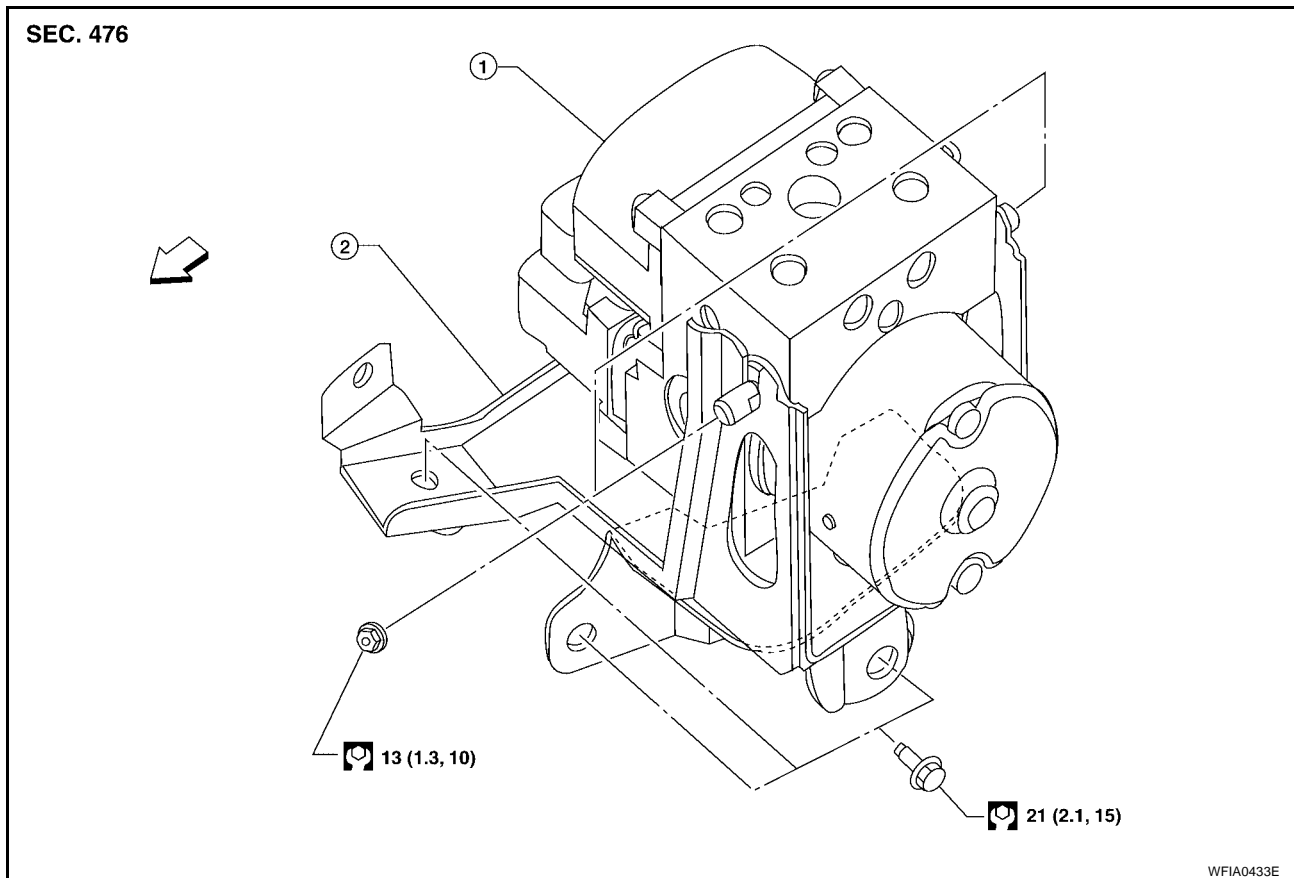
Installation is in the reverse order of removal.

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

PFP:47660

Removal and Installation

EFS0047T



1. ABS actuator and electric unit (control unit) 2. Bracket

← Front

REMOVAL

1. Disconnect battery negative terminal.
2. Remove windshield wiper motor and linkage assembly. Refer to [WW-27, "Removal"](#).
3. Drain brake fluid. Refer to [BR-9, "Changing Brake Fluid"](#).
4. Disconnect harness connectors from ABS actuator and electric unit (control unit).
5. Disconnect brake pipes.

NOTE:

Make note of pipe mounting locations.

6. Remove bolts for bracket then remove ABS actuator and electric unit (control unit) and bracket assembly from vehicle.
7. Remove nuts for ABS actuator and electric unit (control unit) then separate from bracket.

INSTALLATION

CAUTION:

After installation of ABS actuator and electric unit (control unit), refill brake fluid. Then bleed air from system. Refer to [BR-9, "Bleeding Brake System"](#).

1. Assemble ABS actuator and electric unit (control unit) and bracket assembly, then position assembly in vehicle.
2. Install and tighten bracket bolts.
3. Install brake pipes to ABS actuator and electric unit (control unit), then tighten flare nuts. Refer to [BRC-5, "Hydraulic Circuit"](#).
4. Connect ABS actuator and electric unit (control unit) harness connectors.
5. Install windshield wiper motor and linkage assembly. Refer to [WW-27, "Installation"](#).

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ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

[ABS]

6. Reconnect battery negative terminal.

PRECAUTIONS

PFP:00001

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

EFS0047U

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:

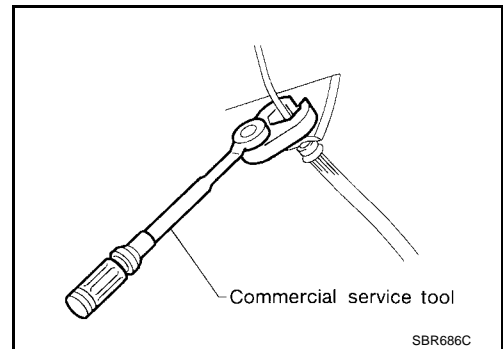
- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation 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

EFS0047V

CAUTION:

- Refer to [MA-12, "RECOMMENDED FLUIDS AND LUBRICANTS"](#) for recommended brake fluid.
- 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.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Before working, turn ignition switch OFF and disconnect electrical connector of the ABS actuator and electric unit (control unit) or battery terminals.
- 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-26, "Brake Burnishing Procedure"](#) .



WARNING:

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

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PREPARATION

[TCS/ABS]

PREPARATION

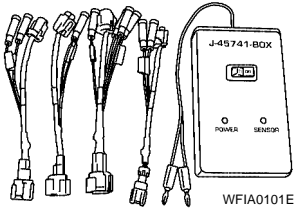
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Special Service Tool

EFS00629

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

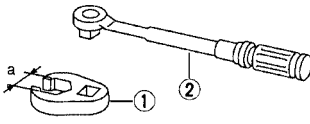
Tool number (Kent-Moore No.) Tool name	Description
— (J-45741) ABS active wheel sensor tester	Checking operation of ABS active wheel sensor



Commercial Service Tools

EFS0062A

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



GENERAL INFORMATION

PFP:00000

**Description
PURPOSE**

EFS0047Z

The Anti-lock Brake System (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 ABS has self-test capabilities. The system turns on the ABS warning lamp for 2 seconds 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

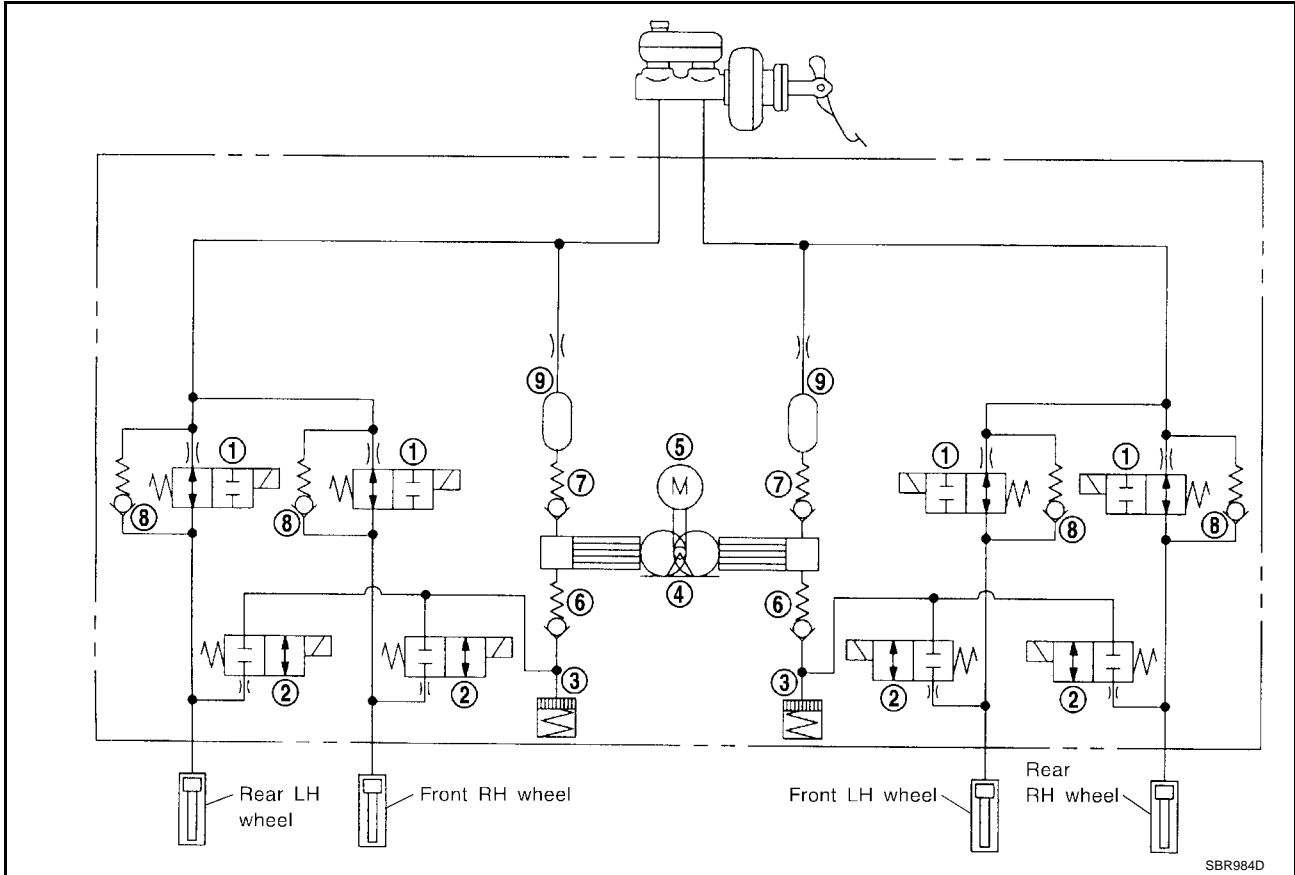
- This system is designed to limit wheel slip during acceleration by changing the transmission shift schedule (with A/T) and cutting fuel to selected engine cylinders.
The ABS actuator and electric unit (control unit) detects drive wheel slip by comparing wheel speed signals from all 4 wheels. The ABS actuator and electric unit (control unit) will then determine 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 transmission shift timing adjustments (with A/T) and fuel cutoff.
The torque reduction is sent from the ABS actuator and electric unit (control unit) through the CAN (Controller Area Network) lines to the TCM (with A/T) and the ECM. 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 OFF 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

EFS00480

If trouble occurs in the ABS, the ABS warning lamp in the combination meter will turn on. At the same time, the ABS actuator and electric unit (control unit) will disable ABS control, and braking becomes the same as that of a vehicle without ABS.

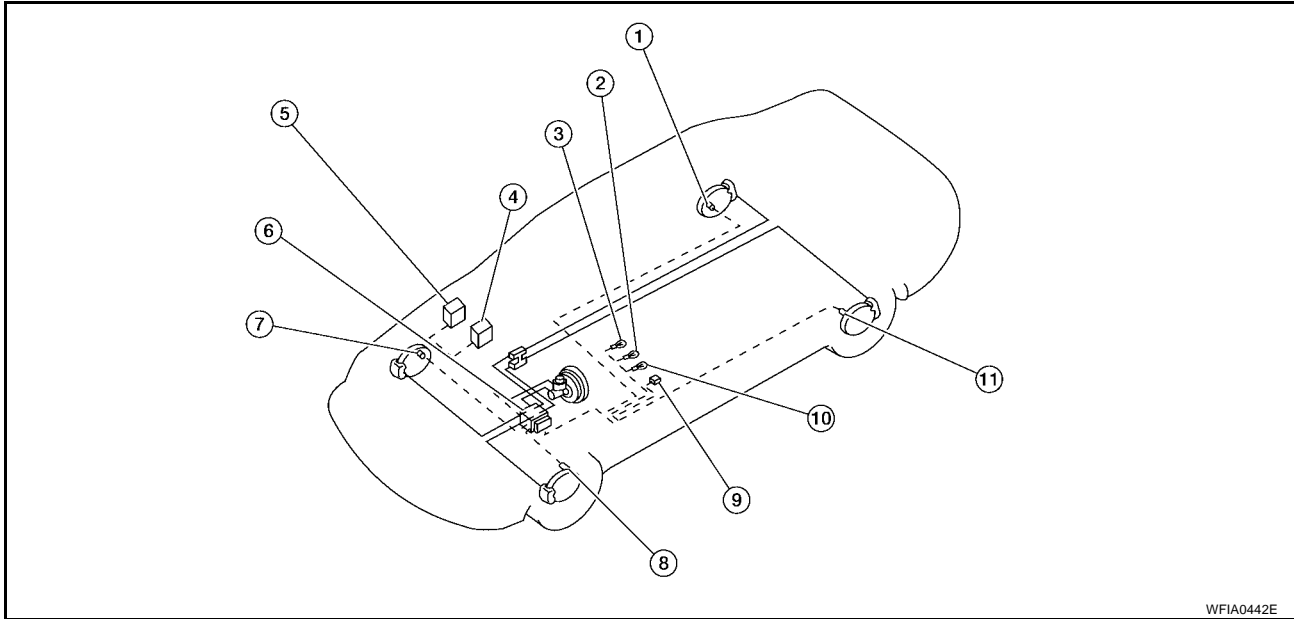
Hydraulic Circuit



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

System Components

EFS00482



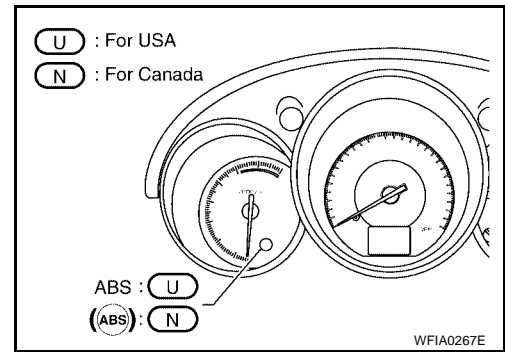
- | | | |
|--------------------------|--------------------------|--|
| 1. Rear wheel sensor RH | 2. SLIP indicator lamp | 3. TCS OFF indicator lamp |
| 4. ECM | 5. TCM | 6. ABS actuator and electric unit (control unit) |
| 7. Front wheel sensor RH | 8. Front wheel sensor LH | 9. TCS OFF switch |
| 10. ABS warning lamp | 11. Rear wheel sensor LH | |

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Control Unit
ABS FUNCTION

EFS00483

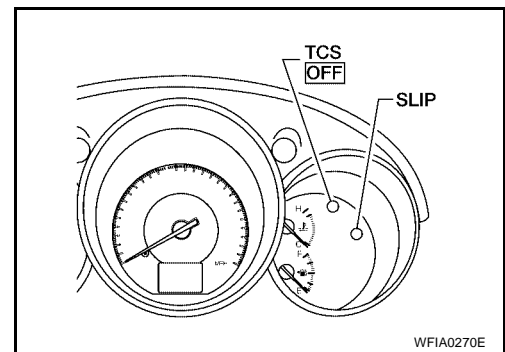
The control unit computes the wheel rotating speed by the signal sent from the sensor. Then it supplies a DC current to the actuator solenoid valve. It also controls ON-OFF operation of the valve relay and motor relay. If any electrical malfunction should be detected in the system, the warning lamp is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



WFIA0267E

TCS FUNCTION

Drive wheel slippage is determined by comparing speed signals from all 4 wheels. When the wheel slip becomes excessive, the TCS operates, causing the SLIP indicator lamp to flash. At the same time, a signal requesting a change in the shift schedule will be sent to the TCM (with A/T) and a fuel-cut signal is sent to the ECM. 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.



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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

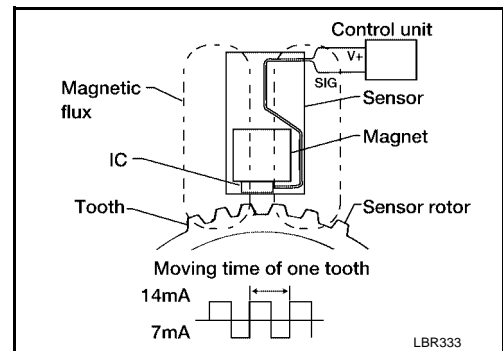
These components control the hydraulic circuit. The ABS actuator and electric unit (control unit) directs the actuator to increase, hold or decrease hydraulic pressure to all or individual wheels. The ABS actuator and electric unit (control unit) cannot be disassembled and must be replaced as an assembly.

ABS ACTUATOR OPERATION

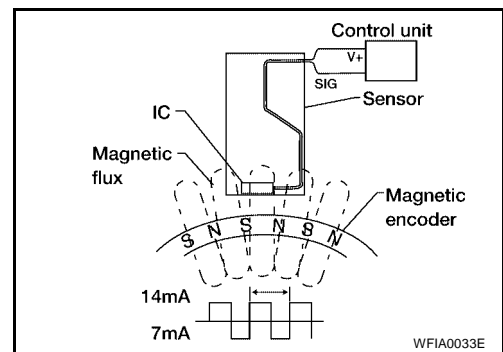
		Inlet solenoid valve	Outlet solenoid valve	
Normal brake operation		OFF (Open)	OFF (Closed)	Master cylinder brake fluid pressure is directly transmitted to caliper via the inlet solenoid valve.
ABS operation	Pressure hold	ON (Closed)	OFF (Closed)	Hydraulic circuit is shut off to hold the caliper brake 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

The front wheel 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 wheel 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

Refer to [LAN-20, "CAN COMMUNICATION"](#) .

TROUBLE DIAGNOSIS

How to Perform Trouble Diagnoses for Quick and Accurate Repair

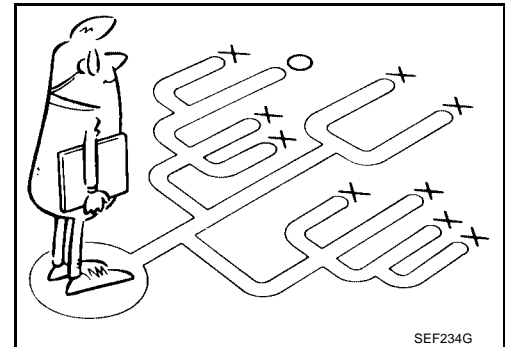
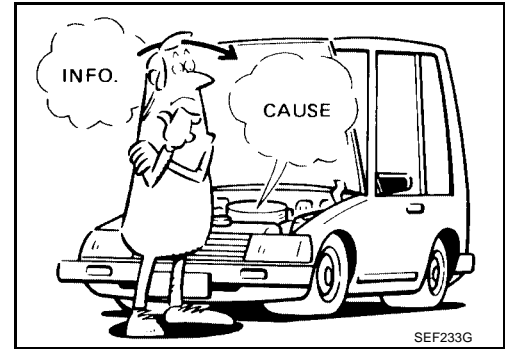
INTRODUCTION

The ABS/TCS 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.



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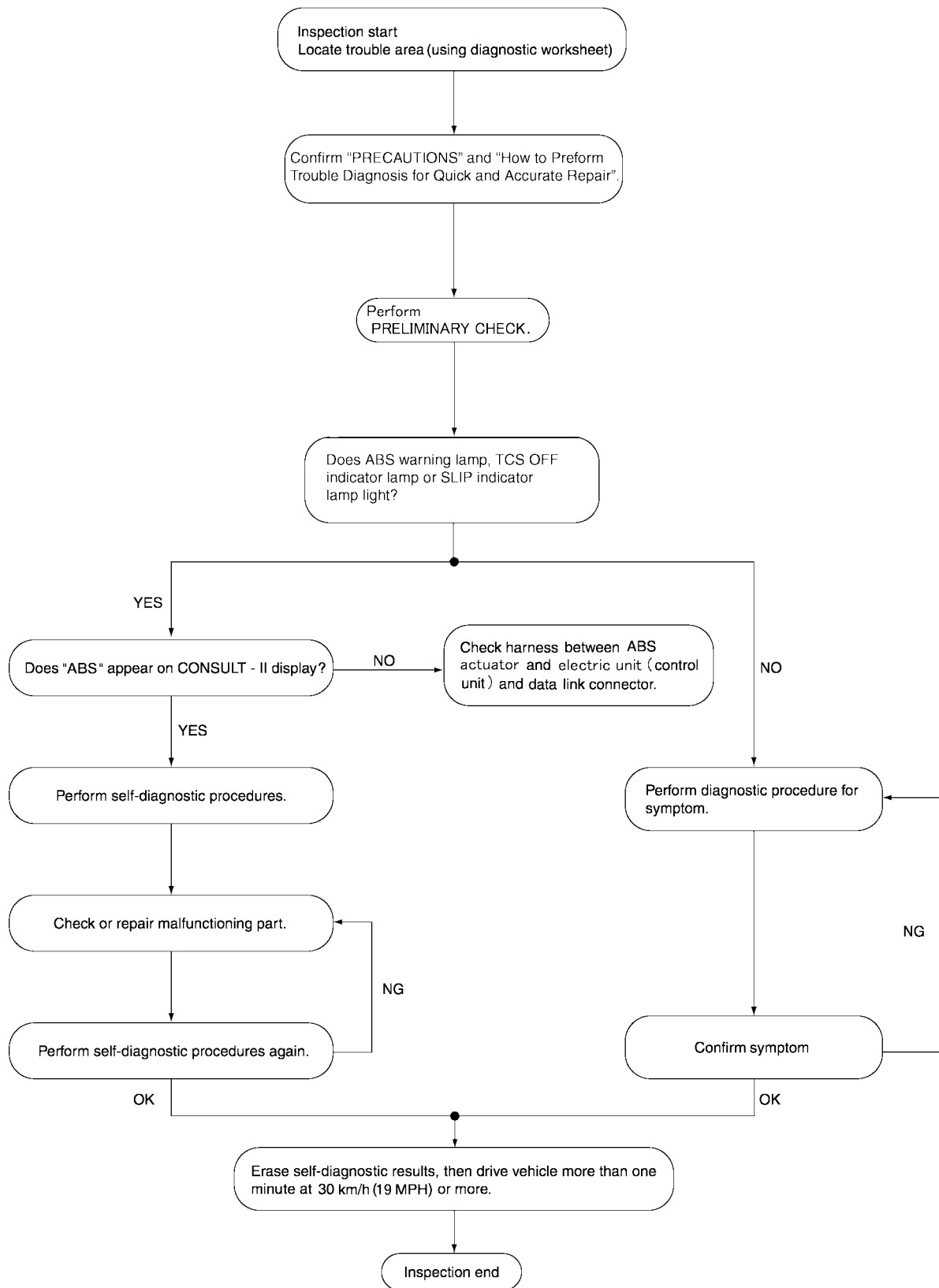
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TROUBLE DIAGNOSIS

[TCS/ABS]

WORK FLOW



WFIA0257E

TROUBLE DIAGNOSIS

[TCS/ABS]

CLARIFY CONCERN

- A customer's description of a vehicle concern may vary depending on the individual. It is important to clarify the customer's concern.
- 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		

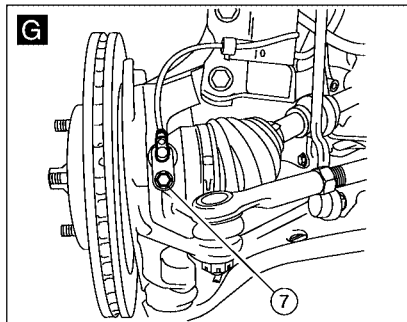
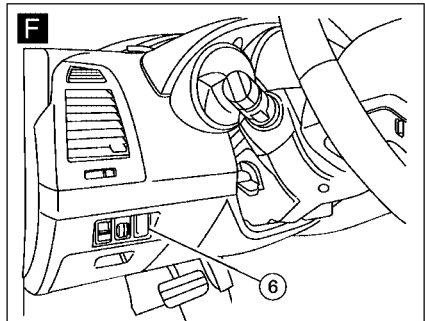
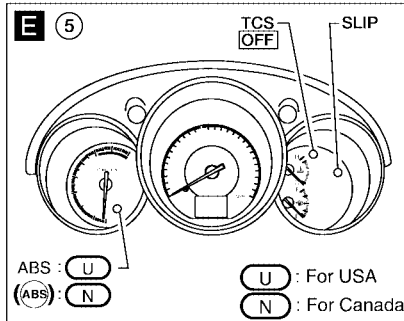
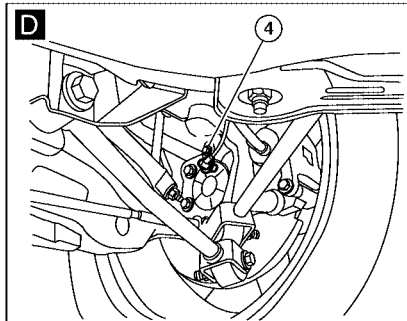
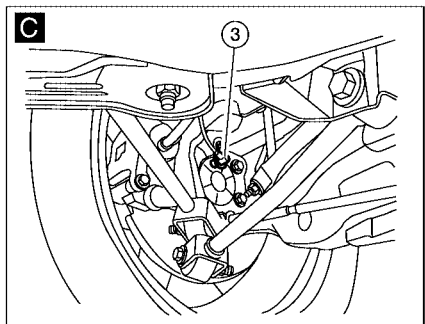
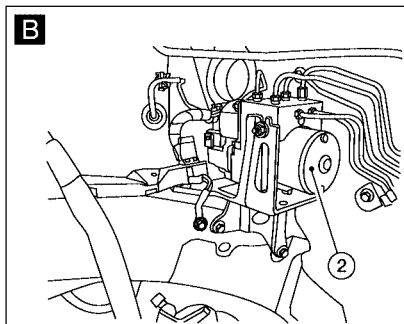
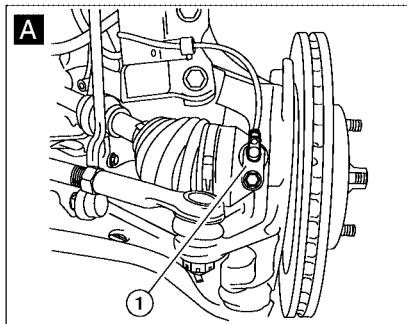
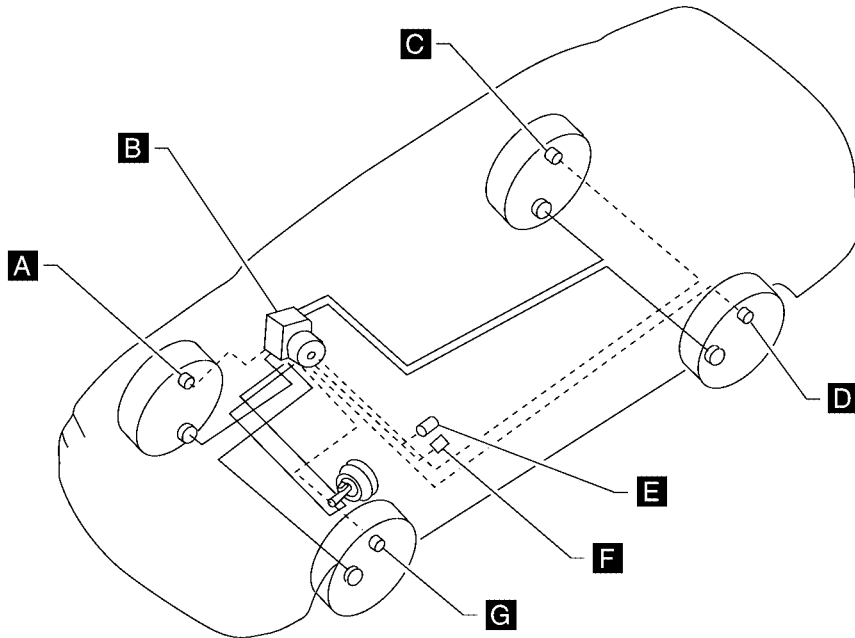
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Component Parts and Harness Connector Location

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TROUBLE DIAGNOSIS

[TCS/ABS]

-
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|-------------------------------|--|------------------------------|
| 1. Front wheel sensor RH E117 | 2. ABS actuator and electric unit (control unit) E125 (engine removed for clarity) | 3. Rear wheel sensor RH B122 |
| 4. Rear wheel sensor LH B123 | 5. Combination meter M24 | 6. TCS OFF switch M6 |
| 7. Front wheel sensor LH E18 | | |

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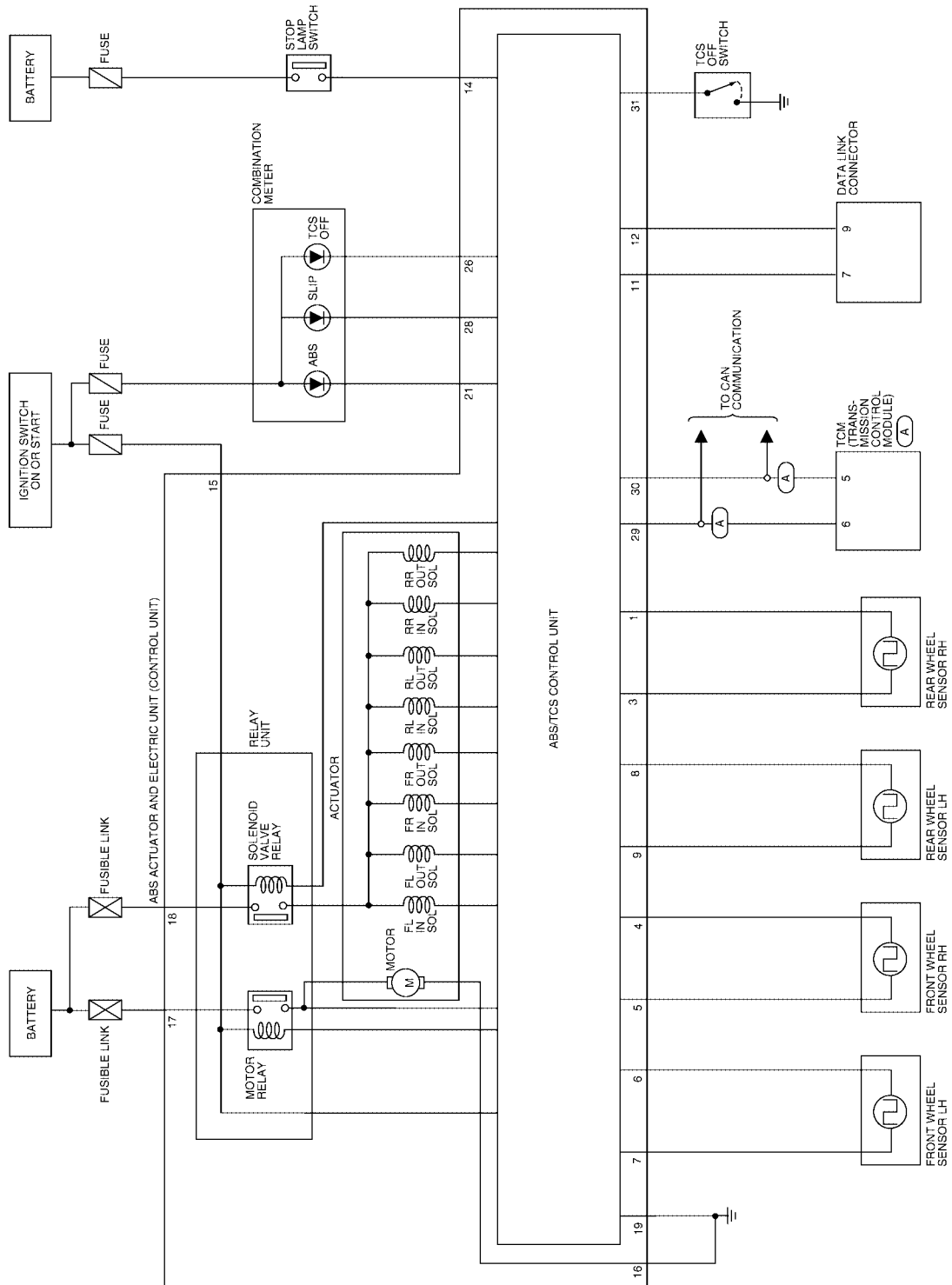
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Schematic



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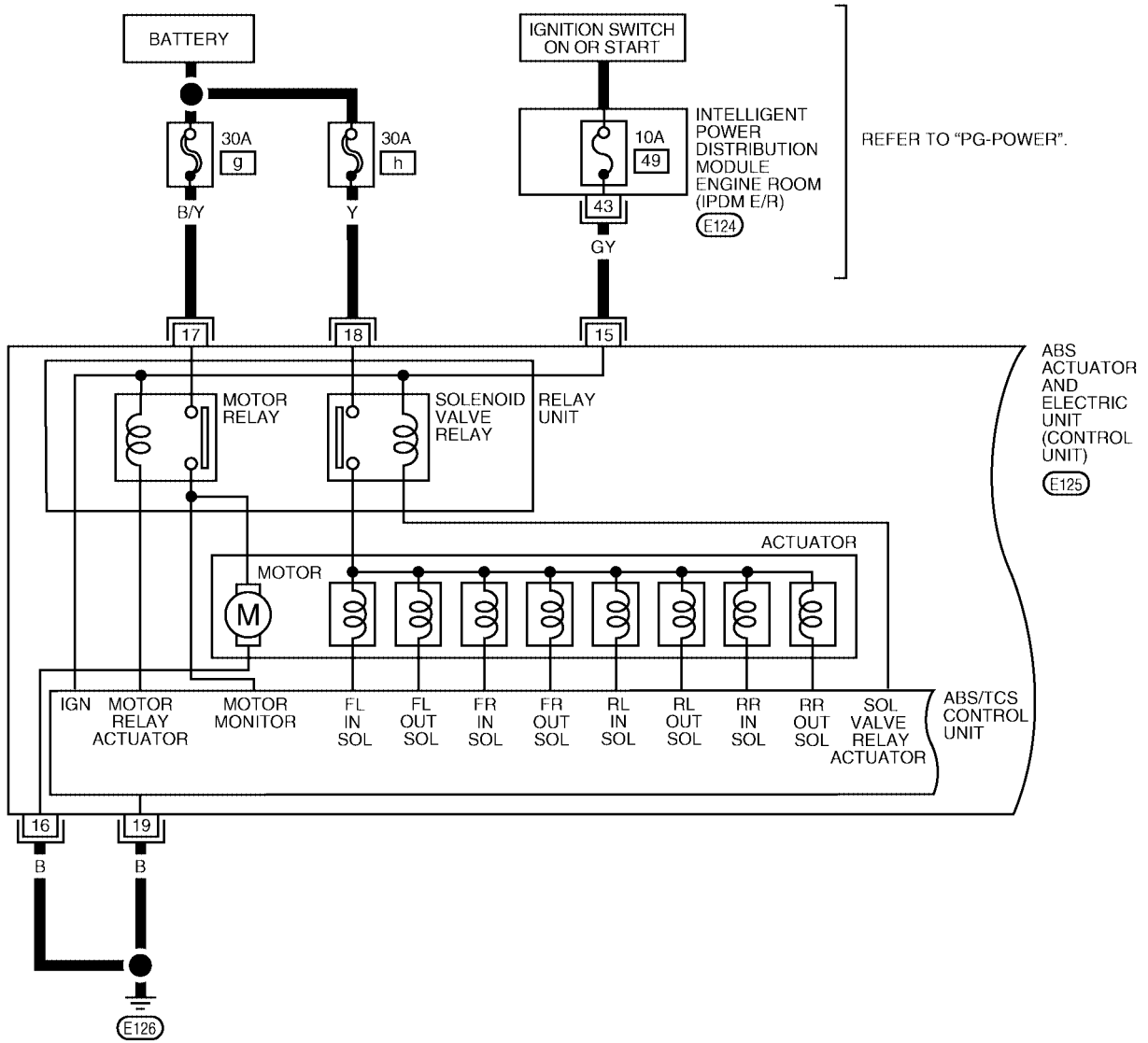
TROUBLE DIAGNOSIS

[TCS/ABS]

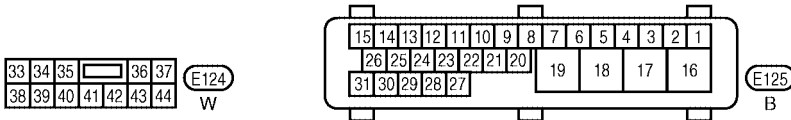
Wiring Diagram — TCS —

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BRC-TCS-01



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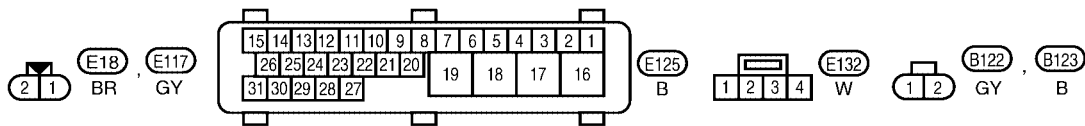
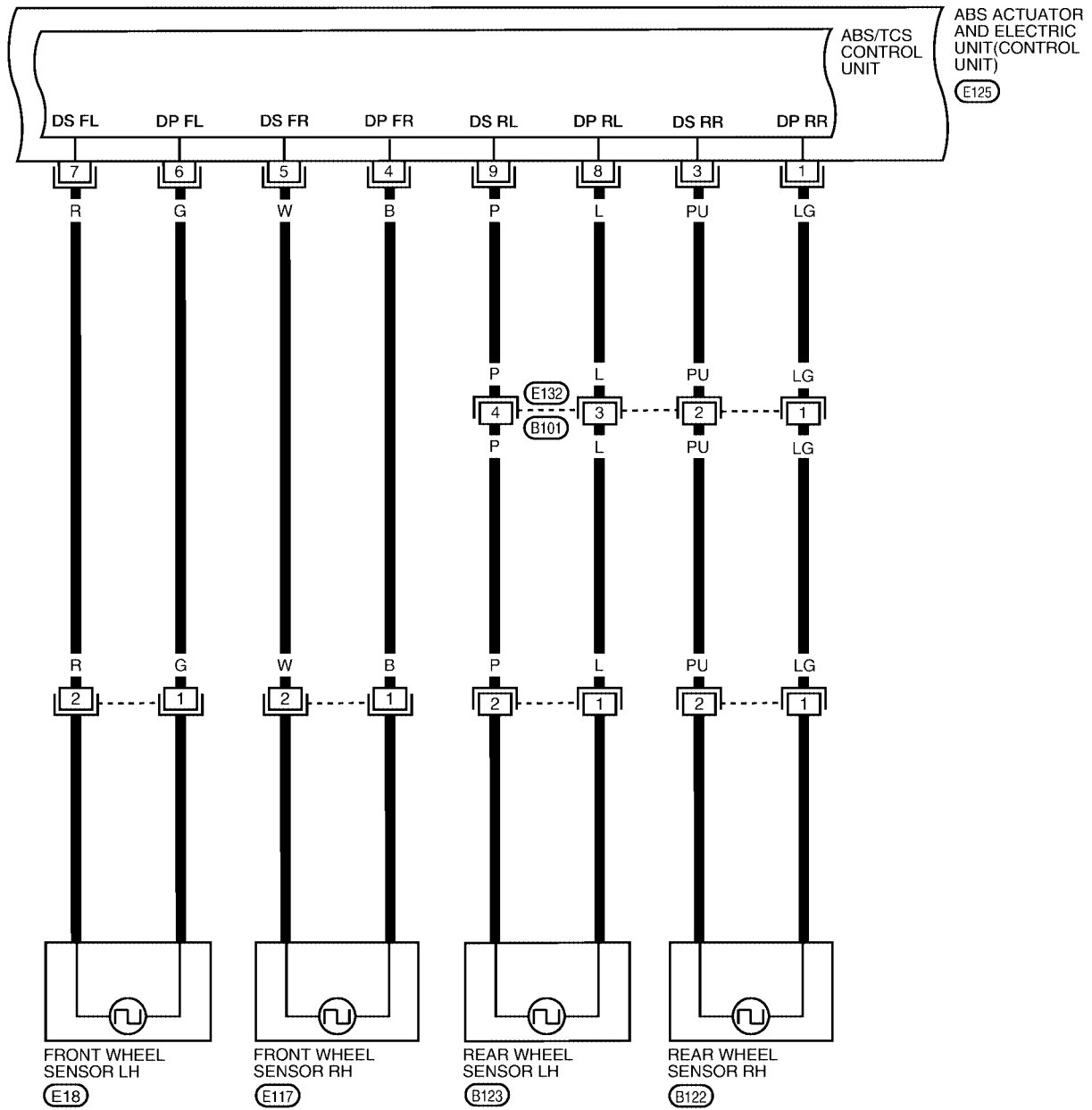


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TROUBLE DIAGNOSIS

[TCS/ABS]

BRC-TCS-02

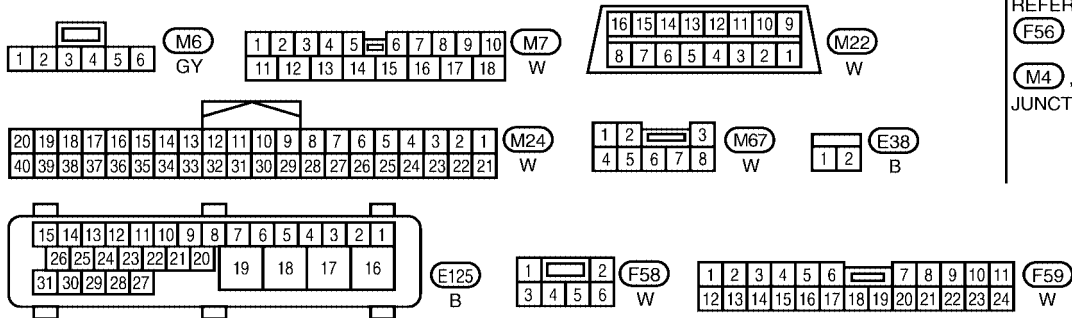
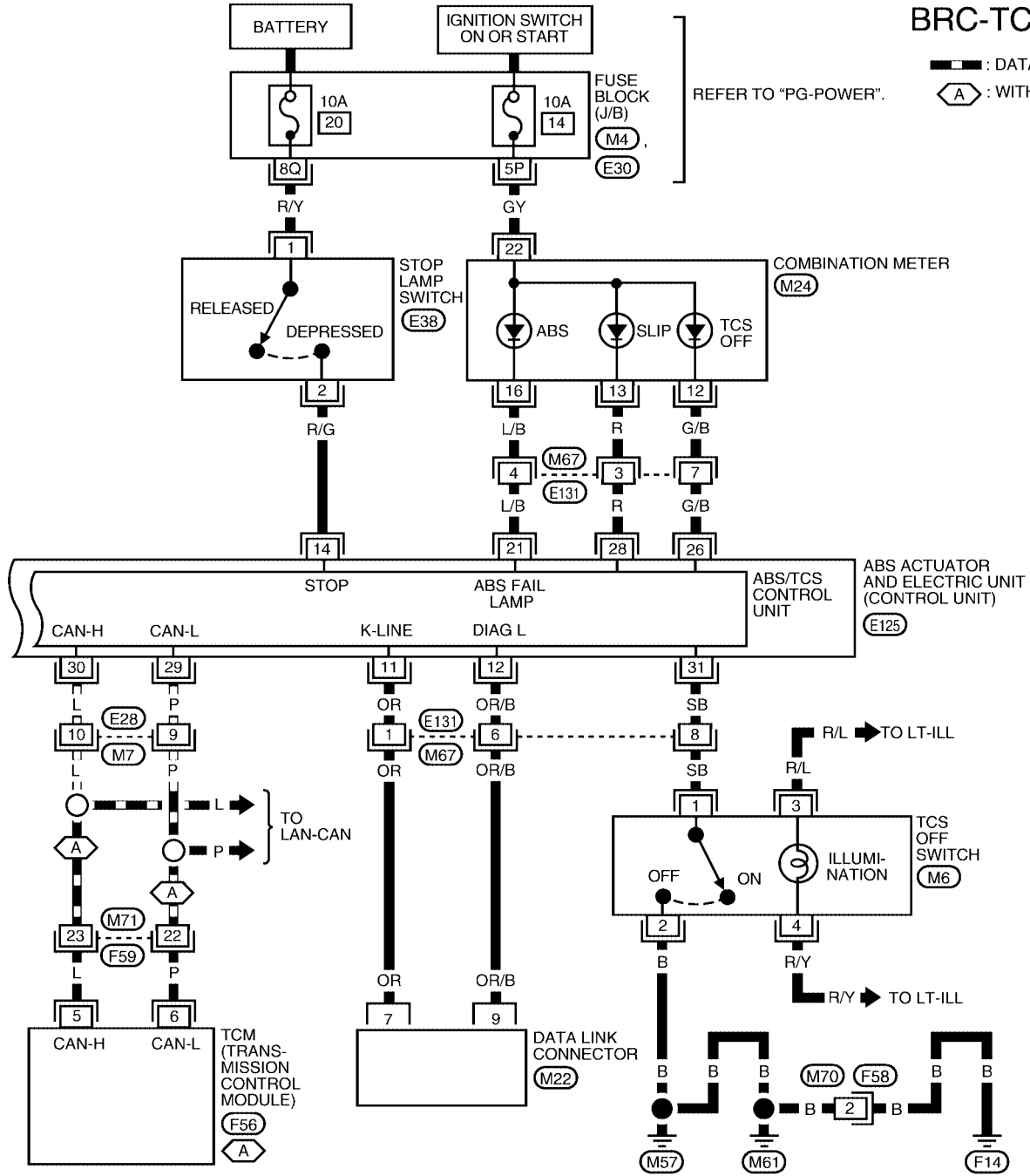


WFWA0299E

TROUBLE DIAGNOSIS

[TCS/ABS]

BRC-TCS-03



REFER TO THE FOLLOWING.
 (F56) - ELECTRICAL UNITS
 (M4), (E30) - FUSE BLOCK - JUNCTION BOX (J/B)

WFWA0300E

CONSULT-II Function (ABS)

CONSULT-II can display each diagnostic item using the diagnostic test modes shown following.

ABS diagnostic mode	Description
WORK SUPPORT	Supports inspection and adjustments. Commands are transmitted to the ABS actuator and electric unit (control unit) for setting the status suitable for required operation, input/output signals are received from the ABS actuator and electric unit (control unit) and received data is displayed.
SELF-DIAG RESULTS	Displays ABS actuator and electric unit (control unit) self-diagnosis results.
DATA MONITOR	Displays ABS actuator and electric unit (control unit) input/output data in real time.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
FUNCTION TEST	Conducted by CONSULT-II instead of a technician to determine whether each system is "OK" or "NG".
ECU PART NUMBER	ABS actuator and electric unit (control unit) part number can be read.

ECU (ABS/TCS CONTROL UNIT) PART NUMBER MODE

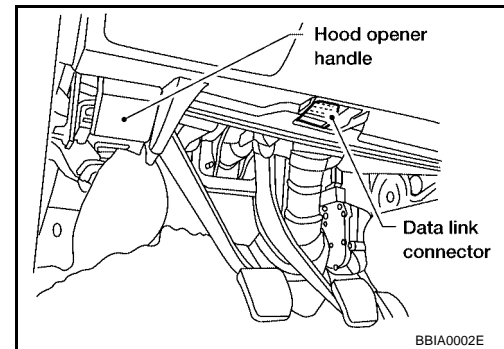
Ignore the ECU part number displayed in the "ECU PART NUMBER" screen. Refer to the parts catalog to order the ECU.

CAUTION:

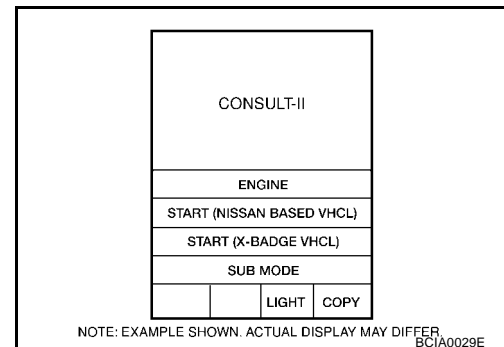
If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carries out CAN communication.

SELF-DIAGNOSIS PROCEDURE

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



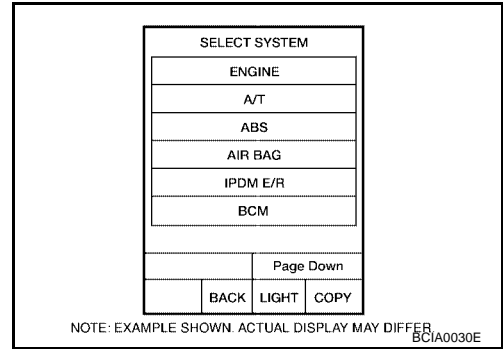
3. Start engine.
4. Drive vehicle over 30 km/h (19 MPH) for at least one minute.
5. Stop vehicle with engine running and touch "START (NISSAN BASED VHCL)" on CONSULT-II screen.



TROUBLE DIAGNOSIS

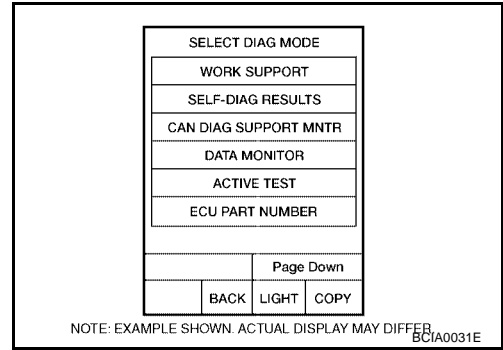
[TCS/ABS]

6. Touch "ABS" in the "SELECT SYSTEM" screen.
If "ABS" is not indicated, go to [GI-39, "Consult-II Data Link Connector \(DLC\) Circuit"](#) .



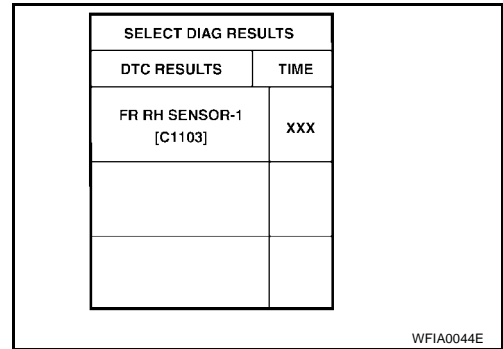
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7. Touch "SELF-DIAG RESULTS".
 - The screen shows the detected malfunction and how many times the ignition switch has been turned since the malfunction.



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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.



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TROUBLE DIAGNOSIS

[TCS/ABS]

SELF-DIAGNOSTIC RESULTS MODE

Diagnostic item	Diagnosed condition	Diagnostic item is detected when...	Reference Page	
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-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-2 [C1105]*1	Short	<ul style="list-style-type: none"> ● Circuit for rear right wheel sensor is shorted. 		BRC-74
RR LH SENSOR-2 [C1106]*1	Short	<ul style="list-style-type: none"> ● Circuit for rear left wheel sensor is shorted. 		
FR RH SENSOR-2 [C1107]*1	Short	<ul style="list-style-type: none"> ● Circuit for front right wheel sensor is shorted. 		
FR LH SENSOR-2 [C1108]*1	Short	<ul style="list-style-type: none"> ● Circuit for front 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. 		
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. 		
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-77	
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.) 		
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.) 		
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.) 		
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 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.) 		
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 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.) 		
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-82	
CONTROLLER FAILURE*2 [C1110]	Control Unit	<ul style="list-style-type: none"> ● Function of calculation in ABS control unit has malfunctioned. 	BRC-83	
PUMP MOTOR [C1111]	Abnormal	<ul style="list-style-type: none"> ● Circuit for actuator motor is open or shorted. ● Actuator motor relay is stuck. 	BRC-77	

TROUBLE DIAGNOSIS

[TCS/ABS]

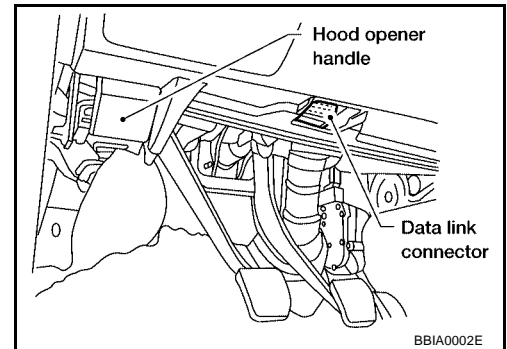
Diagnostic item	Diagnosed condition	Diagnostic item is detected when...	Reference Page
ENG SIG 1 [C1130]	Abnormal	● Fuel cut control abnormal.	BRC-74
ENG SIG 2 [C1131]	Abnormal	● Electric throttle control abnormal.	
ENG SIG 3 [C1132]	Abnormal	● ECM CAN communication abnormal.	
ENG SIG 4 [C1133]	Abnormal	● ECM communication to ABS actuator and electric unit (control unit) abnormal.	
A/T SYSTEM (With A/T) [C1135]	Abnormal	● A/T data from TCM abnormal or not present.	
CAN COMM CIRCUIT [U1000]	CAN Communication Failure	● CAN communication line is open or shorted.	

*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.

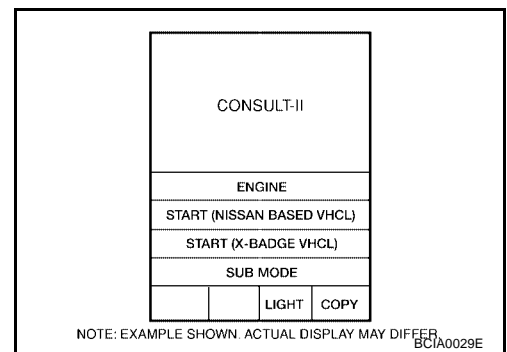
*2: When "CONTROLLER FAILURE" is displayed, check to see if the ABS warning lamp is burned out, and check the circuit between the ABS warning lamp and ABS actuator and electric unit (control unit) for open or short. Then check the ABS actuator and electric unit (control unit) and circuit.

DATA MONITOR PROCEDURE

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



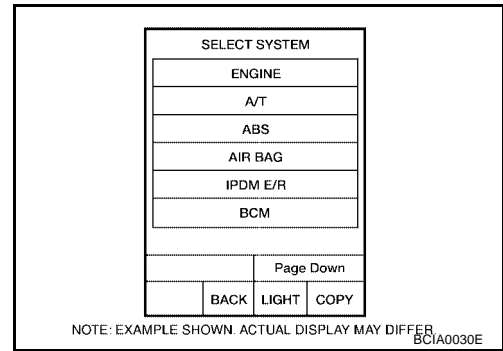
3. Turn ignition switch ON.
4. Touch "START (NISSAN BASED VHCL)" on CONSULT-II screen.



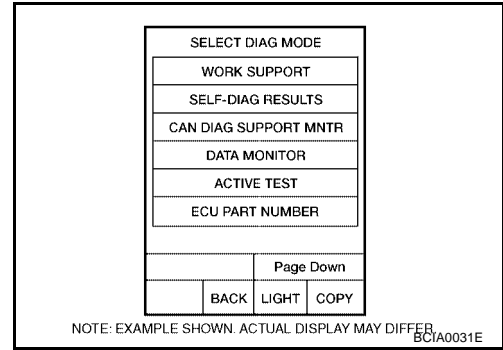
TROUBLE DIAGNOSIS

[TCS/ABS]

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



6. Touch "DATA MONITOR".



7. Touch "SETTING" on "SELECT MONITOR ITEM" screen.
8. Touch "AUTO TRIG" or "MANU TRIG" on "SET RECORDING CONDITION" 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 (With A/T)	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

TROUBLE DIAGNOSIS

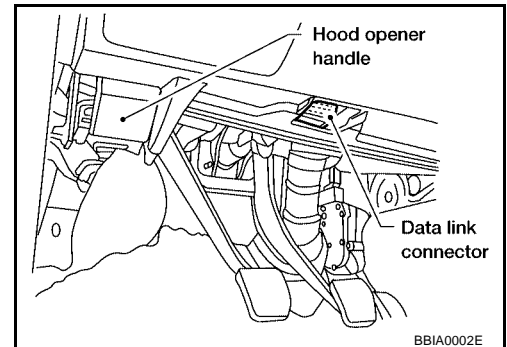
[TCS/ABS]

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

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ACTIVE TEST PROCEDURE

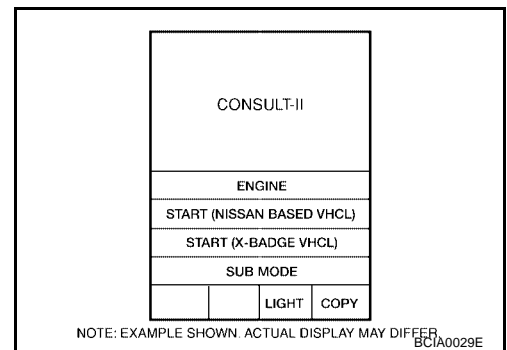
- When conducting active test, vehicle must be stationary.
 - When ABS warning lamp stays on, never conduct active test.
- Turn ignition switch OFF.
 - Connect CONSULT-II and CONSULT-II CONVERTER to data link connector.



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- Start engine.
- Touch "START (NISSAN BASED VHCL)" on CONSULT-II screen.

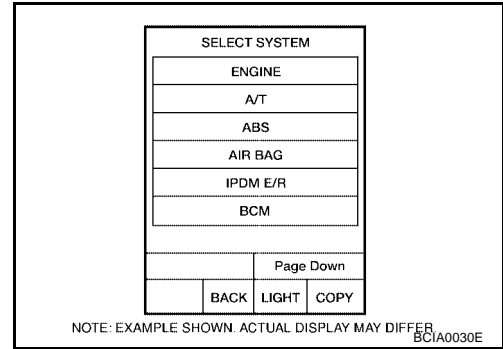


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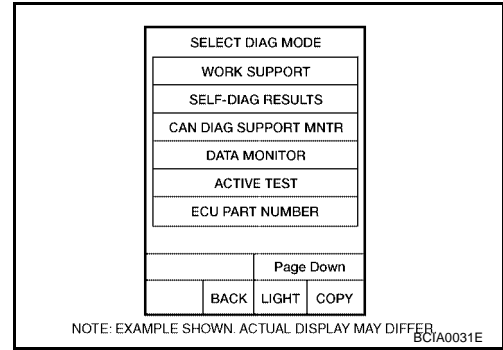
TROUBLE DIAGNOSIS

[TCS/ABS]

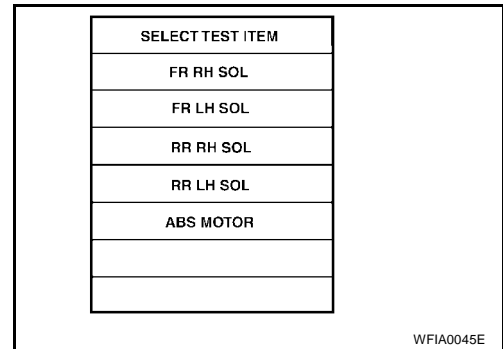
5. Touch "ABS" in the "SELECT SYSTEM" screen.
If "ABS" is not indicated, go to [GI-39, "Consult-II Data Link Connector \(DLC\) Circuit"](#) .



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
		DOWN (Decrease):	ON	ON
ABS MOTOR		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**

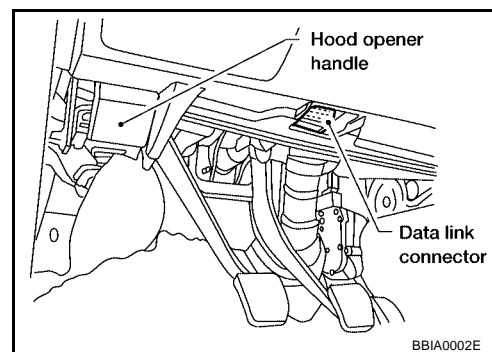
When a problem occurs in the ABS, the ABS warning lamp on the instrument panel comes on. When a problem occurs in the TCS, the TCS OFF indicator lamp and SLIP indicator lamp on the instrument panel come on. To activate the self-diagnostic results mode, ground the self-diagnostic (check) terminal located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

SELF-DIAGNOSIS PROCEDURE

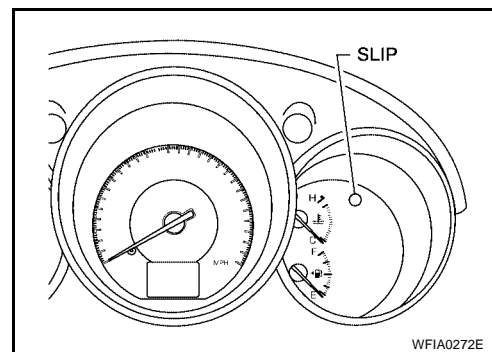
1. Drive vehicle over 30 km/h (19 MPH) for at least one minute.
2. Turn ignition switch OFF.
3. Ground terminal 9 of data link connector with a suitable harness.
4. Turn ignition switch ON while grounding terminal 9.

Do not depress brake pedal.

Do not start engine.



5. After 3.0 seconds, the 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-64, "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-70, "HOW TO ERASE SELF-DIAGNOSTIC RESULTS \(MALFUNCTION CODES\)"](#).
8. Repeat the self-diagnostic procedure to verify that the malfunction codes have been erased.

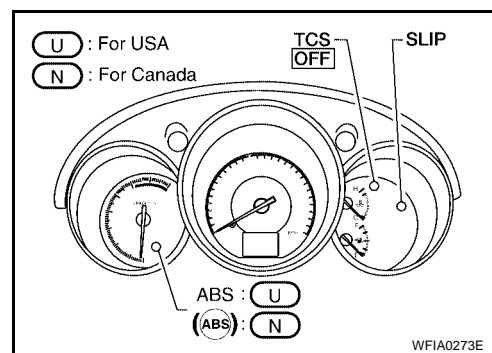


9. Disconnect the data link connector terminal 9 from ground. The self-diagnostic results mode is now complete.
10. Verify that the ABS warning lamp, TCS OFF indicator lamp and SLIP indicator lamp remain off after driving vehicle over 30 km/h (19 MPH) for at least one minute.
11. After making certain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

NOTE:

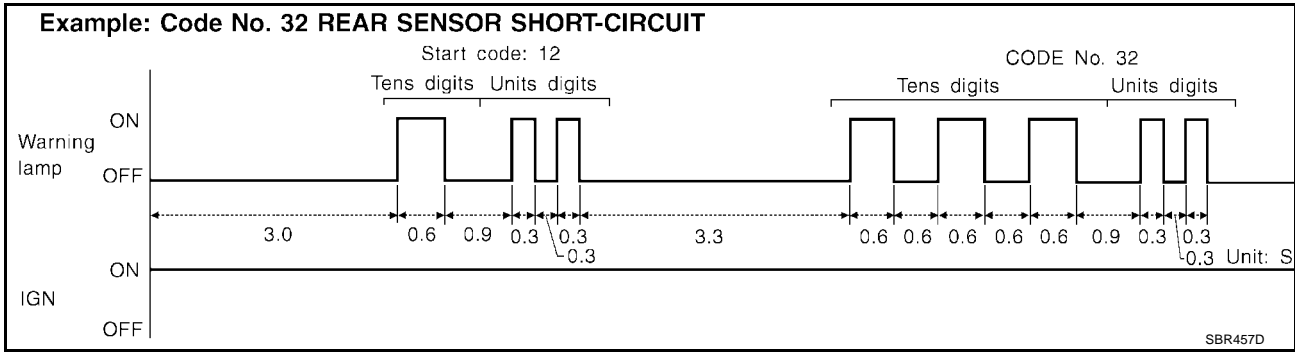
The indication terminates after five minutes.

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)**

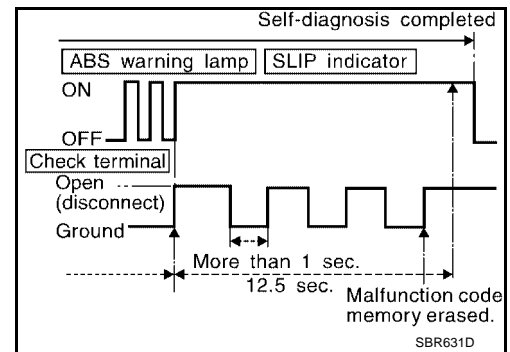
1. Determine the code No. by counting the number of times the ABS warning lamp or SLIP indicator lamp flashes on and off.
2. When several malfunctions occur at one time, up to three code numbers can be stored; the latest malfunction will be indicated first.
3. The indication begins with the start code 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 and the sequence is repeated (the indication will stay on for five minutes at the most).

4. Refer to [BRC-64, "SELF-DIAGNOSTIC RESULTS MODE"](#).



HOW TO ERASE SELF-DIAGNOSTIC RESULTS (MALFUNCTION CODES)

1. Disconnect data link connector terminal 9 from ground (ABS warning lamp will stay lit).
2. Within 12.5 seconds, ground the data link connector terminal 9 three times. Each terminal ground must last more than 1 second. The ABS warning lamp turns off 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.



After the erase operation is completed, it is necessary to repeat the self-diagnostic procedure 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 on.

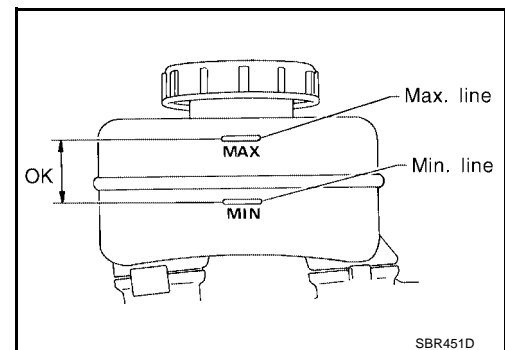
Preliminary Check

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 clean and free of contamination?

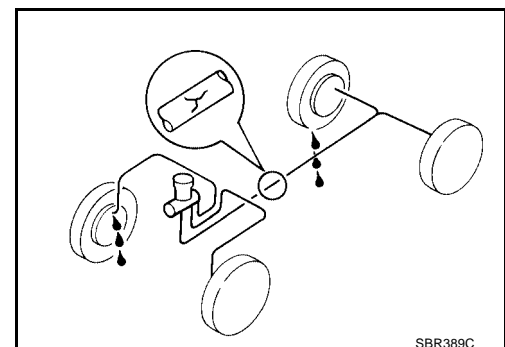
- OK >> GO TO 2.
 NG >> Repair. GO TO 2.



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.

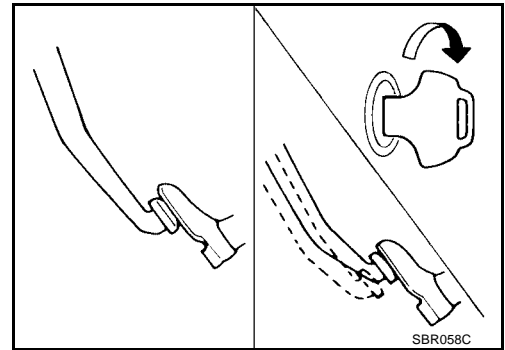


3. CHECK BRAKE BOOSTER OPERATION

Check brake booster for operation and air tightness.
Refer to [BR-17, "AIRTIGHT CHECK"](#) .

Is brake booster airtight and functioning properly?

- YES >> GO TO 4.
- NO >> Replace. GO TO 4.

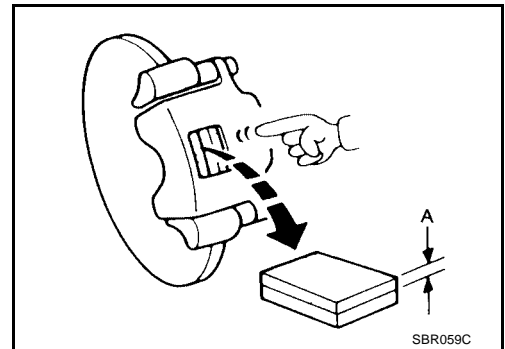


4. CHECK BRAKE PADS AND ROTORS

Check brake pads and rotors.
Refer to [BR-21, "FRONT DISC BRAKE"](#) and [BR-33, "REAR DISC BRAKE"](#) .

Are brake pads and rotors functioning properly?

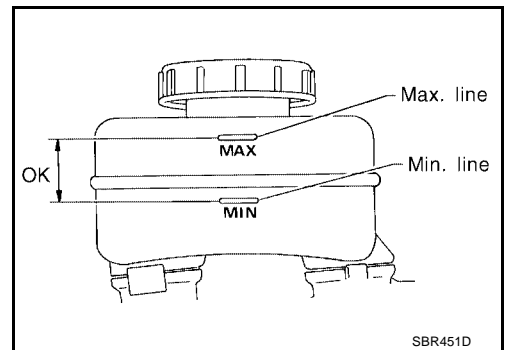
- YES >> GO TO 5.
- NO >> Replace.



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 clean and free of contamination?

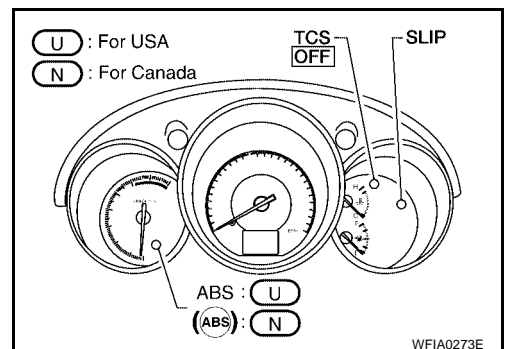
- OK >> GO TO 6.
- NG >> Add brake fluid as necessary.



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 combination meter. Refer to [DI-12, "SELF-DIAGNOSIS FUNCTION"](#) .



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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-69, "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-69, "SELF-DIAGNOSIS PROCEDURE"](#) .

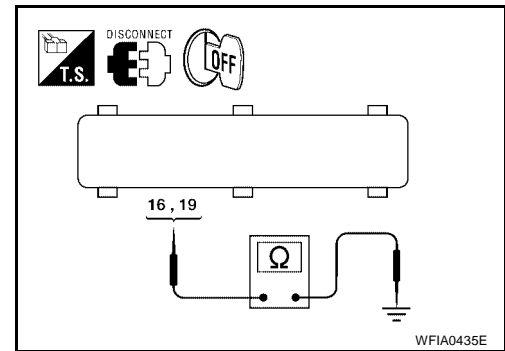
Ground Circuit Check

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND

EFS0048E

- Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 16 and 19 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. 1 second	x	x	x	-
After the ignition switch has been turned ON for approx. 2 seconds	-	-	-	-
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)

EFS0048F

Code No. (No. of LED flashes)	Malfunctioning part	Reference page
12	Self-diagnosis could not detect any malfunctions.	-
18	Sensor rotor malfunction	BRC-74
21, 22	Front right sensor	BRC-74
25, 26	Front left sensor	BRC-74
31, 32	Rear right sensor	BRC-74
35, 36	Rear left sensor	BRC-74
41	Actuator front right outlet solenoid valve	BRC-77

TROUBLE DIAGNOSIS

[TCS/ABS]

Code No. (No. of LED flashes)	Malfunctioning part	Reference page
42	Actuator front right inlet solenoid valve	BRC-77
45	Actuator front left outlet solenoid valve	BRC-77
46	Actuator front left inlet solenoid valve	BRC-77
51	Actuator rear right outlet solenoid valve	BRC-77
52	Actuator rear right inlet solenoid valve	BRC-77
55	Actuator rear left outlet solenoid valve	BRC-77
56	Actuator rear left inlet solenoid valve	BRC-77
57*	Power supply (Abnormal voltage)	BRC-82
61	Actuator motor or motor relay	BRC-80
63	Solenoid valve relay	BRC-77
71	Control unit	BRC-83
77	CAN communication circuit (CAN initialize, Bus-off, Receive)	BRC-74
83	CAN ATMSG1 receive timeout	BRC-74
84	CAN TRQDNINH fault	BRC-74
86	CAN ETCOK fault	BRC-74
87	CAN FCOK fault	BRC-74
88	CAN CANOK fault	BRC-74

*: 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

EFS0048G

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-89
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-88
ABS warning lamp does not come on during self-diagnosis.	Control unit	—
Pedal vibration and noise.	—	BRC-87
Long stopping distance.	—	BRC-86
Unexpected pedal action.	—	BRC-85
ABS does not work.	—	BRC-86
ABS works frequently.	—	BRC-85

TROUBLE DIAGNOSIS FOR SELF-DIAGNOSTIC ITEMS

PFP:00000

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

EFS0048H

- 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="checkbox"/> Malfunction codes	<input type="checkbox"/> 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 E125 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-52, "CAN Communication System Description"](#) .

**Wheel Sensor or Rotor
DIAGNOSTIC PROCEDURE**

EFS0048I

- 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 >> If diagnosing a front wheel sensor, GO TO 5. If diagnosing a rear wheel sensor, GO TO 6.
NO >> Repair as necessary. Refer to [FAX-5, "FRONT WHEEL BEARING"](#) or [RAX-5, "Rear Wheel Bearing"](#). Then retest.

5. CHECK SENSOR ROTOR

Check sensor rotor for tooth damage.

OK or NG

- OK >> GO TO 6.
NG >> Replace sensor rotor. Refer to [BRC-92, "Removal and Installation"](#).

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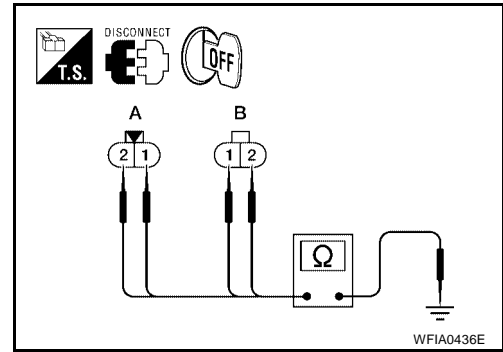
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6. CHECK WIRING HARNESS FOR SHORT CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector E125 and wheel sensor connector of malfunction code No.
2. Check resistance between wheel sensor harness connector terminals and ground.



Terminals		(-)	Continuity
(+) Terminal			
Front (A)	1	Ground	No
	2		
Rear (B)	1		
	2		

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 E125 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	Connector	Terminal	
Front LH	E125	6	E18	1	Yes
		7		2	
Front RH		4	E117	1	
		5		2	
Rear LH		9	B123	2	
		8		1	
Rear RH	3	B122	2		
	1		1		

Continuity should exist.

OK or NG

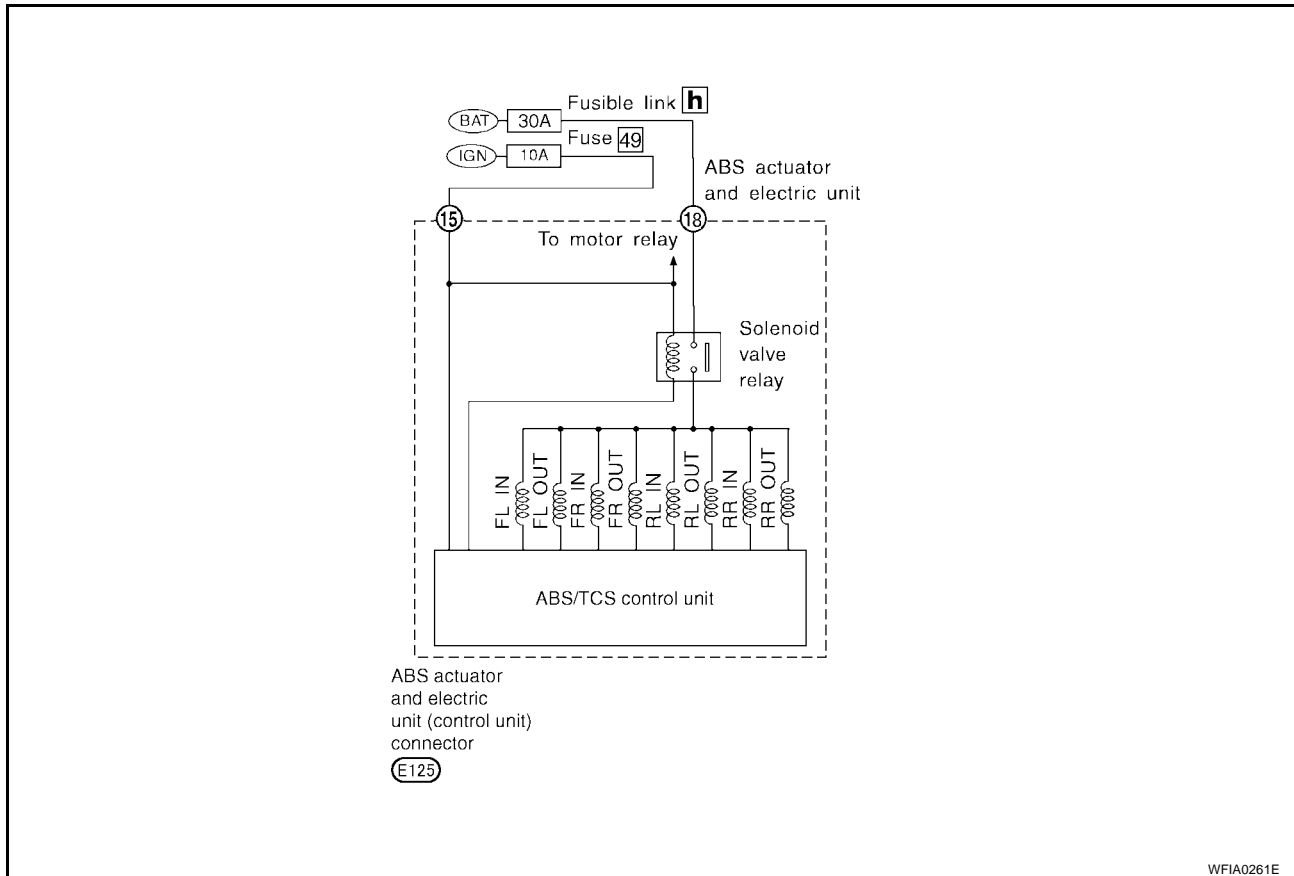
- OK >> Replace the ABS actuator and electric unit (control unit). Refer to [BRC-45, "Removal and Installation"](#).
- NG >> Repair the circuit.

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-4, "POWER SUPPLY ROUTING CIRCUIT"](#).

Is fusible link OK?

- YES >> GO TO 3.
- NO >> GO TO 7.

3. CHECK FUSE

Check 10A fuse No. 49. For fuse layout, refer to [PG-4, "POWER SUPPLY ROUTING CIRCUIT"](#).

Is fuse OK?

- YES >> GO TO 4.
- NO >> GO TO 9.

4. CHECK CONNECTOR

1. Disconnect ABS actuator and electric unit (control unit) connector E125. Check terminals for deformation, disconnection, looseness or damage. Then reconnect connector.
2. Repeat self-diagnosis.

Does warning lamp activate again?

- YES >> GO TO 5.
NO >> Inspection End.

5. CHECK GROUND CIRCUIT

Refer to [BRC-72, "ABS ACTUATOR AND ELECTRIC UNIT \(CONTROL UNIT\) GROUND"](#) .

Is ground circuit OK?

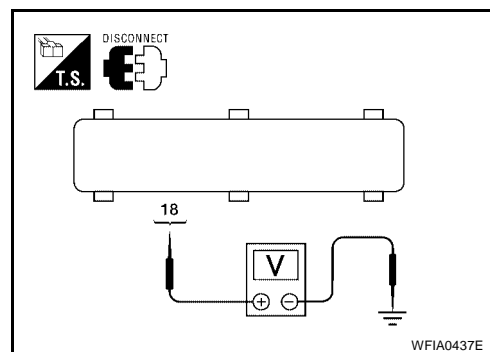
- YES >> GO TO 6.
NO >> Repair harness and connectors.

6. CHECK SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector E125.
2. Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 18 and ground.

Does battery voltage exist?

- YES >> Replace ABS actuator and electric unit (control unit).
Refer to [BRC-93, "Removal and Installation"](#) .
- 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 when the ignition switch is turned ON?

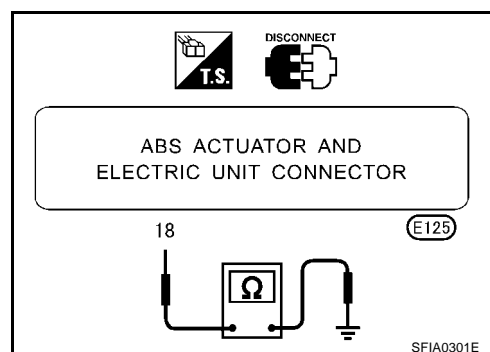
- YES >> GO TO 8.
NO >> Inspection End.

8. CHECK RELAY UNIT POWER SUPPLY CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector E125.
2. Check continuity between ABS actuator and electric unit (control unit) connector E125 terminal 18 and ground.

Does continuity exist?

- YES >> Check the following.
- Harness connector E125
 - Harness for 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-93, "Removal and Installation"](#) .



9. REPLACE FUSE

Replace fuse.

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

YES >> Check the following.

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

NO >> Inspection End.

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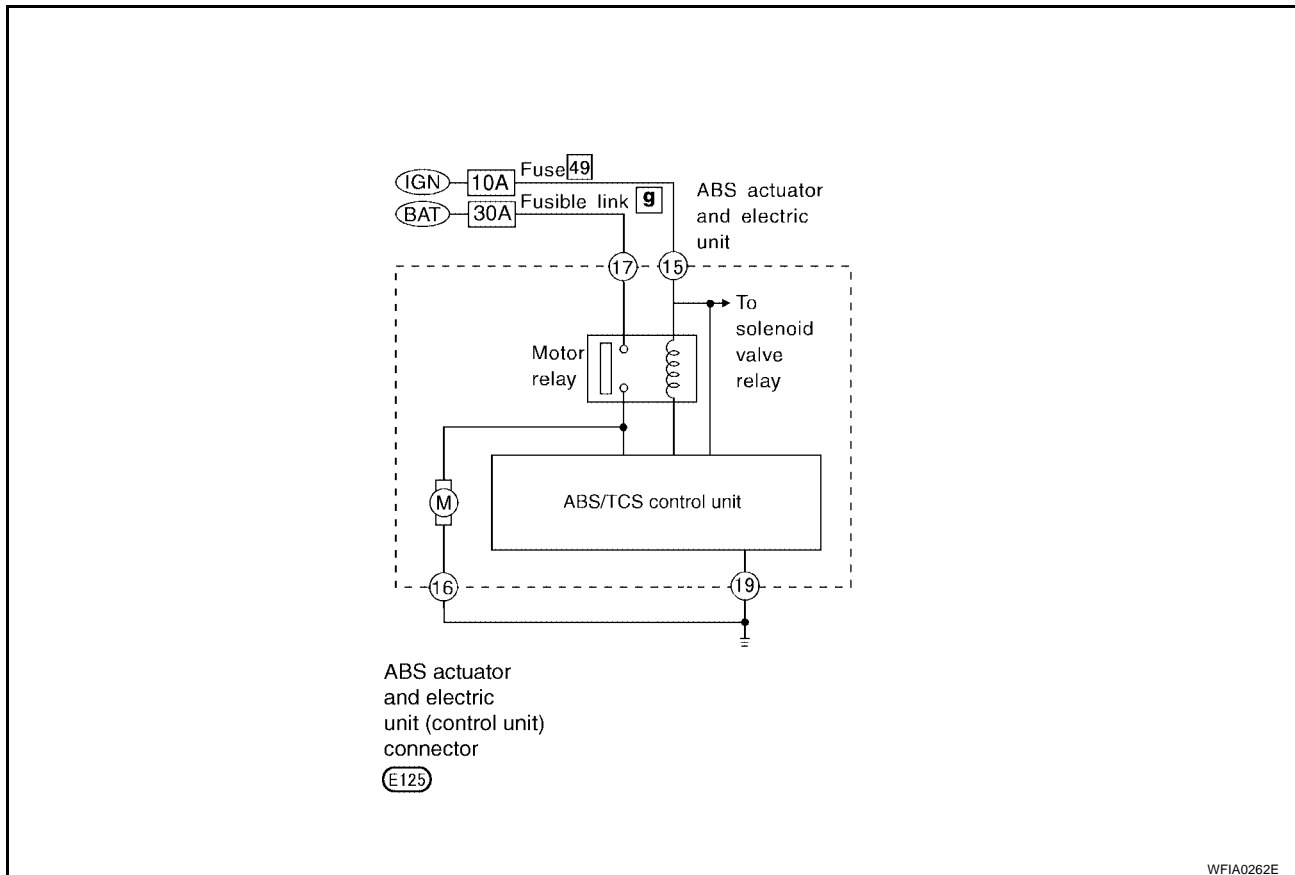
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Motor Relay or Motor DIAGNOSTIC PROCEDURE

- 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-4, "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 E125. Check terminals for deformation, disconnection, looseness or damage. Then reconnect connector.
2. Repeat self-diagnosis.

Does ABS warning lamp activate again?

- YES >> GO TO 4.
- NO >> Inspection End.

4. CHECK MOTOR RELAY POWER SUPPLY CIRCUIT

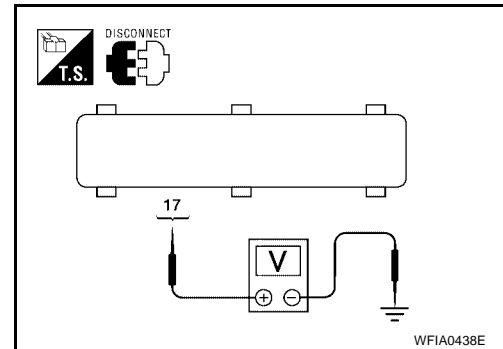
1. Disconnect ABS actuator and electric unit (control unit) connector E125.
2. Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 17 and ground.

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-72, "ABS ACTUATOR AND ELECTRIC UNIT \(CONTROL UNIT\) GROUND"](#).

Is ground circuit OK?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-93, "Removal and Installation"](#)

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 when the ignition switch is turned ON?

YES >> GO TO 7.

NO >> Inspection End.

7. CHECK ABS ACTUATOR MOTOR POWER SUPPLY CIRCUIT

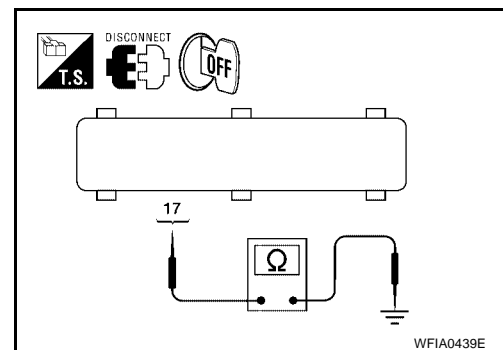
1. Disconnect battery cable and ABS actuator and electric unit (control unit) connector E125.
2. Check continuity between ABS actuator and electric unit (control unit) connector E125 terminal 17 and ground.

Does continuity exist?

YES >> Check the following.

- Harness connector E125
- Harness for 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 and the connection of ABS actuator and electric unit (control unit) harness connector. Reconnect ABS actuator and electric unit (control unit) harness connector. Then retest.



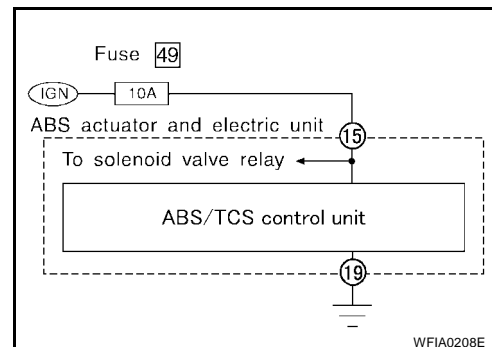
Abnormal Battery Voltage DIAGNOSTIC PROCEDURE

- ① 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 E125. Check terminals for deformation, disconnection, looseness or damage. Then reconnect connector.
2. Repeat self-diagnosis.

Does warning lamp activate again?

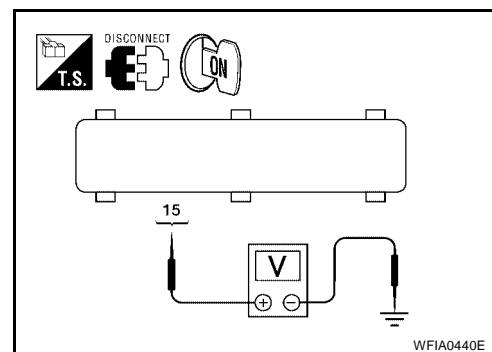
- YES >> GO TO 3.
- NO >> Inspection End.

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

1. Disconnect ABS actuator and electric unit (control unit) connector E125.
2. Check voltage between ABS actuator and electric unit (control unit) connector E125 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-72. "ABS ACTUATOR AND ELECTRIC UNIT \(CONTROL UNIT\) GROUND"](#) .

Is ground circuit OK?

- YES >> Check ABS actuator and electric unit (control unit) pin terminals for damage and 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 >> 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 49 for ABS actuator and electric unit (control unit). Refer to [PG-4, "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

- Turn ignition switch to OFF position.
- Check continuity between battery and ABS actuator and electric unit (control unit) connector E125 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

EFS0048M

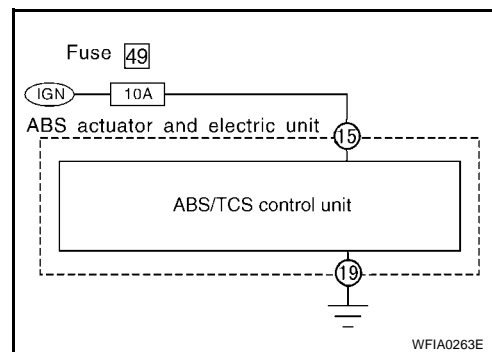
With CONSULT-II: Malfunction code No. C1110

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

- Disconnect ABS actuator and electric unit (control unit) connector E125. Check terminals for deformation, disconnection, looseness or damage. Then reconnect connector.
- Repeat self-diagnosis.

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-82, "DIAGNOSTIC PROCEDURE"](#).

Does battery voltage exist when ignition switch is turned ON?

YES >> GO TO 4.

NO >> Repair.

4. SELF-DIAGNOSIS RESULT CHECK

Check the self-diagnosis results.

Malfunction code

71

Diagnostic trouble code

C1110

Are the above items indicated in self-diagnosis results?

YES >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-93. "Removal and Installation"](#)

NO >> Inspect the system according to the indicated code No.

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

Check brake fluid pressure distribution.
Refer to [BR-40, "Inspection"](#) .

Is brake fluid pressure distribution normal?

YES >> GO TO 2.

NO >> Perform Preliminary Check. Refer to [BRC-70, "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-74, "Wheel Sensor or Rotor"](#) .

Are wheel sensors functioning properly?

YES >> GO TO 3.

NO >> Repair.

3. 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 [BRC-85, "2. Unexpected Pedal Action"](#) .

NO >> Repair as necessary. Refer to [FAX-5, "FRONT WHEEL BEARING"](#) or [RAX-5, "Rear Wheel Bearing"](#) .

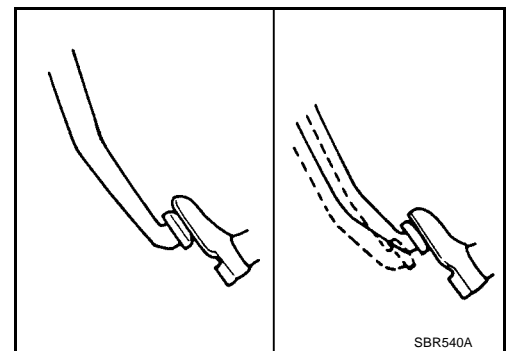
2. Unexpected Pedal Action**1. CHECK BRAKE PEDAL TRAVEL**

Check brake pedal travel.

Is brake pedal travel excessive?

YES >> Perform Preliminary Check. Refer to [BRC-70, "Preliminary Check"](#) .

NO >> GO TO 2.

**2. CHECK BASE BRAKING SYSTEM PERFORMANCE**

Disconnect the ABS actuator and electric unit (control unit) connector E125 and verify that the braking force is sufficient when the ABS is not operating. After the inspection, reconnect the connector.

NOTE:

Driving the vehicle with the ABS actuator and electric unit (control unit) disconnected may induce DTCs in electrical control units using CAN communication. After the inspection, clear all DTCs.

OK or NG

OK >> GO TO 3.

NG >> Perform Preliminary Check. Refer to [BRC-70, "Preliminary Check"](#) .

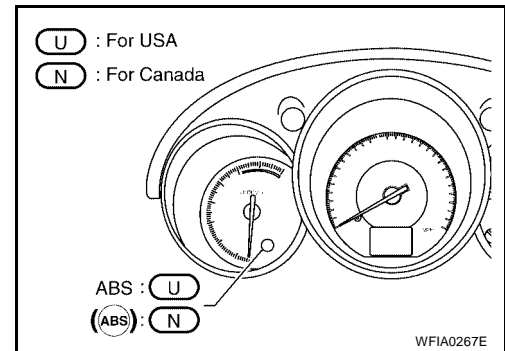
3. CHECK WARNING LAMP INDICATION

Ensure warning lamp remains off while driving.

Is warning lamp turned off?

YES >> GO TO 4.

NO >> Carry out self-diagnosis. Refer to [BRC-69, "SELF-DIAGNOSIS PROCEDURE"](#).



4. CHECK WHEEL SENSORS

1. Check wheel sensor connector for terminal damage or loose connections.
2. Perform wheel sensor check.
Refer to [BRC-74, "Wheel Sensor or Rotor"](#).

Are wheel sensors functioning properly?

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 as necessary.

3. Long Stopping Distance

EFS0048P

1. CHECK BASE BRAKING SYSTEM PERFORMANCE

1. Disable ABS by disconnecting ABS actuator and electric unit (control unit) connector E125.
2. Drive vehicle and check to see if stopping distance is still long.

NOTE:

Driving the vehicle with the ABS actuator and electric unit (control unit) disconnected may induce DTCs in electrical control units using CAN communication. After the inspection, clear all DTCs.

Is stopping distance still long?

YES >> Perform Preliminary Check. Refer to [BRC-70, "Preliminary Check"](#).

NO >> Go to [BRC-85, "2. Unexpected Pedal Action"](#).

NOTE:

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

4. ABS Does Not Work

EFS0048Q

1. CHECK WARNING LAMP INDICATION

Turn the ignition switch ON.

Does the ABS warning lamp activate?

YES >> Carry out self-diagnosis. Refer to [BRC-69, "SELF-DIAGNOSIS PROCEDURE"](#).

NO >> Go to [BRC-88, "6. ABS Warning Lamp Does Not Come On When Ignition Switch Is Turned On"](#).

NOTE:

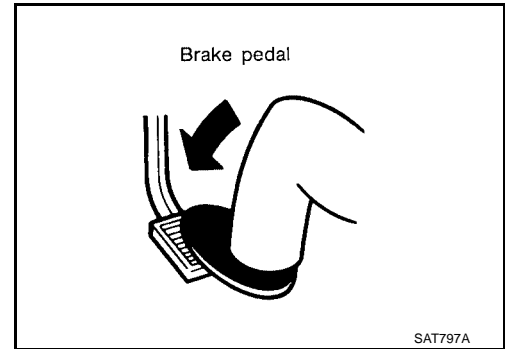
ABS does not work when vehicle speed is under 10 km/h (6 MPH).

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-69, "SELF-DIAGNOSIS PROCEDURE"](#) .
 NO >> GO TO 3.

3. RECHECK SYMPTOM

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

- YES >> Check for radio, antenna or related wiring that is routed too close to the ABS actuator and electric unit (control unit) and reroute as necessary.
 NO >> Go to [BRC-85, "2. Unexpected Pedal Action"](#) .

NOTE:

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

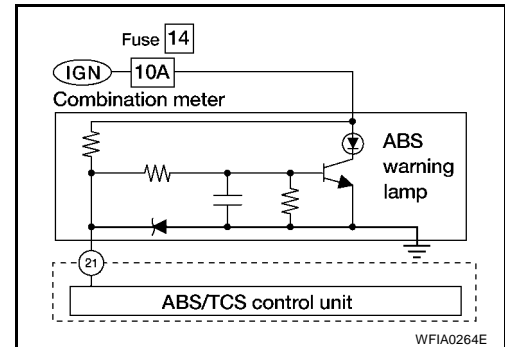
- Applying brake gradually when shifting or operating clutch.
- Low friction (slippery) road.
- High speed cornering.
- Driving over bumps and potholes.

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-4, "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.

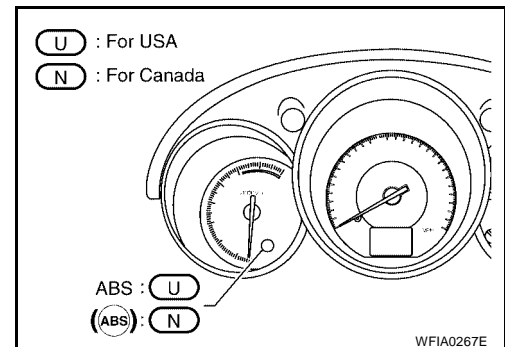
3. CHECK WARNING LAMP ACTIVATION

Disconnect ABS actuator and electric unit (control unit) connector E125.

Does the ABS warning lamp activate?

YES >> Replace ABS actuator and electric unit. Refer to [BRC-45, "Removal and Installation"](#).

NO >> GO TO 4.



4. CHECK HARNESS FOR SHORT

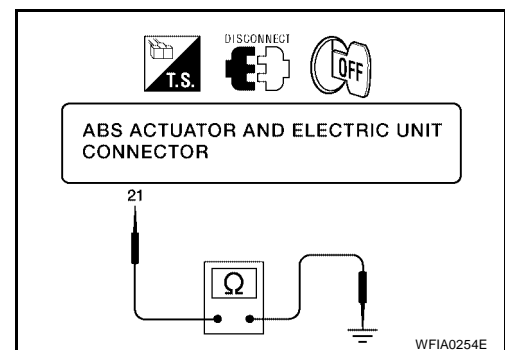
1. Disconnect ABS actuator and electric unit (control unit) connector E125 and combination meter connector M24.

2. Check continuity between ABS actuator and electric unit (control unit) connector E125 terminal 21 and ground.

Does continuity exist?

YES >> Repair harness or connectors.

NO >> Check combination meter. Refer to [DI-13, "How to Proceed With Trouble Diagnosis"](#).



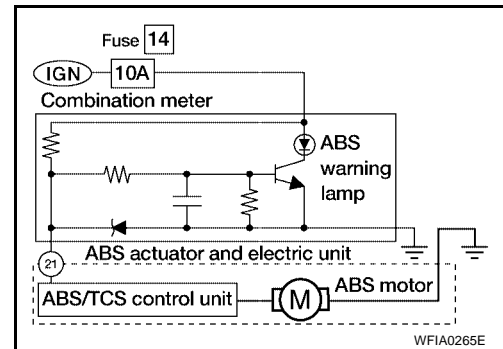
7. ABS Warning Lamp Stays On When Ignition Switch Is Turned On

EFS0048T

1. INSPECTION START

ABS actuator and electric unit (control unit) inspection.

>> GO TO 2.

**2. CHECK WARNING LAMP**

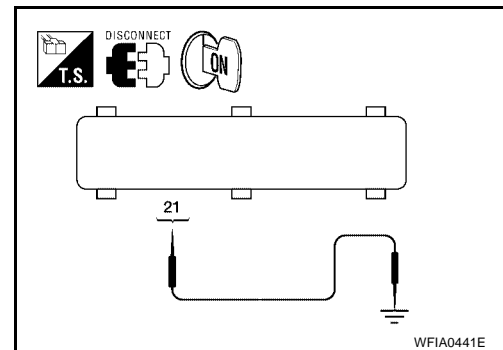
1. Disconnect ABS actuator and electric unit (control unit) connector E125.
2. Connect suitable wire between ABS actuator and electric unit (control unit) connector E125 terminal 21 and ground.

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 combination meter. 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 or NG

OK >> Inspection End.

NG >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-93, "Removal and Installation"](#)

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

EFS0048U

1. ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to [BRC-69, "SELF-DIAGNOSIS PROCEDURE"](#).

Are self-diagnosis result items displayed?

YES >> After checking and repairing the applicable item, perform the ABS actuator and electric unit (control unit) self-diagnosis again.

NO >> GO TO 2.

2. ENGINE SPEED SIGNAL INSPECTION

Perform data monitor with CONSULT-II for the ABS actuator and electric unit (control unit).

Is the engine speed at idle 400 rpm or higher?

YES >> GO TO 4.

NO >> GO TO 3.

3. ECM SELF-DIAGNOSIS

Perform ECM self-diagnosis.

Are self-diagnosis result items displayed?

- YES >> After checking and repairing the applicable item, perform the ECM self-diagnosis again.
- NO >> WITH A/T, GO TO 4. WITH M/T, GO TO 5.

4. TCM SELF-DIAGNOSIS

Perform TCM self-diagnosis.

Are self-diagnosis result items displayed?

- YES >> After checking and repairing the applicable item, perform the TCM self-diagnosis again.
- NO >> GO TO 5.

5. CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and the ECM connectors and check the terminals for deformation, disconnection, looseness or damage.

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace the connector terminal.

6. CAN COMMUNICATION INSPECTION

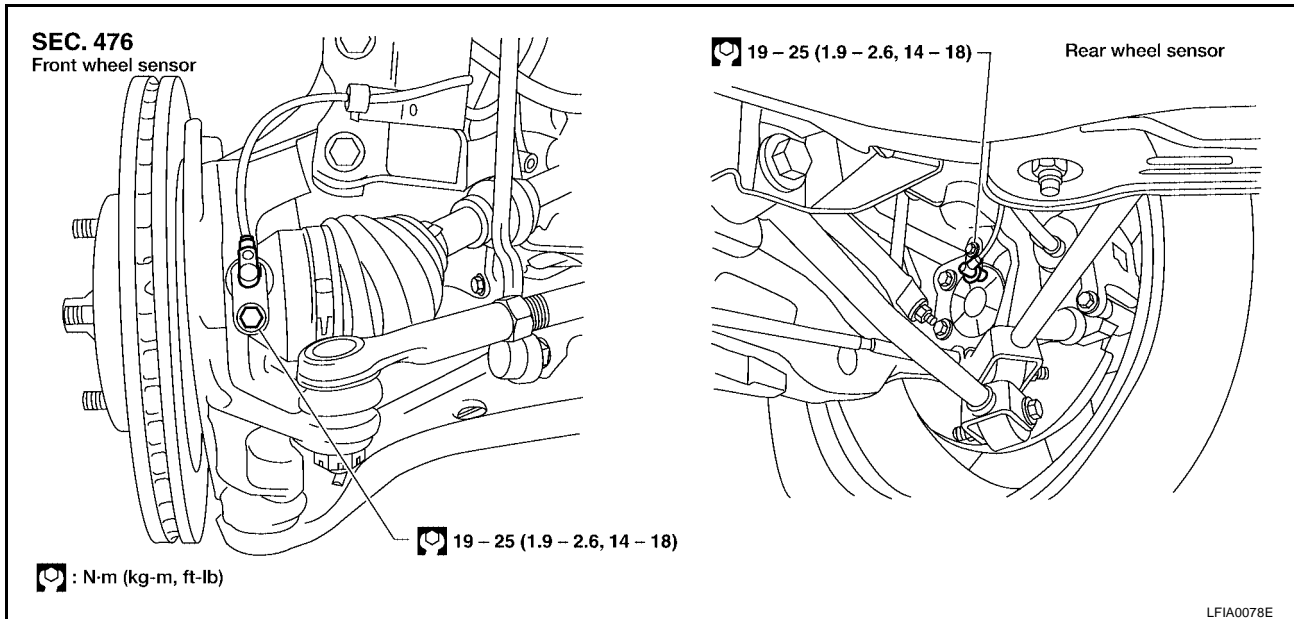
Check the CAN communication system. Refer to [BRC-52, "CAN Communication System Description"](#) .

OK or NG

- OK >> Inspection End.
- NG >> Reconnect the connectors, and perform ABS actuator and electric unit (control unit) self-diagnosis.

WHEEL SENSORS

Removal and Installation



CAUTION:

- Be careful not to damage wheel sensor edge and sensor rotor teeth.
- When removing the front or rear wheel hub assembly, first remove the wheel sensor from the assembly. Failure to do so may result in damage to the wheel sensor wires making the sensor inoperative.

CAUTION:

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

REMOVAL

1. Remove wheel and tire.
2. Disconnect wheel sensor harness connector and remove harness wire from mounts.
3. Remove wheel sensor bolt and wheel sensor.

INSTALLATION

Installation is in the reverse order of removal.

- When installing wheel and tire, refer to [WT-7, "Rotation"](#).

SENSOR ROTOR

PFPA:47970

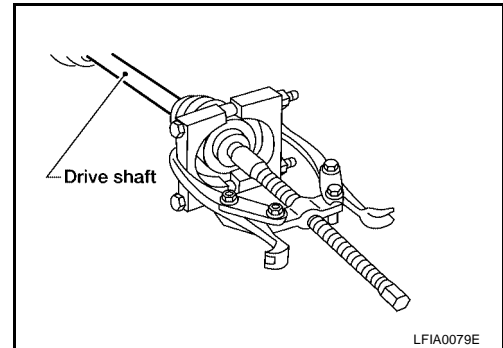
EFS00680

Removal and Installation

REMOVAL

Front

1. Remove the front wheel hub. Refer to [FAX-5, "WHEEL HUB AND KNUCKLE"](#).
2. Remove the sensor rotor from the drive shaft using a suitable puller.



Rear

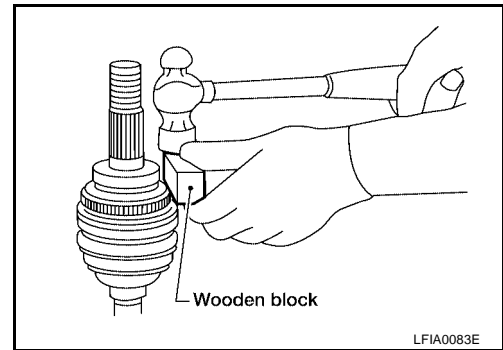
The rear wheel sensor rotor is part of the rear wheel hub. Refer to [RAX-5, "WHEEL HUB"](#).

INSTALLATION

Front

Installation is in the reverse order of removal.

- Install the sensor rotor using a hammer and a wooden block.
- Always replace sensor rotor with new one.



Rear

Installation is in the reverse order of removal.

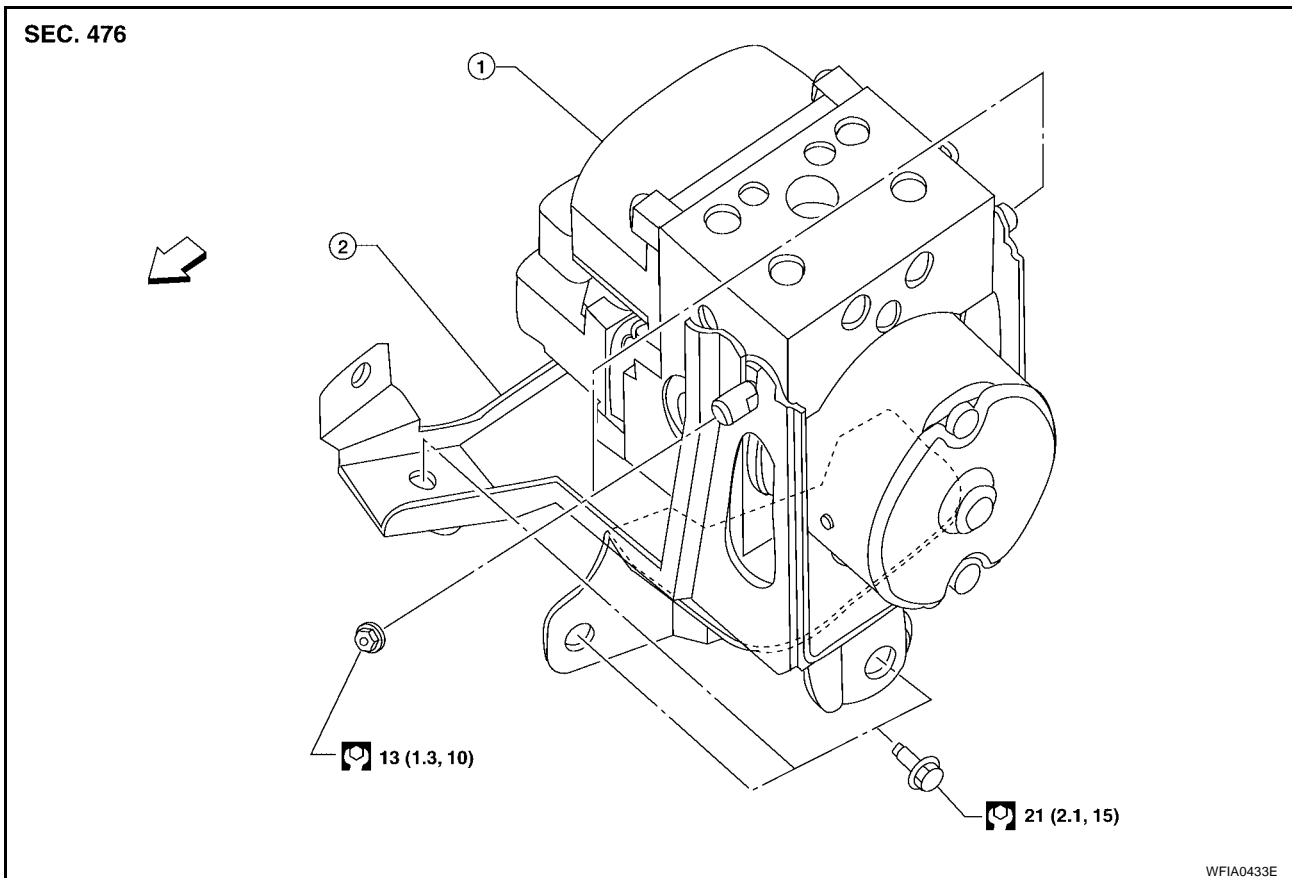
ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

PF:47660

Removal and Installation

EF50048X

SEC. 476



1. ABS actuator and electric unit (control unit) 2. Bracket

← Front

REMOVAL

1. Disconnect battery negative terminal.
2. Remove windshield wiper and linkage assembly. Refer to [WW-27, "Removal"](#).
3. Drain brake fluid. Refer to [BR-9, "Changing Brake Fluid"](#).
4. Disconnect harness connectors from ABS actuator and electric unit (control unit).
5. Disconnect brake pipes.

NOTE:

Make note of pipe mounting locations.

6. Remove bolts for bracket then remove ABS actuator and electric unit (control unit) and bracket assembly from vehicle.
7. Remove nuts for ABS actuator and electric unit (control unit) then separate from bracket.

INSTALLATION

CAUTION:

After installation of ABS actuator and electric unit (control unit), refill brake fluid. Then bleed air from system. Refer to [BR-9, "Bleeding Brake System"](#).

1. Assemble ABS actuator and electric unit (control unit) and bracket assembly, then position assembly in vehicle.
2. Install and tighten bracket bolts.
3. Install brake pipes to ABS actuator and electric unit (control unit), then tighten flare nuts. Refer to [BRC-5, "Hydraulic Circuit"](#).
4. Connect ABS actuator and electric unit (control unit) harness connectors.
5. Install windshield wiper and linkage assembly. Refer to [WW-27, "Installation"](#).

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ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

[TCS/ABS]

6. Connect battery negative terminal.