

# SECTION **BRC**

## BRAKE CONTROL SYSTEM

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## PRECAUTIONS

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

GFS00019

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. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

#### WARNING:

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

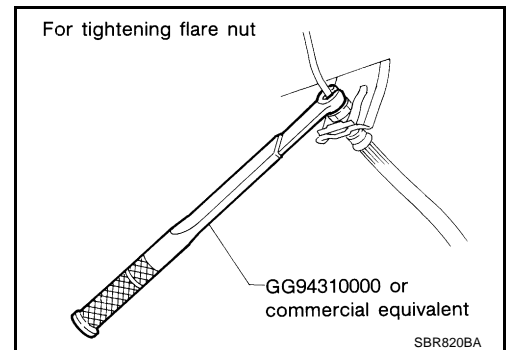
### Precautions for Brake System

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- Recommended fluid is brake fluid “DOT 3”.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas. If brake fluid is splashed, wipe it off and flush area with water immediately.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing flare nuts, and use a flare nut torque wrench when tighten flare nuts.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with new one.
- Before working, turn ignition switch OFF and disconnect connector of ABS actuator and electric unit (control unit) or the battery cables.
- When installing brake tube and hose, be sure to torque.

#### WARNING:

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



### Precautions for Brake Control

GFS0001B

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

# PREPARATION

[ABS]

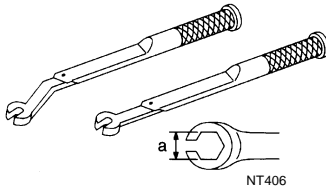
## PREPARATION

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### Special Service Tools (SST)

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Tool number Tool name	Description
GG94310000 Flare nut torque wrench a:10 mm (0.39 in)	Installing brake tube and hose

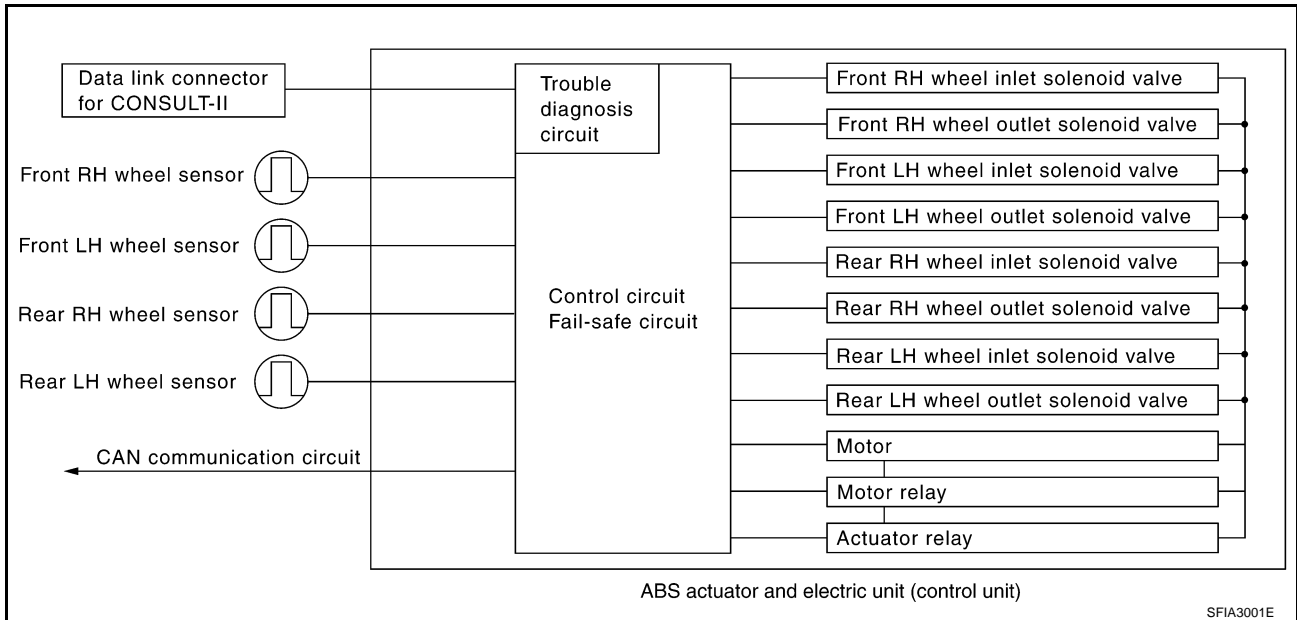


## SYSTEM DESCRIPTION

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### System Diagram

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### Functions

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#### ABS

- The Anti-Lock Brake System is a function that detects wheel revolution while braking, and it improves handling stability during sudden braking by electrically preventing 4 wheels lock. Maneuverability is also improved for avoiding obstacles.
- Electrical system diagnosis by CONSULT-II is available.

#### EBD

- Electronic Brake Distribution is a function that detects subtle slippages between the front and rear tire during braking, and it improves handling stability by electrically controlling the brake fluid pressure which results in reduced rear tire slippage.
- Electrical system diagnosis by CONSULT-II is available.

### Operation That Is Not “System Error”

GFS0001F

#### ABS

- When starting engine or just after starting vehicle, brake pedal may vibrate or the motor operating noise may be heard from engine room. This is a normal states of the operation check.
- During ABS operation, brake pedal lightly vibrates and a mechanical noise may be heard. This is normal.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

### Fail-Safe Function

GFS0001G

#### ABS, EBD SYSTEM

In case of electrical malfunction with ABS, ABS warning lamp will turn on. In case of electrical incidents with EBD, brake warning lamp and ABS warning lamp will turn on. Simultaneously, ABS become one of following conditions of Fail-Safe function.

1. For ABS malfunction, only EBD is activated and condition of vehicle is same condition of vehicles without ABS system.

**NOTE:**

ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for “Ignition switch ON” and “The first starting” are being performed.

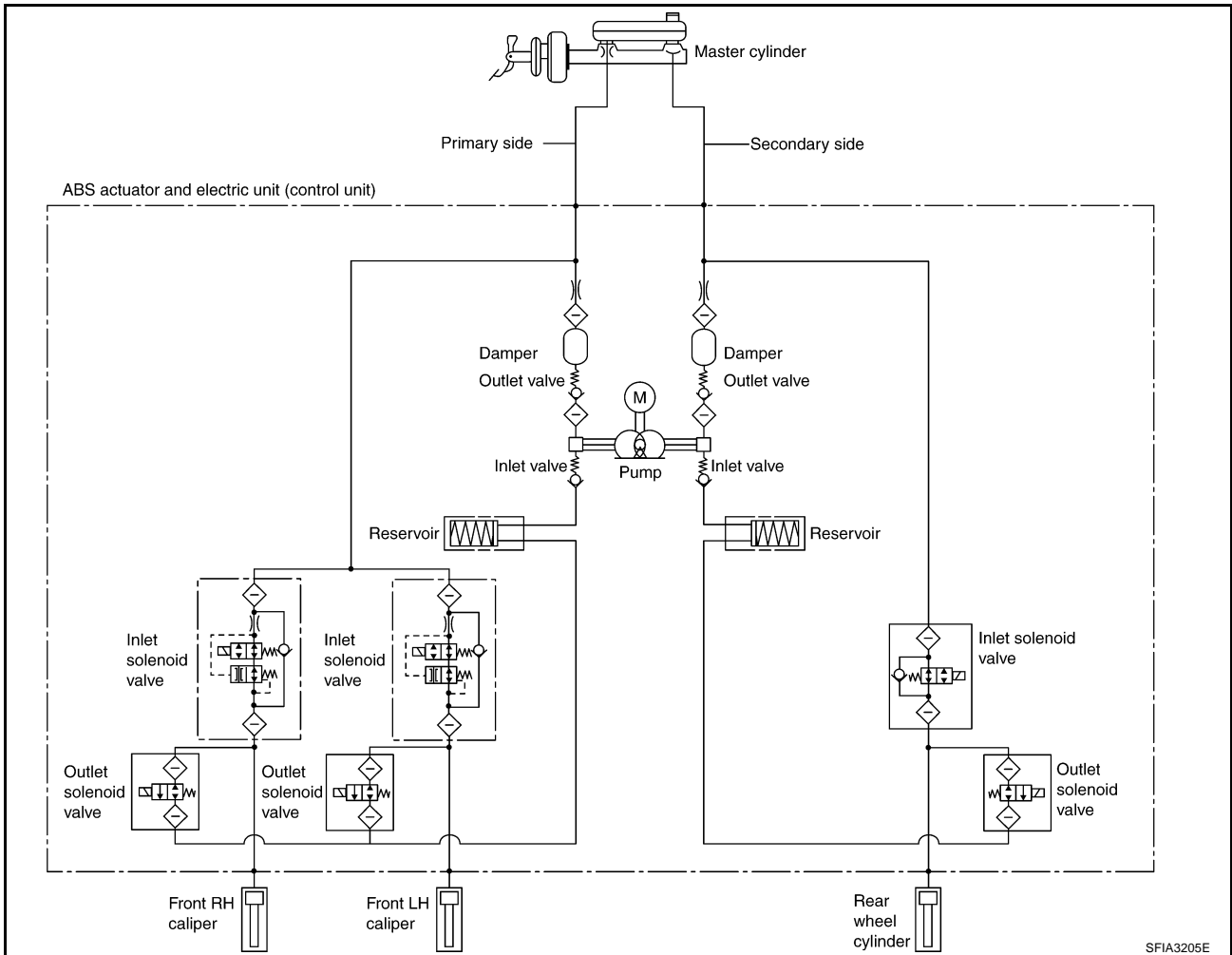
2. For EBD malfunction, EBD and ABS become inoperative, and condition of vehicle is same as condition of vehicles without ABS, EBD system.

# SYSTEM DESCRIPTION

[ABS]

## Hydraulic Circuit Diagram

GFS0001H



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## CAN COMMUNICATION

PFP:23710

### System Description

GFS00011

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. Refer to [LAN-26. "CAN Communication Unit"](#).

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## TROUBLE DIAGNOSIS

### How to Perform Trouble Diagnosis for Quick and Accurate Repair INTRODUCTION

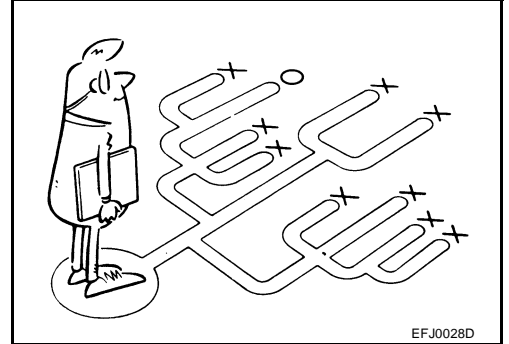
- Most important point to perform diagnosis is to understand systems (control and mechanism) in vehicle thoroughly.

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

First of all, reproduce symptom, and understand it fully. Ask customer about his/her complaints carefully. In some cases, it will be necessary to check symptom by driving vehicle with customer.

**NOTE:**

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

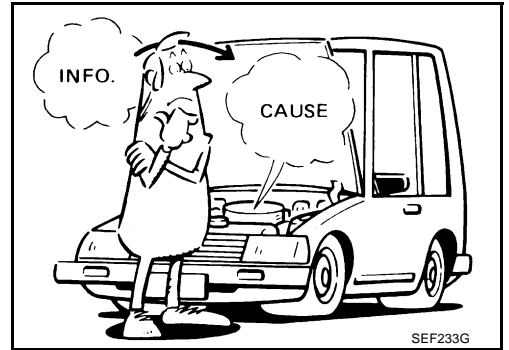


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- It is essential to check symptoms right from beginning in order to repair a malfunction completely.

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

- After diagnosis, make sure to perform “erase memory”. Refer to [BRC-18, "ERASE MEMORY"](#) .
- For an intermittent malfunction, move harness or harness connector by hand to check poor contact or false open circuit.
- Always read “GI General Information” to confirm general precautions. Refer to [GI-4, "General Precautions"](#) .



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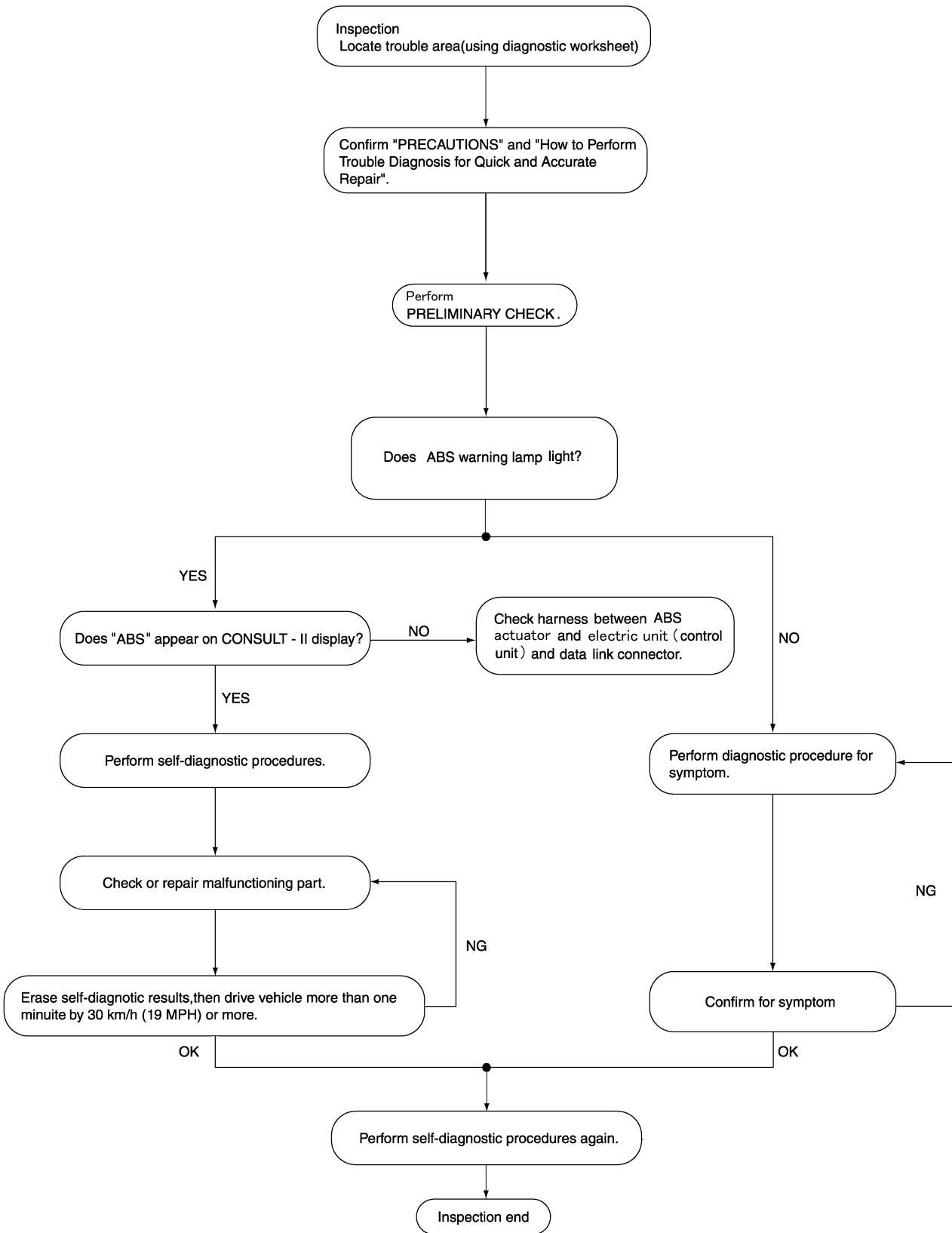


# TROUBLE DIAGNOSIS

[ABS]

## DIAGNOSIS FLOWCHART

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# TROUBLE DIAGNOSIS

[ABS]

## ASKING COMPLAINTS

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

**KEY POINTS**

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

SBR339B

## EXAMPLE OF DIAGNOSIS SHEET

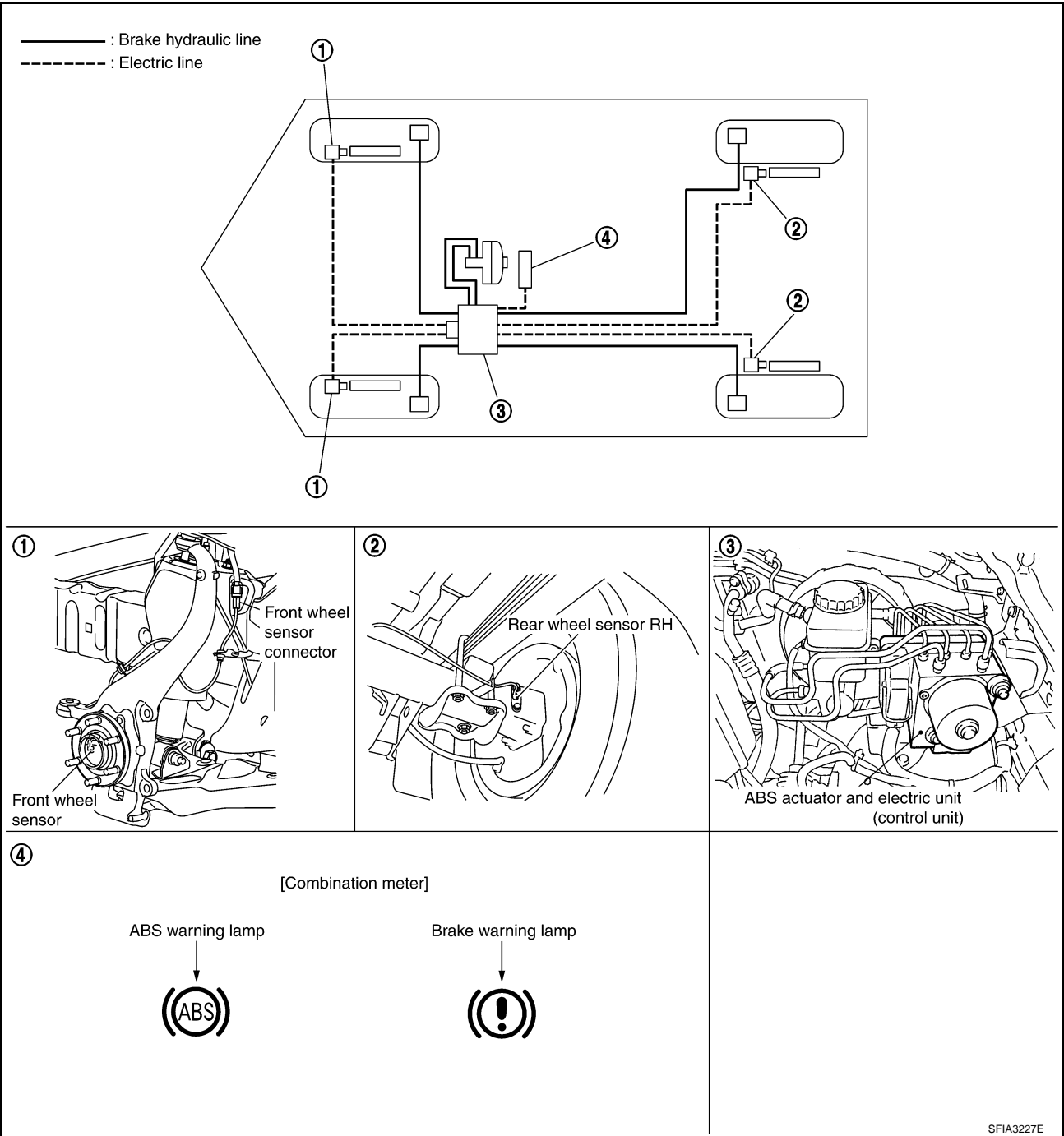
Customer name MR/MS	Model & Year	VIN	
Engine #	Trans.	Mileage	
Incident Date	Manuf. Date	In Service Date	
Symptoms	<input type="checkbox"/> Noise and vibration (from engine compartment) <input type="checkbox"/> Noise and vibration (from axle)	<input type="checkbox"/> Warning / Indicator activate	<input type="checkbox"/> Firm pedal operation Large stroke pedal operation
	<input type="checkbox"/> 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		

LFIA0176E

### Component Parts Location

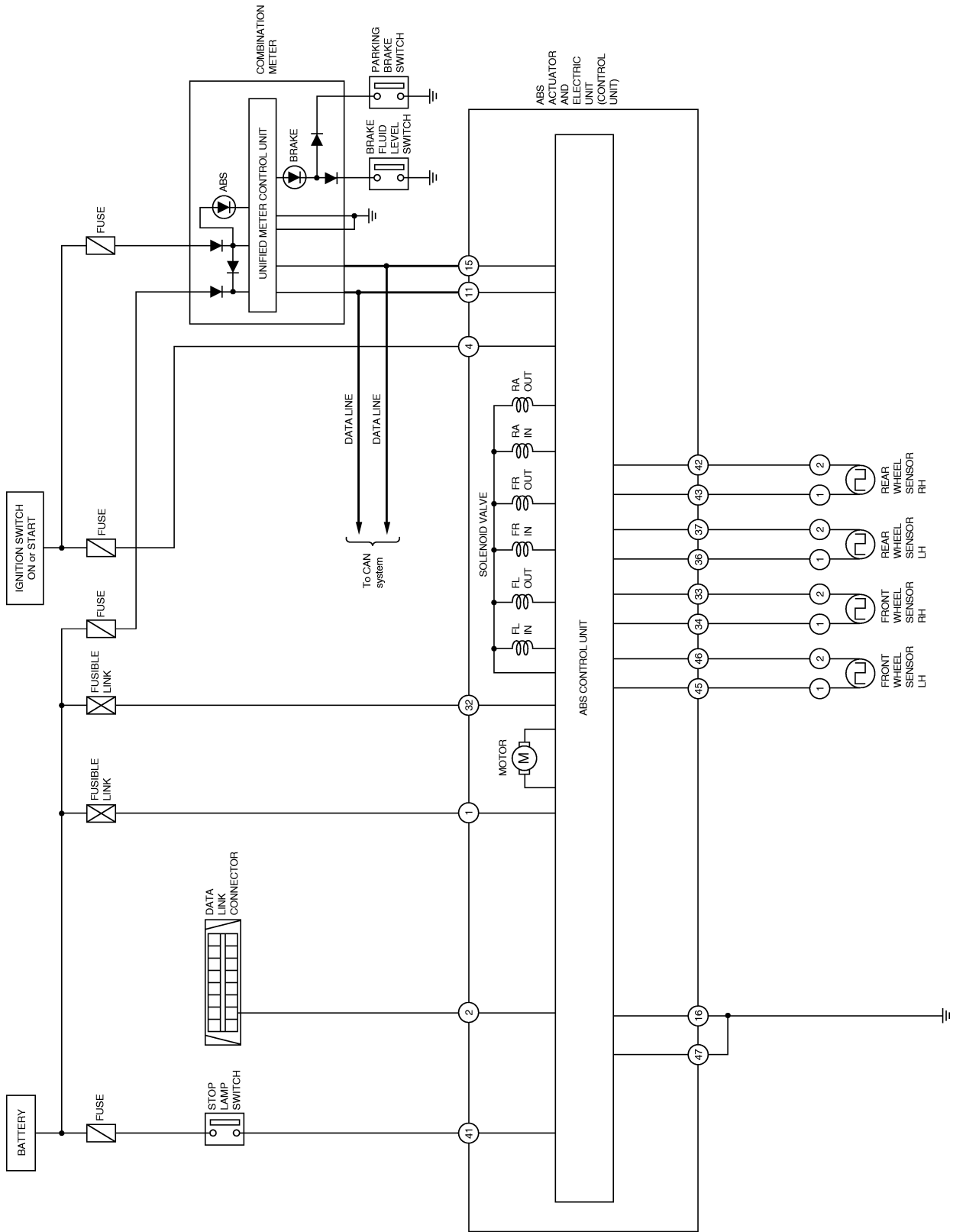
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Schematic — ABS —

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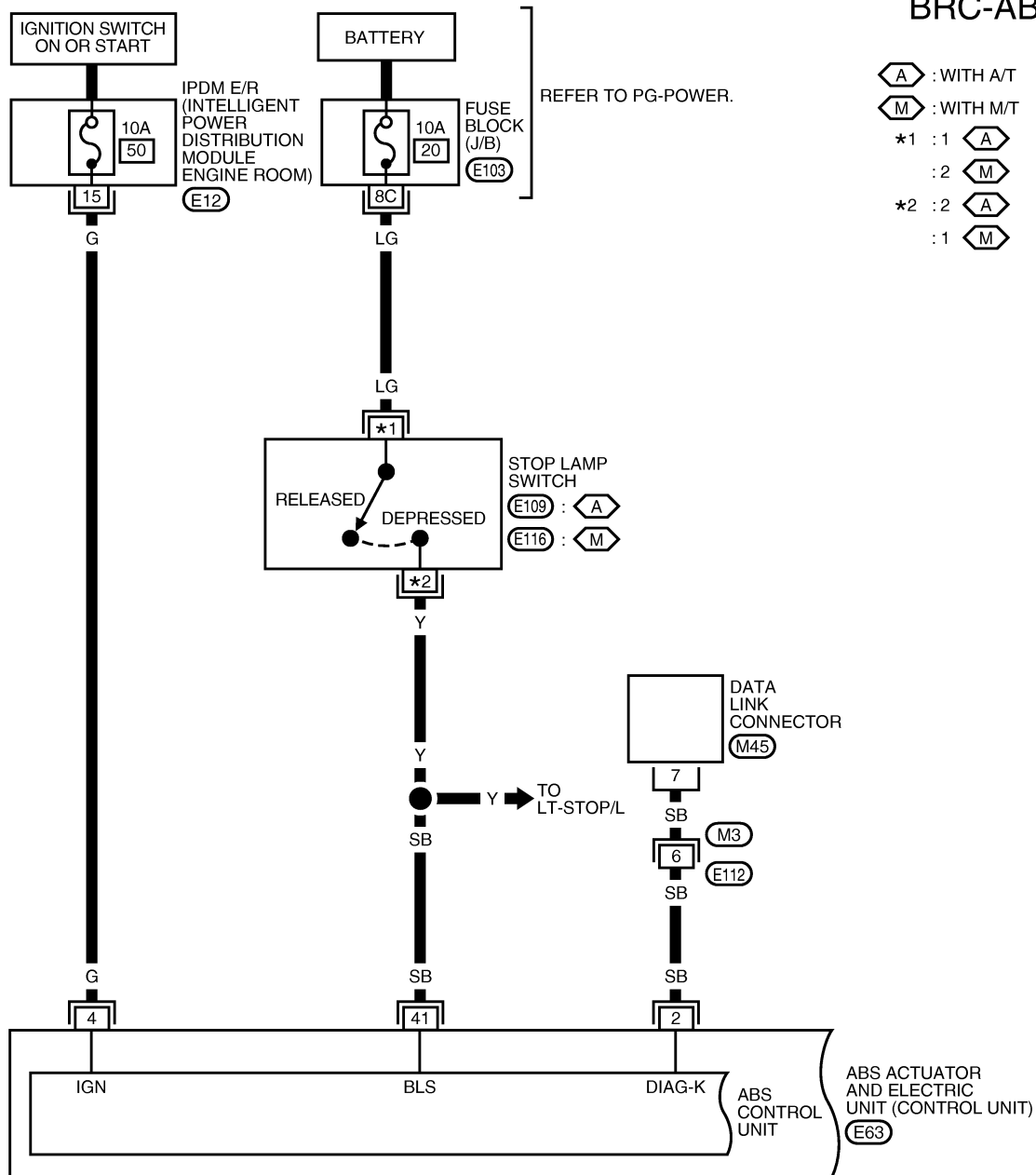


MFWA0130E

### Wiring Diagram — ABS —

GFS0001M

### BRC-ABS-01



- ⬡ : WITH A/T
- ⬢ : WITH M/T
- \*1 : 1 ⬡
- 2 ⬢
- \*2 : 2 ⬡
- 1 ⬢

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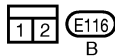
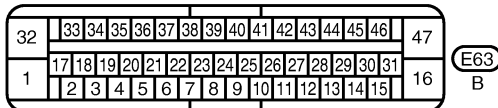
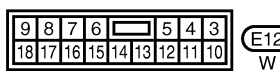
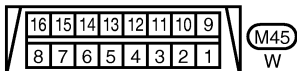
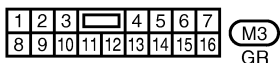
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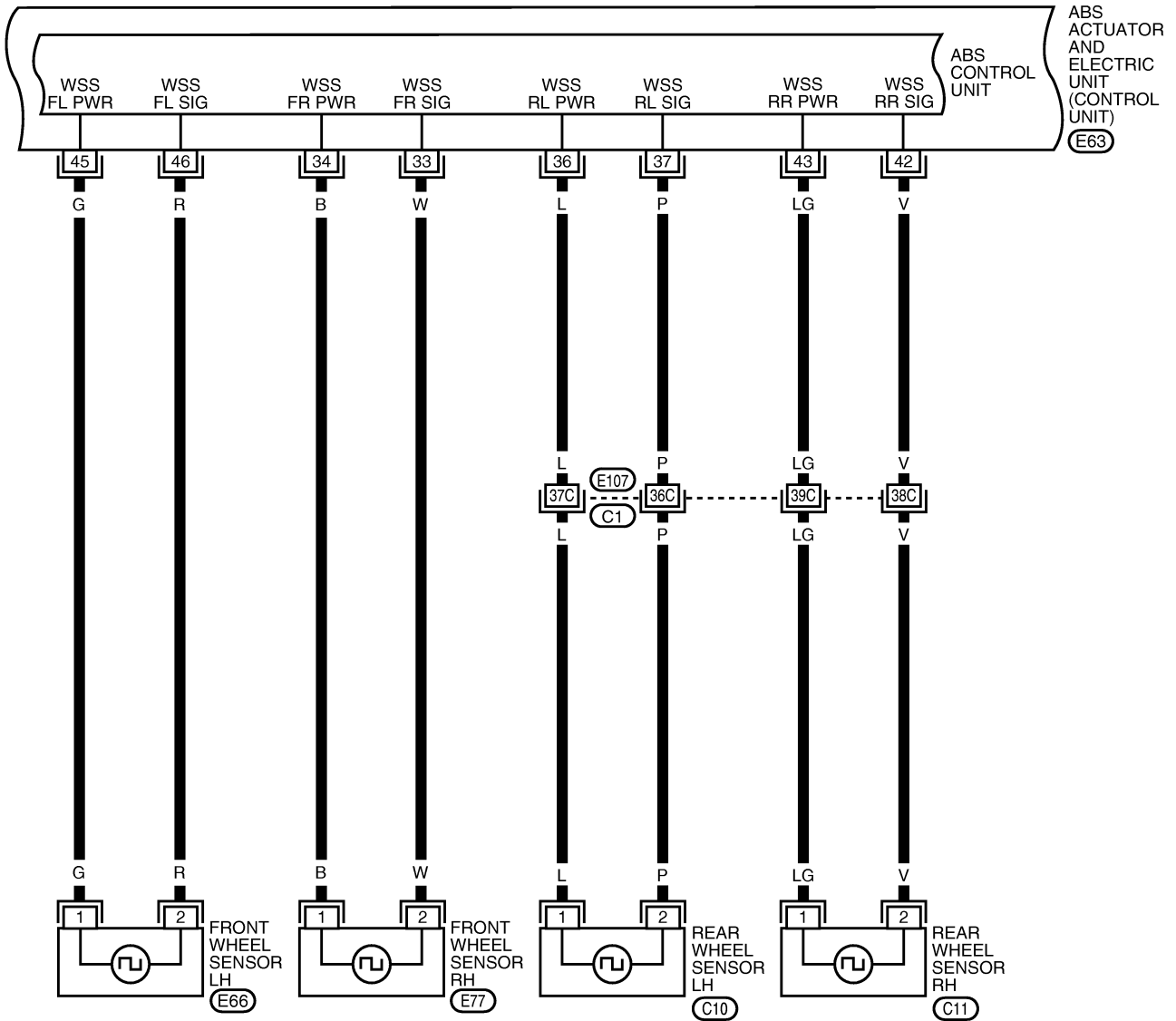
REFER TO THE FOLLOWING.

(E103) - FUSE BLOCK - JUNCTION BOX (J/B)

# TROUBLE DIAGNOSIS

[ABS]

BRC-ABS-02



32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
1	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

(E63)  
B

(2) 1 (E66) (E77) (C10) (C11)  
GR GR GR GR

REFER TO THE FOLLOWING.

(C1) - SUPER MULTIPLE JUNCTION (SMJ)

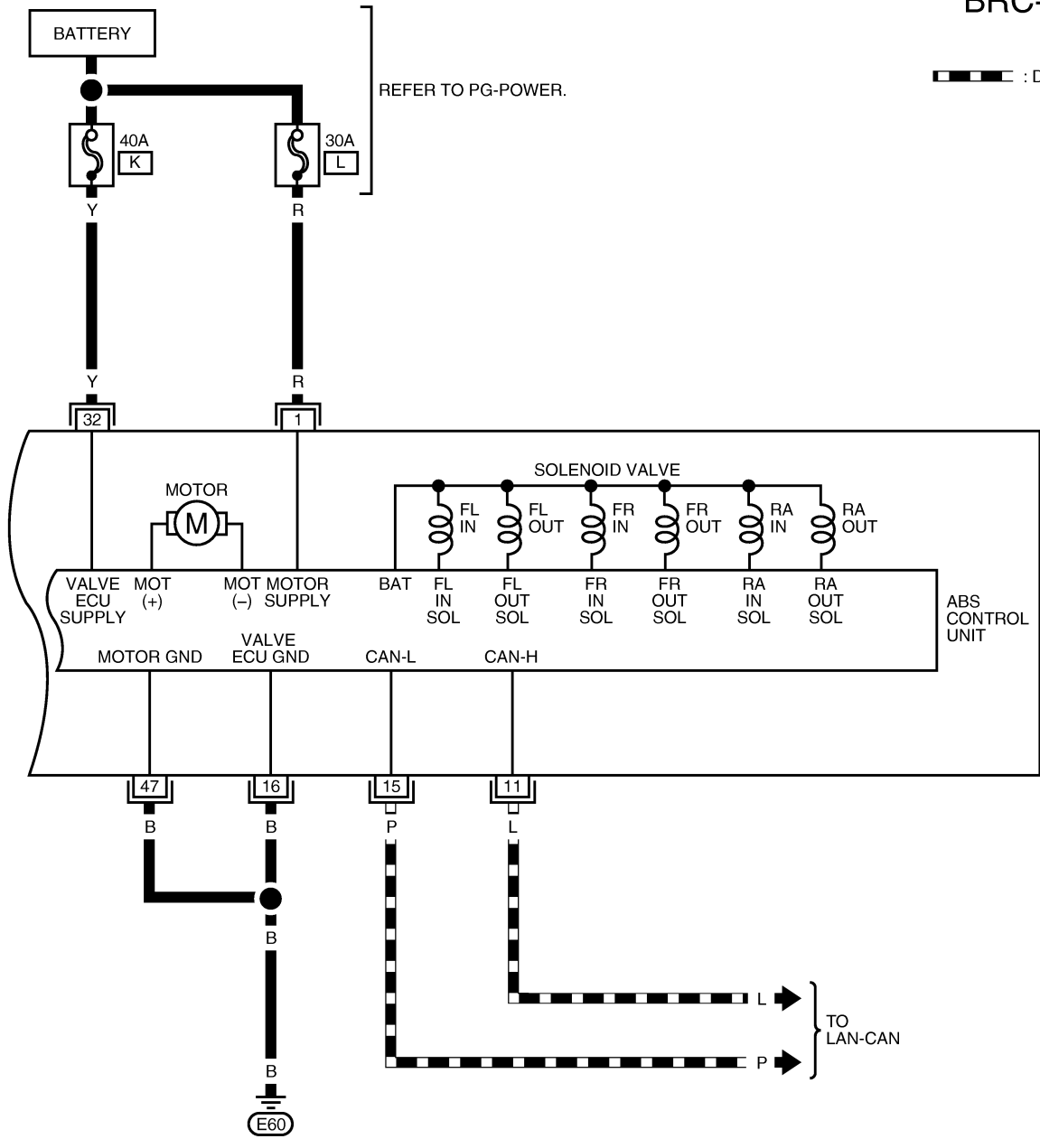
# TROUBLE DIAGNOSIS

[ABS]

BRC-ABS-03

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ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (E63)

TO LAN-CAN

32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
1	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

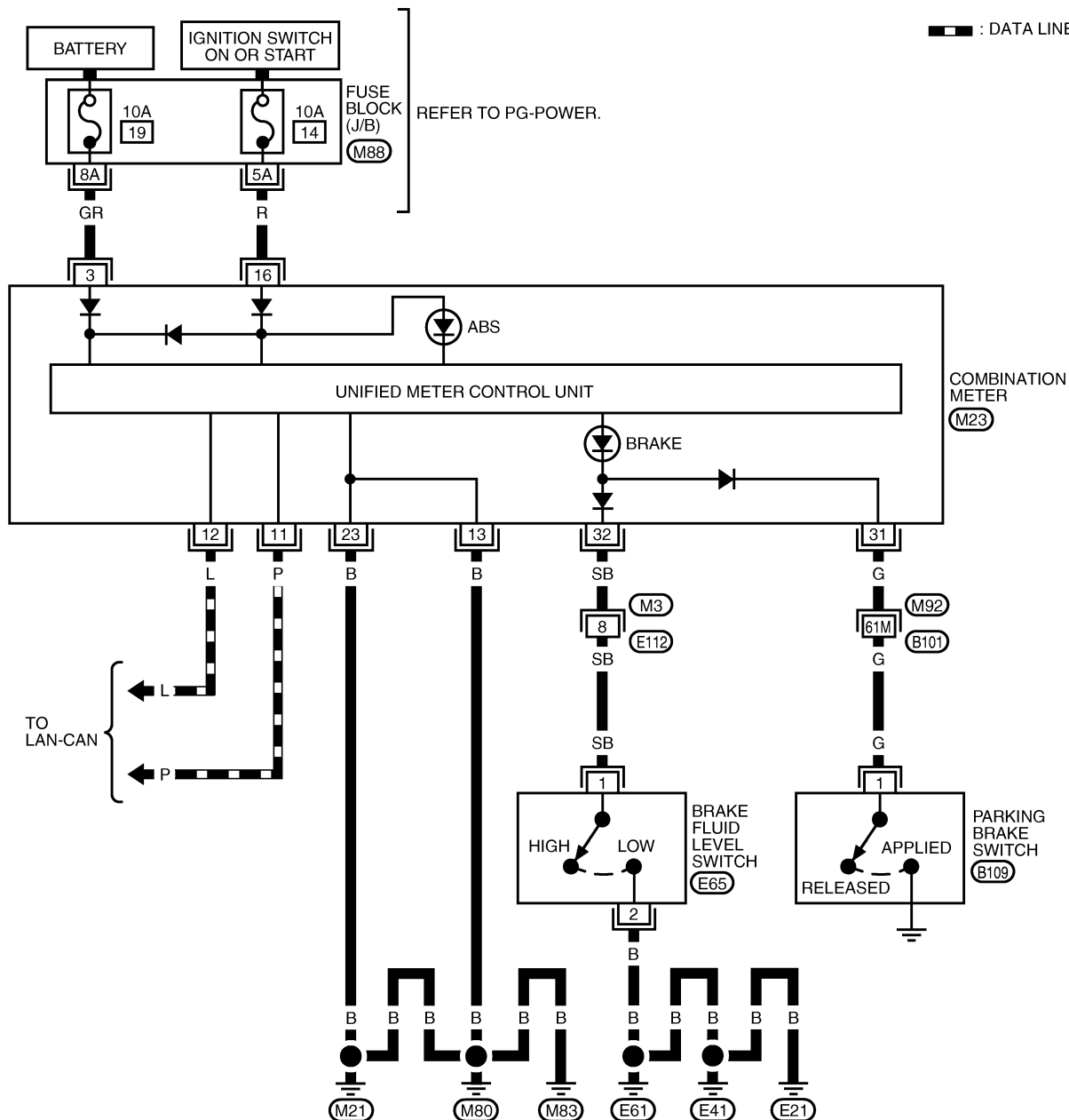
(E63)  
B

# TROUBLE DIAGNOSIS

[ABS]

## BRC-ABS-04

▬ : DATA LINE

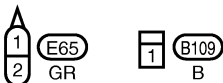


1	2	3	4	5	6	7		
8	9	10	11	12	13	14	15	16

(M3) GR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

(M23) W



REFER TO THE FOLLOWING.  
 (M92) - SUPER  
 MULTIPLE JUNCTION (SMJ)  
 (M88) - FUSE BLOCK -  
 JUNCTION BOX (J/B)



# TROUBLE DIAGNOSIS

[ABS]

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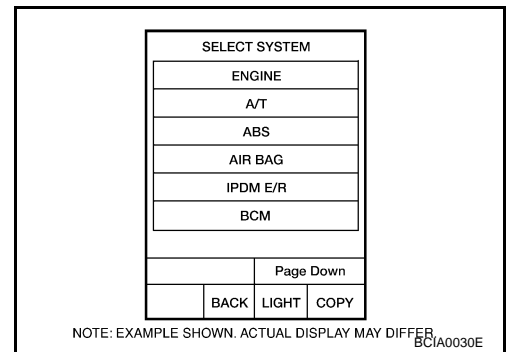
## CONSULT- II Functions CONSULT-II MAIN FUNCTION

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

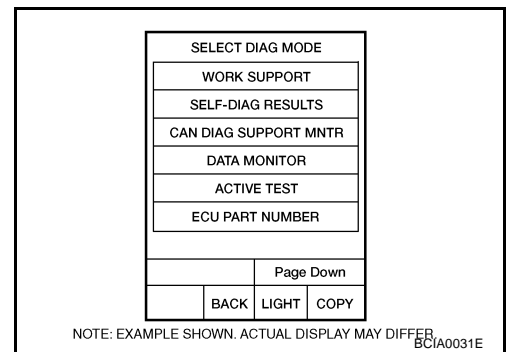
Diagnostic test mode	Function	Reference
SELF-DIAG RESULTS	Self-diagnostic results can be read and erased quickly.	<a href="#">BRC-18. "Self-Diagnosis"</a>
DATA MONITOR	Input/Output data in the ABS actuator and electric unit (control unit) can be read.	<a href="#">BRC-20. "Data Monitor"</a>
CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of communication can be read.	<a href="#">LAN-15. "CAN Diagnostic Support Monitor"</a>
ACTIVE TEST	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.	<a href="#">BRC-21. "Active Test"</a>
FUNCTION TEST	Performed by CONSULT-II instead of a technician to determine whether each system is “OK” or “NG”.	Separate volume “CONSULT-II OPERATION MANUAL (FUNCTION TEST)”
ECU PART NUMBER	ABS actuator and electric unit (control unit) part number can be read.	—

## CONSULT-II BASIC OPERATION PROCEDURE

1. Touch “ABS” in “SELECT SYSTEM” screen.



2. Select required diagnostic location from “SELECT DIAG MODE” screen.



## Self-Diagnosis

### OPERATION PROCEDURE

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

**CAUTION:**

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

6. The self-diagnostic results are displayed. (Touch "PRINT" to print out self-diagnostic results, If necessary.)
  - Check ABS warning lamp if "NO FAILURE" is displayed.
7. Perform the appropriate inspection from display item list, and repair or replace the malfunctioning component. Refer to [BRC-18, "Display Item List"](#).
8. Start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.

**CAUTION:**

When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp and brake warning lamp will not turn off even when the system is normal unless the vehicle is driving at 30 km/h (19MPH) or more for approximately 1 minute.

### ERASE MEMORY

1. Turn ignition switch OFF.
2. Start engine and touch "START (NISSAN BASED VHCL)", "ABS", "SELF-DIAG RESULTS", "ERASE MEMORY" in order on CONSULT-II screen to erase the error memory.  
If "ABS" is not indicated, go to [GI-47, "CONSULT-II Data Link Connector \(DLC\) Circuit"](#).

**CAUTION:**

If the error memory is not erased, re-perform the operation from step 4.

3. Perform self-diagnosis again, and make sure that diagnostic memory is erased.
4. Drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute as the final inspection, and make sure that the ABS warning lamp turn off.

### DISPLAY ITEM LIST

Self-diagnostic item	Malfunction detecting condition	Check system
RR RH SENSOR-1	Circuit of rear RH wheel sensor is open.	
RR LH SENSOR-1	Circuit of rear LH wheel sensor is open.	
FR RH SENSOR-1	Circuit of front RH wheel sensor is open.	
FR LH SENSOR-1	Circuit of front LH wheel sensor is open.	
RR RH SENSOR-2	When the circuit in the rear RH wheel sensor is short-circuited. Or when the sensor power voltage is outside the standard. When the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	<a href="#">BRC-24, "Inspection 1 Wheel Sensor System"</a> (Note 1)
RR LH SENSOR-2	When the circuit in the rear LH wheel sensor is short-circuited. Or when the sensor power voltage is outside the standard. When the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	
FR RH SENSOR-2	When the circuit in the front RH wheel sensor is short-circuited. Or when the sensor power voltage is outside the standard. When the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	
FR LH SENSOR-2	When the circuit in the front LH wheel sensor is short-circuited. Or when the sensor power voltage is outside the standard. When the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	

# TROUBLE DIAGNOSIS

[ABS]

Self-diagnostic item	Malfunction detecting condition	Check system
BATTERY VOLTAGE [ABNORMAL]	ABS actuator and electric unit (control unit) power voltage is too low.	<a href="#">BRC-28, "Inspection 5 ABS Actuator and Electric Unit (Control Unit) Power Supply and Ground Circuit"</a>
CONTROLLER FAILURE	Internal malfunction of ABS actuator and electric unit (control unit)	<a href="#">BRC-26, "Inspection 2 ABS Actuator and Electric Unit (Control Unit)"</a>
PUMP MOTOR	During actuator motor operation with ON, when actuator motor turns OFF or when control line for actuator motor relay is open.	<a href="#">BRC-26, "Inspection 3 ABS Actuator Relay or ABS Motor Relay Circuit"</a>
	During actuator motor operation with OFF, when actuator motor turns ON or when control line for relay is shorted to ground.	
ABS SENSOR [ABNORMAL SIGNAL]	Wheel sensor input is malfunction.	<a href="#">BRC-24, "Inspection 1 Wheel Sensor System"</a> (Note 1)
FR LH IN ABS SOL	When the control unit detects an error in the front LH inlet solenoid circuit.	<a href="#">BRC-26, "Inspection 3 ABS Actuator Relay or ABS Motor Relay Circuit"</a>
FR LH OUT ABS SOL	When the control unit detects an error in the front LH outlet solenoid circuit.	
FR RH IN ABS SOL	When the control unit detects an error in the front RH inlet solenoid circuit.	
FR RH OUT ABS SOL	When the control unit detects an error in the front RH outlet solenoid circuit.	
RR LH IN ABS SOL	When the control unit detects an error in the rear LH inlet solenoid circuit.	
RR LH OUT ABS SOL	When the control unit detects an error in the rear LH outlet solenoid circuit.	
RR RH IN ABS SOL	When the control unit detects an error in the rear RH inlet solenoid circuit.	
RR RH OUT ABS SOL	When the control unit detects an error in the rear RH outlet solenoid circuit.	
ACTUATOR RLY	When the control unit detects an error in the actuator relay circuit.	
CAN COMM CIRCUIT [U1000]	When there is an error in the CAN communications.	

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

Note 2: When errors are detected in several systems, including CAN communication system [U1000], troubleshoot CAN communication circuit. Refer to [BRC-28, "Inspection 4 CAN Communication Circuit"](#).

## Data Monitor

### OPERATION PROCEDURE

1. Touch "START (NISSAN BASED VHCL)", "ABS", "DATA MONITOR" in order on CONSULT-II screen.

**CAUTION:**

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

2. At the monitor item selection screen, touch one of the item "ECU INPUT SIGNALS", "MAIN SIGNALS" or "SELECTION FROM MENU".
3. Touch "START" to proceed to the data monitor screen.

### DISPLAY ITEM LIST

**CAUTION:**

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

E:ECU INPUT SIGNALS M:MAIN SIGNALS S:SELECTION FROM MENU

SELECT MON- ITOR ITEM	Monitor item	Display content	Data monitor	
			Condition	Reference value in normal operation
E, M, S	FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR	Wheel speed	0 [km/h]	Vehicle stopped
			Nearly matches the speedometer display (± 10 % or less)	Vehicle running (Note 1)
E, M, S	STOP LAMP SW	Brake pedal operation	Brake pedal depressed	ON
			Brake pedal not depressed	OFF
E, M, S	BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
M, S	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	Operation status of all solenoid valve	Actuator (solenoid valve) is active ("Active Test" with CONSULT-II) or actuator relay is inactive (in fail-safe mode).	ON
			When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON).	OFF
M, S	MOTOR RELAY	Motor and motor relay operation status	When the motor relay and motor are operating	ON
			When the motor relay and motor are not operating	OFF
M, S	ACTUATOR RLY	Actuator relay operation status	When the actuator relay is operating	ON
			When the actuator relay is not operating	OFF
M, S	ABS WARN LAMP	ABS warning lamp status (Note 2)	When ABS warning lamp is ON.	ON
			When ABS warning lamp is OFF.	OFF
S	EBD WARN LAMP	Brake warning lamp status (Note 2)	Brake warning lamp ON	ON
			Brake warning lamp OFF	OFF
S	EBD SIGNAL	EBD operation	EBD active	ON
			EBD not active	OFF

# TROUBLE DIAGNOSIS

[ABS]

E:ECU INPUT SIGNALS M:MAIN SIGNALS S:SELECTION FROM MENU

SELECT MON-ITOR ITEM	Monitor item	Display content	Data monitor	
			Condition	Reference value in normal operation
S	ABS SIGNAL	ABS operation	ABS active	ON
			ABS not active	OFF
S	EBD FAIL SIG ABS FAIL SIG	System error signal status	Malfunctions condition (When system is malfunctioning)	OFF
S	CRANKING SIG	CRANKING status	Cranking	ON
			Not cranking	OFF

Note 1: Confirm tire pressure is normal.

Note 2: On and off timing for warning lamp and indicator lamp. Refer to [BRC-24, "BASIC INSPECTION 3 ABS WARNING LAMP AND BRAKE WARNING LAMP INSPECTION"](#).

## Active Test

GFS0001Q

### CAUTION:

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

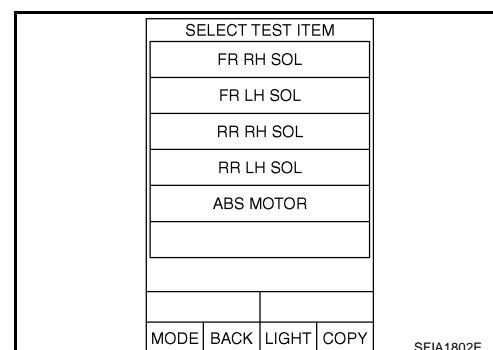
### OPERATION PROCEDURE

1. Touch START (NISSAN BASED VHCL), "ABS", "ACTIVE TEST" in order on CONSULT-II screen. If "ABS" is not indicated, go to [GI-47, "CONSULT-II Data Link Connector \(DLC\) Circuit"](#).

### CAUTION:

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

2. Touch "SELECT TEST ITEM" is displayed.
3. Touch necessary test item.



4. While "MAIN SIGNALS" indication is inverted, touch "START".
5. "ACTIVE TEST" screen will be displayed so perform the following test.

- Solenoid valve
- ABS motor

### NOTE:

- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal.
- "TEST IS STOPPED" is displayed 10 seconds after operation start.
- After "TEST IS STOPPED" is displayed, to perform test again, touch "BACK" and repeat step 3.

# TROUBLE DIAGNOSIS

[ABS]

## SOLENOID VALVE

### NOTE:

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

1. For ABS solenoid valve, touch “UP”, “KEEP”, and “DOWN” on the display screen. Make sure solenoid valve operates as shown in solenoid valve operation chart.

ACTIVE TEST			
FR RH SOL		UP	
MONITOR			
FR RH IN SOL		OFF	
FR RH OUT SOL		OFF	
		KEEP	DOWN
MODE	BACK	LIGHT	COPY

SFIA0678E

### Solenoid Valve Operation Chart

Operation	ABS solenoid valve		
	UP	KEEP	DOWN
FR RH IN SOL	OFF	ON	ON
FR RH OUT SOL	OFF	OFF	ON*

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

## ABS MOTOR

Touch “ON” and “OFF” on the screen. Make sure ABS motor relay and actuator relay operates as shown in table below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY	ON	ON

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

SFIA0593E

## For Fast and Accurate Diagnosis

GFS0001R

### PRECAUTIONS FOR DIAGNOSIS

- Before performing diagnosis, always read precautions. Refer to [BRC-17, "CONSULT- II Functions"](#) .
- After diagnosis is finished, be sure to erase memory. Refer to [BRC-18, "ERASE MEMORY"](#) .
- When checking continuity and voltage between units, be sure to check for disconnection, looseness, bend, or collapse of connector terminals. If any malfunction is found, repair or replace connector terminals.
- For intermittent symptoms, possible cause is malfunction in harness, harness connector, or terminals. Move harness, harness connector, and terminals to check for poor connections.
- If a circuit tester is used for check, be careful not to forcibly extend any connector terminal.
- ABS system electrically controls brake operation and engine output. Following symptoms may be caused by normal operations:

Symptom	Symptom description	Result
Motor operation noise	This is noise of motor inside ABS actuator and electric unit (control unit). Slight noise may occur during ABS operation.	Normal
	Just after engine starts, motor operating noise may be heard. This is a normal status of the system operation check.	
System operation check noise	When engine starts, slight "click" noise may be heard from engine compartment. This is normal and is part of system operation check.	Normal
ABS operation (Longer stopping distance)	When driving on roads with a low coefficient of friction, such as snowy roads or gravel roads, the stopping distance is sometimes longer for vehicles equipped with ABS. Therefore, when driving on such roads, drive at a sufficiently reduced speed to be safe.	Normal

## Basic Inspection

GFS0001S

### BASIC INSPECTION 1 BRAKE FLUID LEVEL, LEAKS, AND BRAKE PADS

1. Check fluid level in the brake reservoir tank. If fluid level is low, refill brake fluid.
2. Check brake tube and around ABS actuator and electric unit (control unit) for leaks. If leakage or seepage is found, check the following items.
  - If ABS actuator and electric unit (control unit) connection is loose, tighten brake tube to the specified torque and re-conduct the leak inspection to make sure there are no leakage.
  - If there is damage to the connection flare nut or ABS actuator and electric unit (control unit) screw, replace the damaged part and re-conduct the leak inspection to make sure there are no leakage.
  - If there is leakage or seepage at any location other than ABS actuator and electric unit (control unit) connection, wipe away leakage or seepage with clean cloth. Then inspect again and confirm than there is on leakage.
  - If there is leakage from ABS actuator and electric unit (control unit), wipe away leakage or seepage with clean cloth. Then inspect again. If there is leakage or seepage, replace ABS actuator and electric unit (control unit).

**CAUTION:**

**ABS actuator and electric unit (control unit) body cannot be disassembled.**

3. Check brake pad degree of wear. Refer to [BR-24, "PAD WEAR INSPECTION"](#) in "Front Disc Brake" and [BR-32, "Lining Thickness Inspection"](#) in "Rear Drum Brake".

### BASIC INSPECTION 2 POWER SYSTEM TERMINAL LOOSENESS AND BATTERY INSPECTION

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

# TROUBLE DIAGNOSIS

[ABS]

## BASIC INSPECTION 3 ABS WARNING LAMP AND BRAKE WARNING LAMP INSPECTION ON and OFF Timing for ABS Warning Lamp, Brake Warning Lamp

x: ON -.: OFF

Condition	ABS warning lamp	Brake warning lamp [Note 1]	Remarks
Ignition SW OFF	—	—	—
Approx. 2 seconds after ignition switch is turned ON	x	x [Note 2]	—
Approx. 2 seconds later after ignition switch ON	—	x [Note 2]	Go out 2 seconds after ignition switch is turned ON.
ABS error	x	—	There is an ABS actuator and electric unit (control unit) error. (Power, ground or system malfunction)
EBD error	x	x	—

Note 1: Brake warning lamp will turn on in case of operating parking brake (switch turned on) or of a actuating brake fluid level switch (brake fluid is insufficient).

Note 2: After starting engine, turn OFF.

Check the following items when unsuitable for an above condition.

- ABS warning lamp: Refer to [BRC-28, "Inspection 4 CAN Communication Circuit"](#) .
- Brake warning lamp: Refer to [BRC-28, "Inspection 4 CAN Communication Circuit"](#) , [BRC-30, "Inspection 6 Brake Fluid Level Switch Circuit"](#) , [BRC-32, "Inspection 7 Parking Brake Switch Circuit"](#) .

If malfunction is not found, refer to [BRC-33, "Inspection 8 Warning lamp system"](#) .

### Inspection 1 Wheel Sensor System

GFS0001T

Check each part according to CONSULT-II self-diagnostic results, and then identify the parts to be replaced.

#### CAUTION:

Check each part between wheel sensor terminals.

#### INSPECTION PROCEDURE

### 1. CHECK SELF-DIAGNOSTIC RESULTS

Check self-diagnostic results.

Self-diagnostic results
FR RH SENSOR-1,-2
FR LH SENSOR- 1,-2
RR RH SENSOR-1,-2
RR LH SENSOR-1,- 2
ABS SENSOR [MALFUNCTION SIGNAL]

Is above displayed in self-diagnosis display items?

YES >> GO TO 2.

NO >> INSPECTION END

### 2. CHECK TIRE

Check air pressure, wear and size.

Are air pressure, wear and size within standard values?

YES >> GO TO 3.

NO >> Adjust air pressure, or replace tire.



## 3. CHECK SENSOR AND SENSOR ROTOR

- Check sensor rotor for damage.
- Check wheel sensor for damage, disconnection or looseness.

OK or NG

- OK >> GO TO 4.  
 NG >> Repair or replace the malfunctioning component.

## 4. CHECK CONNECTOR

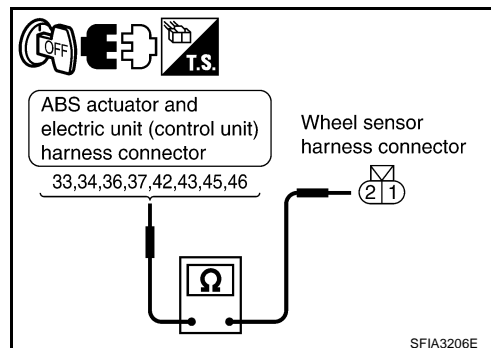
1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E63 and malfunctioning wheel sensor connector E66 (FR - LH), E77 (FR - RH), C10 (RR - LH) or C11 (RR - RH). Check terminal to see if it is deformed, disconnected, loose, etc., and repair or replace it if any malfunction condition is found.
2. Reconnect connectors and check that interference with other parts has not cut wheel sensor cables, drive vehicle at 30 km/h (19 MPH) or more for approximately 1minute, and perform self-diagnosis.

OK or NG

- OK >> Connector terminal contact is loose, damaged, open or shorted.  
 NG >> GO TO 5.

## 5. CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF and disconnect wheel sensor connector E66 (FR - LH), E77 (FR - RH), C10 (RR - LH) or C11 (RR - RH) and ABS actuator and electric unit (control unit) connector E63.
2. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside wheel well is moved.)



Wheel	Power supply circuit		Signal circuit		Ground circuit	
	ABS C/U (E63)	Wheel sensor	ABS C/U (E63)	Wheel sensor	ABS C/U (Signal)	Ground
Front RH	34	1	33	2	34, 33	—
Front LH	45	1	46	2	45, 46	
Rear RH	43	1	42	2	43, 42	
Rear LH	36	1	37	2	36, 37	

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

OK or NG

- OK >> GO TO 6.  
 NG >> Repair or replace harness and connector that have malfunction.

## 6. CHECK WHEEL SENSOR

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

Is above displayed on self-diagnosis display?

OK >> Wheel sensor has malfunction.

NG >> ● Replace ABS actuator and electric unit (control unit).

- Perform to self-diagnosis again, and make sure that the result shows "NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED".

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

GFS0001U

INSPECTION PROCEDURE

#### 1. CHECK SELF-DIAGNOSTIC RESULTS

Check self-diagnostic results.

Self-diagnostic results
-------------------------

CONTROLLER FAILURE
--------------------

Is above displayed in self-diagnosis display items?

YES >> Replace ABS actuator and electric unit (control unit). Perform ABS actuator and electric unit (control unit) self-diagnosis again.

NO >> INSPECTION END

### Inspection 3 ABS Actuator Relay or ABS Motor Relay Circuit

GFS0001V

INSPECTION PROCEDURE

#### 1. CHECK SELF-DIAGNOSTIC RESULTS

Check self-diagnostic results.

Self-diagnostic results
-------------------------

FR LH IN ABS SOL
------------------

FR LH OUT ABS SOL
-------------------

RR RH IN ABS SOL
------------------

RR RH OUT ABS SOL
-------------------

FR RH IN ABS SOL
------------------

FR RH OUT ABS SOL
-------------------

RR LH IN ABS SOL
------------------

RR LH OUT ABS SOL
-------------------

PUMP MOTOR
------------

ACTUATOR RLY
--------------

Is above displayed in self-diagnosis item?

YES >> GO TO 2.

NO >> INSPECTION END

## 2. CHECK CONNECTOR

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E63 check terminal for deformation, disconnection, looseness, and so on. If there is an error, repair or replace terminal.
2. Connect the connector securely and perform self-diagnosis again.

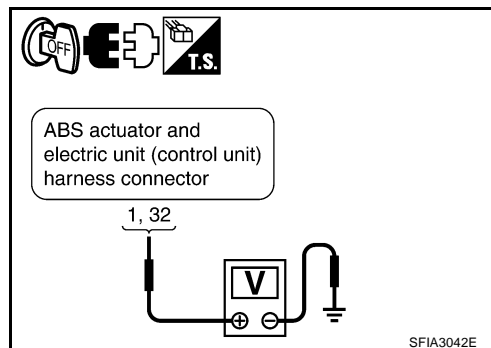
OK or NG

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

## 3. CHECK ABS ACTUATOR RELAY OR ABS MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E63.
2. Check voltage between ABS actuator and electric unit (control unit) harness connector E63 and ground.

ABS actuator and electric unit (control unit) (harness connector E63)	Ground	Measured value
1, 32	—	Battery voltage



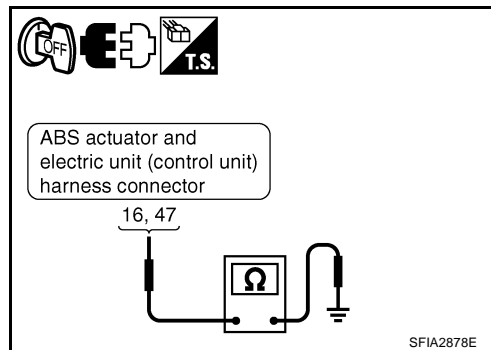
OK or NG

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

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

Check continuity between ABS actuator and electric unit (control unit) harness connector E63 and ground.

ABS actuator and electric unit (control unit) (harness connector E63)	Ground	Continuity
16, 47	—	Yes



OK or NG

- OK >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit).  
 NG >> Open or short in harness. Repair or replace harness.

**Inspection 4 CAN Communication Circuit**

GFS0001W

## INSPECTION PROCEDURE

**1. CHECK CONNECTOR**

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

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

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

**Inspection 5 ABS Actuator and Electric Unit (Control Unit) Power Supply and Ground Circuit**

GFS0001X

## INSPECTION PROCEDURE

**1. CHECK SELF-DIAGNOSTIC RESULTS**

Check self-diagnostic results.

---

Self-diagnostic results

---

BATTERY VOLTAGE [MALFUNCTION]

---

Is above displayed in self-diagnosis display items?

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

**2. CHECK CONNECTOR**

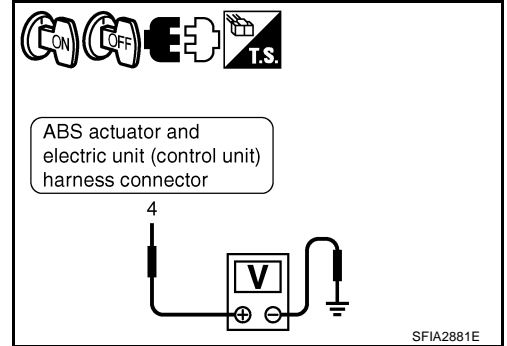
1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E63 check terminals for deformation, disconnection, looseness, and so on. If there is an error, repair or replace terminal.
2. Connect the connector securely and perform self-diagnosis again.

OK or NG

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

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

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E63.
2. Turn ignition switch ON or OFF and check voltage between ABS actuator and electric unit (control unit) connector E63 and ground.



ABS actuator and electric unit (control unit) (harness connector E63)	Ground	Measurement condition	Measured value
4	—	Ignition switch ON	Battery voltage
		Ignition switch OFF	Approx. 0 V

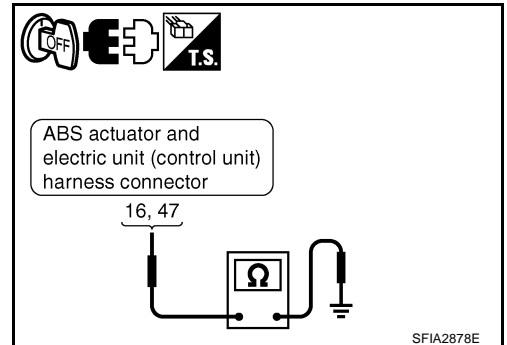
OK or NG

- OK >> GO TO 4.
- NG >> Repair harness or connectors.

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

Check continuity between ABS actuator and electric unit (control unit) connector E63 and ground.

ABS actuator and electric unit (control unit) (harness connector E63)	Ground	Continuity
16, 47	—	Yes



OK or NG

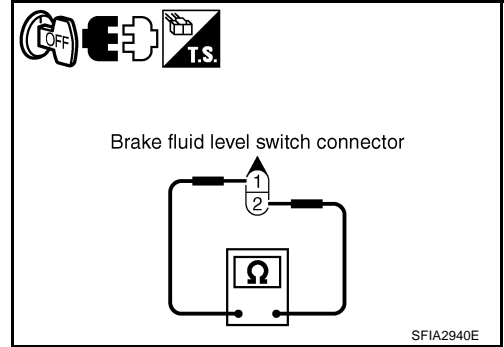
- OK >> Perform ABS actuator and electric unit (control unit) self-diagnosis again.
- NG >> Repair harness or connectors.

**Inspection 6 Brake Fluid Level Switch Circuit**

INSPECTION PROCEDURE

**1. CHECK BRAKE FLUID LEVEL SWITCH**

1. Turn ignition switch OFF and disconnect brake fluid level switch connector E65. For brake fluid level switch connector, refer to [DI-10, "Wiring Diagram — METER —"](#) .
2. Check continuity between brake fluid level switch connector E65.



Brake fluid level switch	Measurement condition	Continuity
1, 2	When fulling the brake fluid up	No
	When the brake fluid is insufficient	Yes

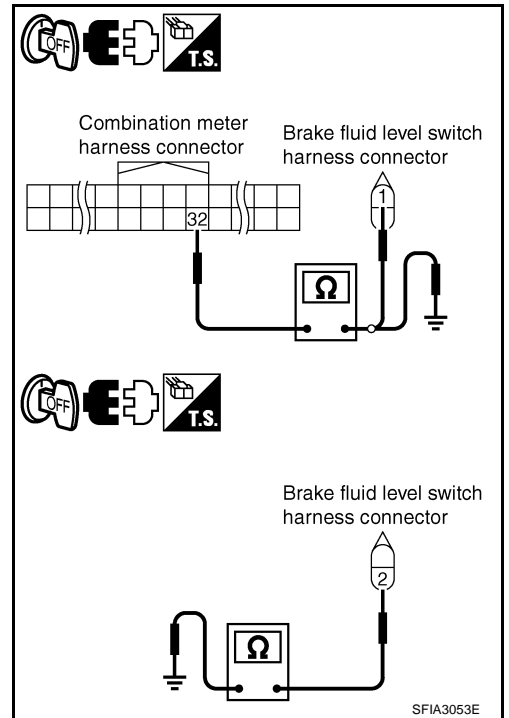
OK or NG

OK >> GO TO 2.

NG >> Replace reservoir tank. Refer to [BR-17, "BRAKE MASTER CYLINDER"](#) .

2. CHECK HARNESS

1. Turn ignition switch OFF and disconnect combination meter connector M23.
2. Check continuity between brake fluid level switch connector E65, combination meter connector M23 and ground.



Brake fluid level switch (harness connector E65)	Combination meter (harness connector M23)	Continuity
1	32	Yes
Ground	32	No
2	Ground	Yes

OK or NG

- OK >> INSPECTION END  
 NG >> If the open or short in harness, repair or replace harness.

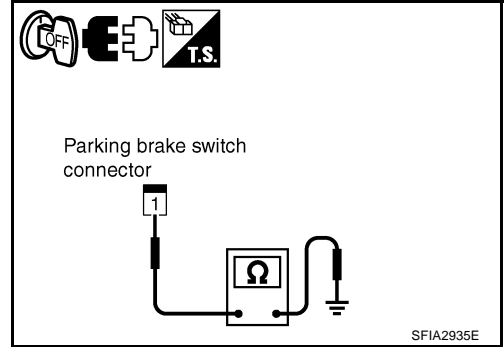
**Inspection 7 Parking Brake Switch Circuit**

INSPECTION PROCEDURE

**1. CHECK PARKING BRAKE SWITCH**

1. Turn ignition switch OFF and disconnect parking brake switch connector B109. For brake fluid level switch, refer to [DI-10, "Wiring Diagram — METER —"](#).
2. Check continuity between parking brake switch connector and ground.

Measurement condition	Continuity
When the parking brake lever is operated.	Yes
When the parking brake lever is not operated.	No

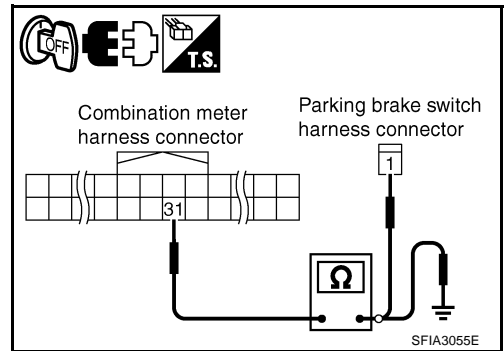


OK or NG

- OK >> GO TO 2.
- NG >> Replace parking brake switch.

**2. CHECK HARNESS**

1. Disconnect combination meter connector M23.
2. Check continuity between parking brake switch connector B109, combination meter connector M23 and ground.



Parking brake switch (harness connector B109)	Combination meter (harness connector M23)	Continuity
1	31	Yes
1	Ground	No

OK or NG

- OK >> INSPECTION END
- NG >> If the open or short in harness, repair or replace harness.



**Inspection 8 Warning lamp system**

GFS00020

## INSPECTION PROCEDURE

**1. CHECK SELF-DIAGNOSTIC RESULTS**

Perform self-diagnosis of ABS actuator and electric unit (control unit). Refer to [BRC-18, "Self-Diagnosis"](#) .

OK or NG

OK >> GO TO 2.

NG >> Check items displayed by self-diagnosis. Refer to [BRC-18, "Display Item List"](#) .

**2. CHECK COMBINATION METER**

Check if the indication and operation of combination meter are normal. Refer to [DI-13, "Self-Diagnosis Mode of Combination Meter"](#) .

OK or NG

OK >> INSPECTION END

NG >> Repair or replace combination meter. Refer to [DI-31, "Removal and Installation of Combination Meter"](#) .

**Symptom 1: Excessive ABS Function Operation Frequency**

GFS00021

**1. CHECK START**

Check longitudinal brake force distribution using a brake tester. Refer to [BR-35, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#) .

OK or NG

OK >> GO TO 2.

NG >> Check the following system. If any malfunction is found, repair or replace malfunctioning parts.

- Brake booster. Refer to [BR-19, "BRAKE BOOSTER"](#) .
- Hydraulic line. Refer to [BR-12, "BRAKE TUBE AND HOSE"](#) .
- Front brake caliper. Refer to [BR-24, "FRONT DISC BRAKE"](#) .
- Rear wheel cylinder. Refer to [BR-30, "REAR DRUM BRAKE"](#) .

**2. CHECK FRONT AND REAR AXLE**

Make sure that there is no excessive play in the front and rear axles. Refer to Front: [FAX-5, "WHEEL BEARING INSPECTION"](#) , Rear: [RAX-6, "Rear Axle Bearing"](#) .

OK or NG

OK >> GO TO 3.

NG >> Repair.

**3. CHECK WHEEL SENSOR AND SENSOR ROTOR**

Check wheel sensor and sensor rotor for the following.

- Wheel sensor installation for damage
- Wheel sensor rotor installation for damage
- Wheel sensor connector connection
- Wheel sensor harness inspection

OK or NG

OK >> GO TO 4.

NG >> ● Replace wheel sensor or sensor rotor.

- Repair harness.

## 4. CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving.

OK or NG

OK >> Normal

NG >> Perform self-diagnosis. Refer to [BRC-18, "Self-Diagnosis"](#).

### Symptom 2: Unexpected Pedal Reaction

GFS00022

#### 1. CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to [BR-6, "Inspection and Adjustment"](#).

Is the stroke too big?

YES >> ● Bleed air from brake piping. Refer to [BR-11, "Bleeding Brake System"](#).

- Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Repair if necessary. Refer to Brake pedal: [BR-8, "COMPONENTS"](#), brake booster and master cylinder: [BR-20, "COMPONENTS"](#).

NO >> GO TO 2.

#### 2. CHECK FUNCTION

Disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. Check if braking force is normal in this condition. Connect connector after inspection.

OK or NG

OK >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to [BRC-33, "Symptom 1: Excessive ABS Function Operation Frequency"](#).

NG >> Check the following system. If any malfunction is found, repair or replace malfunctioning parts.

- Brake booster. Refer to [BR-19, "BRAKE BOOSTER"](#).
- Hydraulic line. Refer to [BR-12, "BRAKE TUBE AND HOSE"](#).
- Front brake caliper. Refer to [BR-24, "FRONT DISC BRAKE"](#).
- Rear wheel cylinder. Refer to [BR-30, "REAR DRUM BRAKE"](#).

### Symptom 3: The Stopping Distance Is Long

GFS00023

#### CAUTION:

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

#### 1. CHECK FUNCTION

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

OK or NG

OK >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to [BRC-33, "Symptom 1: Excessive ABS Function Operation Frequency"](#).

NG >> ● Bleed air from the brake piping. Refer to [BR-11, "Bleeding Brake System"](#).

- Check the following system. If any malfunction is found, repair or replace malfunctioning parts.
  - Brake booster. Refer to [BR-19, "BRAKE BOOSTER"](#).
  - Hydraulic line. Refer to [BR-12, "BRAKE TUBE AND HOSE"](#).
  - Front brake caliper. Refer to [BR-24, "FRONT DISC BRAKE"](#).
  - Rear wheel cylinder. Refer to [BR-30, "REAR DRUM BRAKE"](#).

**Symptom 4: ABS Function Does Not Operate**

GFS00024

**CAUTION:**

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

**1. CHECK ABS WARNING LAMP DISPLAY**

Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving.

OK or NG

- OK >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom1. Refer to [BRC-33, "Symptom 1: Excessive ABS Function Operation Frequency"](#) .
- NG >> Perform self-diagnosis. Refer to [BRC-18, "Self-Diagnosis"](#) .

**Symptom 5: Pedal Vibration or ABS Operation Sound Occurs**

GFS00025

**CAUTION:**

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

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

**1. SYMPTOM CHECK 1**

Check if there is pedal vibration or operation noise when the engine is started.

Do symptoms occur?

- YES >> GO TO 2.
- NO >> Perform self-diagnosis. Refer to [BRC-18, "Self-Diagnosis"](#) .

**2. SYMPTOM CHECK 2**

Check symptoms when electrical component (headlamps, etc.) switches are operated.

Do symptoms occur?

- YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.
- NO >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to [BRC-33, "Symptom 1: Excessive ABS Function Operation Frequency"](#) .

**Symptom 6: ABS Warning Lamp Indication Is Not Normal**

GFS00026

**NOTE:**

Lighting condition of ABS warning lamp refer to [BRC-24, "BASIC INSPECTION 3 ABS WARNING LAMP AND BRAKE WARNING LAMP INSPECTION"](#) .

**1. CHECK COMBINATION METER INDICATION**

Check the combination meter indication and operation. Refer to [DI-13, "Self-Diagnosis Mode of Combination Meter"](#) .

OK or NG

- OK >> GO TO 2.
- NG >> Combination meter is malfunctioning. Check combination meter. Refer to [DI-4, "COMBINATION METERS"](#) .

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## 2. CHECK SELF-DIAGNOSTIC RESULTS

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Check the self-diagnostic results of ABS actuator and electric unit (control unit). Refer to [BRC-18, "Self-Diagnosis"](#).

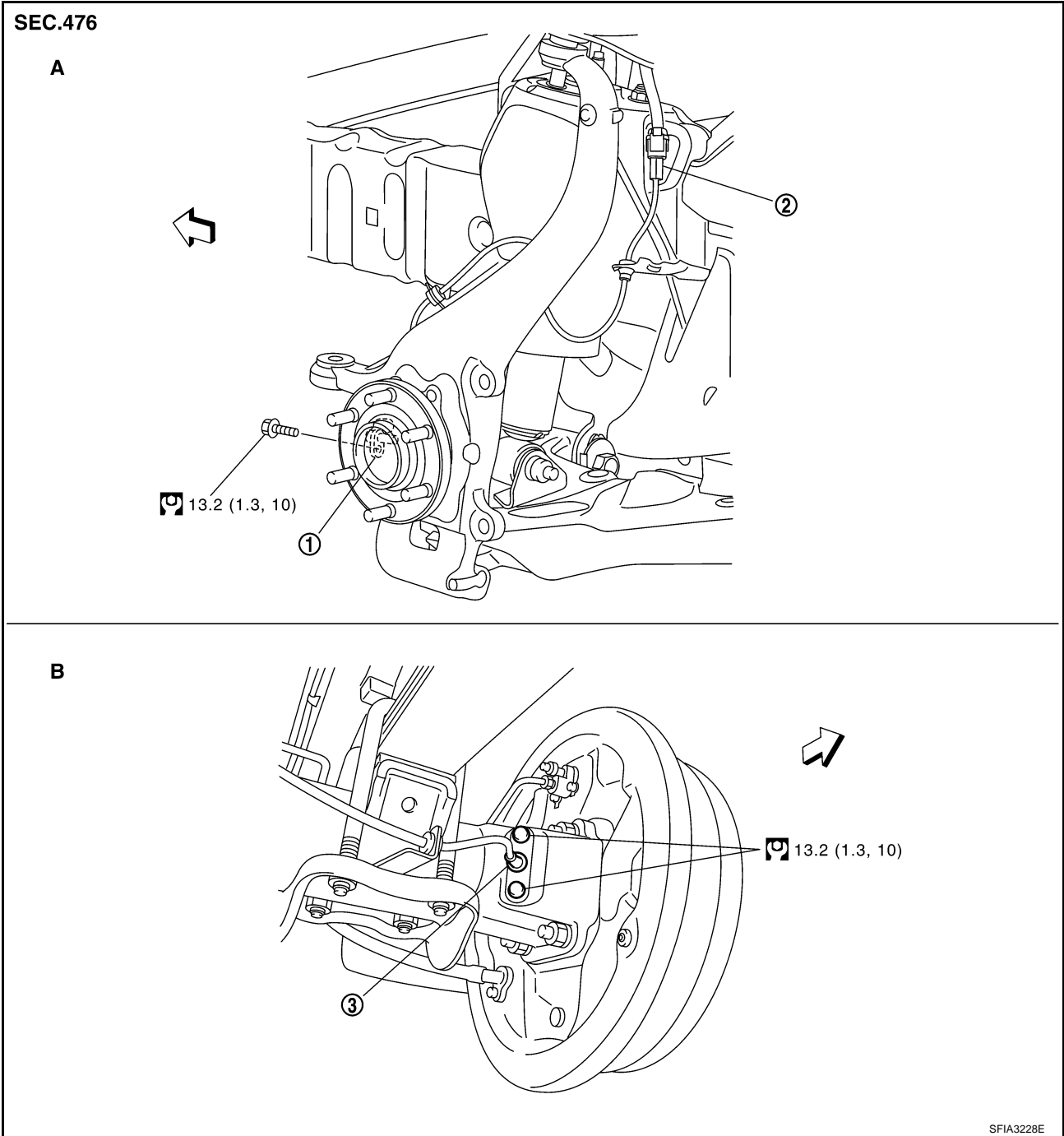
### OK or NG

- OK >> GO TO procedure 1 of symptom 6.
- NG >> Check the items indicated with self-diagnosis.

## WHEEL SENSORS

### Removal and Installation

A  
B  
C  
D  
E  
BRC  
G  
H  
I  
J  
K  
L  
M



- |                            |                                      |                                |
|----------------------------|--------------------------------------|--------------------------------|
| 1. Front wheel sensor (LH) | 2. Front wheel sensor connector (LH) | 3. Rear wheel sensor (LH)      |
| 4. Rear wheel sensor (RH)  | 5. Clip                              | 6. Rear wheel sensor connector |
| A. Front                   | B. Rear                              | ↖ :Front                       |

---

## REMOVAL

Pay attention to the following when removing wheel sensor.

### CAUTION:

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

## INSTALLATION

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

- When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.
- When installing wheel sensor, be sure to press rubber grommets in until they lock at locations shown above in figure. When installed, harness must not be twisted.

## SENSOR ROTOR

PFP:47970

### Removal and Installation FRONT

GFS00028

The sensor rotors are built into the wheel hubs and are not removable. If damaged, replace wheel hub and bearing assembly. Refer to [FAX-5, "Removal and Installation"](#) .

### REAR

#### Removal

1. Remove axle shaft assembly. Refer to [RAX-7, "Removal and Installation"](#) .

**NOTE:**

It is necessary to assemble the rear axle to replace the sensor rotor.

2. Pull the sensor rotor off the axle shaft using Tool and a press.

#### Installation

1. Install new sensor rotor on axle shaft using a suitable length steel tube and a press. Make sure sensor rotor is fully seated.

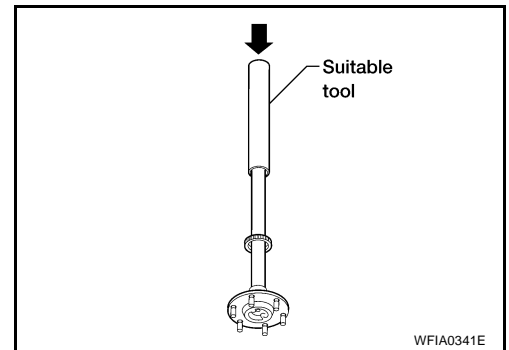
**CAUTION:**

**Do not reuse old sensor rotor.**

2. Install axle shaft assembly. Refer to [RAX-7, "Removal and Installation"](#) .

**CAUTION:**

**Do not reuse axle oil seal. The axle oil seal must be replaced every time the axle shaft assembly is removed from the axle shaft housing.**



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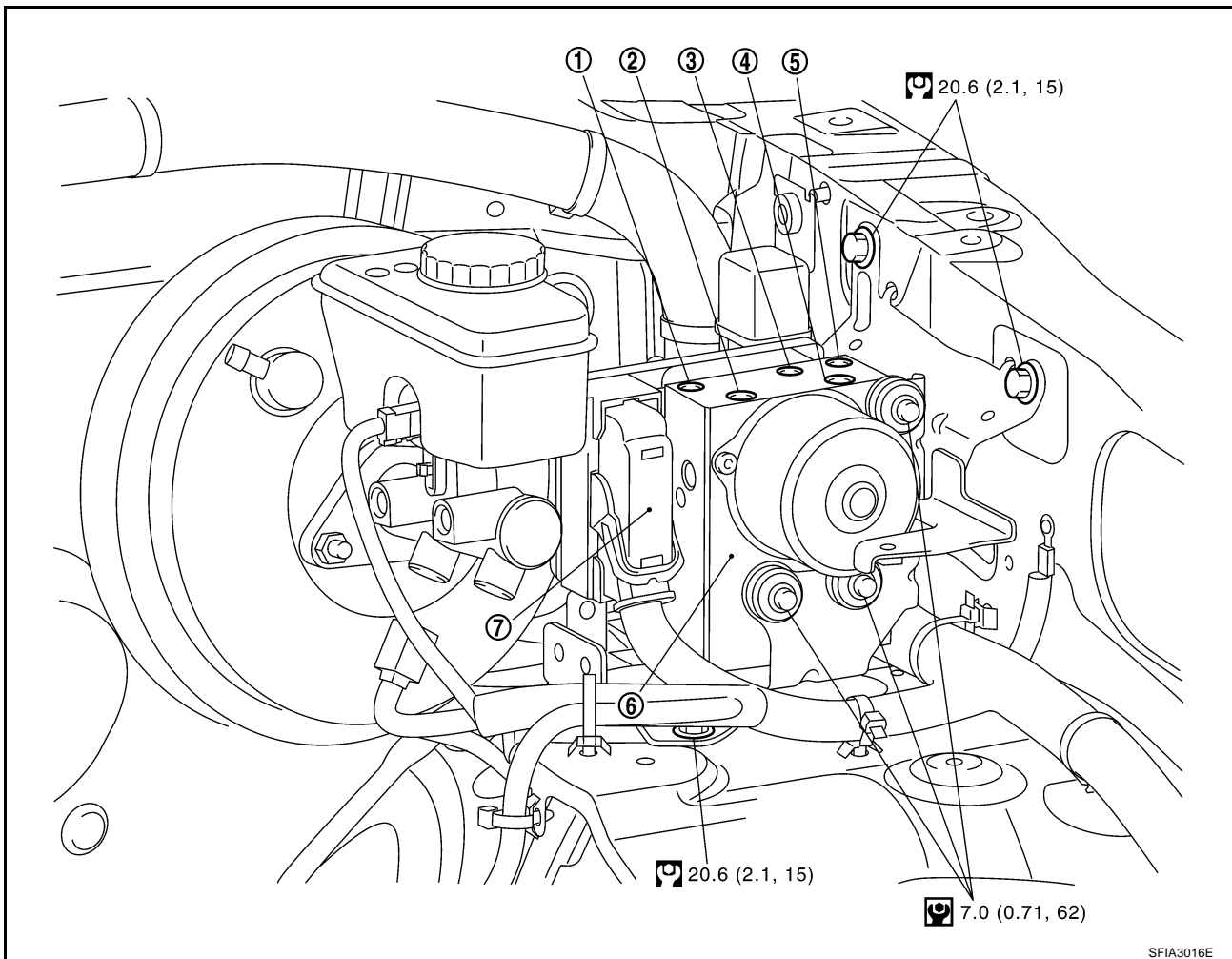
**BRC**

## ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

PFP:47660

### Removal and Installation

GFS00029



- |                                      |  |  |
|--------------------------------------|--|--|
| 1. To rear                           | 2. From master cylinder secondary side | 3. To front left                                 |
| 4. From master cylinder primary side | 5. To front right                      | 6. ABS actuator and electric unit (control unit) |

7. Harness connector

Refer to GI section for symbol marks in the figure.

#### CAUTION:

- Before servicing, disconnect battery cables.
- To remove brake tube, use flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut torque wrench.
- Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.
- Do not remove and install actuator by holding harness.
- After work is completed, bleed air from brake tube and hose. Refer to [BR-11, "Bleeding Brake System"](#).

#### REMOVAL

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
3. Remove ABS actuator and electric unit (control unit) bracket mounting bolts.
4. Remove ABS actuator and electric unit (control unit) from vehicle.



# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

[ABS]

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## INSTALLATION

Installation is the reverse order of removal.

### NOTE:

After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.

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B

C

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**BRC**

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