# SECTION BRC
# BRAKE CONTROL SYSTEM



## CONTENTS

### ABS

## ESP/TCS/ABS

# PRECAUTIONS

PFP:00001

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

BFS0008Z

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.

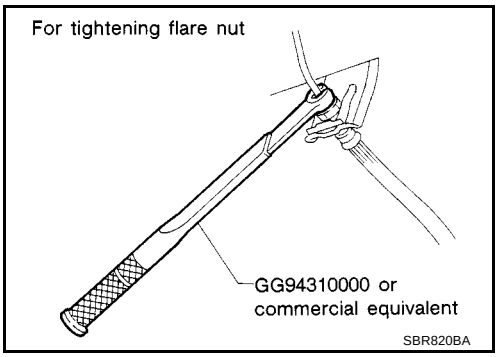
**WARNING:**

- **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 harness connectors.**

## Precautions for Brake System

BFS00090

- Recommended fluid is brake fluid “Nissan Genuine Brake Fluid or DOT 3 or DOT 4 (US FMVSS No.116)”.
- Do not reuse the drained brake fluid.
- Be careful not to splash brake fluid on painted areas such as body. If brake fluid is splashed, wipe it off and flush area with water immediately.
- Do not use mineral oils such as gasoline or kerosene to clean. They will ruin rubber parts and cause improper operation.
- Using a flare nut torque wrench, securely tighten brake tube flare nuts.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble malfunctioning parts. If any malfunctioning part is found, replace the part with a new one.
- Before working, turn ignition switch OFF and disconnect connectors for ABS actuator and electric unit or battery terminals.
- When installing brake piping, be sure to check tightening torque.




## Precautions for Brake Control

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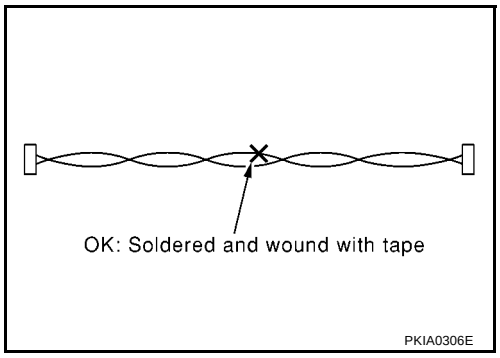
- During ABS operation, brake pedal lightly vibrates and a mechanical noise may be heard. This is normal.
- When starting engine, or just after starting vehicle, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from the customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic servicing. Besides the electrical system inspection, check booster operation, brake fluid level, and oil leaks.
- If tyre 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 the control unit, ABS system may malfunction or return an error.
- If aftermarket parts (e.g. car stereo equipment, CD player) have been installed, check electrical harnesses for pinches, open, and improper wiring.

## Precaution for Harness Repair

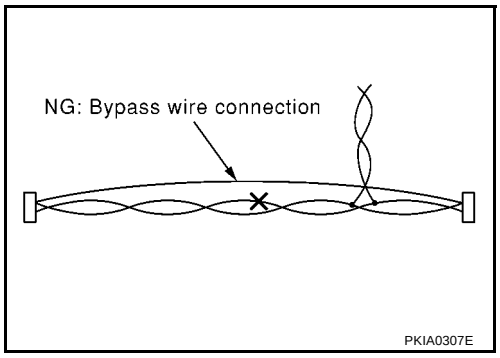
BFS00092

### CAN SYSTEM

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




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



# PREPARATION

PFP:00002

## Special Service Tools

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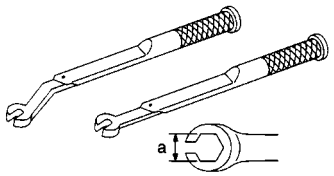
| Tool number<br>Tool name | | Description |
|---|---|---|
| GG94310000<br>Flare nut torque wrench<br>a: 10 mm (0.39 in) |  <br>NT406 | Removing and installing each brake piping |

# SYSTEM DESCRIPTION

PFP:00000

## System Diagram

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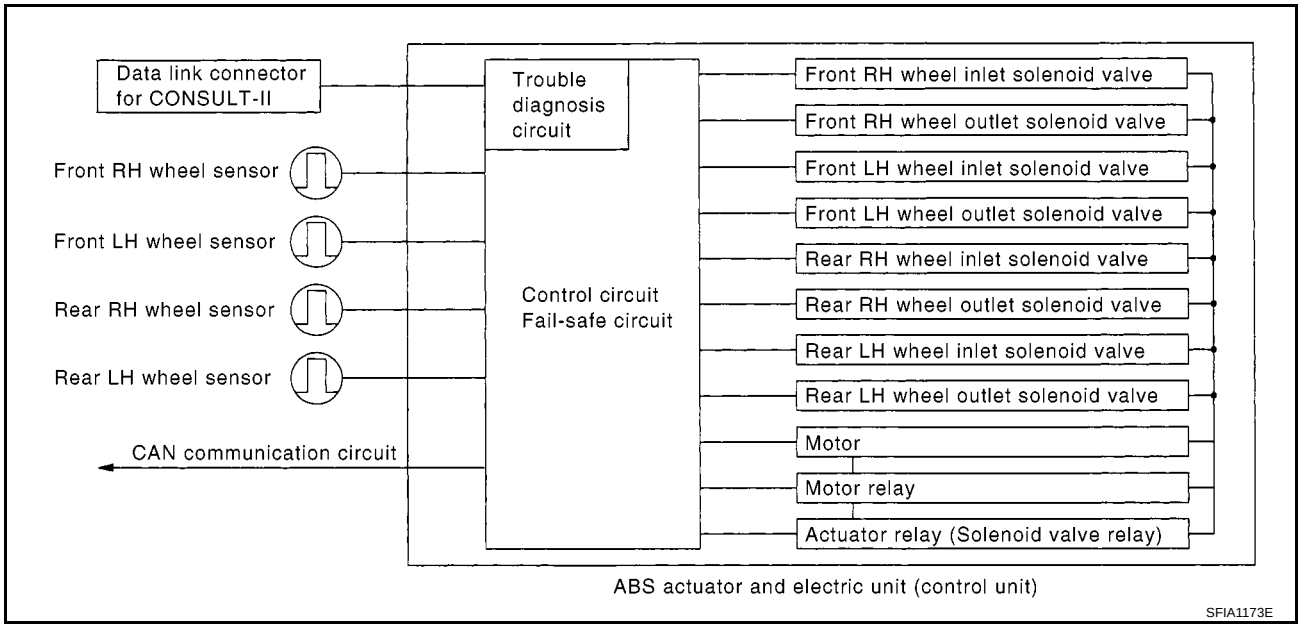
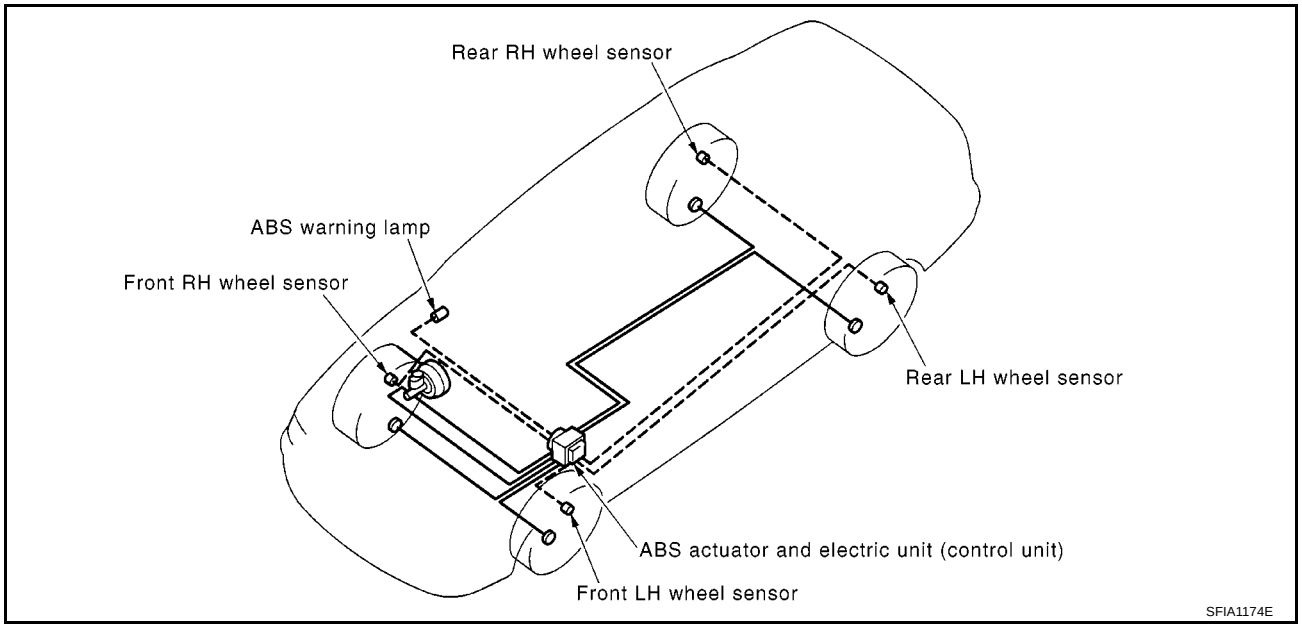



## System Components

BFS00095



## ABS Function

BFS00096

- Anti-lock Brake System monitors wheel rotation in braking and electronically controls braking force (brake fluid pressure) to prevent wheel locking. Thus, it improves vehicle stability in abrupt braking and allows driver to clear obstacles more easily.
- In the event of an electric system malfunction, the fail-safe function will operate, the vehicle will enter the ABS non-operation state, and ABS warning lamp will come on.
- CONSULT-II can be used to diagnose the electrical system.

## EBD Function

BFS00097

- The electronically controlled braking force distribution unit detects the minute slips that occur in front and rear wheels during braking and uses electronic control to control rear wheel braking force (brake hydraulic pressure) to suppress rear wheel slipping as much as possible to improve stability during braking.
- In the event an electrical system malfunction occurs, the fail-safe function will operate and EBD and ABS will enter non-operational states, and ABS warning lamp and brake warning lamp will come on.
- CONSULT-II can be used to diagnose the electrical system.

## Fail-Safe Function

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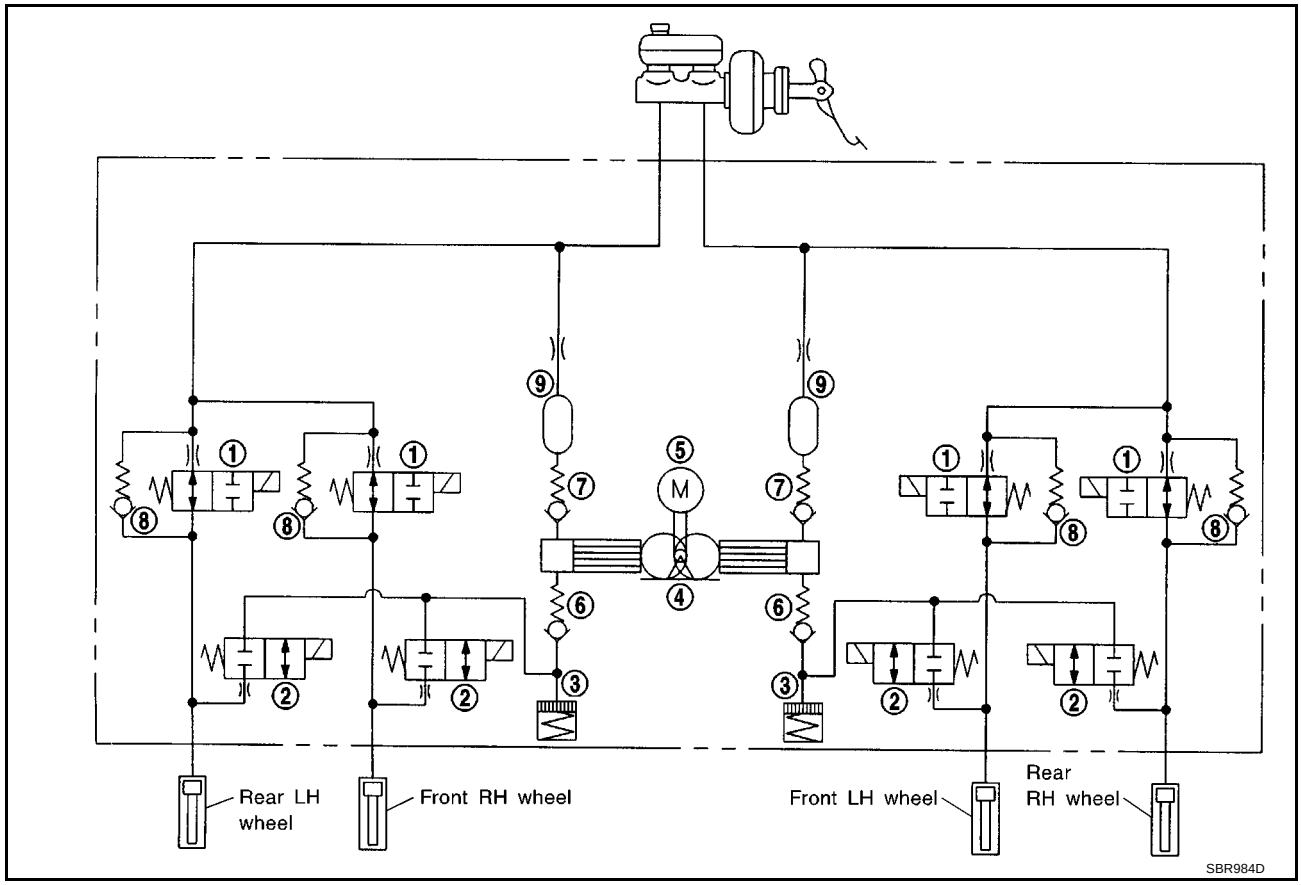
- If a malfunction occurs in ABS system, “ABS warning lamp” turns ON.
- If a malfunction occurs in EBD, brake warning lamp and ABS warning lamp turn ON.

## Hydraulic Circuit Diagram

BFS00099




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

# TROUBLE DIAGNOSIS

PFP:00004

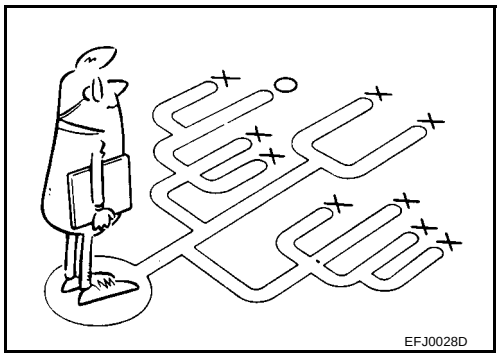
## Diagnosis Procedure

BFS0009A

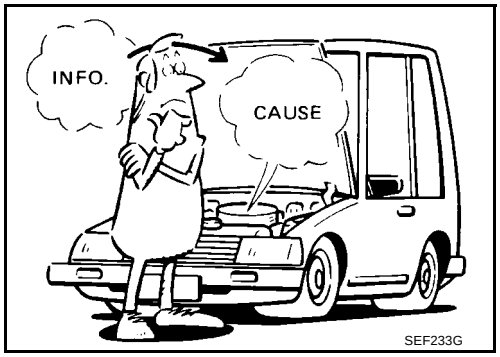
### BASIC CONCEPT

- The most important point in performing trouble diagnosis is to thoroughly understand the vehicle systems (both control and mechanical).
- It is also important to clarify customer concerns before starting the inspection.
  First of all, reproduce the symptom, and understand it fully.
  Ask the customer about his/her complaints carefully. In some cases, it will be necessary to check the symptoms by driving the vehicle with the customer.

  **CAUTION:**
  **Customers are not professional. It is dangerous to make an easy guess like “maybe the customer means that...,” or “maybe the customer mentions this symptom”.**


EFJ0028D

- It is essential to check symptoms right from the beginning in order to repair a error completely.
  For an intermittent error, it is important to reproduce the symptom based on an interview with the customer and past examples. Do not perform an inspection on an ad hoc basis. Most intermittent errors are caused by poor contacts. In this case, it will be effective to shake the suspected harness or connector by hand. When repairs are performed without any symptom diagnosis, no one can judge if the error has actually been eliminated.
- After completing trouble diagnosis, be sure to perform “erase memory”. Refer to BRC-19, "ERASE MEMORY" .
- For an intermittent error, move the harness or harness connector by hand to check for poor contact or false open circuit.



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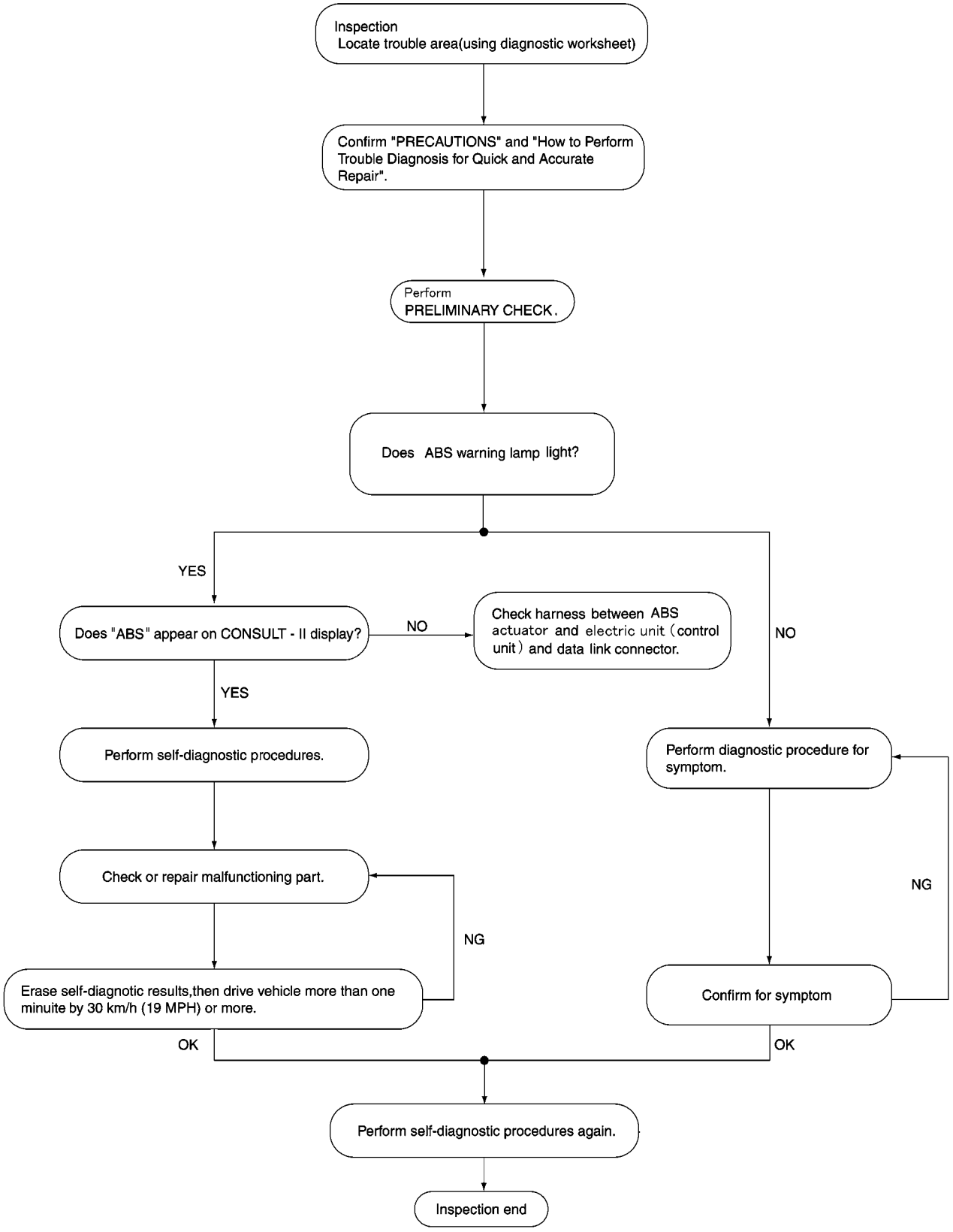
- Always read the GI section to be aware of the general precautions. Refer to GI-4, "General Precautions" .

## DIAGNOSIS FLOW

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## QUESTIONNAIRE

- Complaints against a malfunction vary depending on each person. It is important to clarify the customer complaints.
- Ask the customer about what symptoms are present and under what conditions. Use the information to reproduce the symptom while driving.
- It is also important to use the diagnosis sheet so as not to miss the 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 | ☐ Noise and vibration (from engine compartment)<br>☐ Noise and vibration (from axle) | ☐ Warning / Indicator activate | ☐ Firm pedal operation<br>Large stroke pedal operation |
| | ☐ TCS does not work (Rear wheels slip when accelerating) | ☐ ABS does not work. (wheels slip when braking) | ☐ Lack of sense of acceleration |
| Engine conditions | ☐ When starting ☐ After starting | | |
| Road conditions | ☐ Low friction road ( ☐Snow ☐Gravel ☐Other )<br>☐ Bumps / potholes | | |
| Driving conditions | ☐ Full-acceleration<br>☐ High speed cornering<br>☐ Vehicle speed: Greater than 10 km/h (6 MPH)<br>☐ Vehicle speed: 10 km/h (6 MPH) or less<br>☐ Vehicle is stopped | | |
| Applying brake conditions | ☐ Suddenly<br>☐ Gradually | | |
| Other conditions | ☐ Operation of electrical equipment<br>☐ Shift change<br>☐ Other descriptions | | |

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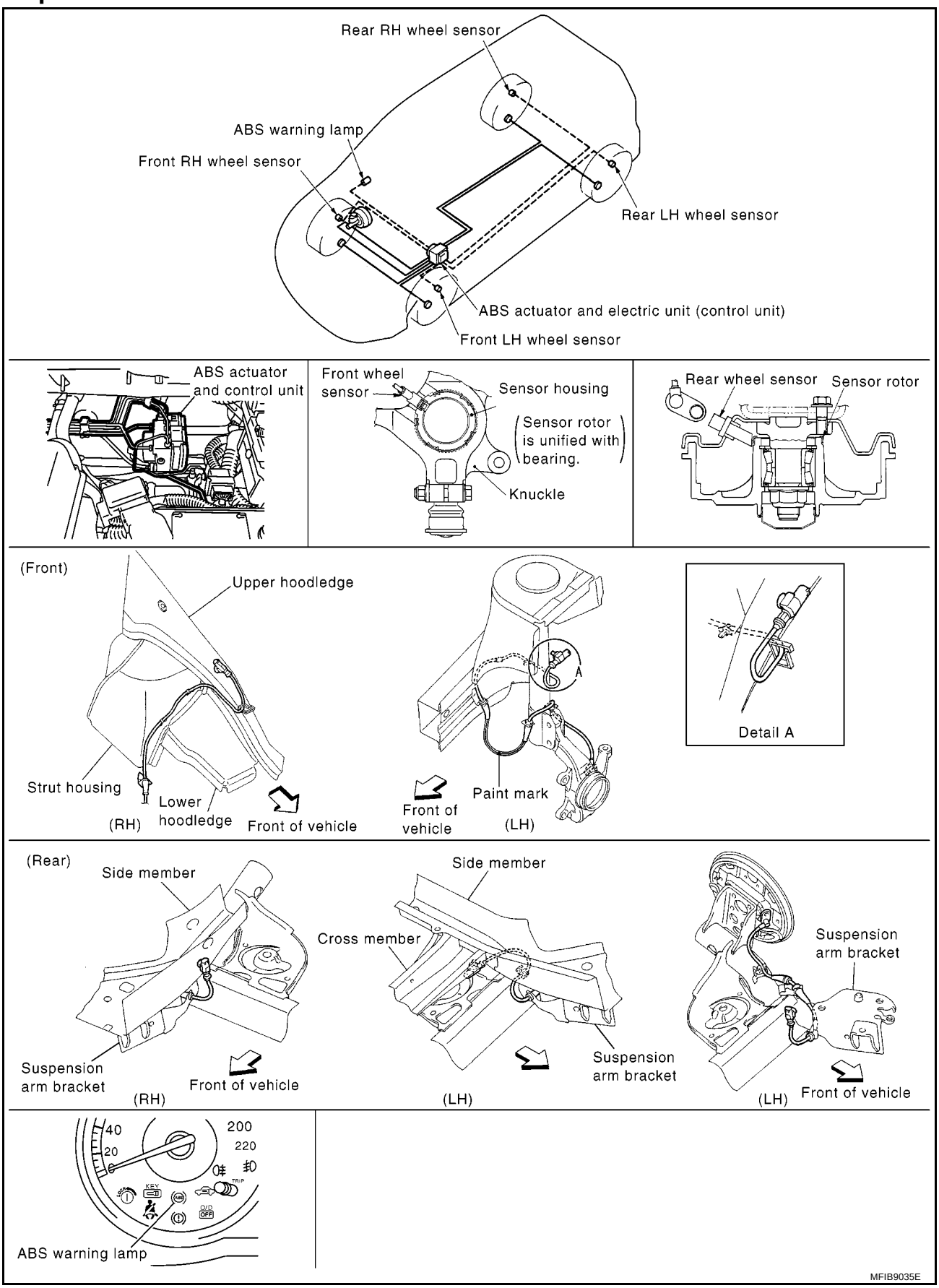
## Component Parts Location

BFS0009B



## Schematic

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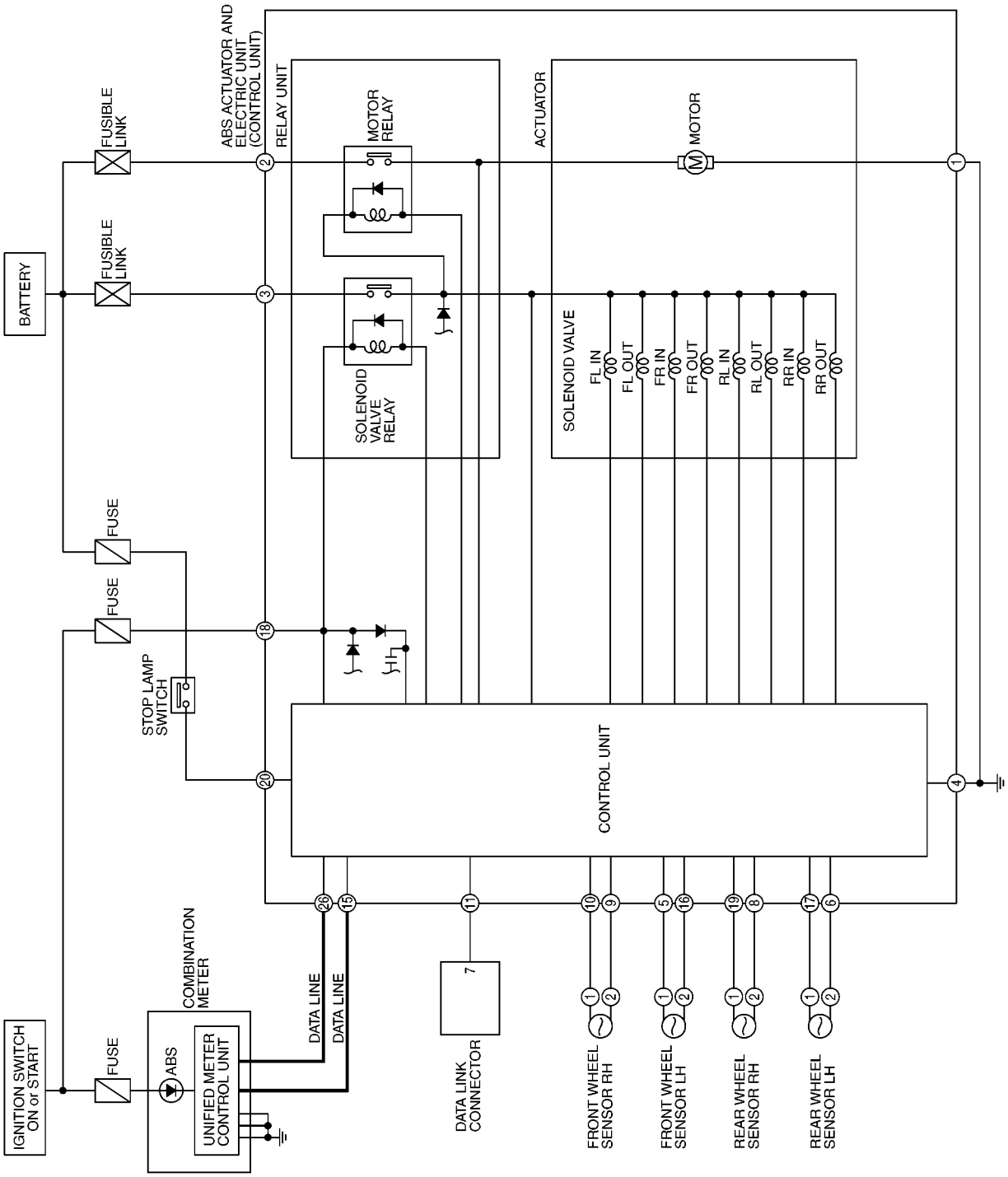


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## Wiring Diagram — ABS —

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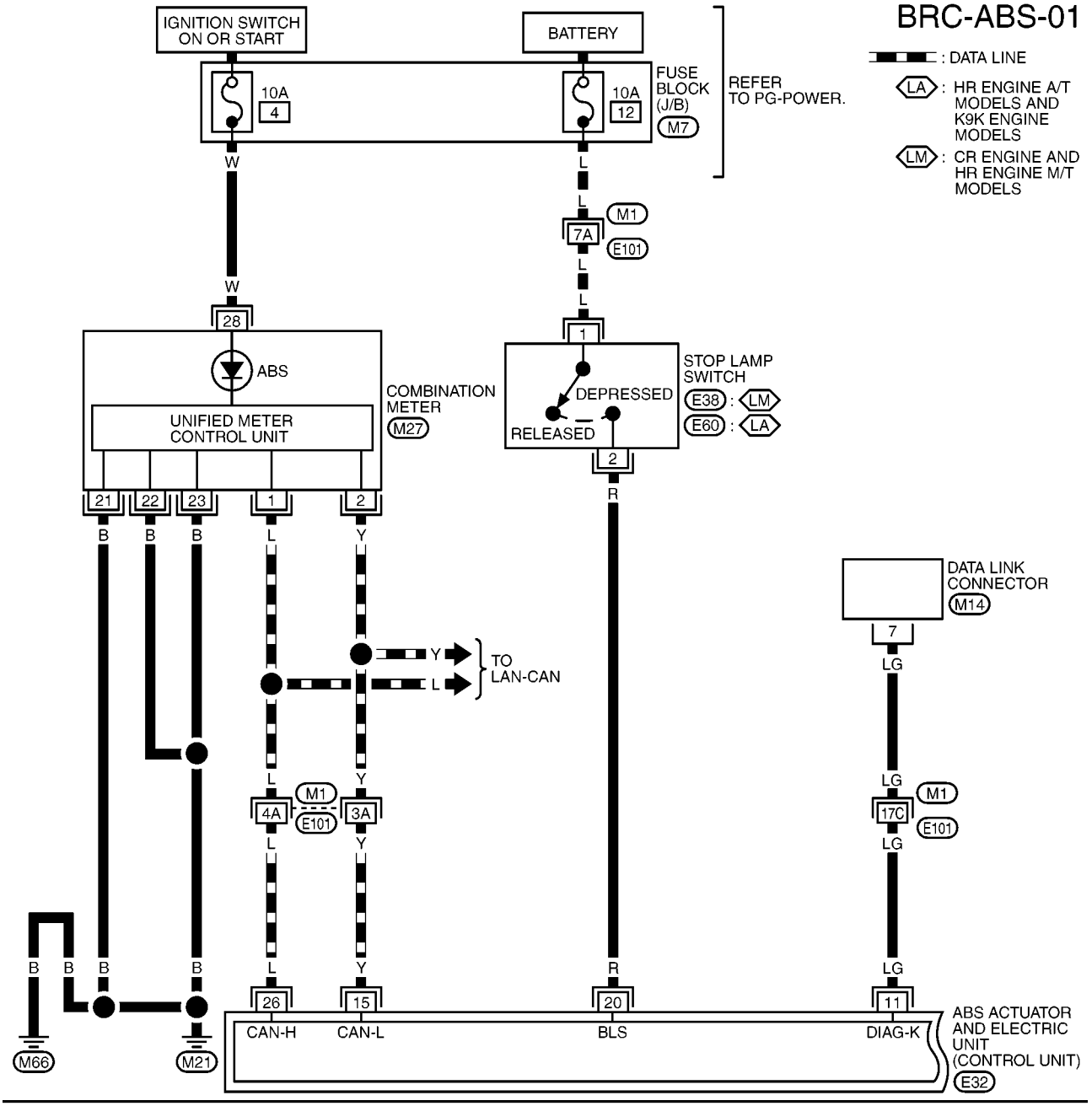


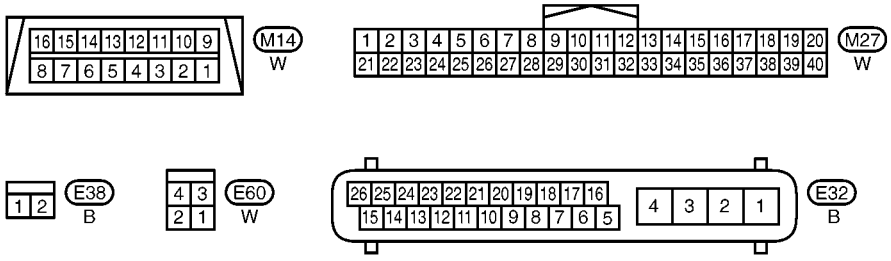


REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)
M7 - FUSE BLOCK - JUNCTION BOX (J/B)

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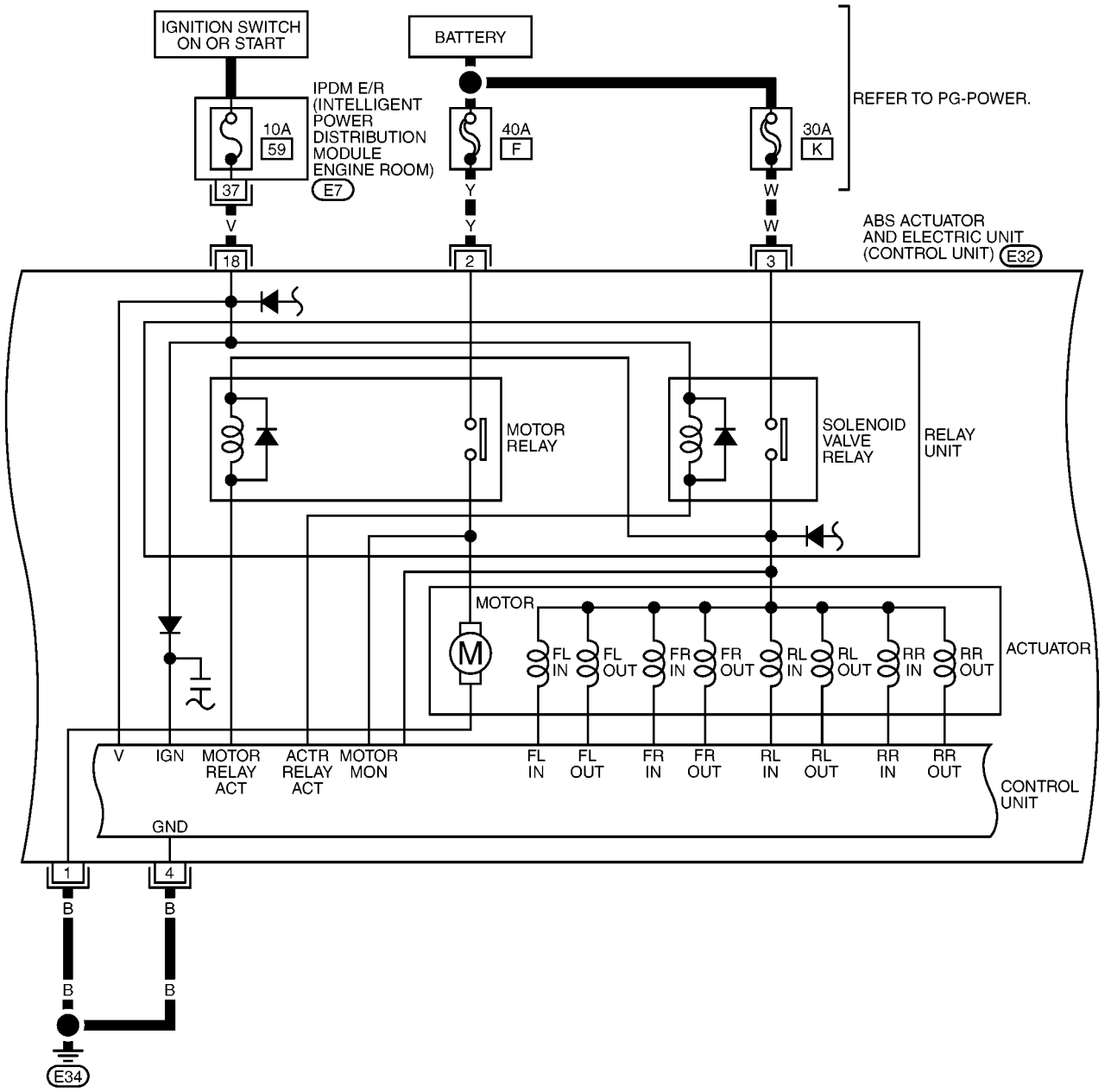
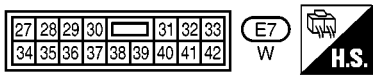
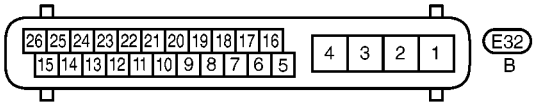
BRC-ABS-02

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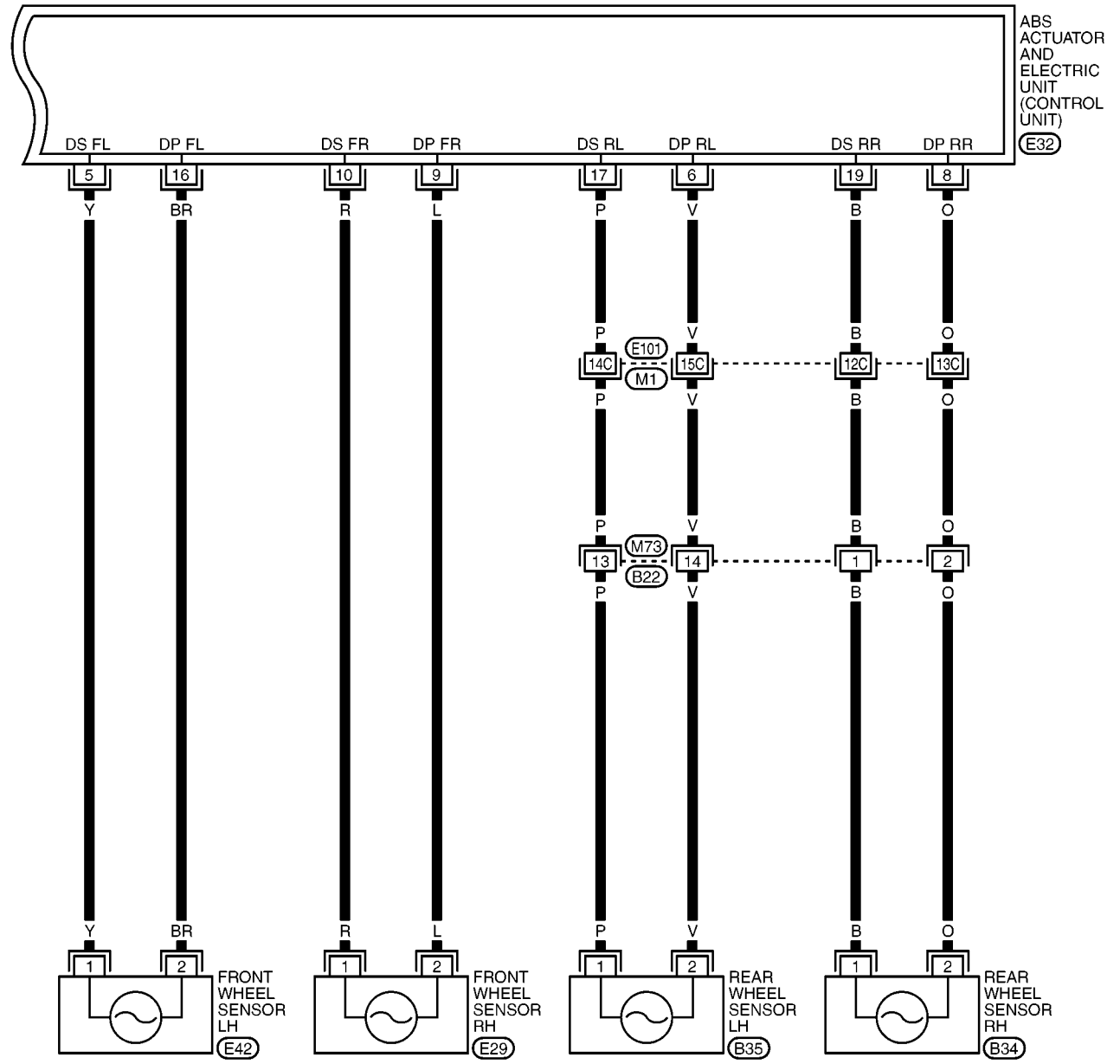
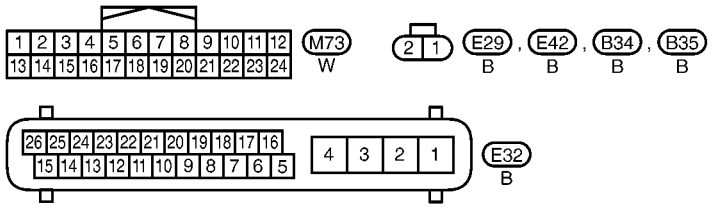
BRC-ABS-03




REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)

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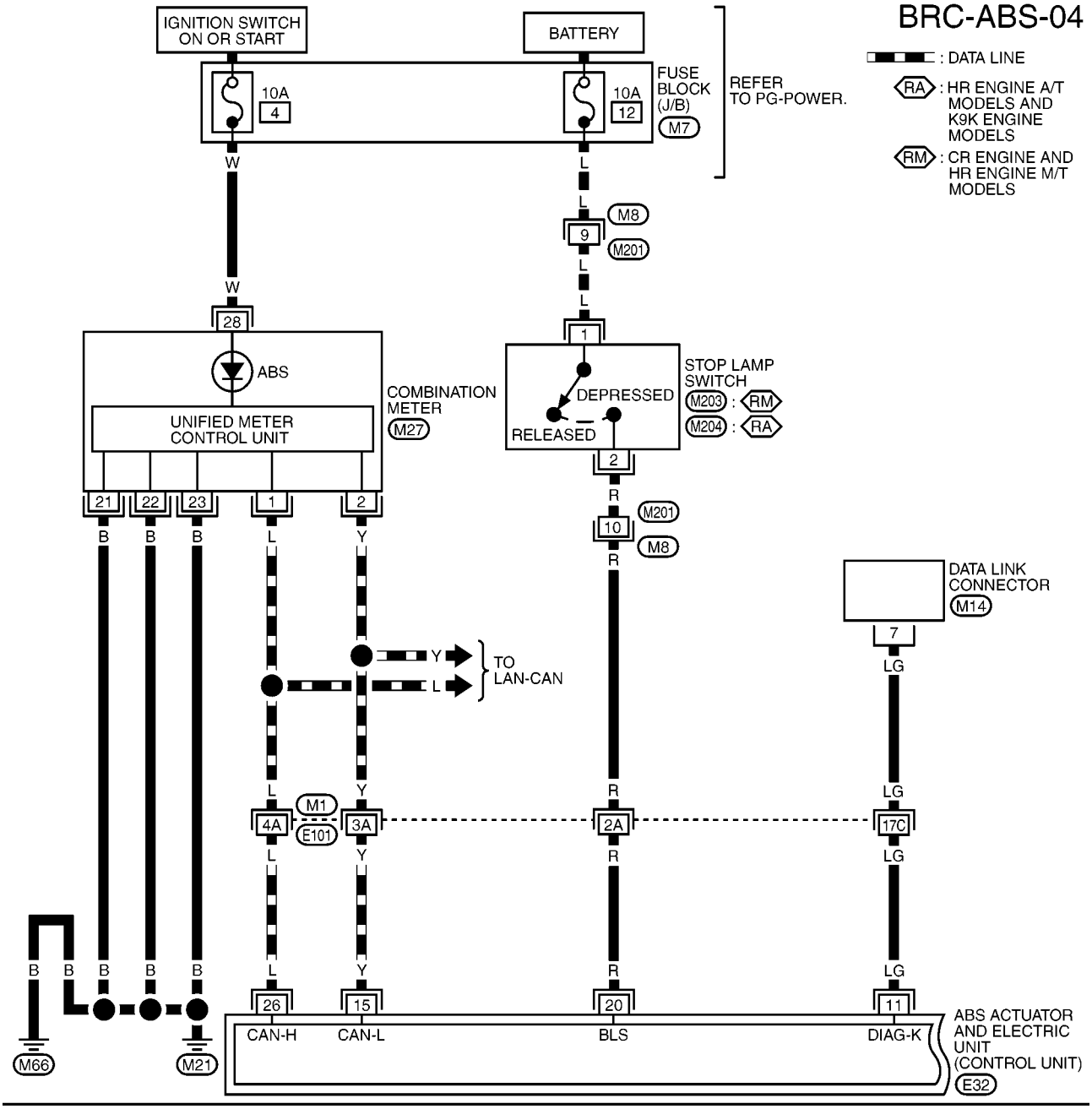
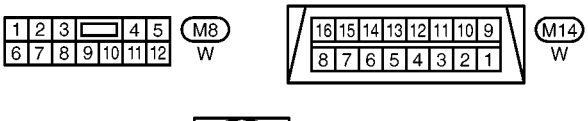
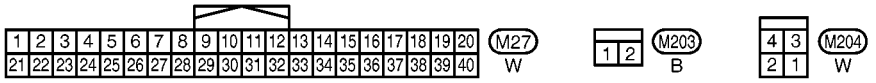
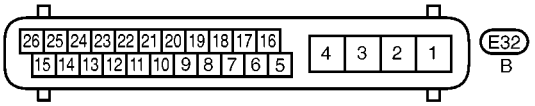
BRC-ABS-04




REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)
M7 - FUSE BLOCK - JUNCTION BOX (J/B)

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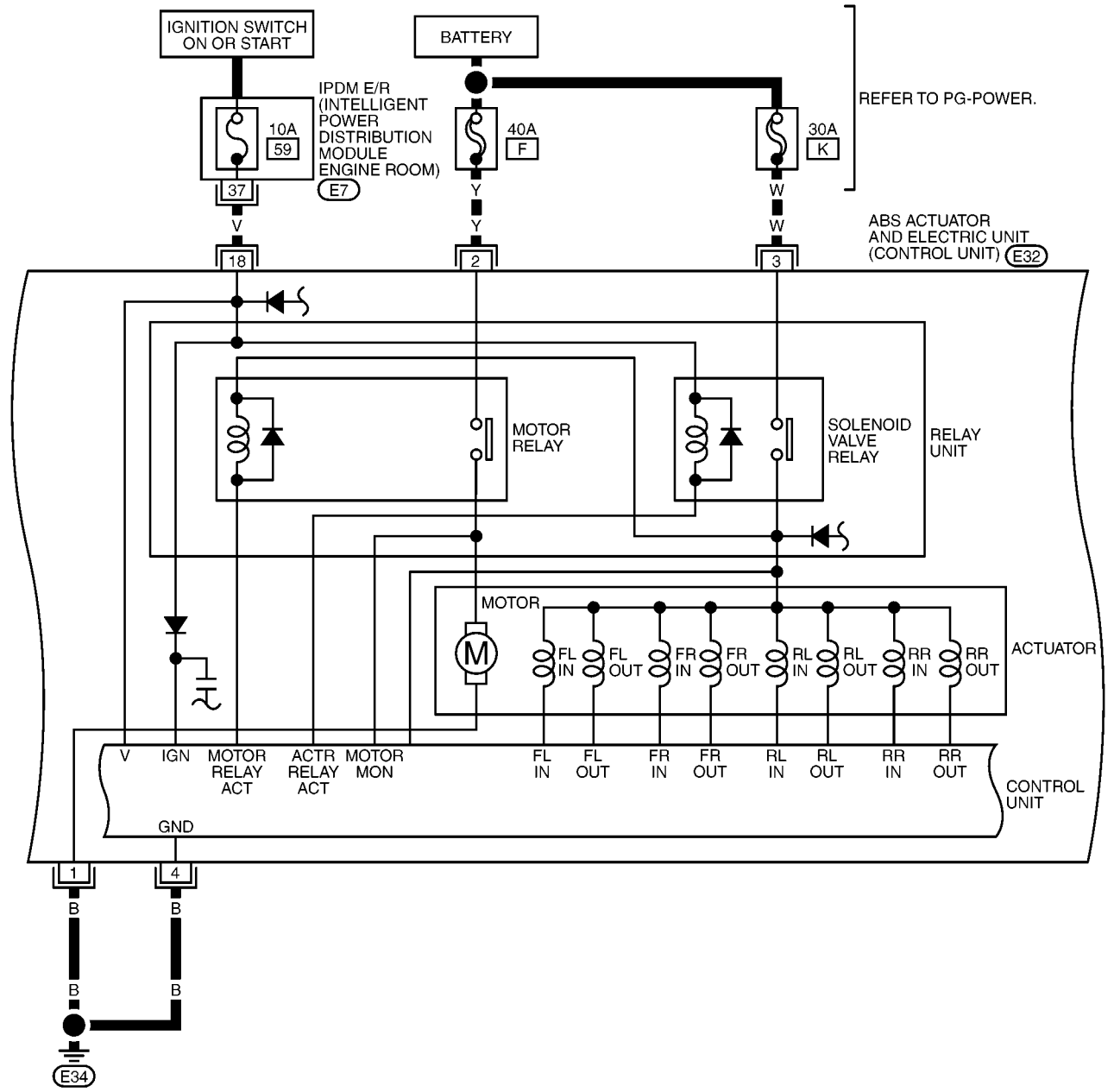
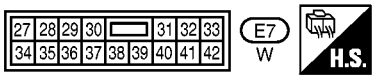
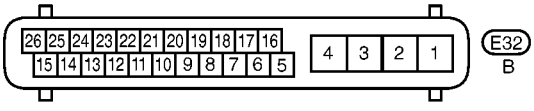
BRC-ABS-05

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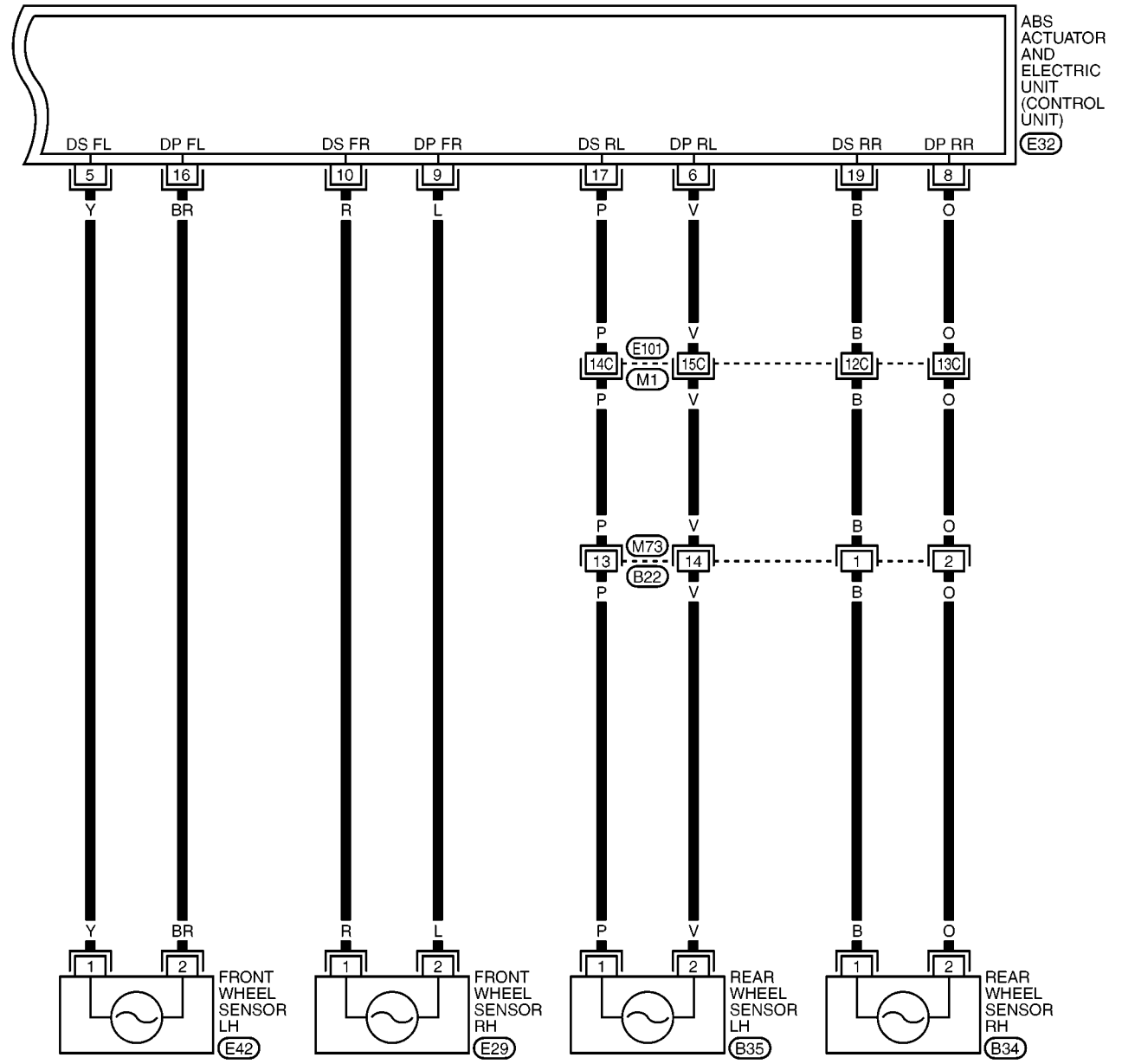
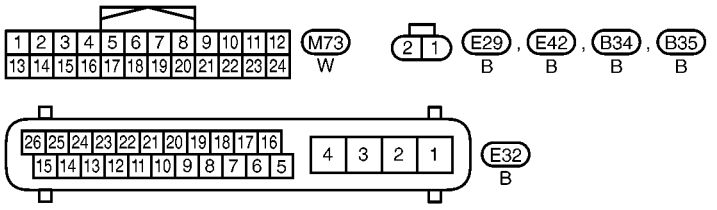
BRC-ABS-06




REFER TO THE FOLLOWING.
(M1) - SUPER MULTIPLE JUNCTION (SMJ)

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# CONSULT-II Functions (ABS)

BFS0009H

## 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. | BRC-19, "Self-Diagnosis" |
| DATA MONITOR | Input/Output data in the ABS actuator and electric unit (control unit) can be read. | BRC-21, "Data Monitor" |
| CAN DIAG SUPPORT MNTR | The results of transmit/receive diagnosis of communication can be read. | LAN-15, "CAN Diagnostic Support Monitor" |
| ACTIVE TEST | Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range. | BRC-22, "Active Test" |
| FUNCTION TEST | Performed by CONSULT-II instead of 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

Refer to GI-36, "CONSULT-II Start Procedure" .

# Self-Diagnosis

BFS000EV

## 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-20, "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 will not turn off even when the system is normal unless the vehicle is driving at 30 km/h (19 MPH) 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-38, "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

| Code | Self-diagnostic item | Malfunction detecting condition | Check system |
|---|---|---|---|
| C100F | FR RH SENSOR | Circuit of front RH wheel sensor is open, shorted or sensor power voltage is unusual. | BRC-27, "Inspection 1 Wheel Sensor System" |
| C101F | FR LH SENSOR | Circuit of front LH wheel sensor is open, shorted or sensor power voltage is unusual. | |
| C102F | RR RH SENSOR | Circuit of rear RH wheel sensor is open, shorted or sensor power voltage is unusual. | |
| C103F | RR LH SENSOR | Circuit of rear LH wheel sensor is open, shorted or sensor power voltage is unusual. | |
| C1041 | FR RH SENSOR ROTOR | ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor. | |
| C1042 | FR LH SENSOR ROTOR | ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor. | |
| C1043 | RR RH SENSOR ROTOR | ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor. | |
| C1044 | RR LH SENSOR ROTOR | ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor. | |
| C10C6 | STOP LAMP SW CIRC | Stop lamp switch is fixed at “ON” position. | BRC-31, "Inspection 5 Stop Lamp Switch System" |
| C10C6 | STOP LAMP OR CONT | Stop lamp switch circuit is open or shorted, or controller failure. | BRC-31, "Inspection 5 Stop Lamp Switch System" |
| C1046 | ABS SENSOR | Wheel sensor input is malfunction or wheel sensor power voltage is too low. | BRC-27, "Inspection 1 Wheel Sensor System" (Note 1) |
| C10CC | BATTERY VOLTAGE | Supply voltage for ABS actuator and electric unit (control unit) is too low or too high, or abnormal. | BRC-29, "Inspection 4 ABS Actuator and Electric Unit Power and Ground System" |
| C10C3 | CONTROLLER FAILURE | Internal malfunction of ABS actuator and electric unit (control unit) | BRC-29, "Inspection 3 ABS Actuator and Electric Unit (Control Unit) System" |
| U1000 | CAN COMM CIRCUIT | ● CAN communication line is open or shorted.<br>● ABS actuator and electric unit (control unit) internal malfunction<br>● Battery voltage for ECM is suddenly interrupted for approximately 0.5 seconds or more. | BRC-33, "Inspection 6 CAN Communication Circuit" (Note 1) |
| C1180 | ECM | ● CAN communication line is open or shorted.<br>● CAN communication signal form ECM cannot be received. | BRC-29, "Inspection 2 Engine System" |

Note 1: If multiple malfunctions are detected including CAN communication line [U1000], perform diagnosis for CAN communication line first.

# Data Monitor

BFS000EW

## 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 MONITOR ITEM | Monitor item | Display content | Data monitor | |
|---|---|---|---|---|
| | | | Condition | Reference values for normal operation |
| E, M, S | FR LH SENSOR<br>FR RH SENSOR<br>RR LH SENSOR<br>RR RH SENSOR | Vehicle wheel speed | Vehicle stopped | 0 (km/h) |
| | | | While driving (Note 1) | Almost in accordance with the speedometer display (within ±10 %) |
| S | STOP LAMP SWITCH | Brake pedal operation | Brake pedal depressed | ON |
| | | | Brake pedal not depressed | OFF |
| M, S | FR LH IN SOL<br>FR LH OUT SOL<br>FR RH IN SOL<br>FR RH OUT SOL<br>RR LH IN SOL<br>RR LH OUT SOL<br>RR RH IN SOL<br>RR RH OUT SOL | Solenoid valve operation | ABS solenoid activated or fail-safe activated (Note 2) | ON |
| | | | Actuator relay is activated and ABS solenoid is not activated | OFF |
| M, S | ACTUATOR RLY | Actuator relay activated | Vehicle stop (Ignition switch ON) | ON |
| | | | Vehicle stopped (engine running) | ON |
| M, S | MOTOR RELAY | Motor relay and motor activated | Motor relay and motor activated | ON |
| | | | Motor relay and motor not activated | OFF |
| S | EBD WARN LAMP | EBD warning lamp ON | Brake warning lamp ON | ON |
| | | | Brake warning lamp OFF | OFF |
| M, S | ABS WARN LAMP | ABS warning lamp ON (Note 3) | ABS warning lamp ON | ON |
| | | | ABS warning lamp OFF | OFF |
| E, M, S | BATTERY VOLT | Battery voltage supplied to control unit | Ignition switch ON | Approximately 10 - 16 V |
| S | EBD SIGNAL | EBD operation signal | EBD is operating | ON |
| | | | EBD is not operating | OFF |
| S | ABS SIGNAL | ABS operation signal | ABS activated | ON |
| | | | ABS not activated | OFF |
| S | EBD FAIL SIG<br>ABS FAIL SIG | System error signal status | Malfunctions condition (When system is malfunctioning) | OFF |

**NOTE:**

1. Confirm tyre pressure is normal.
2. The solenoid turns off when the actuator relay is not operating.

3. ON/OFF timing of ABS warning lamp
   ON: When the switch is turned ON for approximately 1 second or when a malfunction is detected.
   OFF: Approximately 1 second after ignition switch is turned ON (when the system is in normal operation).

## Active Test

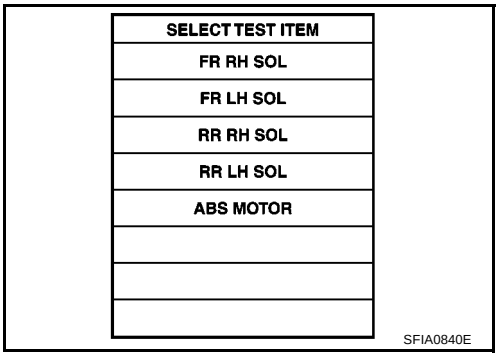
BFS000EX

**CAUTION:**

- **Do not perform active test while driving.**
- **Make sure to completely bleed air from the brake system.**
- **During active test, ABS and brake warning lamps are on.**

### OPERATION PROCEDURE

1. Touch “ACTIVE TEST”.
2. The “SELECT TEST ITEM” screen is displayed.
3. Touch “TEST ITEM”.
4. Touch “START” with “MAIN SIGNALS” line inverted.
5. The “ACTIVE TEST” screen is displayed, and the following test can be performed.

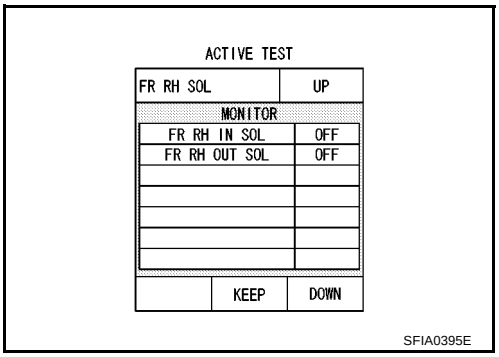



### TEST ITEM —ABS SOLENOID VALVE—

- Touch “UP”, “KEEP” and “DOWN” on the screen to confirm ABS solenoid valves (inlet/outlet) operate as in the following chart.

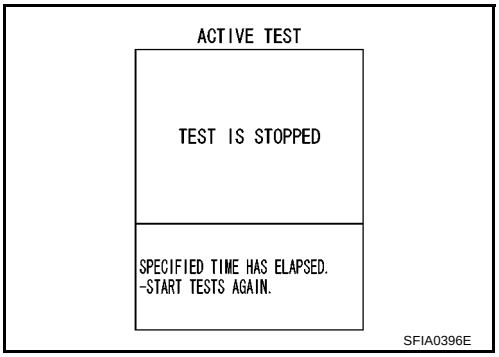
| Operation | UP | KEEP | DOWN |
|---|---|---|---|
| ABS inlet S/V | OFF | ON | ON |
| ABS outlet S/V | OFF | OFF | ON* |

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




**NOTE:**

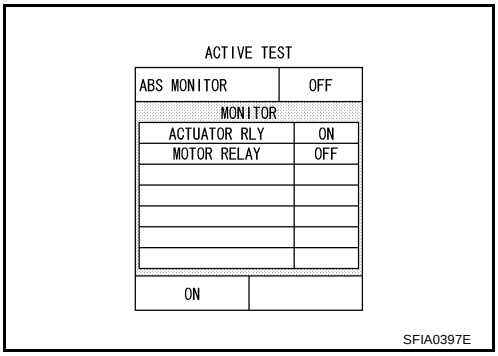
- If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.
- “TEST STOP” is displayed 10 seconds after operation start.
- After “TEST STOP” is displayed, to perform test again, touch “BACK” and repeat step 6.



## TEST ITEM —ABS MOTOR—

- Touch “ON” and “OFF” on the screen to confirm the ABS motor relay operates as shown in the following chart.

| Operation | ON | OFF |
|---|---|---|
| ABS actuator relay | ON | ON |
| ABS motor relay | ON | OFF |




**NOTE:**

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

# CAN Communication

BFS000EY

## SYSTEM DESCRIPTION

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-27, "CAN Communication Unit" .

## For Fast and Accurate Diagnosis

BFS000EZ

### PRECAUTIONS FOR TROUBLE DIAGNOSIS

- Always read the “GI General Information” to confirm the general precautions. Refer to GI-4, "General Precautions" .
- After completing the trouble diagnosis, always erase the fault memory. Refer to BRC-19, "Self-Diagnosis" .
- When inspection of the continuity or voltage between control units is performed, check connector terminals for disconnection, looseness, bend, or collapse. If any non-standard condition is detected, repair or replace applicable part.
- Intermittent errors may be caused by a poor connection in the harness, connector, or terminal.
- If a circuit tester is used for the check, be careful not to forcibly extend any connector terminal.

## Basic Inspection

BFS000F0

### BASIC INSPECTION 1: BRAKE FLUID LEVEL, LEAK AND BRAKE PAD INSPECTION

1. Check fluid level in brake reservoir tank. If fluid level is low, refill the brake fluid.
2. Check area around the brake piping and ABS actuator for leaks. If a leak or oozing is detected, check as follows:
   - If ABS actuator connections are loose, tighten piping to the specified torque. Check again for leaks, and make sure there is no fluid leakage.
   - If flare nuts at the connections and the threads of ABS actuator are damaged, replace damaged parts. Then check again for leaks, and make sure that there is no fluid leak.
   - If a leak or oozing is detected on other parts than ABS actuator connections, wipe the applicable part with a clean cloth. Then check again for leaks, and if there is still a leak or oozing, replace damaged part.
   - If leaks or oozing are detected on ABS actuator body, wipe with a clean cloth and check again. If there is still a leak or oozing, replace ABS actuator.

     **CAUTION:**
     **ABS actuator body cannot be disassembled.**
3. Check for brake pad wear. Refer to BR-21, "PAD WEAR INSPECTION" .

### BASIC INSPECTION 2: INSPECTION OF POWER SUPPLY SYSTEM TERMINAL LOOSENESS AND BATTERY

Check battery for looseness on battery positive/negative cables and ground connection. Also Make sure battery voltage dose not drop.

### BASIC INSPECTION 3: ABS WARNING LAMP AND BRAKE WARNING LAMP INSPECTION

1. Make sure ABS warning lamp and brake warning lamp turn on for approximately 1 sec. When ignition switch is turned ON. If they do not turn on, perform CAN communication system diagnosis. Refer to BRC-33, "Inspection 6 CAN Communication Circuit" .
   If CAN communication system is normal, replace combination meter. Refer to DI-20, "Removal and Installation for Combination Meter" .
2. Make sure ABS warning lamp and brake warning lamp turn off after approximately 1 sec. When ignition switch is turned ON. If they do not turn OFF, perform self-diagnosis.
3. Make sure that ABS warning lamp remains off after the vehicle has been driven at approx. 30 km/h (19 MPH) for approx. 1 minute. If it turns on, perform self-diagnosis.
4. After completing self-diagnosis, always erase self-diagnostic results memory. Refer to BRC-19, "ERASE MEMORY" .

**CAUTION:**
**The brake warning lamp comes on when the parking brake lever is pulled (when switch is on) and when the brake fluid level sensor operates (insufficient brake fluid).**

## Inspection 1 Wheel Sensor System

BFS000F1

**DTC C100F-C103F, C1041-C1043, C1046**

After identifying malfunctioning wheel sensor position according to CONSULT-II self-diagnostic results, check the each part and identify the parts to be replaced.

**CAUTION:**

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

INSPECTION PROCEDURE

### 1. CHECK TYRE

Check air pressure, wear and size.

Are air pressure, wear, and size within specifications?

YES >> GO TO 2.
NO >> Adjust air pressure, or replace tyre.

### 2. CHECK SENSOR AND SENSOR ROTOR

- Inspect the appearance of the sensor and sensor rotor.
- Check sensor rotor rubber bar for damage.
- Check sensor for disconnection or loose.

OK or NG

OK >> GO TO 3.
NG >> Replace sensor rotor.

### 3. SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

| Self-diagnostic results |
|---|
| FR RH SENSOR |
| FR LH SENSOR |
| RR RH SENSOR |
| RR LH SENSOR |
| FR RH SENSOR ROTOR |
| FR LH SENSOR ROTOR |
| RR RH SENSOR ROTOR |
| RR LH SENSOR ROTOR |

Is any of above displayed on self-diagnosis display?

YES >> GO TO 4.
NO >> INSPECTION END

### 4. CHECK CONNECTOR

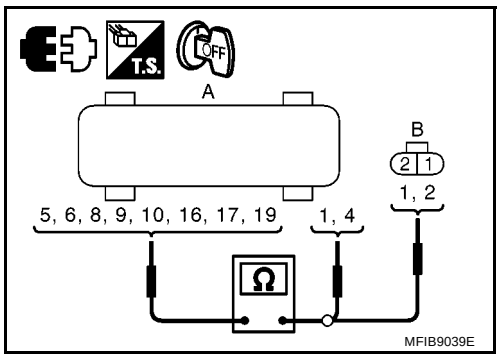
1. Disconnect control unit connector E32 and malfunctioning wheel sensor connector E42 (FL), E29 (FR), B35 (RL) or B34 (RR) and check for deformation, disconnected and loose. If there is any non-standard condition, repair the connector.
2. Reconnect connectors, drive the vehicle at 30km/h (19 MPH) for approximately 1 minute, and then perform self-diagnosis.

OK or NG

OK >> The connector terminal contact is loose, damage, open or shorted.
NG >> GO TO 5.

## 5. CHECK WHEEL SENSOR HARNESS

1. Disconnect control unit connector E32 and wheel sensor connector E42 (FL), E29 (FR), B35 (RL) and B34 (RR).
2. Check continuity between ABS actuator and electric unit (control unit) and Wheel sensor (Power supply system).




| Connector | A | B | Continuity |
|---|---|---|---|
| | ABS actuator and electric unit (control unit) | Wheel sensor | |
| Front LH | 5 | 1 | Yes |
| Front RH | 10 | 1 | |
| Rear LH | 17 | 1 | |
| Rear RH | 19 | 1 | |

3. Check continuity between ABS actuator and electric unit (control unit) and wheel sensor (Signal system).

| Connector | A | B | Continuity |
|---|---|---|---|
| | ABS actuator and electric unit (control unit) | Wheel sensor | |
| Front LH | 16 | 2 | Yes |
| Front RH | 9 | 2 | |
| Rear LH | 6 | 2 | |
| Rear RH | 8 | 2 | |

4. Check continuity between ABS actuator and electric unit (control unit) terminal (Ground).

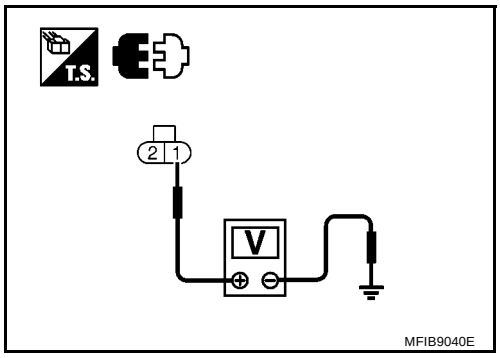
| Connector | A | | Continuity |
|---|---|---|---|
| | ABS actuator and electric unit (control unit) | | |
| Front LH | 5, 16 | 4 | No |
| Front RH | 9, 10 | 4 | |
| Rear LH | 6, 17 | 4 | |
| Rear RH | 8, 19 | 4 | |

OK or NG

OK >> GO TO 6.
NG >> Repair or replace harness connector between ABS actuator and electric unit (control unit) and wheel sensor.

## 6. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Connect control unit connector.
2. Turn ignition switch ON.
3. Check voltage between wheel sensor power supply terminal 1 and ground.




| Wheel sensor | Terminal | Ground | Voltage |
|---|---|---|---|
| E42 (FL), E29 (FR), B35 (RL), B34 (RR) | 1 | | 8V or more |

OK or NG

OK >> Replace wheel sensor.
NG >> Replace ABS actuator and electric unit (control unit).

## Inspection 2 Engine System

BFS000F2

**DTC C1180**

INSPECTION PROCEDURE

### 1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

| Self-diagnostic results |
|---|
| ECM |

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

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

### 2. CHECK ENGINE SYSTEM

1. Perform an ECM self-diagnosis refer to EC-74, "TROUBLE DIAGNOSIS" (CR engine models with EURO-OBD), EC-491, "TROUBLE DIAGNOSIS" (CR engine models without EURO-OBD), EC-863, "TROUBLE DIAGNOSIS" (HR engine models with EURO-OBD), EC-1284, "TROUBLE DIAGNOSIS" (HR engine models without EURO-OBD), EC-1630, "TROUBLE DIAGNOSIS" and repair or replace malfunctioning items. Re-perform ECM self-diagnosis.
2. Re-perform ABS actuator and electric unit (control unit) self-diagnosis.

OK or NG

OK >> INSPECTION END
NG >> Repair or replace malfunctioning items. Re-perform the self-diagnosis.

## Inspection 3 ABS Actuator and Electric Unit (Control Unit) System

BFS000F3

**DTC C10C3**

INSPECTION PROCEDURE

### 1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

| Self-diagnostic results |
|---|
| CONTROLLER FAILURE |

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

YES >> Replace ABS actuator and electric unit (control unit). Re-perform the self-diagnosis.
NO >> INSPECTION END

## Inspection 4 ABS Actuator and Electric Unit Power and Ground System

BFS000F4

**DTC C10CC**

INSPECTION PROCEDURE

### 1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

| Self-diagnostic results |
|---|
| BATTERY VOLTAGE |

Does “BATTERY VOLTAGE” appear in self-diagnostic results display?

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

## 2. STARTING INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) connector E32. Then reconnect it securely.
2. Perform self-diagnosis.

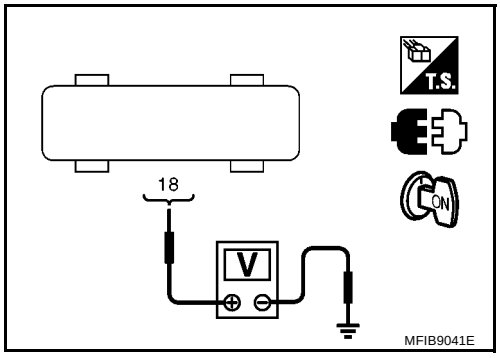
Do any self-diagnosis item appear?

YES >> GO TO 3.
NO >> Poor connection. Repair or replace connector.

## 3. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY (1)

1. Disconnect ABS actuator and electric unit (control unit) connector E32.
2. Turn ignition switch ON (not turn on engine). Check voltage between ABS actuator and electric unit (control unit) harness E32 and ground.

| ABS actuator and electric unit (control unit) | Terminal | Ground | Voltage |
|---|---|---|---|
| E32 | 18 | — | Approx. 12V |

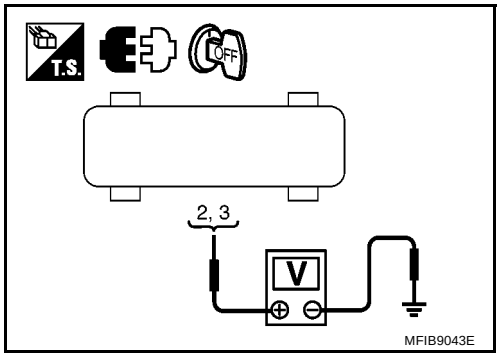



3. Turn ignition switch OFF. Check voltage between ABS actuator and electric unit (control unit) harness E32 and ground.

| ABS actuator and electric unit (control unit) | Terminal | Ground | Voltage |
|---|---|---|---|
| E32 | 2, 3 | — | Approx. 12V |

OK or NG

OK >> GO TO 4.
NG >> GO TO 5.



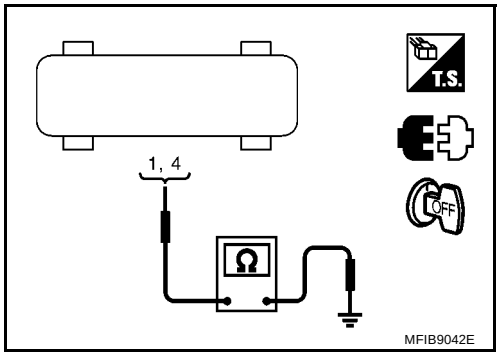

## 4. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND SYSTEM

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

| ABS actuator and electric unit (control unit) | Terminal | Ground | Continuity |
|---|---|---|---|
| E32 | 1, 4 | — | Yes |

OK or NG

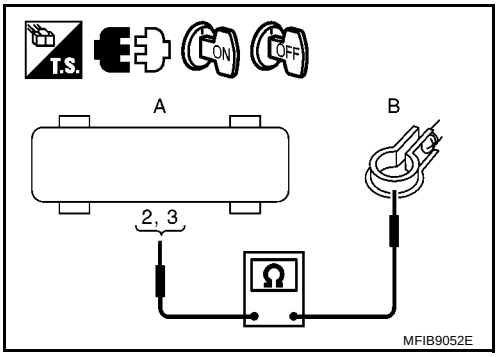
OK >> Perform ABS actuator and electric unit (control unit) self-diagnosis again.
NG >> Repair or replace harness or connectors.



## 5. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY (2)

1. Check fusible links 40A (terminal 2) and 30A (terminal 3).
2. Turn ignition switch OFF and check continuity between battery positive terminal and ABS actuator and electric unit (control unit) harness connector E32.

| A | | B | Continuity |
|---|---|---|---|
| ABS actuator and electric unit (control unit) | Terminal | Battery positive terminal | |
| E32 | 2, 3 | — | Yes |




3. Check fuse 10A (terminal 18)
4. Check continuity between 10A fuse and ABS actuator and electric unit (control unit) harness connector.

OK or NG

OK >> Check for non-standard conditions in battery (terminal looseness, low voltage, etc.) and alternator.
NG >>
- Replace fusible link 40A or 30A or fuse 10A.
- Open or short in harness.

# Inspection 5 Stop Lamp Switch System

BFS000F5

**DTC C10C6**

INSPECTION PROCEDURE

## 1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

| Self-diagnostic results |
|---|
| STOP LAMP SW |

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

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

## 2. CHECK CONNECTOR

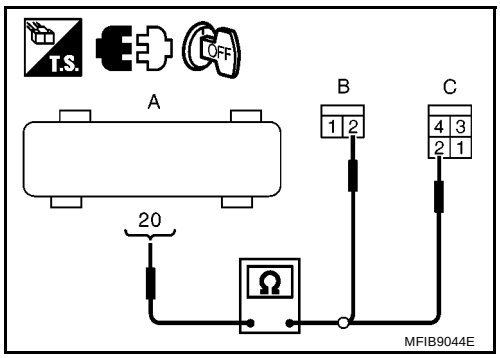
1. Disconnect stop lamp switch connector E38 (LHD MODELS WITH CR ENGINE AND HR ENGINE WITH M/T), E60 (LHD MODELS WITH HR ENGINE WITH A/T AND K9K ENGINE), M203 (RHD MODELS WITH CR ENGINE AND HR ENGINE WITH M/T), M204 (RHD MODELS WITH HR ENGINE WITH A/T AND K9K ENGINE) and ABS actuator and electric unit (control unit) connector E32 and check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
2. Securely reconnect connectors.
3. perform self-diagnosis again.

OK or NG

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

## 3. CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF and disconnect stop lamp switch connector and ABS actuator and electric unit (control unit) connector.
2. Check continuity between stop lamp switch harness connector and ABS actuator and electric unit (control unit) harness connector.



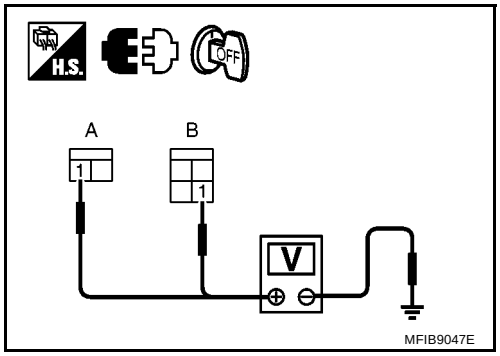

| A | | B | | C | | Continuity |
|---|---|---|---|---|---|---|
| ABS actuator and electric unit (control unit) | Terminal | Stop lamp switch (CR engine and HR engine M/T models) | Terminal | Stop lamp switch (HR engine A/T models and K9K engine models) | Terminal | |
| E32 | 20 | E38 (LHD models)<br>M203 (RHD models) | 2 | E60 (LHD models)<br>M204 (RHD models) | 2 | Yes |

OK or NG

OK >> GO TO 4.
NG >> Open or short in harness between stop lamp switch and ABS actuator and electric unit (control unit). Repair or replace applied harness.

## 4. CHECK STOP LAMP SWITCH POWER SUPPLY

1. Turn ignition switch OFF and disconnect stop lamp switch harness connector.
2. Check voltage between stop lamp switch harness connector and ground.



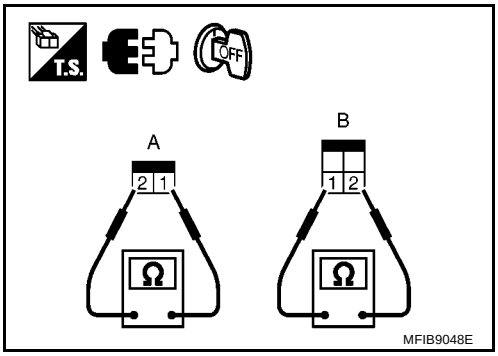

| A | | B | | Ground | Voltage |
|---|---|---|---|---|---|
| Stop lamp switch (CR engine and HR engine M/T models) | Terminal | Stop lamp switch (HR engine A/T models and K9K engine) | Terminal | | |
| E38 (LHD models)<br>M203 (RHD models) | 1 | E60 (LHD models)<br>M204 (RHD models) | 1 | — | Approx. 12V |

OK or NG

OK >> GO TO 5.
NG >> Repair or replace power supply circuit.

## 5. CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF and disconnect stop lamp switch.
2. Check continuity between stop lamp switch harness connector terminals 1 and 2.




| A | | B | | Condition | Continuity |
|---|---|---|---|---|---|
| Stop lamp switch (CR engine and HR engine M/T models) | Terminal | Stop lamp switch (HR engine A/T models and K9K engine) | Terminal | | |
| E38 (LHD models)<br>M203 (RHD models) | 1, 2 | E60 (LHD models)<br>M204 (RHD models) | 1, 2 | Brake pedal is depressed | Yes |
| | | | | Brake pedal is released | No |

OK or NG

OK >> Connect connectors and conduct an ABS actuator and electric unit (control unit) self-diagnosis.
NG >> Replace stop lamp switch.

# Inspection 6 CAN Communication Circuit

BFS000F6

**DTC U1000, C1180**

INSPECTION PROCEDURE

## 1. CHECK CONNECTOR

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

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

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

# Symptom 1 ABS Works Frequently.

BFS000F7

## 1. START INSPECTION

Check brake force distribution.

OK or NG

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

## 2. CHECK FRONT AND REAR AXLE

Check front and real axle for significant “looseness”.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

### 3. CHECK WHEEL SENSOR AND ROTOR

Wheel Sensor Inspection

- Sensor installation and damage inspection
- Sensor rotor installation and damage inspection
- Sensor connector engagement inspection
- Sensor harness inspection

OK or NG

OK >> GO TO 4.
NG >> ● Replace wheel sensor or sensor rotor.
● Repair harness.

### 4. CHECK INDICATOR DISPLAY OF WARNING LAMP

Make sure warning lamp is off approximately 1 second after ignition switch is turned ON or during driving.

OK or NG

OK >> Normal
NG >> Perform self-diagnosis. Refer to BRC-19, "Self-Diagnosis" .

## Symptom 2 Unexpected Pedal Reaction

BFS000F8

### 1. CHECK BRAKE PEDAL STROKE

Check brake pedal stroke.

Is brake pedal stroke not excessive?

YES >> ● Bleed air from brake piping.
● Check for looseness of brake pedal, master back, and master cylinder. Also check brake system for oil leak. Repair as necessary.
NO >> GO TO 2.

### 2. PERFORMANCE CHECK

Disconnect control unit connector E32 to deactivate ABS. In this condition, make sure braking force is normal after inspection, reconnect connector.

OK or NG

OK >> GO TO 3. Wheel Sensor Inspection in BRC-33, "Symptom 1 ABS Works Frequently." .
NG >> Check brake system.

## Symptom 3 Longer Stopping Distance

BFS000F9

**CAUTION:**
**On slippery road, stopping distance could be longer when ABS is activated than when it is not.**

### 1. CHECK FUNCTION

Disconnect control unit connector E32 to deactivate ABS. In this condition, check braking distance After inspection, reconnect connector.

OK or NG

OK >> ● Bleed air from brake piping.
● Check brake system.
NG >> GO TO 3. Wheel Sensor Inspection in BRC-33, "Symptom 1 ABS Works Frequently." .

## Symptom 4 ABS Does Not Work

BFS000FA

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

### 1. CHECK INDICATOR DISPLAY OF WARNING LAMP

Make sure warning lamp is off approximately 1 second after ignition switch is turned ON or during driving.

OK or NG

OK >> GO TO 3. Wheel Sensor Inspection in BRC-33, "Symptom 1 ABS Works Frequently." .
NG >> Perform a self-diagnosis. Refer to BRC-19, "Self-Diagnosis" .

## Symptom 5 Pedal Vibration and ABS Operation Noise

BFS000FB

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

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

### 1. SYMPTOM CHECK 1

Check brake system for pedal vibration or noise at engine start.

OK or NG

OK >> GO TO 2.
NG >> Perform self-diagnosis. Refer to BRC-19, "Self-Diagnosis" .

### 2. SYMPTOM CHECK 2

Operate electrical equipment (head lamp or equivalents), and confirm symptoms.

Does symptom occur when electrical switches (head lamp, etc.) are operated?

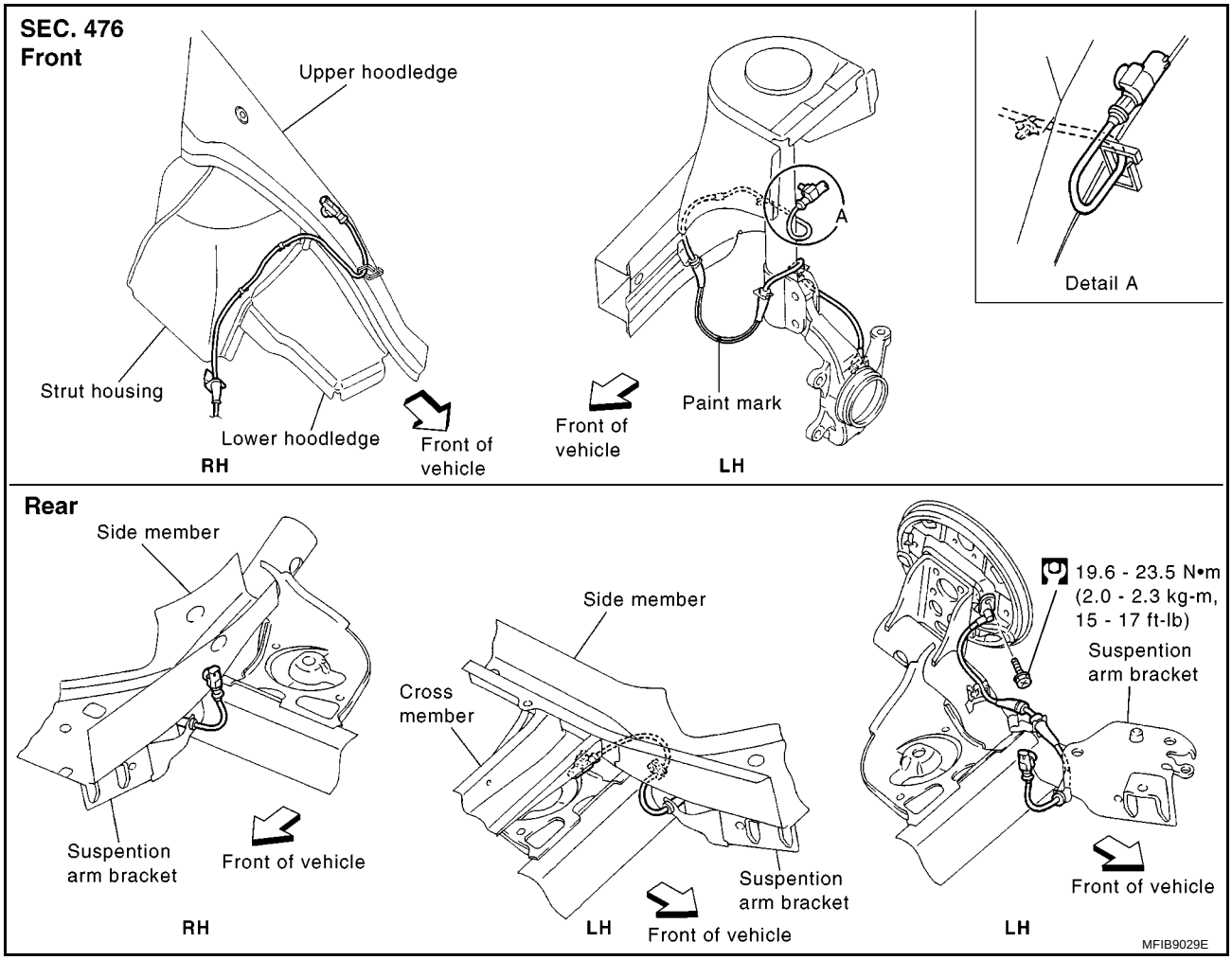
YES >> Check for radio, antenna, and antenna lead-in wires (including wiring) near the control unit. If they are near ABS actuator and electric unit (control unit), move them.
NO >> GO TO 3. Wheel Sensor Inspection in BRC-33, "Symptom 1 ABS Works Frequently." .

# WHEEL SENSORS

PFP:47910

## Removal and Installation

BFS0009X




### REMOVAL

Be careful of the following.

**CAUTION:**

- **When removing the sensor, do not rotate it if possible, and not forcibly pull the sensor harness.**
- **Before removing front or rear wheel hub, remove wheel sensor to avoid sensor wiring damage.**

### INSTALLATION

Be certain to tighten bolts to the specified torque. Be careful of the following:

- Check the inside of the sensor mounting hole for foreign material, the rotor surface for iron chips and other foreign material, and if anything is non-standard, clean it before installation, or replace it.
- When installing the front sensor, completely push in the strut bracket and body bracket rubber grommets until they lock so that the sensor harness does not become twisted. In addition, there should be no twists in the harness when installed. Install the harness so that the painted part faces the outside of the vehicle.
- When installing the rear sensor, completely push in the rubber bracket of the suspension arm bracket and lock the marking area of the side member harness mount so that the sensor harness will not be twisted. In addition, there should be no twists in the harness when installed.

# SENSOR ROTOR

PFP:47970

## Removal and Installation

BFS0009Y

### FRONT

- Because the sensor rotor is integrated with the wheel bearing, replace it together with the wheel bearing assembly. Refer to FAX-6, "FRONT WHEEL HUB AND KNUCKLE" .

### REAR

- During removal and installation, remove the wheel hub (brake drum). Refer to RAX-5, "WHEEL HUB" .

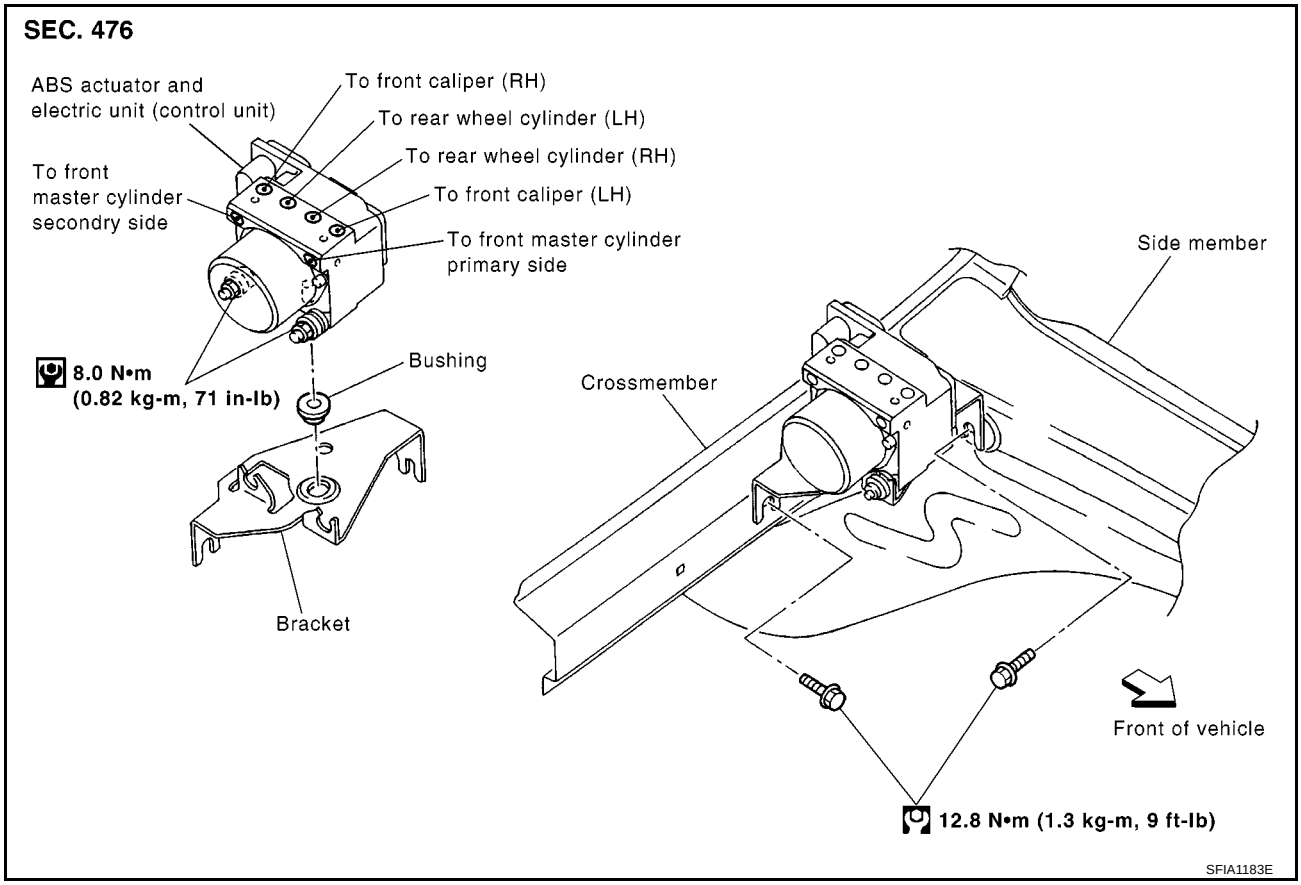
**CAUTION:**
**The sensor rotor is a non-reusable part, it must be replaced by an new part when removing it.**

# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

PFP:47660

## Removal and Installation

BFS0009Z




### REMOVAL

Be careful of the following.

**CAUTION:**

- **Before servicing, disconnect the battery cables.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use a flare nut torque wrench and tighten to the specified torque.**
- **Do not apply excessive impact to the actuator, such as dropping it.**

### INSTALLATION

Be careful of the following.

- When setting the actuator in the bracket, push it in until it locks.
- Tighten the mounting bolts and nuts to the specified torque.
- After the work, breed the air from the brake piping. Refer to BR-10, "Bleeding Brake System" .
- After installing the vehicle harness connector in the actuator, make sure the connector is securely locked.

# PRECAUTIONS

PFP:00001

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

BFS000A0

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.

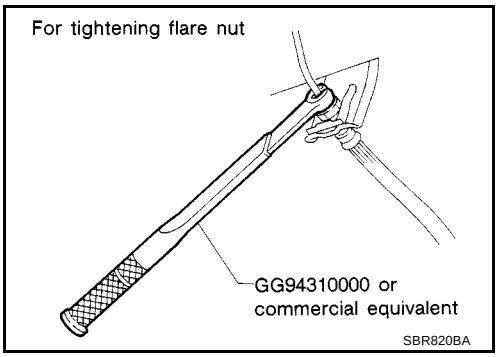
**WARNING:**

- **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

BFS000A1

- Recommended fluid is brake fluid “Nissan Genuine Brake Fluid or DOT 3 or DOT 4 (US FMVSS No.116)”.
- Do not reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas such as body. If brake fluid is splashed, wipe it off and flush area with water immediately.
- Do not use mineral oils such as gasoline or kerosene to clean. They will ruin rubber parts and cause improper operation.
- Using a flare nut torque wrench, securely tighten brake tube flare nuts.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Before working, turn ignition switch OFF and disconnect electrical connectors of ABS actuator and electric unit (control unit) or battery negative terminals.
- When installing brake piping, be sure to check torque.
- After removing/installing any hydraulic parts of the brake or ESP system (such as actuator and piping parts, etc), bleed air from the system.




## Precautions for Brake Control

BFS000A2

- During ESP/TCS/ABS operation, brake pedal lightly vibrates and a mechanical noise may be heard. This is normal.
- When starting engine, or just after starting vehicle, 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 the customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic servicing. Besides the electrical system inspection, check booster operation, brake fluid level, and fluid leaks.
- If tyre 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, ESP/TCS/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.

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

## Diagnosis Precaution

BFS000A3

### CAN SYSTEM

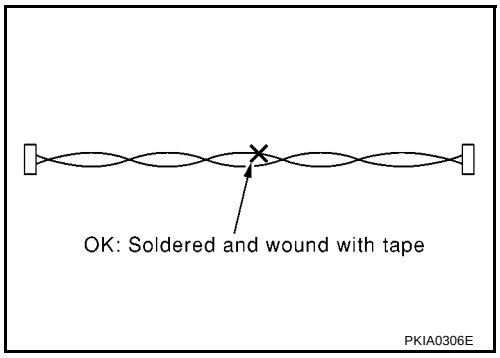
- Do not apply voltage of 7.0 V or higher to terminal to be measured.
- Maximum open terminal voltage of tester in use shall be 7.0 V or lower.
- Before checking harnesses, turn ignition switch OFF and disconnect battery negative cable.

## Precaution for Harness Repair

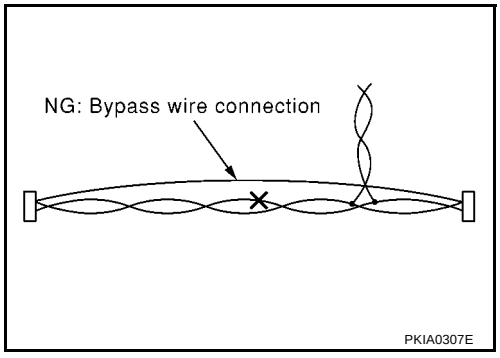
BFS000A4

### CAN SYSTEM

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




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

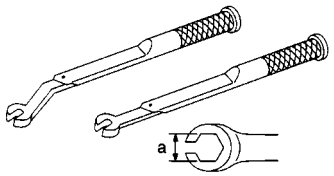


# PREPARATION

PFP:00002

## Special Service Tools

BFS000A5

| Tool number<br>Tool name | | Description |
|---|---|---|
| GG94310000<br>Flare nut torque wrench<br>a: 10 mm (0.39 in) |  <br>NT406 | Removing and installing each brake piping |

# ON-VEHICLE SERVICE

PFP:00000

## Adjustment of Steering Angle Sensor Neutral Position

BFS000A6

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

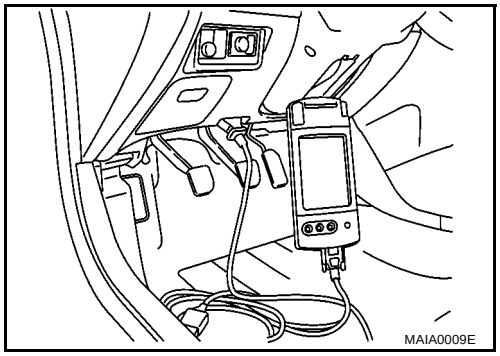
| Situation | Adjustment of Steering Angle Sensor Neutral Position |
|---|---|
| Disconnecting/connecting the battery | – |
| Removing/Installing ABS actuator and electric unit (control unit) | × |
| Replacing ABS actuator and electric unit (control unit) | × |
| Removing/Installing steering angle sensor | × |
| Removing/Installing steering components | × |
| Removing/Installing suspension components | × |
| Removing/Installing the same tyre to the same position | – |
| Change 4 tyres to new ones | – |
| Change some of 4 tyres to new ones (not 4 tyres) | – |
| Tyre rotation | – |
| Adjusting wheel alignment | × |

×: Required
–: Not required

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

### OPERATION PROCEDURE

1. Stop the vehicle with the front wheels in the straight-ahead position.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector on the vehicle, and turn the ignition switch to ON position (engine not running).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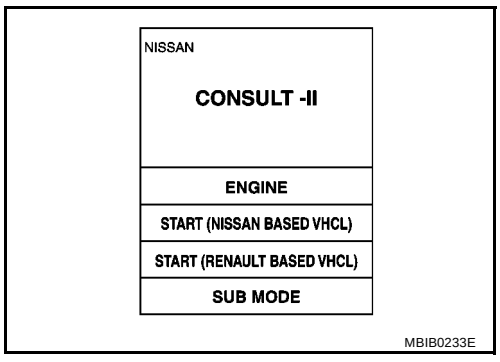
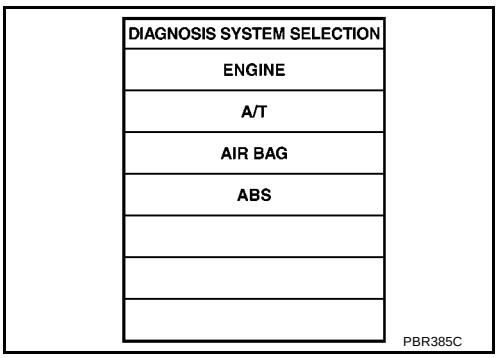
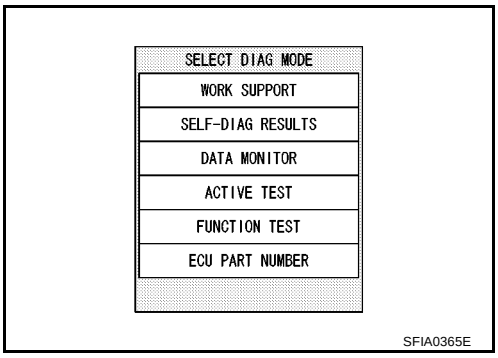
3. Touch “START (NISSAN BASED VHCL).

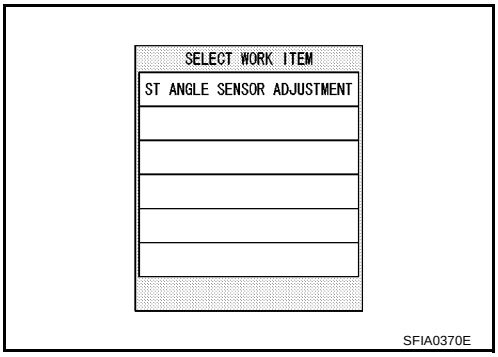


MBIB0233E

4. Touch “ABS”, “WORK SUPPORT” and “ST ANGLE SENSOR ADJUSTMENT” on the CONSULT-II screen in this order.



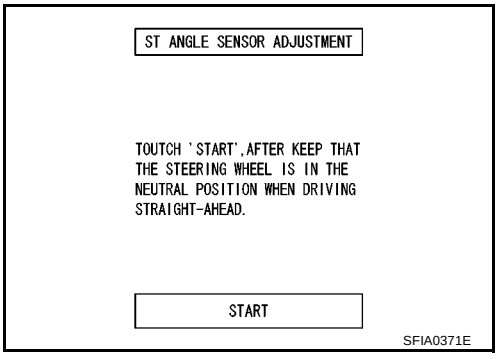

5. Touch “START”.

**CAUTION:**
**Do not touch the steering wheel while adjusting the steering angle sensor.**

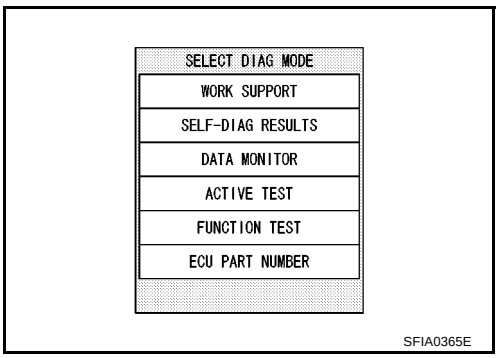
6. After approximately 10 seconds, touch “END”. (After approximately 60 seconds, it ends automatically.)
7. Turn the ignition switch OFF, then turn it ON again.

**CAUTION:**
**Make sure to carry out the above operation.**

8. Run the vehicle with the front wheels in the straight-ahead position, then stop.



9. Select “DATA MONITOR“, “SELECTION FROM MENU” on the CONSULT-II screen. Then check that the “ST ANGLE SIG” is within 0±5deg. If the value is more than the specification, repeat steps 1 to 5.
10. Erase the memory of ESP/TCS/ABS control unit and ECM.
11. Turn the ignition switch OFF.

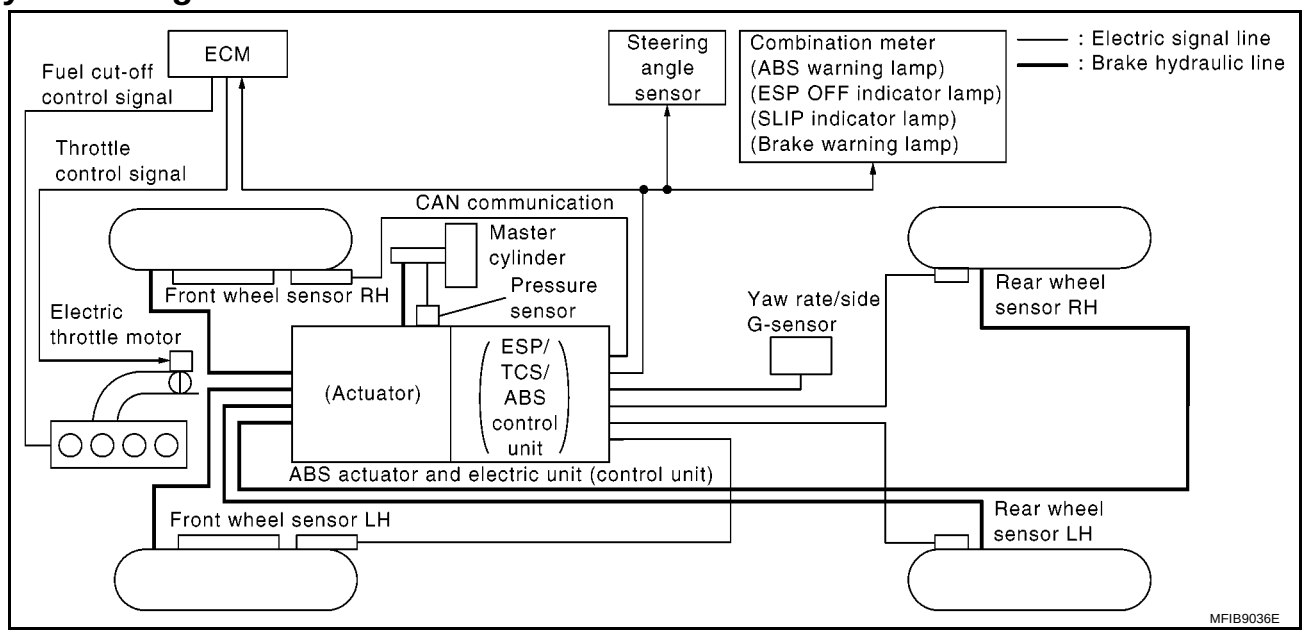


# SYSTEM DESCRIPTION

PFP:00000

## System Diagram

BFS000A7




## ESP Function

BFS000A8

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

## TCS Function

BFS000A9

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

## ABS Function

BFS000AA

- The anti-lock brake system is a function that detects wheel revolution while braking, and it improves handling stability during sudden braking by electrically preventing 4 wheel lock. Maneuverability is also improved for avoiding obstacles.
- If the electrical system breaks down, then the fail-safe function starts, the ABS becomes inoperative, and ABS warning lamp turns on.
- Electrical system diagnosis by CONSULT-II is available.
- During ABS operation, brake pedal lightly vibrates and a mechanical noise may be heard. This is normal.

- When starting engine, or just after starting vehicle, brake pedal may vibrate or motor operating noises may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

## EBD Function

BFS000AB

- Electronic brake distributor is a function that detects subtle slippages between front and rear wheels during braking, and it improves handling stability by electronically controlling the brake fluid pressure which results in reduced rear wheel slippage.
- In case of electrical system break down, the fail-safe function is activated, EBD and ABS becomes inoperative, and ABS warning lamp and brake warning lamp are turned on.
- Electrical system diagnosis by CONSULT-II is available.
- During EBD operation, brake pedal lightly vibrates and a mechanical noise may be heard. This is normal.
- When starting engine, or just after starting vehicle, brake pedal may vibrate or motor operating noises may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without EBD when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

## Fail-Safe Function

BFS000AC

### ESP / TCS SYSTEM

In case of malfunction in the ESP/TCS system, ESP OFF indicator lamp and SLIP indicator lamp are turned on, and the condition of vehicle is the same as the condition of vehicles without ESP/TCS system. In case of malfunction in the ESP/TCS system, the ABS control continues to operate normally without ESP/TCS control.

**CAUTION:**

**If the fail-safe function is activated, then perform the self-diagnosis for ESP/TCS/ABS control system.**

### ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp will turn on. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp will turn on. Simultaneously, the ESP/TCS/ABS become one of the following conditions of the fail-safe function.

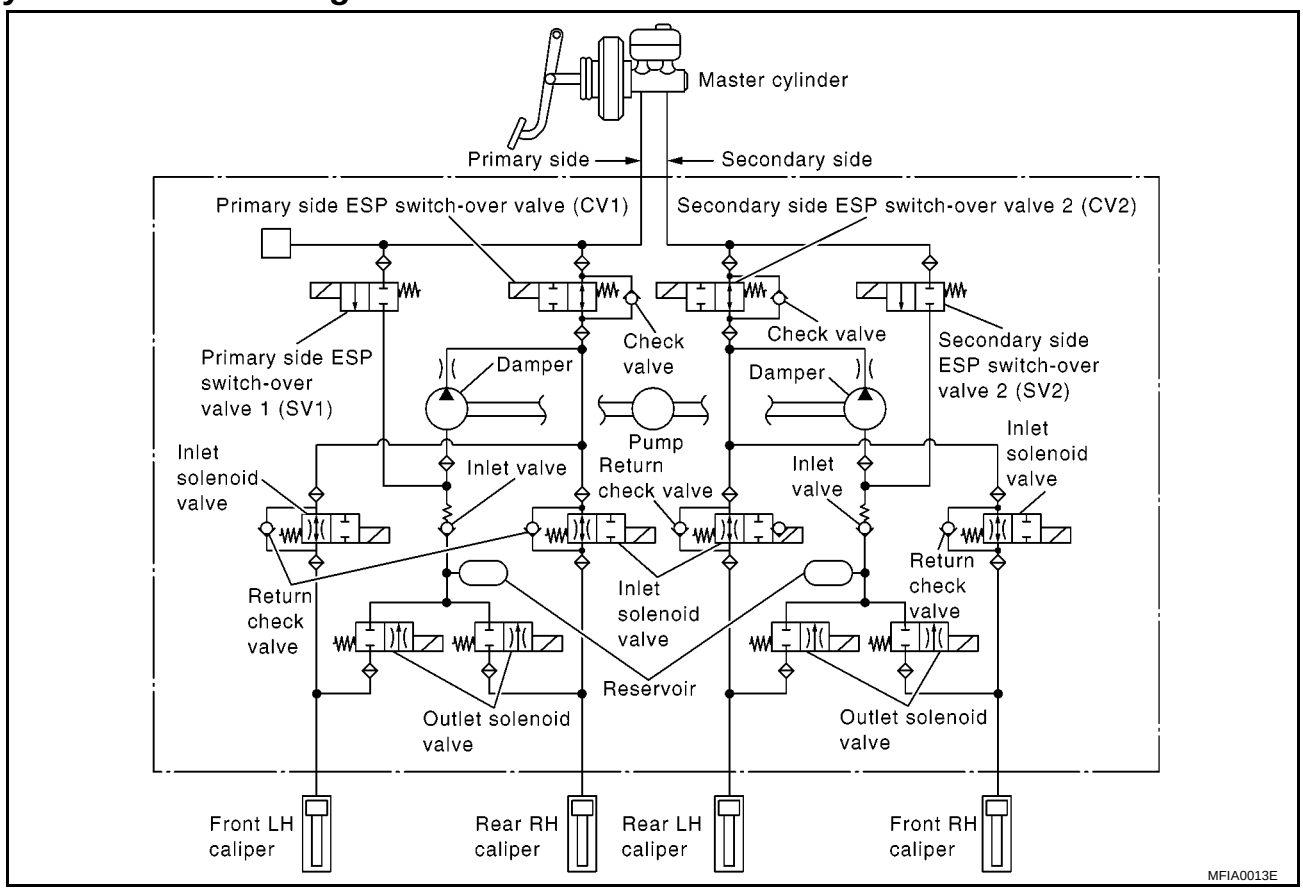
1. For malfunction of ABS, only the EBD is activated and the condition of vehicle is the same condition of vehicles without TCS/ABS system.
2. For malfunction of EBD, EBD and ABS become inoperative, and the condition of vehicle is the same as the condition of vehicles without TCS/ABS, EBD system.

**NOTE:**

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

## Hydraulic Circuit Diagram

BFS000AD



# CAN COMMUNICATION

PFP:23710

## System Description

BFS000AE

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-27, "CAN Communication Unit" .

# TROUBLE DIAGNOSIS

PFP:00004

## How to Proceed With Diagnosis

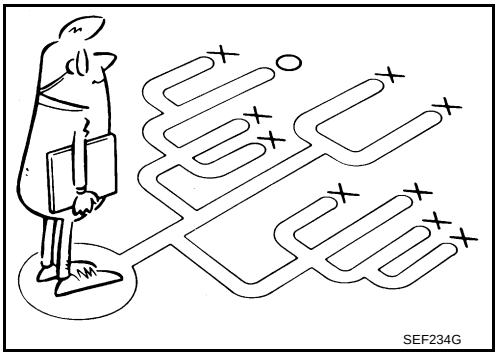
BFS000AG

### BASIC CONCEPT

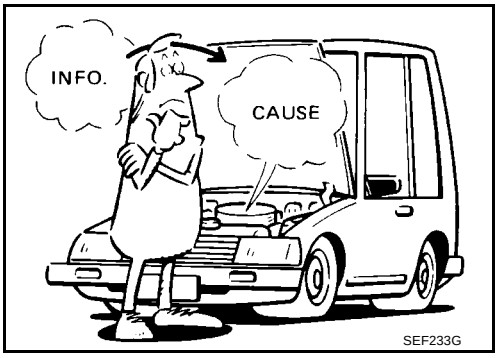
- Most important point to perform diagnosis is to understand systems (control and mechanism) in vehicle thoroughly.

- 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”.


SEF234G

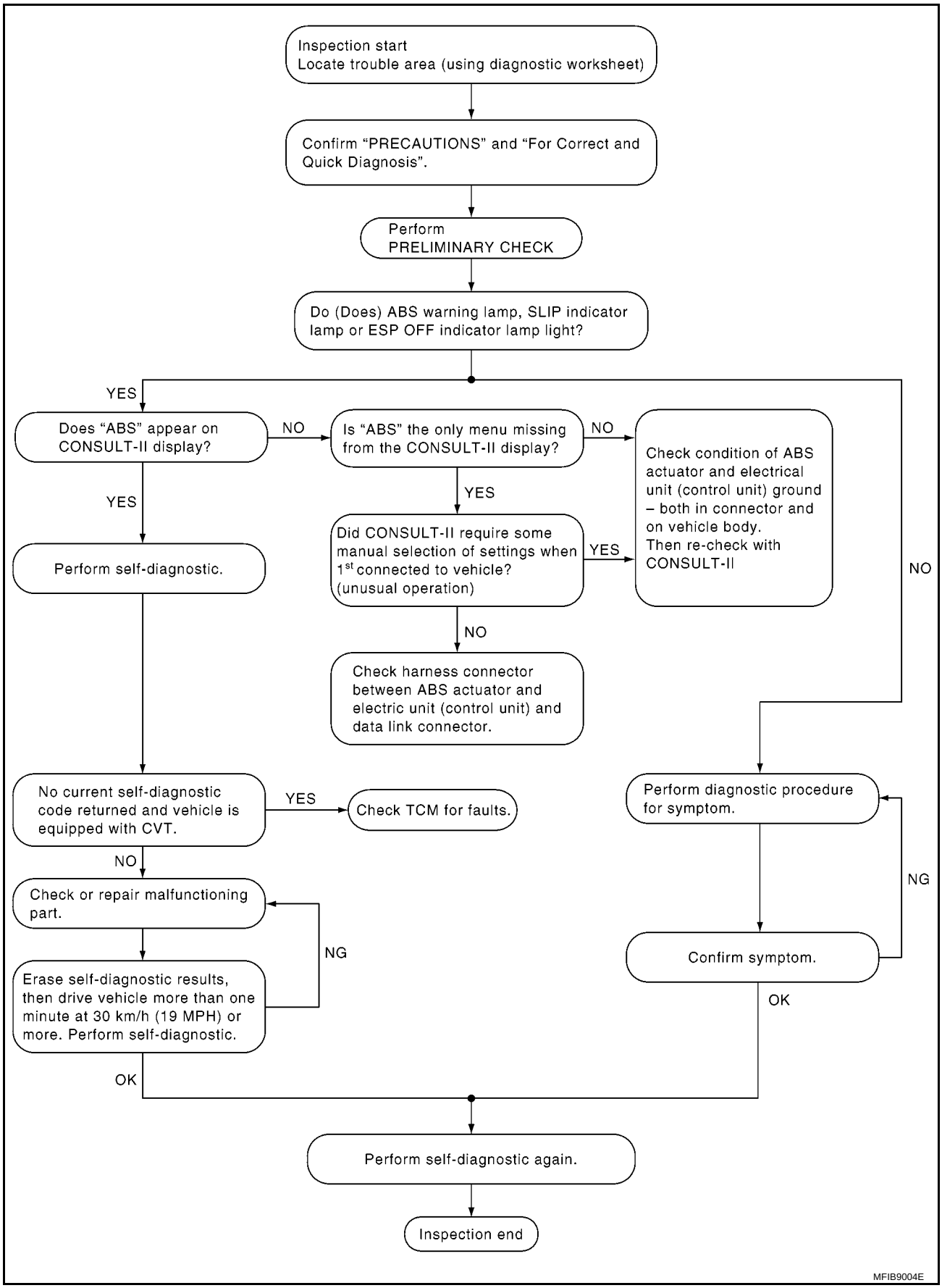
- It is essential to check symptoms right from beginning in order to repair a malfunction completely.
  For an intermittent malfunction, it is important to reproduce symptom based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake suspected harness or connector by hand. When repairs are performed without any symptom check, no one can judge if malfunction has actually been eliminated.
- After diagnosis, make sure to carry out “erase memory”. Refer to BRC-62, "ERASE MEMORY" .
- For an intermittent malfunction, move harness or harness connector by hand to check poor contact or false open circuit.



SEF233G

- Always read “GI General Information” to confirm general precautions. Refer to GI-4, "General Precautions" .

## DIAGNOSIS FLOWCHART



## ASKING COMPLAINTS

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

**KEY POINTS**

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

SBR339B

## EXAMPLE OF DIAGNOSIS SHEET

| | | | |
|---|---|---|---|
| Customer name MR/MS | Model & Year | | VIN |
| Engine # | Trans. | | Mileage |
| Incident Date | Manuf. Date | | In Service Date |
| Symptoms | ☐ Noise and vibration (from engine compartment)<br>☐ Noise and vibration (from axle) | ☐ Warning / Indicator activate | ☐ Firm pedal operation<br>Large stroke pedal operation |
| | ☐ TCS does not work (Rear wheels slip when accelerating) | ☐ ABS does not work. (wheels slip when braking) | ☐ Lack of sense of acceleration |
| Engine conditions | ☐ When starting ☐ After starting | | |
| Road conditions | ☐ Low friction road ( ☐Snow ☐Gravel ☐Other )<br>☐ Bumps / potholes | | |
| Driving conditions | ☐ Full-acceleration<br>☐ High speed cornering<br>☐ Vehicle speed: Greater than 10 km/h (6 MPH)<br>☐ Vehicle speed: 10 km/h (6 MPH) or less<br>☐ Vehicle is stopped | | |
| Applying brake conditions | ☐ Suddenly<br>☐ Gradually | | |
| Other conditions | ☐ Operation of electrical equipment<br>☐ Shift change<br>☐ Other descriptions | | |

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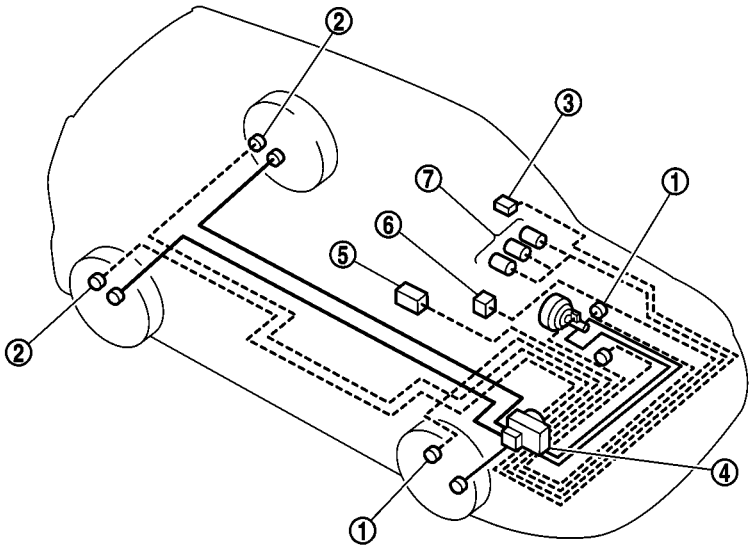
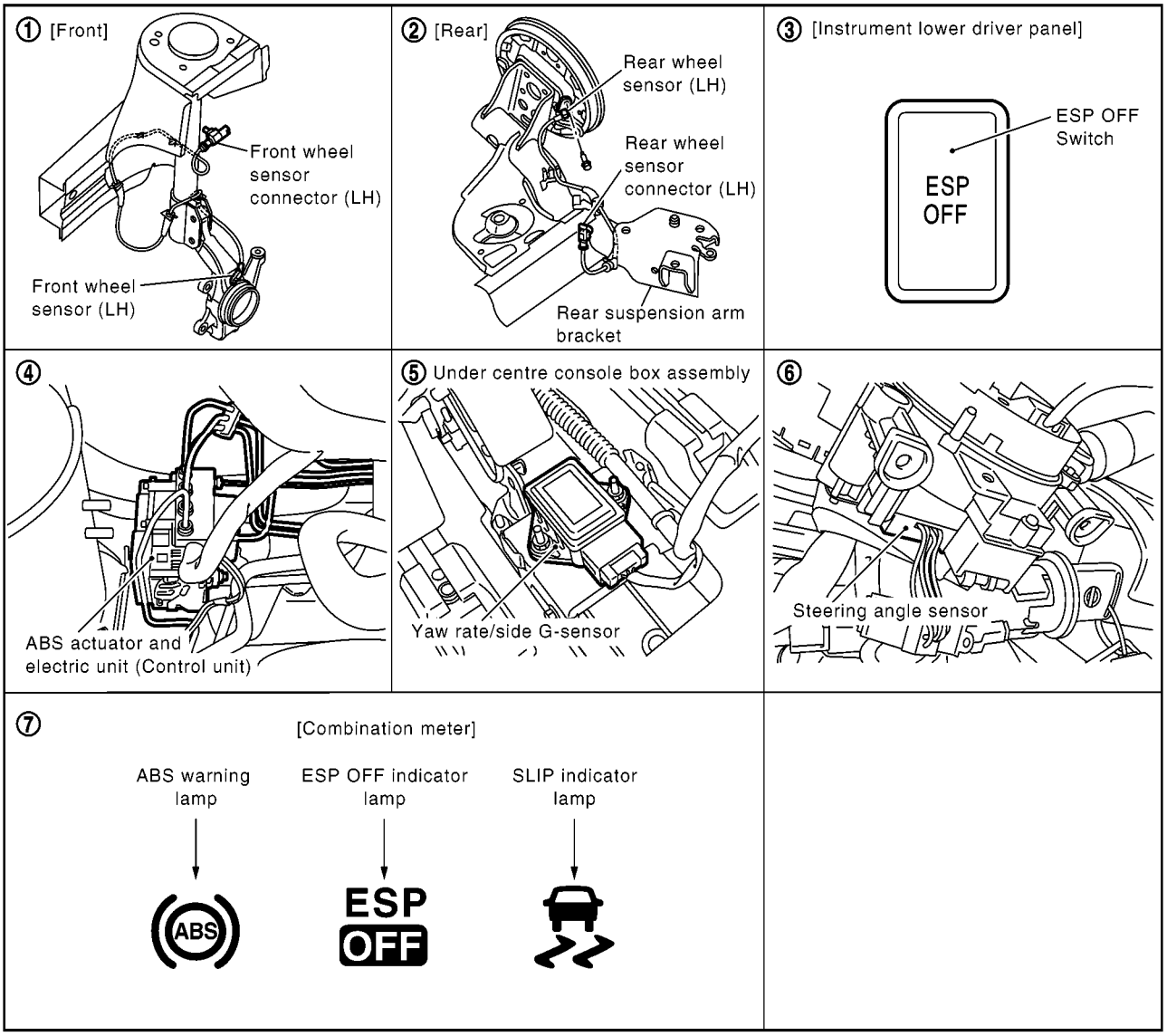
## Component Installation Location

BFS000AH

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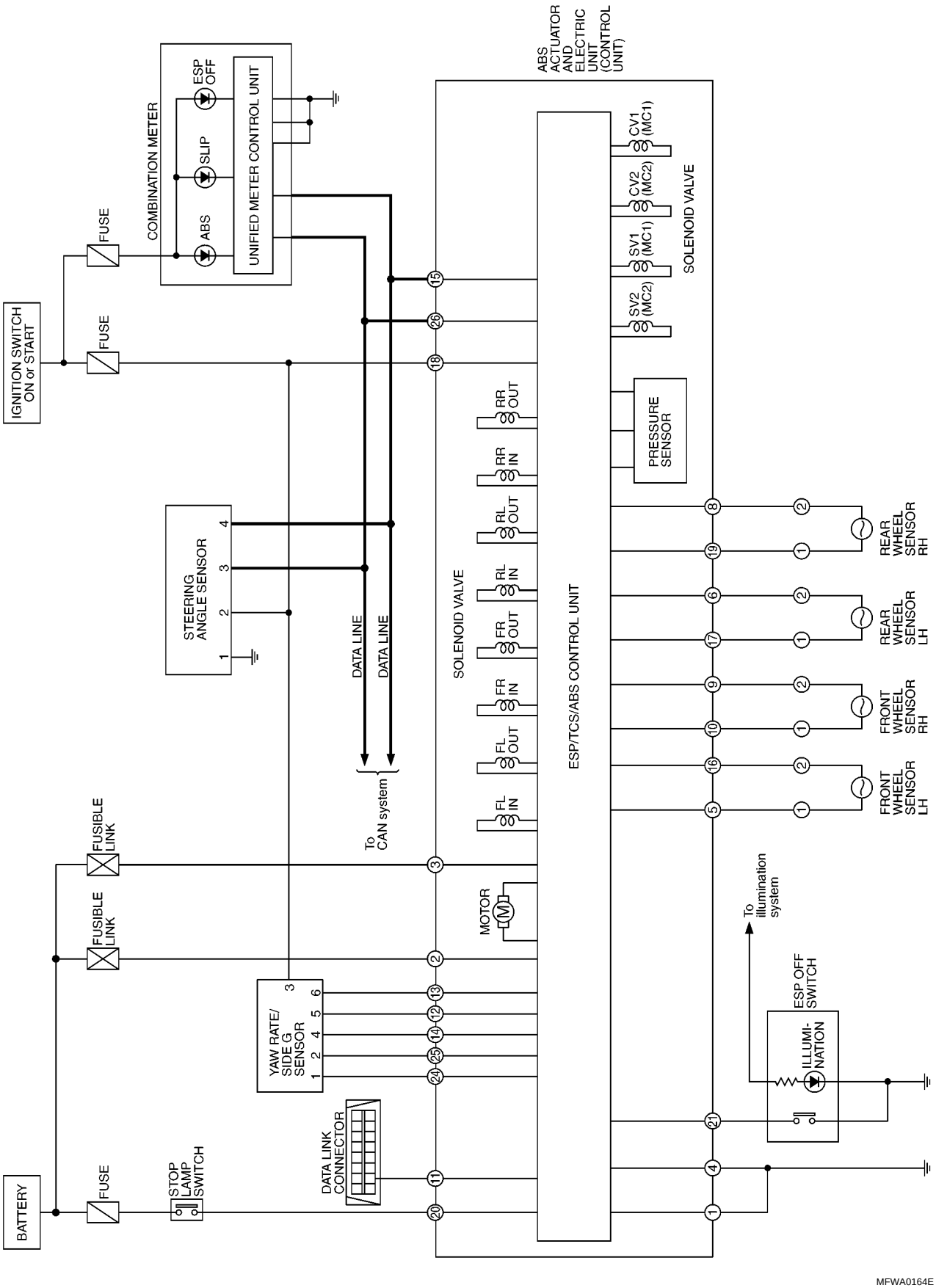
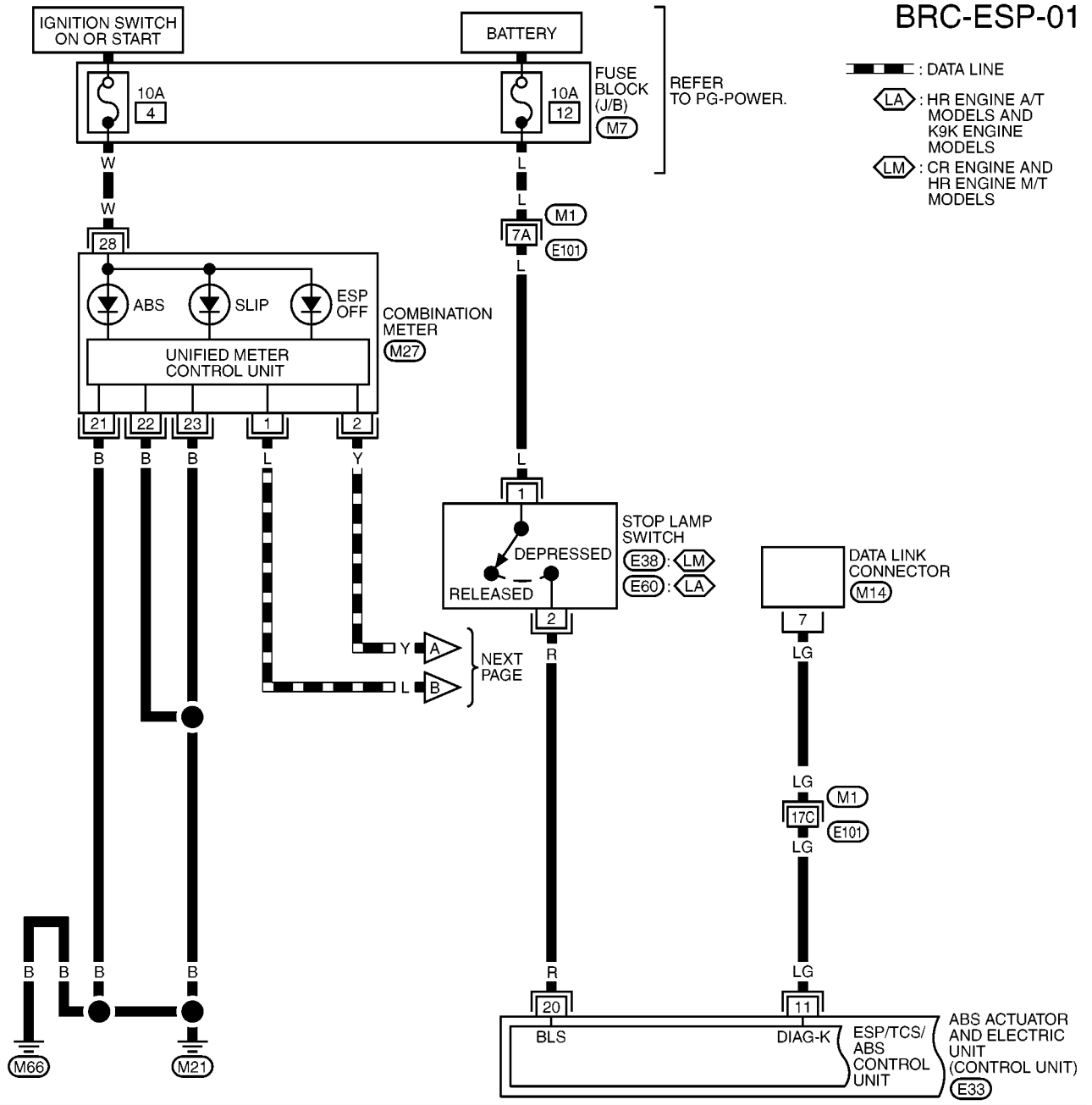
## Schematic

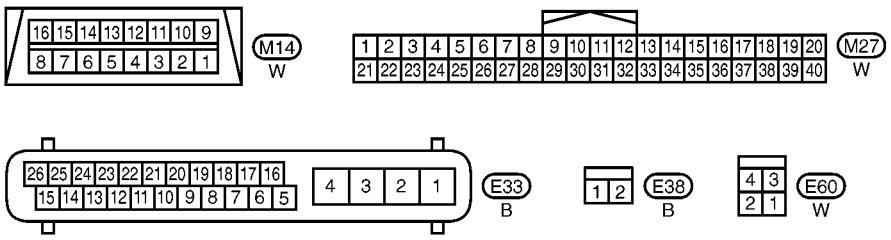
BFS000AI



## Wiring Diagram — ESP —

BFS000AJ

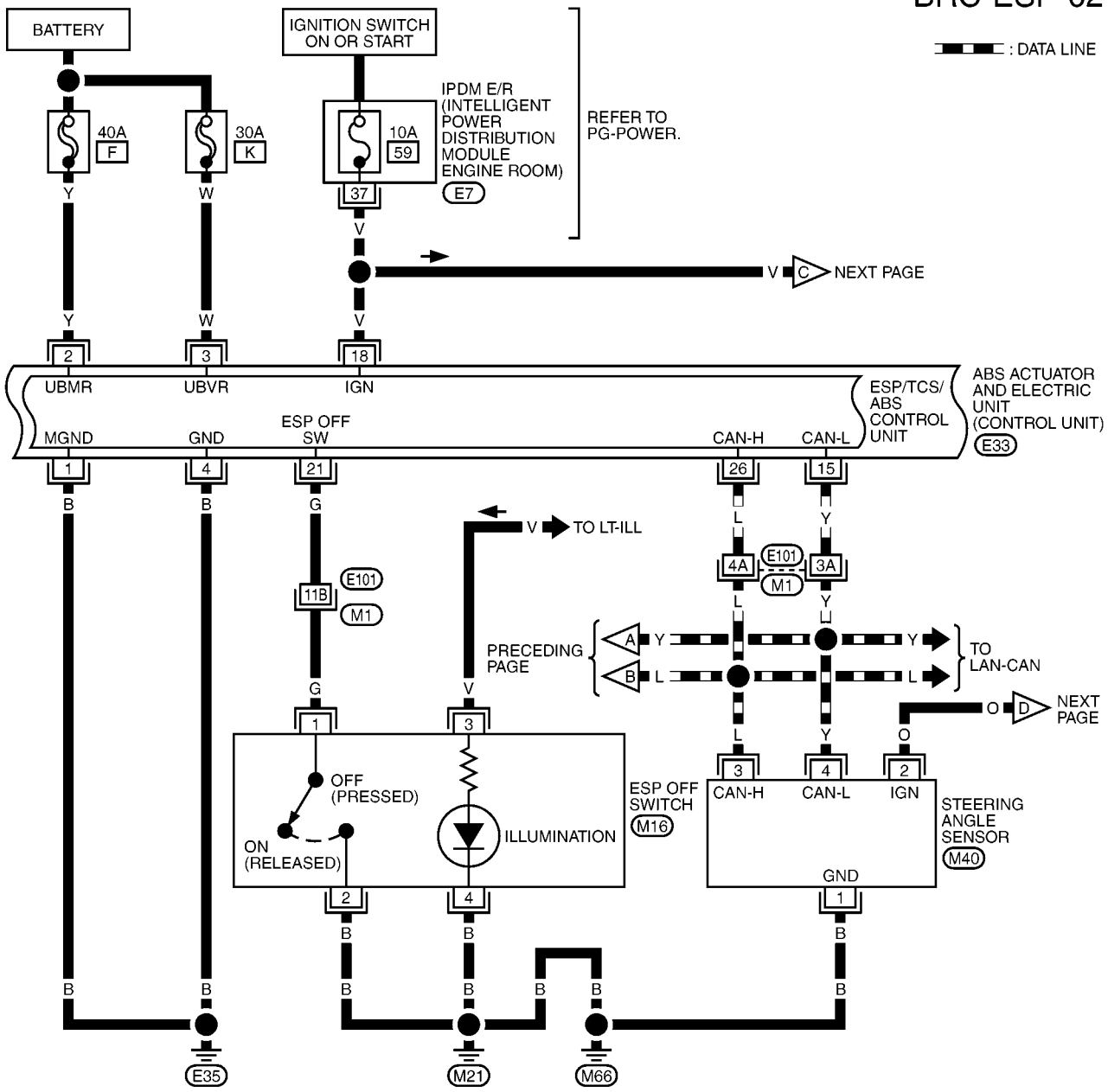


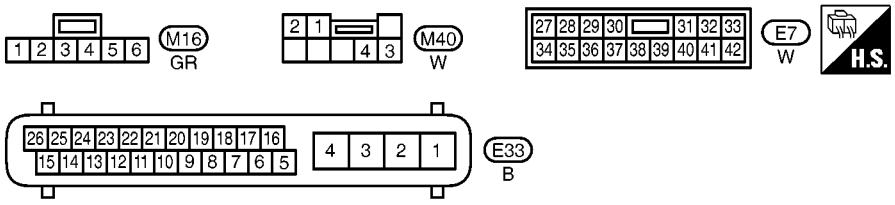




REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)
M7 - FUSE BLOCK - JUNCTION BOX (J/B)

MFWA0165E

BRC-ESP-02

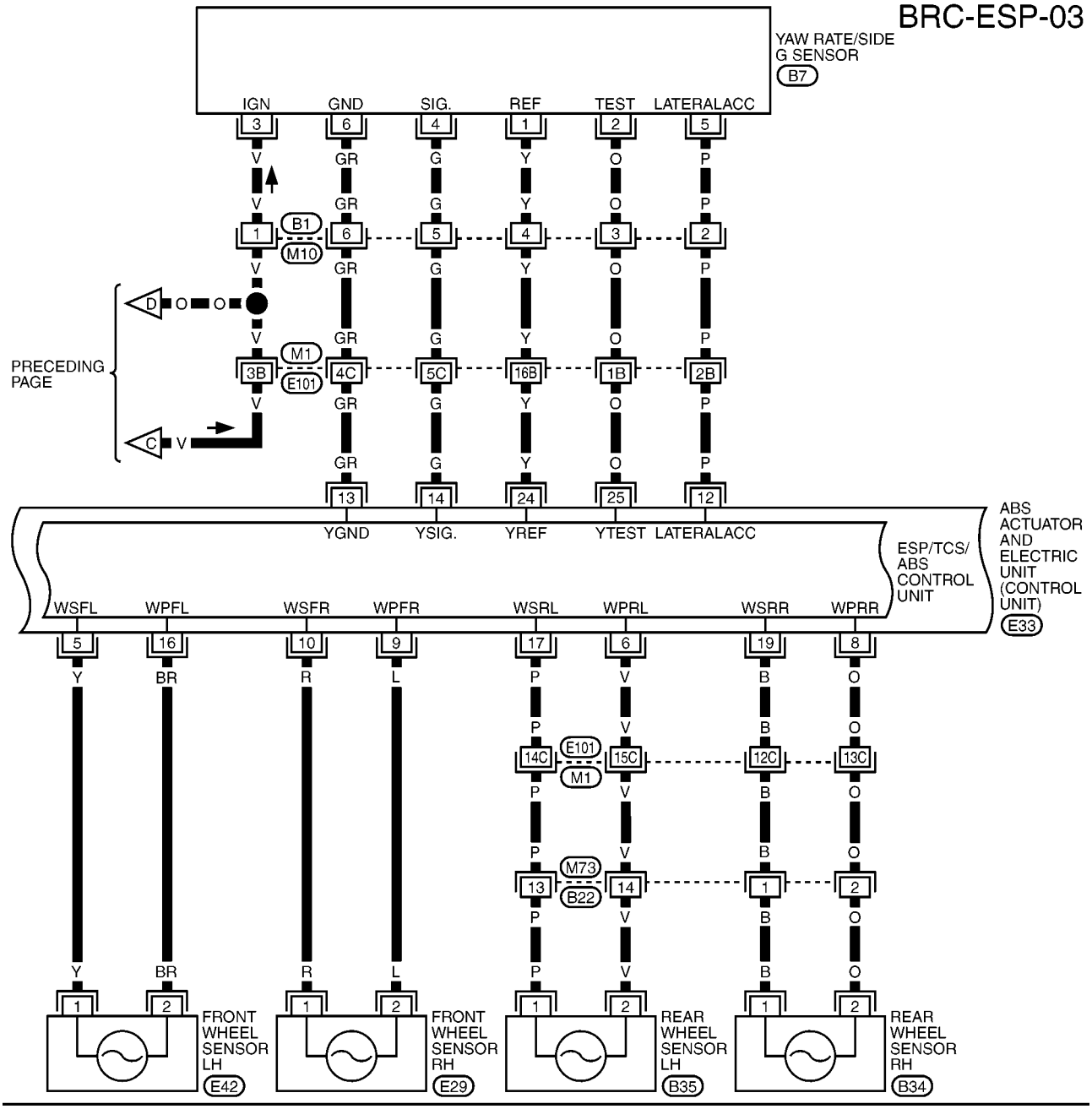


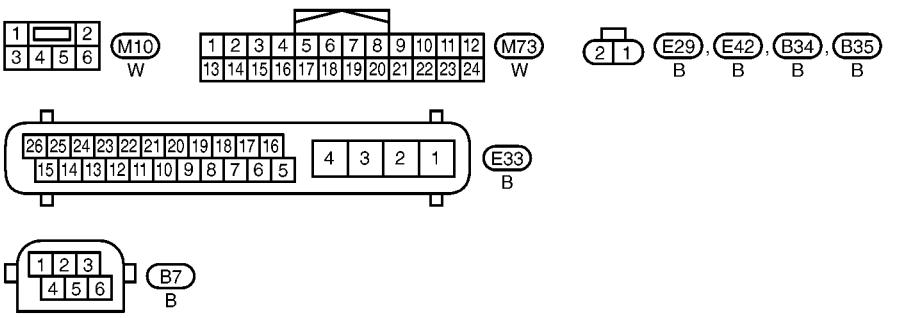




REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)

MFWA0166E

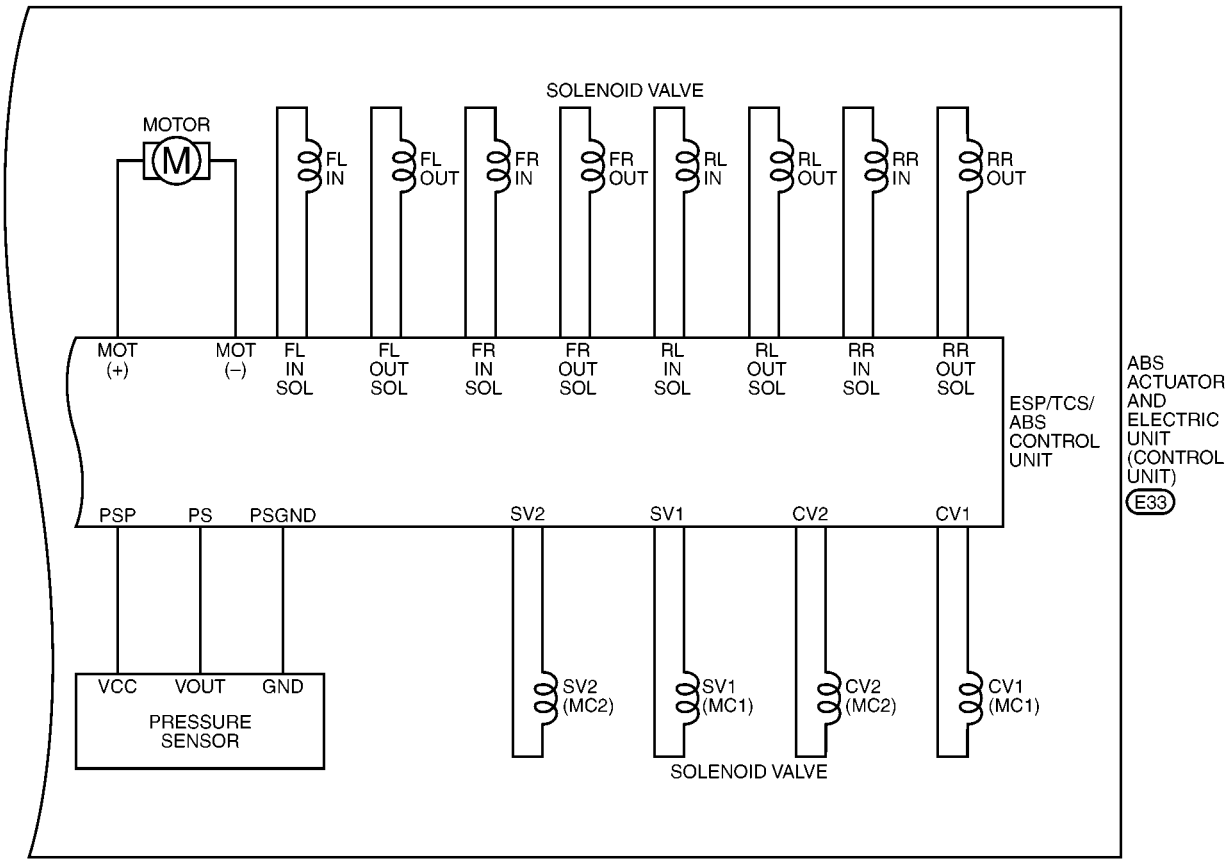
BRC-ESP-03

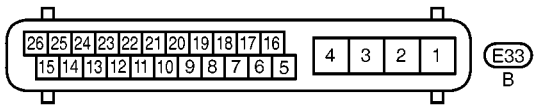


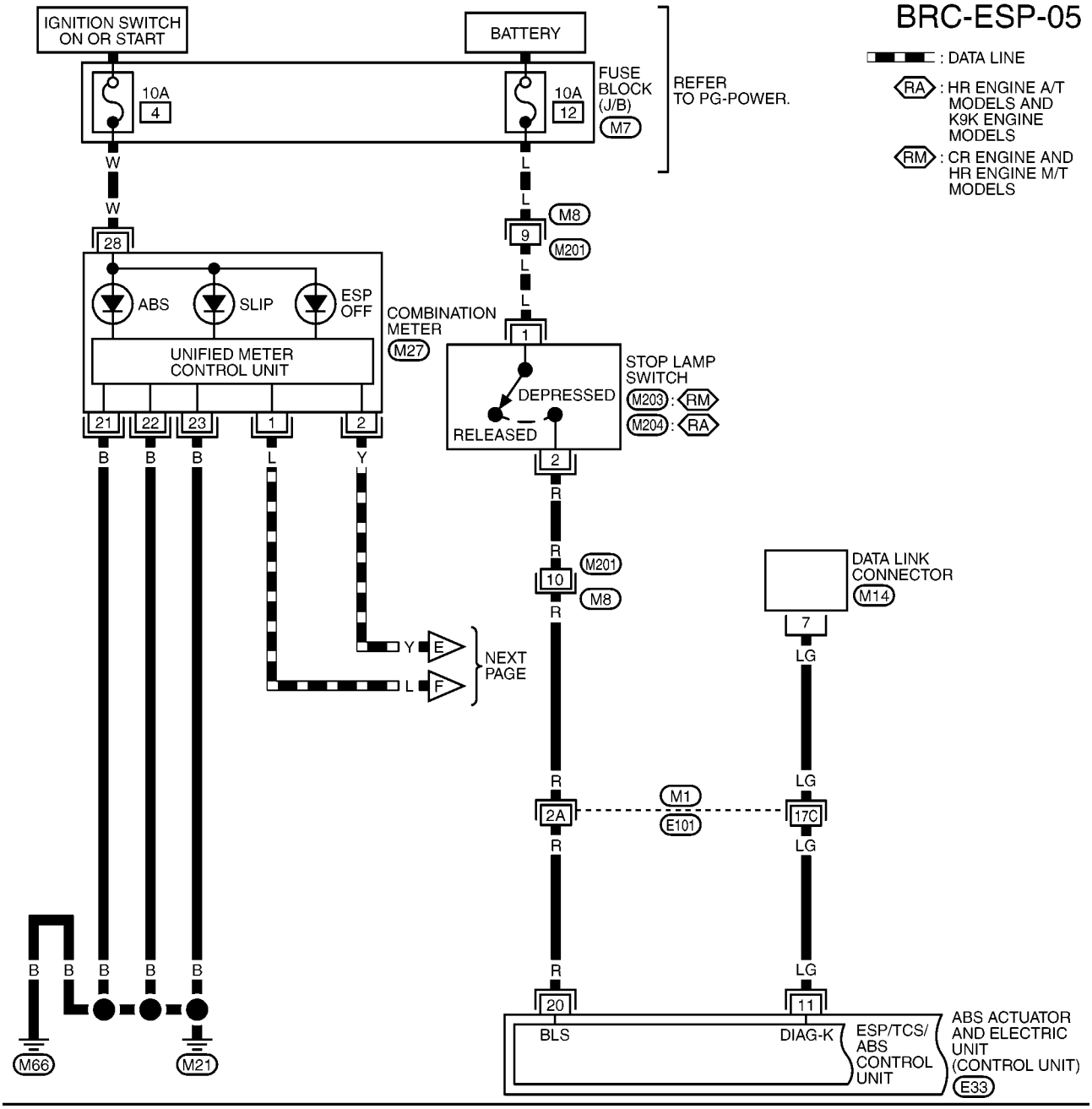

REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)

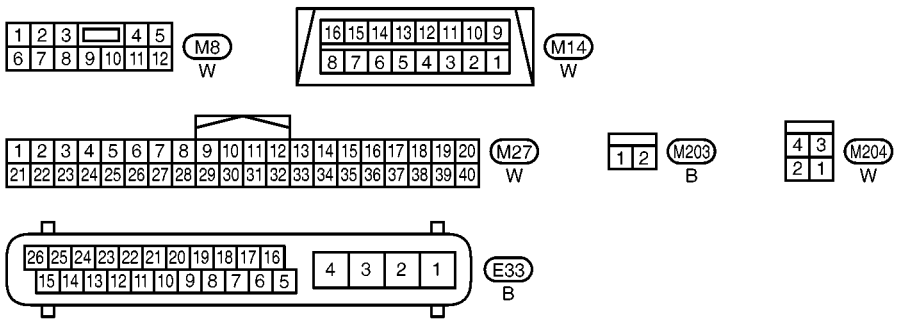
MFWA0167E


SOLENOID VALVE
MOTOR
M
FL IN
FL OUT
FR IN
FR OUT
RL IN
RL OUT
RR IN
RR OUT
MOT (+)
MOT (–)
FL IN SOL
FL OUT SOL
FR IN SOL
FR OUT SOL
RL IN SOL
RL OUT SOL
RR IN SOL
RR OUT SOL
ESP/TCS/ ABS CONTROL UNIT
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
E33
PSP
PS
PSGND
SV2
SV1
CV2
CV1
VCC
VOUT
GND
PRESSURE SENSOR
SV2 (MC2)
SV1 (MC1)
CV2 (MC2)
CV1 (MC1)
SOLENOID VALVE


26 25 24 23 22 21 20 19 18 17 16
15 14 13 12 11 10 9 8 7 6 5
4 3 2 1
E33
B

MFWA0168E

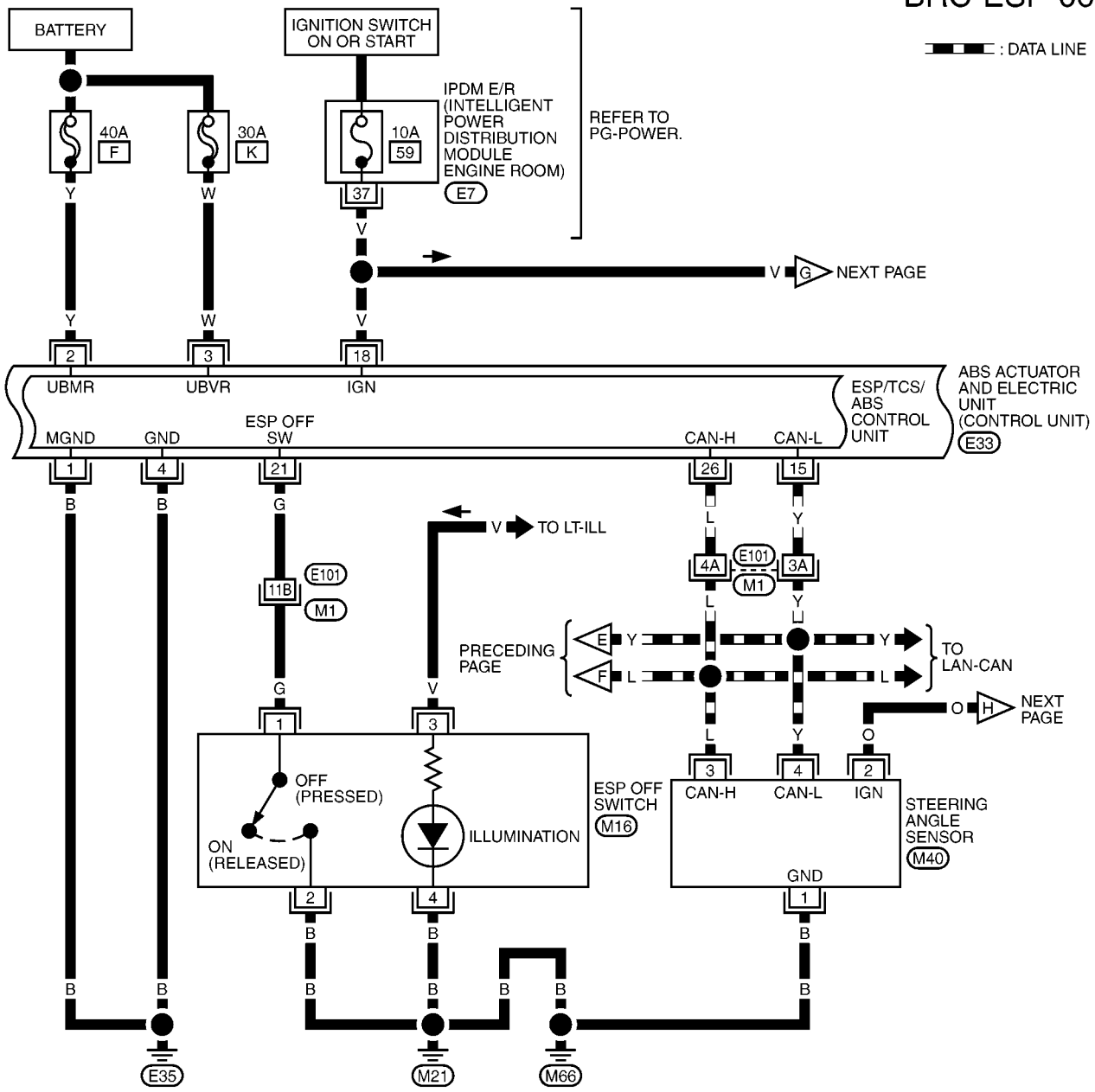


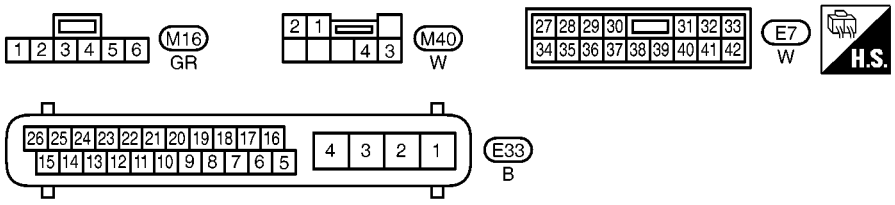




REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)
M7 - FUSE BLOCK - JUNCTION BOX (J/B)

MFWA0170E

BRC-ESP-06

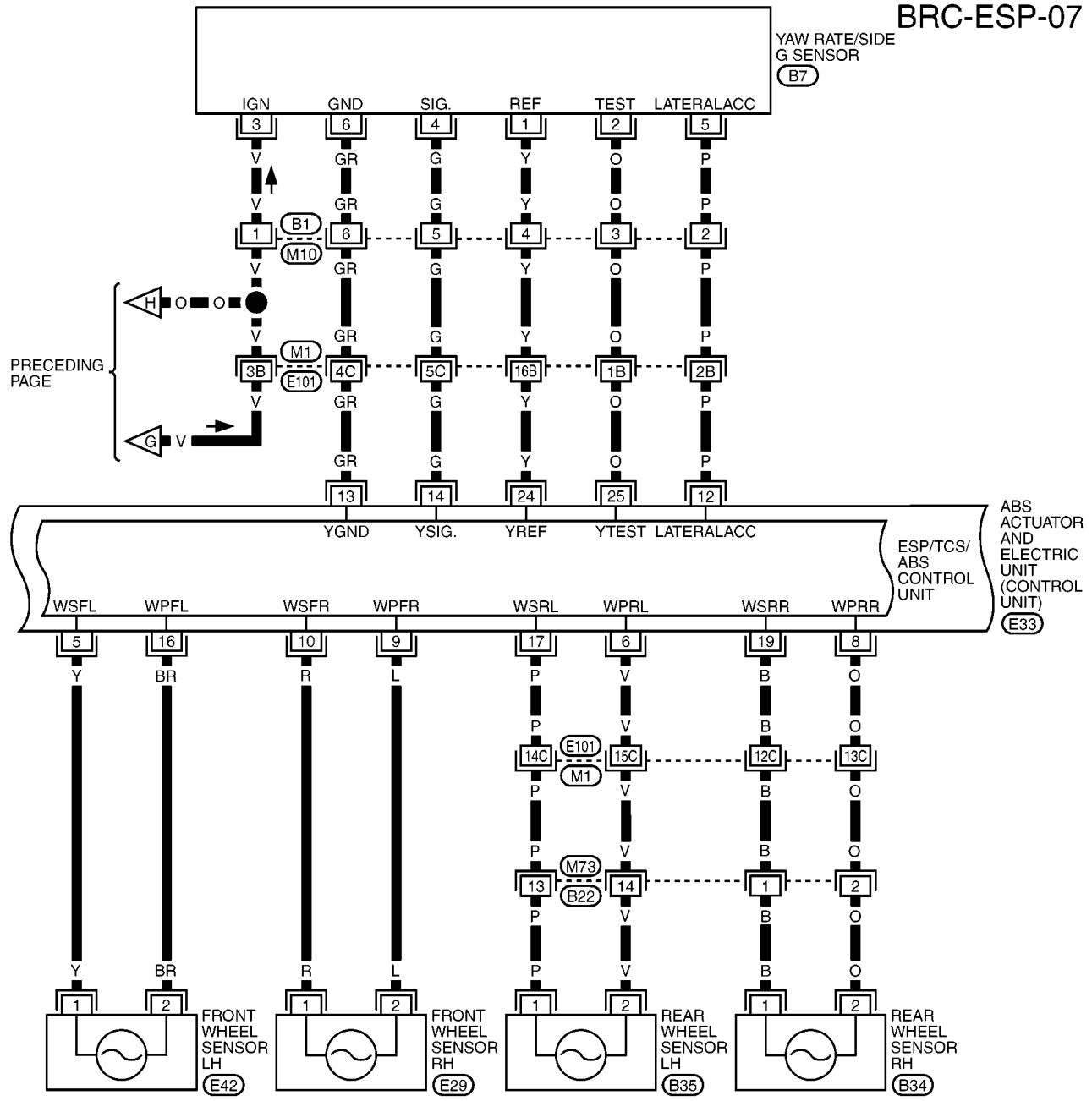


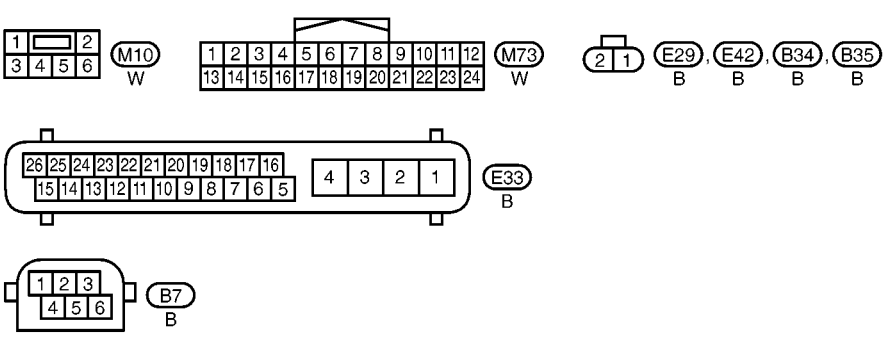




REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)

MFWA0171E

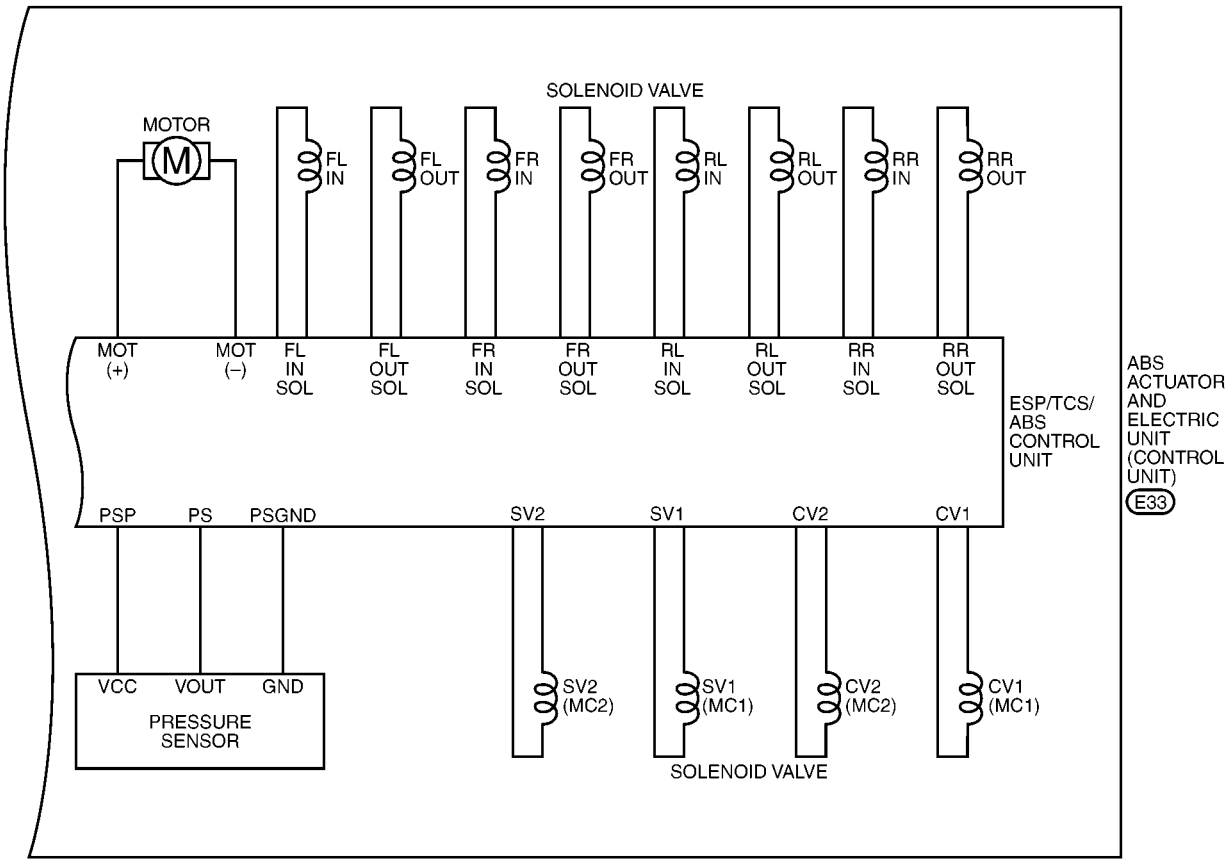
BRC-ESP-07

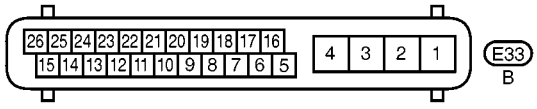



REFER TO THE FOLLOWING.
M1 - SUPER MULTIPLE JUNCTION (SMJ)

MFWA0172E


SOLENOID VALVE
MOTOR
M
FL IN
FL OUT
FR IN
FR OUT
RL IN
RL OUT
RR IN
RR OUT
MOT (+)
MOT (–)
FL IN SOL
FL OUT SOL
FR IN SOL
FR OUT SOL
RL IN SOL
RL OUT SOL
RR IN SOL
RR OUT SOL
ESP/TCS/ ABS CONTROL UNIT
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
E33
PSP
PS
PSGND
SV2
SV1
CV2
CV1
VCC
VOUT
GND
PRESSURE SENSOR
SV2 (MC2)
SV1 (MC1)
CV2 (MC2)
CV1 (MC1)
SOLENOID VALVE


26 25 24 23 22 21 20 19 18 17 16
15 14 13 12 11 10 9 8 7 6 5
4 3 2 1
E33
B

MFWA0173E

# CONSULT-II Functions (ABS)

BFS000FC

## CONSULT-II MAIN FUNCTION

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

| Diagnostic test mode | Function | Reference |
|---|---|---|
| WORK SUPPORT | This mode enables a technician to adjust some devices faster and more accurately by following the indication on CONSULT-II. | BRC-42, "Adjustment of Steering Angle Sensor Neutral Position" |
| SELF-DIAG RESULTS | Self-diagnostic results can be read and erased quickly. | BRC-62, "Self-Diagnosis" |
| DATA MONITOR | Input/Output data in the ABS actuator and electric unit (control unit) can be read. | BRC-64, "Data Monitor" |
| CAN DIAG SUPPORT MNTR | The results of transmit/receive diagnosis of communication can be read. | LAN-15, "CAN Diagnostic Support Monitor" |
| ACTIVE TEST | Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range. | BRC-66, "Active Test" |
| 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

Refer to GI-36, "CONSULT-II Start Procedure" .

# Self-Diagnosis

BFS000FD

## OPERATION PROCEDURE

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

   **CAUTION:**
   **If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which performs CAN communication.**
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 the engine running, touch “START (NISSAN BASED VHCL)”, “ABS”, “SELF-DIAG RESULTS” in order on the CONSULT-II screen.

   **CAUTION:**
   **If “START (NISSAN BASED VHCL)” is touched immediately after starting engine or turning on the ignition switch, “ABS” might not be displayed in the “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, ESP OFF indicator lamp and SLIP indicator lamp if “NO FAILURE” is displayed. Refer to DI-10, "Combination Meter Self-Diagnosis" .
7. Perform the appropriate inspection from display item list, and repair or replace the malfunctioning component. Refer to BRC-63, "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, ESP OFF indicator lamp, SLIP indicator lamp and brake warning lamp will not turn off even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) 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 the CONSULT-II screen to erase the diagnostic memory.
   If “ABS” is not indicated, go to GI-38, "CONSULT-II Data Link Connector (DLC) Circuit" .

**CAUTION:**
**If the diagnostic 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, ESP OFF indicator lamp, SLIP indicator lamp and brake warning lamp turn off.

**NOTE:**

- Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
- ESP OFF switch should not stay “ON” position.

## DISPLAY ITEM LIST

| Code | Self-diagnostic item | Malfunction detecting condition | Check system |
|---|---|---|---|
| C100F | FR RH SENSOR | Circuit of front RH wheel sensor is open, shorted or sensor power voltage is unusual. | |
| C101F | FR LH SENSOR | Circuit of front LH wheel sensor is open, shorted or sensor power voltage is unusual. | BRC-70, "Inspection 1: Wheel Sensor System" |
| C102F | RR RH SENSOR | Circuit of rear RH wheel sensor is open, shorted or sensor power voltage is unusual. | |
| C103F | RR LH SENSOR | Circuit of rear LH wheel sensor is open, shorted or sensor power voltage is unusual. | |
| C1041 | FR RH SENSOR ROTOR | ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor. | |
| C1042 | FR LH SENSOR ROTOR | ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor. | |
| C1043 | RR RH SENSOR ROTOR | ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor. | |
| C1044 | RR LH SENSOR ROTOR | ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor. | |
| C10C6 | STOP LAMP SW CIRC | Stop lamp switch is fixed at “ON” position. | BRC-79, "Inspection 7: Stop Lamp Switch System" |
| C10C6 | STOP LAMP OR CONT | Stop lamp switch circuit is open or shorted, or controller failure. | BRC-79, "Inspection 7: Stop Lamp Switch System" |
| C1158 | ST ANG SEN | Neutral position of steering angle sensor is dislocated, or steering angle sensor is malfunctioning initialize of steering angle sensor is not completed. | BRC-73, "Inspection 4: Steering Angle Sensor System" |
| C10F4 | YAW RATE/G-SEN | Yaw rate/G-sensor has generated an error, or yaw rate/G-sensor signal line is open or shorted. | BRC-75, "Inspection 5: Yaw Rate/Side G-Sensor System" |
| C1046 | ABS SENSOR | Wheel sensor input is malfunction or wheel sensor power voltage is too low. | BRC-70, "Inspection 1: Wheel Sensor System" (Note 1) |
| C10CC | BATTERY VOLTAGE | Supply voltage for ABS actuator and electric unit (control unit) is too low or too high, or abnormal. | BRC-77, "Inspection 6: ABS Actuator and Electric Unit (Control Unit) Power Supply and Ground System" |

| Code | Self-diagnostic item | Malfunction detecting condition | Check system |
|---|---|---|---|
| C10C3 | CONTROLLER FAILURE | Internal malfunction of ABS actuator and electric unit (control unit) | BRC-73, "Inspection 3: ESP/TCS/ABS Control Unit System" |
| U1000 | CAN COMM CIRCUIT | ● CAN communication line is open or shorted.<br>● ABS actuator and electric unit (control unit) internal malfunction<br>● Battery voltage for ECM is suddenly interrupted for approximately 0.5 seconds or more. | BRC-81, "Inspection 9: CAN Communication System" (Note 1) |
| C1180 | ECM | ● CAN communication line is open or shorted.<br>● CAN communication signal form ECM cannot be received. | BRC-73, "Inspection 2: Engine System" |
| C1155 | BR FLUID LEVEL LOW | Brake fluid level drops or circuit between ABS actuator and electric unit (control unit) and brake fluid level switch is open or shorted. | BRC-81, "Inspection 8: Brake Fluid Level Switch System" |

Note 1: If multiple malfunctions are detected including CAN communication line [U1000], perform diagnosis for CAN communication line first.

## Data Monitor

BFS000FE

### 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 the ignition switch, “ABS” might not be displayed in the system selection screen. In this case, repeat the operation from step 1.**
2. At the monitor item selection screen, touch one of the items “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 MONITOR ITEM | Monitor item | Display content | Data monitor | |
|---|---|---|---|---|
| | | | Condition | Reference value in normal operation |
| E, M, S | FR RH SENSOR<br>FR LH SENSOR<br>RR RH SENSOR<br>RR LH SENSOR | Wheel speed | Vehicle stopped | 0 [km/h (MPH)] |
| | | | Vehicle running (Note 1) | Almost in accordance with speedometer display (within ±10 %) |
| S | ACCEL POS SIG | Open/close condition of throttle valve (linked with accelerator pedal). | Accelerator pedal is not depressed (ignition switch is ON) | 0 % |
| | | | Accelerator pedal is depressed (ignition switch is ON) | 0 to 100 % |
| S | ENGINE SPEED | With engine running | With engine stopped | 0 rpm |
| | | | Engine running | Almost in accordance with tachometer display |
| S | STR ANGLE SIG | Steering angle detected by steering angle sensor | Straight-ahead | Approx. 0 deg |
| | | | Steering wheel turned | L500 to R500 deg |

| SELECT MONITOR ITEM | Monitor item | Display content | Data monitor | |
|---|---|---|---|---|
| | | | Condition | Reference value in normal operation |
| S | YAW RATE SEN | Yaw rate detected by yaw rate sensor | Vehicle stopped | Approx. 0 d/s |
| | | | Vehicle running | –200 to 200 d/s |
| S | SIDE G-SENSOR | Transverse G detected by side G-sensor | Vehicle stopped | Approx. 0 G |
| | | | Vehicle running | –1.8 to 1.8 G |
| S | PRESS SENSOR | Brake fluid pressure detected by pressure sensor | With ignition switch turned ON and brake pedal released | Approx. 0 bar |
| | | | With ignition switch turned ON and brake pedal depressed | 30 to 70 bar |
| E, M, S | BATTERY VOLT | Battery voltage supplied to ABS actuator and electric unit (control unit) | Ignition switch ON | 10 to 16 V |
| S | STOP LAMP SW | Brake pedal operation | Brake pedal is depressed | ON |
| | | | Brake pedal is not depressed | OFF |
| S | OFF SW | ESP OFF switch ON/OFF status | ESP OFF switch ON (When ESP OFF indicator lamp is ON) | ON |
| | | | ESP OFF switch OFF (When ESP OFF indicator lamp is OFF) | OFF |
| M, S | ABS WARN LAMP | ABS warning lamp ON condition (Note 2) | ABS warning lamp ON | ON |
| | | | ABS warning lamp OFF | OFF |
| M, S | MOTOR RELAY | Operation status of motor and motor relay | Ignition switch ON or engine running (ABS not operated) | OFF |
| | | | Ignition switch ON or engine running (ABS operated) | ON |
| M, S | ACTUATOR RLY | Actuator relay operation status | Actuator (solenoid) is active | ON |
| | | | When actuator relay is inactive (in fail-safe mode) | OFF |
| S | OFF LAMP | ESP OFF indicator lamp status (Note 3) | When ESP OFF indicator lamp is ON | ON |
| | | | When ESP OFF indicator lamp is OFF | OFF |
| S | SLIP LAMP | SLIP indicator lamp status (Note 4) | When SLIP indicator lamp is ON | ON |
| | | | When SLIP indicator lamp is OFF | OFF |
| M, S | FR LH IN SOL<br>FR LH OUT SOL<br>FR RH IN SOL<br>FR RH OUT SOL<br>RR RH IN SOL<br>RR RH OUT SOL<br>RR LH IN SOL<br>RR LH OUT SOL | Solenoid valve operation | Actuator (solenoid) is active (“ACTIVE TEST” with CONSULT-II) and actuator relay is active (ignition switch ON) | ON |
| | | | When actuator (solenoid) is not active or actuator relay is inactive (in fail-safe mode) | OFF |
| S | HSV [FL-RR]<br>HSV [FR-RL]<br>USV [FL-RR]<br>USV [FR-RL] | ESP/TCS switch-over valve status | When actuator (switch-over valve) is active (“ACTIVE TEST” with CONSULT-II) and actuator relay is active (ignition switch ON) | ON |
| | | | When actuator (switch-over valve) is not active or actuator relay is inactive (in fail-safe mode) | OFF |
| S | FLUID LEV SW | ON/OFF status of brake fluid level switch | When brake fluid level switch ON | ON |
| | | | When brake fluid level switch OFF | OFF |
| S | EBD WARN LAMP | Brake warning lamp on condition (Note 5) | Brake warning lamp ON | ON |
| | | | Brake warning lamp OFF | OFF |

| SELECT MONITOR ITEM | Monitor item | Display content | Data monitor | |
|---|---|---|---|---|
| | | | Condition | Reference value in normal operation |
| S | PARK BRAKE SW | Condition of parking brake | When parking brake is applied | ON |
| | | | When parking brake is released | OFF |
| S | CRANKING SIG | CRANKING status | Cranking | ON |
| | | | Not cranking | OFF |

Note 1: Confirm tire pressure is normal.
Note 2: ON/OFF timing of ABS warning lamp
ON: Approx. Within 1.5 seconds after ignition switch is turned ON, or when a malfunction is detected.
OFF: Approx. 1.5 seconds after ignition switch is turned ON (when system is in normal operation) and ESP/TCS function is not activated.
Note 3: ON/OFF timing of ESP OFF indicator lamp
ON: Approx. Within 1.5 seconds after ignition switch is turned ON, or when a malfunction is detected and ESP OFF switch is ON.
OFF: Approx 1.5 seconds after ignition switch is turned ON (when system is in normal operation.) And when ESP OFF switch is OFF.
Note 4: SLIP indicator lamp ON/OFF timing
ON: Approx. Within 1.5 seconds after ignition switch is turned ON, or when a malfunction is detected and ESP/TCS function is activated while driving.
OFF: Approx. 1.5 seconds after ignition switch is turned ON (when system is in normal operation) and ESP/TCS function is not activated.
Blinking: ESP/TCS function is active during driving
Note 5: Serves as EBD warning lamp.

## Active Test

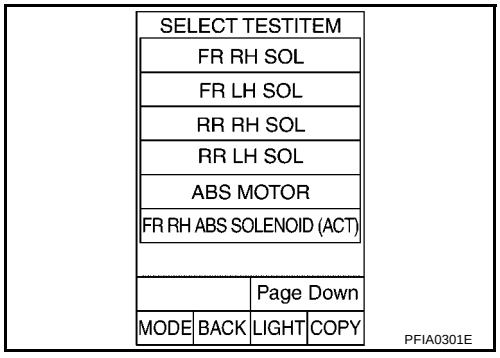
BFS000FF

**CAUTION:**

- **Do not perform active test while driving.**
- **Make sure to completely bleed air from the brake system.**
- **Active test cannot be performed when EBD, ABS, TCS or ESP operation is malfunction.**
- **ABS and brake warning lamps turn on during the active test.**

### OPERATION PROCEDURE

1. Connect CONSULT-II and CONVERTER to data link connector and start engine.
   **CAUTION:**
   **If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.**
2. Touch “START (NISSAN BASED VHCL) ” on the display screen.
3. Touch “ABS”.
   If “ABS” is not indicated, go to GI-38, "CONSULT-II Data Link Connector (DLC) Circuit" .
4. Touch “ACTIVE TEST”.
5. The test item selection screen is displayed.
6. Touch necessary test item.




7. With the “MAIN SIGNALS” display shown in reverse, touch “START”.
8. The “ACTIVE TEST” screen will be displayed, so perform the following test.

## SOLENOID VALVE OPERATION CHART

| Operation | ABS solenoid valve | | | ABS solenoid valve (ACT) | | |
|---|---|---|---|---|---|---|
| | UP | KEEP | DOWN | UP | ACTUATOR UP | ACTUATOR KEEP |
| FR RH SOL | OFF | ON | ON | OFF | OFF | OFF |
| FR LH SOL | OFF | ON | ON | OFF | OFF | OFF |
| RR RH SOL | OFF | ON | ON | OFF | OFF | OFF |
| RR LH SOL | OFF | ON | ON | OFF | OFF | OFF |
| FR RH ABS SOLENOID (ACT) | OFF | OFF | OFF | OFF | ON* | OFF |
| FR LH ABS SOLENOID (ACT) | OFF | OFF | OFF | OFF | ON | ON |
| RR RH ABS SOLENOID (ACT) | OFF | OFF | OFF | OFF | ON* | OFF |
| RR RL ABS SOLENOID (ACT) | OFF | OFF | OFF | OFF | ON | ON |

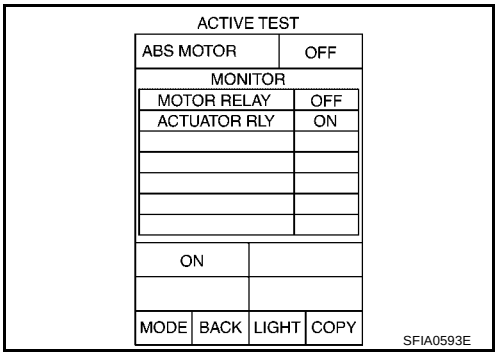
*: ON for 1 to 2 seconds after the touch, and then OFF

**NOTE:**
- If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.
- “TEST IS STOPPED” is displayed approximately 10 seconds after operation starts.
- After “TEST IS STOPPED” is displayed, touch “BACK” and conduct the test from the Step 8.

### ABS MONITOR

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

| Operation | ON | OFF |
|---|---|---|
| MOTOR RELAY | ON | OFF |
| ACTUATOR RELAY | ON | ON |




**NOTE:**
- If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.
- “TEST IS STOPPED” is displayed approximately 10 seconds after operation starts.

## For Fast and Accurate Diagnosis

BFS000FG

### PRECAUTIONS FOR DIAGNOSIS

- Before performing diagnosis, always read precautions. Refer to BRC-49, "How to Proceed With Diagnosis" .
- If ABS actuator and electric unit (control unit), steering angle sensor, steering system parts or suspension system parts have been replaced, or if alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to BRC-42, "Adjustment of Steering Angle Sensor Neutral Position" .
- After diagnosis is finished, be sure to erase memory. Refer to BRC-62, "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 the check, be careful not to forcibly extend any connector terminal.
- To use CONSULT-II to perform self-diagnosis of ABS actuator and electric unit (control unit), active tests, or work support, first stop work, then connect CONSULT-II and select “ABS”.
- While self-diagnostic results of CONSULT-II shows malfunction, if CONSULT-II active test is performed, an engine system error may be indicated. In this case, start engine to resume the normal screen.
- ESP/TCS/ABS system electronically controls brake operation and engine output. The 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 ESP, TCS, and ABS operation. | Normal |
| | When the vehicle speed goes over 10 km/h (6 MPH), motor and valves operating noise may be heard. It happens only once after IGN (ignition) is ON. 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 room. This is normal and is part of system operation check. | Normal |
| ESP/TCS operation (SLIP indicator lamp blinking) | TCS may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when up/downshifting, or when fully depressing accelerator pedal. | Normal<br>Cancel the ESP/TCS function for the inspection on a chassis dynamometer. |
| | For inspection of speedometer or other instruments, press ESP OFF SW to turn ESP/TCS function off. | |
| | When accelerator pedal is depressed on a chassis dynamometer, vehicle speed will not increase. This is not normal. It is result of TCS being activated by stationary front wheels. Warning lamp may also illuminate to indicate “sensor system error”. This is also normal, and is the result of the stationary front wheels being detected. To be certain, restart engine, and drive vehicle at 30 km/h (19 MPH) or above. Make sure warning lamp does not illuminate. | |
| ABS operation (Longer stopping distance) | On roads with low friction coefficients, such as snowy roads or gravel roads, vehicles with ABS may require a longer stopping distance. Therefore, when driving on such roads, avoid overconfidence and keep speed sufficiently low. | Normal |
| Insufficient feeling of acceleration | Depending on road conditions, driver may feel that feeling of acceleration is insufficient. This is because traction control, which controls engine and brakes to achieve optimal traction, has the highest priority (for safety). As a result, there may be times when acceleration is slightly less than usual for the same accelerator pedal operation. | Normal |

### ON and OFF Timing for ABS Warning Lamp, ESP OFF Indicator Lamp, SLIP Indicator Lamp, Brake Warning Lamp

×: ON –: OFF

| Condition | ABS warning lamp | ESP OFF indicator lamp | SLIP indicator lamp | Remarks |
|---|---|---|---|---|
| Ignition SW OFF. | – | – | – | — |
| Approx. 1.5 seconds after ignition switch is turned ON. | × | × | × | — |
| Approx. 1.5 seconds later after ignition switch ON. | – | – | – | Go out 1.5 seconds after ignition switch is turned ON. |
| ESP OFF SW is turned ON. (ESP/TCS function is OFF.) | – | × | – | — |
| ESP/TCS/ABS error. | × | × | × | There is an ABS actuator and electric unit (control unit) error. (Power, ground or system malfunction) |
| When ESP/TCS is not functioning normally. | – | × | × | — |

**NOTE:**

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

## Basic Inspection

BFS000FH

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

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

     **CAUTION:**
     **ABS actuator and electric unit (control unit) body cannot be disassembled.**
3. Check brake pad degree of wear. Refer to BR-21, "PAD WEAR INSPECTION" and BR-28, "INSPECTION AFTER REMOVAL" .

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

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

## BASIC INSPECTION 3: ABS WARNING LAMP, ESP OFF INDICATOR LAMP AND SLIP INDICATOR LAMP INSPECTION

1. Make sure ABS warning lamp and ESP OFF indicator lamp (when ESP OFF switch is OFF) turn ON approximately 1.5 second when ignition switch is turned ON. Make sure SLIP indicator lamp (when ESP OFF switch is OFF) turns ON approximately 3 seconds when ignition switch is turned ON. If they do not, check ESP OFF indicator lamp and then ESP OFF switch. Refer to BRC-82, "ESP OFF SWITCH" . Check CAN communications. Refer to “CAN Communication Inspection”. If there are no errors with ESP OFF switch and CAN communication system, check combination meter. Refer to DI-10, "Combination Meter Self-Diagnosis" .
2. Make sure ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp turn off approximately 1.5 second after turn ignition switch ON. If lamps do not turn off, perform self-diagnosis.
3. With engine running, make sure ESP OFF indicator lamp turns on and off when ESP OFF switch is turned ON and OFF. If indicator lamp status does not correspond to switch operation, check the ESP OFF switch system. Refer to BRC-82, "ESP OFF SWITCH" .
4. Make sure ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp turn off 1.5 seconds after engine is started. If ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp have not turned off 10 seconds after engine has been started, perform self-diagnosis of ABS actuator and electric unit (control unit).
5. After performing the self-diagnosis, be sure to erase the error memory. Refer to BRC-62, "ERASE MEMORY" .

## Inspection 1: Wheel Sensor System

BFS000FI

**DTC C100F-C103F, C1041-C1043, C1046**

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

**CAUTION:**

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

INSPECTION PROCEDURE

### 1. CHECK TIRE

Check air pressure, wear and size.

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

YES >> GO TO 2.
NO >> Adjust air pressure, or replace tire.

### 2. CHECK SENSOR AND SENSOR ROTOR

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

OK or NG

OK >> GO TO 3.
NG >> Repair sensor mount or replace sensor rotor.

## 3. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

| Self-diagnosis results |
|---|
| FR RH SENSOR |
| FR LH SENSOR |
| RR RH SENSOR |
| RR LH SENSOR |
| FR RH SENSOR ROTOR |
| FR LH SENSOR ROTOR |
| RR RH SENSOR ROTOR |
| RR LH SENSOR ROTOR |

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

YES >> GO TO 4.
NO >> INSPECTION END.

## 4. CHECK CONNECTOR

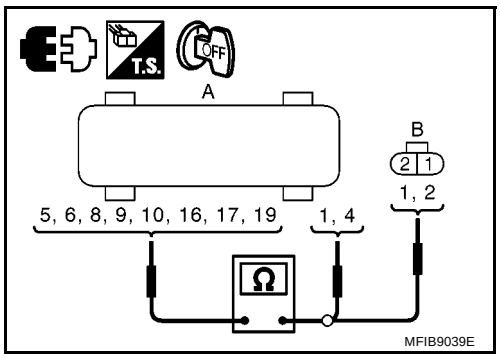
1. Disconnect ABS actuator and electric unit (control unit) connector E33 and malfunctioning wheel sensor connector E42 (FR-LH), E29 (FR-RH), B35 (RR-LH) or B34 (RR-RH). Check terminal for deformation, open circuit, poor contact, etc., and repair or replace if any malfunctioning condition is found.
2. Reconnect connectors, drive at a speed of approximately 30 km/h (19 MPH) 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 malfunctioning wheel sensor connector E42 (FR-LH), E29 (FR-RH), B35 (RR-RH) or B34 (RR-LH) and ABS actuator and electric unit (control unit) connector E33.
2. Check continuity between ABS actuator and electric unit (control unit) and Wheel sensor (Power supply system).




| Connector | A | B | Continuity |
|---|---|---|---|
| | ABS actuator and electric unit (control unit) | Wheel sensor | |
| Front LH | 5 | 1 | Yes |
| Front RH | 10 | 1 | |
| Rear LH | 17 | 1 | |
| Rear RH | 19 | 1 | |

3. Check continuity between ABS actuator and electric unit (control unit) and wheel sensor (Signal system).

| Connector | A | B | Continuity |
|---|---|---|---|
| | ABS actuator and electric unit (control unit) | Wheel sensor | |
| Front LH | 16 | 2 | Yes |
| Front RH | 9 | 2 | |
| Rear LH | 6 | 2 | |
| Rear RH | 8 | 2 | |

4. Check continuity between ABS actuator and electric unit (control unit) terminal (Ground).

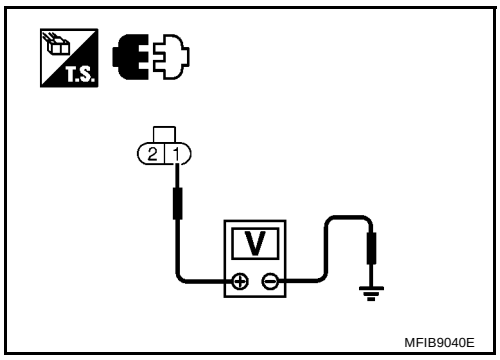
| Connector | A | | Continuity |
|---|---|---|---|
| | ABS actuator and electric unit (control unit) | | |
| Front LH | 5, 16 | 4 | No |
| Front RH | 9, 10 | 4 | |
| Rear LH | 6, 17 | 4 | |
| Rear RH | 8, 19 | 4 | |

OK or NG

OK >> GO TO 6.
NG >> Repair harness and connector between ABS actuator and electric unit (control unit) and wheel sensor.

## 6. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Connect ABS actuator and electric unit (control unit) connector.
2. Turn ignition switch ON.
3. Check voltage between wheel sensor power supply terminal 1 and ground.




| Wheel sensor | Terminal | Ground | Voltage |
|---|---|---|---|
| E42 (FL), E29 (FR), B35 (RL), B34 (RR) | 1 | | 8V or more |

OK or NG

OK >> Replace wheel sensor.
NG >> Replace ABS actuator and electric unit (control unit).

## Inspection 2: Engine System

BFS000FJ

**DTC C1180**

INSPECTION PROCEDURE

### 1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

| Self-diagnostic results |
|---|
| ECM |

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

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

### 2. CHECK ENGINE SYSTEM

1. Perform an ECM self-diagnosis refer to EC-74, "TROUBLE DIAGNOSIS" (CR engine models with EURO-OBD), EC-491, "TROUBLE DIAGNOSIS" (CR engine models without EURO-OBD), EC-863, "TROUBLE DIAGNOSIS" (HR engine models with EURO-OBD), EC-1284, "TROUBLE DIAGNOSIS" (HR engine models without EURO-OBD), EC-1630, "TROUBLE DIAGNOSIS" and repair or replace malfunctioning items. Re-perform ECM self-diagnosis.
2. Re-perform ABS actuator and electric unit (control unit) self-diagnosis.

OK or NG

OK >> INSPECTION END
NG >> Repair or replace malfunctioning items. Re-perform the self-diagnosis.

## Inspection 3: ESP/TCS/ABS Control Unit System

BFS000FK

**DTC C10C3**

INSPECTION PROCEDURE

### 1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

| Self-diagnostic results |
|---|
| CONTROLLER FAILURE |

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

YES >> Replace ABS actuator and electric unit (control unit). Re-perform the self-diagnosis.
NO >> INSPECTION END

## Inspection 4: Steering Angle Sensor System

BFS000FL

**DTC C1158**

INSPECTION PROCEDURE

### 1. CHECK SELF- DIAGNOSTIC RESULTS

Check self-diagnostic results.

| Self-diagnostic results |
|---|
| ST ANGLE SEN CIRCUIT |

Is above displayed in self-diagnosis item?

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

## 2. CHECK CONNECTOR

1. Turn ignition switch OFF and disconnect steering angle sensor connector M40 and ABS actuator and electric unit (control unit) connector E33 and 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.

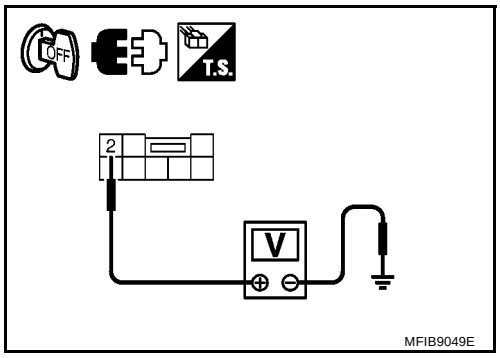
OK or NG

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

## 3. CHECK STEERING ANGLE SENSOR HARNESS

1. Check CAN communication system. Refer to BRC-81, "Inspection 9: CAN Communication System" .
2. Turn ignition switch ON, OFF and disconnect steering angle sensor connector M40.
3. Check voltage between steering angle sensor harness connector M40 and ground.

| Steering angle sensor | Terminal | Ground | Condition | Voltage |
|---|---|---|---|---|
| M40 | 2 | — | Ignition switch ON | Approx. 12V |
| | | | Ignition switch OFF | Approx. 0V |

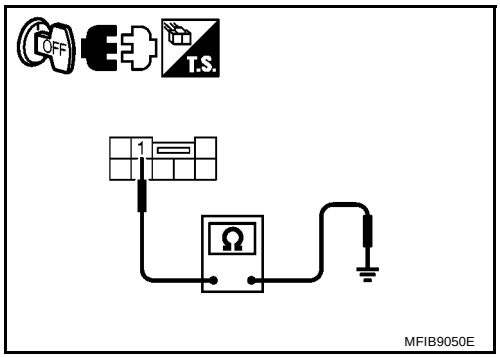



4. Turn ignition switch OFF. Check continuity between steering angle sensor harness connector M40 and ground.

| Steering angle sensor | Terminal | Ground | Continuity |
|---|---|---|---|
| M40 | 1 | — | Yes |

OK or NG

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




## 4. CHECK DATA MONITOR

1. Connect steering angle sensor and ABS actuator and electric unit (control unit) connectors.
2. Perform “DATA MONITOR” of the “STEERING ANGLE SIGNAL” to check if the status is normal.

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

OK or NG

OK >> Perform ABS actuator and electric unit (control unit) self-diagnosis again.
NG >> Replace spiral cable (steering angle sensor) and adjust neutral position of steering angle sensor. Refer to BRC-42, "Adjustment of Steering Angle Sensor Neutral Position" .

## Inspection 5: Yaw Rate/Side G-Sensor System

BFS000FM

**DTC C10F4**

**CAUTION:**

**Sudden turns (such as spin turns, acceleration turns), drifting, etc. May cause the G-sensor system indicate a malfunction. However, this is not a malfunction, if normal operation can be resumed after restarting engine.**

INSPECTION PROCEDURE

### 1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

| Self-diagnostic results |
|---|
| YAW RATE/G-SEN |

**CAUTION:**

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

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

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

### 2. CHECK CONNECTOR

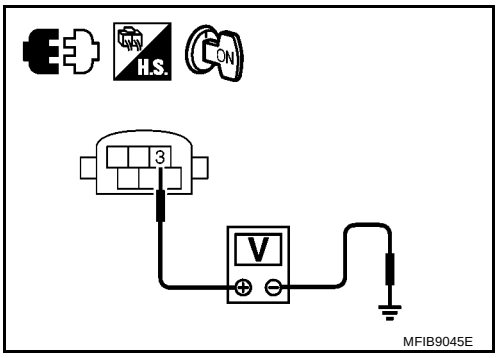
1. Disconnect yaw rate/side G-sensor connector B7 and ABS actuator and electric unit (control unit) connector E33 and check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
2. Reconnect connectors and re-perform a ABS actuator and electric unit (control unit) self-diagnosis.

OK or NG

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

### 3. CHECK YAW RATE/SIDE G-SENSOR POWER SUPPLY

1. Turn ignition switch OFF and disconnect yaw rate/side G-sensor harness connector B7.
2. Turn ignition switch ON.
3. Check voltage between yaw rate/side G-sensor harness connector B7 and ground.



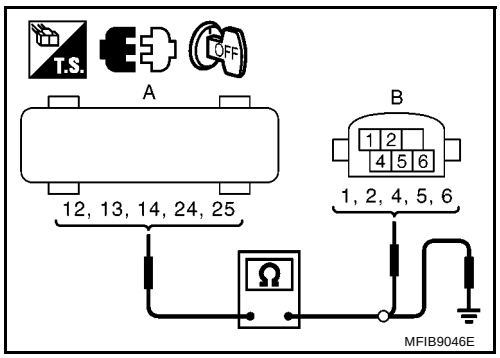

| Yaw rate/side G sensor | Terminal | Ground | Voltage |
|---|---|---|---|
| B7 | 3 | — | Approx. 12V |

OK or NG

OK >> GO TO 4.
NG >> Repair or replace power supply circuit.

## 4. CHECK YAW RATE/SIDE G-SENSOR HARNESS

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E33.
2. Check continuity between ABS actuator and electric unit (control unit) harness connector E33 and yaw rate/side G-sensor harness connector B7.




| A | | B | | Continuity |
|---|---|---|---|---|
| ABS actuator and electric unit (control unit) | Terminal | Yaw rate/side G sensor | Terminal | |
| E33 | 12 | B7 | 5 | Yes |
| | 13 | | 6 | |
| | 14 | | 4 | |
| | 24 | | 1 | |
| | 25 | | 2 | |

3. Check continuity between ABS actuator and electric unit (control unit) harness connector E33 terminals 12, 13, 14, 24 and 25 and ground. Continuity should not exist.

OK or NG

OK >> GO TO 5.
NG >> If the open or short in harness, repair or replace harness.

## 5. CHECK YAW RATE/SIDE G-SENSOR

1. Connect yaw rate/side G-sensor connector B7 and ABS actuator and electric unit (control unit) connector E33.
2. Use CONSULT-II “DATA MONITOR” to check if yaw rate/side G-sensor are normal.

| Vehicle status | Yaw rate sensor (Data monitor standard) | Side G-sensor (Data monitor standard) |
|---|---|---|
| When stopped | –4 to +4 d/s | –0.2 to +0.2 G |
| Right turn | Negative value | Negative value |
| Left turn | Positive value | Positive value |

OK or NG

OK >> Re-perform ABS actuator and electric unit (control unit) self-diagnosis.
NG >> Replace malfunctioning yaw rate/side G-sensor, and then re-perform self-diagnosis for ABS actuator and electric unit (control unit).

# Inspection 6: ABS Actuator and Electric Unit (Control Unit) Power Supply and Ground System

BFS000FN

**DTC C10CC**

Inspection Procedure

## 1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

| Self-diagnostic results |
|---|
| BATTERY VOLTAGE |

Does “BATTERY VOLTAGE” appear in self-diagnostic results display?

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

## 2. STARTING INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) connector E32. Then reconnect it securely.
2. Perform self-diagnosis.

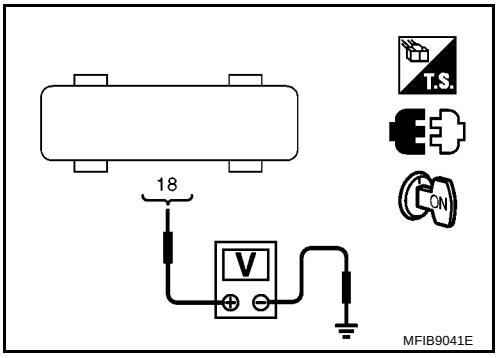
Do any self-diagnosis item appear?

YES >> GO TO 3.
NO >> Poor connection. Repair or replace connector.

## 3. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY (1)

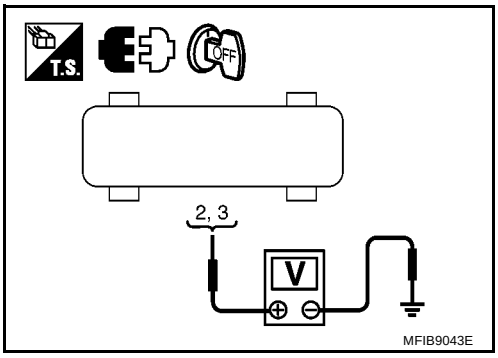
1. Disconnect ABS actuator and electric unit (control unit) connector E32.
2. Turn ignition switch ON (not turn on engine). Check voltage between ABS actuator and electric unit (control unit) harness E33 and ground.

| ABS actuator and electric unit (control unit) | Terminal | Ground | Voltage |
|---|---|---|---|
| E33 | 18 | — | Approx. 12V |




3. Turn ignition switch OFF. Check voltage between ABS actuator and electric unit (control unit) harness E33 and ground.

| ABS actuator and electric unit (control unit) | Terminal | Ground | Voltage |
|---|---|---|---|
| E33 | 2, 3 | — | Approx. 12V |



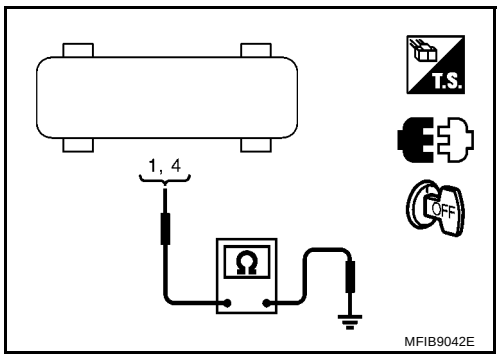

OK or NG

OK >> GO TO 4.
NG >> GO TO 5.

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

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

| ABS actuator and electric unit (control unit) | Terminal | Ground | Continuity |
|---|---|---|---|
| E33 | 1, 4 | — | Yes |



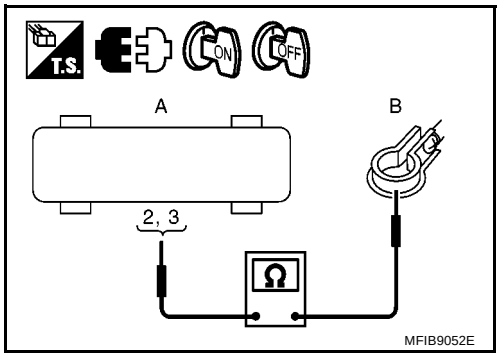

OK or NG

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

## 5. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY (2)

1. Check fusible links 40A (terminal 2) and 30A (terminal 3).
2. Turn ignition switch OFF and check continuity between battery positive terminal and ABS actuator and electric unit (control unit) harness connector E33.

| A | | B | Continuity |
|---|---|---|---|
| ABS actuator and electric unit (control unit) | Terminal | Battery positive terminal | |
| E33 | 2, 3 | — | Yes |




3. Check fuse 10A (terminal 18)
4. Check continuity between 10A fuse and ABS actuator and electric unit (control unit) harness connector.

OK or NG

OK >> Check for non-standard conditions in battery (terminal looseness, low voltage, etc.) and alternator.
NG >> ● Replace fusible link 40A or 30A or fuse 10A.
● Open or short in harness.

## Inspection 7: Stop Lamp Switch System

BFS000FO

**DTC C10C6**

INSPECTION PROCEDURE

### 1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

| Self-diagnostic results |
|---|
| STOP LAMP SW |

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

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

### 2. CHECK CONNECTOR

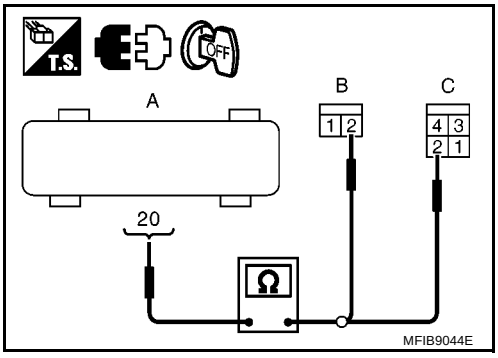
1. Disconnect stop lamp switch connector E38 (LHD MODELS WITH CR ENGINE AND HR ENGINE WITH M/T), E60 (LHD MODELS WITH HR ENGINE WITH A/T AND K9K ENGINE), M203 (RHD MODELS WITH CR ENGINE AND HR ENGINE WITH M/T), M204 (RHD MODELS WITH HR ENGINE WITH A/T AND K9K ENGINE) and ABS actuator and electric unit (control unit) connector E33 and check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
2. Securely reconnect connectors.
3. perform self-diagnosis again.

OK or NG

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

### 3. CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF and disconnect stop lamp switch connector and ABS actuator and electric unit (control unit) connector.
2. Check continuity between stop lamp switch harness connector and ABS actuator and electric unit (control unit) harness connector.



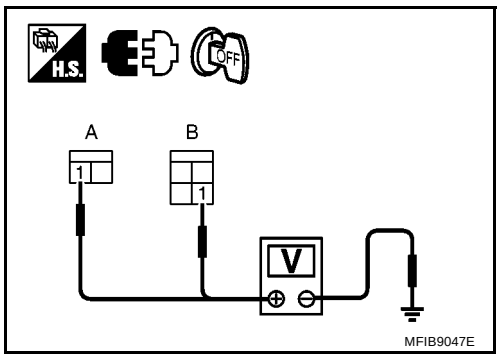

| A | | B | | C | | Continuity |
|---|---|---|---|---|---|---|
| ABS actuator and electric unit (control unit) | Terminal | Stop lamp switch (CR engine and HR engine M/T models) | Terminal | Stop lamp switch (HR engine A/T models and K9K engine models) | Terminal | |
| E33 | 20 | E38 (LHD models) M203 (RHD models) | 2 | E60 (LHD models) M204 (RHD models) | 2 | Yes |

OK or NG

OK >> GO TO 4.
NG >> Open or short in harness between stop lamp switch and ABS actuator and electric unit (control unit). Repair or replace applied harness.

## 4. CHECK STOP LAMP SWITCH POWER SUPPLY

1. Turn ignition switch OFF and disconnect stop lamp switch harness connector.
2. Check voltage between stop lamp switch harness connector and ground.



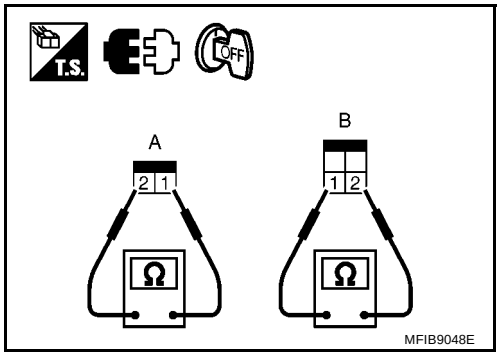

| A | | B | | Ground | Voltage |
|---|---|---|---|---|---|
| Stop lamp switch (CR engine and HR engine M/T models) | Terminal | Stop lamp switch (HR engine A/T models and K9K engine) | Terminal | | |
| E38 (LHD models)<br>M203 (RHD models) | 1 | E60 (LHD models)<br>M204 (RHD models) | 1 | — | Approx. 12V |

OK or NG

OK >> GO TO 5.
NG >> Repair or replace power supply circuit.

## 5. CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF and disconnect stop lamp switch.
2. Check continuity between stop lamp switch harness connector terminals 1 and 2.




| A | | B | | Condition | Continuity |
|---|---|---|---|---|---|
| Stop lamp switch (CR engine and HR engine M/T models) | Terminal | Stop lamp switch (HR engine A/T models and K9K engine) | Terminal | | |
| E38 (LHD models)<br>M203 (RHD models) | 1, 2 | E60 (LHD models)<br>M204 (RHD models) | 1, 2 | Brake pedal is depressed | Yes |
| | | | | Brake pedal is released | No |

OK or NG

OK >> Connect connectors and conduct an ABS actuator and electric unit (control unit) self-diagnosis.
NG >> Replace stop lamp switch.

## Inspection 8: Brake Fluid Level Switch System

BFS000FP

**DTC C1155**

INSPECTION PROCEDURE

### 1. CHECK SELF-DIAGNOSTIC RESULTS-1

Check the self-diagnostic results.

| Self-diagnosis results |
|---|
| CAN COMM CIRCUIT |

Is the above displayed in the self-diagnosis item?

YES >> GO TO Inspection 9, refer to BRC-81, "Inspection 9: CAN Communication System" .
NO >> GO TO 2.

### 2. CHECK SELF-DIAGNOSTIC RESULTS-2

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

| Self-diagnostic results |
|---|
| BR FLUID LEVEL LOW |

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

YES >> GO TO 3.
NO >> INSPECTION END

### 3. CHECK WARNING LAMP SYSTEM

1. Perform an WARNING LAMP self-diagnosis refer to DI-32, "WARNING LAMPS" and repair or replace malfunctioning items. Re-perform WARNING LAMP self-diagnosis.
2. Re-perform ABS actuator and electric unit (control unit) self-diagnosis.

OK or NG

OK >> INSPECTION END
NG >> Repair or replace malfunctioning items. Re-perform the self-diagnosis.

## Inspection 9: CAN Communication System

BFS000FQ

**DTC U1000, C1180**

INSPECTION PROCEDURE

### 1. CHECK CONNECTOR

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

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

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

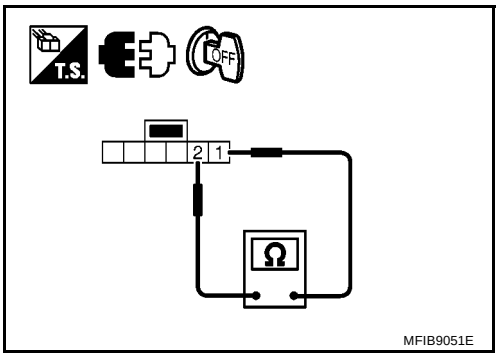
## Component Inspection

BFS000FR

### ESP OFF SWITCH

- Turn ignition switch OFF and disconnect ESP OFF switch connector M16, and check continuity between ESP OFF switch connector terminals 1 and 2.

| ESP OFF switch | Terminal | Ground | Continuity |
|---|---|---|---|
| M16 | 1, 2 | Switch is pressed | Yes |
| | | Switch is released | No |



MFIB9051E

## Symptom 1: Excessive ABS Function Operation Frequency

BFS000FS

### 1. FRONT AND REAR AXLE INSPECTION

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

OK or NG

OK >> GO TO 2.
NG >> Check front or rear axle system.

### 2. WHEEL SENSOR INSPECTION

Perform following inspection for wheel sensor:

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

OK or NG

OK >> GO TO 3.
NG >> Sensor or sensor rotor replacement

### 3. ABS WARNING LAMP DISPLAY CHECK

Make sure warning lamp turns off approximately 2 sec. After turn ignition switch ON or when driving.

OK or NG

OK >> Normal
NG >> Perform self-diagnosis. Refer to BRC-62, "Self-Diagnosis" .

## Symptom 2: Unexpected Pedal Reaction

BFS000FT

### 1. CHECK BRAKE PEDAL STROKE

Check brake pedal stroke.

Is the stroke too long?

YES >>
- Bleed air from brake piping.
- Check brake pedal, brake booster, and master cylinder mount for play, looseness, and brake system for fluid leaks, etc. If any malfunctions are found, make repair.

NO >> GO TO 2.

### 2. CHECK FUNCTION

Disconnect ABS actuator and electric unit (control unit) connector E33 and make sure that braking force is sufficient when ABS in not operating. After the inspection, reconnect connector.

OK or NG

OK >> GO TO symptom 1 “Step 2”. Refer to BRC-82, "Symptom 1: Excessive ABS Function Operation Frequency" .
NG >> Check brake system.

## Symptom 3: The Braking Distance Is Long

BFS000FU

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

### 1. CHECK FUNCTION

Disconnect ABS actuator and electric unit (control unit) connector E33 to deactivate ABS. In this condition, check stopping distance. After inspection, connect connector.

OK or NG

OK >> ● Bleed air from brake piping.
● Check brake system.
NG >> GO TO symptom 1 “Step 2”. Refer to BRC-82, "Symptom 1: Excessive ABS Function Operation Frequency" .

## Symptom 4: The ABS Function Does Not Operate

BFS000FV

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

### 1. CHECK ABS WARNING LAMP DISPLAY

Make sure warning lamp turns off approximately 2 second after the ignition switch is turned on or when driving.

OK or NG

OK >> GO TO symptom 1 “Step 2”. Refer to BRC-82, "Symptom 1: Excessive ABS Function Operation Frequency" .
NG >> Perform self-diagnosis. Refer to BRC-62, "Self-Diagnosis" .

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

BFS000FW

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

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

### 1. SYMPTOM CHECK 1

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

OK or NG

OK >> Perform self-diagnosis. Refer to BRC-62, "Self-Diagnosis" .
NG >> GO TO 2.

## 2. SYMPTOM CHECK 2

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

Does the symptom occur when the electrical component (headlamp, etc.) switches are operated?

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

NO >> GO TO symptom 1 “Step 2”. Refer to BRC-82, "Symptom 1: Excessive ABS Function Operation Frequency" .

# Symptom 6: Vehicle Jerks During ESP/TCS/ABS Control

BFS000FX

## 1. CHECK ENGINE SPEED SIGNAL

Perform CONSULT-II “DATA MONITOR” to check engine speed.

Is engine speed at idle 400 rpm or higher?

YES >> GO TO 3.

NO >> GO TO 2.

## 2. ABS WARNING LAMP DISPLAY CHECK

Make sure warning lamp turns off approximately 2 sec. After turn ignition switch ON or when driving.

OK or NG

OK >> System is normal.

NG >> GO TO 3.

## 3. CHECK ECM SELF-DIAGNOSTIC RESULTS

Perform ECM self-diagnosis.

Are self-diagnosis items displayed?

YES >> Check the corresponding items. Refer to EC-74, "TROUBLE DIAGNOSIS" (CR engine models with EURO-OBD), EC-491, "TROUBLE DIAGNOSIS" (CR engine models without EURO-OBD), EC-863, "TROUBLE DIAGNOSIS" (HR engine models with EURO-OBD), EC-1284, "TROUBLE DIAGNOSIS" (HR engine models without EURO-OBD), EC-1630, "TROUBLE DIAGNOSIS" (K9K engine).

NO >> GO TO 4.

## 4. CHECK SELF-DIAGNOSTIC RESULTS 1

Perform self-diagnosis of ABS actuator and electric unit (control unit).

Are self-diagnosis items displayed?

YES >> Check the corresponding items, make repairs, and re-perform ABS actuator and electric unit (control unit) self-diagnosis.

NO >> GO TO 5.

## 5. CHECK CONNECTOR

1. Disconnect ABS actuator and electric unit (control unit) connector E47 and ECM connector, check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace connector.
2. Securely reconnect connector and perform self-diagnosis.

OK or NG

OK >> If poor connect, damaged, open or short circuit is found, repair or replace connector terminal.

NG >> GO TO 6.

## 6. CHECK SELF-DIAGNOSTIC RESULTS 2

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

Are self-diagnosis items displayed?

YES >> Repair or replace malfunctioning items.
NO >> GO TO 7.

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

Check CAN communication system. Refer to BRC-81, "Inspection 9: CAN Communication System" .

OK or NG

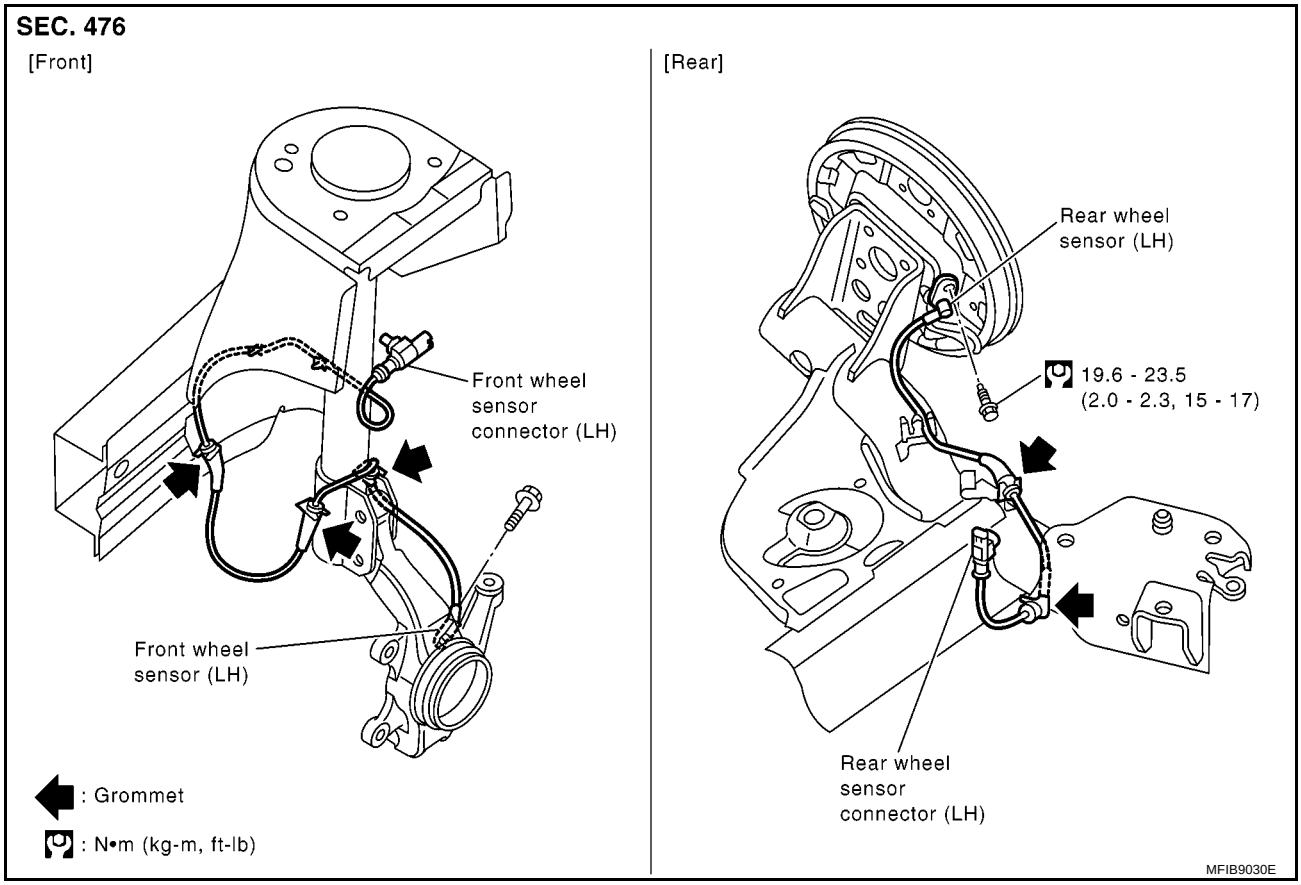
OK >> INSPECTION END
NG >> Connect connectors, and re-perform ABS actuator and electric unit (control unit) self-diagnosis.

# WHEEL SENSORS

PFP:47910

## Removal and Installation

BFS000B4




### REMOVAL

Be careful of the following.

**CAUTION:**

- **When removing the sensor, do not rotate it if possible, and not forcibly pull the sensor harness.**
- **Before removing front or rear wheel hub, remove wheel sensor to avoid sensor wiring damage.**

### INSTALLATION

Be certain to tighten bolts to the specified torque. Be careful of the following:

- Check the inside of the sensor mounting hole for foreign material, the rotor surface for iron chips and other foreign material, and if anything is non-standard, clean it before installation, or replace it.
- When installing the front sensor, completely push in the strut bracket and body bracket rubber grommets until they lock so that the sensor harness does not become twisted. In addition, there should be no twists in the harness when installed. Install the harness so that the painted part faces the outside of the vehicle.
- When installing the rear sensor, completely push in the rubber bracket of the suspension arm bracket and lock the marking area of the side member harness mount so that the sensor harness will not be twisted. In addition, there should be no twists in the harness when installed.

# SENSOR ROTOR

PFP:47970

## Removal and Installation

BFS000B5

### FRONT

- Because the sensor rotor is integrated with the wheel bearing, replace it together with the wheel bearing assembly. Refer to FAX-6, "FRONT WHEEL HUB AND KNUCKLE" .

### REAR

- During removal and installation, remove the wheel hub (brake drum). Refer to RAX-5, "WHEEL HUB" .

**CAUTION:**

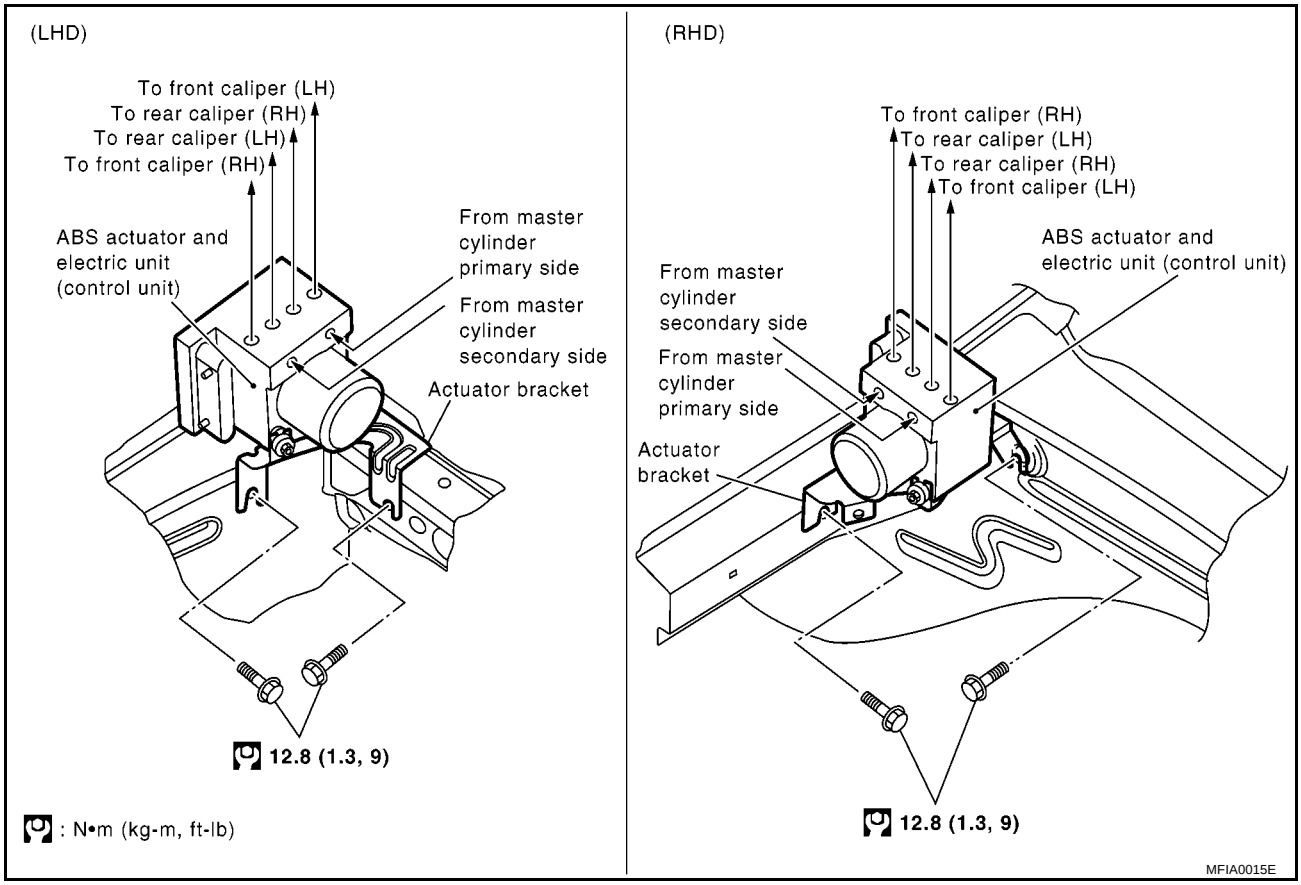
**The sensor rotor is a non-reusable part, it must be replaced by an new part when removing it.**

# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

PFP:47660

## Removal and Installation

BFS000B6




### 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) mounting nuts.
4. Remove ABS actuator and electric unit (control unit) from vehicle.

**CAUTION:**

**Be careful of the following when removing ABS actuator and electric unit (control unit).**

- **If the part number on the part number label (pasted on actuator upper surface) is the same, ABS actuator and electric unit (control unit) cannot be used on another vehicle.**
  **If it is used on another vehicle, ABS warning lamp, SLIP indicator lamp and ESP OFF indicator lamp may turn ON or ESP/TCS/ABS may not operate normally.**
  **When replacing ABS actuator and electric unit (control unit), must use new service parts.**
- **Before servicing, disconnect battery cables.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use a flare nut torque wrench (commercial service tool) and tighten to the specified torque.**
- **Do not apply excessive impact to actuator, such as dropping it.**
- **Do not remove and install ABS actuator and electric unit (control unit) by holding harness.**

### INSTALLATION

To install, follow procedure for removal in reverse order.

**CAUTION:**

**Be careful of the following when installing ABS actuator and electric unit (control unit).**

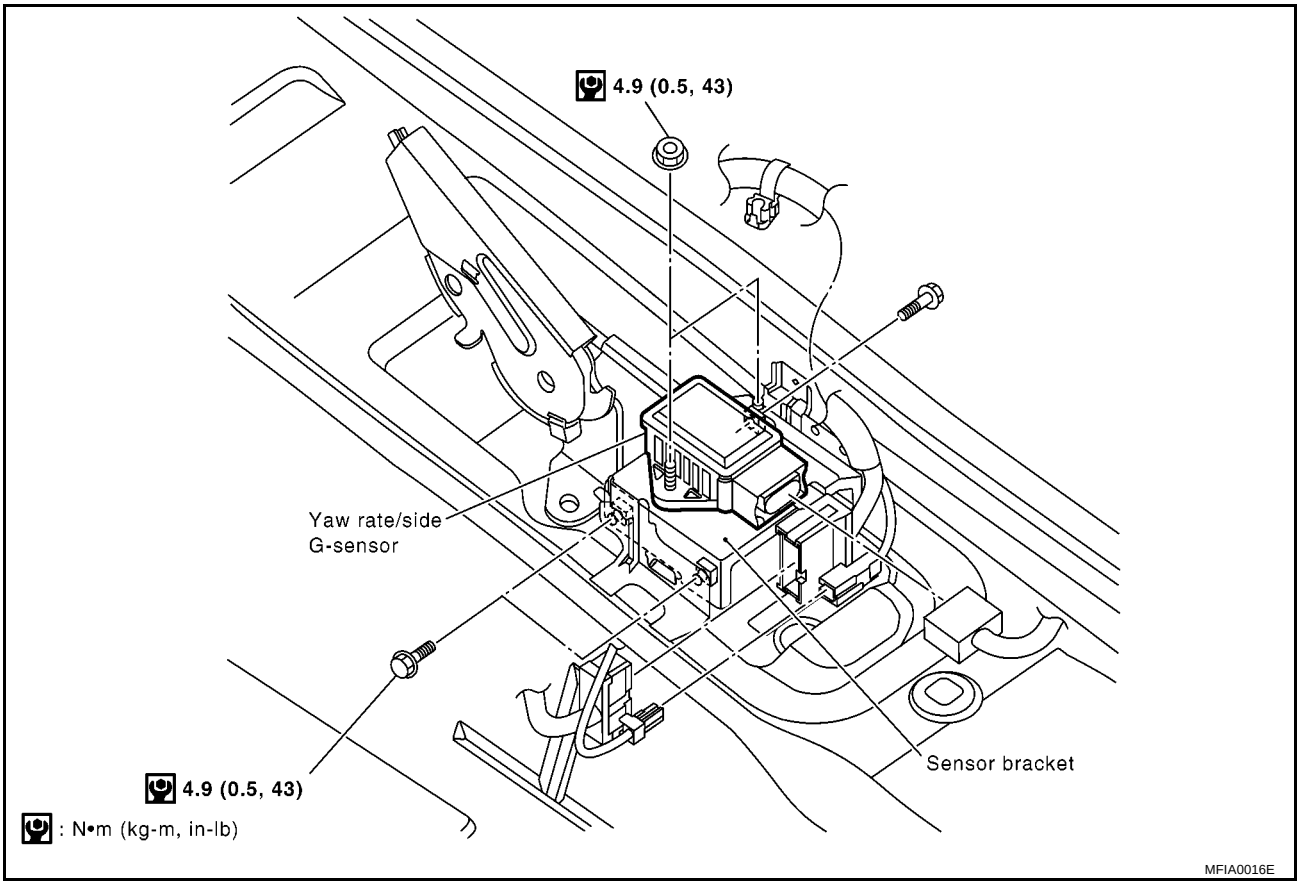
- **Tighten the mounting bolts and nuts to the specified torque.**
- **After the work, bleed air from brake piping. Refer to BR-10, "Bleeding Brake System" .**
- **After installing vehicle harness connector in the actuator, make sure connector is securely locked.**

# YAW RATE/SIDE G SENSOR

PFP:47931

## Removal and Installation

BFS000B7




### REMOVAL

1. Remove center console. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Disconnect yaw rate/side G-sensor harness connector.
3. Remove yaw rate/side G-sensor mounting bolts. Then remove yaw rate/side G-sensor from vehicle.

**CAUTION:**

- **Do not drop or strike yaw rate/side G-sensor, because it has little endurance to impact.**
- **Do not use power tool etc., because yaw rate/side G-sensor is weak for the impact.**

### INSTALLATION

To install, follow procedure for removal in reverse order.

**CAUTION:**

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

# STEERING ANGLE SENSOR

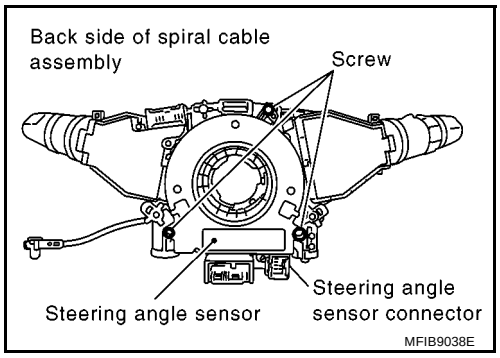
PFP:25554

## Removal and Installation

BFS000B8

### REMOVAL

1. Remove spiral cable assembly. Refer to SRS-38, "SPIRAL CABLE" .
2. Remove steering angle sensor from spiral cable assembly.




### INSTALLATION

Installation is the reverse order of removal.

**NOTE:**

In the case that ABS actuator and electric unit (control unit) are replaced, make sure to adjust neutral position of steering angle sensor. Refer to BRC-42, "Adjustment of Steering Angle Sensor Neutral Position" .