# SECTION BRC
# BRAKE CONTROL SYSTEM



## CONTENTS

### ABS



### ESP/TCS/ABS

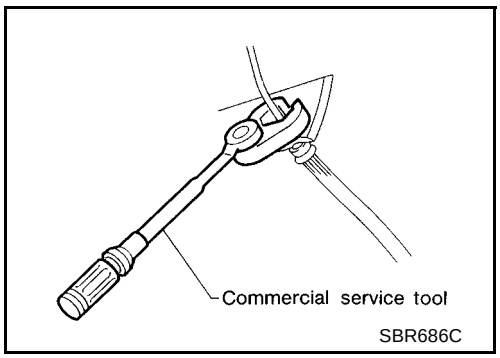
# PRECAUTIONS

PFP:00001

## Precautions for brake system

EFS001IW

- Recommended fluid is brake fluid “DOT 3 ”or “DOT 4”.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas.
- To clean or wash all parts of master cylinder, disc brake caliper and wheel cylinder, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- Always torque brake lines when installing.
- Burnish the brake contact surfaces after refinishing or replacing drums or rotors, after replacing pads or linings, or if a soft pedal occurs at very low mileage. Refer to BR-25, "BRAKE BURNISHING PROCEDURE" .
- Before working, turn OFF ignition switch. Disconnect connectors for ABS actuator and control module or battery terminals.




**WARNING:**

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

## Precautions for brake control

EFS001IX

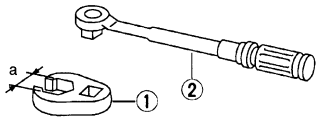
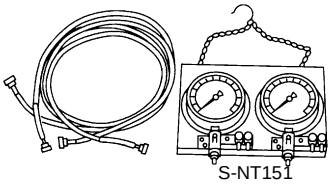
- If malfunction is indicated by ABS warning lamp, collect necessary information from customer (what symptoms are present under what conditions). Find out possible causes before starting service. Besides electrical system inspection, check operation of ABS actuator and electric unit.
- If malfunction is detected, proceed to trouble diagnosis after checking tire pressure and tire wear.
- Stopping distance or steering stability may be deteriorated by the following conditions. Tire size and type are in improper combination. Brake pads are not Nissan genuine parts.
- Fitting tires of different size on vehicle can be cause of longitudinal vibration. Always use tires of the same size and brand. Exchange front and rear tires on the following conditions: Longitudinal vibration occurs in vehicle with tires of the same size and brand. After replacement, perform trouble diagnosis. 1580|None
- ABS function may have a failure or error under following condition: There is radio, antenna, or antenna lead-in wire (including wiring) near control module.
- If aftermarket parts (e.g. Car stereo equipment, CD player) have been installed, check electrical harnesses for pinches, open, and improper wiring.

# PREPARATION

PFP:00002

## Special Service Tools

EFS001IY

| Tool name | | Description |
|---|---|---|
| 1 Flare nut crowfoot<br>2 Torque wrench |  <br>S-NT360 | Removing and installing each brake piping<br>a:10mm (0.39 in) |
| Brake fluid pressure gauge |  <br>S-NT151 | Measuring brake fluid pressure |

# CAN COMMUNICATION

PFP:23710

## System Description

EFS001OH

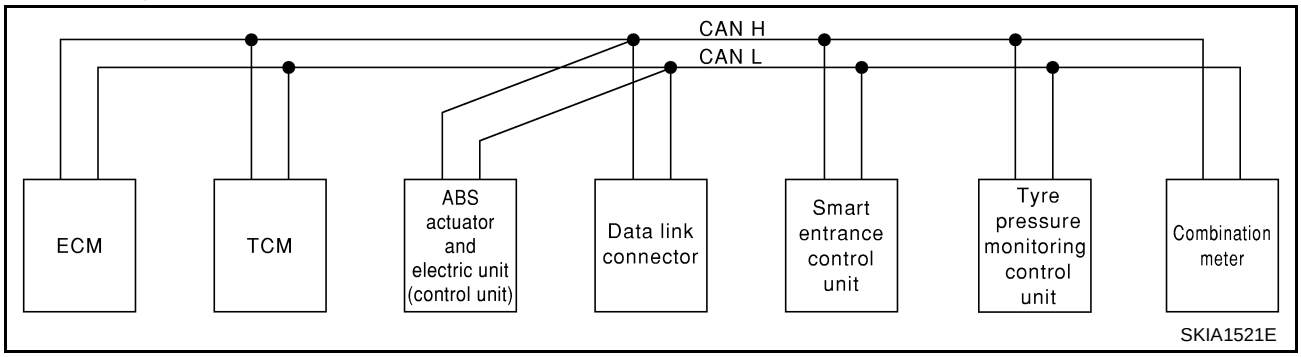
CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information 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.

## CAN Communication Unit For LHD Models with Tyre Pressure Monitoring System

EFS001ON

### FOR QR20DE MODELS

### System diagram




### Input/output signal chart

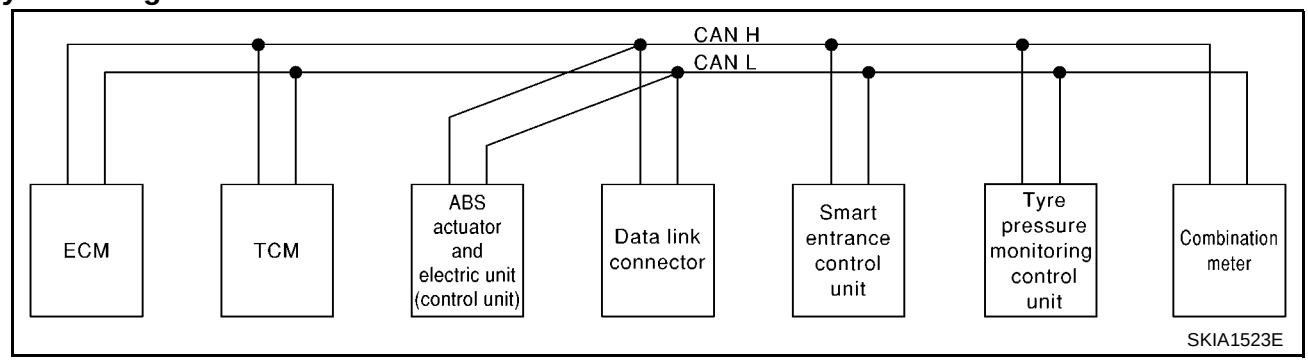
T: Transmit R: Receive

| Signals | ECM | TCM | ABS actuator and electric unit (control unit) | Smart entrance control unit | Tyre pressure monitoring control unit | Combination meter |
|---|---|---|---|---|---|---|
| Engine speed signal | T | R | | | | R |
| Stop lamp switch signal | | R | T | | | |
| Rear window defogger signal | R | | | T | | |
| Heater fan switch signal | R | | | | | T |
| Air conditioner switch signal | R | | | | | T |
| Primary pulley revolution signal | R | T | | | | |
| Secondary pulley revolution signal | R | T | | | | |
| MI signal | T | | | | | R |
| Current gear position signal | | T | | | | R |
| Engine coolant temperature signal | T | | | | | R |
| Fuel consumption signal | T | | | | | R |
| Vehicle speed signal | | | T | | | R |
| | R | | | | | T |
| Seat belt reminder signal | | | | R | | T |
| Headlamp switch signal | | | | T | | R |
| Flashing indicator signal | | | | T | | R |
| Engine cooling fan speed signal | T | | | R | | |
| Child lock indicator signal | | | | T | | R |
| Door switches state signal | | | | T | | R |
| Key ID signal | R | | | T | | |
| | T | | | R | | |

| Signals | ECM | TCM | ABS actuator and electric unit (control unit) | Smart entrance control unit | Tyre pressure monitoring control unit | Combination meter |
|---|---|---|---|---|---|---|
| A/C compressor signal | T | | | R | | |
| Tire pressure signal | | | | | T | R |

## FOR A/T MODELS

### System diagram



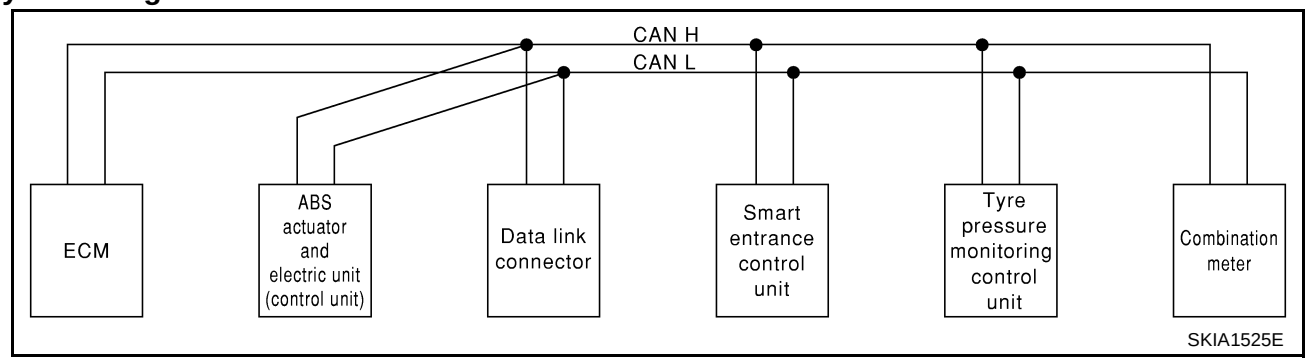

### Input/output signal chart

T: Transmit R: Receive

| Signals | ECM | TCM | ABS actuator and electric unit (control unit) | Smart entrance control unit | Type pressure monitoring control unit | Combination meter |
|---|---|---|---|---|---|---|
| Engine speed signal | T | R | | | | R |
| Stop lamp switch signal | | R | T | | | |
| Rear window defogger signal | R | | | T | | |
| Heater fan switch signal | R | | | | | T |
| Air conditioner switch signal | R | | | | | T |
| MI signal | T | | | | | R |
| Current gear position signal | | T | | | | R |
| Engine coolant temperature signal | T | | | | | R |
| Fuel consumption signal | T | | | | | R |
| Vehicle speed signal | | | T | | | R |
| | R | | | | | T |
| Seat belt reminder signal | | | | R | | T |
| Headlamp switch signal | | | | T | | R |
| Flashing indicator signal | | | | T | | R |
| Engine cooling fan speed signal | T | | | R | | |
| Child lock indicator signal | | | | T | | R |
| Door switches state signal | | | | T | | R |
| Key ID signal | R | | | T | | |
| | T | | | R | | |
| A/C compressor signal | T | | | R | | |
| Tire pressure signal | | | | | T | R |

## FOR M/T MODELS

### System diagram




### Input/output signal chart

T: Transmit R: Receive

| Signals | ECM | ABS actuator and electric unit (control unit) | Smart entrance control unit | Tyre pressure monitoring control unit | Combination meter |
|---|---|---|---|---|---|
| Engine speed signal | T | | | | R |
| Rear window defogger signal | R*1 | | T | | |
| Heater fan switch signal | R*1 | | | | T |
| Air conditioner switch signal | R | | | | T |
| MI signal | T | | | | R |
| Glow lamp signal*2 | T | | | | R |
| Engine coolant temperature signal | T | | | | R |
| Fuel consumption signal | T | | | | R |
| Vehicle speed signal | | T | | | R |
| | R | | | | T |
| Seat belt reminder signal | | | R | | T |
| Headlamp switch signal | | | T | | R |
| Flashing indicator signal | | | T | | R |
| Engine cooling fan speed signal | T | | R | | |
| Child lock indicator signal | | | T | | R |
| Door switches state signal | | | T | | R |
| Key ID signal | R | | T | | |
| | T | | R | | |
| A/C compressor signal | T | | R | | |
| Tire pressure signal | | | | T | R |

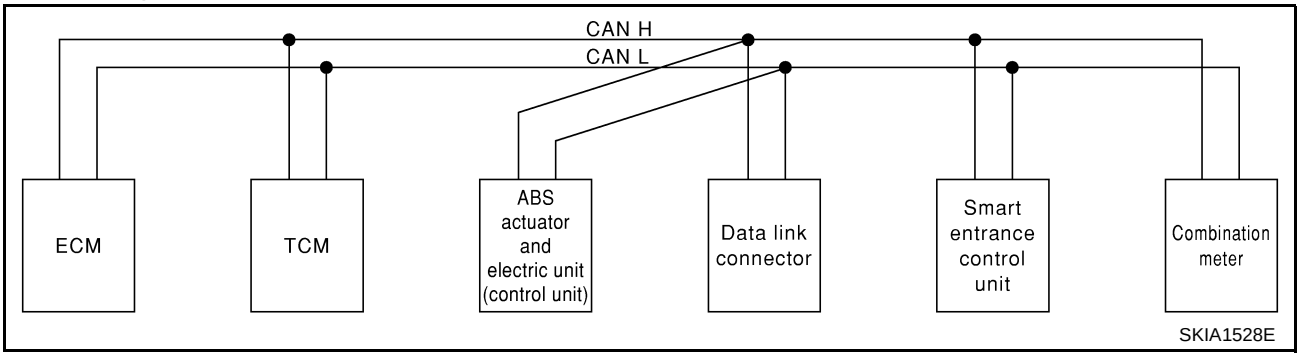
*1: Except YD22DDTi engine model
*2: YD22DDTi engine model only

# CAN Communication Unit For LHD Models without Tyre Pressure Monitoring System

EFS001OO

## FOR QR20DE MODELS

### System diagram



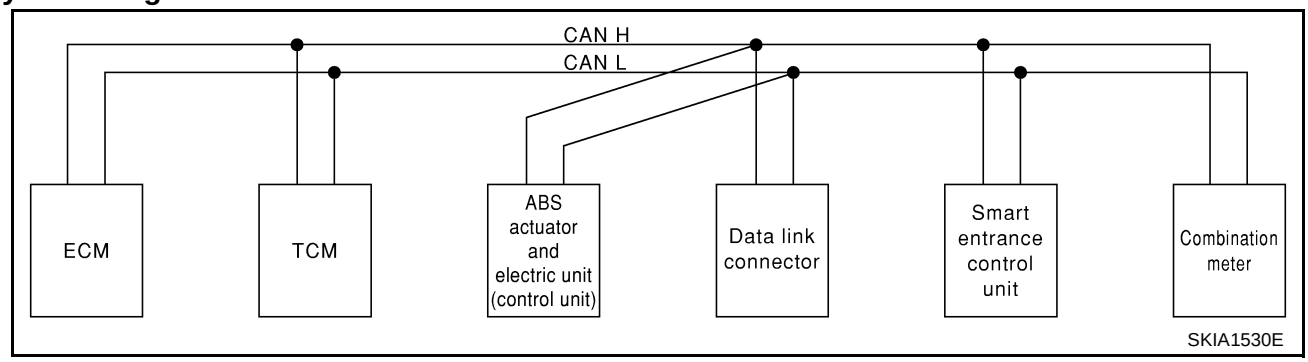

### Input/output signal chart

T: Transmit R: Receive

| Signals | ECM | TCM | ABS actuator and electric unit (control unit) | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|
| Engine speed signal | T | R | | | R |
| Stop lamp switch signal | | R | T | | |
| Rear window defogger signal | R | | | T | |
| Heater fan switch signal | R | | | | T |
| Air conditioner switch signal | R | | | | T |
| Primary pulley revolution signal | R | T | | | |
| Secondary pulley revolution signal | R | T | | | |
| MI signal | T | | | | R |
| Current gear position signal | | T | | | R |
| Engine coolant temperature signal | T | | | | R |
| Fuel consumption signal | T | | | | R |
| Vehicle speed signal | | | T | | R |
| | R | | | | T |
| Seat belt reminder signal | | | | R | T |
| Headlamp switch signal | | | | T | R |
| Flashing indicator signal | | | | T | R |
| Engine cooling fan speed signal | T | | | R | |
| Child lock indicator signal | | | | T | R |
| Door switches state signal | | | | T | R |
| Key ID signal | R | | | T | |
| | T | | | R | |
| A/C compressor signal | T | | | R | |

## FOR A/T MODELS

### System diagram



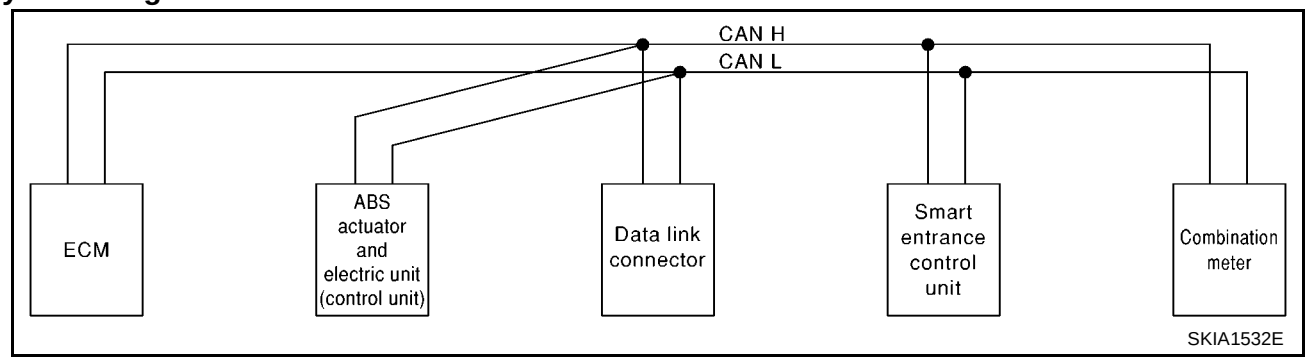

### Input/output signal chart

T: Transmit R: Receive

| Signals | ECM | TCM | ABS actuator and electric unit (control unit) | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|
| Engine speed signal | T | R | | | R |
| Stop lamp switch signal | | R | T | | |
| Rear window defogger signal | R | | | T | |
| Heater fan switch signal | R | | | | T |
| Air conditioner switch signal | R | | | | T |
| MI signal | T | | | | R |
| Current gear position signal | | T | | | R |
| Engine coolant temperature signal | T | | | | R |
| Fuel consumption signal | T | | | | R |
| Vehicle speed signal | | | T | | R |
| | R | | | | T |
| Seat belt reminder signal | | | | R | T |
| Headlamp switch signal | | | | T | R |
| Flashing indicator signal | | | | T | R |
| Engine cooling fan speed signal | T | | | R | |
| Child lock indicator signal | | | | T | R |
| Door switches state signal | | | | T | R |
| Key ID signal | R | | | T | |
| | T | | | R | |
| A/C compressor signal | T | | | R | |

## FOR M/T MODELS

### System diagram



## Input/output signal chart

T: Transmit R: Receive

| Signals | ECM | ABS actuator and electric unit (control unit) | Smart entrance control unit | Combination meter |
|---|---|---|---|---|
| Engine speed signal | T | | | R |
| Rear window defogger signal | R*1 | | T | |
| Heater fan switch signal | R*1 | | | T |
| Air conditioner switch signal | R | | | T |
| MI signal | T | | | R |
| Glow lamp signal*2 | T | | | R |
| Engine coolant temperature signal | T | | | R |
| Fuel consumption signal | T | | | R |
| Vehicle speed signal | | T | | R |
| | R | | | T |
| Seat belt reminder signal | | | R | T |
| Headlamp switch signal | | | T | R |
| Flashing indicator signal | | | T | R |
| Engine cooling fan speed signal | T | | R | |
| Child lock indicator signal | | | T | R |
| Door switches state signal | | | T | R |
| Key ID signal | R | | T | |
| | T | | R | |
| A/C compressor signal | T | | R | |

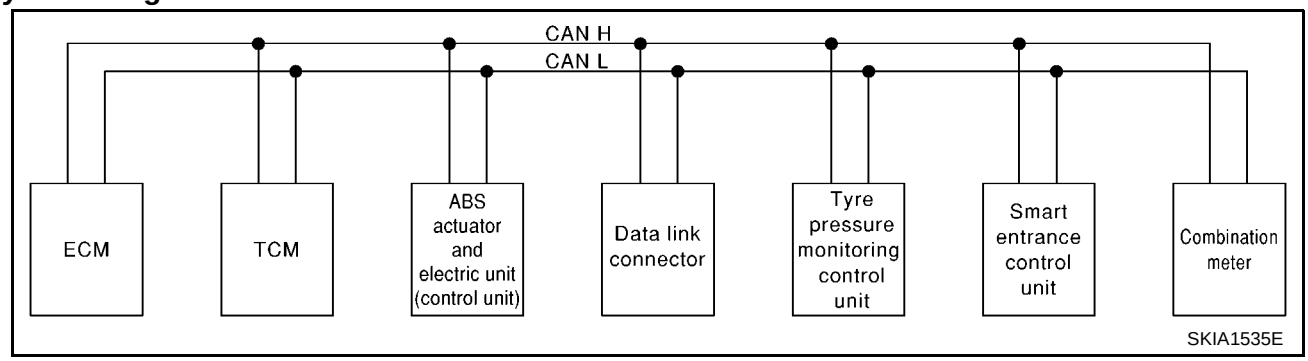
*1: Except YD22DDTi engine model
*2:YD22DDTi engine model only

# CAN Communication Unit For RHD Models with Tyre Pressure Monitoring System

EFS001OP

## FOR QR20DE MODELS

### System diagram




### Input/output signal chart

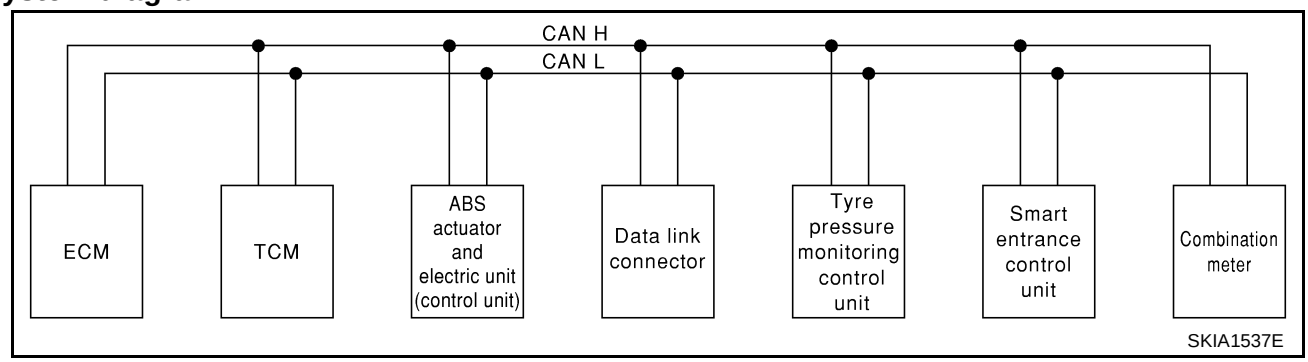
T: Transmit R: Receive

| Signals | ECM | TCM | ABS actuator and electric unit (control unit) | Tyre pressure monitoring control unit | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|---|
| Engine speed signal | T | R | | | | R |
| Stop lamp switch signal | | R | T | | | |

| Signals | ECM | TCM | ABS actuator and electric unit (control unit) | Tyre pressure monitoring control unit | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|---|
| Rear window defogger signal | R | | | | T | |
| Heater fan switch signal | R | | | | | T |
| Air conditioner switch signal | R | | | | | T |
| Primary pulley revolution signal | R | T | | | | |
| Secondary pulley revolution signal | R | T | | | | |
| MI signal | T | | | | | R |
| Current gear position signal | | T | | | | R |
| Engine coolant temperature signal | T | | | | | R |
| Fuel consumption signal | T | | | | | R |
| Vehicle speed signal | | | T | | | R |
| | R | | | | | T |
| Seat belt reminder signal | | | | | R | T |
| Headlamp switch signal | | | | | T | R |
| Flashing indicator signal | | | | | T | R |
| Engine cooling fan speed signal | T | | | | R | |
| Child lock indicator signal | | | | | T | R |
| Door switches state signal | | | | | T | R |
| Key ID signal | R | | | | T | |
| | T | | | | R | |
| A/C compressor signal | T | | | | R | |
| Tire pressure signal | | | | T | | R |

## FOR A/T MODELS

### System diagram




### Input/output signal chart

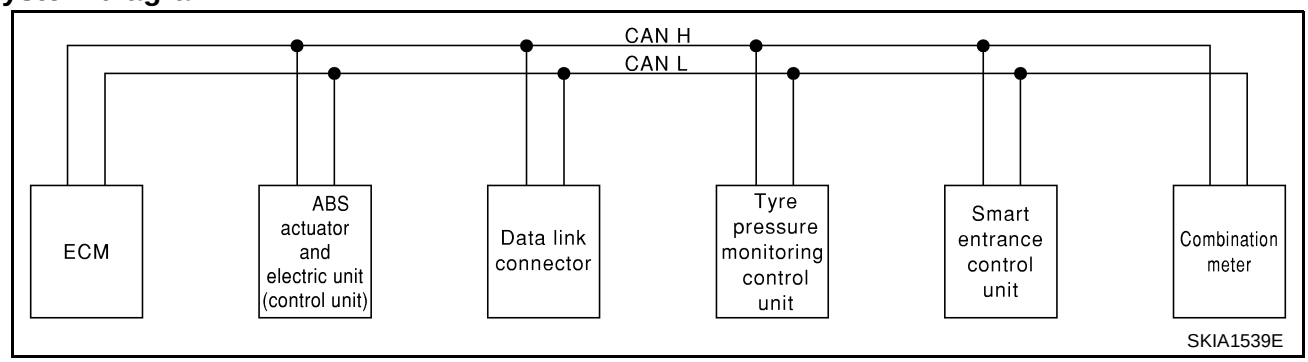
T: Transmit R: Receive

| Signals | ECM | TCM | ABS actuator and electric unit (control unit) | Tyre pressure monitoring control unit | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|---|
| Engine speed signal | T | R | | | | R |
| Stop lamp switch signal | | R | T | | | |
| Rear window defogger signal | R | | | | T | |
| Heater fan switch signal | R | | | | | T |

| Signals | ECM | TCM | ABS actuator and electric unit (control unit) | Tyre pressure monitoring control unit | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|---|
| Air conditioner switch signal | R | | | | | T |
| MI signal | T | | | | | R |
| Current gear position signal | | T | | | | R |
| Engine coolant temperature signal | T | | | | | R |
| Fuel consumption signal | T | | | | | R |
| Vehicle speed signal | | | T | | | R |
| | R | | | | | T |
| Seat belt reminder signal | | | | | R | T |
| Headlamp switch signal | | | | | T | R |
| Flashing indicator signal | | | | | T | R |
| Engine cooling fan speed signal | T | | | | R | |
| Child lock indicator signal | | | | | T | R |
| Door switches state signal | | | | | T | R |
| Key ID signal | R | | | | T | |
| | T | | | | R | |
| A/C compressor signal | T | | | | R | |
| Tire pressure signal | | | | T | | R |

## FOR M/T MODELS

### System diagram




### Input/output signal chart

T: Transmit R: Receive

| Signals | ECM | ABS actuator and electric unit (control unit) | Tyre pressure monitoring control unit | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|
| Engine speed signal | T | | | | R |
| Rear window defogger signal | R*1 | | | T | |
| Heater fan switch signal | R*1 | | | | T |
| Air conditioner switch signal | R | | | | T |
| MI signal | T | | | | R |
| Glow lamp signal*2 | T | | | | R |
| Engine coolant temperature signal | T | | | | R |
| Fuel consumption signal | T | | | | R |

| Signals | ECM | ABS actuator and electric unit (control unit) | Tyre pressure monitoring control unit | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|
| Vehicle speed signal | | T | | | R |
| | R | | | | T |
| Seat belt reminder signal | | | | R | T |
| Headlamp switch signal | | | | T | R |
| Flashing indicator signal | | | | T | R |
| Engine cooling fan speed signal | T | | | R | |
| Child lock indicator signal | | | | T | R |
| Door switches state signal | | | | T | R |
| Key ID signal | R | | | T | |
| | T | | | R | |
| A/C compressor signal | T | | | R | |
| Tire pressure signal | | | T | | R |

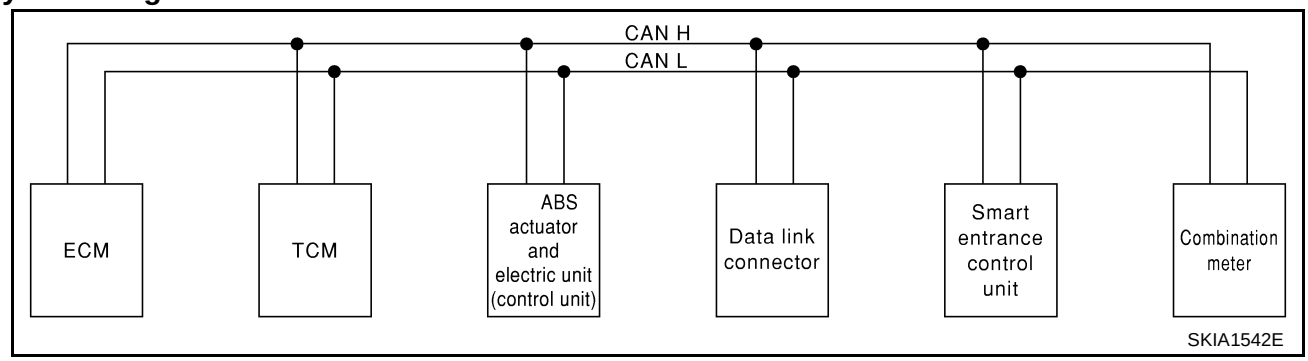
*1: Except YD22DDTi engine model
*2: YD22DDTi engine model only

## CAN Communication Unit For RHD Models without Tyre Pressure Monitoring System

EFS001OQ

### FOR QR20DE MODELS

### System diagram




### Input/output signal chart

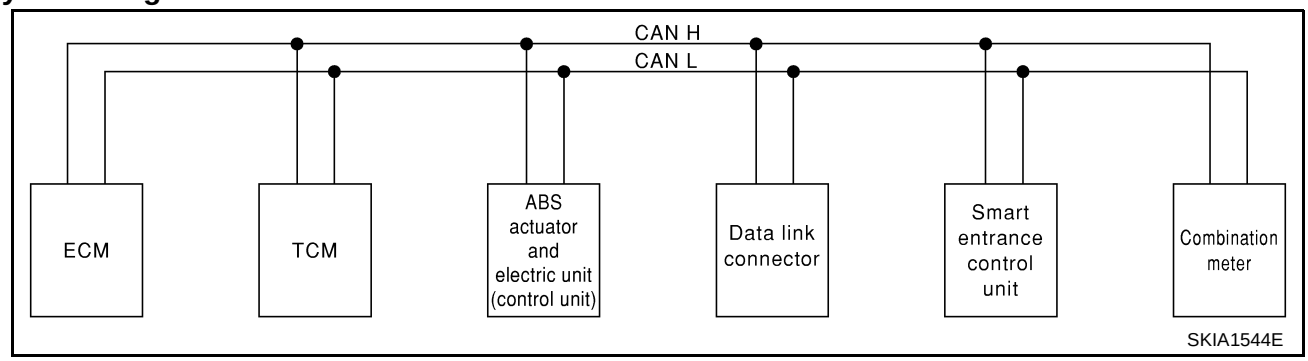
T: Transmit R: Receive

| Signals | ECM | TCM | ABS actuator and electric unit (control unit) | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|
| Engine speed signal | T | R | | | R |
| Stop lamp switch signal | | R | T | | |
| Rear window defogger signal | R | | | T | |
| Heater fan switch signal | R | | | | T |
| Air conditioner switch signal | R | | | | T |
| Primary pulley revolution signal | R | T | | | |
| Secondary pulley revolution signal | R | T | | | |
| MI signal | T | | | | R |
| Current gear position signal | | T | | | R |
| Engine coolant temperature signal | T | | | | R |
| Fuel consumption signal | T | | | | R |

| Signals | ECM | TCM | ABS actuator and electric unit (control unit) | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|
| Vehicle speed signal | | | T | | R |
| | R | | | | T |
| Seat belt reminder signal | | | | R | T |
| Headlamp switch signal | | | | T | R |
| Flashing indicator signal | | | | T | R |
| Engine cooling fan speed signal | T | | | R | |
| Child lock indicator signal | | | | T | R |
| Door switches state signal | | | | T | R |
| Key ID signal | R | | | T | |
| | T | | | R | |
| A/C compressor signal | T | | | R | |

## FOR A/T MODELS

### System diagram




### Input/output signal chart

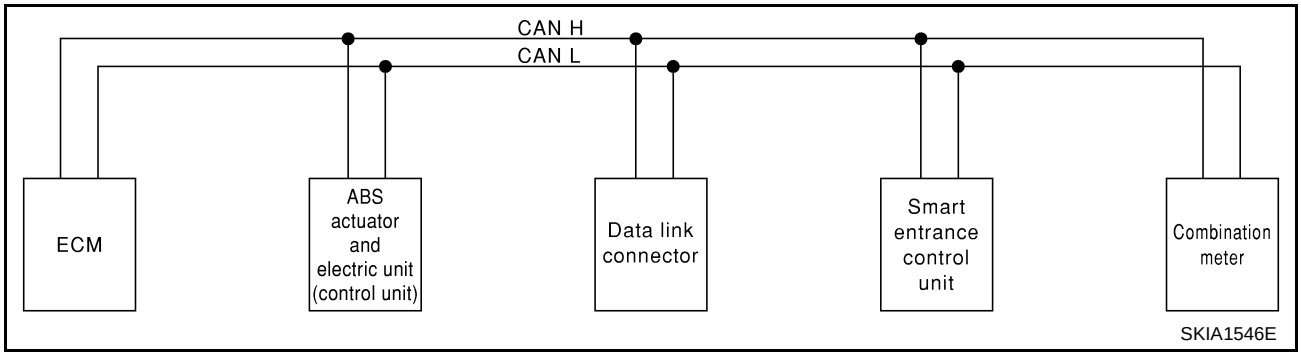
T: Transmit R: Receive

| Signals | ECM | TCM | ABS actuator and electric unit (control unit) | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|
| Engine speed signal | T | R | | | R |
| Stop lamp switch signal | | R | T | | |
| Rear window defogger signal | R | | | T | |
| Heater fan switch signal | R | | | | T |
| Air conditioner switch signal | R | | | | T |
| MI signal | T | | | | R |
| Current gear position signal | | T | | | R |
| Engine coolant temperature signal | T | | | | R |
| Fuel consumption signal | T | | | | R |
| Vehicle speed signal | | | T | | R |
| | R | | | | T |
| Seat belt reminder signal | | | | R | T |
| Headlamp switch signal | | | | T | R |
| Flashing indicator signal | | | | T | R |
| Engine cooling fan speed signal | T | | | R | |

| Signals | ECM | TCM | ABS actuator and electric unit (control unit) | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|
| Child lock indicator signal | | | | T | R |
| Door switches state signal | | | | T | R |
| Key ID signal | R | | | T | |
| | T | | | R | |
| A/C compressor signal | T | | | R | |

## FOR M/T MODELS

### System diagram




### Input/output signal chart

T: Transmit R: Receive

| Signals | ECM | ABS actuator and electric unit (control unit) | Smart entrance control unit | Combination meter |
|---|---|---|---|---|
| Engine speed signal | T | | | R |
| Rear window defogger signal | R*1 | | T | |
| Heater fan switch signal | R*1 | | | T |
| Air conditioner switch signal | R | | | T |
| MI signal | T | | | R |
| Glow lamp signal*2 | T | | | R |
| Engine coolant temperature signal | T | | | R |
| Fuel consumption signal | T | | | R |
| Vehicle speed signal | | T | | R |
| | R | | | T |
| Seat belt reminder signal | | | R | T |
| Headlamp switch signal | | | T | R |
| Flashing indicator signal | | | T | R |
| Engine cooling fan speed signal | T | | R | |
| Child lock indicator signal | | | T | R |
| Door switches state signal | | | T | R |
| Key ID signal | R | | T | |
| | T | | R | |
| A/C compressor signal | T | | R | |

*1: Except YD22DDTi engine model
*2: YD22DDTi engine model only

# TROUBLE DIAGNOSIS

PFP:00004

## Fail-safe Function

EFS001IZ

- If a malfunction occurs in ABS electrical system, and control unit detects the malfunction, ABS warning light on gauge turns ON to inform driver of system malfunction.

## How to Proceed with Trouble Diagnosis

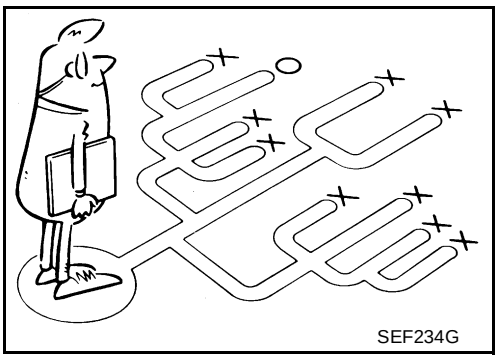
EFS001J0

### BASIC CONCEPT

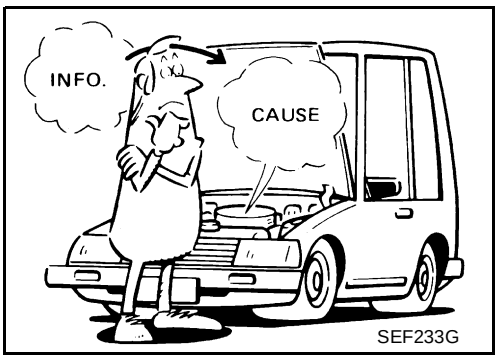
- The most important point to perform trouble diagnosis is to understand vehicle systems (control and mechanism) thoroughly.

- 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 symptoms by driving vehicle with 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”.**


SEF234G

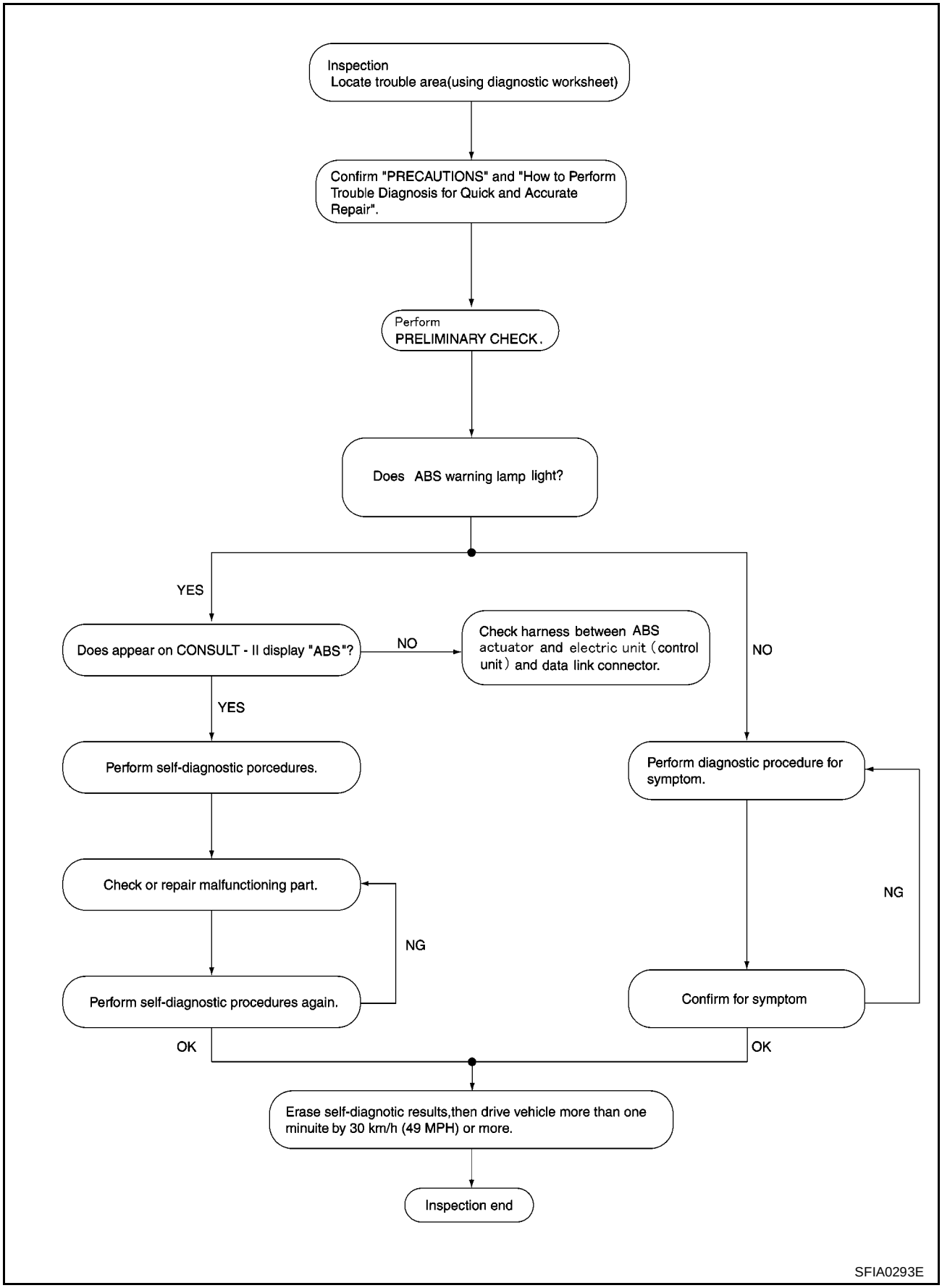
- It is essential to check symptoms right from the beginning in order to repair a malfunction completely.
  For intermittent malfunction, reproduce symptom based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake suspected harness or connector by hand. When repairing without any symptom diagnosis, you can not judge if malfunction has actually been eliminated.
- After completing diagnosis, always erase diagnostic memory. Refer toBRC-26, "CONSULT-II Functions" .



SEF233G

- For intermittent malfunction, move harness or harness connector by hand. Then check poor contact or false open circuit.
- Always read “GI Section” GI-3, "PRECAUTIONS" to check the general guidelines and to confirm the general precautions.

## DIAGNOSIS FLOW



## ASKING COMPLAINTS

- Complaints against malfunction vary depending on each person. It is important to clarify customer complaints.
- Ask customer about what symptoms are present 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

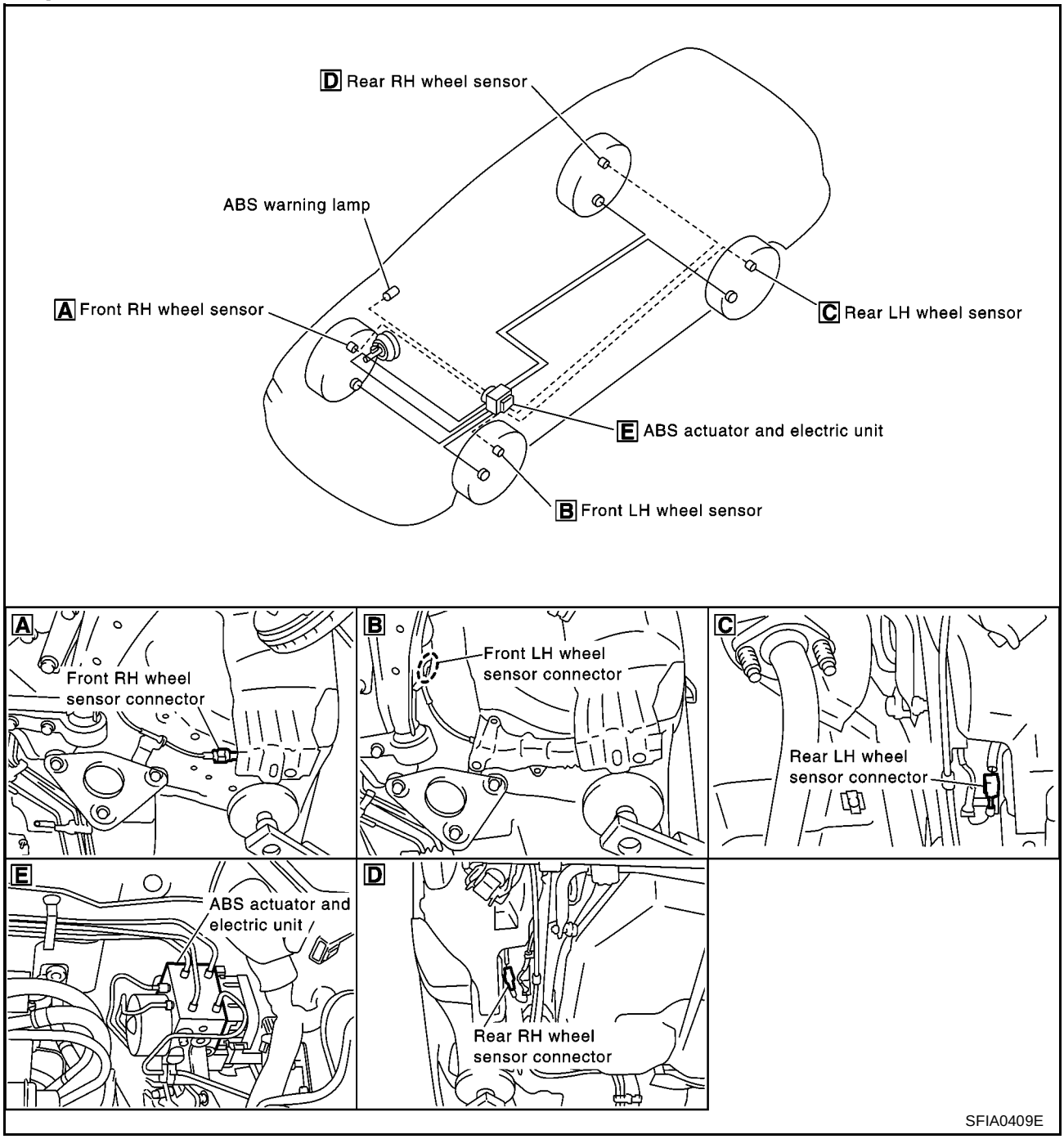
## TROUBLE DIAGNOSIS SHEET - EXAMPLE

| | | | |
|---|---|---|---|
| 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 dose not work (Rear wheels slip when accelerating) | ☐ ABS dose 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 | | |

SFIA0029E

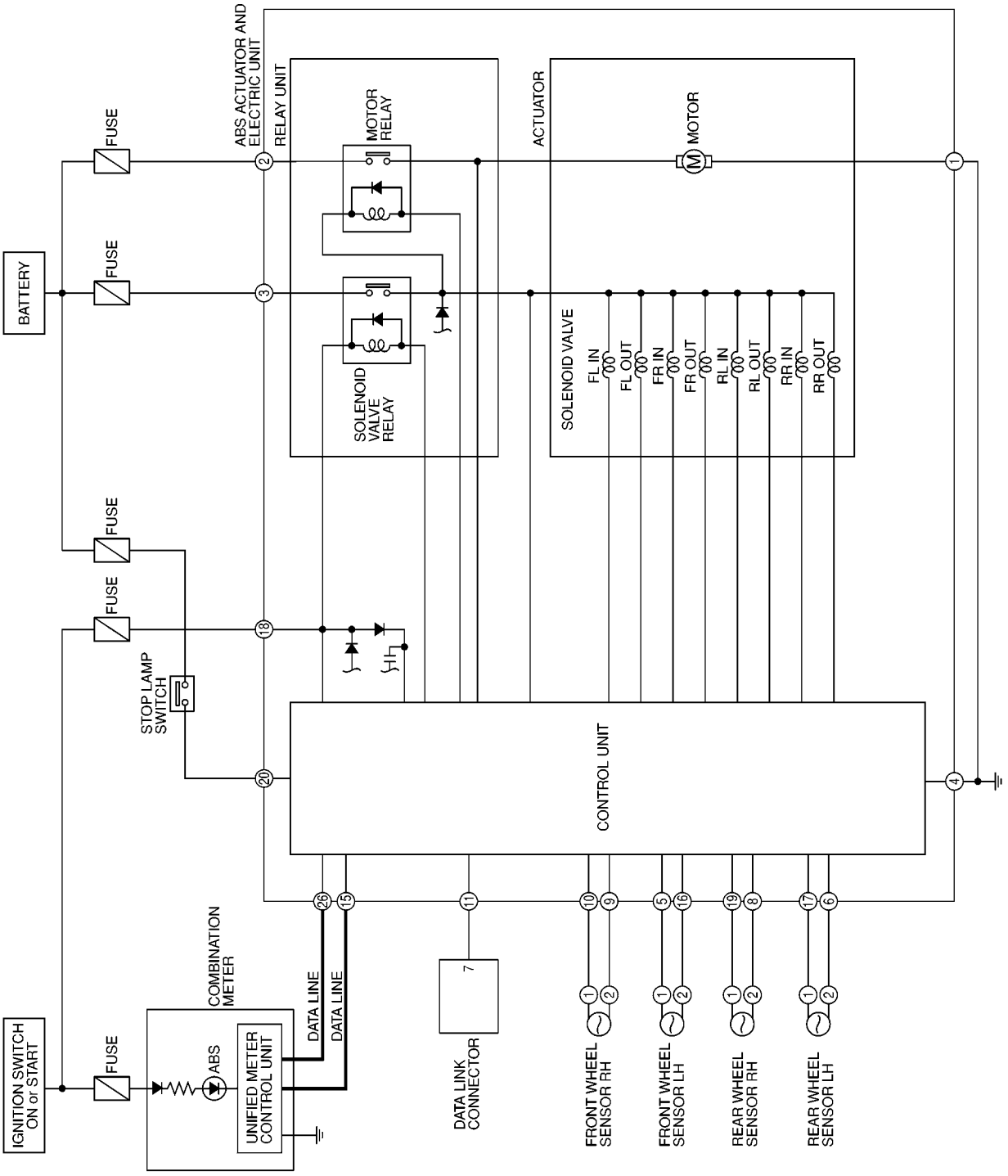
## Component Parts Location

EFS001J1



## Schematic

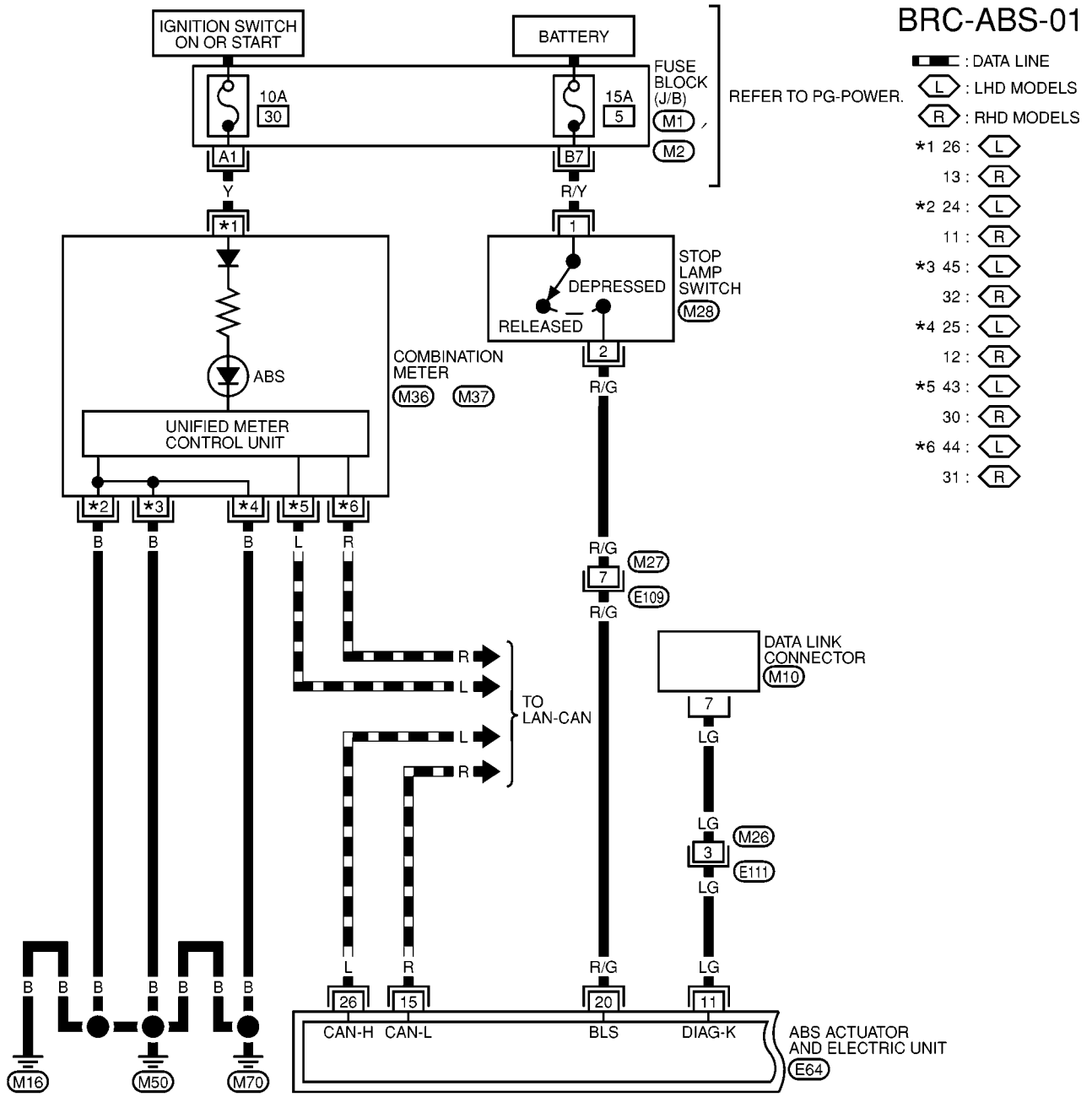
EFS001J2



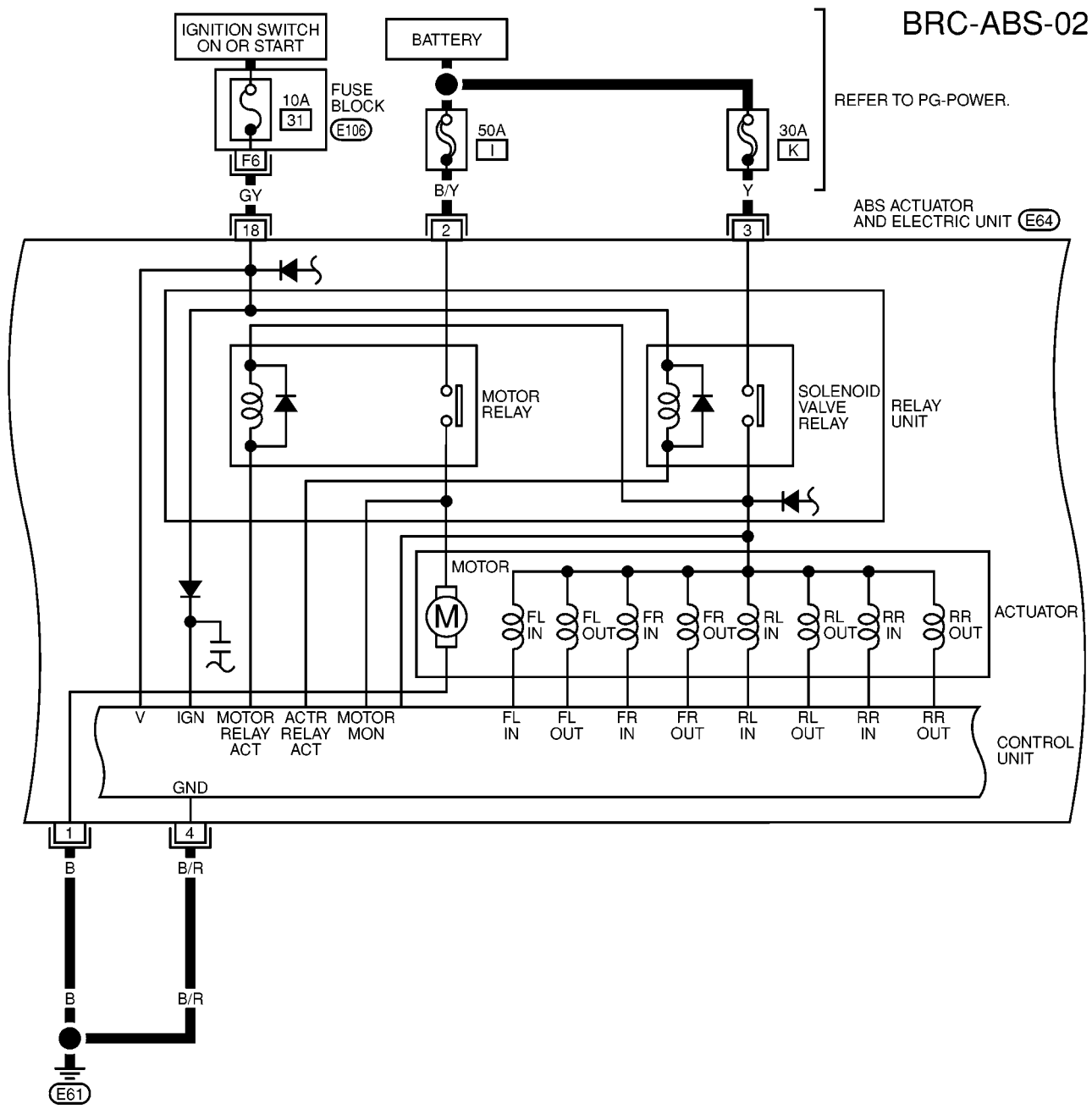

MFWA0008E

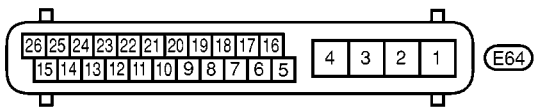
## Wiring Diagram — ABS —

EFS001J3




MFWA0009E

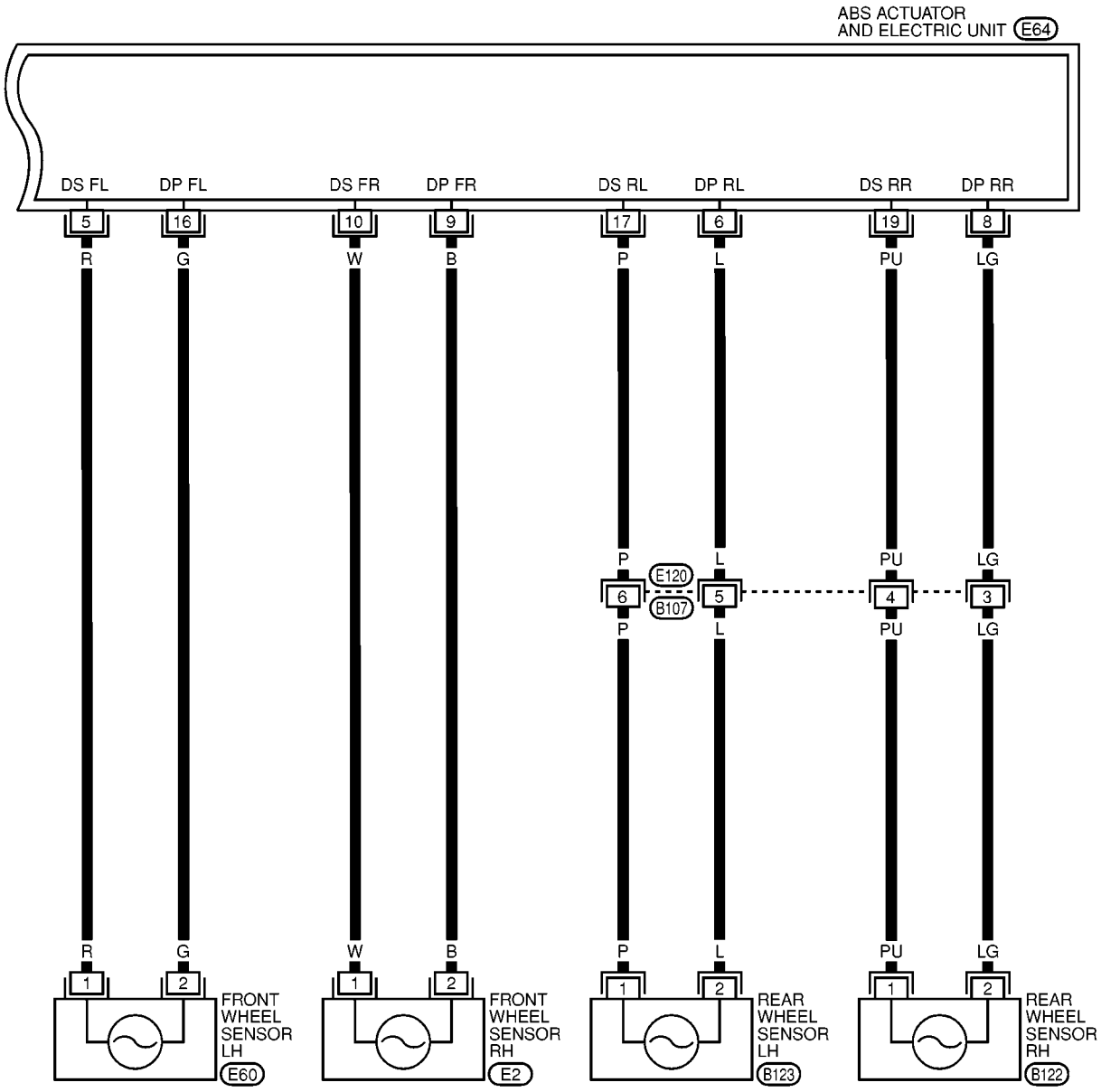


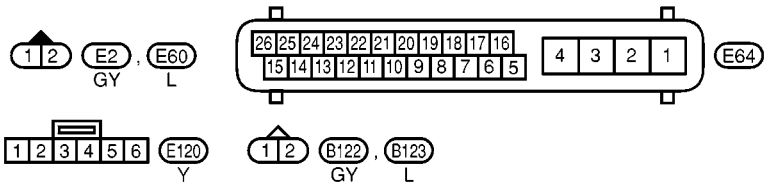




REFER TO THE FOLLOWING.
E106 -FUSE BLOCK-
JUNCTION BOX (J/B)

MFWA0010E

BRC-ABS-03




MFWA0011E

## Trouble Diagnosis Chart by Symptom

EFS001J4

When ABS and warning lamps illuminate, perform self-diagnosis.

| Symptom | Condition | Check items | Reference page |
|---|---|---|---|
| ABS warning lamp does not illuminate with ignition ON. (ABS warning lamp check) | IGN-ON | ● Blown ABS warning lamp bulb<br>● Blown fuse between ignition and ABS warning lamp.<br>● Open circuit of wiring between ignition and ABS warning lamp.<br>● Malfunction in ABS system | BRC-33 |
| ABS warning lamp illuminates with ignition ON, but does not illuminates after a few seconds. (ABS warning lamp has not illuminated.) | IGN-ON | ● ABS actuator and electric unit connector disconnected<br>● Malfunction in ABS system | BRC-33 |

## ABS actuator and electric unit Input/Output Signal Standard

EFS001J5

### SPECIFICATIONS DEFINED BY CONSULT áU

| Items to be monitored | Contents | Data monitor | | (Reference) Check points when result was malfunctioning |
|---|---|---|---|---|
| | | Condition | Reference values in normal operation | |
| Wheel sensor FR, FL, RR, RL (km/h) | Vehicle wheel speed | When the vehicle is stopped | 0 km/h | Wheel sensor and harness |
| | | While driving (note:1) | Almost in accordance with speedometer display (within ±10%) | |
| Stop lamp switch | Brake pedal status | Depress the brake pedal. | ON | Stop lamp switch and path |
| | | Release brake pedal. | OFF | |
| ENGINE RPM SIGNAL [STOP/RUN] | With engine running | Engine RPM below 400 rpm | STOP | Engine RPM signal path |
| | | Engine RPM 400 rpm or higher | RUN | |
| ABS inlet S/V FR, FL, RR, RL (ON/OFF) | Solenoid valve operation | Actuator and electric unit (solenoid valve) is activated (by active test mode of CONSULT áU) or actuator relay is not activated (in fail-safe mode, before starting engine) | ON | ABS solenoid valve path |
| ABS outlet S/V FR, FL, RR, RL (ON/OFF) | | Actuator and electric unit (solenoid valve) is not activated and actuator relay is activated (vehicle stopped with (Engine running) | OFF | |
| ABS actuator relay (ON/OFF) | Actuator relay activated | Vehicle stopped Ignition switch ON | OFF | ABS actuator relay and harness |
| | | Vehicle stopped Engine running | ON | |

| | | | | |
|---|---|---|---|---|
| ABS motor relay (ON/OFF) | Motor relay and motor activated | (Ignition switch ON or engine is running): ABS inactive | OFF | ABS motor and motor relay harness |
| | | (Ignition switch ON or engine is running): ABS active | ON | |
| Warning lamp (ON/OFF) | ABS warning lamp ON condition (Note 2) | ABS warning lamp ON | ON | ABS warning lamp and path |
| | | ABS warning lamp OFF condition | OFF | |
| POWER VOLTAGE (V) | Battery voltage supplied to control module | Ignition switch ON | Approx. 10 - 16 V | Control unit power supply circuit |

**CAUTION:**

**1. Check air pressure of tire under normal condition.**

**2. ABS warning lamp ON/OFF timing**

**ON: When ignition switch is turned ON (before engine starts) or when malfunction is detected**

**OFF: After engine is started (When the system is in normal condition)**

## CONSULT-II Functions

EFS001J6

### CONSULT-II FUNCTION APPLICATION TABLE

| Item | Self-diagnosis | Data monitor | Active test |
|---|---|---|---|
| FR RH SENSOR | × | × | - |
| FR LH SENSOR [OPEN] | × | × | - |
| RR RH SENSOR | × | × | - |
| RR LH SENSOR | × | × | - |
| Speed sensor | × | - | - |
| Stop lamp switch | - | × | - |
| FR RH IN ABS SOL | × | × | × |
| FR RH OUT ABS SOL | × | × | × |
| FR LH IN ABS SOL | × | × | × |
| FR LH OUT ABS SOL | × | × | × |
| RR RH IN ABS SOL | × | × | × |
| RR RH OUT ABS SOL | × | × | × |
| RR LH IN ABS SOL | × | × | × |
| RR LH OUT ABS SOL | × | × | × |
| ABS ACTUATOR RELAY | × | × | - |
| ABS MOTOR RELAY | × | × | × |
| ABS warning lamp | - | × | - |
| Battery voltage | × | × | - |
| Control module | × | - | - |

×: Applicable

–: Not applicable

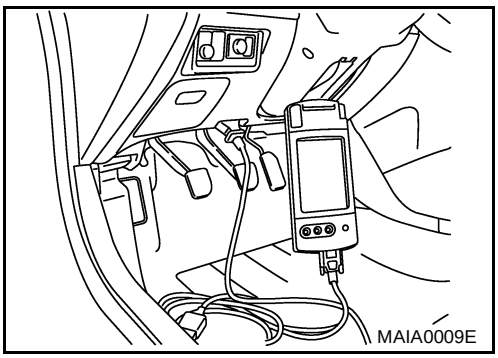
### SELF-DIAGNOSIS

#### Operation procedure

1. After obtaining customer's information, perform BRC-31, "Basic Inspection" .

2. After turning ignition switch OFF, connect CONSULT-II connector to data link connector on vehicle.
3. Start engine and drive at Approx. 30 km/m (19 MPH) for Approx. 1 minute.
4. Stop vehicle. With engine at idle, touch “START”, “ABS” and “SELF-DIAG RESULTS” on CONSULT-II screen in this order.

   **CAUTION:**
   **“ABS” may not be displayed on the system selection screen in the following case: When “START” was touched just after engine is started or ignition switch is turned to ON. In this case, repeat procedure from step 2.**




5. Self-diagnosis result is displayed. (If necessary, touch “PRINT” to print self-diagnosis result.)
   - If“NO MALFUNCTION”is displayed, check ABS warning lamp. Refer to BRC-32, "BASIC INSPECTION 3 ABS WARNING LAMP INSPECTION" .
6. Check the faulty part indicated by the chart to repair or replace.
7. Start engine and drive at Approx. 30 km/m (19 MPH) for Approx. 1 minute.

   **CAUTION:**
   - **Check again to make sure that there is NO FAILURE on other parts.**
   - **If wheel sensor [SHORT] is detected, ABS warning lamp does not turn off until following conditions: Vehicle is driven at Approx. 30km/h for Approx. 1 minute, even in normal conditions.**
8. Turn OFF ignition switch to prepare for erasing memory.
9. Start engine. Touch “START,” “ABS,” “SELF-DIAG RESULTS,” and “ERASE MEMORY” on CONSULT-II screen in this order to erase fault memory.

   **CAUTION:**
   **If memory cannot be erased, proceed to 6.**
10. Drive at Approx. 30 km/m (19 MPH) for Approx. 1 minute. Be sure ABS warning lamp is OFF.

## Display item list

| Faulty lines | Malfunction detecting condition | Check harness |
|---|---|---|
| Front RH wheel sensor [OPEN] | Either of following causes may be possible. Circuit of front RH wheel sensor is open. Abnormally high input voltage is caused by a short to power supply on signal lines. | Wheel sensor harness |
| Front LH wheel sensor [OPEN] | Circuit of front LH wheel sensor is open, or abnormally high input voltage is caused by a short to power supply on signal lines. | |
| REAR RH wheel sensor [OPEN] | Either of following causes may be possible. Circuit of rear RH wheel sensor is open. Abnormally high input voltage is caused by a short to power supply on signal lines. | |
| REAR LH wheel sensor [OPEN] | Either of following causes may be possible. Circuit of rear LH wheel sensor is open. Abnormally high input voltage is caused by a short to power supply on signal lines. | |
| Front RH wheel sensor [short 1]or Front RH wheel sensor [short 2] (Note 1), (Note 2) | At RH front wheel sensor, following conditions occur: abnormally high or low input voltage by short to power supply or ground on signal lines, abnormal input signal | |
| Front LH wheel sensor [short 1] or front left wheel sensor [open 2] (Note 1), (Note 2) | At LH front wheel sensor, following conditions occur: abnormally high or low input voltage by short to power supply or ground on signal lines, abnormal input signal | |
| Rear RH wheel sensor [SHORT] (Note 1), (Note 2) | At RH rear wheel sensor, following conditions occur: abnormally high or low input voltage by short to power supply or ground on signal lines, abnormal input signal | |
| Rear LH wheel sensor [SHORT] (Note 1), (Note 2) | At LH rear wheel sensor, following conditions occur: abnormally high or low input voltage by short to power supply or ground on signal lines, abnormal input signal | |

| Faulty lines | Malfunction detecting condition | Check harness |
|---|---|---|
| FR RH IN ABS SOL [OPEN] [SHORT] | At RH front wheel ABS inlet solenoid valve, following conditions occur: open circuit, output voltage is abnormally lower or higher than control value by short to ground on control line. | ABS solenoid valve and actuator relay harness |
| FR LH IN ABS SOL [OPEN] [SHORT] | At LH front wheel ABS inlet solenoid valve, following conditions occur: open circuit, output voltage is abnormally lower or higher than control value by short to ground on control line. | |
| RR RH IN ABS SOL [OPEN] [SHORT] | At RH rear wheel ABS inlet solenoid valve, following conditions occur: open circuit, output voltage is abnormally lower or higher than control value by short to ground on control line. | |
| RR LH IN ABS SOL [OPEN] [SHORT] | At LH rear wheel ABS inlet solenoid valve, following conditions occur: open circuit, output voltage is abnormally lower or higher than control value by short to ground on control line. | |
| FR RH OUT ABS SOL [OPEN] [SHORT] | At RH front wheel ABS outlet solenoid valve, following conditions occur: open circuit, output voltage is abnormally lower or higher than control value by short to ground on control line. | |
| FR LH OUT ABS SOL [OPEN] [SHORT] | At LH front wheel ABS outlet solenoid valve, following conditions occur: open circuit, output voltage is abnormally lower or higher than control value by short to ground on control line. | |
| RR RH OUT ABS SOL [OPEN] [SHORT] | At RH rear wheel ABS outlet solenoid valve, following conditions occur: open circuit, output voltage is abnormally lower or higher than control value by short to ground on control line. | |
| RR LH OUT ABS SOL [OPEN] [SHORT] | At LH rear wheel ABS outlet solenoid valve, following conditions occur: open circuit, output voltage is abnormally lower or higher than control value by short to ground on control line. | |
| ABS motor [ON error] | ABS actuator motor turned ON when the ABS motor is controlled OFF. | ABS motor relay and harness |
| ABS motor [OFF error] | ABS actuator motor turned OFF when the ABS motor is controlled ON. | |
| ABS actuator relay [ON error] | ABS actuator relay turned ON wheel it is controlled OFF. | ABS actuator relay and harness |
| ABS ACTUATOR RELAY [OFF abnormal] | ABS actuator relay turned OFF wheel it is controlled ON. | |
| BATTERY VOLTAGE [ABNORMAL] | Power source voltage supplied to ABS actuator and electric unit is abnormally low. | ABS actuator and electric unit power supply circuit |
| CONTROL UNIT | Function of calculation in ABS actuator and electric unit has failed. | ABS actuator and electric unit, power and ground circuits |
| CAN COMM | ● CAN communication function of ABS actuator and electric unit is not malfunctioning.<br>● CAN communication function of combination meter. | CAN communication system of ABS actuator and electric unit. |

(Note 1): When vehicle was stuck on slippery road, and spin its wheels for Approx. 10 - 80 seconds (the period depends on vehicle speed). ABS warning lamp may come on. However, this is not abnormal.
(Note 2): Repair short circuit in sensor. ABS warning lamp will come on when ignition switch is turned ON. According to self-diagnosis operation procedure, drive vehicle at Approx. 30 km/m (19 MPH). Then check ABS warning lamp goes out in about one minute.

## DATA MONITOR

- For details of data monitor function, refer to CONSULT -II Instruction Manual.

### Operation procedure

1. Turn the ignition switch to OFF.
2. Connect CONSULT-II connector to data link connector on vehicle.
3. Turn ignition switch ON.
4. Touch “START” on the display.
5. Touch “ABS” on display.

**CAUTION:**
**"ABS" may not be displayed on the system selection screen in the following case: When "START" was touched just after engine is started or ignition switch is turned to ON. In this case, repeat procedure from step 2.**

6. Touch "DATA MONITOR".
7. Return to monitor item selection screen. Touch any of "ECU INPUT SIGNALS", "MAIN SIGNALS", "CAN DIG SUPPORT MINTR" or "SELECTION FROM MENU".
   Refer to following "Data monitor item chart".
8. Touch "MONITOR START".
9. Screen of data monitor is displayed.

## Display item list

| Item (Unit) | Monitor item selection | | Remarks |
|---|---|---|---|
| | Main item | Item menu selection | |
| FR RH SENSOR (km/h) | × | × | Wheel speed calculated by front RH wheel sensor signal is displayed. |
| FR LH SENSOR (km/h) | × | × | Wheel speed calculated by front LH wheel sensor signal is displayed. (Note 1) |
| RR RH SENSOR (km/h) | × | × | Wheel speed calculated by rear RH wheel sensor signal is displayed. (Note 1) |
| RR LH SENSOR (km/h) | × | × | Wheel speed calculated by rear LH wheel sensor signal is displayed. |
| STOP LAMP SW | × | × | Operating condition of ABS warning lamp by control unit is displayed. |
| FR RH IN SOL | × | × | Operating condition (ON/OFF) of rear RH ABS inlet solenoid valve is displayed. |
| FR RH OUT SOL | × | × | Operating condition (ON/OFF) of rear RH ABS outlet solenoid valve is displayed. |
| FR LH IN SOL | × | × | Operating condition (ON/OFF) of rear RH ABS inlet solenoid valve is displayed. |
| FR LH OUT SOL (ON/OFF) | × | × | Operating condition (ON/OFF) of rear RH ABS outlet solenoid valve is displayed. |
| RR RH IN SOL (ON/OFF) | × | × | Operating condition (ON/OFF) of rear RH ABS inlet solenoid valve is displayed. |
| RR RH OUT SOL (ON/OFF) | × | × | Operating condition (ON/OFF) of rear RH ABS outlet solenoid valve is displayed. |
| RR LH IN SOL (ON/OFF) | × | × | Operating condition (ON/OFF) of rear RH ABS inlet solenoid valve is displayed. |
| RR LH OUT SOL (ON/OFF) | × | × | Operating condition (ON/OFF) of rear RH ABS outlet solenoid valve is displayed. |
| ACTUATOR RLY (ON/OFF) | × | × | Condition of ABS actuator relay (ON/OFF) is displayed. |

| Item (Unit) | Monitor item selection | | Remarks |
|---|---|---|---|
| | Main item | Item menu selection | |
| MOTER RLY (ON/OFF) | × | × | Condition of ABS motor relay (ON/OFF) is displayed. |
| WARNING LAMP (ON/OFF) | × | × | Indicates ABS warning lamp operating condition |
| BATTERY VOLT | × | × | Indicates voltage supplied by ABS actuator and electric unit |
| Voltage | - | × | Displays values measured by voltage probe |

×: Applicable
–: Not applicable

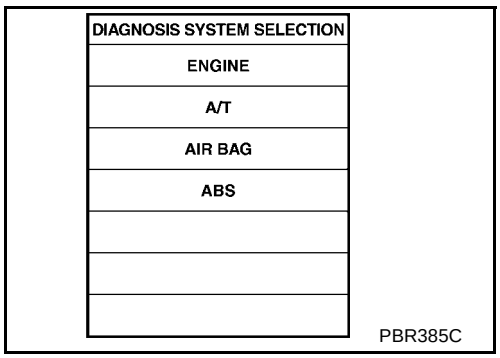
## ACTIVE TEST

### Operation procedure

**CAUTION:**

- **Do not perform active test wheel running.**
- **Be sure completely bleed air from brake system.**
- **Active test cannot be performed with ABS warning lamp on.**

1. Connect CONSULT-II to data link connector and start engine.
2. Touch “START” on the display.
3. Touch “ABS”.
4. Touch “ACTIVE TEST”.
5. Test item selection screen is displayed.
6. Touch test item.



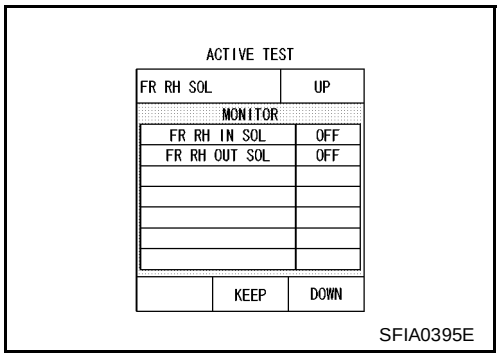

7. Touch “START” with “MAIN SIGNALS” line inverted.
8. Active test screen is displayed.

### Display item list

ABS solenoid valve
Touch “UP,” “KEEP,” and “DOWN”. Check ABS solenoid valves (inlet/outlet) operate as the following chart using screen monitor.

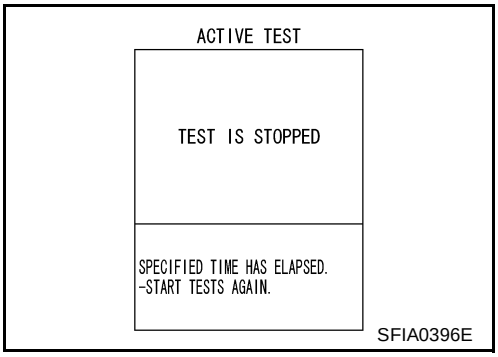
| Operation | Up | Keep | Down |
|---|---|---|---|
| ABS inlet S/V | OFF | ON | ON |
| ABS outlet S/V | OFF | OFF | ON* |

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



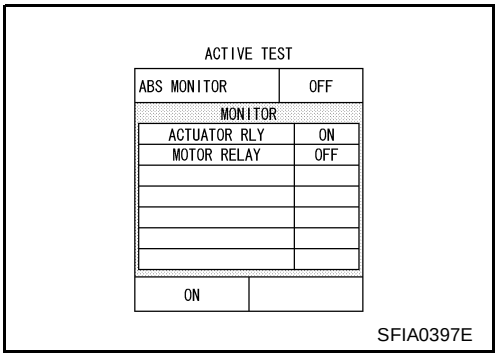
**NOTE:**

- If active test is performed with brake pedal depressed, pedal stroke may be changed. This is a normal condition.
- "TEST STOP" is displayed 10 seconds later from the operation start.
- To perform test again after "TEST STOP" is displayed, repeat step 6 of operation procedure.




ABS motor
Touch "ON" and "OFF" on screen. Check ABS motor relay operates as shown in the following chart.

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




**NOTE:**

- If active test is performed with brake pedal depressed, pedal stroke may be changed. This is a normal condition.
- "TEST STOP" is displayed 10 seconds later from the operation start.

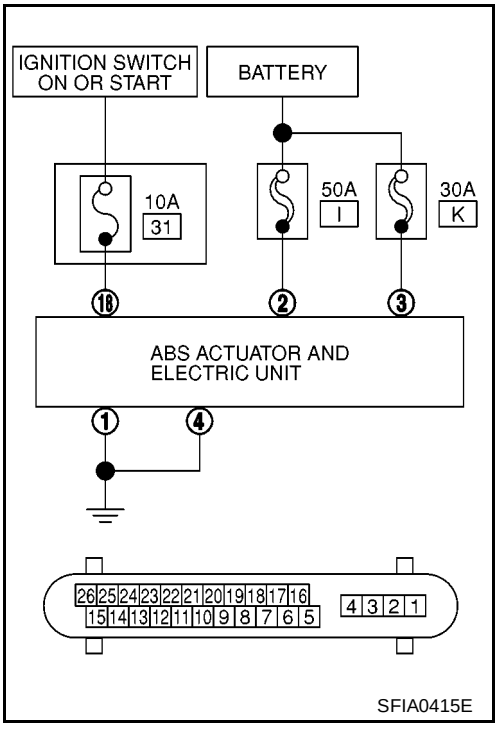
## Component Inspection

EFS001J7

### ABS ACTUATOR AND ELECTRIC UNIT

- Disconnect each ABS actuator and electric unit E64 connector. Confirm continuity and resistance value between each pair of ABS actuator and electric unit harness connector.

  **CAUTION:**
  **Be sure ABS motor is securely grounded.**




## Basic Inspection

EFS001J8

### BASIC INSPECTION 1 BRAKE FLUID LEVEL AND LEAKAGE INSPECTION

1. Check fluid level in brake reservoir tank. If fluid level is low, refill brake fluid.
2. Check area around brake piping and ABS actuator and electric unit for leaks. If a leak or oozing is detected, check as follows:

- If connections at ABS actuator and electric unit are loose, tighten piping to the specified torque. Then check again for leaks, and be sure there is no fluid leak.
- If the flare nuts at the connections and the threads of the ABS actuator and electric unit are damaged, replace the damaged parts. Then check again for leaks, and make sure that there is no fluid leak.
- If leak or oozing is detected except for ABS actuator and electric unit connections, wipe it with clean cloth. Then check again for leaks. If there is still leak or oozing, replace damaged part.
- If leak or oozing is detected on ABS actuator and electric unit, wipe with a clean cloth. Check again for leaks, and if there is still leak or oozing, replace ABS actuator and electric unit.

**CAUTION:**
**ABS actuator and electric unit body cannot be disassembled.**

### BASIC INSPECTION 2 INSPECTION FOR LOOSE POWER SUPPLY TERMINAL

Check battery for looseness on battery positive/negative terminals and ground connection.

### BASIC INSPECTION 3 ABS WARNING LAMP INSPECTION

1. Be sure ABS warning lamp turns on when ignition switch is turned ON. If it does not turn on, check ABS warning lamp harness.
2. Be sure ABS warning lamp turns off after approximately 1 second when ignition switch is turned ON. If it does not turn off, perform self-diagnosis.
3. After driving the vehicle at Approx. 30km/h for a few seconds, check ABS warning lamp do not illuminate.
4. After completing the self-diagnosis, always erase the diagnosis memory.

## Wheel Sensor System

EFS001J9

### INSPECTION PROCEDURE

### 1. TIRE INSPECTION

Check air pressure, wear, and size.

Are air pressure, wear, and size within specifications?

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

### 2. SENSOR ROTOR INSPECTION

Check sensor rotor tooth for damage.

Is inspection result OK?

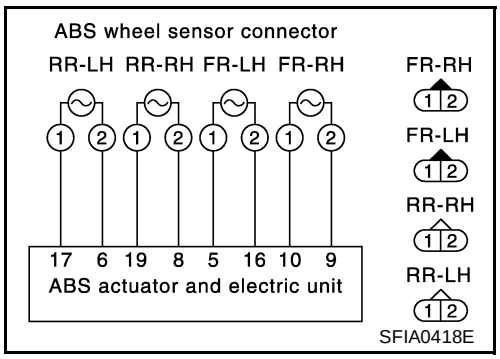
OK >> GO TO 3.
NG >> Replace sensor rotor.

### 3. CHECK THE CONNECTOR

1. Remove both the malfunctioning wheel sensor (identified at control unit) and the ABS actuator and electric unit connector.Check the deformation of the terminal or if the connection is at the incomplete state.Then connect the connectors.
2.Operate self-diagnosis.

Does ABS warning lamp illuminate?

YES >> GO TO 4
NO >> Check is completed.



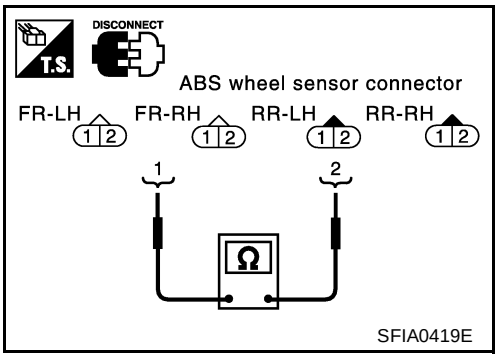
## 4. CHECK WHEEL SENSOR.

Check internal resistance of wheel sensor.

**Resistance :1.44 - 1.76 kΩ**

Is inspection result OK?

OK >> GO TO 5.
NG >> Replace wheel sensor.

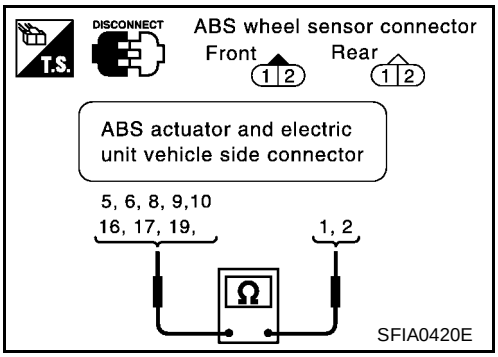



## 5. CHECK WHEEL SENSOR CIRCUIT.

1. Disconnect control unit connector and wheel sensor connector.
2. Check continuity between the ABS actuator and electric unit harness connector E64 terminal No.5 (R),16 (G),10 (W),9 (B),17 (P), 6 (L),19 (PU),8 (LG) and wheel sensor harness connector E60 No.1 (R), 2 (G), E2 No.1 (W),2 (B),B123 No.1 (P), 2 (L), B122 No.1 (PU), 2(LG)

Is inspection result OK?

OK >> Replace ABS actuator and electric unit.
NG >> Repair or replace the harness.




## ABS warning lamp does not illuminate. (ABS warning lamp does not come on when the ignition switch is turned ON.)

EFS001JF

Replace the combination meter control unit.

## ABS warning lamp illuminates with ignition ON, but does not illuminates after a few seconds. (ABS warning lamp has illuminated.)

EFS001JG

### 1. ABS ACTUATOR AND ELECTRIC UNIT CONNECTOR CONNECTION INSPECTION

Remove glove box on the passenger side and check ABS actuator and electric unit connector for proper connection.

Is inspection result OK?

OK >> Proceed to 2. (ABS actuator and electric unit connector is properly connected.)
NG >> Connect the ABS actuator and electric unit connector and perform inspection again.

### 2. USING CONSULT áU, PERFORM SELF-DIAGNOSIS.

Connect the CONSULT áUand perform self-diagnosis.

Is inspection result OK?

OK >> GO TO 3. (No self-diagnosis malfunction indicated.)
NG >> Perform inspection according to the trouble codes displayed on the CONSULTáU. Refer to the “DTC chart”.

## CAN Communication Circuit

EFS001OV

Inspection procedure

## 1. SELF-DIAGNOSIS RESULT CHECK 1

Description

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

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

YES >> Repair or replace affected items.
NO >> GO TO 2.

## 2. CAN COMMUNICATION SYSTEM CHECK

Check “CAN DIAG SUPPORT MNTR” of the data monitor items.

| Normal | Abnormal (example) |
|---|---|
| CAN COMM: OK | CAN COMM: NG |
| CAN CIRC 1: OK | CAN CIRC 1: UNKWN |
| CAN CIRC 2: OK | CAN CIRC 2: UNKWN |
| CAN CIRC 3: UNKWN | CAN CIRC 3: UNKWN |

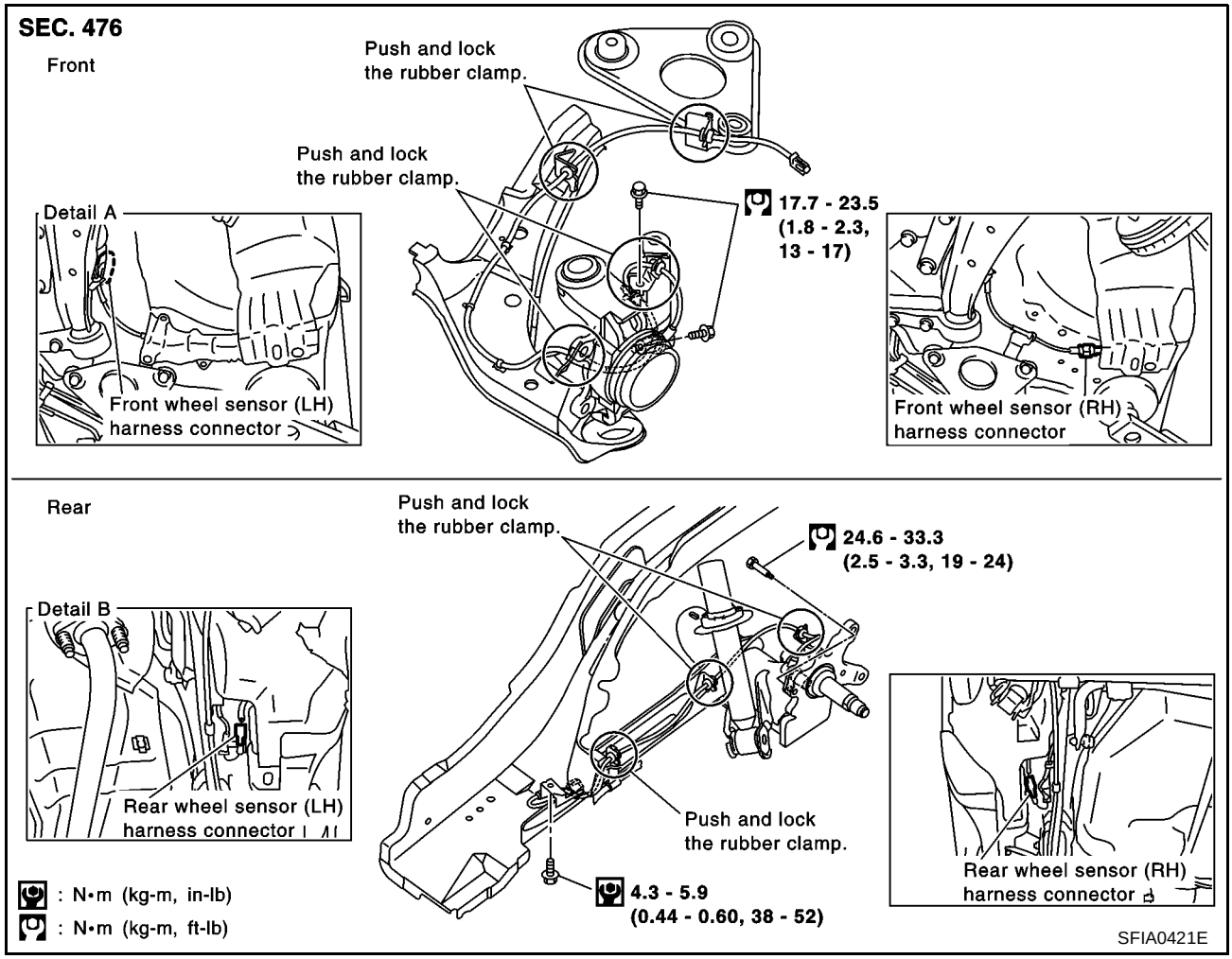
>> After printing the monitor items, go to CAN SYSTEM. Refer to BRC-6, "CAN COMMUNICATION"

# WHEEL SENSORS

PFP:47910

## Removal and Installation

EFS001JR




**CAUTION:**

- **Be careful not to damage sensor edge and rotor tooth. Before removing front or rear wheel hub, remove wheel sensor to avoid sensor wiring damage. Otherwise, sensor may be deactivated.**
- **When removing sensor, avoid rotating it as much as possible. Do not forcibly pull sensor harness.**
- **When installing, check sensor pick-up and mounting hole for foreign material such as iron chips. Check no foreign material has been caught in sensor rotor. Remove any foreign material found. Tighten mounting bolts and nuts to the specified torque.**

# SENSOR ROTOR

PFP:47970

## Removal and Installation

EFS001JS

### REMOVAL

#### Front

1. Remove drive shaft. Refer to FAX-11, "REMOVAL" .
2. Remove sensor rotor from drive shaft. Refer to FAX-14, "DISASSEMBLY" .

#### Rear

1. Remove wheel hub. Refer to RAX-5, "REMOVAL" .
2. Remove sensor rotor from wheel hub. Refer to RAX-5, "REMOVAL" .

### INSTALLATION

#### Front

1. Install sensor rotor to drive shaft. Refer to FAX-17, "ASSEMBLY" .
2. Connect drive shaft. Refer to FAX-12, "INSTALLATION" .

#### Rear

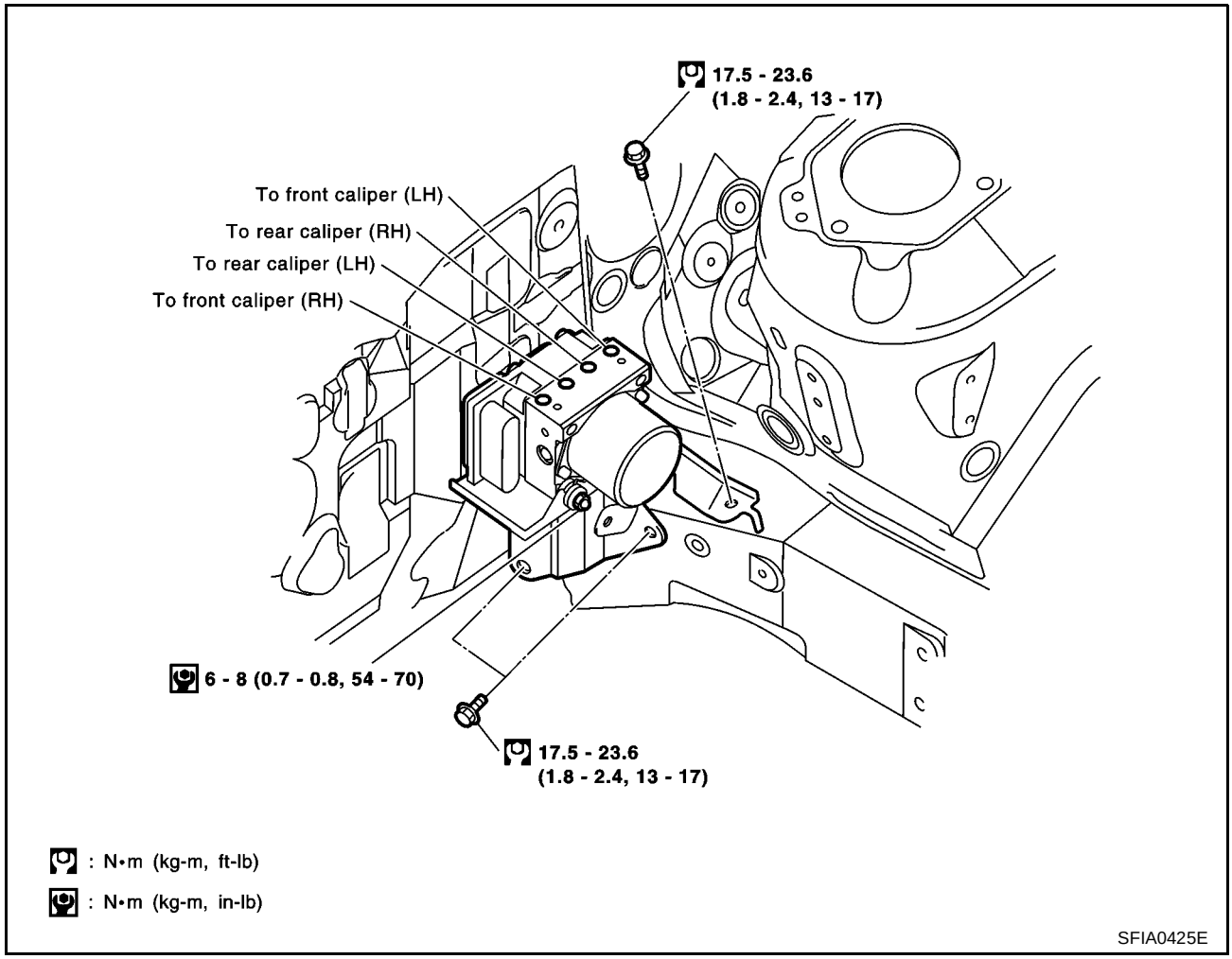
1. Install sensor rotor to wheel hub. Refer to RAX-6, "INSTALLATION" .
2. Connect wheel hub. Refer to RAX-6, "INSTALLATION" .

# ACTUATOR AND ELECTRIC UNIT

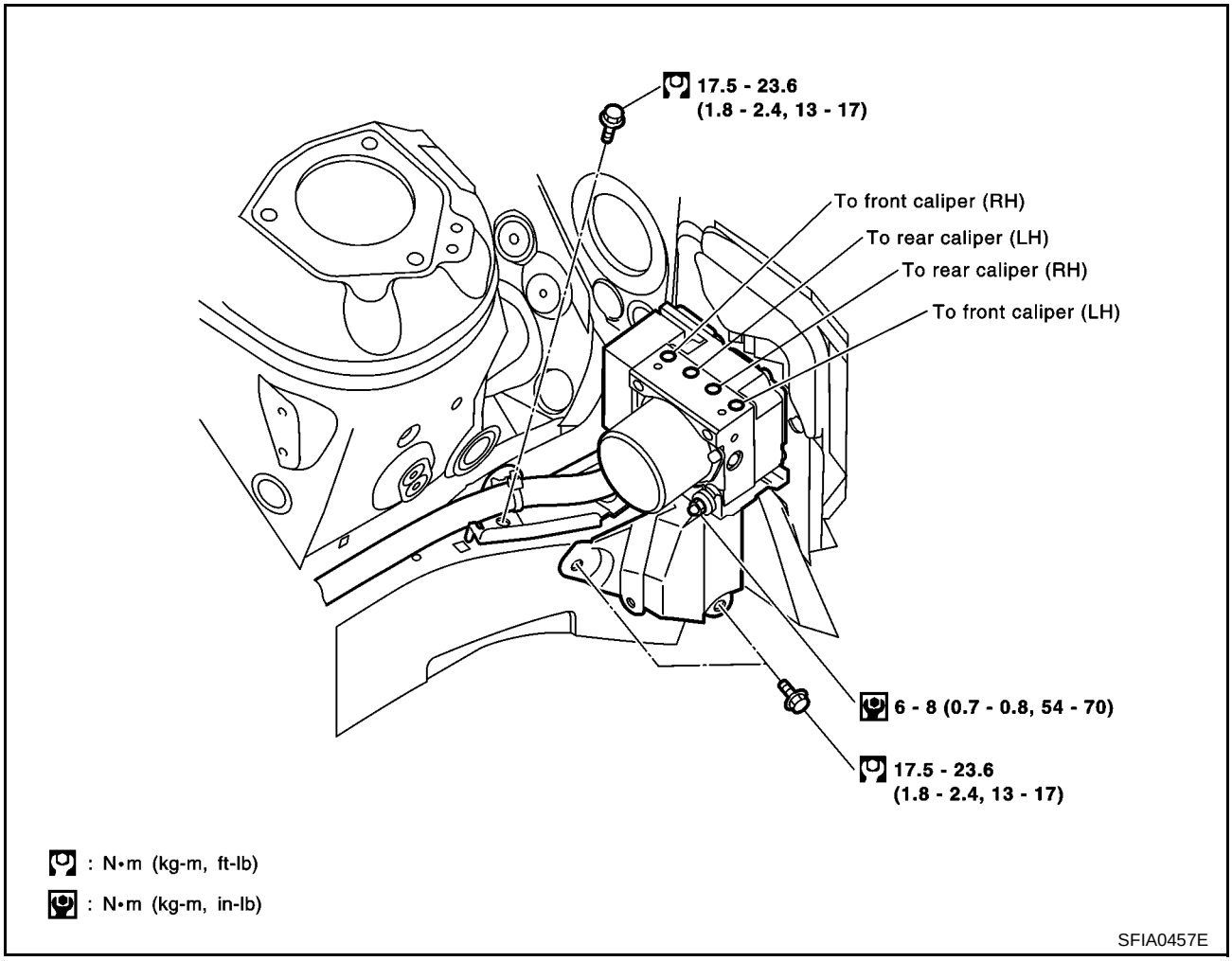
PFP:47660

## Removal and Installation

EFS001LR



## REMOVAL




**CAUTION:**

- **Before servicing, disconnect battery terminals.**
- **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.**

## INSTALLATION

Be careful of the following.

- Tighten mounting bolts and nuts to the specified torque.
- After the work, bleed the brakes. Refer to BR-10, "Bleeding Brake System" .

# PRECAUTIONS

PFP:00001

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

EFS001OM

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:**

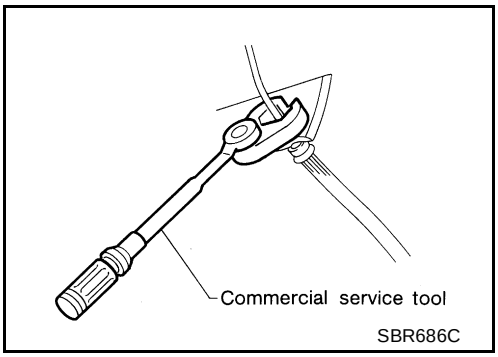
- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal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

EFS001HJ

- Recommended fluid is brake fluid “DOT 3” or “DOT 4”.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of hydraulic system.
- Use flare nut wrench when removing and installing brake tubes.
- Always torque brake lines when installing.
- Before working, turn the ignition switch OFF and disconnect the connectors for the ESP/TCS/ABS actuator and control unit or the battery terminals.
- Burnish the brake contact surfaces after refinishing or replacing drums or rotors, after replacing pads or linings, or if a soft pedal occurs at very low mileage. Refer to BR-25, "BRAKE BURNISHING PROCEDURE" .

  **WARNING:**
  **Clean brakes with a vacuum dust collector to minimize risk of health hazard from powder caused by friction.**




## Precautions for Brake Control

EFS001HK

- During the ESP/TCS/ABS operation, the brake pedal vibrates lightly and its mechanical noise may be heard. This is a normal condition.
- Just after starting the vehicle after ignition switch ON, the brake pedal may vibrate or the motor operating noise may be heard from the engine compartment. This is a normal status of the operation check.
- The stopping distance may be longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snowy (fresh deep snow) road.
- If a malfunction is indicated by the ABS warning lamp, or other warning lamps, collect the necessary information from the customer (what symptoms are present under what conditions) and find out the possible causes before starting the service. Besides the electrical system inspection, check the booster operation, brake fluid level, and oil leaks.
- If the tire size and type are used in a improper combination, or the brake pads are not NISSAN genuine parts, the stopping distance or steering stability may deteriorate.
- If there is a radio, antenna, or antenna lead-in wire (including wiring) near the control unit, the ESP/TCS/ABS function may have a malfunction or error.
- If aftermarket parts (e.g. Car stereo equipment, CD player) have been installed, check the electrical harnesses for pinches, open, and improper wiring.

## Precautions for CAN System

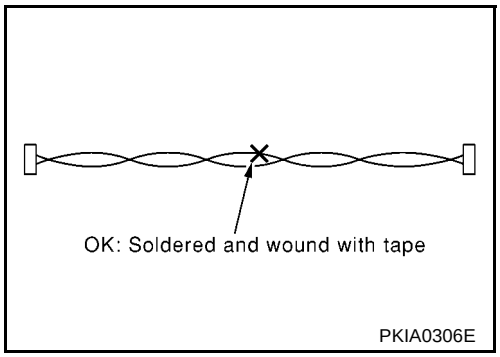
EFS001HL

### FOR INSPECTION

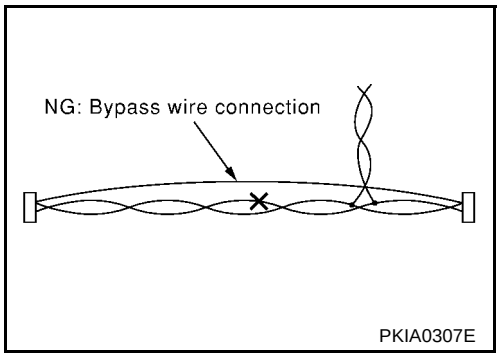
- Do not apply voltage of 7.0V or higher to the measurement terminals.
- Use the tester with its open terminal voltage being 7.0V or less.
- Before harness inspection, turn the ignition switch off, disconnect the negative battery terminal.

### FOR HARNESS REPAIR

- Solder the repaired parts, and wrap with tape. [Frays of twisted line must be within 110 mm (4.33 in)]




- Do not perform bypass wire connections for the repair parts.(The spliced wire will become separated and the characteristics of twisted line will be lost.)



# ON-VEHICLE SERVICE

PFP:00000

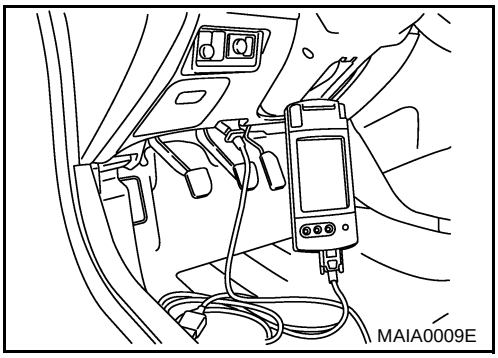
## Adjustment of Neutral Position of Steering Angle Sensor

EFS001HM

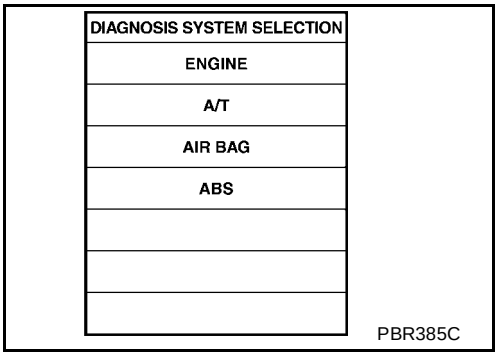
- After removing/installing or replacing the ESP/TCS/ABS control unit, steering angle sensor, steering components, suspension components, and tires, or after adjusting the wheel alignment, make sure to adjust the neutral position of the steering angle sensor before running the vehicle.

**CAUTION:**
**To adjust the neutral position of the steering angle sensor, make sure to use CONSULT-II. (Adjustment cannot be done other than CONSULT-II.)**

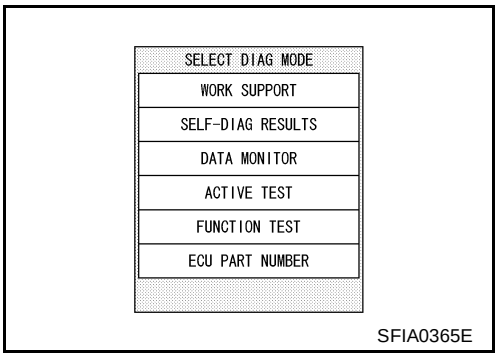
1. Stop the vehicle with the front wheels in the straight-ahead position.
2. Connect CONSULT-II to data link connector on the vehicle, and turn the ignition switch to ON position (engine not running).


MAIA0009E

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



PBR385C



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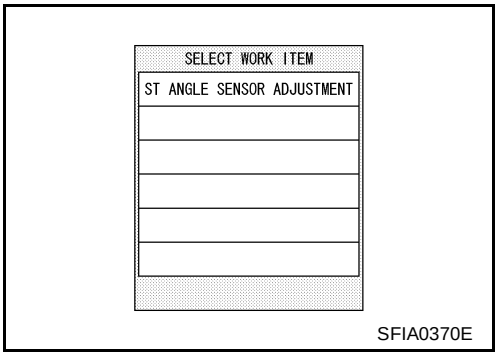


SFIA0370E

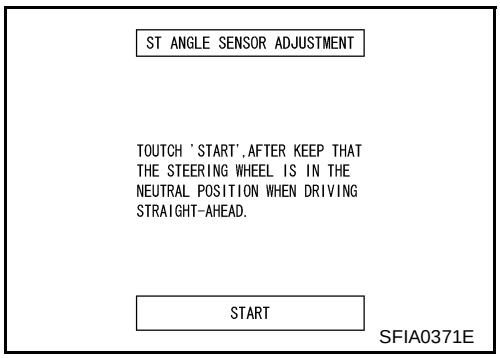
4. Touch “START”.

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

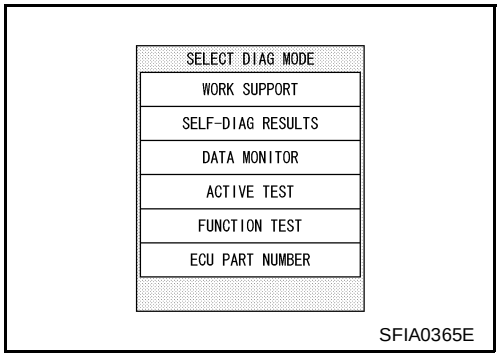
5. After approximately 10 seconds, touch “END”. (After approximately 60 seconds, it ends automatically.)
6. Turn the ignition switch OFF, then turn it ON again.

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

7. Run the vehicle with the front wheels in the straight-ahead position, then stop.
8. Select “DATA MONITOR“, “ECU INPUT SIGNALS” on the CONSULT-II screen. Then check that the “ST ANGLE SIG” is within 0±2.5deg. If the value is more than the specification, repeat steps 1 to 5.
9. Erase the memory of ESP/TCS/ABS control unit and ECM.
10. Turn the ignition switch OFF.



SFIA0371E



SFIA0365E

# GENERAL INFORMATION

PFP:00000

## Fail-Safe

EFS001HN

### ABS SYSTEM

If a malfunction occurs in the electrical system, the ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp in the meter will turn ON. In this condition, the ESP/TCS/ABS and EBD become one of the following conditions by the fail-safe function.

1. Only EBD operates. The same condition as that of models without ESP/TCS/ABS
2. ESP/TCS/ABS and EBD do not operate. Only normal brake operates on 4 wheels.

**NOTE:**
In the step 1 shown above, the self-diagnosis is carried out at the ignition switch is turned ON and when the vehicle initial starts. ABS self-diagnosis noise may be heard as usual.

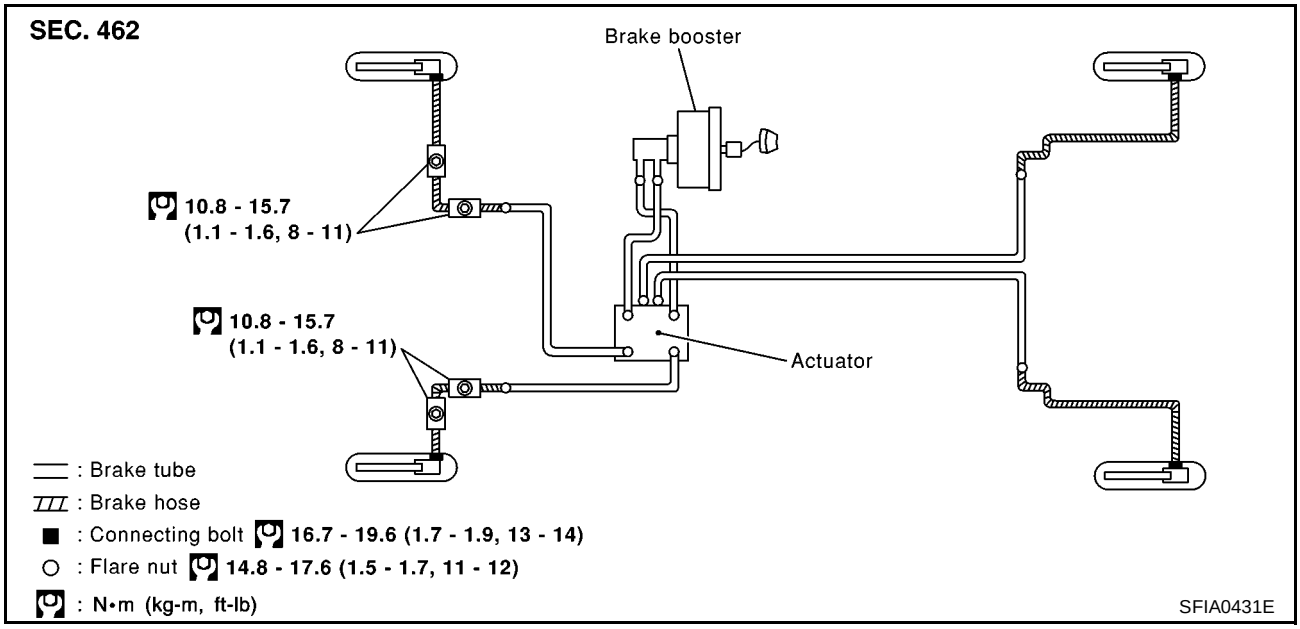
### ESP/TCS SYSTEM

If a malfunction occurs in the electrical system, the ESP OFF indicator lamp and SLIP indicator lamp in the meter turn on. In this condition, ESP/TCS will be deactivated and it becomes equal to that of models without ESP/TCS. However, ABS is controlled normally.
If a malfunction occurs in the throttle control system, ESP/TCS control does not operate. Only ABS control operates normally.

**CAUTION:**
**If the fail-safe function operates, carry out the self-diagnosis for ESP/TCS/ABS control system.**

## Hydraulic Circuit

EFS001HO




**CAUTION:**

- **When installing, check for twist and fracture.**
- **Make sure that there is no interference with other parts when turning the steering clockwise or counter clockwise.**
- **The brake piping is an important safety part. If a brake fluid leak is detected, always disassemble and replace with a new one, if necessary.**

## ABS Functions

EFS001HP

1. In cases of braking suddenly or braking on slippery road (ice road), ABS functions prevent wheels from lock, improve the stability in sudden braking, and make efficient avoidance of obstacles with steering manipulation by detecting 4-wheel speed and controlling 4-wheel brake fluid pressure.
2. EBD is integrated in ESP/TCS/ABS system.

**CAUTION:**

- **During ABS operation, the brake pedal lightly vibrates and its mechanical noise may be heard. This is a normal condition.**

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

## TCS Functions

EFS001HQ

1. With the wheel sensor signals from 4 wheels, the ESP/TCS/ABS control unit detects a wheel spin. If a wheel spins, the control unit controls brake fluid pressure to the spinning wheel, and cuts the fuel to the engine. It also closes the throttle valve to reduce the engine torque. Furthermore, throttle position is controlled to the appropriate engine torque.
2. If a wheel spins, the TCS system works same as LSD (Limited Slip Differential) function applying brake fluid pressure to the spinning wheel.
3. During TCS operation, it informs a driver of system operation by flashing SLIP indicator lamp.

**CAUTION:**

- **During TCS operation, the body and the brake pedal lightly vibrate and the mechanical noise may be heard. This is a normal condition.**
- **Depending on road circumstances, the driver may have a sluggish feel. This is not abnormal, because the optimum traction has the highest priority by TCS operation.**
- **When the vehicle is passing through a road where the surface friction coefficient varies, downshifting or depressing the accelerator pedal fully may activate TCS temporarily.**

## ESP Functions

EFS001HR

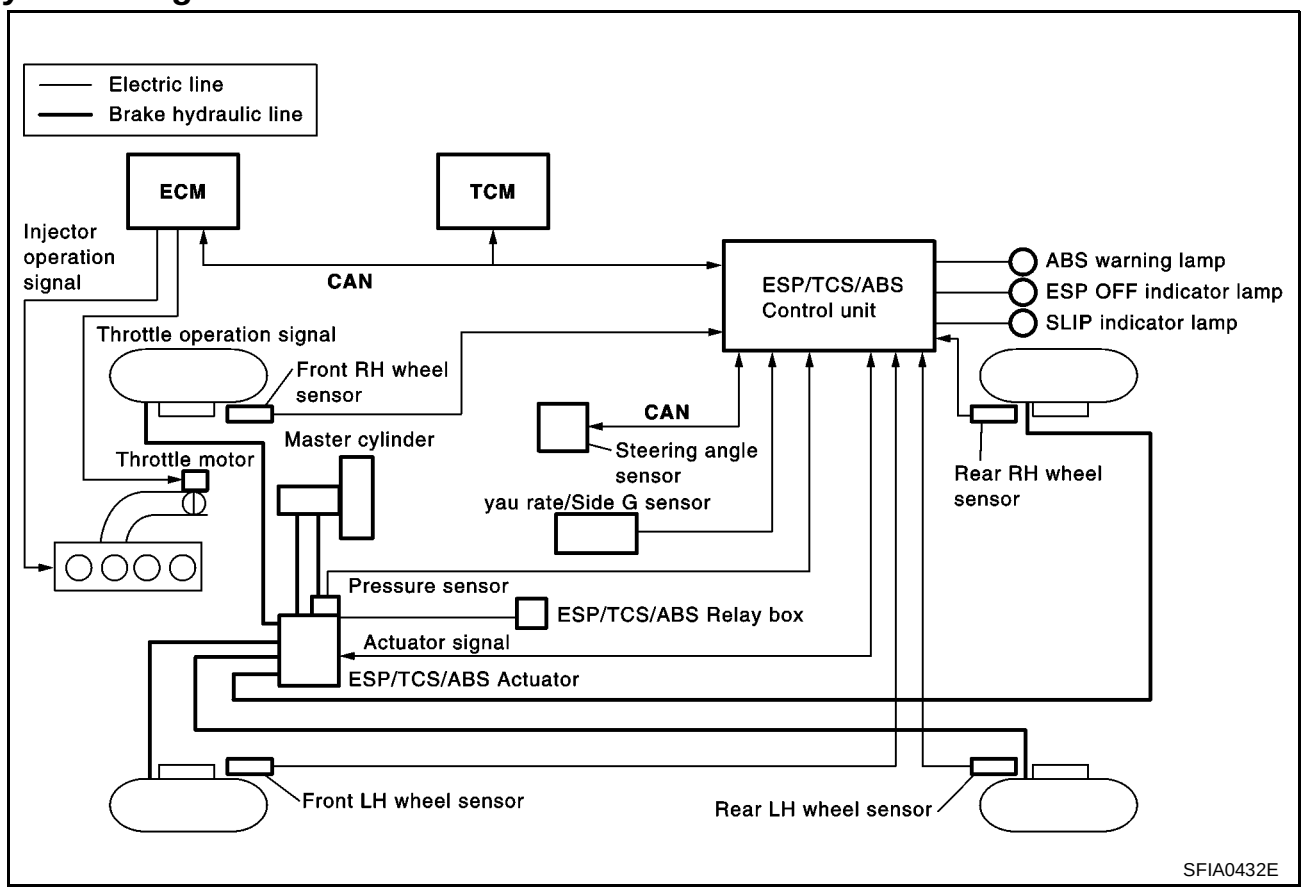
1. The Electronic Stability Program is called the ESP for short.
   The ESP is indicated as the VDC (the Vehicle Dynamics Control) on the CONSULT-II screen.
2. In addition to the ABS/TCS function, ESP detects the driver's steering operation amount and brake operation amount from the steering angle sensor and pressure sensor. Using the information from the yaw rate/side G sensor and wheel sensors, ESP judges the driving condition (conditions of understeer and oversteer) to improve the stability by controlling the brake on 4 wheels and engine output.
3. During ESP operation, the SLIP indicator lamp flashes to inform the driver of the operation.

**CAUTION:**

- **During ESP operation, the body and the brake pedal lightly vibrate and their mechanical noise may be heard. This is a normal condition.**
- **If the vehicle is rotated on a turn table, or rolled and rocked on a ship, the ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp may turn ON. In this case, start the engine on a normal road again. If the ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp turn OFF after the restart, it is normal.**
- **When driving in a steep slope such as a bank, the ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp may turn ON. In this case, start the engine on a normal road again. If the ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp turn OFF after the restart, it is normal.**

## System Diagram

EFS001HS



# CAN COMMUNICATION

PFP:23710

## System Description

EFS001OC

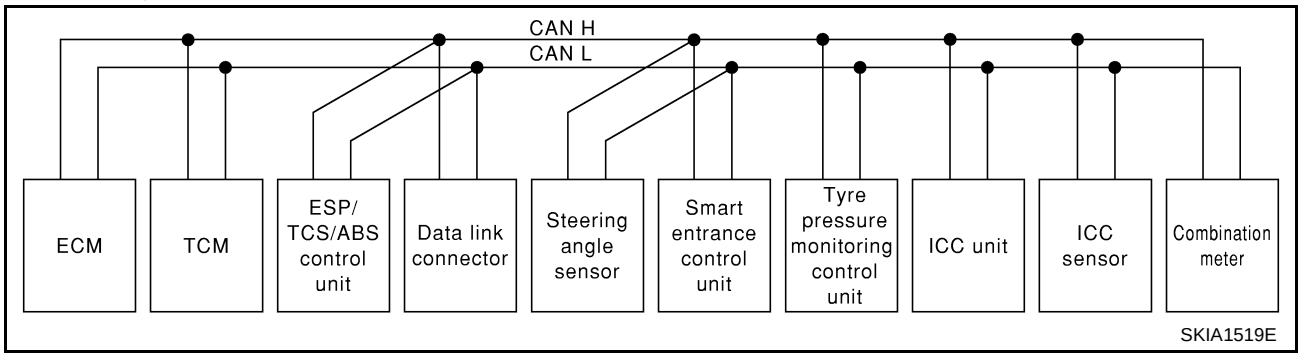
CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information 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.

## CAN Communication Unit For LHD Models with Tyre Pressure Monitoring System

EFS001OR

### FOR QR20DE CVT WITH ICC MODELS

### System diagram




### Input/output signal chart

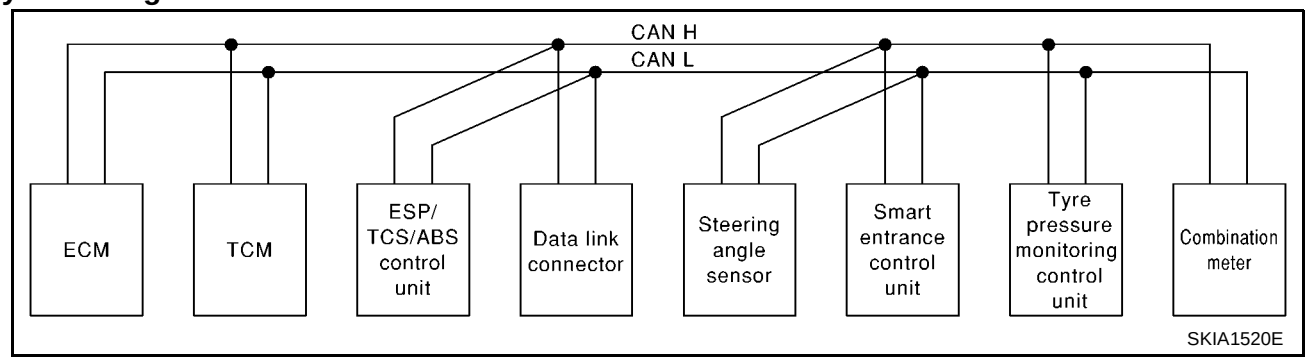
T: Transmit R: Receive

| Signals | ECM | TCM | ESP/ TCS / ABS control unit | Steering angle sensor | Smart entrance control unit | Tyre pressure monitoring control unit | ICC unit | ICC sensor | Combination meter |
|---|---|---|---|---|---|---|---|---|---|
| Engine speed signal | T | R | R | | | | R | | R |
| Accelerator pedal position signal | T | R | R | | | | R | | |
| Closed throttle position signal | T | | | | | | R | | |
| ICC steering switch signal | T | | | | | | R | | |
| Shift pattern signal | | T | | | | | R | | |
| Parking brake switch signal | | | T | | | | R | | |
| ICC system display signal | | | | | | | T | | R |
| ICC sensor signal | | | | | | | R | T | |
| ESP operation signal | R | | T | | | | R | | |
| TCS operation signal | R | | T | | | | R | | |
| ABS operation signal | R | R | T | | | | R | | |
| Stop lamp switch signal | | R | T | | | | | | |
| Steering wheel angle sensor signal | | | R | T | | | | | |
| Wheel speed sensor signal | | | T | | | | R | | |
| Rear window defogger signal | R | | | | T | | | | |
| Heater fan switch signal | R | | | | | | | | T |
| Air conditioner switch signal | R | | | | | | | | T |
| Primary pulley revolution signal | R | T | | | | | R | | |
| Secondary pulley revolution signal | R | T | | | | | R | | |

| Signals | ECM | TCM | ESP/ TCS / ABS control unit | Steering angle sensor | Smart entrance control unit | Tyre pressure monitoring control unit | ICC unit | ICC sensor | Combination meter |
|---|---|---|---|---|---|---|---|---|---|
| ICC operation signal | R | | | | | | T | | |
| Brake switch signal | R | | | | | | T | | |
| MI signal | T | | | | | | | | R |
| Current gear position signal | | T | | | | | | | R |
| Engine coolant temperature signal | T | | | | | | R | | R |
| Fuel consumption signal | T | | | | | | | | R |
| Vehicle speed signal | | | T | | | | | | R |
| | R | | | | | | | | T |
| Seat belt reminder signal | | | | | R | | | | T |
| Headlamp switch signal | | | | | T | | | | R |
| Flashing indicator signal | | | | | T | | | | R |
| Engine cooling fan speed signal | T | | | | R | | | | |
| Child lock indicator signal | | | | | T | | | | R |
| Door switches state signal | | | | | T | | | | R |
| Key ID signal | R | | | | T | | | | |
| | T | | | | R | | | | |
| A/C compressor signal | T | | | | R | | | | |
| Tire pressure signal | | | | | | T | | | R |

## FOR QR20DE CVT WITHOUT ICC MODELS

### System diagram




### Input/output signal chart

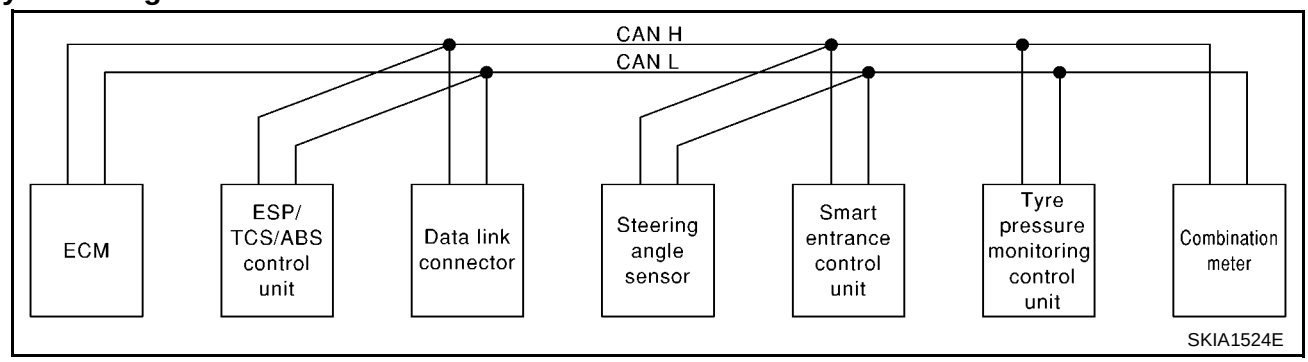
T: Transmit R: Receive

| Signals | ECM | TCM | ESP/ TCS / ABS control unit | Steering angle sensor | Smart entrance control unit | Tyre pressure monitoring control unit | Combination meter |
|---|---|---|---|---|---|---|---|
| Engine speed signal | T | R | R | | | | R |
| Accelerator pedal position signal | T | R | R | | | | |
| ESP operation signal | R | | T | | | | |
| TCS operation signal | R | | T | | | | |
| ABS operation signal | R | R | T | | | | |
| Stop lamp switch signal | | R | T | | | | |

| Signals | ECM | TCM | ESP/ TCS / ABS control unit | Steering angle sensor | Smart entrance control unit | Tyre pressure monitoring control unit | Combination meter |
|---|---|---|---|---|---|---|---|
| Steering wheel angle sensor signal | | | R | T | | | |
| Rear window defogger signal | R | | | | T | | |
| Heater fan switch signal | R | | | | | | T |
| Air conditioner switch signal | R | | | | | | T |
| Primary pulley revolution signal | R | T | | | | | |
| Secondary pulley revolution signal | R | T | | | | | |
| MI signal | T | | | | | | R |
| Current gear position signal | | T | | | | | R |
| Engine coolant temperature signal | T | | | | | | R |
| Fuel consumption signal | T | | | | | | R |
| Vehicle speed signal | | | T | | | | R |
| | R | | | | | | T |
| Seat belt reminder signal | | | | | R | | T |
| Headlamp switch signal | | | | | T | | R |
| Flashing indicator signal | | | | | T | | R |
| Engine cooling fan speed signal | T | | | | R | | |
| Child lock indicator signal | | | | | T | | R |
| Door switches state signal | | | | | T | | R |
| Key ID signal | R | | | | T | | |
| | T | | | | R | | |
| A/C compressor signal | T | | | | R | | |
| Tire pressure signal | | | | | | T | R |

## FOR M/T MODELS

### System diagram




### Input/output signal chart

T: Transmit R: Receive

| Signals | ECM | ESP/ TCS / ABS control unit | Steering angle sensor | Smart entrance control unit | Tyre pressure monitoring control unit | Combination meter |
|---|---|---|---|---|---|---|
| Engine speed signal | T | R | | | | R |
| Accelerator pedal position signal | T | R | | | | |
| ESP operation signal | R | T | | | | |
| TCS operation signal | R | T | | | | |

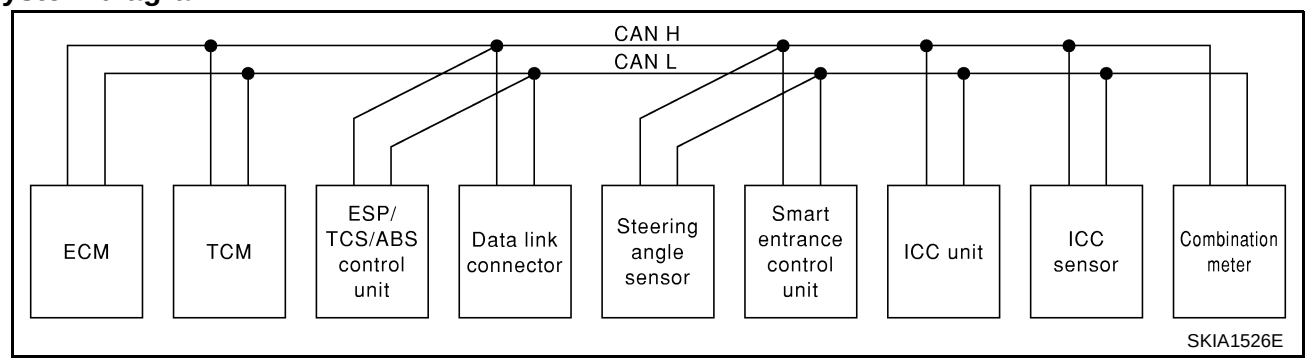
| Signals | ECM | ESP/ TCS / ABS control unit | Steering angle sensor | Smart entrance control unit | Tyre pressure monitoring control unit | Combination meter |
|---|---|---|---|---|---|---|
| ABS operation signal | R | T | | | | |
| Steering wheel angle sensor signal | | R | T | | | |
| Rear window defogger signal | R | | | T | | |
| Heater fan switch signal | R | | | | | T |
| Air conditioner switch signal | R | | | | | T |
| MI signal | T | | | | | R |
| Engine coolant temperature signal | T | | | | | R |
| Fuel consumption signal | T | | | | | R |
| Vehicle speed signal | | T | | | | R |
| | R | | | | | T |
| Seat belt reminder signal | | | | R | | T |
| Headlamp switch signal | | | | T | | R |
| Flashing indicator signal | | | | T | | R |
| Engine cooling fan speed signal | T | | | R | | |
| Child lock indicator signal | | | | T | | R |
| Door switches state signal | | | | T | | R |
| Key ID signal | R | | | T | | |
| | T | | | R | | |
| A/C compressor signal | T | | | R | | |
| Tire pressure signal | | | | | T | R |

## CAN Communication Unit For LHD Models without Tyre Pressure Monitoring System

EFS001OS

### FOR QR20DE CVT WITH ICC MODELS

### System diagram




### Input/output signal chart

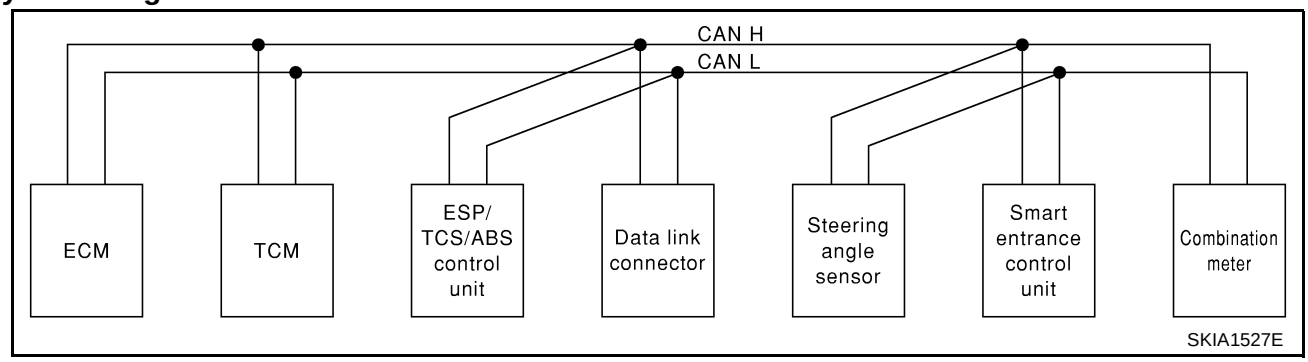
T: Transmit R: Receive

| Signals | ECM | TCM | ESP/ TCS / ABS control unit | Steering angle sensor | Smart entrance control unit | ICC unit | ICC sensor | Combination meter |
|---|---|---|---|---|---|---|---|---|
| Engine speed signal | T | R | R | | | R | | R |
| Accelerator pedal position signal | T | R | R | | | R | | |
| Closed throttle position signal | T | | | | | R | | |
| ICC steering switch signal | T | | | | | R | | |

| Signals | ECM | TCM | ESP/ TCS / ABS control unit | Steering angle sensor | Smart entrance control unit | ICC unit | ICC sensor | Combination meter |
|---|---|---|---|---|---|---|---|---|
| Shift pattern signal | | T | | | | R | | |
| Parking brake switch signal | | | T | | | R | | |
| ICC system display signal | | | | | | T | | R |
| ICC sensor signal | | | | | | R | T | |
| ESP operation signal | R | | T | | | R | | |
| TCS operation signal | R | | T | | | R | | |
| ABS operation signal | R | R | T | | | R | | |
| Stop lamp switch signal | | R | T | | | | | |
| Steering wheel angle sensor signal | | | R | T | | | | |
| Wheel speed sensor signal | | | T | | | R | | |
| Rear window defogger signal | R | | | | T | | | |
| Heater fan switch signal | R | | | | | | | T |
| Air conditioner switch signal | R | | | | | | | T |
| Primary pulley revolution signal | R | T | | | | R | | |
| Secondary pulley revolution signal | R | T | | | | R | | |
| ICC operation signal | R | | | | | T | | |
| Brake switch signal | R | | | | | T | | |
| MI signal | T | | | | | | | R |
| Current gear position signal | | T | | | | | | R |
| Engine coolant temperature signal | T | | | | | R | | R |
| Fuel consumption signal | T | | | | | | | R |
| Vehicle speed signal | | | T | | | | | R |
| | R | | | | | | | T |
| Seat belt reminder signal | | | | | R | | | T |
| Headlamp switch signal | | | | | T | | | R |
| Flashing indicator signal | | | | | T | | | R |
| Engine cooling fan speed signal | T | | | | R | | | |
| Child lock indicator signal | | | | | T | | | R |
| Door switches state signal | | | | | T | | | R |
| Key ID signal | R | | | | T | | | |
| | T | | | | R | | | |
| A/C compressor signal | T | | | | R | | | |

## FOR QR20DE CVT WITHOUT ICC MODELS

### System diagram



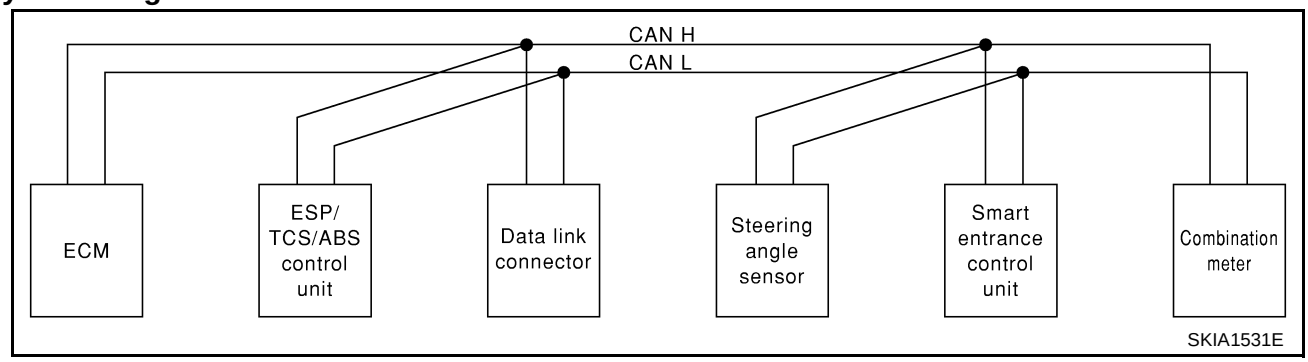

### Input/output signal chart

T: Transmit R: Receive

| Signals | ECM | TCM | ESP/ TCS / ABS control unit | Steering angle sensor | Smart entrance control unit | Combina-tion meter |
|---|---|---|---|---|---|---|
| Engine speed signal | T | R | R | | | R |
| Accelerator pedal position signal | T | R | R | | | |
| ESP operation signal | R | | T | | | |
| TCS operation signal | R | | T | | | |
| ABS operation signal | R | R | T | | | |
| Stop lamp switch signal | | R | T | | | |
| Steering wheel angle sensor signal | | | R | T | | |
| Rear window defogger signal | R | | | | T | |
| Heater fan switch signal | R | | | | | T |
| Air conditioner switch signal | R | | | | | T |
| Primary pulley revolution signal | R | T | | | | |
| Secondary pulley revolution signal | R | T | | | | |
| MI signal | T | | | | | R |
| Current gear position signal | | T | | | | R |
| Engine coolant temperature signal | T | | | | | R |
| Fuel consumption signal | T | | | | | R |
| Vehicle speed signal | | | T | | | R |
| | R | | | | | T |
| Seat belt reminder signal | | | | | R | T |
| Headlamp switch signal | | | | | T | R |
| Flashing indicator signal | | | | | T | R |
| Engine cooling fan speed signal | T | | | | R | |
| Child lock indicator signal | | | | | T | R |
| Door switches state signal | | | | | T | R |
| Key ID signal | R | | | | T | |
| | T | | | | R | |
| A/C compressor signal | T | | | | R | |

## FOR M/T MODELS

### System diagram




### Input/output signal chart

T: Transmit R: Receive

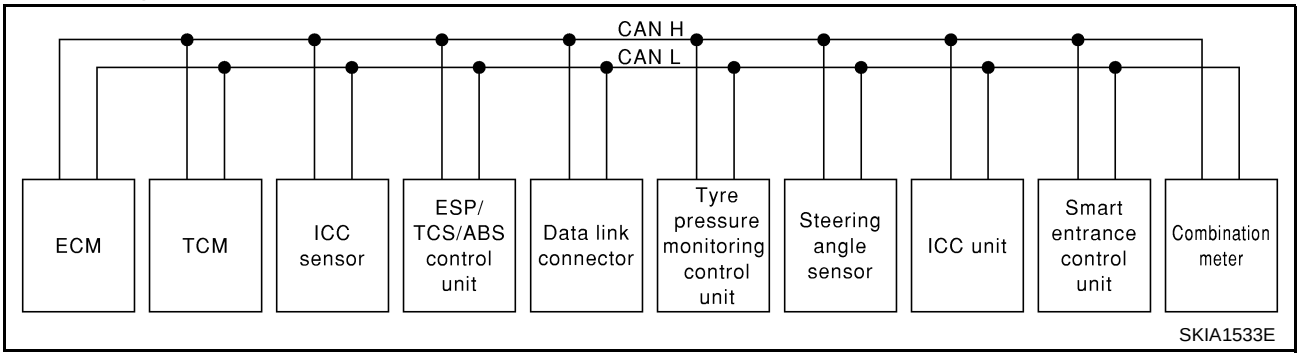
| Signals | ECM | ESP/ TCS / ABS control unit | Steering angle sensor | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|
| Engine speed signal | T | R | | | R |
| Accelerator pedal position signal | T | R | | | |
| ESP operation signal | R | T | | | |
| TCS operation signal | R | T | | | |
| ABS operation signal | R | T | | | |
| Steering wheel angle sensor signal | | R | T | | |
| Rear window defogger signal | R | | | T | |
| Heater fan switch signal | R | | | | T |
| Air conditioner switch signal | R | | | | T |
| MI signal | T | | | | R |
| Engine coolant temperature signal | T | | | | R |
| Fuel consumption signal | T | | | | R |
| Vehicle speed signal | | T | | | R |
| | R | | | | T |
| Seat belt reminder signal | | | | R | T |
| Headlamp switch signal | | | | T | R |
| Flashing indicator signal | | | | T | R |
| Engine cooling fan speed signal | T | | | R | |
| Child lock indicator signal | | | | T | R |
| Door switches state signal | | | | T | R |
| Key ID signal | R | | | T | |
| | T | | | R | |
| A/C compressor signal | T | | | R | |

# CAN Communication Unit For RHD Models with Tyre Pressure Monitoring System

EFS001OT

## FOR QR20DE CVT WITH ICC MODELS

### System diagram




### Input/output signal chart

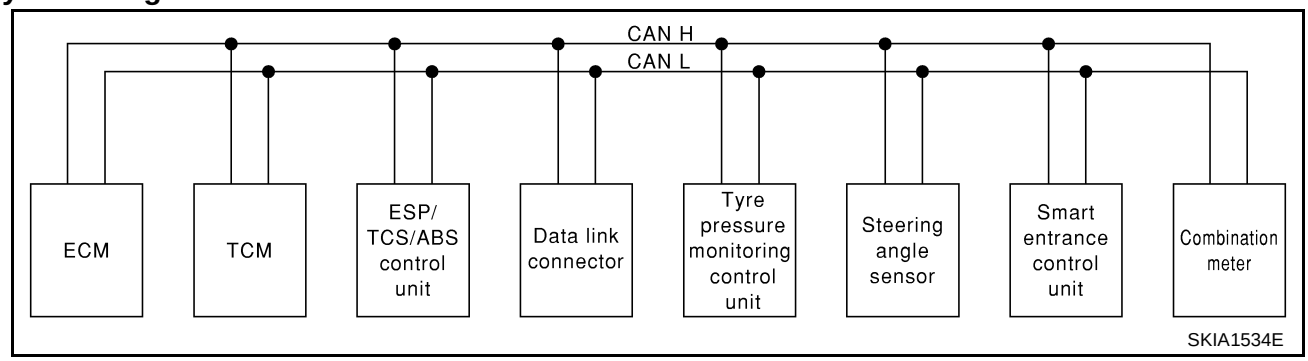
T: Transmit R: Receive

| Signals | ECM | TCM | ICC sensor | ESP/ TCS / ABS control unit | Tyre pressure monitoring control unit | Steering angle sensor | ICC unit | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|---|---|---|---|
| Engine speed signal | T | R | | R | | | R | | R |
| Accelerator pedal position signal | T | R | | R | | | R | | |
| Closed throttle position signal | T | | | | | | R | | |
| ICC steering switch signal | T | | | | | | R | | |
| Shift pattern signal | | T | | | | | R | | |
| Parking brake switch signal | | | | T | | | R | | |
| ICC system display signal | | | | | | | T | | |
| ICC sensor signal | | | T | | | | R | | |
| ESP operation signal | R | | | T | | | R | | |
| TCS operation signal | R | | | T | | | R | | |
| ABS operation signal | R | R | | T | | | R | | |
| Stop lamp switch signal | | R | | T | | | | | |
| Steering wheel angle sensor signal | | | | R | | T | | | |
| Wheel speed sensor signal | | | | T | | | R | | |
| Rear window defogger signal | R | | | | | | | T | |
| Heater fan switch signal | R | | | | | | | | T |
| Air conditioner switch signal | R | | | | | | | | T |
| Primary pulley revolution signal | R | T | | | | | R | | |
| Secondary pulley revolution signal | R | T | | | | | R | | |
| ICC operation signal | R | | | | | | T | | |
| Brake switch signal | R | | | | | | T | | |
| MI signal | T | | | | | | | | R |
| Current gear position signal | | T | | | | | | | R |
| Engine coolant temperature signal | T | | | | | | R | | R |
| Fuel consumption signal | T | | | | | | | | R |
| Vehicle speed signal | | | | T | | | | | R |
| | R | | | | | | | | T |

| Signals | ECM | TCM | ICC sensor | ESP/ TCS / ABS control unit | Tyre pressure monitoring control unit | Steering angle sensor | ICC unit | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|---|---|---|---|
| Seat belt reminder signal | | | | | | | | R | T |
| Headlamp switch signal | | | | | | | | T | R |
| Flashing indicator signal | | | | | | | | T | R |
| Engine cooling fan speed signal | T | | | | | | | R | |
| Child lock indicator signal | | | | | | | | T | R |
| Door switches state signal | | | | | | | | T | R |
| Key ID signal | R | | | | | | | T | |
| | T | | | | | | | R | |
| A/C compressor signal | T | | | | | | | R | |
| Tire pressure signal | | | | | T | | | | R |

## FOR QR20DE CVT WITHOUT ICC MODELS

### System diagram




### Input/output signal chart

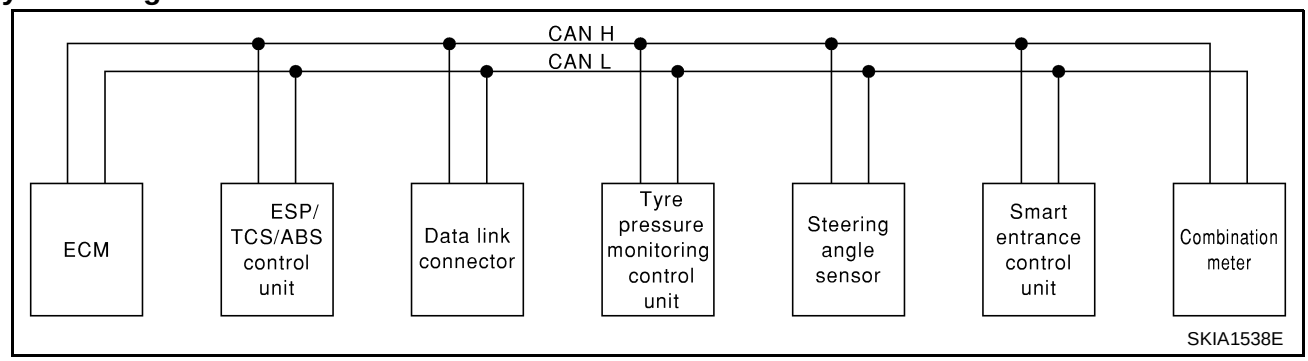
T: Transmit R: Receive

| Signals | ECM | TCM | ESP/ TCS / ABS control unit | Tyre pressure monitoring control unit | Steering angle sensor | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|---|---|
| Engine speed signal | T | R | R | | | | R |
| Accelerator pedal position signal | T | R | R | | | | |
| ESP operation signal | R | | T | | | | |
| TCS operation signal | R | | T | | | | |
| ABS operation signal | R | R | T | | | | |
| Stop lamp switch signal | | R | T | | | | |
| Steering wheel angle sensor signal | | | R | | T | | |
| Rear window defogger signal | R | | | | | T | |
| Heater fan switch signal | R | | | | | | T |
| Air conditioner switch signal | R | | | | | | T |
| Primary pulley revolution signal | R | T | | | | | |
| Secondary pulley revolution signal | R | T | | | | | |
| MI signal | T | | | | | | R |
| Current gear position signal | | T | | | | | R |

| Signals | ECM | TCM | ESP/ TCS / ABS control unit | Tyre pressure monitoring control unit | Steering angle sensor | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|---|---|
| Engine coolant temperature | T | | | | | | R |
| Fuel consumption signal | T | | | | | | R |
| Vehicle speed signal | | | T | | | | R |
| | R | | | | | | T |
| Seat belt reminder signal | | | | | | R | T |
| Headlamp switch signal | | | | | | T | R |
| Flashing indicator signal | | | | | | T | R |
| Engine cooling fan speed signal | T | | | | | R | |
| Child lock indicator signal | | | | | | T | R |
| Door switches state signal | | | | | | T | R |
| Key ID signal | R | | | | | T | |
| | T | | | | | R | |
| A/C compressor signal | T | | | | | R | |
| Tire pressure signal | | | | T | | | R |

## FOR M/T MODELS

### System diagram




### Input/output signal chart

T: Transmit R: Receive

| Signals | ECM | ESP/ TCS / ABS control unit | Tyre pressure monitoring control unit | Steering angle sensor | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|---|
| Engine speed signal | T | R | | | | R |
| Accelerator pedal position signal | T | R | | | | |
| ESP operation signal | R | T | | | | |
| TCS operation signal | R | T | | | | |
| ABS operation signal | R | T | | | | |
| Steering wheel angle sensor signal | | R | | T | | |
| Rear window defogger signal | R | | | | T | |
| Heater fan switch signal | R | | | | | T |
| Air conditioner switch signal | R | | | | | T |
| MI signal | T | | | | | R |
| Engine coolant temperature signal | T | | | | | R |
| Fuel consumption signal | T | | | | | R |

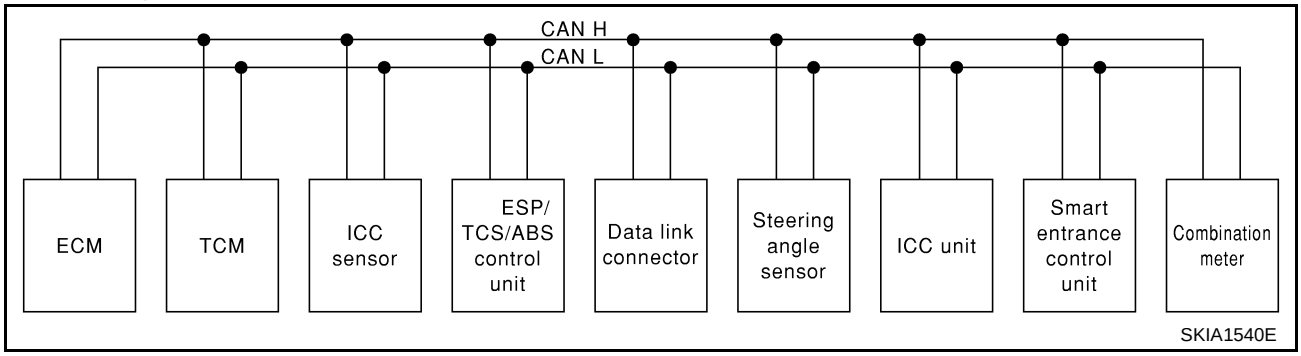
| Signals | ECM | ESP/ TCS / ABS control unit | Tyre pressure monitoring control unit | Steering angle sensor | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|---|
| Vehicle speed signal | | T | | | | R |
| | R | | | | | T |
| Seat belt reminder signal | | | | | R | T |
| Headlamp switch signal | | | | | T | R |
| Flashing indicator signal | | | | | T | R |
| Engine cooling fan speed signal | T | | | | R | |
| Child lock indicator signal | | | | | T | R |
| Door switches state signal | | | | | T | R |
| Key ID signal | R | | | | T | |
| | T | | | | R | |
| A/C compressor signal | T | | | | R | |
| Tire pressure signal | | | T | | | R |

# CAN Communication Unit For RHD Models without Tyre Pressure Monitoring System

EFS001OU

## FOR QR20DE CVT WITH ICC MODELS

### System diagram




### Input/output signal chart

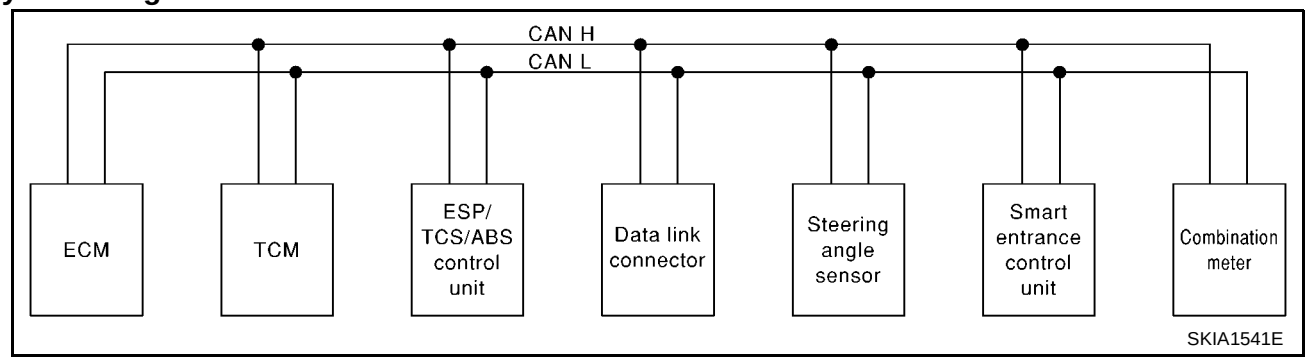
T: Transmit R: Receive

| Signals | ECM | TCM | ICC sensor | ESP/ TCS / ABS control unit | Steering angle sensor | ICC unit | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|---|---|---|
| Engine speed signal | T | R | | R | | R | | R |
| Accelerator pedal position signal | T | R | | R | | R | | |
| Closed throttle position signal | T | | | | | R | | |
| ICC steering switch signal | T | | | | | R | | |
| Shift pattern signal | | T | | | | R | | |
| Parking brake switch signal | | | | T | | R | | |
| ICC system display signal | | | | | | T | | R |
| ICC sensor signal | | | T | | | R | | |
| ESP operation signal | R | | | T | | R | | |
| TCS operation signal | R | | | T | | R | | |
| ABS operation signal | R | R | | T | | R | | |
| Stop lamp switch signal | | R | | T | | | | |

| Signals | ECM | TCM | ICC sensor | ESP/ TCS / ABS control unit | Steering angle sensor | ICC unit | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|---|---|---|
| Steering wheel angle sensor signal | | | | R | T | | | |
| Wheel speed sensor signal | | | | T | | R | | |
| Rear window defogger signal | R | | | | | | T | |
| Heater fan switch signal | R | | | | | | | T |
| Air conditioner switch signal | R | | | | | | | T |
| Primary pulley revolution signal | R | T | | | | R | | |
| Secondary pulley revolution signal | R | T | | | | R | | |
| ICC operation signal | R | | | | | T | | |
| Brake switch signal | R | | | | | T | | |
| MI signal | T | | | | | | | R |
| Current gear position signal | | T | | | | | | R |
| Engine coolant temperature signal | T | | | | | R | | R |
| Fuel consumption signal | T | | | | | | | R |
| Vehicle speed signal | | | | T | | | | R |
| | R | | | | | | | T |
| Seat belt reminder signal | | | | | | | R | T |
| Headlamp switch signal | | | | | | | T | R |
| Flashing indicator signal | | | | | | | T | R |
| Engine cooling fan speed signal | T | | | | | | R | |
| Child lock indicator signal | | | | | | | T | R |
| Door switches state signal | | | | | | | T | R |
| Key ID signal | R | | | | | | T | |
| | T | | | | | | R | |
| A/C compressor signal | T | | | | | | R | |

## FOR QR20DE CVT WITHOUT ICC MODELS

### System diagram




### Input/output signal chart

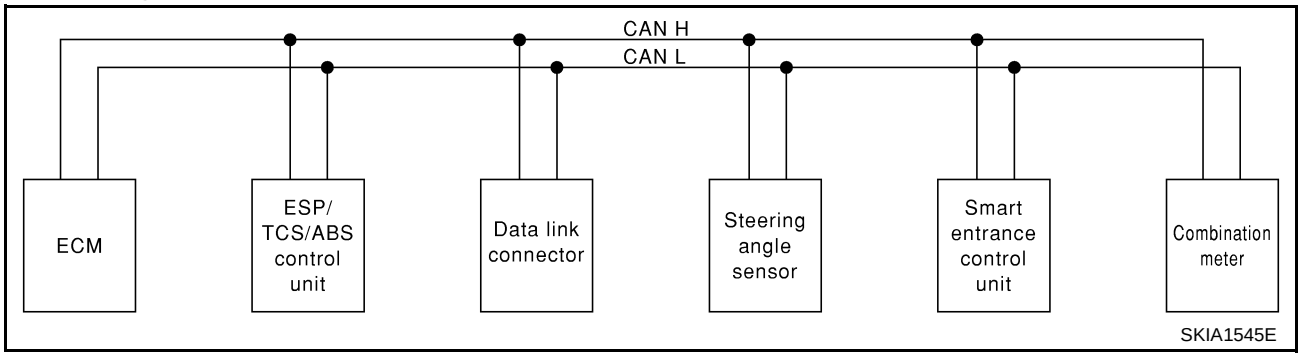
T: Transmit R: Receive

| Signals | ECM | TCM | ESP/ TCS / ABS control unit | Steering angle sensor | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|---|
| Engine speed signal | T | R | R | | | R |
| Accelerator pedal position signal | T | R | R | | | |

| Signals | ECM | TCM | ESP/ TCS / ABS control unit | Steering angle sensor | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|---|
| ESP operation signal | R | | T | | | |
| TCS operation signal | R | | T | | | |
| ABS operation signal | R | R | T | | | |
| Stop lamp switch signal | | R | T | | | |
| Steering wheel angle sensor signal | | | R | T | | |
| Rear window defogger signal | R | | | | T | |
| Heater fan switch signal | R | | | | | T |
| Air conditioner switch signal | R | | | | | T |
| Primary pulley revolution signal | R | T | | | | |
| Secondary pulley revolution signal | R | T | | | | |
| MI signal | T | | | | | R |
| Current gear position signal | | T | | | | R |
| Engine coolant temperature signal | T | | | | | R |
| Fuel consumption signal | T | | | | | R |
| Vehicle speed signal | | | T | | | R |
| | R | | | | | T |
| Seat belt reminder signal | | | | | R | T |
| Headlamp switch signal | | | | | T | R |
| Flashing indicator signal | | | | | T | R |
| Engine cooling fan speed signal | T | | | | R | |
| Child lock indicator signal | | | | | T | R |
| Door switches state signal | | | | | T | R |
| Key ID signal | R | | | | T | |
| | T | | | | R | |
| A/C compressor signal | T | | | | R | |

## FOR M/T MODELS

### System diagram




### Input/output signal chart

T: Transmit R: Receive

| Signals | ECM | ESP/ TCS / ABS control unit | Steering angle sensor | Smart entrance control unit | Combination meter |
|---|---|---|---|---|---|
| Engine speed signal | T | R | | | R |
| Accelerator pedal position signal | T | R | | | |

| Signals | ECM | ESP/ TCS / ABS control unit | Steering angle sensor | Smart entrance control unit | Combina-tion meter |
|---|---|---|---|---|---|
| ESP operation signal | R | T | | | |
| TCS operation signal | R | T | | | |
| ABS operation signal | R | T | | | |
| Steering wheel angle sensor signal | | R | T | | |
| Rear window defogger signal | R | | | T | |
| Heater fan switch signal | R | | | | T |
| Air conditioner switch signal | R | | | | T |
| MI signal | T | | | | R |
| Engine coolant temperature signal | T | | | | R |
| Fuel consumption signal | T | | | | R |
| Vehicle speed signal | | T | | | R |
| | R | | | | T |
| Seat belt reminder signal | | | | R | T |
| Headlamp switch signal | | | | T | R |
| Flashing indicator signal | | | | T | R |
| Engine cooling fan speed signal | T | | | R | |
| Child lock indicator signal | | | | T | R |
| Door switches state signal | | | | T | R |
| Key ID signal | R | | | T | |
| | T | | | R | |
| A/C compressor signal | T | | | R | |

# TROUBLE DIAGNOSIS

PFP:00004

## How to Perform Trouble Diagnoses for Quick and Accurate Repair

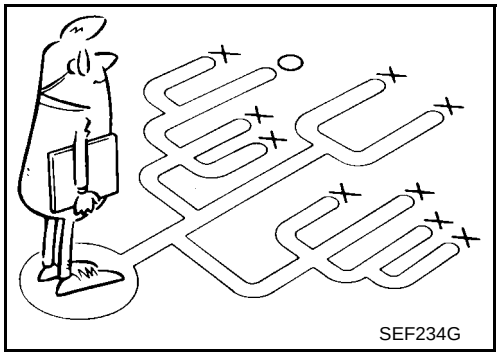
EFS001HU

### INTRODUCTION

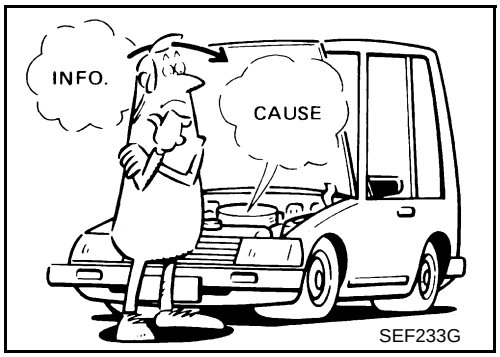
- The most important point to perform the trouble diagnosis is to understand the systems (control and mechanism) in the vehicle thoroughly.

- It is also important to clarify the customer complaints before 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″.**


SEF234G

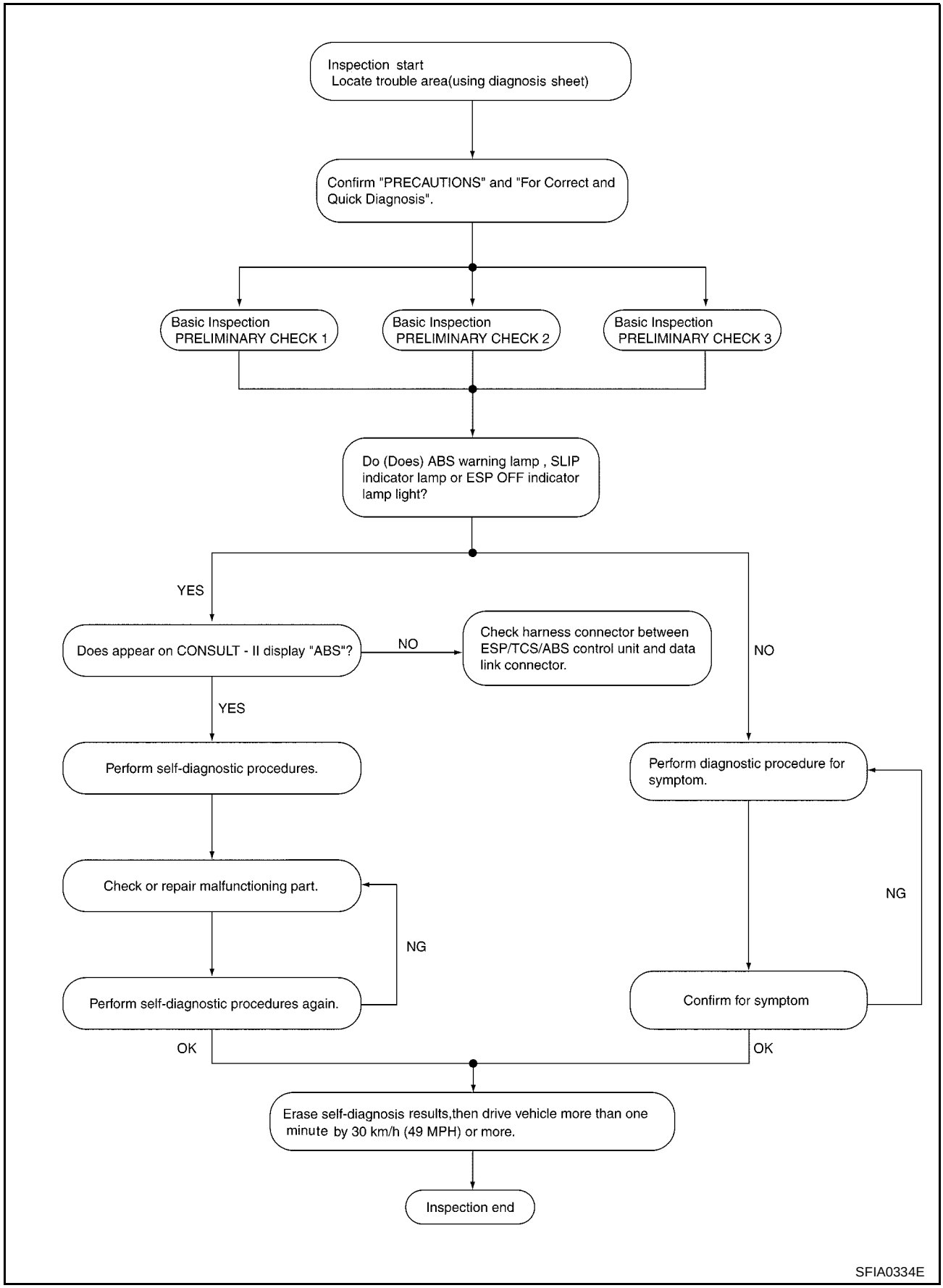
- It is essential to check symptoms right from the beginning in order to repair a malfunction completely.
  For an intermittent malfunction, it is important to reproduce the symptom based on an interview with the customer and past examples. Do not perform an inspection on an ad hoc basis. Most intermittent malfunctions 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 travel diagnosis, Repair work is not confirmed if it's done correctly.



SEF233G

- After the diagnosis, make sure to carry out ″erase memory″. Refer to BRC-76, "Functions of CONSULT-II" .
- For an intermittent malfunction, move the harness or harness connector by hand to check the poor contact or false open circuit.
- Always read the ″GI Section″ GI-3, "PRECAUTIONS" to check the general guidelines and to confirm the general precautions.

## WORK FLOW


Inspection start
Locate trouble area(using diagnosis sheet)
Confirm "PRECAUTIONS" and "For Correct and Quick Diagnosis".
Basic Inspection PRELIMINARY CHECK 1
Basic Inspection PRELIMINARY CHECK 2
Basic Inspection PRELIMINARY CHECK 3
Do (Does) ABS warning lamp , SLIP indicator lamp or ESP OFF indicator lamp light?
YES
NO
Does appear on CONSULT - II display "ABS"?
NO
Check harness connector between ESP/TCS/ABS control unit and data link connector.
YES
Perform self-diagnostic procedures.
Perform diagnostic procedure for symptom.
Check or repair malfunctioning part.
NG
Perform self-diagnostic procedures again.
NG
Confirm for symptom
OK
OK
Erase self-diagnosis results,then drive vehicle more than one minute by 30 km/h (49 MPH) or more.
Inspection end
SFIA0334E

## ASKING COMPLAINTS

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

**KEY POINTS**

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

SBR339B

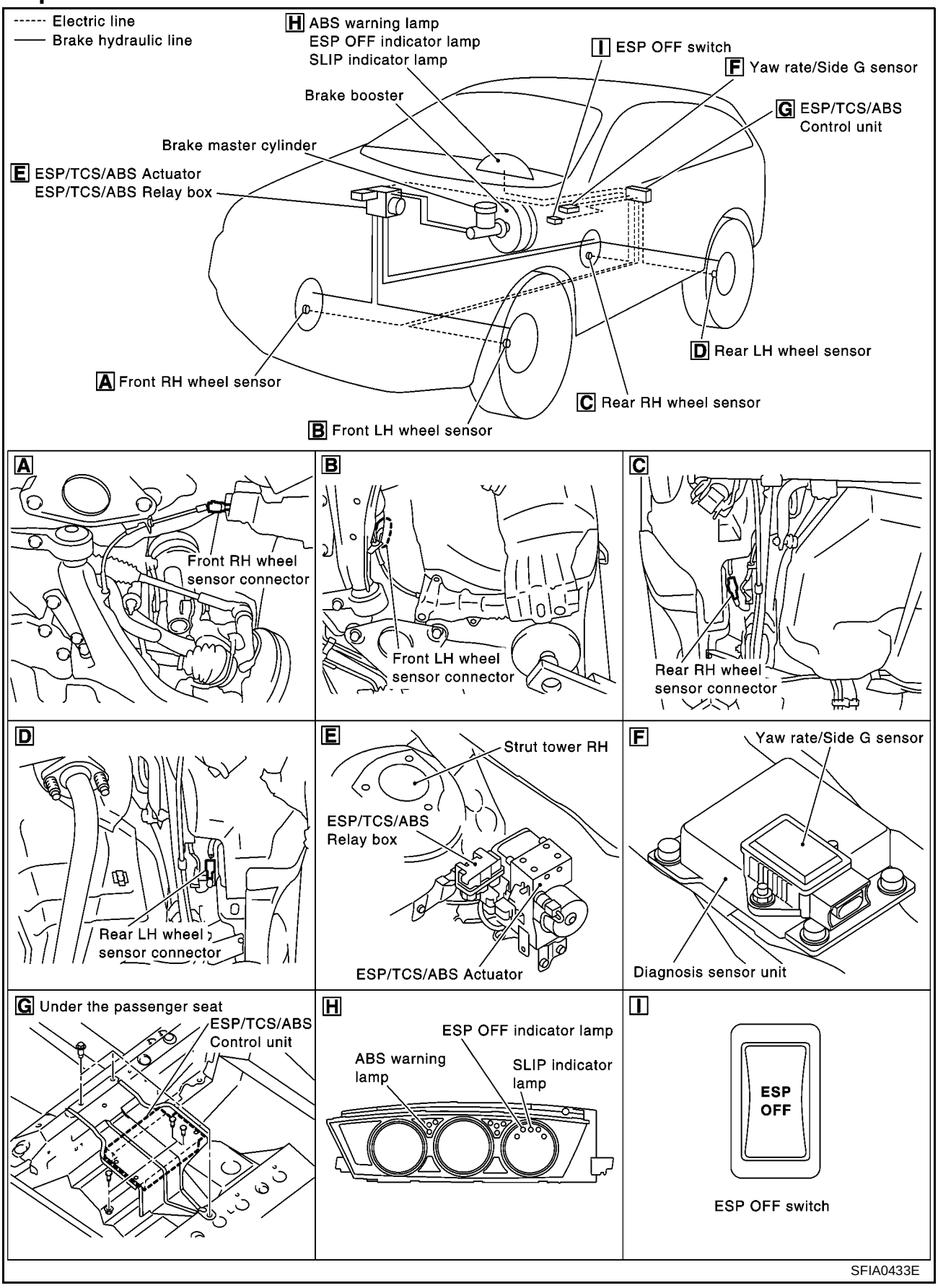
## EXAMPLE OF DIAGNOSIS SHEET

| | | | |
|---|---|---|---|
| Customer name MR/MS | Model & Year | | VIN |
| Engine # | Trans. | | Mileage |
| Incident Date | Manuf. Date | | In Service Date |
| Symptoms | ☐ Noise and vibration (from engine compartment)<br>☐ Noise and vibration (from axle) | ☐ Warning / Indicator activate | ☐ Firm pedal operation<br>Large stroke pedal operation |
| | ☐ TCS dose not work (Rear wheels slip when accelerating) | ☐ ABS dose 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 | | |

SFIA0029E

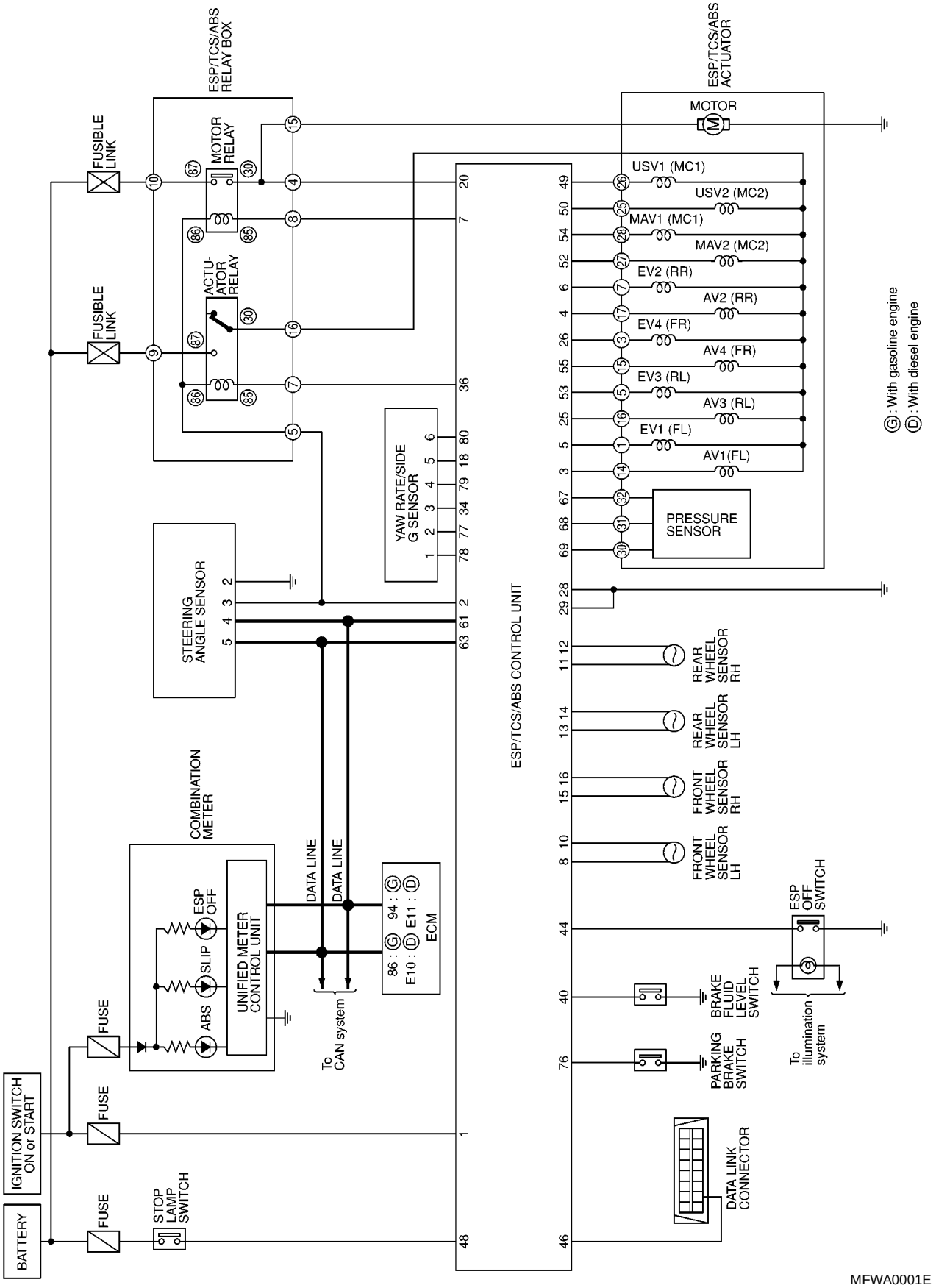
## Component Parts and Harness Connector Location

EFS001HV



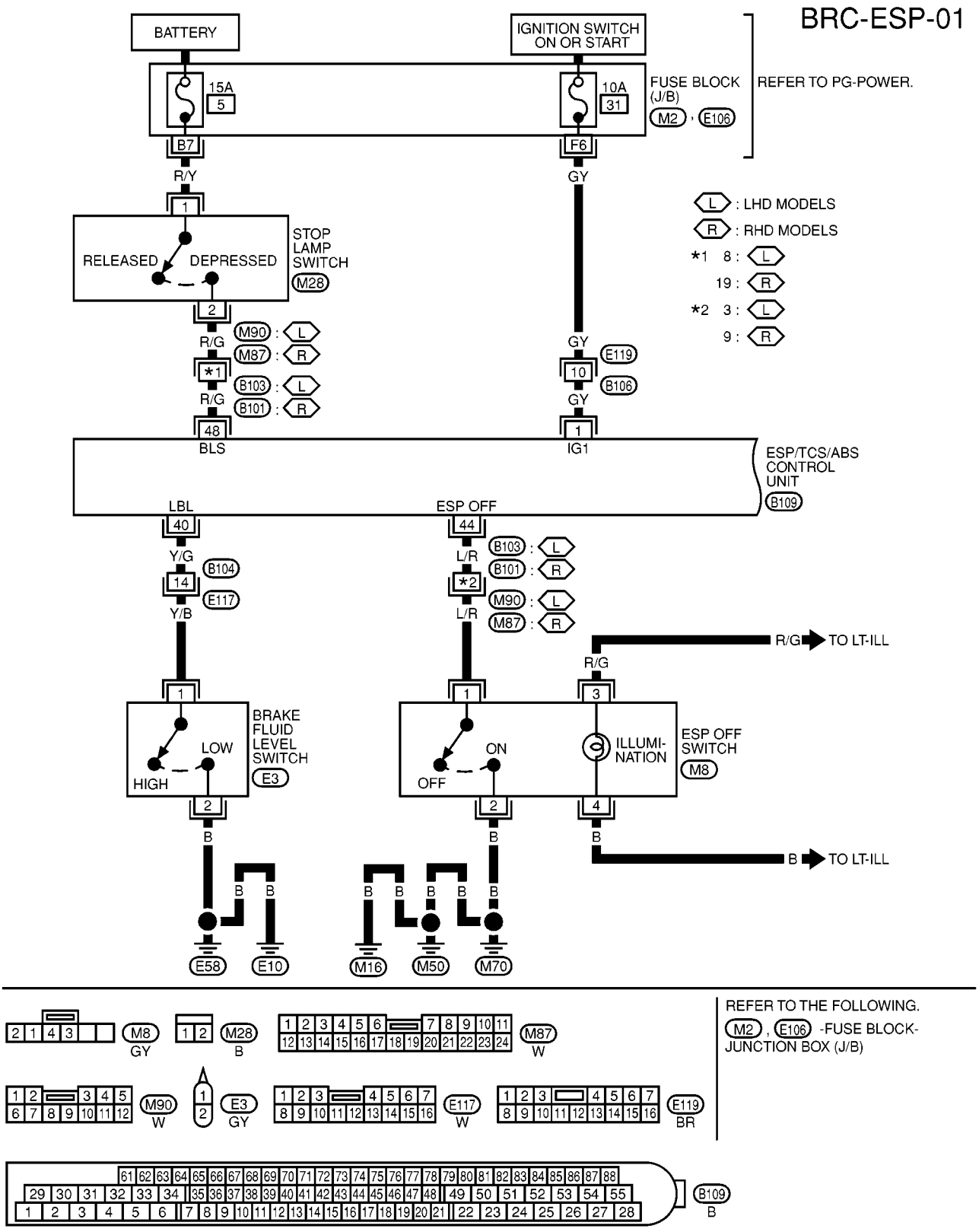
## Schematic

EFS001HW



## Wiring Diagram —ESP/TCS/ABS—

EFS001HX



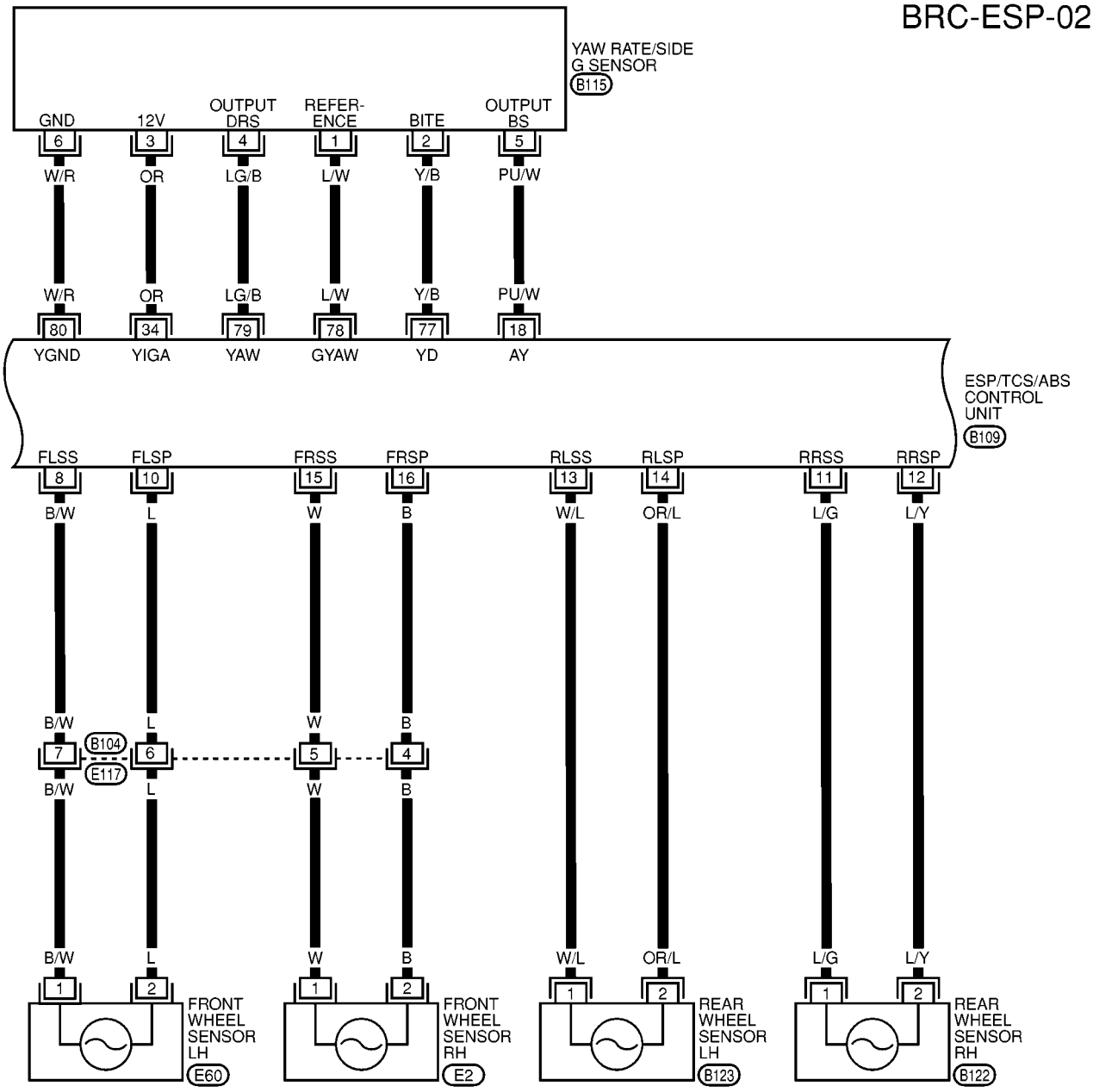


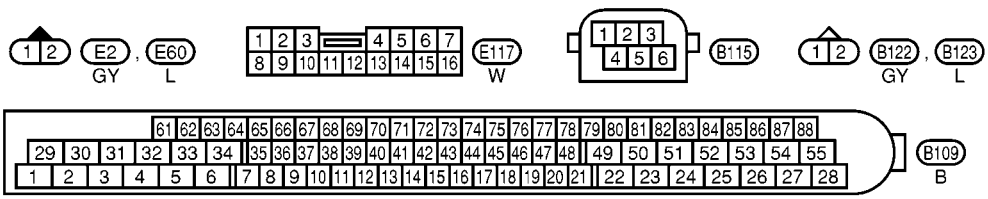


REFER TO THE FOLLOWING.
M2, E106 -FUSE BLOCK-JUNCTION BOX (J/B)

MFWA0002E

BRC-ESP-02

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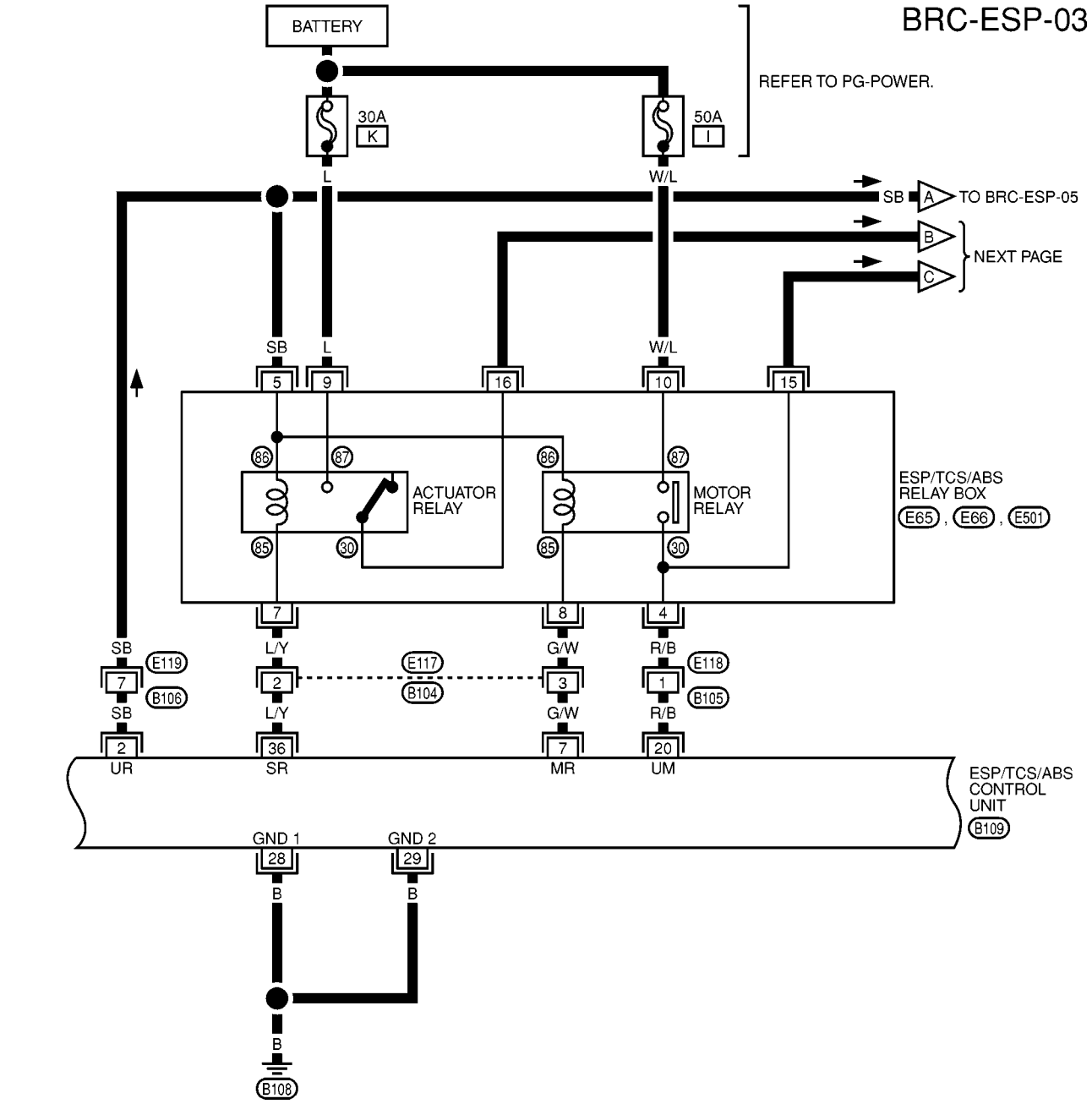
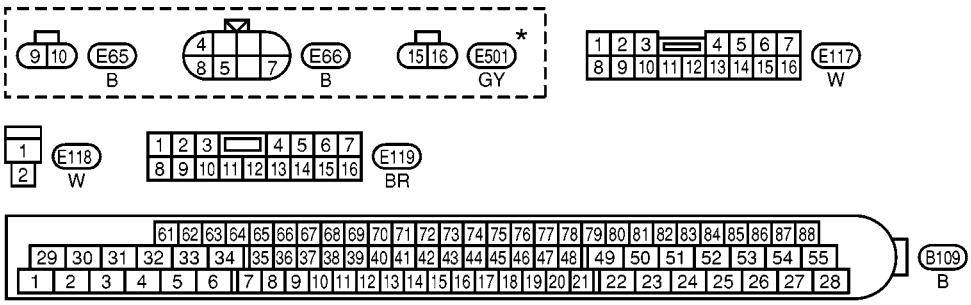
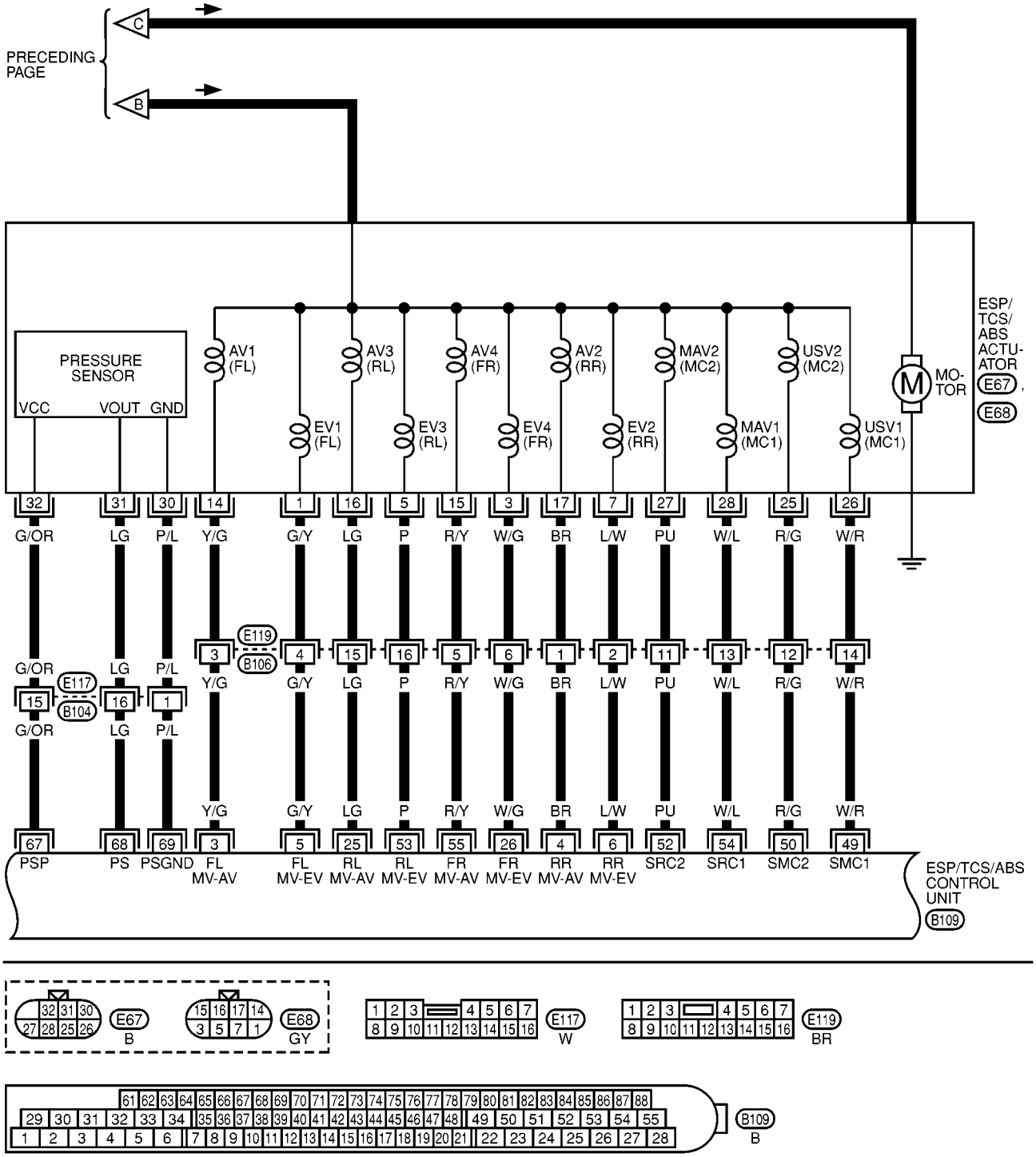



*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

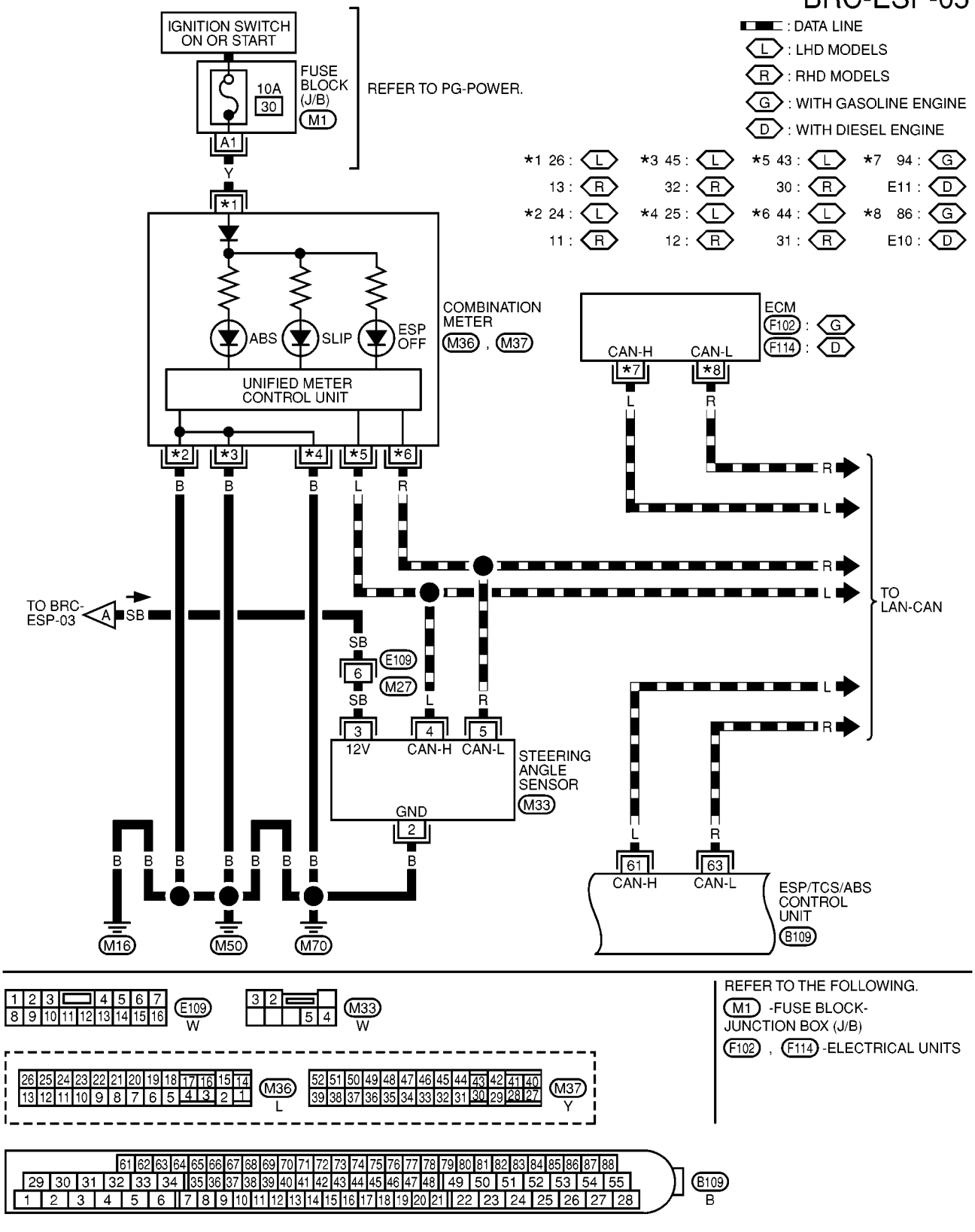
MFWA0004E

BRC-ESP-04



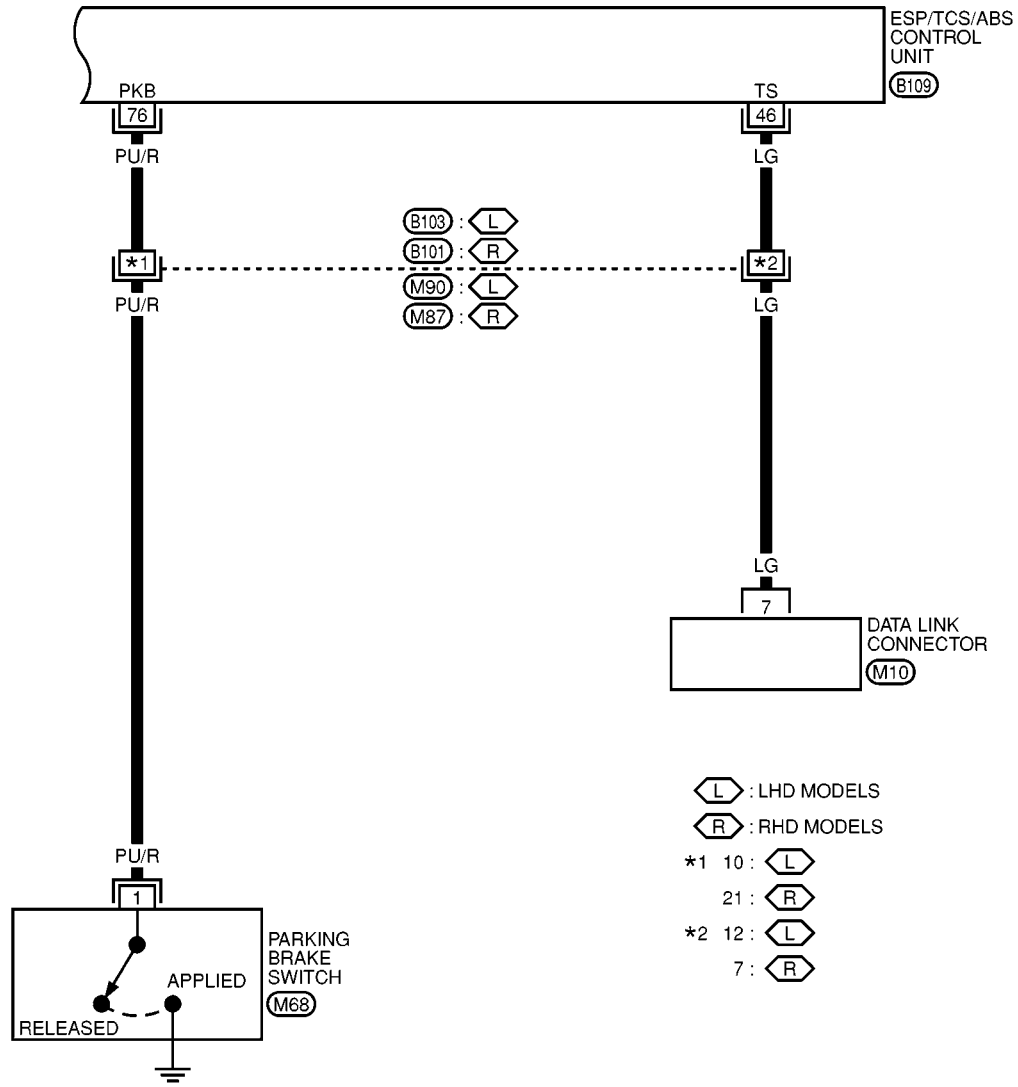

MFWA0005E

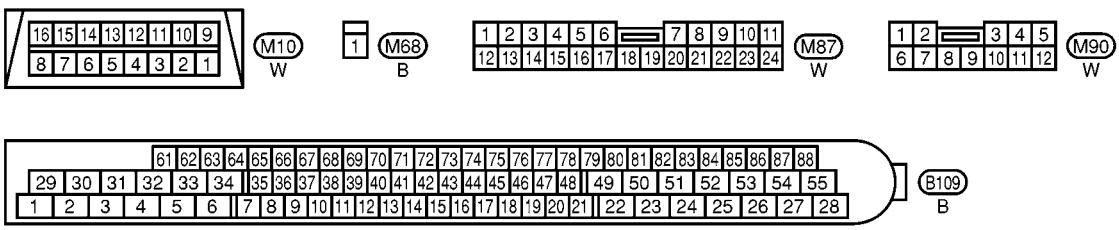
BRC-ESP-05




MFWA0006E

BRC-ESP-06




MFWA0007E

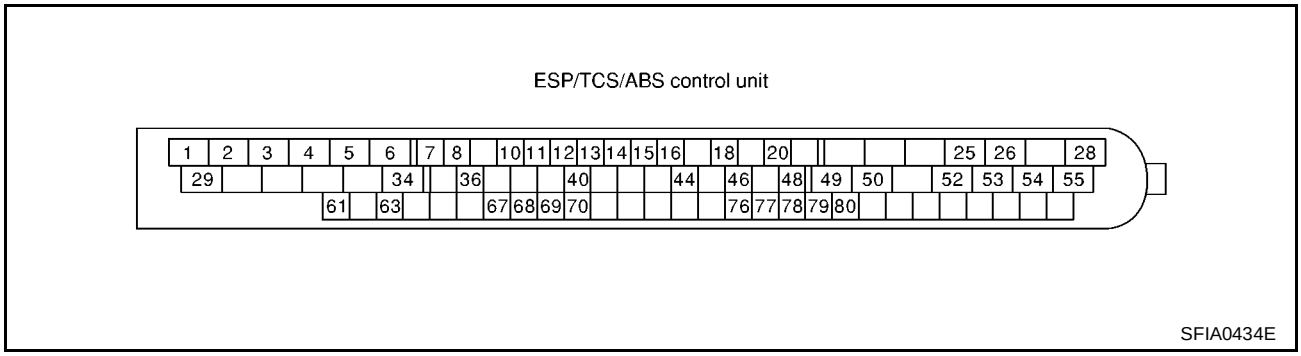
# Control Unit Input/Output Signal Standard

EFS001HY

## STANDARDS USING A CIRCUIT TESTER AND OSCILLOSCOPE

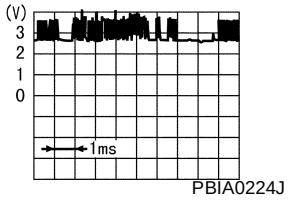
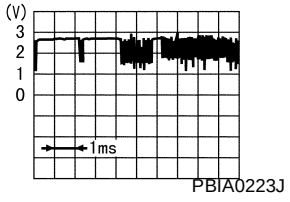
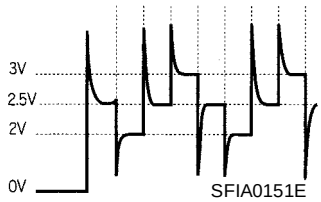
**CAUTION:**

**Connect the connectors for the ESP/TCS/ABS control unit and actuator, and turn the ignition switch ON.**




| Measurement terminal | | Measuring point | Standard value (Note 1) | | (Reference) Check items for malfunction |
|---|---|---|---|---|---|
| + | – | | | | |
| 1 | Body ground | Power supply | Ignition switch ON | Battery voltage (Approx. 12V) | Control unit power supply circuit |
| 2 | | Actuator motor relay, actuator relay power supply and steering angle sensor power supply | Ignition switch ON | Battery voltage (Approx. 12V) | |
| 7 | | Actuator motor relay | Actuator motor being driven (″Active test ″mode with CONSULT-II) | Approx. 0V | Actuator motor, motor relay, and circuit |
| | | | Actuator motor while the vehicle is stopped | Battery voltage (Approx. 12V) | |
| 36 | | Actuator relay | When actuator relay is active. (the engine running) | Approx. 0V | Actuator relay and circuit |
| | | | When actuator relay is inactive. (Fail-safe, engine starts.) | Battery voltage (Approx. 12V) | |
| 20 | | Actuator motor monitor | When actuator relay is active. (the engine running) | Battery voltage (Approx. 12V) | Actuator motor monitor circuit |
| | | | When actuator relay is inactive. (Fail-safe, engine starts.) | Approx. 0V | |

| Measurement terminal + | Measurement terminal – | Measuring point | Standard value (Note 1) | | (Reference) Check items for malfunction |
|---|---|---|---|---|---|
| 3 | Body ground | Front LH wheel outlet solenoid valve | Solenoid valve activated (In “active test” mode of CONSULT-II) or actuator relay inactive (in fail-safe mode)<br><br>When solenoid valve is inactive and actuator relay active (when ignition switch ON) | Approx. 0V<br><br>Battery voltage (Approx. 12V) | Solenoid valve and circuit |
| 4 | | Rear RH wheel outlet solenoid valve | | | |
| 5 | | Front LH wheel inlet solenoid valve | | | |
| 6 | | Rear RH wheel inlet solenoid valve | | | |
| 25 | | Rear LH wheel outlet solenoid valve | | | |
| 26 | | Front RH wheel inlet solenoid valve | | | |
| 53 | | Rear LH wheel inlet solenoid valve | | | |
| 55 | | Front RH wheel outlet solenoid valve | | | |
| 49 | Body ground | Primary-side ESP switch-over solenoid valve 1 (USV) | When switch-over solenoid valve is active (in “active test” mode of CONSULT-II)<br>Or, when actuator relay inactive (when fail-safe)<br><br>When switch-over solenoid valve is inactive and actuator relay is active (when ignition switch ON) | Approx. 0V<br><br>Battery voltage (Approx. 12V) | Switch-over solenoid valve and circuit |
| 50 | | Secondary-side ESP switch-over solenoid valve 1 (USV) | | | |
| 52 | | Secondary-side ESP switch-over solenoid valve 2 (HSV) | | | |
| 54 | | Primary-side ESP switch-over solenoid valve 2 (HSV) | | | |
| 8 | 10 | Front LH wheel sensor | Wheel rotated (Approx. 30 km/h (19 MPH) (Note 2) | Pulse generation<br>: Approx. 200 Hz | Wheel sensor and circuit |
| 11 | 12 | Rear RH wheel sensor | | | |
| 13 | 14 | Rear LH wheel sensor | | | |
| 15 | 16 | Front RH wheel sensor | | | |
| 48 | Body ground | Stop lamp signal | Depress brake pedal. | Battery voltage (Approx. 12V) | Stop lamp switch and circuit |
| | | | Release the brake pedal. | Approx. 0V | |

| Measurement terminal + | Measurement terminal – | Measuring point | Standard value (Note 1) | | (Reference) Check items for malfunction |
|---|---|---|---|---|---|
| 44 | Body ground | ESP OFF switch | ESP OFF switch is pressed. | Approx. 10V | ESP OFF switch and circuit |
| | | | ESP OFF switch is released. | Approx. 12V | |
| 61 | | CAN communication input/output signal (H) | Ignition switch ON |  PBIA0224J | – |
| 63 | | CAN communication input/output signal (L) | Ignition switch ON |  PBIA0223J | |
| 67 | Body ground | Pressure sensor | Ignition switch ON | Approx. 0V | Pressure sensor and circuit |
| 68 | | | When ignition switch ON and brake pedal released. | Approx. 0.6V | |
| 69 | | | Ignition switch ON | Approx. 0V | |
| 18 | | Side G sensor | Ignition switch ON | Approx. 2.5V | Yaw rate /Side G sensor and circuit |
| 34 | | Yaw rate/Side G sensor | Ignition switch ON | Battery voltage (Approx. 12V) | Yaw rate /Side G sensor and circuit |
| 77 | | | Ignition switch ON |  SFIA0150E | |
| 78 | | | Ignition switch ON | Approx. 2.5V | |
| 79 | | Yaw rate sensor | Ignition switch ON |  SFIA0151E | Yaw rate sensor and circuit |
| 80 | | | Ignition switch ON | Approx. 0V | |
| 70 | | ESP OFF indicator lamp | ESP OFF indicator lamp turns on (Note 4) | Approx. 0V | ESP OFF warning lamp and circuit |
| | | | ESP OFF indicator lamp turns off (note 4) | Battery voltage (Approx. 12V) | |
| 40 | | Brake fluid level warning switch | Brake fluid is not enough | Battery voltage (Approx. 12V) | Brake fluid level warning switch and circuit |
| | | | Brake fluid is enough | Approx. 0V | |
| 76 | Body ground | Parking brake signal | Apply the parking brake. | Battery voltage (Approx. 12V) | Parking brake switch and circuit |
| | | | Release the parking brake. | Approx. 0V | |

(Note 1): When the standard value is checked using a circuit tester for voltage measurement, the connector terminals should not extend forcefully.
(Note 2): Check the pressure of the tire in normal condition.
(Note 3): ON/OFF timing of the ABS warning lamp
ON: When the ignition switch is turned ON (before engine start) or a malfunction is detected.
OFF: 2 seconds after the engine started (the system is in normal condition).
(Note 4): ESP OFF indicator lamp ON/OFF timing
ON: When the ignition switch is turned ON (before engine start) or a malfunction is detected, if the ESP OFF switch is ON.
OFF: 2 seconds after the engine started (the system is in normal condition) and ESP OFF switch is OFF.
(Note 5): ON/OFF timing of the SLIP indicator lamp
ON: When the ignition switch is turned ON (before engine start) or a malfunction is detected.
OFF: 2 seconds after the engine started (the system is in normal condition) and the ESP/TCS function is inactive.
Flashing: ESP/TCS function is active during driving.

## STANDARDS WITH CONSULT-II

**CAUTION:**

**The displayed item is the data calculated by the control unit, so it may indicate a normal value even if an output circuit (harness) is open or shorted.**

| Data monitor item | Contents | Data monitor | | (Reference) Check items for malfunction |
|---|---|---|---|---|
| | | Condition | Reference value in normal operation | |
| FR RH SENSOR<br>FR LH SENSOR<br>RR RH SENSOR<br>RR LH SENSOR | Wheel speed (Note 1) | Vehicle stopped | 0 [km/h (MPH)] | Wheel sensor circuit |
| | | During driving | Almost in accordance with the speedometer display (within ±10%) | |
| ACCEL POS SIG | Open/close condition of throttle valve (linked with accelerator pedal) | Accelerator pedal not depressed (ignition switch is ON) | 0% | Control unit communication circuit between the ESP/TCS/ABS control unit and ECM |
| | | Accelerator pedal depressed (ignition switch is ON) | 0 – 100% | |
| ENG RPM | With the engine running | With the engine stopped | 0rpm | Engine speed signal circuit |
| | | Engine running | Almost in accordance with tachometer display | |
| STR ANGLE SIG | Steering angle detected by steering angle sensor | Straight-ahead condition | Approx. 0 deg | Steering angle sensor and circuit |
| | | Steering | – 720 to 720deg | |
| YAW RATE SEN | Yaw rate detected by yaw rate sensor | Vehicle stopped | Approx. 0 d/s | Yaw rate sensor and circuit |
| | | During driving | – 70 to 70d/s | |
| SIDE G-SENSOR | Transverse acceleration detected by side G sensor | Vehicle stopped | Approx. 0 $m/s^2$ | Side G sensor and circuit |
| | | During driving | – 24.3 to 24.1$m/s^2$ | |
| PRESS SENSOR | Brake fluid pressure detected by pressure sensor | With the ignition switch turned ON and brake pedal released. | Approx. 0 bar | Pressure sensor and circuit |
| | | With the ignition switch turned ON and brake pedal depressed. | – 40 to 300bar | |
| BATTERY VOLT | Battery voltage supplied to the ESP/TCS/ABS control unit | Ignition switch ON | 10 – 16V | ESP/TCS/ABS control unit power supply circuit and ground circuit |
| MOTOR RELAY | Motor relay ON/OFF condition | ABS not activated. | OFF | Motor relay and circuit |
| | | ABS activated. | ON | |

| Data monitor item | Contents | Data monitor | | (Reference) Check items for malfunction |
|---|---|---|---|---|
| | | Condition | Reference value in normal operation | |
| ACTUATOR RLY | Actuator relay ON/OFF condition | Ignition ON and Vehicle stopped. | OFF | Actuator relay and circuit |
| | | Engine running and Vehicle stopped. | ON | |
| STOP LAMP SW | Operating status of brake pedal | Depress brake pedal. | ON | Stop lamp switch circuit |
| | | Release the brake pedal. | OFF | |
| PARK BRAKE SW | Parking brake status | Parking brake activated | ON | Parking brake switch circuit |
| | | Parking brake not activated | OFF | |
| OFF SW | ESP OFF SW ON/OFF condition | ESP OFF switch ON (When ESP OFF indicator lamp is ON.) | ON | ESP OFF switch circuit |
| | | ESP OFF switch OFF (When ESP OFF indicator lamp is OFF.) | OFF | |
| ABS WARN LAMP | ABS warning lamp status (Note 2) | When ABS warning lamp is ON. | ON | ABS warning lamp circuit |
| | | When ABS warning lamp is OFF. | OFF | |
| OFF LAMP | ESP OFF indicator lamp status (Note 3) | When ESP OFF indicator lamp is ON. | ON | ESP OFF indicator lamp circuit |
| | | When ESP OFF indicator lamp is OFF. | OFF | |
| SLIP LAMP | SLIP indicator lamp status (Note 4) | When SLIP indicator lamp is ON | ON | SLIP indicator lamp circuit |
| | | When SLIP indicator lamp is OFF | OFF | |
| 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 | Actuator (solenoid valve) is active (″Active Test ″with CONSULT-II) or actuator relay is inactive (in fail-safe mode). | ON | Solenoid valve and circuit |
| | | When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON). | OFF | |
| USV [FR-PL]<br>UISV [FL-RR]<br>HSV [FR-RL]<br>HSV [FL-RR] | ESP switch-over solenoid valve status | When the actuator (switch-over solenoid valve) is active (″Active test″ with CONSULT-II) or the actuator relay is inactive (when fail-safe mode). | ON | Switch-over solenoid valve and circuit |
| | | When the actuator (switch-over solenoid valve) is inactive or the actuator relay is active (ignition switch ON). | OFF | |
| V/R OUTPUT | Actuator relay activated (ON/OFF) | When the actuator relay is active (the engine is running). | ON | Actuator relay and circuit |
| | | When the actuator relay is not active (before the engine get started and in the fail-safe mode). | OFF | |

| Data monitor item | Contents | Data monitor | | (Reference) Check items for malfunction |
|---|---|---|---|---|
| | | Condition | Reference value in normal operation | |
| M/R OUTPUT | Actuator motor and motor relay status (ON/OFF) | When the actuator motor and motor relay are active (″Active test″ with CONSULT-II). | ON | Actuator motor, motor relay, and circuit |
| | | When the actuator motor and motor relay are inactive. | OFF | |
| FLUID LEV SW | Brake fluid level warning switch status. | When brake fluid level warning switch is ON. | ON | Brake fluid level warning switch, brake warning lamp and circuit. |
| | | When brake fluid lever warning switch is OFF. | OFF | |
| EBD FAIL SIG<br>ABS FAIL SIG<br>TCS FAIL SIG<br>VDC FAIL SIG | System fail signal status | Malfunctions condition (When system failed) | OFF | EBD system<br>ABS system<br>TCS system<br>ESP system |

(Note 1): Check the pressure of the tire in normal condition.
(Note 2): ON/OFF timing of the ABS warning lamp
ON: For approximately 0.5 seconds after the ignition switch is turned ON, or when a malfunction is detected.
OFF: Approximately 0.5 seconds after the ignition switch is turned ON (when the system is in normal operation).
(Note 3): ON/OFF timing of the ESP OFF indicator lamp
ON: For approximately 0.5 seconds after the ignition switch is turned ON, or when a malfunction is detected ESP OFF switch is ON.
OFF: Approximately 0.5 seconds after the ignition switch is turned ON (when the system is in normal operation) or when ESP OFF switch is OFF.
(Note 4): SLIP indicator lamp ON/OFF timing
ON: For approximately 0.5 seconds after the ignition switch is turned ON, or when a malfunction is detected.
OFF: Approximately 0.5 seconds after the ignition switch is turned ON (when the system is in normal operation) and ESP/TCS function is not activated.
Flashing: ESP/TCS function is active during driving.

## Functions of CONSULT-II

EFS001HZ

### CONSULT-II MAINLY FUNCTION APPLICATION TO ESP/TCS/ABS

| Item | Self-diagnosis | Data monitor | Active test |
|---|---|---|---|
| Wheel sensors | × | × | – |
| Solenoid valves | × | × | × |
| Switch-over solenoid valves | × | × | × |
| Stop lamp switch | × | × | – |
| Yaw rate sensor | × | × | × |
| Side G sensor | × | × | × |
| Press sensor | × | × | × |
| Steering angle sensor | × | × | × |
| Actuator relay | × | × | × |
| Motor relay | × | × | × |
| ABS warning lamp | – | × | × |
| Battery voltage | × | × | – |
| ESP/TCS/ABS C/U | × | – | – |
| ESP/TCS/ABS actuator motor | × | × | × |
| CAN communication | × | × | – |
| Engine speed signal | – | × | – |
| ESP OFF switch | – | × | – |
| ESP OFF indicator lamp | – | × | × |

| Item | Self-diagnosis | Data monitor | Active test |
|---|---|---|---|
| SLIP indicator lamp | – | × | × |
| Throttle angle | – | × | – |

×: Applicable
–: Not applicable

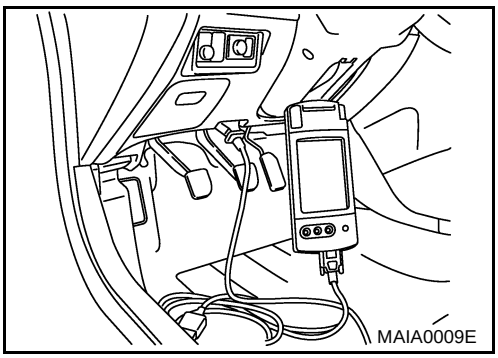
## SELF-DIAGNOSIS

### Description

If a malfunction is detected in the system, the ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp on the meter turn on. In this case, perform the self-diagnosis as follows:

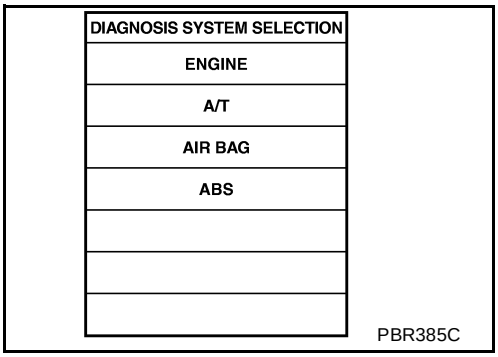
### Procedure

1. Perform a BRC-88, "Basic Inspection" using information from the customer.
2. After the ignition switch is turned OFF, connect the CONSULT-II connector to the vehicle-side data link connector. The data link connector is on the lower instrument cover).
3. Start the engine and drive at Approx. 30 km/h (19 MPH) for approx. 1 minute.

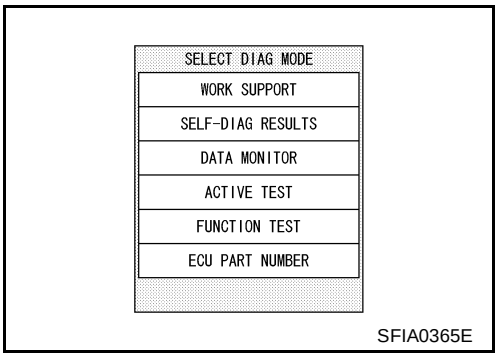

MAIA0009E

4. After stopping the vehicle, with the engine still idling, touch " START", "ABS", "SELF-DIAG RESULTS" on the CONSULT-II screen in this order.

   **CAUTION:**
   **Just after starting the engine, or turning the ignition switch ON, ″ABS″ may not be displayed on the system selection screen even if ″START″ is touched. In this case, start the self-diagnosis again from step 2. If it cannot be shown after several attempts, the ESP/TCS/ABS control unit may malfunction. Repair or replace the control unit.**



PBR385C



SFIA0365E

5. The self-diagnosis result is displayed. (If necessary, touch ″PRINT″ to print the self-diagnosis result.)
   - When ″NO FAILURE″ is shown, check the ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp. Refer to BRC-87, "For Correct and Quick Diagnosis" .
   - CONSULT-II self-diagnosis results are displayed without regard to occurrence timing. In some case, the later ones (timing value is small) appear on the next screen.
6. Go to appropriate ″Inspection″ chart according to ″Self-Diagnostic Items to Result Mode″ and repair or replace as necessary.
7. Start the engine and drive at Approx. 30 km/h (19 MPH) for Approx. 1 minute.

**CAUTION:**
**Check again to make sure that there is NO MALFUNCTION on other parts.**

8. Turn the ignition switch OFF to prepare for erasing the memory.
9. Start the engine and touch ″START″, ″ABS″, ″SELF-DIAG RESULTS″ and ″ERASE″ on CONSULT-II screen in this order to ease the memory.

**CAUTION:**
**If the memory cannot be erased, go to step 6.**

10. Drive the vehicle at Approx. 30 km/h (19 MPH) and check that the ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp stay off.

**CAUTION:**
**ESP OFF switch is not cancelled.**

## Self-Diagnostic Items to Result Mode

| Self-Diagnostic item | Malfunction detecting condition | Check route |
|---|---|---|
| FR LH SENSOR – 1 | Circuit of front LH wheel sensor is open. | Wheel sensor and circuit. Refer to BRC-89 |
| RR RH SENSOR – 1 | Circuit of rear RH wheel sensor is open. | |
| FR RH SENSOR – 1 | Circuit of front RH wheel sensor is open. | |
| RR LH SENSOR – 1 | Circuit of rear LH wheel sensor is open. | |
| FR LH SENSOR – 2 | Front LH wheel sensor is shorted or input signal is abnormal. | |
| RR RH SENSOR – 2 | Rear RH wheel sensor is shorted or input signal is abnormal. | |
| FR RH SENSOR – 2 | Front RH wheel sensor is shorted or input signal is abnormal. | |
| RR LH SENSOR – 2 | Rear LH wheel sensor is shorted or input signal is abnormal. | |
| MAIN RELAY | During the actuator relay operation with OFF, when the actuator relay turns ON. Or when the control line for the relay is shorted to the ground. | Actuator relay and circuit. Refer to BRC-101 |
| | During the actuator relay operation with ON, when the actuator relay turns OFF. Or when the control line for the relay is open. | |
| STOP LAMP SW | Stop lamp switch circuit is open. | Stop lamp switch and circuit. Refer to BRC-103 |
| PRESS SEN CIRCUIT | Pressure sensor signal line is open or shorted, or pressure sensor is abnormal. | Pressure sensor and circuit. Refer to BRC-92 |
| ST ANGLE SEN CIRCUIT | Neutral position of the steering angle sensor is dislocated, or the steering angle sensor is abnormal. | Steering angle sensor and circuit. Refer to BRC-93 |
| YAW RATE SENOR | Yaw rate sensor is abnormal, or the yaw rate sensor signal line is open or shorted. | Yaw rate/transverse acceleration sensor and circuit. Refer to BRC-94 |

| Self-Diagnostic item | Malfunction detecting condition | Check route |
|---|---|---|
| FR LH IN ABS SOL | Circuit of the front LH wheel inlet solenoid valve is open or shorted, or the control line is open or shorted to the power supply or the ground. | Solenoid valve and circuit. Refer to BRC-96 |
| FR LH OUT ABS SOL | Circuit of the front LH wheel outlet solenoid valve is open or shorted, or the control line is open or shorted to the power supply or the ground. | |
| RR RH IN ABS SOL | Circuit of the rear RH wheel inlet solenoid valve is open or shorted, or the control line is open or shorted to the power supply or the ground. | |
| RR RH OUT ABS SOL | Circuit of the rear RH wheel outlet solenoid valve is open or shorted, or the control line is open or shorted to the power supply or the ground. | |
| FR RH IN ABS SOL | Circuit of the front RH wheel inlet solenoid valve is open or shorted, or the control line is open or shorted to the power supply or the ground. | |
| FR RH OUT ABS SOL | Circuit of the front RH wheel outlet solenoid valve is open or shorted, or the control line is open or shorted to the power supply or the ground. | |
| RR LH IN ABS SOL | Circuit of the rear LH wheel inlet solenoid valve is open or shorted, or the control line is open or shorted to the power supply or the ground. | |
| RR LH OUT ABS SOL | Circuit of the rear LH wheel outlet solenoid valve is open or shorted, or the control line is open or shorted to the power supply or the ground. | |
| USV LINE [FL-RR] | ESP switch-over solenoid valve 1 on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground. | ESP switch-over solenoid valve and circuit. Refer to BRC-96 . |
| USV LINE [FR-RL] | ESP switch-over solenoid valve 1 on the secondary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground. | |
| HSV LINE [FL-RR] | ESP switch-over solenoid valve 2 on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground. | |
| HSV LINE [FR-RL] | ESP switch-over solenoid valve 2 on the secondary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground. | |
| PUMP MOTOR ACTUATOR RLY (note) | During the actuator motor operation with ON, when the actuator motor turns OFF. Or when the control line for actuator motor relay is open. | Actuator motor, motor relay, and circuit. Refer to BRC-99 |
| | During the actuator motor operation with OFF, when the actuator motor turns ON. Or when the control line for relay is shorted to ground. | |
| ABS SENSOR [ABNORMAL SIGNAL] | Wheel sensor input is abnormal. | Wheel sensor and circuit. Refer to BRC-89 |
| BATTERY VOLTAGE [ABNORMAL] | ESP/TCS/ABS control unit battery voltage is too low. | ESP/TCS/ABS control unit battery voltage circuit and ground circuit. Refer to BRC-103 |
| ST ANGLE SEN SIGNAL | Neutral position correction of steering angle sensor is not finished. | Neutral position adjustment of steering angle sensor. Refer to BRC-105 |
| ST ANG SEN COM CIR | CAN communication system or steering angle sensor is abnormal. | Steering angle sensor and CAN communication circuit. Refer to BRC-107 |

| Self-Diagnostic item | Malfunction detecting condition | Check route |
|---|---|---|
| SIDE G-SEN CIRCUIT | Side G sensor is abnormal, or the signal line of side G sensor is open or shorted. | Yaw rate /Side G sensor and circuit. Refer to BRC-94 |
| EMERGENCY BRAKE | ESP/TCS/ABS control unit malfunction (pressure increase is too much or too little.) | ESP/TCS/ABS control unit. Refer to BRC-105 |
| CONTROLLER FAILURE | ESP/TCS/ABS internal malfunction of control unit | ESP/TCS/ABS control unit. Refer to BRC-91 |
| CAN COMM CIRCUIT | ● CAN communication line is open or shorted.<br>● ESP/TCS/ABS control unit internal malfunction.<br>● Battery voltage for EMC is interrupted instantaneously for Approx. 0.5 seconds or more. | Communication circuit between ESP/TCS/ABS control unit and units. Refer to BRC-107 |
| BR FLUID LEVEL LOW | Brake fluid level drops or communication line between the ESP/TCS/ABS control unit and the brake fluid level warning switch is open or shorted. | Communication circuit between the ESP/TCS/ABS control unit and the brake fluid level warning switch.<br>Reservoir tank fluid.<br>Refer to BRC-106 |
| ENGINE SIGNAL 1-4, 6 | Major engine components are abnormal | Engine system. Refer to BRC-91 |

(note) “ACTUATOR RLY” on the CONSULT-II self-diagnosis results indicates the malfunction of the actuator motor relay and circuit.

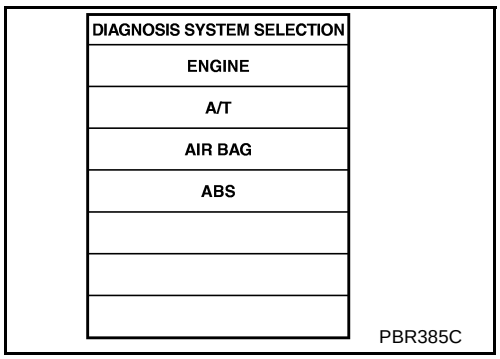
## DATA MONITOR

For details of the data monitor function, refer to the CONSULT-II Instruction Manual.

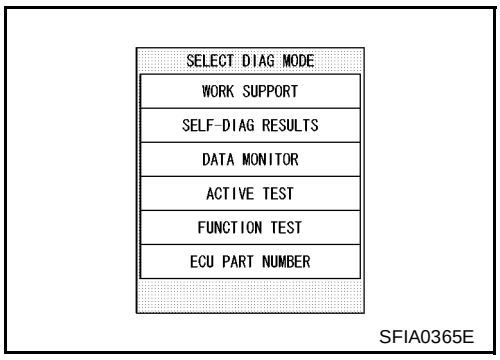
### Procedure

1. Turn the ignition switch OFF.
2. Connect the CONSULT-II connector to the vehicle-side data link connector.
3. Turn the ignition switch ON.
4. Touch ″START″ on the display.
5. Touch ″ABS″ on the display.

**CAUTION:**
**Just after the engine is started, or the ignition switch is turned ON, ″ABS″ may not be displayed on the system selection screen even if ″START″ is touched. In this case, start the self-diagnosis again from step 2.**




6. Touch ″DATA MONITOR″.
7. The data monitor item selection screen is displayed, and touch one of “ECU INPUT SIGNALS” “MAIN SIGNALS”, “CAN DIAG SUPPORT MNTR” or “SELECTION FROM MENU”. Refer to BRC-81, "Data Monitor Items to be Displayed".
8. Touch ″START″.
9. Screen of data monitor is displayed.



## Data Monitor Items to be Displayed

| Data Monitor Item (Unit) | Data Monitor item selection | | | | Remarks |
|---|---|---|---|---|---|
| | ECU INPUT SIGNALS | MAIN SIGNALS | SELECTION FROM MENU | CAN DIAG SUPPORT MNTR | |
| GEAR | × | × | × | – | "1" is displayed. |
| SLCT LVR POSI | × | × | × | – | "##" is displayed. |
| FR RH SENSOR (km/h,MPH) | × | × | × | – | Wheel speed calculated by front RH wheel sensor signal is displayed. |
| FR LH SENSOR (km/h, MPH) | × | × | × | – | Wheel speed calculated by front LH wheel sensor signal is displayed. |
| RR RH SENSOR (km/h, MPH) | × | × | × | – | Wheel speed calculated by rear RH wheel sensor signal is displayed. |
| RR LH SENSOR (km/h, MPH) | × | × | × | – | Wheel speed calculated by rear LH wheel sensor signal is displayed. |
| ACCEL POS SIG (%) | × | × | × | – | Throttle valve open/close status judged by the CAN communication signal is displayed. |
| ENGINE RPM (rpm) | × | × | × | – | Engine speed judged by the CAN communication signal is displayed. |
| CAN COM START (ON/OFF) | – | × | × | – | Communication status of CAN communication is displayed. |
| STR ANGLE SIG (deg) | × | × | × | – | Steering angle detected by the steering angle sensor is displayed. |
| YAW RATE SEN (d/s) | × | × | × | – | Yaw rate detected by the yaw rate sensor is displayed. |
| SIDE G-SENSOR ($m/s^2$ ) | × | × | × | – | Transverse acceleration detected by the side G sensor is displayed. |
| PRESS SENSOR (bar ) | × | × | × | – | Brake fluid pressure detected by the pressure sensor is displayed. |
| BATTERY VOLT (V ) | × | × | × | – | Voltage supplied to ESP/TCS/ABS control unit is displayed. |
| MOTOR RELAY (ON/OFF ) | – | × | × | – | Motor relay signal (ON/OFF) status is displayed. |
| ACTUATOR RLY (ON/OFF ) | – | × | × | – | Actuator relay signal (ON/OFF) status is displayed. |
| STOP LAMP SW (ON/OFF) | × | × | × | – | Stop lamp switch (ON/OFF) status is displayed. |
| PARK BRAKE SW (ON/OFF) | × | × | × | – | Parking brake switch (ON/OFF) status is displayed. |
| OFF SW (ON/OFF) | × | × | × | – | ESP OFF switch (ON/OFF) status is displayed. |
| ABS WARN LAMP (ON/OFF) | – | × | × | – | ABS warning lamp (ON/OFF) status is displayed. |
| OFF LAMP (ON/OFF) | – | × | × | – | ESP OFF indicator lamp (ON/OFF) status is displayed. |

| Data Monitor Item (Unit) | Data Monitor item selection | | | | Remarks |
|---|---|---|---|---|---|
| | ECU INPUT SIGNALS | MAIN SIGNALS | SELECTION FROM MENU | CAN DIAG SUPPORT MNTR | |
| SLIP LAMP (ON/OFF) | – | × | × | – | SLIP indicator lamp (ON/OFF) status is displayed. |
| FR LH IN SOL (ON/OFF) | – | × | × | – | Front LH wheel inlet solenoid valve (ON/OFF) status is displayed. |
| FR LH OUT SOL (ON/OFF) | – | × | × | – | Front LH wheel outlet solenoid valve (ON/OFF) status is displayed. |
| RR RH IN SOL (ON/OFF) | – | × | × | – | Rear RH wheel inlet solenoid valve (ON/OFF) status is displayed. |
| RR RH OUT SOL (ON/OFF) | – | × | × | – | Rear RH wheel outlet solenoid valve (ON/OFF) status is displayed. |
| FR RH IN SOL (ON/OFF) | – | × | × | – | Front RH wheel inlet solenoid valve (ON/OFF) status is displayed. |
| FR RH OUT SOL (ON/OFF) | – | × | × | – | Front RH wheel outlet solenoid valve (ON/OFF) status is displayed. |
| RR LH IN SOL (ON/OFF) | – | × | × | – | Rear LH wheel inlet solenoid valve (ON/OFF) status is displayed. |
| RR LH OUT SOL (ON/OFF) | – | × | × | – | Rear LH wheel outlet solenoid valve (ON/OFF) status is displayed. |
| USV [FL-RR] (ON/OFF) | – | – | × | – | Primary-side switch-over solenoid valve (ON/OFF) status is displayed. (USV) |
| USV [FR-RL] (ON/OFF) | – | – | × | – | Secondary-side switch-over solenoid valve (ON/OFF) status is displayed. (USV) |
| HSV [FL-RR] (ON/OFF) | – | – | × | – | Primary-side switch-over solenoid valve (ON/OFF) status is displayed. (HSV) |
| HSV [FR-RL] (ON/OFF) | – | – | × | – | Secondary-side switch-over solenoid valve (ON/OFF) status is displayed. (HSV) |
| V/R OUTPUT (ON/OFF) | – | – | × | – | Actuator relay operation signal (ON/OFF) status is displayed. |
| M/R OUTPUT (ON/OFF) | – | – | × | – | Motor relay activation signal (ON/OFF) status is displayed. |
| VDC FAIL SIG (ON/OFF) | – | – | × | – | ESP fail signal (ON/OFF) status is displayed. |
| TCS FAIL SIG (ON/OFF) | – | – | × | – | TCS fail signal (ON/OFF) status is displayed. |
| ABS FAIL SIG (ON/OFF) | – | – | × | – | ABS fail signal (ON/OFF) status is displayed. |
| EBD FAIL SIG (ON/OFF) | – | – | × | – | EBD fail signal (ON/OFF) status is displayed. |

| Data Monitor Item (Unit) | Data Monitor item selection | | | | Remarks |
|---|---|---|---|---|---|
| | ECU INPUT SIGNALS | MAIN SIGNALS | SELECTION FROM MENU | CAN DIAG SUPPORT MNTR | |
| FLUID LEV SW (ON/OFF) | – | – | × | – | Brake fluid level warning switch (ON/OFF) status is displayed. |
| SNOW MODE SW (ON/OFF) | – | – | × | – | “OFF” is displayed. |
| BST OPER SIG (ON/OFF) | – | – | × | – | “OFF” is displayed. |
| CAN COMM (OK/NG) | – | – | – | × | CAN communication signal (OK/NG) status is displayed. |
| CAN CIRC 1 (ON/ UNKWN) | – | – | – | × | CAN communication signal (OK/UNKWN) status is displayed. |
| CAN CIEC 2 (OK/ UNKWN) | – | – | – | × | |
| CAN CIEC 3 (OK/ UNKWN) | – | – | – | × | |
| CAN CIRC 4 (OK/ UNKWN) | – | – | – | × | |
| CAN CIRC 5 (ON / UNKWN) | – | – | – | × | |
| CAN CIRC 6 (ON / UNKWN) | – | – | – | × | |
| M MODE SIG (ON/OFF) | – | – | × | – | “OFF” is displayed. |
| OD OFF SW (ON/OFF) | – | – | × | – | “OFF” is displayed. |
| EBD SIGNAL (ON/OFF) | – | – | × | – | EBD operation (ON/OFF) status is displayed. |
| ABS SIGNAL (ON/OFF) | – | – | × | – | ABS operation (ON/OFF) status is displayed. |
| TCS SIGNAL (ON/OFF) | – | – | × | – | TCS operation (ON/OFF) status is displayed. |
| VDC SIGNAL (ON/OFF) | – | – | × | – | ESP operation (ON/OFF) status is displayed. |

×: Applicable
–: Not applicable

## ACTIVE TEST

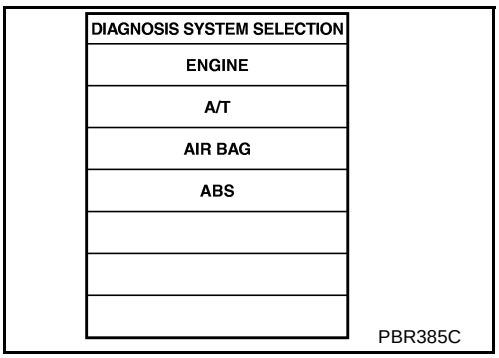
### Procedure

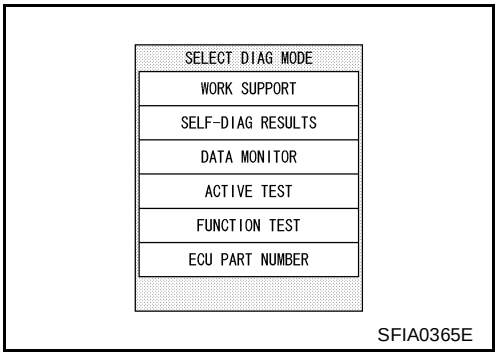
**CAUTION:**

- **Do not perform active test while driving the vehicle.**
- **Make sure that completely bleed air from the brake system.**
- **The active test cannot be performed with the ABS warning lamp on.**

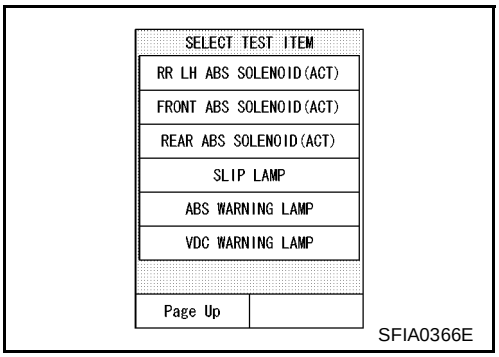
1. Connect the CONSULT-II connector to the vehicle-side data link connector and start the engine.
2. Touch ″START″ on the display.

3. Touch ″ABS″ and ″ACTIVE TEST″.

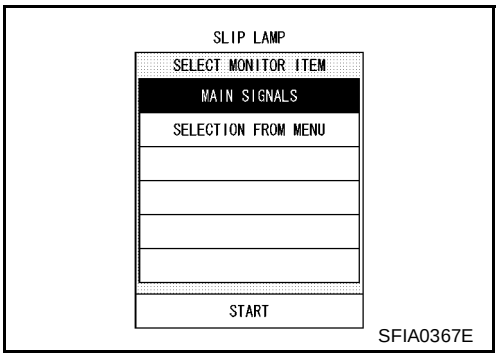


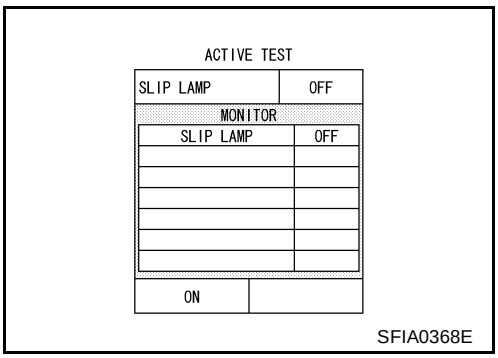

4. The test item selection screen is displayed.
5. Touch necessary test item.




6. Touch ″START″ with ″MAIN SIGNALS″ line inverted.



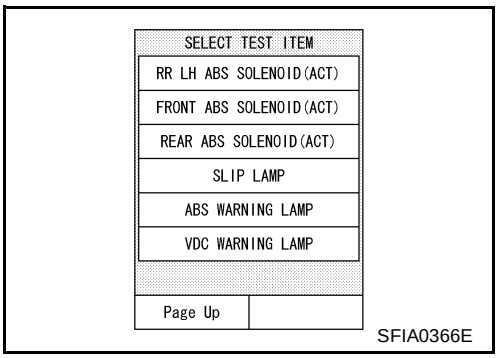
7. The active test screen is displayed.



SFIA0368E

## Solenoid Valve

1. Select each test items without “(ACT)” for the ABS function active test, and with “(ACT)” for the ESP/TCS function active test.
2. Touch ″UP,″ ″KEEP,″ and ″DOWN″ or ″UP,″ ″ACTUATOR UP,″ and ″ACTUATOR KEEP″. And check that the solenoid valves operate as the “Solenoid Valve Operation Chart”. Refer to BRC-85, "Solenoid Valve Operation Chart" .



SFIA0366E

## Solenoid Valve Operation Chart

| Operation | | Without “(ACT)” | | | With “(ACT)” | | |
|---|---|---|---|---|---|---|---|
| | | UP | KEEP | DOWN | UP | ACTUA-TOR UP | ACTUA-TOR KEEP |
| FR RH SOL<br>FR RH ABS SOLE-NOID (ACT) | FR RH IN SOL | OFF | ON | ON | OFF | OFF | OFF |
| | FR RH OUT SOL | OFF | OFF | ON* | OFF | OFF | OFF |
| | USV [FR-RL] | OFF | OFF | OFF | OFF | ON | ON |
| | HSV [FR-RL] | OFF | OFF | OFF | OFF | ON* | OFF |
| FR LH SOL<br>FR LH ABS SOLE-NOID (ACT) | FR LH IN SOL | OFF | ON | ON | OFF | OFF | OFF |
| | FR LH OUT SOL | OFF | OFF | ON* | OFF | OFF | OFF |
| | USV [FL-RR] | OFF | OFF | OFF | OFF | ON | ON |
| | HSV [FL-RR] | OFF | OFF | OFF | OFF | ON* | OFF |
| RR RH SOL<br>RR RH ABS SOLE-NOID (ACT) | RR RH IN SOL | OFF | ON | ON | OFF | OFF | OFF |
| | RR RH OUT SOL | OFF | OFF | ON* | OFF | OFF | OFF |
| | USV [FL-RR] | OFF | OFF | OFF | OFF | ON | ON |
| | HSV [FL-RR] | OFF | OFF | OFF | OFF | ON* | OFF |
| RR LH SOL<br>RR LH ABS SOLE-NOID (ACT) | RR LH IN SOL | OFF | ON | ON | OFF | OFF | OFF |
| | RR LH OUT SOL | OFF | OFF | ON* | OFF | OFF | OFF |
| | USV [FR-RL] | OFF | OFF | OFF | OFF | ON | ON |
| | HSV [FR-RL] | OFF | OFF | OFF | OFF | ON* | OFF |
| FRONT SOLENOID<br>FRONT ABS SOLE-NOID (ACT) | FR RH IN SOL | OFF | ON | ON | OFF | OFF | OFF |
| | FR RH OUT SOL | OFF | OFF | ON | OFF | OFF | OFF |
| | FR LH IN SOL | OFF | ON | ON | OFF | OFF | OFF |
| | FR LH OUT SOL | OFF | OFF | ON | OFF | OFF | OFF |

| Operation | | Without "(ACT)" | | | With "(ACT)" | | |
|---|---|---|---|---|---|---|---|
| | | UP | KEEP | DOWN | UP | ACTUA-TOR UP | ACTUA-TOR KEEP |
| REAR SOLENOID REAR ABS SOLNOID (ACT) | RR RH IN SOL | OFF | ON | ON | OFF | OFF | OFF |
| | RR RH OUT SOL | OFF | OFF | ON | OFF | OFF | OFF |
| | RR LH IN SOL | OFF | ON | ON | OFF | OFF | OFF |
| | RR LH OUT SOL | OFF | OFF | ON | OFF | OFF | OFF |

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

**NOTE:**
- If the active test is performed with the brake pedal depressed, the pedal stroke may be changed. This is a normal condition.
- ″TEST STOP″ is displayed 6 seconds after the operation start.
- After ″TEST STOP″ is displayed, to perform the test again, repeat the step 6 of the operation procedure.

### ESP OFF Indicator Lamp

Touch ″ ON ″ and ″ OFF on the "VDC WARNING LAMP" screen to check that ESP OFF indicator lamp operates as follows.

| Operation | ON | OFF |
|---|---|---|
| VDC WARNING LAMP | ON (Lamp ON) | OFF (Lamp OFF) |

**NOTE:**
During the active test when ″OFF″ on the "VDC WARNING LAMP" screen is touched, all of the ESP OFF indicator lamp, SLIP indicator lamp, and ABS warning lamp flash once. This is not abnormal.

### Motor Relay and Actuator Relay

Touch ″ON″ and ″OFF″ on the "ABS MOTOR" screen to check that the motor relay and the actuator relay operate as follows.

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

**NOTE:**
- If the active test is performed with the brake pedal depressed, the pedal stroke may be changed. This is a normal condition.
- ″TEST STOP″ is displayed after 10 seconds from the operation start.

### SLIP Indicator Lamp

Touch ″ON″ and ″OFF″ on the "SLIP LAMP" screen to check that the SLIP indicator lamp operates as follows.

| Operation | ON | OFF |
|---|---|---|
| SLIP LAMP | ON (Lamp ON) | OFF (Lamp OFF) |

**NOTE:**
During the active test when ″OFF″ on the "SLIP LAMP" screen is touched, all of the ESP OFF indicator lamp, SLIP indicator lamp, and ABS warning lamp flash once. This is not abnormal.

### ABS Warning Lamp

Touch ″ON″ and ″OFF″ on the "ABS WARNING LAMP" screen to check that the ABS warning lamp operates as follows.

| Operation | ON | OFF |
|---|---|---|
| ABS WARNING LAMP | ON (Lamp ON) | OFF (Lamp OFF) |

**NOTE:**
During the active test when ″OFF″ on the "ABS WARNING LAMP" screen is touched, all of the ESP OFF indicator lamp, SLIP indicator lamp, and ABS warning lamp flash once. This is not abnormal.

## For Correct and Quick Diagnosis

EFS001I0

### PRECAUTIONS FOR TROUBLE DIAGNOSIS

- Before performing the trouble diagnosis, always read the GI-3, "PRECAUTIONS" to confirm the general precautions.
- After replacement of ESP/TCS/ABS control unit, steering angle sensor, steering parts, suspension parts, or tires, and adjustment of alignment, always adjust the neutral position of steering angle sensor before driving.
- When the ESP/TCS/ABS control unit is replaced, check that the label on the computer unit is identical color.
- After completing the trouble diagnosis, always erase the malfunctioning memory. BRC-76, "Functions of CONSULT-II"
- When inspection of the continuity or voltage between units is performed, check the connector terminals for disconnection, looseness, bend, or collapse. If any malfunction is detected, repair or replace the applicable part.
- Intermittent problems may be caused by a malfunction on harness, connector, or terminal. Move the harnesses, harness connectors, or terminals by hand to make sure that there is no contact malfunction.
- If a circuit tester is used for the check, be careful not to forcibly extend any connector terminal.
- For self-diagnosis, active test, and work support of ESP/TCS/ABS control unit with CONSULT-II, stop and connect CONSULT-II and select ″ABS″.
- CONSULT-II self-diagnosis results are displayed without regard to occurrence timing. In some case, the later ones (timing value is small) appear on the next screen.
- While the self-diagnosis results of CONSULT-II shows a malfunction, if CONSULT-II active test is performed, an engine system malfunction may be indicated. In this case, start the engine to resume the normal screen.
- ESP/TCS/ABS system electronically controls the brake operation and engine output. The following symptoms may be caused by the normal operations.

| Symptom | Symptom description | Result |
|---|---|---|
| Motor operation noise | During ESP, TCS, or ABS operation, sometimes a faint noise can be heard. This is a motor operation noise in the ESP/TCS/ABS actuator. | Normal |
| | Just after the engine starts, the motor operating noise may be heard. This is a normal status of the system operation check. | |
| System operation check noise | When the engine starts, a ″click″ noise may be heard from the engine compartment. This is a normal status of the system operation check. | Normal |
| ESP/TCS operation (SLIP lamp ON) | When the vehicle is passing through a road where the surface friction coefficient varies or the wheel speed changes suddenly by downshifting or depressing of the accelerator pedal fully, TCS may be activated temporarily. | Normal<br>Cancel the ESP/TCS function for the inspection on a chassis dynamometer. |
| | Before the speedometer inspection, turn ESP OFF switch off to cancel the ESP/TCS function. | |
| | When the accelerator pedal is depressed on a chassis dynamometer, the vehicle speed will not increase. This is not malfunction, because TCS is activated by the wheel speed difference between front and rear. The warning lamp may also illuminate to show ″sensor system failure″ in this case. This is not malfunction either, because the stationary front wheels are detected. Restart the engine, and drive the vehicle at 30 km/h or higher to check that the warning lamp no longer illuminates. | |
| ABS operation (Longer stopping distance) | The stopping distance may be longer for the vehicles with ABS when the vehicle is driver on snowy and rough road. When driving on the road like that, slow down the speed. | Normal |
| Sluggish feel | Depending on road circumstances, the driver may have a sluggish feel. This is not abnormal, because the optimum traction has the highest priority (safety first) by TCS operation. Sometimes the driver has a slight sluggish feel against the substantial accelerator pedal operation. | Normal |

## ABS Warning Lamp, ESP OFF Indicator Lamp, SLIP Indicator Lamp ON/OFF Timing

×:ON –: Lamp OFF

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

×: Applicable
–: Not applicable

# Basic Inspection

EFS001I1

## PRELIMINARY CHECK 1: (BRAKE FLUID LEVEL AND LEAK INSPECTION)

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

     **CAUTION:**
     **Do not disassemble the actuator body.**
3. Check the brake disc rotor and pads.

## PRELIMINARY CHECK 2: (INSPECTION FOR LOOSE POWER SUPPLY TERMINAL)

Check the battery for looseness on the battery positive/negative terminals and ground connection. If looseness is detected, tighten the piping to the specified torque. Check that the battery voltage does not drop and the alternator is normal.

## PRELIMINARY CHECK 3: (INSPECTION FOR ABS WARNING LAMP, ESP OFF INDICATOR LAMP, AND SLIP INDICATOR LAMP)

1. Check that the ABS warning lamp is ON for Approx. 0.5 seconds when the ignition switch is turned ON. If it does not turn on, check the ABS warning lamp and the circuit, and the combination meter.
2. Check that ESP OFF indicator lamp is ON for Approx. 0.5 seconds when the ignition switch is turned ON. If it does not turn ON, check the ESP OFF indicator lamp and the circuit, and the combination meter.
3. Check that the SLIP indicator lamp is ON for Approx. 0.5 seconds when the ignition switch is turned ON. If it does not turn ON, check the SLIP indicator lamp and the circuit.

4. With the engine running, check the ESP OFF indicator lamp turns ON and OFF when the ESP OFF switch turns ON and OFF. If it dose not operate in accordance with the switch, check the ESP OFF switch and the circuit.
5. Check that the ESP OFF indicator lamp turns OFF after Approx. 2 seconds delay when the ESP OFF switch turned ON (The ESP/TCS system was not operated). If the ESP OFF indicator lamp does not turn OFF in 10 seconds from the engine start, perform the self-diagnosis of ESP/TCS/ABS control unit.

## Inspection 1 Wheel Sensor and Circuit

EFS001I2

Inspection procedure

### 1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONSULT-II indication item |
| ABS SENSOR [ABNORMAL SIGNAL] |
| FR RH SENSOR – 1 |
| FR RH SENSOR – 2 |
| FR LH SENSOR – 1 |
| FR LH SENSOR – 2 |
| RR RH SENSOR – 1 |
| RR RH SENSOR – 2 |
| RR LH SENSOR – 1 |
| RR LH SENSOR – 2 |

Are any self-diagnosis result items above indicated?

>> GO TO 2.

### 2. CHECK THE CONNECTOR

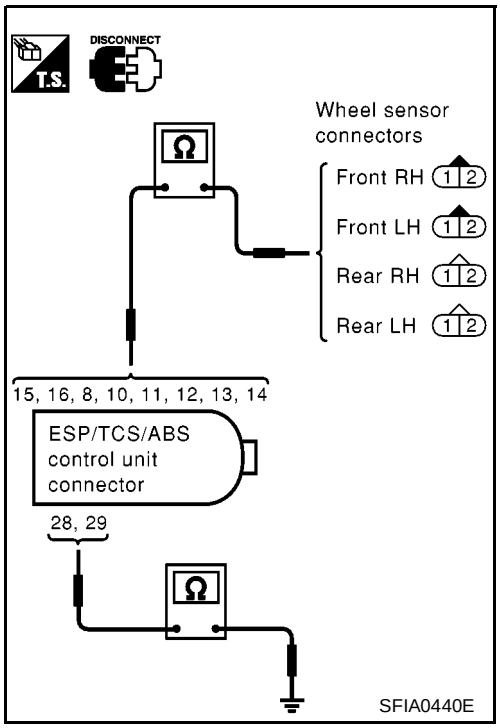
Remove connectors of the wheel sensor which is malfunctioning and the ESP/TCS/ABS control unit. Check whether the deformation of terminal, or incorporate connection of connectors. Then, connect connectors. In addition, check if the wheel sensor cable is damaged due to friction.

Does ABS warning lamp is out when driving 30km/h (49MPH) for Approx. One minute?

YES >> Check is completed.
NO >> GO TO 3.

## 3. CHECK WHEEL SENSOR CIRCUIT

1. Disconnect connectors of the ESP/TCS/ABS control unit and wheel sensors.
2. Check for continuity among the ESP/TCS/ABS control unit (vehicle-side connector) and wheel sensors (vehicle-side connector), body grand.




| | ESP/TCS/ABS control unit (vehicle-side connector) | Wheel sensor (Vehicle-side connector) | Continuity (Resistance) |
|---|---|---|---|
| Front RH | 15 (W) | 1 (W) | Yes (0 - 0.5Ω) |
| | 16 (B) | 2 (B) | |
| Front LH | 8 (B/W) | 1 (B/W) | Yes (0 - 0.5Ω) |
| | 10 (L) | 2 (L) | |
| Rear RH | 11 (L/G) | 1 (L/G) | Yes (0 - 0.5Ω) |
| | 12 (L/Y) | 2 (L/Y) | |
| Rear LH | 13 (W/L) | 1 (W/L) | Yes (0 - 0.5Ω) |
| | 14 (OR/L) | 2 (O/R) | |

| | ESP/TCS/ABS control unit (vehicle-side connector) | Body ground | Continuity |
|---|---|---|---|
| Grand line | 28 (B) | — | Yes |
| | 29 (B) | — | |

Is inspection result OK?

YES >> GO TO 4
NO >> Repair harness and connector between the control unit and the wheel sensor.

## 4. INSPECTION THE TIRE

Check the tire pressure, wear, size.

Check if the pressure, wear, and size are in range of the standard?

YES >> GO TO 5
NO >> Adjusting tire pressure, and replace tire.

### 5. SENSOR ROTOR INSPECTION

Check sensor rotor tooth for damage.

Is inspection result OK?

YES >> Check the EPS/TCS/ABS control unit connector for disconnect, loose, bent and collapse terminals. Securely connect them again. Perform the ESP/TCS/ABS control unit self-diagnosis again.
NO >> Replace sensor rotor.

## Inspection 2 Engine System

EFS001I3

Inspection procedure

### 1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONSULT-II indication item |
| ENGINE SYSTEM 1 |
| ENGINE SYSTEM 2 |
| ENGINE SYSTEM 3 |
| ENGINE SYSTEM 4 |
| ENGINE SYSTEM 6 |

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

YES >> Repair or replace affected items.
NO >> GO TO 2.

### 2. SELF-DIAGNOSIS RESULT CHECK 2

1. Perform the ECM self-diagnosis and repair or replace affected items, then perform the ECM self-diagnosis again.
2. Perform the ESP/TCS/ABS control unit self-diagnosis again.

Is inspection result OK?

OK >> Inspection End
NG >> Repair or replace affected items. Perform the self-diagnosis again.

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

EFS001I4

Inspection procedure

### 1. SELF-DIAGNOSIS RESULT CHECK

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONSULT-II indication item |
| CONTROLLER FAILURE |

Are any items other than "CONTROLLER FAILURE" indicated in the self-diagnosis results?

YES >> Repair or replace affected items. Perform the self-diagnosis again.
NO >> Replace the ESP/TCS/ABS control unit and perform the ESP/TCS/ABS control unit self-diagnosis again.

## Inspection 4 Pressure Sensor and the Circuit between Pressure Sensor and ESP/TCS/ABS Control Unit.

EFS001I5

Inspection procedure

### 1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONSULT-II indication item |
| PRESS SEN CIRCUIT |

Is " PRESS SEN CIRCUIT " indicated in the self-diagnosis results?

>> GO TO 2.

### 2. SELF-DIAGNOSIS RESULT CHECK 2

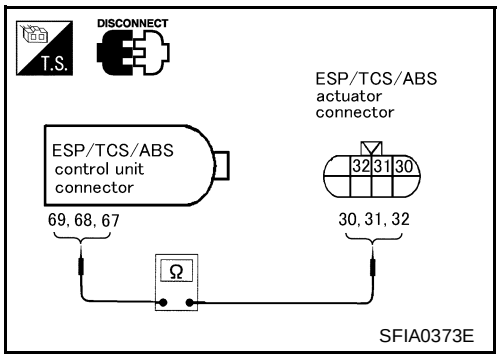
1. Disconnect connectors of the pressure sensor and the ESP/TCS/ABS control unit, and connect them again correctly.
2. Perform the ESP/TCS/ABS control unit self-diagnosis again.

Is inspection result OK?

OK >> Repair or replace the poorly connected connector, then perform the self-diagnosis again.
NG >> GO TO 3.

### 3. PRESSURE SENSOR CIRCUIT INSPECTION

1. Disconnect connectors of the pressure sensor and the ESP/TCS/ABS control unit.
2. Check for continuity between the ESP/TCS/ABS control unit (vehicle-side connector) and the pressure sensor (vehicle-side connector).




| ESP/TCS/ABS control unit (Vehicle-side connector) | Pressure sensor (ESP/TCS/ABS actuator vehicle-side connector) | Continuity |
|---|---|---|
| 69 (P/L) | 30 (P/L) | Yes |
| 68 (LG) | 31 (LG) | Yes |
| 67 (G/OR) | 32 (G/OR) | Yes |

Is inspection result OK?

OK >> GO TO 4.
NG >> Repair or replace the disconnected harness.

## 4. PRESSURE SENSOR INSPECTION

Check the “PRESS SENSOR” value in ″DATA MONITOR″.

| Condition | PRESS SENSOR (Data monitor) |
|---|---|
| Brake pedal depressed | Positive value |
| Brake pedal released | Approx. 0 bar |

Is inspection result OK?

OK >> Perform the ESP/TCS/ABS control unit self-diagnosis again.
NG >> Pressure sensor malfunction. Replace the ESP/TCS/ABS actuator (with the pressure sensor).

# Inspection 5 Steering Angle Sensor and the Circuit between Steering Angle Sensor and ESP/TCS/ABS Control Unit.

EFS001I6

Inspection procedure

## 1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONSULT-II indication item |
| ST ANG SEN CIRCUIT |

Perform inspection 15.
Refer to BRC-107, "Inspection 15 CAN Communication Circuit, ESP/TCS/ABS Control Unit and Steering Angle Sensor" .

Is ″ ST ANG SEN CIRCUIT ″ indicated in the self-diagnosis results.

>> GO TO 2.

## 2. SELF-DIAGNOSIS RESULT CHECK 2

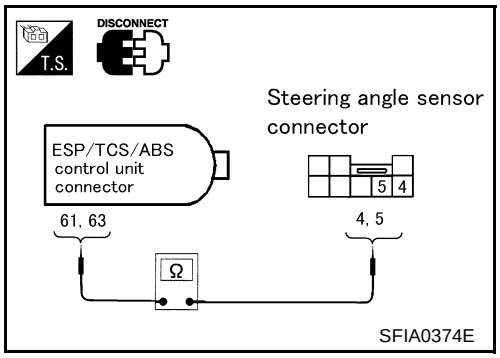
1. Repair or replace the poorly connected connector
- Check the connector housing for disconnect, loose, bent and collapse terminals
  If any malfunction are detected, repair or replace the applicable part.
2. Perform the ESP/TCS/ABS control unit self-diagnosis again.

Is inspection result OK?

OK >> Inspection END
NG >> GO TO 3.

## 3. STEERING ANGLE SENSOR CURCUIT CHECK

1. Disconnect the ESP/TCS/ABS control unit connector and the steering angle sensor connector.
2. Check for continuity between the ESP/TCS/ABS control unit (vehicle-side connector) and the steering angle sensor (vehicle-side connector).




| ESP/TCS/ABS control unit (Vehicle-side connector) | Steering angle sensor (Vehicle-side connector) | Continuity |
|---|---|---|
| 61 (L) | 4 (L) | Yes |
| 63 (R) | 5 (R) | Yes |

Is inspection result OK?

OK >> GO TO 4.
NG >> Repair or replace the disconnected harness.

## 4. DATA MONITOR CHECK

Perform the ″STR ANGLE SIG″ value in ″DATA MONITOR″ and check that it is in normal condition.

| Steering condition | STR ANGLE SIG (Data monitor) |
|---|---|
| Straight-ahead | – 5deg to + 5deg |
| Turn the wheel to the right by 90°. | Approx. + 90deg |
| Turn the wheel to the left by 90°. | Approx. - 90deg |

Is inspection result OK?

OK >> Perform the ESP/TCS/ABS control unit self-diagnosis again.
NG >> Replace the spiral cable (with the steering angle sensor) and adjust the neutral position of steering angle sensor. BRC-41, "Adjustment of Neutral Position of Steering Angle Sensor" .

# Inspection 6 Yaw Rate Sensor/ Side G sensor and the Circuit between Yaw Rate Sensor/ Side G sensor and ESP/TCS/ABS Control Unit.

EFS001I7

Inspection procedure

## 1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONSULT-II indication item |
| YAW RATE SENSOR<br>SIDE G-SEN CIRCUIT |

**CAUTION:**

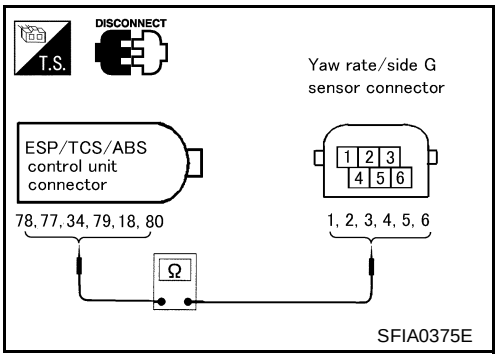
**When the vehicle on a turn-table at an entrance of parking lot or on a moving unit, the ESP OFF indicator lamp turns ON, and the self-diagnosis with CONSULT-II may indicate that the yaw rate sensor system is malfunction. In this case, the yaw rate sensor is not malfunction. Move the vehicle from the turn-table or other moving unit, and restart the engine. This will return the status normal.**

Are ″ YAW RATE SENSOR ″ and ″ SIDE G-SEN CIRCUIT ″ indicated in the self-diagnosis results.

>> GO TO 2.

## 2. SELF-DIAGNOSIS RESULT CHECK 2

1. Disconnect connectors of the yaw rate / side G sensor and the ESP/TCS/ABS control unit.
2. Check for continuity between the ESP/TCS/ABS control unit (vehicle-side connector) and the yaw rate / side G sensor (vehicle-side connector).




| ESP/TCS/ABS control unit (Vehicle-side connector) | Yaw rate/side G-sensor (Vehicle-side connector) | Continuity |
|---|---|---|
| 78 (L/W) | 1 (L/W) | Yes |
| 77 (Y/B) | 2 (Y/B) | Yes |
| 34 (OR) | 3 (OR) | Yes |
| 79 (LG/B) | 4 (OR) | Yes |
| 18 (PU/W) | 5 (PU/W) | Yes |
| 80 (W/R) | 6 (W/R) | Yes |

Is inspection result OK?

OK >> GO TO 3.
NG >> Repair or replace the disconnected harness.

## 3. YAW RATE SENSOR / SIDE G SENSOR CIRCUIT CHECK

Check that the “YAW RATE SEN” and the “SIDE G-SENSOR” are in normal operation in ″DATA MONITOR″.

| Vehicle status | YAW RATE SEN (DATA MONITOR) | SIDE G-SENSOR (DATA MONITOR) |
|---|---|---|
| While the vehicle is stopped | –4 to +4deg/s | –1.1 to +1.1m/s$^2$ |
| Right turn | Negative value | Negative value |
| Left turn | Positive value | Positive value |

Is inspection result OK?

OK >> Perform the ESP/TCS/ABS control unit self-diagnosis again.
NG >> The yaw rate / side G sensor malfunction. After replacing the sensor, perform the self-diagnosis of the ESP/TCS/ABS control unit again.

## Inspection 7 Solenoid Valve, ESP Switch-over Solenoid Valve and Circuit

EFS001I8

Inspection procedure

### 1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONSULT-II indication item |
| FR LH IN ABS SOL |
| FR LH OUT ABS SOL |
| RR RH IN ABS SOL |
| RR RH OUT ABS SOL |
| FR RH IN ABS SOL |
| FR RH OUT ABS SOL |
| RR LH IN ABS SOL |
| RR LH OUT ABS SOL |
| USV LINE [FL-RR] |
| USV LINE [FR-RL] |
| HSV LINE [FL-RR] |
| HSV LINE [FR-RL] |

Are any self-diagnosis result items above indicated?

>> GO TO 2.

### 2. SELF-DIAGNOSIS RESULT CHECK 2

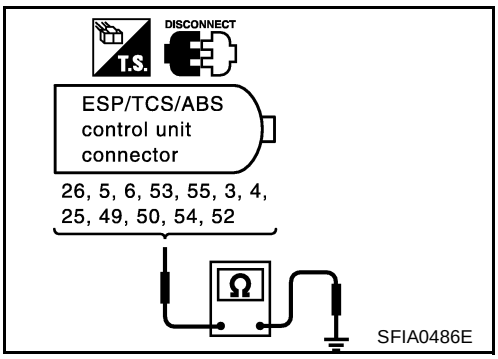
1. Disconnect the ESP/TCS/ABS control unit connector and solenoid valve connectors. Securely connect them again.
2. Perform the self-diagnosis again.

Are any self-diagnosis result items indicated again?

YES >> GO TO 3.
NO >> Repair or replace the poorly connected connector.

## 3. SOLENOID VALVE INPUT SIGNAL CHECK.

1. Disconnect the ESP/TCS/ABS control unit connector.
2. Check the resistance value between the ESP/TCS/ABS control unit (vehicle-side connector B109) and body ground.



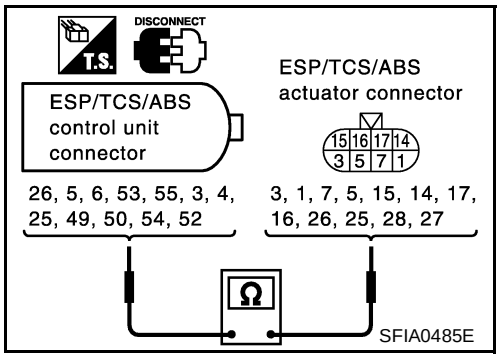

| VDC/TCS/ABS control unit (Vehicle-side connector) | Body ground | Resistance |
|---|---|---|
| 26 (W/G) | – | 6.0 – 11Ω |
| 5 (G/Y) | – | 6.0 – 11Ω |
| 6 (L/W) | – | 6.0 – 11Ω |
| 53 (P) | – | 6.0 – 11Ω |
| 55 (R/Y) | – | 3.0 – 5.0Ω |
| 3 (Y/G) | – | 3.0 – 5.0Ω |
| 4 (BR) | – | 3.0 – 5.0Ω |
| 25 (LG) | – | 3.0 – 5.0Ω |
| 49 (W/R) | – | 6.0 – 11.0Ω |
| 50 (R/G) | – | 6.0 – 11.0Ω |
| 54 (W/L) | – | 3.0 – 5.0Ω |
| 52 (PU) | – | 3.0 – 5.0Ω |

Is inspection result OK?

OK >> Check the ESP/TCS/ABS control unit power supply circuit.
NG >> GO TO 4.

## 4. SOLENOID VALVE LINE CHECK

1. Disconnect connectors for the ESP/TCS/ABS control unit and the ESP/TCS/ABS actuator.
2. Check for continuity between the ESP/TCS/ABS control unit (vehicle-side connector B109) and the ESP/TCS/ABS actuator (vehicle-side connector E67,E68).



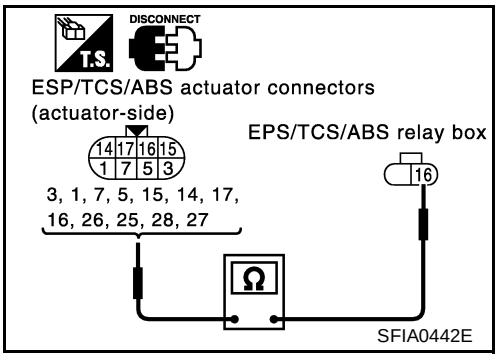

| ESP/TCS/ABS control unit (Vehicle-side connector) | ESP/TCS/ABS Actuator (Vehicle-side connector) | Continuity |
|---|---|---|
| 26 (W/G) | 3 (W/G) | Yes |
| 5 (G/Y) | 1 (G/Y) | Yes |
| 6 (L/W) | 7 (L/W) | Yes |
| 53 (P) | 5 (P) | Yes |
| 55 (R/Y) | 15 (R/Y) | Yes |
| 3 (Y/G) | 14 (Y/G) | Yes |
| 4 (BR) | 17 (BR) | Yes |
| 25 (LG) | 16 (LG) | Yes |
| 49 (W/R) | 26 (W/R) | Yes |
| 50 (R/G) | 25 (R/G) | Yes |
| 54 (W/L) | 28 (W/L) | Yes |
| 52 (PU) | 27 (PU) | Yes |

Is inspection result OK?

OK >> GO TO 5.
NG >> Harness disconnection between the ESP/TCS/ABS control unit and the actuator

## 5. ACTUATOR SOLENOID INSPECTION

1. Disconnect the ESP/TCS/ABS actuator connector.
2. Check the resistance value at the ESP/TCS/ABS actuator.




| ESP/TCS/ABS Actuator (actuator side) | ESP/TCS/ABS Actuator (actuator side) | Resistance |
|---|---|---|
| 3 (W/G) | 16 | 6.0 – 11Ω |
| 1 (G/Y) | 16 | 6.0 – 11Ω |
| 7 (L/W) | 16 | 6.0 – 11Ω |
| 5 (P) | 16 | 6.0 – 11Ω |
| 15 (R/Y) | 16 | 3.0 – 5.0Ω |
| 14 (Y/G) | 16 | 3.0 – 5.0Ω |
| 17 (BR) | 16 | 3.0 – 5.0Ω |
| 16 (LG) | 16 | 3.0 – 5.0Ω |
| 26 (W/R) | 16 | 6.0 – 11.0Ω |
| 25 (R/G) | 16 | 6.0 – 11.0Ω |
| 28 (W/L) | 16 | 3.0 – 5.0Ω |
| 27 (PU) | 16 | 3.0 – 5.0Ω |

Is inspection result OK?

OK >> Perform the ESP/TCS/ABS control unit self-diagnosis again.
NG >> Replace the ESP/TCS/ABS actuator assembly.

## Inspection 8 Actuator Motor, Motor Relay and Circuit

EFS001I9

Inspection procedure

### 1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONSULT-II indication item |
| PUMP MOTOR<br>ACTUATOR RLY (NOTE) |

Are "PUMP MOTOR" and "ACTUATOR RLY" (NOTE) indicated in the self-diagnosis results?

>> ● GO TO 2.

**NOTE:**
"ACTUATOR RLY" on the CONSULT-II self-diagnosis results indicates the malfunction of the actuator relay and circuit.

## 2. SELF-DIAGNOSIS RESULT CHECK 2

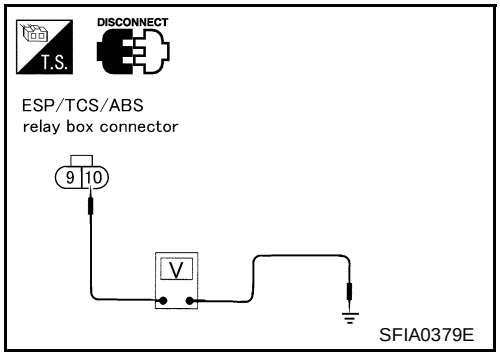
1. Disconnect connectors for the ESP/TCS/ABS control unit and the actuator. Securely connect them again.
2. Perform the self-diagnosis again.

Are any self-diagnosis items indicated again?

YES >> GO TO 3.
NO >> Repair or replace the poorly connected connector.

## 3. ACTUATOR MOTOR, MOTOR RELAY POWER SUPPLY CIRCUIT INSPECTION

1. Disconnect relay box connectors.




2. Check the voltage between the vehicle-side connector and body ground.

| Relay box (Vehicle-side connector) | Body ground | Voltage value |
|---|---|---|
| 10 (W/L) | – | Battery voltage (approx. 12V) |

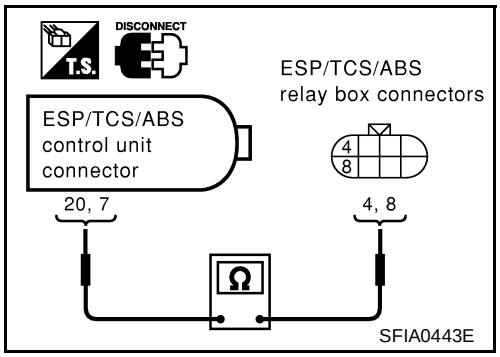
Is inspection result OK?

OK >> GO TO 4.
NG >> ● Check the fuse 50A.
● Check for continuity between the battery and the relay box terminal No. 10.

## 4. ACTUATOR MOTOR AND MOTOR RELAY CIRCUIT CHECK

1. Disconnect connectors for the ESP/TCS/ABS control unit and the relay box.
2. Check for continuity between the ESP/TCS/ABS control unit, the relay, and the actuator (vehicle-side connector).

| ESP/TCS/ABS control unit (Vehicle-side connector) | Relay box (Vehicle-side connector) | Continuity |
|---|---|---|
| 20 (R/B) | 4 (R/B) | Yes |
| 7 (G/W) | 8 (G/W) | Yes |




Is inspection result OK?

OK >> GO TO 5.
NG >> Harness malfunction between the ESP/TCS/ABS control unit, the relay box and the actuator.

## 5. MOTOR RELAY UNIT INSPECTION

Check the motor relay as a unit.

Is inspection result OK?

OK >> Check the ESP/TCS/ABS control unit power supply circuit.
NG >> Replace the motor relay.

## Inspection 9 Actuator Relay and Circuit

EFS001IA

Inspection procedure

### 1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONSULT-II indication item |
| MAIN RELAY |

Is "MAIN RELAY" indicated in the self-diagnosis results?

>> GO TO 2.

### 2. SELF-DIAGNOSIS RESULT CHECK 2

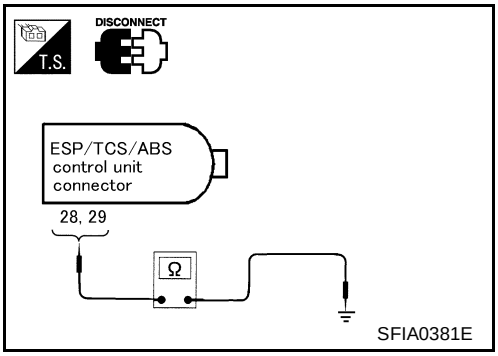
1. Disconnect the ESP/TCS/ABS control unit connector. Securely connect them again.
2. Perform the ESP/TCS/ABS control unit self-diagnosis again.

Is the same self-diagnosis item indicated?

YES >> GO TO 3.
NO >> Repair or replace the poorly connected connector.

### 3. ESP/TCS/ABS CONTROL UNIT GROUND CIRCUIT INSPECTION

Check the ESP/TCS/ABS control unit ground circuit.



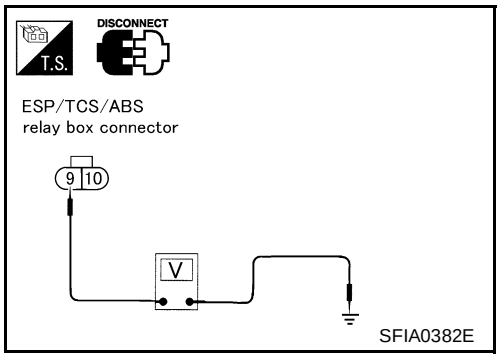

| ESP/TCS/ABS control unit (Vehicle-side connector) | Body ground | Continuity |
|---|---|---|
| 28 (B) | – | Yes |
| 29 (B) | – | Yes |

Is inspection result OK?

OK >> GO TO 4.
NG >> Poorly connection on the ESP/TCS/ABS control unit connector or harness disconnection.

## 4. ACTUATOR RELAY POWER SUPPLY CIRCUIT INSPECTION

1. Disconnect relay box connectors.
2. Check the voltage between the vehicle-side connector and body ground.



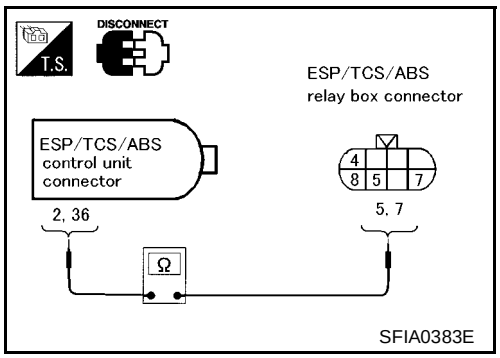

| RELAY BOX (Vehicle-side connector) | Body ground | Voltage value |
|---|---|---|
| 9 (L) | – | Battery voltage (approx. 12V) |

Is inspection result OK?

OK >> GO TO 5.
NG >> ● Check the fuse 30A.
● Check for continuity between the battery and the relay box terminal No. 9. If it is not OK, replace the fuse or harness.

## 5. ACTUATOR RELAY POWER CIRCUIT CHECK

1. Disconnect connectors for the ESP/TCS/ABS control unit and the relay box.
2. Check for continuity between the ESP/TCS/ABS control unit and the relay box (vehicle-side connector).




| ESP/TCS/ABS control unit (Vehicle-side connector) | Relay box (Vehicle-side connector) | Continuity |
|---|---|---|
| 2 (SB) | 5 (SB) | Yes |
| 36 (L/Y) | 7 (L/Y) | Yes |

Is inspection result OK?

OK >> GO TO 6.
NG >> Harness disconnection between the ESP/TCS/ABS control unit and the relay box.

## 6. ACTUATOR RELAY UNIT INSPECTION

Check the actuator relay as a unit.

Is inspection result OK?

OK >> Check the ESP/TCS/ABS control unit power supply circuit.
NG >> Replace the actuator relay.

## Inspection 10 Stop Lamp Switch and Circuit

EFS001IB

Inspection procedure

### 1. SELF-DIAGNOSIS RESULT CHECK

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONSULT-II indication item |
| STOP LAMP SW |

Is "STOP LAMP SW" indicated in the self-diagnosis results?

>> GO TO 2.

### 2. STOP LAMP INSPECTION

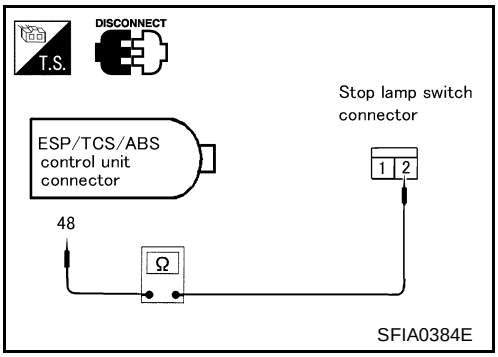
1. Disconnect connectors for the stop lamp switch and the ESP/TCS/ABS control unit.
2. Securely connect them again.
3. Start the engine.
4. Repeat depressing the brake pedal carefully several times, then perform the self-diagnosis again.

Is the same self-diagnosis item indicated?

YES >> GO TO 3.
NO >> Repair or replace the poorly connected connector.

### 3. STOP LAMP SWITCH CIRCUIT CHECK

1. Disconnect connectors for the stop lamp switch and the ESP/TCS/ABS control unit.
2. Check for continuity between the stop lamp switch (vehicle-side connector) and the ESP/TCS/ABS control unit (vehicle-side connector).




| ESP/TCS/ABS control unit (Vehicle-side connector) | STOP LAMP SW (Vehicle-side connector) | Continuity |
|---|---|---|
| 48 (R/G) | 2 (R/G) | Yes |

Is inspection result OK?

OK >> Perform the ESP/TCS/ABS control unit self-diagnosis again.
NG >> Harness disconnection between the ESP/TCS/ABS control unit and the stop lamp switch.

## Inspection 11 ESP/TCS/ABS Control Unit Power Supply Circuit

EFS001IC

Inspection procedure

### 1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONSULT-II indication item |
| BATTERY VOLTTAGE [ABNORMAL] |

Is "BATTERY VOLTTAGE [ABNORMAL] "indicated in the self-diagnosis results?

>> GO TO 2.

## 2. SELF-DIAGNOSIS RESULT CHECK 2

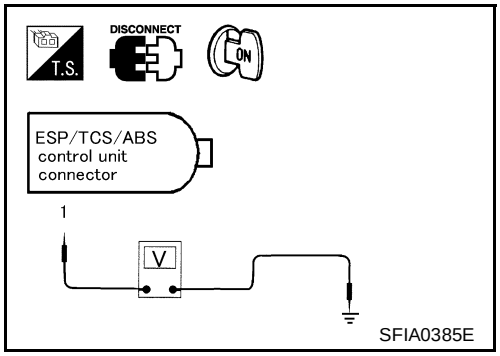
1. Disconnect the ESP/TCS/ABS control unit connector. Securely connect them again.
2. Perform the self-diagnosis.

Is the same self-diagnosis item indicated?

YES >> GO TO 3.
NO >> Repair or replace the poorly connected connector.

## 3. ESP/TCS/ABS CONTROL UNIT POWER SUPPLY CIRCUIT INSPECTION 1

1. Disconnect the ESP/TCS/ABS control unit connector.
2. Turn the ignition switch ON (engine not running), and check the voltage between the ESP/TCS/ABS control unit (vehicle-side connector) and body ground.



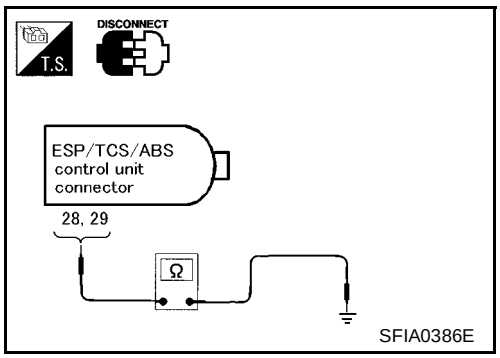

| ESP/TCS/ABS control unit (Vehicle-side connector) | Body ground | Voltage value |
|---|---|---|
| 1 (GY) | – | Battery voltage (approx. 12V) |

Is inspection result OK?

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

## 4. ESP/TCS/ABS CONTROL UNIT GROUND CIRCUIT INSPECTION 1

Check the ESP/TCS/ABS control unit ground circuit.



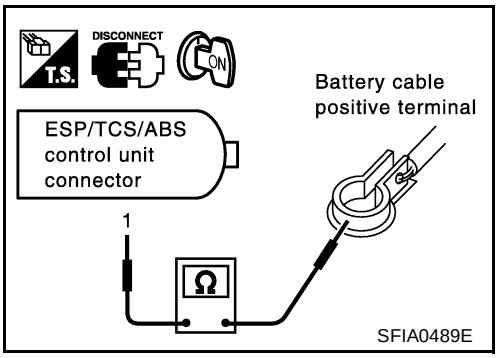

| ESP/TCS/ABS control unit (Vehicle-side connector) | Body ground | Continuity |
|---|---|---|
| 28 (B) | – | Yes |
| 29 (B) | – | Yes |

Is inspection result OK?

OK >> Perform the ESP/TCS/ABS control unit self-diagnosis again.
NG >> Harness disconnection or improper installation of the ESP/TCS/ABS control unit.

## 5. ESP/TCS/ABS CONTROL UNIT POWER SUPPLY CIRCUIT INSPECTION 2

1. Check the fuse 10A.
2. Check for continuity between the battery positive terminal and the ESP/TCS/ABS control unit connector.




| ESP/TCS/ABS control unit (Vehicle-side connector) | Battery terminal | Continuity |
|---|---|---|
| 1 (GY) | positive | Yes |

Is inspection result OK?

OK >> Check the battery for a loose terminal and low voltage or the alternator for abnormality.
NG >> ● Replace the fuse 10A.
● Harness disconnection

## Inspection 12 When “EMERGENCY BRAKE” is indicated in the Self-Diagnosis Results

EFS001ID

Inspection procedure

### 1. SELF-DIAGNOSIS RESULT CHECK

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONSULT-II indication item |
| EMERGENCY BRAKE |

When any items other than ″EMERGENCY BRAKE″ is displayed in the self-diagnosis results, follow the instructions below.

**CAUTION:**
**″EMERGENCY BRAKE″ is indicated when the control unit itself is detected internal error. If this display item was indicated, replace the control unit.**

Is ″EMERGENCY BRAKE″ is indicated in the self-diagnosis results?

>> Replace the ESP/TCS/ABS control unit, and perform the self-diagnosis again.

## Inspection 13 When “ST ANG SEN SIGNAL” is Indicated in the Self-Diagnosis Results

EFS001IE

Inspection procedure

### 1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONSULT-II indication item |
| ST ANGLE SEN SIGNAL |

When any items other than ″ST ANGLE SEN SIGNAL″ is displayed in the self-diagnosis results:

YES >> Check and repair the applicable items. Perform the self-diagnosis again.
NO >> Perform the steering angle sensor neutral position adjustment. GO TO 2.

## 2. SELF-DIAGNOSIS RESULT CHECK 2

Turn the ignition switch OFF, and ON to erase the self-diagnosis results. And perform the ESP/TCS/ABS control unit self-diagnosis again.

Is the same self-diagnosis item indicated again?

YES >> After replacing the spiral cable (with the steering angle sensor), perform the neutral position adjustment. Then conduct the self-diagnosis again.
NO >> Inspection End

# Inspection 14 Brake Fluid Level of Reservoir Tank, Communication Circuit between ESP/TCS/ABS Control Unit and Brake Fluid Level Warning Switch

EFS001IF

Inspection procedure

## 1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONSULT-II indication item |
| BR FLUID LEVEL LOW |

Does the brake warning light turn on?

YES >> Check the pad for wear. Check the brake fluid for leakage.
NO >> GO TO 2.

## 2. SELF-DIAGNOSIS RESULT CHECK 2

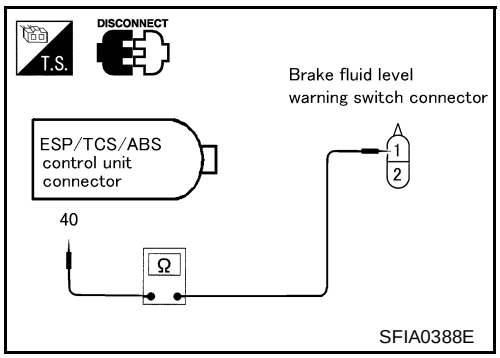
1. Disconnect connectors for the brake fluid level warning switch and the ESP/TCS/ABS control unit.
2. Securely connect connectors. Perform the ESP/TCS/ABS control unit self-diagnosis again.

Is the same self-diagnosis item indicated again?

YES >> Poor connection of connector. Repair or replace the poorly connected connector.
NO >> GO TO 3.

## 3. CIRCUIT CHECK BETWEEN BRAKE FLUID LEVEL WARNING SWITCH AND ESP/TCS/ABS CONTROL UNIT

1. Disconnect connectors for the brake fluid level warning switch and the ESP/TCS/ABS control unit.




2. Check for continuity between the brake fluid level warning switch (vehicle-side connector) and the ESP/TCS/ABS control unit (vehicle-side connector).

| ESP/TCS/ABS control unit (Vehicle-side connector) | Brake fluid level warning switch (Vehicle-side connector) | Continuity |
|---|---|---|
| 40 (Y/G) | 1 (Y/G) | Yes |

Is inspection result OK?

OK >> Perform the ESP/TCS/ABS control unit self-diagnosis again.
NG >> Repair or replace the disconnected harness.

# Inspection 15 CAN Communication Circuit, ESP/TCS/ABS Control Unit and Steering Angle Sensor

EFS001IG

Inspection procedure

## 1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

| Self-diagnosis results |
|---|
| CONSULT-II indication item |
| CAN COMM CIRCUIT<br>ST ANG SEN COM CIR |

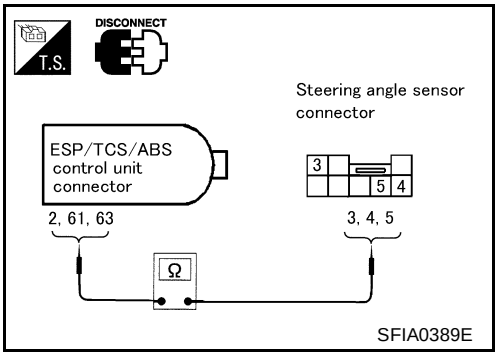
Are any items other than above indicated in self-diagnosis results?

YES >> Repair or replace affected items.
NO >> GOTO 2.

## 2. CHECK HARNESS AND CONNECTORS BETWEEN ESP/TCS/ABS CONTROL UNIT AND STEERING ANGLE SENSOR.

1. Turn the ignition switch OFF, and disconnect the battery negative terminal.
2. Disconnect the ESP/TCS/ABS control unit connector and the steering angle sensor connector.
3. Check the harness between the ESP/TCS/ABS control unit and the steering angle sensor for open and short circuit.
4. Check connectors for the control unit and the sensor.

– Check the connector housing for disconnected, loose, bent, and collapsed terminals.




| ESP/TCS/ABS control unit (Vehicle-side connector) | Steering angle sensor (Vehicle-side connector) | Continuity |
|---|---|---|
| 2 (B) | 3 (B) | Yes |
| 61 (L) | 4 (L) | Yes |
| 63 (R) | 5 (R) | Yes |

Is inspection result OK?

OK >> GO TO 3.
NG >> Repair disconnected harness or poorly connected connectors. GO TO 3.

## 3. SELF-DIAGNOSIS RESULT CHECK 2

1. Connect connectors to the control unit and the sensor.
2. Connect the battery negative terminal, and turn the ignition switch ON.
3. After erasing the self-diagnosis result, start the engine to perform the self-diagnosis again.

Is only "ST ANGLE SEN COM CIR" indicated in the self-diagnosis results?

YES >> Replace the spiral cable (with the steering angle sensor) and adjust the neutral position of the steering angle sensor. Refer to BRC-41, "ON-VEHICLE SERVICE" .
NO >> GO TO 4.

## 4. CAN COMMUNICATION SYSTEM CHECK

Check “CAN DIAG SUPPORT MNTR” of the data monitor items.

| Normal | Abnormal (example) |
|---|---|
| CAN COMM: OK | CAN COMM: NG |
| CAN CIRC 1: OK | CAN CIRC 1: UNKWN |
| CAN CIRC 2: OK | CAN CIRC 2: UNKWN |
| CAN CIRC 3: OK | CAN CIRC 3: UNKWN |
| CAN CIRC 4: OK | CAN CIRC 4: UNKWN |
| CAN CIRC 5: OK | CAN CIRC 5: UNKWN |
| CAN CIRC 6: OK | CAN CIRC 6: UNKWN |

>> After printing the monitor items, go to CAN SYSTEM. Refer to BRC-46, "CAN COMMUNICATION"

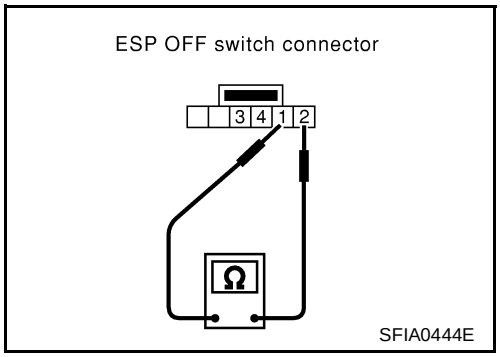
# Component Check

EFS001IH

### ESP OFF SWITCH

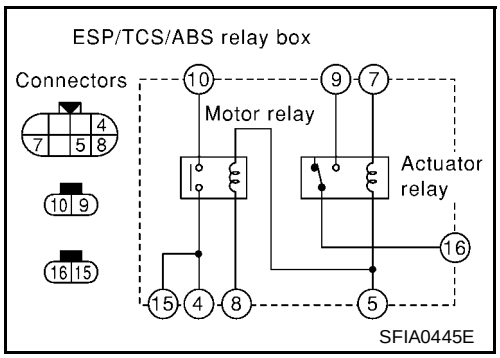
- Disconnect the ESP OFF switch connector. Check for continuity between the terminal No. 1 and No. 2.

**1 - 2 Pressing the switch will make a continuity, and releasing it will stop the continuity.**




### ESP/TCS/ABS RELAY BOX

Disconnect the relay box connectors. Check for continuity, resistance value, and insulation between any pair of terminals in the relay box.



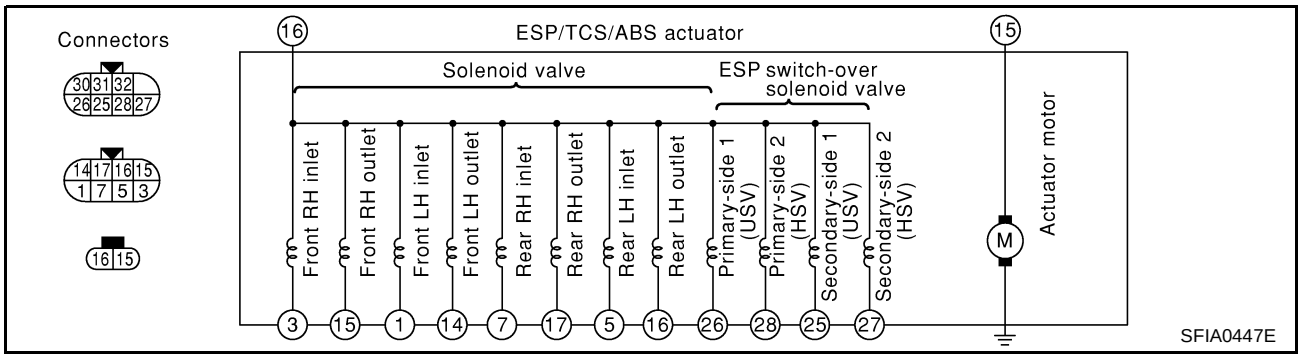
## Continuity and resistance

| Item | ESP/TCS/ABS relay box | | | Condition |
|---|---|---|---|---|
| | 16 — 9 | 4 — 15 — 10 | 5 — 7 — 8 | |
| Actuator relay | ○—×—○ | | Open (0V) ○—○ | Between terminal No. 5 and No. 7 Open (0V) |
| | ○———○ | | 12V ○—○ | Between terminal No. 5 and No. 7 Add 12V |
| Motor relay | | ○—○ | | —— |
| | | ○—×—○ | Open (0V) ○———○ | Between terminal No. 5 and No. 8 Open (0V) |
| | | ○———○ | 12V ○———○ | Between terminal No. 5 and No. 8 Add 12V |
| Relay coil | | | Approx. 100Ω ○—W—○<br>Approx. 80Ω ○—W—○ | —— |

○———○ : Conductivity ○———○ : Open between terminals (0V) Approx. 100Ω ○—W—○ : Resistance between terminals is 100Ω
○—×—○ : Not conductivity ○—12V—○ : Add 12V between terminals
SFIA0446E

## ESP/TCS/ABS ACTUATOR

Take each connector off from the actuator.Then check electric circulation and resistance in between terminals.




**CAUTION:**

**Confirm that the earth of actuator motor is completely removed.**

## Continuity and resistance

| Item | ESP/TCS/ABS actuator connector terminal number<br>16★ 3 15 1 14 7 17 5 16 26 25 28 27 15★ Body ground | Condition |
|---|---|---|
| Solenoid valve | 6.0 - 11.0Ω<br>3.0 - 5.0Ω<br>6.0 - 11.0Ω<br>3.0 - 5.0Ω<br>6.0 - 11.0Ω<br>3.0 - 5.0Ω<br>6.0 - 11.0Ω<br>3.0 - 5.0Ω | Check the Resistance |
| ESP switch-over solenoid value | 6.0 - 11.0Ω<br>6.0 - 11.0Ω<br>3.0 - 5.0Ω<br>3.0 - 5.0Ω | |
| Actuator motor | | ——— |

(Resistance)
: Continuity : Yes
: Continuity : Yes

Note:
★: EPS/TCS/ABS relay box harness connector E 501 tarminal No.

SFIA0448E

**NOTE:**
★:EPS/TCS/ABS relay box harness connector E501 terminal No.

## Check the resistance

**Standard value (Ω)**

**Solenoid valves**

| | |
|---|---|
| **Outlet ~ Outlet** | **: 6.0 - 10.0** |
| **Outlet ~ Inlet** | **: 9.0 - 16.0** |
| **Inlet ~ Inlet** | **: 12.0 - 22.0** |

**ESP switch-over solenoid valve**

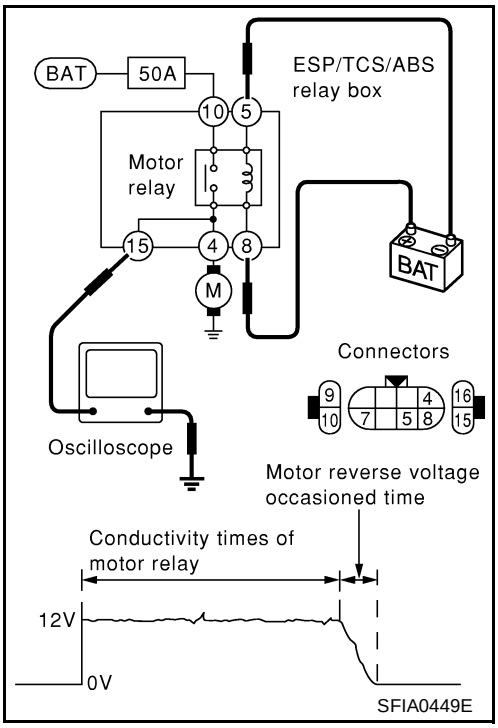
| | |
|---|---|
| **Primary-side 1 - Secondary-side 1** | **: 12.0 - 22.0** |
| **Primary-side 2 - Secondary-side 2** | **: 6.0 - 10.0** |
| **Primary-side 1 - Primary-side 2, Secondary-side 2** | **: 9.0 - 16.0** |
| **Secondary-side 1 - Primary-side 2, Secondary-side 2** | **: 9.0 - 16.0** |

### Actuator operation check

1. Connect 19 and 21 terminals of actuator to 40 and 41 terminals of relay box.
2. Measure the motor voltage (No.4 terminal to body earth) with oscilloscope. Then check the motor reverse voltage occasioned time.
   The motor reverse voltage occasioned time is more than 0.1 sec.

**CAUTION:**

- **Perform checking of motor relay unit.Then confirm that relay functions.**
- **Driving actuator motor is with in 4 sec to prevent heating up.**
- **Standard condition of the motor reverse voltage occasioned time is: Battery voltage is 12V. Temperature 20°. when the battery voltage or temperature is lower than the standard, the motor reverse voltage occasioned time becomes slightly shorter.**




## Symptom 1: ABS Works Frequently.

EFS001II

Inspection procedure

### 1. INSPECTION START

Check the wheel sensor system.

- Sensor mounting inspection
- Sensor pick-up inspection for iron chips
- Sensor rotor inspection (e.g. Number of teeth, damaged teeth)
- Sensor connector engagement inspection

Is inspection result OK?

OK >> GO TO 2.
NG >> Refer to wheel sensor and rotor lines.

### 2. LOOSENESS INSPECTION

Check the front axle for looseness.

Is inspection result OK?

OK >> BRC-111, "Symptom 2: Unexpected Pedal Action"
NG >> Axle inspection and repair

## Symptom 2: Unexpected Pedal Action

EFS001IJ

Inspection procedure

### 1. BRAKE PEDAL STROKE INSPECTION

Check the brake pedal stroke.

Is stroke excessively long?

YES >> Check the bleeding and brake system.
NO >> GO TO 2.

## 2. PEDAL FORCE INSPECTION

Check that the brake is effective with the pedal depressed.

Is the pedal heavy, but effective?

YES >> Normal
NO >> GO TO 3.

## 3. CONNECTOR AND PERFORMANCE INSPECTION

Disconnect the actuator relay unit connector to deactivate the ABS function. Check that the brake is effective.

Is the brake effective?

YES >> GO TO 4.
NO >> Brake line inspection

## 4. ABS WARNING LAMP INDICATOR INSPECTION

Check that the ABS warning lamp illuminates.

Does the ABS warning lamp illuminate?

YES >> Perform the self-diagnosis.
NO >> GO TO 5.

## 5. WHEEL SENSOR INSPECTION

Check the wheel sensor system.

- Sensor mounting inspection
- Sensor pick-up inspection for iron chips
- Sensor rotor inspection (e.g. Number of teeth, damaged teeth)
- Sensor connector engagement inspection

Is inspection result OK?

OK >> Normal
NG >> Wheel sensor and rotor lines repair

# Symptom 3: Longer Stopping Distance

EFS001IK

Inspection procedure

## 1. INSPECTION START

Check that the stopping distance when braking becomes longer only on a snowy or gravel road.

Does the stopping distance when braking become longer only on a snowy or gravel road?

YES >> It may be longer than that of vehicle without ABS.
NO >> GO TO 2.

## 2. PERFORMANCE CHECK

Disconnect the actuator relay box to deactivate the ABS function.

Is the stopping distance still longer?

YES >>
- Brake line air bleeding
- Brake line inspection

NO >> GO TO 3.

## 3. ABS WARNING LAMP INDICATOR INSPECTION

Check that the ABS warning lamp illuminates.

Does the ABS warning lamp illuminate?

YES >> Perform the self-diagnosis.
NO >> GO TO 4.

### 4. WHEEL SENSOR INSPECTION

Check the wheel sensor system.

- Sensor mounting inspection
- Sensor pick-up inspection for iron chips
- Sensor rotor inspection (e.g. Number of teeth, damaged teeth)
- Sensor connector engagement inspection

Is inspection result OK?

OK >> Normal
NG >> Wheel sensor and rotor lines repair

## Symptom 4: ABS Does Not Work.

EFS001IL

Inspection procedure

### 1. ABS WARNING LAMP INDICATOR INSPECTION

Check that the ABS warning lamp illuminates.

Does the ABS warning lamp illuminate?

YES >> Perform the self-diagnosis.
NO >> GO TO 2.

### 2. WHEEL SENSOR INSPECTION

Check the wheel sensor system.

- Sensor mounting inspection
- Sensor pick-up inspection for iron chips
- Sensor rotor inspection (e.g. Number of teeth, damaged teeth)
- Sensor connector engagement inspection

Is inspection result OK?

OK >> Normal
NG >> Wheel sensor and rotor lines repair

## Symptom 5: Pedal Vibration and Noise

EFS001IM

Inspection procedure

### 1. SYMPTOM CHECK

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

Is inspection result OK?

OK >> Perform the self-diagnosis.
NG >> GO TO 2.

### 2. SYMPTOM CHECK 2

Check the brake system for pedal vibration or noise when the pedal depressed lightly (just put a foot on).

**CAUTION:**
**Under the following driving conditions, the wheel speed will fluctuates, resulting in ABS activation.**

- **When shifting gears**
- **High speed cornering**
- **When a gust of wind**

Is inspection result OK?

OK >> GO TO 3.
NG >> Normal

## 3. SYMPTOM CHECK 3

Does the symptom appear during normal braking operation?

**CAUTION:**
**ABS may work in following driving conditions even if there is no sudden brake.**

- **When road friction is low.**
- **High speed cornering**
- **When a gust of wind**

Is inspection result OK?

OK >> GO TO 4.
NG >> Normal

## 4. SYMPTOM CHECK 4

Check that the symptom is reproduce when the engine speed is increased with the vehicle stopped.

Is inspection result OK?

OK >> GO TO 5.
NG >> ● Normal.

**CAUTION:**
**This symptom may appear with vehicle stopped.**

## 5. SYMPTOM CHECK 5

Check that the symptom is reproduce when any switch of electrical equipment is operated.

Is inspection result OK?

OK >> Check that there are no radio, antenna, and antenna lead-in wires (including wiring) near control unit.
NG >> GO TO 6.

## 6. ABS WARNING LAMP INSPECTION

Check that the ABS warning lamp turns on.

Is inspection result OK?

OK >> Perform the self-diagnosis.
NG >> GO TO 7.

## 7. WHEEL SENSOR INSPECTION

Check the wheel sensor system.

- Sensor mounting inspection
- Sensor pick-up inspection for iron chips (e.g. Number of teeth, damaged teeth)
- Sensor connector engagement inspection
- Wheel sensor path harness and connector inspection

Is inspection result OK?

OK >> Normal
NG >> Wheel sensor and rotor lines repair

# Symptom 6: ESP OFF Indicator Lamp Does Not Illuminate

EFS001IN

Inspection procedure

## 1. ESP OFF INDICATOR LAMP INSPECTION

Disconnect the ESP/TCS/ABS control unit connector.

Does the ABS warning lamp and ESP OFF indicator lamp illuminate?

YES >> ESP/TCS/ABS control unit malfunction. Repair or replace the control unit.
NO >> Combination meter system malfunction. Check the combination meter.

## Symptom 7: SLIP Indicator Lamp Does Not Illuminate

EFS001IO

Inspection procedure

### 1. SLIP INDICATOR LAMP BURNED-OUT BULB INSPECTION

Check for continuity between the power supply terminal of meter and terminal of ABS warning lamp.

Is inspection result OK?

OK >> GO TO 2.
NG >> Circuit malfunction in SLIP indicator lamp or combination meter

### 2. SLIP INDICATOR LAMP POWER CIRCUIT INSPECTION

Disconnect the meter connector. Check that the voltage between the vehicle-side harness terminal and body ground is battery voltage (Approx. 12V).

Is inspection result OK?

OK >> GO TO 3.
NG >>
- Fuse inspection
- Inspection for harness and connectors between fuse block and meter
- Check the power supply circuit (battery and ignition switch circuit).

### 3. SLIP INDICATOR LAMP HARNESS INSPECTION

1. Disconnect connectors for the ESP/TCS/ABS control unit and meter vehicle-side harness.
2. Check the harness between the meter and the ESP/TCS/ABS control unit for an open/shorted circuit.

Is inspection result OK?

OK >> GO TO 4.
NG >> Repair or replace the disconnected harness.

### 4. SLIP INDICATOR LAMP CONNECTOR INSPECTION

Check connectors for the ESP/TCS/ABS control unit and meter vehicle-side harness.

Is inspection result OK?

OK >> Connect connectors, and perform the self-diagnosis. The vehicle harness has the intermediate connector. Refer to the vehicle wiring diagram, always check it.
NG >> Repair or replace the disconnected connector.

## Symptom 8: During ESP/TCS/ABS Control, Vehicle Behavior is Jerky.

EFS001IP

Inspection procedure

### 1. ENGINE SPEED SIGNAL INSPECTION

Perform ″DATA MONITOR″ with CONSULT-II for the ESP/TCS/ABS control unit.

Is the engine speed at idle 400 rpm or higher?

YES >> Normal
NO >> GO TO 2.

### 2. SELF-DIAGNOSIS RESULT CHECK 1

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

Is the self-diagnosis results displayed?

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

## 3. ECM SELF-DIAGNOSIS RESULT CHECK

Perform the ECM self-diagnosis.

Is the self-diagnosis results indicated?

YES >> Repair or replace the camshaft position sensor system.
NO >> GO TO 4.

## 4. SELF-DIAGNOSIS RESULT 2

Disconnect connectors for the ESP/TCS/ABS control unit and ECM, and reconnect them correctly to perform the self-diagnosis again.

Is inspection result OK?

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

## 5. SELF-DIAGNOSIS RESULT CHECK 4

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

Is the self-diagnosis results displayed?

YES >> Repair or replace the applicable item.
NO >> GO TO 6.

## 6. CIRCUIT CHECK BETWEEN ESP/TCS/ABS CONTROL UNIT AND ECM

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

Is inspection result OK?

OK >> Inspection End
NG >> Repair or replace the applicable item and perform the ESP/TCS/ABS control unit self-diagnosis again.

# ESP/TCS/ABS CONTROL UNIT

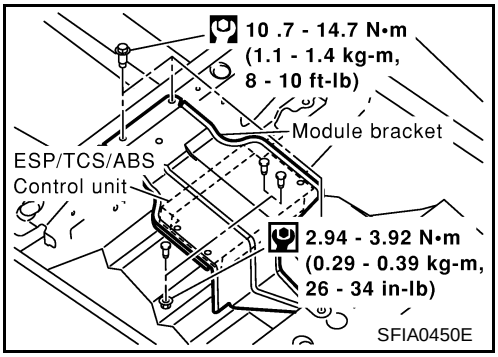
PFP:47660

## Removal and Installation

EFS001IQ

### REMOVAL

1. Remove the passenger seat. Refer to
2. Remove the ESP/TCS/ABS control unit.




### INSTALLATION

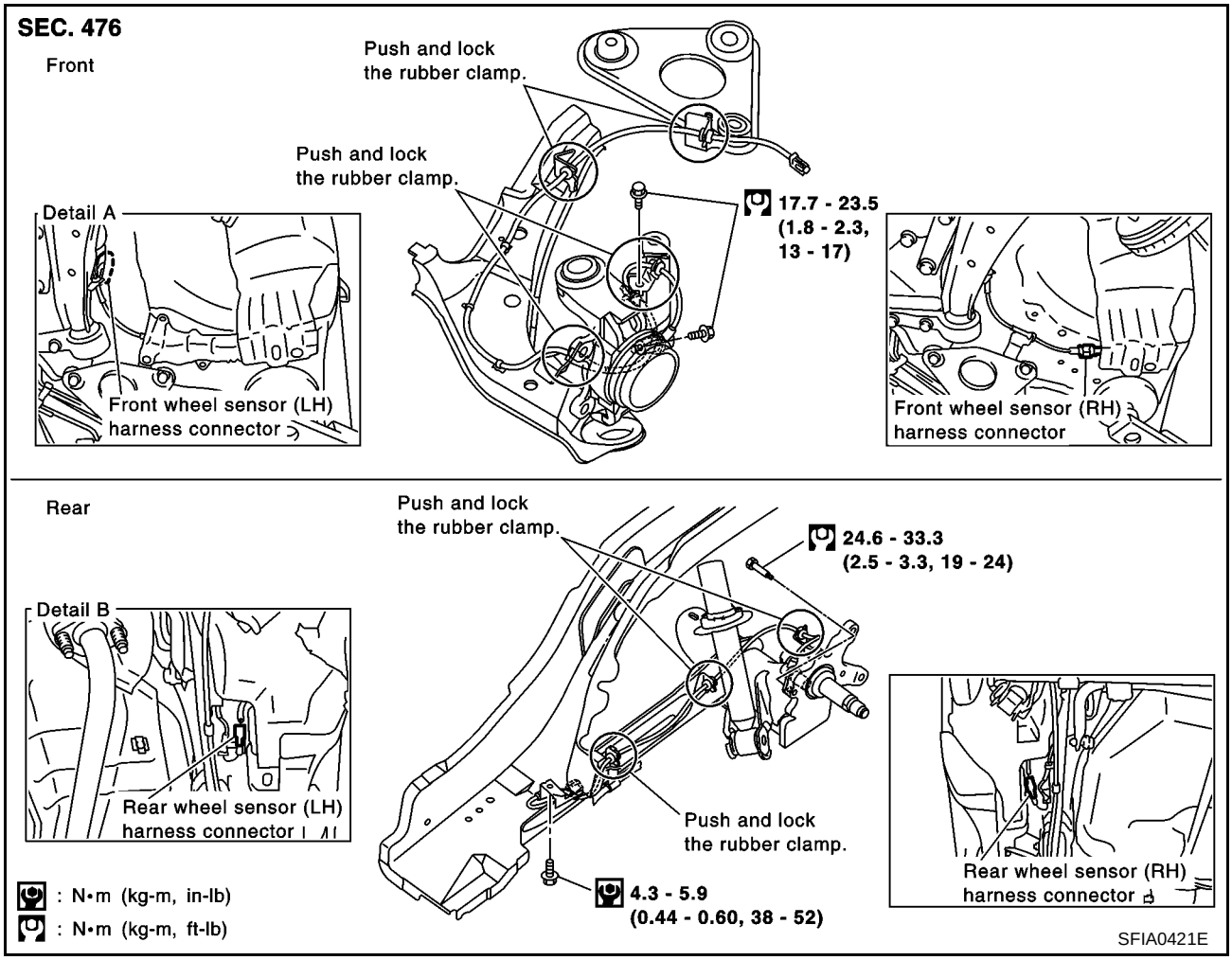
- Installation is the reverse order of removal.

# WHEEL SENSORS

PFP:47910

## Removal and Installation

EFS001O0




**CAUTION:**

- **Be careful not to damage sensor edge and rotor tooth. Before removing front or rear wheel hub, remove wheel sensor to avoid sensor wiring damage. Otherwise, sensor may be deactivated.**
- **When removing sensor, avoid rotating it as much as possible. Do not forcibly pull sensor harness.**
- **When installing, check sensor pick-up and mounting hole for foreign material such as iron chips. Check no foreign material has been caught in sensor rotor. Remove any foreign material found. Tighten mounting bolts and nuts to the specified torque.**

# SENSOR ROTOR

PFP:47970

## Removal and Installation

EFS001IS

### REMOVAL

#### Front

1. Remove drive shaft. Refer to FAX-11, "REMOVAL" .
2. Remove sensor rotor from drive shaft. Refer to “FAX Front axle/Drive shaft ” FAX-14, "DISASSEMBLY"

#### Rear

1. Remove wheel hub. Refer to RAX-5, "REMOVAL" .
2. Remove sensor rotor from wheel hub. Refer to “RAX Rear axle/Wheel hub” RAX-5, "REMOVAL"

### INSTALLATION

#### Front

1. Install sensor rotor to drive shaft. Refer to “FAX Front axle/Drive shaft” FAX-17, "ASSEMBLY"
2. Connect drive shaft. Refer to FAX-12, "INSTALLATION" in “FAX Front Axle/Drive Shaft”.

#### Rear

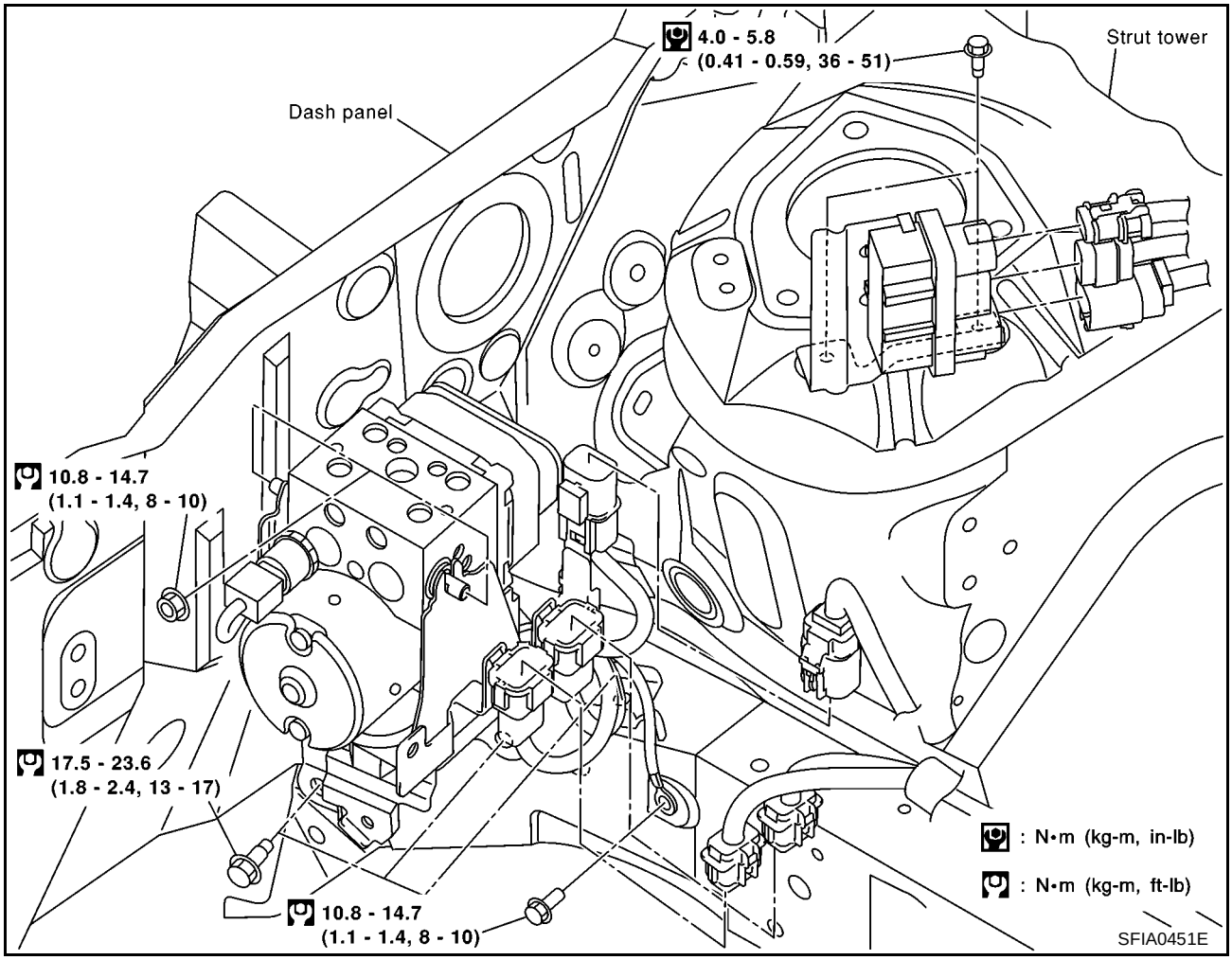
1. Install sensor rotor to wheel hub. Refer to RAX Rear axle/Wheel hub” RAX-6, "INSTALLATION"
2. Connect wheel hub. Refer to RAX-6, "INSTALLATION" in “RAX Rear Axle/Wheel hub”.

# ESP/TCS/ABS ACTUATOR AND RELAY BOX

PFP:47850

## Removal and Installation

EFS001IT




Be careful of the following.

**CAUTION:**

- **Before servicing, disconnect the battery terminals.**
- **To remove the brake tube, use a flare nut wrench to prevent the flare nuts and brake tube from being damaged. To install, use a brake tube torque wrench.**
- **Do not remove and install the actuator by holding the harness.**
- **After completing the work, bleed the brake piping of air. Refer to BR-10, "Bleeding Brake System" .**
- **Make sure to connect the ground terminal securely.**

# YAW RATE/SIDE G SENSOR

PFP:47931

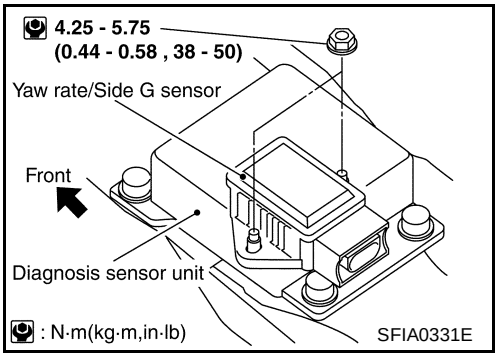
## Removal and Installation

EFS001IU

### REMOVAL

1. Remove the diagnosis sensor unit. Refer to SRS-42, "DIAGNOSIS SENSOR UNIT" .
2. Disconnect the harness connector.
3. Remove the mounting bolts, and remove the yaw rate / side G sensor.

**CAUTION:**
**Do not drop or strike the yaw rate / side G sensor, because it has little endurance against impact.**




### INSTALLATION

- Installation is the reverse order of removal.

**CAUTION:**
**Do not drop or strike the yaw rate / side G sensor, because it has little endurance against impact.**

# ESP OFF SWITCH

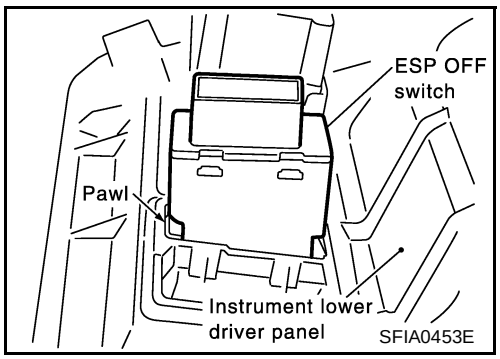
PFP:25145

## Removal and Installation

EFS001IV

### REMOVAL

1. Remove the instrument lower driver panel. Refer to IP-8, "INSTRUMENT LOWER DRIVER PANEL" .
2. Push the ESP OFF switch's pawls and remove the switch from the instrument lower driver panel.




### INSTALLATION

Installation is the reverse order of removal.