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BRC

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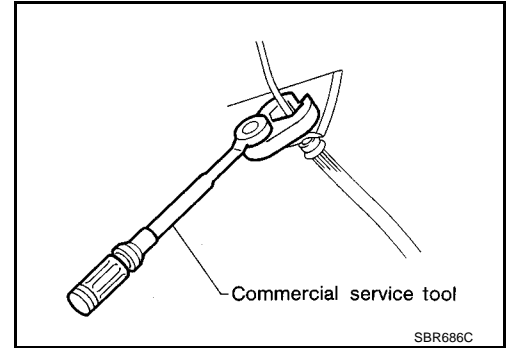
PRECAUTIONS

Precautions for brake system

- 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-27, "BRAKE BURNISH-ING 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.**

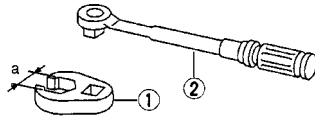
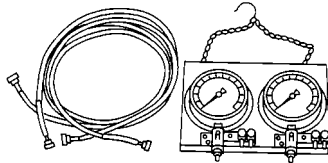


Precautions for brake control

- Just after starting the vehicle after ignition switch ON, brake pedal may vibrate or motor operating noise may be heard from the engine compartment. This is a normal status of operation check.
- 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.
- 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

Special Service Tools

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

CAN COMMUNICATION

System Description

EFS002VX

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

EFS003FA

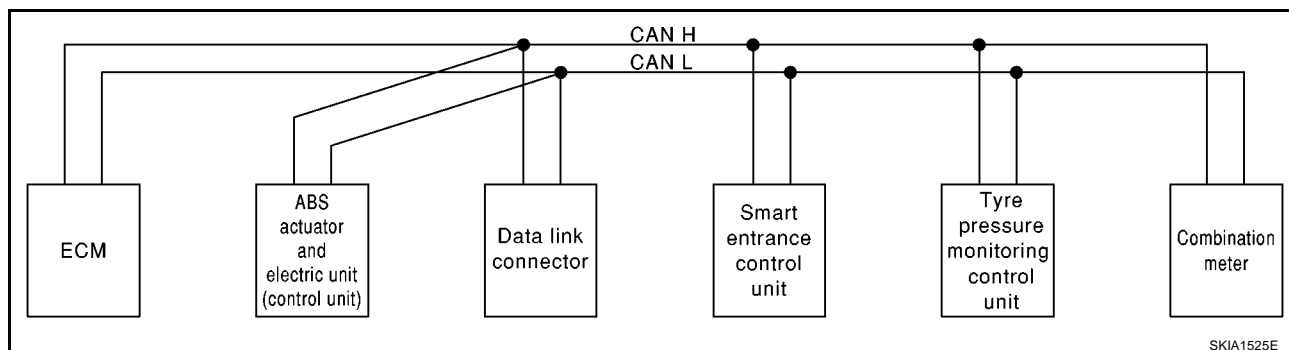
Body type	Sedan/Wagon/Hatch back							
Axle	2WD							
Engine	YD22DDTi				F9Q			
Transmission	M/T							
Brake control	ESP		ABS		ESP		ABS	
CAN communication unit								
ECM	×	×	×	×	×	×	×	×
ESP/TCS/ABS control unit	×	×			×	×		
ABS actuator and electric unit (control unit)			×	×			×	×
Data link connector	×	×	×	×	×	×	×	×
Tyre pressure monitoring control unit	×		×		×		×	
Steering angle sensor	×	×			×	×		
Smart entrance control unit	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×
Can communication type	BRC-43. "TYPE 21,TYPE22/TYPE29,TYPE30"		BRC-6. "TYPE 23,TYPE24/TYPE31,TYPE32"		BRC-45. "TYPE 25/TYPE26"		BRC-7. "TYPE 27/TYPE28"	

×:Applicable

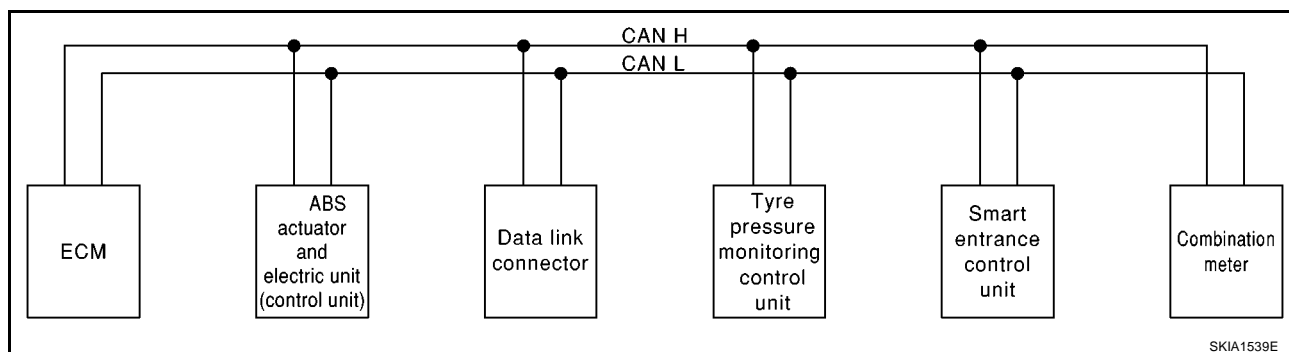
TYPE 23, TYPE24/TYPE31, TYPE32

System diagram

- LHD models (Type23, Type24)



- RHD models (Type31, Type32)



Input/output signal chart

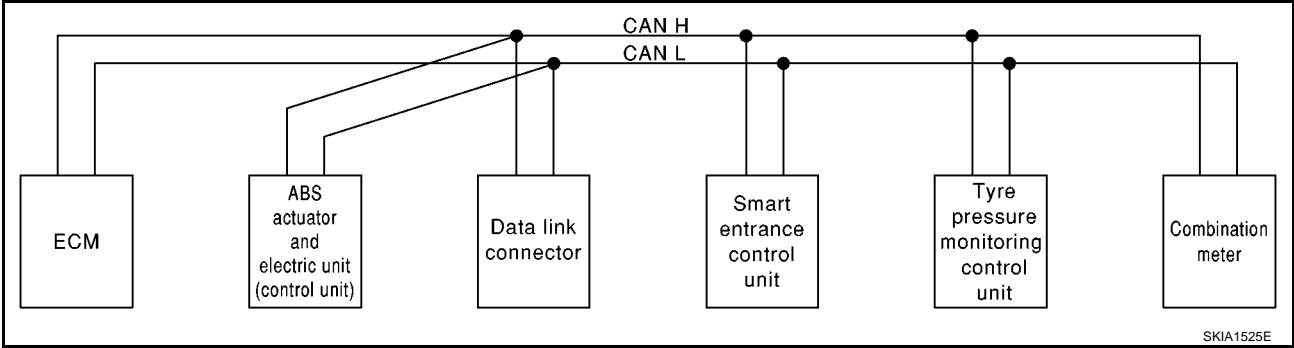
T: Transmit R: Receive

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
Air conditioner switch signal	R				T
MI signal	T				R
Glow indicator lamp signal*1	T				R
Engine coolant temperature signal	T				R
Fuel consumption signal	T				R
Vehicle speed signal		T			R
	R			R	T
Seat belt reminder signal			R		T
Lighting switch position 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
A/C compressor signal	T		R		
Tyre pressure signal				T	R

TYPE 27/TYPE28

System diagram

- LHD models (Type27, Type28)



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
ABS operation signal	R	T			
MI signal	T				R
Glow indicator lamp signal	T				R
Engine coolant temperature signal	T				R
Fuel consumption signal	T				R
Vehicle speed signal	R	T			R
				R	T
Seat belt reminder signal			R		T
Lighting switch position 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
A/C compressor signal	T		R		
Tyre pressure signal				T	R

TROUBLE DIAGNOSIS

Fail-safe Function

EFS002VZ

- 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

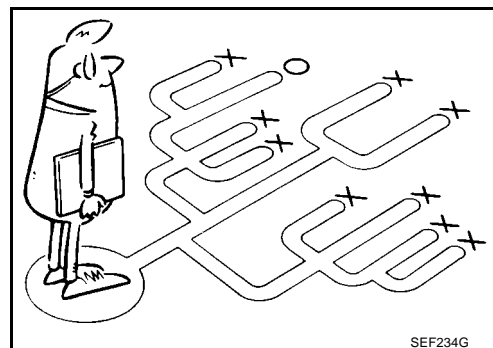
EFS002W0

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.

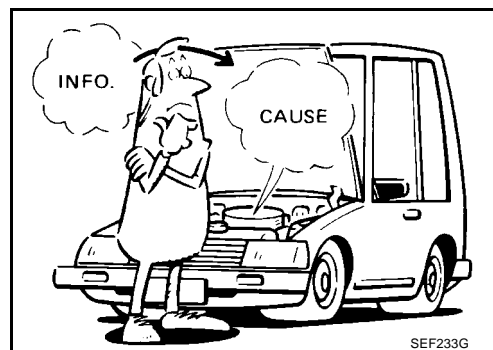
CAUTION:

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 to [BRC-17, "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

A

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BRC

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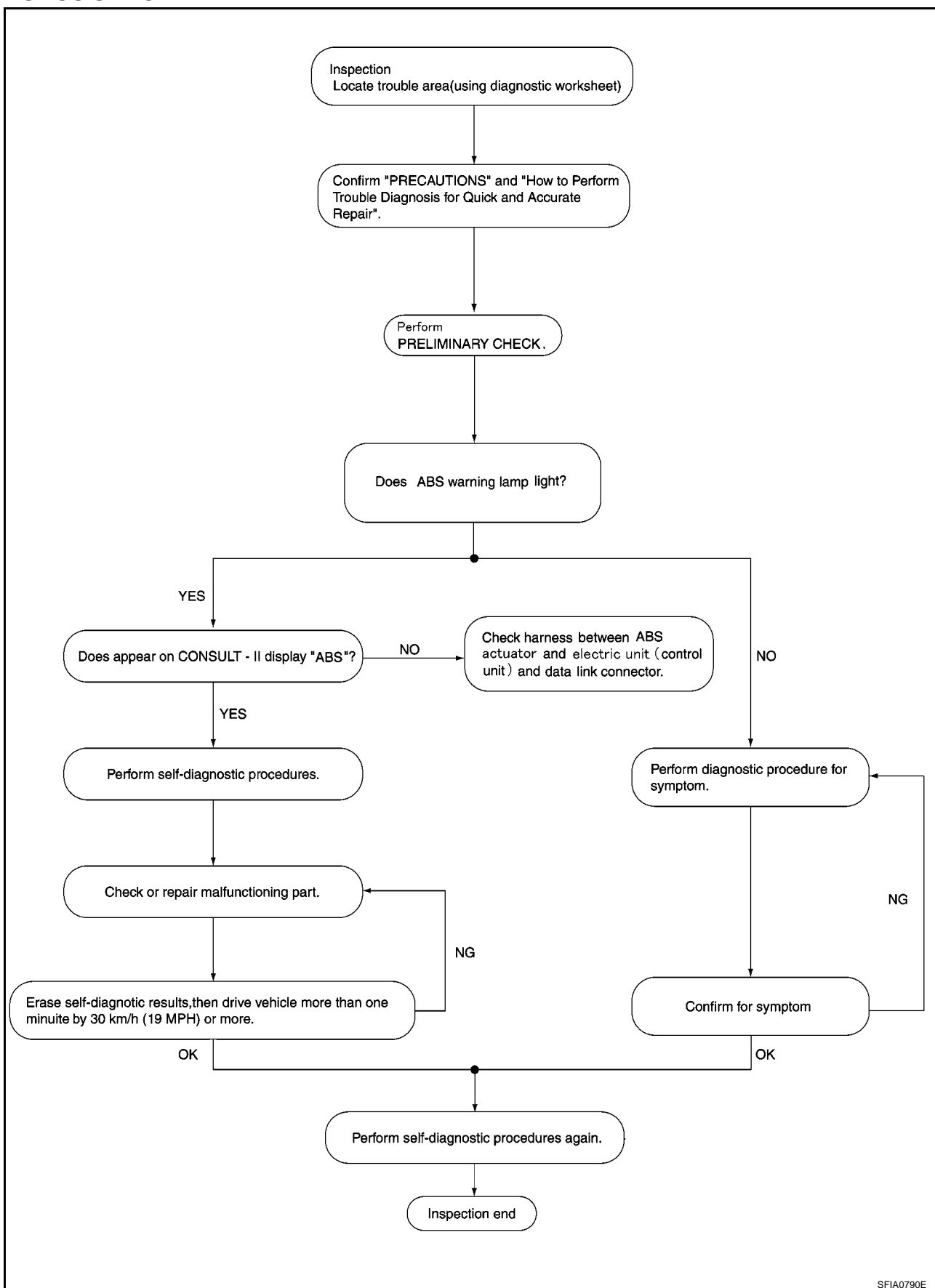
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TROUBLE DIAGNOSIS

[ABS]

ASKING COMPLAINTS

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

SFIA0791E

Component Parts Location

EFS002W1

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BRC

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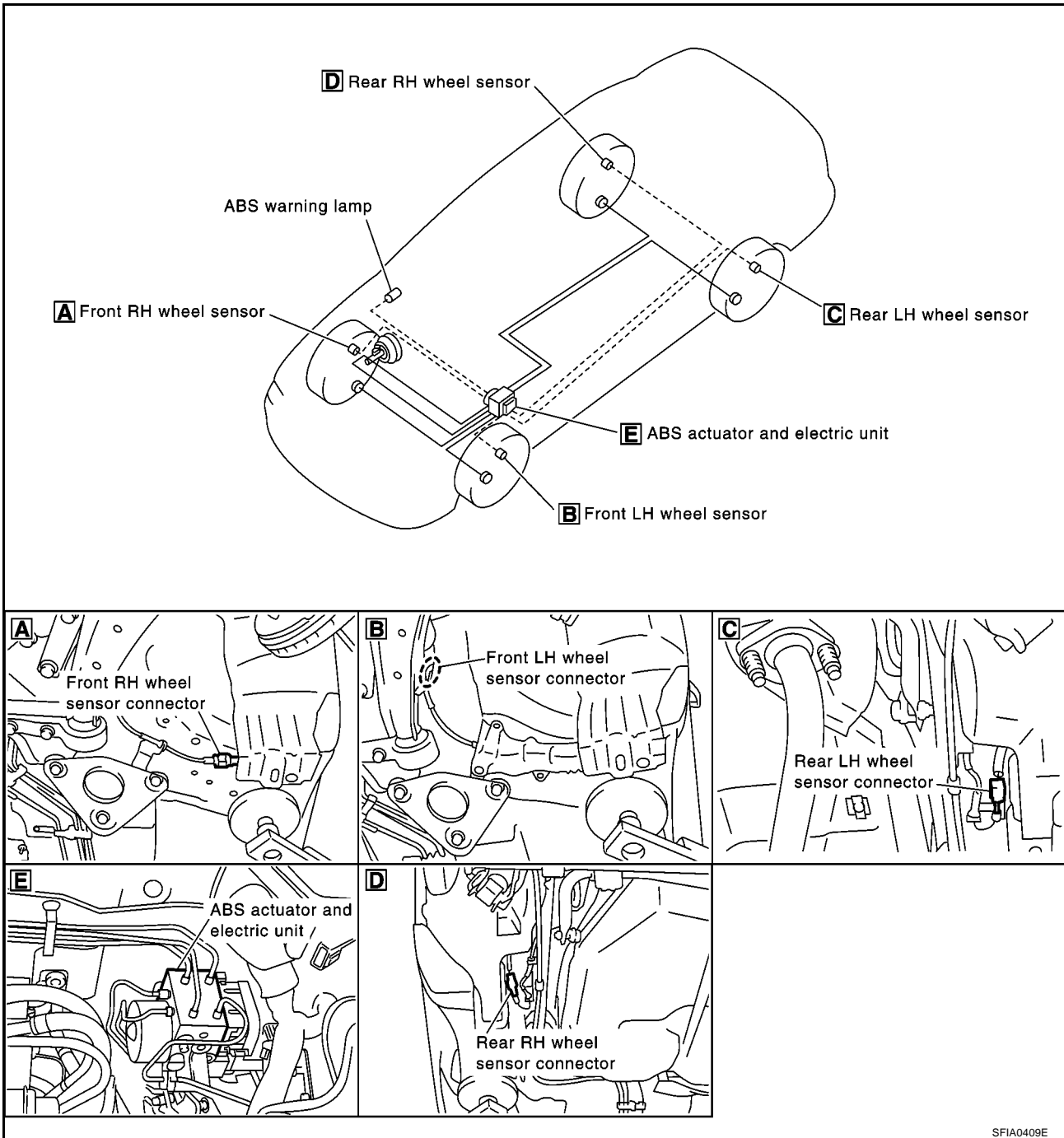
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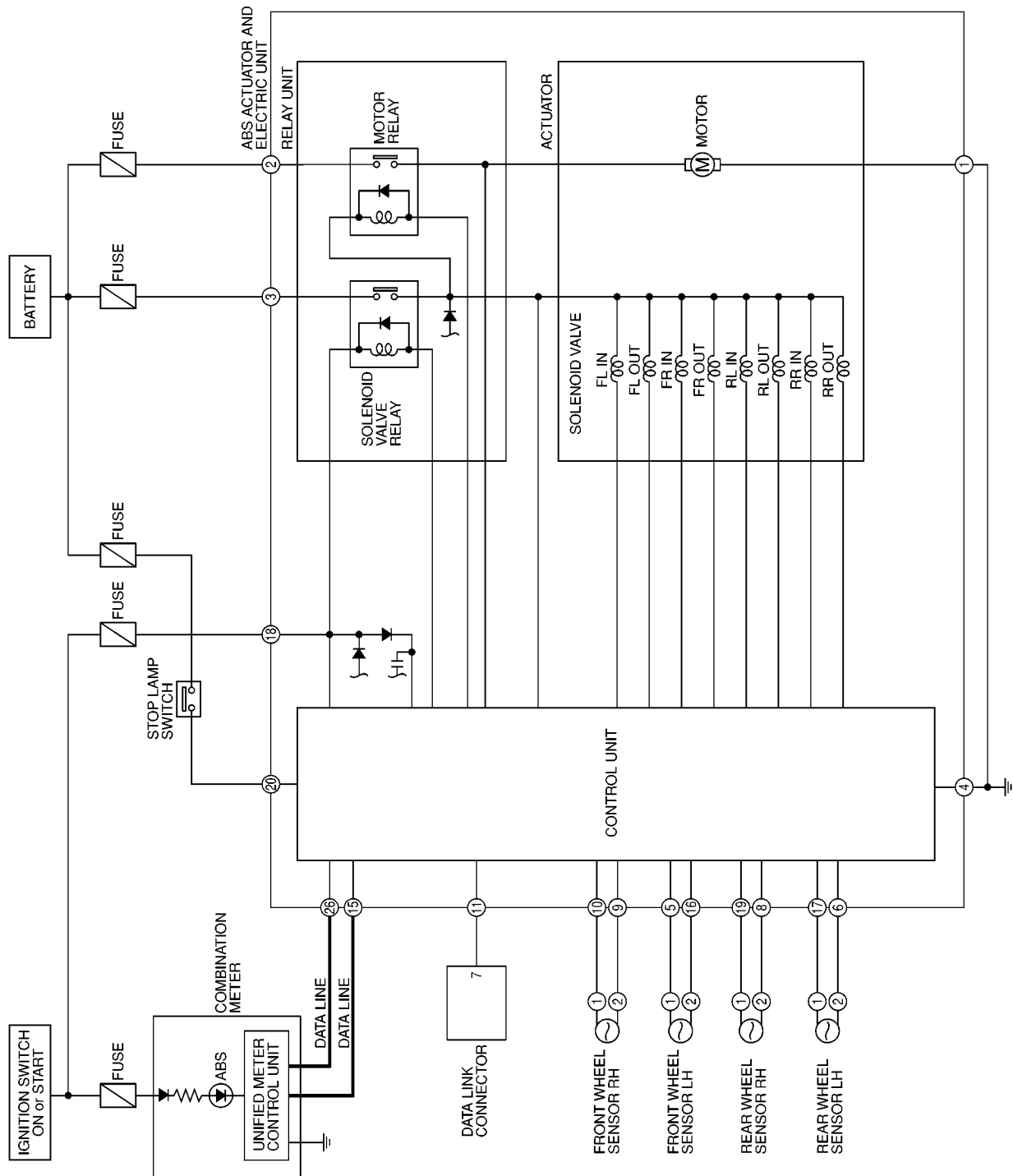
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Schematic

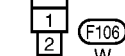
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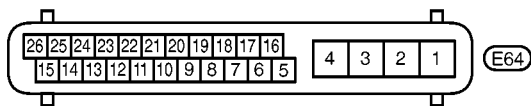
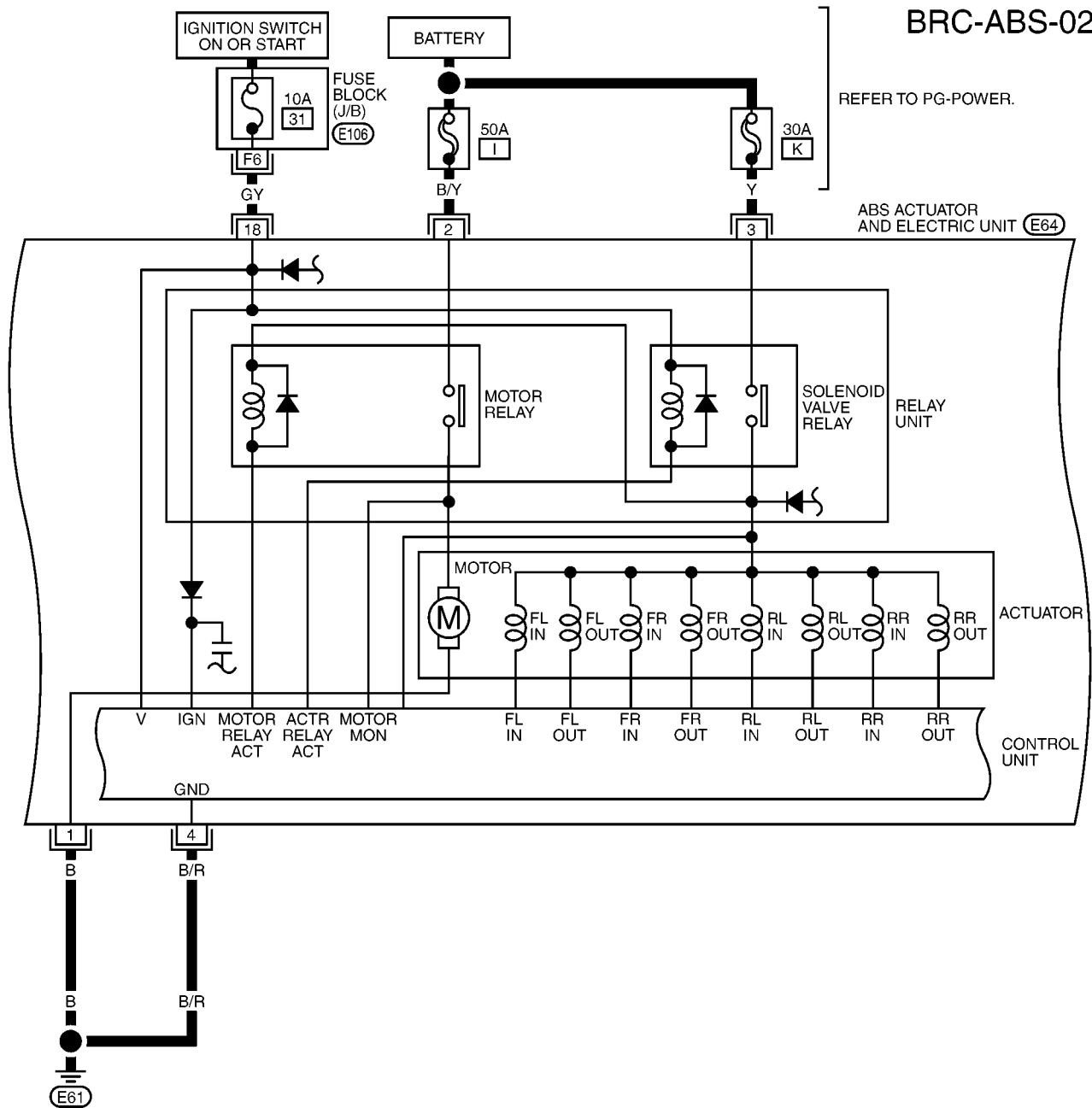
[ABS]

FFS002W.3



MEWA0021E

BRC-ABS-02

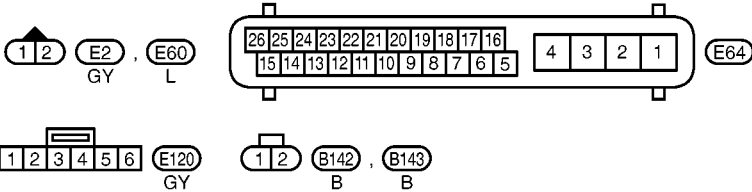
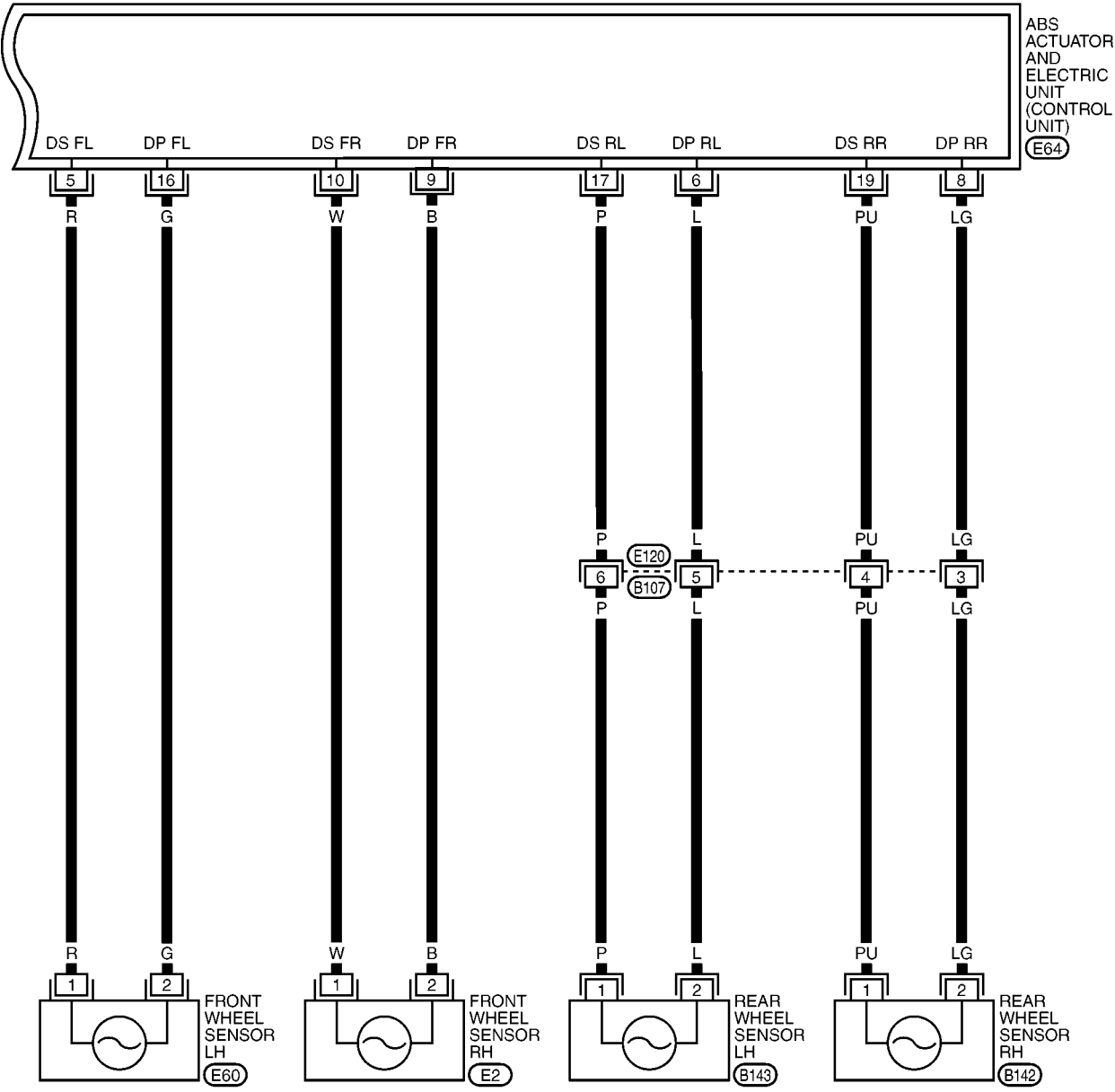


REFER TO THE FOLLOWING.

(E106) -FUSE BLOCK-
JUNCTION BOX (J/B)

BRC-ABS-03

A
B
C
D
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BRC
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J
K
L
M



Trouble Diagnosis Chart by Symptom

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	<ul style="list-style-type: none"> Blown ABS warning lamp bulb Blown fuse between ignition and ABS warning lamp. Open circuit of wiring between ignition and ABS warning lamp. Malfunction in ABS system 	BRC-25
ABS warning lamp illuminates with ignition ON, but does not illuminates off after a few seconds. (ABS warning lamp has been illuminated.)	IGN-ON	<ul style="list-style-type: none"> ABS actuator and electric unit connector disconnected Malfunction in ABS system 	BRC-25

ABS actuator and electric unit Input/Output Signal Standard SPECIFICATIONS DEFINED BY CONSULT-II

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 (MPH)]	Vehicle wheel speed	When the vehicle is stopped	0 km/h (0 MPH)	Wheel sensor and harness
		While driving (note:1)	Almost in accordance with speedometer display (within $\pm 10\%$)	
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-II) 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	

TROUBLE DIAGNOSIS

[ABS]

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

EFS002W6

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

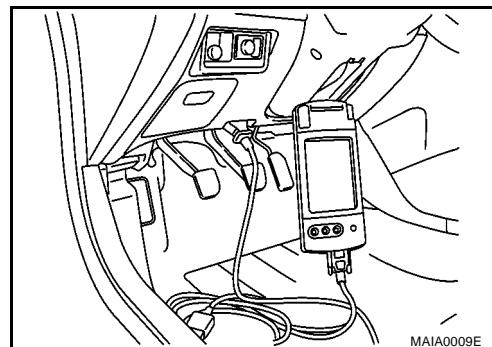
—: Not applicable

SELF-DIAGNOSIS

Operation procedure

1. After obtaining customer's information, perform [BRC-23, "Basic Inspection"](#).

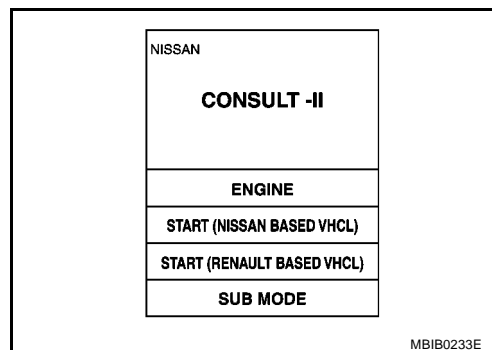
2. After turning ignition switch OFF, connect CONSULT-II connector to data link connector on vehicle.
3. Start engine and drive at Approx. 30 km/h (19 MPH) for Approx. 1 minute.



4. Stop vehicle. With engine at idle, touch "START (NISSAN BASED VHCL)", "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 (NISSAN BASED VHCL)" 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-24, "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/h (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 (19MPH) for Approx. 1 minute, even in normal conditions.

8. Turn OFF ignition switch to prepare for erasing memory.
9. Start engine. Touch "START (NISSAN BASED VHCL)", "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/h (19 MPH) for Approx. 1 minute. Be sure ABS warning lamp is OFF.

TROUBLE DIAGNOSIS

[ABS]

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	
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 when it is controlled OFF.	ABS actuator relay and harness
ABS ACTUATOR RELAY [OFF abnormal]	ABS actuator relay turned OFF when it is controlled ON.	

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BRC

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TROUBLE DIAGNOSIS

[ABS]

Faulty lines	Malfunction detecting condition	Check harness
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	<ul style="list-style-type: none"> CAN communication function of ABS actuator and electric unit is not malfunctioning. 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.

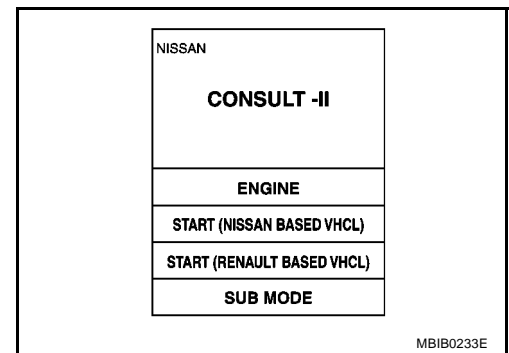
(Note 2): Repair short circuit in sensor. ABS warning lamp will come on when ignition switch is turned ON. According to self-diagnosis operation procedure, drive vehicle at Approx. 30 km/h (19 MPH). Then check ABS warning lamp goes out in about one minute.

DATA MONITOR

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

Operation procedure

- Turn the ignition switch to OFF.
- Connect CONSULT-II connector to data link connector on vehicle.
- Turn ignition switch ON.
- Touch "START (NISSAN BASED VHCL)" on the display.

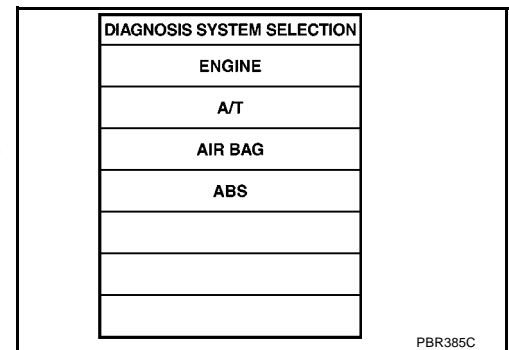


- Touch "ABS" on display.

CAUTION:

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

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



TROUBLE DIAGNOSIS

[ABS]

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.
MOTOR 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

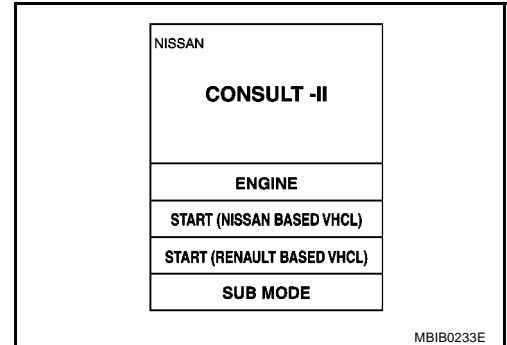
–: Not applicable

ACTIVE TEST

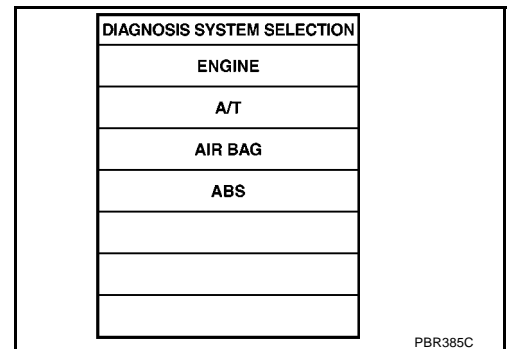
Operation procedure

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 (NISSAN BASED VHCL)" 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.



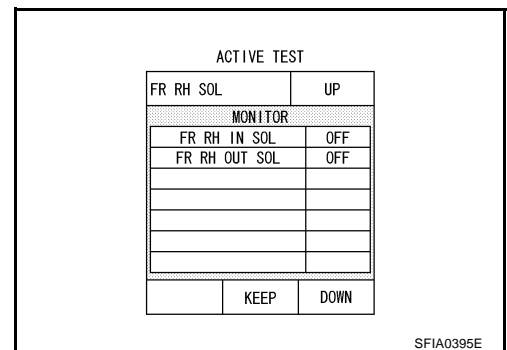
Display item list

ABS solenoid valve

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

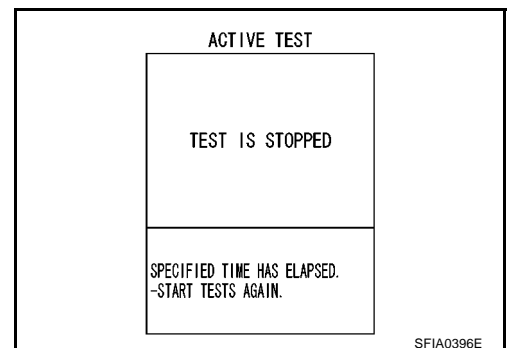
Operation	Up	Keep	Down
ABS inlet S/V	OFF	ON	ON
ABS outlet S/V	OFF	OFF	ON*

*: 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.



TROUBLE DIAGNOSIS

[ABS]

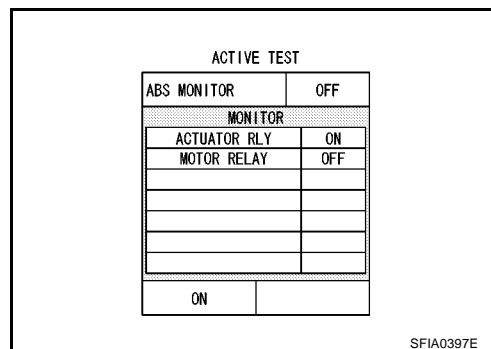
ABS motor

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.



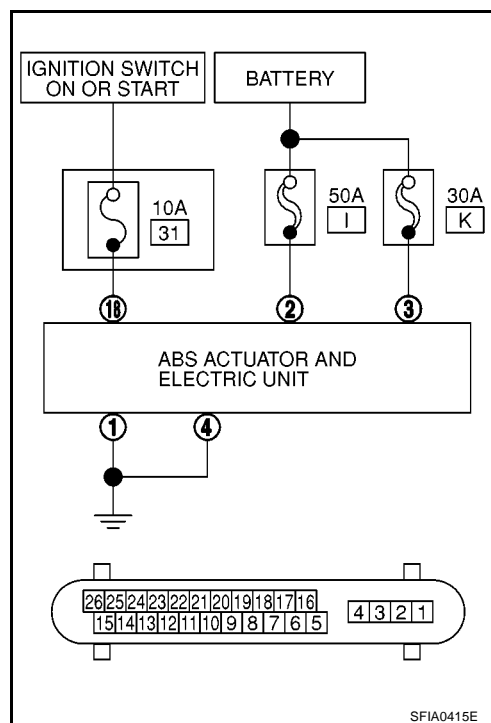
Component Inspection

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

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 (19MHP) 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 INSPECTION PROCEDURE

EFS002W9

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

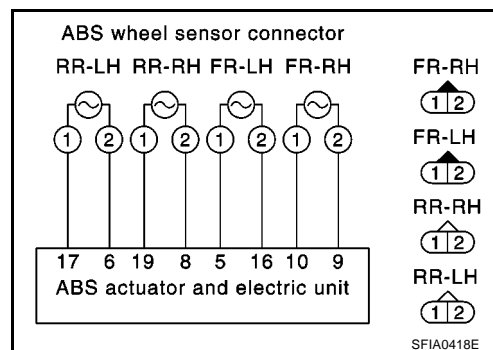
1. Remove both the malfunctioning wheel sensor (identified at control unit) and the ABS actuator and electric unit connector. Check the deformation of the terminal or if the connection is at the incomplete state. Then connect the connectors.

2. Operate self-diagnosis.

Does ABS warning lamp illuminate?

YES >> GO TO 4

NO >> Check is completed.



4. CHECK WHEEL SENSOR.

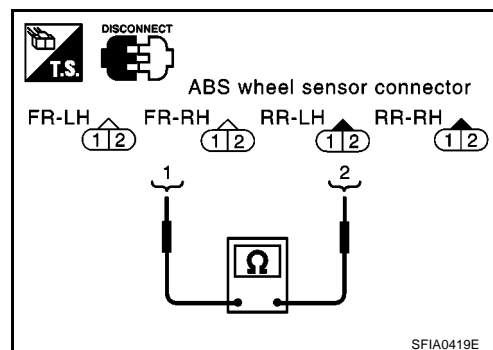
Check internal resistance of wheel sensor.

Resistance : 1.44 - 1.76 kΩ

Is inspection result OK?

OK >> GO TO 5.

NG >> Replace wheel sensor.

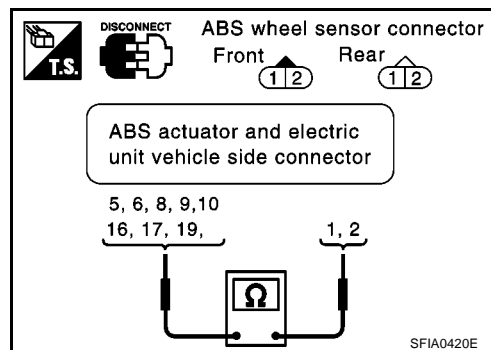


5. CHECK WHEEL SENSOR CIRCUIT.

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), B143 No.1 (P), 2 (L), B142 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.)

EFS002WA

Replace the combination meter control unit.

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

EFS002WB

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-II, PERFORM SELF-DIAGNOSIS.

Connect the CONSULT-II and 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 CONSULT-II. Refer to the "DTC chart".

CAN Communication Circuit

EFS002WC

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Description

Self-diagnosis results
CONSULT-II
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

>> After printing the monitor items, go to CAN SYSTEM. Refer to [BRC-5, "CAN Communication Unit"](#)

Symptom 1: ABS Works Frequently.

EFS002WD

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 and rear axle for looseness.

Is inspection result OK?

OK >> [BRC-26, "Symptom 2: Unexpected Pedal Action"](#)

NG >> Axle inspection and repair

Symptom 2: Unexpected Pedal Action

EFS002WE

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

EFS002WF

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.

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

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

A

B

C

D

E

BRC

G

H

I

J

K

L

M

WHEEL SENSORS

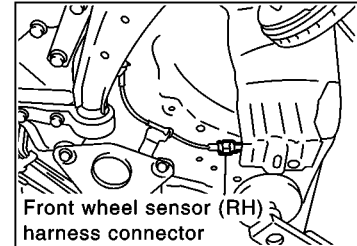
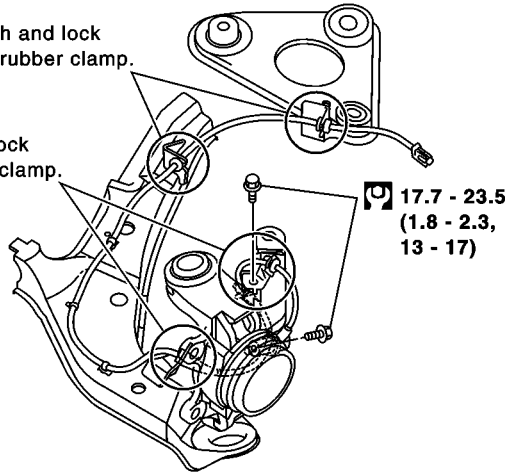
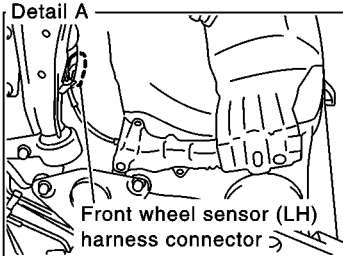
Removal and Installation

SEC. 476

Front

Push and lock the rubber clamp.

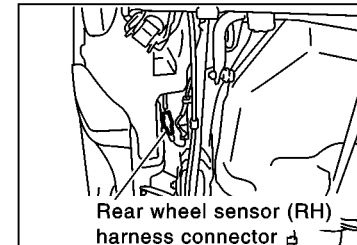
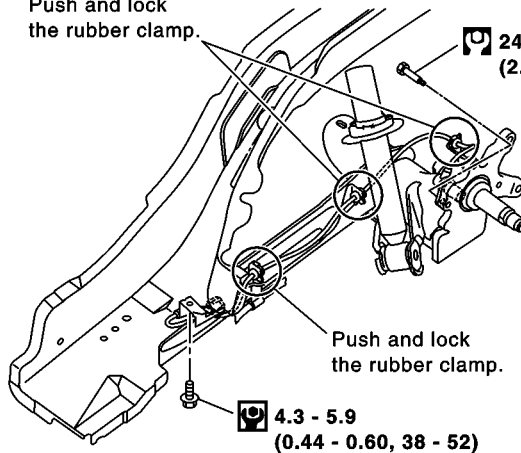
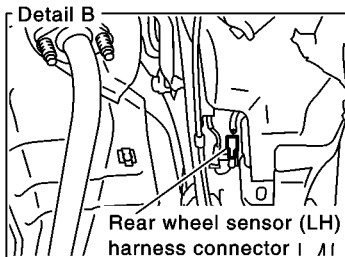
Push and lock the rubber clamp.



Rear

Push and lock the rubber clamp.

24.6 - 33.3
(2.5 - 3.3, 19 - 24)



: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

SFIA0421E

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

Removal and Installation

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-13, "INSTALLATION"](#) .

Rear

1. Install sensor rotor to wheel hub. Refer to [RAX-6, "INSTALLATION"](#) .
2. Connect wheel hub. Refer to [RAX-6, "INSTALLATION"](#) .

A

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BRC

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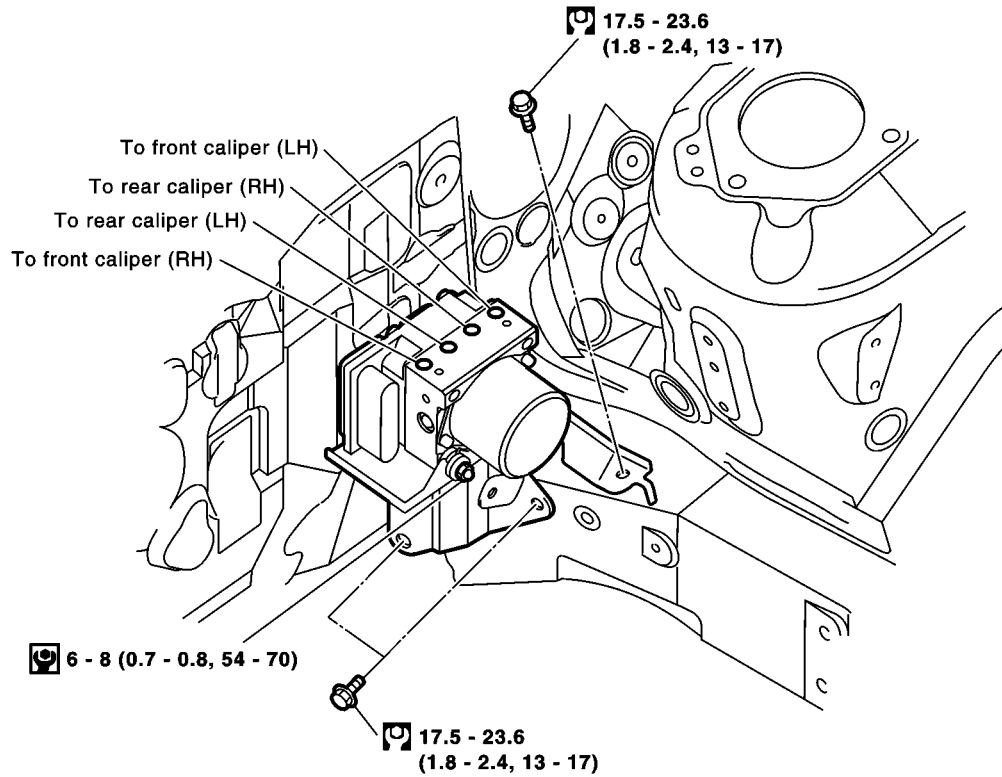
M


ACTUATOR AND ELECTRIC UNIT


PFP:47660

Removal and Installation

EFS002WK

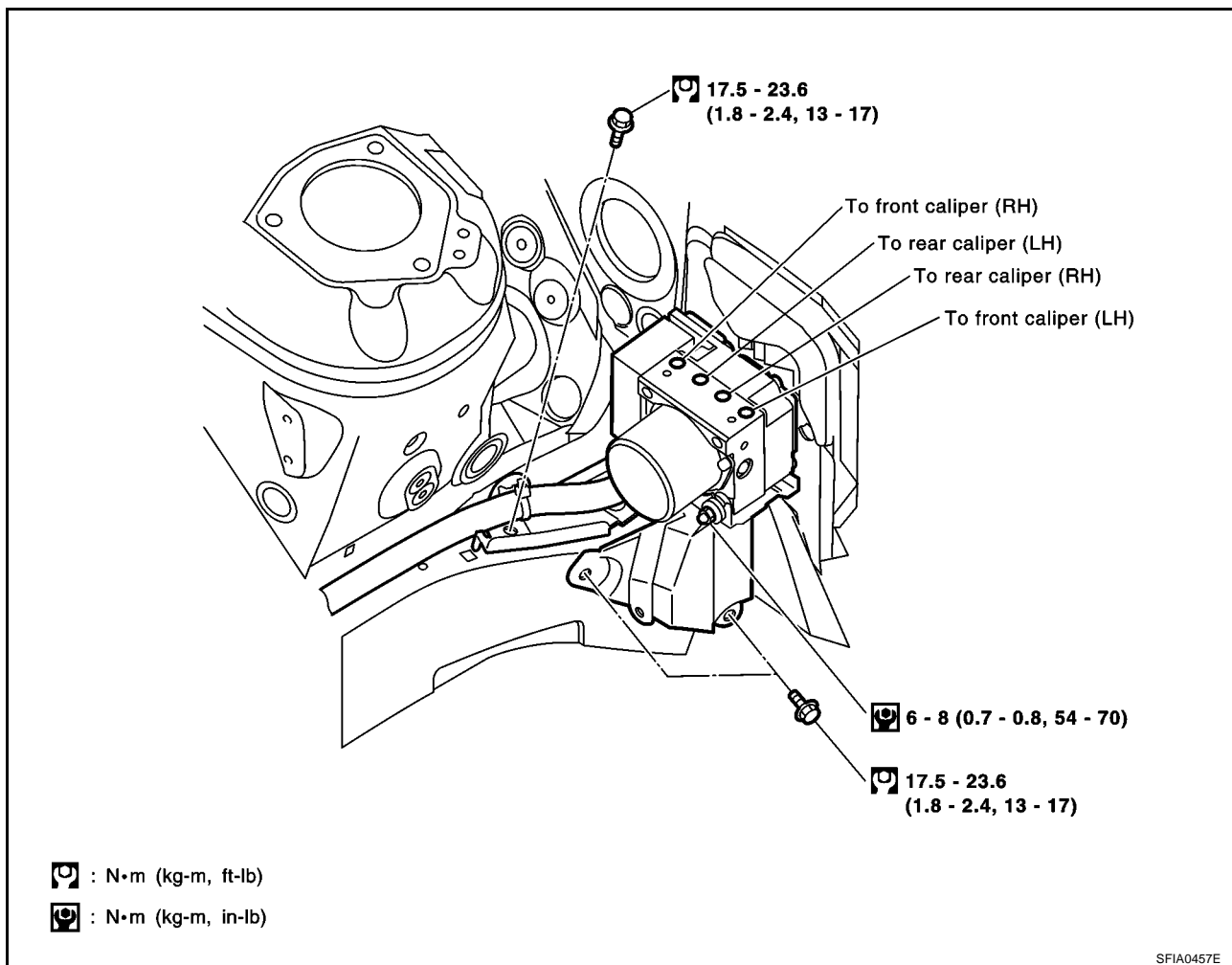


 : N·m (kg-m, ft-lb)

 : N·m (kg-m, in-lb)

SFIA0425E

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”

EFS002WL

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

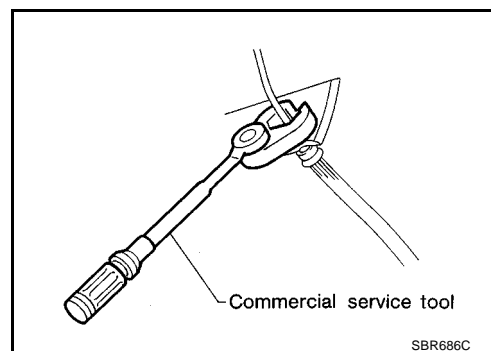
WARNING:

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

Precautions for Brake System

EFS002WM

- 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-27, “BRAKE BURNISHING PROCEDURE”](#).



SBR686C

WARNING:

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

Precautions for Brake Control

EFS002WN

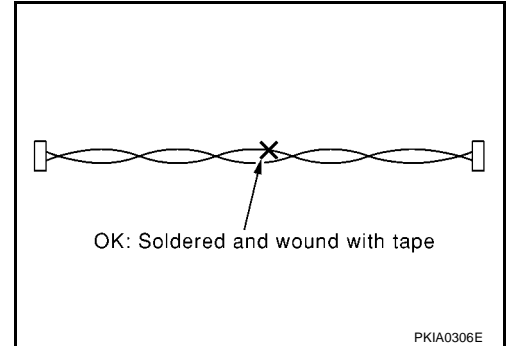
- During the ESP/TCS/ABS operation, the brake pedal vibrates lightly and its mechanical noise may be heard. This is a normal condition.
- Just after starting the vehicle after ignition switch ON, the brake pedal may vibrate or the motor operating noise may be heard from the engine compartment. This is 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 FOR INSPECTION

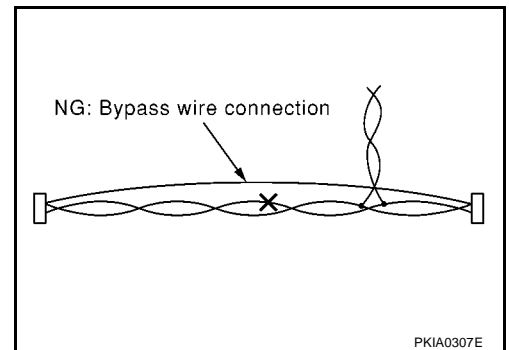
- Do not apply voltage of 7.0V or higher to the measurement terminals.
- Use the tester with its open terminal voltage being 7.0V or less.
- Before harness inspection, turn the ignition switch off, disconnect the negative battery terminal.

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.)

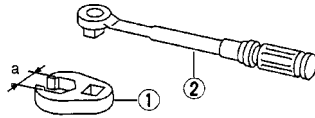
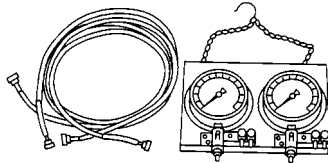


PREPARATION

PFP:00002

Special Service Tools

EFS002WP

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

ON-VEHICLE SERVICE

PFP:00000

Adjustment of Neutral Position of Steering Angle Sensor

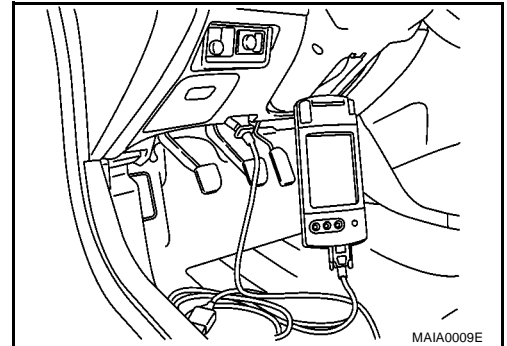
EFS002WQ

- 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.

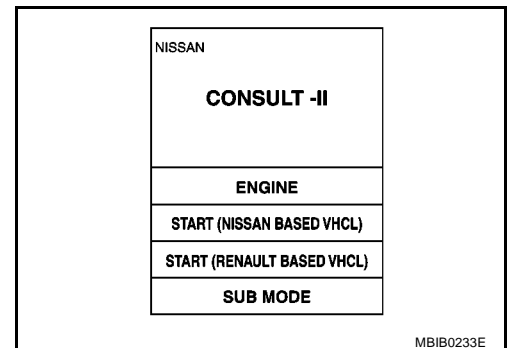
CAUTION:

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

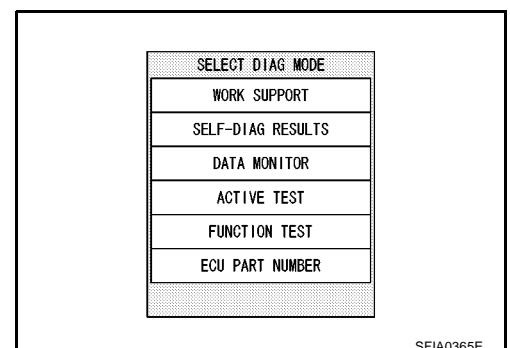
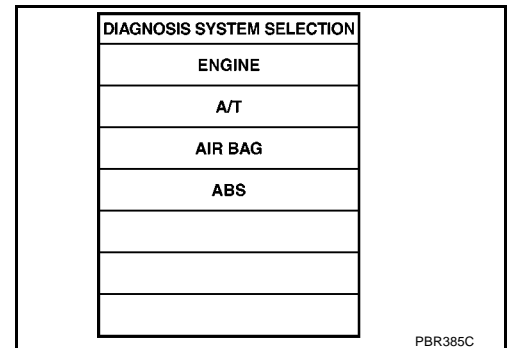
- Stop the vehicle with the front wheels in the straight-ahead position.
- Connect CONSULT-II to data link connector on the vehicle, and turn the ignition switch to ON position (engine not running).

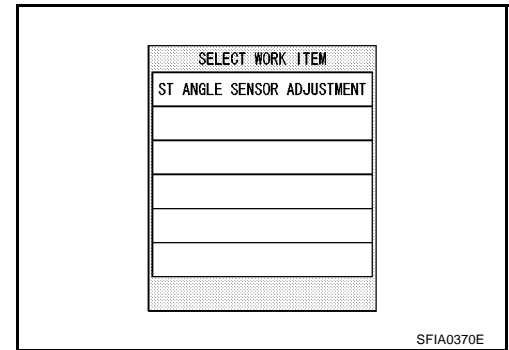


- Touch "START (NISSAN BASED VHCL)".



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





5. Touch "START".

CAUTION:

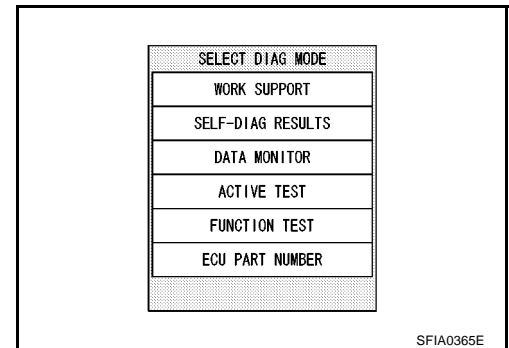
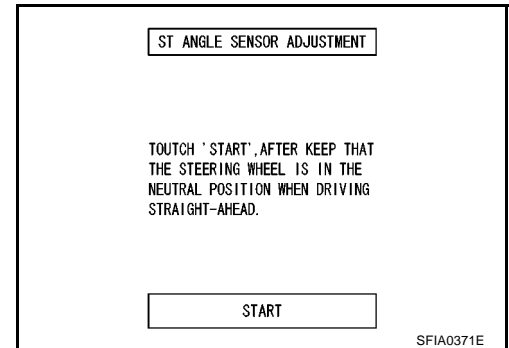
Do not touch the steering wheel while adjusting the steering angle sensor.

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

CAUTION:

Make sure to carry out the above operation.

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



GENERAL INFORMATION

PFP:00000

Fail-Safe
ABS SYSTEM

EFS002WR

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.

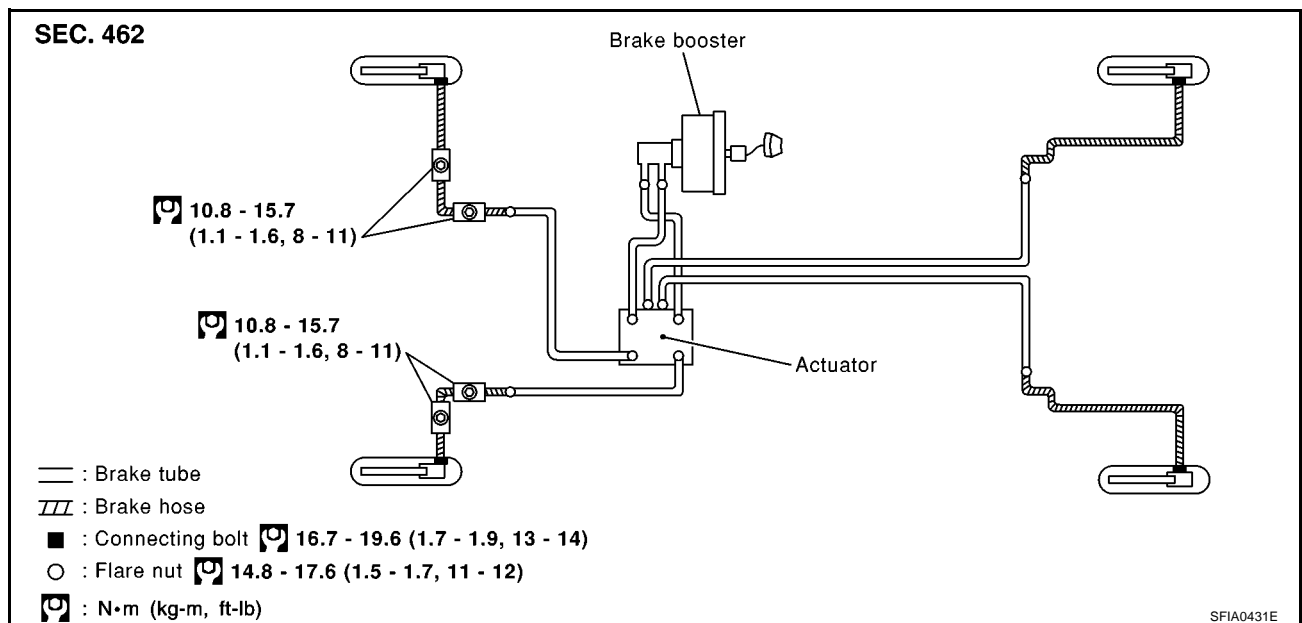
If a malfunction occurs in the throttle control system, ESP/TCS control does not operate. Only ABS control operates normally.

CAUTION:

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

Hydraulic Circuit

EFS002WS

**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

EFS002WT

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

EFS002WU

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

EFS002WV

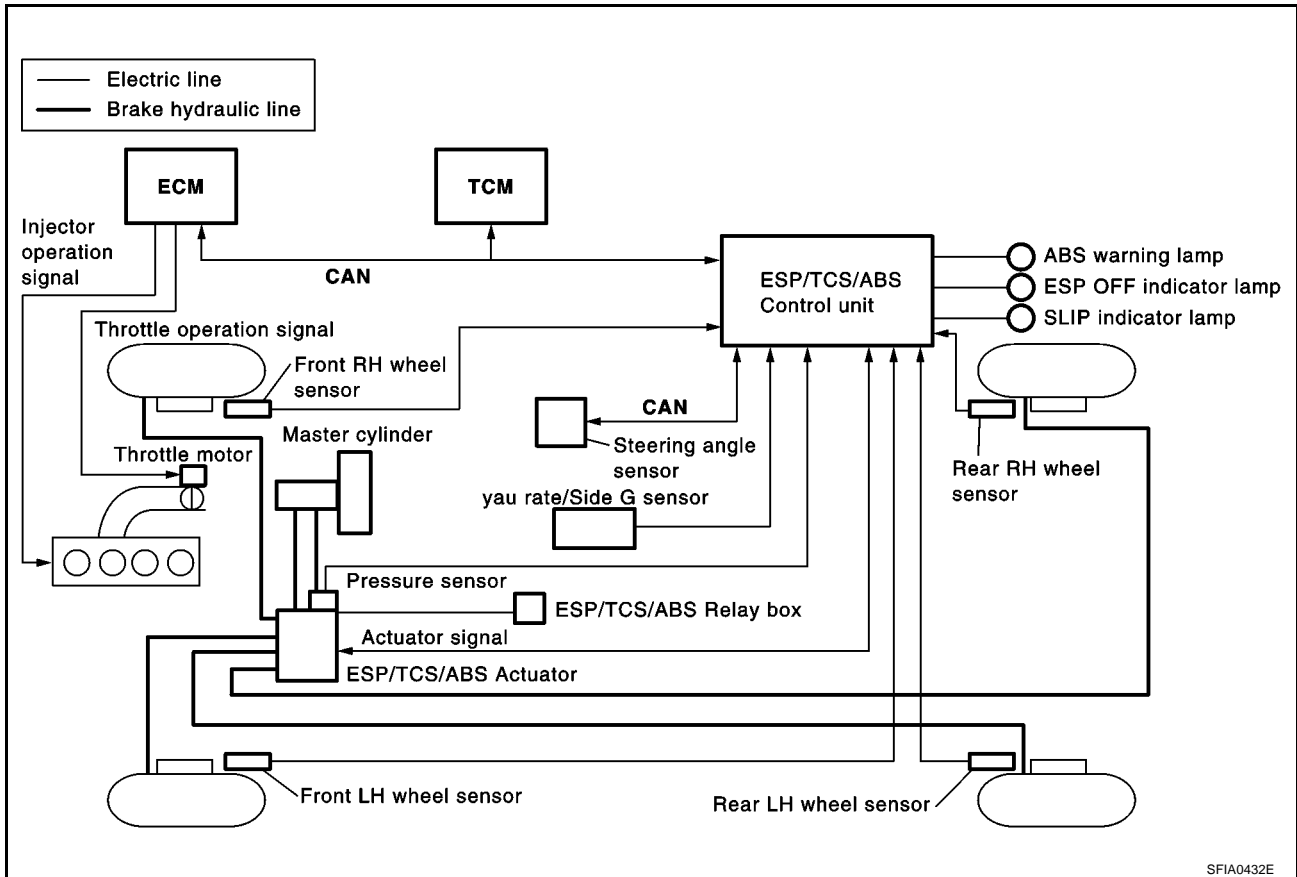
1. The Electronic Stability Program is called the ESP for short.
The ESP is indicated as the VDC (the Vehicle Dynamics Control) on the CONSULT-II screen.
2. In addition to the ABS/TCS function, ESP detects the driver's steering operation amount and brake operation amount from the steering angle sensor 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

EFS002WW



A

B

C

D

E

BRC

G

H

I

J

K

L

M

CAN COMMUNICATION

PFP:23710

System Description

EFS002WX

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

EFS003FB

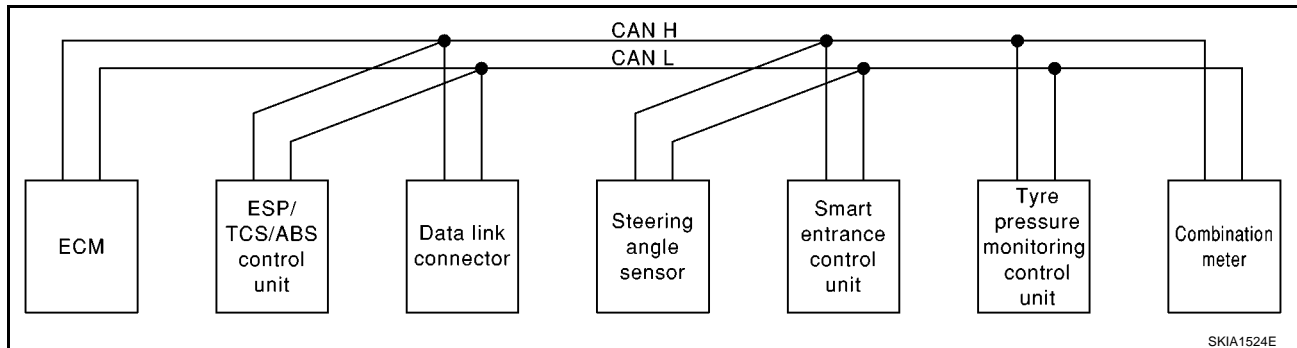
Body type	Sedan/Wagon/Hatch back							
Axle	2WD							
Engine	YD22DDTi				F9Q			
Transmission	M/T							
Brake control	ESP		ABS		ESP		ABS	
CAN communication unit								
ECM	×	×	×	×	×	×	×	×
ESP/TCS/ABS control unit	×	×			×	×		
ABS actuator and electric unit (control unit)			×	×			×	×
Data link connector	×	×	×	×	×	×	×	×
Tyre pressure monitoring control unit	×		×		×		×	
Steering angle sensor	×	×			×	×		
Smart entrance control unit	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×
Can communication type	BRC-43. "TYPE 21.TYPE22/TYPE29, TYPE30"		BRC-44. "TYPE 23.TYPE24/TYPE31, TYPE32"		BRC-45. "TYPE 25/TYPE26"		BRC-46. "TYPE 27/TYPE28"	

×:Applicable

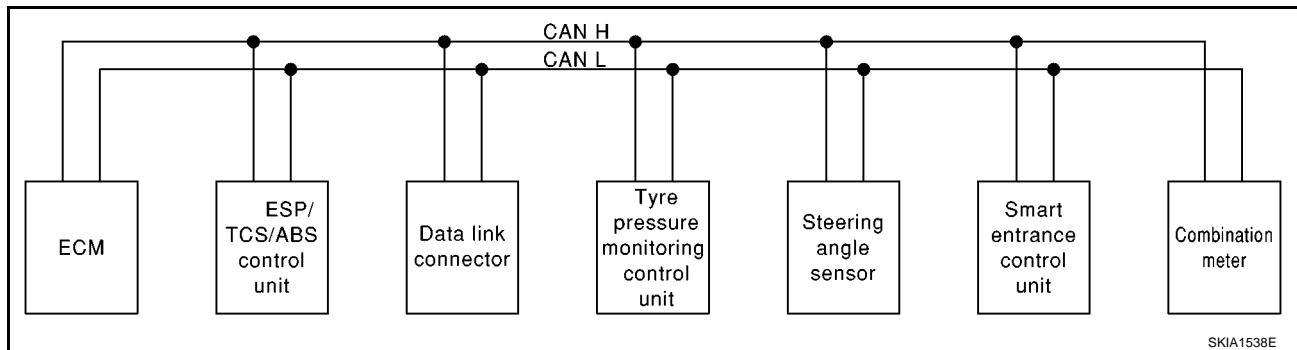
TYPE 21, TYPE22/TYPE29, TYPE30

System diagram

- LHD models (Type21, Type22)



- RHD models (Type29, Type30)



Input/output signal chart

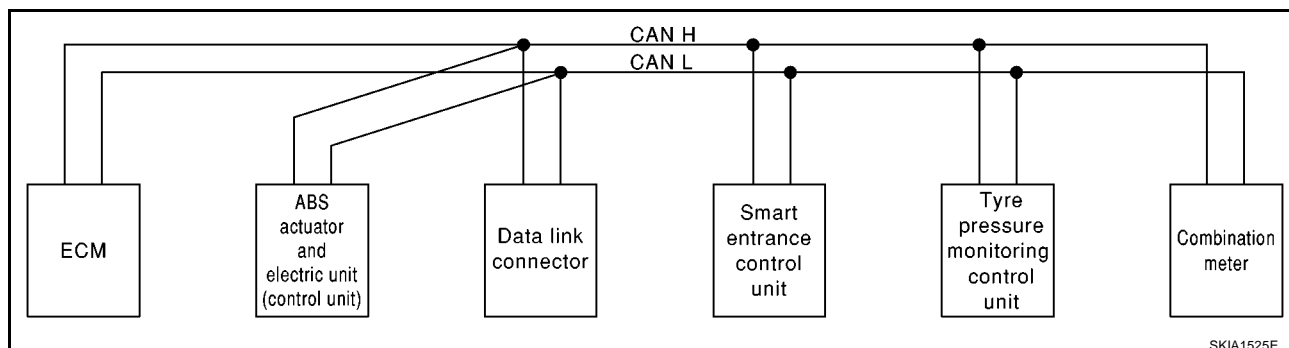
T: Transmit R: Receive

Signals	ECM	ESP/ TCS / ABS control unit	Steering angle sensor	Smart entrance control unit	Tyre pres- sure monitor- ing control unit	Combination meter
Engine speed signal	T	R				R
Accelerator pedal position signal	T	R				
Steering angle sensor signal		R	T			
Air conditioner switch signal	R					T
MI signal	T					R
Glow indicator lamp signal	T					R
Engine coolant temperature signal	T					R
Fuel consumption signal	T					R
Vehicle speed signal		T				R
	R				R	T
Seat belt reminder signal				R		T
Lighting switch position 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
A/C compressor signal	T			R		
Tyre pressure signal					T	R

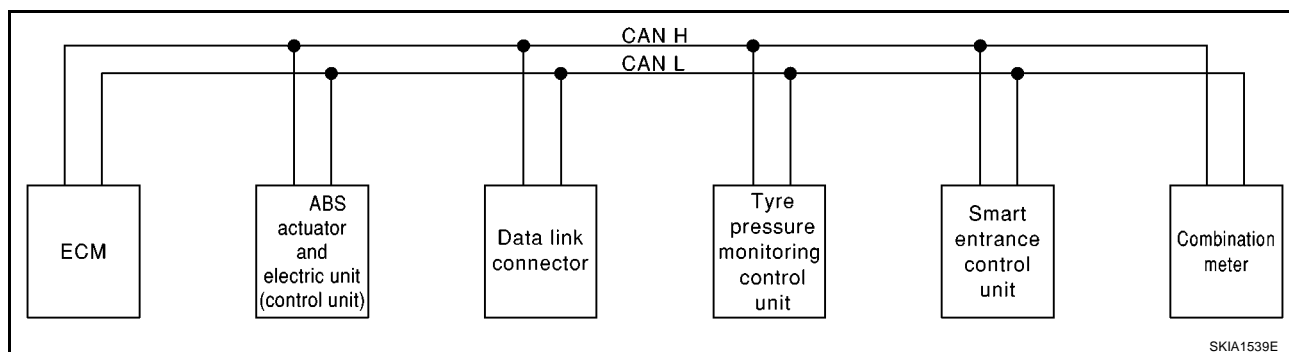
TYPE 23,TYPE24/TYPE31, TYPE32

System diagram

- LHD models (Type23, Type24)



- RHD models (Type31, Type32)



Input/output signal chart

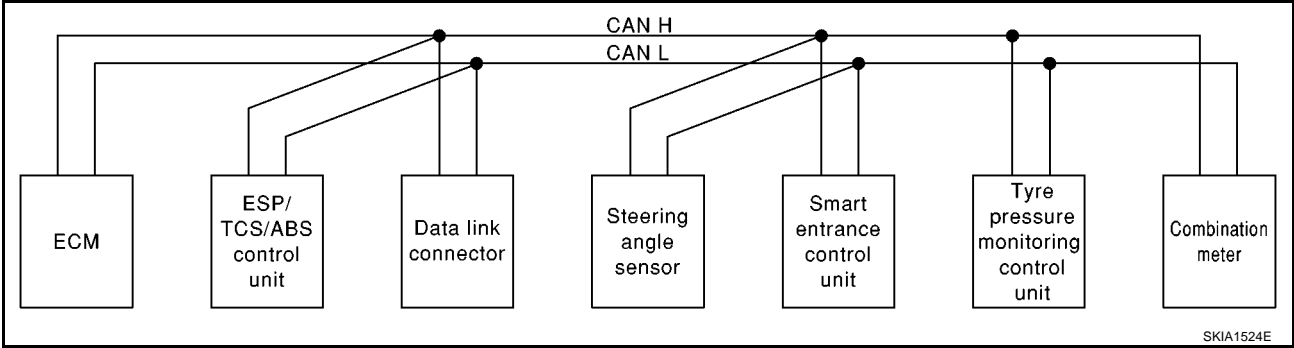
T: Transmit R: Receive

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
Air conditioner switch signal	R				T
MI signal	T				R
Glow indicator lamp signal*1	T				R
Engine coolant temperature signal	T				R
Fuel consumption signal	T				R
Vehicle speed signal		T			R
	R			R	T
Seat belt reminder signal			R		T
Lighting switch position 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
A/C compressor signal	T		R		
Tyre pressure signal				T	R

TYPE 25/TYPE26

System diagram

LHD models (Type25, Type26)



Input/output signal chart

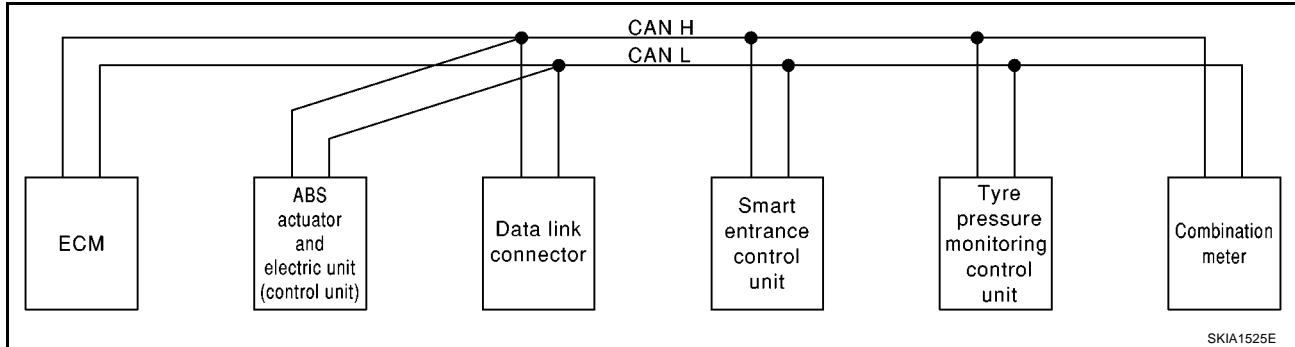
T: Transmit R: Receive

Signals	ECM	ESP/ TCS / ABS control unit	Steering angle sensor	Smart entrance control unit	Tyre pres- sure monitor- ing 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 angle sensor signal		R	T			
MI signal	T					R
Engine coolant temperature signal	T					R
Fuel consumption signal	T					R
Vehicle speed signal	R	T				R
					R	T
Seat belt reminder signal				R		T
Lighting switch position 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
A/C compressor signal	T			R		
Glow indicator lamp signal	T					R
Tyre pressure signal					T	R

TYPE 27/TYPE28

System diagram

- LHD models (Type27, Type28)



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
ABS operation signal	R	T			
MI signal	T				R
Glow indicator lamp signal	T				R
Engine coolant temperature signal	T				R
Fuel consumption signal	T				R
Vehicle speed signal	R	T			R
				R	T
Seat belt reminder signal			R		T
Lighting switch position 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
A/C compressor signal	T		R		
Tyre pressure signal				T	R

TROUBLE DIAGNOSIS

How to Perform Trouble Diagnoses for Quick and Accurate Repair
INTRODUCTION

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

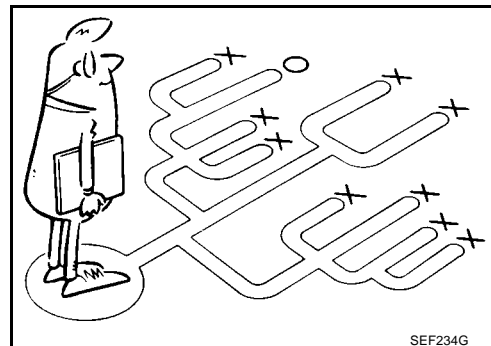
- It is also important to clarify the customer complaints before inspection.

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.

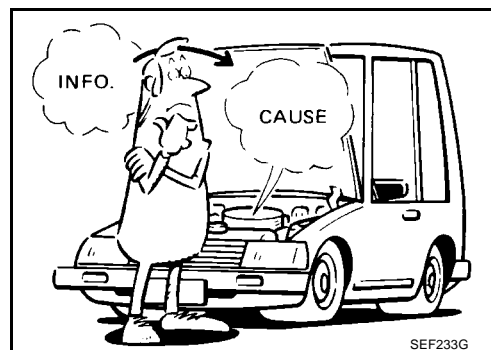
CAUTION:

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”.



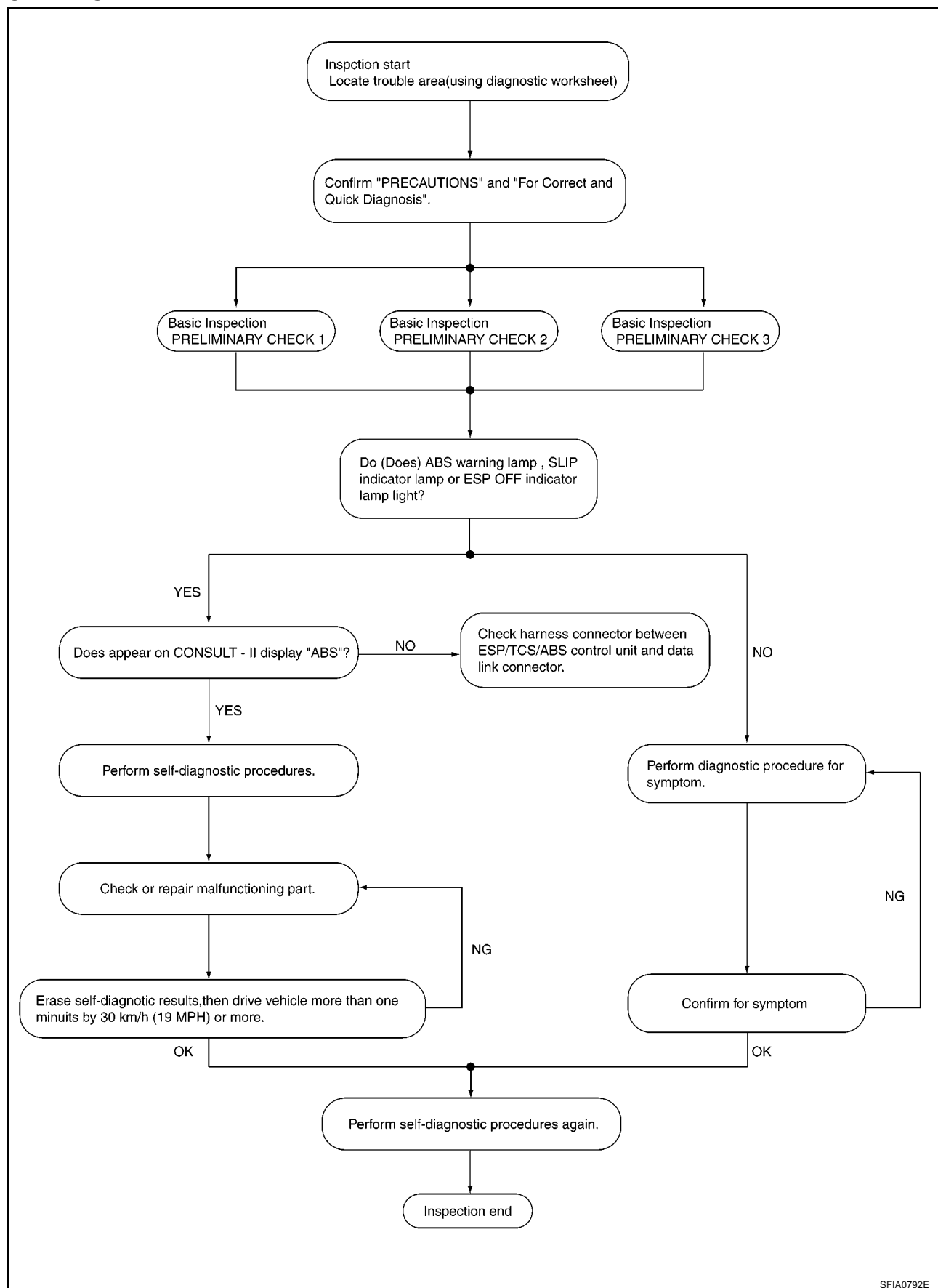
- It is essential to check symptoms right from the beginning in order to repair a malfunction completely.

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.



- After the diagnosis, make sure to carry out “erase memory”. Refer to [BRC-63, "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



SFIA0792E

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

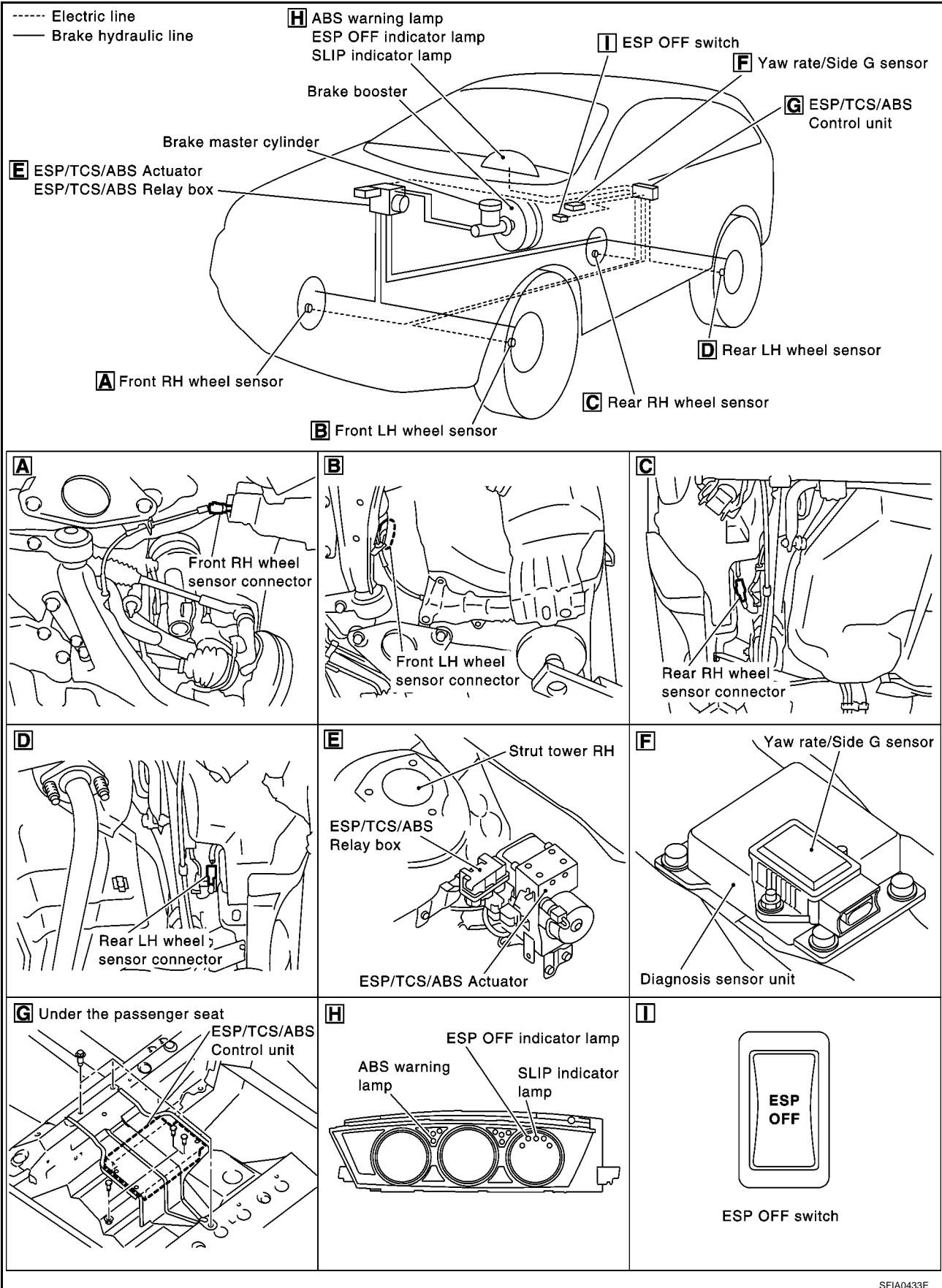
EXAMPLE OF DIAGNOSIS SHEET

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

SFIA0791E

Component Parts and Harness Connector Location

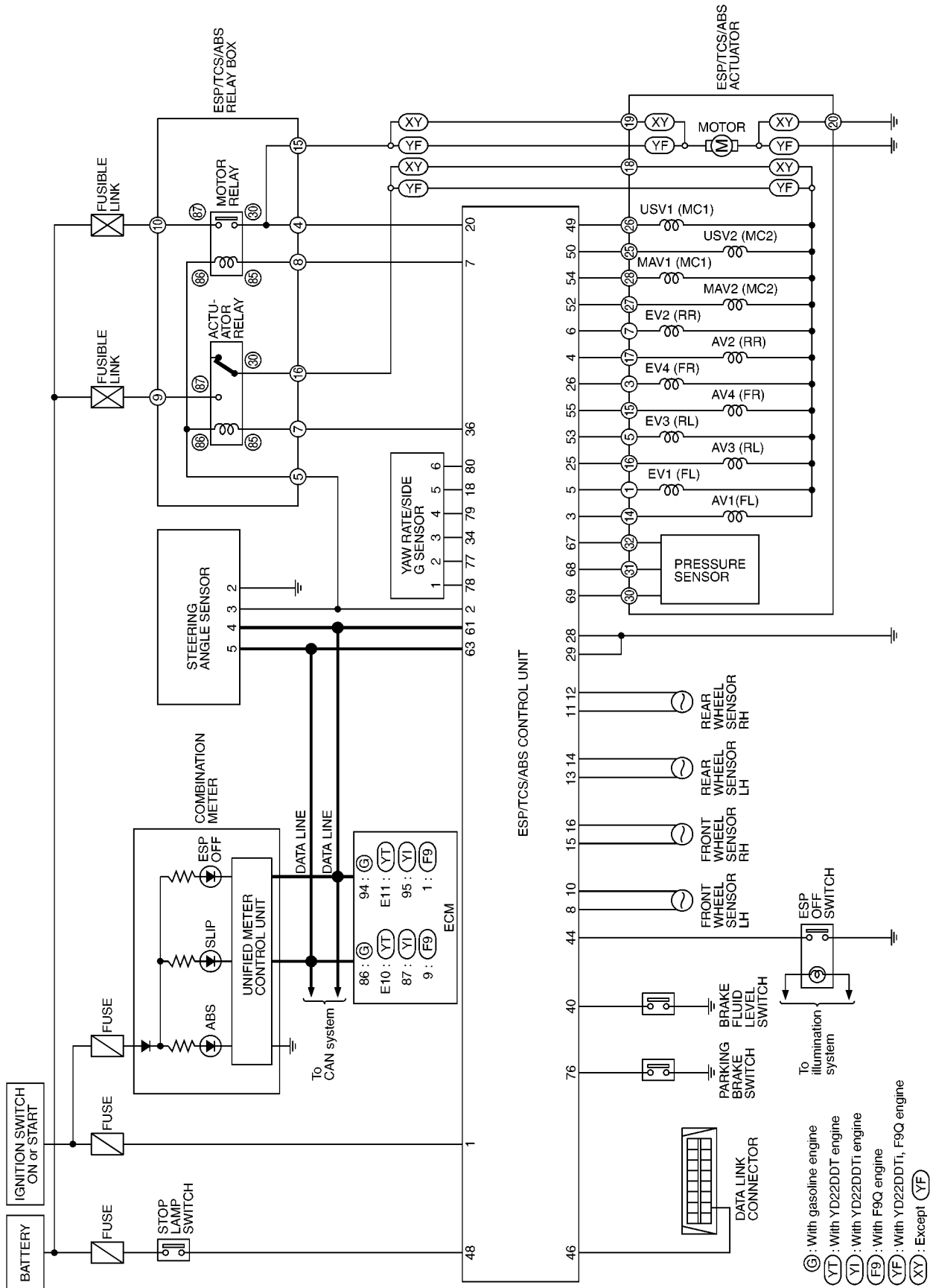
EFS002X0



SFIA0433E

Schematic

EFS002X1



MFWA00025E

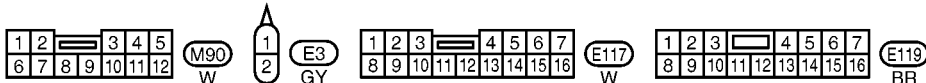
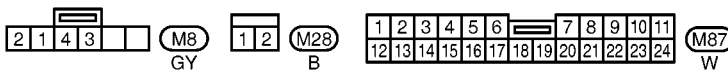
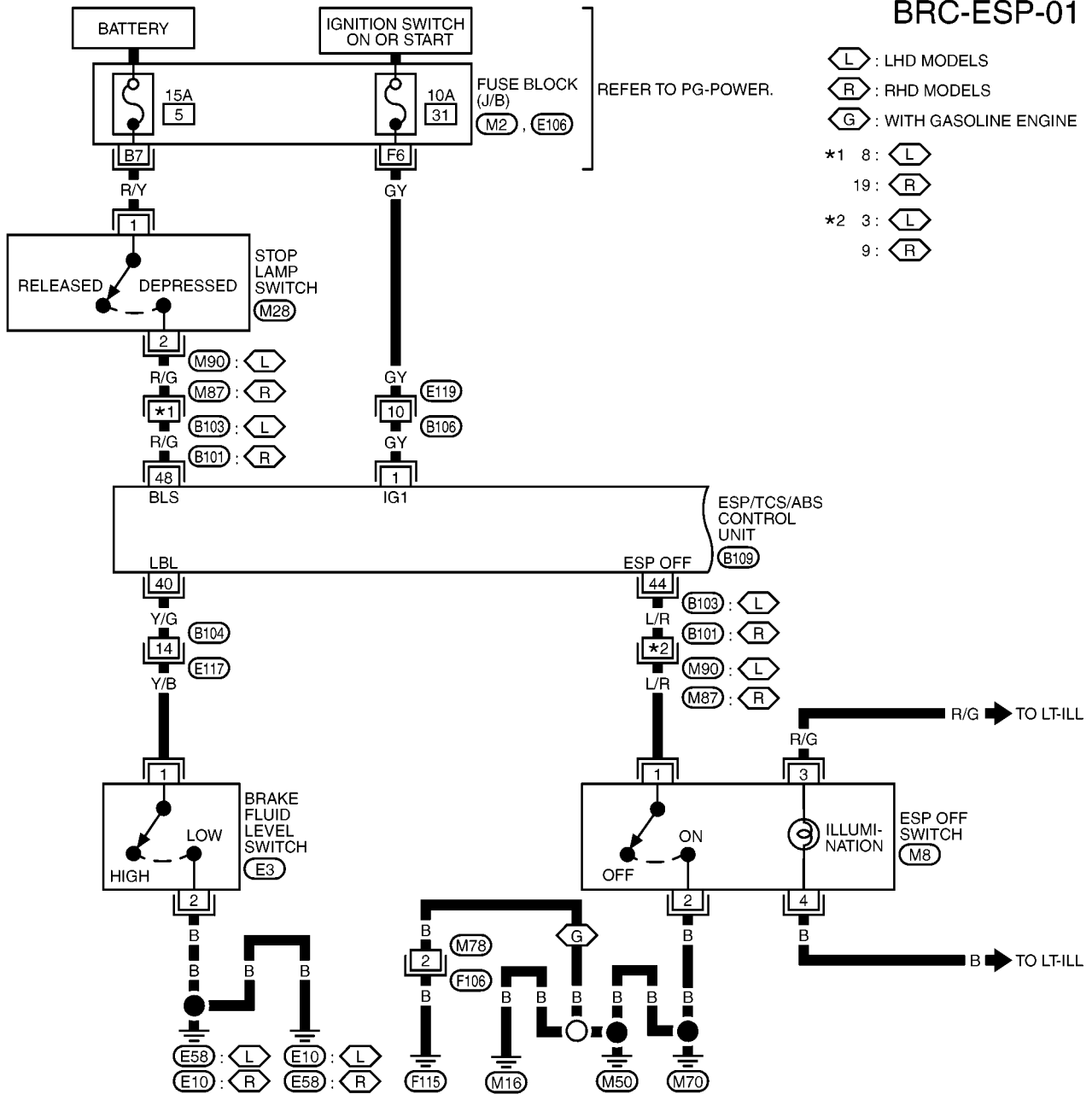
TROUBLE DIAGNOSIS

[ESP/TCS/ABS]

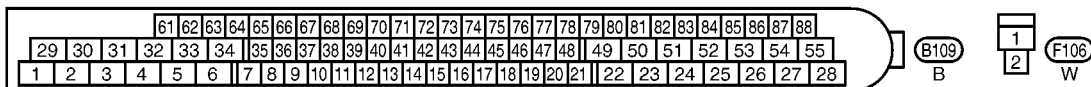
Wiring Diagram —ESP/TCS/ABS—

EFS002X2

BRC-ESP-01



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

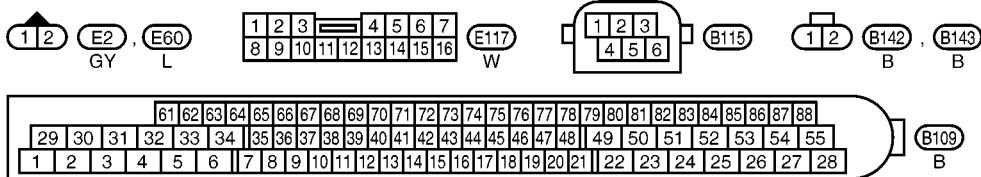
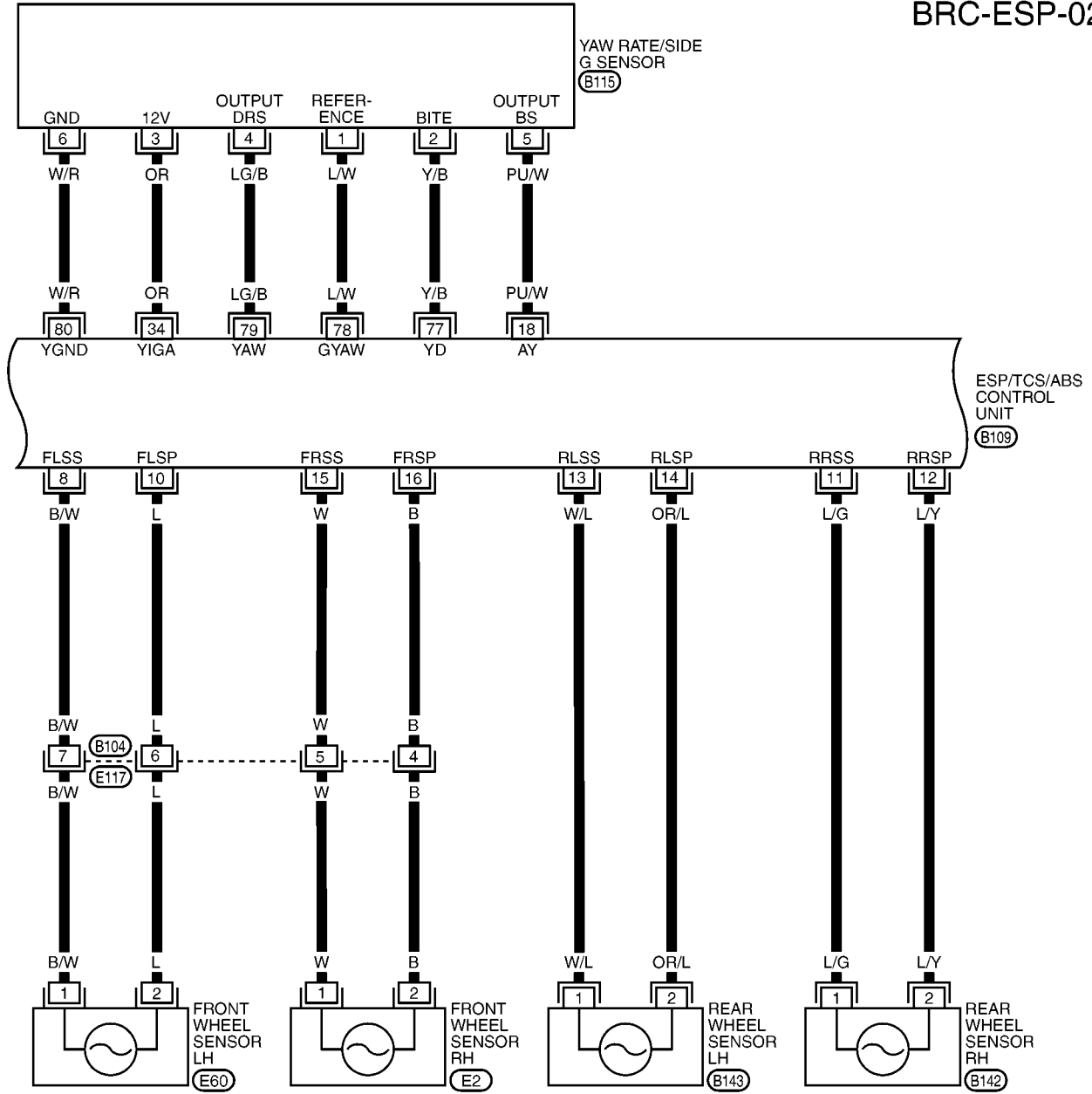


MFWA0026E

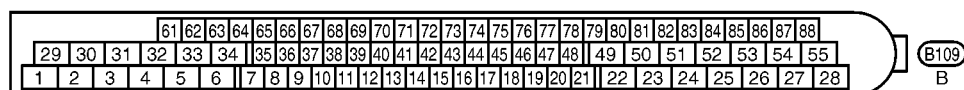
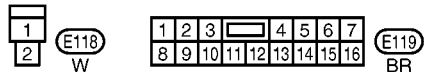
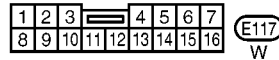
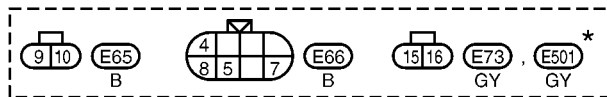
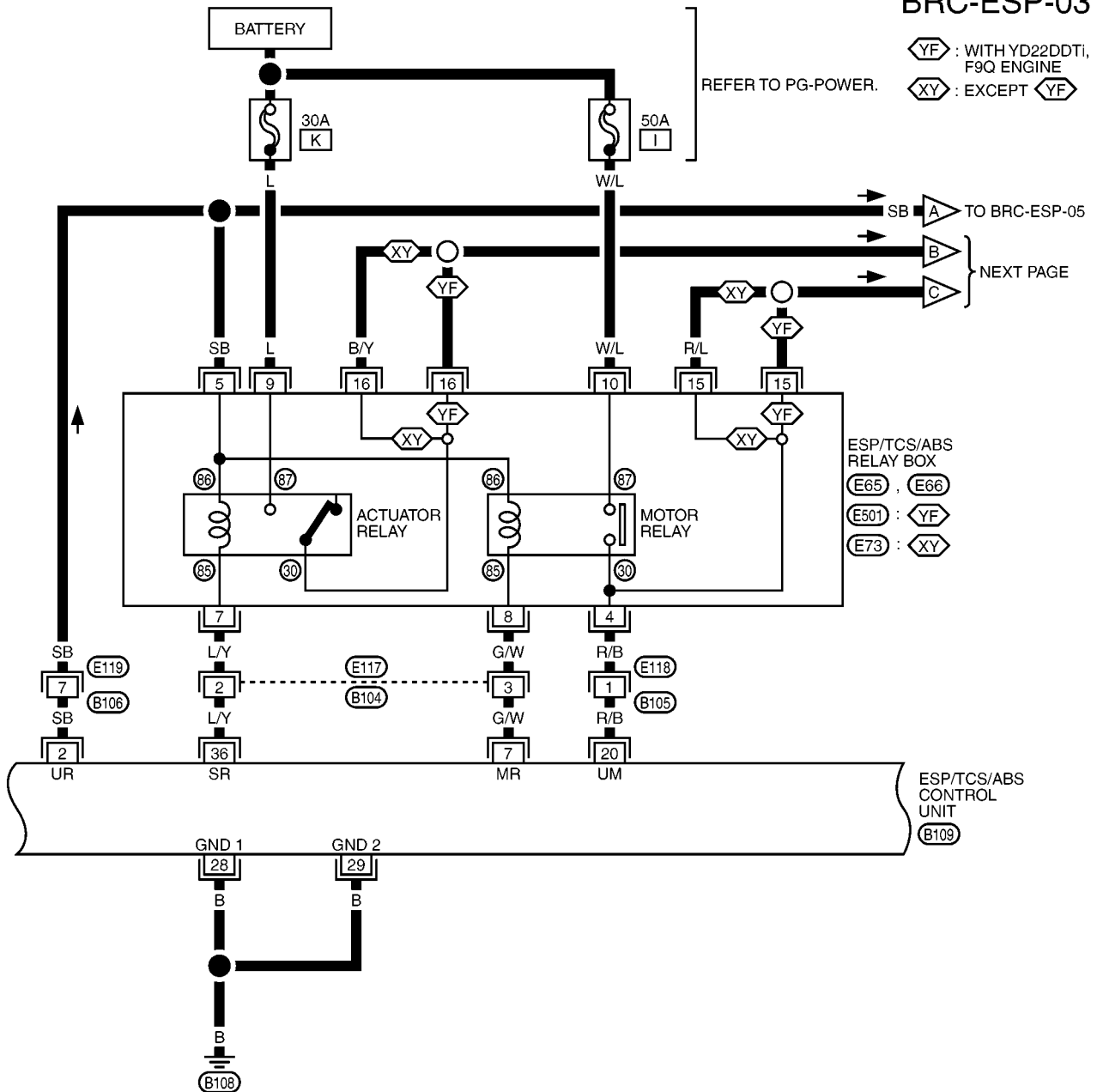
TROUBLE DIAGNOSIS

[ESP/TCS/ABS]

BRC-ESP-02



BRC-ESP-03

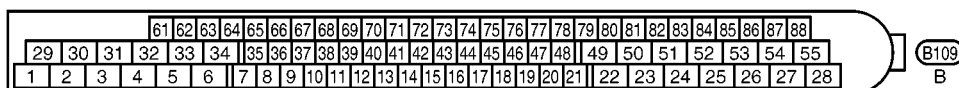
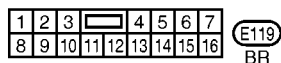
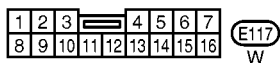
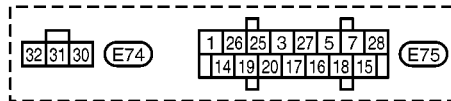
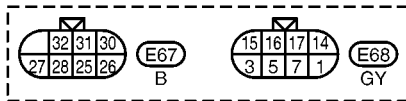
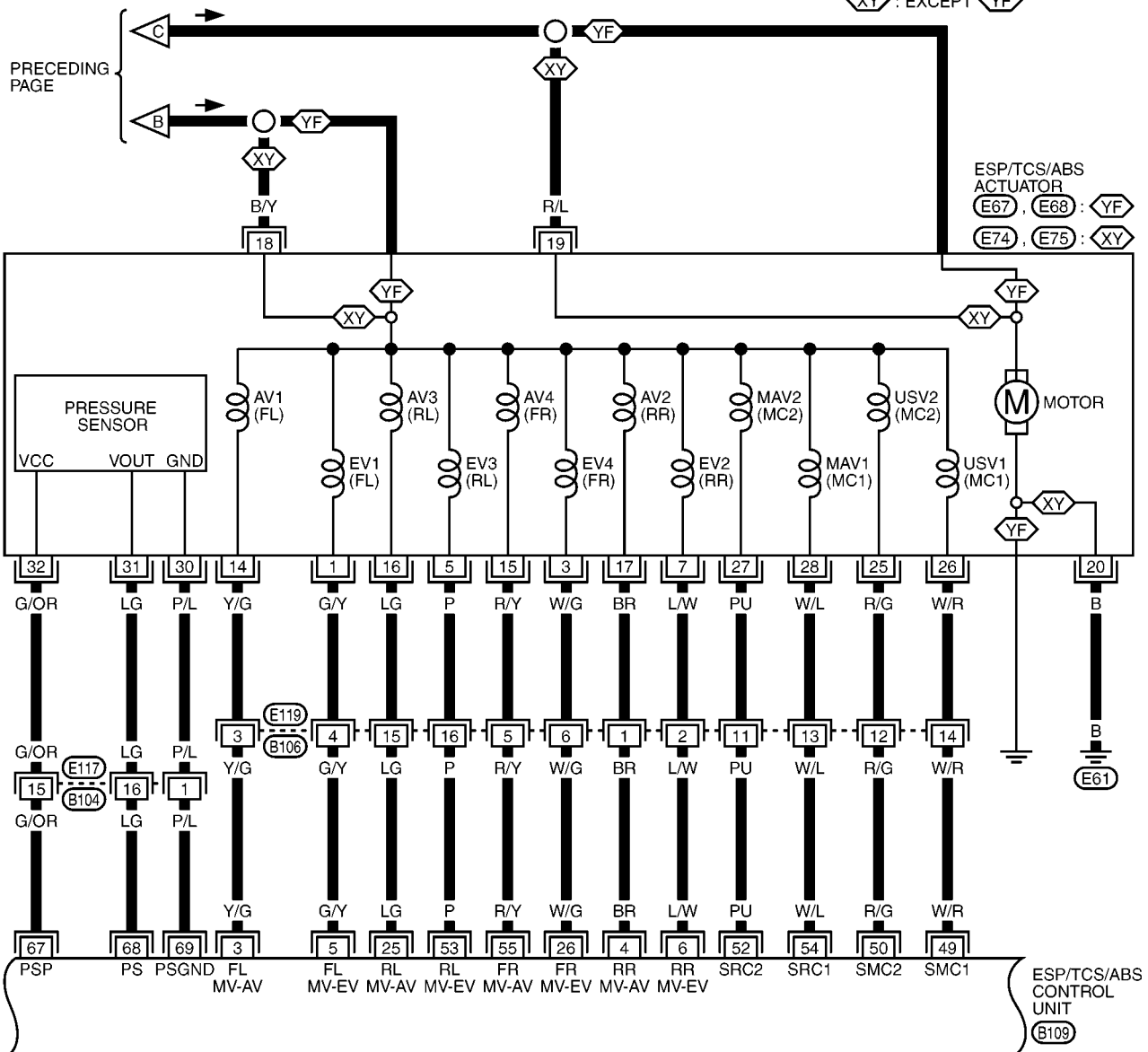


*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

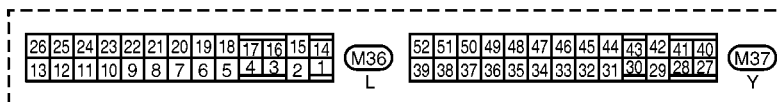
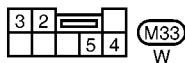
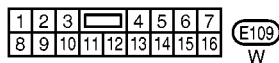
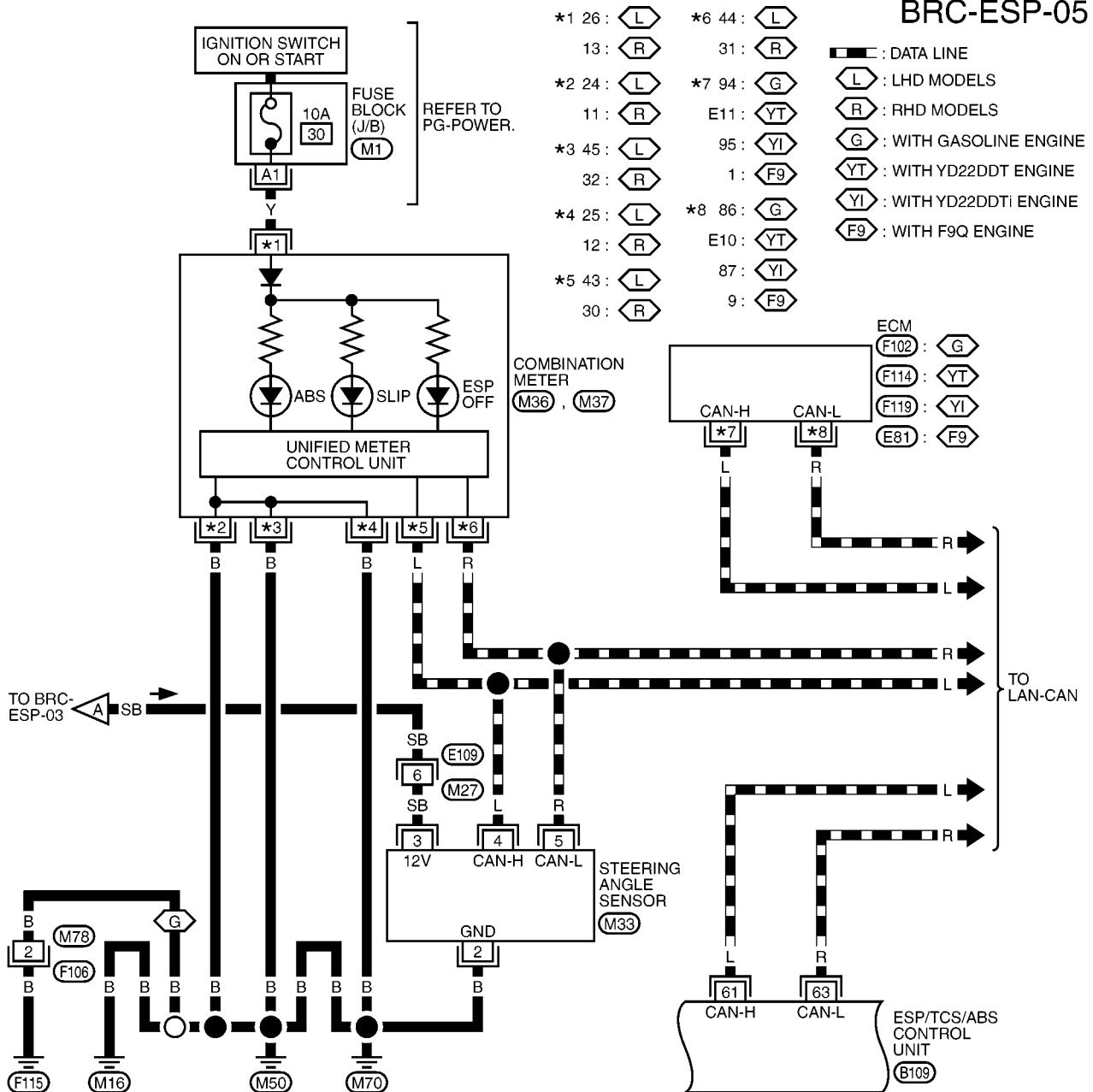
BRC-ESP-04

YF : WITH YD2DDTI, F9Q ENGINE

XY : EXCEPT YF

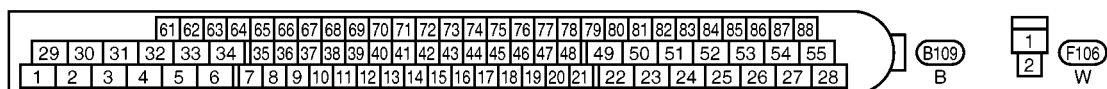


BRC-ESP-05

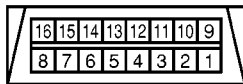
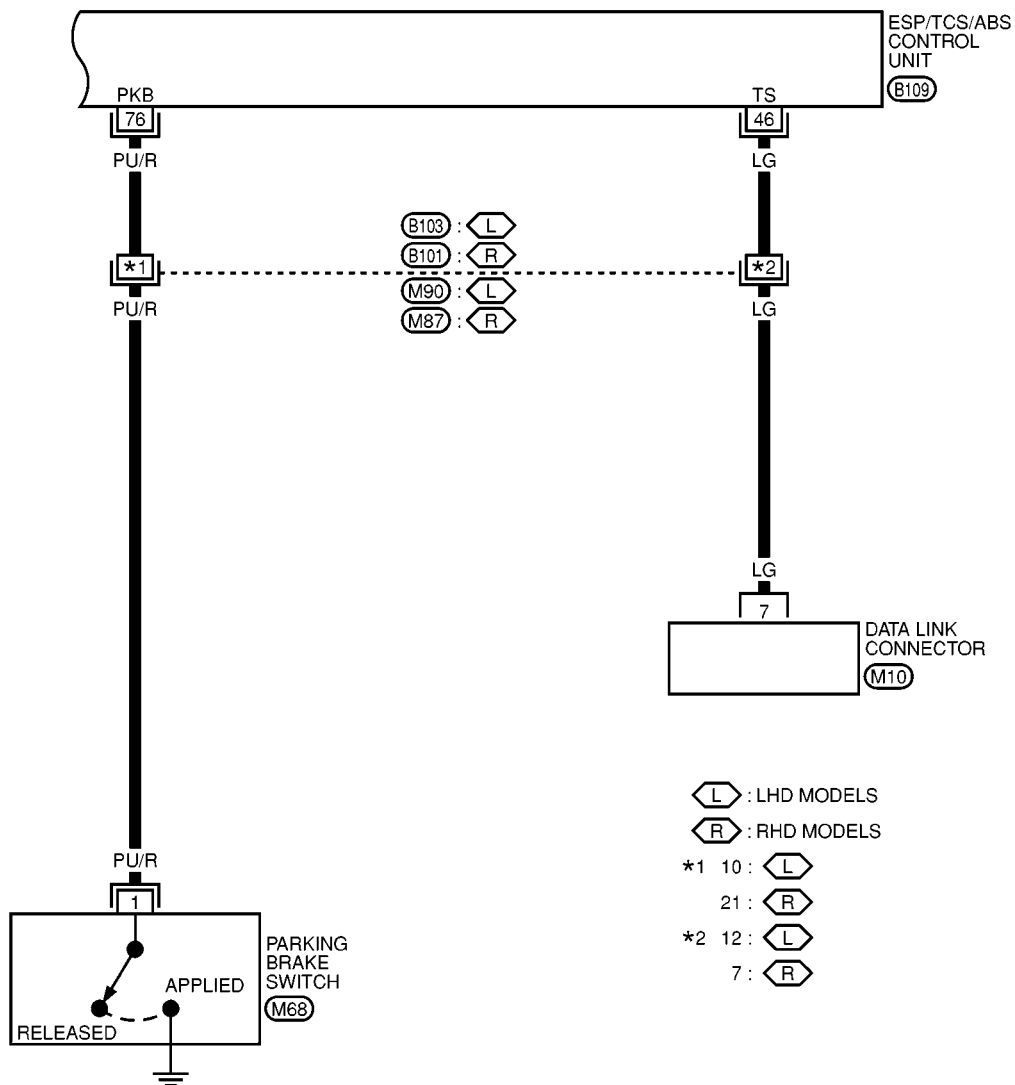


REFER TO THE FOLLOWING.

- (M1) - FUSE BLOCK-JUNCTION BOX (J/B)
- (F102), (F114), (F119) - ELECTRICAL UNITS



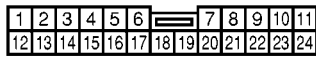
BRC-ESP-06



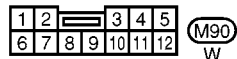
M10
W

1
B

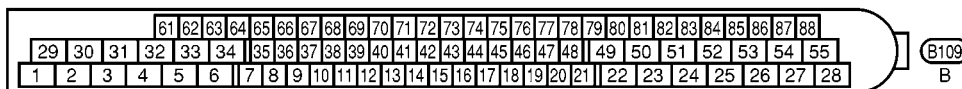
M68
B



M87
W



M90
W



TROUBLE DIAGNOSIS

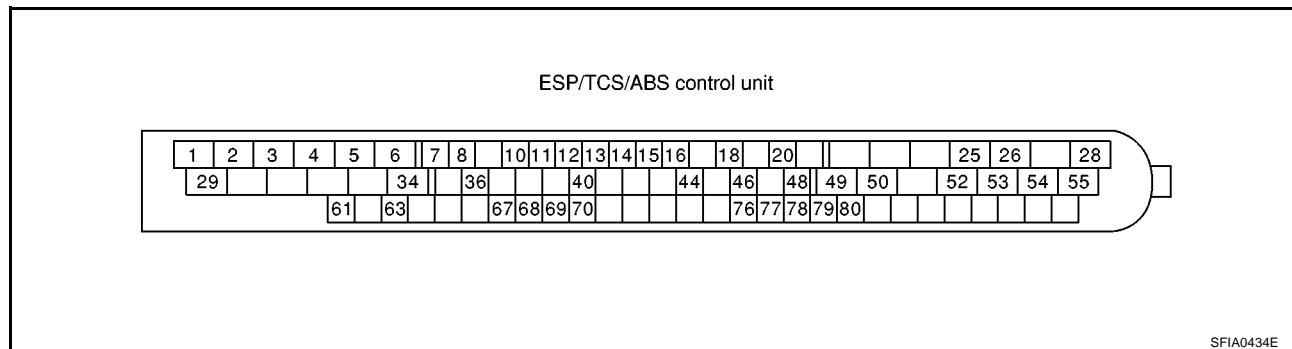
[ESP/TCS/ABS]

Control Unit Input/Output Signal Standard STANDARDS USING A CIRCUIT TESTER AND OSCILLOSCOPE

EF5002X3

CAUTION:

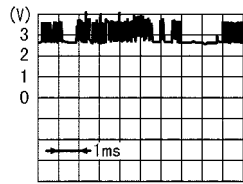
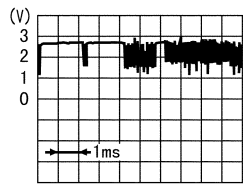
Connect the connectors for the ESP/TCS/ABS control unit and actuator, and turn the ignition switch ON.



Measure- ment termi- nal		Measuring point	Standard value (Note 1)		(Reference) Check items for malfunc- tion
+	-				
1		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 sup- ply	Ignition switch ON	Battery voltage (Approx. 12V)	
7	Body ground	Actuator motor relay	Actuator motor being driven ("Active test" mode with CON- SULT-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	
3	Body ground	Front LH wheel outlet solenoid valve	Solenoid valve activated (In "active test" mode of CON- SULT-II) or actuator relay inac- tive (in fail-safe mode)	Approx. 0V	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	When solenoid valve is inactive and actuator relay active (when ignition switch ON)	Battery voltage (Approx. 12V)	
26		Front RH wheel inlet solenoid valve			
53		Rear LH wheel inlet sole- noid valve			
55		Front RH wheel outlet solenoid valve			

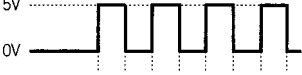
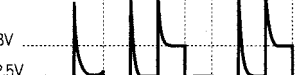
TROUBLE DIAGNOSIS

[ESP/TCS/ABS]

Measurement terminal		Measuring point	Standard value (Note 1)		(Reference) Check items for malfunction
+	−				
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) Or, when actuator relay inactive (when fail-safe)	Approx. 0V	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)	When switch-over solenoid valve is inactive and actuator relay is active (when ignition switch ON)	Battery voltage (Approx. 12V)	
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 : 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	
44		ESP OFF switch	ESP OFF switch is pressed.	Approx. 10V	ESP OFF switch and circuit
			ESP OFF switch is released.	Approx. 12V	
61	Body ground	CAN communication input/output signal (H)	Ignition switch ON	 PBIA0224J	—
63		CAN communication input/output signal (L)	Ignition switch ON	 PBIA0223J	

TROUBLE DIAGNOSIS

[ESP/TCS/ABS]

Measurement terminal		Measuring point	Standard value (Note 1)		(Reference) Check items for malfunction
+	-				
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.

TROUBLE DIAGNOSIS

[ESP/TCS/ABS]

Data monitor item	Contents	Data monitor		(Reference) Check items for malfunction
		Condition	Reference value in normal operation	
FR RH SENSOR FR LH SENSOR RR RH SENSOR 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 $\pm 10\%$)	
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%	
ENGINE 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 24.1m/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	
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	

TROUBLE DIAGNOSIS

[ESP/TCS/ABS]

Data monitor item	Contents	Data monitor		(Reference) Check items for malfunction
		Condition	Reference value in normal operation	
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 FR LH OUT SOL FR RH IN SOL FR RH OUT SOL RR LH IN SOL RR LH OUT SOL RR RH IN SOL 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-RL] USV [FL-RR] HSV [FR-RL] 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	
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 ABS FAIL SIG TCS FAIL SIG VDC FAIL SIG	System fail signal status	Malfunctions condition (When system failed)	OFF	EBD system ABS system TCS system 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.

TROUBLE DIAGNOSIS

[ESP/TCS/ABS]

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

EF5002X4

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	—	×	×
SLIP indicator lamp	—	×	×
Throttle angle	—	×	—

×: Applicable

—: Not applicable

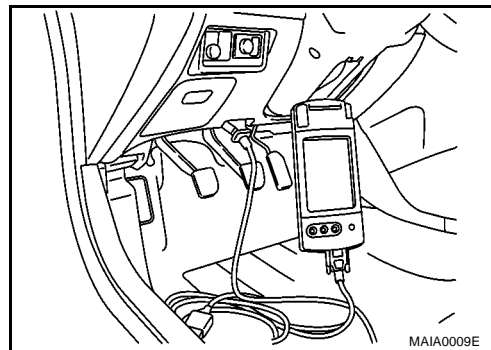
SELF-DIAGNOSIS

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

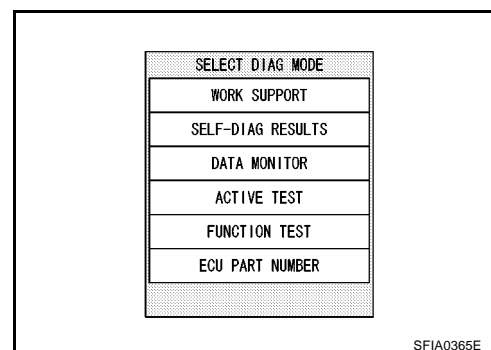
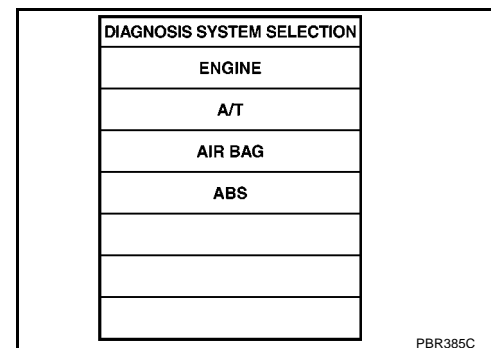
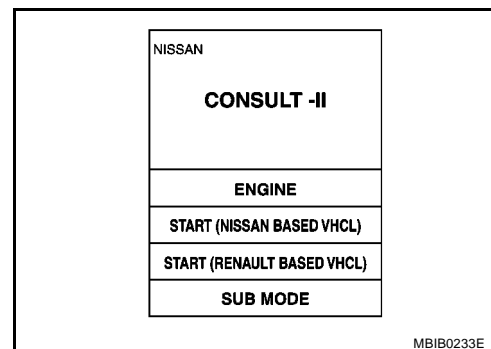
1. Perform a [BRC-75, "Basic Inspection"](#) using information from the customer.
2. After the ignition switch is turned OFF, connect the CONSULT-II connector to the vehicle-side data link connector. The data link connector is on the lower instrument cover).
3. Start the engine and drive at Approx. 30 km/h (19 MPH) for approx. 1 minute.



4. After stopping the vehicle, with the engine still idling, touch “START (NISSAN BASED VHCL)”, “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 (NISSAN BASED VHCL)” 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.



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-75, "PRELIMINARY CHECK 3: \(INSPECTION FOR ABS WARNING LAMP, ESP OFF INDICATOR LAMP, AND SLIP INDICATOR LAMP\)"](#) .
 - 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 (NISSAN BASED VHCL)”, “ABS”, “SELF-DIAG RESULTS” and “ERASE” on CONSULT-II screen in this order to erase 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.

TROUBLE DIAGNOSIS

[ESP/TCS/ABS]

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-76
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.	Actuator relay and circuit. Refer to BRC-88
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.	
	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-90
PRESS SEN CIRCUIT	Pressure sensor signal line is open or shorted, or pressure sensor is abnormal.	Pressure sensor and circuit. Refer to BRC-79
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-80
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-81
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-83
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.	

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TROUBLE DIAGNOSIS

[ESP/TCS/ABS]

Self-Diagnostic item	Malfunction detecting condition	Check route
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-83 .
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-86
	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-76
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-90
ST ANGLE SEN SIGNAL	Neutral position correction of steering angle sensor is not finished.	Neutral position adjustment of steering angle sensor. Refer to BRC-37
ST ANG SEN COM CIR	CAN communication system or steering angle sensor is abnormal.	Steering angle sensor and CAN communication circuit. Refer to BRC-94
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-81
EMERGENCY BRAKE	ESP/TCS/ABS control unit malfunction (pressure increase is too much or too little.)	ESP/TCS/ABS control unit. Refer to BRC-92
CONTROLLER FAILURE	ESP/TCS/ABS internal malfunction of control unit	ESP/TCS/ABS control unit. Refer to BRC-78
CAN COMM CIRCUIT	<ul style="list-style-type: none"> ● CAN communication line is open or shorted. ● ESP/TCS/ABS control unit internal malfunction. ● 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-94
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. Reservoir tank fluid. Refer to BRC-93
ENGINE SIGNAL 1 - 4, 6	Major engine components are abnormal	Engine system. Refer to BRC-78

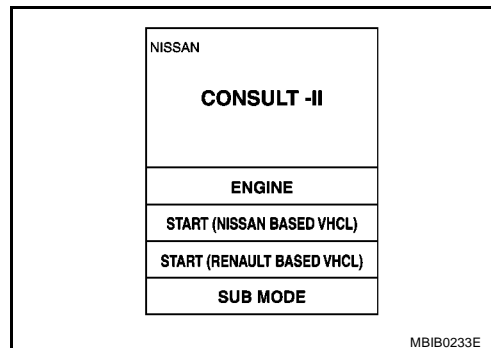
(note) "ACTUATOR RLY" on the CONSULT-II self-diagnosis results indicates the malfunction of the actuator motor relay and circuit.

DATA MONITOR

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

Procedure

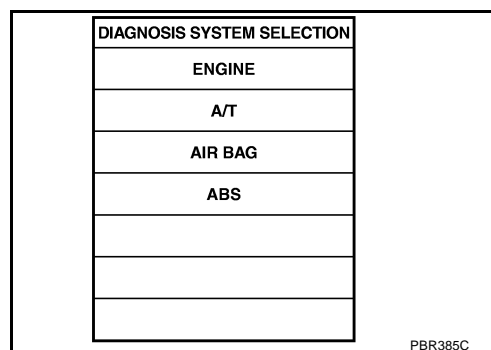
1. Turn the ignition switch OFF.
2. Connect the CONSULT-II connector to the vehicle-side data link connector.
3. Turn the ignition switch ON.
4. Touch "START (NISSAN BASED VHCL)" on the display.



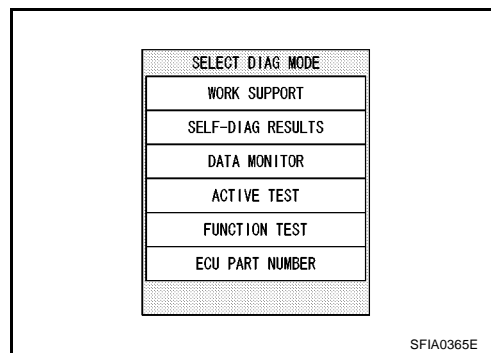
5. Touch "ABS" on the display.

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 (NISSAN BASED VHCL)" 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-67, "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.

TROUBLE DIAGNOSIS

[ESP/TCS/ABS]

Data Monitor Item (Unit)	Data Monitor item selection				Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	CAN DIAG SUPPORT MNTR	
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.
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.

TROUBLE DIAGNOSIS

[ESP/TCS/ABS]

Data Monitor Item (Unit)	Data Monitor item selection				Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	CAN DIAG SUPPORT MNTR	
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.
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.

A

B

C

D

E

BRC

G

H

I

J

K

L

M

TROUBLE DIAGNOSIS

[ESP/TCS/ABS]

Data Monitor Item (Unit)	Data Monitor item selection				Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	CAN DIAG SUPPORT MNTR	
CAN CIRC 1 (ON/ UNKWN)	—	—	—	×	CAN communication signal (OK/UNKWN) status is displayed.
CAN CIRC 2 (OK/ UNKWN)	—	—	—	×	
CAN CIRC 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

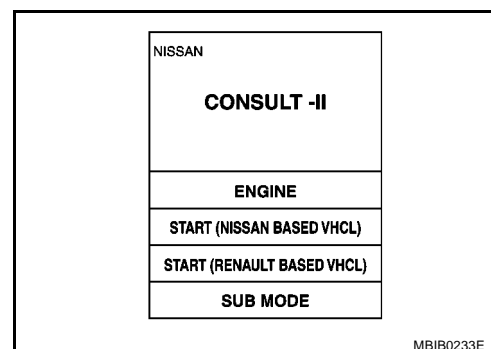
—: Not applicable

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 (NISSAN BASED VHCL)" on the display.



TROUBLE DIAGNOSIS

[ESP/TCS/ABS]

3. Touch "ABS" and "ACTIVE TEST".

DIAGNOSIS SYSTEM SELECTION
ENGINE
A/T
AIR BAG
ABS

PBR385C

A

B

C

D

E

BRC

G

H

I

J

K

L

M

4. The test item selection screen is displayed.

5. Touch necessary test item.

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
ACTIVE TEST
FUNCTION TEST
ECU PART NUMBER

SFIA0365E

SELECT TEST ITEM
RR LH ABS SOLENOID (ACT)
FRONT ABS SOLENOID (ACT)
REAR ABS SOLENOID (ACT)
SLIP LAMP
ABS WARNING LAMP
VDC WARNING LAMP
Page Up

SFIA0366E

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

SLIP LAMP
SELECT MONITOR ITEM
MAIN SIGNALS
SELECTION FROM MENU
START

SFIA0367E

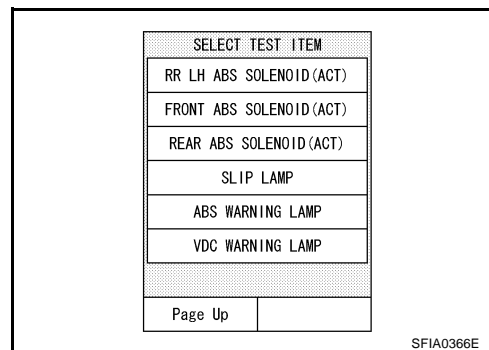
7. The active test screen is displayed.

ACTIVE TEST	
SLIP LAMP	OFF
MONITOR	
SLIP LAMP	OFF
ON	

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-72, "Solenoid Valve Operation Chart"](#) .

**Solenoid Valve Operation Chart**

Operation		Without “(ACT)”			With “(ACT)”		
		UP	KEEP	DOWN	UP	ACTUA-TOR UP	ACTUA-TOR KEEP
FR RH SOL FR RH ABS SOLENOID (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 FR LH ABS SOLENOID (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 RR RH ABS SOLENOID (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 RR LH ABS SOLENOID (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 FRONT ABS SOLENOID (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
REAR SOLENOID REAR ABS SOLENOID (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

EFS002X5

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-63, "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.

TROUBLE DIAGNOSIS

[ESP/TCS/ABS]

- 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 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 (19 MPH) 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 driven 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 -: 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.

TROUBLE DIAGNOSIS

[ESP/TCS/ABS]

Condition	ABS warning lamp	ESP OFF indicator lamp	SLIP indicator lamp	Remarks
ESP/TCS/ABS malfunction	×	×	×	—
	×	×	—	When the ESP/TCS/ABS control unit is abnormal (power supply or ground malfunction).
When the ESP/TCS is abnormal.	—	×	×	—

Basic Inspection

EPS002X6

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 does 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

EFS002X7

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?

YES >> GO TO 2.

NO >> Check is completed

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.

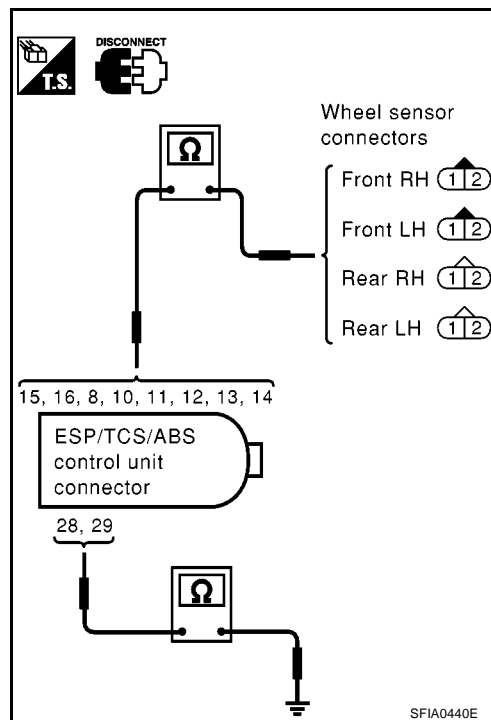
Does ABS warning lamp is out when driving 30km/h (19 MPH) for Approx. One minute?

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 harness connector B109 and wheel sensors harness connector E60, E2, B143, B142 body grand.



	ESP/TCS/ABS control unit harness connector B109	Wheel sensor harness connector E60, E2, B143, B142	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 harness connector B109	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

EFS002X8

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 5

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

EFS002X9

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.

EFS002XA

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?

YES >> GO TO 2.

NO >> Check is completed

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.

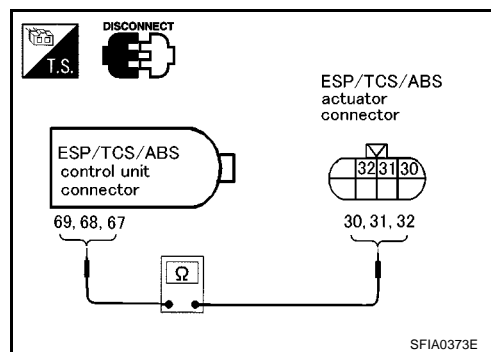
Is inspection result OK?

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 harness connector B109 and the pressure sensor harness connector E67.



ESP/TCS/ABS control unit harness connector B109	Pressure sensor harness connector E67	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.

EFS002XB

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSUL-II indication item
ST ANG SEN CIRCUIT

Perform inspection 15. Refer to [BRC-94, "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

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

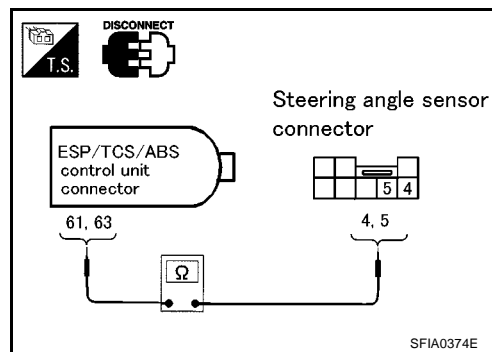
Is inspection result OK?

OK >> Inspection END

NG >> GO TO 3.

3. STEERING ANGLE SENSOR CIRCUIT 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 harness connector B109 and the steering angle sensor harness connector M33.



ESP/TCS/ABS control unit harness connector B109	Steering angle sensor harness connector M33	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-37, "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.

EF5002XC

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSULT-II indication item
YAW RATE SENSOR SIDE G-SEN CIRCUIT

CAUTION:

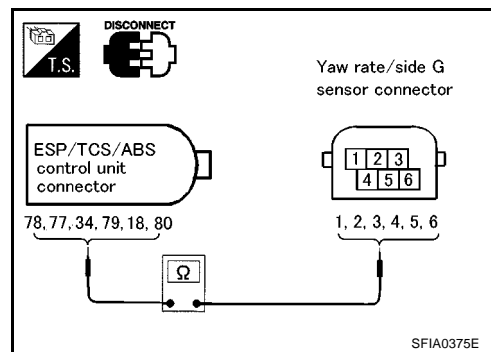
When the vehicle on a turn-table at an entrance of parking lot or on a moving unit, the ESP OFF indicator lamp turns ON, and the self-diagnosis with CONSULT-II may indicate that the yaw rate sensor system is malfunction. In this case, the yaw rate sensor is not malfunction. Move the vehicle from the 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 harness connector B109 and the yaw rate/side G sensor harness connector B115.



ESP/TCS/ABS control unit harness connector B109	Yaw rate/side G sensor harness connector B115	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

EFS002XD

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSUL-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.

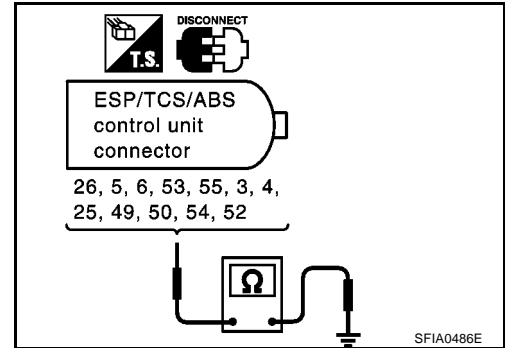
Are any self-diagnosis result items indicated again?

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 harness connector B109 and body ground.



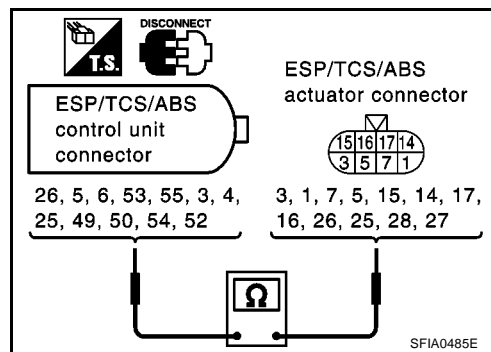
ESP/TCS/ABS control unit harness connector B109	Body ground	Resistance
26 (W/G)	—	6.0 – 11Ω
5 (G/Y)	—	6.0 – 11Ω
6 (L/W)	—	6.0 – 11Ω
53 (P)	—	6.0 – 11Ω
55 (R/Y)	—	3.0 – 5.0Ω
3 (Y/G)	—	3.0 – 5.0Ω
4 (BR)	—	3.0 – 5.0Ω
25 (LG)	—	3.0 – 5.0Ω
49 (W/R)	—	6.0 – 11.0Ω
50 (R/G)	—	6.0 – 11.0Ω
54 (W/L)	—	3.0 – 5.0Ω
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 harness connector B109 and the ESP/TCS/ABS actuator harness connector E67, E68.



ESP/TCS/ABS control unit harness connector B109	ESP/TCS/ABS Actuator harness connector E67, E68	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

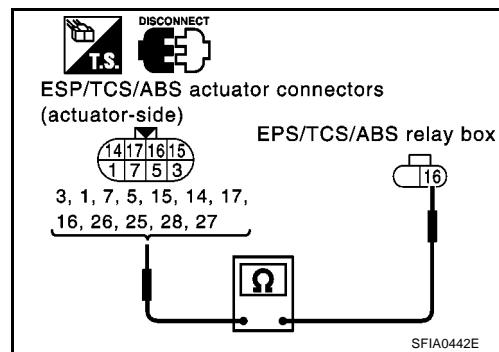
Is inspection result OK?

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 connector (actuator side)	ESP/TCS/ABS Actuator connector (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

EFS002XE

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSULT-II indication item
PUMP MOTOR ACTUATOR RLY (NOTE)

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

- YES >> ● 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.

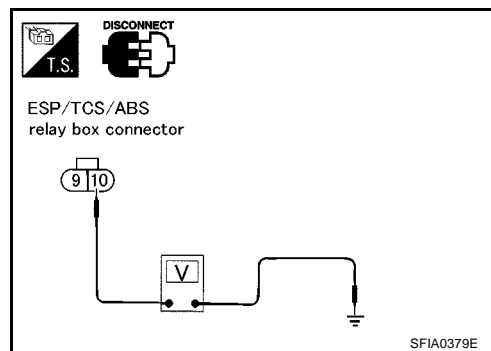
Are any self-diagnosis items indicated again?

YES >> GO TO 3.

NO >> Repair or replace the poorly connected connector.

3. ACTUATOR MOTOR, MOTOR RELAY POWER SUPPLY CIRCUIT INSPECTION

1. Disconnect the ESP/TCS/ABS relay box connectors.



2. Check the voltage between the ESP/TCS/ABS relay box harness connector E65 and body ground.

ESP/TCS/ABS relay box harness connector E65	Body ground	Voltage value
10 (W/L)	—	Battery voltage (approx. 12V)

Is inspection result OK?

OK >> GO TO 4.

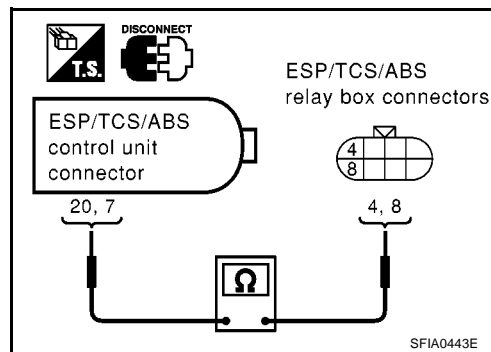
NG >> ● Check the fuse 50A.

- Check for continuity between the battery and the ESP/TCS/ABS 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 harness connectors.

ESP/TCS/ABS control unit harness connector B109	ESP/TCS/ABS Relay box harness connector E66	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

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.

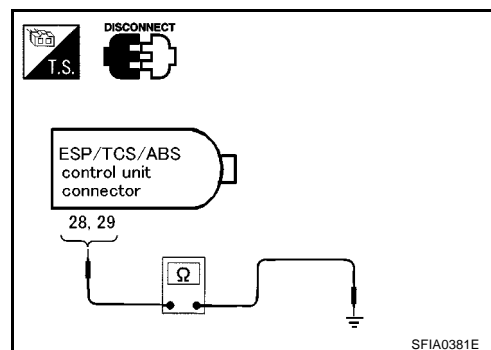
Is the same self-diagnosis item indicated?

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 harness connector B109	Body ground	Continuity
28 (B)	—	Yes
29 (B)	—	Yes

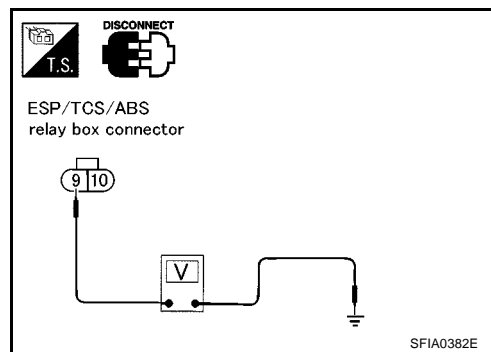
Is inspection result OK?

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 ESP/TCS/ABS relay box harness connector E65 and body ground.



RELAY BOX harness connector E65	Body ground	Voltage value
9 (L)	—	Battery voltage (approx. 12V)

Is inspection result OK?

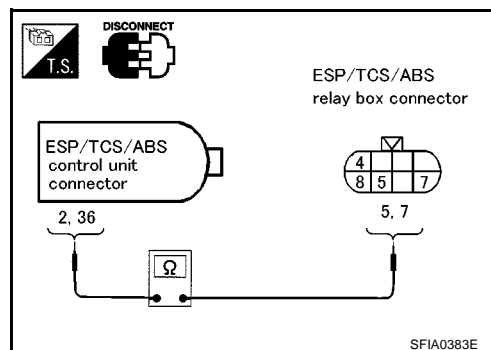
OK >> GO TO 5.

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 harness connector E109 and the relay box harness connector E66.



ESP/TCS/ABS control unit harness connector E109	Relay box harness connector E66	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

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.

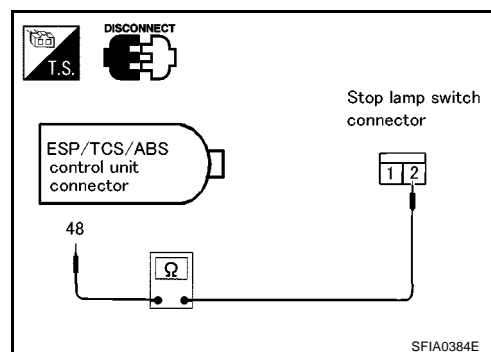
Is the same self-diagnosis item indicated?

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 harness connector and the ESP/TCS/ABS control unit harness connector.



ESP/TCS/ABS control unit harness connector	STOP LAMP SW harness 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

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

SELF-diagnosis results
CONSULT-II indication item
BATTERY VOLTAGE [ABNORMAL]

Is "BATTERY VOLTAGE [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.

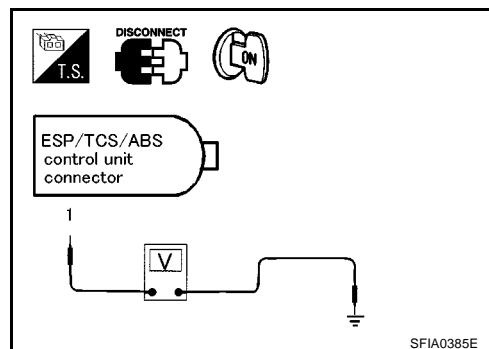
Is the same self-diagnosis item indicated?

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 harness connector and body ground.



ESP/TCS/ABS control unit harness connector	Body ground	Voltage value
1 (GY)	—	Battery voltage (approx. 12V)

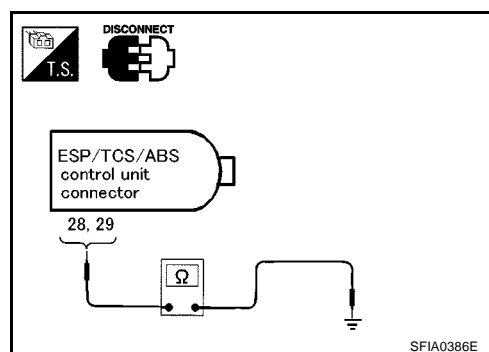
Is inspection result OK?

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 harness connector	Body ground	Continuity
28 (B)	—	Yes
29 (B)	—	Yes

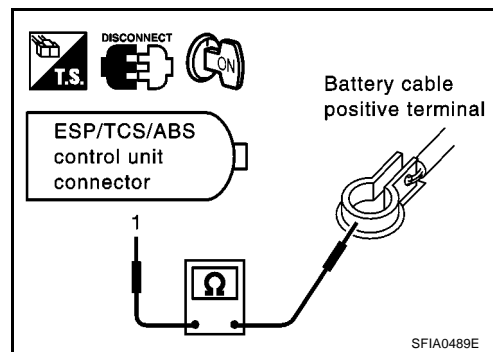
Is inspection result OK?

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 harness 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

EFS002XI

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

EFS002XJ

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

EFS002XK

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

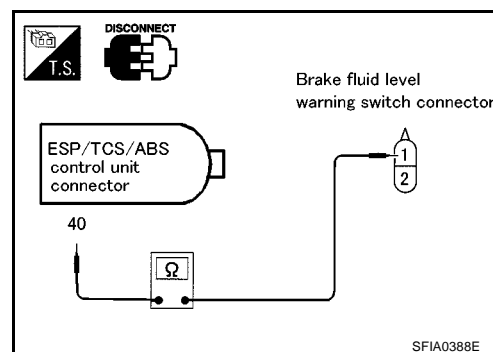
1. Disconnect connectors for the brake fluid level warning switch and the ESP/TCS/ABS control unit.
2. Securely connect connectors. Perform the ESP/TCS/ABS control unit self-diagnosis again.

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 harness connector and the ESP/TCS/ABS control unit harness connector.

ESP/TCS/ABS control unit harness connector	Brake fluid level warning switch harness 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

EFS002XL

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

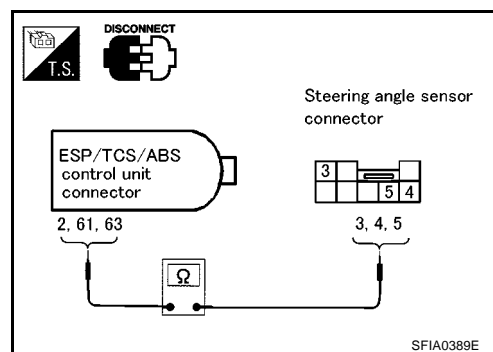
Self-diagnosis results
CONSULT-II indication item
CAN COMM CIRCUIT ST ANG SEN COM CIR

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

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

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

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

- Connect connectors to the control unit and the sensor.
- Connect the battery negative terminal, and turn the ignition switch ON.
- 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-37, "Adjustment of Neutral Position of Steering Angle Sensor"](#).
- NO >> GO TO 4.

4. CAN COMMUNICATION SYSTEM CHECK

Check "CAN DIAG SUPPORT MNTR" of the data monitor items.

Normal	Abnormal (example)
CAN COME: OK	CAN COME: NO
CAN CIRC 1: OK	CAN CIRC 1: UNTWINE
CAN CIRC 2: UNKWN	CAN CIRC 2: UNKWN
CAN CIRC 5: OK	CAN CIRC 5: UNKWN

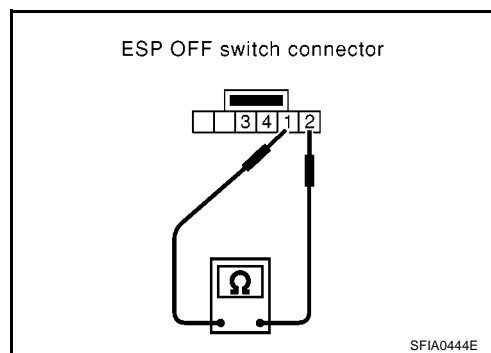
>> After printing the monitor items, go to CAN SYSTEM. Refer to [BRC-42. "CAN Communication Unit"](#).

Component Check ESP OFF SWITCH

EFS002XM

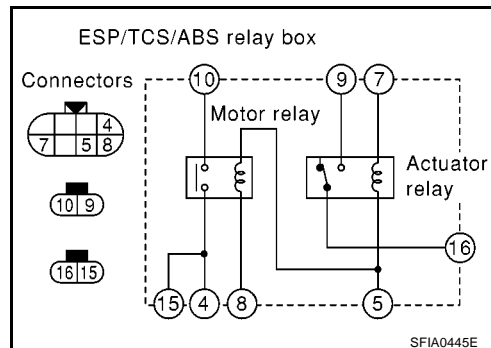
- Disconnect the ESP OFF switch connector. Check for continuity between the terminal No. 1 and No. 2.

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.



TROUBLE DIAGNOSIS

[ESP/TCS/ABS]

Continuity and resistance

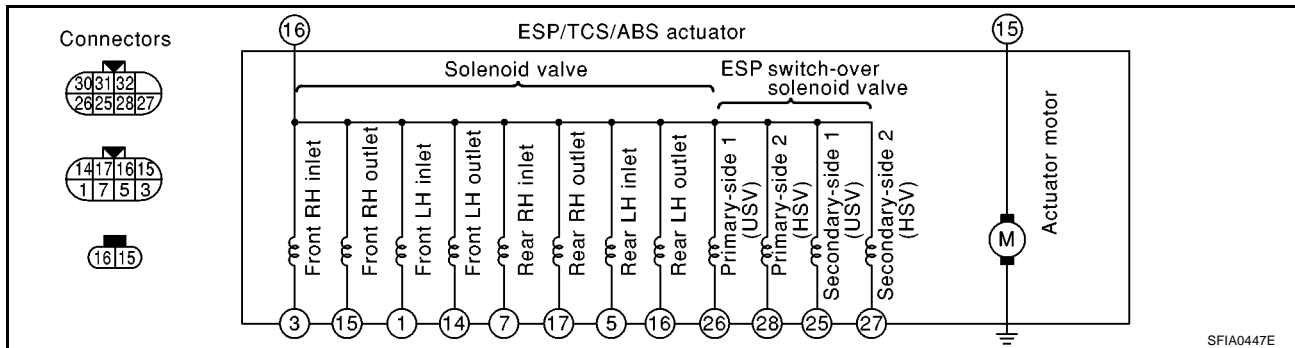
Item	ESP/TCS/ABS relay box								Condition
	16	9	4	15	10	5	7	8	
Actuator relay						Open (0V) 			Between terminal No. 5 and No. 7 Open (0V)
						12V 			Between terminal No. 5 and No. 7 Add 12V
Motor relay									—
						Open (0V) 			Between terminal No. 5 and No. 8 Open (0V)
						12V 			Between terminal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

: Conductivity
 : Open between terminals (0V)
 Approx. 100Ω
 : Not conductivity
 : Add 12V between terminals
 : Resistance between terminals is 100Ω

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														Condition
	16★	3	15	1	14	7	17	5	16	26	25	28	27	15★ Body ground	
Solenoid valve	6.0 - 11.0Ω 														Check the Resistance
	3.0 - 5.0Ω 														
	6.0 - 11.0Ω 														
	3.0 - 5.0Ω 														
	6.0 - 11.0Ω 														
	3.0 - 5.0Ω 														
	6.0 - 11.0Ω 														
	3.0 - 5.0Ω 														
	6.0 - 11.0Ω 														
	3.0 - 5.0Ω 														
ESP switch-over solenoid valve	6.0 - 11.0Ω 														Check the Resistance
	6.0 - 11.0Ω 														
	3.0 - 5.0Ω 														
	3.0 - 5.0Ω 														
	3.0 - 5.0Ω 														
Actuator motor															—
(Resistance) : Continuity : Yes : Continuity : Yes Note: ★ : EPS/TCS/ABS relay box harness connector E 501 terminal No.															

SFIA0448E

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

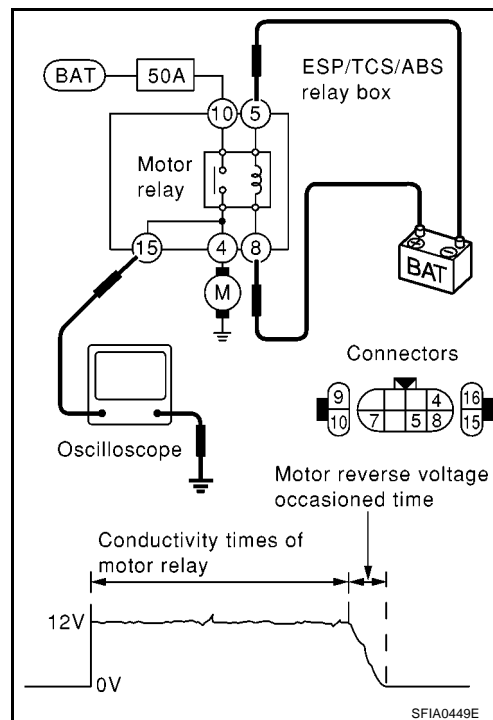
Primary-side 1 - Secondary-side 1	: 12.0 - 22.0
Primary-side 2 - Secondary-side 2	: 6.0 - 10.0
Primary-side 1 - Primary-side 2, Secondary-side 2	: 9.0 - 16.0
Secondary-side 1 - Primary-side 2, Secondary-side 2	: 9.0 - 16.0

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.**

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 and rear axle for looseness.

Is inspection result OK?

OK >> [BRC-98, "Symptom 2: Unexpected Pedal Action"](#)

NG >> Axle inspection and repair

Symptom 2: Unexpected Pedal Action

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

EFS002XP

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.

EFS002XQ

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

EFS002XR

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

EFS002XS

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

EFS002XT

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.

EFS002XU

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.

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B

C

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BRC

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ESP/TCS/ABS CONTROL UNIT

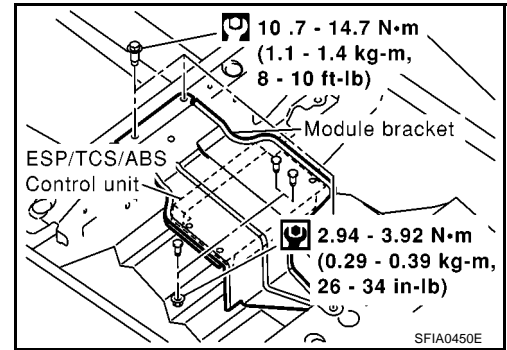
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Removal and Installation

EFS002XV

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

Removal and Installation

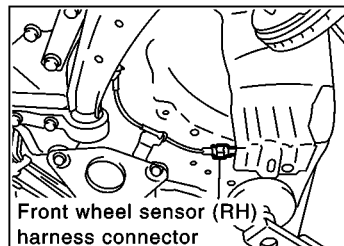
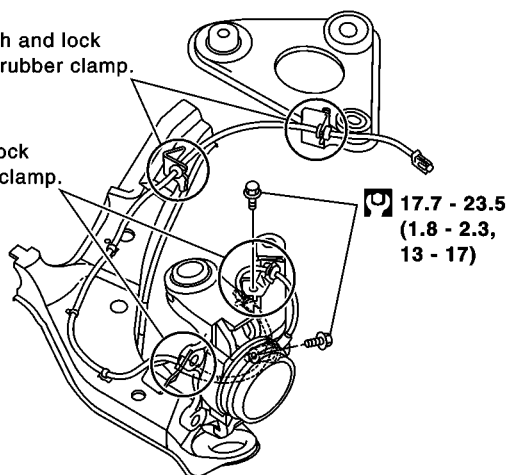
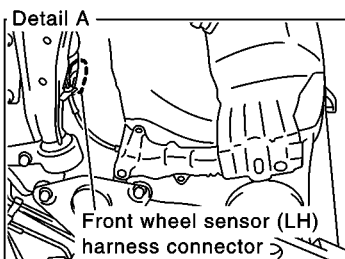
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Front

Push and lock the rubber clamp.

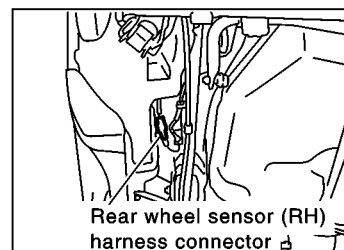
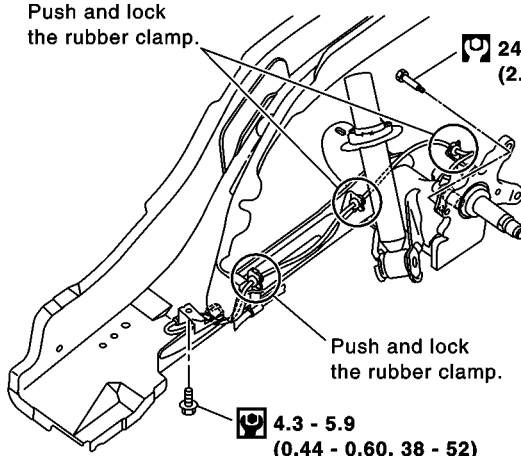
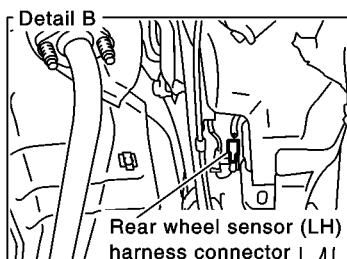
Push and lock the rubber clamp.



Rear

Push and lock the rubber clamp.

24.6 - 33.3
(2.5 - 3.3, 19 - 24)



: N·m (kg-m, in-lb)
 : N·m (kg-m, ft-lb)

SFIA0421E

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

Removal and Installation

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-13, "INSTALLATION"](#) in "FAX Front Axle/Drive Shaft".

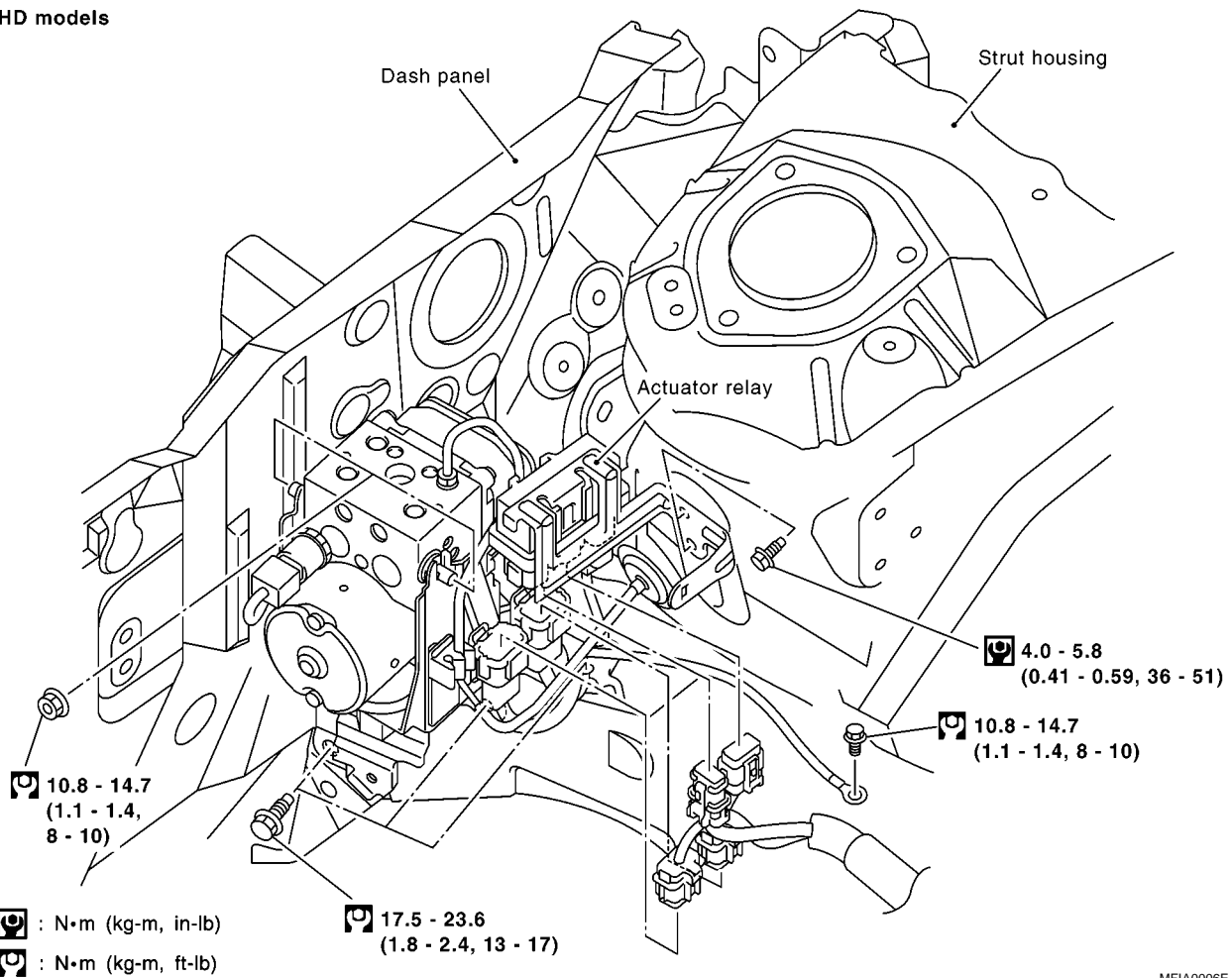
Rear

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

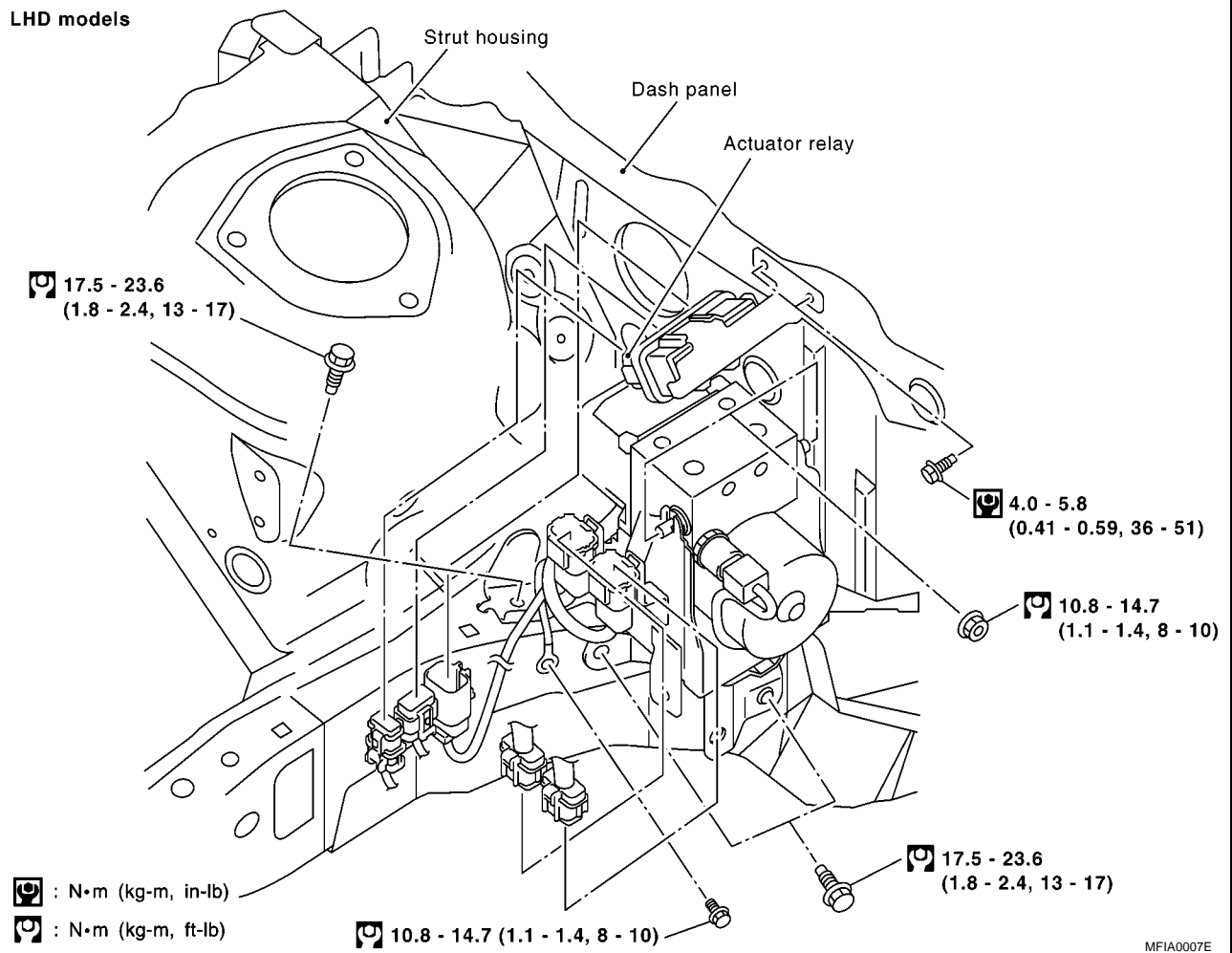
Removal and Installation

RHD models



MFIA0006E

LHD models



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

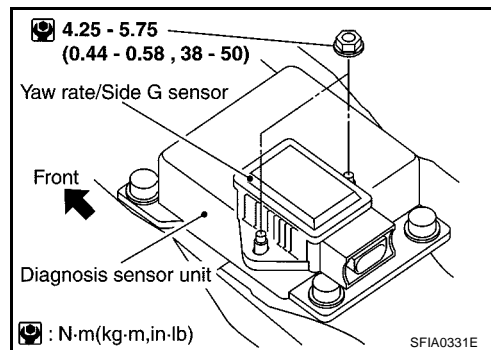
Removal and Installation

REMOVAL

1. Remove the diagnosis sensor unit. Refer to SRS section in P12 ESM (SM2E00-1P12E0E) .
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

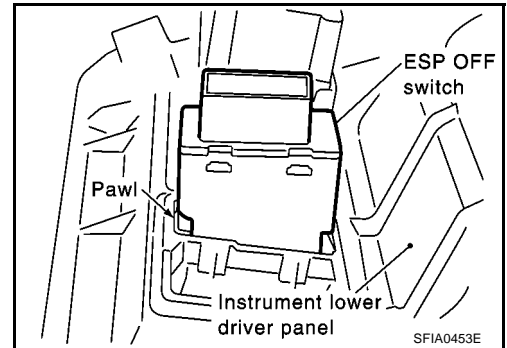
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Removal and Installation

EFS002Y0

REMOVAL

1. Remove the instrument lower driver panel. Refer to IP section in P12 ESM (SM2E00-1P12E0E) .
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.