SECTION BRC
BRAKE CONTROL SYSTEM

CONTENTS

4WD/ABS

ESP/TCS/ABS

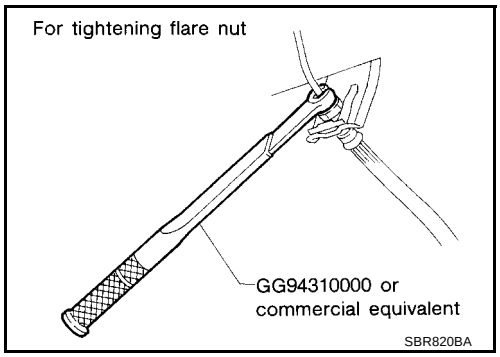
PRECAUTIONS

PFP:00001

Precautions for brake system

EFS001B6

- 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-10, "Brake Burnishing Procedure" .
- Before working, turn OFF ignition switch. Disconnect connectors for ABS actuator and control module or battery terminals.



WARNING:

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

Precautions for brake control

EFS001B7

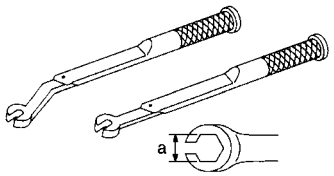
- If malfunction is indicated by 4WD warning lamp and/or ABS warning lamp, collect necessary information from customer (what symptoms are present under what conditions). Find out possible causes before starting service. Besides electrical system inspection, check operation of ABS actuator.
- If malfunction is detected, proceed to trouble diagnosis after checking tire pressure and tire wear.
- Stopping distance or steering stability may be deteriorated by the following conditions. Tire size and type are in improper combination. Brake pads are not Nissan genuine parts.
- Fitting tires of different size on vehicle can be cause of longitudinal vibration. Always use tires of the same size and brand. Exchange front and rear tires on the following conditions: Longitudinal vibration occurs in vehicle with tires of the same size and brand. After replacement, perform trouble diagnosis. 1580|None
- 4WD/ABS function may have a failure or error under following condition: There is radio, antenna, or antenna lead-in wire (including wiring) near control module.
- If aftermarket parts (e.g. Car stereo equipment, CD player) have been installed, check electrical harnesses for pinches, open, and improper wiring.

PREPARATION

PFP:00002

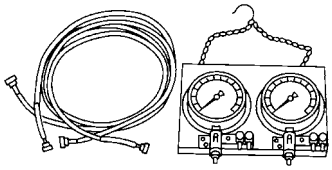
Special Service Tool

EFS001B8

Tool number Tool name		Description
GG9431 0000 Flare nut torque wrench a: 10mm (0.39 in)	 NT406	Removing and installing each brake piping

Commercial Service Tool

EFS00216

Tool name		Description
Brake fluid pressure gauge	 S-NT151	Measuring brake fluid pressure

ALL MODE 4X4 SYSTEM

PFP:47850

System Description

EFS001CJ

ABS FUNCTION

- During ABS operation, brake pedal lightly vibrates and its mechanical noise may be heard. This is a normal condition.
- When starting engine, or just after starting vehicle, brake pedal may vibrate. Also motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- When vehicle drives on rough, gravel, or snowy (fresh deep snow) road, the following conditions occur. Stopping distance may be longer than that of vehicles without ABS.

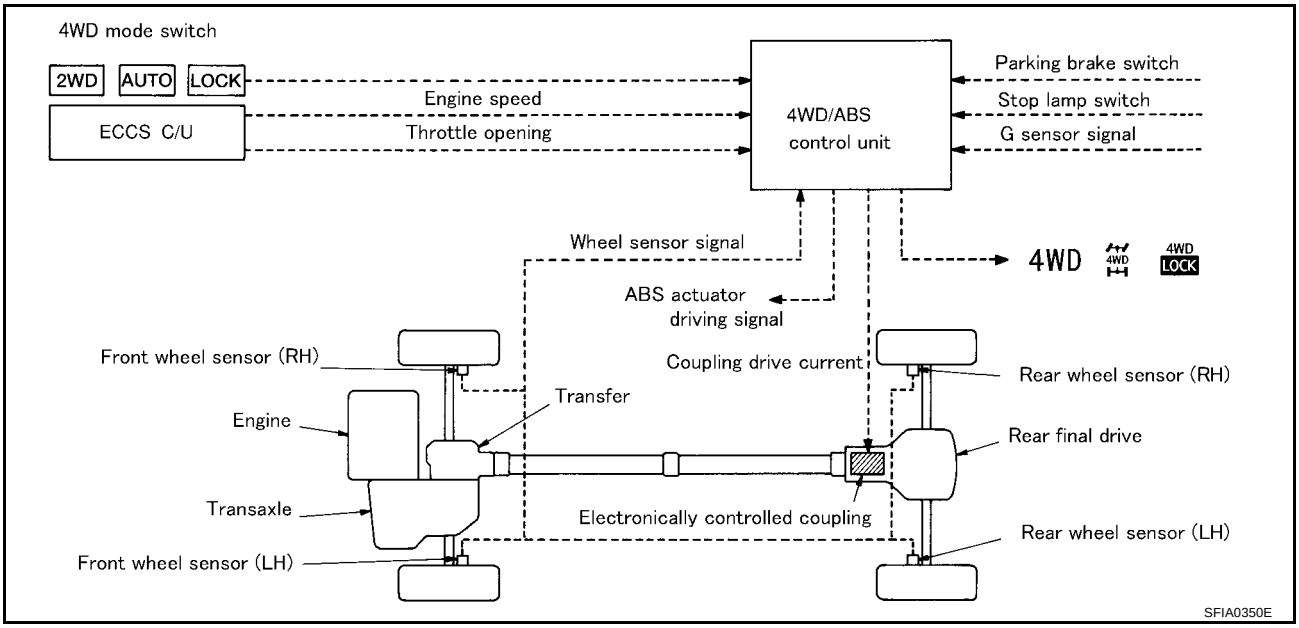
4WD FUNCTION

- Electronically controlled 4WD is controlled by the same control module as that for ABS (4WD/ABS control unit). 4WD/ABS control unit controls both electronically-controlled 4WD and ABS, based on input signals from several sensors.
- If electrical system-related malfunction occurred in 4WD/ABS system, control unit illuminates the following lamps: 4WD warning lamp and/or ABS warning lamp on meter control unit assembly. This notifies driver of malfunction. At the same time, control unit indicates malfunctioning part detected by self-diagnosis with flashing pattern of LED. Indication on electronic system diagnosis tester (CONSULT) corresponds to this flashing pattern as shown below.

Self-diagnostic test mode	Remarks
Result of self-diagnosis	Conformable to 4WD/ABS
Data monitor	Conformable to 4WD/ABS
Active test	Checks ABS solenoid valve ON/OFF, ABS motor ON/OFF, 4WD solenoid
Control unit part No.	4WD/ABS control unit

Control System Diagram

EFS001CK



TROUBLE DIAGNOSIS

PFP:00004

Fail-safe Function

EFS001BB

- If a malfunction occurs in 4WD/ABS electrical system, and control unit detects the malfunction, 4WD warning light on gauge turns ON to inform driver of system malfunction.
- When 4WD and ABS warning lamp is ON, vehicle is in 2WD.

How to Proceed with Trouble Diagnosis

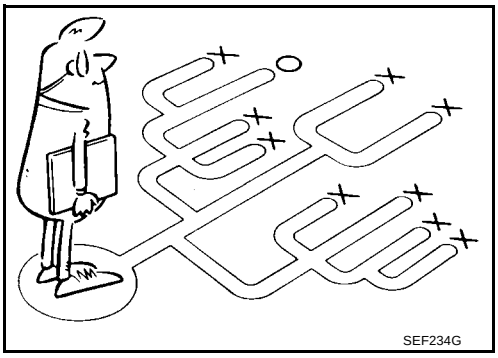
EFS001BC

BASIC CONCEPT

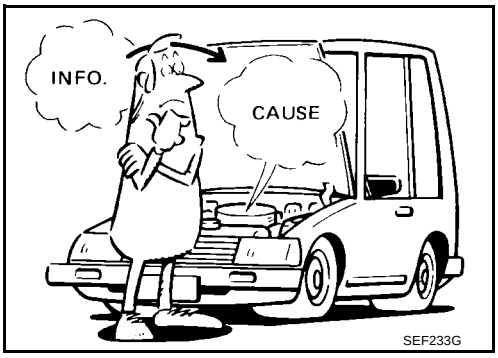
- The most important point to perform trouble diagnosis is to understand vehicle systems (control and mechanism) thoroughly.

- 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

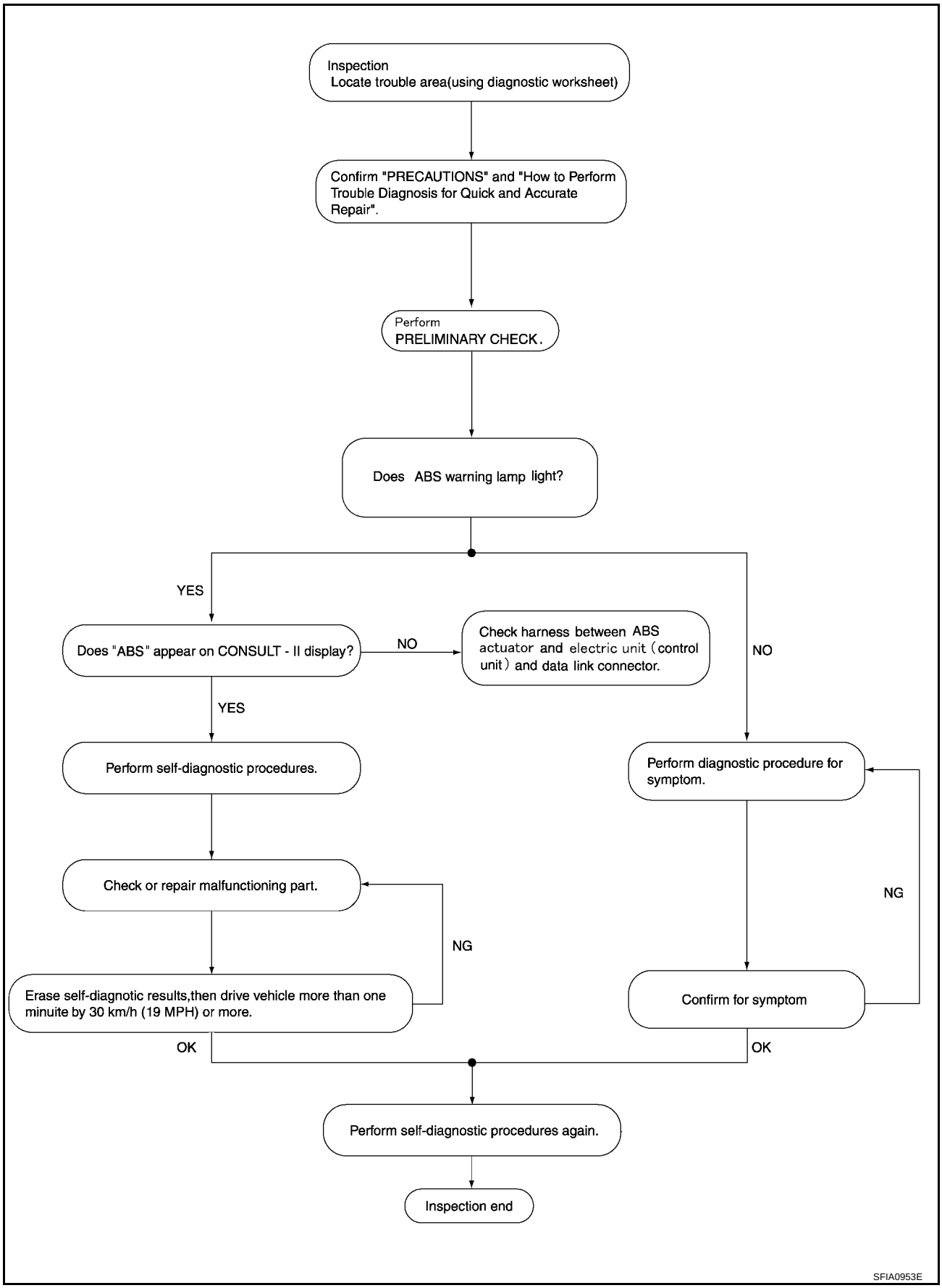
- It is essential to check symptoms right from the beginning in order to repair a malfunction completely.
  For intermittent malfunction, reproduce symptom based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are caused by poor 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-24, "Operation Procedure" .



SEF233G

- For intermittent malfunction, move harness or harness connector by hand. Then check poor contact or false open circuit.
- Always read “GI General Information” to check general to confirm general precautions.

DIAGNOSIS FLOW



ASKING COMPLAINTS

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

KEY POINTS

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

SBR339B

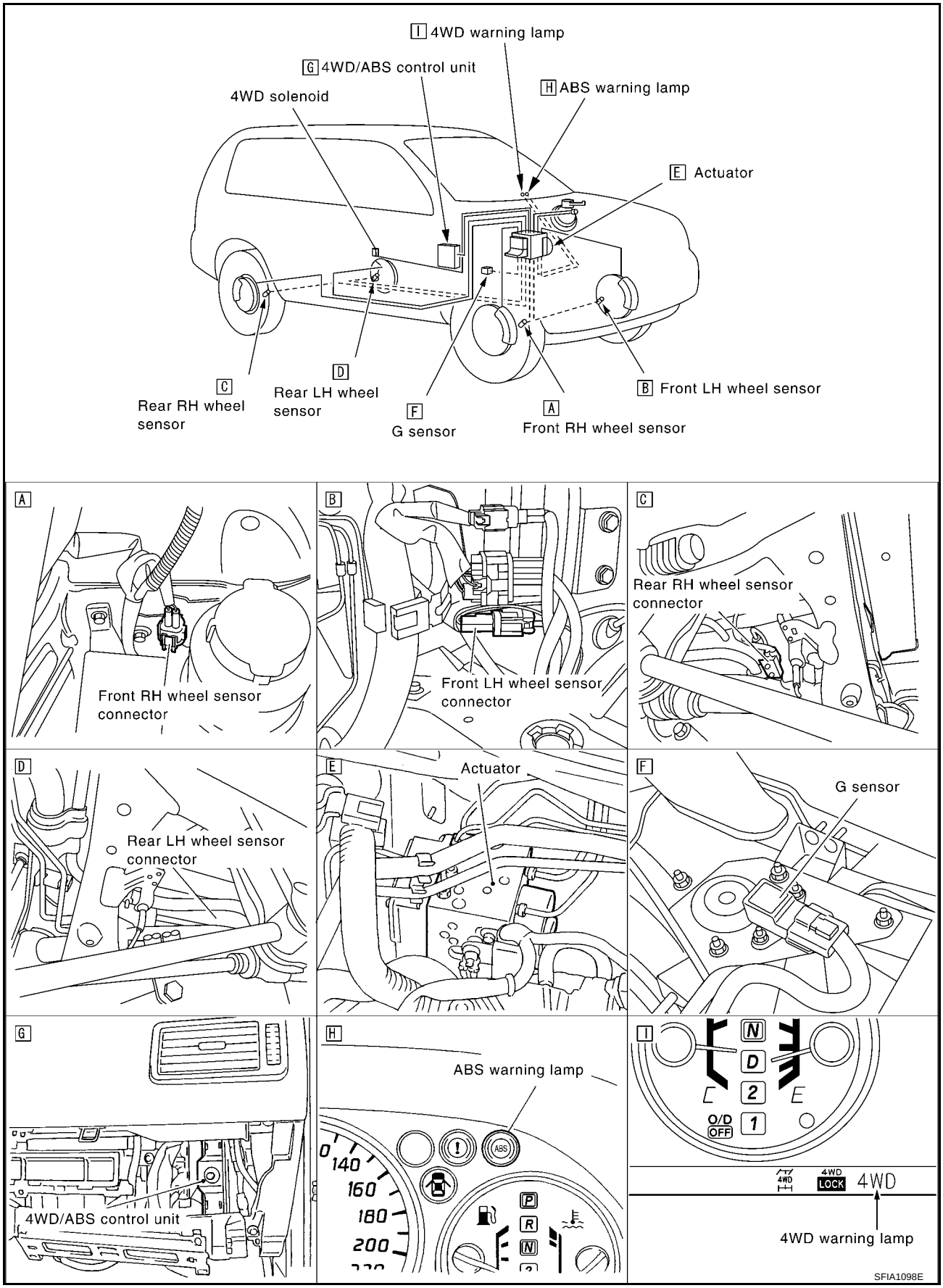
TROUBLE DIAGNOSIS SHEET - EXAMPLE

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

SFIA0029E

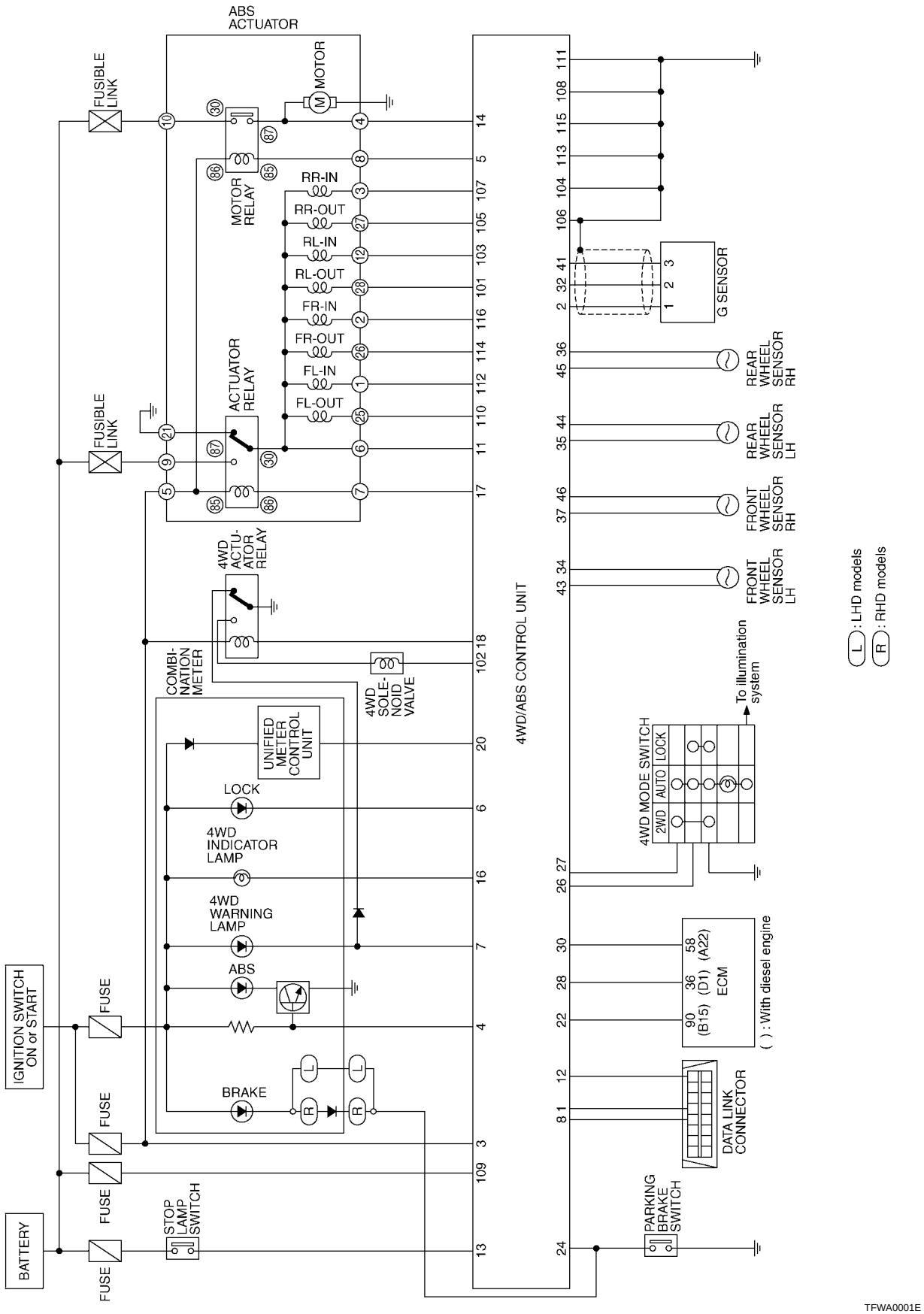
Component Parts Location

EFS001BD



Schematic

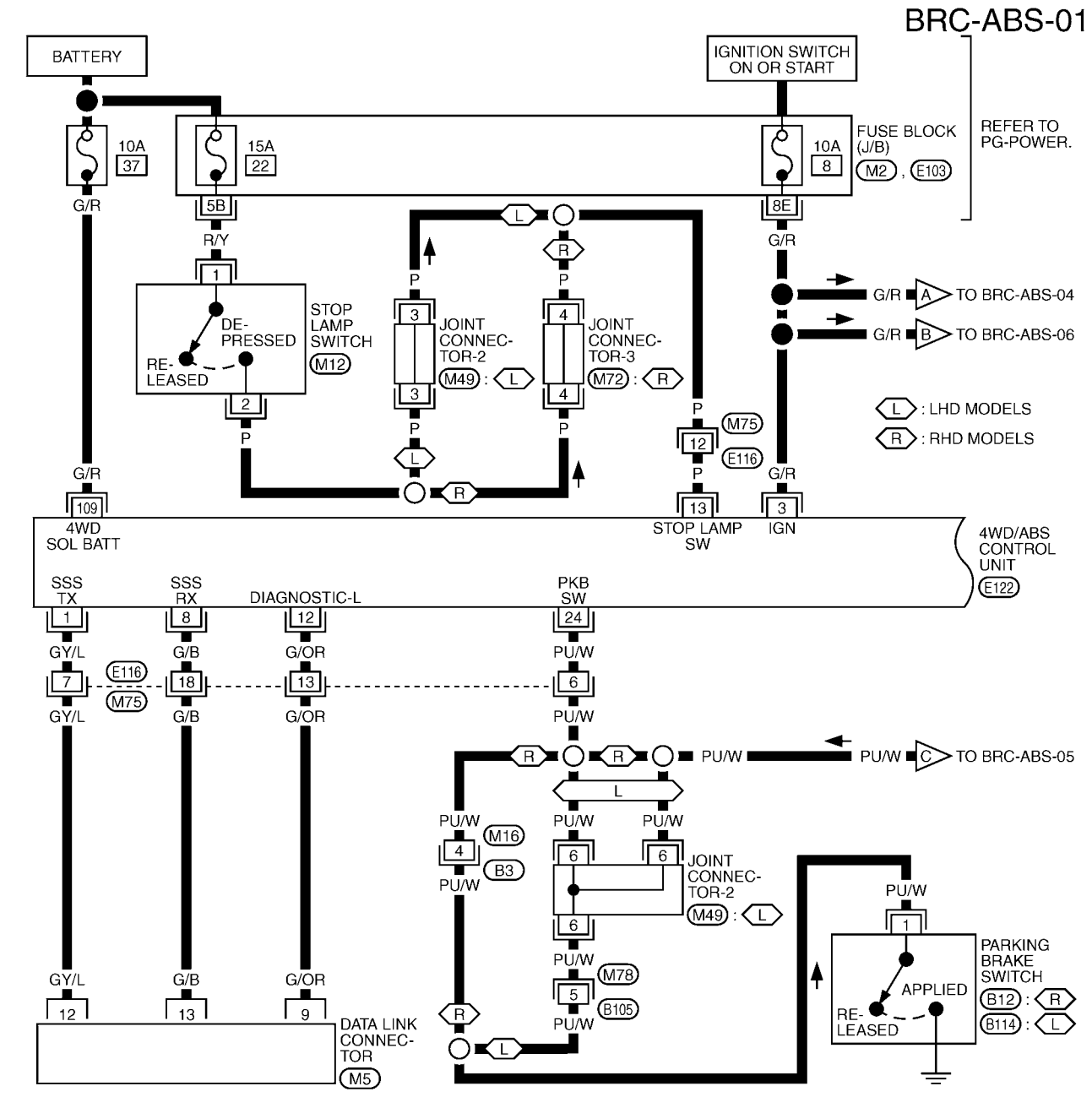
EFS001BE

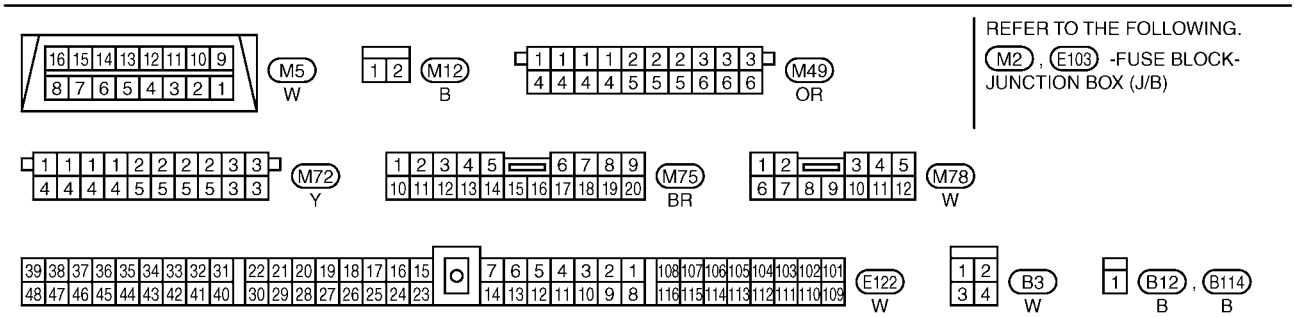


TFWA0001E

Wiring Diagram — ABS —

EFS001CL





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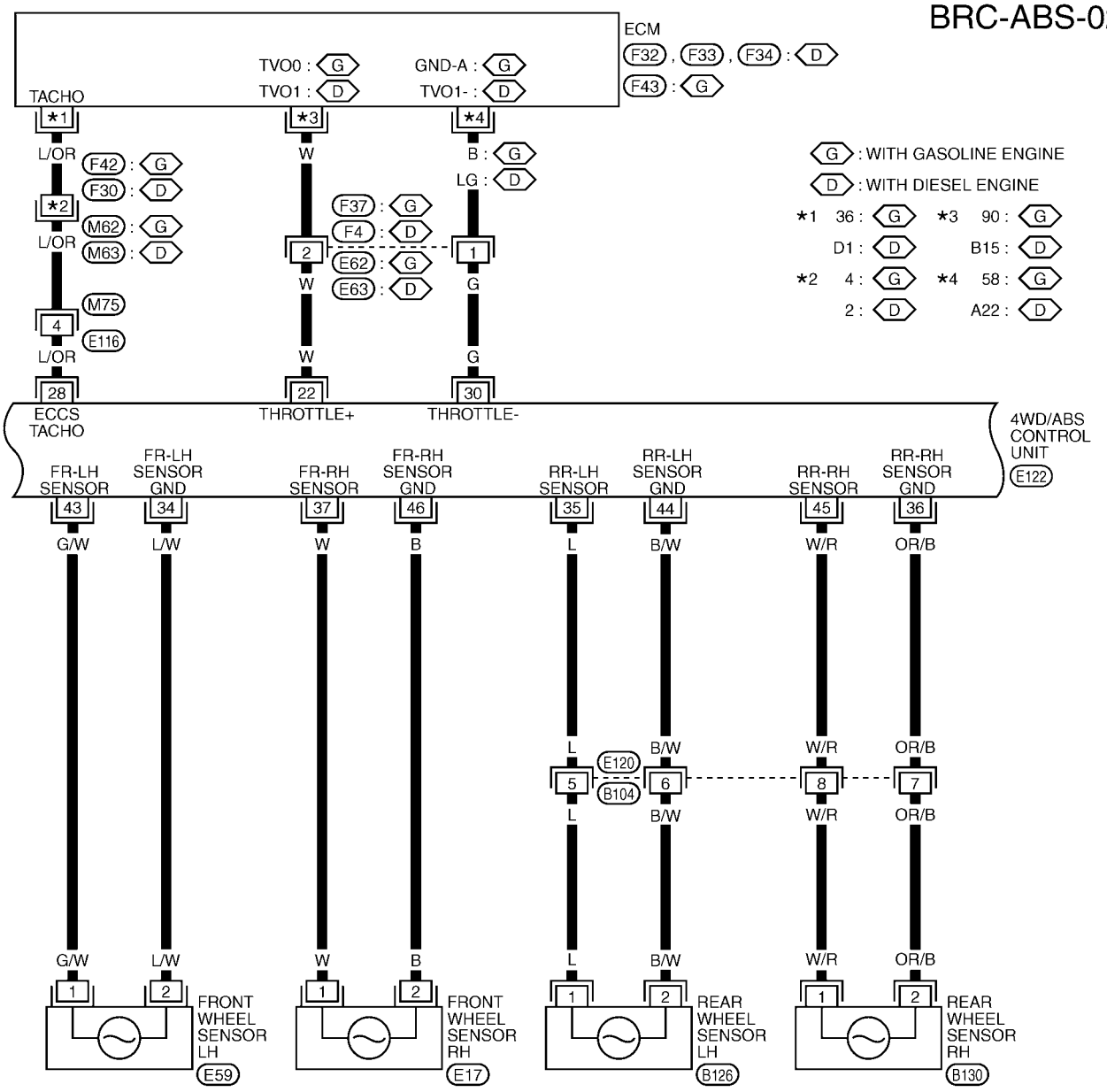
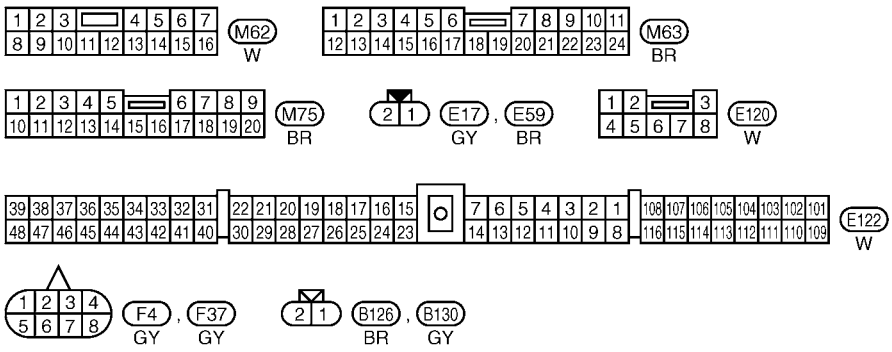
BRC-ABS-02

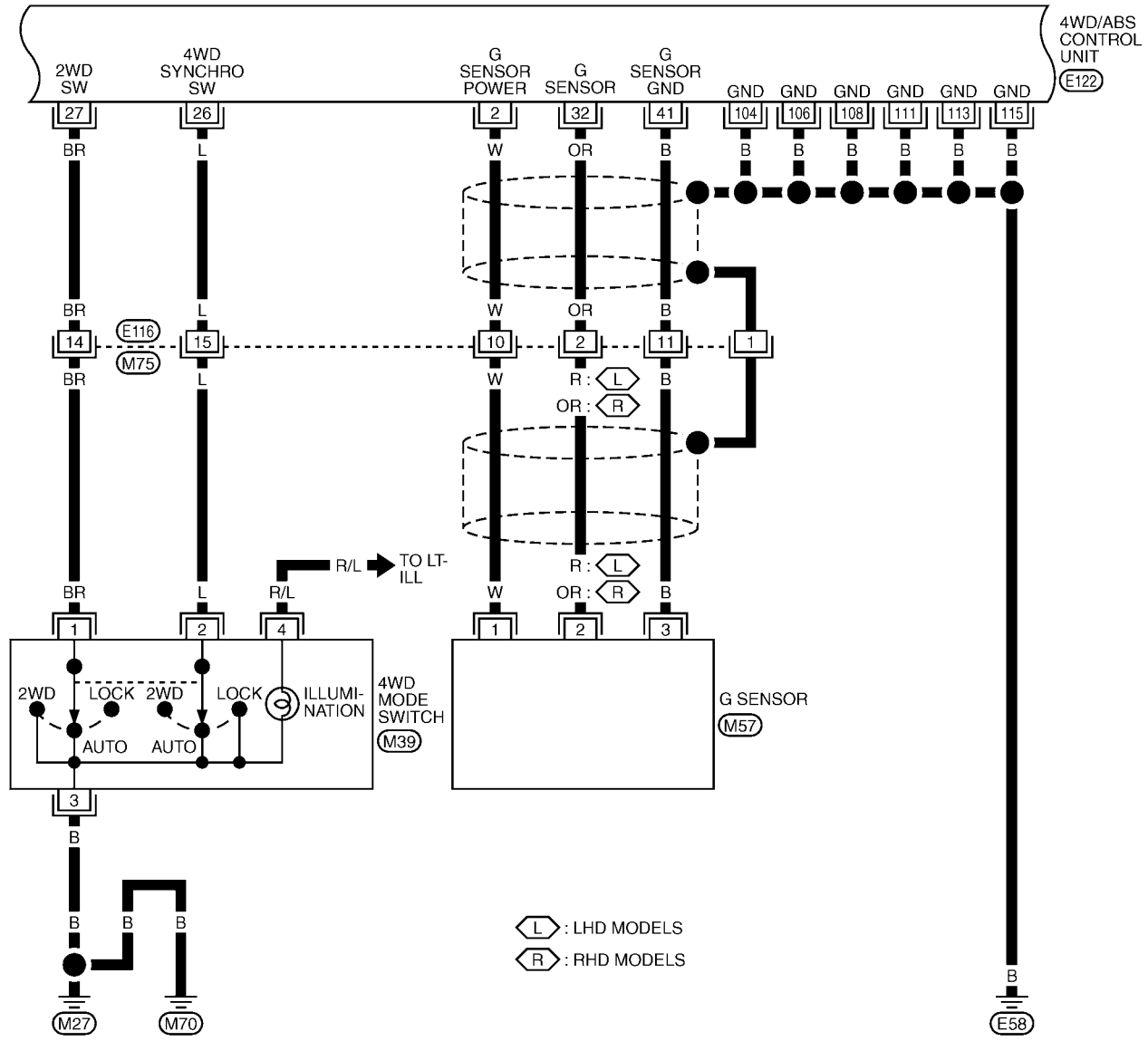


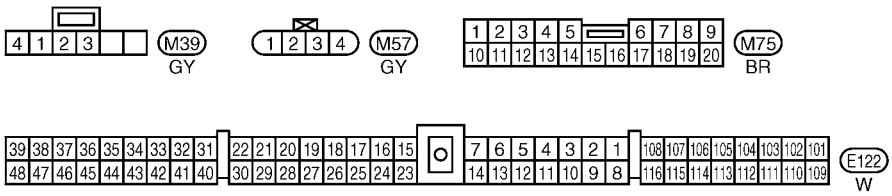


REFER TO THE FOLLOWING.
F32, F33, F34, F43
-ELECTRICAL UNITS

TFWA0003E

BRC-ABS-03





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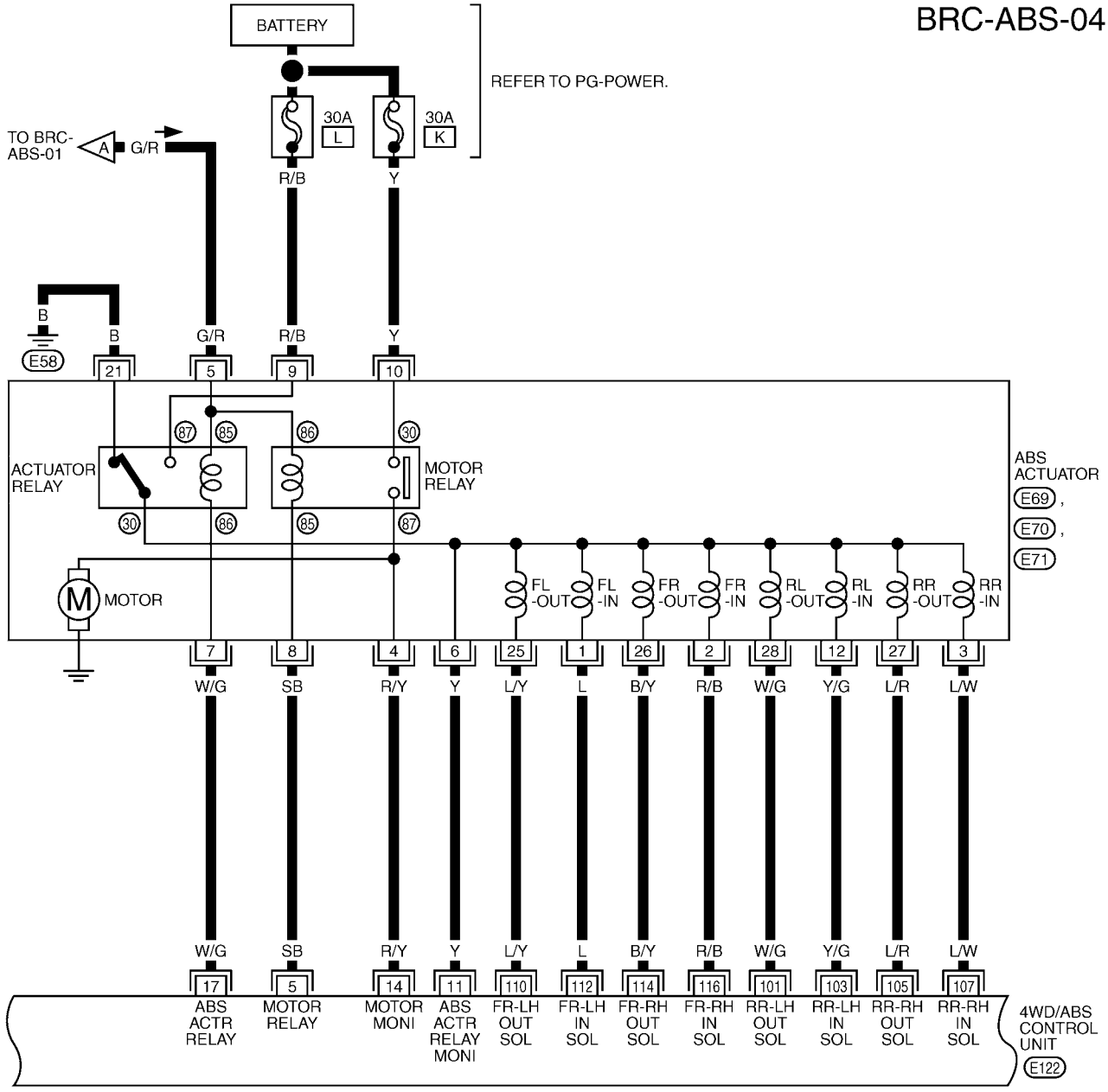
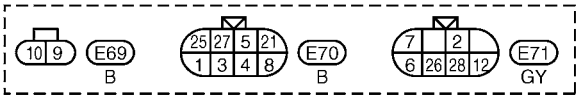
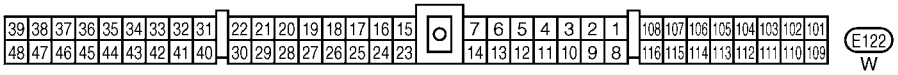
BRC-ABS-04







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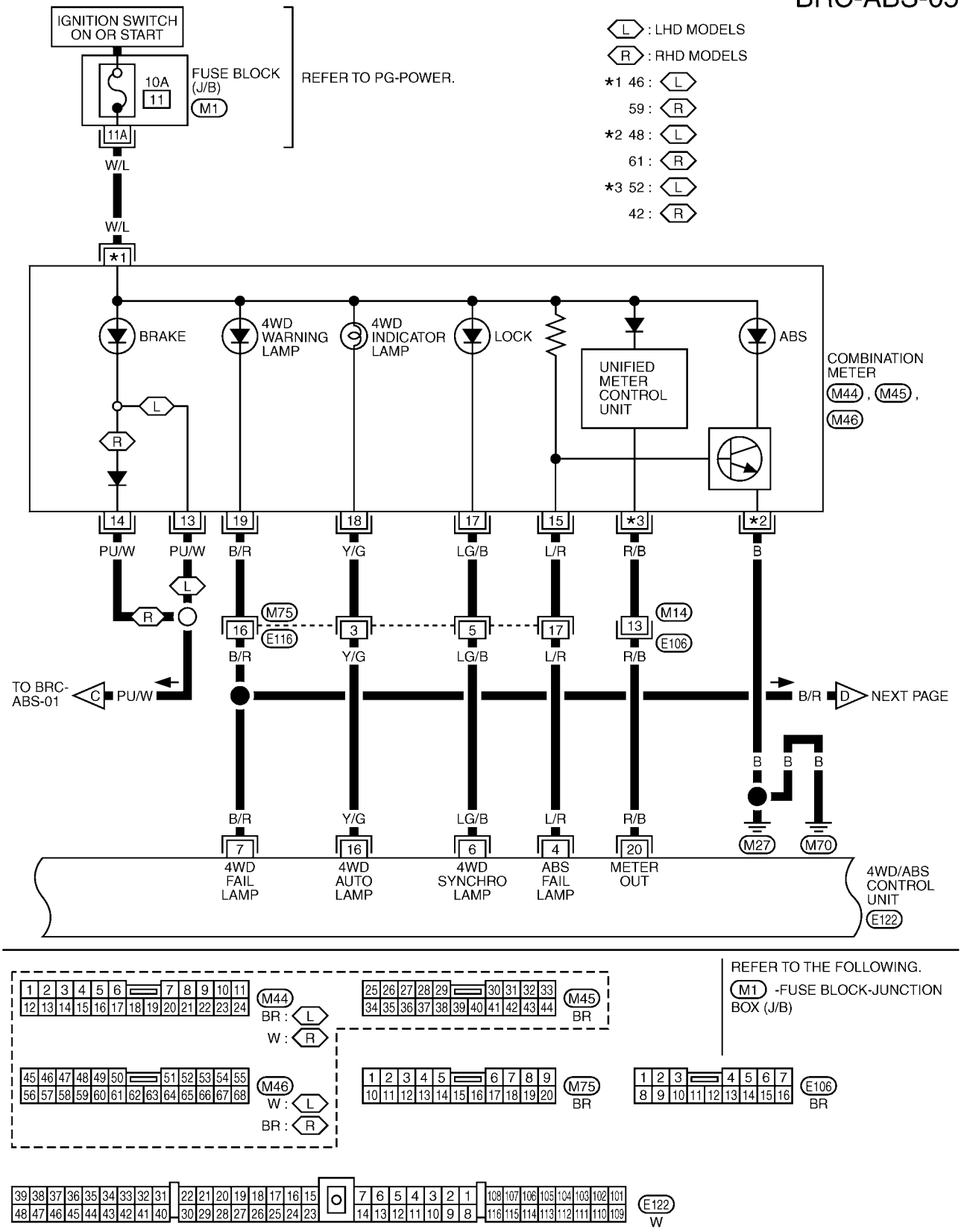
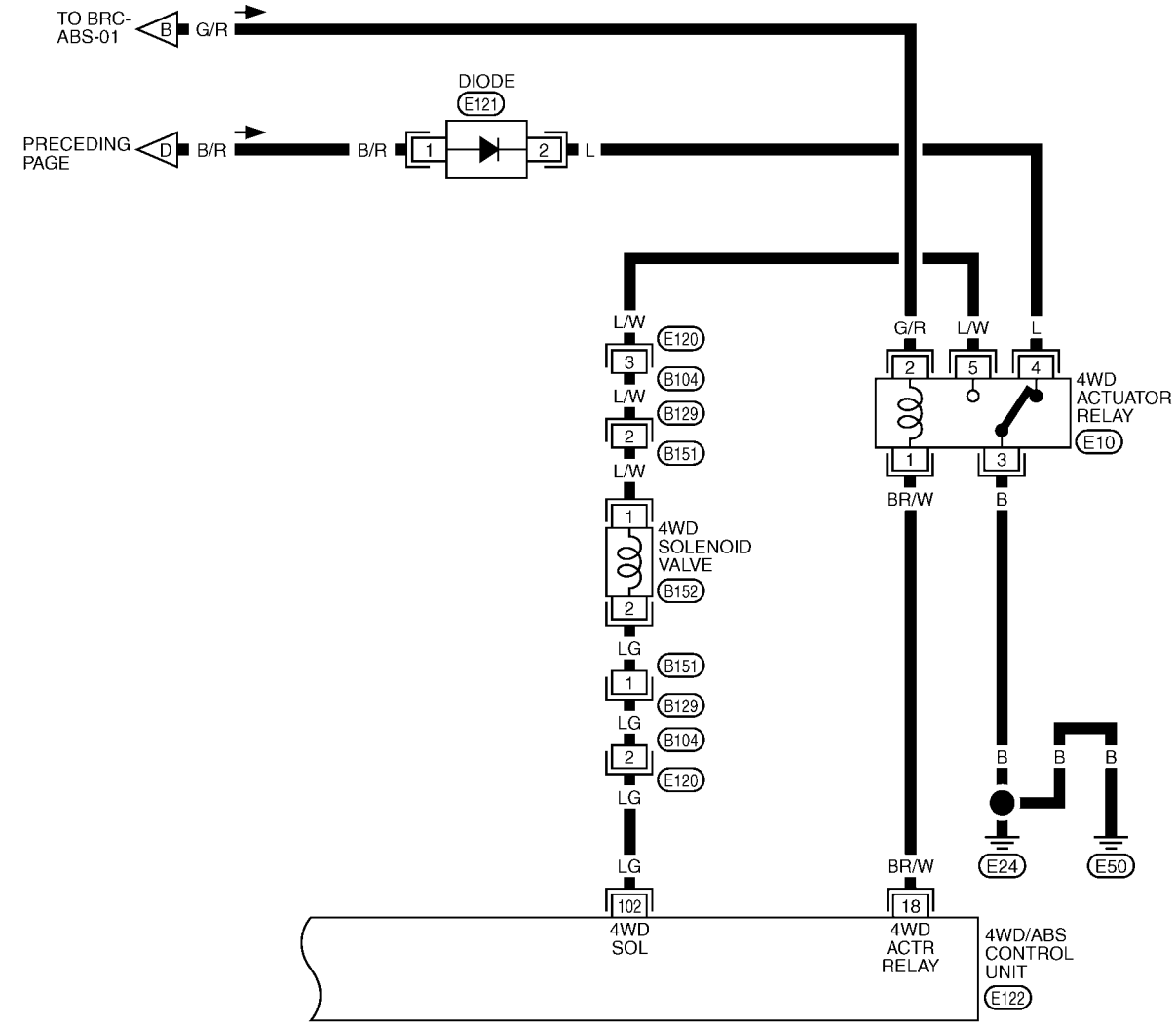
BRC-ABS-05

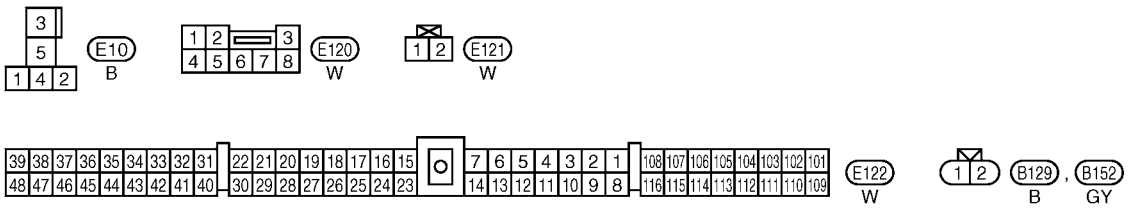


REFER TO THE FOLLOWING.
M1 -FUSE BLOCK-JUNCTION BOX (J/B)

TFWA0006E

BRC-ABS-06





TFWA0007E

Trouble Diagnosis Chart by Symptom

EFS001BF

When ABS and 4WD warning lamps illuminate, perform self-diagnosis.

Symptom	Condition	Check items	Reference page
4wd indicator lamp does not come on for approximately 1 second when the ignition switch is turned on.	IGN-ON	● Blown drive mode indicator lamp bulb ● Blown fuse between ignition and drive mode indicator lamp ● Open circuit of wiring between ignition and drive mode indicator lamp	BRC-42
ABS warning lamp does not illuminate with ignition ON. (ABS warning lamp check)	IGN-ON	● 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-42
ABS warning lamp illuminates with ignition ON, but does not illuminates after a few seconds. (ABS warning lamp has not illuminated.)	IGN-ON	● 4WD/ABS control unit connector disconnected ● Malfunction in ABS system	BRC-42
4WD warning lamp does not illuminate with ignition ON.	IGN-ON	● Blown 4WD warning lamp bulb ● Blown fuse between ignition and 4WD warning lamp ● Open circuit in wire between ignition and 4WD warning lamp ● Open circuit in wire between 4WD warning lamp and 4WD actuator relay ● Disconnected 4WD actuator relay ● Open circuit in wire between 4WD actuator relay and body ground	BRC-43
4WD warning lamp does not go out several seconds after engine is started. (Drive mode indicator lamp goes out.)	Engine running	● 4WD/ABS control unit connector disconnected ● Malfunction present in 4WD system	BRC-43
Heavy tight-corner braking symptom occurs when vehicle is driven in the following conditions: AUTO mode and steering wheel is turned fully to either sides after engine is started (Note 1, Note 2).	● Engine running ● AUTO mode ● Steering wheel fully turned	● Operation is not in AUTO mode (in 2WD or LOCK mode). ● Throttle position signal error ● Mechanical malfunction of electronically controlled coupling ● Malfunction present in 4WD system	BRC-44
Drive modes cannot be switched after engine is started.	Engine running	● Drive mode change-over switch is disconnected. ● Open circuit between drive mode change-over switch and 4WD /ABS control unit ● Open circuit between drive mode change-over switch and body ground	BRC-45
Vehicle running, 4WD warning lamp flashes rapidly. (When it flashes for Approx. One minute, then does not illuminate.) Rapid flashing: Two times flashing per 1 second	Engine running (to other than 2WD mode)	Protection function was activated due to heavy load to electronically controlled coupling. (4WD system is not malfunctioning.)	BRC-45

Symptom	Condition	Check items	Reference page
Vehicle running, 4WD warning lamp flashes slowly. (When it flashes for Approx. One minute, then does not illuminate.) slow flashing: One flashing per 2 seconds	● Engine running ● Driving at vehicle speed 30km/h (19 MPH)	Tire size is different for front and rear of vehicle.	BRC-45
Vehicle does not enter 4WD mode even though 4WD warning lamp is off.	Engine running	Mechanical malfunction of electronically controlled coupling (Mechanical engagement of clutch is not possible.)	BRC-46

CAUTION:

1. **Light tight-corner braking symptom may occur depending on driving conditions in AUTO mode. This is not malfunction.**
2. **Heavy tight-corner braking symptom occurs when vehicle is driven in the following conditions: LOCK mode, steering wheel is turned fully to either sides, and accelerator pedal was depressed.**

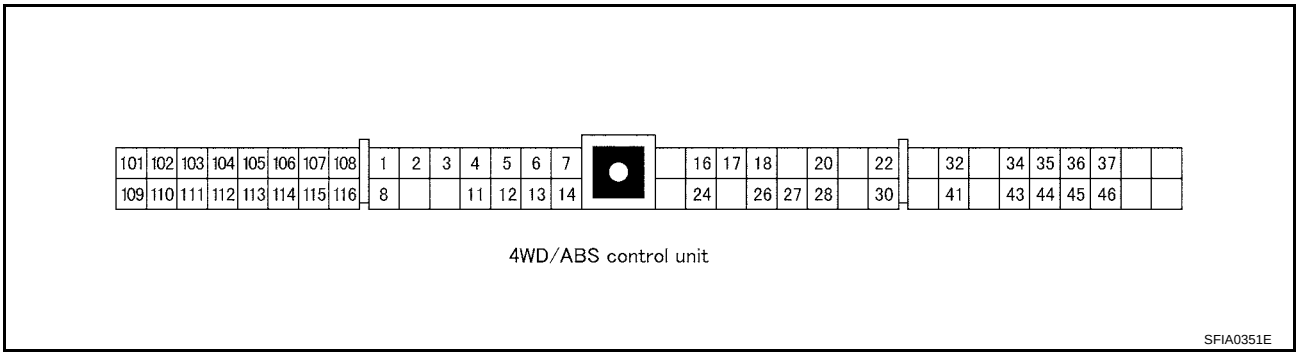
4WD/ABS Control Unit Input/Output Signal Standard

EFS001BG

4WD/ABS CONTROL UNIT CONNECTOR TERMINAL ARRANGEMENT

CAUTION:

When ignition switch is turned to ON with connectors of 4WD/ABS control unit and actuator connected.



REFERENCE STANDARD TABLE

Specifications defined by circuit tester

Terminal No.		Location	Standard (note 1)		(Note) Check points when result was malfunctioning
+	–				
3. 109		Power supply	Ignition switch ON	Battery voltage (Approx. 12V)	Control unit power supply circuit

Terminal No.		Location	Standard (note 1)		(Note) Check points when result was malfunctioning
+	–				
115	Body ground	Ground	-		Control unit ground path
113					
111					
108					
106					
104					
13		Stop lamp signal	Depress the brake pedal. Release brake pedal.	Battery voltage (Approx. 12V) Approx. 0V	Stop lamp switch and path
5		ABS MOTOR RELAY	ABS motor actuated (by active test mode of CONSULT-II) ABS motor stopped (Ignition switch is in ON)	Approx. 2 V or less Battery voltage (Approx. 12V)	ABS motor, motor relay and harness
17		ABS ACTUATOR RELAY	When actuator relay is active. (the engine running) When actuator relay is inactive. (In fail-safe mode, before starting engine)	Approx. 2 V or less Battery voltage (Approx. 12V)	ABS actuator relay and harness
116		Front RH wheel IN solenoid	Actuator is activated (by active test mode of CONSULT-II) or actuator relay is not activated (In fail-safe mode, before starting engine) Actuator is not activated and actuator relay is activated (Vehicle stopped with engine running)	Approx. 0V Battery voltage (Approx. 12V)	ABS solenoid valve path
114		Front RH wheel OUT solenoid			
112		Front LH wheel IN solenoid			
110		Front LH wheel OUT solenoid			
107		Rear RH wheel IN solenoid			
105		Rear RH wheel OUT solenoid			
103		Rear LH wheel IN solenoid			
101		Rear LH wheel OUT solenoid			
7		4WD warning lamp (Note 2)	4WD warning lamp ON 4WD warning lamp OFF	Approx. 0V Battery voltage (Approx. 12V)	4WD warning lamp and harness
4		ABS warning lamp (Note 3)	ABS warning lamp ON ABS warning lamp OFF	Approx. 0V Battery voltage (Approx. 12V)	ABS warning lamp and path
16		AUTO indicator lamp	AUTO indicator lamp ON AUTO indicator lamp OFF	Approx. 0V Battery voltage (Approx. 12V)	AUTO indicator lamp and harness
6		LOCK indicator lamp	LOCK indicator lamp ON LOCK indicator lamp OFF	Approx. 0V Battery voltage (Approx. 12V)	LOCK indicator lamp and harness
46	37	FR RH SENSOR	At vehicle rotating (Approx. 30km/h(19MPH))	Pulse generation Approx. 200Hz	Speed sensor and harness
34	43	FR LH SENSOR			
36	45	RR RH SENSOR			
44	35	RR LH SENSOR			

Terminal No. +	Terminal No. –	Location	Standard (note 1)		(Note) Check points when result was malfunctioning
102	Body ground	4WD solenoid valve (E-TS solenoid valve) (Note 4)	At vehicle stop engine idling	Battery voltage (Approx. 12V)	4WD actuator relay solenoid valve and harness
18		4WD actuator relay	At vehicle stop engine idling	2 V or lower	4WD actuator relay and harness
2		G - sensor power supply	At ignition switch ON (vehicle horizontal stop condition)	Approx. 8 V	G -sensor and harness
32		Longitudinal G - sensor		Approx. 2.5V	
41		G -sensor ground		Approx. 0V	
22		Throttle position sensor	Wide open throttle Closed throttle	Approx. 4.0 V Approx. 0.5 V	Throttle position sensor and harness
24		Parking brake switch	In parking position In other than parking position	-	Parking brake switch and harness
26		Drive mode change-over switch AUTO	Drive mode change-over switch: 2WD Drive mode change-over switch: other than 2WD	SW ON: Approx. 0 V SW OFF: Approx. 5 V	Drive mode change-over switch and path
27		Drive mode change-over switch LOCK	Drive mode change-over switch: LOCK Drive mode change-over switch: other than LOCK	SW ON: Approx. 0 V SW OFF: Approx. 5 V	Drive mode change-over switch and path

NOTE:

1. If a circuit tester for measuring voltage is used for the check, do not forcibly extend any connector terminals.
2. 4WD 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)
3. 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)
4. Unit name is indicated by the name used in circuit diagram (4WD solenoid valve). However, it is “E-TS solenoid” in CONSULT-II data.

Specifications defined by 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) is open or shorted.

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 (MPH)	Wheel speed sensor and harness
		While driving (note:1)	Almost in accordance with speedometer display (within ±10%)	
LONGITUDINAL G-SENSOR (4WD models)	G -sensor operating condition	With vehicle stopped on flat road.	plus; 0.15 G	G -sensor and harness

Items to be monitored	Contents	Data monitor		(Reference) Check points when result was malfunctioning
		Condition	Reference values in normal operation	
Throttle position sensor [V]	Throttle valve open/ close condition	Closed throttle to wide open throttle	When closed throttle: Approx. 0.5V	Throttle position sensor and harness
			When wide open throttle: Approx. 4.0 V	
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 (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 (solenoid valve) is not activated and actuator relay is activated (vehicle stopped with (Engine running)	OFF	
E-TS solenoid valve (A) (4WD solenoid valve)	4WD solenoid valve current supply monitoring condition	In LOCK mode, at starting vehicle (when accelerator pedal was depressed)	Approx. 2.8 A	E-TS solenoid valve (4WD solenoid valve) and harness
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 condition	(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	
E-TS actuator relay (4WD actuator relay) (ON/OFF)	E-TS actuator relay (4WD actuator relay) activation condition	Vehicle stopped (Ignition switch ON)	OFF	E-TS actuator relay (4WD actuator relay) and harness
		Engine running	ON	
Warning lamp (ON/ OFF)	ABS warning lamp ON condition (Note 2)	ABS warning lamp ON condition	ON	ABS warning lamp and path
		ABS warning lamp OFF condition	OFF	
G-SENSOR POWER (4WD) [V]	G -sensor power supply condition	With vehicle stopped on flat road.	Approx. 8V (reference value)	G -sensor and harness
POWER VOLTAGE (V)	Battery voltage supplied to control module	Ignition switch ON	Approx. 10 - 16 V	Control unit power supply circuit
4WD WARNING LAMP [ON/OFF]	4WD warning lamp ON condition	4WD warning lamp ON	ON	4WD warning lamp and harness Refer to “4WD Warning Lamp”.
		4WD warning lamp OFF	OFF	

Items to be monitored	Contents	Data monitor		(Reference) Check points when result was malfunctioning
		Condition	Reference values in normal operation	
4WD MODE SWITCH (ON/OFF)	Input condition of drive mode change-over switch	Engine running, vehicle stopped, switch pressed	-	Drive mode change-over switch and path
4WD MODE MONITOR	Output condition of drive mode indicator lamp signal	Engine running, vehicle stopped	Using drive mode change-over switch	Drive mode indicator lamp and path
IMPROPER SIZE TIRE MONITOR (mm)	Improper size tire installed condition	-	0 - 4, 4 - 8	Front/Rear tire size difference, wear condition
PARKING BRAKE SWITCH (ON/OFF)	Parking brake switch operating condition	Parking brake depressed	ON	Parking brake switch and harness
		Parking brake not depressed	OFF	
METER OUTPUT (km/h)	Output condition of vehicle speed for speedometer	Wheel stopped	0 km/h	Speed meter and harness
		Vehicle running	Almost in accordance with the wheel speed sensor display	

NOTE:
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

EFS001BH

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	×	–	–
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	×	–	–
ABS MOTOR	×	–	×
Longitudinal G -sensor	×	×	–

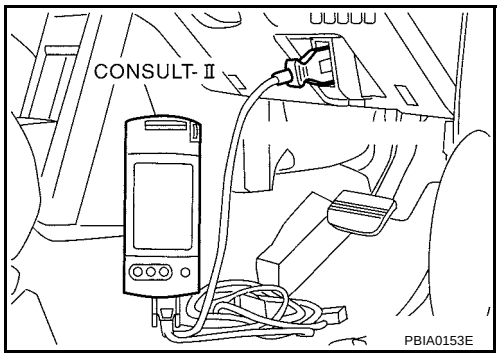
Item	Self-diagnosis	Data monitor	Active test
4WD solenoid valve	×	×	×
4WD actuator relay	–	×	–
Engine speed signal	–	×	–
Throttle position sensor	×	×	–
Improper size tire monitor	–	×	–
4WD mode monitor	–	×	–
4WD warning lamp	–	×	–
Stop lamp switch	–	×	–
Parking brake switch	–	×	–
Meter output	–	×	–

×: Applicable
–: Not applicable

SELF-DIAGNOSIS

Operation Procedure

1. After obtaining customer's information, perform BRC-32, "Basic Inspection" .
2. After turning ignition switch OFF, connect CONSULT-II connector to data link connector on vehicle.
3. Start engine and drive at Approx. 30 km/m (19 MPH) for Approx. 1 minute.
4. Stop vehicle. With engine at idle, touch “START”, “ABS” and “SELF-DIAG RESULTS” on CONSULT-II screen in this order.



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

5. Self-diagnosis result is displayed. (If necessary, touch “PRINT” to print self-diagnosis result.)
   - If “NO MALFUNCTION” is displayed, check ABS warning lamp. Refer to BRC-32, "BASIC INSPECTION 3 ABS/4WD WARNING LAMP INSPECTION" .
6. Check the faulty part indicated by the chart to repair or replace.
7. Start engine and drive at Approx. 30 km/m (19 MPH) for Approx. 1 minute.

CAUTION:
- **Check again to make sure that there is NO FAILURE on other parts.**
- **If wheel speed sensor [SHORT] is detected, ABS warning lamp does not turn off until following conditions: Vehicle is driven at Approx. 30km/h (19 MPH) for Approx. 1 minute, even in normal conditions.**

8. Turn OFF ignition switch to prepare for erasing memory.
9. Start engine. Touch “START,” “ABS,” “SELF-DIAG RESULTS,” and “ERASE MEMORY” on CONSULT-II screen in this order to erase fault memory.

CAUTION:
If memory cannot be erased, proceed to 6.

10. Drive at Approx. 30 km/m (19 MPH) for Approx. 1 minute. Be sure ABS warning lamp is OFF.

Display Item List

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

Faulty lines	Malfunction detecting condition	Check harness
ABS actuator relay [ON error]	ABS actuator relay turned ON wheel it is controlled OFF.	ABS actuator relay and harness
ABS ACTUATOR RELAY [OFF malfunction]	ABS actuator relay turned OFF wheel it is controlled ON.	
BATTERY VOLTAGE [VB-HIGH]	4WD control module power voltage is excessively high.	Control unit power supply circuit
BATTERY VOLTAGE [VB-LOW]	4WD control module power voltage is excessively low.	
DECEL G-SENSOR	Longitudinal G -sensor output voltage is outside specification.	G -sensor harness
G-SENSOR VOLTAGE	Power voltage of longitudinal G -sensor remains irregularly high or low for a certain period of time.	
ETS SOLENOID (4WD solenoid valve) (OPEN)	4WD solenoid valve control terminal is not supplied with proper voltage due to open circuit in 4WD solenoid valve.	4WD actuator relay, solenoid, and harness
ETS SOLENOID (4WD solenoid valve) (Short)	4WD solenoid valve control terminal is not supplied with proper voltage due to short circuit in 4WD solenoid valve.	
ETS SOLENOID (4WD solenoid valve) (CURRENT FAILURE)	Current supplied to 4WD solenoid valve is irregularly high or low compared with the specification.	
CONTROL UNIT	Processing function of 4WD/ABS control unit is malfunctioning.	4WD/ABS control unit, power and ground circuits
DECEL G-SEN MONI	Output voltage of longitudinal G -sensor is outside specification	G -sensor harness
DECEL G-SEN IN	Output voltage of longitudinal G -sensor is outside specification	G -sensor harness
3 V POWER SUPPLY CHECK	4WD/ABS control unit internal 3V power supply is malfunctioning	Control unit power supply circuit
4WD A/R CHECK	4WD actuator relay turned ON while it is controlled OFF.	4WD actuator relay, 4WD solenoid and harness.
4WD SOL/V CHECK	4WD solenoid not supplied with proper voltage due to open circuit in 4WD solenoid valve.	
CAN COMM	● CAN communication function of 4WD control units is not malfunctioning. ● CAN communication function of EPS control unit, ECM is malfunctioning.	CAN communication system of 4WD control unit.
ABS 4WD COMM	4WD/ABS control unit internal 3V power supply is malfunctioning	EPS control unit and harness

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

CAUTION:
If "ALL MODE 4WD" is not displayed on system selection screen, check the following: 4WD actuator and control unit, data link connector harness, and No. Of CONSULT-II program card

DATA MONITOR

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

Operation Procedure

1. Turn the ignition switch to OFF.
2. Connect CONSULT-II connector to data link connector on vehicle.
3. Turn ignition switch ON.
4. Touch "START" on the display.
5. Touch "ALL MODE 4WD" on display.

   CAUTION:
   "ALL MODE 4WD" may not be displayed on the system selection screen in the following case: When "START" was touched just after engine is started or ignition switch is turned to ON. In this case, repeat procedure from step 2.
6. Touch "DATA MONITOR".

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

Display Item List

Item (Unit)	Monitor item selection			Remarks
	Control module input item	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.
RR RH SENSOR (km/h)	×	×	×	Wheel speed calculated by rear RH wheel sensor signal is displayed.
RR LH SENSOR (km/h)	×	×	×	Wheel speed calculated by rear LH wheel sensor signal is displayed.
DECEL G-SENSOR	×	×	×	Condition of G -sensor is displayed.
THRTL POS SEN	×	×	×	Indicates throttle position sensor signal voltage
STOP LAMP SW	×	×	×	Operating condition of ABS warning lamp by control unit is displayed.
ENGINE SPEED SIG (STOP/RUN)	×	×	×	Condition of stop lamp switch (ON/OFF) 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.

Item (Unit)	Monitor item selection			Remarks
	Control module input item	Main item	Item menu selection	
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.
E-TS SOLENOID (A)	–	×	×	Current supplied to E-TS solenoid valve
ACTUATOR RLY (ON/OFF)	–	×	×	Condition of ABS actuator relay (ON/OFF) is displayed.
MOTER RLY (ON/OFF)	–	×	×	Condition of ABS motor relay (ON/OFF) is displayed.
E-TS ACTUATOR	–	×	×	E-TS actuator relay ON/OFF condition
WARNING LAMP (ON/OFF)	–	×	×	Indicates ABS warning lamp operating condition
G-SEN VOLT (V)	×	–	×	Condition of G -sensor (ON/OFF) is displayed.
BATTERY VOLT	×	–	×	Indicates voltage supplied by 4WD/ABS control unit
4WD WARNING LAMP	–	×	×	Indicates 4WD warning lamp operating condition
4WD MODE SW	–	×	×	4WD mode recognized by control module
4WD MODE MON	–	×	×	Output condition of drive mode indicator lamp signal
DIS TIRE MONI (mm)	–	×	×	Improper size tire installed condition
PARK BRAKE SW (ON/OFF)	–	×	×	Indicates parking brake switch ON/OFF condition
SPEED MTR O/P (km/h)	–	×	×	Indicates vehicle speed recognized by meter control unit
VOLTAGE	–	–	×	Displays values measured by voltage probe
FREQUENCY	–	–	×	Refer to CONSULT operation manual.

×: Applicable
–: Not applicable

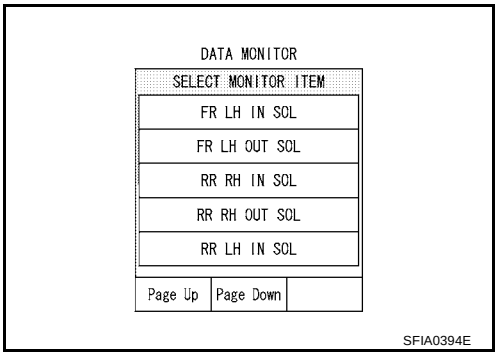
ACTIVE TEST

Operation Procedure

CAUTION:

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

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



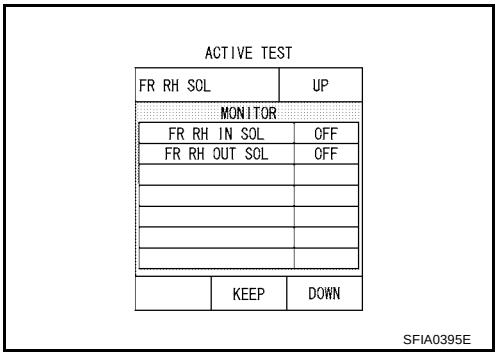
7. Touch “START” with “MAIN SIGNALS” line inverted.
8. Active test screen is displayed.

Display Item List

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

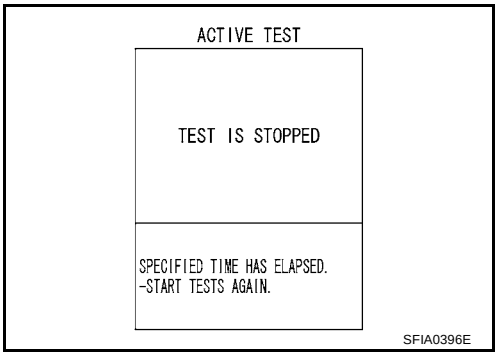
Operation	Up	Keep	Down
ABS inlet S/V	OFF	ON	ON
ABS outlet S/V	OFF	OFF	ON*

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



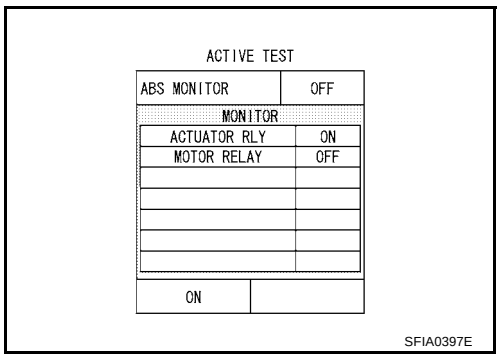
NOTE:

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



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

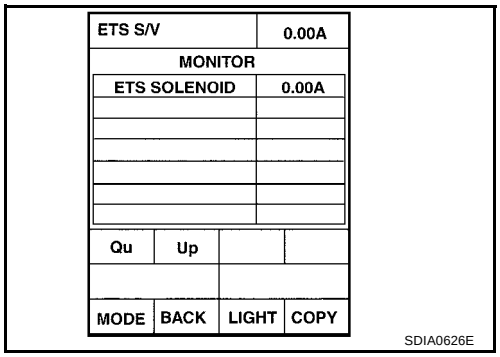
Operation	ON	OFF
ABS actuator	ON	ON
ABS motor	ON	OFF



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

Active test
4WD solenoid valve
Under the vehicle stopped with engine running, touch UP, DOWN on screen. Adjust 4WD solenoid command current.
Check the monitor current at that time. If monitor current is within Approx. ±10%, light switch is normal.

CAUTION:
Do not continuously energize solenoid for long period of time.



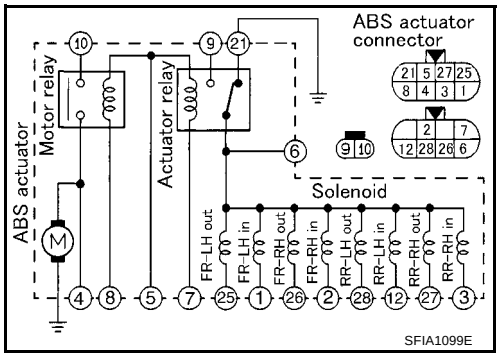
Component Inspection

EFS001BJ

ABS ACTUATOR

- Disconnect each ABS actuator E69, E70, E71 connector. Confirm continuity and resistance value between each pair of ABS actuator-side terminal.

  CAUTION:
  Be sure ABS motor is securely grounded.



Continuity Exists, Resistance Value

Item	ABS actuator connector terminal number															Body ground	Condition
	6	21	9	4	10	5	7	8	25	1	26	2	28	12	27	3	
Actuator relay	○——○					Open (0V) ○——○											Terminal No. 5 — 7 Open (0V)
	○—×—○					12V ○——○											Terminal No. 5 — 7 Add 12V
Motor relay				○—×—○		Open (0V) ○——○											Terminal No. 5 — 8 Open (0V)
				○——○		12V ○——○											Terminal No. 5 — 8 Add 12V
Relay coil						Approx. 100Ω ○—W—○ Approx. 100Ω											Check resistance
ABS solenoid	2.9~6Ω ○—W—○ 5.2~10.6Ω ○—W—○ 2.9~6Ω ○—W—○ 5.2~10.6Ω ○—W—○ 2.9~6Ω ○—W—○ 5.2~10.6Ω ○—W—○ 2.9~6Ω ○—W—○ 5.2~10.6Ω ○—W—○																
ABS motor				○——○												○	—

○——○ : Conductivity
○—×—○ : Not conductivity
0V ○——○ : Open between teminals (0V)
12V ○——○ : Add 12V between terminals
Approx.100V ○—W—○ : Resistance between terminals is approx.100 Ω.
2.9~6Ω ○—W—○ : Resistance between terminals is 2.9 – 6 Ω.

SFIA0930E

Insulation Inspection

- Check resistance value between each pair of ABS solenoid connector E71 terminal No.6 and E70 and E71 terminals No.1, 2, 3,12, 25, 26, 27, 28.

Standard : 5.8 - 21.2 Ω

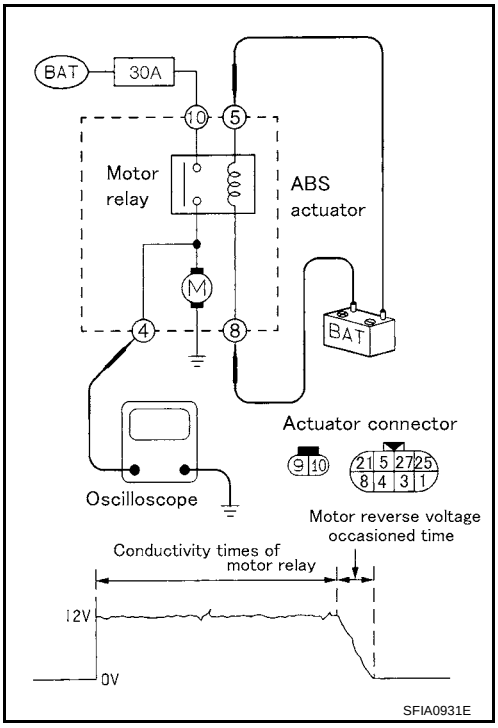
ABS Motor Operation Inspection

1. Connect 2-pin connector on ABS actuator harness connector E69 terminals No. 9 (R/B) and No. 10 (Y).
2. Apply voltage of Approx. 12V voltage between connector E70 terminal No. 5 and E70 terminal No. 8 on ABS relay unit. Measure motor voltage (E70 terminal No. 4 - Body ground) using an oscilloscope and check motor counter electromotive force duration when operation stops.

Motor counter electromotive force duration:
0.1 second or longer

CAUTION:

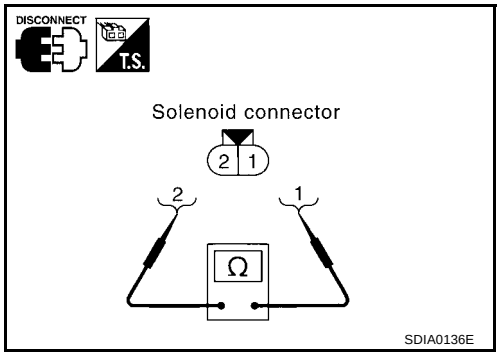
- **Before measuring time, check each part of ABS relay unit and confirm motor relay is normal.**
- **To prevent overheating, ABS motor should be driven no longer than 4 seconds.**
- **Motor counter electromotive force duration is based on the time at 20°C, in ambient temperatures, with 12V battery voltage. If battery voltage is low, time will be slightly shorter.**



4WD SOLENOID VALVE

- Disconnect connector B152 and measure resistance between terminals No. 1 and No. 2.

  4WD solenoid valve 1 - 2 : Approx. 2.45 Ω



Basic Inspection

EFS001BK

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 for leaks. If a leak or oozing is detected, check as follows:
   - If connections at ABS actuator 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 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 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, wipe with a clean cloth. Check again for leaks, and if there is still leak or oozing, replace ABS actuator.

     CAUTION:
     ABS actuator 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/4WD 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. Check 4WD warning lamp illuminates with ignition switch ON. If not so, check 4WD warning lamp path.
3. 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.
4. Be sure 4WD warning lamp turns off after several seconds when engine is started. If it does not turn off, perform self-diagnosis.
5. After driving the vehicle at Approx. 30km/h (19MPH) for a few seconds, check 4WD warning lamp and ABS warning lamp do not illuminate.
6. After completing the self-diagnosis, always erase the diagnosis memory.

Wheel Sensor System

EFS001BL

INSPECTION PROCEDURE

1. TIRE INSPECTION

Check tire 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?

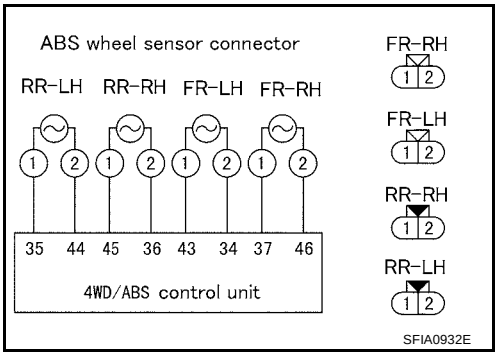
YES >> GO TO 3.
NO >> Replace sensor rotor.

3. CHECK THE CONNECTOR

1. Remove both the malfunctioning wheel sensor (identified at control unit) and the 4WD/ABS control 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.



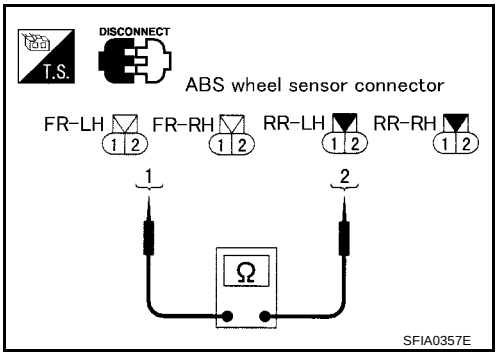
4. CHECK WHEEL SENSOR.

Check internal resistance of wheel sensor.

Resistance : 1.44 - 1.76 kΩ

Is inspection result OK?

YES >> GO TO 5.
NO >> Replace wheel speed sensor.

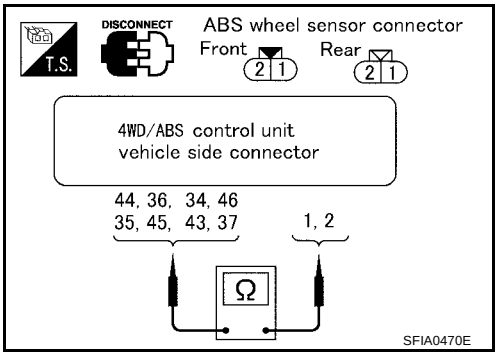


5. CHECK WHEEL SENSOR CIRCUIT.

1. Disconnect control unit connector and wheel sensor connector.
2. Check continuity between the 4WD/ABS control unit harness connector E122 terminal N0.43 (G/W), 34 (L/W), 37 (W), 46 (B), 35 (L), 44 (B/W), 45 (W/R), 36 (OR/B) and wheel sensor harness connector E59 No.1 (G/W), 2 (L/W), E17 No.1 (W), 2 (B), B126 No.1 (L), 2 (B/W), B130 No.1 (W/R), 2(OR/B)

Is inspection result OK?

YES >> Replace 4WD/ABS control unit.
NO >> Repair or replace the harness.

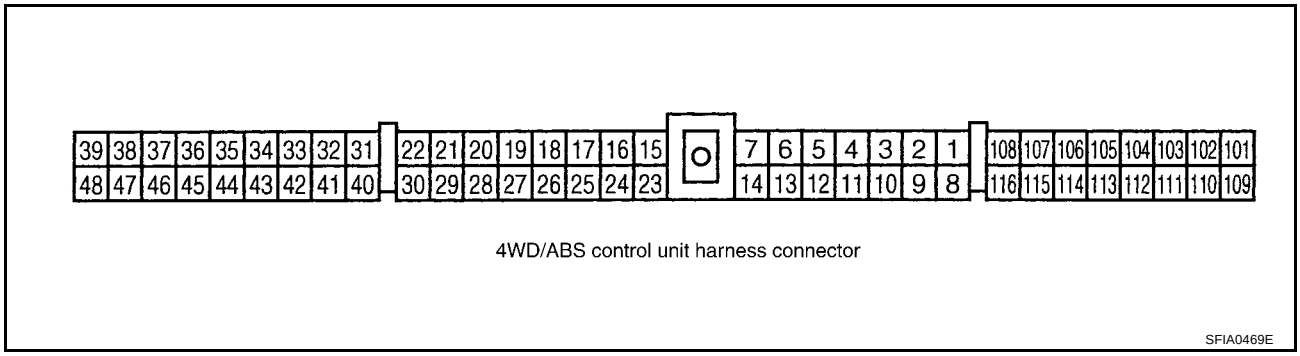


Control Unit Power Supply System

EFS001BM

INSPECTION PROCEDURE

Disconnect control unit connector. Check for continuity and voltage between each terminal of vehicle-side connector and body ground.



Terminal No.	Signal name	Measuring condition	Measurement value
3 (G/R), 109 (G/R)	Power supply	Ignition switch ON	Battery voltage
104 (B), 106 (B), 108 (B), 11 (B), 113 (B), 115 (B)	Ground	Ignition switch OFF	There should be continuity.

G -Sensor System (4WD models)

EFS001BN

INSPECTION PROCEDURE

1. CONNECTOR INSPECTOR INSPECTION

1. Disconnect control unit connector and G sensor connector. Check control module connector terminal for deformation and poor connection. Reconnect connector.
2. Perform the self-diagnosis.

Dose warning lamp illuminate?

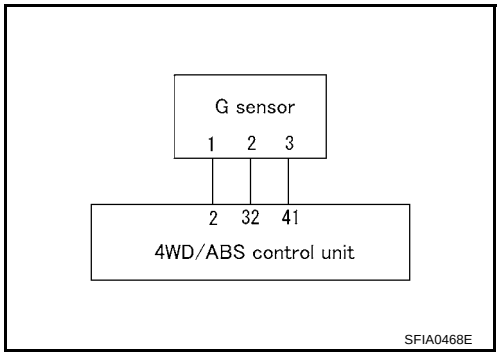
YES >> GO TO 2.
NO >> Diagnosis completed

2. G -SENSOR OR HARNESS INSPECTION

1. Disconnect G -sensor connector.
2. Disconnect control unit connector.
3. Check harness between control unit and G sensor.

Is inspection result OK?

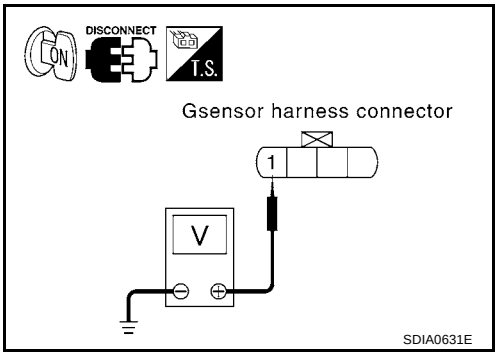
YES >> GO TO 3.
NO >> Repair or replace the harness.



3. G -SENSOR CIRCUIT CONNECTOR INSPECTION

1. Disconnect connectors and remove G -sensor from vehicle.
2. Check the voltage under following condition with ignition switch ON: G sensor harness-side connector terminal M57 No.1 (W) - Body ground

No.1 - Body ground : Approx. 8.0 V

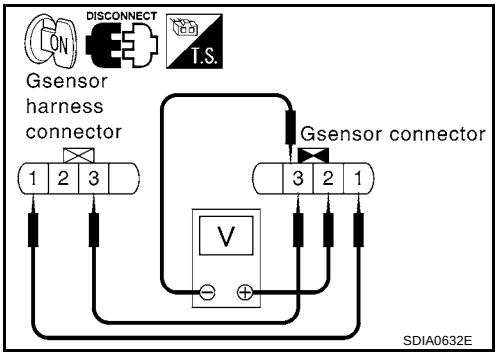


Is inspection result OK?

YES >> GO TO 4.
NO >> Replace 4WD/ABS control unit.

4. G -SENSOR UNIT INSPECTION

1. Using a test harness, connect 8.0V from the G -sensor harness connector terminal M57 No.1 (W) to the G -sensor connector terminal M57 No.1.
2. Using a test harness, connect a ground from the G -sensor harness connector terminal M57 No.3 (B) to the G -sensor connector terminal M57 No. 3.
3. With ignition switch ON, when the G sensor is in horizontal, check the output voltage under following condition with tilted forward and backward by 90° and 0°: terminal M57 No.2 - terminal M57 No.3.



No. 2 to No. 3 output voltage (V)

Horizontal : 2.3 - 2.7
Tilted forward by 90° : 0.80 - 0.86
Tilted rearward by 90° : 3.87 - 4.47

4. After inspection, install the G sensor. Erase diagnosis trouble code of the 4WD/ABS control unit.

Is inspection result OK?

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

5. WARNING LAMP DISPLAY CODE INSPECTION

1. Connect the connector and perform self-diagnosis again.
2. Follow self-diagnosis procedure. After diagnosis, be sure to drive the vehicle at 30 km/m (19 MPH) for 1 minute or longer and be sure that the ABS warning lamp does not come on.

>> Diagnosis completed

4WD Solenoid, Actuator Relay System

EFS001CA

Checking procedure

1. INSPECTION START

Use CONSULT-II and perform self-diagnosis.

OK or NG

OK >> Drive at 30 km/h (19 MPH) for at least 1 minute. Check that 4WD warning lamp does not turn ON.
NG >> GO TO 2.

2. CONNECTOR INSPECTION

1. Disconnect the 4WD/ABS control unit connector E122 and the 4WD solenoid connector B152. Check that terminals are not deformed. Check that the connectors were connected properly. Reconnect connectors.
2. Perform self-diagnosis again.

OK or NG

OK >> Diagnosis completed.
NG >> GO TO 3.

3. INSPECTION OF 4WD SOLENOID UNIT

1. Disconnect connector B152 and check resistance between terminals No.1 and 2.

1 - 2 : Approx. 2.45 Ω

OK or NG

OK >> GO TO 4.
NG >> Replace 4WD solenoid.

4. INSPECTION OF 4WD SOLENOID CIRCUIT HARNESS

1. Disconnect the 4WD solenoid connector.
2. Disconnect the 4WD/ABS control unit.
3. Check the circuit continuity between control unit harness connector E122 terminal No.102 (LG) and 4WD solenoid harness connector B152 terminal No.2 (LG).

102 (LG) - 2 (LG) : Continuity should exist.

4. Disconnect the 4WD actuator relay connector.
5. Check circuit continuity between 4WD solenoid harness connector B152 terminal No.1 (L/W) and 4WD actuator relay connector E10 terminal No.5 (L/W)

1 (L/W) - 5 (L/W) : Continuity should exist.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace the harness.

5. CHECK 4WD ACTUATOR RELAY AND CONNECTOR

1. Check the 4WD actuator relay and control unit harness connector.
2. Check the 4WD actuator relay unit.

OK or NG

OK >> GO TO 6.
NG >> Repair or replace 4WD actuator relay and connector.

6. CHECK 4WD ACTUATOR RELAY POWER CIRCUIT

1. Disconnect the 4WD/ABS control unit connector.
2. Turn the ignition switch ON and check voltage between the 4WD control unit harness connector E122 terminal No.18 (BR/W) and body ground.

18 (BR/W) - Body ground : Battery voltage

OK or NG

OK >> GO TO 7.
NG >> ● Check items below. Perform self-diagnosis again.
- Check fuse 10 A (#8).
- Check harness and connectors between the fuse 10 A (#8), the 4WD actuator relay and the 4WD control unit.

7. CHECK 4WD ACTUATOR RELAY GROUND CIRCUIT

1. Disconnect the 4WD actuator relay connector.
2. Check continuity between the 4WD actuator relay harness connector E10 terminal No.3 (B) and body ground.

3 (B) - Body ground : Continuity should exist.

OK or NG

OK >> 1. Connect the connector and perform self-diagnosis again.
2. Follow self-diagnosis procedure and, at the end, be sure to drive the vehicle at 30 km/h (19 MPH) for at least 1 minute and check that the 4WD warning lamp does not turn ON.

NG >> Repair or replace harness.

4WD Mode Switch System

EFS001CB

1. INPUT SIGNAL CHECK

Check using the data monitor function of the CONSULT-II. While monitoring the 4WD mode switch items, press 2WD mode switch. Check the display changes from ## to 2WD. Check the display for AUTO and LOCK just the same. (## indicates when mode SW is not pressed.)

OK or NG

OK >>
- 4WD/ABS control unit input/output signal inspection
- Recheck 4WD/ABS control unit connector terminals and connection.

NG >> GO TO 3.

2. INSPECTION OF 4WD MODE SWITCH POWER SUPPLY

- Disconnect 4WD mode switch connector.
- Turn ignition switch ON.
- Measure voltage between 4WD mode change and over switch harness connector M39 terminal No.2 (L), No.1 (BR).

2 (L), 1 (BR) - Body ground : 4 V or more.

OK or NG

OK >> GO TO 4.
NG >> Harness malfunction or connector malfunction between ignition switch and 4WD mode switch connector or connector malfunction.

3. HARNESS CONTINUITY INSPECTION

- Turn ignition switch OFF.
- Confirm the continuity between the following terminals.

– 4WD/ABS control unit harness connector E122 terminal No. 26 (L) and 4WD mode switch harness connector M39 terminal No. 2 (L)
– 4WD control unit harness connector E122 terminal No. 27 (BR) and 4WD mode switch harness connector M39 terminal No. 1 (BR)

26 (L) - 2 (L) : Continuity should exist.
27 (BR) - 1 (BR) : Continuity should exist.

OK or NG

OK >> GO TO 5.
NG >> Malfunctioning harness or connector.

4. HARNESS CONTINUITY INSPECTION

Drive the vehicle for a while and the perform self-diagnosis.

OK or NG

OK >> End
NG >> ● 4WD/ABS control unit input/output signal inspection
● Recheck 4WD control unit connector terminals and connection.

Trouble Diagnoses for Symptoms

EFS001CC

4WD INDICATOR LAMP DOES NOT COME ON FOR APPROXIMATELY 1 SECOND WHEN THE IGNITION SWITCH IS TURNED TO ON

Inspection Procedure

1. CHECK BLOWN FUSES BETWEEN IGN AND COMBINATION METER

Check that there are no blown fuses between IGN and combination meter.

OK or NG

OK >> GO TO 2.
NG >> Replace fuse and check again.

2. CHECK CONTINUITY BETWEEN COMBINATION METER AND 4WD/ABS CONTROL UNIT

1. Disconnect combination meter connector and 4WD/ABS control unit connector.
2. Check continuity between combination meter harness connector M44 terminal No.18 (Y/G) and 4WD/ABS control unit harness connector E122 terminal No.16 (Y/G).

18 (YG) - 16 (Y/G) : Continuity should exist.

OK or NG

OK >> GO TO 3.
NG >> Check harness between combination meter and 4WD/ABS control unit.

3. CHECK COMBINATION METER POWER CIRCUIT

1. Disconnect combination meter connector.
2. With ignition ON, check the voltage between the combination meter harness connector M46 terminal No.46 (W/L) (LHD models) or No.59 (W/L) (RHD models) and body ground.

46 (W/L) (LHD models) or 59 (W/L) (RHD models) - Body ground:
Battery voltage

OK or NG

OK >> GO TO 4.
NG >> Check combination meter circuits.

4. CHECK 4WD AUTO LAMP (ON COMBINATION METER) CIRCUIT

Check continuity between combination meter terminal 46 (W/L) (LHD models) or 59 (W/L) (RHD models) and terminal 18.

46 (W/L) (LHD models) or 59 (RHD models) - 18:
Continuity should exist.

OK or NG

OK >> Using CONSULT-II perform self-diagnosis.
NG >> Check for burned-out bulb in 4WD AUTO lamp.

4WD WARNING LAMP DOES NOT ILLUMINATE WITH IGNITION ON

1. INSPECTION OF BLOWN FUSE BETWEEN IGNITION SWITCH AND COMBINATION METER

Check blown fuse between ignition switch and combination meter.

OK or NG

OK >> GO TO 2 (No blown fuse)
NG >> Replace the fuse and perform the inspection again.

2. COMBINATION METER POWER SUPPLY CIRCUIT INSPECTION

1. Disconnect combination meter connector.
2. Check voltage between the combination meter harness connector M46 terminal No. LHD models: 46 (W/L) RHD models: 59 (W/L) and body ground.

OK or NG

OK >> Malfunctioning combination meter.
NG >> Check fuse 10A [#11] to combination meter harness and connector.

4WD WARNING LAMP DOES NOT GO OUT SEVERAL SECONDS AFTER ENGINE STARTED.(4WD MODE INDICATOR LAMP GOES OUT)

1. PERFORM SELF-DIAGNOSIS

Using CONSULT-II perform self-diagnosis.

OK or NG

OK >> No malfunction detected. Perform inspection again.
NG >>
- Determine the location of the malfunction according to the result of Self-diagnosis using CONSULT-II. (Malfunction is present in the 4WD system.)
- CONSULT-II does not display 4WD system-related trouble codes. GO TO 2.

2. 4WD CONTROL UNIT CONNECTOR CONNECTION INSPECTION

- Check 4WD/ABS control unit connector for proper connection.

OK or NG

OK >> Reconnect the 4WD/ABS control unit connector properly and perform inspection again.
NG >> Repair or replace the connector.

HEAVY TIGHT-CORNER BRAKING SYMPTOM OCCURS WHEN THE VEHICLE IS DRIVEN IN AUTO MODE AND THE STEERING WHEEL IS TURNED FULLY TO EITHER SIDE AFTER THE ENGINE IS STARTED

1. PERFORM SELF-DIAGNOSIS

Using CONSULT-II perform self-diagnosis.

OK or NG

OK >> GO TO 2. (No self-diagnosis malfunction indicated.)
NG >> Determine the location of the malfunction according to the result of Self-diagnosis using CONSULT-II. (Malfunction is present in the 4WD system.)

2. CHECK USING THE DATA MONITOR FUNCTION OF THE CONSULT- II

- Perform inspection by the data monitor function of the CONSULT-II.
- Check that the operation is in AUTO mode.
- Measure voltage when the accelerator pedal is not depressed. (Accelerator pedal not depressed: Approx. 0.5V or lower)
- Measure the current supplied to the E-TS solenoid valve. (Accelerator pedal not depressed: Approx. 0A)

OK or NG

OK >> GO TO 3. (No self-diagnosis malfunction indicated.)
NG >>
- Not in AUTO mode. GO TO 3.
- Voltage when accelerator pedal is not depressed is higher than approximately 0.5V.
- 4WD solenoid valve current when the accelerator pedal is not depressed is other than 0A.
- Countermeasure: Keep the vehicle idling for approximately 15 minutes before checking again. (Voltage when accelerator pedal is not depressed will be automatically reset to zero during this period.)

3. INSPECTION USING 4WD MODE CHANGE-OVER SWITCH

- On data monitor screen of the CONSULT-II, check 4WD mode switch.
- Check if the display changes from ## to 2WD mode when the 2WD switch is pressed.
- Check if the display changes from ## to AUTO mode when the AUTO switch is pressed.
- Check if the display changes from ## to LOCK mode when the LOCK switch is pressed.

OK or NG

OK >> No malfunction detected.
NG >>
- Not in AUTO mode. (In 2WD or LOCK mode)
  Countermeasure: Slightly depress the accelerator pedal and check that the operation mode changes to LOCK mode.
- Check circuit between 4WD mode switch harness connector M39 terminal No.1 (BR) and 4WD control unit harness connector E122 terminal No. 27 (BR).
  (AUTO mode is not available because a malfunction is present in the 2WD mode harness.)

  NOTICE:
  Mechanism of 4WD mode change-over
- 2WD mode: Operation changes to 2WD mode when 4WD/ABS control unit harness connector E122 terminal No. 27 (BR) is shorted to ground.
- AUTO mode: Operation changes to AUTO mode when 4WD/ABS control unit harness connector E122 terminals No. 27 (BR) and No. 26 (L) is shorted to ground.
- LOCK mode: Operation changes to LOCK mode when 4WD/ABS control unit harness connector E122 terminal No. 26 (L) is shorted to ground.

4WD MODES CANNOT BE SWITCHED AFTER ENGINE IS STARTED

1. INSPECTION USING 4WD MODE CHANGE-OVER SWITCH

- Drive modes cannot be switched after the engine is started.
- On data monitor screen of the CONSULT-II, check 4WD mode switch.
- Check if the display changes from ## to 2WD mode when the 2WD switch is pressed.
- Check if the display changes from ## to AUTO mode when the AUTO switch is pressed.
- Check if the display changes from ## to LOCK mode when the LOCK switch is pressed.

OK or NG

OK >> No malfunction detected.

NG >>
- CONSULT-II display does not change from ## when the 2WD switch is pressed. Check harness of the 2WD switch.
- CONSULT-II display does not change from ## when the AUTO switch is pressed. Check harness of the 2WD switch and LOCK switch.
- CONSULT-II display does not change from ## when the LOCK switch is pressed. Check harness of the LOCK switch.
- Perform 4WD mode change-over switch inspection.

WHILE DRIVING, 4WD WARNING LAMP FLASHES RAPIDLY. (WHEN IT FLASHERS FOR APPROX. ONE MINUTE, THEN DOES NOT ILLUMINATE.)

- While driving, 4WD warning lamp flashes rapidly. (When it flashes for Approx. One minute, then does not illuminate.)
  Rapid flashing: 2 times/second
  This phenomenon protects drivetrain parts when a heavy load is applied to the electronically controlled coupling and multiple disc clutch temperature increases. It is not a malfunction.
  When the difference of revolution speed by or with the front and rear wheel with AUTO mode, the shift switch occasionally changes to LOCK mode automatically. This is not a malfunction.
  When the difference of revolution speed between the front and rear wheel with AUTO mode, the shift switch occasionally changes to LOCK mode automatically. This is not a malfunction.

WHILE DRIVING, 4WD WARNING LAMP FLASHES SLOWLY. (WHEN IT CONTINUES TO ILLUMINATE UNTIL ENGINE TURNS OFF.)

1. Check using the data monitor function of the CONSULT-II.
   - Perform inspection with the data monitor function of the CONSULT-II.
   - Check if the value of IMPROPER SIZE TIRE MONITOR is 8 mm (0.31 in) or more.
   - Stop the engine. Restart the engine and drive the vehicle at 20 km/h (12 MPH) or faster for approximately 200 seconds. Confirm the 4WD warning lamp flashes slowly.
     (Check if the value of IMPROPER SIZE TIRE MONITOR is 8 mm (0.31 in) or more.)
     When the tire size is normal, the value of IMPROPER SIZE TIRE MONITOR will change from 8 mm (0.31 in) or more to 0 to 4 mm (0 to 0.16 in) (normal condition) after the vehicle is driven 20 km/h (12 MPH) or faster for approximately 5 seconds.
2. Tire inspection
   - Inspection of tire pressure
   - Wear condition
   - Check size of the front and rear tires. (No excessive difference should be observed.) Refer to GI-44, "Wheels & Tires"

VEHICLE DOES NOT ENTER 4WD MODE EVEN THOUGH 4WD WARNING LAMP IS OFF.

1. Check using the data monitor function of the CONSULT-II.
   Perform inspection by the data monitor function of the CONSULT-II.

– Check if the vehicle operation changes to 2WD, AUTO, and LOCK modes.

– Check current supplied to the 4WD solenoid valve in AUTO mode.

Accelerator pedal not depressed : Approx. 0 A
Accelerator pedal depressed : Approx. 2.8 A

2. Check using the active test function of the CONSULT-II.

Using active test mode of CONSULT-II, supply current to the 4WD solenoid valve and check that the monitor current becomes close to this supply current.

Example) Monitor value becomes Approx. 1 A for 4WD solenoid current 1 A setting.

- The 4WDcontrol unit is normal when the difference between 4WD solenoid valve current and the monitor current is within ±10%.
  It is necessary to inspect the electronically controlled coupling assembly.

TIGHT-CORNER BRAKING SYMPTOM OCCURS WHEN THE VEHICLE IS STARTED IN AUTO WARNING LAMP REMAIN OFF).

1. THROTTLE POSITION SENSOR AND HARNESS INSPECTION

Check accelerator pedal stroke.

OK or NG

OK >> Perform self-diagnosis again.
NG >> Malfunctioning throttle position sensor harness

4WD ACTUATOR RELAY (4WD SOLENOID ACTUATOR RELAY) TURNS ON/OFF FREQUENTLY

1. SELF-DIAGNOSIS RESULT IS 4WD ACTUATOR RELAY (4WD SOLENOID ACTUATOR RELAY) ON ERROR AND OFF ERROR

Is self-diagnosis result [ON error and OFF error]?

OK or NG

OK >> GO TO 2.
NG >> Repair or replace as necessary.

2. 4WD ACTUATOR RELAY (4WD SOLENOID ACTUATOR RELAY) AND HARNESS INSPECTION

Is self-diagnosis result [ON error and OFF error]?

OK or NG

OK >> Perform self-diagnosis again.
NG >> Malfunctioning 4WD actuator relay (4WD solenoid actuator relay) harness

ABS Warning Lamp Does Not Illuminate. (ABS Warning Lamp Does Not Come On When The Ignition Switch Is Turned ON.)

EFS001BP

- Replace the combination meter control unit.

ABS Warning Lamp Illuminates With Ignition ON, But Does Not Illuminates After A Few Seconds. (ABS Warning Lamp Has Illuminated.)

EFS001BQ

1. 4WD/ABS CONTROL MODULE CONNECTOR CONNECTION INSPECTION

- Remove glove box on the passenger side and check 4WD/ABS control module connector for proper connection.

Is inspection result OK?

YES >> Proceed to 2. (4WD/ABS control unit connector is properly connected.)
NO >> ● Connect the 4WD/ABS control unit connector and perform inspection again.

2. USING CONSULT, PERFORM SELF-DIAGNOSIS

- Connect the CONSULT-II and perform self-diagnosis.

Is inspection result OK?

YES >> GO TO 3. (No self-diagnosis malfunction indicated.)
NO >> Perform inspection according to the trouble codes displayed on the CONSULT-II. Refer to the “DTC chart”.

3. CHECK CONTINUITY BETWEEN IGNITION SWITCH AND ABS WARNING LAMP

- Disconnect 4WD/ABS control unit connector.
- Check continuity between ignition switch and 4WD/ABS control module terminal No. 4. (Open circuit check)

Is inspection result OK?

YES >> Continuity exists. Connect 4WD/ABS control module connector, check again.
NO >> Continuity does not exist. Check ABS warning lamp path.

4. CHECK FUSE

- Check if Fuse No.8 is working normally.

Is the check result OK?

YES >> Repair or replace the harness in between 4WD/ABS control unit and IGN.
NO >> Replace the fuse and replace again.

- If the figure of the monitor is with in ± 10% of the set value of E-TS solenoid electric current, 4WD/ABS C/U is operating normally. Check for electric control coupling ASSY is required.

4WD Warning Lamp Does Not Illuminate With Ignition ON.

EFS001BR

1. INSPECTION OF BLOWN 4WD WARNING LAMP BULB

- Remove glove box on the passenger side and disconnect the 4WD/ABS control unit connector.
- Confirm continuity between 4WD/ABS control unit connector terminals No. 3 (IGN) and No. 4 (ABS warning lamp).

Is inspection result OK?

YES >> GO TO 3. (Continuity exists.)
NO >> ● Check 4WD warning lamp harness.
● Remove meter control module assembly and check for blown 4WD warning lamp bulb.

2. 4WD ACTUATOR RELAY HARNESS INSPECTION

- Open the hood and check that the 4WD relay is properly installed in the relay box.
- Confirm continuity between 4WD/ABS control unit connector terminals No. 7 (4WD warning lamp) and No. 104 (ground).
- Confirm continuity between 4WD/ABS control unit connector terminals No. 3 (IGN) and No. 18 (4WD actuator relay).

Is inspection result OK?

YES >> Continuity exists. Connect 4WD/ABS control unit connector, check again.
NO >> Check ABS warning lamp harness.

4WD Warning Lamp Does Not Go Out Several Seconds After Engine Is Started. (Drive Mode Indicator Lamp Goes Out.)

EFS001BS

1. USING CONSULT, PERFORM SELF-DIAGNOSIS

4WD warning lamp does not go out several seconds after the engine is started. (Drive mode indicator lamp goes out.)

Is inspection result OK?

YES >> No malfunction detected. Perform inspection again.
NO >> ● Determine the location of the malfunction according to the result of self-diagnosis using CONSULT. (Malfunction is present in the 4WD system.)
● CONSULT-II does not display ABS -related trouble codes. Proceed to 2.

2. 4WD/ABS CONTROL UNIT CONNECTOR CONNECTION INSPECTION

- Remove glove box on the passenger side and check 4WD/ABS control unit connector for proper connection.

Is inspection result OK?

YES >> 4WD/ABS control unit connector is properly connected.
NO >> Reconnect the 4WD/ABS control module connector properly and perform inspection again.

Heavy Tight-corner Braking Symptom Occurs When The Vehicle Is Driven In Auto Mode And The Steering Wheel Is Turned Fully To Either Side After The Engine Is Started.

EFS001BT

1. USING CONSULT, PERFORM OR SELF-DIAGNOSIS

Heavy tight-corner braking symptom occurs when the vehicle is driven in AUTO mode and the steering wheel is turned fully to either side after the engine is started.

Is inspection result OK?

YES >> GO TO 2. (No self-diagnosis malfunction indicated.)
NO >> Determine the location of the malfunction according to the result of self-diagnosis using CONSULT-II. (Malfunction is present in the 4WD system.)

2. CHECK USING THE DATA MONITOR FUNCTION OF THE CONSULT-II

- Perform inspection by the data monitor function of the CONSULT-II.
- Check that the operation is in AUTO mode.
- Measure voltage when the accelerator pedal is not depressed. (Accelerator pedal not depressed: Approx. 0.5V or lower)
- Measure the current supplied to the E-TS solenoid valve. (Accelerator pedal not depressed: Approx. 0A)

Is inspection result OK?

YES >> GO TO 3. (No self-diagnosis malfunction indicated.)
NO >>
- Not in AUTO mode. GO TO 3.
- Voltage when accelerator pedal is not depressed is higher than approximately 0.5V.
- E-TS solenoid valve current when accelerator pedal is not depressed is other than 0A.
- Countermeasure: Keep the vehicle idling for approximately 15 minutes before checking again. (Voltage when accelerator pedal is not depressed will be automatically reset to zero during this period.)

3. INSPECTION USING DRIVE MODE CHANGE-OVER SWITCH

- On data monitor screen of the CONSULT, check 4WD mode switch.
- Check if the display changes from ## to 2WD mode when the 2WD switch is pressed.
- Check if the display changes from ## to AUTO mode when the AUTO switch is pressed.
- Check if the display changes from ## to LOCK mode when the LOCK switch is pressed.

Is inspection result OK?

YES >> No malfunction detected.

NO >>
- Not in AUTO mode. (In 2WD or LOCK mode)
  Countermeasure: Slightly depress the accelerator pedal and check that the operation mode changes to LOCK mode.
- Check path between drive mode switch and 4WD/ABS control unit E122 terminal No.27 (BR). (AUTO mode is not available because a malfunction is present in the 2WD mode harness.)

  NOTICE:
  Mechanism of drive mode change-over
- 2WD mode: Operation changes to 2WD mode when 4WD/ABS control unit connector terminal No. 27 is shorted to ground.
- AUTO mode: Operation changes to AUTO mode when 4WD/ABS control unit connector terminals No. 27 and No. 26 were shorted to ground.
- LOCK mode: Operation changes to LOCK mode when 4WD/ABS control unit connector E122 terminal No. 26 (L) is shorted to ground.

Drive Modes Cannot Be Switched After Engine Is Started.

EFS001BU

1. INSPECTION USING DRIVE MODE CHANGE-OVER SWITCH

- Drive modes cannot be switched after the engine is started.
- On data monitor screen of the CONSULT, check 4WD mode switch.
- Check if the display changes from ## to 2WD mode when the 2WD switch is pressed.
- Check if the display changes from ## to AUTO mode when the AUTO switch is pressed.
- Check if the display changes from ## to LOCK mode when the LOCK switch is pressed.

Is inspection result OK?

YES >> No malfunction detected.

NO >>
- CONSULT-II display does not change from ## when the 2WD switch is pressed. Check harness of the 2WD switch.
- CONSULT-II display does not change from ## when the AUTO switch is pressed. Check harness of the 2WD switch and LOCK switch.
- CONSULT-II display does not change from ## when the LOCK switch is pressed. Check harness of the LOCK switch.
- Perform drive mode change-over switch inspection.

Wheel Driving, 4WD Warning Lamp Flashes Rapidly. (When It Flashes For Approx. One Minute, Then Does Not Illuminate.)

EFS001BV

- Wheel driving, 4WD warning lamp flashes rapidly. (When it flashes for Approx. 1 minute, then does not illuminate.)
  Rapid flashing: 2 times/second
  This phenomenon protects drivetrain parts when a heavy load is applied to the electronically controlled coupling and multiple disc clutch temperature increases. It is not a malfunction.

Wheel Driving, 4WD Warning Lamp Flashes Slowly. (When It Continues To Illuminate Until Engine Turns OFF.)

EFS001BW

1. Check using the data monitor function of the CONSULT-II.
   - Perform inspection with the data monitor function of the CONSULT-II.
   - Check if the value of IMPROPER SIZE TIRE MONITOR is 8 mm or more.

- Stop the engine. Restart the engine and drive the vehicle at 20 km/h or faster for approximately 200 seconds. Confirm the 4WD warning lamp flashes slowly.
  (Check if the value of IMPROPER SIZE TIRE MONITOR is 8 mm or more.)
  When the tire size is normal, the value of IMPROPER SIZE TIRE MONITOR will change from 8 mm or more to 0 - 4 mm (normal condition) after the vehicle is driven 20 km/h or faster for approximately 5 seconds.

2. Tire inspection
   - Inspection of tire air pressure
   - Wear condition
   - Check size of the front and rear tires. (No excessive difference should be observed.) Refer to GI-44, "Wheels & Tires"

Vehicle Does Not Enter 4WD Mode Even Though 4WD Warning Lamp Is OFF.

EFS001BX

1. Check using the data monitor function of the CONSULT.
   Perform inspection by the data monitor function of the CONSULT.

– Check if the vehicle operation changes to 2WD, AUTO, and LOCK modes.
– Check current supplied to the E-TS solenoid valve in AUTO mode.

Accelerator pedal not depressed : Approx. 0 A
Accelerator pedal depressed : Approx. 2.8 A

2. Check using the active test function of the CONSULT.
   Using active test mode of CONSULT, supply current to the E-TS solenoid valve and check that the monitor current becomes close to this supply current.

Example) Monitor value becomes Approx. 1 A for E-TS solenoid current 1 A setting.

- The 4WD/ABS control unit is normal when the difference between E-TS solenoid valve current and the monitor current is within ±10%.
  It is necessary to inspect the electronically controlled coupling assembly.

Tight-corner Braking Symptom Occurs When The Vehicle Is Started In Auto Mode (4WD Warning Lamp Remain OFF).

EFS001BY

1. THROTTLE POSITION SENSOR AND HARNESS INSPECTION

Check accelerator pedal stroke.

Is inspection result OK?

YES >> Perform self-diagnosis again.
NO >> Malfunctioning throttle position sensor harness

E-TS Actuator Relay (4WD Solenoid Actuator Relay) Turns ON/OFF Frequently.

EFS001BZ

1. SELF-DIAGNOSIS RESULT IS E-TS ACTUATOR RELAY (4WD ACTUATOR RELAY) ON ERROR AND OFF ERROR

Is self-diagnosis result [ON error and OFF error]?

Is inspection result OK?

YES >> GO TO 2.
NO >> Repair or replace as necessary.

2. E-TS ACTUATOR RELAY (4WD SOLENOID ACTUATOR RELAY) AND HARNESS INSPECTION

Is self-diagnosis result [ON error and OFF error]?

Is inspection result OK?

YES >> Perform self-diagnosis again.
NO >> Malfunctioning E-TS actuator relay (4WD solenoid actuator relay) harness

Inspection Of Drive Mode Change-over Switch Path

EFS001C0

1. INSPECTION OF DRIVE MODE CHANGE-OVER SWITCH

Inspection of drive mode change-over switch

Is inspection result OK?

YES >> GO TO 2.
NO >> Poor drive mode change-over switch

2. INPUT SIGNAL CHECK

Select control module input item on monitoring item selection. While monitoring drive mode change-over switch items, press 2WD mode switch. Check the display changes from ##to 2WD. Check the display for AUTO and LOCK just the same. (## indicates when mode SW is not pressed.)

Is inspection result OK?

YES >>
- 4WD/ABS control unit input/output signal inspection
- Recheck 4WD/ABS control unit connector terminals and connection.

NO >> GO TO 3.

3. INSPECTION OF DRIVE MODE CHANGE-OVER SWITCH POWER SUPPLY

- Disconnect drive mode change-over switch connector.
- Turn ignition switch ON.
- Measure voltage between drive mode change-over switch connector and body ground. Check the voltage is 4V or more.

Is inspection result OK?

YES >> GO TO 4.
NO >> Harness malfunction or connector malfunction between ignition switch and drive mode change-over switch connector or connector malfunction.

4. HARNESS CONTINUITY INSPECTION

- Turn OFF ignition switch.
- Confirm continuity between following terminals.
  (4WD/ABS control unit connector E122 terminal No.26 (L) - Drive mode switch connector M39 terminal No.2 (L)) (4WD/ABS control unit connector E122 terminal No. 27 (BR) - Drive mode switch connector M39 terminal No.1 (BR)).

Is inspection result OK?

YES >> GO TO 5.
NO >> Malfunctioning harness or connector.

5. HARNESS CONTINUITY INSPECTION

Drive the vehicle for a while and the perform self-diagnosis.

Is inspection result OK?

YES >> End
NO >>
- 4WD/ABS control unit input/output signal inspection
- Recheck 4WD/ABS control unit connector terminals and connection.

4WD/ABS CONTROL UNIT

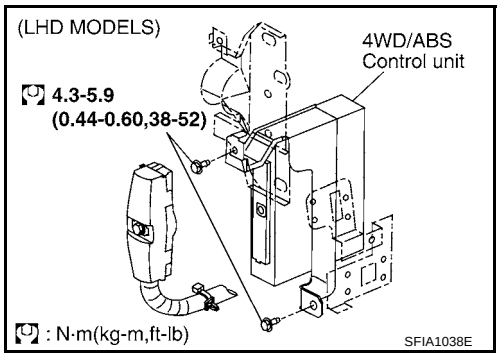
PFP:47660

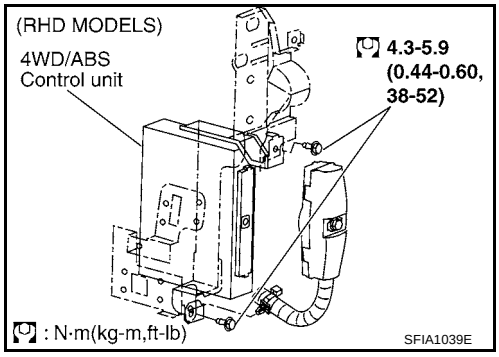
Removal and Installation

EFS002F7

REMOVAL

1. Remove lower instrument panel and glove box. Refer to IP-3, "INSTRUMENT PANEL ASSEMBLY" .
2. Remove 4WD/ABS control unit.





INSTALLATION

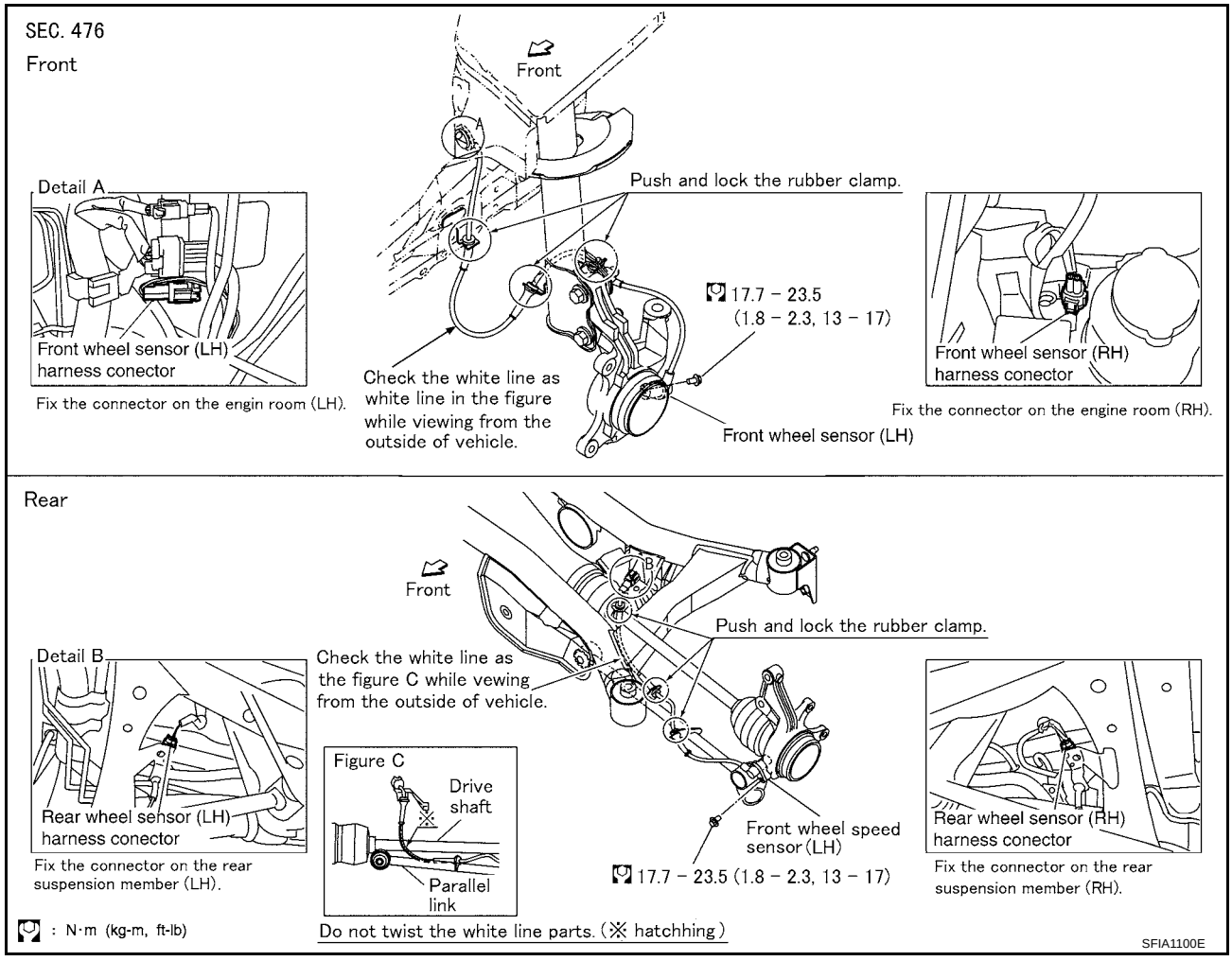
Install in the reverse order of removal.

WHEEL SENSORS

PFP:47910

Removal and Installation

EFS001C1



CAUTION:

- **Be careful not to damage sensor edge and rotor tooth. Before removing front or rear wheel hub, remove wheel speed 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.**

G-SENSOR (4WD MODEL ONLY)

PFP:47930

Removal and Installation

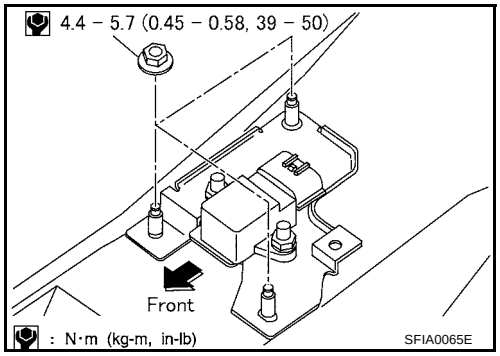
EFS001C2

CAUTION:

Be careful not to drop or bump G -sensor because it is sensitive to impact.

1. Remove center console and instrument. Refer to applicable section in IP-3, "INSTRUMENT PANEL ASSEMBLY" .
2. Disconnect G -sensor connector.
3. Remove mounting nuts and remove G -sensor.

Install in the reverse order of removal observing the precautions above.



SENSOR ROTOR

PFP:47970

Removal and Installation

EFS001C3

REMOVAL

Front

1. Remove drive shaft. Refer to FAX-11, "REMOVAL" in “FAX Front Axle/Drive Shaft”.
2. Remove sensor rotor from drive shaft. Refer to FAX-13, "DISASSEMBLY" in “FAX Front axle/Drive shaft ”.

Rear

1. Remove drive shaft. Refer to RAX-9, "Removal" in “RAX Rear Axle/Drive Shaft”.
2. Remove sensor rotor from drive shaft. Refer to RAX-10, "DISASSEMBLY" in “RAX Rear axle/Drive shaft”.

INSTALLATION

Front

1. Install sensor rotor to drive shaft. Refer to FAX-15, "ASSEMBLY" in “FAX Front axle/Drive shaft”.
2. Connect drive shaft. Refer to FAX-12, "INSTALLATION" in “FAX Front Axle/Drive Shaft”.

Rear

1. Install sensor rotor to drive shaft. Refer to RAX-12, "ASSEMBLY" in “RAX Rear axle/Drive shaft”.
2. Connect drive shaft. Refer to RAX-9, "Installation" in “RAX Rear Axle/Drive Shaft”.

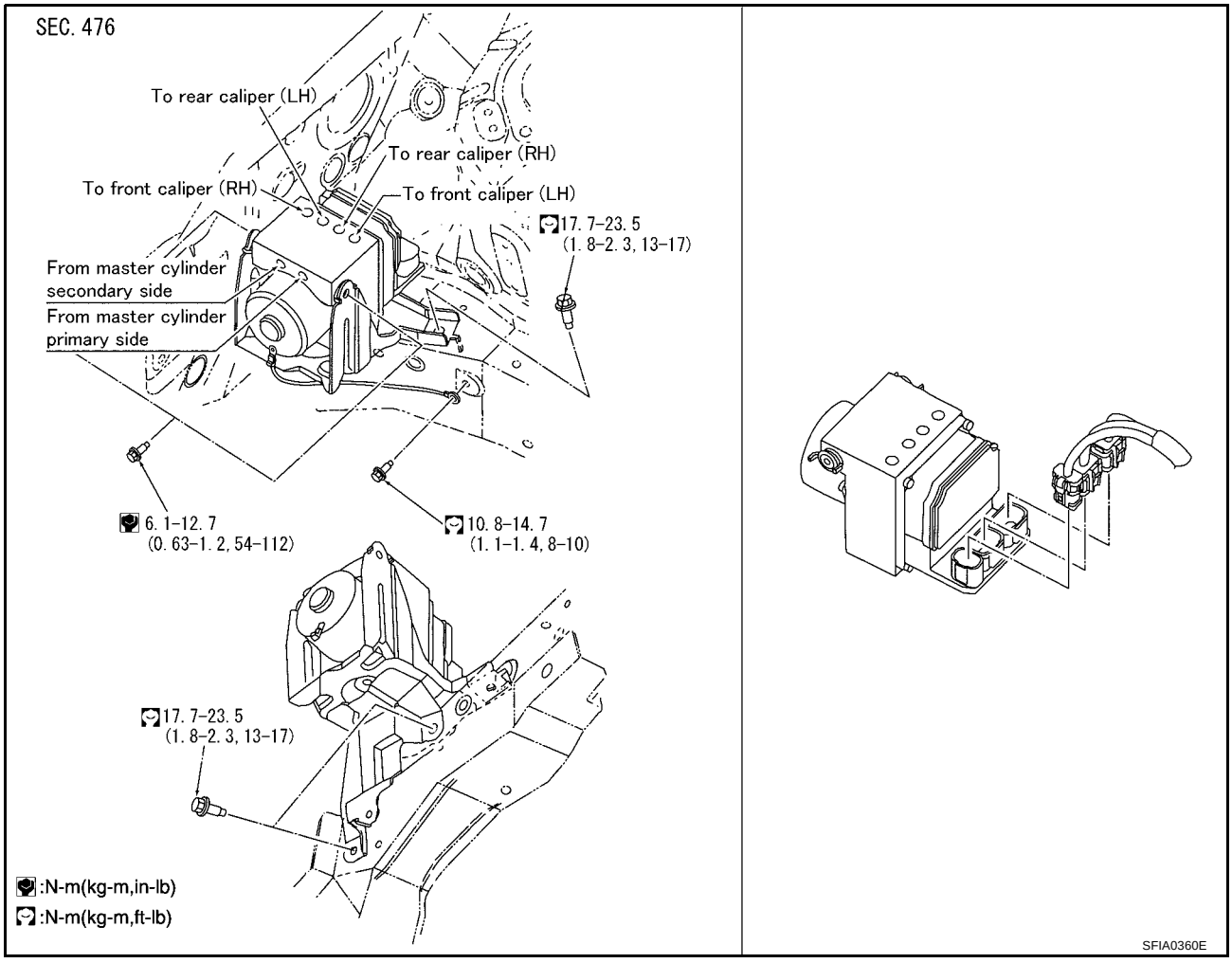
ACTUATOR

PFP:47600

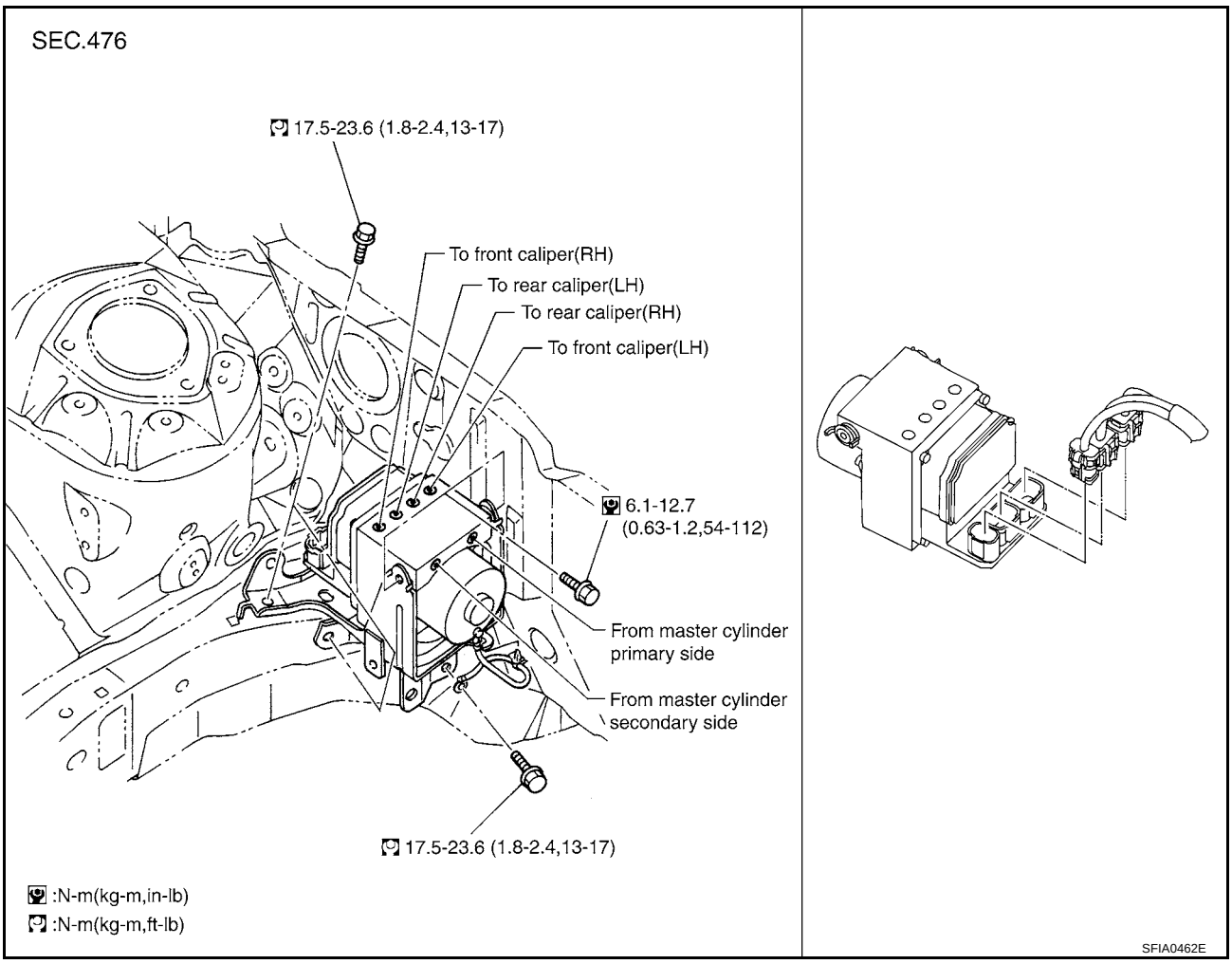
Removal and Installation

EFS002F8

LHD models



RHD models



REMOVAL

Be careful of the following.

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

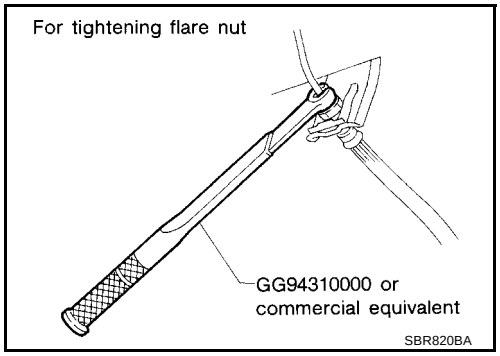
PFP:00001

Precautions for Brake System

EFS0019O

- 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-10, "Brake Burnishing Procedure" .

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



Precautions for Brake Control

EFS0019P

- 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

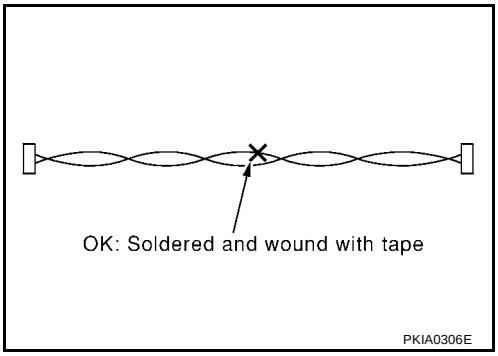
EFS001CP

FOR INSPECTION

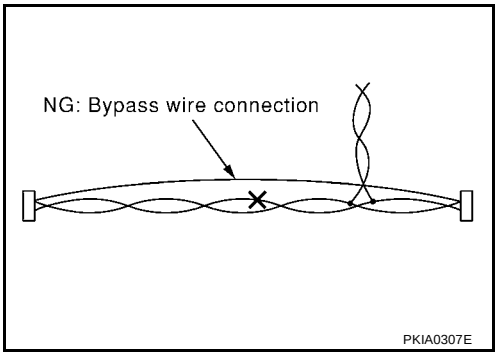
- Do not apply voltage of 7.0V or higher to the measurement terminals.
- Use the tester with its open terminal voltage being 7.0V or less.
- Before harness inspection, turn the ignition switch off, disconnect the negative battery terminal.

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.)

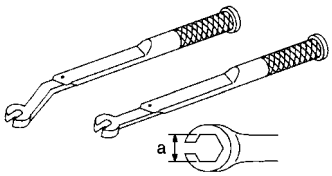


PREPARATION

PFP:00002

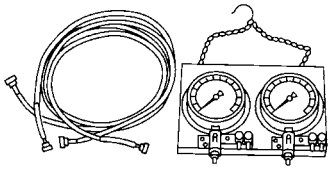
Special Service Tool

EFS00219

Tool number Tool name	Description
GG9431 0000 Flare nut torque wrench a:10mm (0.39 in)  NT406	Removing and installing each brake piping

Commercial Service Tool

EFS0021A

Tool name	Description
Brake fluid pressure gauge  S-NT151	Measuring brake fluid pressure

ON-VEHICLE SERVICE

PFP:00000

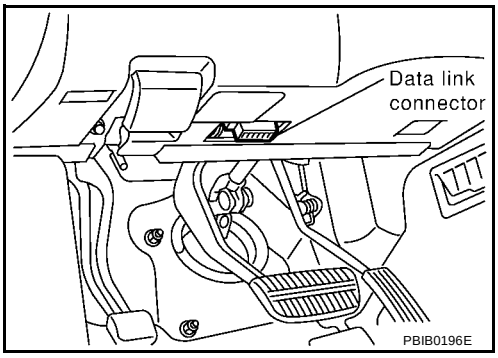
Adjustment of Neutral Position of Steering Wheel Angle Sensor

EFS0019R

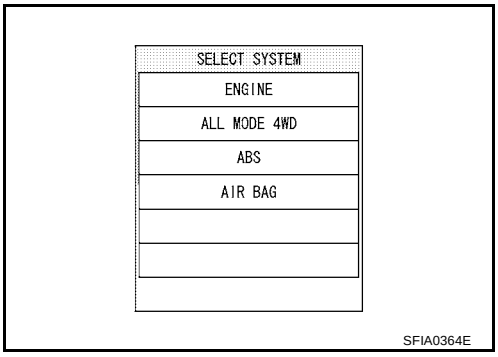
- After removing/installing or replacing the ESP/TCS/ABS control unit, steering wheel angle sensor, steering components, suspension components, and tires, or after adjusting the wheel alignment, make sure to adjust the neutral position of the steering wheel angle sensor before running the vehicle.

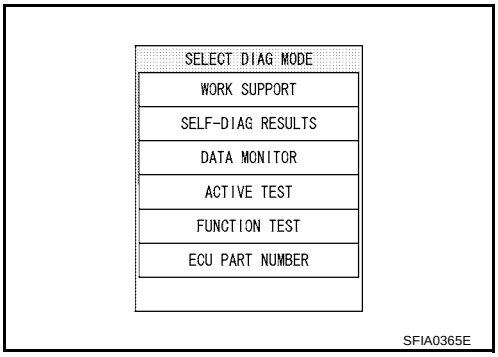
CAUTION:
To adjust the neutral position of the steering wheel angle sensor, make sure to use CONSULT-II. (Adjustment cannot be done other than CONSULT-II.)

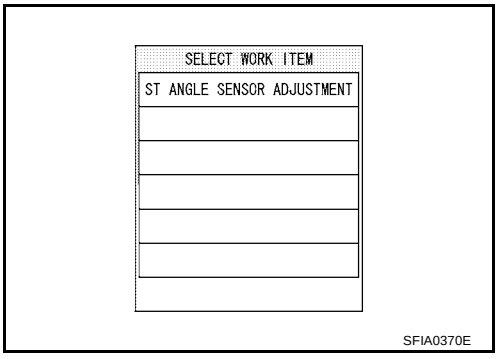
1. Stop the vehicle with the front wheels in the straight-ahead position.
2. Connect CONSULT-II to data link connector on the vehicle, and turn the ignition switch to ON position (engine not running).



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



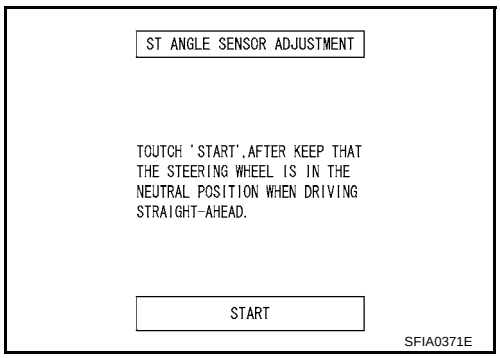


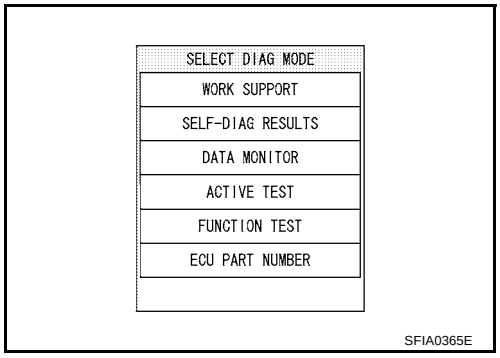


4. Touch “START”.

   CAUTION:
   Do not touch the steering wheel while adjusting the steering wheel angle sensor.
5. After approximately 10 seconds, touch “END”. (After approximately 60 seconds, it ends automatically.)
6. Turn the ignition switch OFF, then turn it ON again.

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





GENERAL INFORMATION

PFP:00000

Fail-Safe

EFS0019S

ABS SYSTEM

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

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

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

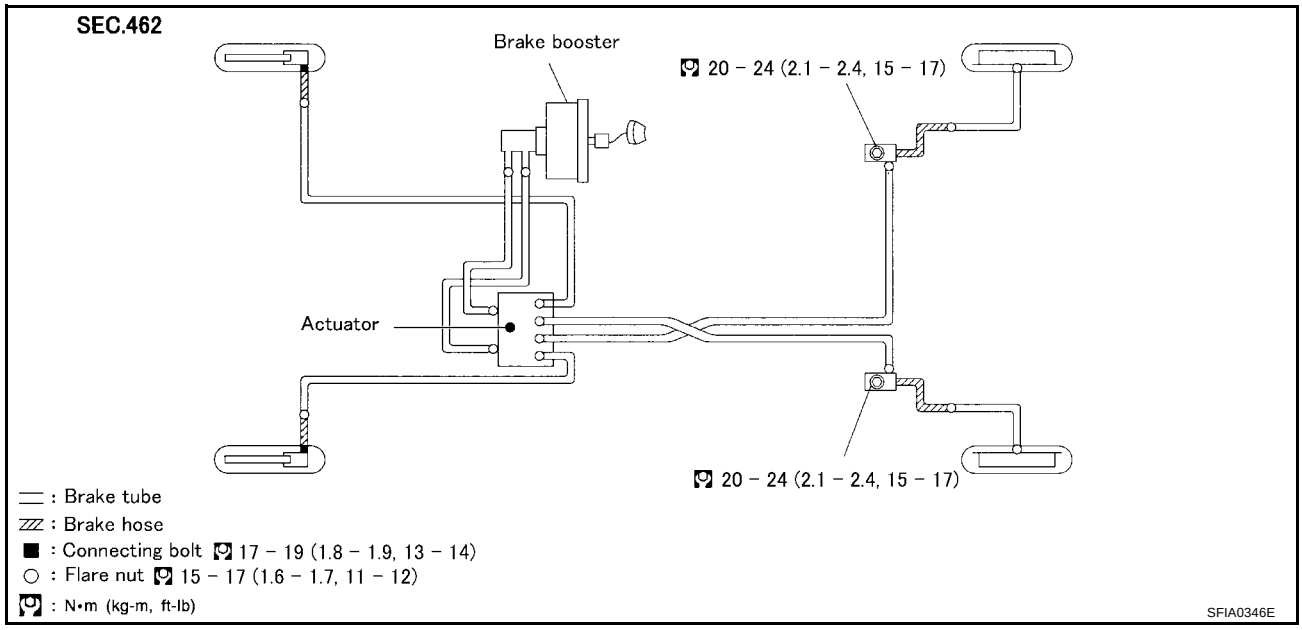
ESP/TCS SYSTEM

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

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

Hydraulic Circuit

EFS0019T



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

EFS0019U

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

EFS0019V

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 and function by 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

EFS0019W

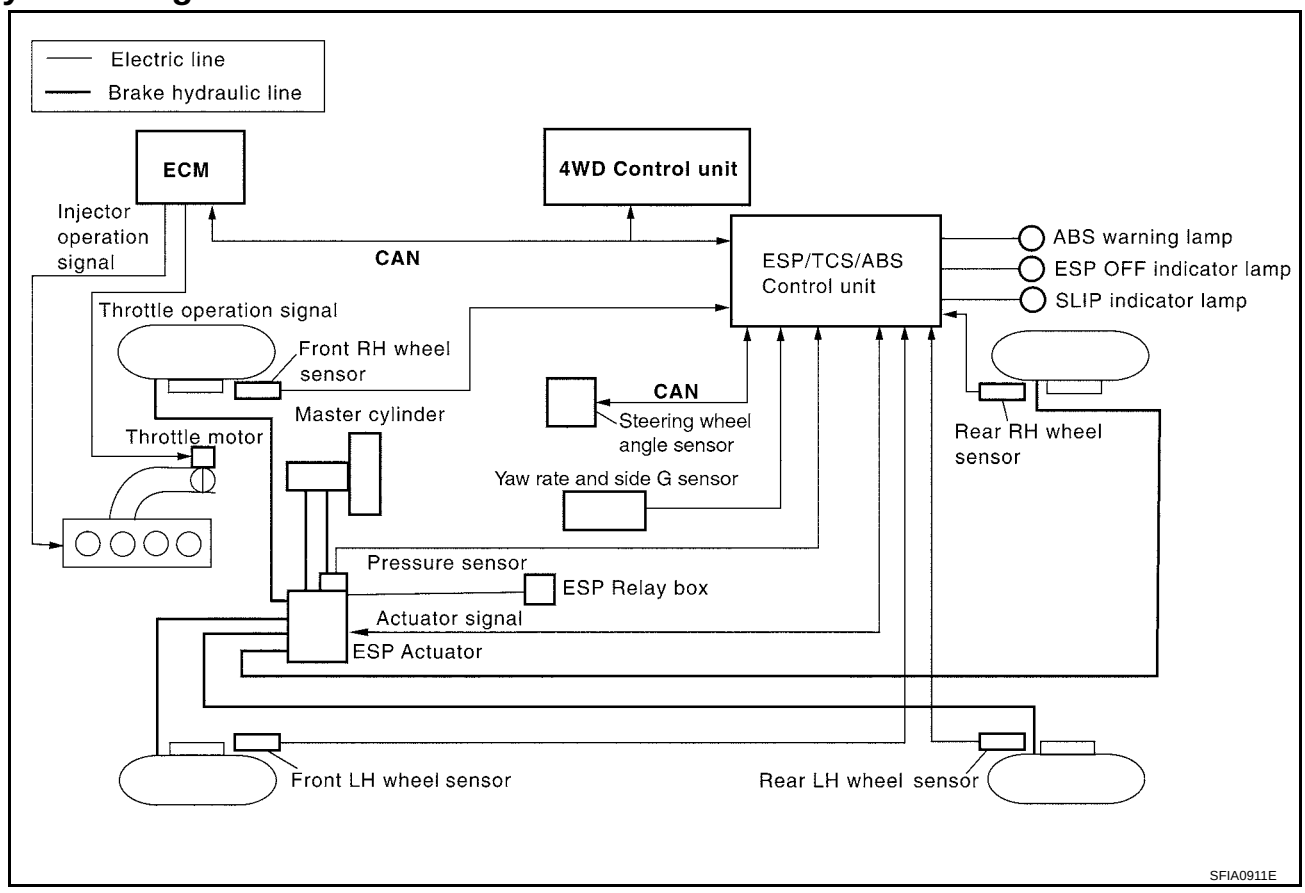
1. The Electronic Stability Program is called the ESP for short.
   The ESP is indicated as the VDC (the Vehicle Dynamics Control) on the CONSULT-II screen.
2. In addition to the ABS/TCS function, ESP detects the driver's steering operation amount and brake operation amount from the steering wheel angle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

EFS0019X



CAN COMMUNICATION

PFP:23710

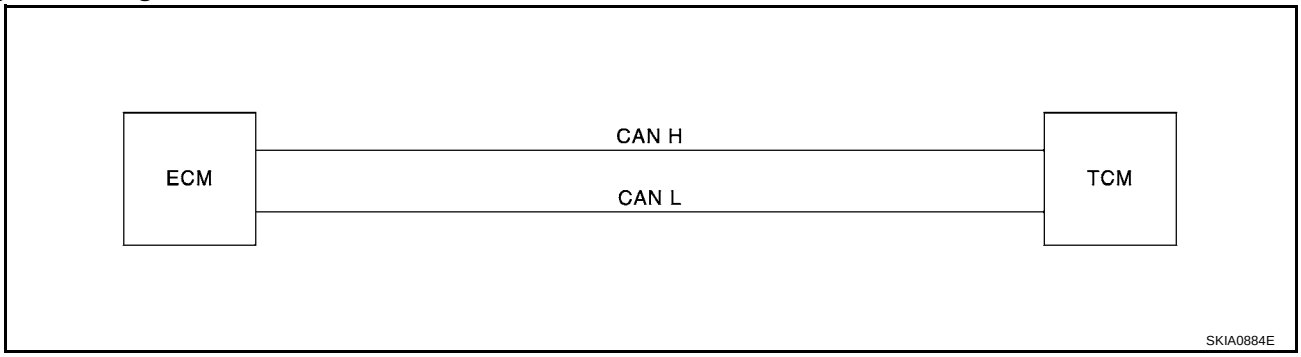
System Description

EFS002AW

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.

FOR A/T MODELS

System diagram



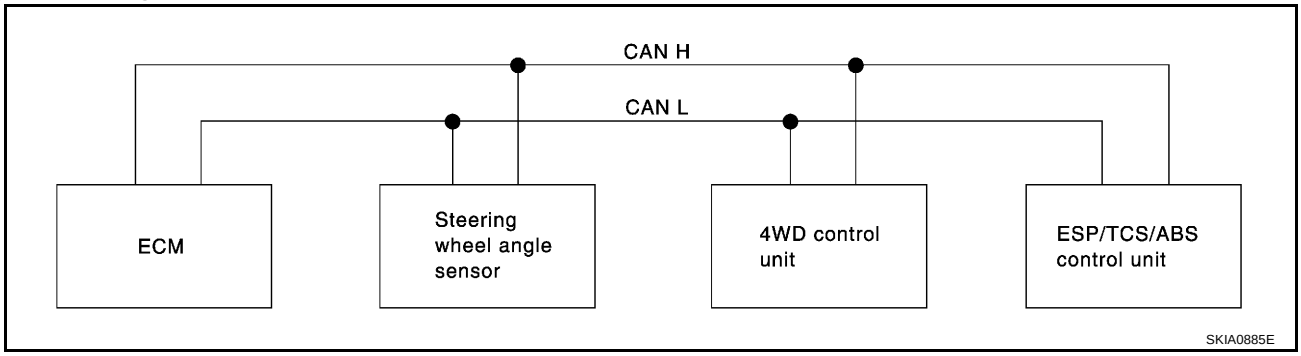
Input/output signal chart

T: Transmit R: Receive

Signals	ECM	TCM
Engine coolant temperature signal	T	R
Accelerator pedal position signal	T	R
A/T self-diagnosis signal	R	T

FOR M/T MODELS

System diagram



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Steering wheel angle sensor	4WD control unit	ESP/ TCS / ABS control unit
Engine speed signal	T		R	R
Accelerator pedal position signal	T			R
ESP operation signal	R		R	T
TCS operation signal	R		R	T
ABS operation signal	R		R	T
Stop lamp switch signal			R	T
Steering wheel angle sensor signal		T		R
ESP-OFF switch signal			R	T

Signals	ECM	Steering wheel angle sensor	4WD control unit	ESP/ TCS / ABS control unit
Wheel speed sensor signal			R	T
4WD mode signal			T	R

TROUBLE DIAGNOSIS

PFP:00004

How to Perform Trouble Diagnoses for Quick and Accurate Repair

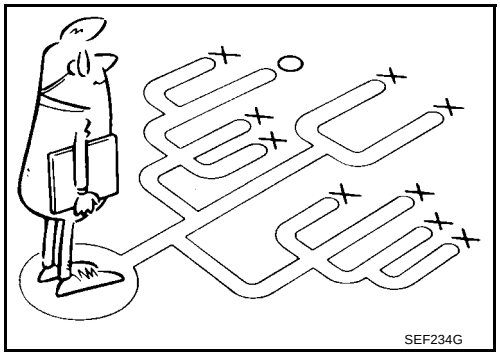
EFS001A2

INTRODUCTION

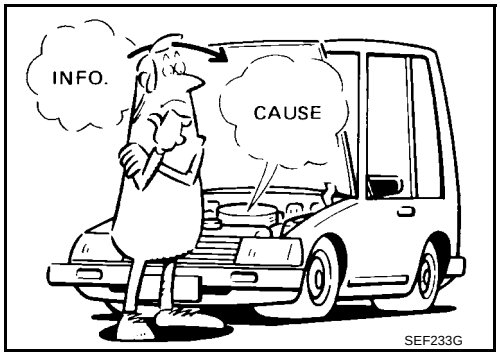
- The most important point to perform the trouble diagnosis is to understand the systems (control and mechanism) in the vehicle thoroughly.

- It is also important to clarify the customer complaints before inspection.
  First of all, reproduce the symptom, and understand it fully.
  Ask the customer about his/her complaints carefully. In some cases, it will be necessary to check the symptoms by driving the vehicle with the customer.

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


SEF234G

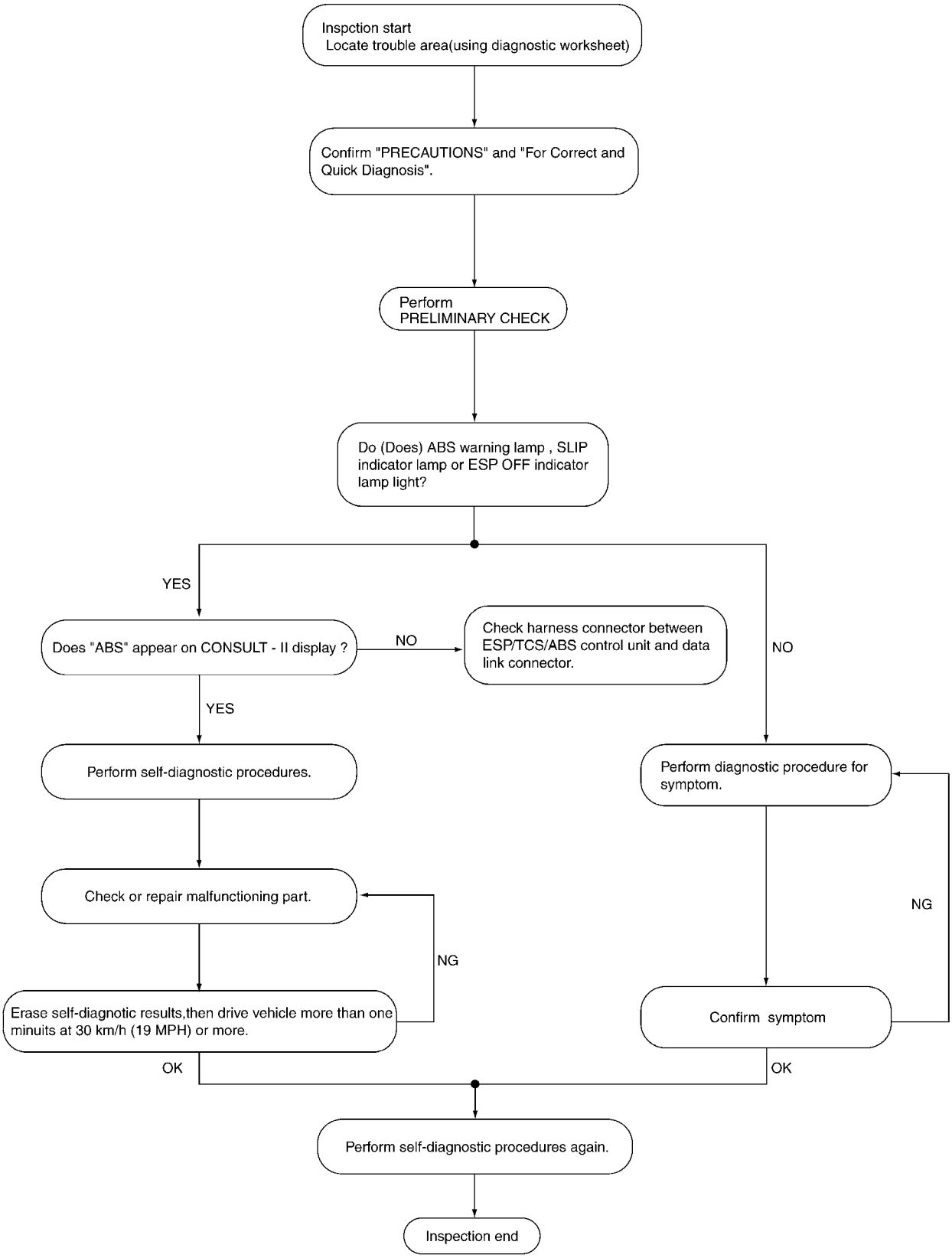
- It is essential to check symptoms right from the beginning in order to repair a malfunction completely.
  For an intermittent malfunction, it is important to reproduce the symptom based on an interview with the customer and past examples. Do not perform an inspection on an ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake the suspected harness or connector by hand. When repairs are performed without any travel diagnosis, Repair work is not confirmed if it's done correctly.



SEF233G

- After the diagnosis, make sure to carry out “erase memory”. Refer to BRC-81, "Procedure" .
- 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



SFIA1082E

ASKING COMPLAINTS

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

KEY POINTS

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

SBR339B

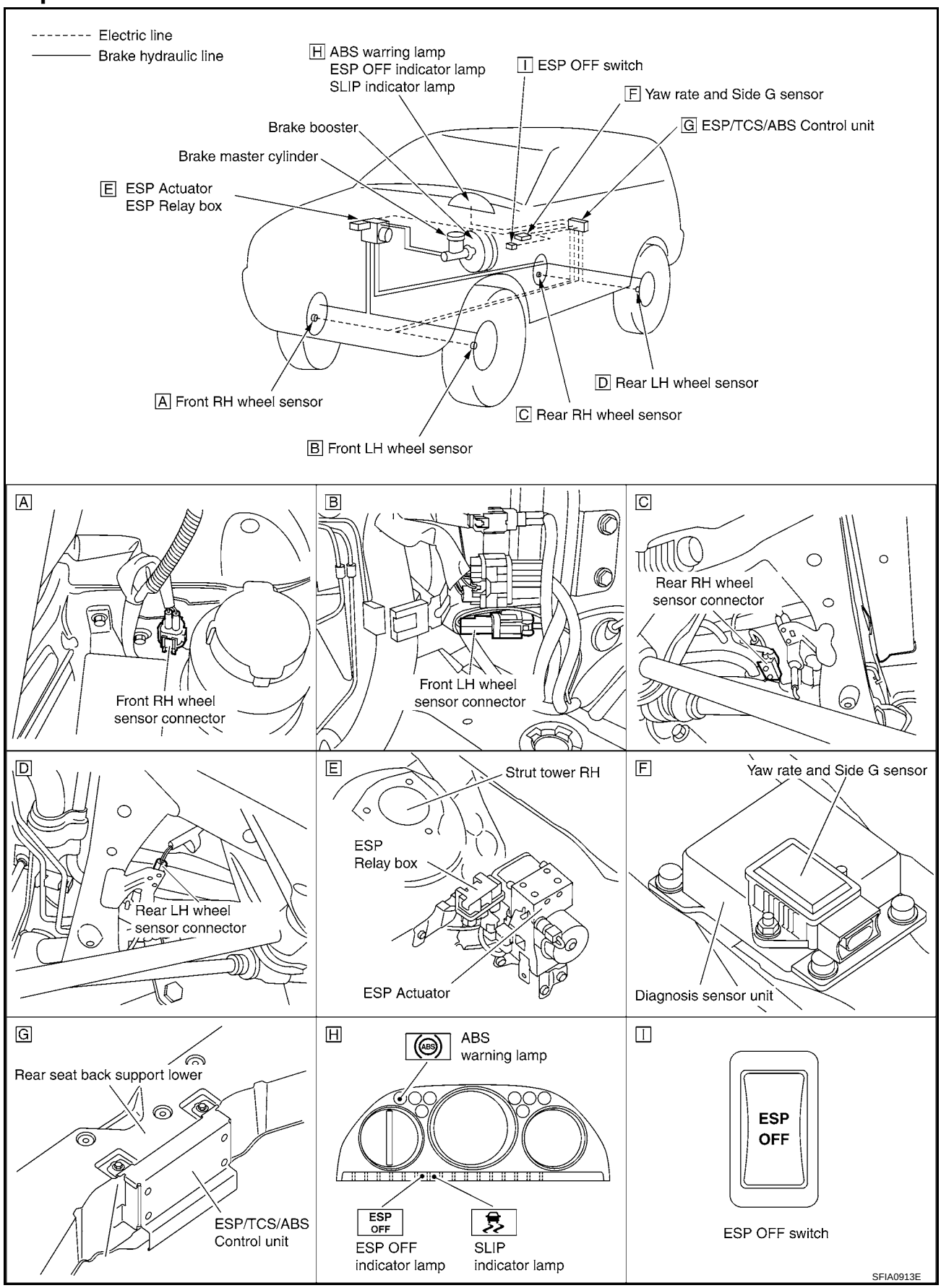
EXAMPLE OF DIAGNOSIS SHEET

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

SFIA0791E

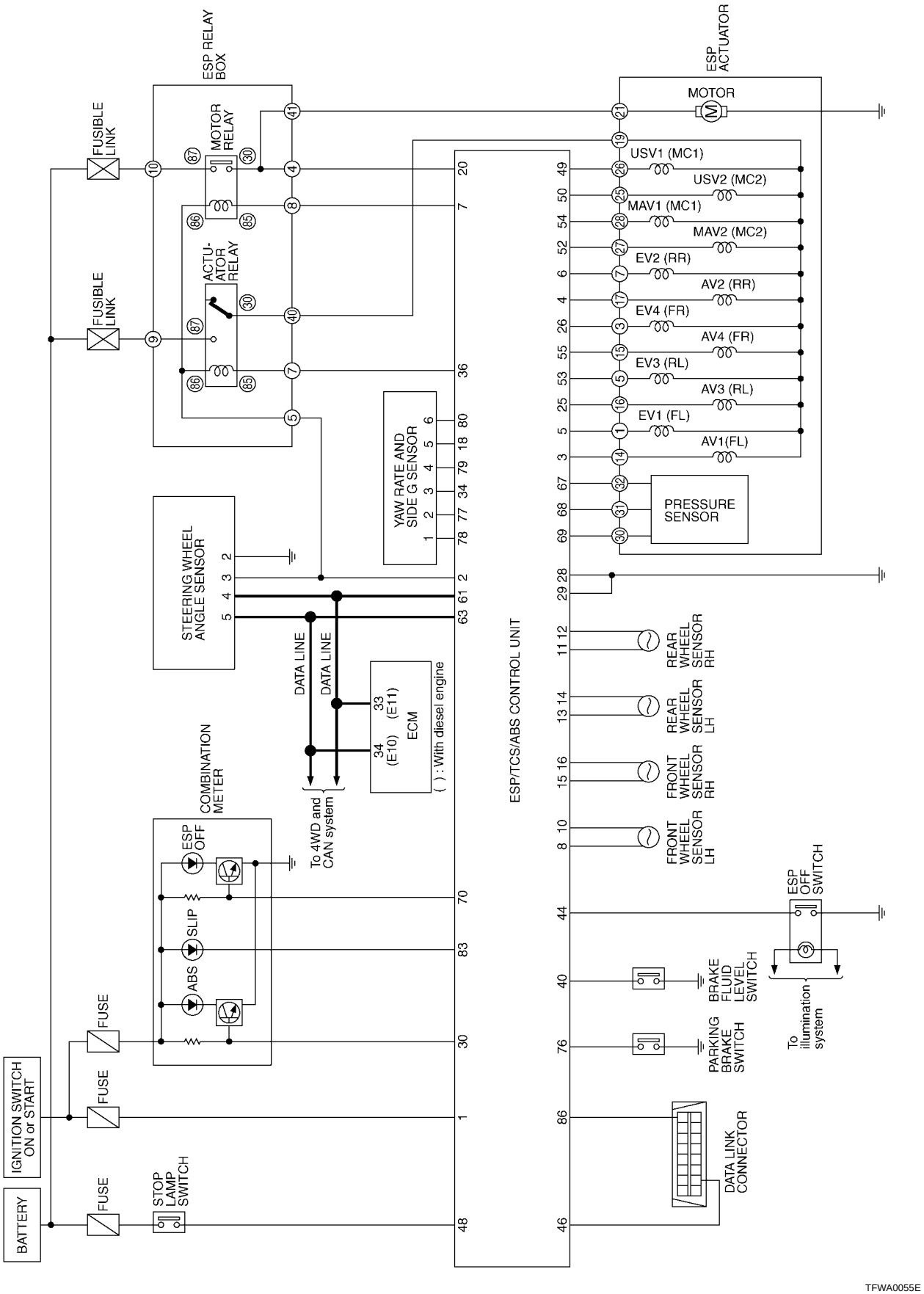
Component Parts and Harness Connector Location

EFS001A3



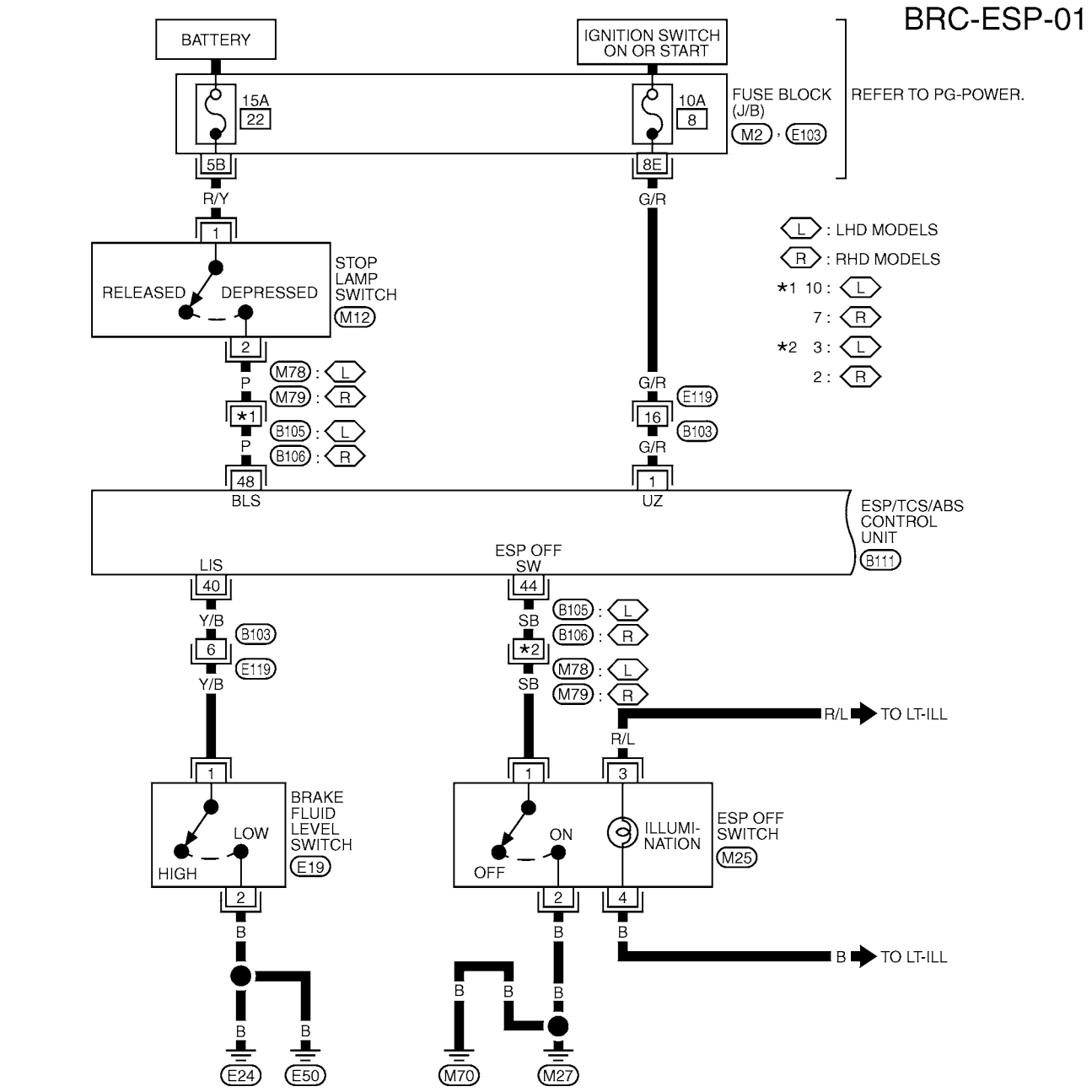
Schematic

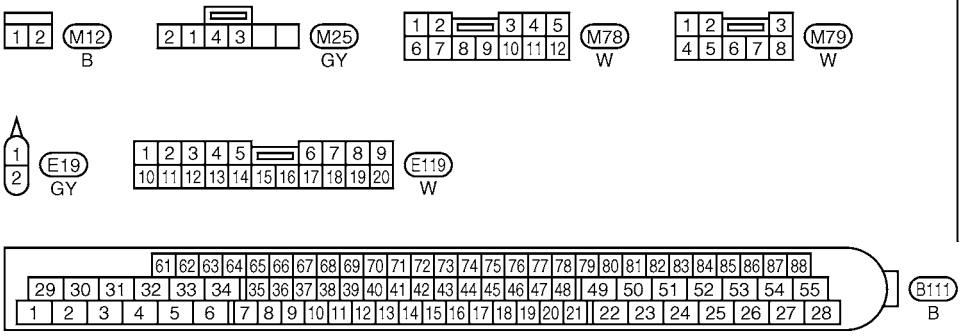
EFS001A4



Wiring Diagram —ESP/TCS/ABS—

EFS001A5

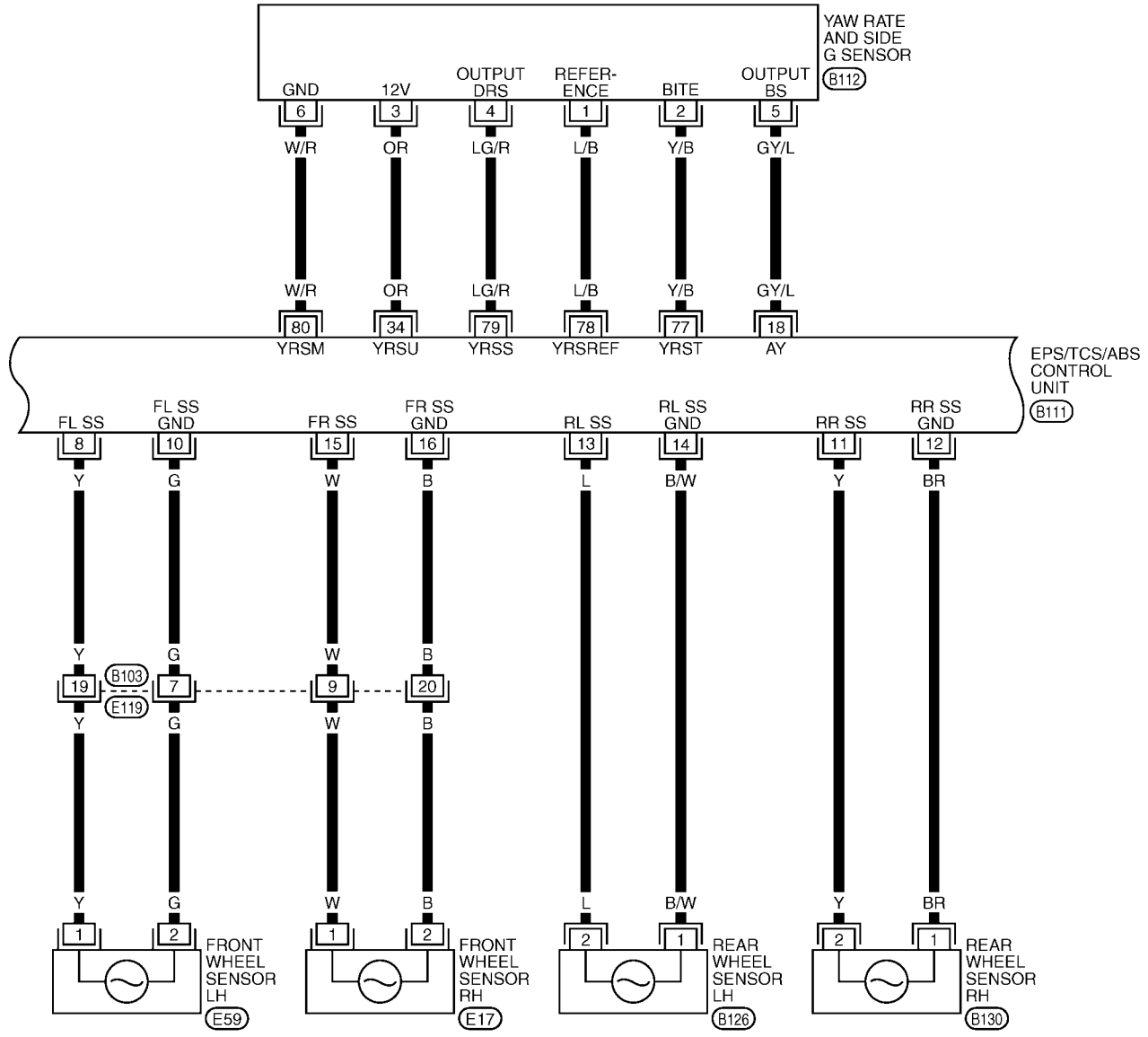


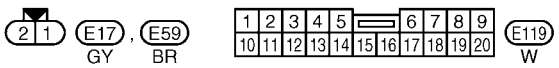


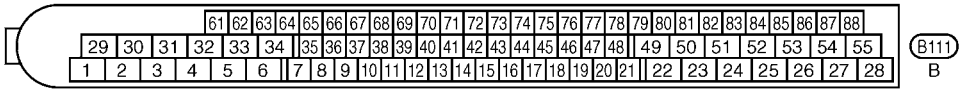
REFER TO THE FOLLOWING.
M2, E103 -FUSE BLOCK-JUNCTION BOX (J/B)

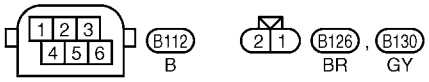
TFWA0010E

BRC-EPS-02



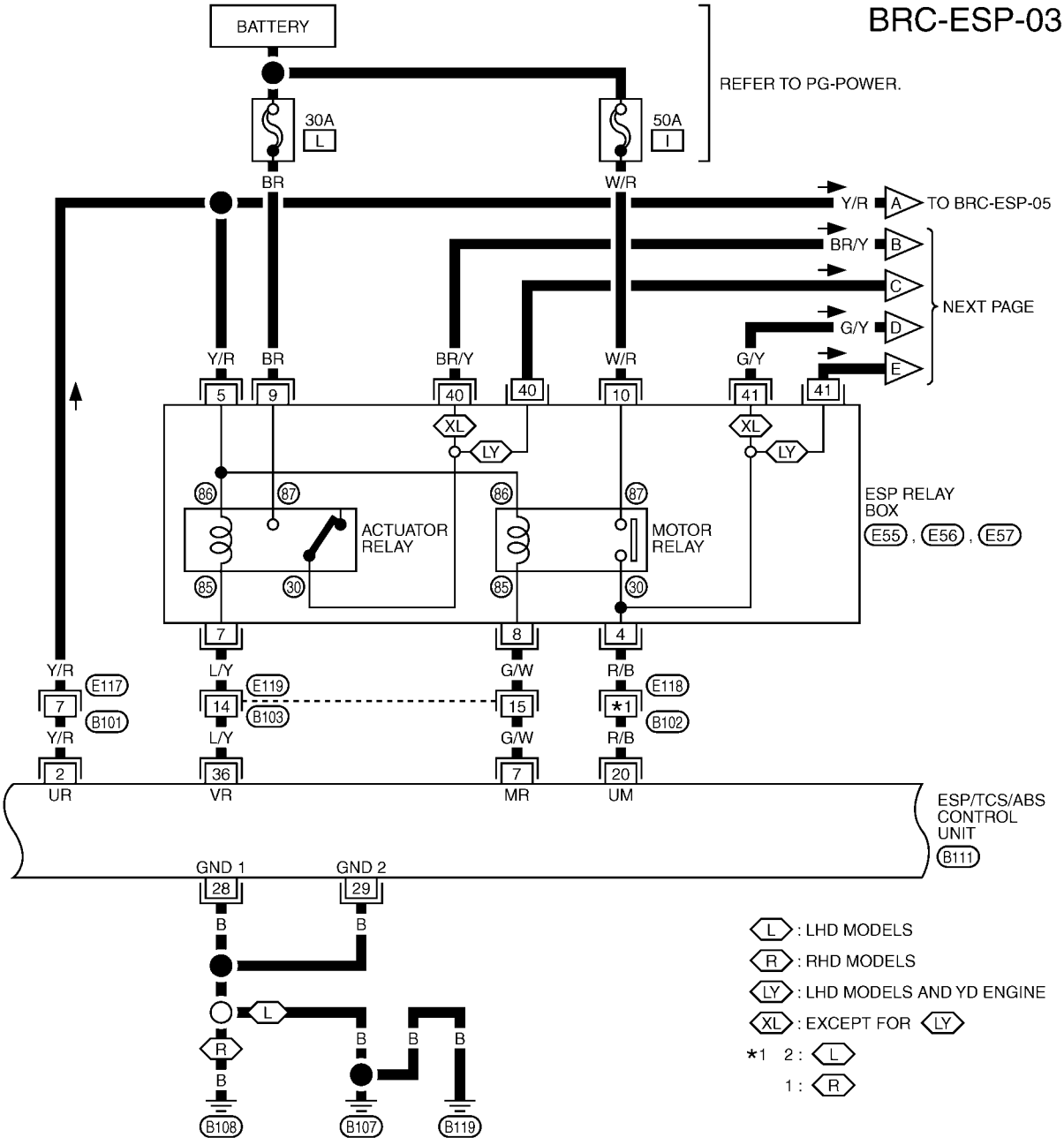


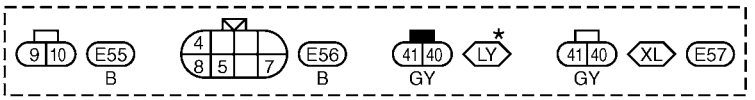


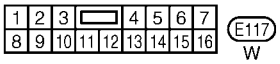


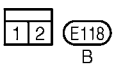
TFWA0056E

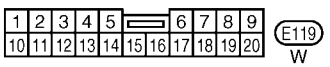
BRC-ESP-03



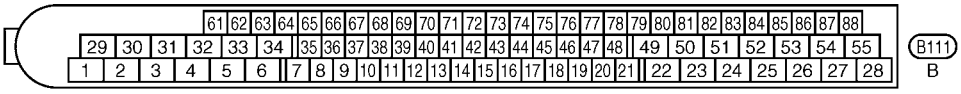






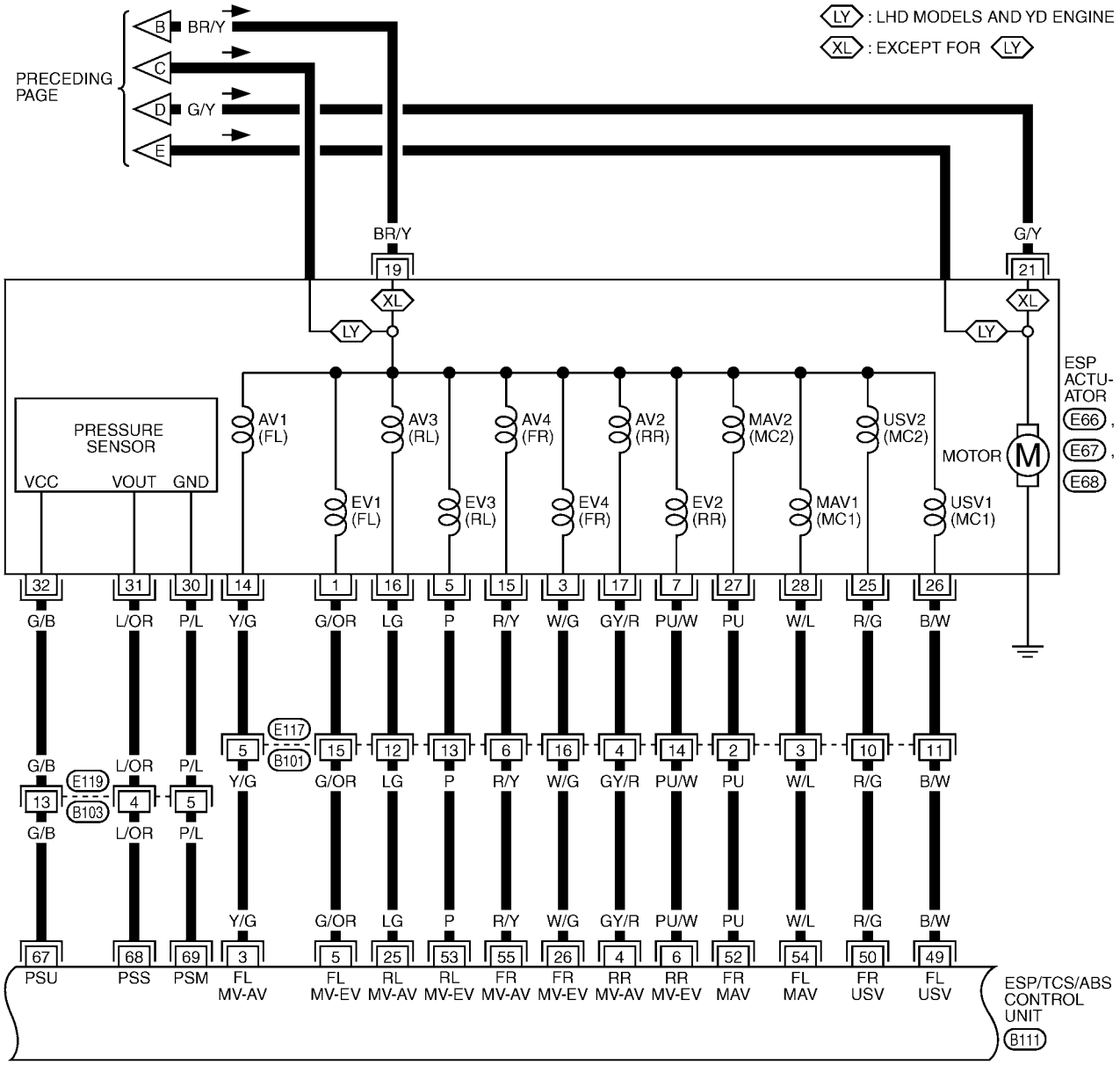


*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.



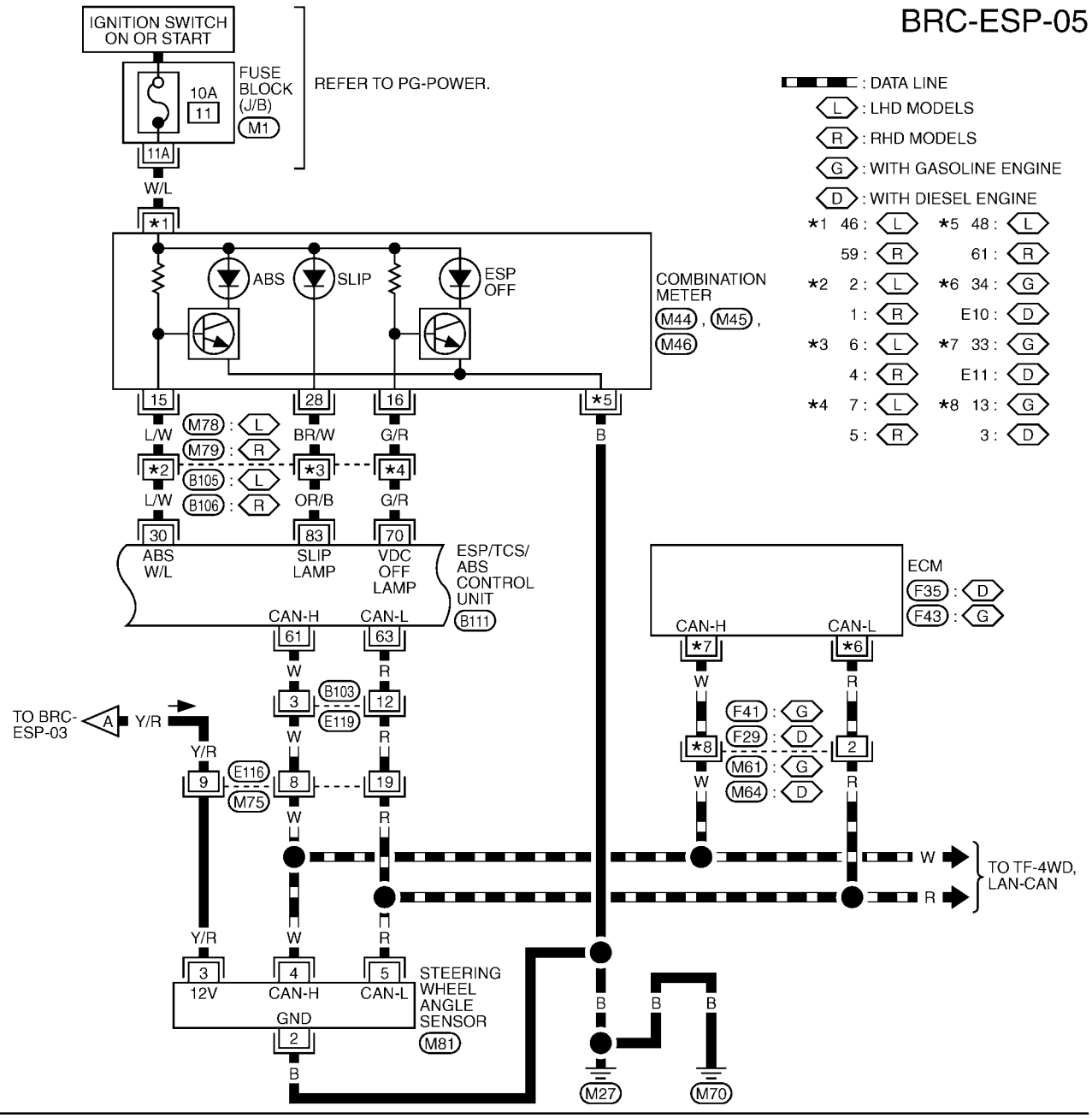
TFWA0057E

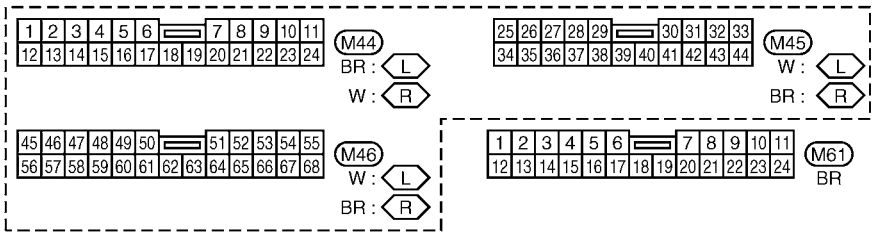
BRC-ESP-04



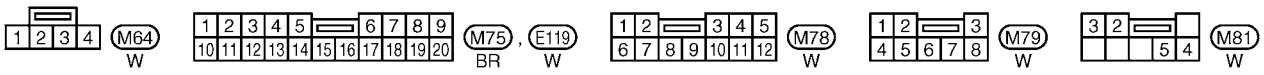
TFWA0058E

BRC-ESP-05



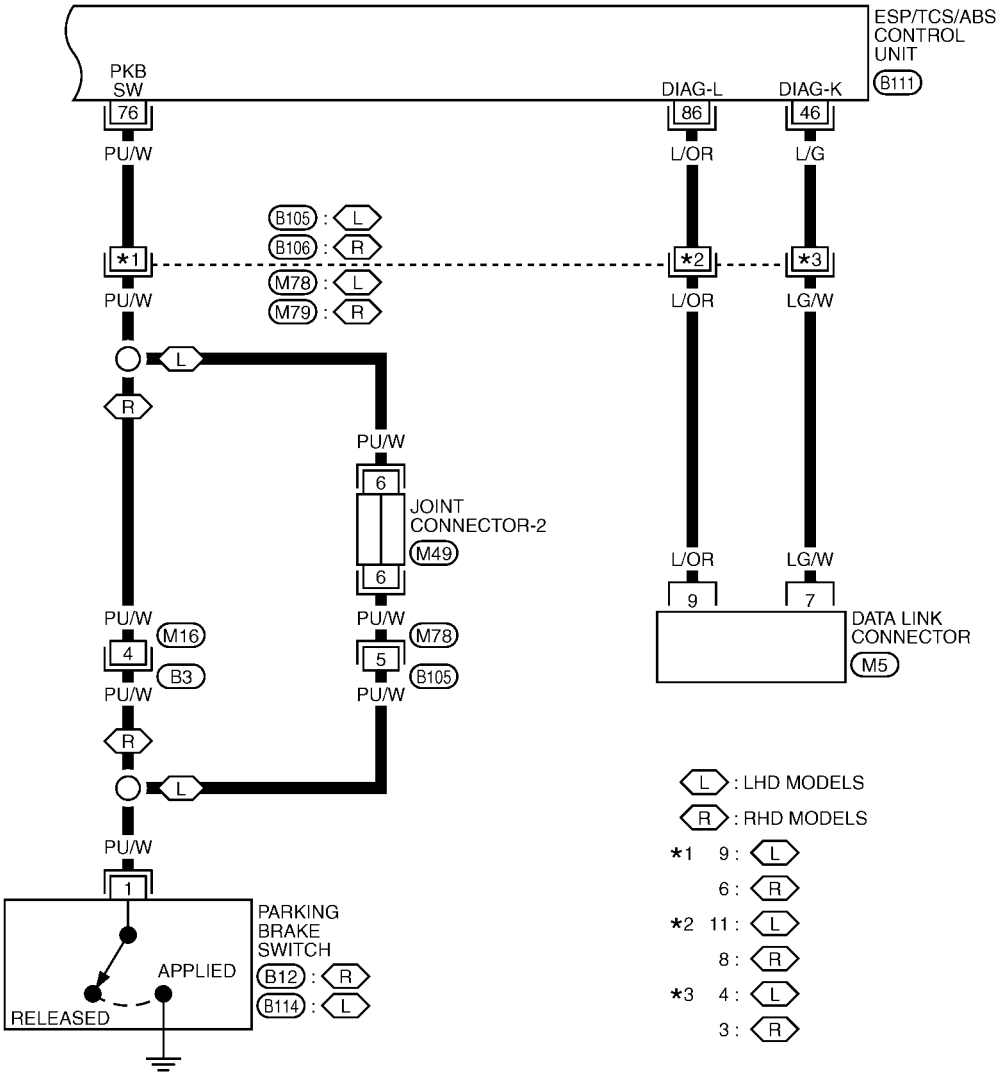


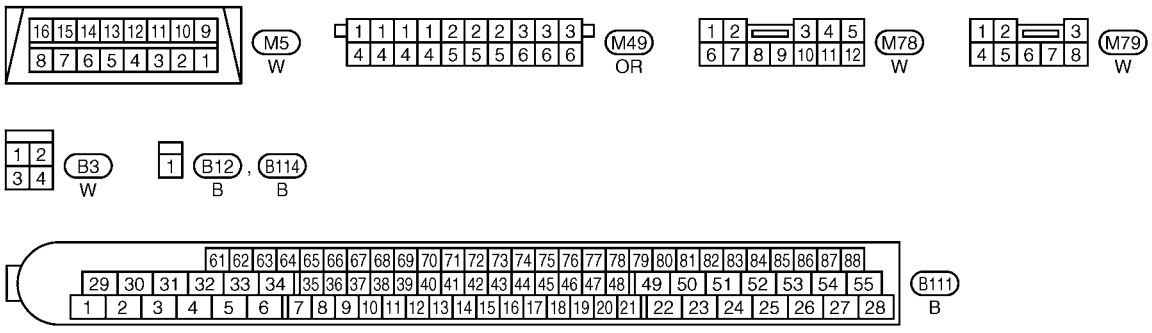
REFER TO THE FOLLOWING.
M1 -FUSE BLOCK-JUNCTION BOX (J/B)
F35, F43, B111
-ELECTRICAL UNITS



TFWA0059E

BRC-ESP-06





TFWA0072E

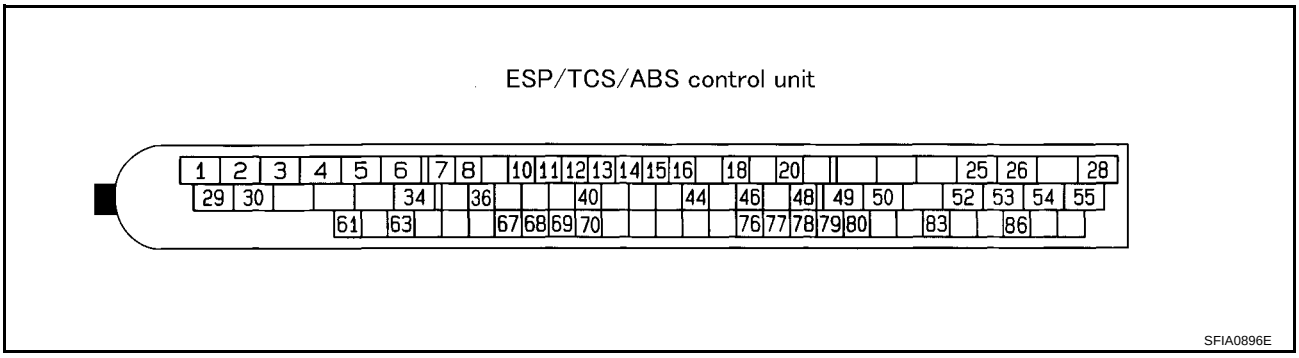
Control Unit Input/Output Signal Standard

EFS001A6

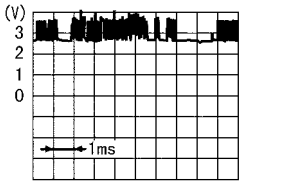
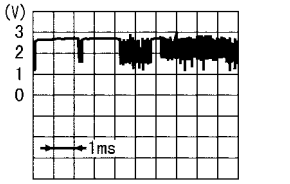
STANDARDS USING A CIRCUIT TESTER AND OSCILLOSCOPE

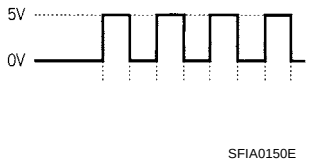
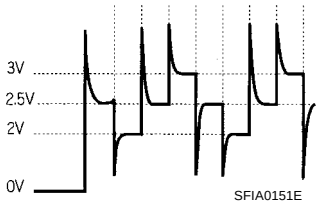
CAUTION:

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



Measurement terminal		Measuring point	Standard value (Note 1)		(Reference) Check items for malfunction
+	–				
1	Body ground	Power supply	Ignition switch ON	Battery voltage (Approx. 12V)	Control unit power supply circuit
2		Actuator motor relay, actuator relay power supply and steering wheel angle sensor power supply	Ignition switch ON	Battery voltage (Approx. 12V)	
7		Actuator motor relay	Actuator motor being driven (“Active test ”mode with CONSULT-II)	Approx. 0V	Actuator motor, motor relay, and circuit
			Actuator motor while the vehicle is stopped	Battery voltage (Approx. 12V)	
36		Actuator relay	When actuator relay is active. (the engine running)	Approx. 0V	Actuator relay and circuit
			When actuator relay is inactive. (Fail-safe, engine starts.)	Battery voltage (Approx. 12V)	
20		Actuator motor monitor	When actuator relay is active. (the engine running)	Battery voltage (Approx. 12V)	Actuator motor monitor circuit
			When actuator relay is inactive. (Fail-safe, engine starts.)	Approx. 0V	
3	Body ground	Front LH wheel outlet solenoid valve	Solenoid valve activated (In “active test” mode of CONSULT-II) or actuator relay inactive (in fail-safe mode)	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 solenoid valve			
55		Front RH wheel outlet solenoid valve			

Measurement terminal +	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 speed 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	Body ground	ESP OFF switch	ESP OFF switch is pressed.	Approx. 10V	ESP OFF switch and circuit
			ESP OFF switch is released.	Approx. 12V	
61		CAN communication input/output signal (H)	Ignition switch ON	 PBIA0224J	–
63		CAN communication input/output signal (L)	Ignition switch ON	 PBIA0223J	

Measurement terminal +	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 and Side G sensor and circuit
34		Yaw rate and Side G sensor	Ignition switch ON	Battery voltage (Approx. 12V)	Yaw rate and 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	
30		ABS warning lamp	ABS warning lamp turns on (Note 3)	Approx. 0V	ABS warning lamp and circuit
			ABS warning lamp turns off (note 3)	Battery voltage (Approx. 12V)	
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)	
83		SLIP indicator lamp	When SLIP indicator lamp is ON (Note 5)	Approx. 0V	SLIP indicator lamp and circuit
			SLIP indicator lamp turns off (note 5)	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: 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 4): 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 5): SLIP indicator lamp ON/OFF timing
ON: For approximately 0.5 seconds after the ignition switch is turned ON, or when a malfunction is detected.
OFF: Approximately 0.5 seconds after the ignition switch is turned ON (when the system is in normal operation) and ESP/TCS function is not activated.
Flashing: ESP/TCS function is active during driving.

STANDARDS WITH CONSULT-II

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

Data monitor item	Contents	Data monitor		(Reference) Check items for malfunction
		Condition	Reference value in normal operation	
FR RH SENSOR FR LH SENSOR RR RH SENSOR RR LH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]	Wheel sensor circuit
		During driving (Note 1)	Almost in accordance with the speedometer display (within ±10%)	
ACCEL POS SIG	Open/close condition of throttle valve (linked with accelerator pedal)	Accelerator pedal not depressed (ignition switch is ON)	0%	Control unit communication circuit between the ESP/TCS/ABS control unit and ECM
		Accelerator pedal depressed (ignition switch is ON)	0 – 100%	
ENG RPM	With the engine running	With the engine stopped	0rpm	Engine speed signal circuit
		Engine running	Almost in accordance with tachometer display	
STR ANGLE SIG	Steering wheel angle detected by steering wheel angle sensor	Straight-ahead condition	Approx. 0 deg	Steering wheel 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	

Data monitor item	Contents	Data monitor		(Reference) Check items for malfunction
		Condition	Reference value in normal operation	
PARK BRAKE SW	Parking brake status	Parking brake activated	ON	Parking brake switch circuit
		Parking brake not activated	OFF	
OFF SW	ESP OFF SW ON/OFF condition	ESP OFF switch ON (When ESP OFF indicator lamp is ON.)	ON	ESP OFF switch circuit
		ESP OFF switch OFF (When ESP OFF indicator lamp is OFF.)	OFF	
ABS WARN LAMP	ABS warning lamp status (Note 2)	When ABS warning lamp is ON.	ON	ABS warning lamp circuit
		When ABS warning lamp is OFF.	OFF	
OFF LAMP	ESP OFF indicator lamp status (Note 3)	When ESP OFF indicator lamp is ON.	ON	ESP OFF indicator lamp circuit
		When ESP OFF indicator lamp is OFF.	OFF	
SLIP LAMP	SLIP indicator lamp status (Note 4)	When SLIP indicator lamp is ON	ON	SLIP indicator lamp circuit
		When SLIP indicator lamp is OFF.	OFF	
FR LH IN SOL 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-PL] UISV [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	

Data monitor item	Contents	Data monitor		(Reference) Check items for malfunction
		Condition	Reference value in normal operation	
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.
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

EFS001A7

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 wheel angle sensor	×	×	×
Actuator relay	×	×	×
Motor relay	×	×	×
ABS warning lamp	–	×	×
Battery voltage	×	×	–
ESP/TCS/ABS C/U	×	–	–
ESP actuator motor	×	×	×
CAN communication	×	×	–
Engine speed signal	–	×	–
ESP OFF switch	–	×	–
ESP OFF indicator lamp	–	×	×
SLIP indicator lamp	–	×	×
Throttle angle	–	×	–

×: Applicable
–: Not applicable

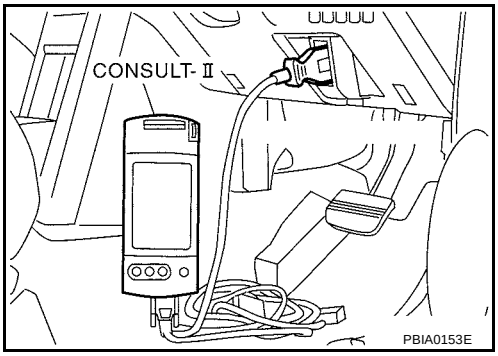
SELF-DIAGNOSIS

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:

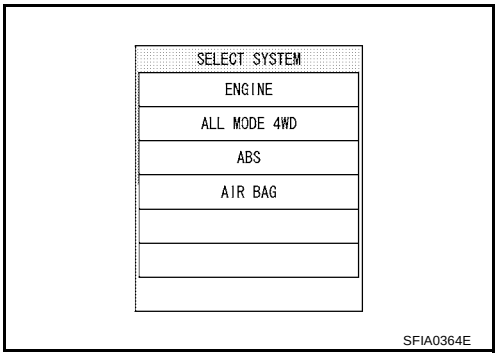
Procedure

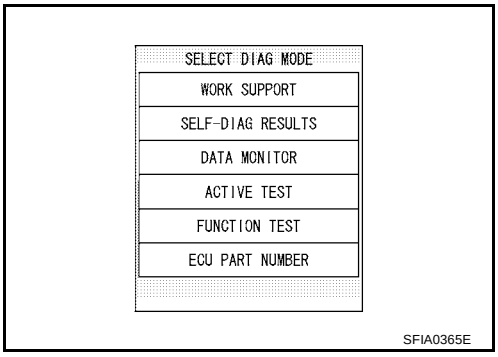
1. Perform a BRC-91, "Basic Inspection" using information from the customer.
2. After the ignition switch is turned OFF, connect the CONSULT-II connector to the vehicle-side data link connector. The data link connector is on the lower instrument cover).
3. Start the engine and drive at Approx. 30 km/h (19 MPH) for approx. 1 minute.



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

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





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-90, "For Correct and Quick Diagnosis" .
   - CONSULT-II self-diagnosis results are displayed without regard to occurrence timing. In some case, the later ones (timing value is small) appear on the next screen.
6. Go to appropriate "Inspection" chart according to "Self-Diagnostic Items to Result Mode" and repair or replace as necessary.
7. Start the engine and drive at Approx. 30 km/h (19 MPH) for Approx. 1 minute.

   CAUTION:
   Check again to make sure that there is NO MALFUNCTION on other parts.
8. Turn the ignition switch OFF to prepare for erasing the memory.
9. Start the engine and touch "START", "ABS", "SELF-DIAG RESULTS" and "ERASE" on CONSULT-II screen in this order to ease the memory.

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

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

CAUTION:
ESP OFF switch is not cancelled.

Self-Diagnostic Items to Result Mode

Self-Diagnostic item	Malfunction detecting condition	Check route
FR LH SENSOR – 1	Circuit of front LH wheel sensor is open.	Wheel sensor and circuit. Refer to BRC-92
RR RH SENSOR – 1	Circuit of rear RH wheel sensor is open.	
FR RH SENSOR – 1	Circuit of front RH wheel sensor is open.	
RR LH SENSOR – 1	Circuit of rear LH wheel sensor is open.	
FR LH SENSOR – 2	Front LH wheel sensor is shorted or input signal is abnormal.	
RR RH SENSOR – 2	Rear RH wheel sensor is shorted or input signal is abnormal.	
FR RH SENSOR – 2	Front RH wheel sensor is shorted or input signal is abnormal.	
RR LH SENSOR – 2	Rear LH wheel sensor is shorted or input signal is abnormal.	
MAIN RELAY	During the actuator relay operation with OFF, when the actuator relay turns ON. Or when the control line for the relay is shorted to the ground.	Actuator relay and circuit. Refer to BRC-104
	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-106
PRESS SEN CIRCUIT	Pressure sensor signal line is open or shorted, or pressure sensor is abnormal.	Pressure sensor and circuit. Refer to BRC-95
ST ANGLE SEN CIRCUIT	Neutral position of the steering wheel angle sensor is dislocated, or the steering wheel angle sensor is abnormal.	Steering wheel angle sensor and circuit. Refer to BRC-96
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-98
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-99
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.	

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-99 .
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-102
	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-92
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-106
ST ANGLE SEN SIGNAL	Neutral position correction of steering wheel angle sensor is not finished.	Neutral position adjustment of steering wheel angle sensor. Refer to BRC-108
ST ANG SEN COM CIR	CAN communication system or steering wheel angle sensor is abnormal.	Steering wheel angle sensor and CAN communication circuit. Refer to BRC-110
SIDE G-SEN CIRCUIT	Side G sensor is abnormal, or the signal line of side G sensor is open or shorted.	Yaw rate and Side G sensor and circuit. Refer to BRC-98
EMERGENCY BRAKE	ESP/TCS/ABS control unit malfunction (pressure increase is too much or too little.)	ESP/TCS/ABS control unit. Refer to BRC-108
CONTROLLER FAILURE	ESP/TCS/ABS internal malfunction of control unit	ESP/TCS/ABS control unit. Refer to BRC-94
CAN COMM CIRCUIT	● 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-110
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-109
ENGINE SIGNAL 1-4, 6	Major engine components are abnormal	Engine system. Refer to BRC-94

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

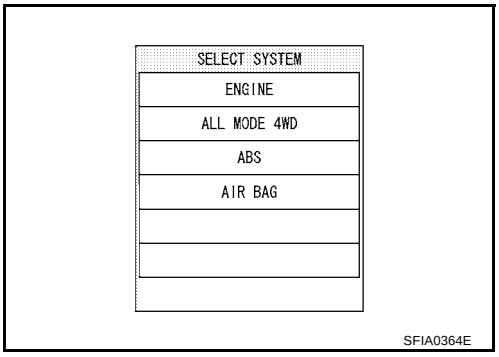
DATA MONITOR

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

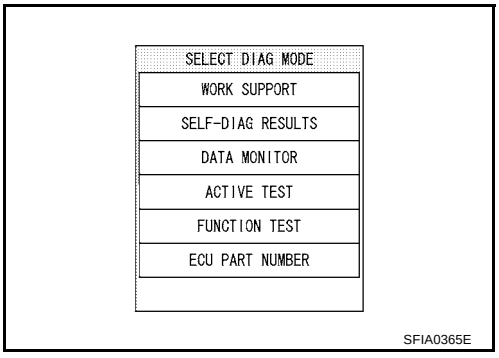
Procedure

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

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



6. Touch “DATA MONITOR”.
7. The data monitor item selection screen is displayed, and touch one of “ECU INPUT SIGNALS” “MAIN SIGNALS”, “CAN DIAG SUPPORT MNTR” or “SELECTION FROM MENU”. Refer to BRC-84, "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)	×	×	×	–	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.
RR RH SENSOR (km/h)	×	×	×	–	Wheel speed calculated by rear RH wheel sensor signal is displayed.
RR LH SENSOR (km/h)	×	×	×	–	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.

Data Monitor Item (Unit)	Data Monitor item selection				Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	CAN DIAG SUPPORT MNTR	
STR ANGLE SIG (deg)	×	×	×	–	Steering wheel angle detected by the steering wheel 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.
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.

Data Monitor Item (Unit)	Data Monitor item selection				Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	CAN DIAG SUPPORT MNTR	
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.
CAN CIRC 1 (ON/ UNKWN)	–	–	–	×	CAN communication signal (OK/UNKWN) status is displayed.
CAN CIEC 2 (OK/ UNKWN)	–	–	–	×	
CAN CIRC 5 (OK/ UNKWN)	–	–	–	×	
CAN CIRC 7 (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.

Data Monitor Item (Unit)	Data Monitor item selection				Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	CAN DIAG SUPPORT MNTR	
ABS SIGNAL (ON/OFF)	–	–	×	–	ABS operation (ON/OFF) status is displayed.
TCS SIGNAL (ON/OFF)	–	–	×	–	TCS operation (ON/OFF) status is displayed.
VDC SIGNAL (ON/OFF)	–	–	×	–	ESP operation (ON/OFF) status is displayed.

×: Applicable
–: Not applicable

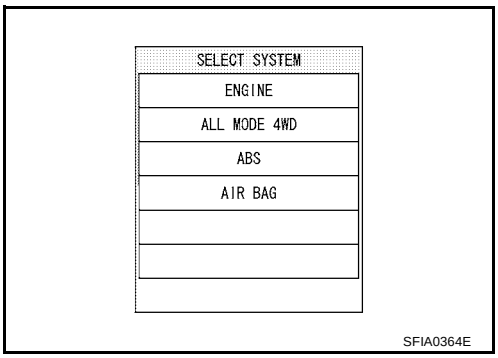
ACTIVE TEST

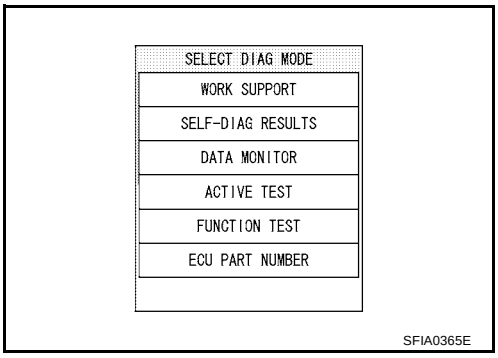
Procedure

CAUTION:

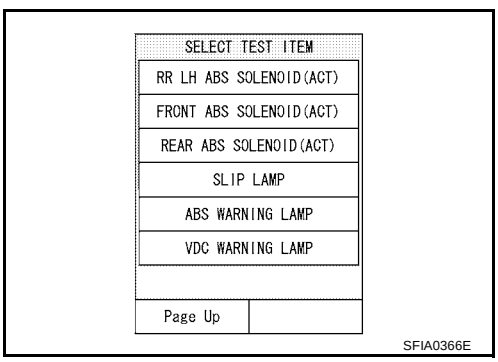
- **Do not perform active test while driving the vehicle.**
- **Make sure that completely bleed air from the brake system.**
- **The active test cannot be performed with the ABS warning lamp on.**

1. Connect the CONSULT-II connector to the vehicle-side data link connector and start the engine.
2. Touch “START” on the display.
3. Touch “ABS” and “ACTIVE TEST”.

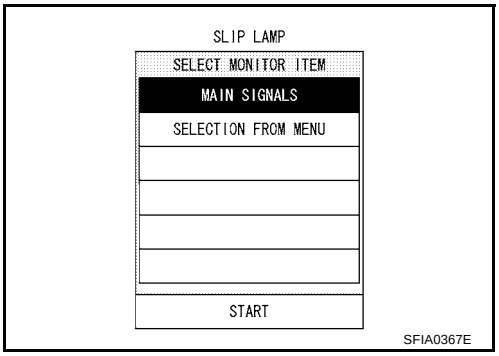




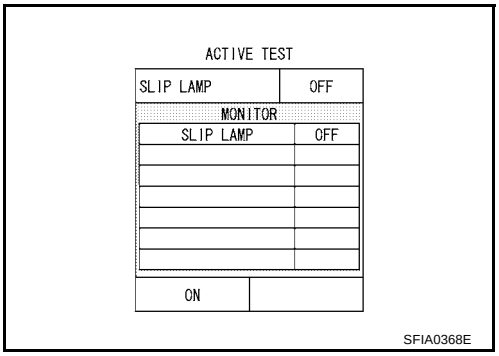
4. The test item selection screen is displayed.
5. Touch necessary test item.



6. Touch “START” with “MAIN SIGNALS” line inverted.

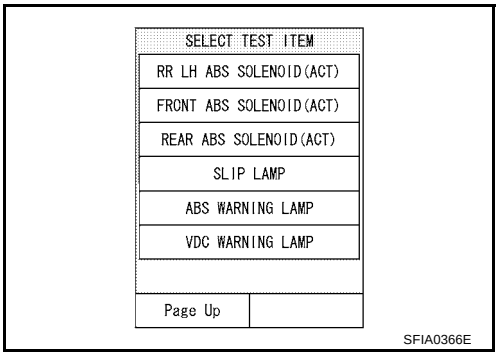


7. The active test screen is displayed.



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-88, "Solenoid Valve Operation Chart" .



Solenoid Valve Operation Chart

Operation		Without “(ACT)”			With “(ACT)”		
		UP	KEEP	DOWN	UP	ACTUATOR UP	ACTUATOR 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

Operation		Without "(ACT)"			With "(ACT)"		
		UP	KEEP	DOWN	UP	ACTUATOR UP	ACTUATOR KEEP
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

EFS001A8

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 wheel angle sensor, steering parts, suspension parts, or tires, and adjustment of alignment, always adjust the neutral position of steering wheel 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. Refer to BRC-81, "Procedure" .
- When inspection of the continuity or voltage between units is performed, check the connector terminals for disconnection, looseness, bend, or collapse. If any malfunction is detected, repair or replace the applicable part.
- Intermittent problems may be caused by a malfunction on harness, connector, or terminal. Move the harnesses, harness connectors, or terminals by hand to make sure that there is no contact malfunction.
- If a circuit tester is used for the check, be careful not to forcibly extend any connector terminal.
- For self-diagnosis, active test, and work support of ESP/TCS/ABS control unit with CONSULT-II, stop and connect CONSULT-II and select “ABS”.
- CONSULT-II self-diagnosis results are displayed without regard to occurrence timing. In some case, the later ones (timing value is small) appear on the next screen.
- While the self-diagnosis results of CONSULT-II shows a malfunction, if CONSULT-II active test is performed, an engine system malfunction may be indicated. In this case, start the engine to resume the normal screen.
- ESP/TCS/ABS system electronically controls the brake operation and engine output. The following symptoms may be caused by the normal operations.

Symptom	Symptom description	Result
Motor operation noise	During ESP, TCS, or ABS operation, sometimes a faint noise can be heard. This is a motor operation noise in the ESP 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

Symptom	Symptom description	Result
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 or higher to check that the warning lamp no longer illuminates.	
ABS operation (Longer stopping distance)	The stopping distance may be longer for the vehicles with ABS when the vehicle is driver on snowy and rough road. When driving on the road like that, slow down the speed.	Normal
Sluggish feel	Depending on road circumstances, the driver may have a sluggish feel. This is not abnormal, because the optimum traction has the highest priority (safety first) by TCS operation. Sometimes the driver has a slight sluggish feel against the substantial accelerator pedal operation.	Normal

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

×:ON –: Lamp OFF

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

×: Applicable
–: Not applicable

Basic Inspection

EFS001A9

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 actuator for leaks. If a leak or oozing is detected, check as follows:
   - If the connections at the ESP 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 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 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 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 actuator body.

  CAUTION:
  Do not disassemble the actuator body.

3. Check the brake disc rotor and pads.

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

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

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

1. Check that the ABS warning lamp is ON for Approx. 0.5 seconds when the ignition switch is turned ON. If it does not turn on, check the ABS warning lamp and the circuit, and the combination meter.
2. Check that ESP OFF indicator lamp is ON for Approx. 0.5 seconds when the ignition switch is turned ON. If it does not turn ON, check the ESP OFF indicator lamp and the circuit, and the combination meter.
3. Check that the SLIP indicator lamp is ON for Approx. 0.5 seconds when the ignition switch is turned ON. If it does not turn ON, check the SLIP indicator lamp and the circuit.
4. With the engine running, check the ESP OFF indicator lamp turns ON and OFF when the ESP OFF switch turns ON and OFF. If it dose not operate in accordance with the switch, check the ESP OFF switch and the circuit.
5. Check that the ESP OFF indicator lamp turns OFF after Approx. 2 seconds delay when the ESP OFF switch turned ON (The ESP/TCS system was not operated). If the ESP OFF indicator lamp does not turn OFF in 10 seconds from the engine start, perform the self-diagnosis of ESP/TCS/ABS control unit.

Inspection 1 Wheel Sensor and Circuit

EFS001AB

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

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

Are any self-diagnosis result items above indicated?

>> GO TO 2.

2. CHECK THE CONNECTOR

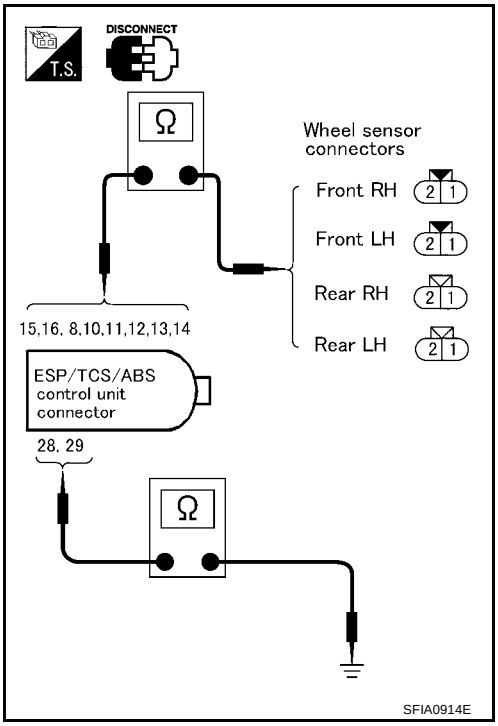
Remove connectors of the wheel sensor which is malfunctioning and the ESP/TCS/ABS control unit. Check whether the deformation of terminal, or incorporate connection of connectors. Then, connect connectors. In addition, check if the wheel sensor cable is damaged due to friction.

Does ABS warning lamp is out when driving 30 km/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 (vehicle-side connector B111) and wheel sensors (vehicle-side connector E59, E17, B129 and B130), body grand.



	ESP/TCS/ABS control unit (vehicle-side connector B111)	Wheel sensor (Vehicle-side connector E59, E17, B129 and B130)	Continuity (Resistance)
Front RH	15 (W)	1 (W)	Yes (0 - 0.5Ω)
	16 (B)	2 (B)	
Front LH	8 (Y)	1 (Y)	Yes (0 - 0.5Ω)
	10 (G)	2 (G)	
Rear RH	11 (Y)	2 (Y)	Yes (0 - 0.5Ω)
	12 (BR)	1 (BR)	
Rear LH	13 (L)	2 (L)	Yes (0 - 0.5Ω)
	14 (B/W)	1 (B/W)	

	ESP/TCS/ABS control unit (vehicle-side connector B111)	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 ESP/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

EFS001AC

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

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

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

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

2. SELF-DIAGNOSIS RESULT CHECK 2

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

Is inspection result OK?

YES >> Inspection End
NO >> Repair or replace affected items. Perform the self-diagnosis again.

Inspection 3 ESP/TCS/ABS Control Unit System

EFS001AD

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.

EFS001AE

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

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

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

>> GO TO 2.

2. SELF-DIAGNOSIS RESULT CHECK 2

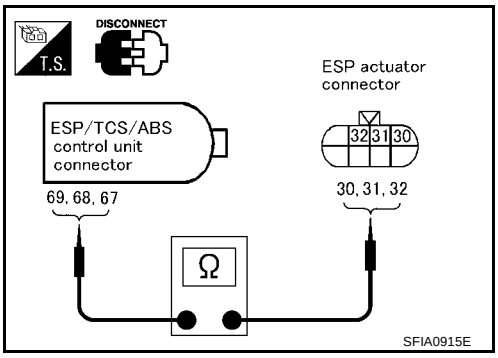
1. Disconnect connectors of the pressure sensor and the ESP/TCS/ABS control unit, and connect them again correctly.
2. Perform the ESP/TCS/ABS control unit self-diagnosis again.

Is inspection result OK?

YES >> Repair or replace the poorly connected connector, then perform the self-diagnosis again.
NO >> GO TO 3.

3. PRESSURE SENSOR CIRCUIT INSPECTION

1. Disconnect connectors of the pressure sensor and the ESP/TCS/ABS control unit.
2. Check for continuity between the ESP/TCS/ABS control unit (vehicle-side connector B111) and the pressure sensor (vehicle-side connector E67).



ESP/TCS/ABS control unit (Vehicle-side connector B111)	Pressure sensor (ESP actuator vehicle-side connector E67)	Continuity
69 (P/L)	30 (P/L)	Yes
68 (L/OR)	31 (L/OR)	Yes
67 (G/B)	32 (G/B)	Yes

Is inspection result OK?

YES >> GO TO 4.
NO >> 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?

YES >> Perform the ESP/TCS/ABS control unit self-diagnosis again.
NO >> Pressure sensor malfunction. Replace the ESP actuator (with the pressure sensor).

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

EFS001AF

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

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

Perform inspection 15.
Refer to BRC-110, "Inspection 15 CAN Communication Circuit, ESP/TCS/ABS Control Unit and Steering Wheel Angle Sensor" .

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

>> GO TO 2.

2. SELF-DIAGNOSIS RESULT CHECK 2

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

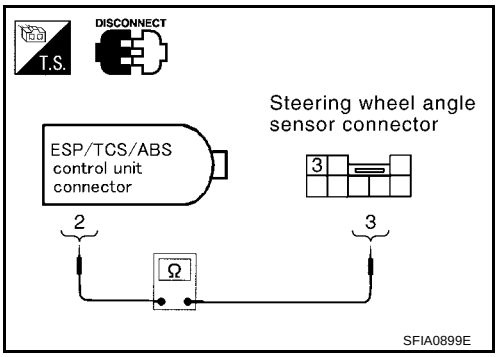
Is inspection result OK?

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

3. STEERING WHEEL ANGLE SENSOR CIRCUIT CHECK

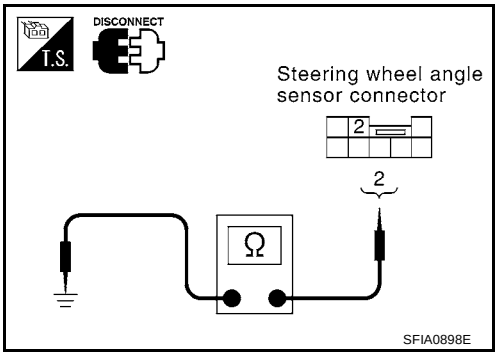
1. Disconnect the ESP/TCS/ABS control unit connector and the steering wheel angle sensor connector.

2. Check for continuity between the ESP/TCS/ABS control unit (vehicle-side connector B111) and the steering wheel angle sensor (vehicle-side connector M81).



ESP/TCS/ABS control unit (Vehicle-side connector B111)	Steering wheel angle sensor (Vehicle-side connector M81)	Continuity
2 (Y/R)	3 (Y/R)	Yes

3. Check for continuity between the steering wheel angle sensor and ground.



Steering wheel angle sensor (Vehicle-side connector M81)	ground	Continuity
2 (B)	—	Yes

Is inspection result OK?

YES >> GO TO 4.
NO >> 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	– 5 deg to + 5 deg
Tun the wheel to the right by 90°	Approx. + 90 deg
Tun the wheel to the left by 90°	Approx. – 90 deg

Is inspection result OK?

YES >> Perform the ESP/TCS/ABS control unit self-diagnosis again.
NO >> Replace the spiral cable (with the steering wheel angle sensor) and adjust the neutral position of steering wheel angle sensor. BRC-57, "Adjustment of Neutral Position of Steering Wheel Angle Sensor" .

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

EFS001AG

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:

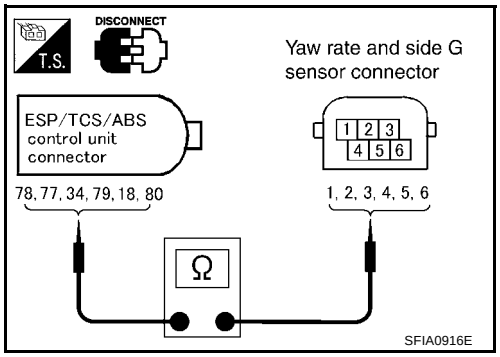
When the vehicle on a turn-table at an entrance of parking lot or on a moving unit, the ESP OFF indicator lamp turns ON, and the self-diagnosis with CONSULT-II may indicate that the yaw rate sensor system is malfunction. In this case, the yaw rate sensor is not malfunction. Move the vehicle from the 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 and side G sensor and the ESP/TCS/ABS control unit.
2. Check for continuity between the ESP/TCS/ABS control unit (vehicle-side connector B111) and the yaw rate and side G sensor (vehicle-side connector B112).



ESP/TCS/ABS control unit (Vehicle-side connector B111)	Yaw rate and side G-sensor (Vehicle-side connector B112)	Continuity
78 (L/B)	1 (L/B)	Yes
77 (Y/B)	2 (Y/B)	Yes
34 (OR)	3 (OR)	Yes
79 (LG/R)	4 (LG/R)	Yes
18 (GY/L)	5 (GY/L)	Yes
80 (W/R)	6 (W/R)	Yes

Is inspection result OK?

YES >> GO TO 3.
NO >> Repair or replace the disconnected harness.

3. YAW RATE SENSOR AND 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 + 4 deg/s	–1.1 to + 1.1 m/s^2
Right turn	Negative value	Negative value
Left turn	Positive value	Positive value

Is inspection result OK?

YES >> Perform the ESP/TCS/ABS control unit self-diagnosis again.
NO >> The yaw rate and 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

EFS001AI

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

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

Are any self-diagnosis result items above indicated?

>> GO TO 2.

2. SELF-DIAGNOSIS RESULT CHECK 2

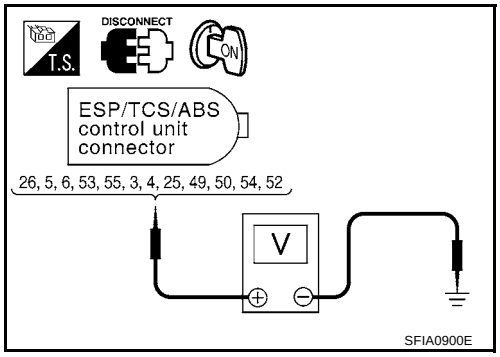
1. Disconnect the ESP/TCS/ABS control unit connector and solenoid valve connectors. Securely connect them again.
2. Perform the self-diagnosis again.

Are any self-diagnosis result items indicated again?

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

3. SOLENOID VALVE INPUT SIGNAL CHECK.

1. Disconnect the ESP/TCS/ABS control unit connector.
2. Turn on the ignition switch and check the voltage between the ESP/TCS/ABS control unit (vehicle-side connector B111) and body ground.



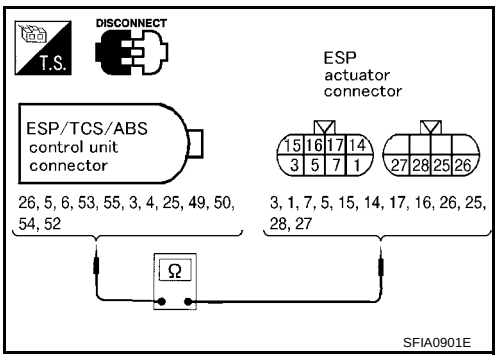
VDC/TCS/ABS control unit (Vehicle-side connector B111)	Body ground	Voltage
26 (W/G)	–	Battery voltage (approx.12V)
5 (G/OR)	–	
6 (PU/W)	–	
53 (P)	–	
55 (R/Y)	–	
3 (Y/G)	–	
4 (GY/R)	–	
25 (LG)	–	
49 (B/W)	–	
50 (R/G)	–	
54 (W/L)	–	
52 (PU)	–	

Is inspection result OK?

YES >> Check the ESP/TCS/ABS control unit power supply circuit.
NO >> GO TO 4.

4. SOLENOID VALVE LINE CHECK

1. Disconnect connectors for the ESP/TCS/ABS control unit and the ESP actuator.
2. Check for continuity between the ESP/TCS/ABS control unit (vehicle-side connector B111) and the ESP actuator (vehicle-side connector E67and E68).



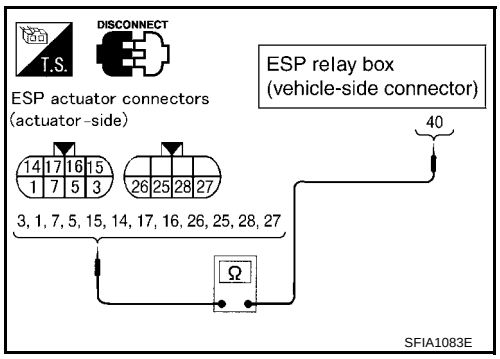
ESP/TCS/ABS control unit (Vehicle-side connector B111)	ESP Actuator (Vehicle-side connector E67 and E68)	Continuity
26 (W/G)	3 (W/G)	Yes
5 (G/OR)	1 (G/OR)	Yes
6 (PU/W)	7 (PU/W)	Yes
53 (P)	5 (P)	Yes
55 (R/Y)	15 (R/Y)	Yes
3 (Y/G)	14 (Y/G)	Yes
4 (GY/R)	17 (GY/R)	Yes
25 (LG)	16 (LG)	Yes
49 (B/W)	26 (B/W)	Yes
50 (R/G)	25 (R/G)	Yes
54 (W/L)	28 (W/L)	Yes
52 (PU)	27 (PU)	Yes

Is inspection result OK?

YES >> GO TO 5.
NO >> Harness disconnection between the ESP/TCS/ABS control unit and the actuator

5. ACTUATOR SOLENOID INSPECTION

1. Disconnect the ESP actuator connector and ESP relay box vehicle-side connector E57.
2. Check the resistance value at the ESP actuator.



ESP Actuator (Actuator side)	ESP Relay box (Vehicle-side connector E57)	Resistance
3	40 (BR/Y: Except for LHD models and YD ENGINE)	6.0 – 11Ω
1		6.0 – 11Ω
7		6.0 – 11Ω
5		6.0 – 11Ω
15		3.0 – 5.0Ω
14		3.0 – 5.0Ω
17		3.0 – 5.0Ω
16		3.0 – 5.0Ω
26		6.0 – 11.0Ω
25		6.0 – 11.0Ω
28		3.0 – 5.0Ω
27		3.0 – 5.0Ω

Is inspection result OK?

YES >> Perform the ESP/TCS/ABS control unit self-diagnosis again.
NO >> Replace the ESP actuator assembly.

Inspection 8 Actuator Motor, Motor Relay and Circuit

EFS001AJ

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?

>> ● GO TO 2.

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

2. SELF-DIAGNOSIS RESULT CHECK 2

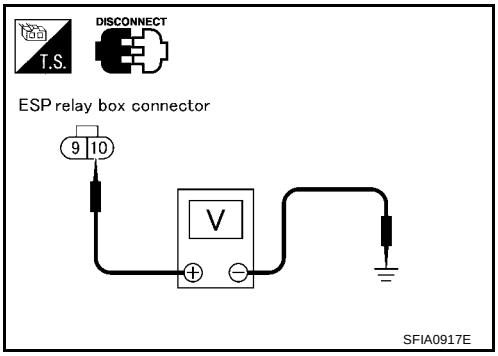
1. Disconnect connectors for the ESP/TCS/ABS control unit and the actuator. Securely connect them again.
2. Perform the self-diagnosis again.

Are any self-diagnosis items indicated again?

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

3. ACTUATOR MOTOR, MOTOR RELAY POWER SUPPLY CIRCUIT INSPECTION

1. Disconnect relay box connectors.



2. Check the voltage between the vehicle-side connector E55 and body ground.

Relay box (Vehicle-side connector E55)	Body ground	Voltage value
10 (W/R)	–	Battery voltage (approx. 12V)

Is inspection result OK?

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

4. ACTUATOR MOTOR AND MOTOR RELAY CIRCUIT CHECK

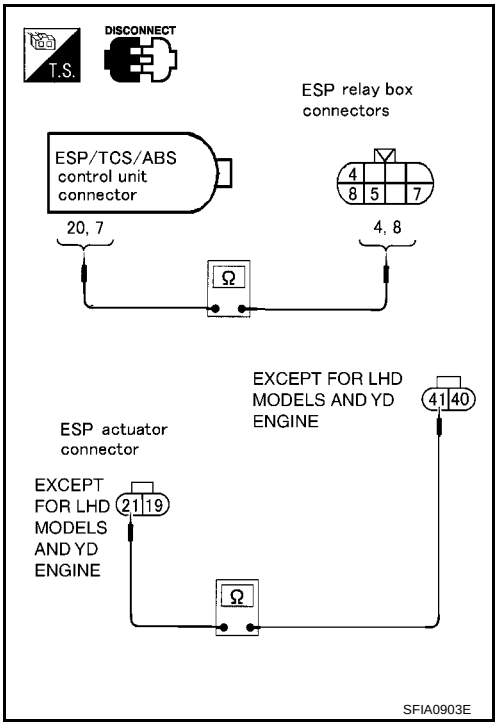
1. Disconnect connectors for the ESP/TCS/ABS control unit and the relay box.
2. Check for continuity between the ESP/TCS/ABS control unit, the relay, and the actuator (vehicle-side connector E66).

ESP/TCS/ABS control unit (Vehicle-side connector B111)	ESP relay box (Vehicle-side connector E56)	ESP actuator (Vehicle-side connector E66)	Continuity
20 (R/B)	4 (R/B)	—	Yes
7 (G/W)	8 (G/W)	—	Yes
—	41 (G/Y) *	21 (G/Y) *	Yes

* Except for LHD models and YD engine.

Is inspection result OK?

YES >> GO TO 5.
NO >> 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?

YES >> Check the ESP/TCS/ABS control unit power supply circuit.
NO >> Replace the motor relay.

Inspection 9 Actuator Relay and Circuit

EFS001AK

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSUL-II indication item
MAIN RELAY

Is “MAIN RELAY” indicated in the self-diagnosis results?

>> GO TO 2.

2. SELF-DIAGNOSIS RESULT CHECK 2

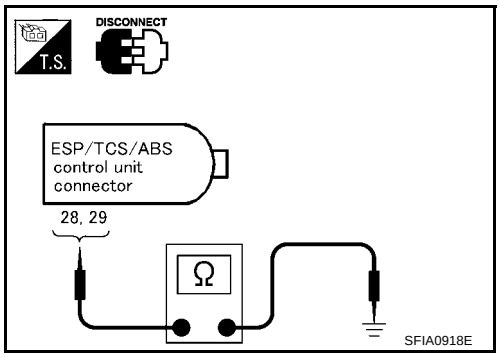
1. Disconnect the ESP/TCS/ABS control unit connector. Securely connect them again.
2. Perform the ESP/TCS/ABS control unit self-diagnosis again.

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

1. Disconnect the ESP/TCS/ABS control unit connector.
2. Check the ESP/TCS/ABS control unit ground circuit.



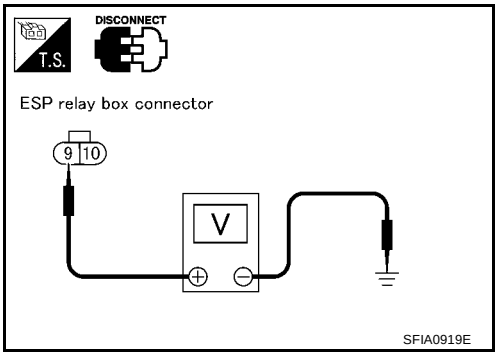
ESP/TCS/ABS control unit (Vehicle-side connector B111)	Body ground	Continuity
28 (B)	–	Yes
29 (B)	–	Yes

Is inspection result OK?

YES >> GO TO 4.
NO >> Poorly connection on the ESP/TCS/ABS control unit connector or harness disconnection.

4. ACTUATOR RELAY POWER SUPPLY CIRCUIT INSPECTION

1. Disconnect relay box connectors.
2. Check the voltage between the vehicle-side connector E55 and body ground.



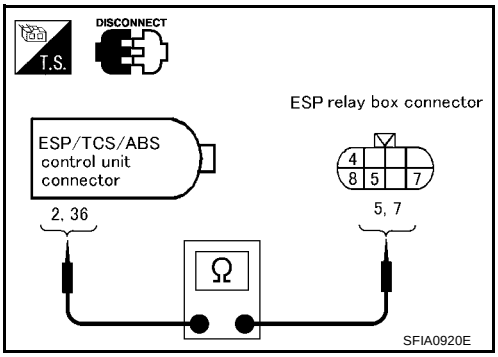
RELAY BOX (Vehicle-side connector) E55	Body ground	Voltage value
9 (BR)	–	Battery voltage (approx. 12V)

Is inspection result OK?

YES >> GO TO 5.
NO >> ● 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 (vehicle-side connector B111) and the relay box (vehicle-side connector E56).



ESP/TCS/ABS control unit (Vehicle-side connector B111)	ESP relay box (Vehicle-side connector E56)	Continuity
2 (Y/R)	5 (Y/R)	Yes
36 (L/Y)	7 (L/Y)	Yes

Is inspection result OK?

YES >> GO TO 6.
NO >> 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?

YES >> Check the ESP/TCS/ABS control unit power supply circuit.
NO >> Replace the actuator relay.

Inspection 10 Stop Lamp Switch and Circuit

EFS001AL

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK

Check the self-diagnosis results.

Self-diagnosis results
CONSUL-II indication item
STOP LAMP SW

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

>> GO TO 2.

2. STOP LAMP INSPECTION

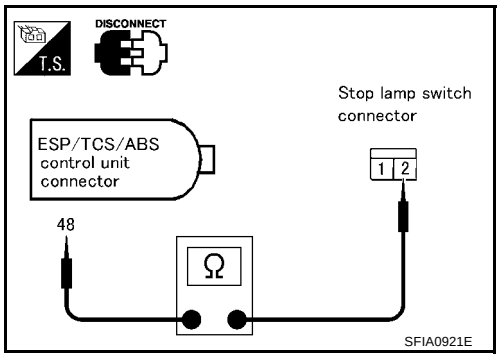
1. Disconnect connectors for the stop lamp switch and the ESP/TCS/ABS control unit.
2. Securely connect them again.
3. Start the engine.
4. Repeat depressing the brake pedal carefully several times, then perform the self-diagnosis again.

Is the same self-diagnosis item indicated?

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

3. STOP LAMP SWITCH CIRCUIT CHECK

1. Disconnect connectors for the stop lamp switch and the ESP/TCS/ABS control unit.
2. Check for continuity between the stop lamp switch (vehicle-side connector M12) and the ESP/TCS/ABS control unit (vehicle-side connector B111).



ESP/TCS/ABS control unit (Vehicle-side connector B111)	STOP LAMP SW (Vehicle-side connector M12)	Continuity
48 (P)	2 (P)	Yes

Is inspection result OK?

YES >> Perform the ESP/TCS/ABS control unit self-diagnosis again.
NO >> Harness disconnection between the ESP/TCS/ABS control unit and the stop lamp switch.

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

EFS001AM

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

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

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

>> GO TO 2.

2. SELF-DIAGNOSIS RESULT CHECK 2

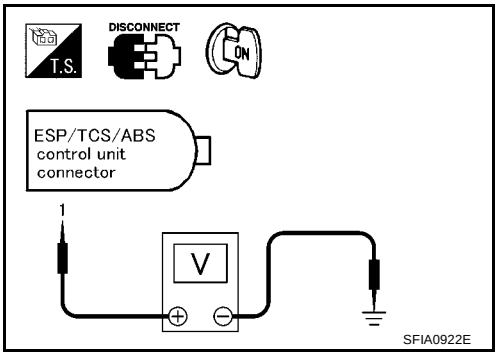
1. Disconnect the ESP/TCS/ABS control unit connector. Securely connect them again.
2. Perform the self-diagnosis.

Is the same self-diagnosis item indicated?

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

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

1. Disconnect the ESP/TCS/ABS control unit connector.
2. Turn the ignition switch ON (engine not running), and check the voltage between the ESP/TCS/ABS control unit (vehicle-side connector B111) and body ground.



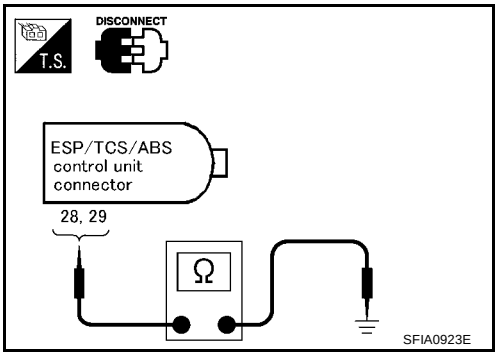
ESP/TCS/ABS control unit (Vehicle-side connector B111)	Body ground	Voltage value
1 (G/R)	–	Battery voltage (approx. 12V)

Is inspection result OK?

YES >> GO TO 4.
NO >> GO TO 5.

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

Check the ESP/TCS/ABS control unit (vehicle-side connector B111) ground circuit.



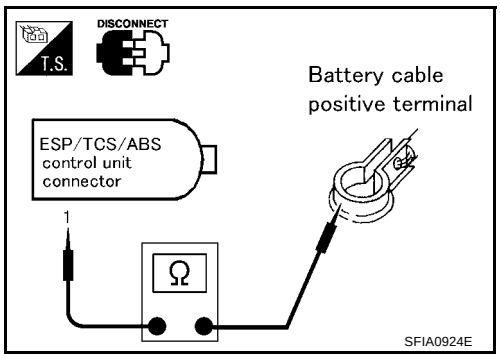
ESP/TCS/ABS control unit (Vehicle-side connector B111)	Body ground	Continuity
28 (B)	–	Yes
29 (B)	–	Yes

Is inspection result OK?

YES >> Perform the ESP/TCS/ABS control unit self-diagnosis again.
NO >> 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 (vehicle-side connector B111).



ESP/TCS/ABS control unit (Vehicle-side connector B111)	Battery terminal	Continuity
1 (G/R)	positive	Yes

Is inspection result OK?

YES >> Check the battery for a loose terminal and low voltage or the alternator for abnormality.
NO >> ● Replace the fuse 10A.
● Harness disconnection

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

EFS001AO

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK

Check the self-diagnosis results.

Self-diagnosis results
CONSUL-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

EFS001AP

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSUL-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 wheel 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 wheel 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

EFS001AQ

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSUL-II indication item
BR FLUID LEVER 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

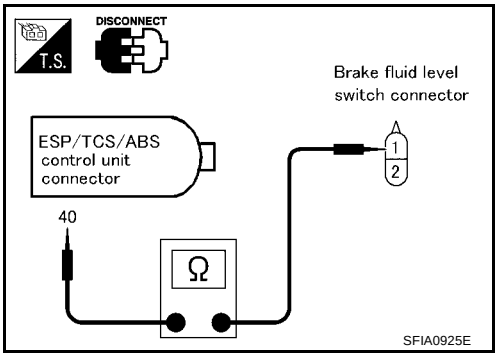
1. Disconnect connectors for the brake fluid level warning switch and the ESP/TCS/ABS control unit.
2. Securely connect connectors. Perform the ESP/TCS/ABS control unit self-diagnosis again.

Is the same self-diagnosis item indicated again?

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

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

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



2. Check for continuity between the brake fluid level warning switch (vehicle-side connector E19) and the ESP/TCS/ABS control unit (vehicle-side connector B111).

ESP/TCS/ABS control unit (Vehicle-side connector B111)	Brake fluid level warning switch (Vehicle-side connector E19)	Continuity
40 (Y/B)	1 (Y/B)	Yes

Is inspection result OK?

YES >> Perform the ESP/TCS/ABS control unit self-diagnosis again.
NO >> Repair or replace the disconnected harness.

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

EFS001C6

Inspection procedure

1. SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

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

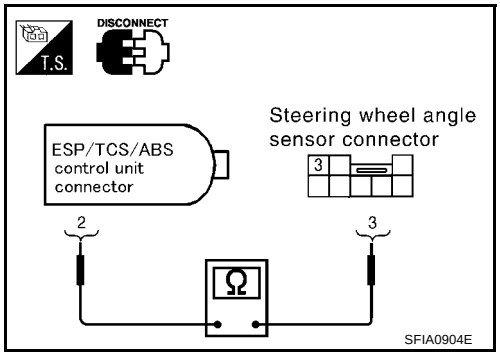
Are any items other than above indicated in self-diagnosis results?

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

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

1. Turn the ignition switch OFF, and disconnect the battery negative terminal.
2. Disconnect the ESP/TCS/ABS control unit connector and the steering wheel angle sensor connector.
3. Check the harness between the ESP/TCS/ABS control unit (vehicle-side connector B111) and the steering wheel angle sensor (vehicle-side connector M81) for open and short circuit.
4. Check connectors for the control unit and the sensor.

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



ESP/TCS/ABS control unit (Vehicle-side connector B111)	Steering wheel angle sensor (Vehicle-side connector M81)	Continuity
2 (Y/R)	3 (Y/R)	Yes

Is inspection result OK?

YES >> GO TO 3.
NO >> Repair disconnected harness or poorly connected connectors. GO TO 3.

3. SELF-DIAGNOSIS RESULT CHECK 2

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

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

YES >> Replace the spiral cable (with the steering wheel angle sensor) and adjust the neutral position of the steering wheel angle sensor. Refer to BRC-57, "ON-VEHICLE SERVICE" .
NO >> GO TO 4.

4. CAN COMMUNICATION SYSTEM CHECK

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

Normal	Abnormal (example)
CAN COMM: OK	CAN COMM: OK
CAN CIRC 1: OK	CAN CIRC 1: UNKWN
CAN CIRC 2: OK	CAN CIRC 2: UNKWN
CAN CIRC 5: OK	CAN CIRC 5: UNKWN
CAN CIRC 7: OK	CAN CIRC 7: UNKWN

Is inspection result OK?

>> After printing the monitor items, go to CAN SYSTEM. Refer to LAN-12, "CAN SYSTEM (FOR M/T MODELS)" .

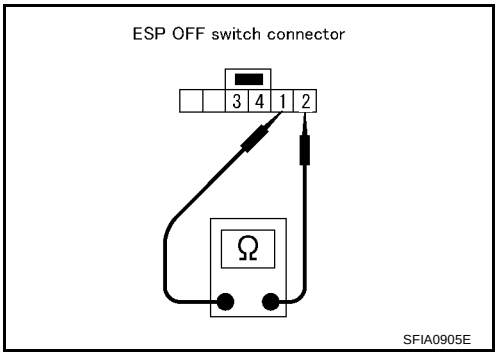
Component Check

EFS001AR

ESP OFF SWITCH

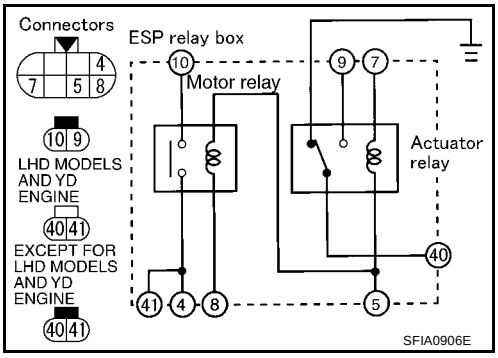
- Disconnect the ESP OFF switch connector. Check for continuity between the terminal No. 1 and No. 2.

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



ESP RELAY BOX

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



Continuity and resistance

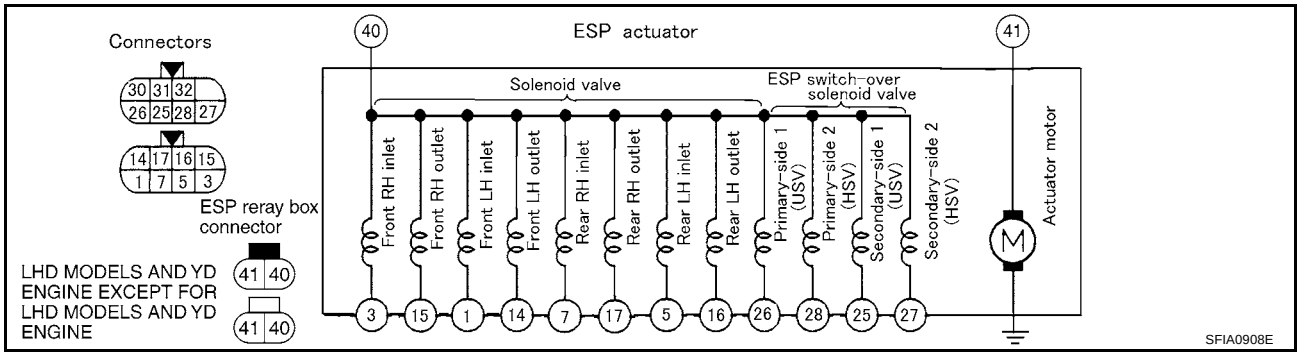
Item	ESP relay box										Condition
	40	2	4	1	9	4	41	10	5	7	8	
Actuator relay	○——×——○								Open (0V) ○——○			Between terminal No.5 and No.7 Open (0V)
	○——————○								12V ○——○			Between terminal No.5 and No.7 Add 12V
Motor relay						○——○						—
						○——×——○			Open (0V) ○——————○			Between terminal No.5 and No.8 Open (0V)
						○——————○			12V ○——————○			Between terminal No.5 and No.8 Add 12V
Relay coil						Approx. 100Ω ○—∿—○ Approx. 80Ω ○—∿—○						—

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

SFIA0907E

ESP 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 actuator and ESP reray box connector terminals number	Condition
	40 3 15 1 14 7 17 5 16 26 25 28 27 41 Body ground	
Solenoid valve	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	Check rhe Resistance
ESP switch-over solenoid value	6.0～11.0Ω 6.0～11.0Ω 3.0～5.0Ω 3.0～5.0Ω	
Actuator motor		———

(Resistance)
: Continuity : Yes
: Continuity : Yes

SFIA0909E

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**

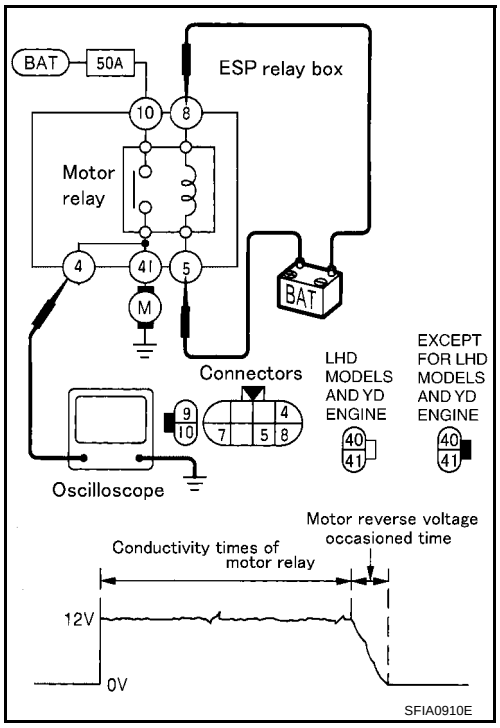
ESP switch-over solenoid valve

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 9 and 10 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.

EFS001AS

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?

YES >> GO TO 2.
NO >> Refer to wheel sensor and rotor lines.

2. LOOSENESS INSPECTION

Check the front axle for looseness.

Is inspection result OK?

YES >> BRC-114, "Symptom 2: Unexpected Pedal Action"
NO >> Axle inspection and repair

Symptom 2: Unexpected Pedal Action

EFS001AT

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?

YES >> Normal
NO >> Wheel sensor and rotor lines repair

Symptom 3: Longer Stopping Distance

EFS001AU

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?

YES >> Normal
NO >> Wheel sensor and rotor lines repair

Symptom 4: ABS Does Not Work.

EFS001AV

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?

YES >> Normal
NO >> Wheel sensor and rotor lines repair

Symptom 5: Pedal Vibration and Noise

EFS001AW

Inspection procedure

1. SYMPTOM CHECK

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

Is inspection result OK?

YES >> Perform the self-diagnosis.
NO >> 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?

YES >> GO TO 3.
NO >> 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?

YES >> GO TO 4.
NO >> 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?

YES >> GO TO 5.
NO >> ● 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?

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

6. ABS WARNING LAMP INSPECTION

Check that the ABS warning lamp turns on.

Is inspection result OK?

YES >> Perform the self-diagnosis.
NO >> 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?

YES >> Normal
NO >> Wheel sensor and rotor lines repair

Symptom 6: ESP OFF Indicator Lamp Does Not Illuminate

EFS001AX

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

EFS001AY

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?

YES >> GO TO 2.
NO >> 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?

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

YES >> GO TO 4.
NO >> 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?

YES >> Connect connectors, and perform the self-diagnosis. The vehicle harness has the intermediate connector. Refer to the vehicle wiring diagram, always check it.
NO >> Repair or replace the disconnected connector.

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

EFS001AZ

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?

YES >> GO TO 5.
NO >> Connector malfunction. Repair or replace the connector.

5. SELF-DIAGNOSIS RESULT CHECK 3

Perform the 4WD control unit self-diagnosis.

Is inspection result OK?

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

6. SELF-DIAGNOSIS RESULT CHECK 4

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

Is the self-diagnosis results displayed?

YES >> Repair or replace the applicable item.
NO >> GO TO 7.

7. 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?

YES >> Inspection End
NO >> Repair or replace the applicable item and perform the ESP/TCS/ABS control unit self-diagnosis again.

ESP/TCS/ABS CONTROL UNIT

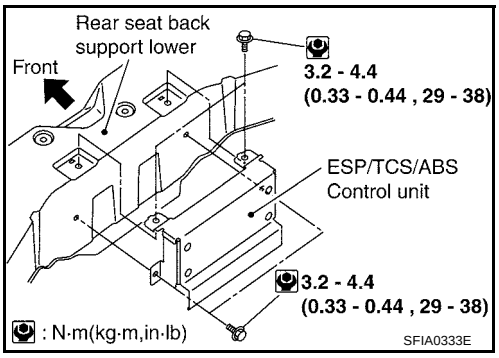
PFP:47660

Removal and Installation

EFS001B0

REMOVAL

1. Remove the luggage floor board (rear).
2. Remove the ESP/TCS/ABS control unit.



INSTALLATION

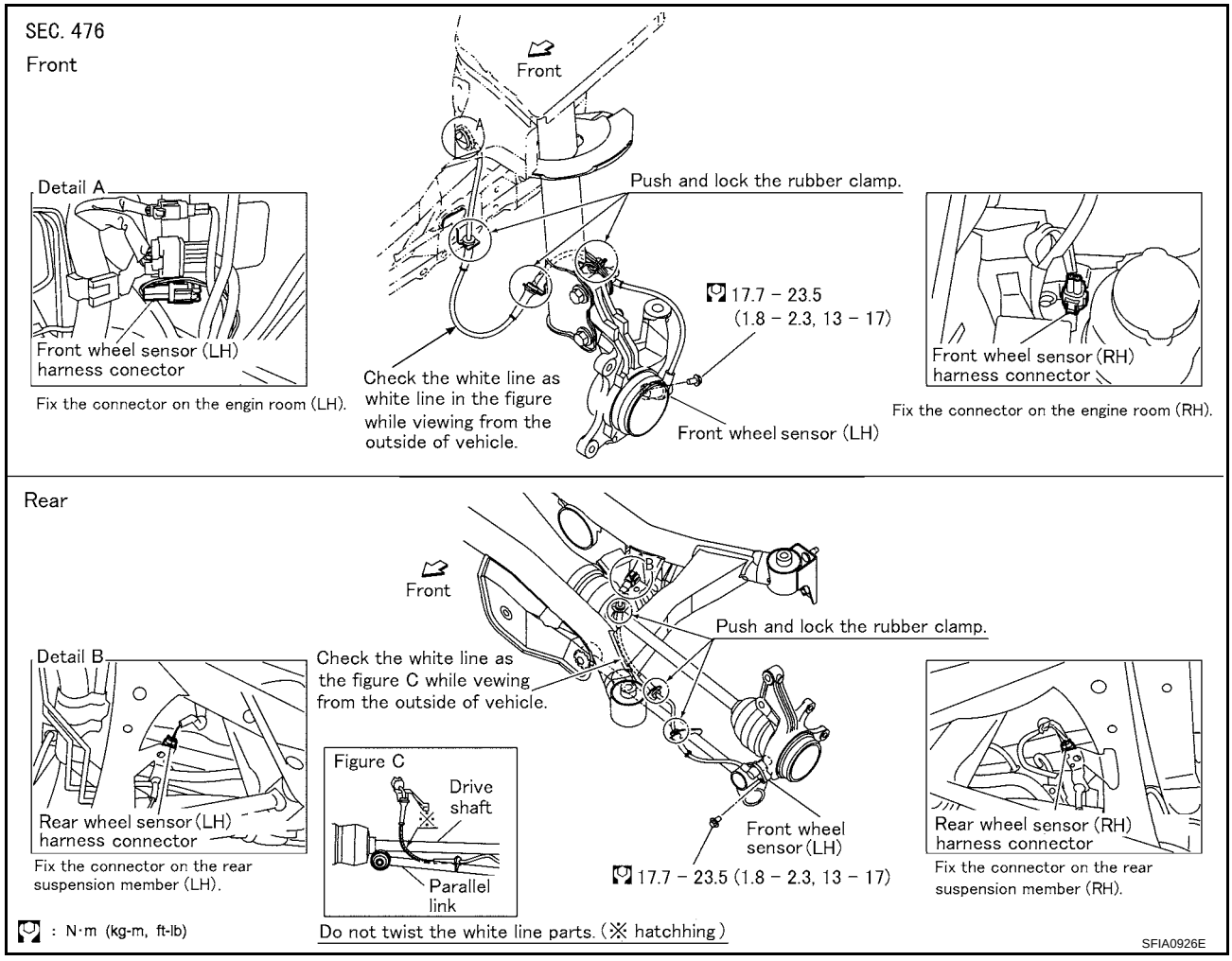
- Installation is the reverse order of removal.

WHEEL SPEED SENSORS

PFP:47910

Removal and Installation

EFS001CD



CAUTION:

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

SENSOR ROTOR

PFP:47970

Removal and Installation

EFS001CE

REMOVAL

Front

1. Remove drive shaft. Refer to FAX-11, "REMOVAL" in “FAX Front Axle”.
2. Remove sensor rotor from drive shaft. Refer to “FAX Front axle/Drive shaft ” FAX-13, "DISASSEMBLY"

Rear

1. Remove drive shaft. Refer to RAX-9, "Removal" in “RAX Rear Axle/Drive Shaft”.
2. Remove sensor rotor from drive shaft. Refer to “RAX Rear axle/Drive shaft” RAX-10, "DISASSEMBLY"

INSTALLATION

Front

1. Install sensor rotor to drive shaft. Refer to “FAX Front axle/Drive shaft” FAX-15, "ASSEMBLY"
2. Connect drive shaft. Refer to FAX-12, "INSTALLATION" in “FAX Front Axle/Drive Shaft”.

Rear

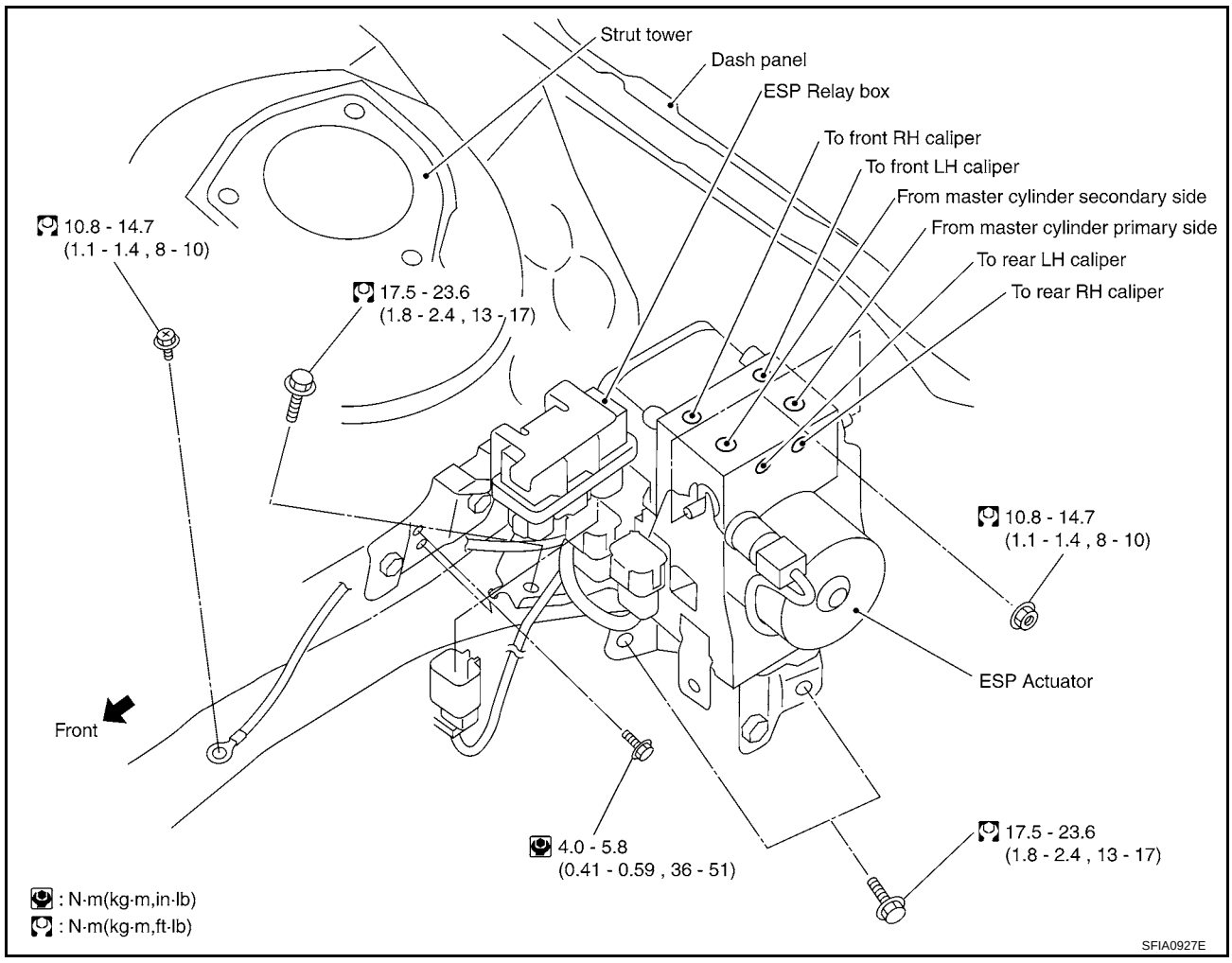
1. Install sensor rotor to drive shaft. Refer to RAX Rear axle/Drive shaft” RAX-12, "ASSEMBLY"
2. Connect drive shaft. Refer to RAX-9, "Installation" in “RAX Rear Axle/Drive Shaft”.

ESP/TCS/ABS ACTUATOR AND RELAY BOX

PFP:47850

Removal and Installation

EFS001CR



Be careful of the following.

CAUTION:

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

YAW RATE/SIDE G SENSOR

PFP:47931

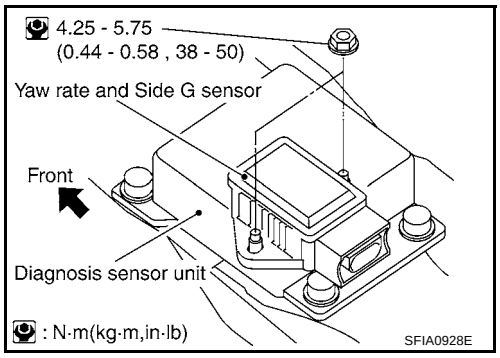
Removal and Installation

EFS001CS

REMOVAL

1. Remove the diagnosis sensor unit. Refer to SRS-40, "DIAGNOSIS SENSOR UNIT" .
2. Disconnect the harness connector.
3. Remove the mounting bolts, and remove the yaw rate and side G sensor.

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

ESP OFF SWITCH

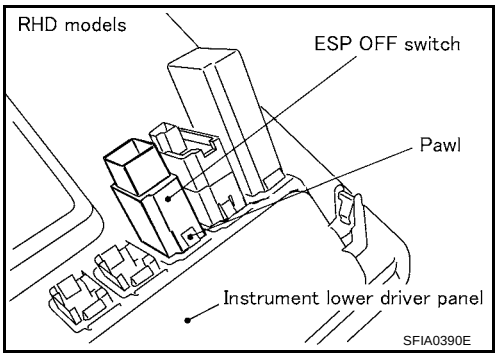
PFP:25145

Removal and Installation

EFS001CQ

REMOVAL

1. Remove the instrument lower driver panel. Refer to IP-7, "INSTRUMENT LOWER DRIVER PANEL" .
2. Push the ESP OFF switch's pawls and remove the switch from the instrument lower driver panel.



INSTALLATION

Installation is the reverse order of removal.