
Important safety notice

- Providing appropriate service and repair is a matter of great importance in the serviceman's safety maintenance and safe operation, function and performance which the SUBARU vehicle possesses.
- In case the replacement of parts or replenishment of consumables is required, genuine SUBARU parts whose parts numbers are designated or their equivalents must be utilized.
- It must be made well known that the safety of the serviceman and the safe operation of the vehicle would be jeopardized if the used any service parts, consumables, special tools and work procedure manuals which are not approved or designated by SUBARU.

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How to use this manual

- This Service Manual is divided into four volumes by section so that it can be used with ease at work. Refer to the Table of Contents, select and use the necessary section.

- GENERAL INFORMATION SECTION
- REPAIR SECTION
- TROUBLESHOOTING SECTION
- WIRING DIAGRAM SECTION

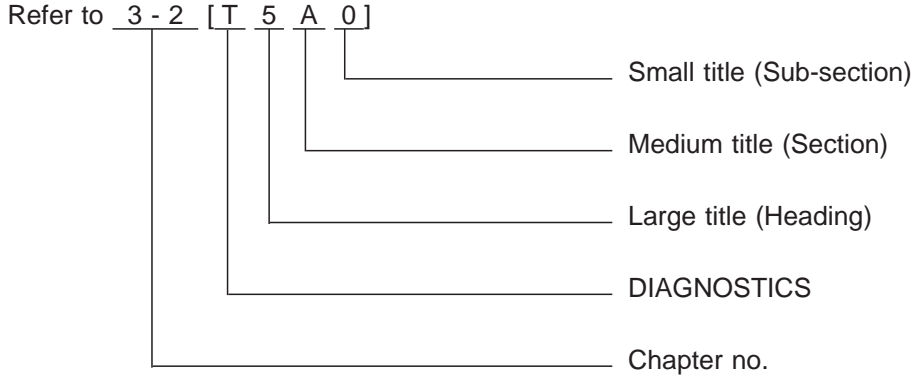
- The description of each area is provided with four types of titles different in size as shown below. The Title No. or Symbol prefixes each title in order that the construction of the article and the flow of explanation can be easily understood.

[Example of each title]

- Area title: T. DIAGNOSTICS
- Large title (Heading): 1. Diagnostics Chart with Select Monitor
(to denote the main item of explanation)
- Medium title (Section): A: BASIC DIAGNOSTICS CHART
(to denote the type of work in principle)
- Small title (Sub-section): 1. CHECK INPUT SIGNAL FOR ECM
(to denote a derivative item of explanation)

- The Title Index No. is indicated on the top left (or right) side of the page as the book is opened. This is useful for retrieving the necessary portion.

(Example of usage)



Example of title placement

Title index No. 7

AUTOMATIC TRANSMISSION AND DIFFERENTIAL [T5A1] 3-2
 5. Diagnostic Chart with Trouble Code

5. Diagnostic Chart with Trouble Code

A: TROUBLE CODE 11
— DUTY SOLENOID A —

DIAGNOSIS:
 Output signal circuit of duty solenoid A or resistor is open or shorted.

TROUBLE SYMPTOM:
 Excessive shift shock

1 Measure signal voltage output emitted from TCM. Not OK → Repair TCM terminal poor contact. (Replace TCM.)
 OK ↓

2 Check harnesses and connectors between TCM and duty solenoid A and TCM and resistor. Not OK → Repair or replace harness/connector.
 OK ↓

Repair TCM terminal poor contact. (Replace TCM.)

1. MEASURE SIGNAL VOLTAGE OUTPUT EMITTED FROM TCM.

G3M0106

1) Warm-up the engine and transmission.
 2) Ignition switch ON (Engine OFF).
 3) Move shift lever to "N".
 4) While opening and closing throttle valve, measure voltage between TCM connector and body.

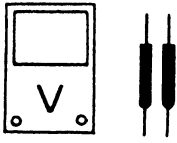
Connector & terminal / Specified resistance:
 (B52) No. 11 — No. 13 /
 1.5 — 4.0 V (Throttle is fully closed.)
 0.5 V, max. (Throttle is fully open.)

Medium title

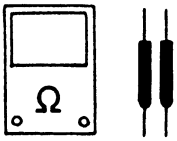
Large title

Small title

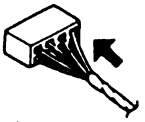
-
- In this manual, the following symbols are used.



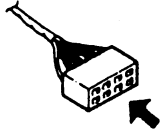
Circuit tester
Voltage measurement



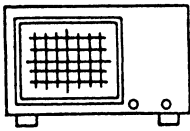
Circuit tester
Resistance measurement



The arrow indicates that insertion of the probe or numbering of the connector pins is made from the side.



The arrow indicates that insertion of the probe or numbering of the connector pins is made from the side.



Oscilloscope



Oscilloscope positive probe



Oscilloscope earth head

- WARNING, CAUTION, NOTE

- **WARNING:** Indicates the item which must be observed precisely during performance of maintenance services in order to avoid injury to the mechanics and other persons.
- **CAUTION:** Indicates that item which must be followed precisely during performance of maintenance services so as to avoid damage and breakage to the vehicle and its parts and components.
- **NOTE:** Indicates the hints, knacks, etc. which make the maintenance job easier.

Basic checks

DISCONNECTING CONNECTORS

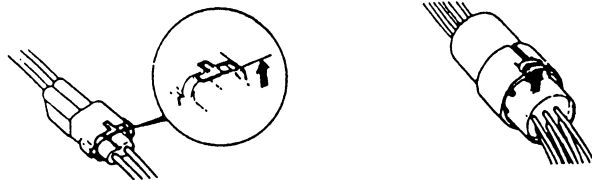
- Always hold the connector itself.

CAUTION:

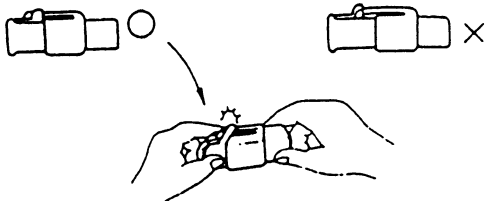
Don't pull the harness.



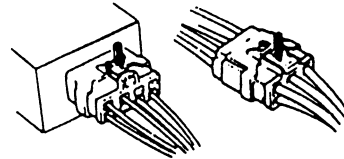
- To disconnect a locking connector, first re-lease the lock, then pull the connector off.
<Unlock by pulling the locking tab>



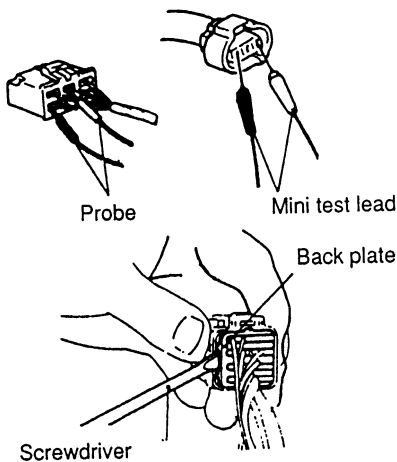
- Insert a connector by pushing it all the way in. If the connector is equipped with a locking device, push it in until a clicking sound is heard.



<Unlock by pushing the locking tab>



INSERTING A PROBE



- Generally, probes are inserted into connectors from the rear.
- Connectors equipped with shock protectors must be checked with a mini probe (thin), or it will be necessary to remove the shock protector.
- When removing the shock protector take care not to deform it; this also applies to waterproof connectors, which cannot be tested from the wire side.
- When the connector has a back plate, remove the plate after removing the projection of the plate first. (Be careful not to use excessive force, since the terminals might brake off).

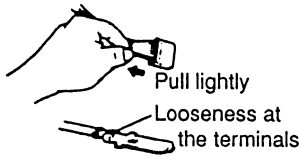
CHECKING FOR POOR CONTACT ON PLUG-IN CONNECTORS

Most intermittent problems are caused by poor contact of plug-in connectors.

Poor contact is frequently caused by corroded terminals, dirt, foreign substances, weak contact points between male and female connectors, etc.

To help prevent the replacement of good component parts, sufficiently check the following points.

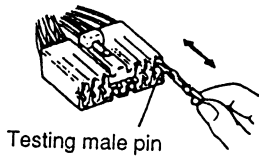
- Quite often a plug with poor contact will work perfectly again after it has been pulled off and reconnected.



- Disconnect the two connector halves.
- Check the connector pins for signs of corrosion or foreign material.
- Check the connector for loose and damaged terminals, and make sure they are set correctly in the connector.

NOTE:

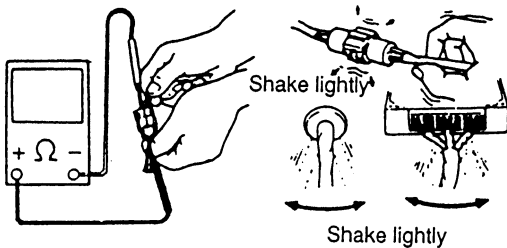
When the harness is pulled lightly, the terminals should not come out.



- Insert the male pin of the connector into the female pin, then pull it out.

NOTE:

If one of the pins pulls out easily, it is a likely source of a malfunction.

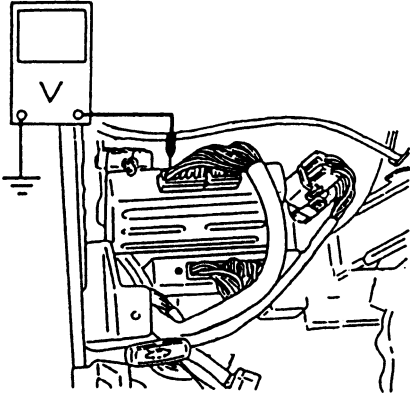


- Lightly shake the connector and the harness, and check for sudden changes in voltage or resistance.

If harness and connector checks do not reveal any defect, it can be assumed that an intermittent contact in a connector is the source of trouble.

Diagnosis and checking procedure using instruments

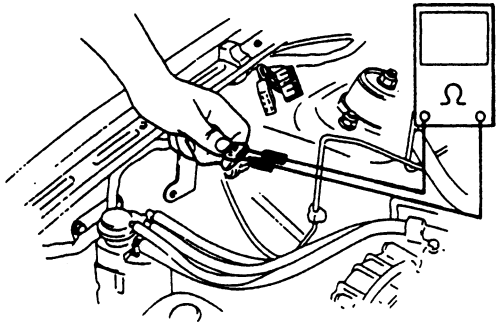
USING A CIRCUIT TESTER



J3-1012

- **Voltage check (range set to DC V)**

Connect the positive probe to the terminal to be tested, and the negative probe to body ground (or the ground terminal of the ECM)



J3-830

- **Checking the connection (range set to Ω)**

Measure the resistance and check for open or shorted wire in the harness or the connector.

NOTE:

This check must be carried out with both connectors disconnected.

(This avoids by-passing the connection through other circuits).

1) Check for open circuit (range: Ω x 1K)

Measure the resistance between the respective pins in both connectors.

Specified resistance:

1 MΩ, or more (No continuity) Open circuit

10 Ω, or less (Continuity) O.K.

2) Check for correct insulation value (range: Ω x 1K)

Measure the resistance between the pins in both connectors, as well as between the suspected pin and the body (body short).

Specified resistance:

1 MΩ, or more (No continuity) O.K.

10 Ω, or less (Continuity) Short circuit

- **Resistance measurement (range set to Ω)**

Measuring the internal resistance of sensors, solenoid valves etc. to check the operating condition of components.

NOTE:

- Select the appropriate range for measuring the internal resistance, or the measurement will result in an incorrect reading.

- Before changing the measurement range the gauge must be reset to zero.

USING A SUBARU SELECT MONITOR

With this testing procedure the defective component can be determined by directly monitoring input/output signals of the ECM or the trouble codes.

Features

- A variety of data can be checked without movements from the drivers seat, passenger's seat or from outside the vehicle.
- This unit allows the identification of the type of malfunction, for example whether the cause is an open or shorted wire in the input/output signal line, or whether the breakdown of a component is caused by a lack of maintenance.

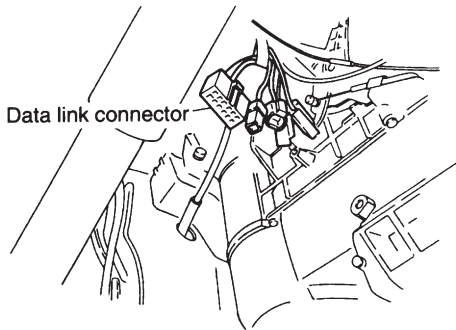
Diagnosis

- Refer to the reference values for input/output and control data to determine whether the malfunction is caused by a worn out component, an open wire, a short etc.
- Perform the diagnostics procedure as described in chapter "Check based on trouble codes" by monitoring the trouble codes.

NOTE:

It will be easier to determine a malfunction if the vehicle data for normal conditions are available for comparison.

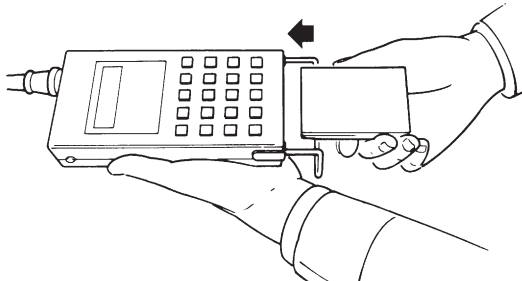
Use of select monitor



G2H0054

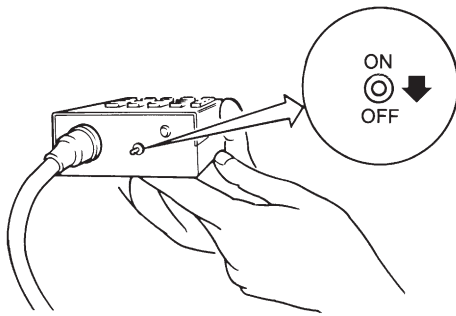
1. CONNECT SELECT MONITOR.

- 1) Connect select monitor to data link connector located under instrument panel (on driver's side).



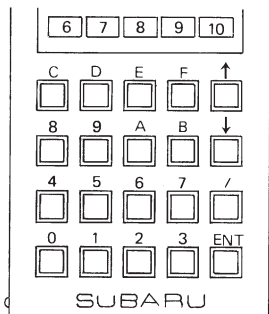
G3M0150

- 2) Insert cartridge into select monitor.



- 3) Turn ignition switch and select monitor switch ON.
- 4) After display is shown, press slash "/" key.
- 5) After AT mode is displayed, press function "[0]".
(Display returns to AT mode when slash "/" is pressed during on-board diagnostic operation.)

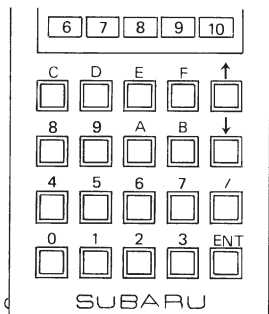
G3M0151



2. READ TROUBLE CODE SHOWN ON DISPLAY.

- 1) Connect select monitor.
- 2) Designate mode using function key.
Press [F] [B] [0] [ENT] in that order.
- 3) Ensure trouble code(s) is shown.

G3M0152



3. PREVIOUS TROUBLE CODE READING

- 1) Connect select monitor.
- 2) Designate mode using function key.
Press [F] [B] [1] [ENT] in that order.
- 3) Ensure displayed trouble code(s).

G3M0152

USING AN OSCILLOSCOPE

A malfunction can be determined by displaying the waveforms of input/output signals on the oscilloscope.

Diagnosis

A simple comparison of the waveforms may lead to an incorrect diagnosis. To exactly determine the sources of the malfunction it will be necessary to determine them under consideration about information other than waveforms.

Applying input/output signals

Connect the probe directly with the terminal of the signal.

1. General

1. GENERAL DESCRIPTION

- The on-board diagnostics (OBD) system detects and indicates a fault in various inputs and outputs of the complex electronic control. CHECK ENGINE malfunction indicator lamp (MIL) in the combination meter indicates occurrence of a fault or trouble.
- Further, against such a failure or sensors as may disable the drive, the fail-safe function is provided to ensure the minimal driveability.
- The OBD system incorporated with the vehicles within this engine family complies with Section 1968.1, California Code of Regulations (OBD-II regulation). The OBD system monitors the components and the system malfunction listed in Engine Section which affects on emissions.
- When the system decides that a malfunction occurs, MIL illuminates. At the same time of the MIL illumination or blinking, a diagnostic trouble code (DTC) and a freeze frame engine conditions are stored into on-board computer.
- The OBD system stores freeze frame engine condition data (engine load, engine coolant temperature, fuel trim, engine speed and vehicle speed, etc.) into on-board computer when it detects a malfunction first.
- If the OBD system detects the various malfunctions including the fault of fuel trim or misfire, the OBD system first stores freeze frame engine conditions about the fuel trim or misfire.
- When the malfunction does not occur again for three trips, MIL is turned off, but DTC remains at on-board computer.
- The OBD-II system is capable of communication with a general scan tool (OBD-II general scan tool) formed by ISO 9141 CARB.
- The OBD-II diagnostics procedure is different from the usual diagnostics procedure. When troubleshooting OBD-II vehicles, connect Subaru select monitor or the OBD-II general scan tool to the vehicle.

A: ENGINE

1. ENGINE AND EMISSION CONTROL SYSTEM

- The Multipoint Fuel Injection (MFI) system is a system that supplies the optimum air-fuel mixture to the engine for all the various operating conditions through the use of the latest electronic technology.

With this system fuel, which is pressurized at a constant pressure, is injected into the intake air passage of the cylinder head. The injection quantity of fuel is controlled by an intermittent injection system where the electro-magnetic injection valve (fuel injector) opens only for a short period of time, depending on the quantity of air required for one cycle of operation. In actual operation, the injection quan-

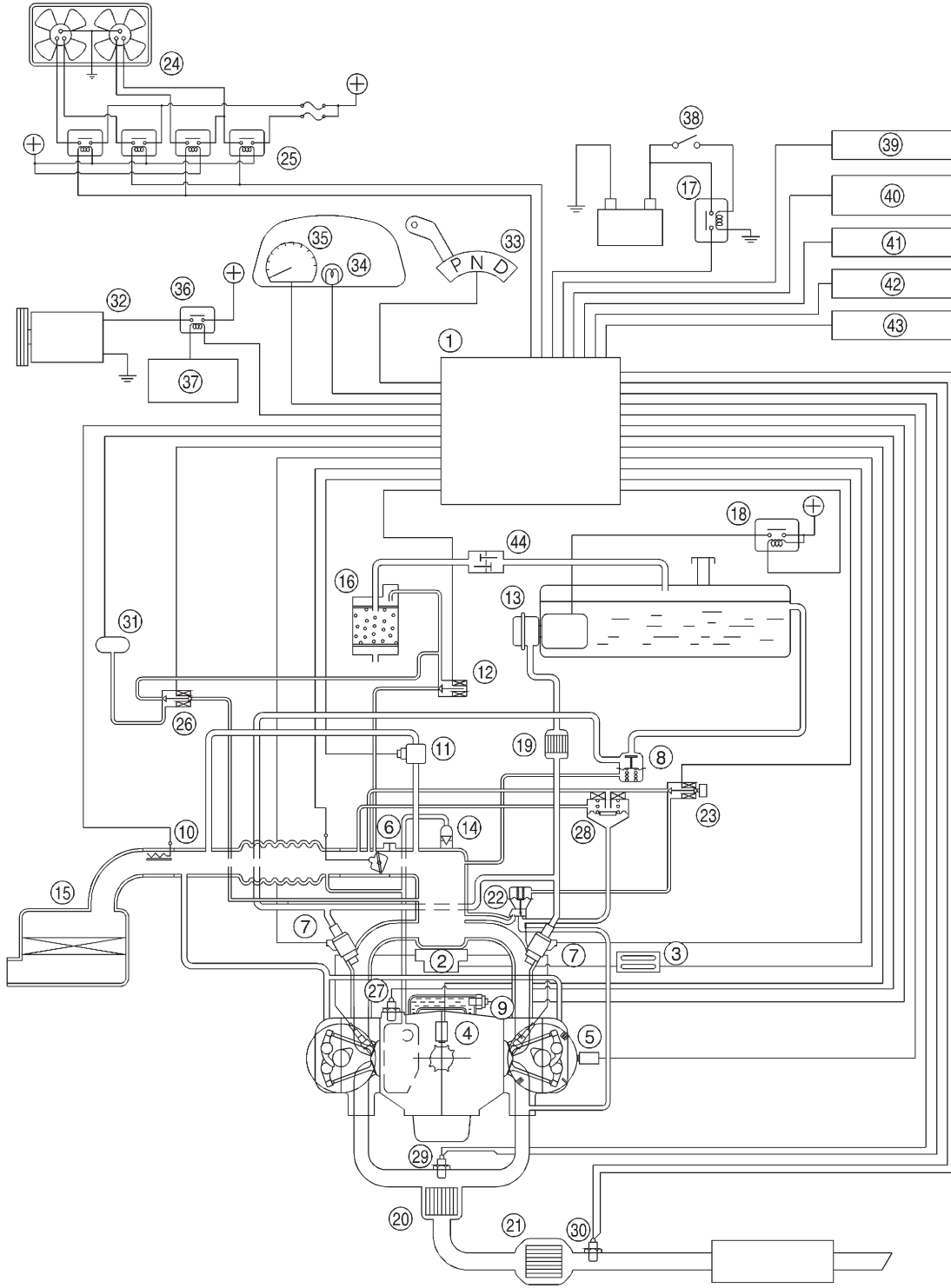
tity is determined by the duration of an electric pulse applied to the fuel injector and this permits simple, yet highly precise metering of the fuel.

- Further, all the operating conditions of the engine are converted into electric signals, and this results in additional features of the system, such as large improved adaptability, easier addition of compensating element, etc.

The MFI system also has the following features:

- 1) Reduced emission of harmful exhaust gases.
- 2) Reduced in fuel consumption.
- 3) Increased engine output.
- 4) Superior acceleration and deceleration.
- 5) Superior startability and warm-up performance in cold weather since compensation is made for coolant and intake air temperature.

2. SCHEMATIC



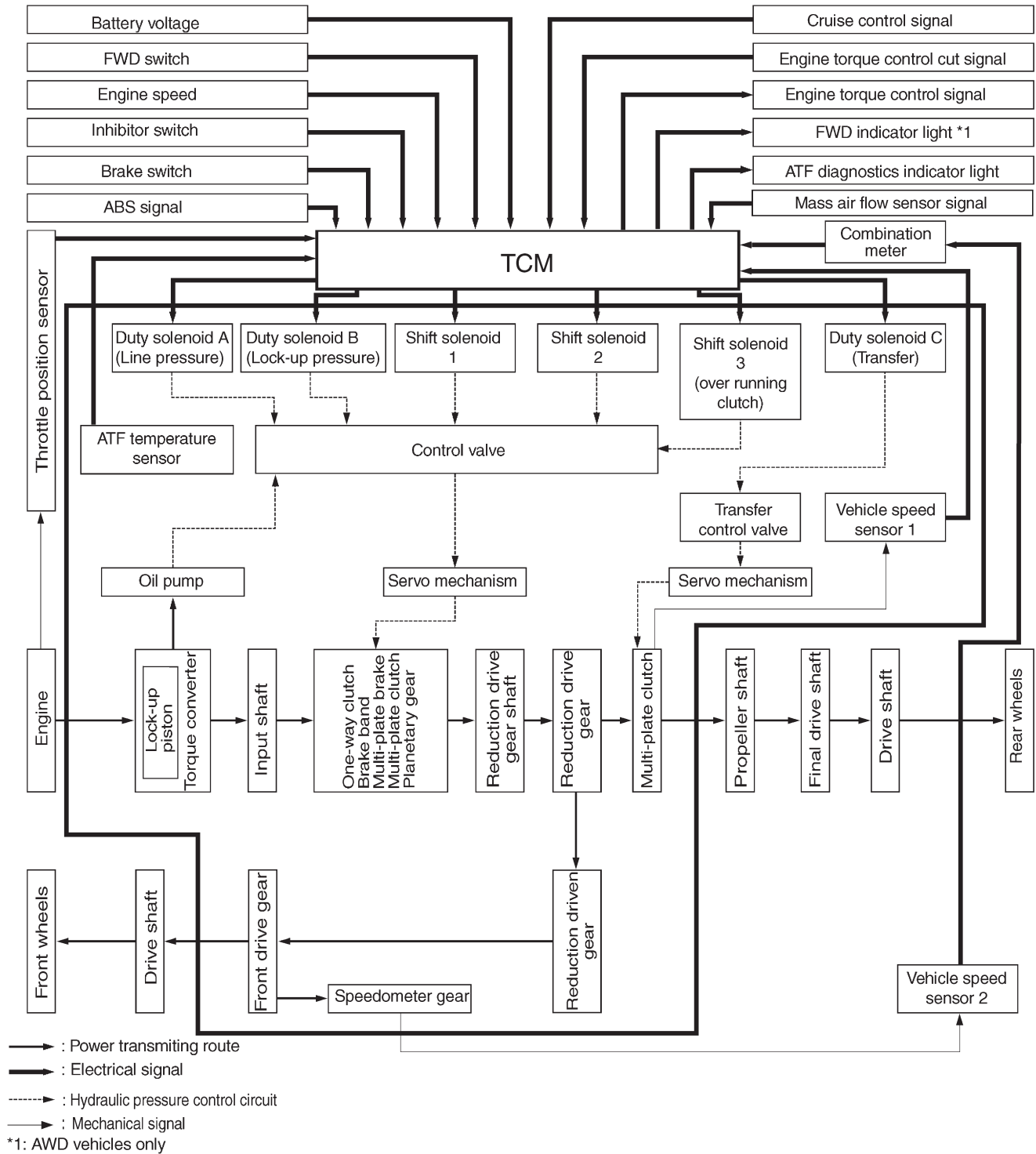
OBD0001A

- ① Engine control module (ECM)
- ② Ignition coil
- ③ Ignitor
- ④ Crankshaft position sensor
- ⑤ Camshaft position sensor
- ⑥ Throttle position sensor
- ⑦ Fuel injectors
- ⑧ Pressure regulator
- ⑨ Engine coolant temperature sensor
- ⑩ Mass air flow sensor
- ⑪ Idle air control solenoid valve
- ⑫ Purge control solenoid valve
- ⑬ Fuel pump
- ⑭ PCV valve
- ⑮ Air cleaner
- ⑯ Canister
- ⑰ Main relay
- ⑱ Fuel pump relay
- ⑲ Fuel filter
- ⑳ Front catalytic converter
- ㉑ Rear catalytic converter
- ㉒ EGR valve
- ㉓ EGR control solenoid valve
- ㉔ Radiator fan
- ㉕ Radiator fan relay
- ㉖ Pressure sources switching solenoid valve (AT vehicles only)
- ㉗ Knock sensor
- ㉘ Back-pressure transducer (AT vehicles only)
- ㉙ Front oxygen sensor
- ㉚ Rear oxygen sensor
- ㉛ Pressure sensor (AT vehicles only)
- ㉜ A/C compressor
- ㉝ Inhibitor switch
- ㉞ CHECK ENGINE malfunction indicator lamp (MIL)
- ㉟ Tachometer
- ㊱ A/C relay
- ㊲ A/C control module
- ㊳ Ignition switch
- ㊴ Transmission control module (TCM) (AT vehicles only)
- ㊵ ABS/TCS control module (TCS equipped models)
- ㊶ Vehicle speed sensor
- ㊷ Data link connector (Subaru select monitor)
- ㊸ Data link connector (OBD-II general scan tool)
- ㊹ Two way valve

B: AUTOMATIC TRANSMISSION**1. ELECTRONIC-HYDRAULIC CONTROL SYSTEM**

The electronic-hydraulic control system consists of various sensors and switches, a transmission control module (TCM) and the hydraulic controller including solenoid valves. The system controls the transmission proper including shift control, lock-up control, overrunning clutch control, line pressure control and shift timing control. It also controls the AWD transfer clutch. In other words, the system detects various operating conditions from various input signals and sends output signals to shift solenoids 1, 2 and 3 and duty solenoids A, B and C (a total of six solenoids).

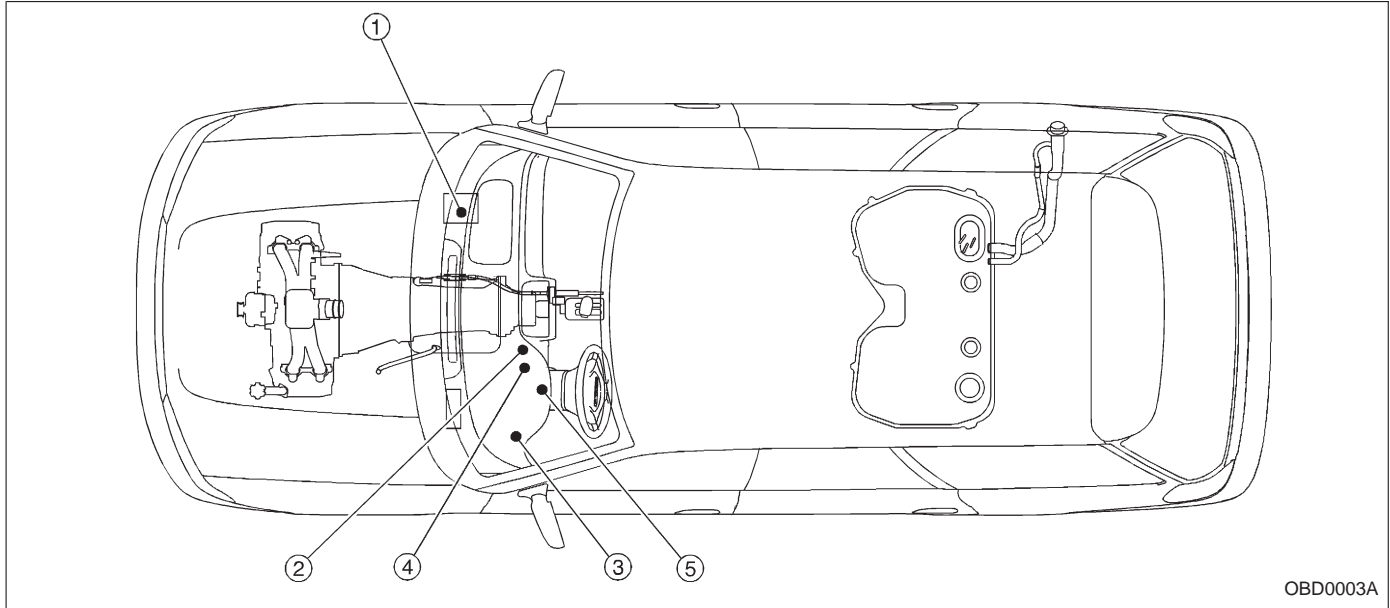
2. SCHEMATIC



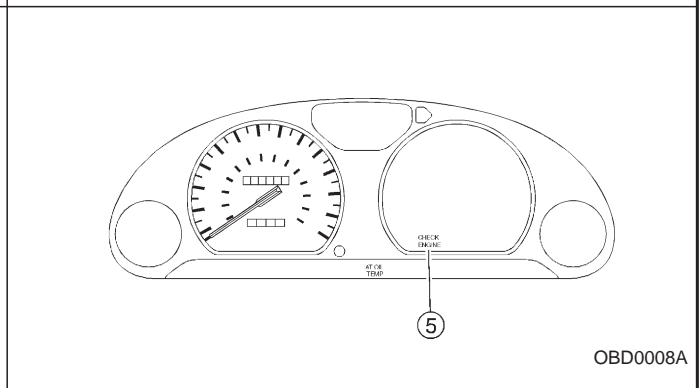
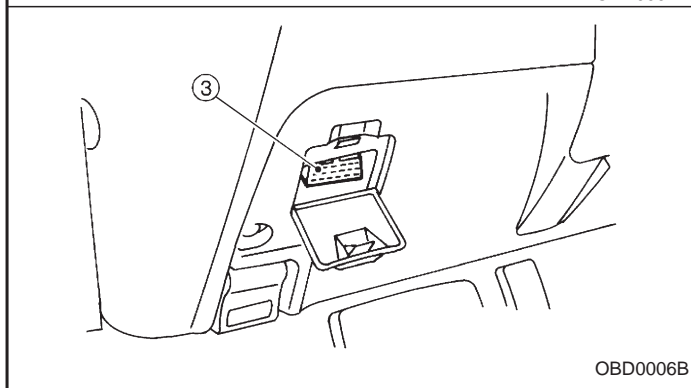
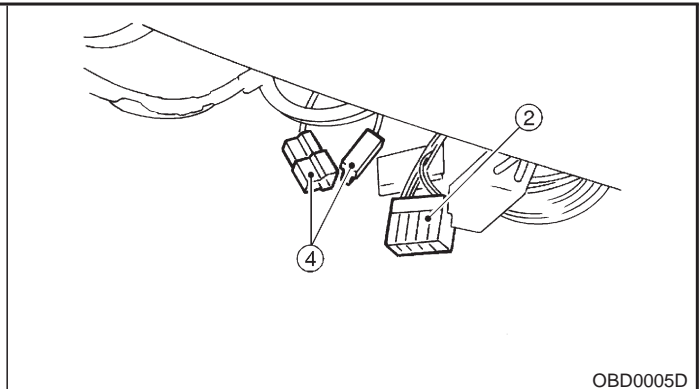
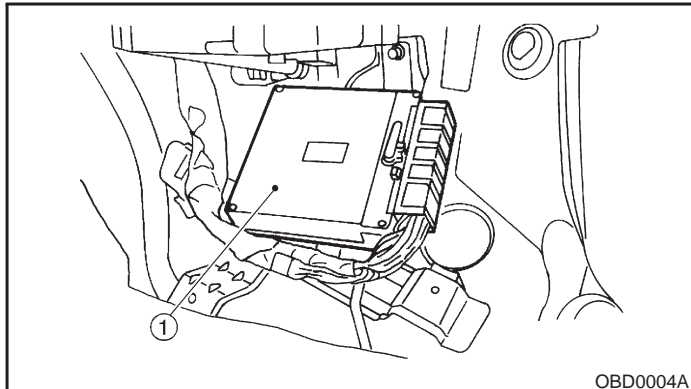
2. Electrical Components Location

A: ENGINE

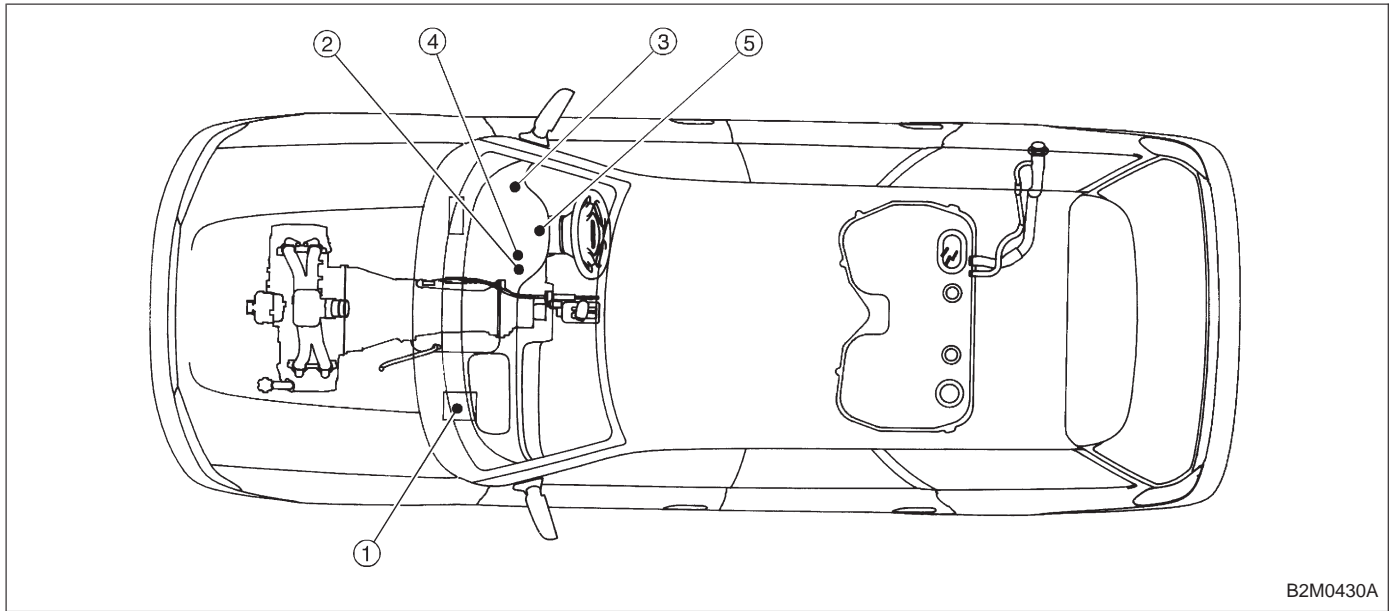
1. MODULE (LHD MODEL)



- ① Engine control module (ECM)
- ② Data link connector (for Subaru select monitor only)
- ③ Data link connector (for Subaru select monitor and OBD-II general scan tool)
- ④ Test mode connector
- ⑤ CHECK ENGINE malfunction indicator lamp (MIL)

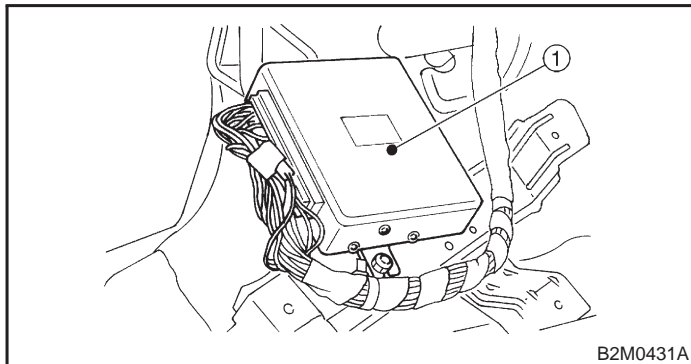


2. MODULE (RHD MODEL)

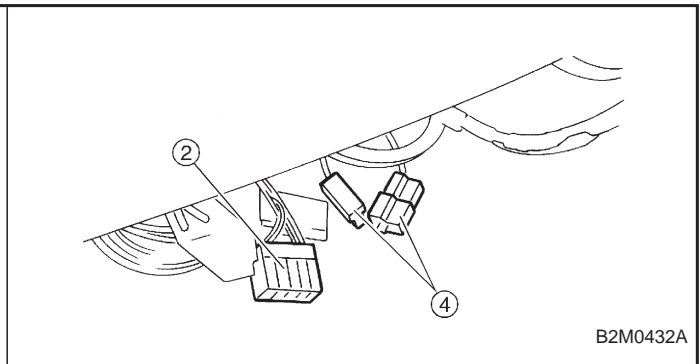


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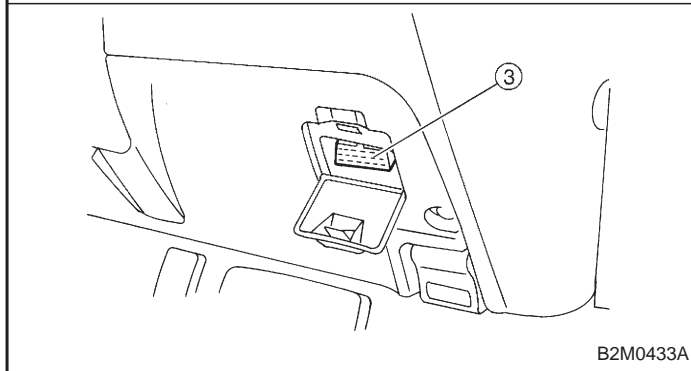
- ① Engine control module (ECM)
- ② Data link connector (for Subaru select monitor only)
- ③ Data link connector (for Subaru select monitor and OBD-II general scan tool)
- ④ Test mode connector
- ⑤ CHECK ENGINE malfunction indicator lamp (MIL)



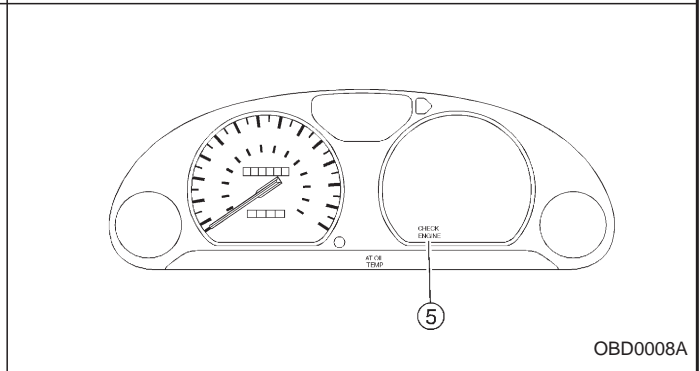
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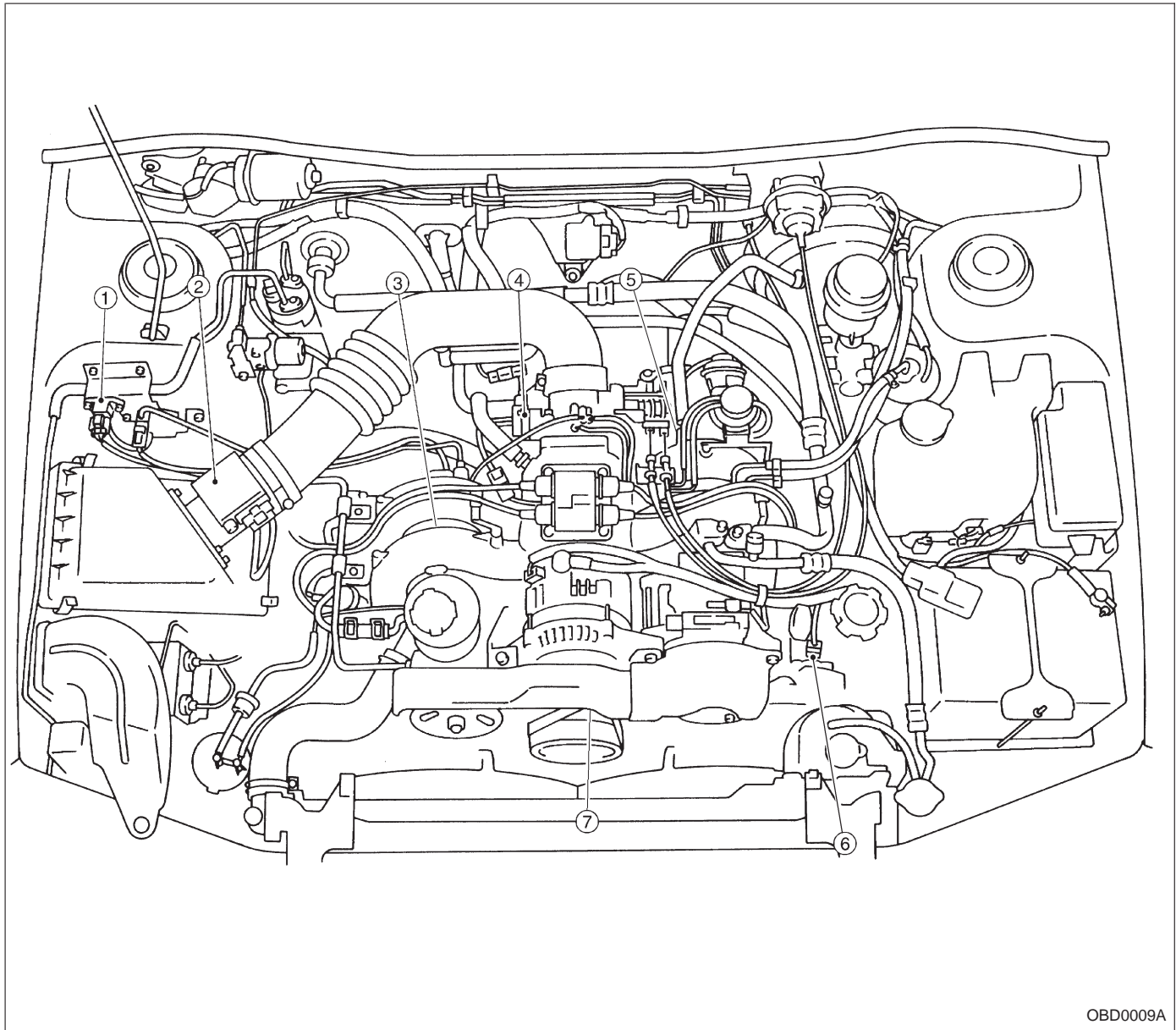


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OBD0008A

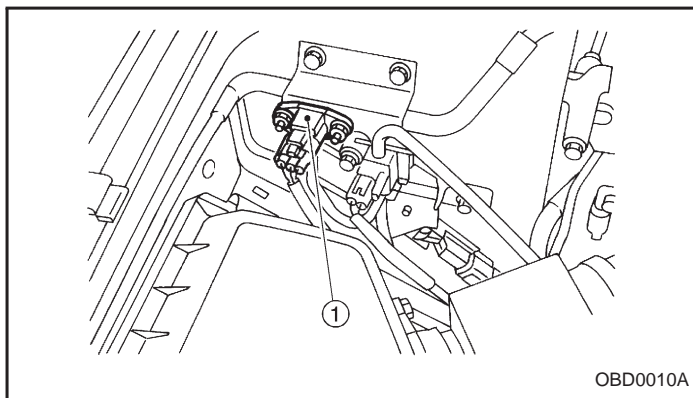
3. SENSOR



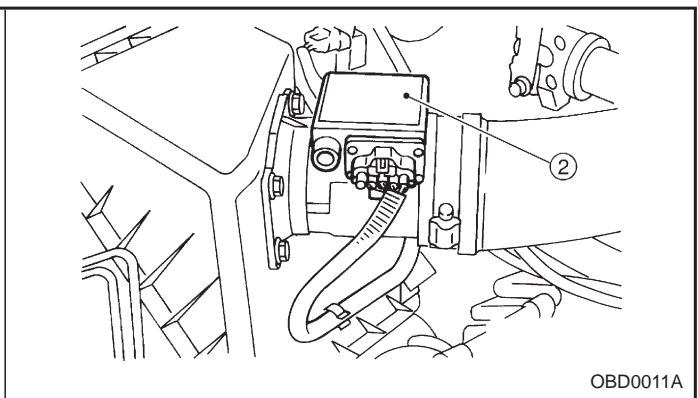
OBD0009A

- ① Pressure sensor (AT vehicles only)
- ② Mass air flow sensor
- ③ Engine coolant temperature sensor
- ④ Throttle position sensor

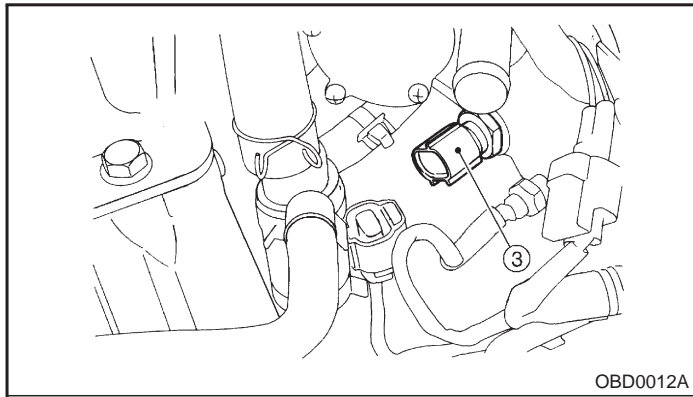
- ⑤ Knock sensor
- ⑥ Camshaft position sensor
- ⑦ Crankshaft position sensor



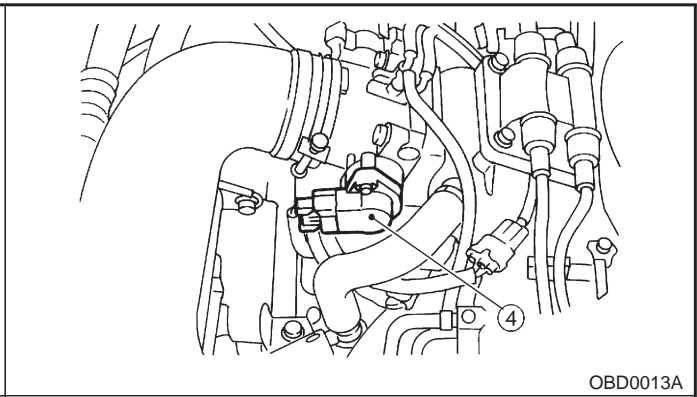
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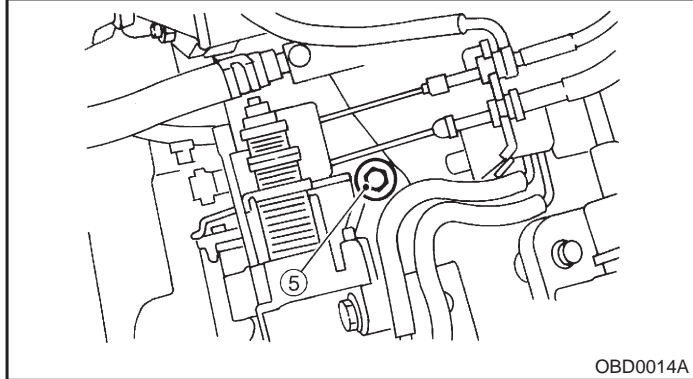
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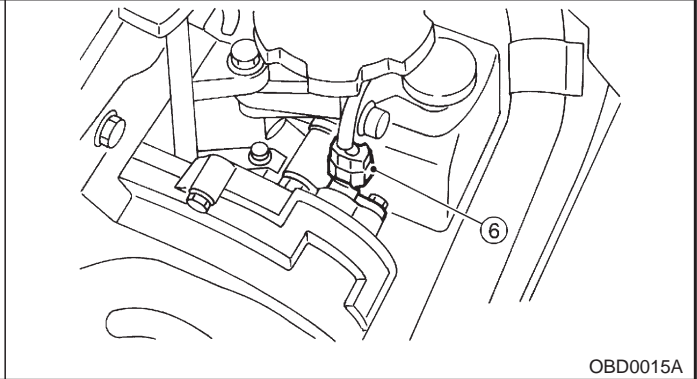
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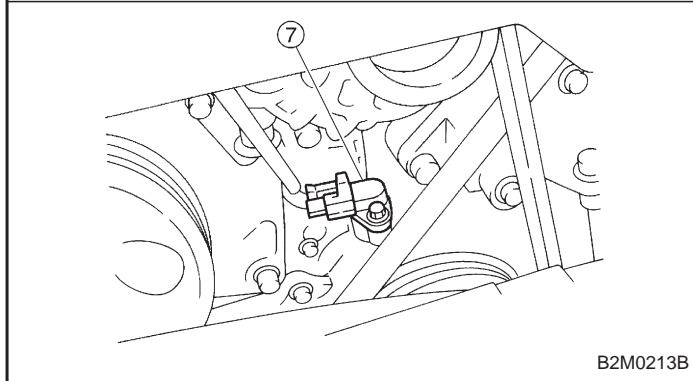
OBD0013A



OBD0014A



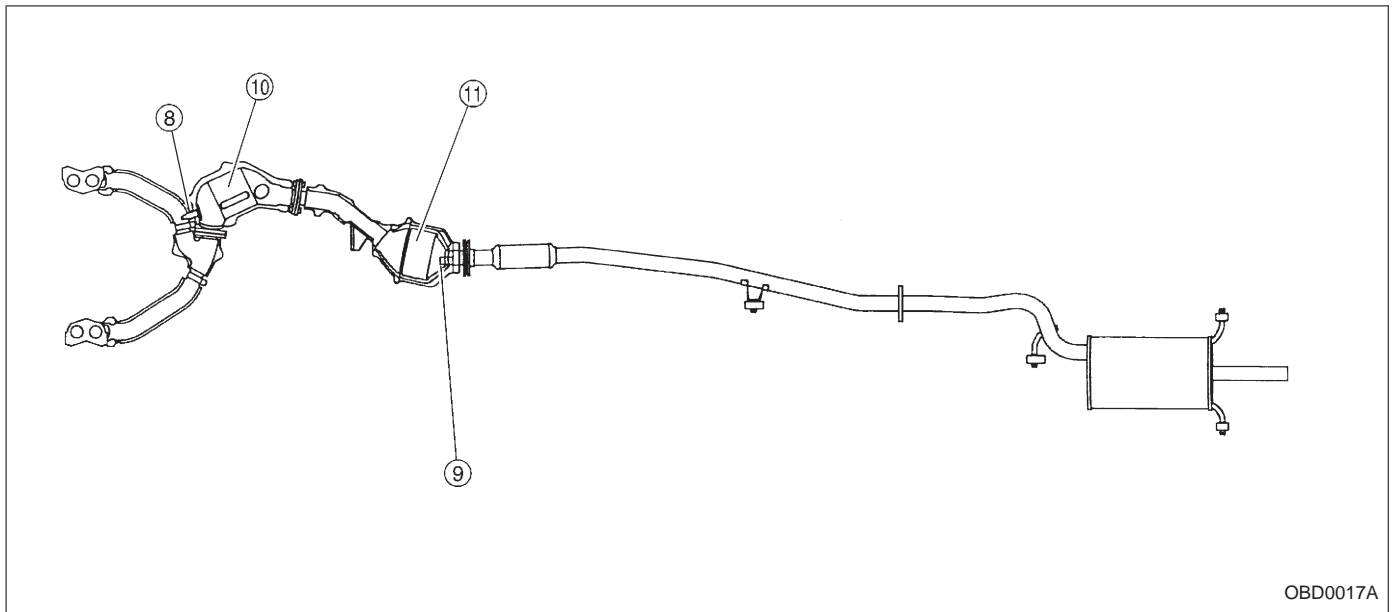
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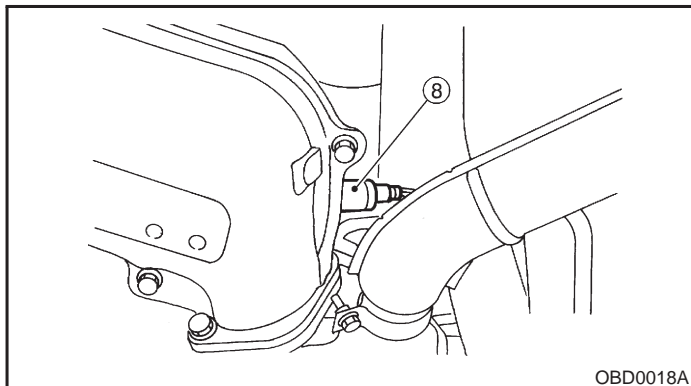
2. Electrical Components Location



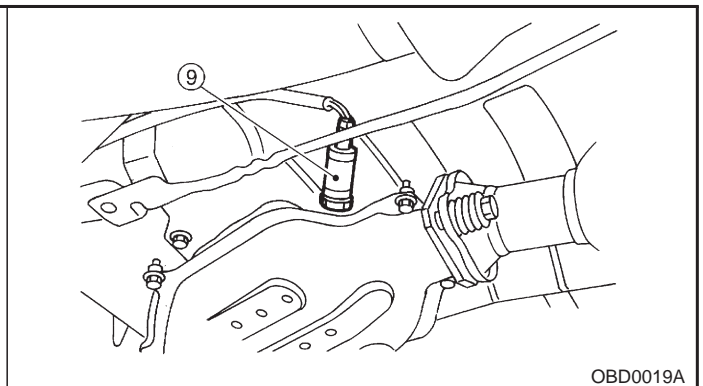
OBD0017A

- ⑧ Front oxygen sensor
- ⑨ Rear oxygen sensor

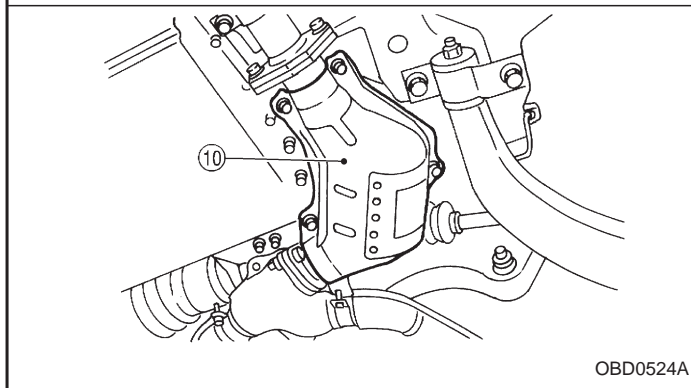
- ⑩ Front catalytic converter
- ⑪ Rear catalytic converter



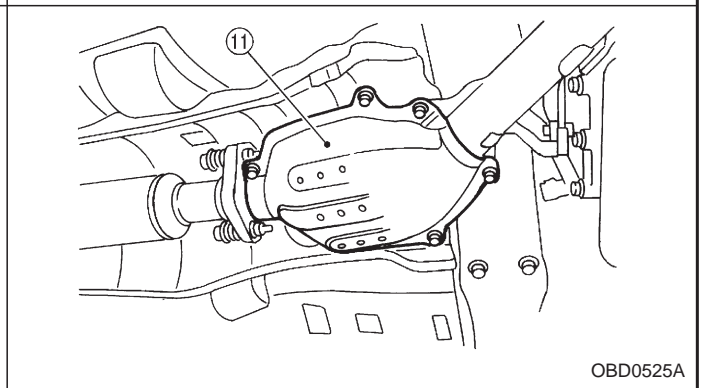
OBD0018A



OBD0019A

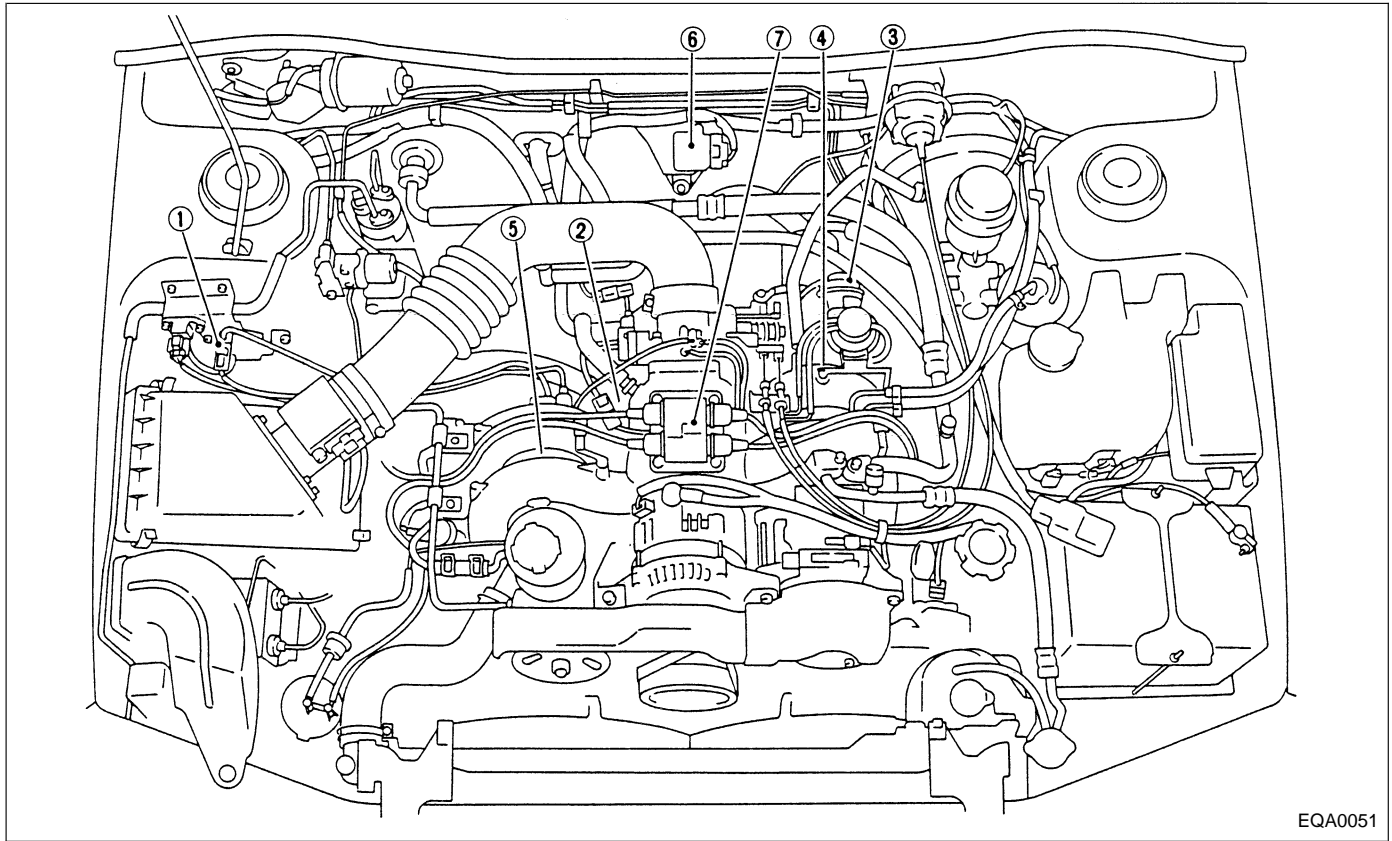


OBD0524A



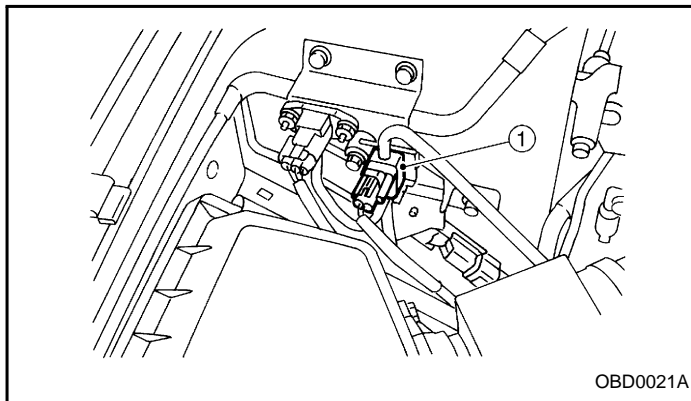
OBD0525A

4. SOLENOID VALVE, EMISSION CONTROL SYSTEM PARTS AND IGNITION SYSTEM PARTS (LHD MODEL)

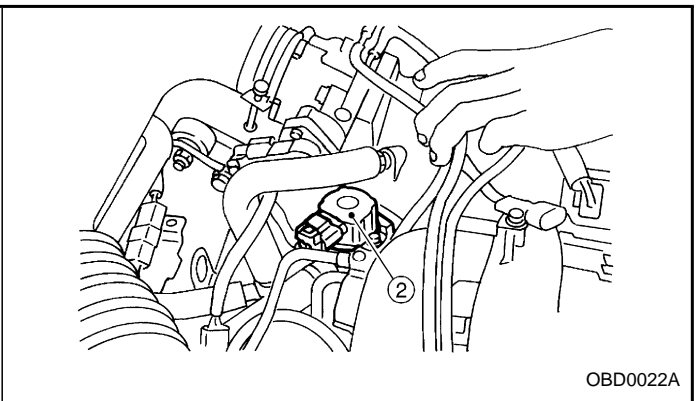


EQA0051

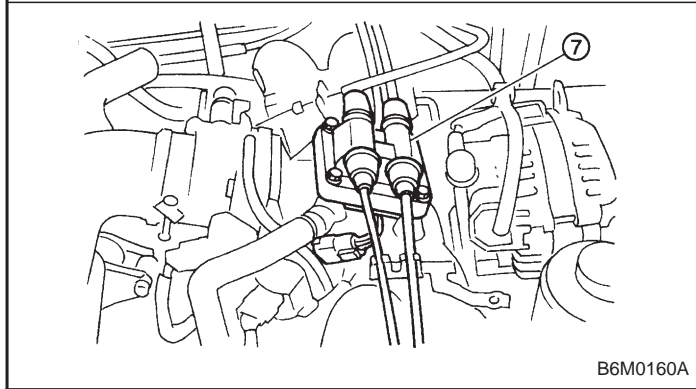
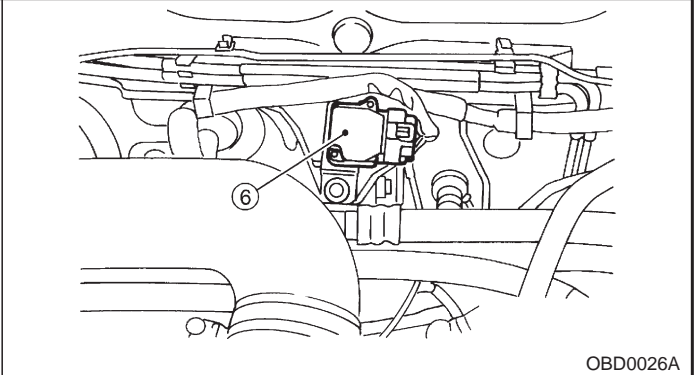
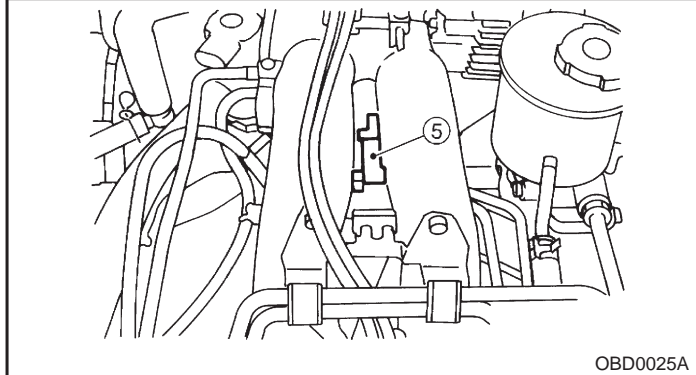
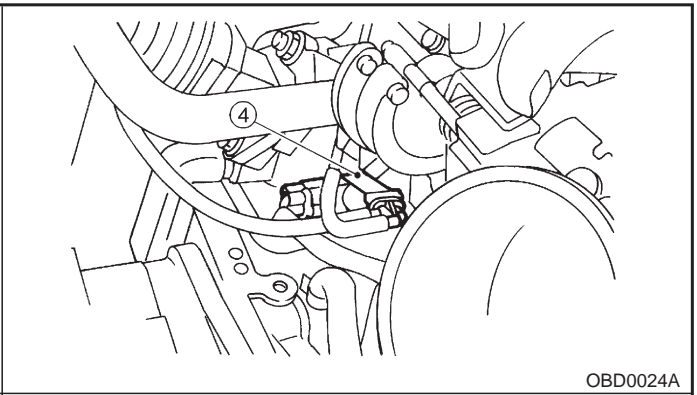
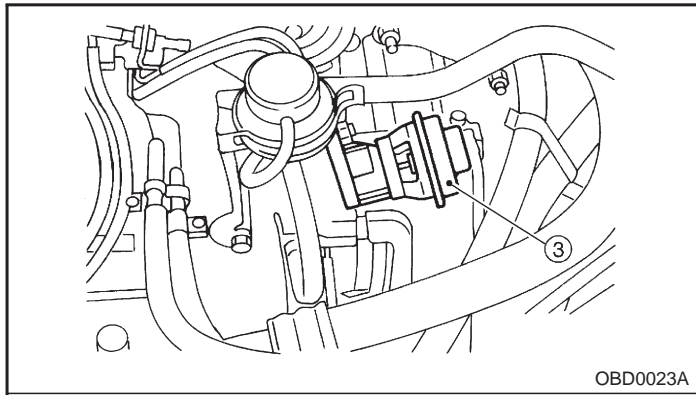
- | | |
|---|---|
| <ul style="list-style-type: none"> ① Pressure sources switching solenoid valve (AT vehicles only) ② Idle air control solenoid valve ③ EGR valve (AT vehicles only) | <ul style="list-style-type: none"> ④ EGR control solenoid valve (AT vehicles only) ⑤ Purge control solenoid valve ⑥ Ignitor ⑦ Ignition coil |
|---|---|

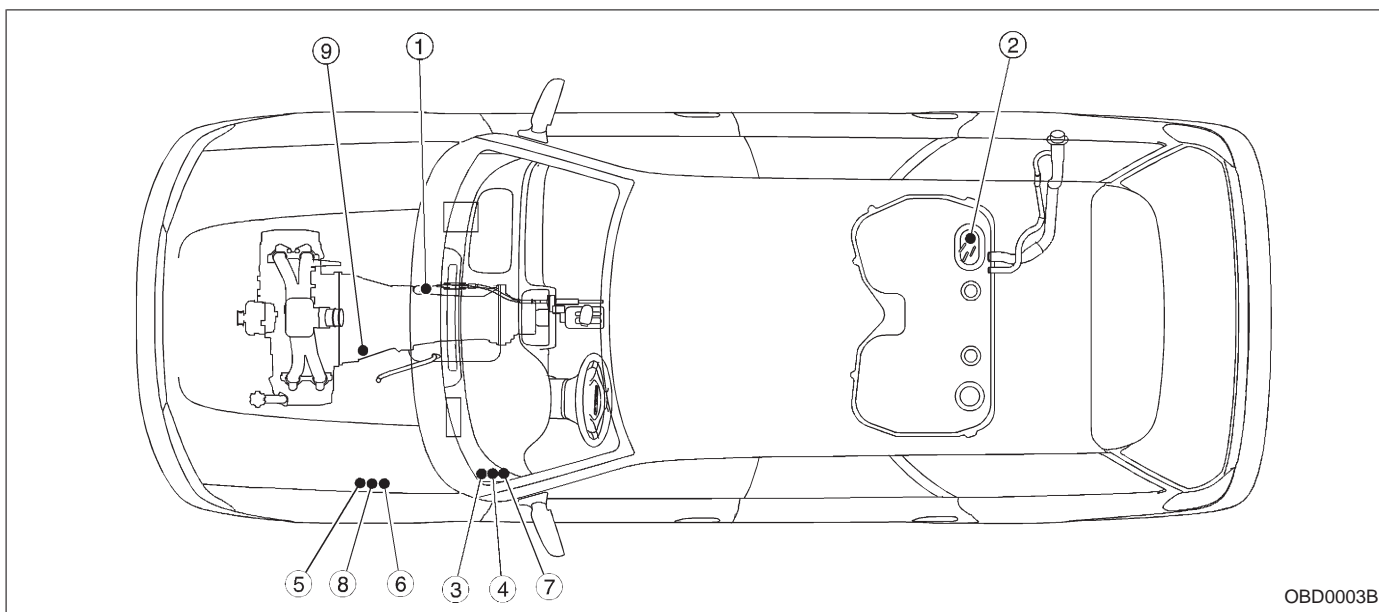


OBD0021A

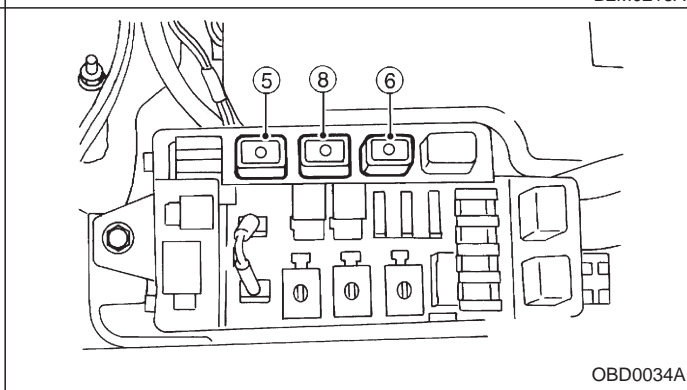
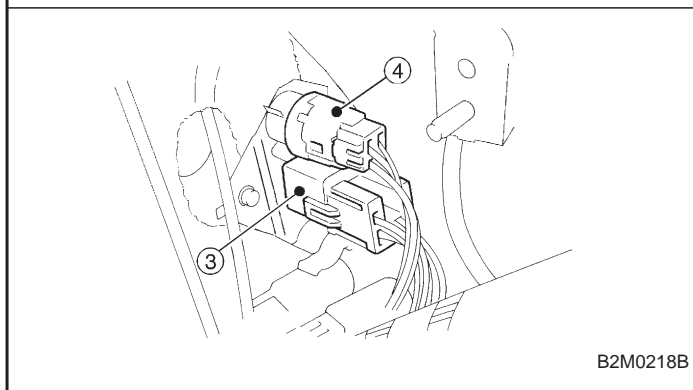
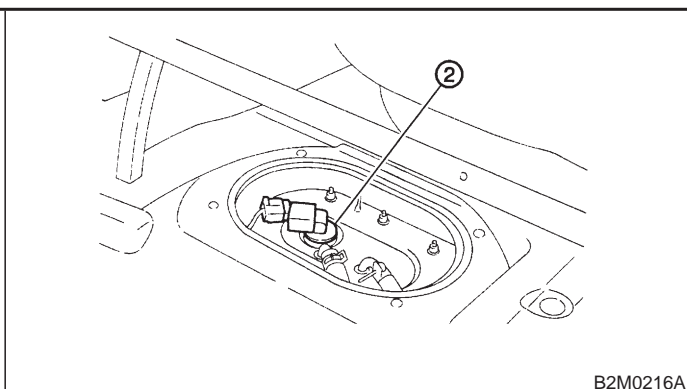
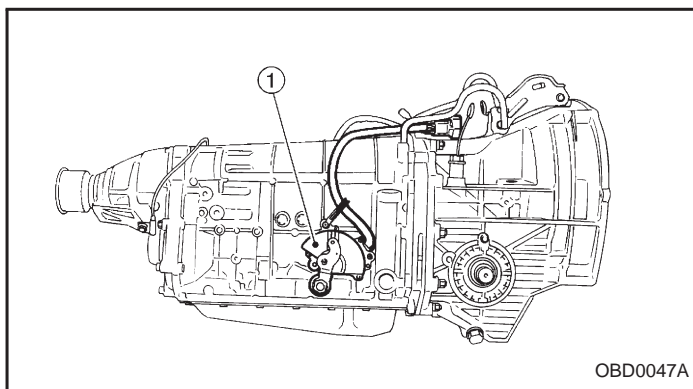


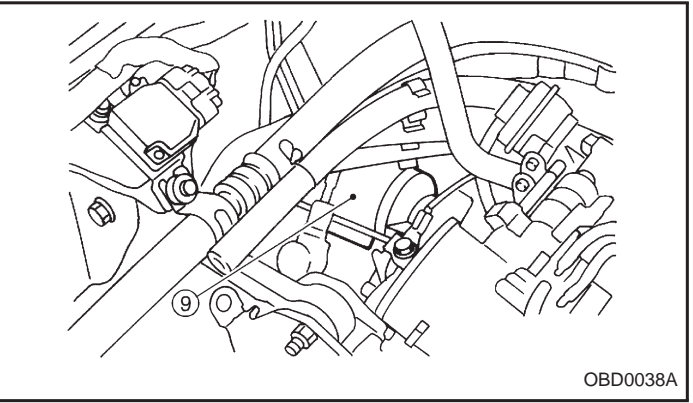
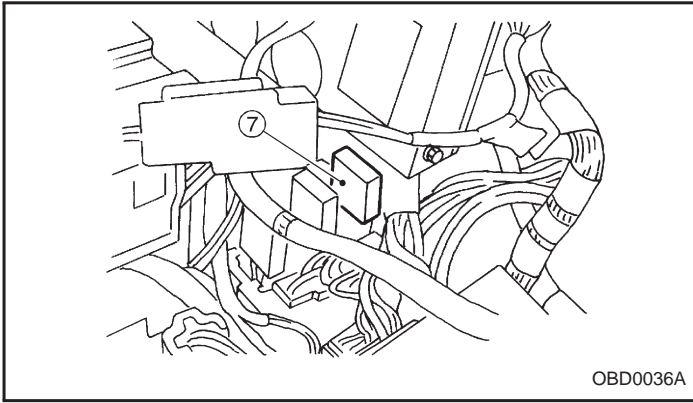
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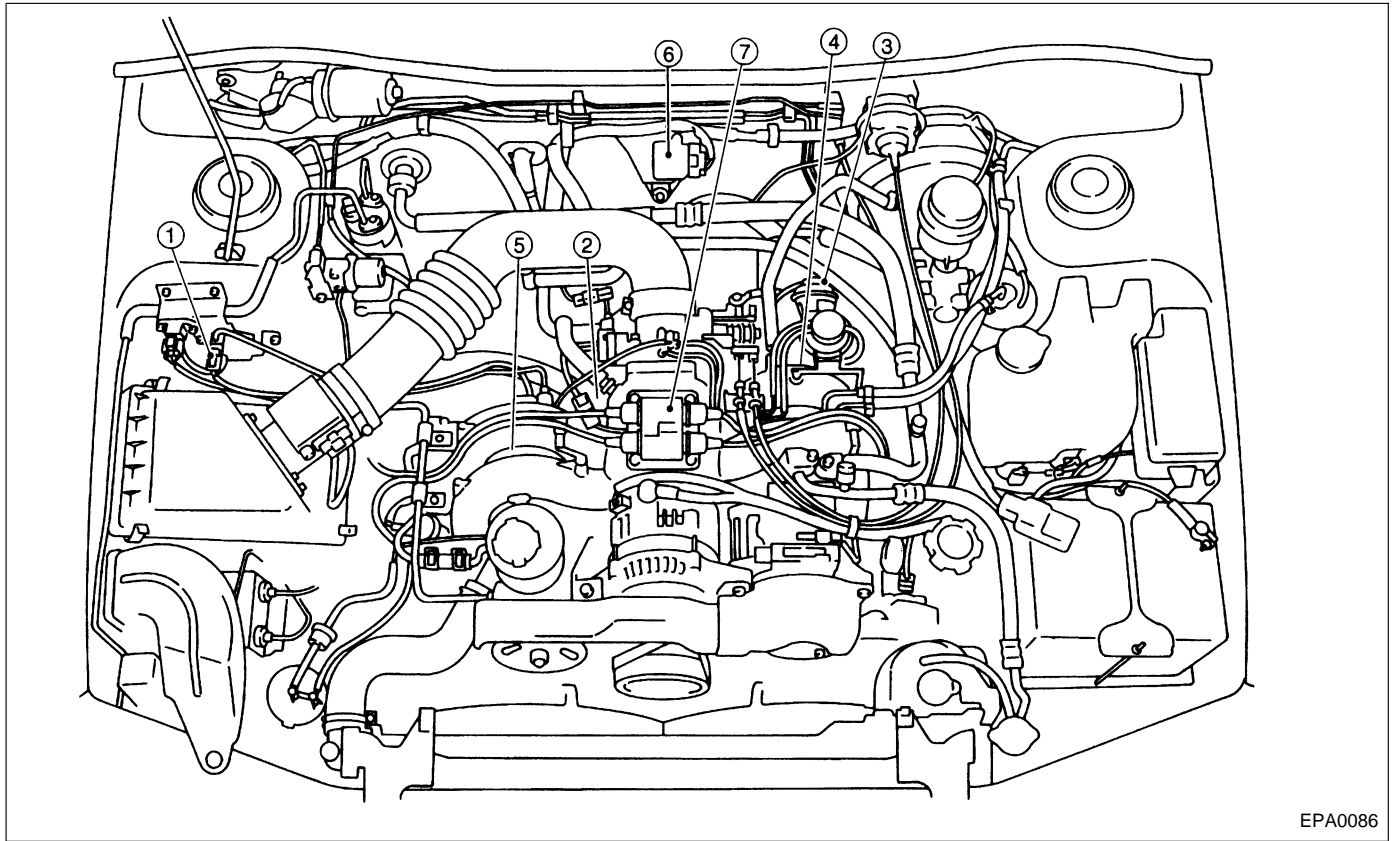


- | | |
|---|--|
| <ul style="list-style-type: none"> ① Inhibitor switch (AT vehicles only) ② Fuel pump ③ Main relay ④ Fuel pump relay ⑤ Radiator main fan relay 1 (With A/C models only) | <ul style="list-style-type: none"> ⑥ Radiator main fan relay 2 (With A/C models only) ⑦ Radiator sub fan relay 1 (With A/C models)
Main fan relay (Without A/C models) ⑧ Radiator sub fan relay 2 (With A/C models only) ⑨ Starter |
|---|--|





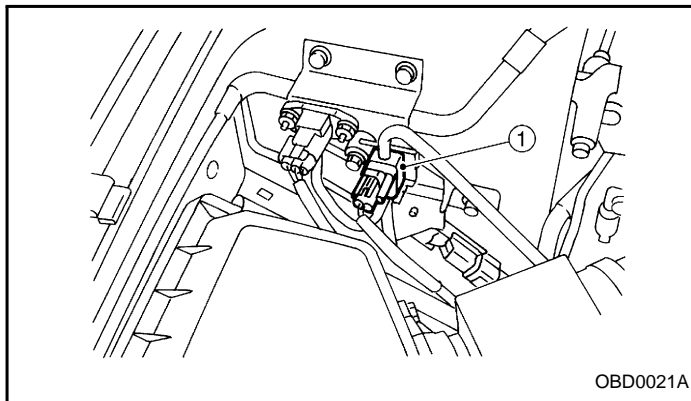
5. SOLENOID VALVE, EMISSION CONTROL SYSTEM PARTS AND IGNITION SYSTEM PARTS (RHD MODEL)



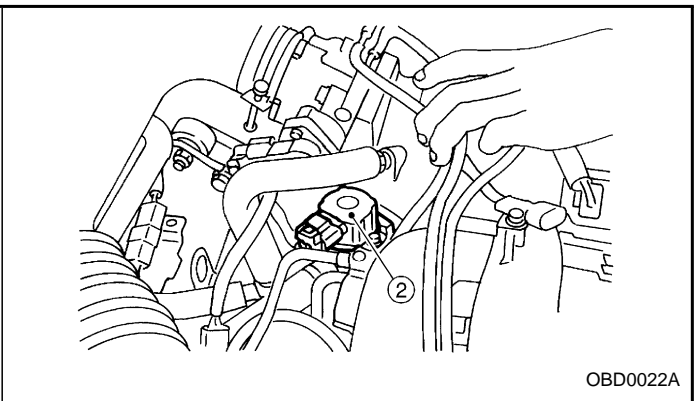
EPA0086

- ① Pressure sources switching solenoid valve
- ② Idle air control solenoid valve
- ③ EGR valve
- ④ EGR control solenoid valve

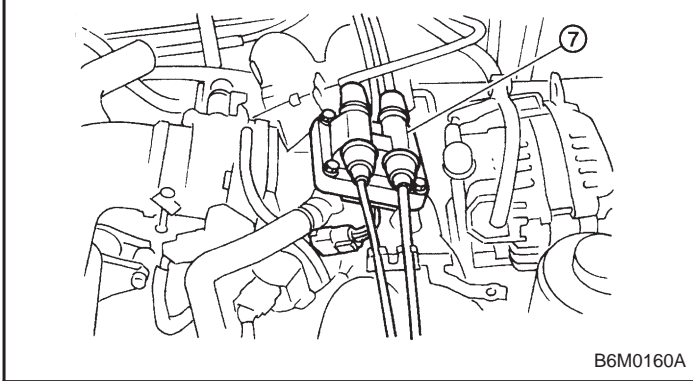
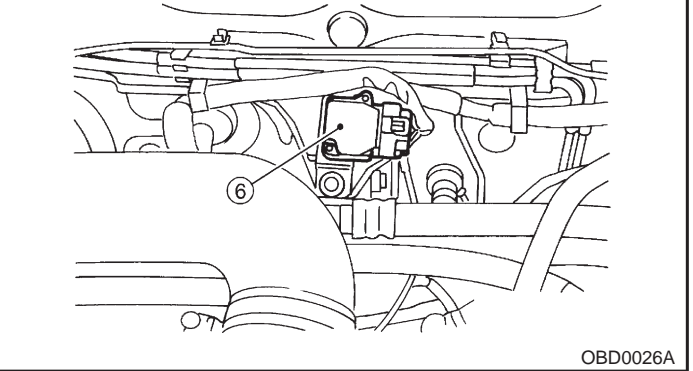
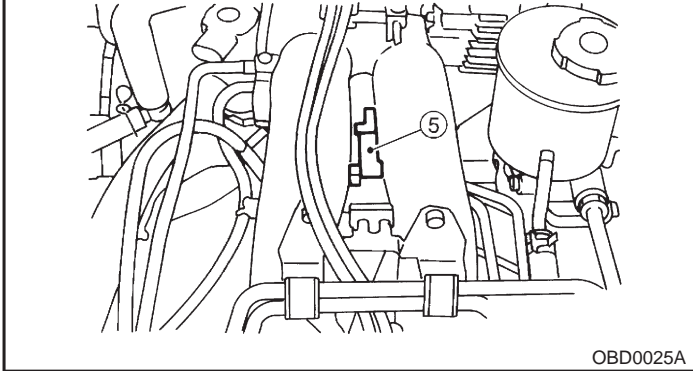
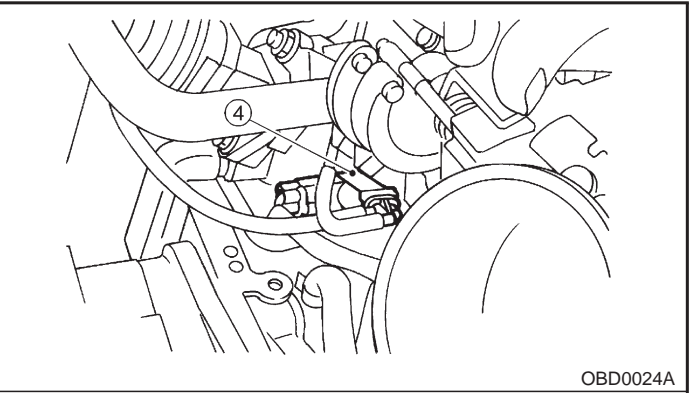
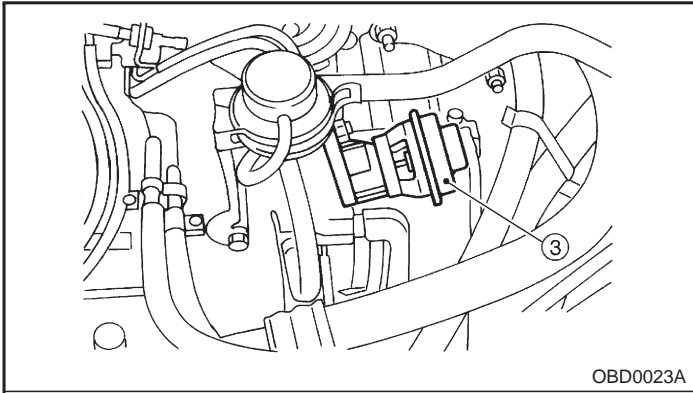
- ⑤ Purge control solenoid valve
- ⑥ Ignitor
- ⑦ Ignition coil

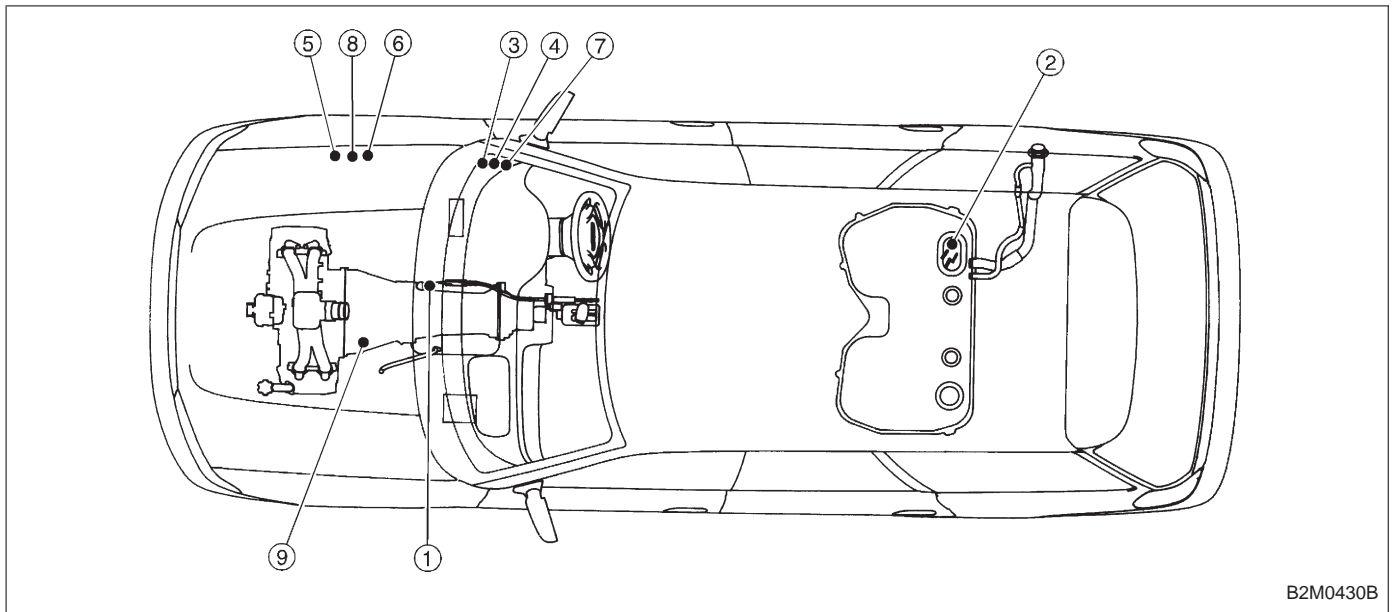


OBD0021A



OBD0022A

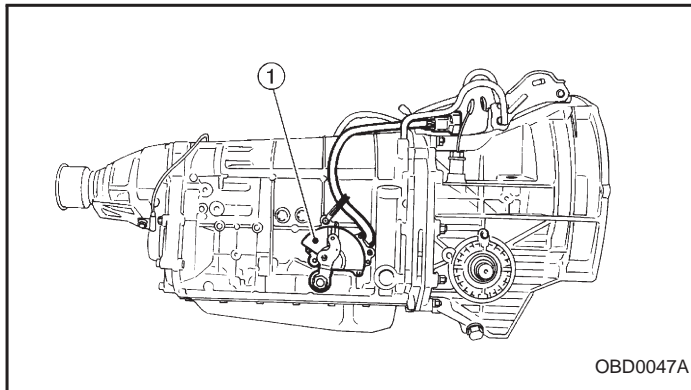




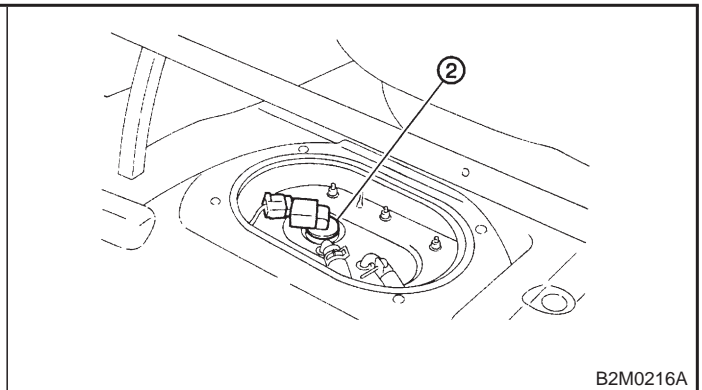
B2M0430B

- ① Inhibitor switch
- ② Fuel pump
- ③ Main relay
- ④ Fuel pump relay
- ⑤ Radiator main fan relay 1

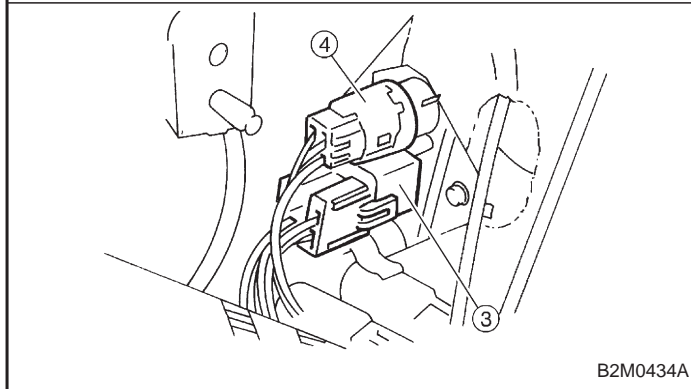
- ⑥ Radiator main fan relay 2
- ⑦ Radiator sub fan relay 1
- ⑧ Radiator sub fan relay 2
- ⑨ Starter



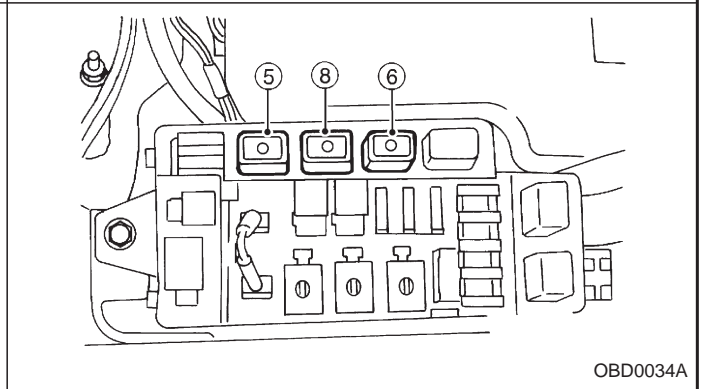
OBD0047A



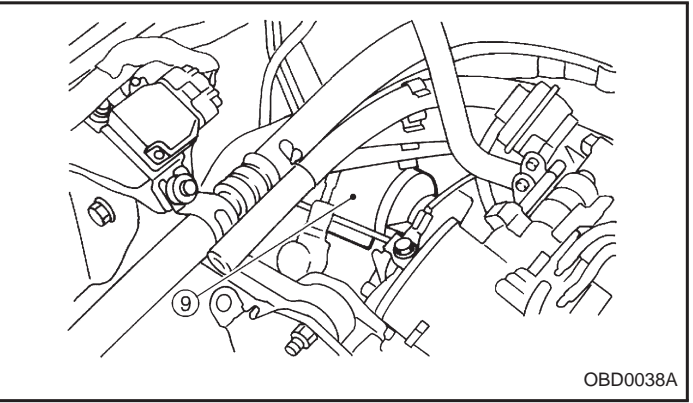
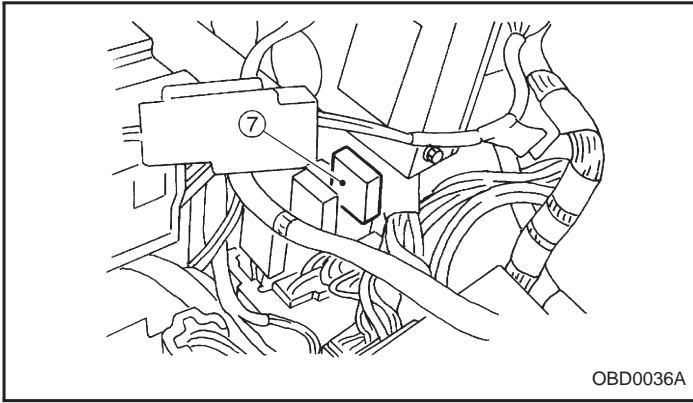
B2M0216A



B2M0434A

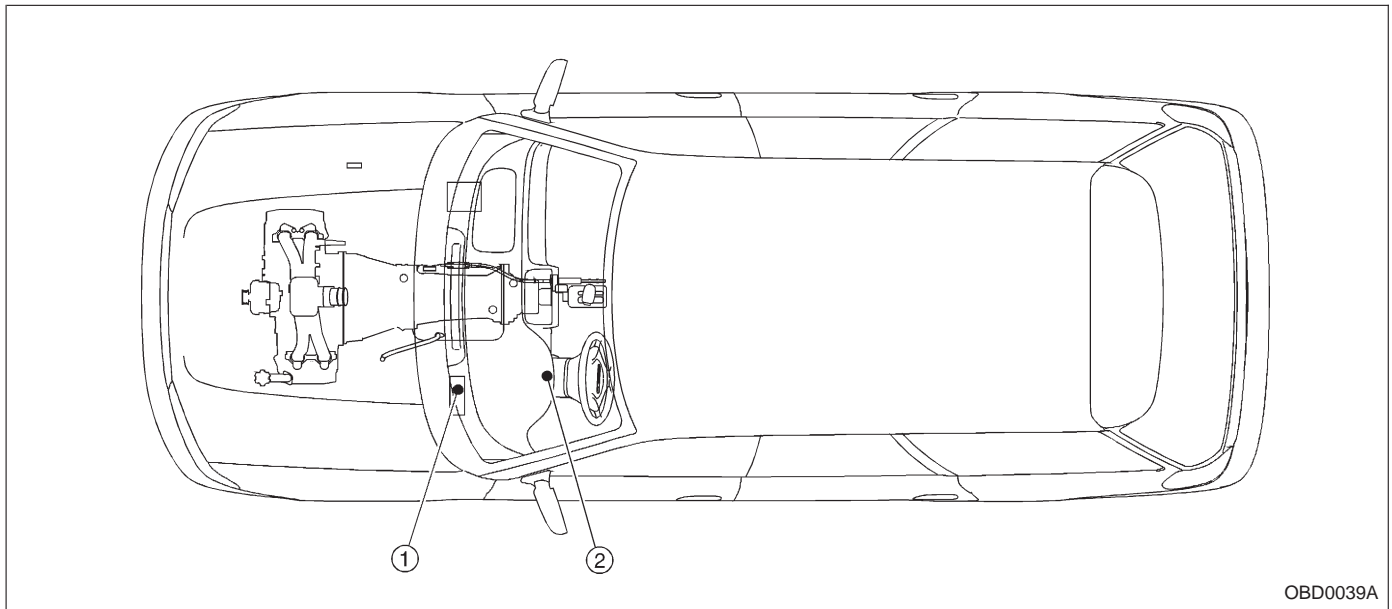


OBD0034A



B: TRANSMISSION

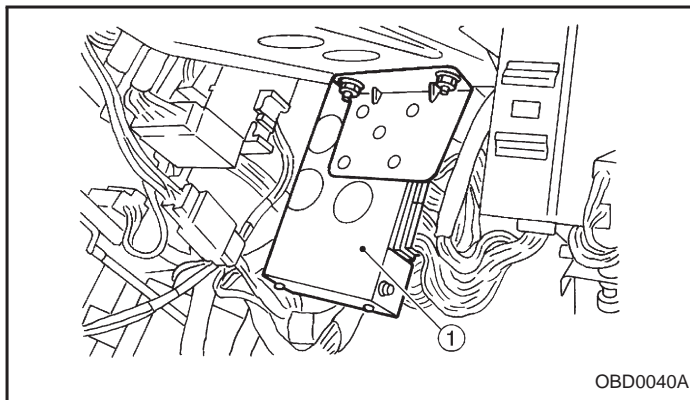
1. MODULE (LHD MODEL)



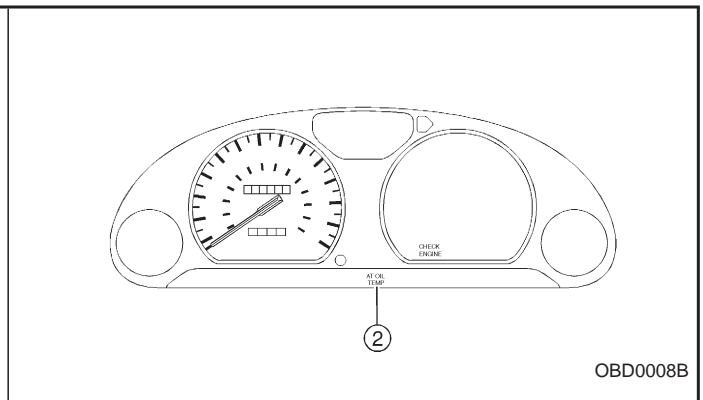
OBD0039A

① Transmission Control Module (TCM) (for AT vehicles)

② AT diagnostic indicator light (for AT vehicles)

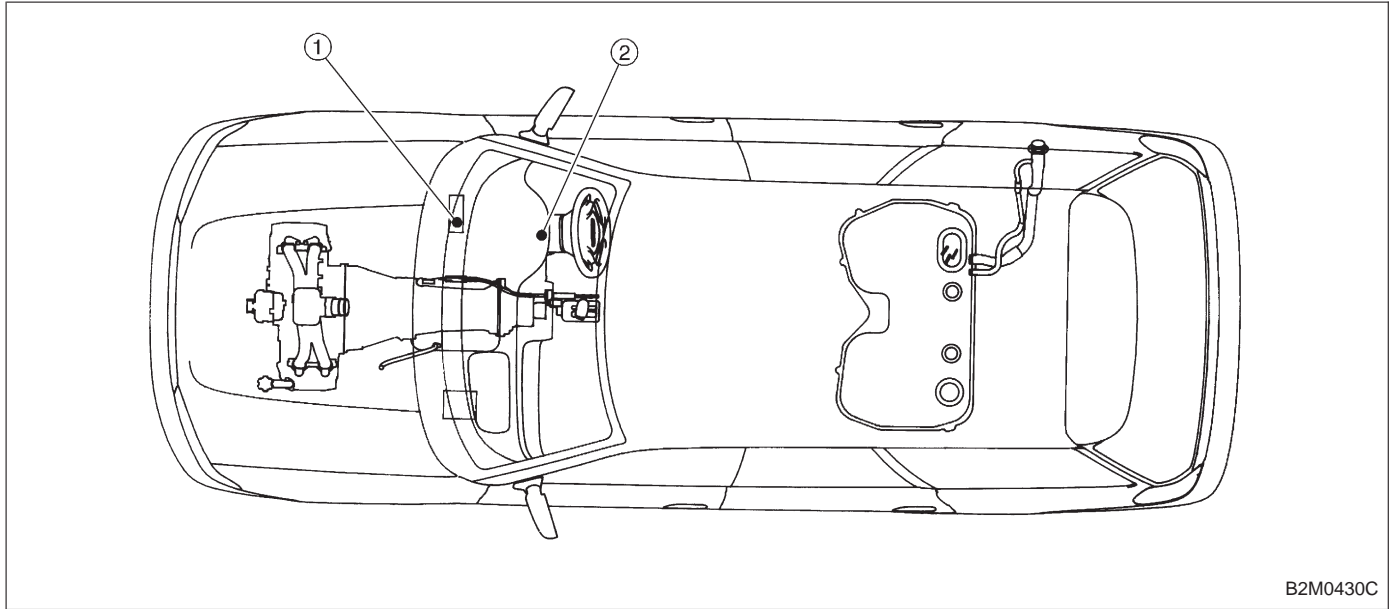


OBD0040A



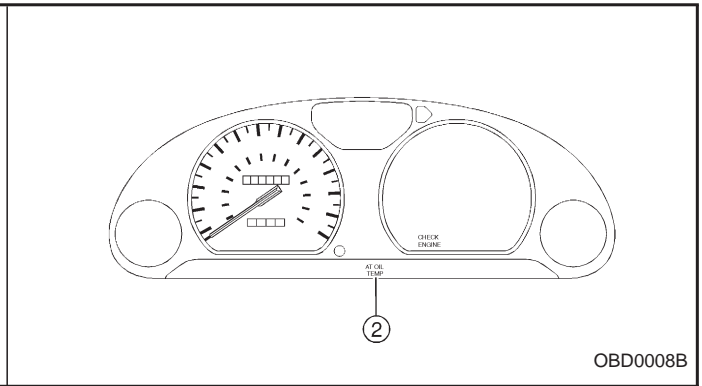
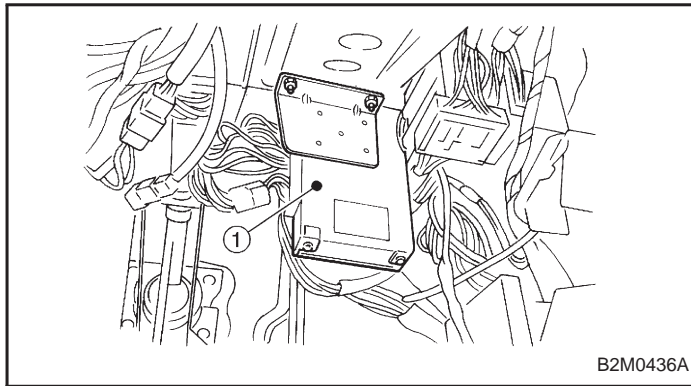
OBD0008B

2. MODULE (RHD MODEL)

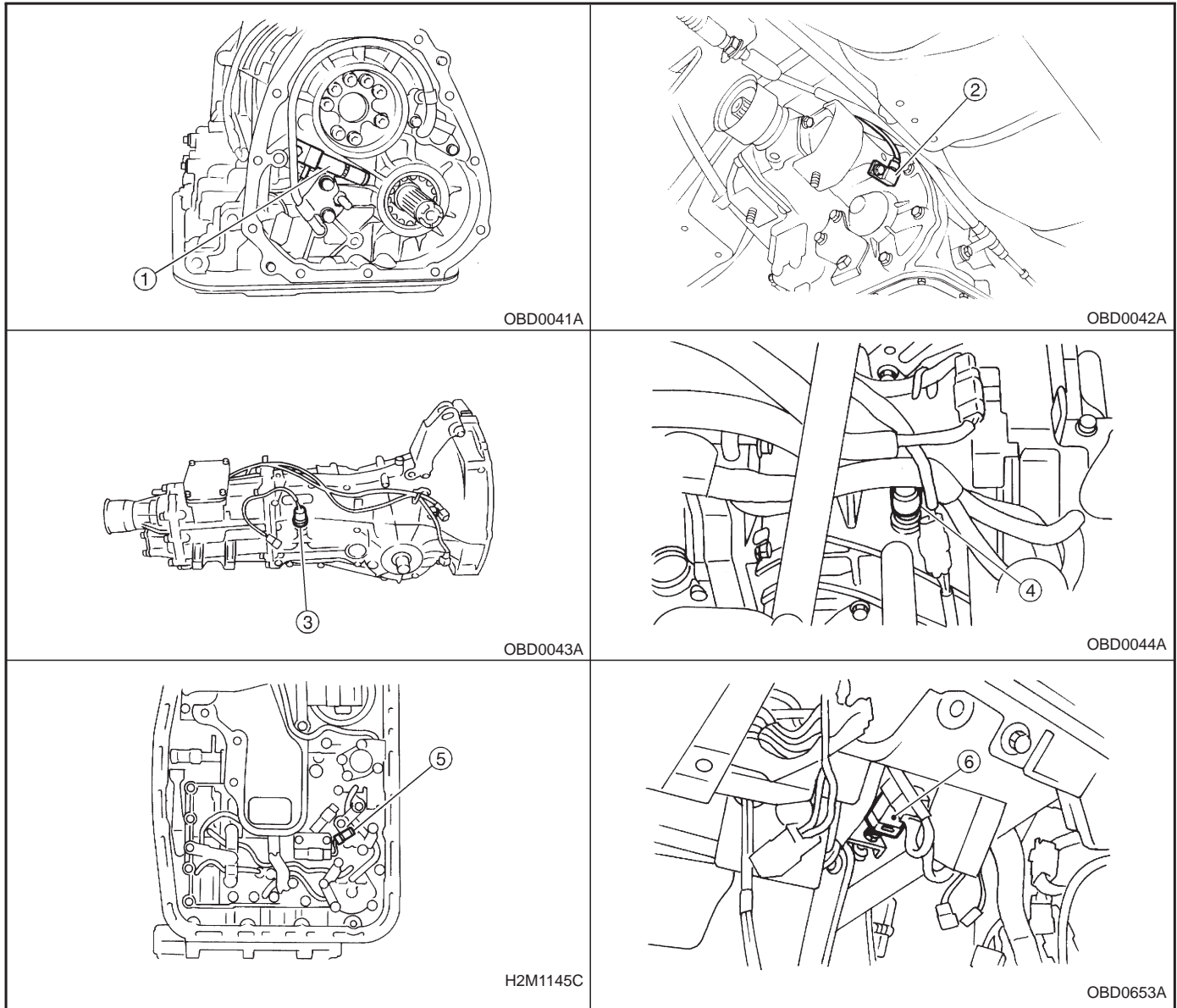


① Transmission Control Module (TCM)

② AT diagnostic indicator light



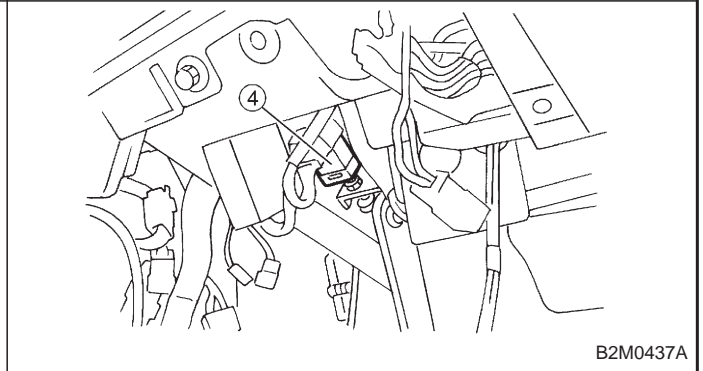
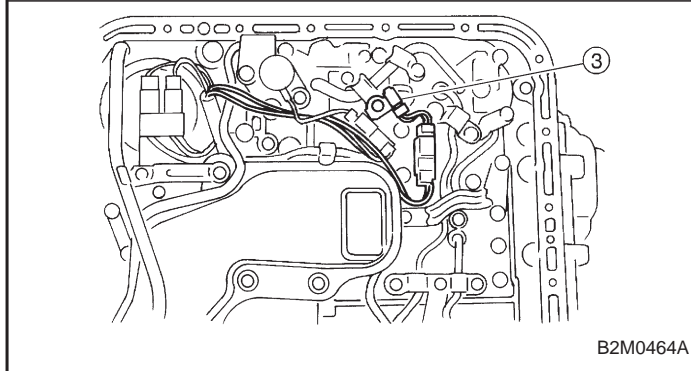
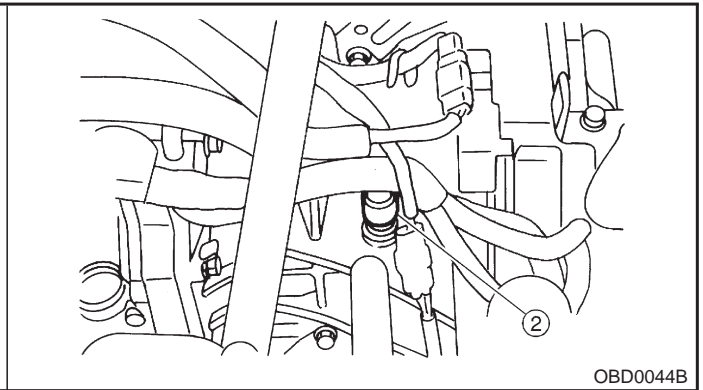
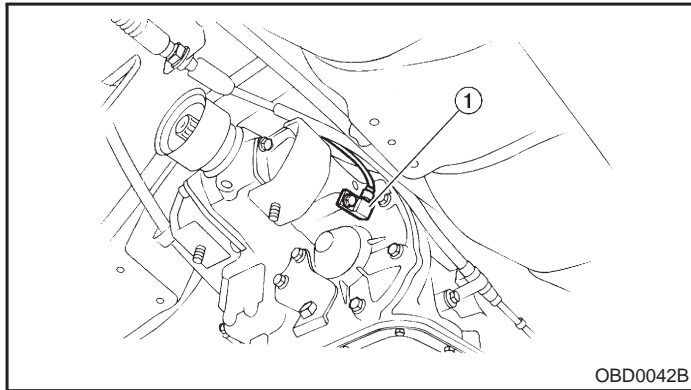
3. SENSOR (LHD MODEL)



- ① Vehicle speed sensor 1 (for AT FWD vehicles)
- ② Vehicle speed sensor 1 (for AT AWD vehicles)
- ③ Vehicle speed sensor 2 (for MT vehicles)

- ④ Vehicle speed sensor 2 (for AT vehicles)
- ⑤ ATF temperature sensor (for AT vehicles)
- ⑥ Brake light switch

4. SENSOR (RHD MODEL)

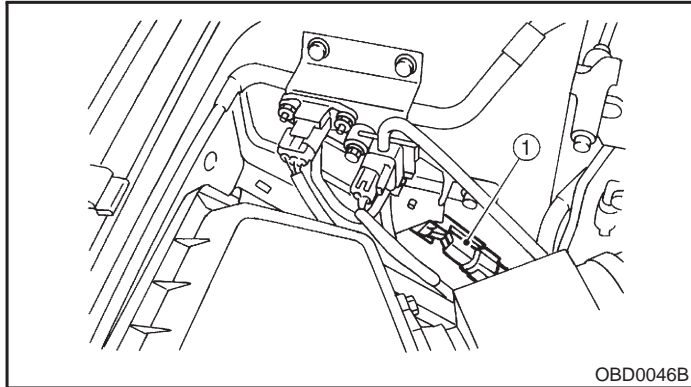


- ① Vehicle speed sensor 1
- ② Vehicle speed sensor 2

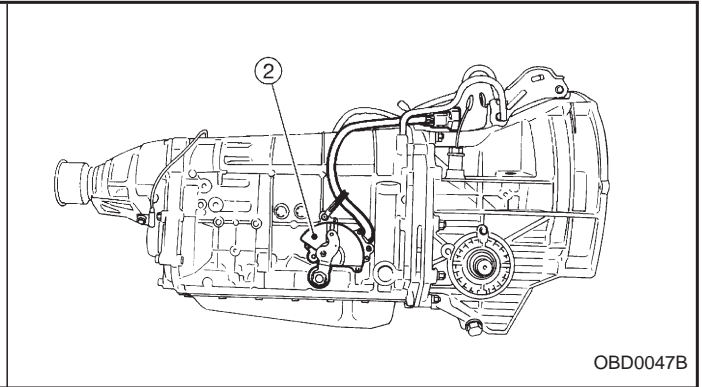
- ③ ATF temperature sensor
- ④ Brake light switch

5. SOLENOID VALVE AND RELAY

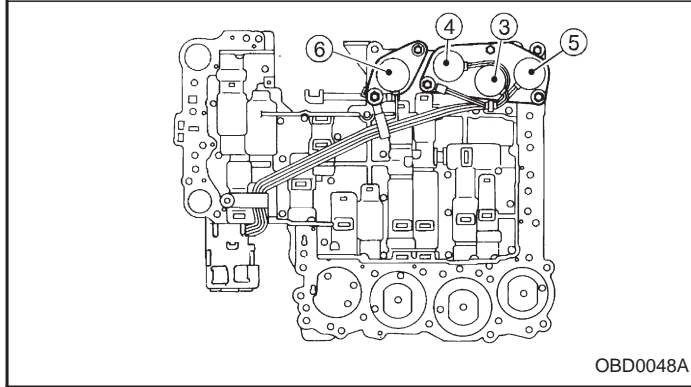
● For AT vehicles



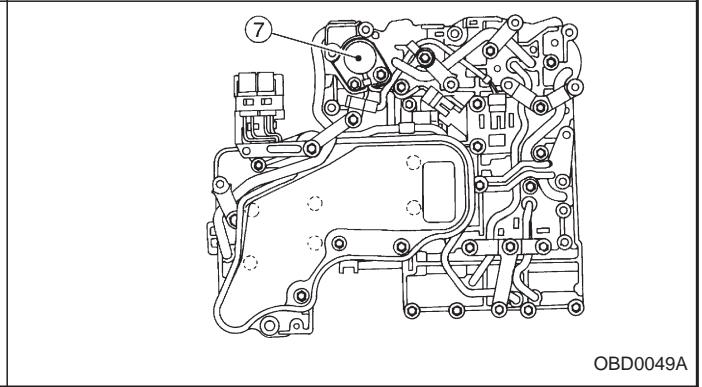
OBD0046B



OBD0047B



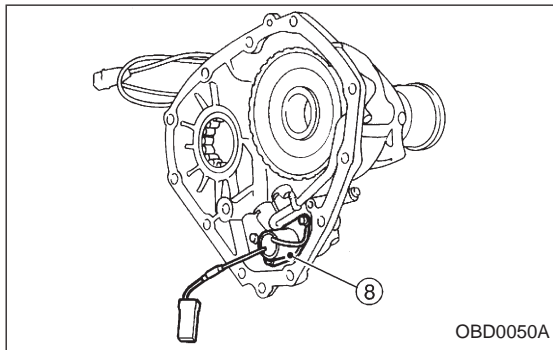
OBD0048A



OBD0049A

- ① Dropping resistor
- ② Inhibitor switch
- ③ Shift solenoid valve 1
- ④ Shift solenoid valve 2

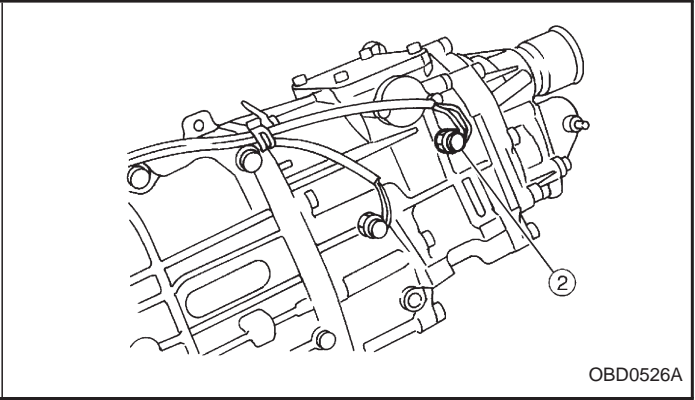
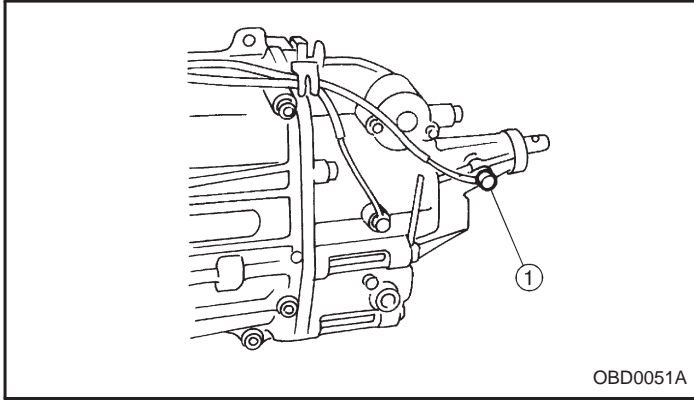
- ⑤ Shift solenoid valve 3
- ⑥ Duty solenoid valve A
- ⑦ Duty solenoid valve B



OBD0050A

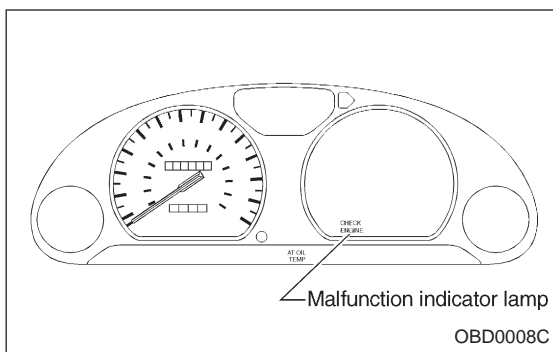
- ⑧ Duty solenoid valve C (AWD models)

● For MT vehicles



① Neutral position switch (FWD models)

② Neutral position switch (AWD models)



3. Diagnosis System

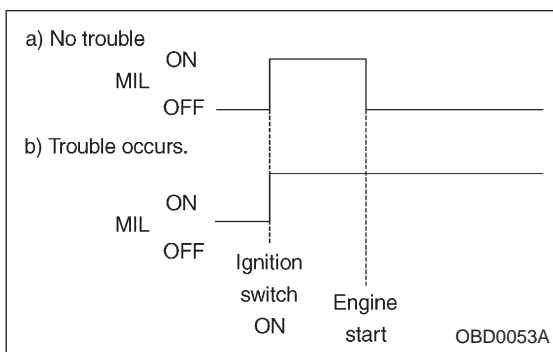
A: MALFUNCTION INDICATOR LAMP (MIL)

1. ACTIVATION OF MALFUNCTION INDICATOR LAMP (MIL)

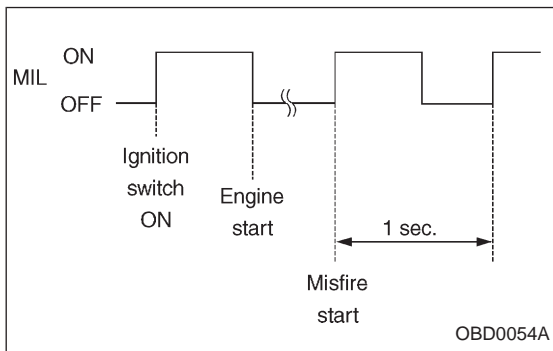
1) When ignition switch is turned to ON (engine off), the CHECK ENGINE malfunction indicator lamp (MIL) in the combination meter illuminates.

NOTE:

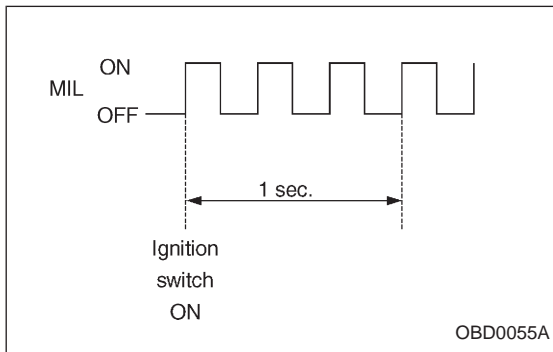
If the MIL does not illuminate, perform diagnostics of the CHECK ENGINE light circuit or the combination meter circuit. <Refer to "8. Diagnostics for CHECK ENGINE Malfunction Indicator Lamp (MIL) [T800]">



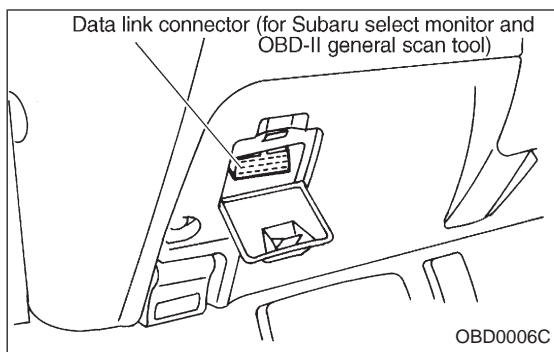
2) After starting the engine, the MIL goes out. If it does not, either the engine or the emission control system is malfunctioning.



3) If the diagnosis system senses a misfire which could damage the catalyzer, the MIL will blink at a cycle of 1 Hz.



4) When ignition switch is turned to ON (engine off) or to "START" with the test mode connector connected, the MIL blinks at a cycle of 3 Hz.



B: OBD-II GENERAL SCAN TOOL

1. HOW TO USE OBD-II GENERAL SCAN TOOL

- 1) Prepare a general scan tool (OBD-II general scan tool) required by SAE J1978.
- 2) Open the cover and connect the OBD-II general scan tool to the data link connector located in the lower portion of the instrument panel (on the driver's side), to the lower cover.
- 3) Using the OBD-II general scan tool, call up diagnostic trouble code(s) and freeze frame data.

OBD-II general scan tool functions consist of:

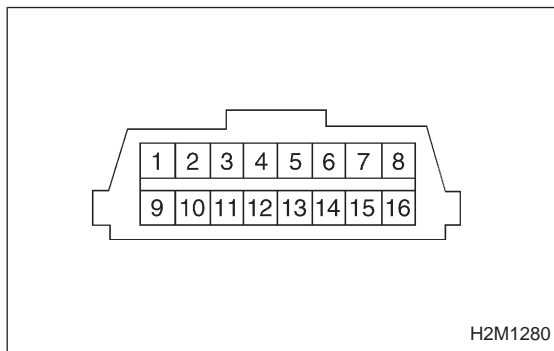
- (1) MODE \$01: Current powertrain diagnostic data
- (2) MODE \$02: Powertrain freeze frame data
- (3) MODE \$03: Emission-related powertrain diagnostic trouble codes
- (4) MODE \$04: Clear/Reset emission-related diagnostic information
- (5) MODE \$05: Oxygen sensor monitoring test results

Read out data according to repair procedures.

(For detailed operation procedures, refer to the OBD-II General Scan Tool Operation Manual.)

NOTE:

For details concerning diagnostic trouble codes, refer to the DIAGNOSTIC TROUBLE CODE (DTC) LIST [T11A0].



2. DATA LINK CONNECTOR (FOR OBD-II GENERAL SCAN TOOL AND SUBARU SELECT MONITOR)

- 1) This connector is used both for OBD-II general scan tools and Subaru Select Monitor.
- 2) Terminal No. 4 to No. 6 of data link connector is used for Subaru Select Monitor signal.

CAUTION:

Do not connect scan tools other than OBD-II general scan tools and Subaru Select Monitor, because the circuit for Subaru Select Monitor may be damaged.

Terminal No.	Contents	Terminal No.	Contents
1	Power supply	9	Blank
2	Blank	10	K line of ISO 9141 CARB
3	Blank	11	Blank
4	Subaru Select Monitor signal (ECM to Subaru Select monitor)*	12	Ground
5	Subaru Select Monitor signal (Subaru Select monitor to ECM)*	13	Ground
6	Subaru Select Monitor clock*	14	Blank
7	Blank	15	Blank
8	Blank	16	Blank

*: Circuit only for Subaru Select Monitor

3. READ DATA LIST**● MODE \$01**

— Current powertrain diagnostic data —

Refers to data denoting the current operating condition of analog input/output, digital input/output and/or the powertrain system.

A list of the support data and PID (Parameter Identification) codes are shown in the following table.

PID	Data	Unit of measure
01	Number of emission-related powertrain trouble codes and MIL status	ON/OFF
03	Fuel system control status	—
04	Calculated engine load value	%
05	Engine coolant temperature	°C
06	Short term fuel trim	%
07	Long term fuel trim	%
0B	Intake manifold absolute pressure	kPa
0C	Engine revolution	rpm
0D	Vehicle speed	km/h
0E	Ignition timing advance	°
10	Air flow rate from mass air flow sensor	g/sec
11	Throttle valve opening angle	%
13	Check whether oxygen sensor is installed.	—
14	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor—bank 1	V and %
15	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor—bank 2	V and %
1C	On-board diagnosis system	—

NOTE:

Refer to OBD-II general scan tool manufacturer's instruction manual to access generic OBD-II PIDs (MODE \$01).

- **MODE \$02**

— Powertrain freeze frame data —

Refers to data denoting the operating condition when trouble is sensed by the on-board diagnosis system.

A list of the support data and PID (Parameter Identification) codes are shown in the following table.

PID	Data	Unit of measure
02	Trouble code that caused CARB required freeze frame data storage	—
03	Fuel system control status	—
04	Calculated engine load value	%
05	Engine coolant temperature	°C
06	Short term fuel trim	%
07	Long term fuel trim	%
0B	Intake manifold absolute pressure	kPa
0C	Engine revolution	rpm
0D	Vehicle speed	km/h

NOTE:

Refer to OBD-II general scan tool manufacturer's instruction manual to access freeze frame data (MODE \$02).

- **MODE \$03**

— Emission-related powertrain diagnostic trouble codes —

Refers to data denoting emission-related powertrain diagnostic trouble codes.

For details concerning diagnostic trouble codes, refer to the DIAGNOSTIC TROUBLE CODE (DTC) LIST [T11A0].

NOTE:

Refer to OBD-II general scan tool manufacturer's instruction manual to access emission-related powertrain diagnostic trouble codes (MODE \$03).

- **MODE \$04**

— Clear/Reset emission-related diagnostic information —
Refers to the mode used to clear or reset emission-related diagnostic information (OBD-II trouble diagnostic information).

NOTE:

Refer to OBD-II general scan tool manufacturer's instruction manual to clear or reset emission-related diagnostic information (MODE \$04).

- **MODE \$05**

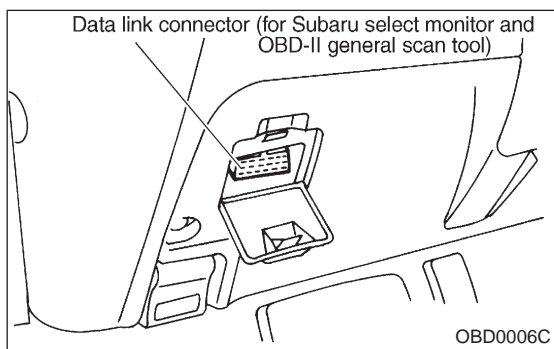
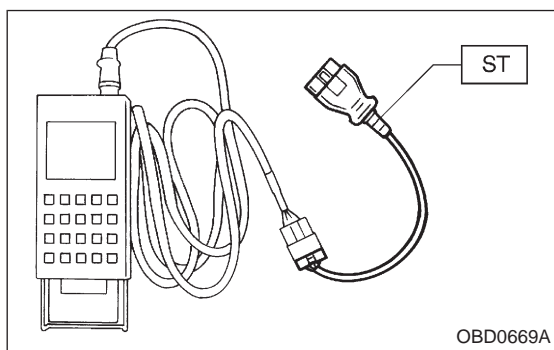
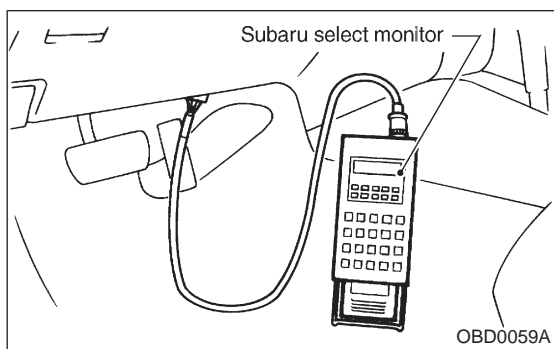
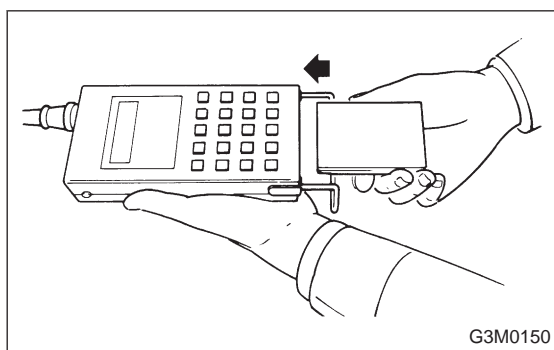
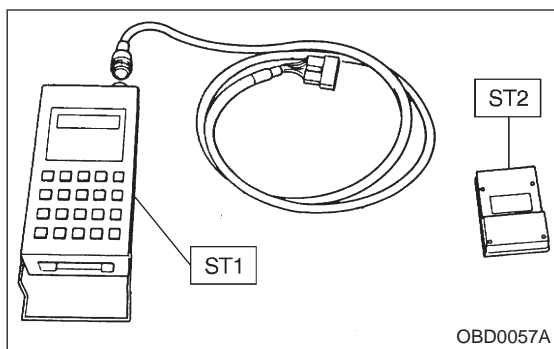
— Oxygen sensor monitoring test results —
Refers to the mode using oxygen sensor output data while the on-board diagnosis system is performing diagnosis on the oxygen sensor.

A list of the support oxygen sensor output data and test ID (identification) are shown in the following table.

Test ID	Data	Unit of measure
01	Rich to lean sensor threshold voltage (constant)	V
02	Lean to rich sensor threshold voltage (constant)	V
03	Low sensor voltage for switch time calculation (constant)	V
04	High sensor voltage for switch time calculation (constant)	V
05	Rich to lean sensor switch time (calculated)	sec.
06	Lean to rich sensor switch time (calculated)	sec.
07	Minimum sensor voltage for test cycle (calculated)	V
08	Maximum sensor voltage for test cycle (calculated)	V

NOTE:

Refer to OBD-II general scan tool manufacturer's instruction manual to access oxygen sensor monitoring test results (MODE \$05).



C: SUBARU SELECT MONITOR

1. HOW TO USE SUBARU SELECT MONITOR

1) Prepare Subaru select monitor and cartridge.

ST1 498307500 SELECT MONITOR KIT
ST2 498349601 CARTRIDGE

2) Turn ignition switch and Subaru select monitor switch to OFF.

3) Insert cartridge into Subaru select monitor.

4) Connect Subaru select monitor to data link connector.

- Using data link connector for Subaru select monitor only, connect Subaru select monitor to its data link connector located in the lower portion of the instrument panel (on the driver's side), to the side of the center console box.

- Using data link connector for Subaru select monitor and OBD-II general scan tool;

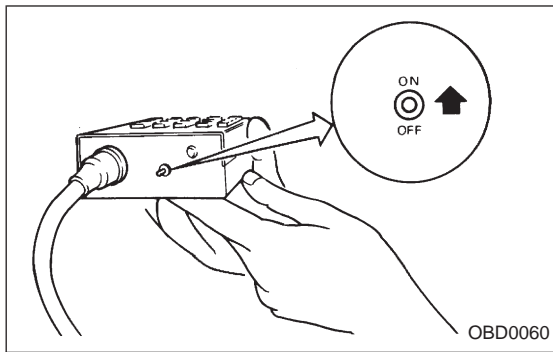
(1) Connect ST to Subaru select monitor cable.

ST 498357200 ADAPTER CABLE

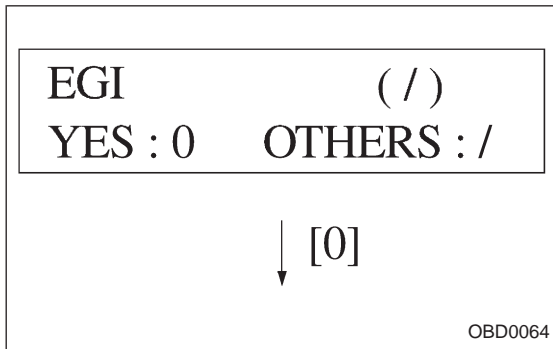
(2) Open the cover and connect Subaru select monitor to data link connector located in the lower portion of the instrument panel (on the driver's side), to the lower cover.

CAUTION:

Do not connect scan tools except for Subaru select monitor and OBD-II general scan tool.



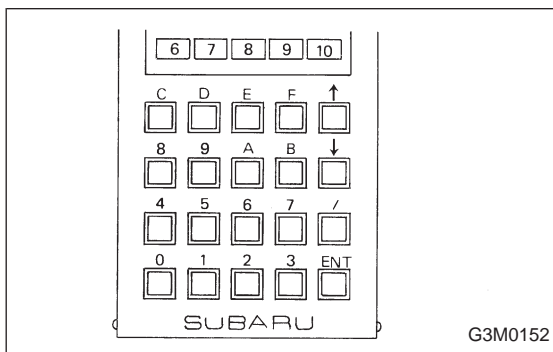
5) Turn ignition switch ON (engine OFF) and Subaru select monitor switch ON.



6) Using Subaru select monitor, call up diagnostic trouble code(s) and various data, then record them.

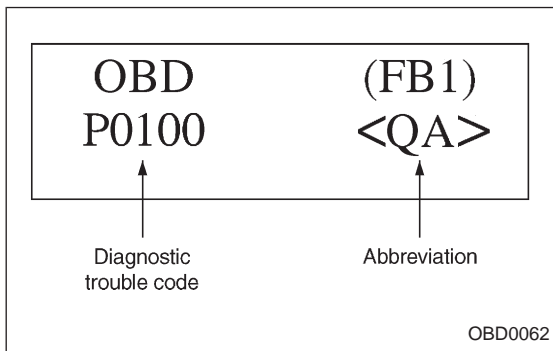
● **READ DIAGNOSTIC TROUBLE CODE (DTC) SHOWN ON DISPLAY. (MODE FB1)**

(1) Press the function key [0].



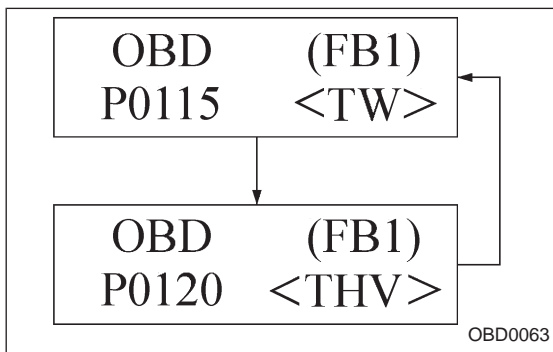
(2) Designate mode using function key.

Press [F] [B] [1] [ENT] in that order.



(3) Ensure diagnostic trouble code(s) is shown.

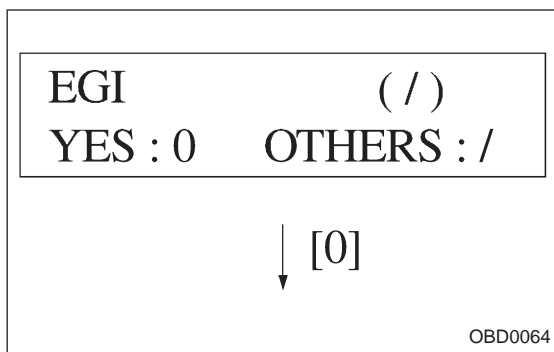
● When there is only one diagnostic trouble code.



● When there are multiple diagnostic trouble codes.

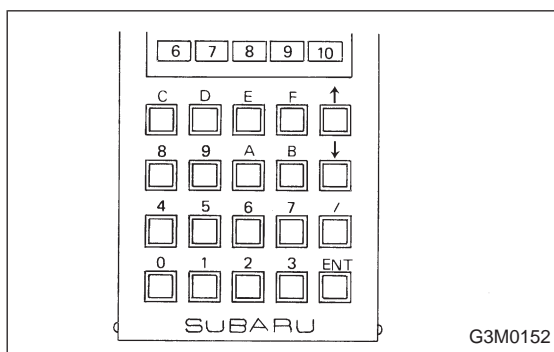
NOTE:

For details concerning diagnostic trouble codes, refer to the DIAGNOSTIC TROUBLE CODE (DTC) LIST [T11A0].



● READ CURRENT DATA AND FREEZE FRAME DATA SHOWN ON DISPLAY FOR ENGINE. (FUNCTION MODE)

(1) Press the function key [0].

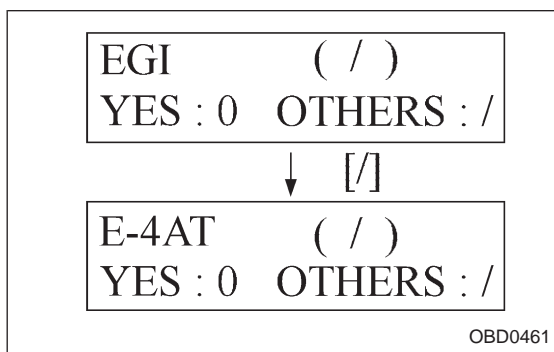


(2) Designate mode using function key.

Refer to "READ DATA FUNCTION KEY LIST FOR ENGINE" [T3C2].

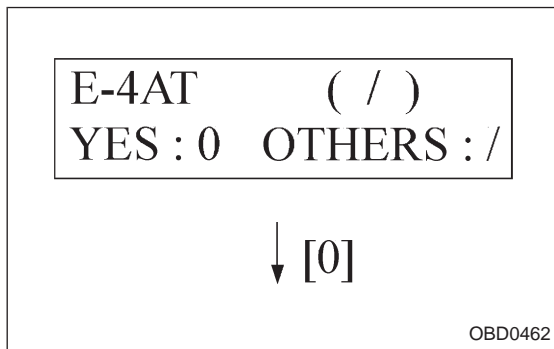
(Example: Press [F] [0] [1] [ENT] in that order.)

(3) Ensure data of input or output signal is shown.

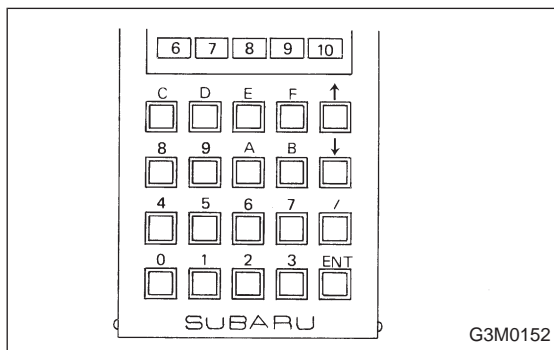


● READ CURRENT DATA SHOWN ON DISPLAY FOR AT. (FUNCTION MODE)

(1) Press the function key [/], and change to AT mode.



(2) Press the function key [0].



(3) Designate mode using function key.

Refer to "READ DATA FUNCTION KEY LIST FOR AT" [T3C6].

(Example: Press [F] [0] [2] [ENT] in that order.)

(4) Ensure data of input or output signal is shown.

2. READ DATA FUNCTION KEY LIST FOR ENGINE

Function mode	Contents	Abbreviation	Unit of measure
F00	ROM ID number	YEAR	—
F01	Battery voltage	VB	V
F02	Vehicle speed signal	VSP	m/h
F03	Vehicle speed signal	VSP	km/h
F04	Engine speed signal	EREV	rpm
F05	Engine coolant temperature signal	TW	°F
F06	Engine coolant temperature signal	TW	°C
F07	Ignition signal	ADVS	deg
F08	Mass air flow signal	QA	V
F09	Load data	DATA	—
F10	Throttle position signal	THV	V
F11	Injector pulse width	TIM	mS
F12	Idle air control signal	ISC	%
F13	Front oxygen sensor output signal	FO2	V
F14	Front oxygen sensor maximum output signal	FO2max	V
F15	Front oxygen sensor minimum output signal	FO2min	V
F16	Rear oxygen sensor output signal	RO2	V
F17	Rear oxygen sensor maximum output signal	RO2max	V
F18	Rear oxygen sensor minimum output signal	RO2min	V
F19	Short term fuel trim	ALPHA	%
F20	Knock sensor signal	RTRD	deg
F21	A/F correction (short term trim) by rear oxygen sensor	PHOS	%
F23	Atmospheric absolute pressure signal (AT vehicles)	BARO. P	V
F24	Intake manifold absolute pressure signal (AT vehicles)	MANI. P	V
F25	Long term fuel trim	KBLRC	%
F28	Long term whole fuel trim	K0	%
F29	Front oxygen sensor heater current	FO2H	A
F30	Rear oxygen sensor heater current	RO2H	A
F33	Maximum value of cylinder #1 misfire times during 200 rotations	MF1	%
F34	Maximum value of cylinder #2 misfire times during 200 rotations	MF2	%
F35	Maximum value of cylinder #3 misfire times during 200 rotations	MF3	%
F36	Maximum value of cylinder #4 misfire times during 200 rotations	MF4	%
F37	Maximum EGR system pressure value (AT vehicles)	EGRmax	mmHg
F38	Minimum EGR system pressure value (AT vehicles)	EGRmin	mmHg
F45	Load data	LOAD	%
F46	Throttle position signal	THV	%
F47	Mass air flow signal	QA	g/s
F48	Atmospheric absolute pressure signal	BARO. P	kPa
F49	Intake manifold absolute pressure signal	MANI. P	kPa

Function mode	Contents	Abbreviation	Unit of measure
F50	Load data (Freeze frame data)	LOAD-F	%
F51	Engine coolant temperature signal (Freeze frame data)	TW-F	°C
F52	Short term fuel trim (Freeze frame data)	ALPH-F	%
F53	Long term fuel trim (Freeze frame data)	KBLR-F	%
F54	Intake manifold absolute pressure signal (Freeze frame data) <AT vehicles>	MANI-F	kPa
F55	Engine speed signal (Freeze frame data)	EREV-F	rpm
F56	Vehicle speed signal (Freeze frame data)	VSP-F	km/h
FA0	ON ↔ OFF signal	—	—
FA1	ON ↔ OFF signal	—	—
FA2	ON ↔ OFF signal	—	—
FA3	ON ↔ OFF signal	—	—
FA4	ON ↔ OFF signal	—	—
FB0	Diagnostic trouble code (DTC)	INSPECT	—
FB1	Diagnostic trouble code (DTC)	OBD	—
FC0	Clear memory	—	—

NOTE:

1) Subaru select monitor is also available for monitoring information other than that used for check and repair of the vehicle.

2) The maximum values shown for F33, F34, F35 and F36 do not indicate the actual cylinder misfire rate.

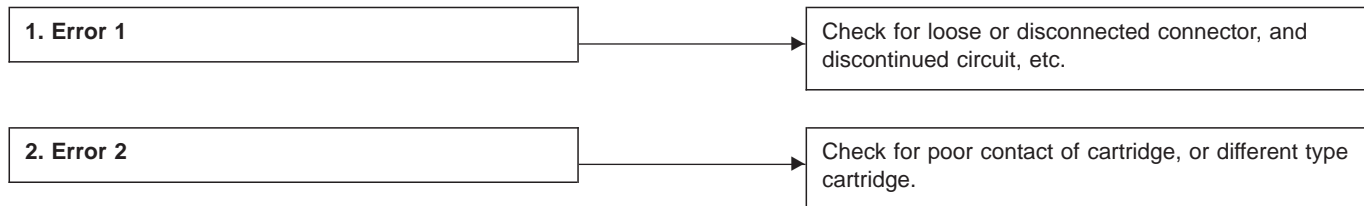
1995	(F00)
2.2	SOHC
OBD0065	

● **FUNCTION MODE: F00**
— ROM ID NUMBER (YEAR) —

CONDITION:
 Ignition switch "ON"

SPECIFIED DATA:
 Presentation display

● Probable cause (Item outside "specified data")



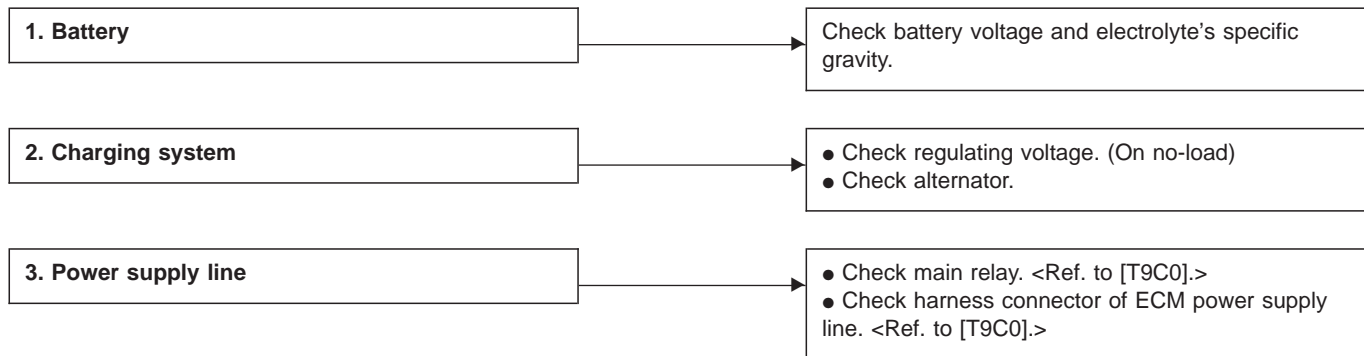
VB	(F01)
12.4 V	
B2M0270	

● **FUNCTION MODE: F01**
— BATTERY VOLTAGE (VB) —

CONDITION:
 (1) Ignition switch "ON"
 (2) Idling after warm-up

SPECIFIED DATA:
 (1) 11±1 V
 (2) 13±1 V

● Probable cause (Item outside "specified data")



VSP	(F02)
15 MPH	
G2M0523	

- **FUNCTION MODE: F02 AND F03**
— **VEHICLE SPEED SIGNAL (VSP)** —
- F02: Vehicle speed is indicated in mile per hour (MPH).
- F03: Vehicle speed is indicated in kilometer per hour (km/h).

EREV	(F04)
1500 rpm	
G2M0524	

- **FUNCTION MODE: F04**
— **ENGINE SPEED SIGNAL (EREV)** —

TW	(F05)
170 ° F	
OBD0176	

- **FUNCTION MODE: F05 AND F06**
— **ENGINE COOLANT TEMPERATURE SIGNAL (TW)** —
- F05: Engine coolant temperature is indicated in "°F".
- F06: Engine coolant temperature is indicated in "°C".

ADVS	(F07)
15 deg	
G2M0654	

- **FUNCTION MODE: F07**
— **IGNITION SIGNAL (ADVS)** —

NOTE:

The ignition timing value displayed in mode F07 is a value computed by ECM and will not always correspond with the value measured with a timing light.

QA	(F08)
0.98 V	
B2M0271	

- **FUNCTION MODE: F08**
— **MASS AIR FLOW SIGNAL (QA)** —

LDATA	(F09)
17	
B2M0272	

- **FUNCTION MODE: F09**
— LOAD DATA (LDATA) —

THV	(F10)
1.00 V	
OBD0671	

- **FUNCTION MODE: F10**
— THROTTLE POSITION SIGNAL (THV) —

NOTE:

Be sure that the displayed value changes smoothly when changing throttle valve from fully closed to fully opened.

TIM	(F11)
2.82 mS	
B2M0273	

- **FUNCTION MODE: F11**
— INJECTOR PULSE WIDTH (TIM) —

ISC	(F12)
35.7 %	
B2M0274	

- **FUNCTION MODE: F12**
— IDLE AIR CONTROL SIGNAL (ISC) —

FO2	(F13)
0.60V	
OBD0205	

- **FUNCTION MODE: F13**
— FRONT OXYGEN SENSOR OUTPUT SIGNAL (FO2) —

FO2max	(F14)
0.80V	
OBD0206	

- **FUNCTION MODE: F14**
— FRONT OXYGEN SENSOR MAXIMUM OUTPUT SIGNAL (FO2MAX) —

FO2min	(F15)
0.10V	
OBD0207	

- **FUNCTION MODE: F15**
— FRONT OXYGEN SENSOR MINIMUM OUTPUT SIGNAL (FO2MIN) —

RO2	(F16)
0.60V	
OBD0225	

- **FUNCTION MODE: F16**
— REAR OXYGEN SENSOR OUTPUT SIGNAL (RO2) —

RO2max	(F17)
0.80V	
OBD0226	

- **FUNCTION MODE: F17**
— REAR OXYGEN SENSOR MAXIMUM OUTPUT SIGNAL (RO2MAX) —

RO2min	(F18)
0.10V	
OBD0227	

- **FUNCTION MODE: F18**
— REAR OXYGEN SENSOR MINIMUM OUTPUT SIGNAL (RO2MIN) —

ALPHA (F19)

-0.8 %

B2M0278

- FUNCTION MODE: F19
- SHORT TERM FUEL TRIM [A/F CORRECTION COEFFICIENT] (ALPHA) —

RTRD (F20)

3.0 deg

OBD0672

- FUNCTION MODE: F20
- KNOCK SENSOR SIGNAL [IGNITION TIMING CORRECTION COEFFICIENT] (RTRD) —

PHOS (F21)

0.78 %

OBD0619

- FUNCTION MODE: F21
- A/F CORRECTION COEFFICIENT [SHORT TERM TRIM] BY REAR OXYGEN SENSOR (PHOS) —

BARO.P (F23)

3.60 V

OBD0158

- FUNCTION MODE: F23
- ATMOSPHERIC ABSOLUTE PRESSURE SIGNAL [AT VEHICLES] (BARO. P) —

MANI.P (F24)

2.30 V

OBD0620

- FUNCTION MODE: F24
- INTAKE MANIFOLD ABSOLUTE PRESSURE SIGNAL [AT VEHICLES] (MANI. P) —

KBLRC (F25)

5.5 %

OBD0621

- **FUNCTION MODE: F25**
— LONG TERM FUEL TRIM [A/F LEARNING CORRECTION COEFFICIENT] (KBLRC) —

K0 (F28)

0.0 %

OBD0624

- **FUNCTION MODE: F28**
— LONG TERM FUEL TRIM WHOLE [A/F LEARNING CONTROL COEFFICIENT] (K0) —

FO2H (F29)

1.00A

OBD0215

- **FUNCTION MODE: F29**
— FRONT OXYGEN SENSOR HEATER CURRENT (FO2H) —

RO2H (F30)

1.00 A

OBD0235

- **FUNCTION MODE: F30**
— REAR OXYGEN SENSOR HEATER CURRENT (RO2H) —

MF1 (F33)

0 %

OBD0627

- **FUNCTION MODE: F33**
— MAXIMUM VALUE OF CYLINDER #1 MISFIRE RATE DURING 200 ROTATIONS (MF1) —

NOTE:

Maximum misfire rate of cylinder #1 indicated on Subaru select monitor is not the same as the actual rate.

MF2 (F34)

0 %

OBD0628

- **FUNCTION MODE: F34**
— **MAXIMUM VALUE OF CYLINDER #2 MISFIRE RATE DURING 200 ROTATIONS (MF2) —**

NOTE:

Maximum misfire rate of cylinder #2 indicated on Subaru select monitor is not the same as the actual rate.

MF3 (F35)

0 %

OBD0629

- **FUNCTION MODE: F35**
— **MAXIMUM VALUE OF CYLINDER #3 MISFIRE RATE DURING 200 ROTATIONS (MF3) —**

NOTE:

Maximum misfire rate of cylinder #3 indicated on Subaru select monitor is not the same as the actual rate.

MF4 (F36)

0 %

OBD0630

- **FUNCTION MODE: F36**
— **MAXIMUM VALUE OF CYLINDER #4 MISFIRE RATE DURING 200 ROTATIONS (MF4) —**

NOTE:

Maximum misfire rate of cylinder #4 indicated on Subaru select monitor is not the same as the actual rate.

EGRmax (F37)

161 mmHg

OBD0631

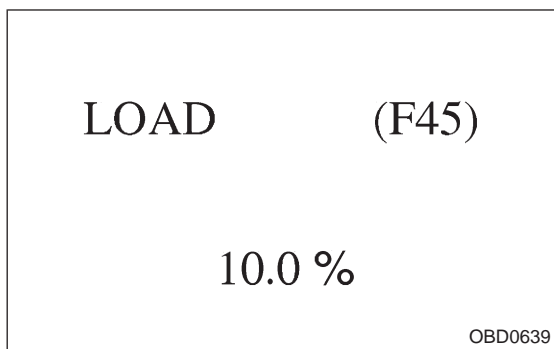
- **FUNCTION MODE: F37**
— **MAXIMUM EGR SYSTEM PRESSURE VALUE [AT VEHICLES] (EGRMAX) —**

EGRmin (F38)

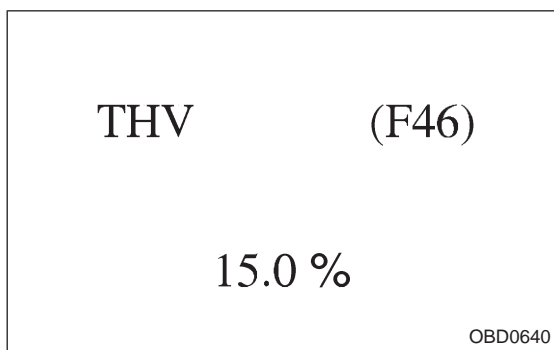
161 mmHg

OBD0632

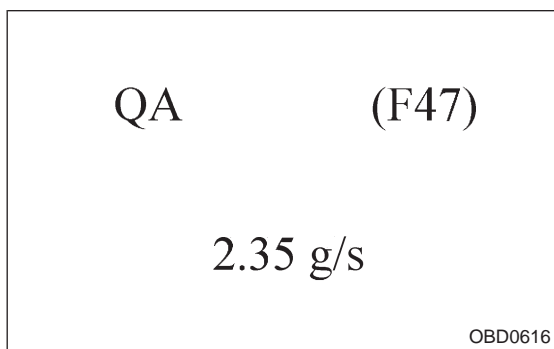
- **FUNCTION MODE: F38**
— **MINIMUM EGR SYSTEM PRESSURE VALUE [AT VEHICLES] (EGRMIN) —**



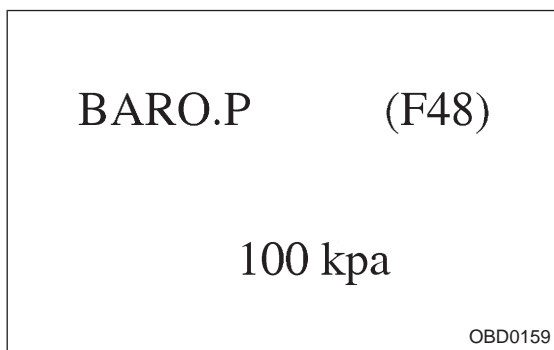
- **FUNCTION MODE: F45**
— LOAD DATA (LOAD) —



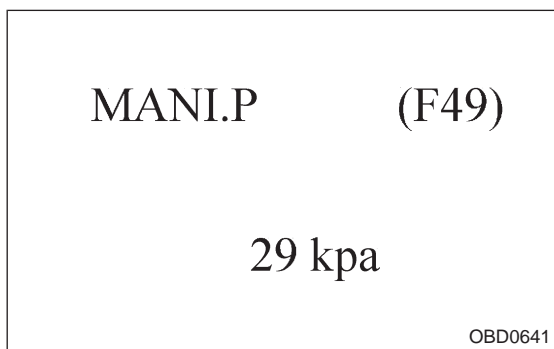
- **FUNCTION MODE: F46**
— THROTTLE POSITION SIGNAL (THV) —



- **FUNCTION MODE: F47**
— MASS AIR FLOW SIGNAL (QA) —



- **FUNCTION MODE: F48**
— ATMOSPHERIC ABSOLUTE PRESSURE SIGNAL [AT VEHICLES] (BARO. P) —



- **FUNCTION MODE: F49**
— INTAKE MANIFOLD ABSOLUTE PRESSURE SIGNAL [AT VEHICLES] (MANI. P) —

LOAD_F (F50)

15 %

OBD0642

- FUNCTION MODE: F50
— LOAD DATA [FREEZE FRAME DATA] (LOAD — F) —

TW_F (F51)

95 °C

OBD0643

- FUNCTION MODE: F51
— ENGINE COOLANT TEMPERATURE SIGNAL [FREEZE FRAME DATA] (TW — F) —

ALPH_F (F52)

0.0 %

OBD0644

- FUNCTION MODE: F52
— THROTTLE POSITION SIGNAL [FREEZE FRAME DATA] (ALPH — F) —

KBLR_F (F53)

0.0 %

OBD0645

- FUNCTION MODE: F53
— LONG TERM FUEL TRIM <A/F LEARNING CONTROL COEFFICIENT> [FREEZE FRAME DATA] (KBLR — F) —

MANI_F (F54)

29 kpa

OBD0646

- FUNCTION MODE: F54
— INTAKE MANIFOLD ABSOLUTE PRESSURE SIGNAL <AT VEHICLES> [FREEZE FRAME DATA] (MANI — F) —

EREV_F (F55)

700 rpm

OBD0647

- **FUNCTION MODE: F55**
— ENGINE SPEED SIGNAL [FREEZE FRAME DATA] (EREV – F) —

VSP_F (F56)

20 km/h

OBD0648

- **FUNCTION MODE: F56**
— VEHICLE SPEED SIGNAL [FREEZE FRAME DATA] (VSP – F) —

3. FA MODE FOR ENGINE

Function mode	LED No.	Contents	Display	LED "ON" requirements
FA0	1	Ignition switch	IG	When ignition switch is turned ON.
	2	AT/MT identification signal	AT	When AT identification signal is entered.
	3	Test mode connector	UD	When test mode connector is connected.
	5	Idle speed control identification signal	IC	When engine rpm is less than the established value.
	7	Neutral switch	NT	When neutral position signal is entered.
FA1	2	Air conditioner switch	AC	When air conditioner switch is turned ON.
	3	Air conditioner relay	AR	When air conditioner relay is in function.
	4	Radiator fan relay 1	R1	When radiator fan relay 1 is in function.
	5	Radiator fan relay 2	R2	When radiator fan relay 2 is in function.
	6	Fuel pump relay	FP	When fuel pump relay is in function.
	7	Purge control solenoid valve	CP	When purge control solenoid valve is in function.
	9	Pressure sources switching solenoid valve	BR	When pressure sources switching solenoid valve is in function.
FA2	3	EGR solenoid valve	EG	When EGR solenoid valve is in function.
	4	Engine torque control signal	TR	When engine torque control signal is entered.
	5	Engine torque control cut signal	TC	When engine torque control cut signal is got out.
	9	Front oxygen sensor signal	FO	When front oxygen sensor mixture ratio is rich.
	10	Rear oxygen sensor signal	RO	When rear oxygen sensor mixture ratio is rich.

LED No.	Signal name	Display
1	Ignition switch	IG
2	Identification of AT model	AT
3	Test mode connector	UD
4	—	—
5	ISC identification	IC
6	—	—
7	Park/Neutral position switch	NT
8	—	—
9	—	—
10	—	—

IG	AT	UD	ID	IC
—	NT	—	—	—

1	2	3	4	5
---	---	---	---	---

6	7	8	9	10
---	---	---	---	----

LED No.	Signal name	Display
1	—	—
2	A/C switch	AC
3	A/C relay	AR
4	Radiator fan relay 1	R1
5	Radiator fan relay 2	R2
6	Fuel pump relay	FP
7	Purge control solenoid valve	CP
8	—	—
9	Pressure sources switching solenoid valve	BR
10	—	—

—	AC	AR	R1	R2
FP	CP	—	BR	—

1	2	3	4	5
---	---	---	---	---

6	7	8	9	10
---	---	---	---	----

● FUNCTION MODE: FA0

— ON ↔ OFF SIGNAL —

Requirement for LED “ON”.

LED No. 1 Ignition switch is turned ON.

LED No. 2 Vehicle is AT model.

LED No. 3 Test mode connector is connected.

LED No. 5 Engine speed is less than the specified value.

LED No. 7 ● On MT model, gear position is in neutral.
● On AT model, shift position is in “P” or “N”.

● FUNCTION MODE: FA1

— ON ↔ OFF SIGNAL —

Requirement for LED “ON”.

LED No. 2 A/C switch is turned ON.

LED No. 3 A/C relay is turned ON.

LED No. 4 Radiator fan relay 1 is turned ON.

LED No. 5 Radiator fan relay 2 is turned ON.

LED No. 6 Fuel pump relay is turned ON.

LED No. 7 Purge control solenoid valve is in function.

LED No. 9 Pressure sources switching solenoid valve is in function.

NOTE:

● When LED No. 3, 4, 5, 6, 7 and 9 blinks with the test mode connector connected and the ignition switch turned to ON, the corresponding part is functioning properly.

● When LED No. 6 illuminates for only 2 seconds after the ignition switch is turned to ON, (and then goes out), the corresponding part is functioning properly.

LED No.	Signal name	Display
1	—	—
2	—	—
3	EGR solenoid valve	EG
4	Torque control signal	TR
5	Torque control cut signal	TC
6	—	—
7	—	—
8	—	—
9	Front oxygen sensor signal	FO
10	Rear oxygen sensor signal	RO

—	—	EG	TR	TC
—	—	—	FO	RO

1	2	3	4	5
6	7	8	9	10

● **FUNCTION MODE: FA2**

— **ON ↔ OFF SIGNAL** —

Requirement for LED “ON”.

LED No. 3 EGR solenoid valve is in function.

LED No. 4 ECM entered the torque control signal emitted from TCM.

LED No. 5 Engine torque control cut signal goes out.

LED No. 9 Front oxygen sensor mixture ratio is rich.

LED No. 10 Rear oxygen sensor mixture ratio is rich.

4. FB MODE FOR ENGINE

Function mode	Abbreviation	Contents	Contents of display	Page
FB0	INSPECT	On-board diagnostics (Inspection)	Current trouble code indicated by on-board diagnostics after clear memory.	58
FB1	OBD	On-board diagnostics (Read data)	Current trouble code indicated by on-board diagnostics.	32

5. FC MODE FOR ENGINE

Function mode	Abbreviation	Contents	Contents of display	Page
FC0	MEMORY CLR	Back-up memory clear	Function of clearing trouble code stored in memory.	57

6. READ DATA FUNCTION KEY LIST FOR AT

Function mode	Contents	Abbr.	Unit
F00	Mode display	—	—
F01	Battery voltage	VB	V
F02	Vehicle speed sensor 1	VSP1	m/h
F03	Vehicle speed sensor 1	VSP1	km/h
F04	Vehicle speed sensor 2	VSP2	m/h
F05	Vehicle speed sensor 2	VSP2	km/h
F06	Engine speed	EREV	rpm
F07	ATF temperature sensor	ATFT	deg F
F08	ATF temperature sensor	ATFT	deg C
F09	Throttle position sensor	THV	V
F10	Gear position	GEAR	—
F11	Line pressure duty	PLDTY	%
F12	Lock-up duty	LUPTY	%
F13	AWD duty	4WDTY	%
F14	Throttle position sensor power supply	THVCC	V
F15	Mass air flow sensor	AFM	V

E-4AT	(F00)
4WD	1993
G3M0723	

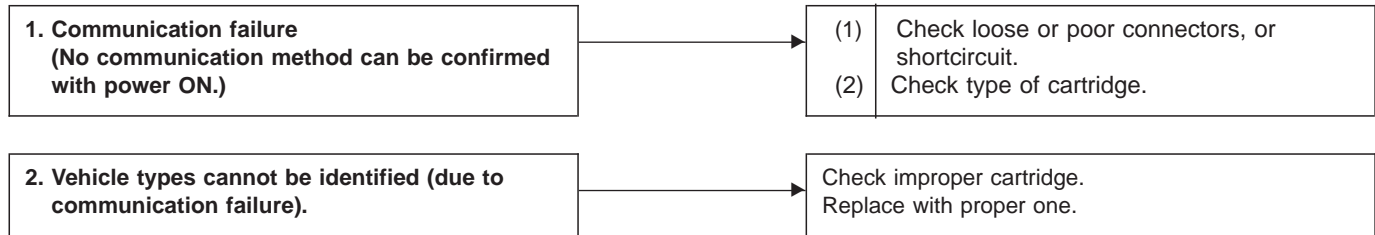
● **FUNCTION MODE: F00**

— **MODE DISPLAY** —

SPECIFIED DATA:

Data at the left should be indicated.

Probable cause (if outside "specified data")



VB	(F01)
12.7 V	
OBD0673	

● **FUNCTION MODE: F01**

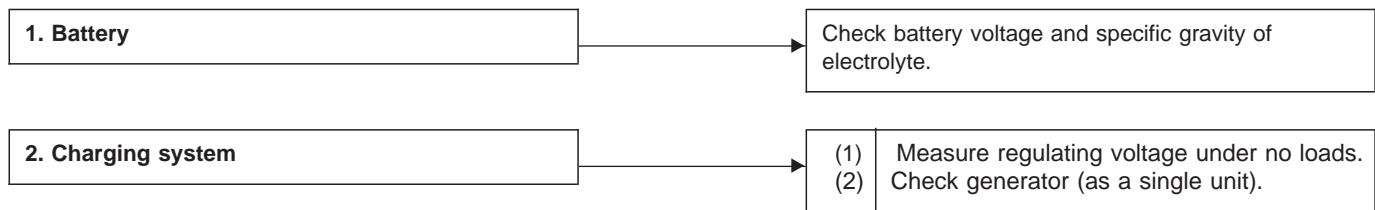
— **BATTERY VOLTAGE (VB)** —

CONDITION:

- (1) Ignition switch ON
- (2) Engine idling after warm-up

SPECIFIED DATA:

- (1) 12±1 V
- (2) 13±1 V



VSP1 (F02)

18 m/h

G3M0725

- **FUNCTION MODE: F02**
— **VEHICLE SPEED SENSOR 1 (VSP1)** —

- F02: Vehicle speed is indicated in mile per hour (m/h).
- F03: Vehicle speed is indicated in kilometer per hour (km/h).

VSP2 (F04)

12 m/h

G3M0726

- **FUNCTION MODE: F04**
— **VEHICLE SPEED SENSOR 2 (VSP2)** —

- F04: Vehicle speed is indicated in mile per hour (m/h).
- F05: Vehicle speed is indicated in kilometer per hour (km/h).

EREV (F06)

1,500 rpm

G3M0727

- **FUNCTION MODE: F06**
— **ENGINE SPEED (EREV)** —

ATFT (F07)

176 deg F

B2M0620

- **FUNCTION MODE: F07**
— **ATF TEMPERATURE SENSOR (ATFT)** —

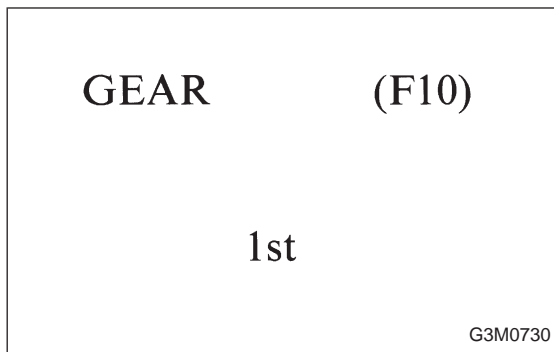
- F07: ATF temperature is indicated in "deg F".
- F08: ATF temperature is indicated in "deg C".

THV (F09)

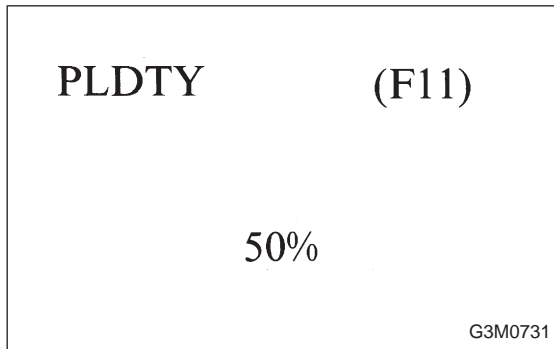
4.0 V

G3M0935

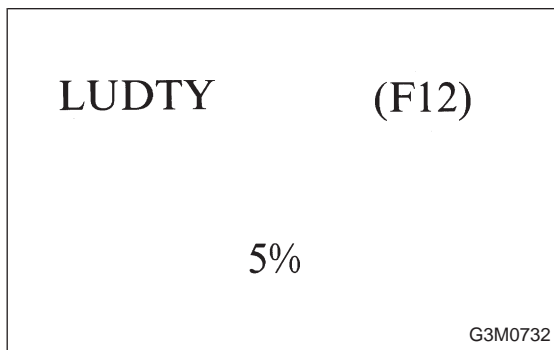
- **FUNCTION MODE: F09**
— **THROTTLE POSITION SENSOR (THV)** —



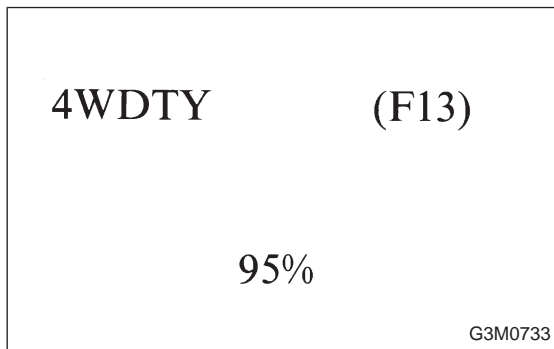
- **FUNCTION MODE: F10**
— GEAR POSITION (GEAR) —



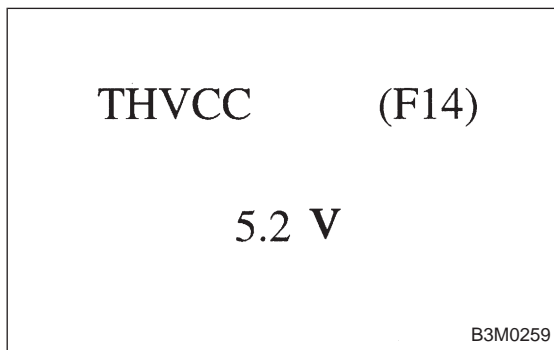
- **FUNCTION MODE: F11**
— LINE PRESSURE DUTY (PLDTY) —



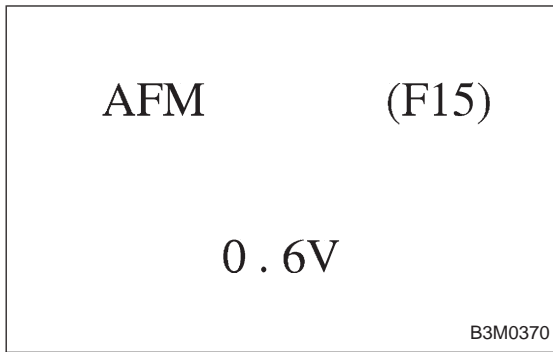
- **FUNCTION MODE: F12**
— LOCK-UP DUTY (LUPTY) —



- **FUNCTION MODE: F13**
— AWD DUTY (4WDTY) —



- **FUNCTION MODE: F14**
— THROTTLE POSITION SENSOR POWER SUPPLY (THVCC) —



- FUNCTION MODE: F15
- MASS AIR FLOW SIGNAL (AFM) —

LED No.	Signal name	Display
1	FWD switch	FF
2	Kick-down switch	KD
3	—	—
4	—	—
5	Brake switch	BR
6	ABS switch	AB
7	Cruise control set	CR
8	Power switch	PW
9	—	—
10	—	—

FF	KD	—	—	BR
AB	CR	PW	—	—

1	2	3	4	5
---	---	---	---	---

6	7	8	9	10
---	---	---	---	----

● FUNCTION MODE: FA0

— ON ↔ OFF SIGNAL —

Requirement for LED “ON”.

LED No. 1 Fuse is installed in FWD switch.

LED No. 2 Kick-down switch is turned ON. (Europe and General models only)

LED No. 5 Brake pedal is depressed.

LED No. 6 ABS signal is entered.

LED No. 7 Cruise control is set.

LED No. 8 Power switch is turned ON. (Europe and General models only)

LED No.	Signal name	Display
1	N/P range switch	NP
2	R range switch	RR
3	D range switch	RD
4	3 range switch	R3
5	2 range switch	R2
6	1 range switch	R1
7	Diagnosis switch	SS
8	—	—
9	—	—
10	—	—

NP	RR	RD	R3	R2
R1	SS	—	—	—

1	2	3	4	5
---	---	---	---	---

6	7	8	9	10
---	---	---	---	----

● FUNCTION MODE: FA1

— ON ↔ OFF SIGNAL —

Requirement for LED “ON”.

LED No. 1 “N” or “P” range is selected.

LED No. 2 “R” range is selected.

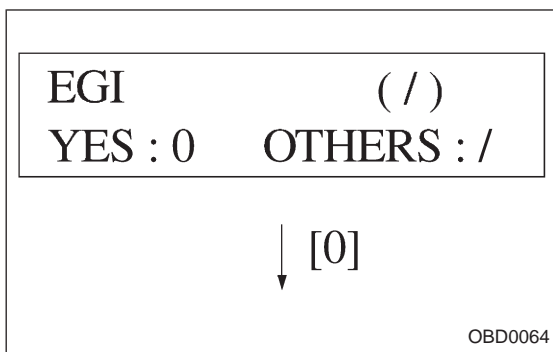
LED No. 3 “D” range is selected.

LED No. 4 “3” range is selected.

LED No. 5 “2” range is selected.

LED No. 6 “1” range is selected.

LED No. 7 Diagnosis connector is connected.



D: CLEAR MEMORY MODE

1. SUBARU SELECT MONITOR

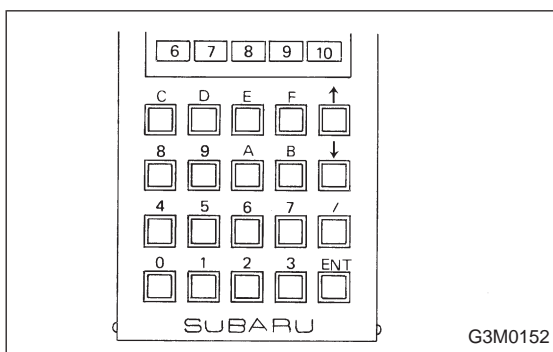
1) Select engine mode or AT mode using function key.

- Engine mode:

Press the function key [0].

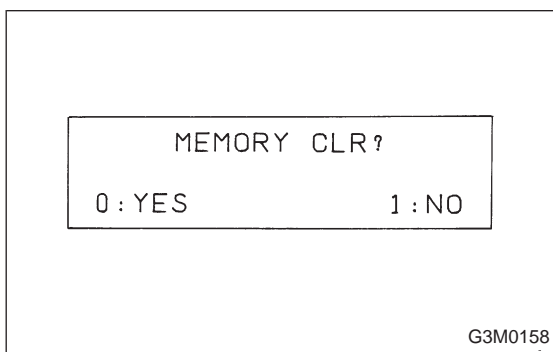
- AT mode:

Press the function key [/] [0] in that order.

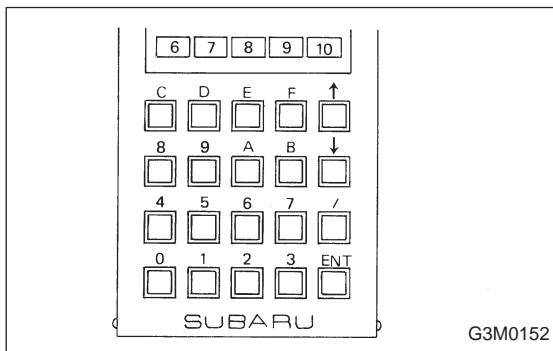


2) Designate mode using function key.

Press [F] [C] [0] [ENT] in that order.



3) Ensure displayed message.



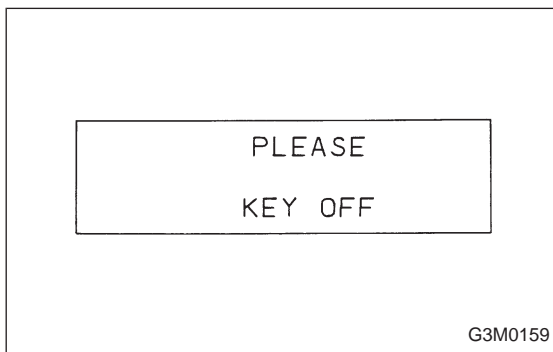
4) Press function key.

- When executing, (YES)

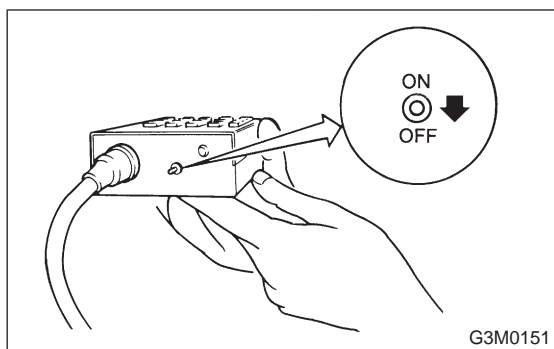
Press [0] [ENT] in that order.

- When not executing, (NO)

Press [1] [ENT] in that order.



5) When executed, the indication as shown here appears for approximately four seconds, and the past trouble history is deleted.



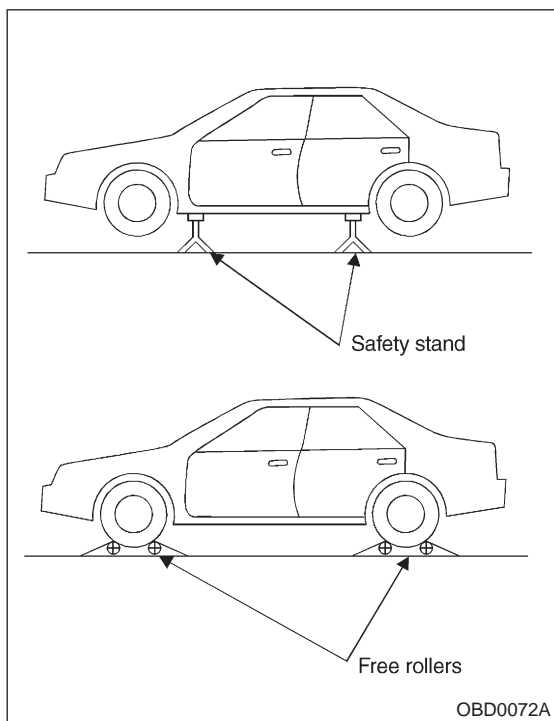
6) After the display is gone, turn Subaru select monitor switch and ignition switch to OFF.

NOTE:

When the ECM, battery terminals, etc. are disconnected after memory is cleared, idling speed may increase. This is not considered a problem because the ISC valve duty controlled learning value has been cleared. To return the engine to idling speed, idle for approximately 2 minutes with air conditioner off.

2. OBD-II GENERAL SCAN TOOL

For clear memory procedures using the OBD-II general scan tool, refer to the OBD-II General Scan Tool Instruction Manual.



E: INSPECTION MODE

1. PREPARATIONS FOR THE INSPECTION MODE

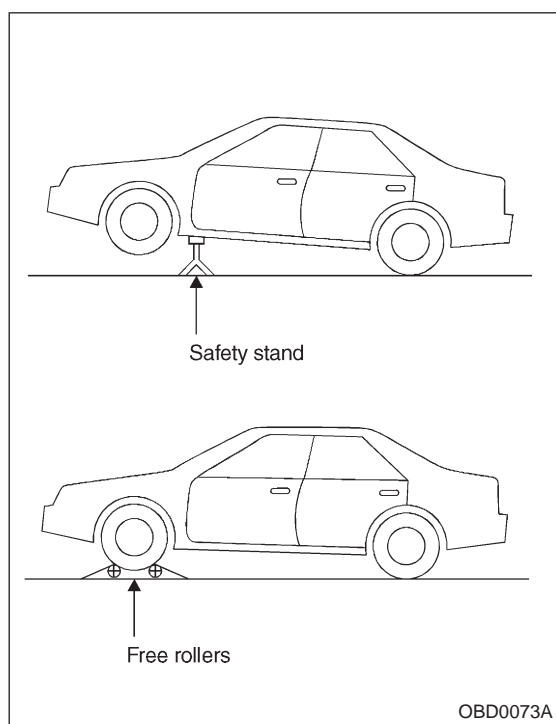
Raise the vehicle using a garage jack and place on safety stands or drive the vehicle onto free rollers.

● FULL-TIME AWD MODELS

WARNING:

- Before raising the vehicle, ensure parking brakes are applied.
- Do not use a pantograph jack in place of a safety stand.
- Secure a rope or wire to the front and rear towing or tie-down hooks to prevent the lateral runout of front wheels.
- Do not abruptly depress/release clutch pedal or accelerator pedal during works even when engine is operating at low speeds since this may cause vehicle to jump off free rollers.
- In order to prevent the vehicle from slipping due to vibration, do not place any wooden blocks or similar items between the safety stands and the vehicle.

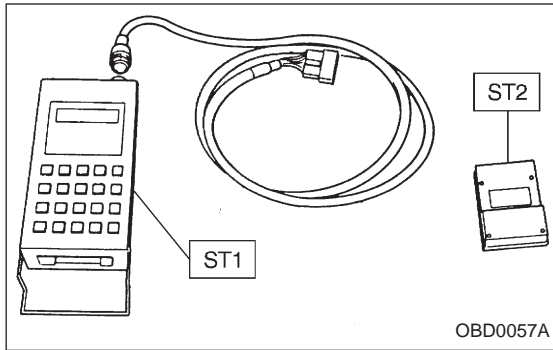
- Since the rear wheels will also rotating, do not place anything near them. Also, make sure that nobody goes in front of the vehicle.



- **FWD MODELS**

- **WARNING:**

- Before raising the vehicle, ensure parking brakes are applied.
- Do not use a pantograph jack in place of a safety stand.
- If only the front wheels are raised or placed on a free roller, apply parking brakes and lock the rear wheels.
- Secure a rope or wire to the front and rear towing or tie-down hooks to prevent the lateral runout of front wheels.
- Do not abruptly depress/release clutch pedal or accelerator pedal during works even when engine is operating at low speeds since this may cause vehicle to jump off free rollers.
- In order to prevent the vehicle from slipping due to vibration, do not place any wooden blocks or similar items between the safety stands and the vehicle.
- Since the rear wheels will also rotating, do not place anything near them. Also, make sure that nobody goes in front of the vehicle.



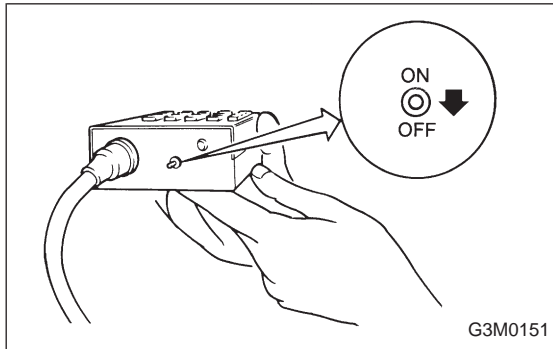
2. SUBARU SELECT MONITOR

After performing diagnostics and clearing the memory, check for any remaining unresolved trouble data.

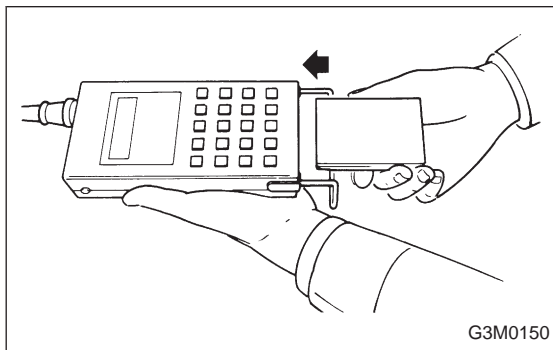
1) Prepare Subaru select monitor and cartridge.

ST1 498307500 SELECT MONITOR KIT

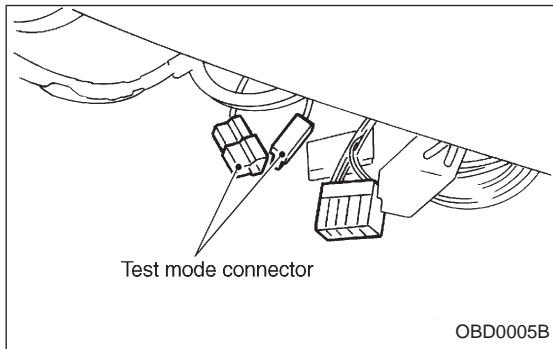
ST2 498349601 CARTRIDGE



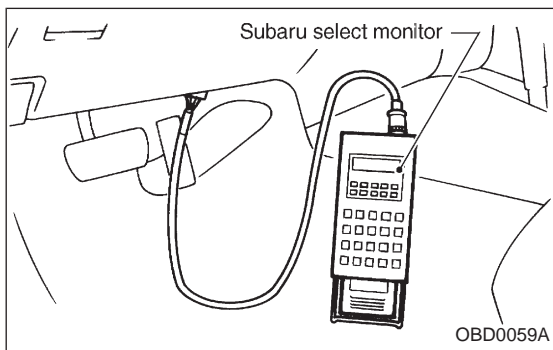
2) Turn ignition switch and monitor switch to OFF.



3) Insert cartridge into Subaru select monitor.

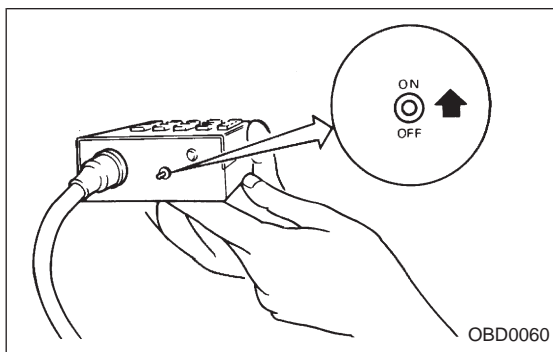
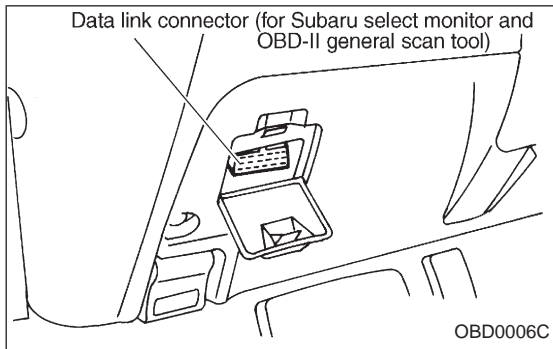
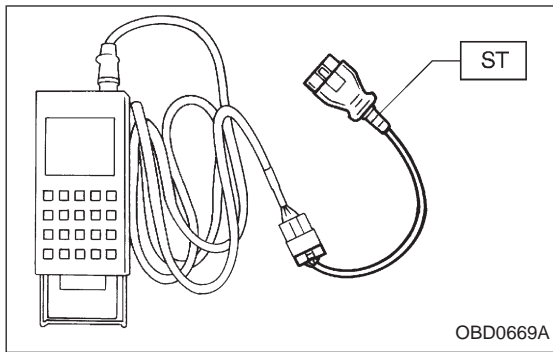


4) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



5) Connect Subaru select monitor to data link connector.

● Using data link connector for Subaru select monitor only:
Connect Subaru select monitor to its data link connector located in the lower portion of the instrument panel (on the driver's side), to the side of the center console box.



- Using data link connector for Subaru select monitor and OBD-II general scan tool:

(1) Connect ST to Subaru select monitor cable.

ST 498357200 ADAPTER CABLE

(2) Open the cover and connect Subaru select monitor to data link connector located in the lower portion of the instrument panel (on the driver's side), to the lower cover.

CAUTION:

Do not connect scan tools except for Subaru select monitor and OBD-II general scan tool.

6) Turn ignition switch ON (engine OFF) and Subaru select monitor switch ON.

7) Start the engine.

NOTE:

- Ensure the selector lever is placed in the "P" position before starting. (AT vehicles)
- Depress clutch pedal when starting the engine. (MT vehicles)

8) Using the selector lever or shift lever, turn the "P" position switch and the "N" position switch to ON.

9) Depress the brake pedal to turn the brake switch ON. (AT vehicles)

10) Keep engine speed in the 2,500 — 3,000 rpm range for 40 seconds.

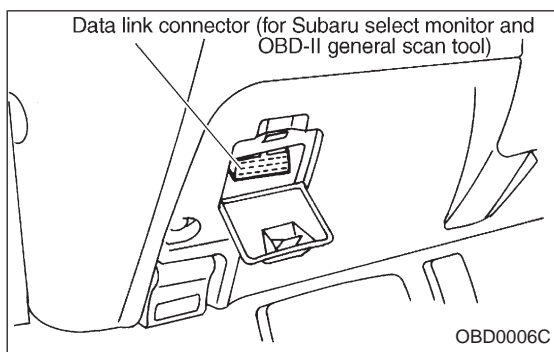
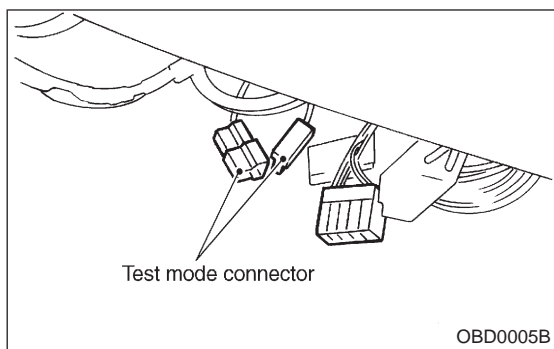
NOTE:

On models without tachometer, use the Subaru select monitor or tachometer (Secondary pickup type).

11) Place the selector lever or shift lever in the "D" position (AT vehicles) or "1st" gear (MT vehicles) and drive the vehicle at 5 to 10 km/h (3 to 6 MPH).

NOTE:

- On AWD vehicles, release the parking brake.
- The speed difference between front and rear wheels may light either the ABS or the ABS/TCS warning light, but this indicates no malfunctions. When engine control diagnosis is finished, perform the ABS or the ABS/TCS memory clearance procedure of self-diagnosis system. <Ref. to 4-4a [T6C2] or 4-4b [T6C2] or [T9K0].>



3. OBD-II GENERAL SCAN TOOL

After performing diagnostics and clearing the memory, check for any remaining unresolved trouble data:

1) Connect test mode connector at the lower side of the instrument panel (on the driver's side), to the side of the center console box.

2) Open the cover and connect the OBD-II general scan tool to its data link connector in the lower portion of the instrument panel (on the driver's side), to the lower cover.

CAUTION:

Do not connect the scan tools except for Subaru select monitor and OBD-II general scan tool.

3) Start the engine.

NOTE:

- Ensure the selector lever is placed in the "P" position before starting. (AT vehicles)
- Depress clutch pedal when starting the engine. (MT vehicles)

4) Using the selector lever or shift lever, turn the "P" position switch and the "N" position switch to ON.

5) Depress the brake pedal to turn the brake switch ON. (AT vehicles)

6) Keep engine speed in the 2,500 — 3,000 rpm range for 40 seconds.

NOTE:

On models without tachometer, use the Subaru select monitor or tachometer (Secondary pickup type).

7) Place the selector lever or shift lever in the "D" position (AT vehicles) or "1st" gear (MT vehicles) and drive the vehicle at 5 to 10 km/h (3 to 6 MPH).

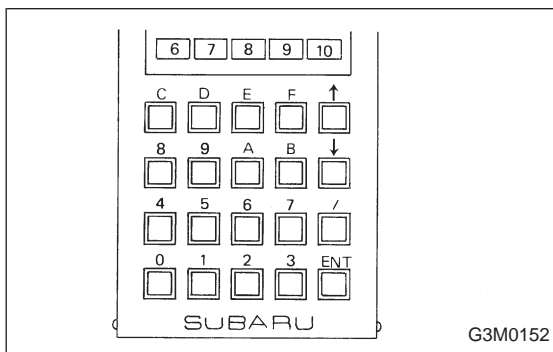
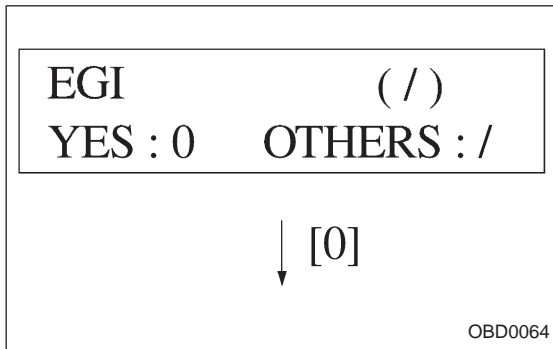
NOTE:

- On AWD vehicles, release the parking brake.
- The speed difference between front and rear wheels may light either the ABS or the ABS/TCS warning light, but this indicates no malfunctions. When engine control diagnosis is finished, perform the ABS or the ABS/TCS memory clearance procedure of self-diagnosis system. <Ref. to 4-4a [T6C2] or 4-4b [T6C2] or [T9K0].>

8) Using the OBD-II general scan tool, check for diagnostic trouble code(s) and record the result(s).

NOTE:

- For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.
- For details concerning diagnostic trouble codes, refer to the DIAGNOSTIC TROUBLE CODE (DTC) LIST [T11A0].



4. CHECK FOR DIAGNOSTICS TROUBLE CODE

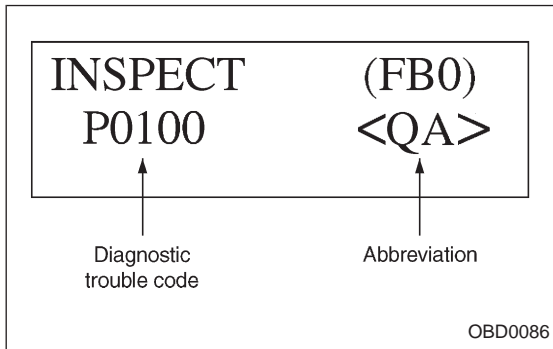
Using Subaru select monitor, check for diagnostic trouble code(s) and record the result(s).

● **READ DIAGNOSTIC TROUBLE CODE (DTC) SHOWN ON DISPLAY. (MODE FB0 <INSPECTION MODE>)**

(1) Press the function key [0].

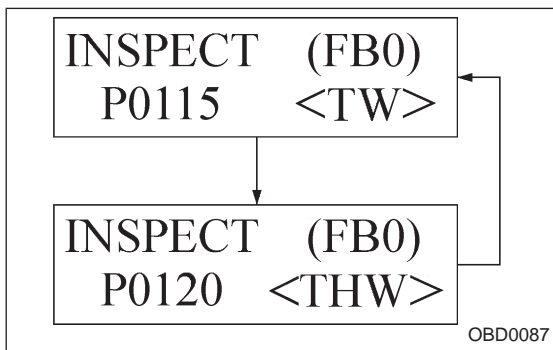
(2) Designate mode using function key.

Press [F] [B] [0] [ENT] in that order.



(3) Ensure diagnostic trouble code(s) is shown.

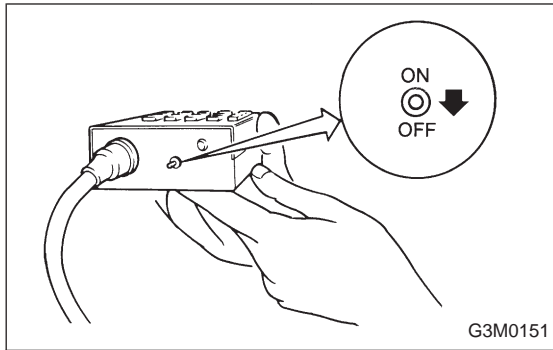
- When there is only one diagnostic trouble code.



- When there are multiple diagnostic trouble codes.

NOTE:

For details concerning diagnostic trouble code(s), refer to the DIAGNOSTIC TROUBLE CODE (DTC) LIST [T11A0].



5. FINISHING DIAGNOSIS OPERATION

- 1) Disconnect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.
- 2) Turn Subaru select monitor switch and ignition switch to OFF.
- 3) Disconnect Subaru select monitor from its data link connector.

4. Cautions

A: SUPPLEMENTAL RESTRAINT SYSTEM “AIRBAG”

Airbag system wiring harness is routed near the engine control module (ECM), main relay and fuel pump relay.

CAUTION:

- All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuit.
- Be careful not to damage Airbag system wiring harness when servicing the engine control module (ECM), transmission control module (TCM), main relay and fuel pump relay.

B: PRECAUTIONS

- 1) Never connect the battery in reverse polarity.
 - The ECM will be destroyed instantly.
 - The fuel injector and other part will be damaged in just a few minutes more.
- 2) Do not disconnect the battery terminals while the engine is running.
 - A large counter electromotive force will be generated in the alternator, and this voltage may damage electronic parts such as ECM, etc.
- 3) Before disconnecting the connectors of each sensor and the ECM, be sure to turn OFF the ignition switch.
- 4) Before removing ECM from the located position, disconnect two cables on battery.
 - Otherwise, the ECM may be damaged.
- 5) The connectors to each sensor in the engine compartment and the harness connectors on the engine side and body side are all designed to be waterproof. However, it is still necessary to take care not to allow water to get into the connectors when washing the vehicle, or when servicing the vehicle on a rainy day.
- 6) Every MFI-related part is a precision part. Do not drop them.
- 7) Observe the following cautions when installing a radio in MFI equipped models.

CAUTION:

- The antenna must be kept as far apart as possible from the control unit.

(The ECM is located under the steering column, inside of the instrument panel lower trim panel.)

- The antenna feeder must be placed as far apart as possible from the ECM and MFI harness.
- Carefully adjust the antenna for correct matching.

- When mounting a large power type radio, pay special attention to the three items above mentioned.
- Incorrect installation of the radio may affect the operation of the ECM.

8) Before disconnecting the fuel hose, disconnect the fuel pump connector and crank the engine for more than five seconds to release pressure in the fuel system. If engine starts during this operation, run it until it stops.

9) Problems in the electronic-controlled automatic transmission may be caused by failure of the engine, the electronic control system, the transmission proper, or by a combination of these. These three causes must be distinguished clearly when performing diagnostics.

10) Diagnostics should be conducted by rotating with simple, easy operations and proceeding to complicated, difficult operations. The most important thing in diagnostics is to understand the customer's complaint, and distinguish between the three causes.

11) In AT vehicles, do not continue the stall for more than five seconds at a time (from closed throttle, fully open throttle to stall engine speed).

12) On ABS or ABS/TCS vehicle, when performing driving test in jacked-up or lifted-up position, sometimes the warning light may be lit, but this is not a malfunction of the system. The reason for this is the speed difference between the front and rear wheels. After diagnosis of engine control system, perform the ABS or ABS/TCS memory clearance procedure of self-diagnosis system. <Ref. to 4-4a [T6C2] or 4-4b [T6C2] or [T9K0].>

C: PRE-INSPECTION

Before performing diagnostics, check the following items which might affect engine problems:

1. POWER SUPPLY

1) Measure battery voltage and specific gravity of electrolyte.

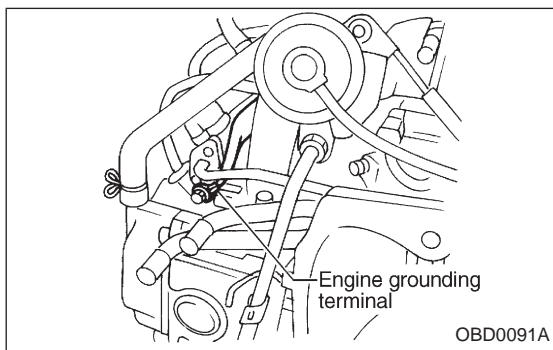
Standard voltage: 12 V

Specific gravity: Above 1.260

2) Check the condition of the main and other fuses, and harnesses and connectors. Also check for proper grounding.

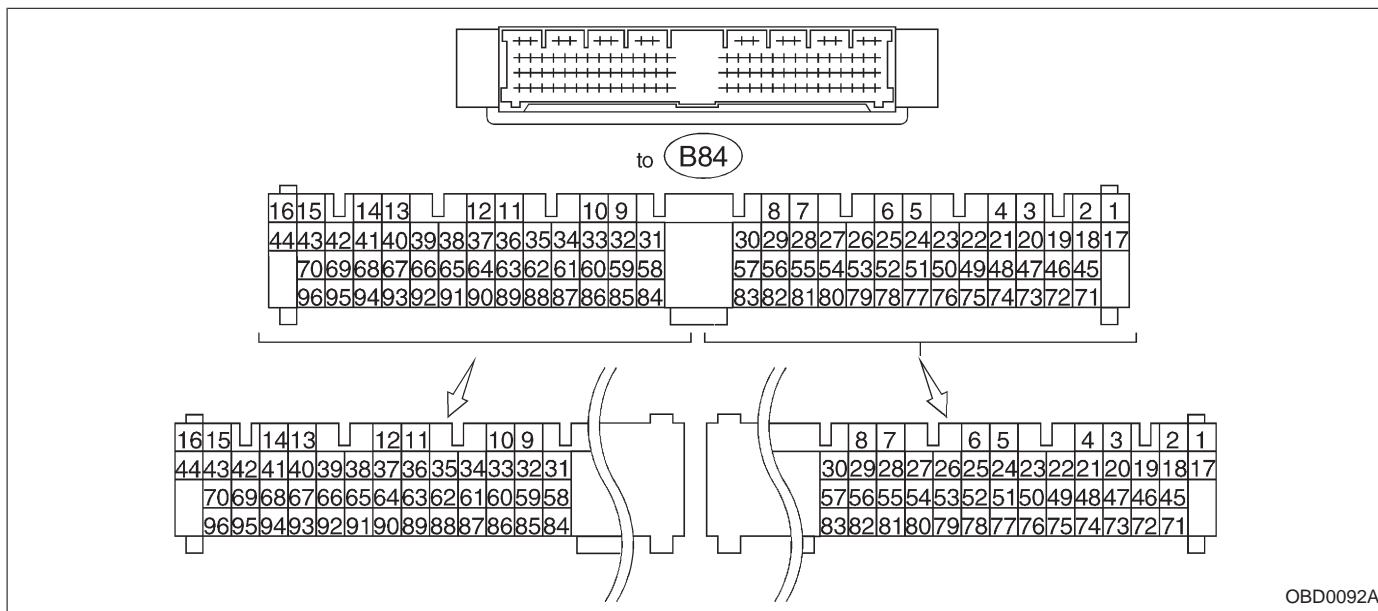
2. ENGINE GROUNDING

Make sure the engine grounding terminal is properly connected to the engine.



5. Specified Data

1. ENGINE CONTROL MODULE (ECM) I/O SIGNAL



OBD0092A

Content	Connector No.	Terminal No.	Signal (V)		Note	
			Ignition SW ON (Engine OFF)	Engine ON (Idling)		
Crankshaft position sensor	Signal (+)	B84	8	0	±7	Sensor output waveform
	Signal (-)	B84	7	0	0	—
	Shield	B84	52	0	0	—
Camshaft position sensor	Signal (+)	B84	6	0	±7	Sensor output waveform
	Signal (-)	B84	5	0	0	—
	Shield	B84	52	0	0	—
Mass air flow sensor	Signal	B84	26	0 — 0.3	0.8 — 1.2	—
	Shield	B84	54	0	0	—
	GND	B84	25	0	0	—
Throttle position sensor	Signal	B84	24	Fully closed: 0.2 — 1.0 Fully opened: 4.2 — 4.7		—
	Power supply	B84	22	5	5	—
	GND	B84	25	0	0	—
Front oxygen sensor	Signal	B84	28	0	0 ↔ 0.9	—
	Shield	B84	56	0	0	—
Rear oxygen sensor	Signal	B84	27	0	0 ↔ 0.9	—
	Shield	B84	56	0	0	—
Engine coolant temperature sensor	B84	29		1.0 — 1.4	1.0 — 1.4	After warm-up
Vehicle speed sensor 2	B84	57		0 or 5	0 or 5	“5” and “0” are repeatedly displayed when vehicle is driven.

Content	Connector No.	Terminal No.	Signal (V)		Note
			Ignition SW	Engine ON (Idling)	
			ON (Engine OFF)		
Starter switch	B84	81	0	0	Cranking: 8 to 14
A/C switch	B84	80	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
Ignition switch	B84	79	10 — 13	13 — 14	—
Neutral position switch (MT)	B84	78	ON: 5.0±0.5 OFF: 0		● On MT model; switch is ON when gear is in neutral position.
Neutral position switch (AT)			ON: 0 OFF: 5.0±0.5		● On AT model; switch is ON when shift is in "N" or "P" position.
Test mode connector	B84	75	5	5	When connected: 0

Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW		
				ON (Engine OFF)	Engine ON (Idling)	
Knock sensor	Signal	B84	30	2.8	2.8	—
	Shield	B84	56	0	0	—
AT/MT identification		B84	50	(AT) 5 (MT) 0	(AT) 5 (MT) 0	When measuring voltage between ECM and body.
Back-up power supply		B84	42	10 — 13	13 — 14	Ignition switch "OFF": 10 — 13
Control unit power supply		B84	15	10 — 13	13 — 14	—
			16			
Ignition control	# 1, # 2	B84	14	0	1 — 3.4	—
	# 3, # 4	B84	13	0	1 — 3.4	—
Fuel injector	# 1	B84	2	10 — 13	1 — 14	Waveform
	# 2	B84	1	10 — 13	1 — 14	Waveform
	# 3	B84	18	10 — 13	1 — 14	Waveform
	# 4	B84	17	10 — 13	1 — 14	Waveform
Idle air control solenoid valve	OPEN end	B84	12	—	1 — 13	Waveform
	CLOSE end	B84	11	—	13 — 1	Waveform
Fuel pump relay control		B84	84	ON: 0.5, or less OFF: 10 — 13	0.5, or less	—
A/C relay control		B84	85	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—
Radiator fan relay 1 control		B84	77	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—
			88			
Radiator fan relay 2 control		B84	61	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	With A/C vehicles only
Self-shutoff control		B84	86	10 — 13	13 — 14	—
Malfunction indicator lamp		B84	31	—	—	Light "ON": 1, or less Light "OFF": 10 — 14
Engine speed output		B84	33	—	0 — 13, or more	Waveform
Torque control signal		B84	49	5	5	—
Torque control cut signal		B84	36	8	8	—
Mass air flow signal for AT		B84	35	0 — 0.3	0.8 — 1.2	—
Purge control solenoid valve		B84	59	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—
Atmospheric pressure sensor		B84	23	3.9 — 4.1	2.0 — 2.3	—
Pressure sources switching solenoid valve		B84	58	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—
EGR solenoid valve		B84	60	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—
Front oxygen sensor heater signal		B84	44	0 — 1.0	0 — 1.0	—
Rear oxygen sensor heater signal		B84	43	0 — 1.0	0 — 1.0	—
TCS signal		B84	34	0 — 7	0 — 7	Waveform
AT diagnosis input signal		B84	48	Less than 1 ↔ More than 4	Less than 1 ↔ More than 4	Waveform
GND (sensors)		B84	25	0	0	—

Content	Connector No.	Terminal No.	Signal (V)		Note
			Ignition SW	Engine ON (Idling)	
			ON (Engine OFF)		
GND (injectors)	B84	71	0	0	—
		72			
GND (ignition system)	B84	69	0	0	—
GND (power supply)	B84	95	0	0	—
		96			
GND (control systems)	B84	45	0	0	—
		46			
GND (oxygen sensor heater)	B84	70	0	0	—

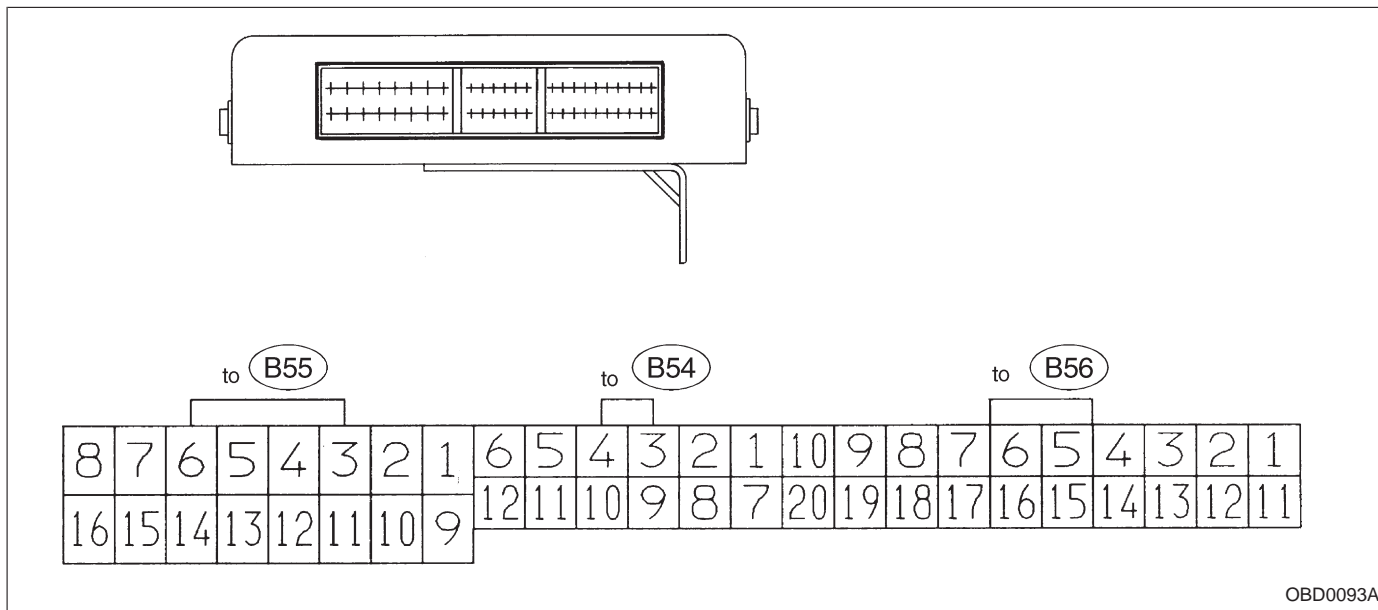
2. ENGINE CONDITION DATA

Content	Specified data
Mass air flow	1.9 — 3.6 (g/sec): Idling
	7.0 — 14.8 (g/sec): 2,500 rpm racing
Engine load	1.9 — 3.6 (%): Idling
	7.0 — 14.8 (%): 2,500 rpm racing

Measuring condition:

- Engine is warmed up.
- Gear position is in "N" or "P" position.
- A/C is turned OFF.
- All accessory switches are turned OFF.

3. TRANSMISSION CONTROL MODULE (TCM) I/O SIGNAL



OBD0093A

Check with ignition switch ON.

Content		Connector No.	Terminal No.	Measuring conditions	Voltage (V)
Back-up power supply		B56	14	Ignition switch OFF	10 — 16
Ignition power supply		B54	6	Ignition switch ON (with engine OFF)	10 — 16
		B55	1		
Inhibitor switch	"P" range switch	B56	9	Selector lever in "P" range	Less than 1
				Selector lever in any other than "P" range	More than 8
	"N" range switch	B56	8	Selector lever in "N" range	Less than 1
				Selector lever in any other than "N" range	More than 8
	"R" range switch	B56	10	Selector lever in "R" range	Less than 1
				Selector lever in any other than "R" range	More than 6
	"D" range switch	B54	1	Selector lever in "D" range	Less than 1
				Selector lever in any other than "D" range	More than 6
	"3" range switch	B54	2	Selector lever in "3" range	Less than 1
				Selector lever in any other than "3" range	More than 6
	"2" range switch	B54	3	Selector lever in "2" range	Less than 1
				Selector lever in any other than "2" range	More than 6
	"1" range switch	B54	4	Selector lever in "1" range	Less than 1
				Selector lever in any other than "1" range	More than 6
Brake switch		B56	7	Brake pedal depressed	More than 10.5
				Brake pedal released	Less than 1
ABS signal		B56	5	ABS switch ON	Less than 1
				ABS switch OFF	More than 6.5
AT diagnostics signal		B55	12	Ignition switch ON (with engine OFF)	Less than 1
				Ignition switch ON (with engine ON)	More than 10
Diagnosis switch		B56	6	Diagnosis connector connected.	Less than 1
				Diagnosis connector disconnected.	More than 6

5. Specified Data

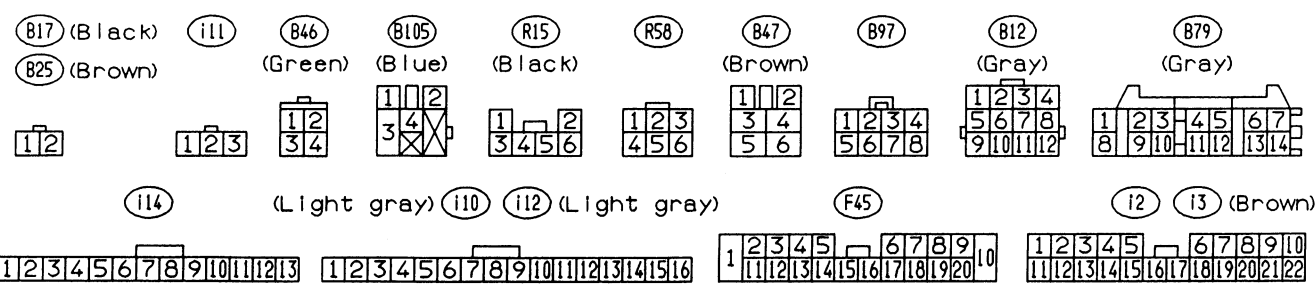
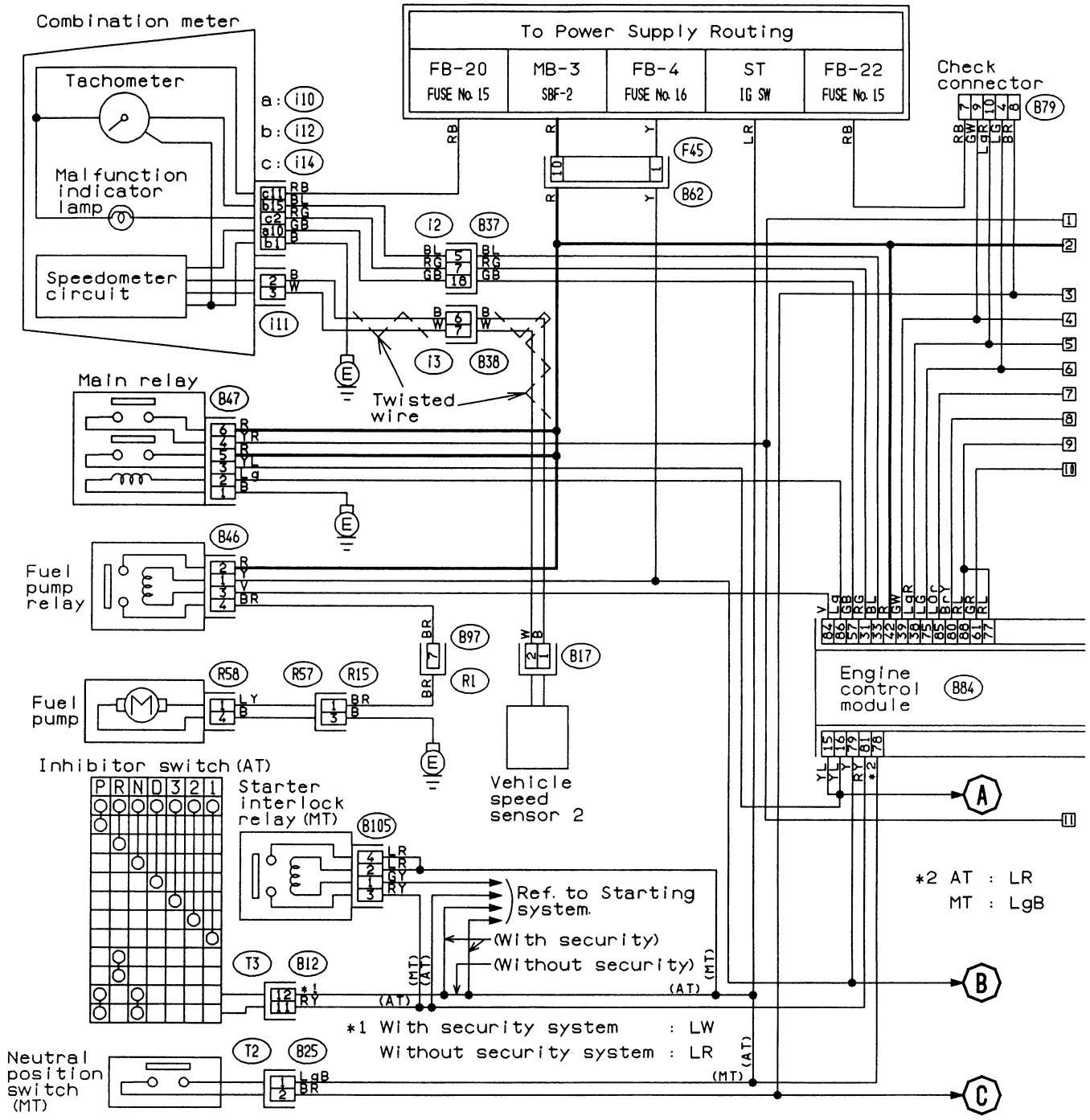
Content	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
Throttle position sensor	B54	8	Throttle fully closed.	0.3 — 0.7	—
			Throttle fully open.	4.3 — 4.9	
Throttle position sensor power supply	B56	19	Ignition switch ON (with engine OFF)	4.8 — 5.3	—
ATF temperature sensor	B54	10	ATF temperature 20°C (68°F)	2.9 — 4.0	2.1 k — 2.9 k
			ATF temperature 80°C (176°F)	1.0 — 1.4	275 — 375
Vehicle speed sensor 1	B54	12	Vehicle stopped.	0	450 — 720
			Vehicle speed at least 20 km/h (12 MPH)	More than 1 (AC range)	
Vehicle speed sensor 2	B56	11	When vehicle is slowly moved at least 2 meters (7ft).	Less than 1 ↔ More than 9	—
Engine speed signal	B54	5	Ignition switch ON (with engine OFF).	More than 10.5	—
			Ignition switch ON (with engine ON).	8 — 11	
Cruise set signal	B56	3	When cruise control is set (SET lamp ON).	Less than 1	—
			When cruise control is not set (SET lamp OFF).	More than 6.5	
Torque control signal	B55	16	Ignition switch ON	4 — 6	—
Torque control cut signal	B56	16	Ignition switch ON	6 — 9	—
Mass air flow signal	B54	9	Engine idling after warm-up	0.5 — 1.2	—
Shift solenoid 1	B55	14	1st or 4th gear	More than 9	20 — 32
			2nd or 3rd gear	Less than 1	
Shift solenoid 2	B55	13	1st or 2nd gear	More than 9	20 — 32
			3rd or 4th gear	Less than 1	
Shift solenoid 3	B55	15	Selector lever in "N" range (with throttle fully closed).	Less than 1	20 — 32
			Selector lever in "D" range (with throttle fully closed).	More than 9	
Duty solenoid A	B55	8	Throttle fully closed (with engine OFF) after warm-up.	1.5 — 4.0	1.5 — 4.5
			Throttle fully open (with engine OFF) after warm-up.	Less than 0.5	
Dropping resistor	B55	7	Throttle fully closed (with engine OFF) after warm-up.	5 — 14	12 — 18
			Throttle fully open (with engine OFF) after warm-up.	Less than 0.5	
Duty solenoid B	B55	5	When lock up occurs.	More than 8.5	9 — 17
			When lock up is released.	Less than 0.5	
Duty solenoid C (AWD model only)	B55	3	Fuse on FWD switch	More than 8.5	9 — 17
			Fuse removed from FWD switch (with throttle fully open and with select lever in 1st gear).	Less than 0.5	
Sensor ground line 1	B54	7	—	0	Less than 1
Sensor ground line 2	B56	20	—	0	Less than 1
System ground line	B56	1	—	0	Less than 1
Power system ground line	B55	10	—	0	Less than 1
FWD switch (AWD model only)	B56	2	Fuse removed.	6 — 9.1	—
			Fuse installed.	Less than 1	
Data link signal (Subaru select monitor)	B56	12	—	—	—
		13	—	—	
AT diagnosis signal	B56	11	Ignition switch ON	Less than 1 ↔ More than 4	—

6. Wiring Diagram and Wiring Harness

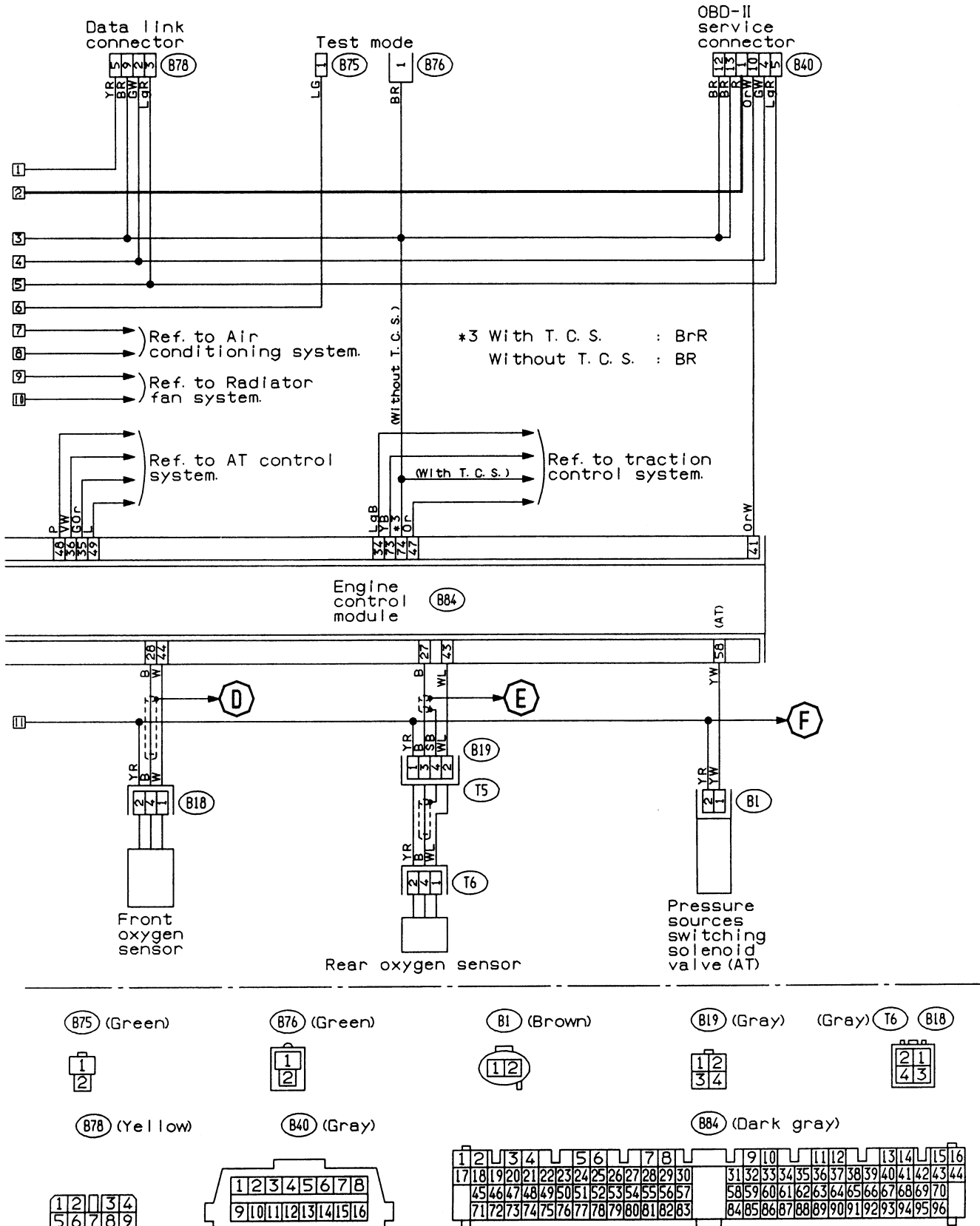
A: WIRING DIAGRAM

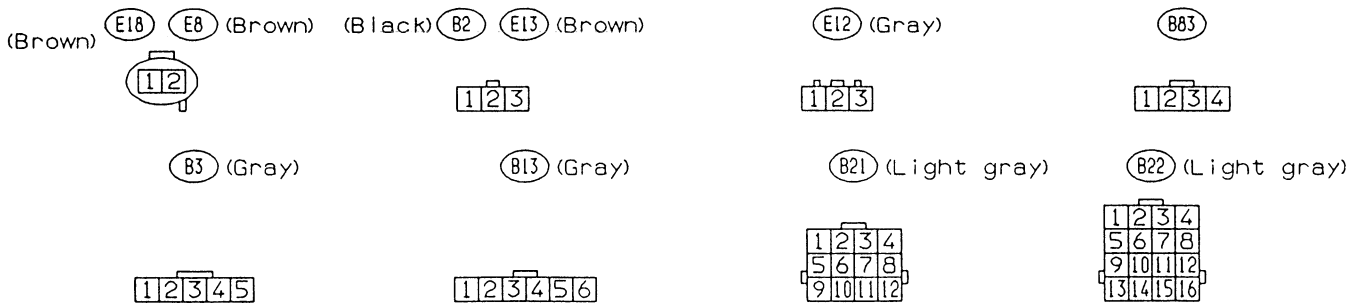
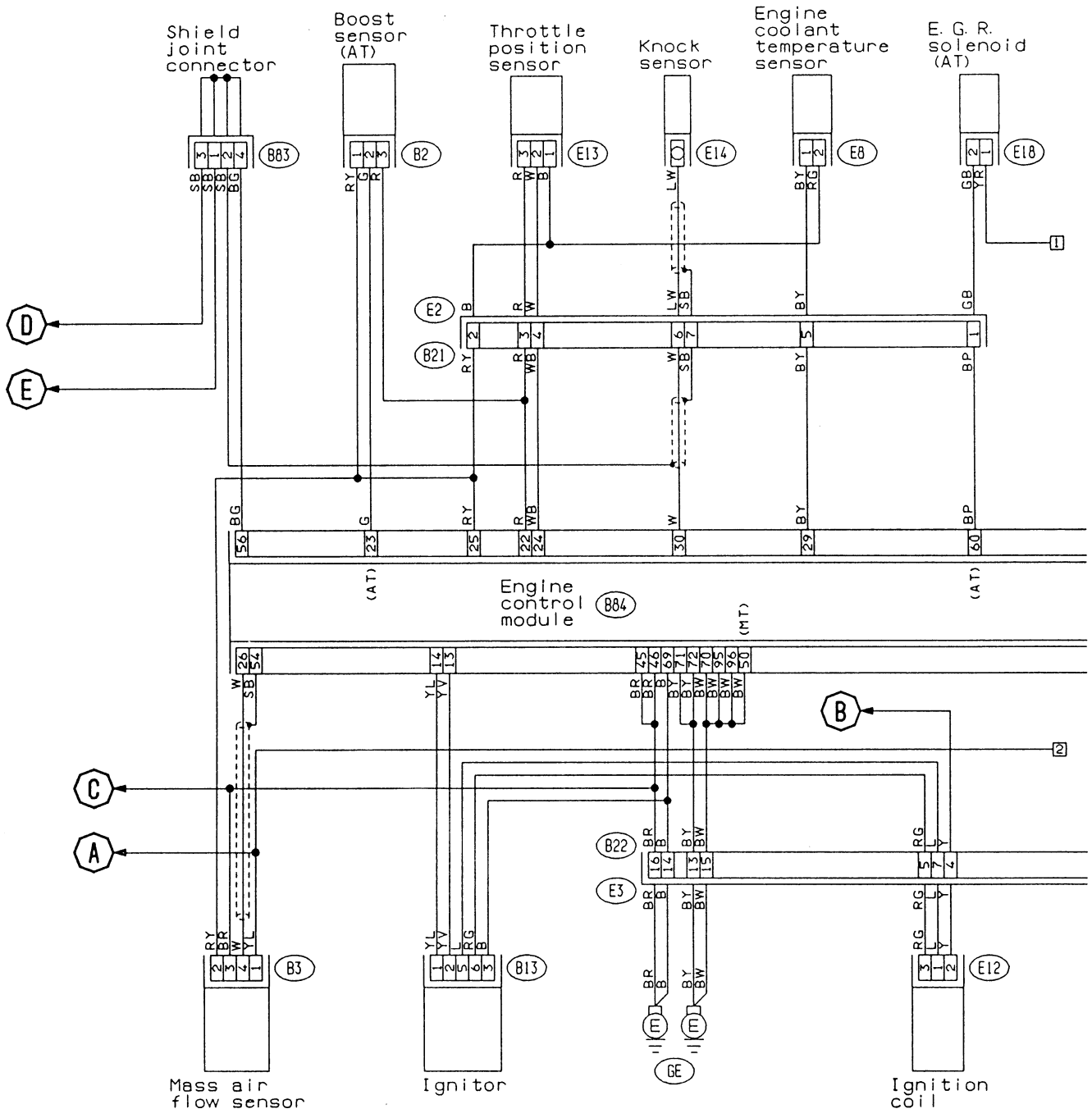
1. ENGINE ELECTRICAL SYSTEM

● LHD model

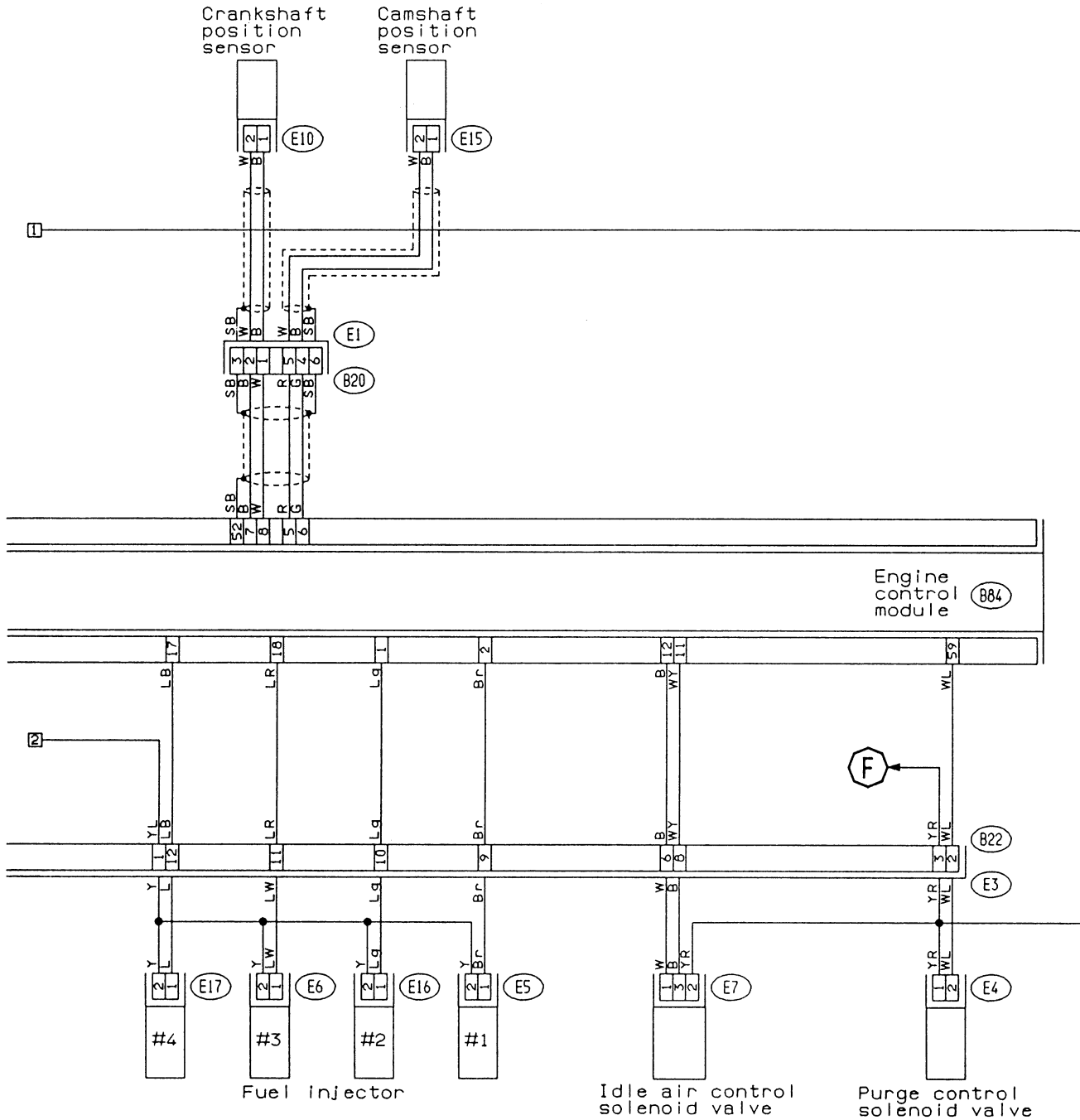


6. Wiring Diagram and Wiring Harness

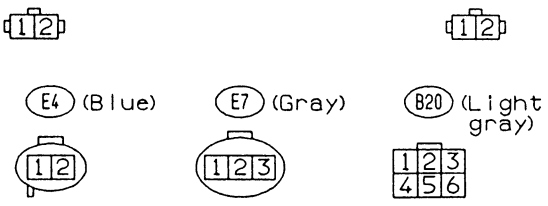




6. Wiring Diagram and Wiring Harness



(E15) (Dark gray) (Light gray) (E5) (E16) (Light gray)
 (E10) (Gray) (Dark gray) (E6) (E17) (Dark gray)

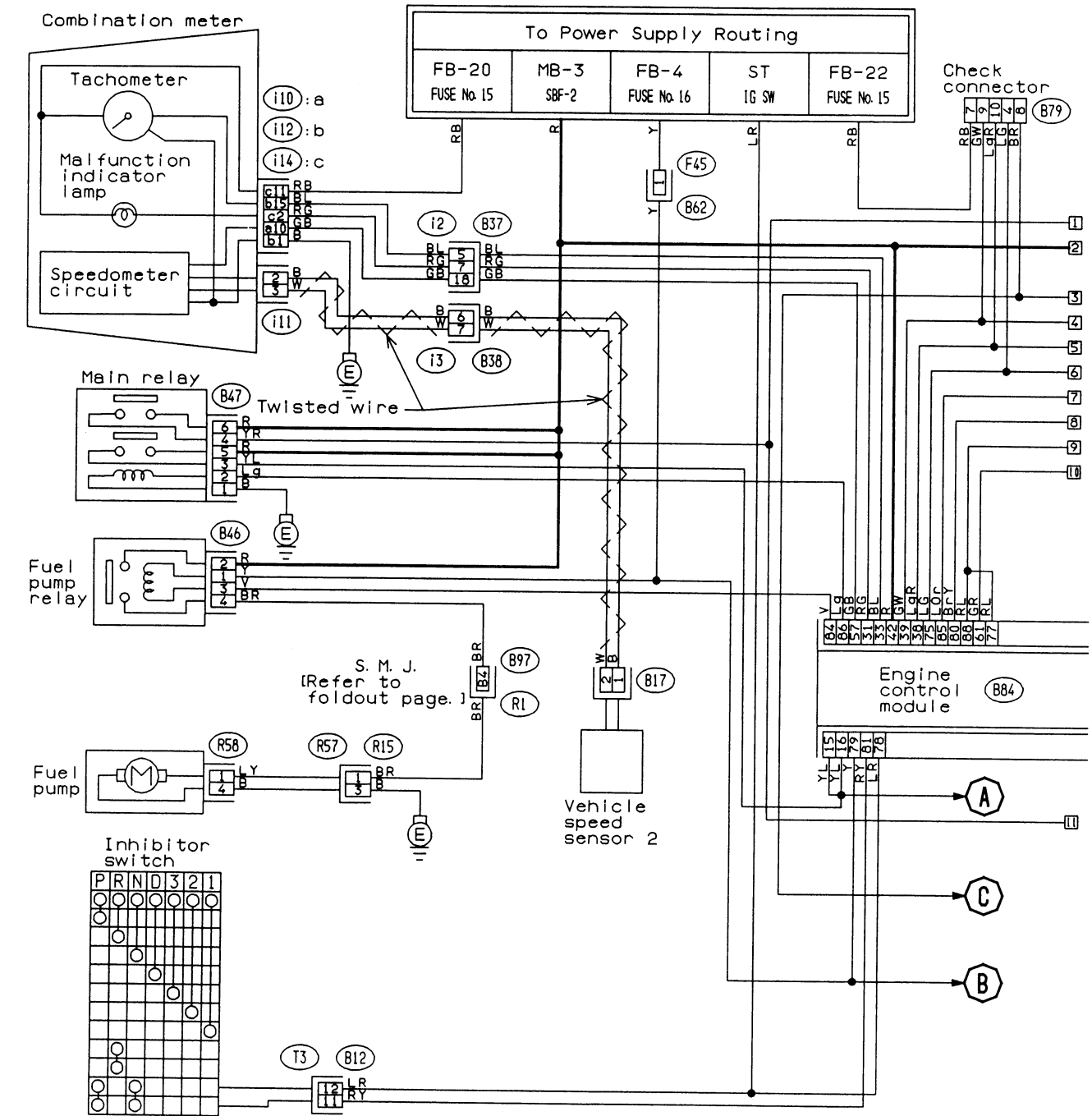


(884) (Dark gray)

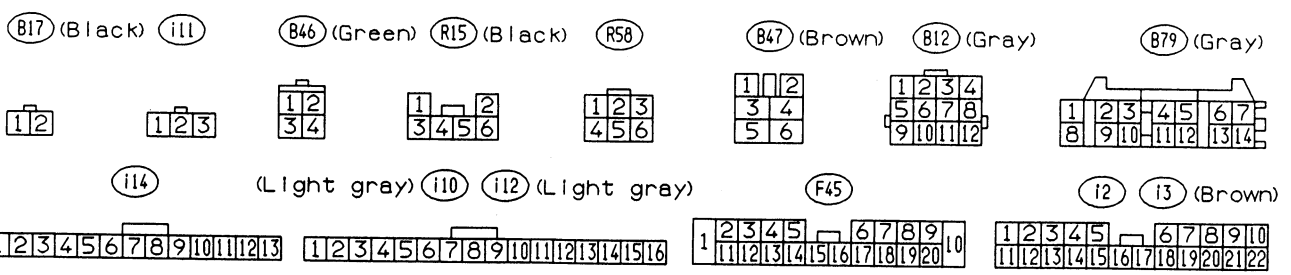
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16																																				
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44																								
45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96

1. ENGINE ELECTRICAL SYSTEM

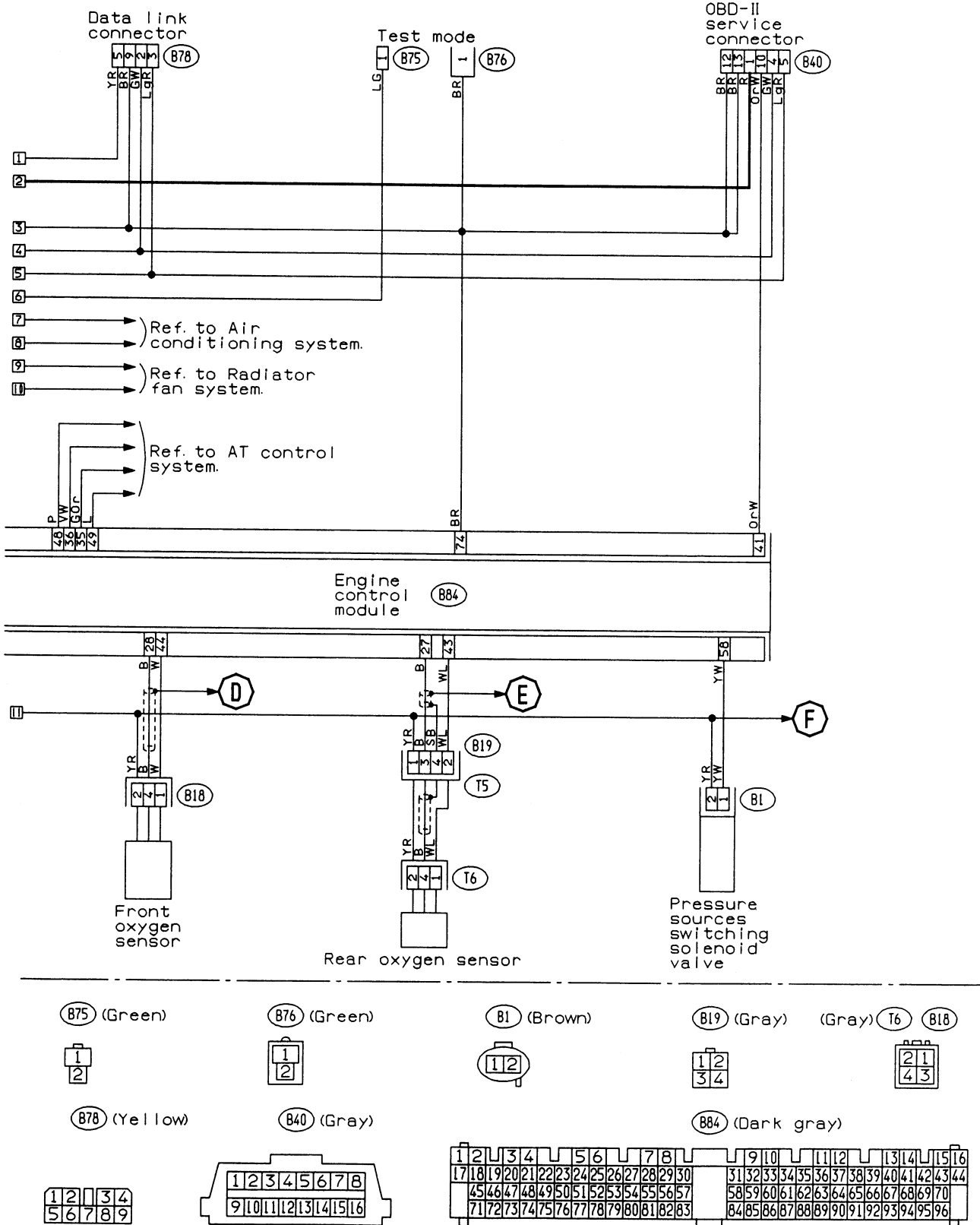
● RHD model

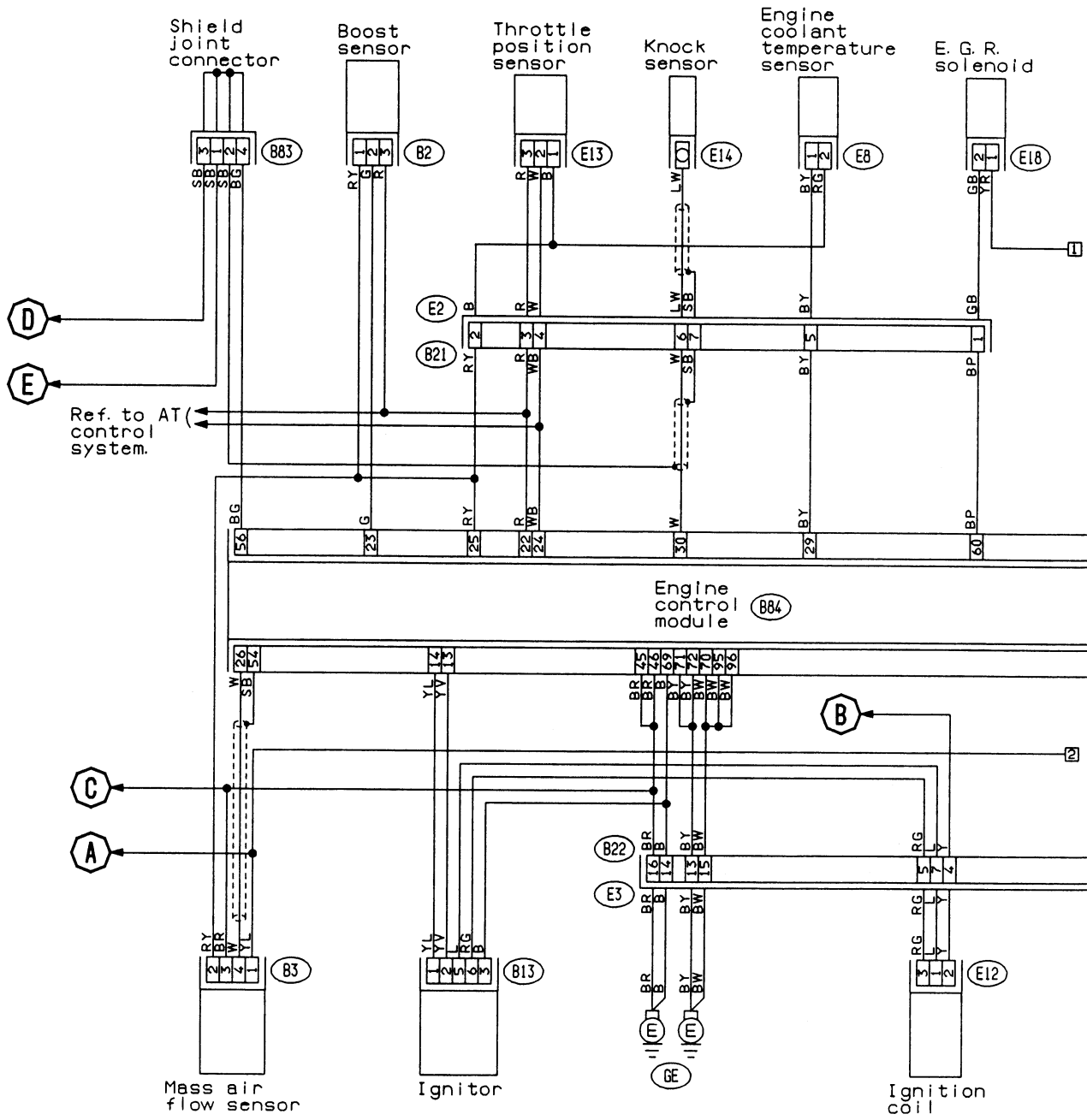


S. M. J.
(Refer to
foldout page.)



6. Wiring Diagram and Wiring Harness

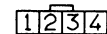




(Brown) (E18) (E8) (Brown) (Black) (B2) (E13) (Brown)

(E12) (Gray)

(B83)

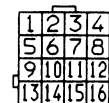
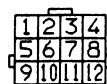
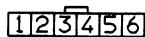
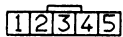


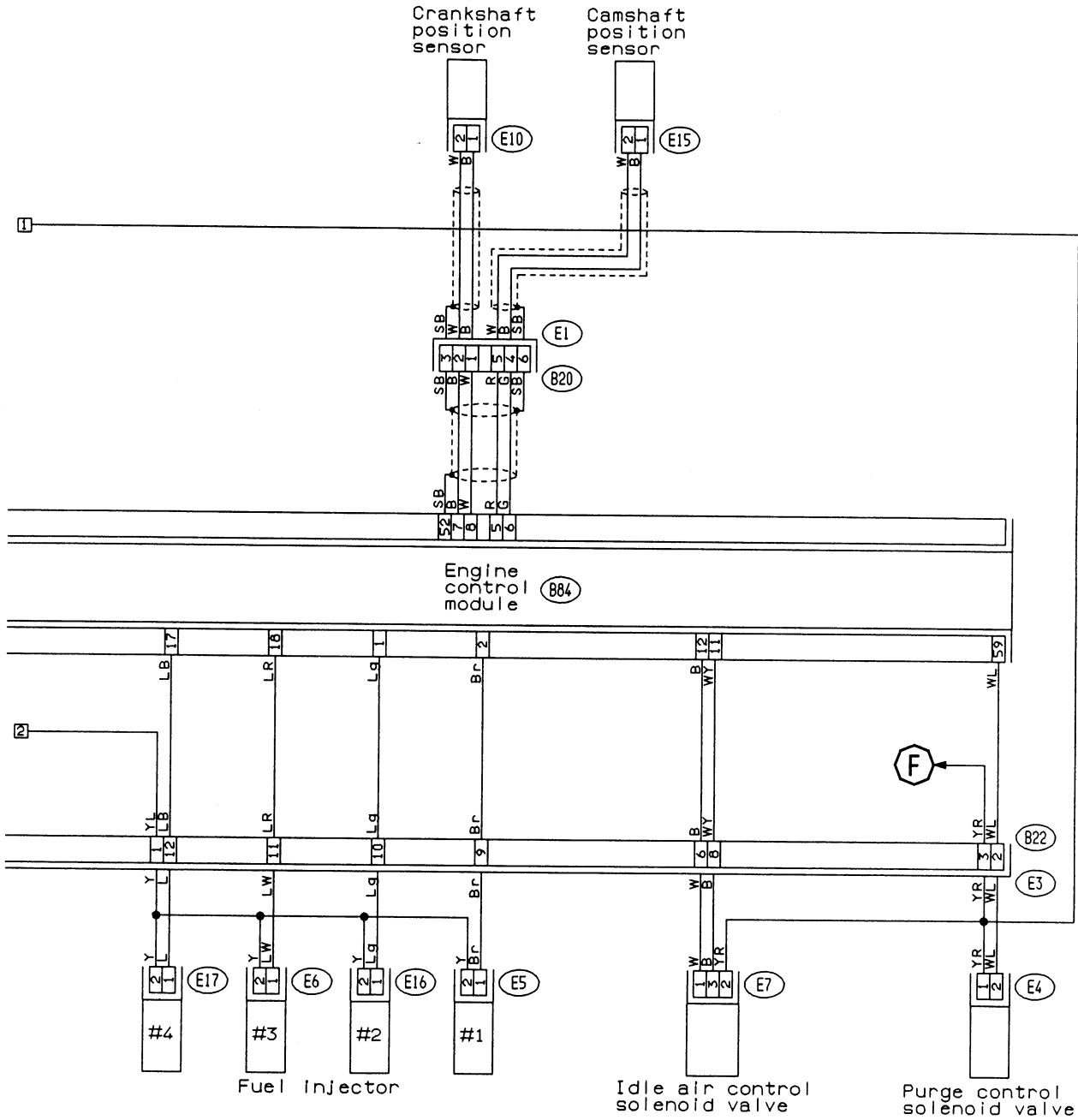
(B3) (Gray)

(B13) (Gray)

(B21) (Light gray)

(B22) (Light gray)





- (E15) (Dark gray) (Light gray) (E5) (E16) (Light gray)
- (E10) (Gray) (Dark gray) (E6) (E17) (Dark gray)



(B84) (Dark gray)

(E4) (Blue)

(E7) (Gray)

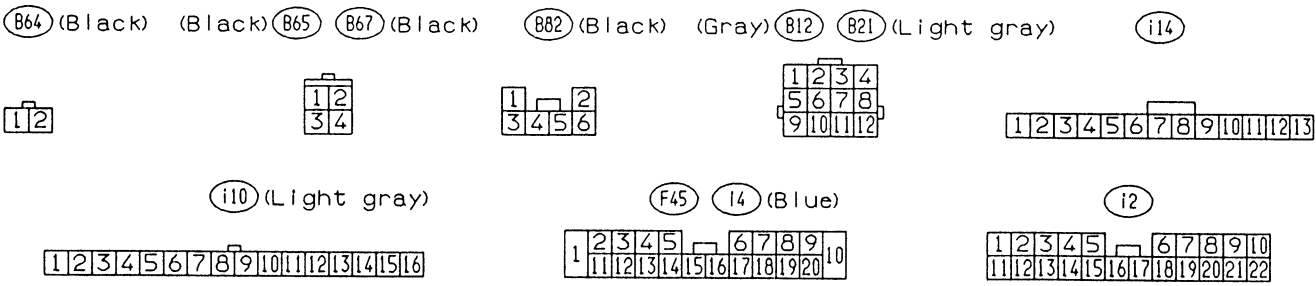
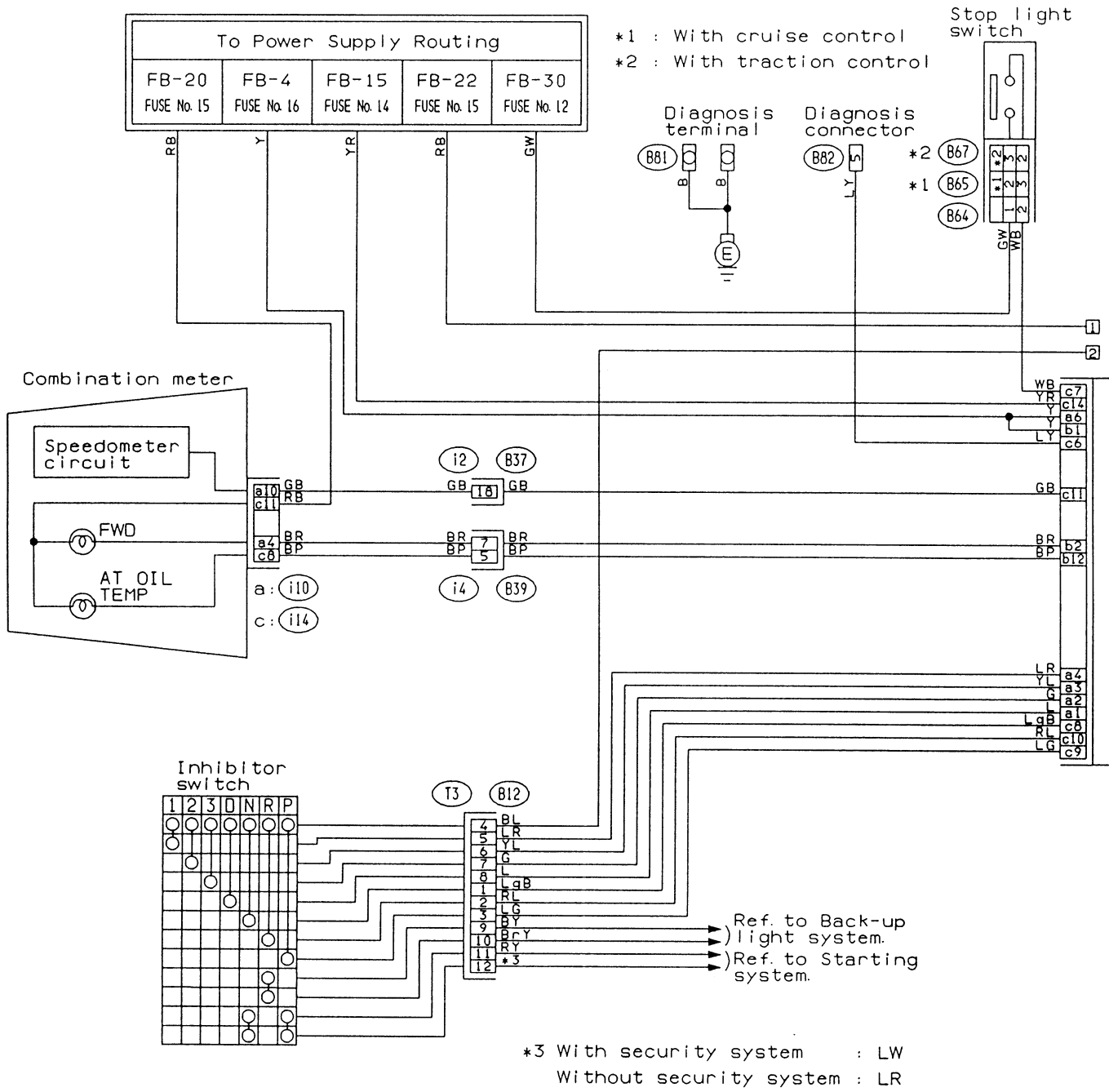
(B20) (Light gray)



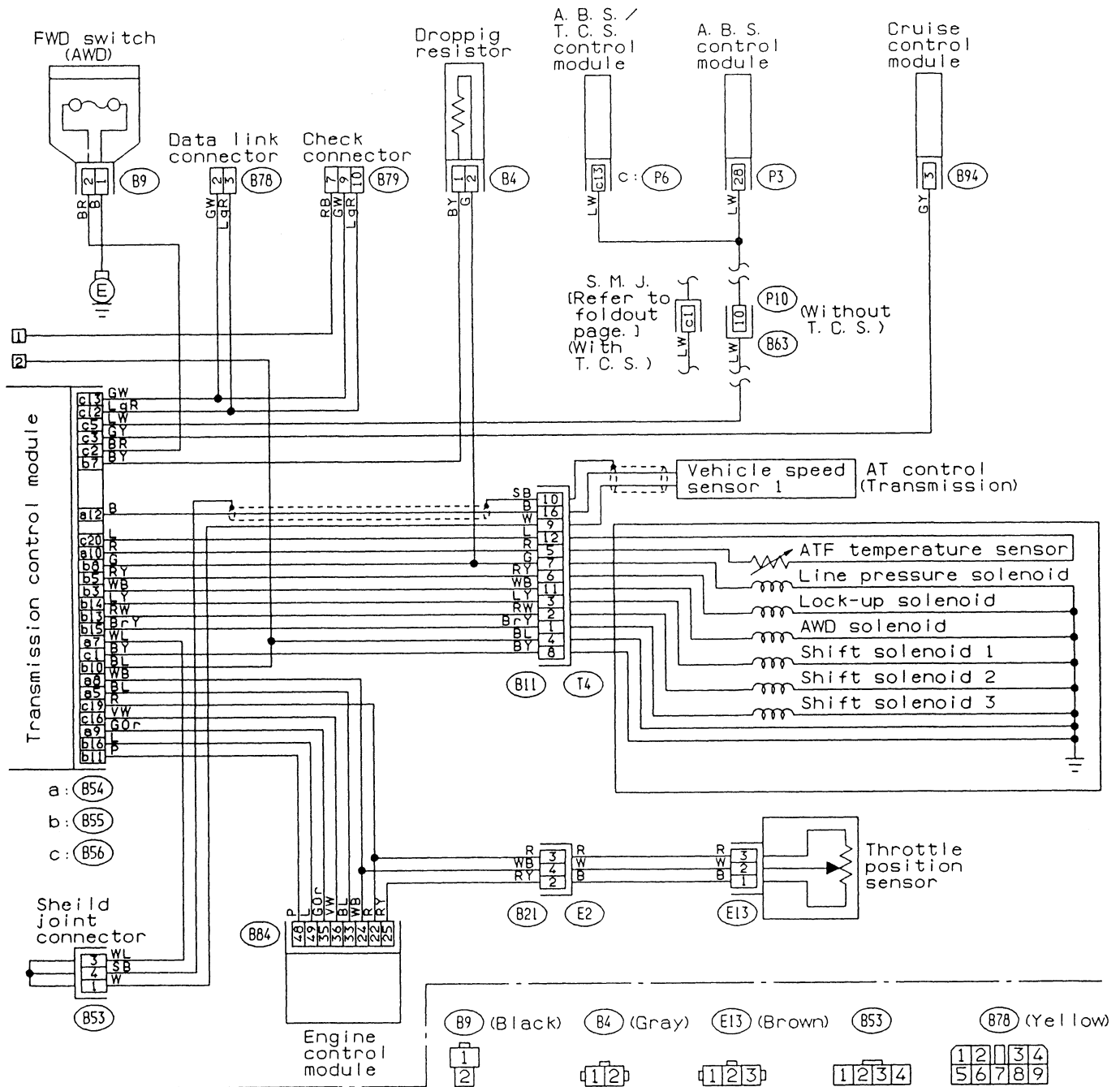
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16																																				
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44																								
45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96

2. AT CONTROL SYSTEM

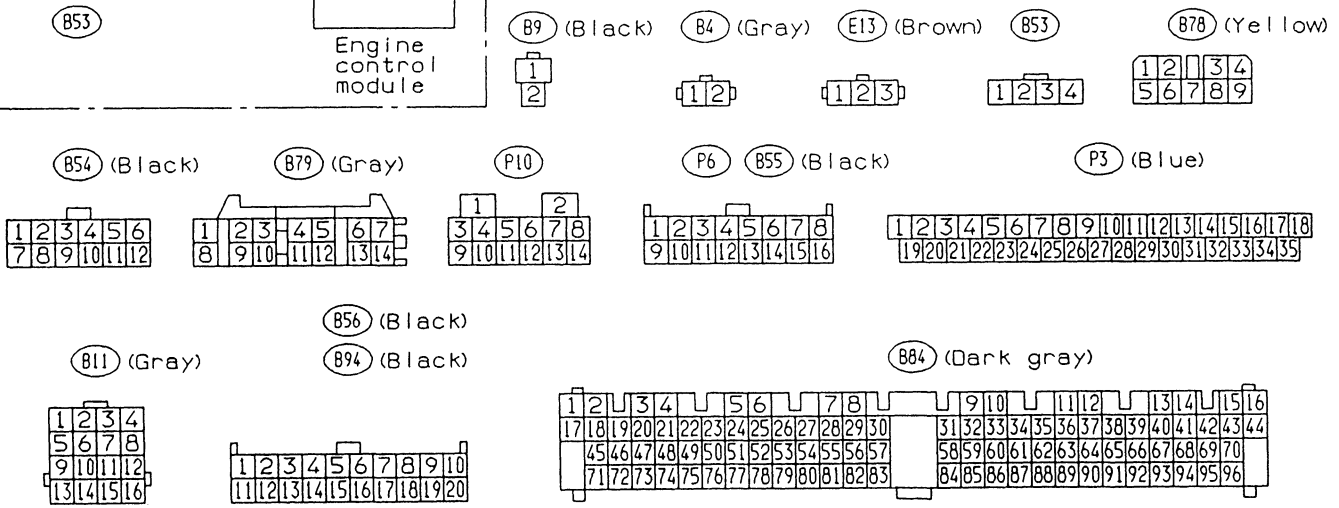
● LHD model



6. Wiring Diagram and Wiring Harness

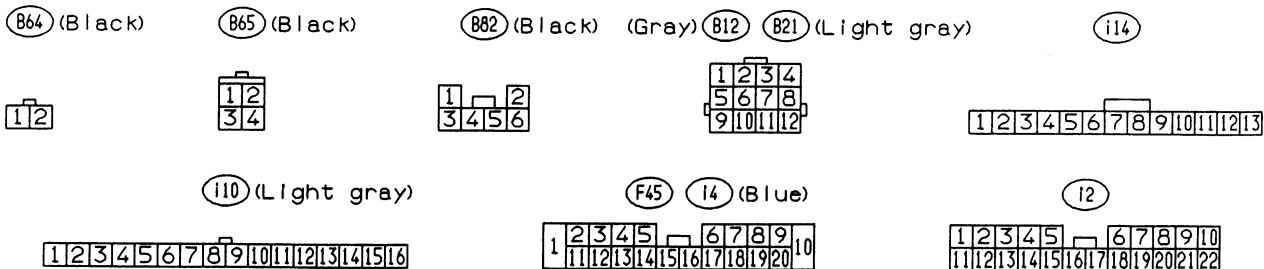
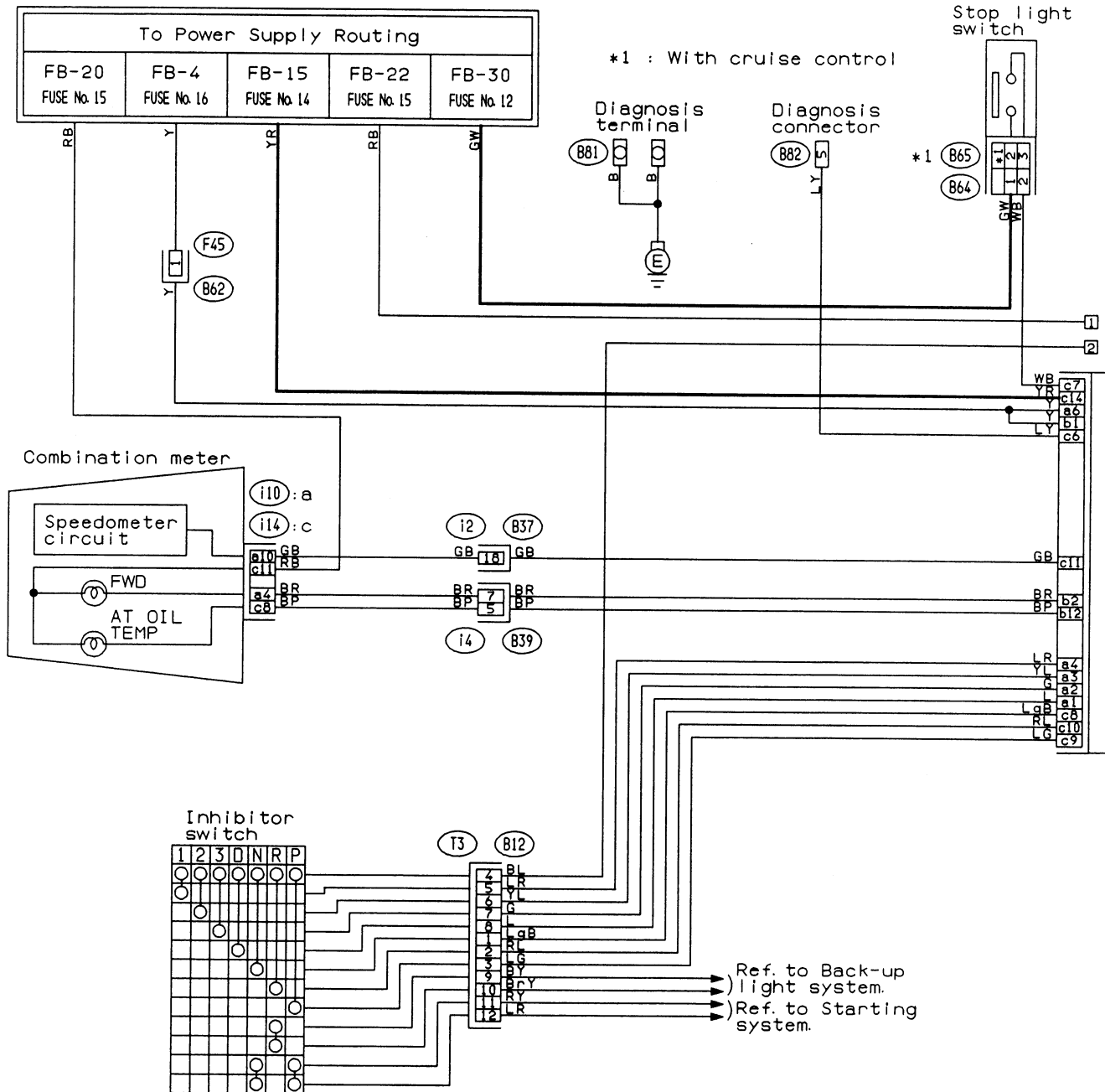


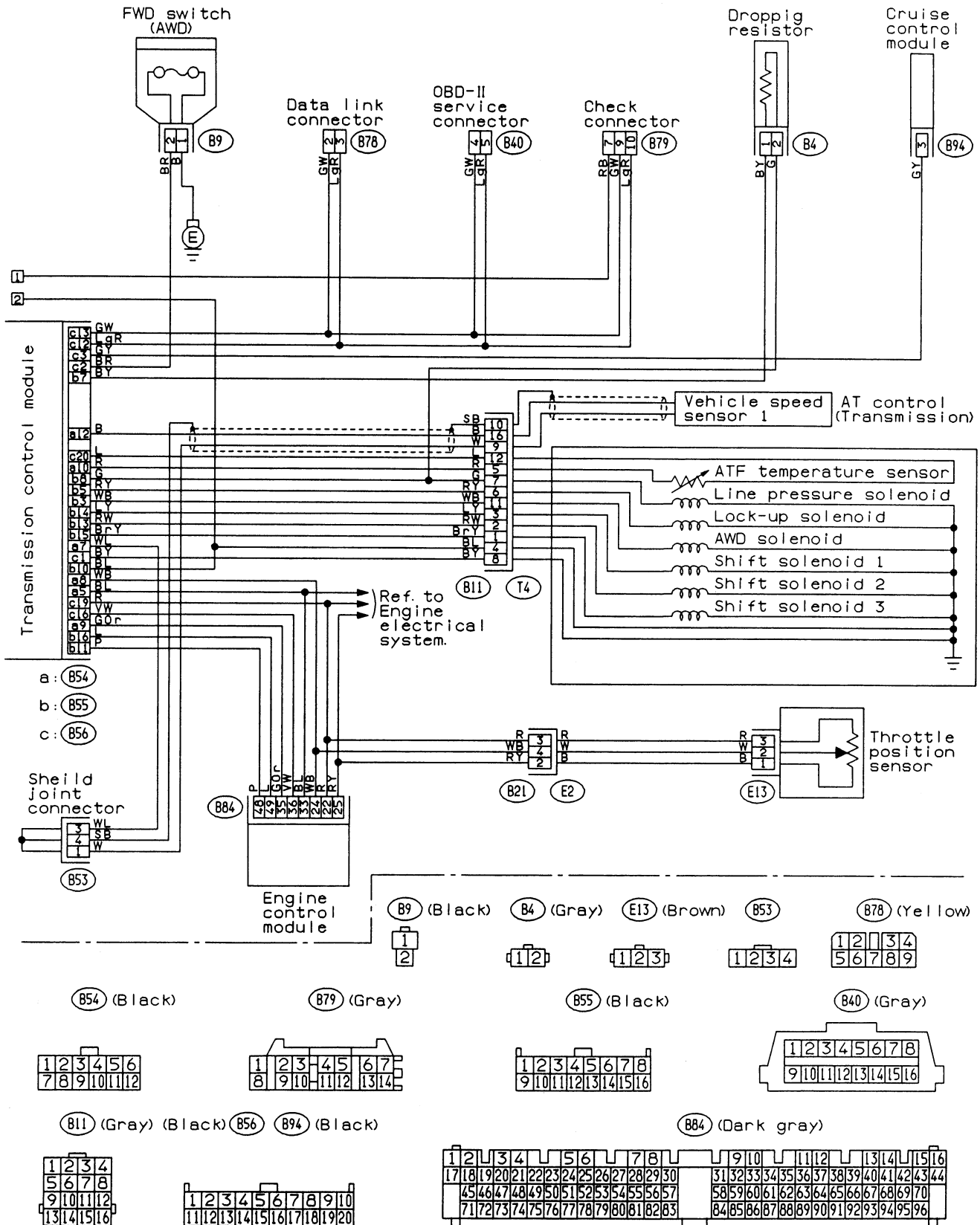
- a: (B54)
- b: (B55)
- c: (B56)



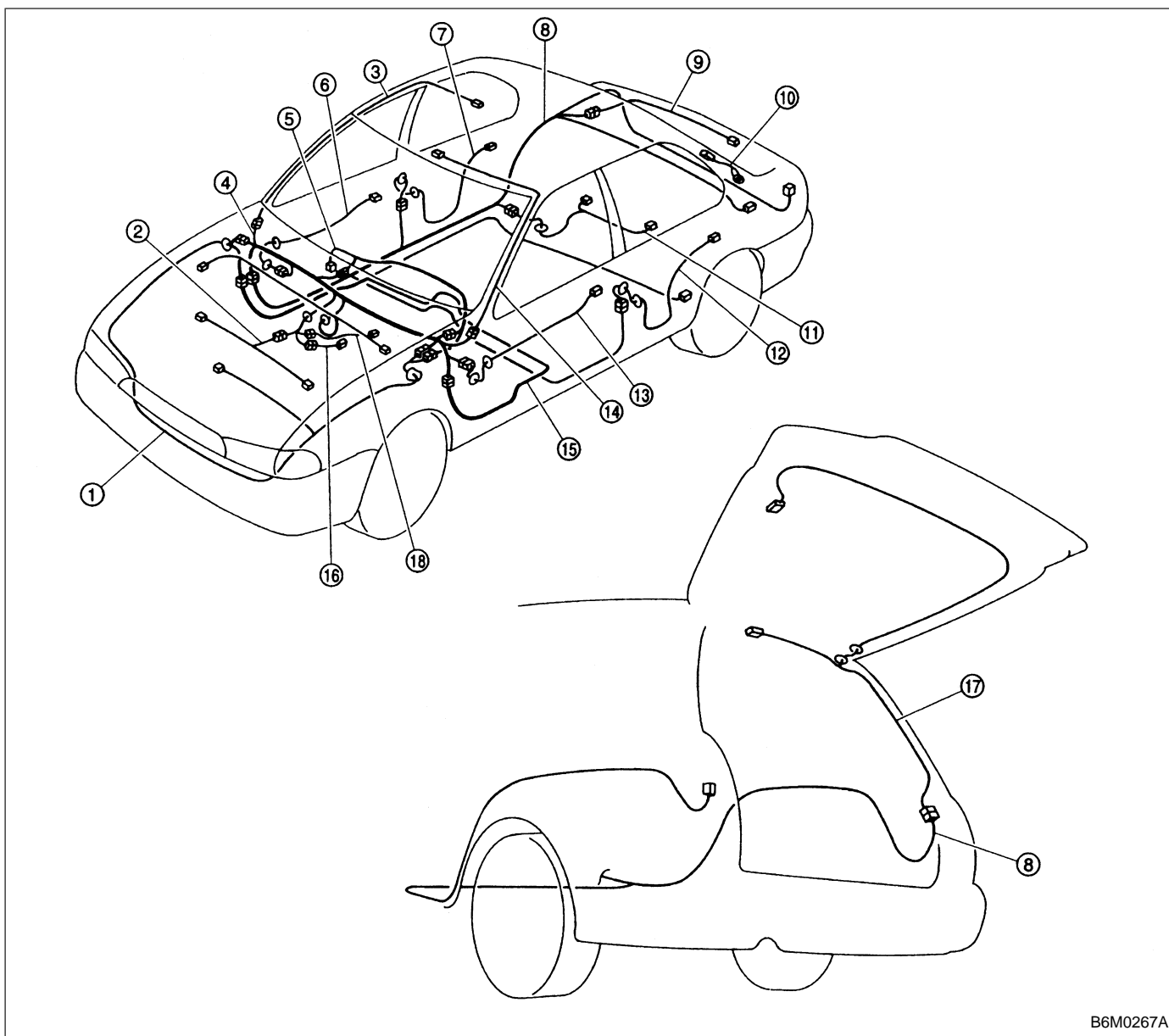
2. AT CONTROL SYSTEM

● RHD model





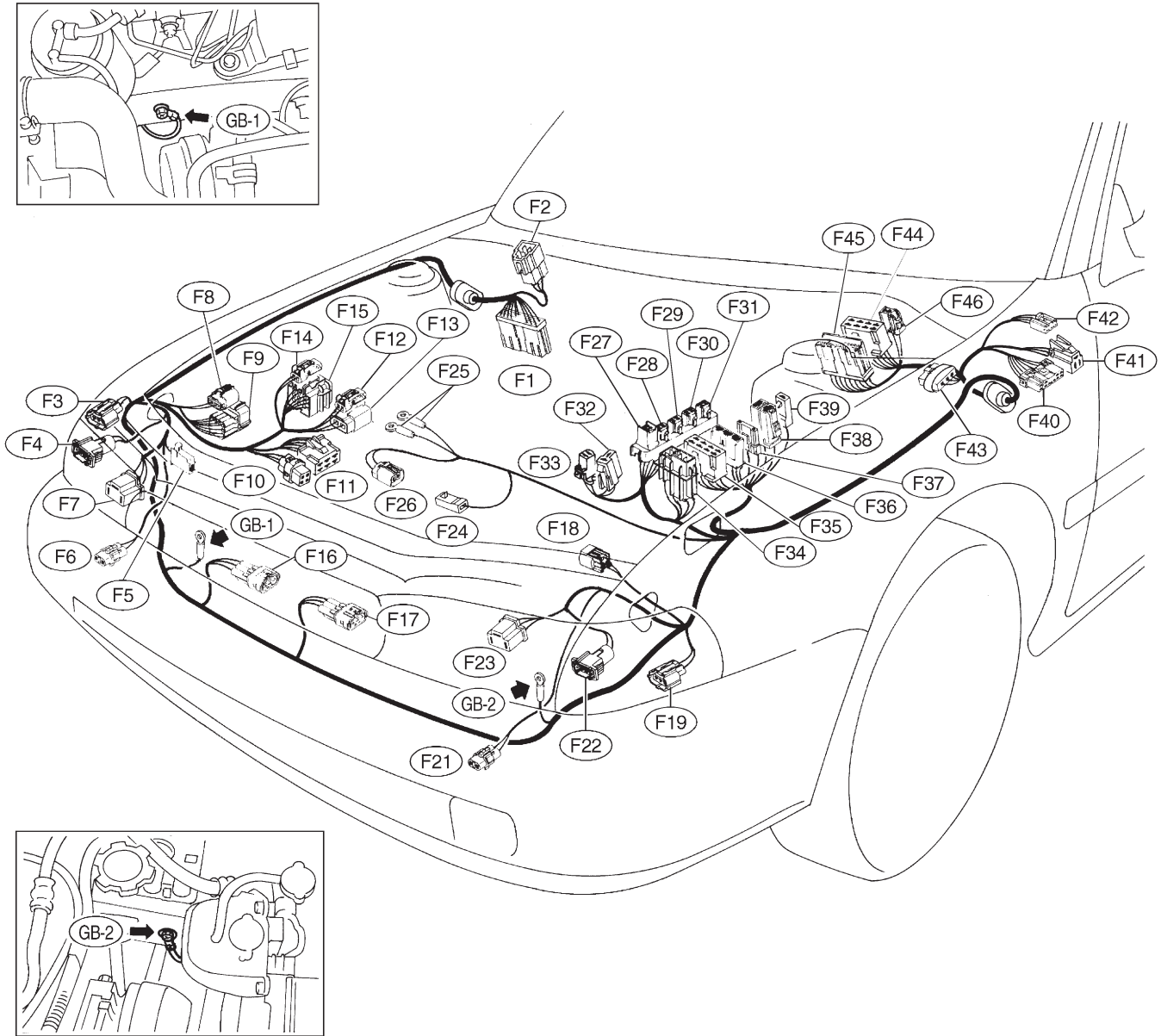
B: ELECTRICAL WIRING HARNESS AND GROUND POINT



B6M0267A

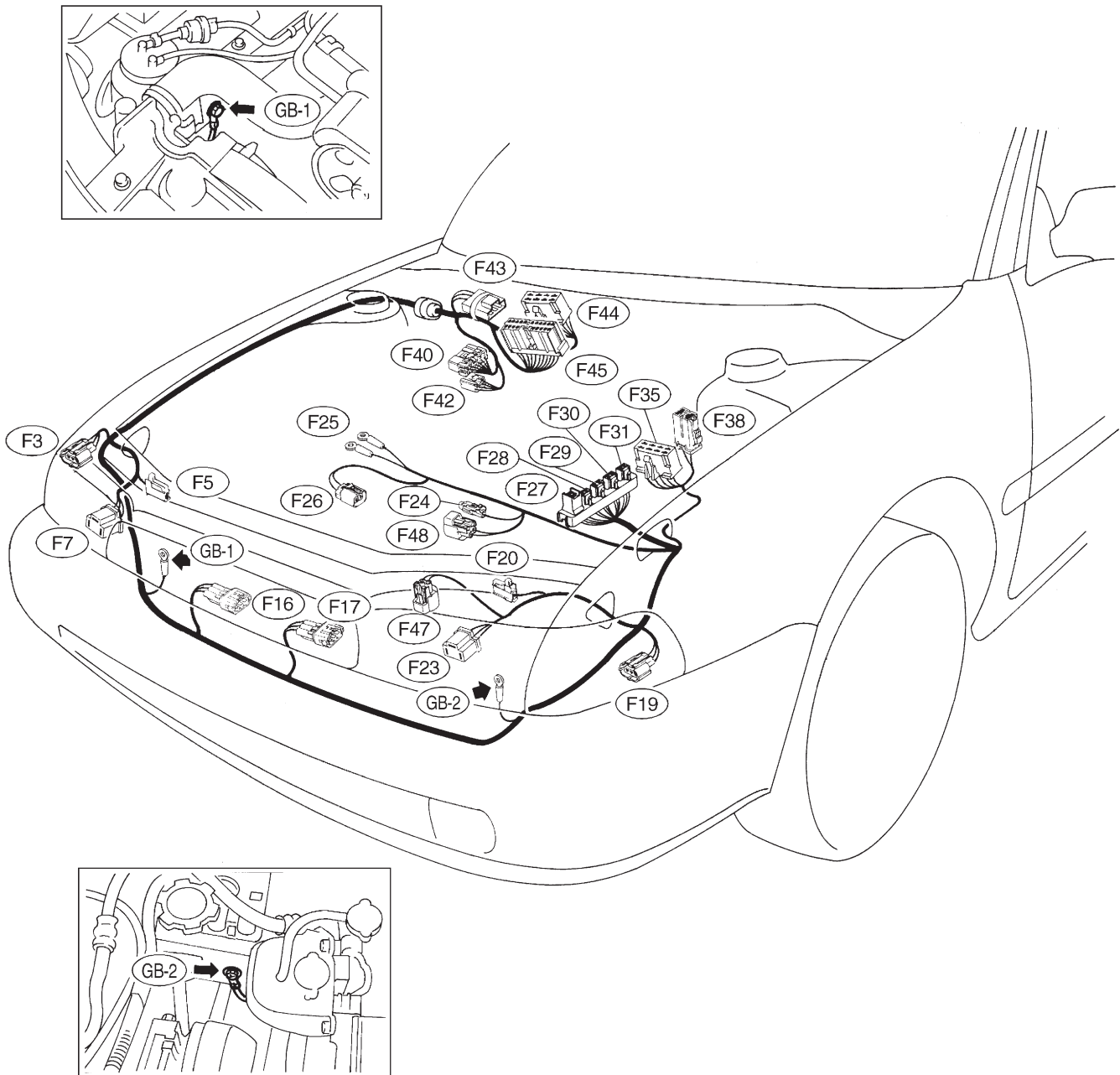
- | | |
|-----------------------------------|-------------------------------------|
| ① Front wiring harness | ⑩ Rear defogger ground cord (Sedan) |
| ② Engine wiring harness | ⑪ Fuel tank cord |
| ③ Room light cord | ⑫ Rear door cord LH |
| ④ Bulkhead wiring harness | ⑬ Front door cord LH |
| ⑤ Instrument panel wiring harness | ⑭ Sunroof cord |
| ⑥ Front door cord RH | ⑮ Floor wiring harness |
| ⑦ Rear door cord RH | ⑯ Transmission cord |
| ⑧ Rear wiring harness | ⑰ Rear gate cord (Wagon) |
| ⑨ Trunk lid cord (Sedan) | ⑱ Rear oxygen sensor cord |

1. FRONT WIRING HARNESS AND GROUND POINT (LHD MODEL)



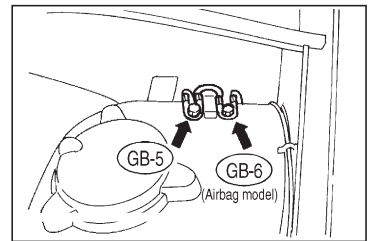
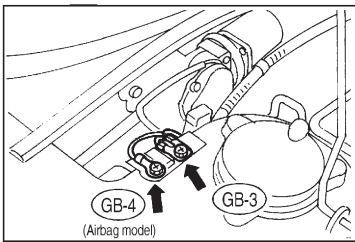
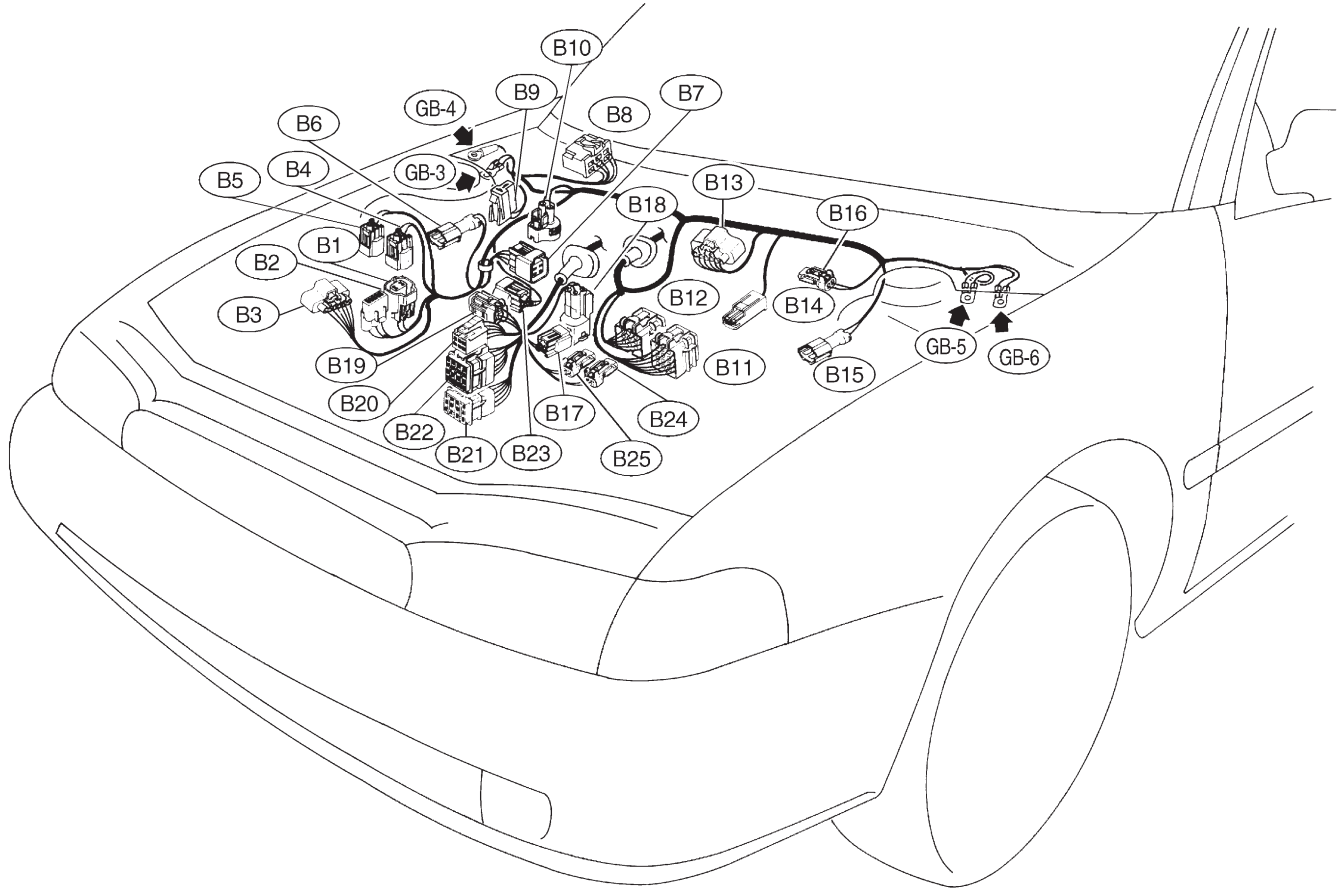
OBD0729

2. FRONT WIRING HARNESS AND GROUND POINT (RHD MODEL)



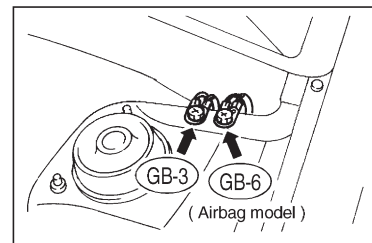
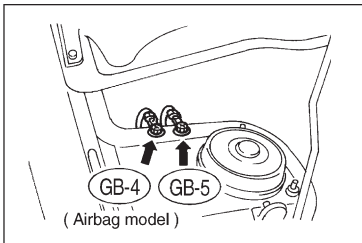
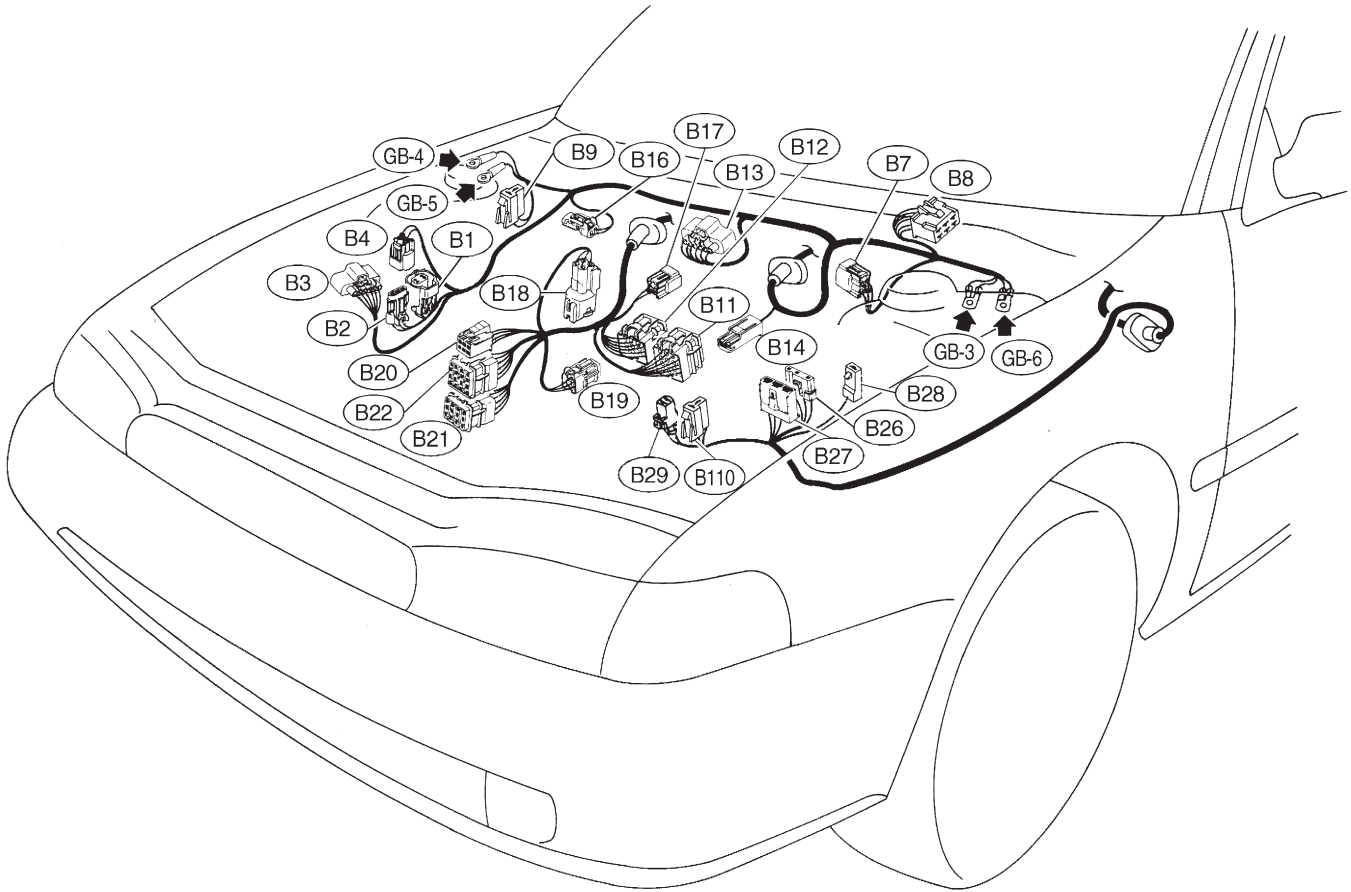
B2M0438

3. BULKHEAD WIRING HARNESS AND GROUND POINT (IN ENGINE ROOM) (LHD MODEL)



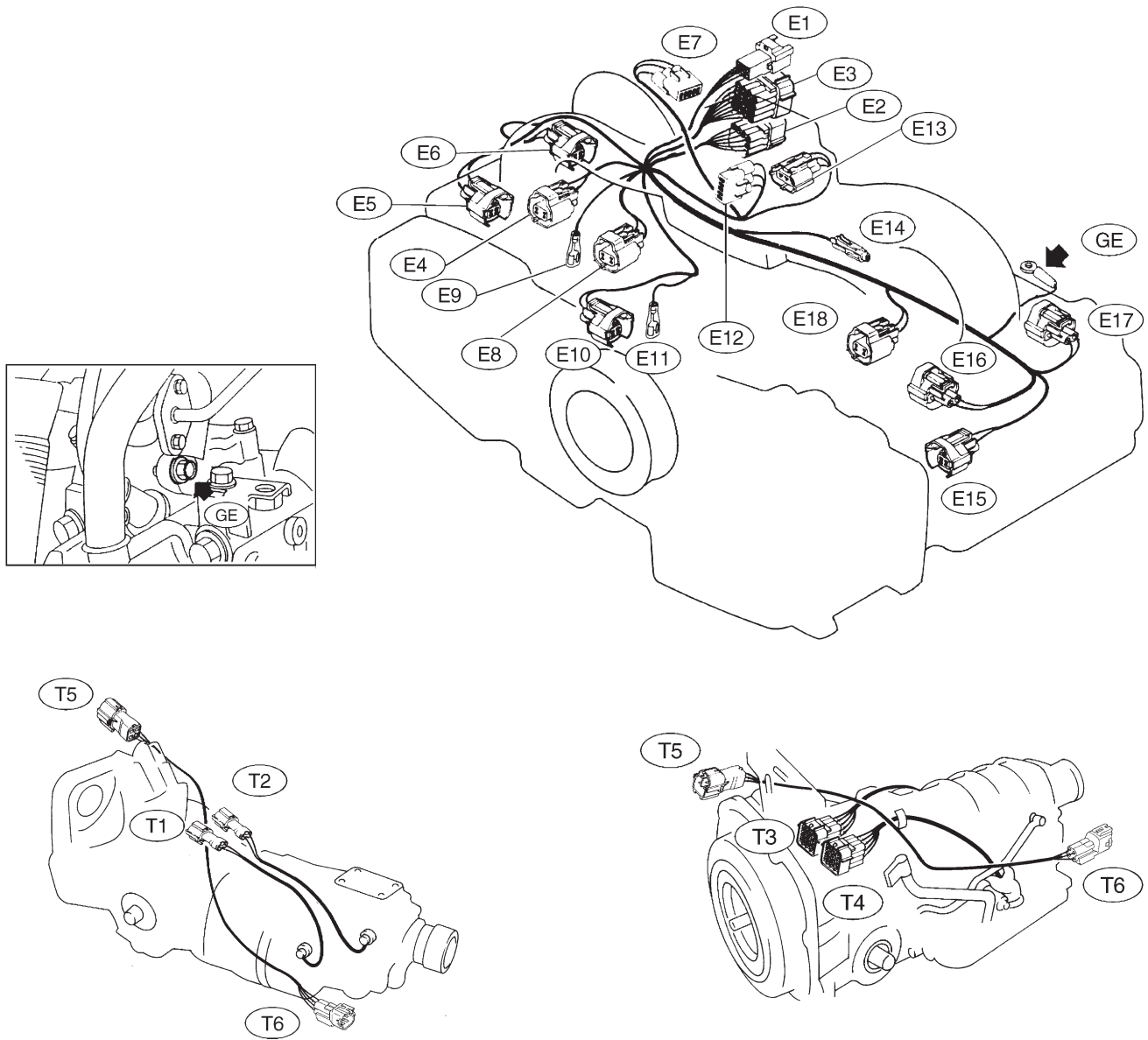
OBD0730

4. BULKHEAD WIRING HARNESS AND GROUND POINT (IN ENGINE ROOM) (RHD MODEL)



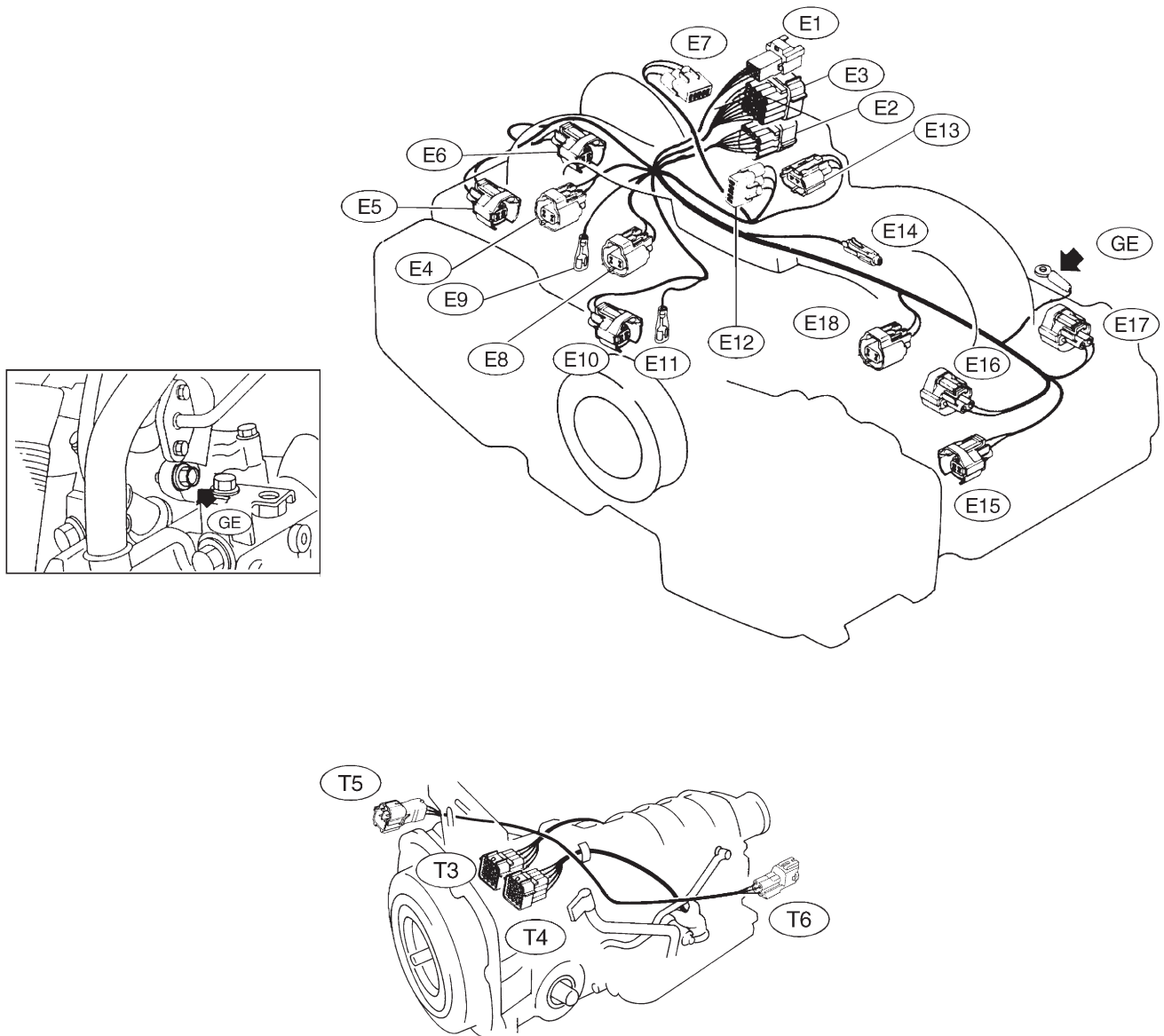
B2M0439

5. ENGINE WIRING HARNESS, TRANSMISSION HARNESS AND GROUND POINT (LHD MODEL)



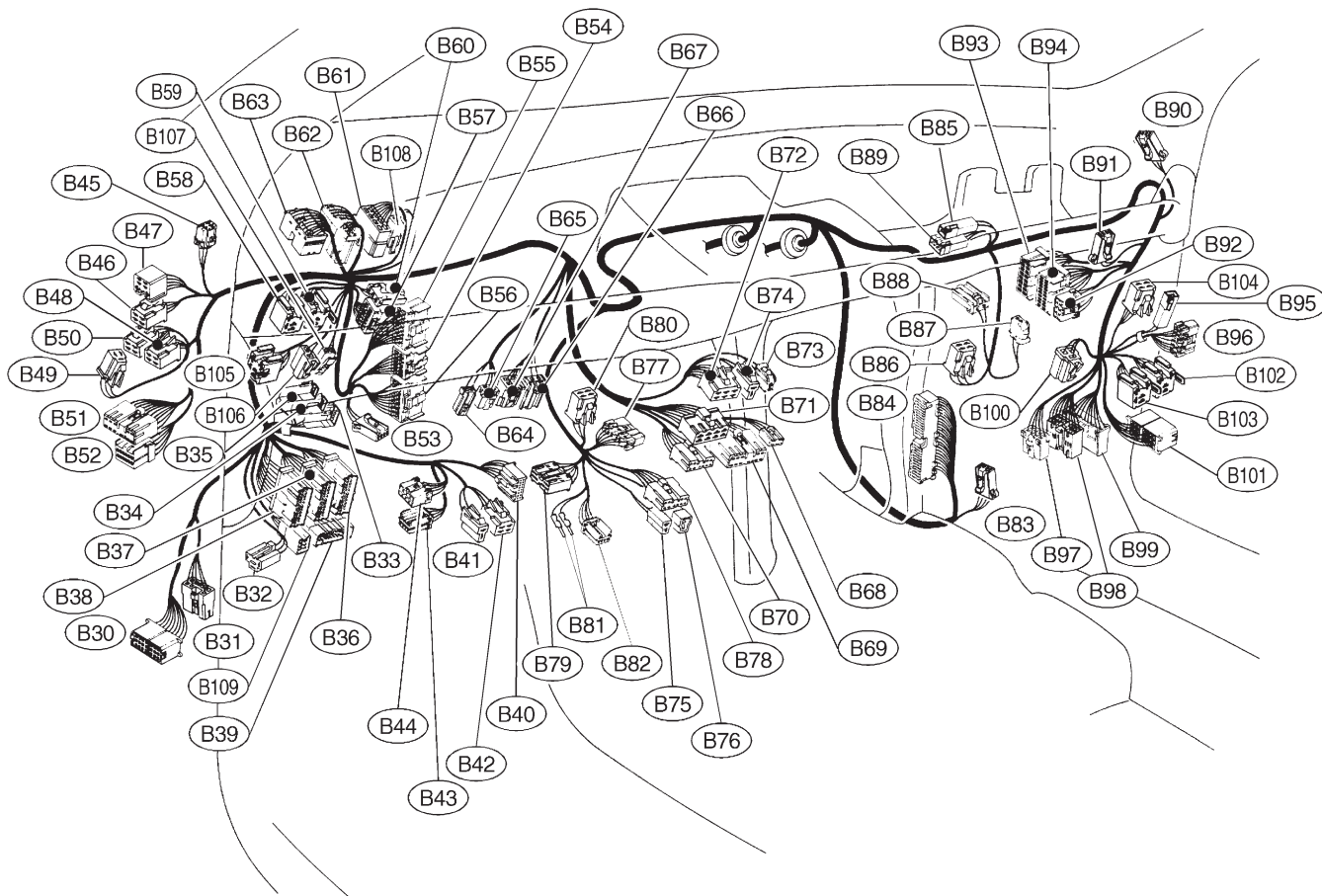
OBD0731

6. ENGINE WIRING HARNESS, TRANSMISSION HARNESS AND GROUND POINT (RHD MODEL)



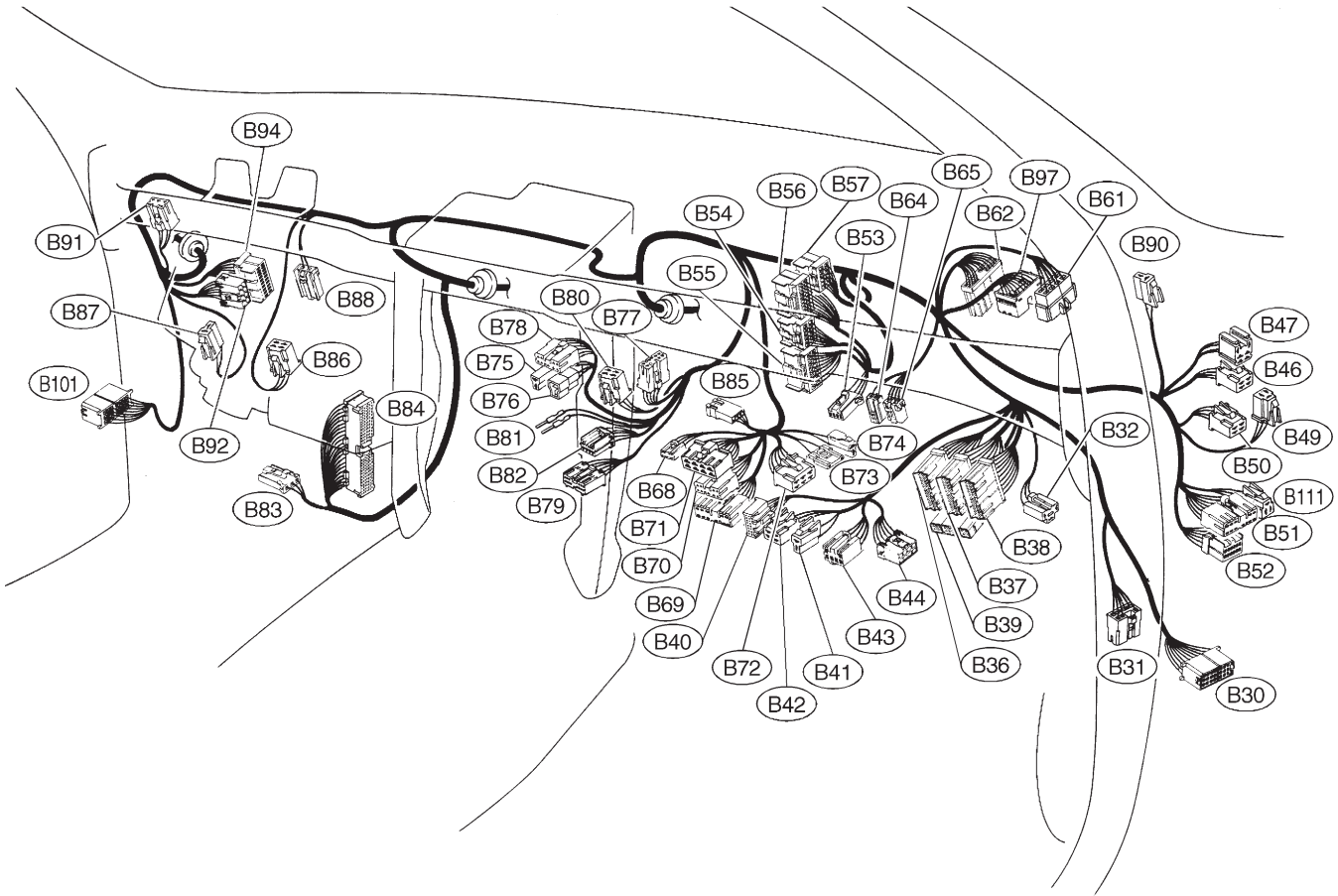
B2M0440

7. BULKHEAD WIRING HARNESS (IN COMPARTMENT) (LHD MODEL)



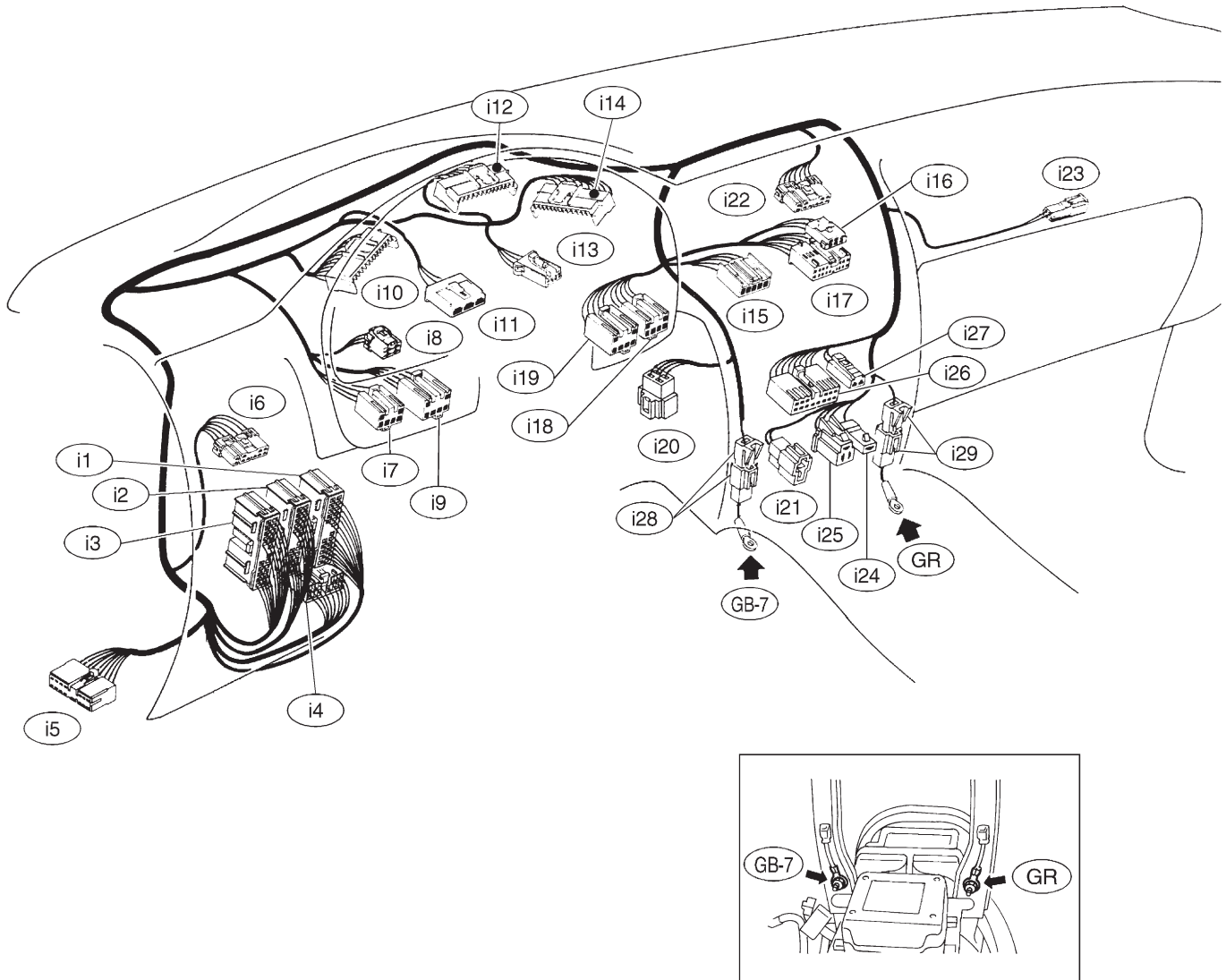
OBD0732

8. BULKHEAD WIRING HARNESS (IN COMPARTMENT) (RHD MODEL)



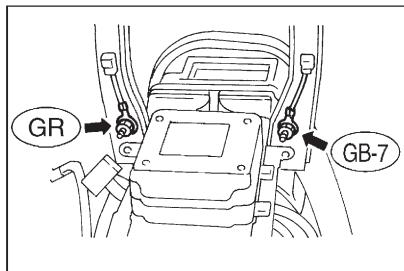
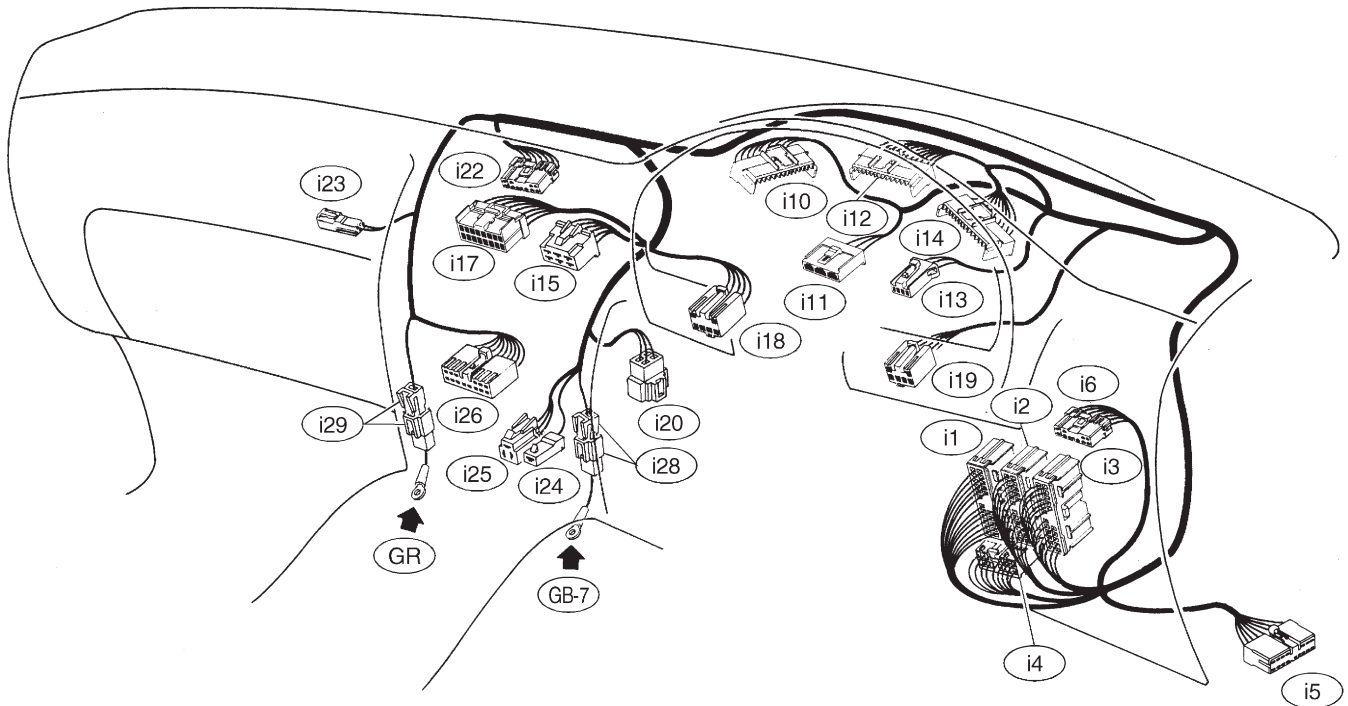
B2M0441

9. INSTRUMENT PANEL WIRING HARNESS AND GROUND POINT (LHD MODEL)



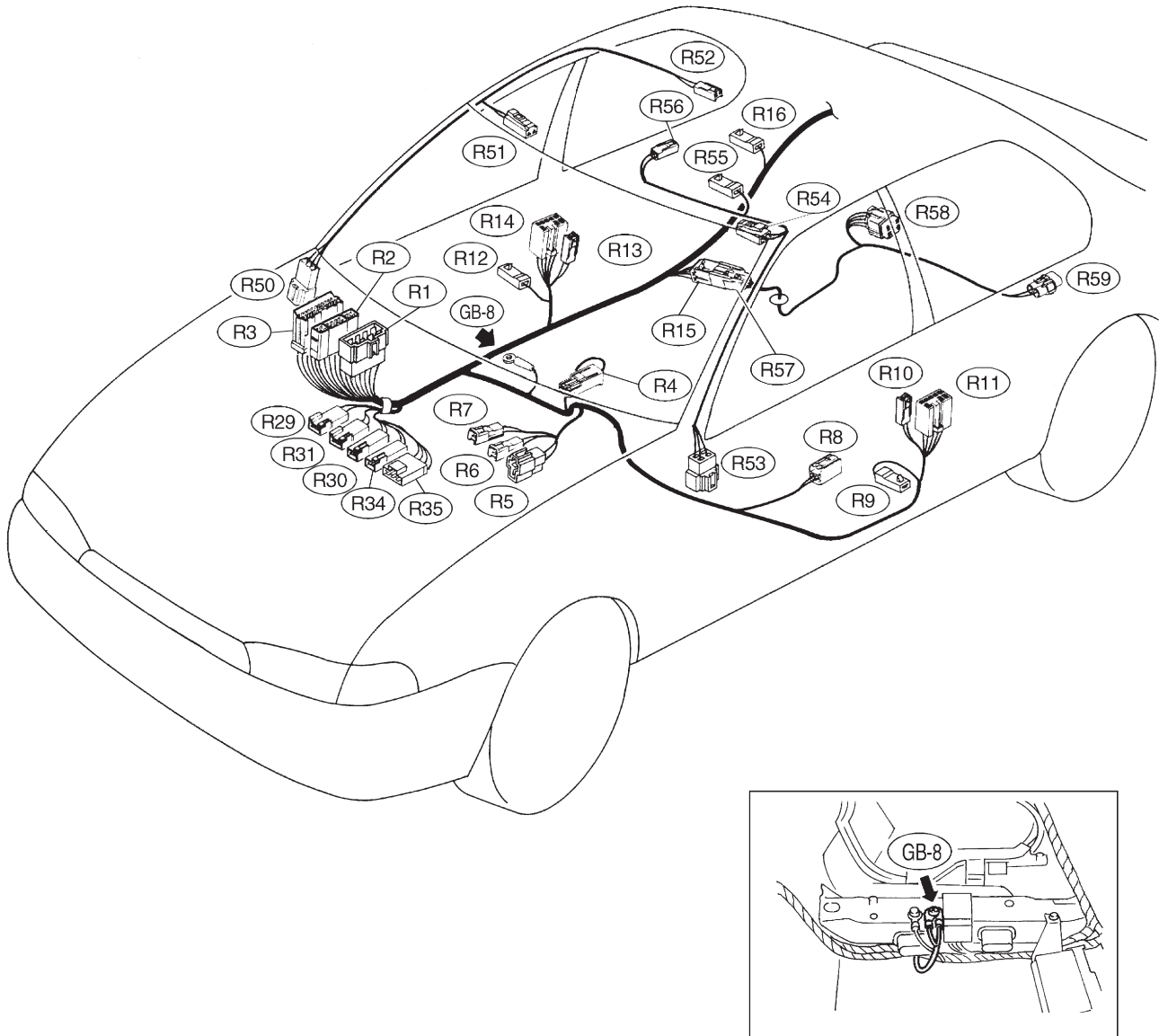
OBD0733

10. INSTRUMENT PANEL WIRING HARNESS AND GROUND POINT (RHD MODEL)



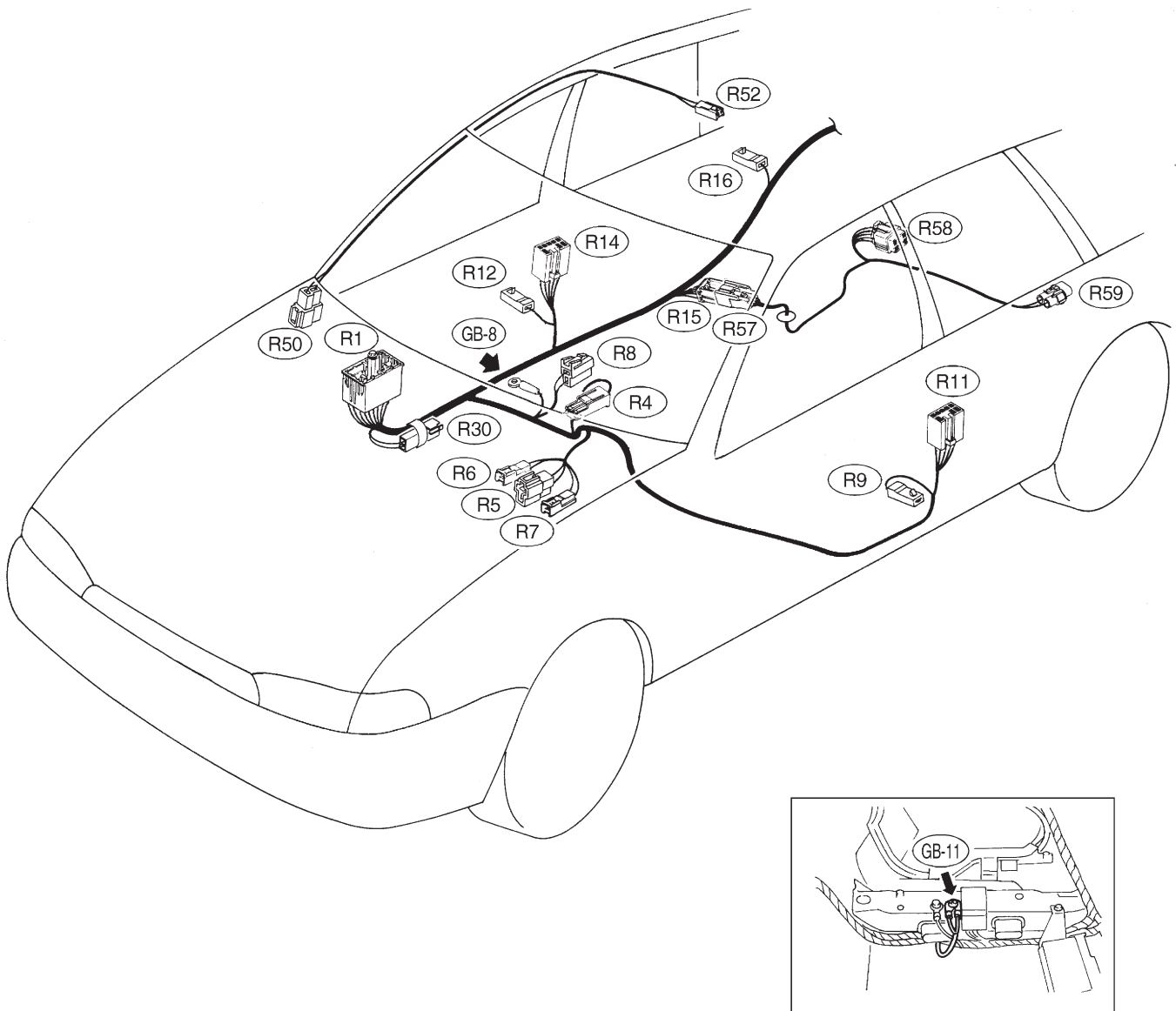
B2M0442

11. REAR WIRING HARNESS AND GROUND POINT (LHD MODEL)



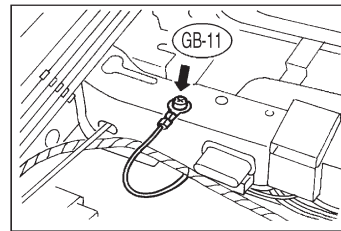
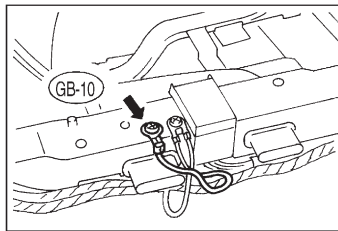
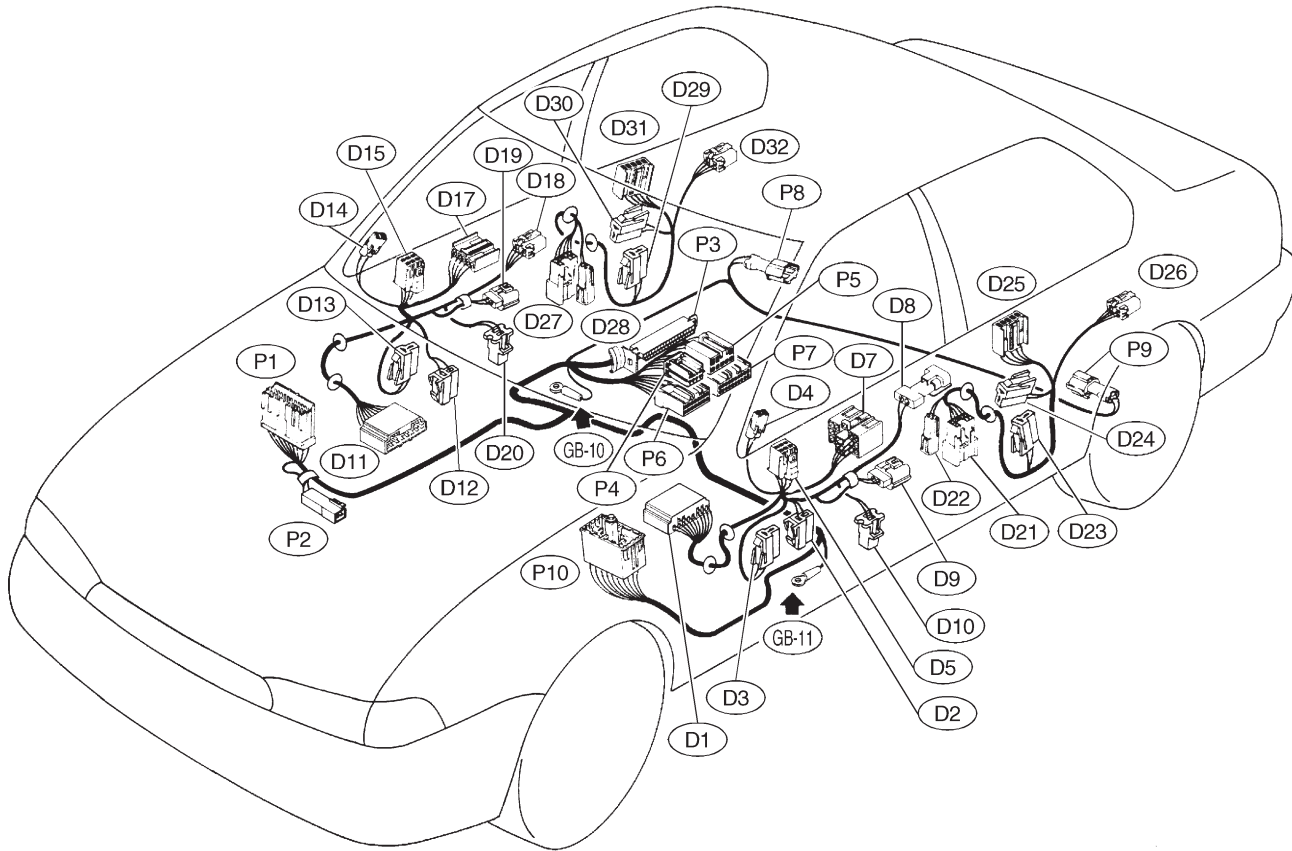
OBD0734

12. REAR WIRING HARNESS AND GROUND POINT (RHD MODEL)



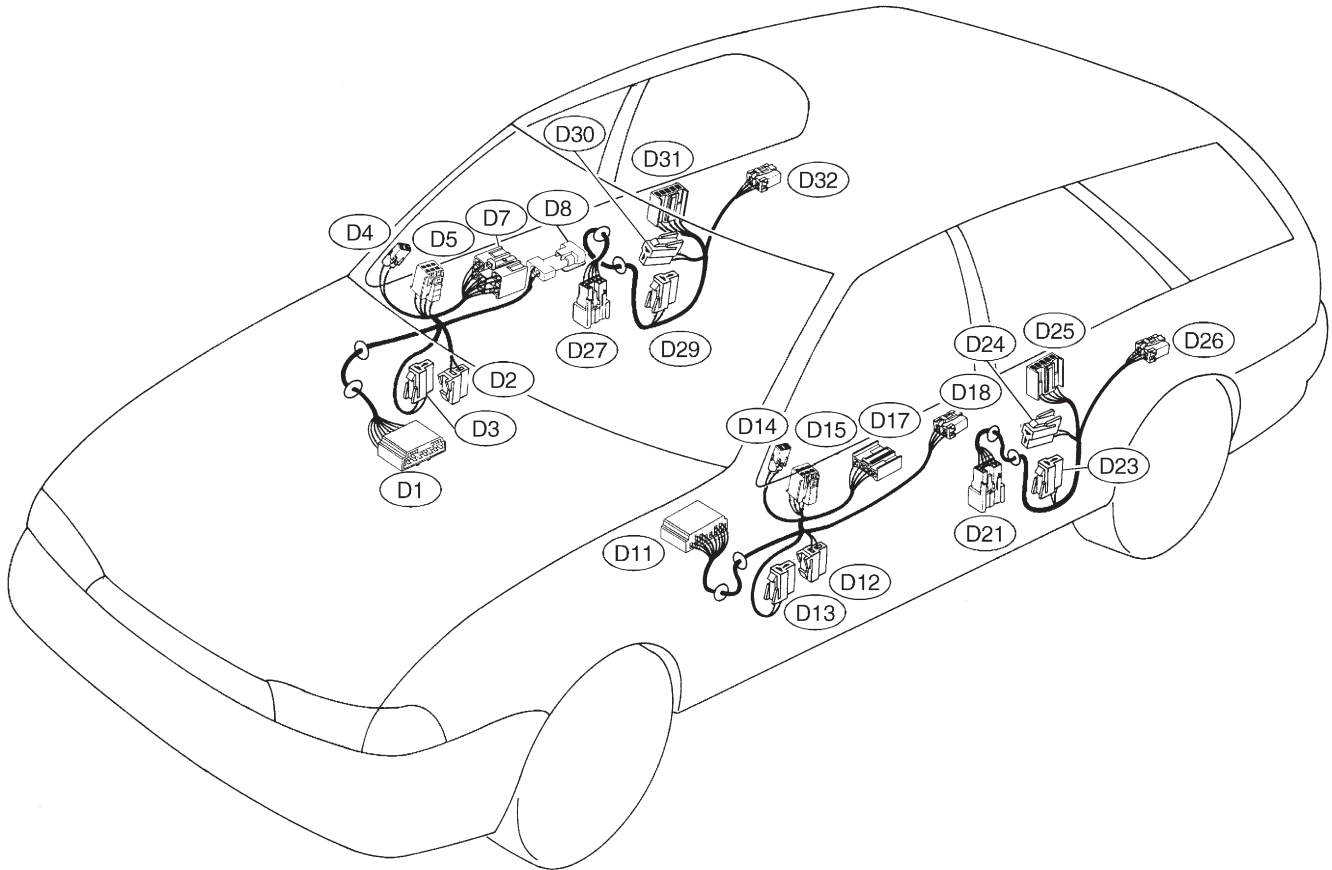
B2M0443

13. FLOOR WIRING HARNESS, DOOR CORD AND GROUND POINT (LHD MODEL)



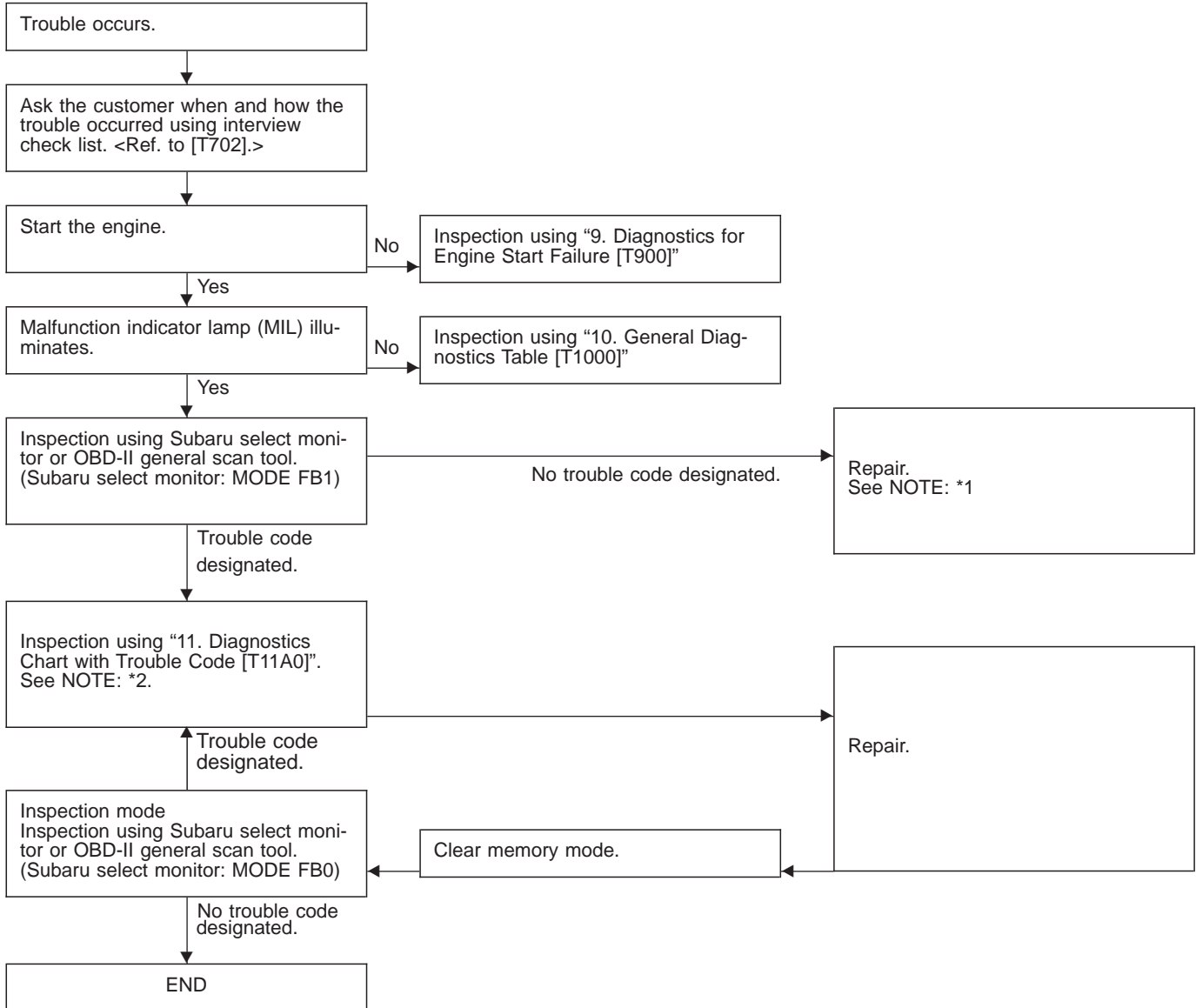
OBD0735

14. DOOR CORD AND GROUND POINT (RHD MODEL)



B2M0444

7. Basic Diagnostics Procedure



NOTE:

*1: If trouble code is not shown on display although the MIL illuminates, perform diagnostics of the MIL (CHECK ENGINE LIGHT) circuit or combination meter. <Refer to "8. Diagnostics for CHECK ENGINE Malfunction Indicator Lamp (MIL) [T800].">

*2: Carry out the basic check, only when trouble code about automatic transmission is shown on display. <Ref. to [T701].>

1. BASIC CHECK ITEMS FOR AT

When trouble code about automatic transmission is shown on display, carry out the following basic check. After that, carry out the replacement or repair work.

- 1) ATF level check
- 2) Differential gear oil level check
- 3) ATF leak check
- 4) Differential gear oil leak check
- 5) Brake band adjustment
- 6) Stall test
- 7) Line pressure test
- 8) Transfer clutch pressure test
- 9) Time lag test
- 10) Road test
- 11) Shift characteristics

NOTE:

As for the method, refer to 3-2 [W2A1].

2. CHECK LIST FOR INTERVIEW

Check the following items when problem occurred.

Customer's name		Engine no.	
Date of sale		Fuel brand	
Date of repair		Odometer reading	km miles
Vin no.			
Weather	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Other__		
Outdoor Temperature	<input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (approx. ___ °F/ ___ °C)		
Place	<input type="checkbox"/> Highway <input type="checkbox"/> Suburbs <input type="checkbox"/> Inner City <input type="checkbox"/> Uphill <input type="checkbox"/> Downhill <input type="checkbox"/> Rough road <input type="checkbox"/> Other _____		
Engine Temp.	<input type="checkbox"/> Cold <input type="checkbox"/> Warming-up <input type="checkbox"/> After warming-up <input type="checkbox"/> Any temp. <input type="checkbox"/> Other		
Engine speed			
Driving conditions	<input type="checkbox"/> Not affected <input type="checkbox"/> At starting <input type="checkbox"/> While idling <input type="checkbox"/> At racing <input type="checkbox"/> While accelerating <input type="checkbox"/> While cruising <input type="checkbox"/> While decelerating <input type="checkbox"/> While turning (RH/LH)		
	Vehicle speed		
Headlight	<input type="checkbox"/> ON / <input type="checkbox"/> OFF		
Blower	<input type="checkbox"/> ON / <input type="checkbox"/> OFF		
A/C compressor	<input type="checkbox"/> ON / <input type="checkbox"/> OFF		
Cooling fan	<input type="checkbox"/> ON / <input type="checkbox"/> OFF		
Front wiper	<input type="checkbox"/> ON / <input type="checkbox"/> OFF		
Rear wiper	<input type="checkbox"/> ON / <input type="checkbox"/> OFF		
Rear defogger	<input type="checkbox"/> ON / <input type="checkbox"/> OFF		
Radio	<input type="checkbox"/> ON / <input type="checkbox"/> OFF		
CD/Cassette	<input type="checkbox"/> ON / <input type="checkbox"/> OFF		
Car phone	<input type="checkbox"/> ON / <input type="checkbox"/> OFF		
CB			

NOTE: Use copies of this page for interviewing customers.

Check the following items about the vehicle's state when MIL turns on.

a) Other warning lights or indicators turn on. <input type="checkbox"/> Yes / <input type="checkbox"/> No
<input type="checkbox"/> ① Low fuel warning light
<input type="checkbox"/> ② Charge indicator light
<input type="checkbox"/> ③ AT diagnostics indicator light
<input type="checkbox"/> ④ ABS warning light
<input type="checkbox"/> ⑤ TCS warning light
<input type="checkbox"/> ⑥ Engine oil pressure warning light
b) Fuel level
● Lack of gasoline: <input type="checkbox"/> Yes / <input type="checkbox"/> No
● Indicator position of fuel gauge:
c) Intentional connecting or disconnecting of harness connectors or spark plug cords: <input type="checkbox"/> Yes / <input type="checkbox"/> No
● What:
d) Intentional connecting or disconnecting of hoses: <input type="checkbox"/> Yes / <input type="checkbox"/> No
● What:
e) Installing of parts other than genuine parts <input type="checkbox"/> Yes / <input type="checkbox"/> No
● What:
● Where:
f) Occurrence of noise <input type="checkbox"/> Yes / <input type="checkbox"/> No
● From where:
● What kind:
g) Occurrence of smell <input type="checkbox"/> Yes / <input type="checkbox"/> No
● From where:
● What kind:
h) Intrusion of water into engine compartment or passenger compartment <input type="checkbox"/> Yes / <input type="checkbox"/> No
i) Troubles occurred
<input type="checkbox"/> ① Engine does not start.
<input type="checkbox"/> ② Engine stalls during idling.
<input type="checkbox"/> ③ Engine stalls while driving.
<input type="checkbox"/> ④ Engine speed decreases.
<input type="checkbox"/> ⑤ Engine speed does not decrease.
<input type="checkbox"/> ⑥ Rough idling
<input type="checkbox"/> ⑦ Poor acceleration
<input type="checkbox"/> ⑧ Back fire
<input type="checkbox"/> ⑨ After fire
<input type="checkbox"/> ⑩ No shift
<input type="checkbox"/> ⑪ Excessive shift shock

NOTE: Use copies of this page for interviewing customers.

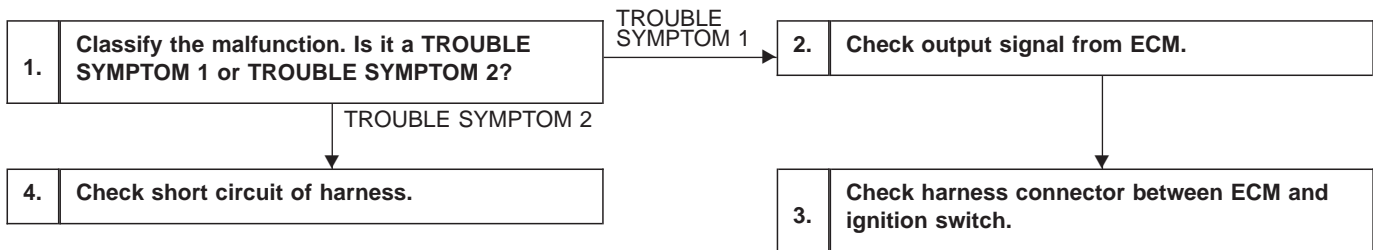
8. Diagnostics for CHECK ENGINE Malfunction Indicator Lamp (MIL)

DIAGNOSIS:

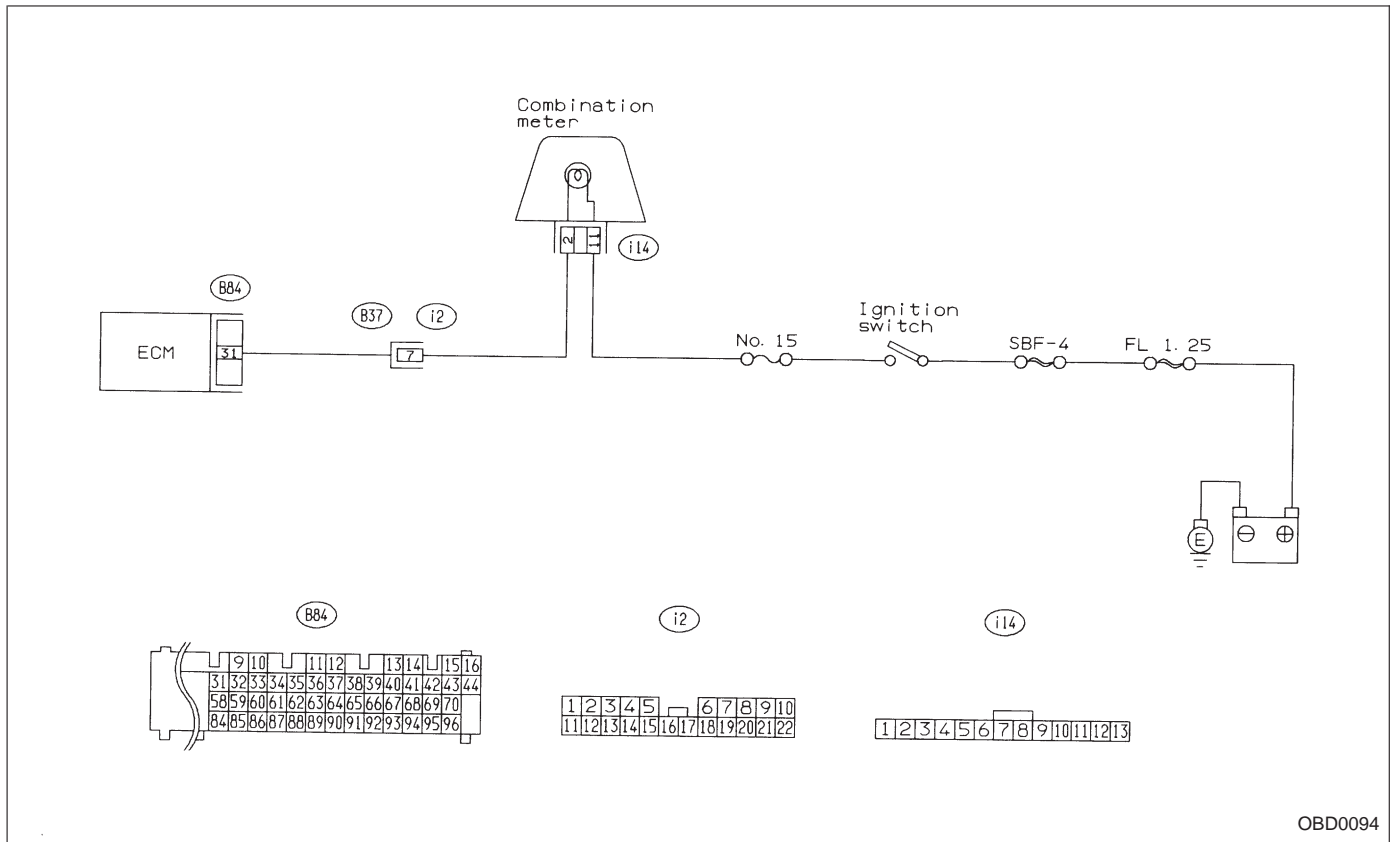
- The CHECK ENGINE malfunction indicator lamp (MIL) circuit is in short or open.

TROUBLE SYMPTOM:

- When ignition switch is turned to ON (engine OFF), MIL does not illuminate.....TROUBLE SYMPTOM 1
- Although MIL illuminates, trouble code is not shown on Subaru select monitor or the OBD-II general scan tool display.....TROUBLE SYMPTOM 2



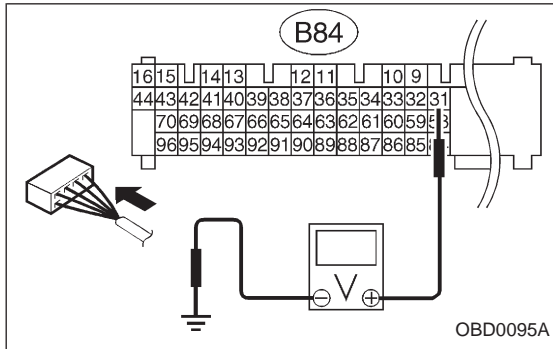
WIRING DIAGRAM:



OBD0094

1 CLASSIFY THE MALFUNCTION. IS IT A TROUBLE SYMPTOM 1 OR TROUBLE SYMPTOM 2?

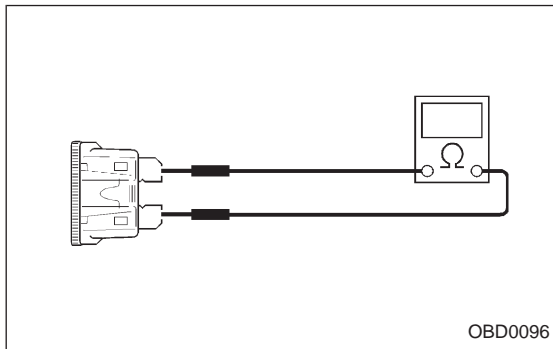
If the malfunction shows TROUBLE SYMPTOM 1, go to step 2.
 If the malfunction shows TROUBLE SYMPTOM 2, go to step 4.



2 CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM and body.

- CHECK** : **Connector & terminal (B84) No. 31 — Body/1 V, or less**
- YES** : Go to step 3.
- NO** : ● If MIL comes on when shaking or pulling ECM connector and harness, repair ECM connector.
 ● Check that ECM connector is correctly connected. If the MIL does not come on even when ECM connector is correctly connected, replace the ECM.



3 CHECK HARNESS CONNECTOR BETWEEN ECM AND IGNITION SWITCH.

- Check the following and repair if necessary.
- ① Check that fuse (No. 15) is not blown out.
- NOTE:**
 If replaced fuse (No. 15) blows out easily, check the harness for short circuit between fuse (No. 15) and combination meter.
- ② Check that harness from fuse to combination meter is not open.
 - ③ Check that the MIL wiring is not open.
 - ④ Check that harness from combination meter to the ECM is not open.
 - ⑤ Check that the connector (B37) is correctly connected as the wiring diagram shows.

4	CHECK SHORT CIRCUIT OF HARNESS.
----------	--

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ECM.
- 3) Turn ignition switch to ON.

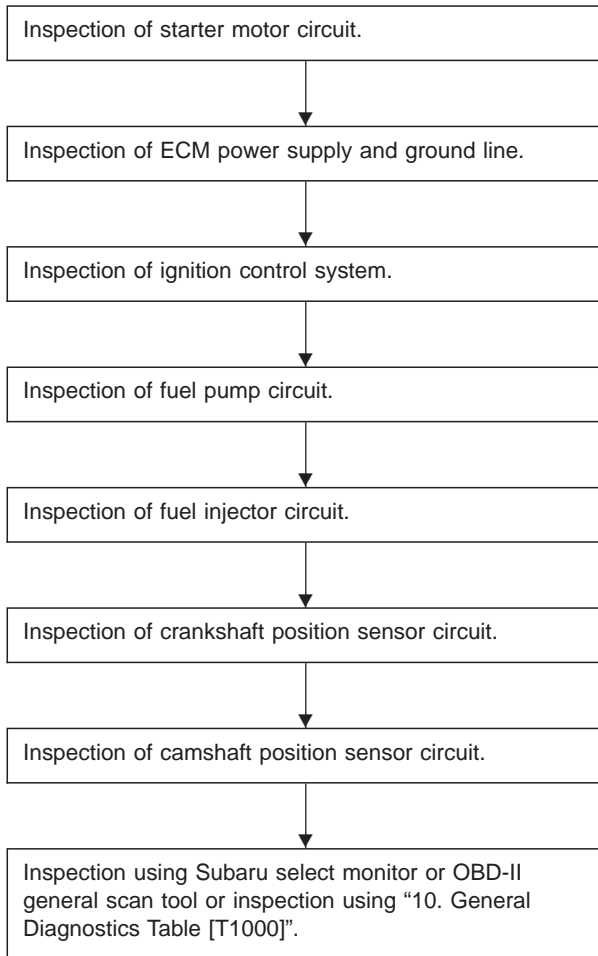
CHECK : ***Does the MIL come on?***

YES : Repair short circuit of harness between ECM and combination meter.

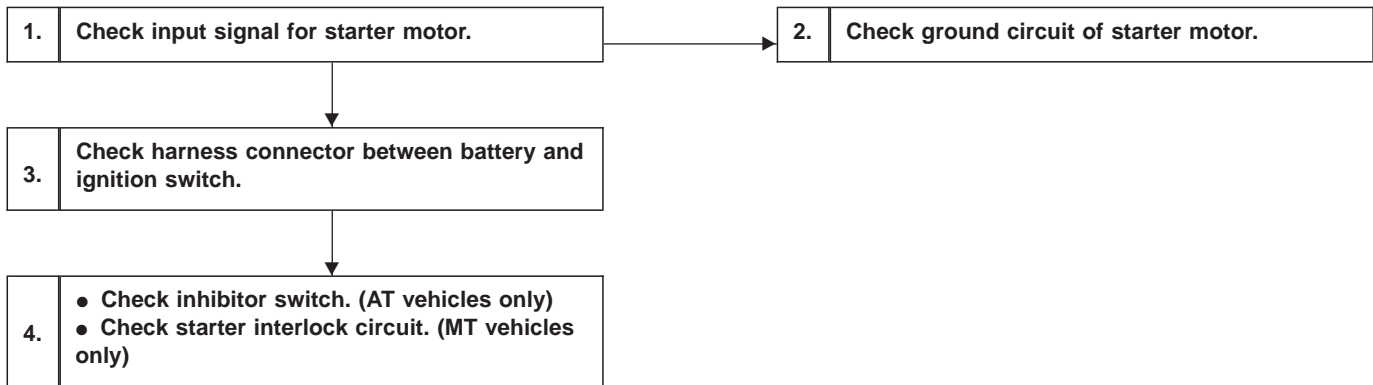
NO : Replace ECM.

9. Diagnostics for Engine Starting Failure

A: BASIC DIAGNOSTICS CHART

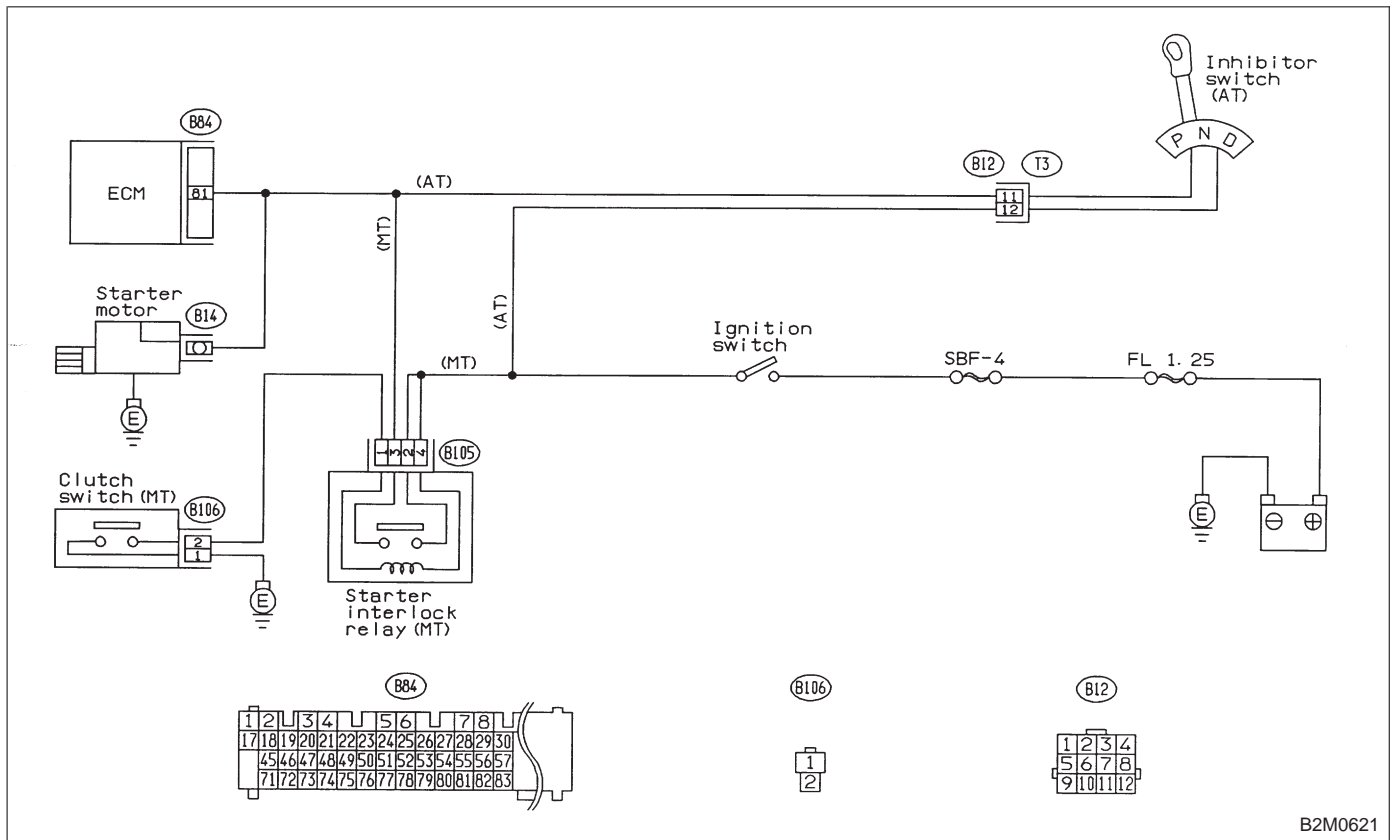


B: STARTER MOTOR CIRCUIT

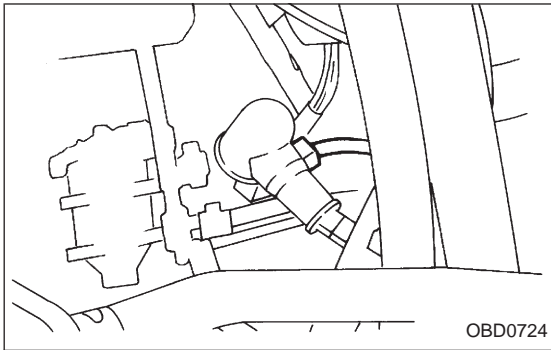


CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

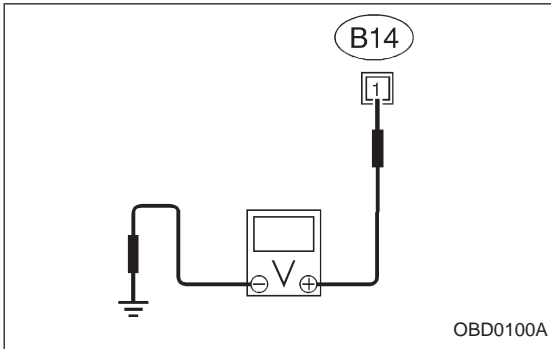


B2M0621



1 CHECK INPUT SIGNAL FOR STARTER MOTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from starter motor.
- 3) Turn ignition switch to ST.



- 4) Measure power supply voltage between starter motor connector terminal and body.

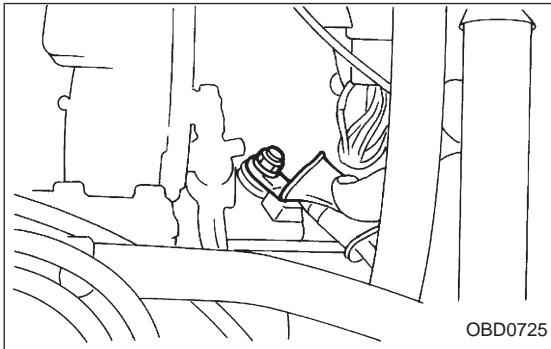
CHECK : **Connector & terminal (B14) No. 1 — Body/10 V, or more**

NOTE:

- On AT vehicles, place the inhibitor switch in the “P” or “N” position.
- On MT vehicles, depress the clutch pedal.

YES : Go to step 2.

NO : Go to step 3.



2 CHECK GROUND CIRCUIT OF STARTER MOTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect terminal from starter motor.
- 3) Measure resistance of ground cable between ground cable terminal and body.

CHECK : **Is resistance less than 10 Ω?**

YES : Check starter motor. <Ref. to “6-1 [K100]”.>

NO : Repair open circuit of ground cable.

3 CHECK HARNESS CONNECTOR BETWEEN BATTERY AND IGNITION SWITCH.

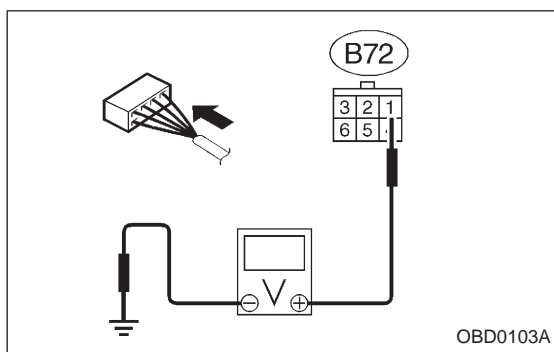
- 1) Turn ignition switch to OFF.
- 2) Remove SBF No. 4 from main fuse box.
- 3) Measure resistance of fuse.

CHECK : **Is resistance less than 1 Ω?**

NO : Replace SBF No. 4.

YES : Go to next step.

- 4) Install SBF No. 4 to main fuse box.
- 5) Turn ignition switch to ON.

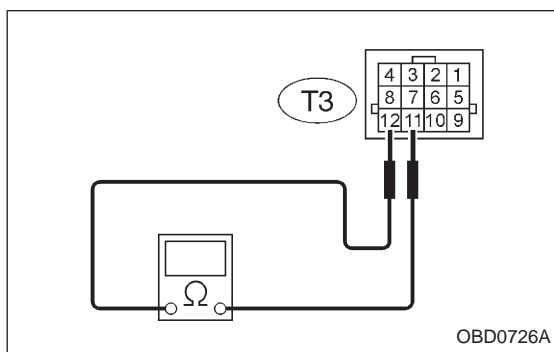


- 6) Measure power supply voltage between ignition switch connector and body.

CHECK : **Connector & terminal (B72) No. 1 — Body/10 V, or more**

YES : Go to step 4.

NO : Repair harness between ignition switch connector and body.



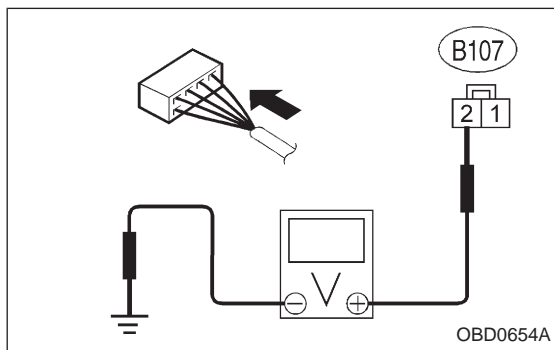
4 ● CHECK INHIBITOR SWITCH. (AT VEHICLES ONLY)

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from transmission.
- 3) Measure resistance between transmission harness connector receptacle's terminals.

CHECK : **Connector & terminal (T3) No. 11 — No. 12/10 Ω , or less**

YES : Repair harness between starter motor and ignition switch connector.

NO : Repair or replace inhibitor switch.



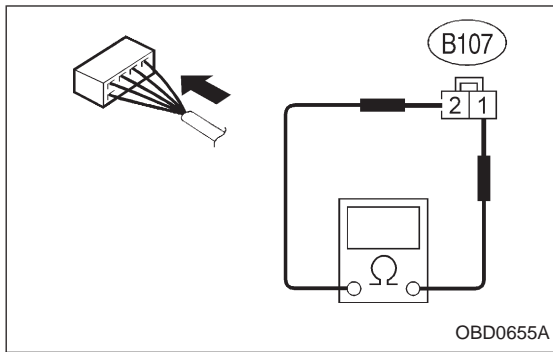
4 ● CHECK STARTER INTERLOCK CIRCUIT. (MT VEHICLES ONLY)

- 1) Turn ignition switch to "ST".
- 2) Measure voltage between clutch switch connector and body.

CHECK : **Connector & terminal (B107) No. 2 — Body/10 V, or more**

NO : Replace starter interlock relay.

YES : Go to next step.



- 3) Turn ignition switch to OFF.
- 4) Measure resistance between clutch switch connector terminals while depressing the clutch pedal.

CHECK : **Connector & terminal**
(B107) No. 1 — No. 2/10 Ω , or less

YES : Repair harness between starter motor and ignition switch connector.

NO : Replace clutch switch.

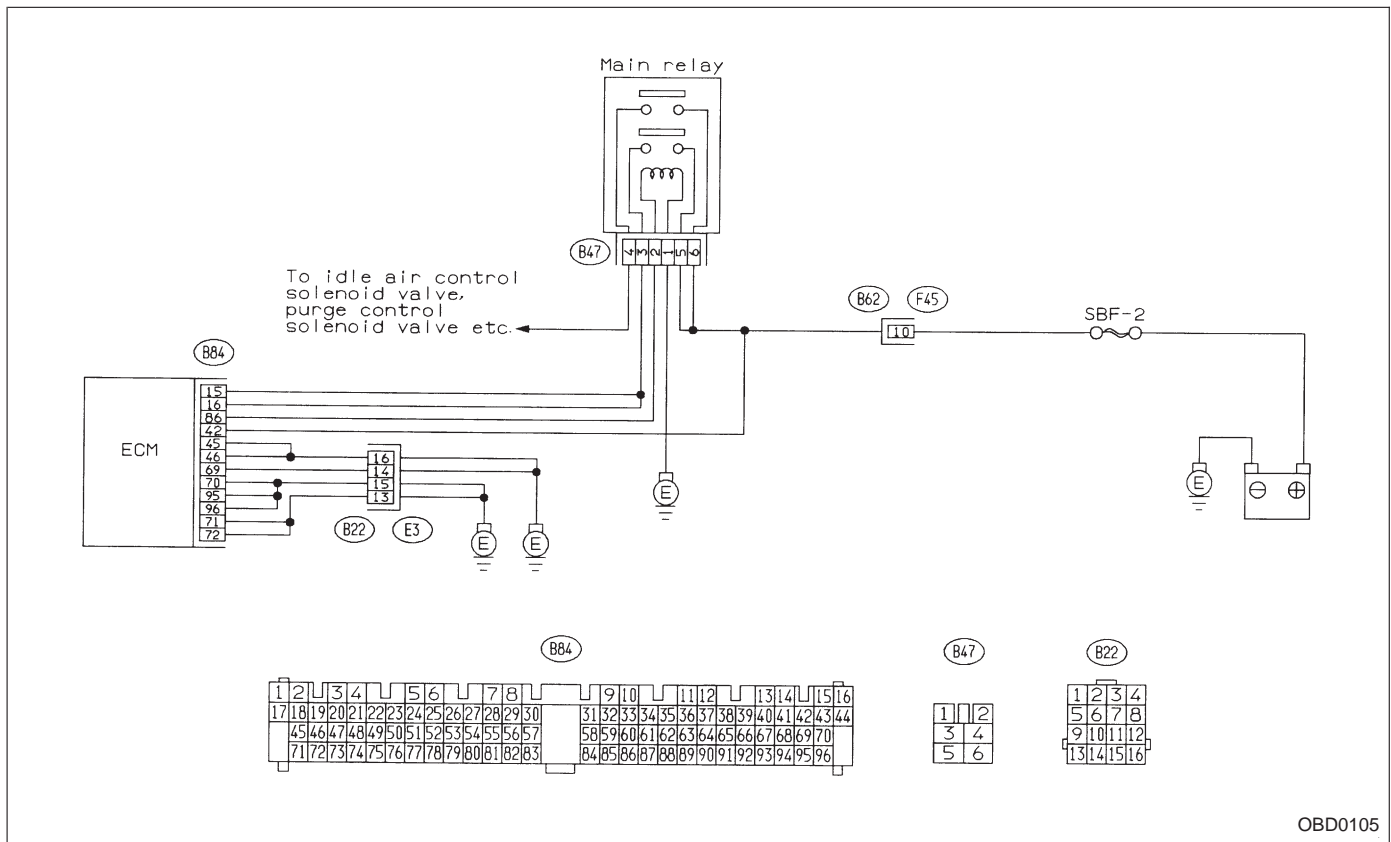
C: CONTROL MODULE POWER SUPPLY AND GROUND LINE

1. Check main relay.
2. Check power supply circuit of ECM.
3. Check ground circuit of ECM.

CAUTION:
 After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

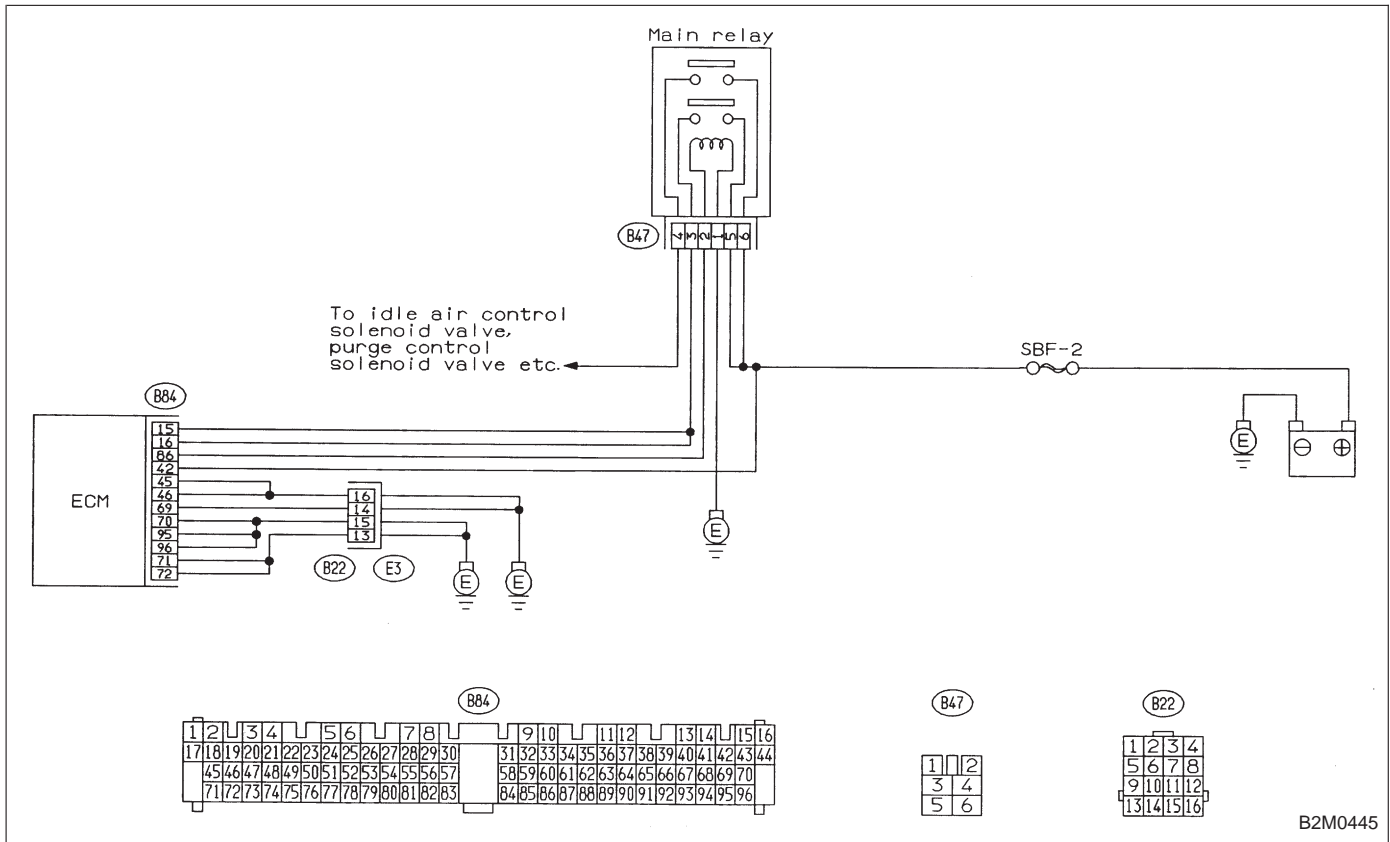
WIRING DIAGRAM:

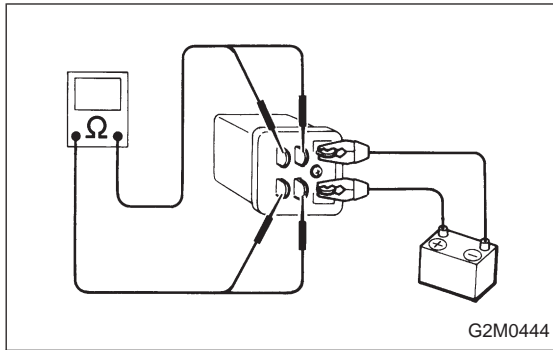
● LHD model



WIRING DIAGRAM:

- RHD model





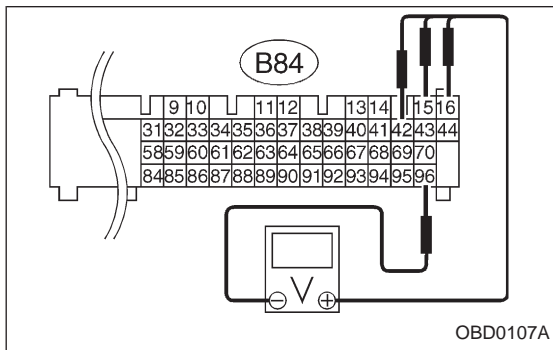
1 CHECK MAIN RELAY.

- 1) Turn the ignition switch to OFF.
- 2) Remove main relay.
- 3) Connect battery to main relay terminals No. 1 and No. 2.
- 4) Measure resistance between main relay terminals.

CHECK : **Terminals**
No. 3 — No. 5/10 Ω , or less
No. 4 — No. 6/10 Ω , or less

YES : Go to step 2.

NO : Replace main relay.



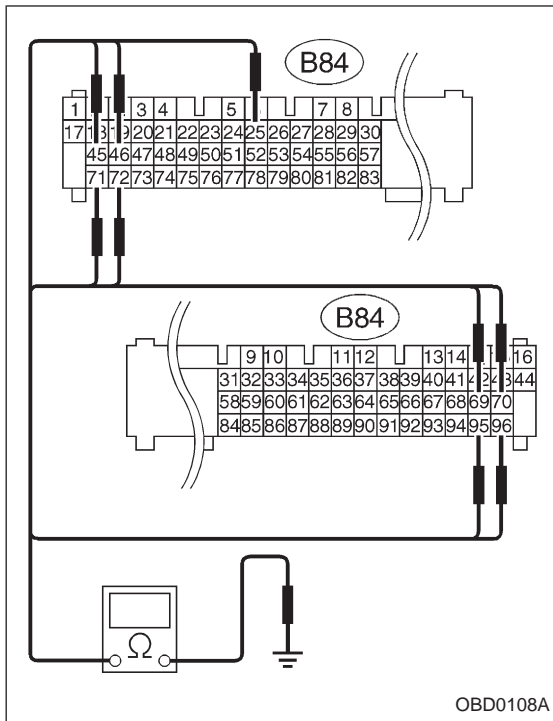
2 CHECK POWER SUPPLY CIRCUIT OF ECM.

- 1) Install main relay.
- 2) Disconnect connectors from ECM.
- 3) Turn ignition switch to ON.
- 4) Measure power supply voltage between ECM connector terminals.

CHECK : **Connector & terminal**
(B84) No. 15 — No. 96/10 V, or more
(B84) No. 16 — No. 96/10 V, or more
(B84) No. 42 — No. 96/10 V, or more

YES : Go to step 3.

NO : Repair harness of power supply circuit.



3 CHECK GROUND CIRCUIT OF ECM.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance of harness connector between ECM and body.

- CHECK** : **Connector & terminal**
- (B84) No. 25 — Body/10 Ω, or less
 - (B84) No. 45 — Body/10 Ω, or less
 - (B84) No. 46 — Body/10 Ω, or less
 - (B84) No. 69 — Body/10 Ω, or less
 - (B84) No. 70 — Body/10 Ω, or less
 - (B84) No. 71 — Body/10 Ω, or less
 - (B84) No. 72 — Body/10 Ω, or less
 - (B84) No. 95 — Body/10 Ω, or less
 - (B84) No. 96 — Body/10 Ω, or less

YES : Check ignition control system. <Ref. to “2-7 [T9D0]”.>

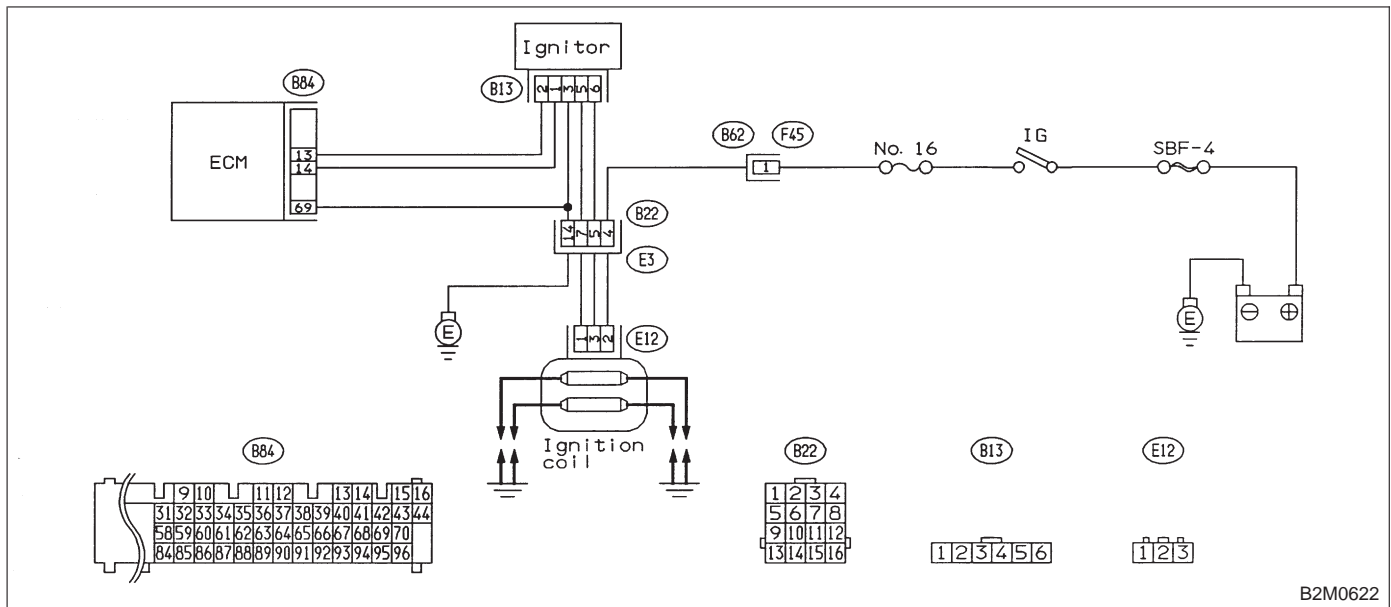
NO : Repair harness between ECM connector and body.

D: IGNITION CONTROL SYSTEM

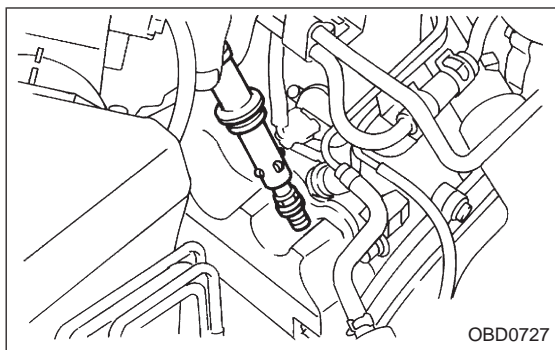
1. Check ignition system for sparks.
2. Check power supply circuit for ignition coil.
3. Check ignition coil.
4. Check harness connector between ignitor and ignition coil.
5. Check input signal for ignitor.
6. Check harness connector of ignitor ground circuit.
7. Check harness connector between ECM and ignitor.

CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



B2M0622



1 CHECK IGNITION SYSTEM FOR SPARKS.

- 1) Remove plug cord cap from each spark plug.
- 2) Install new spark plug on plug cord cap.

CAUTION:

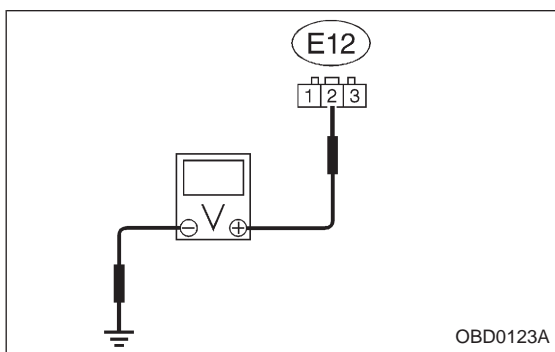
Do not remove spark plug from engine.

- 3) Contact spark plug's thread portion on engine.
- 4) While opening throttle valve fully, crank engine to check that spark occurs at each cylinder.

CHECK : **Does spark occur at each cylinder?**

YES : Check fuel pump system. <Ref. to "2-7 [T9E0]">

NO : Go to step 2.



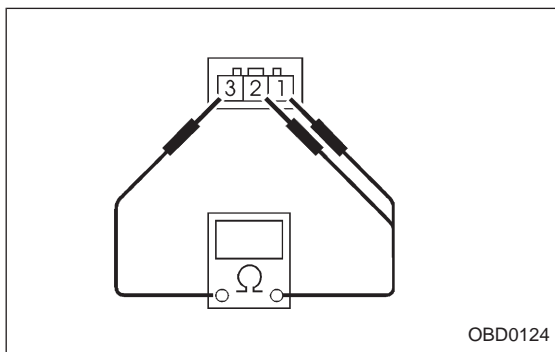
2 CHECK POWER SUPPLY CIRCUIT FOR IGNITION COIL.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ignition coil.
- 3) Turn ignition switch to ON.
- 4) Measure power supply voltage between ignition coil connector terminal and body.

CHECK : **Connector & terminal (E12) No. 2 — Body /10 V, or more**

YES : Go to step 3.

NO : Repair harness between ignition coil and ignition switch connector.



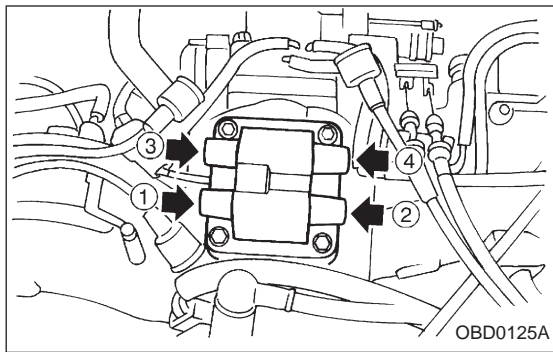
3 CHECK IGNITION COIL.

- 1) Measure resistance between ignition coil terminals to check primary coil.

CHECK : **Terminals**
No. 2 — No. 1/0.7±0.3 Ω
No. 2 — No. 3/0.7±0.3 Ω

NO : Replace ignition coil.

YES : Go to next step.

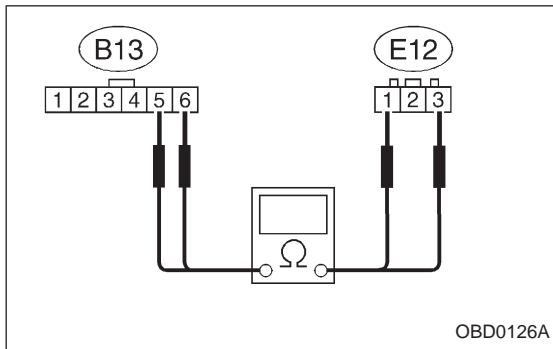


2) Measure resistance between spark plug cord contact portions to check secondary coil.

CHECK : **Connector & terminal**
 #1 — #2 /21±3 kΩ
 #3 — #4 /21±3 kΩ

YES : Go to step 4.

NO : Replace ignition coil.



4 CHECK HARNESS CONNECTOR BETWEEN IGNITOR AND IGNITION COIL.

1) Turn ignition switch to OFF.

2) Disconnect connector from ignitor.

3) Measure resistance of harness connector between ignition coil and ignitor.

CHECK : **Connector & terminal**
 (B13) No. 5 — (E12) No. 1/10 Ω, or less
 (B13) No. 6 — (E12) No. 3/10 Ω, or less

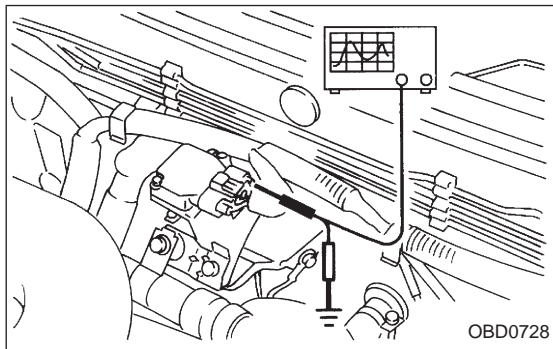
YES : Go to step 5.

NO : Go to next **CHECK** .

CHECK : **Is there poor contact in coupling connector (B22)?**

YES : Repair poor contact in coupling connector.

NO : Repair harness between ignition coil and ignitor connector.



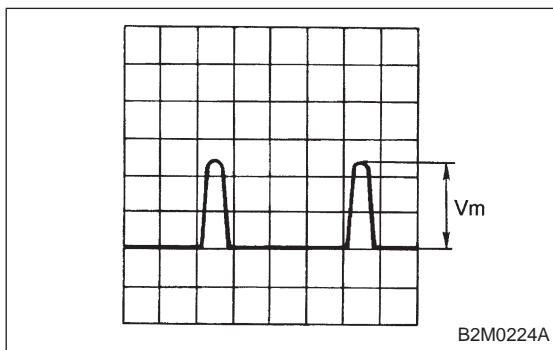
5 CHECK INPUT SIGNAL FOR IGNITOR.

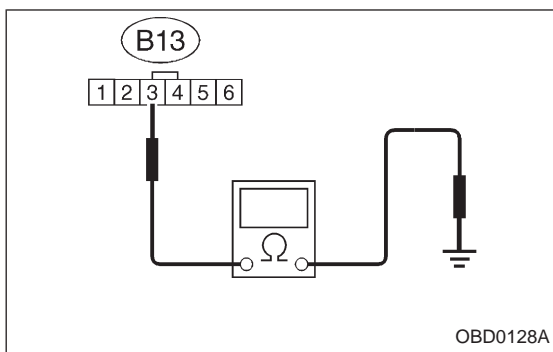
Check if voltage varies synchronously with engine speed when cranking, while monitoring voltage between ignitor connector and body.

CHECK : **Connector & terminal:**
 (B13) No. 1 — Body/10 V, or more
 (B13) No. 2 — Body/10 V, or more

YES : Go to step 6.

NO : Replace ignitor.





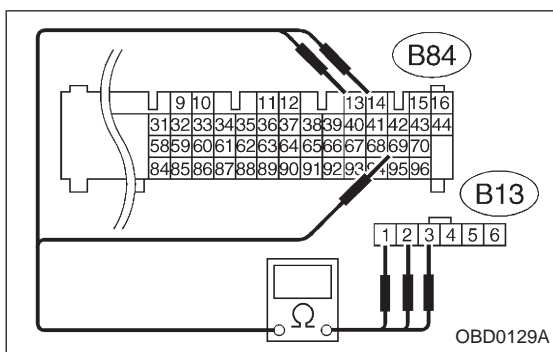
6 CHECK HARNESS CONNECTOR OF IGNITOR GROUND CIRCUIT.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between ignitor and body.

CHECK : **Connector & terminal**
(B13) No. 3 — Body /10 Ω, or less

YES : Go to step 7.

NO : Repair harness between ignitor connector and body.



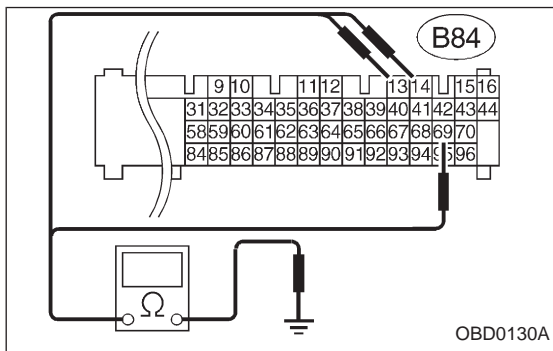
7 CHECK HARNESS CONNECTOR BETWEEN ECM AND IGNITOR.

- 1) Disconnect connector from ECM.
- 2) Measure resistance of harness connector between ECM and ignitor.

CHECK : **Connector & terminal**
(B84) No. 14 — (B13) No. 1/10 Ω, or less
(B84) No. 13 — (B13) No. 2/10 Ω, or less
(B84) No. 69 — (B13) No. 3/10 Ω, or less

NO : Repair open circuit of harness between ECM and ignitor connector.

YES : Go to next step.



- 3) Measure resistance of harness connector between ECM and body.

CHECK : **Connector & terminal**
(B84) No. 13 — Body/1 MΩ, or more
(B84) No. 14 — Body/1 MΩ, or more

NO : Repair short circuit of harness between ECM and ignitor.

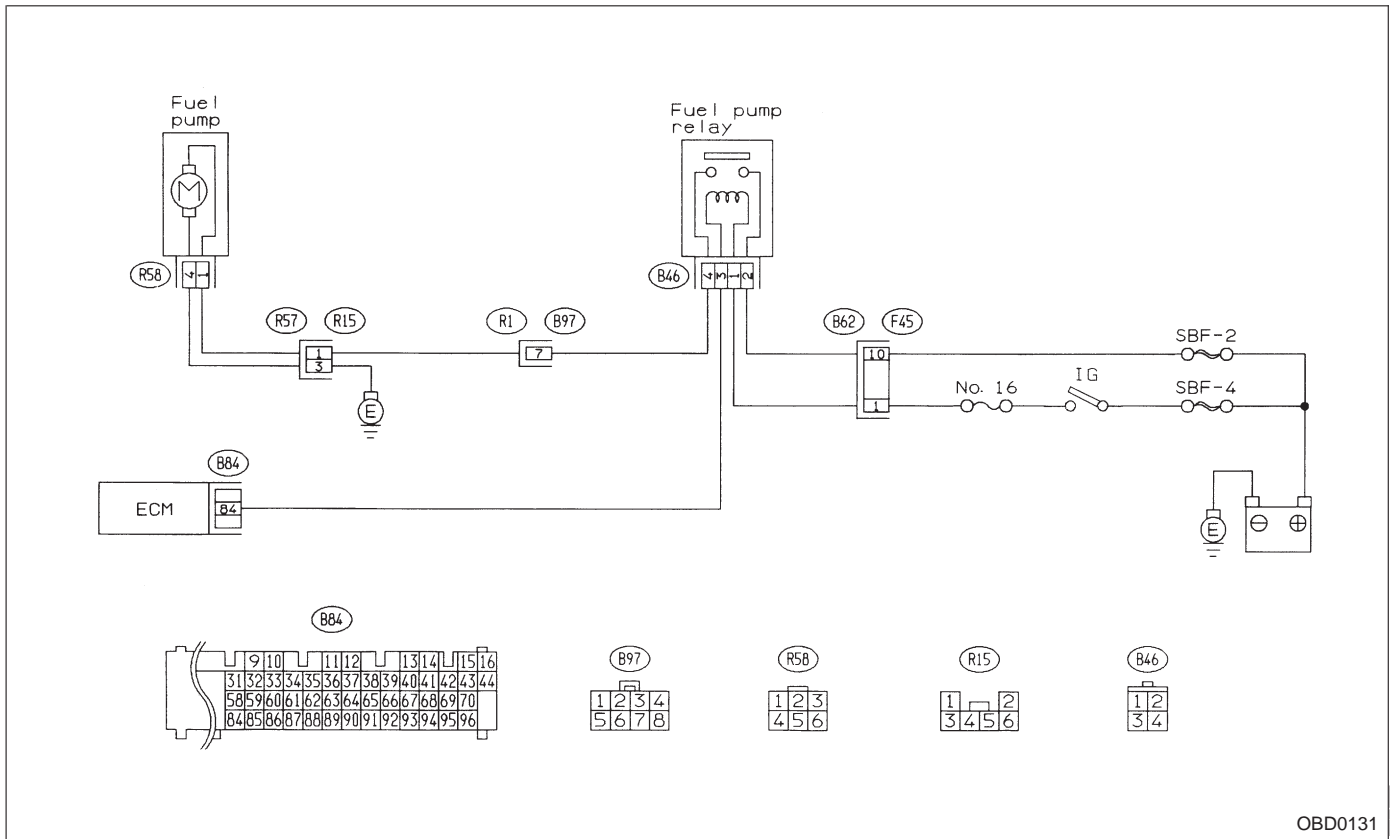
YES : Confirm good connection in ECM connector.

E: FUEL PUMP CIRCUIT

1. Check operating sound of fuel pump.
2. Check ground circuit of fuel pump.
3. Check power supply to fuel pump.
4. Check harness connector between fuel pump and fuel pump relay.
5. Check fuel pump relay.
6. Check harness connector between ECM and fuel pump relay.

WIRING DIAGRAM:

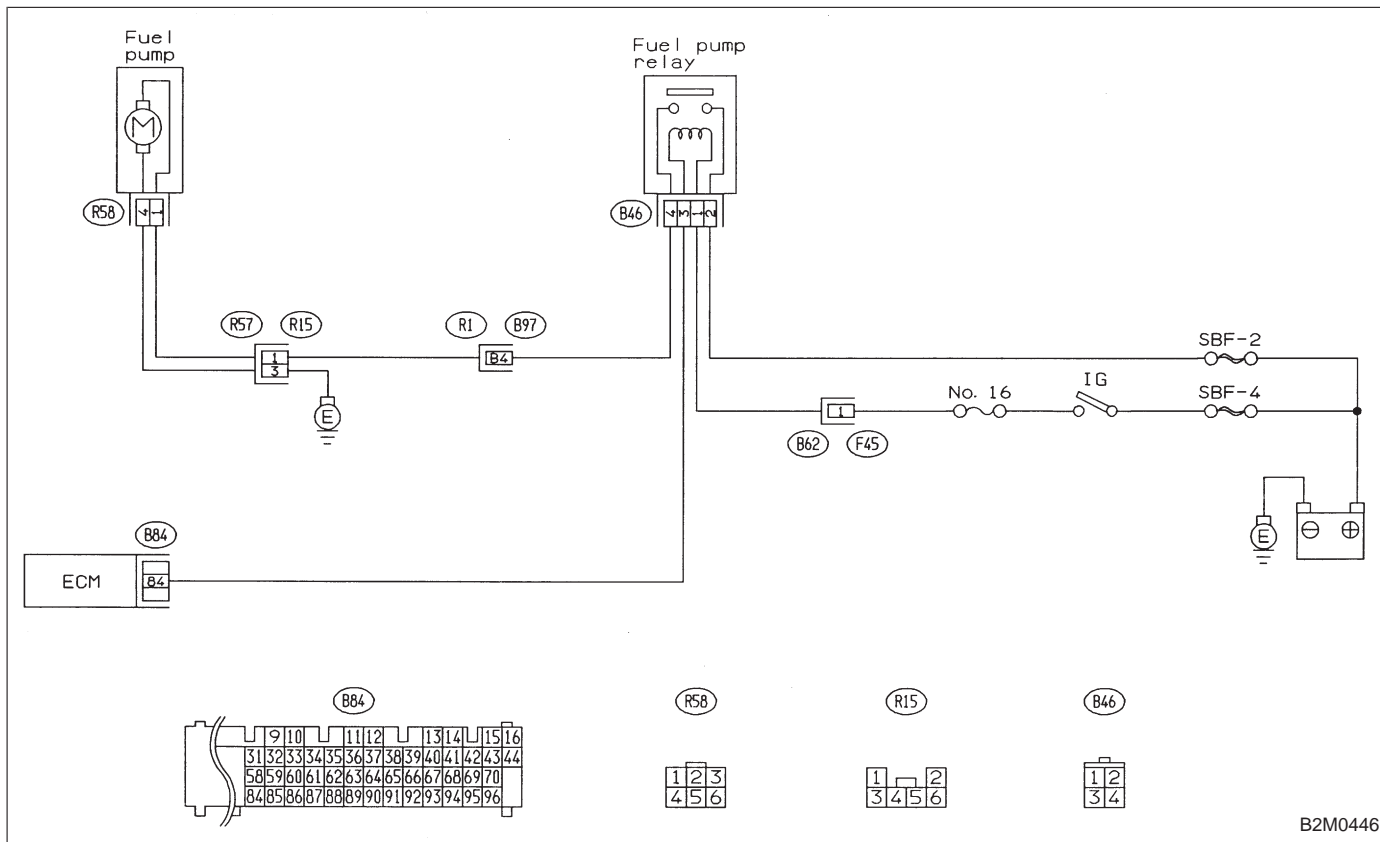
● LHD model



OBD0131

WIRING DIAGRAM:

- RHD model



B2M0446

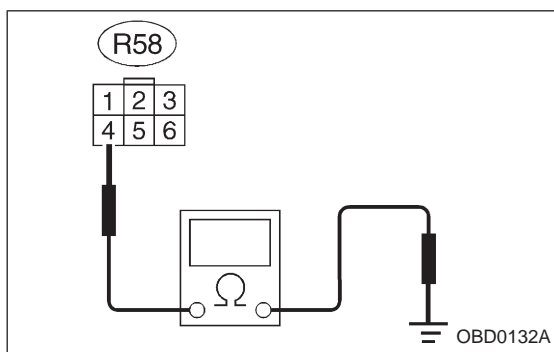
1 CHECK OPERATING SOUND OF FUEL PUMP.

Make sure that fuel pump is in operation for two seconds when turning ignition switch to ON.

CHECK : **Does fuel pump produce operating sound?**

YES : Check fuel injector circuit. <Ref. to "2-7 [T11Q0]">

NO : Go to step 2.

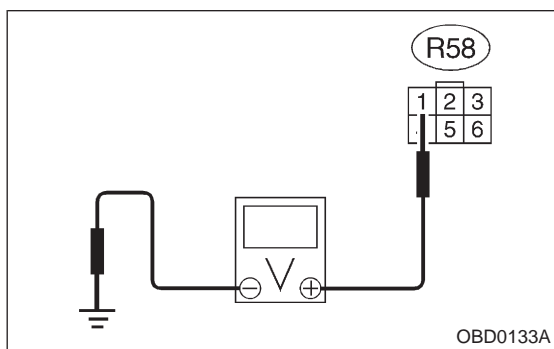
**2 CHECK GROUND CIRCUIT OF FUEL PUMP.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from fuel pump.
- 3) Measure resistance of harness connector between fuel pump and body.

CHECK : **Connector & terminal**
(R58) No. 4 — Body /10 Ω, or less

YES : Go to step 3.

NO : Repair open circuit of fuel pump ground circuit.

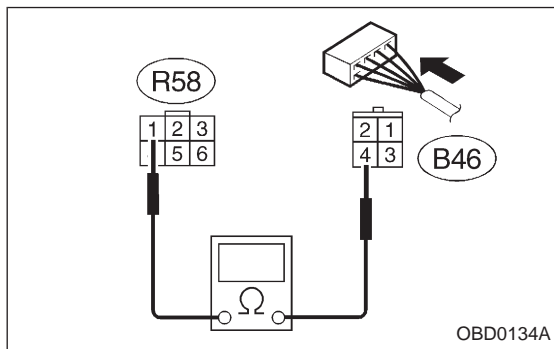
**3 CHECK POWER SUPPLY TO FUEL PUMP.**

- 1) Turn ignition switch to ON.
- 2) Measure voltage of power supply circuit between fuel pump connector and body.

CHECK : **Connector & terminal**
(R58) No. 1 — Body /10 V, or more

YES : Replace fuel pump.

NO : Go to step 4.

**4 CHECK HARNESS CONNECTOR BETWEEN FUEL PUMP AND FUEL PUMP RELAY.**

- 1) Turn ignition switch to OFF.
- 2) Measure resistance of harness connector between fuel pump and fuel pump relay.

CHECK : **Connector & terminal**
(R58) No. 1 — (B46) No. 4/10 Ω, or less

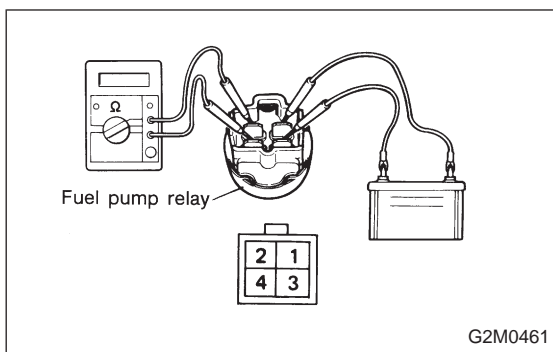
YES : Go to next **CHECK** .

NO : Repair open circuit of harness between fuel pump and fuel pump relay connector.

CHECK : **Connector & terminal**
(R58) No. 1 — Body/1 MΩ, or more

YES : Go to step 5.

NO : Repair short circuit of harness between fuel pump and fuel pump relay connector.



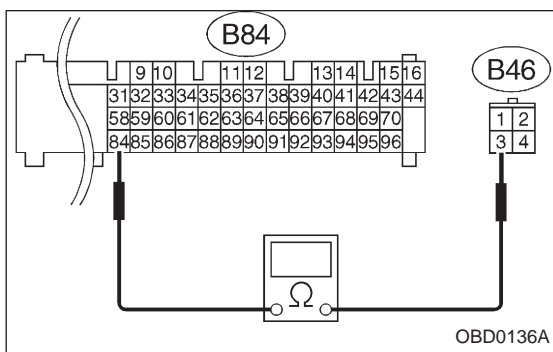
5 CHECK FUEL PUMP RELAY.

- 1) Disconnect connectors from fuel pump relay and main relay.
- 2) Remove fuel pump relay and main relay with bracket.
- 3) Connect battery to fuel pump relay connector terminals No. 1 and No. 3.
- 4) Measure resistance between connector terminals of fuel pump relay.

CHECK : **Terminals**
No. 2 — No. 4/10 Ω, or less

YES : Go to step 6.

NO : Replace fuel pump relay.



6 CHECK HARNESS CONNECTOR BETWEEN ECM AND FUEL PUMP RELAY.

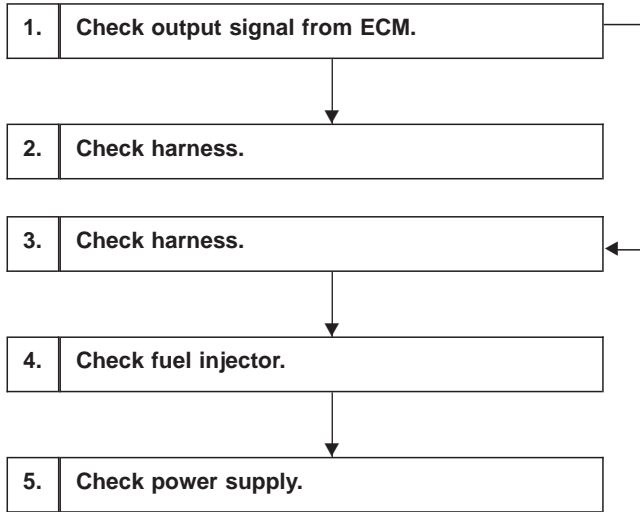
- 1) Disconnect connectors from ECM.
- 2) Measure resistance of harness connector between ECM and fuel pump relay.

CHECK : **Connector & terminal**
(B84) No. 84 — (B46) No. 3/10 Ω, or less

NO : Repair harness between ECM and fuel pump relay connector.

YES : Confirm good connection in ECM connector.

F: FUEL INJECTOR CIRCUIT

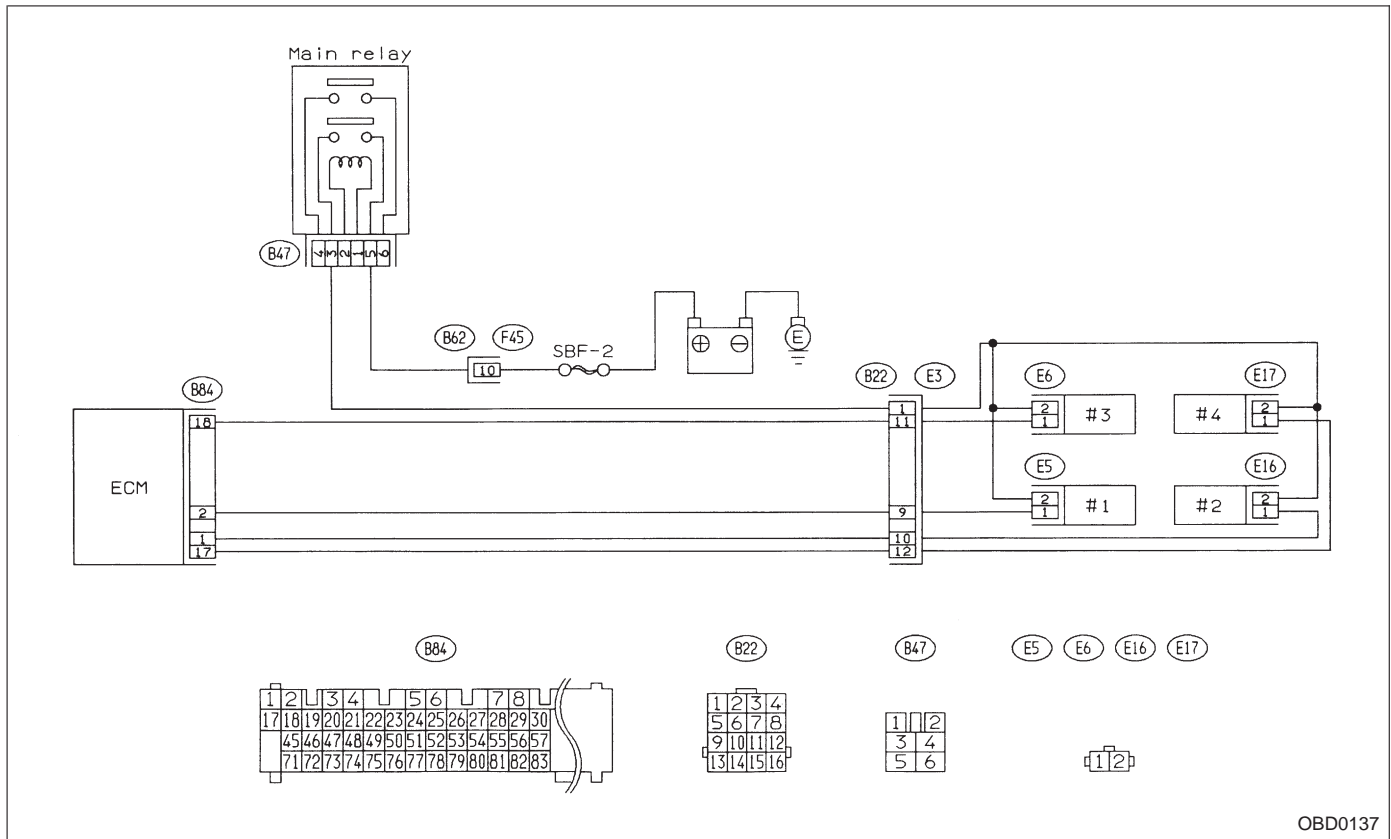


CAUTION:

- Check or repair only faulty parts.
- After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

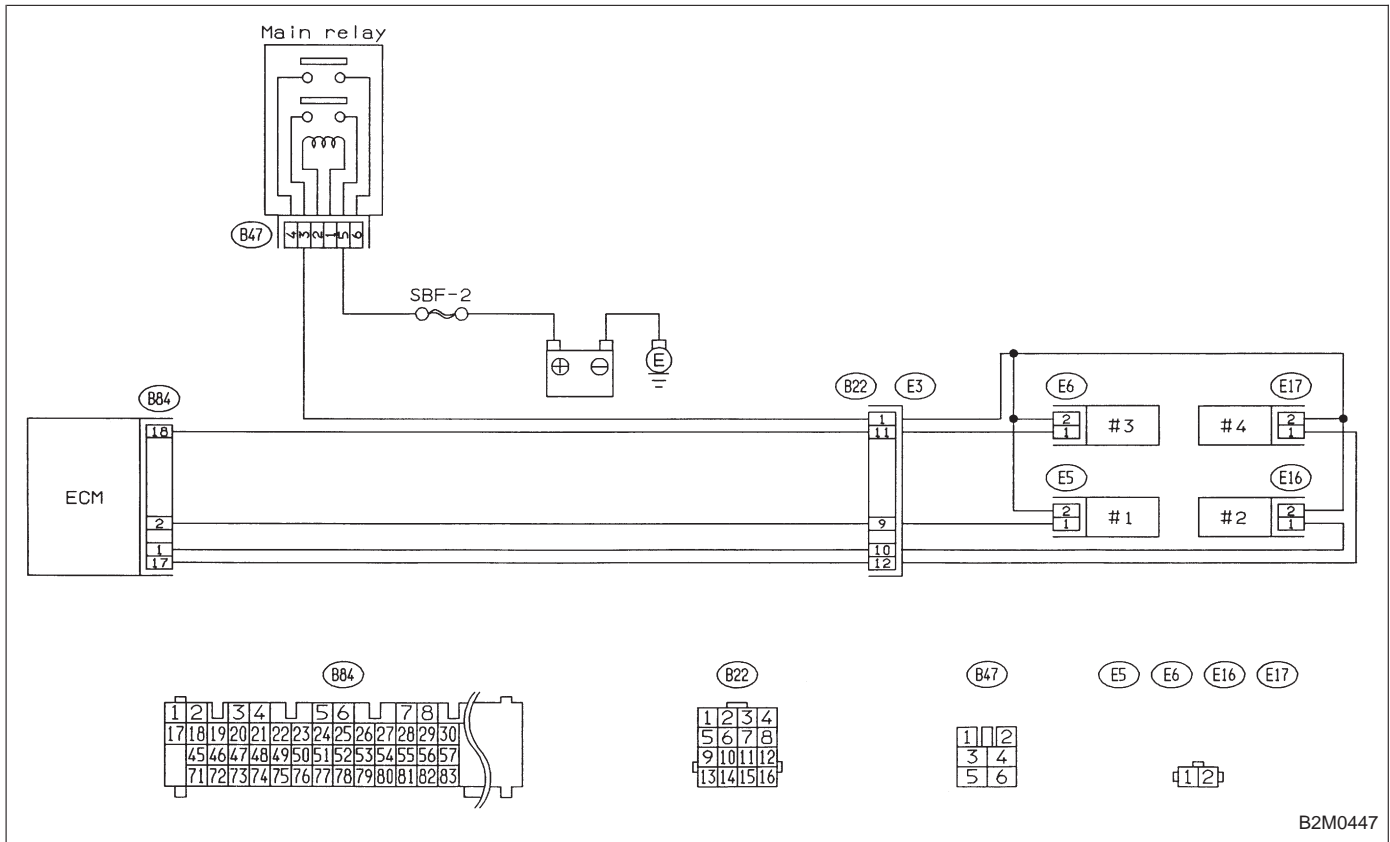
- LHD model



OBD0137

WIRING DIAGRAM:

- RHD model



B2M0447

NOTE:

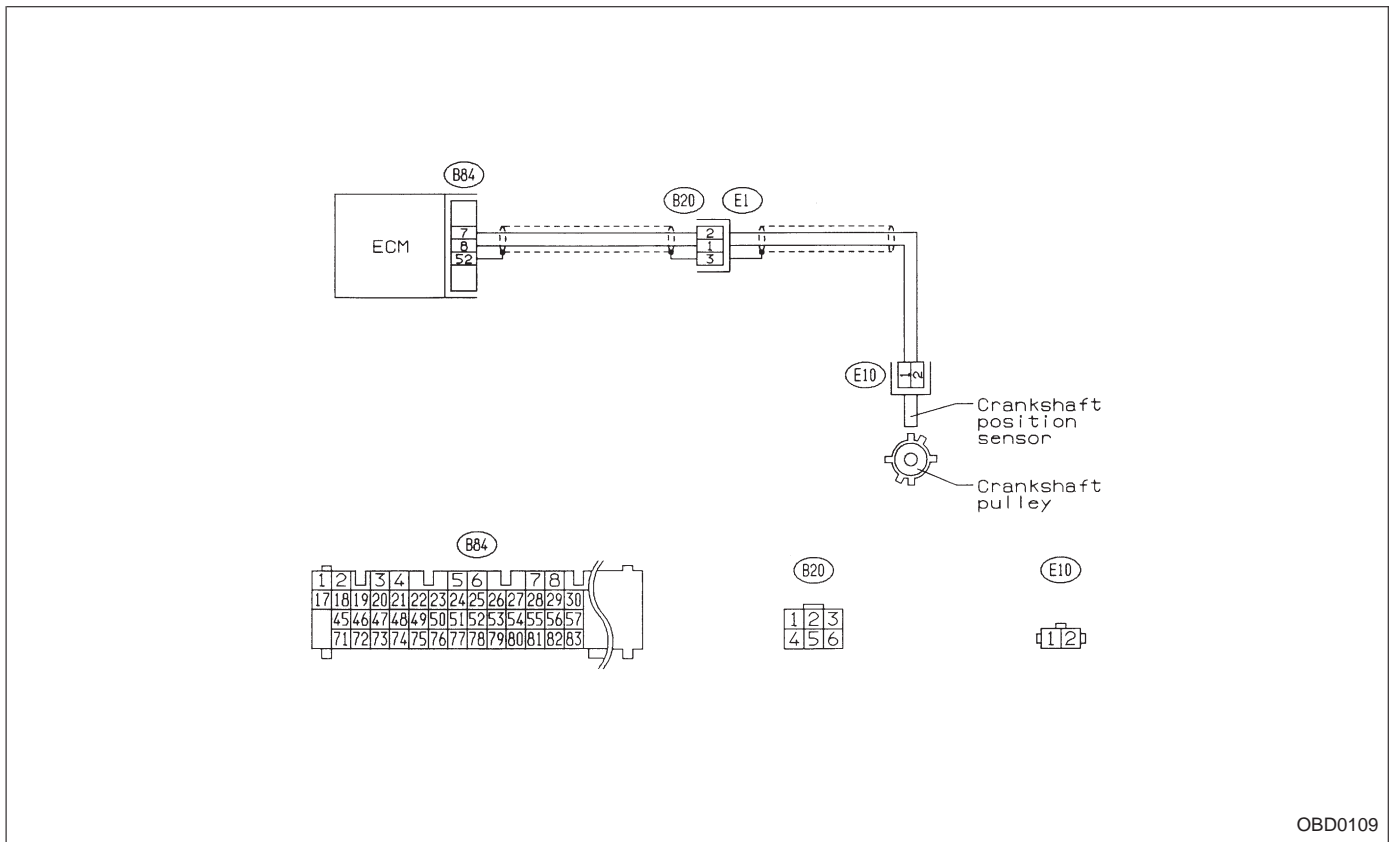
For the diagnostic procedure on fuel injector circuit, refer to "2-7 [T11Q0]".

G: CRANKSHAFT POSITION SENSOR CIRCUIT

1. Check harness.
2. Check crankshaft position sensor.

CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES.
 <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD0109

NOTE:
 For the diagnostic procedure on crankshaft position sensor circuit, refer to "2-7 [T11Z0]".

H: CAMSHAFT POSITION SENSOR CIRCUIT

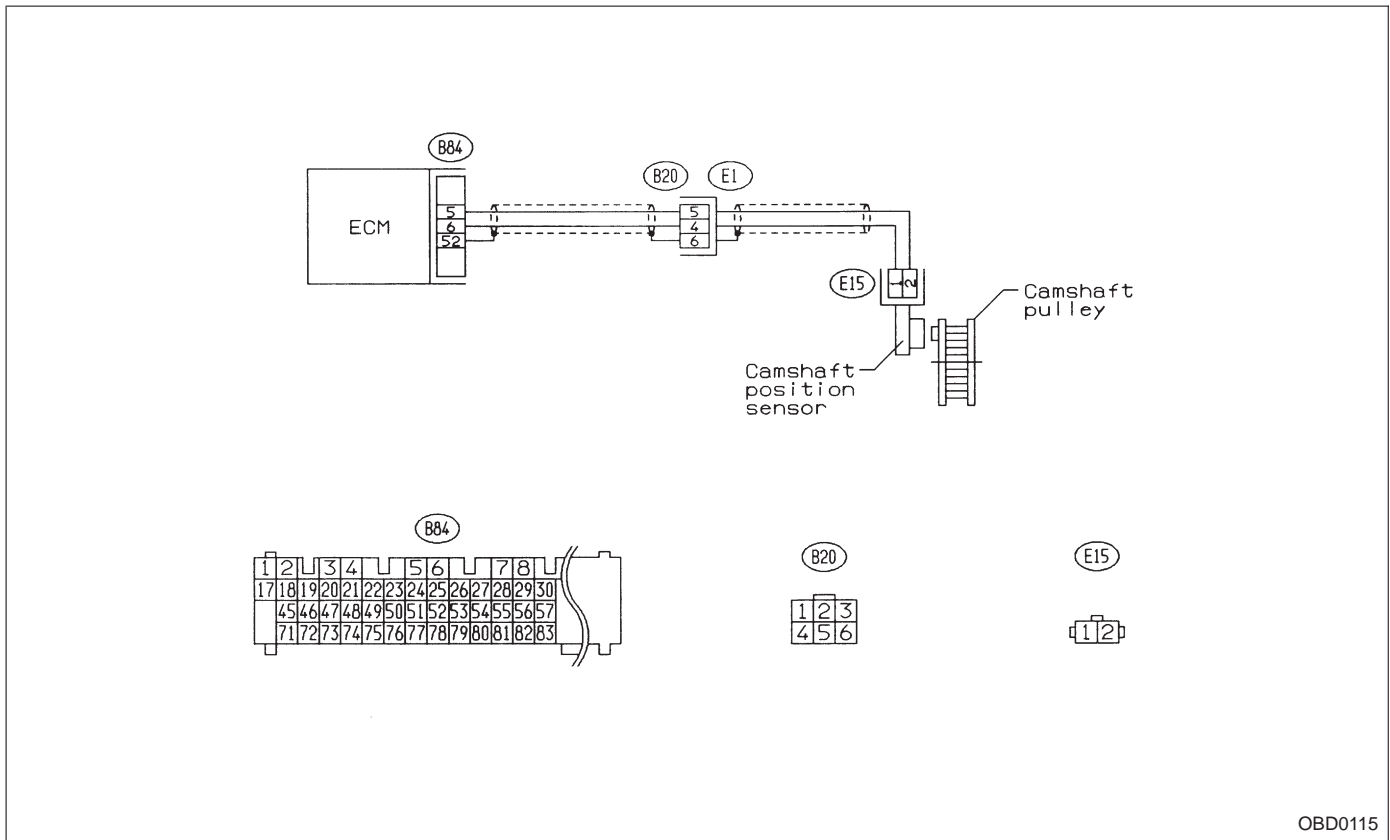
1. Check harness.



2. Check camshaft position sensor.

CAUTION:
 After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**.
 <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD0115

NOTE:
 For the diagnostic procedure on crankshaft position sensor circuit, refer to "2-7 [T11AA]".

10. General Diagnostics Table

1. FOR ENGINE

Symptom		Problem parts												
		1	2	3	4	5	6	7	8	9	10	11	12	13
		Mass air flow sensor	Engine coolant temperature sensor (*1)	Throttle position sensor	Crankshaft position sensor & Camshaft position sensor (*2)	Idle air control solenoid valve	Knock sensor	Purge control solenoid valve	EGR valve	Fuel injection parts (*3)	Ignition parts (*4)	Fuel pump and relay	A/C switch and A/C cut relay	Engine torque control signal circuit
1	Engine stalls during idling.	○	△		□	○			○	○	○			
2	Rough idling	○	△	○	□	○			○					
3	Engine does not return to idle.	○		○		○								
4	Poor acceleration	○	△		□					○		○	○	○
5	Engine stalls or engine sags or hesitates at acceleration.	○	△	○	□			○	○	○		○		
6	Surge	○	△	○					○	○		○		
7	Spark knock	○					○			○		○		
8	After burning in exhaust system	○	△							○		○		

*1: The mark, △, indicates the symptom occurring only in cold temperatures.

*2: For items with the mark, □, ensure the secure installation of crankshaft position sensor and camshaft position sensor. Replacement is not necessary.

*3: Check fuel injector, fuel pressure regulator and fuel filter.

*4: Check igniter, ignition coil and spark plug.

NOTE:

Malfunction of parts other than the above is also possible. Refer to 1. Engine Trouble in General [K100] in Repair Section 2-3 of the Service Manual.

2. FOR AT

Symptom	Problem parts																																	
	Inhibitor switch	Control module	Vehicle speed sensor 1	Vehicle speed sensor 2	Select cable	Select lever	FWD switch	Starter motor and harness	Throttle position sensor	Hold switch	Accumulator ("N" — "D")	Accumulator (2A)	Accumulator (4A)	Accumulator (3R)	ATF temperature sensor	Strainer	Duty solenoid A	Duty solenoid B	Shift solenoid 1	Shift solenoid 2	Shift solenoid 3	Control valve	Detent spring	Manual plate	Transfer clutch	Transfer valve	Transfer pipe	Duty solenoid C	Forward clutch					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29					
Starter does not rotate when select lever is in "P" or "N."; starter rotates when select lever is "R", "D", "3" or "2."	<input type="radio"/>				<input type="radio"/>	<input type="radio"/>		<input type="radio"/>																										
Abnormal noise when select lever is in "P" or "N."																<input type="radio"/>												<input type="radio"/>						
Hissing noise occurs during standing starts.																<input type="radio"/>																		
Noise occurs while driving in "D ₁ " range.																																		
Noise occurs while driving in "D ₂ " range.																																		
Noise occurs while driving in "D ₃ " range.																																		
Noise occurs while driving in "D ₄ " range.																																		
Engine stalls while shifting from one range to another.																							<input type="radio"/>											
Vehicle moves when select lever is in "N."																														<input type="radio"/>				
Shock occurs when select lever is moved from "N" to "D."		<input type="radio"/>									<input type="radio"/>											<input type="radio"/>												
Excessive time lag occurs when select lever is moved from "N" to "D."																						<input type="radio"/>									<input type="radio"/>			
Shock occurs when select lever is moved from "N" to "R."		<input type="radio"/>											<input type="radio"/>									<input type="radio"/>												
Excessive time lag occurs when select lever is moved from "N" to "R."																						<input type="radio"/>												
Vehicle does not start in any shift range (engine revving up).																<input type="radio"/>						<input type="radio"/>												
Vehicle does not start in any shift range (engine stall).																																		
Vehicle does not start in "R" range only (engine revving up).					<input type="radio"/>	<input type="radio"/>																<input type="radio"/>												
Vehicle does not start in "R" range only (engine stall).																															<input type="radio"/>			
Vehicle does not start in "D" or "3" range (engine revving up).																															<input type="radio"/>			
Vehicle does not start in "D", "3" or "2" range (engine revving up).																															<input type="radio"/>			
Vehicle does not start in "D", "3" or "2" range (engine stall).																															<input type="radio"/>			
Vehicle starts in "R" range only (engine revving up).																						<input type="radio"/>												
Acceleration during standing starts is poor (high stall rpm).																						<input type="radio"/>									<input type="radio"/>			
Acceleration during standing starts is poor (low stall rpm).																																		
Acceleration is poor when select lever is in "D", "3" or "2" range (normal stall rpm).		<input type="radio"/>																				<input type="radio"/>												
Acceleration is poor when select lever is in "R" (normal stall rpm).																							<input type="radio"/>											
No shift occurs from 1st to 2nd gear.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					<input type="radio"/>												<input type="radio"/>	<input type="radio"/>	<input type="radio"/>											
No shift occurs from 2nd to 3rd gear.		<input type="radio"/>																					<input type="radio"/>											
No shift occurs from 3rd to 4th gear.		<input type="radio"/>												<input type="radio"/>	<input type="radio"/>							<input type="radio"/>	<input type="radio"/>											
No "kick-down" shifts occur.		<input type="radio"/>							<input type="radio"/>																									
Engine brake is not effected when select lever is in "3" range.	<input type="radio"/>	<input type="radio"/>							<input type="radio"/>														<input type="radio"/>											

10. General Diagnostics Table

30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	Problem parts
																												Symptom	
																												Starter does not rotate when select lever is in "P" or "N."; starter rotates when select lever is "R", "D", "3" or "2."	
							○												○					○				Abnormal noise when select lever is in "P" or "N."	
																								○				Hissing noise occurs during standing starts.	
					○												○	○							○			Noise occurs while driving in "D ₁ " range.	
					○												○	○							○			Noise occurs while driving in "D ₂ " range.	
					○												○	○							○			Noise occurs while driving in "D ₃ " range.	
					○												○	○							○			Noise occurs while driving in "D ₄ " range.	
																						○			○			Engine stalls while shifting from one range to another.	
																												Vehicle moves when select lever is in "N."	
																												Shock occurs when select lever is moved from "N" to "D."	
																												Excessive time lag occurs when select lever is moved from "N" to "D."	
																												Shock occurs when select lever is moved from "N" to "R."	
										○	○																	Excessive time lag occurs when select lever is moved from "N" to "R."	
	○	○	○	○			○									○	○	○		○								Vehicle does not start in any shift range (engine revving up).	
																										○		Vehicle does not start in any shift range (engine stall).	
											○	○																Vehicle does not start in "R" range only (engine revving up).	
																	○											Vehicle does not start in "R" range only (engine stall).	
												○																Vehicle does not start in "D" or "3" range (engine revving up).	
																												Vehicle does not start in "D", "3" or "2" range (engine revving up).	
												○																Vehicle does not start in "D", "3" or "2" range (engine stall).	
																												Vehicle starts in "R" range only (engine revving up).	
																									○			Acceleration during standing starts is poor (high stall rpm).	
							○																		○			Acceleration during standing starts is poor (low stall rpm).	
								○	○									○										Acceleration is poor when select lever is in "D", "3" or "2" range (normal stall rpm).	
○								○	○									○										Acceleration is poor when select lever is in "R" (normal stall rpm).	
																												No shift occurs from 1st to 2nd gear.	
													○															No shift occurs from 2nd to 3rd gear.	
																												No shift occurs from 3rd to 4th gear.	
																												No "kick-down" shifts occur.	
																												Engine brake is not effected when select lever is in "3" range.	

Symptom	Problem parts																												
	Inhibitor switch	Control module	Vehicle speed sensor 1	Vehicle speed sensor 2	Select cable	Select lever	FWD switch	Starter motor and harness	Throttle position sensor	Hold switch	Accumulator ("N" — "D")	Accumulator (2A)	Accumulator (4A)	Accumulator (3R)	ATF temperature sensor	Strainer	Duty solenoid A	Duty solenoid B	Shift solenoid 1	Shift solenoid 2	Shift solenoid 3	Control valve	Detent spring	Manual plate	Transfer clutch	Transfer valve	Transfer pipe	Duty solenoid C	Forward clutch
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Engine brake is not effected when select lever is in "3" or "2" range.																													
Engine brake is not effected when select lever is in "1" range.																							○						
Shift characteristics are erroneous.	○	○	○	○					○														○						
No lock-up occurs.		○							○						○								○						
Vehicle cannot be set in "D" range power mode.		○							○																				
"D" range power mode cannot be released.		○							○						○														
Parking brake is not effected.					○	○																							
Shift lever cannot be moved or is hard to move from "P" range.					○	○																							
Select lever is hard to move.					○	○																		○	○				
Select lever is too light to move (unreasonable resistance).																							○	○					
ATF spurts out.																													
Differential oil spurts out.																													
Differential oil level changes excessively.																													
Odor is produced from oil supply pipe.																										○			○
Shock occurs when select lever is moved from "1" to "2" range.		○							○			○			○		○					○							
Slippage occurs when select lever is moved from "1" to "2" range.		○							○			○			○		○					○							
Shock occurs when select lever is moved from "2" to "3" range.		○							○				○		○		○					○							
Slippage occurs when select lever is moved from "2" to "3" range.		○							○				○		○		○					○							
Shock occurs when select lever is moved from "3" to "4" range.		○							○				○		○		○					○							
Slippage occurs when select lever is moved from "3" to "4" range.		○							○				○		○		○					○							
Shock occurs when select lever is moved from "3" to "2" range.		○							○						○		○					○							
Shock occurs when select lever is moved from "D" to "1" range.		○							○						○		○					○							
Shock occurs when select lever is moved from "2" to "1" range.		○							○						○		○					○							
Shock occurs when accelerator pedal is released at medium speeds.		○							○						○		○					○							
Vibration occurs during straight-forward operation.		○																											
Select lever slips out of position during acceleration or while driving on rough terrain.					○	○																	○	○					
Vibration occurs during turns (tight corner "braking" phenomenon).		○	○	○					○	○					○											○	○		○
Front wheel slippage occurs during standing starts.		○		○			○		○	○					○							○			○	○	○	○	○
Vehicle is not set in FWD mode.		○					○																		○	○		○	

10. General Diagnostics Table

30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58				
Overrunning clutch	Drive pinion	Crown gear	Axle shaft	Differential gear	Final gear	Seal pipe	Oil pump	High clutch	Band brake	Low & reverse clutch	Reverse clutch	One-way clutch (1-2)	One-way clutch (3-4)	Double oil seal	Input shaft	Output shaft	Planetary gear	Reduction gear	Drive plate	Torque converter one-way clutch	Lock-up facing	Lock-up damper	ATF deterioration	ATF level too high or too low	Differential gear oil level too high or too low	Engine performance	Engine speed signal	Parking brake mechanism	Problem parts			
																															Symptom	
																																Engine brake is not effected when select lever is in "3" or "2" range.
																																Engine brake is not effected when select lever is in "1" range.
																																Shift characteristics are erroneous.
																																No lock-up occurs.
																																Vehicle cannot be set in "D" range power mode.
																																"D" range power mode cannot be released.
																																○ Parking brake is not effected.
																																○ Shift lever cannot be moved or is hard to move from "P" range.
																																Select lever is hard to move.
																																Select lever is too light to move (unreasonable resistance).
																																○ ATF spurts out.
																																○ Differential oil spurts out.
																																○ Differential oil level changes excessively.
																																○ Odor is produced from oil supply pipe.
																																○ Shock occurs when select lever is moved from "1" to "2" range.
																																○ Slippage occurs when select lever is moved from "1" to "2" range.
																																○ Shock occurs when select lever is moved from "2" to "3" range.
																																○ Slippage occurs when select lever is moved from "2" to "3" range.
																																○ Shock occurs when select lever is moved from "3" to "4" range.
																																○ Slippage occurs when select lever is moved from "3" to "4" range.
																																○ Shock occurs when select lever is moved from "3" to "2" range.
																																○ Shock occurs when select lever is moved from "D" to "1" range.
																																○ Shock occurs when select lever is moved from "2" to "1" range.
																																○ Shock occurs when accelerator pedal is released at medium speeds.
																																○ Vibration occurs during straight-forward operation.
																																○ Select lever slips out of position during acceleration or while driving on rough terrain.
																																○ Vibration occurs during turns (tight corner "braking" phenomenon).
																																○ Front wheel slippage occurs during standing starts.
																																○ Vehicle is not set in FWD mode.

11. Diagnostics Chart with Trouble Code

A: DIAGNOSTIC TROUBLE CODE (DTC) LIST

DTC No.	Abbreviation (Subaru select monitor)	Item	Page
P0100	QA	Mass air flow sensor circuit malfunction	135
P0101	QA — R	Mass air flow sensor circuit range/performance problem	141
P0105	P — S	Pressure sensor circuit malfunction	144
P0106	P — R	Pressure sensor circuit range/performance problem	151
P0115	TW	Engine coolant temperature sensor circuit malfunction	156
P0120	THV	Throttle position sensor circuit malfunction	161
P0121	TH — R	Throttle position sensor circuit range/performance problem	167
P0125	TW — CL	Insufficient coolant temperature for closed loop fuel control	169
P0130	FO2 — V	Front oxygen sensor circuit malfunction	171
P0133	FO2 — R	Front oxygen sensor circuit slow response	177
P0135	FO2H	Front oxygen sensor heater circuit malfunction	180
P0136	RO2 — V	Rear oxygen sensor circuit malfunction	185
P0139	RO2 — R	Rear oxygen sensor circuit slow response	190
P0141	RO2H	Rear oxygen sensor heater circuit malfunction	193
P0170	FUEL	Fuel trim malfunction	198
P0201	INJ1	Fuel injector circuit malfunction - #1	203
P0202	INJ2	Fuel injector circuit malfunction - #2	
P0203	INJ3	Fuel injector circuit malfunction - #3	
P0204	INJ4	Fuel injector circuit malfunction - #4	
P0301	MIS — 1	Cylinder 1 misfire detected	210
P0302	MIS — 2	Cylinder 2 misfire detected	
P0303	MIS — 3	Cylinder 3 misfire detected	
P0304	MIS — 4	Cylinder 4 misfire detected	
P0325	KNOCK	Knock sensor circuit malfunction	217
P0335	CRANK	Crankshaft position sensor circuit malfunction	221
P0340	CAM	Camshaft position sensor circuit malfunction	225
P0400	EGR	Exhaust gas recirculation flow malfunction	229
P0403	EGRSOL	Exhaust gas recirculation circuit malfunction	235
P0420	CAT	Catalyst system efficiency below threshold	240
P0441	CPC — F	Evaporative emission control system incorrect purge flow	244
P0443	CPC	Evaporative emission control system purge control valve circuit malfunction	248
P0500	VSP	Vehicle speed sensor malfunction	253
P0505	ISC	Idle control system malfunction	256
P0506	ISC — L	Idle control system RPM lower than expected	262
P0507	ISC — H	Idle control system RPM higher than expected	264
P0600	—	Serial communication link malfunction	266
P0601	RAM	Internal control module memory check sum error	268
P0703	BRK	Brake switch input malfunction	271

DTC No.	Abbreviation (Subaru select monitor)	Item	Page
P0705	RNG	Transmission range sensor circuit malfunction	274
P0710	ATF	Transmission fluid temperature sensor circuit malfunction	279
P0720	ATVSP	Output speed sensor (vehicle speed sensor 1) circuit malfunction	281
P0725	ATNE	Engine speed input circuit malfunction	283
P0731	GR – 1	Gear 1 incorrect ratio	285
P0732	GR – 2	Gear 2 incorrect ratio	
P0733	GR – 3	Gear 3 incorrect ratio	
P0734	GR – 4	Gear 4 incorrect ratio	
P0740	LU – F	Torque converter clutch system malfunction	289
P0743	LU	Torque converter clutch system electrical	294
P0748	PL	Pressure control solenoid electrical	296
P0753	SFT1	Shift solenoid A electrical	298
P0758	SFT2	Shift solenoid B electrical	300
P0760	OVR – F	Shift solenoid C malfunction	302
P0763	OVR	Shift solenoid C electrical	307
P1100	ST – SW	Starter switch circuit malfunction	309
P1101	N – SW	Neutral position switch circuit malfunction [MT vehicles]	311
P1101	N – SW	Neutral position switch circuit malfunction [AT vehicles]	315
P1102	BR	Pressure sources switching solenoid valve circuit malfunction	319
P1103	TRQ	Engine torque control signal circuit malfunction	325
P1104	TCS	TCS signal circuit malfunction	328
P1500	FAN – 1	Radiator fan relay 1 circuit malfunction	331
P1502	FAN – F	Radiator fan function problem	338
P1700	ATTH	Throttle position sensor circuit malfunction for automatic transmission	341
P1701	CRS	Cruise control set signal circuit malfunction for automatic transmission	343
P1702	ATDIAG	Automatic transmission diagnosis input signal circuit malfunction	346

OBD

(FB1)

P0100

<QA>

OBD0142

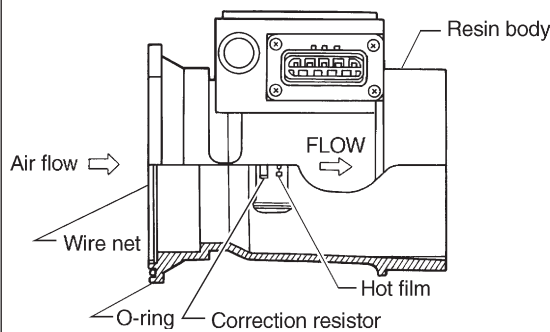
B: DTC P0100
— MASS AIR FLOW SENSOR CIRCUIT
MALFUNCTION (QA) —

DESCRIPTION:

- The MFI system employs a hot film type air flow sensor. These mass air flow sensors convert the amount of air taken into the engine into an electric signal by utilizing the heat transfer phenomenon between the incoming air and a heating resistor (hot film) located in the air intake.

- The features of these flow sensor types are as follows:

- 1) High-altitude compensation is made automatically.
- 2) Quick response
- 3) These are no moving parts.
- 4) They are compact.



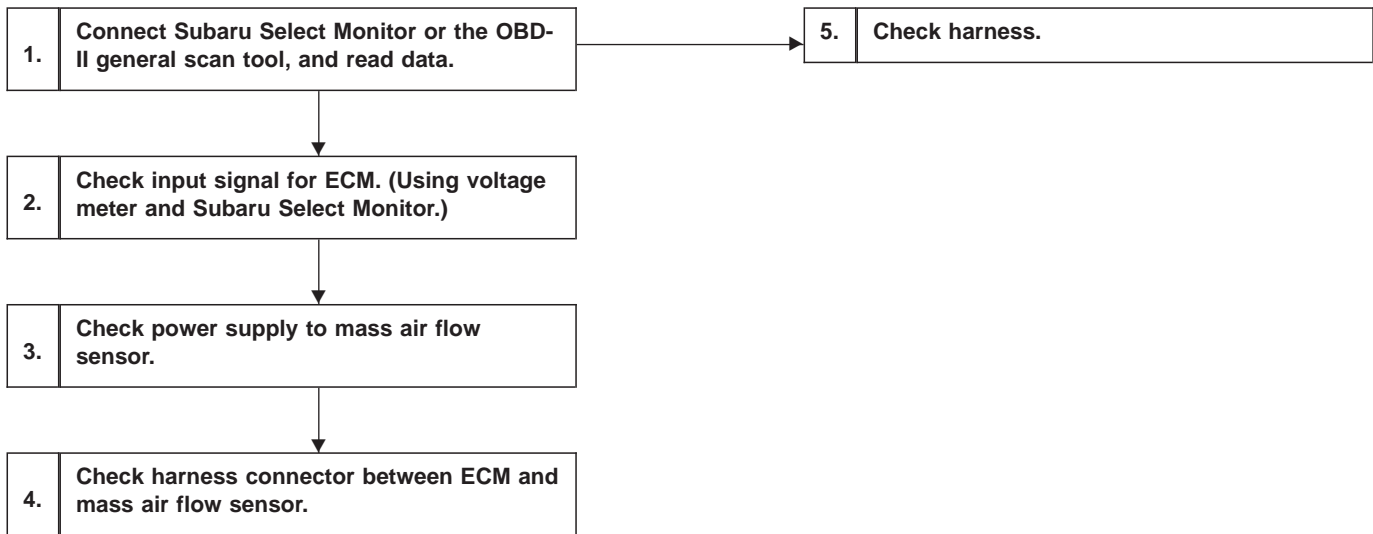
OBD0143A

DTC DETECTING CONDITION:

- Immediately at fault recognition

TROUBLE SYMPTOM:

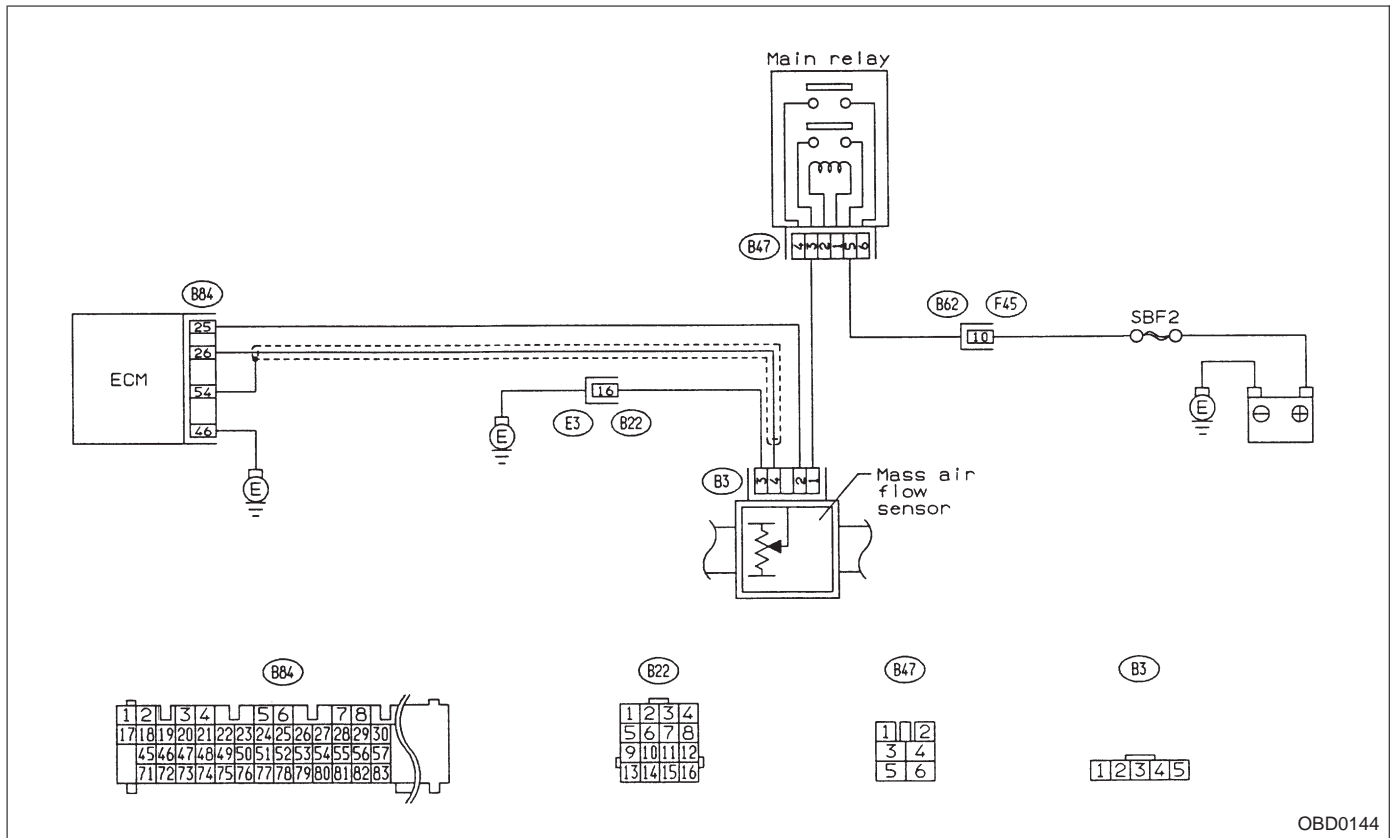
- Erroneous idling
- Engine stalls.
- Poor driving performance



CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

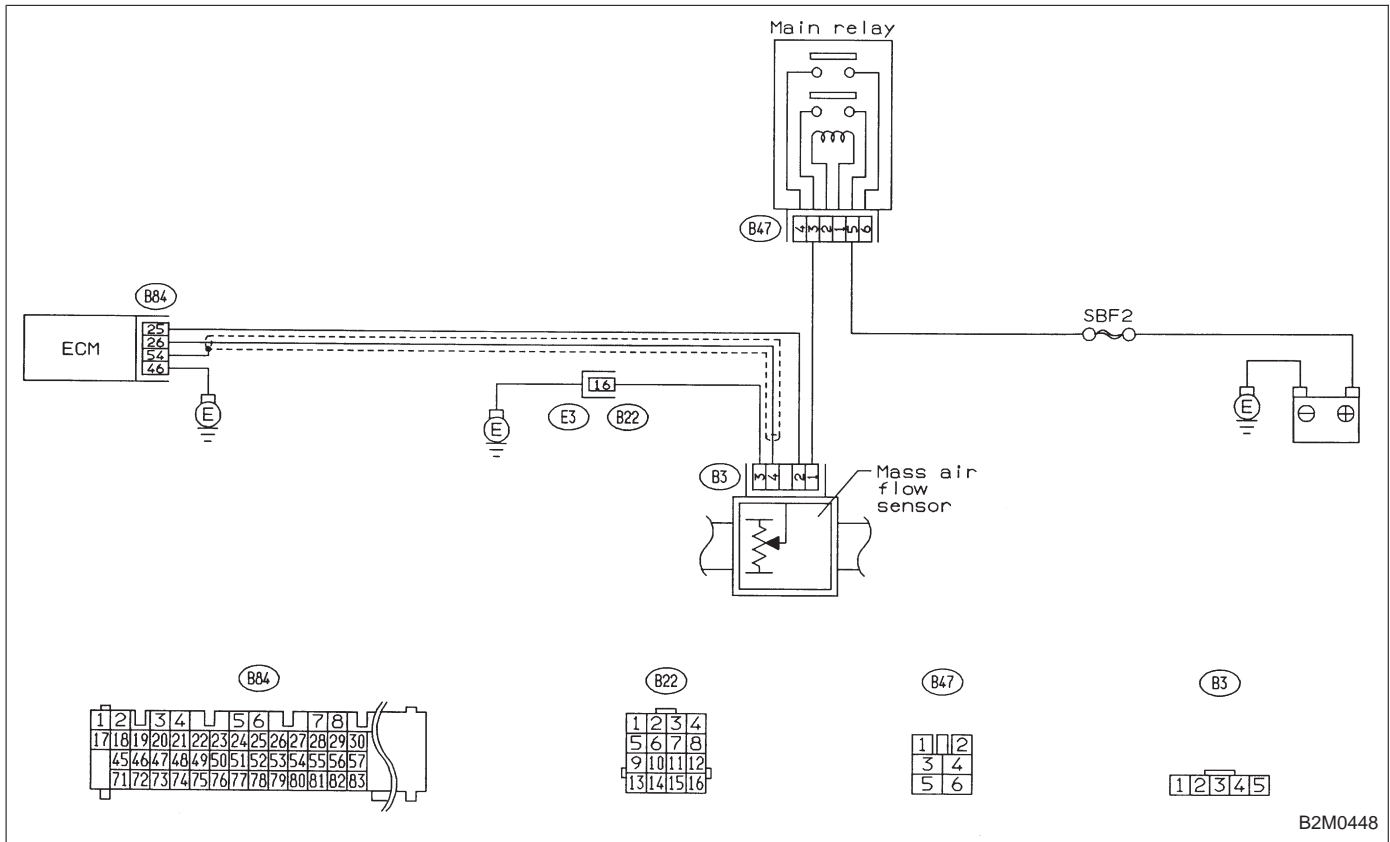
- LHD model

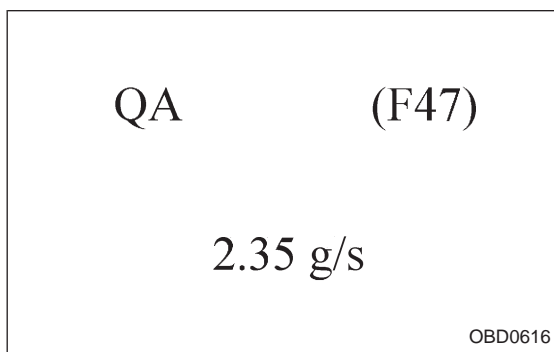
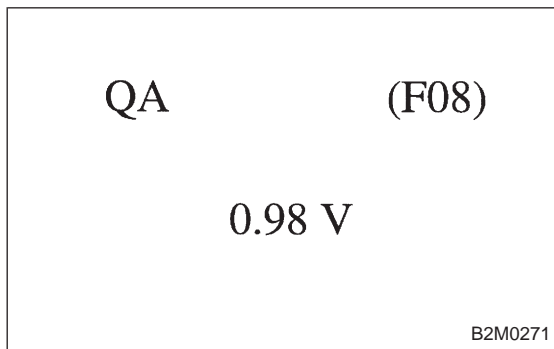
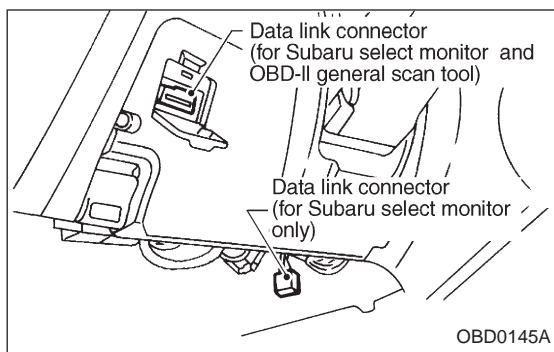


OBD0144

WIRING DIAGRAM:

- RHD model





1 CONNECT SUBARU SELECT MONITOR OR THE OBD-II GENERAL SCAN TOOL, AND READ DATA.

- 1) Turn ignition switch to OFF.
- 2) Connect Subaru Select Monitor or the OBD-II general scan tool to data link connector.
- 3) Turn ignition switch to ON and Subaru Select Monitor or the OBD-II general scan tool switch to ON.
- 4) Start engine.
- 5) Read data on Subaru Select Monitor or OBD-II general scan tool.

- Subaru Select Monitor
- Designate mode using function key.

Function mode: F08 or F47

- F08: Voltage input from mass air flow sensor is shown on display.
- F47: Mass air flow is shown on display.

- CHECK** ● **F08: Is sensor output equal to or more than 0.3 V and equal to or less than 5.0 V?**
- **F47: Is sensor output equal to or more than 1.3 g/sec and equal to or less than 250 g/sec?**

Probable cause: Poor connect of connectors, circuit and grounding line.

- YES** : Even if MIL lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair harness or connector of the mass air flow sensor.

- HINT:** ① Open or short circuit between mass air flow sensor and ECM.
 ② Poor contact of connectors for mass air flow sensor or ECM.

NO : Go to next **CHECK** .

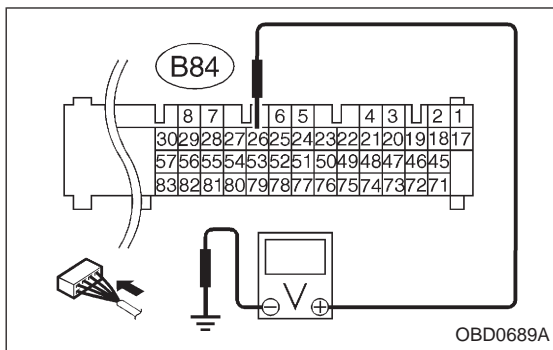
CHECK : **Is the value less than 0.3 V (1.3 g/sec)?**

YES : Go to step 2.

NO : Go to step 5.

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.



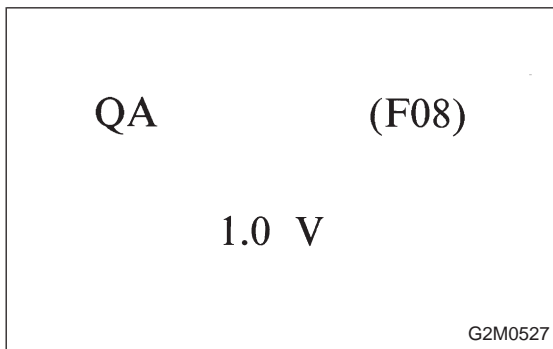
2 CHECK INPUT SIGNAL FOR ECM. (USING VOLTAGE METER AND SUBARU SELECT MONITOR.)

Measure voltage between ECM and body while engine is idling.

CHECK : Connector & terminal (B84) No. 26 — Body/0.3 V, or less

YES : Go to step 3.

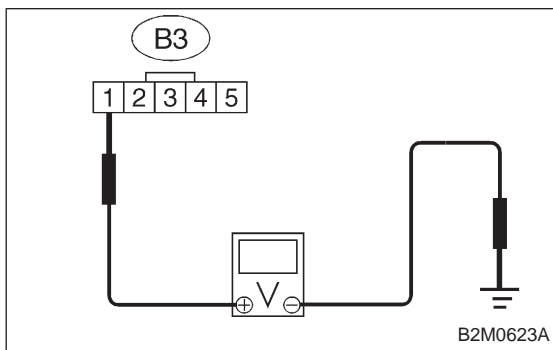
NO : Go to next **CHECK** .



CHECK : Is the voltage more than 0.3 V while shaking harness and connector of ECM and monitoring the value with Subaru select monitor?

YES : Repair poor contact in ECM connector.

NO : Replace ECM with a new one.



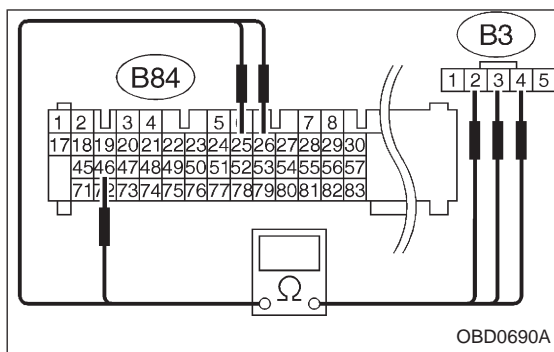
3 CHECK POWER SUPPLY TO MASS AIR FLOW SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from mass air flow sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between mass air flow sensor connector and body.

CHECK : Connector & terminal (B3) No. 1 — Body/10 V, or more

YES : Go to step 4.

NO : Repair open circuit of harness between main relay connector and mass air flow sensor connector.



4

CHECK HARNESS CONNECTOR BETWEEN ECM AND MASS AIR FLOW SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ECM.
- 3) Measure resistance of harness connector between ECM and mass air flow sensor.

CHECK : **Connector & terminal**

- ① (B84) No. 26 — (B3) No. 4/10 Ω , or less
- ② (B84) No. 46 — (B3) No. 3/10 Ω , or less
- ③ (B84) No. 25 — (B3) No. 2/10 Ω , or less

YES : Replace mass air flow sensor with a new one.**NO** : Repair poor contact and open circuit of harness between ECM and mass air flow sensor connector.

QA

(F08)

1.0 V

G2M0527

5

CHECK HARNESS.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from mass air flow sensor.
- 3) Connect Subaru Select Monitor or OBD-II General Scan Tool to data link connector.
- 4) Turn ignition switch to ON.
- 5) Read data on Subaru select monitor or OBD-II general scan tool.

● Subaru Select Monitor

Designate mode using function key.

Function mode: F08**CHECK** : **Is the value more than 5 V?****YES** : Repair short circuit of harness between mass air flow sensor and ECM.**NO** : Go to next **CHECK** .**CHECK** : **Is there poor contact in mass air flow sensor connector?****YES** : Repair poor contact in mass air flow sensor connector.**NO** : Replace mass air flow sensor.

● OBD-II general scan tool

For detailed operation procedures, refer to OBD-II General Scan Tool Instruction Manual.

OBD	(FB1)
P0101	<QA_R>
OBD0152	

C: DTC P0101**— MASS AIR FLOW SENSOR CIRCUIT
RANGE/PERFORMANCE PROBLEM (QA — R)****—****DESCRIPTION:**

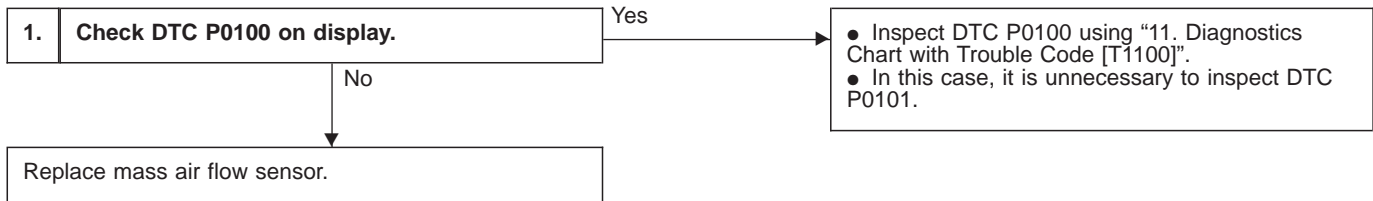
Refer to “B: DTC P0100 — MASS AIR FLOW SENSOR CIRCUIT MALFUNCTION — [T11B0]”.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

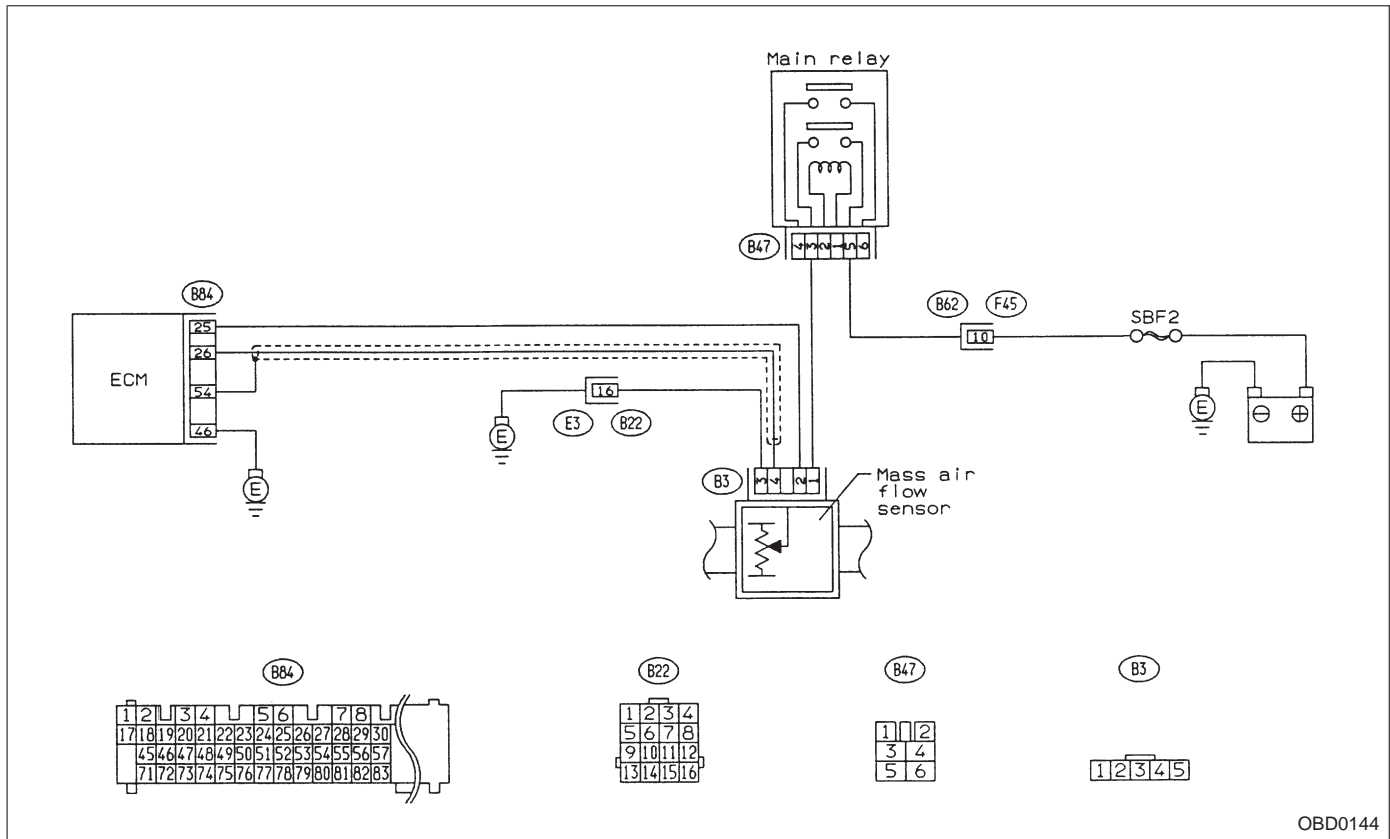
- Erroneous idling
- Engine stalls.
- Poor driving performance



CAUTION:
 After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

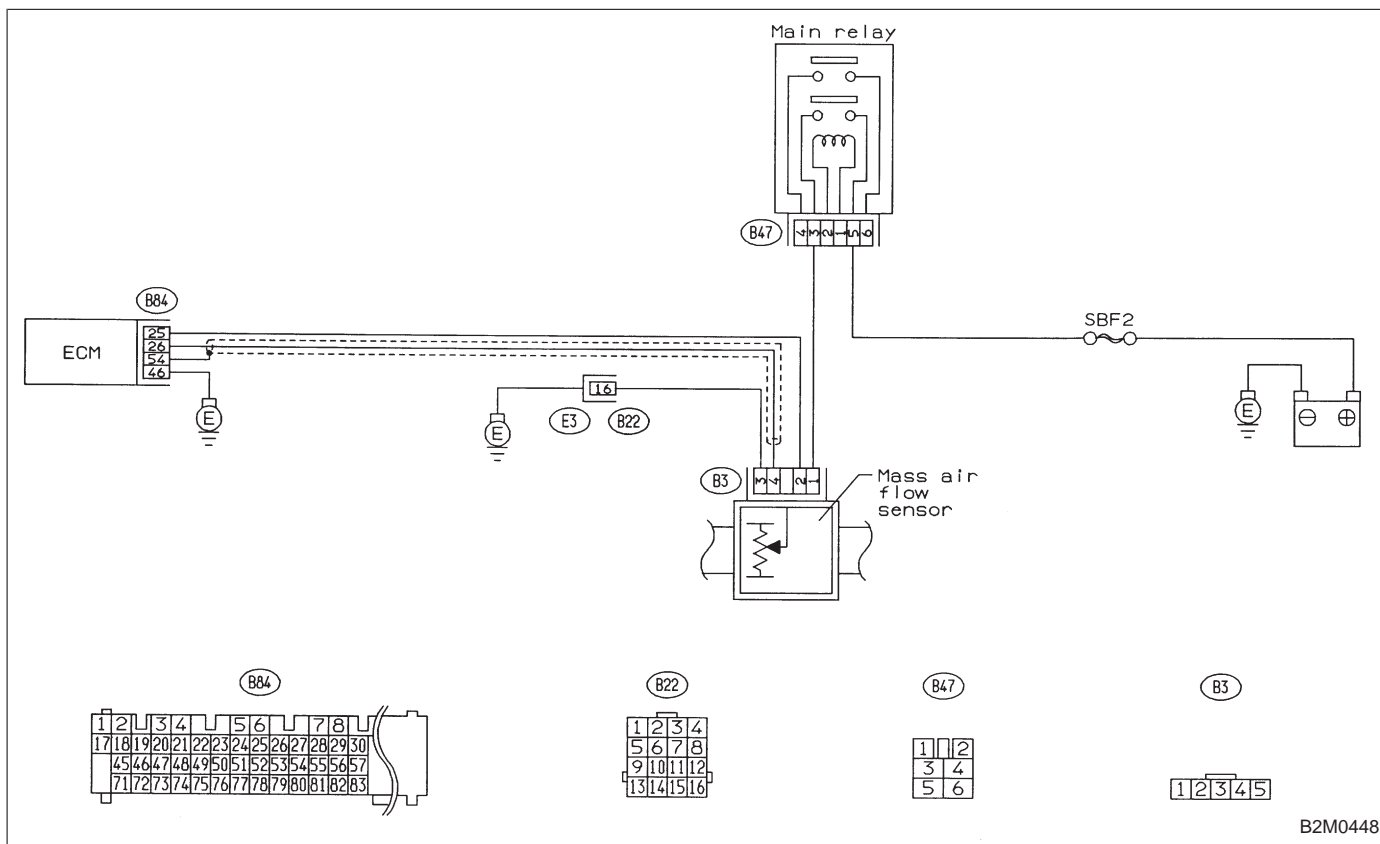
WIRING DIAGRAM:

- LHD model



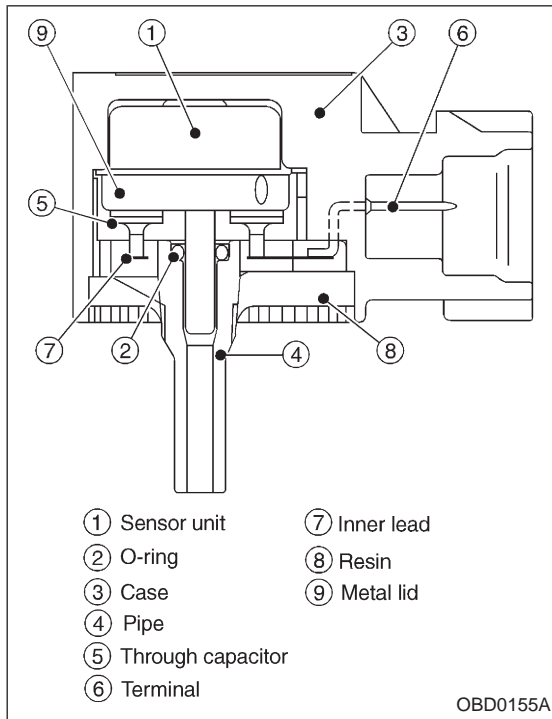
WIRING DIAGRAM:

- RHD model





D: DTC P0105
— PRESSURE SENSOR CIRCUIT
MALFUNCTION (P — S) —



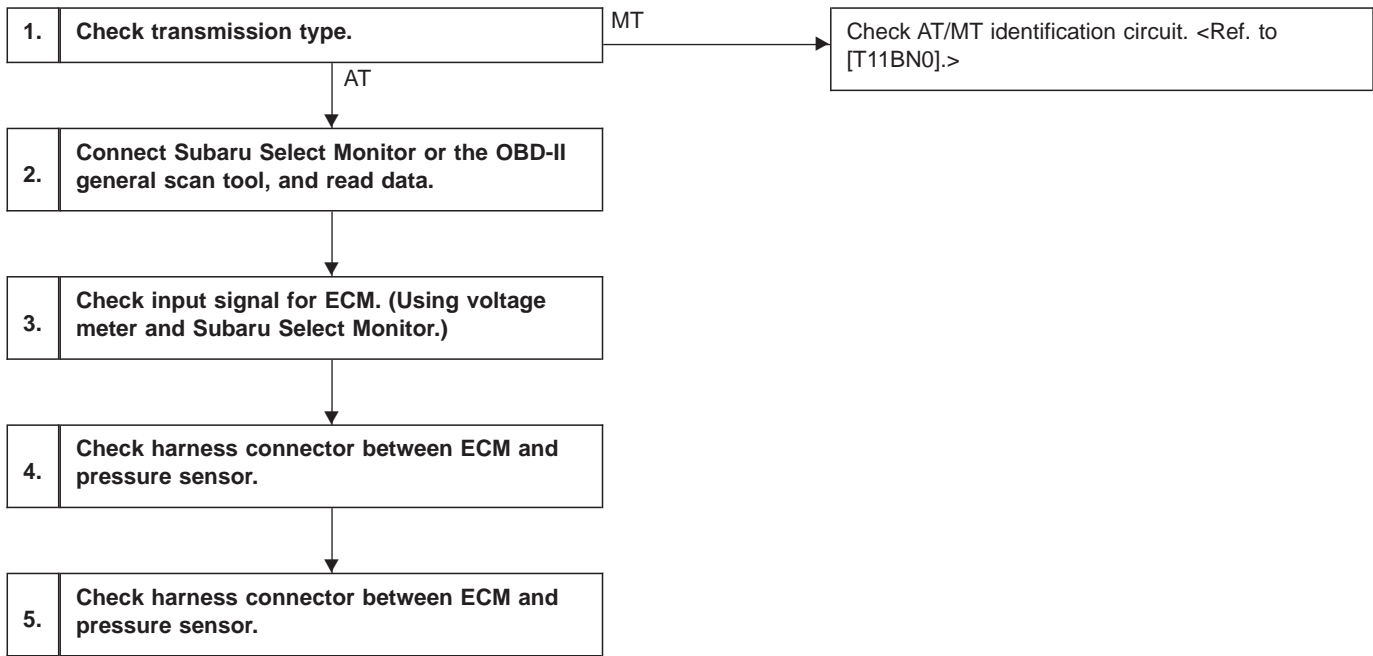
DESCRIPTION:

The pressure sensor is used in AT vehicles. It is located in the engine compartment, at the front of the right-hand suspension. It consists of a solenoid, which switches between the atmospheric pressure and suction pressure lines and a pressure sensor. This arrangement allows either pressure line to be monitored.

A sensor output signal is sent to the ECM to diagnose the EGR system and evaporative emission control system. (The pressure sensor is not used in MT vehicles.)

DTC DETECTING CONDITION:

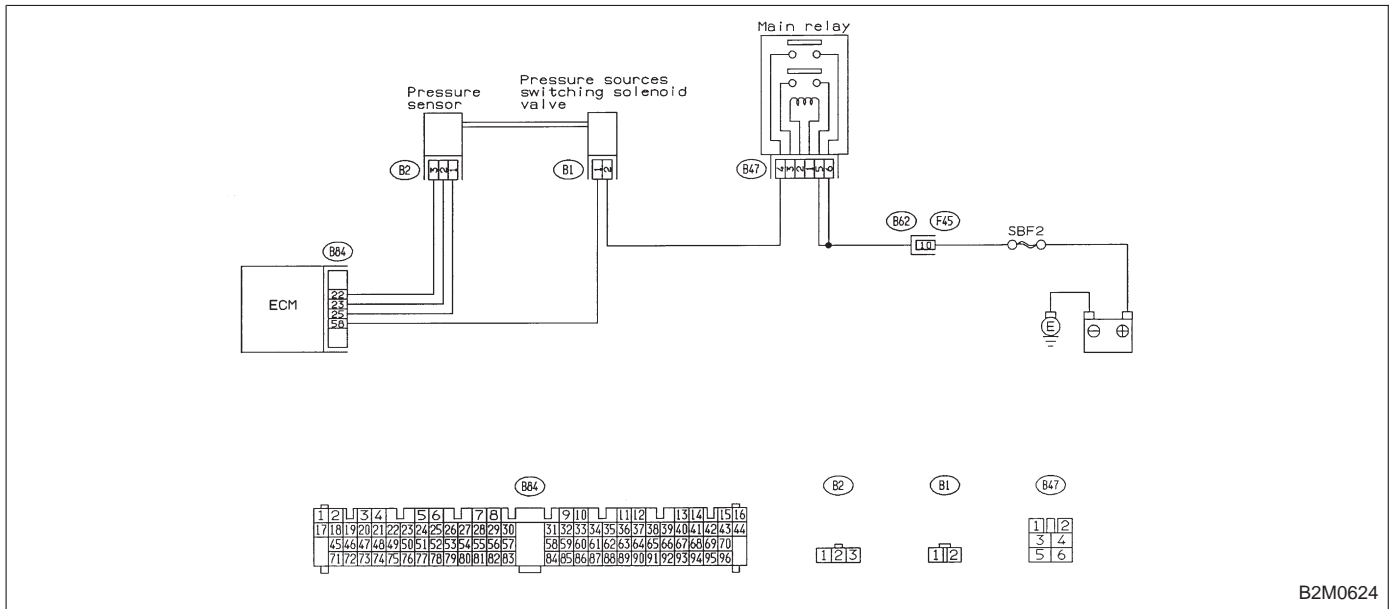
- Immediately at fault recognition



CAUTION:
 After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

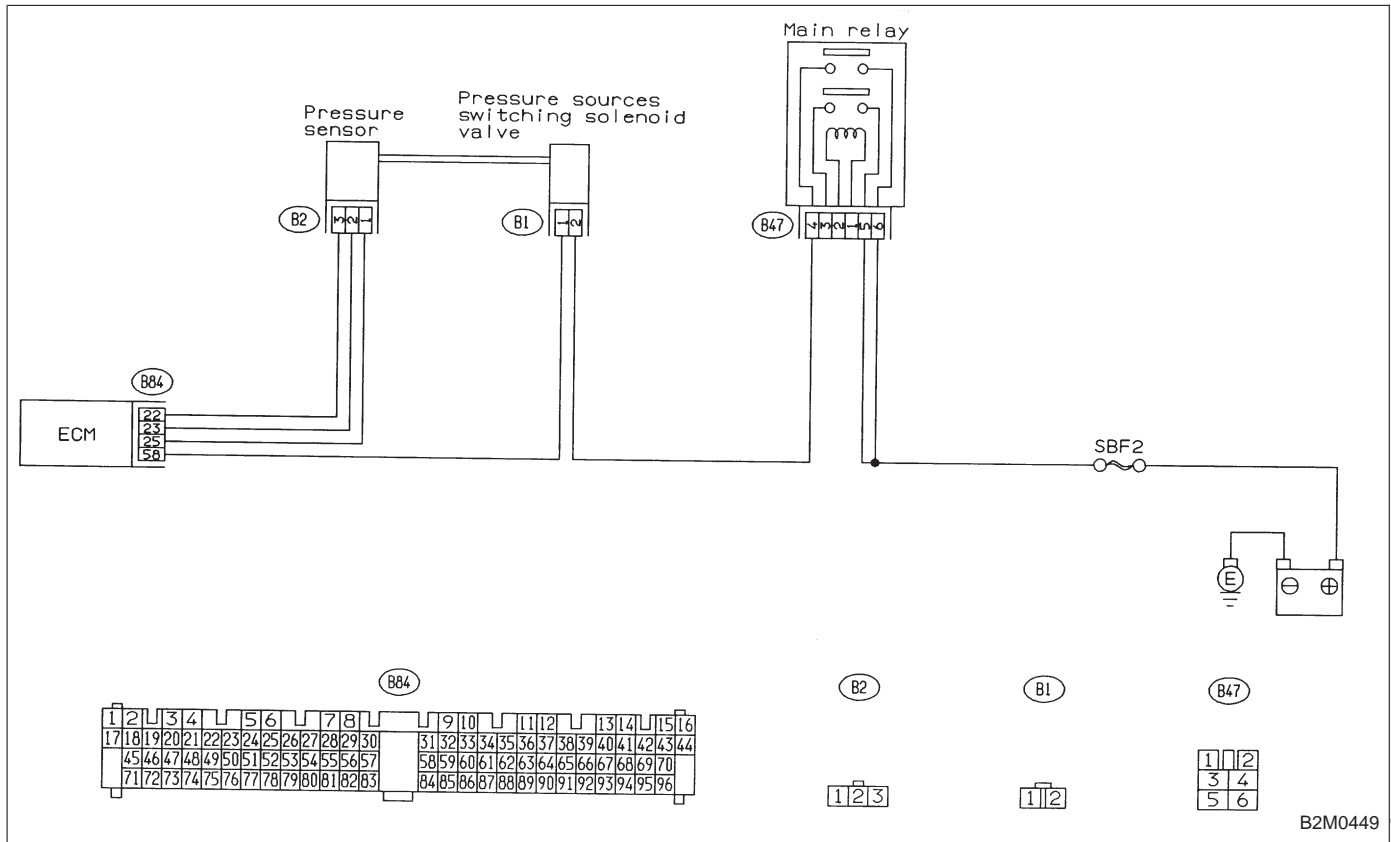
WIRING DIAGRAM:

- LHD model



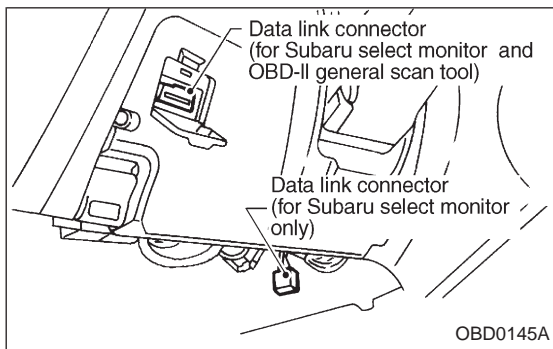
WIRING DIAGRAM:

● RHD model



1 CHECK TRANSMISSION TYPE.

Refer to the flow chart on page 145.



2 CONNECT SUBARU SELECT MONITOR OR THE OBD-II GENERAL SCAN TOOL, AND READ DATA.

- 1) Turn ignition switch to OFF.
- 2) Connect Subaru Select Monitor or the OBD-II general scan tool to data link connector.
- 3) Turn ignition switch to ON and Subaru Select Monitor or the OBD-II general scan tool switch to ON.
- 4) Start engine.
- 5) Read the data on Subaru Select Monitor or the OBD-II general scan tool.

- Subaru Select Monitor
Designate mode using function key.

Function mode: F24 or F49

- F24: Display shows voltage signal value sent from pressure sensor.
- F49: Display shows pressure signal value sent from pressure sensor.

CHECK : **Less than 0.2 V or 0 kPa**

YES : Go to step 3.

NO : Go to next **CHECK** .

CHECK : **More than 4.9 V or 140 kPa**

YES : Go to step 5.

NO : Repair the harness and connector between pressure sensor and ECM.

HINT: ① Open or short circuit of harness between pressure sensor and ECM.

② Poor contact of pressure sensor connector and ECM connector.

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

MANI.P (F24)

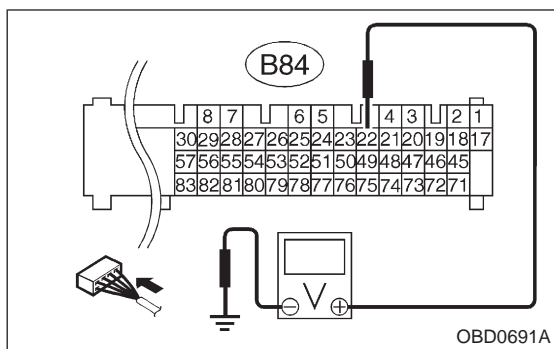
2.30 V

OBD0620

MANI.P (F49)

29 kpa

OBD0641



3 CHECK INPUT SIGNAL FOR ECM. (USING VOLTAGE METER AND SUBARU SELECT MONITOR.)

1) Measure voltage between ECM and body.

CHECK : **Connector & terminal**
(B84) No. 22 — Body/4.5 V, or more

YES : Go to next step.

NO : Go to next **CHECK** .

CHECK : **Is the voltage more than 4.5 V while shaking harness and connector of ECM?**

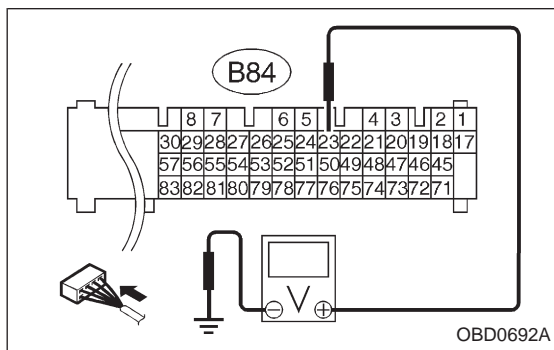
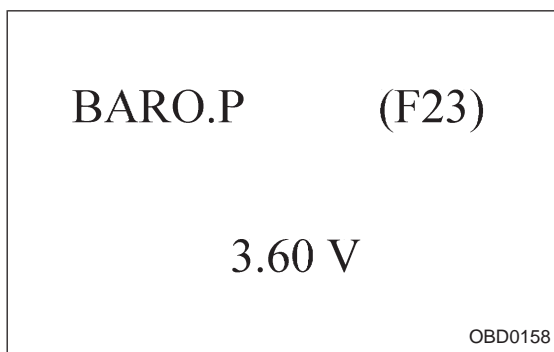
- Subaru Select Monitor
Designate mode using function key.

Function mode: F23

- F23: Display shows voltage signal value sent from pressure sensor.

YES : Repair poor contact in ECM connector.

NO : Replace ECM with a new one.



2) Measure voltage between ECM and body.

CHECK : **Connector & terminal**
(B84) No. 23 — Body/0.2 V, or less

NO : Go to next **CHECK** .

YES : Go to step 4.

CHECK : **Is the voltage more than 0.2 V while shaking harness and connector of ECM and monitoring the value with Subaru select monitor?**

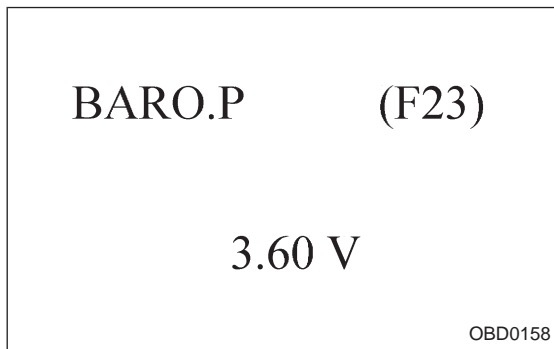
- Subaru Select Monitor
Designate mode using function key.

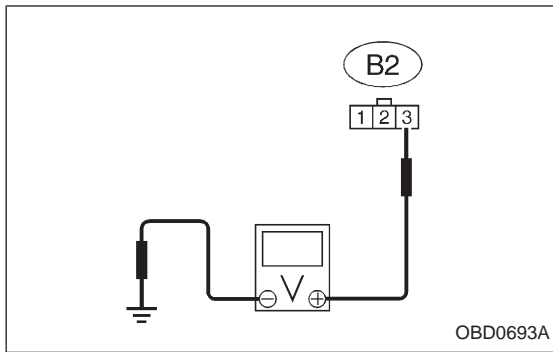
Function mode: F23

- F23: Display shows voltage signal value sent from pressure sensor.

YES : Repair poor contact in ECM connector.

NO : Go to step 4.





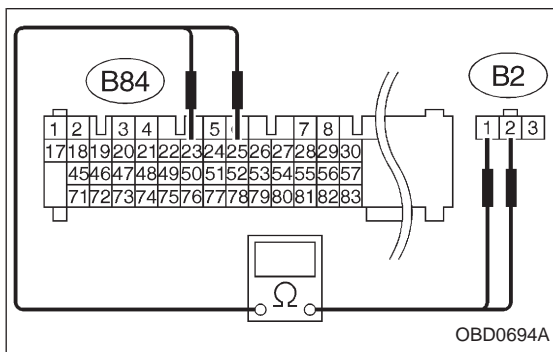
4 CHECK HARNESS CONNECTOR BETWEEN ECM AND PRESSURE SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector pressure sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage of harness connector between pressure sensor and body.

CHECK : **Connector & terminal (B2) No. 3 — Body/4.5 V, or more**

NO : Repair open circuit of harness between ECM and pressure sensor.

YES : Go to the next step.

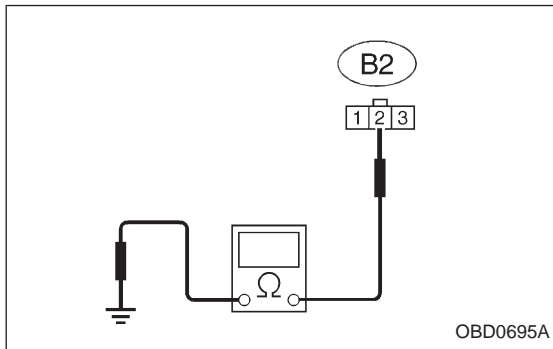


- 5) Turn ignition switch to OFF.
- 6) Disconnect connector from ECM.
- 7) Measure resistance of harness connector between ECM and pressure sensor.

CHECK : **Connector & terminal (B84) No. 23 — (B2) No. 2/10 Ω, or less (B84) No. 25 — (B2) No. 1/10 Ω, or less**

NO : Repair open circuit of harness between ECM and pressure sensor connector.

YES : Go to the next step.



- 8) Measure resistance of the connector between pressure sensor and body.

CHECK : **Connector & terminal (B2) No. 2 — Body/500 kΩ, or more**

NO : Repair short circuit of the harness between ECM and pressure sensor connector.

YES : Go to the next **CHECK** .

CHECK : **Is there poor contact in pressure sensor connector?**

YES : Repair poor contact in pressure sensor connector.

NO : Replace pressure sensor with a new one.

<p>MANI.P (F24)</p> <p>2.30 V</p> <p>OBD0620</p>
--

5

CHECK HARNESS CONNECTOR BETWEEN ECM AND PRESSURE SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from pressure sensor.
- 3) Turn ignition switch to ON.
- 4) Read data on Subaru select monitor or the OBD-II general scan tool.

- Subaru Select Monitor
Designate mode using function key.

Function mode: F24

CHECK : *Is the value more than 4.9 V?*

YES : Repair short circuit of harness between ECM and pressure sensor connector.

NO : Replace pressure sensor with a new one.

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

OBD	(FB1)
P0106	<P_R>
OBD0170	

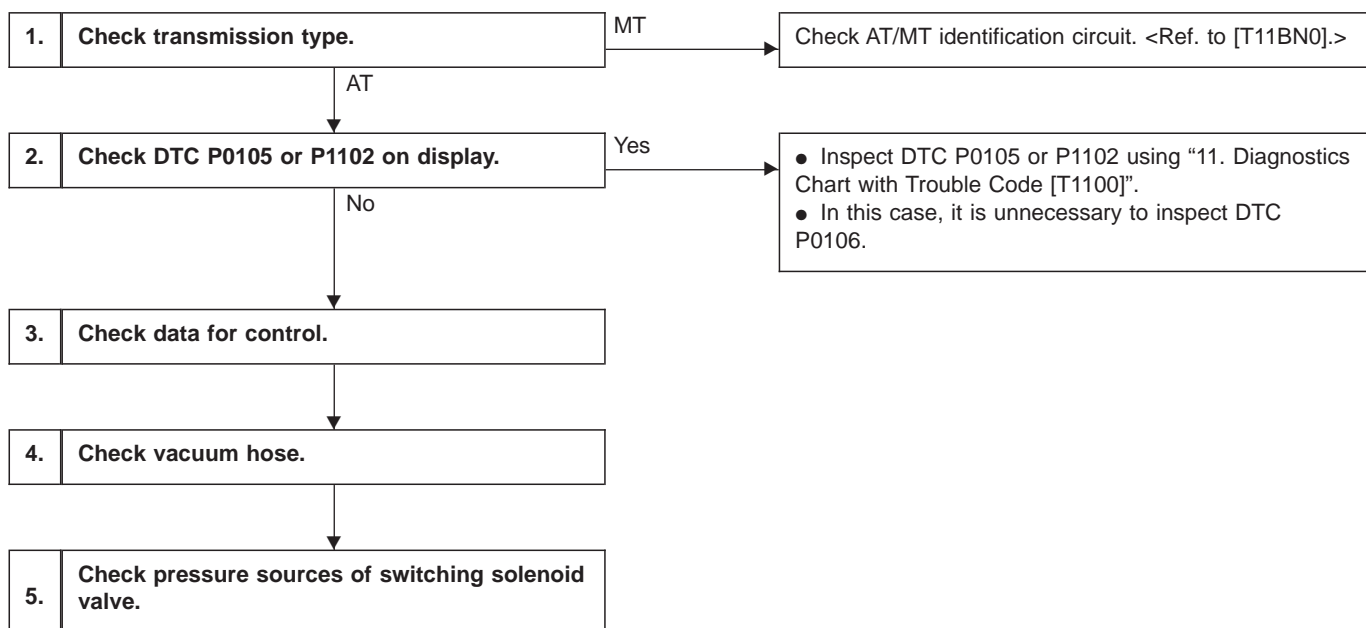
E: DTC P0106
— PRESSURE SENSOR CIRCUIT
RANGE/PERFORMANCE PROBLEM (P — R) —

DESCRIPTION:

Refer to “D: DTC P0105 — PRESSURE SENSOR CIRCUIT MALFUNCTION — [T11D0]”.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

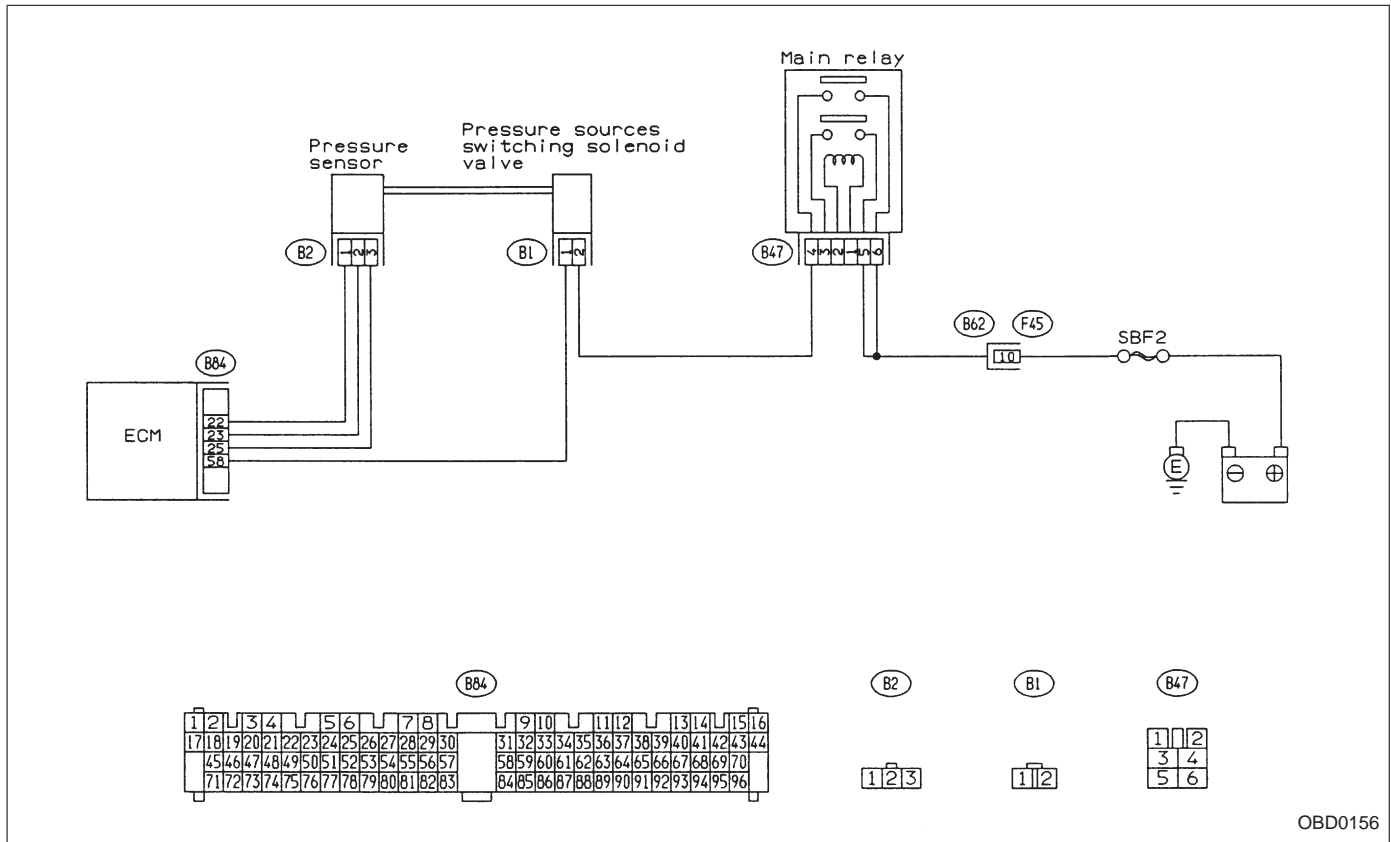


CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

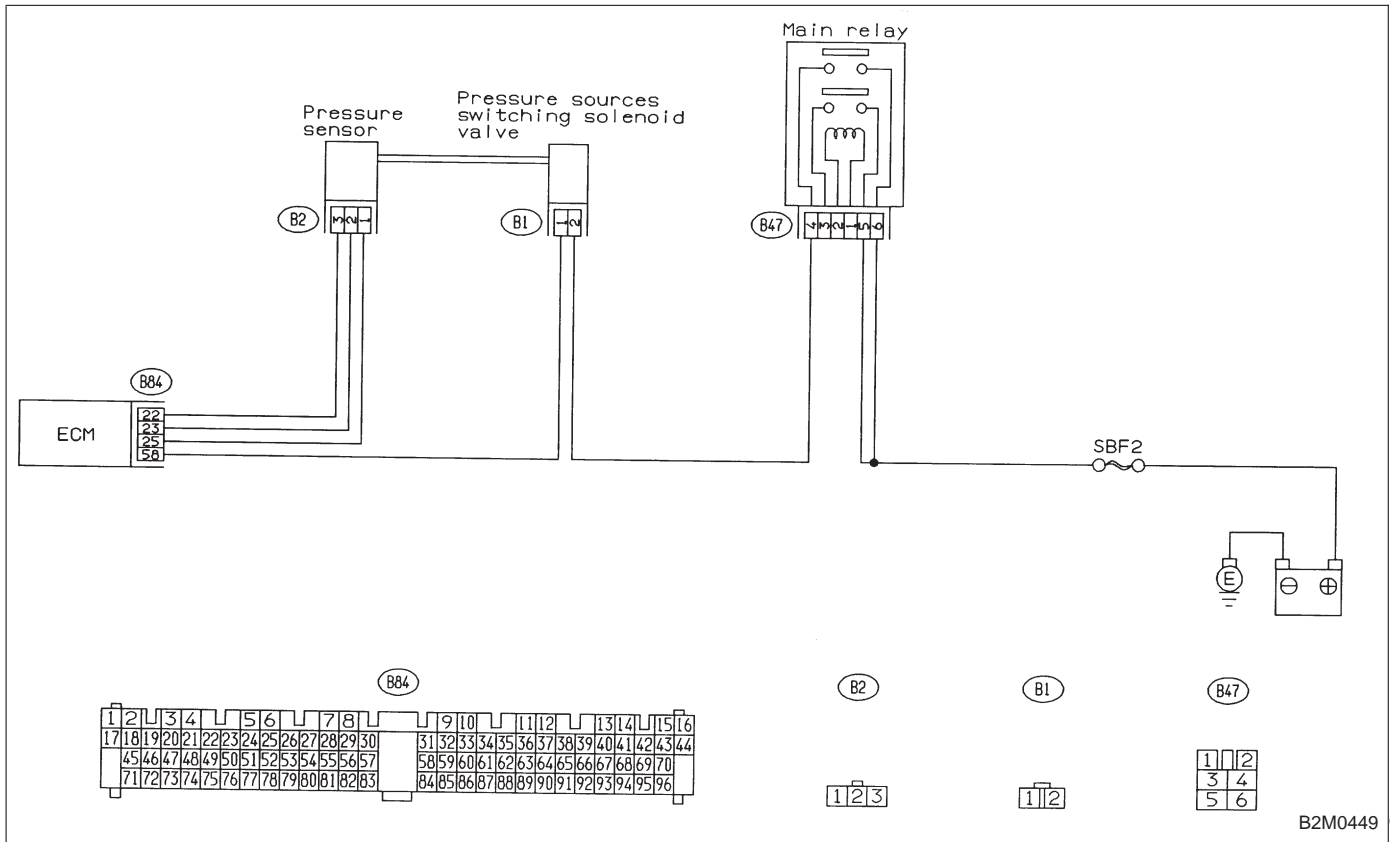
- LHD model



OBD0156

WIRING DIAGRAM:

● RHD model

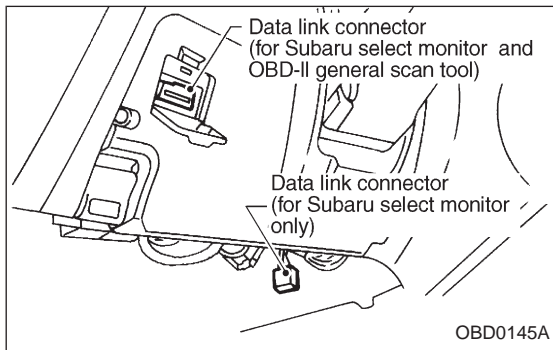


1 CHECK TRANSMISSION TYPE.

Refer to the flow chart on page 151.

2 CHECK DTC P0105 OR P1102 ON DISPLAY.

Refer to the flow chart on page 151.



3 CHECK DATA FOR CONTROL.

- 1) Turn ignition switch to OFF.
- 2) Connect Subaru Select Monitor or the OBD-II general scan tool to data link connector.
- 3) Turn ignition switch ON and Subaru Select Monitor or the OBD-II general scan tool switch ON.
- 4) Start engine.

MANI.P	(F24)
2.30 V	
OBD0620	

5) Read data on Subaru Select Monitor or the OBD-II general scan tool.

- Subaru Select Monitor
Designate mode using function key.

Function mode: F24 and F23

- F24: Display shows a voltage signal value sent from the pressure sensor.
- F23: Display shows a voltage signal value sent from the pressure sensor.

CHECK : *Is the voltage more than 3.24 V with function mode F24?*

YES : Go to step 4.

NO : Go to next **CHECK** .

BARO.P	(F23)
3.60 V	
OBD0158	

CHECK : *Is the voltage less than 1.6 V with function mode F23?*

YES : Go to step 5.

NO : Go to next **CHECK** .

BARO.P	(F23)
3.60 V	
OBD0158	

CHECK : *Is the voltage more than 4.7 V with function mode F23?*

YES : Replace pressure sensor.

NO : Repair poor contact in pressure sensor connector, pressure sources switching solenoid valve connector, and ECM connector.

- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

4 CHECK VACUUM HOSE.

CHECK : *Check for disconnection, holes, or clogging of the vacuum hoses.*

NOTE:

Check the hoses;

- From pressure sources switching solenoid valve to intake manifold.
- From pressure sensor to pressure sources switching solenoid valve.

YES : Repair hoses.

NO : Go to step 5.

5 CHECK PRESSURE SOURCES OF SWITCHING SOLENOID VALVE.

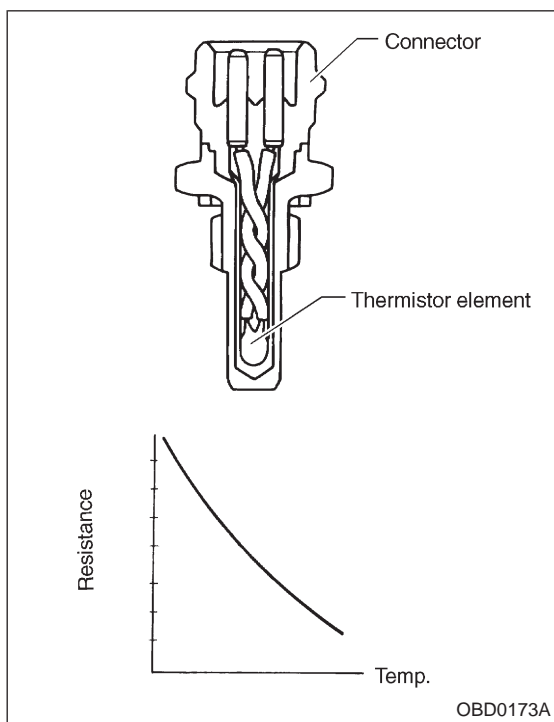
- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector.
- 3) Turn ignition switch to ON.

CHECK : *Is operation sound of the pressure sources solenoid valve heard? (ON ↔ OFF each 1.5 sec.)*

YES : Replace pressure sensor.

NO : Replace pressure sources switching solenoid valve.

OBD	(FB1)
P0115	<TW>
OBD0172	



F: DTC P0115
— ENGINE COOLANT TEMPERATURE
SENSOR CIRCUIT MALFUNCTION (TW) —

DESCRIPTION:

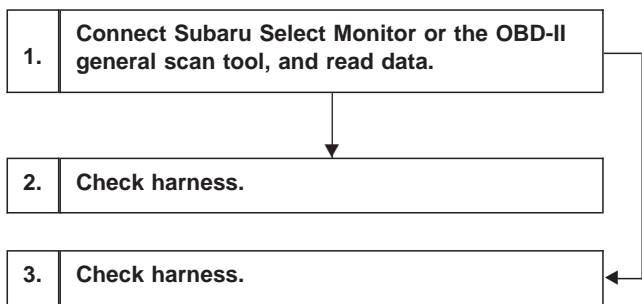
The engine coolant temperature sensor is located on the engine coolant pipe which is made of aluminum alloy. Its thermistor changes resistance with respect to temperature. A engine coolant temperature signal converted into resistance is transmitted to the ECM to control the amount of fuel injection, ignition timing, purge control solenoid valve, etc.

DTC DETECTING CONDITION:

- Immediately at fault recognition

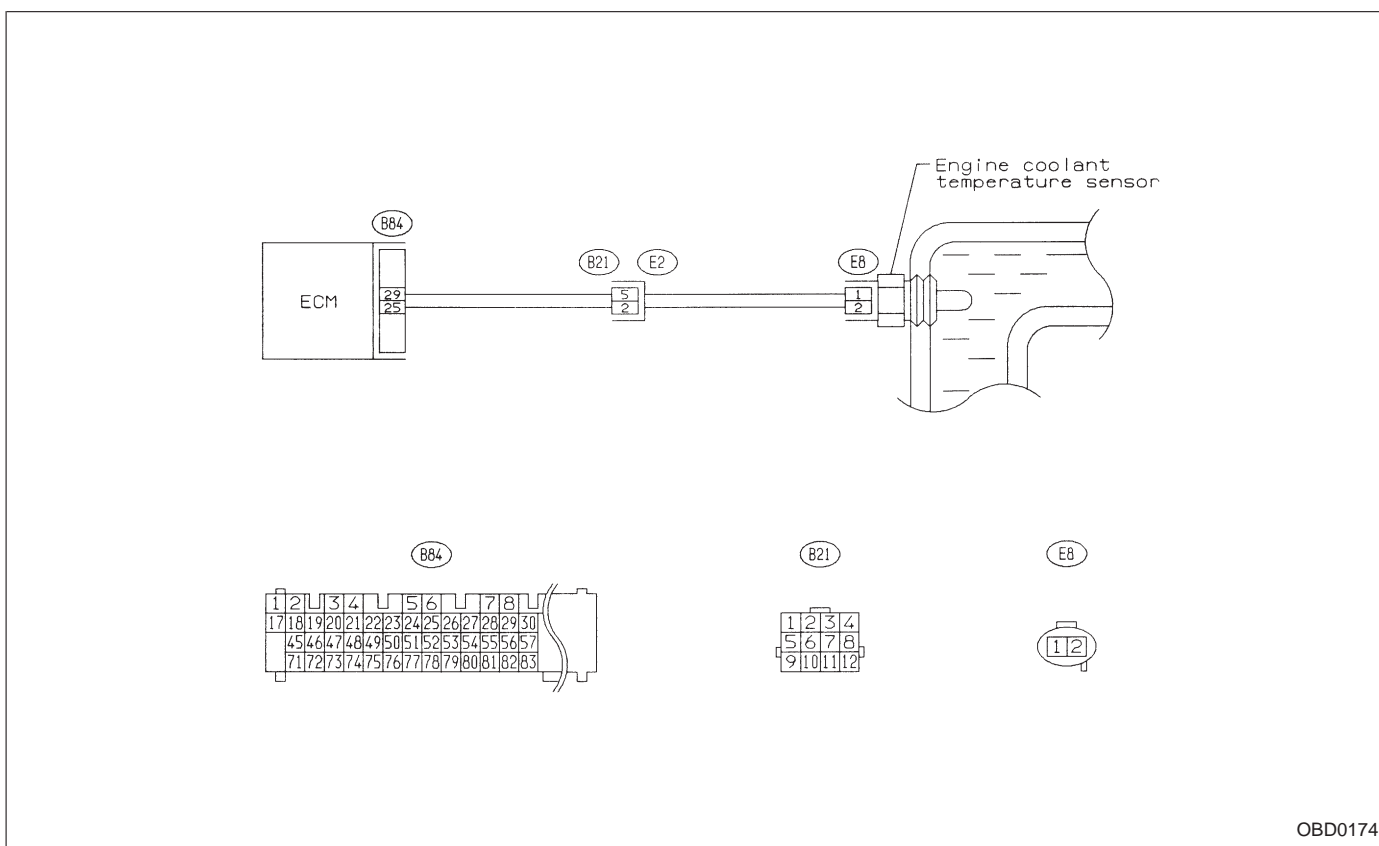
TROUBLE SYMPTOM:

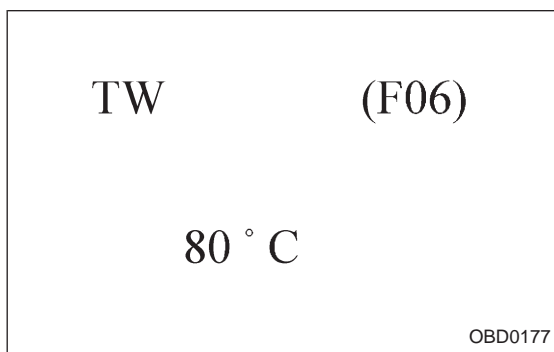
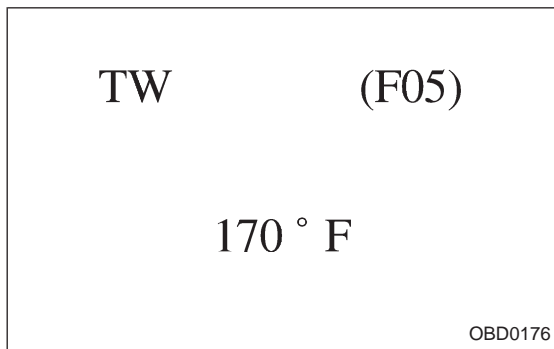
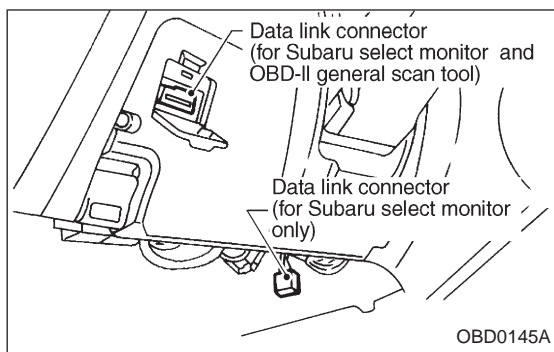
- Hard to start
- Erroneous idling
- Poor driving performance



CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:





1 CONNECT SUBARU SELECT MONITOR OR THE OBD-II GENERAL SCAN TOOL, AND READ DATA.

- 1) Turn ignition switch to OFF.
- 2) Connect Subaru Select Monitor or the OBD-II general scan tool to data link connector.
- 3) Turn ignition switch to ON and Subaru Select Monitor or OBD-II general scan tool switch to ON.
- 4) Start engine.

5) Read data on Subaru Select Monitor or OBD-II general scan tool.

- Subaru Select Monitor
Designate mode using function key.

Function mode: F05 or F06

- F05: Water temperature is indicated in "°F".
- F06: Water temperature is indicated in "°C".

CHECK : ● *Is the value greater than 300°F with function mode F05?*
 ● *Is the value greater than 150°C with function mode F06?*

YES : Go to step 2.

NO : Go to next **CHECK** .

CHECK : ● *Is the value less than -40°F with function mode F05?*
 ● *Is the value less than -40°C with function mode F06?*

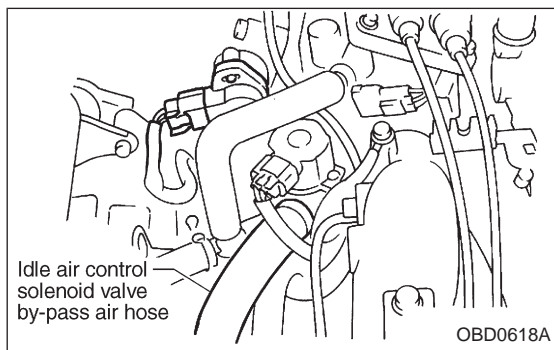
YES : Go to step 3.

NO : Repair poor contact in connectors or harness.

- Engine coolant temperature sensor connector
- ECM connector
- Coupling connector (B21)

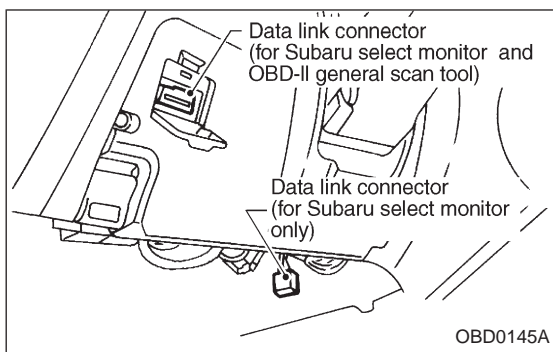
- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

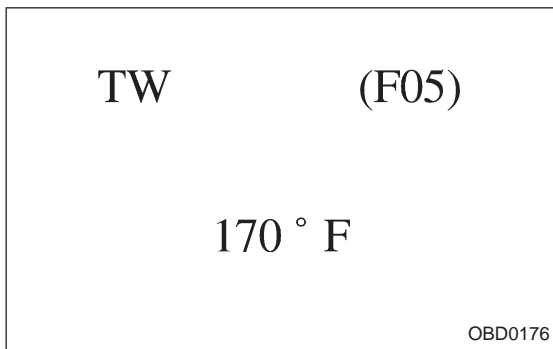


2 CHECK HARNESS.

- 1) Turn ignition switch to OFF.
- 2) Remove idle air control solenoid valve by-pass air hose.
- 3) Disconnect connector from engine coolant temperature sensor.



4) Connect Subaru Select Monitor or the OBD-II general scan tool to data link connector.



5) Turn ignition switch and Subaru Select Monitor or OBD-II general scan tool switch to ON.

6) Read data on Subaru Select Monitor or the OBD-II general scan tool.

- Subaru Select Monitor Designate mode using function key.

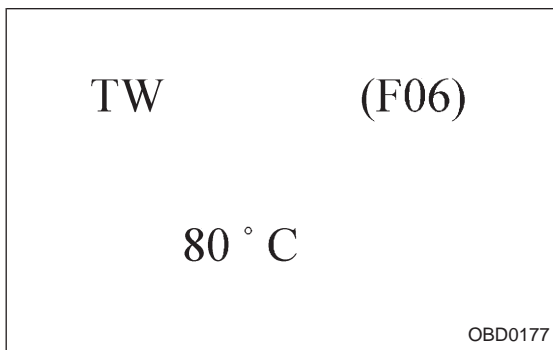
Function mode: F05 or F06

- F05: Water temperature is indicated in "°F".
- F06: Water temperature is indicated in "°C".

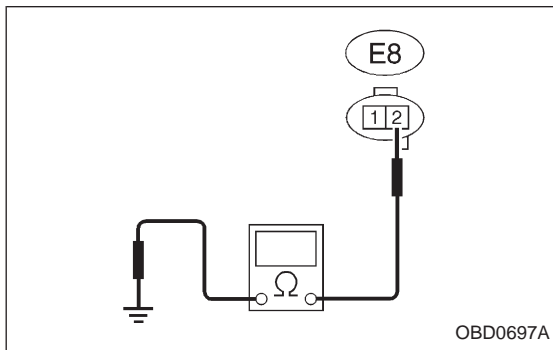
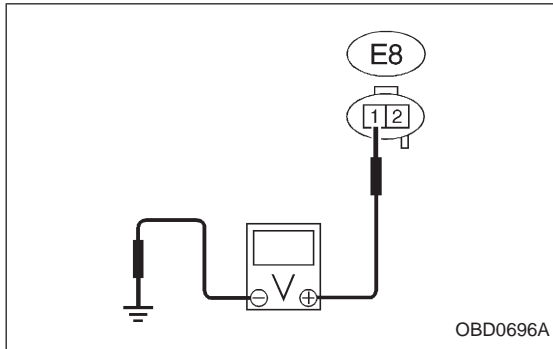
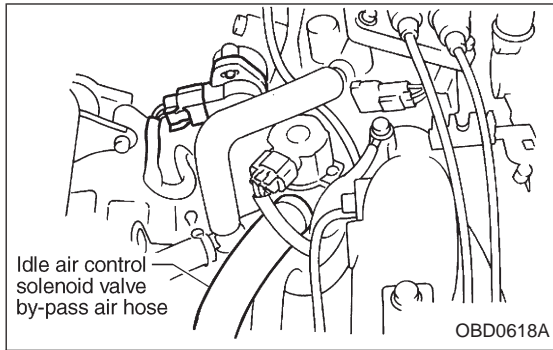
CHECK : ● *Is the value less than -40°F with function mode F05?*
 ● *Is the value less than -40°C with function mode F06?*

YES : Replace engine coolant temperature sensor.

NO : Repair short circuit of harness between engine coolant temperature sensor connector and ECM connector.



- OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.



3 CHECK HARNESS.

- 1) Turn ignition switch to OFF.
- 2) Remove idle air control solenoid valve by-pass air hose.
- 3) Disconnect connector from engine coolant temperature sensor.
- 4) Turn ignition switch to ON.

- 5) Measure voltage between engine coolant temperature sensor and body.

CHECK : **Connector & terminal (E8) No. 1 — Body/4 V, or more**

NO : Repair open circuit of harness or poor contact in ECM and engine coolant temperature sensor connector.

YES : Go to the next step.

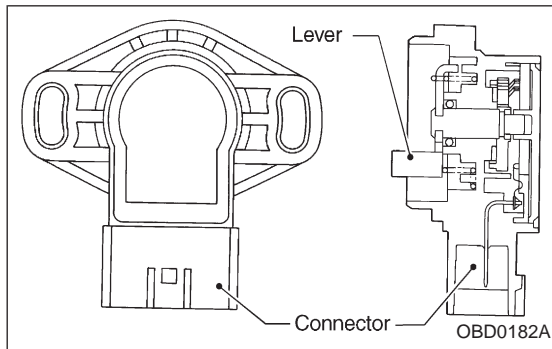
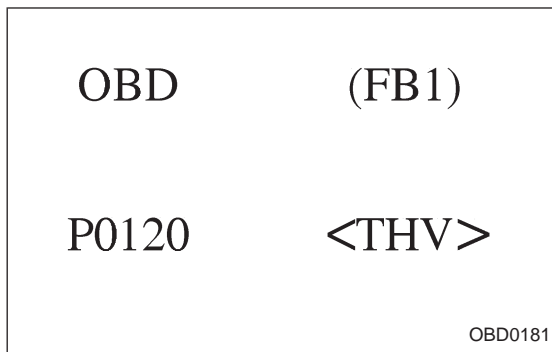
- 6) Turn ignition switch to OFF.

- 7) Measure resistance of harness between engine coolant temperature sensor connector and body.

CHECK : **Connector & terminal (E8) No. 2 — Body/10 Ω, or less**

NO : Repair open circuit of harness or poor contact in ECM and engine coolant temperature sensor connector.

YES : Replace engine coolant temperature sensor.



G: DTC P0120
— THROTTLE POSITION SENSOR CIRCUIT
MALFUNCTION (THV) —

DESCRIPTION:

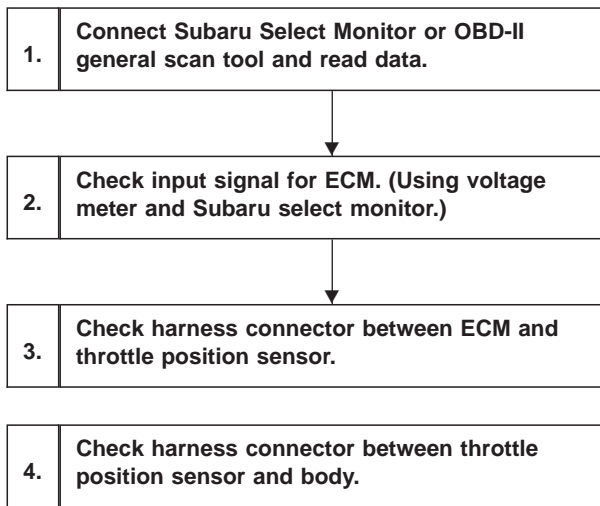
- A throttle position sensor is provided with a potentiometer which is interlocked with the throttle valve shaft.
- This throttle position sensor sends the ECM a potentiometer output signal corresponding to the opening of the throttle valve. When the level of this signal exceeds a predetermined value, the ECM interprets it as complete closure of the throttle valve and makes a control most suitable for the engine operation with the throttle valve fully closed. For correcting error of this signal, the ECM is provided with a learning function.
- Thus, the ECM precisely controls the air-fuel ratio during acceleration and deceleration as well as engine idling.

DTC DETECTING CONDITION:

- Immediately at fault recognition

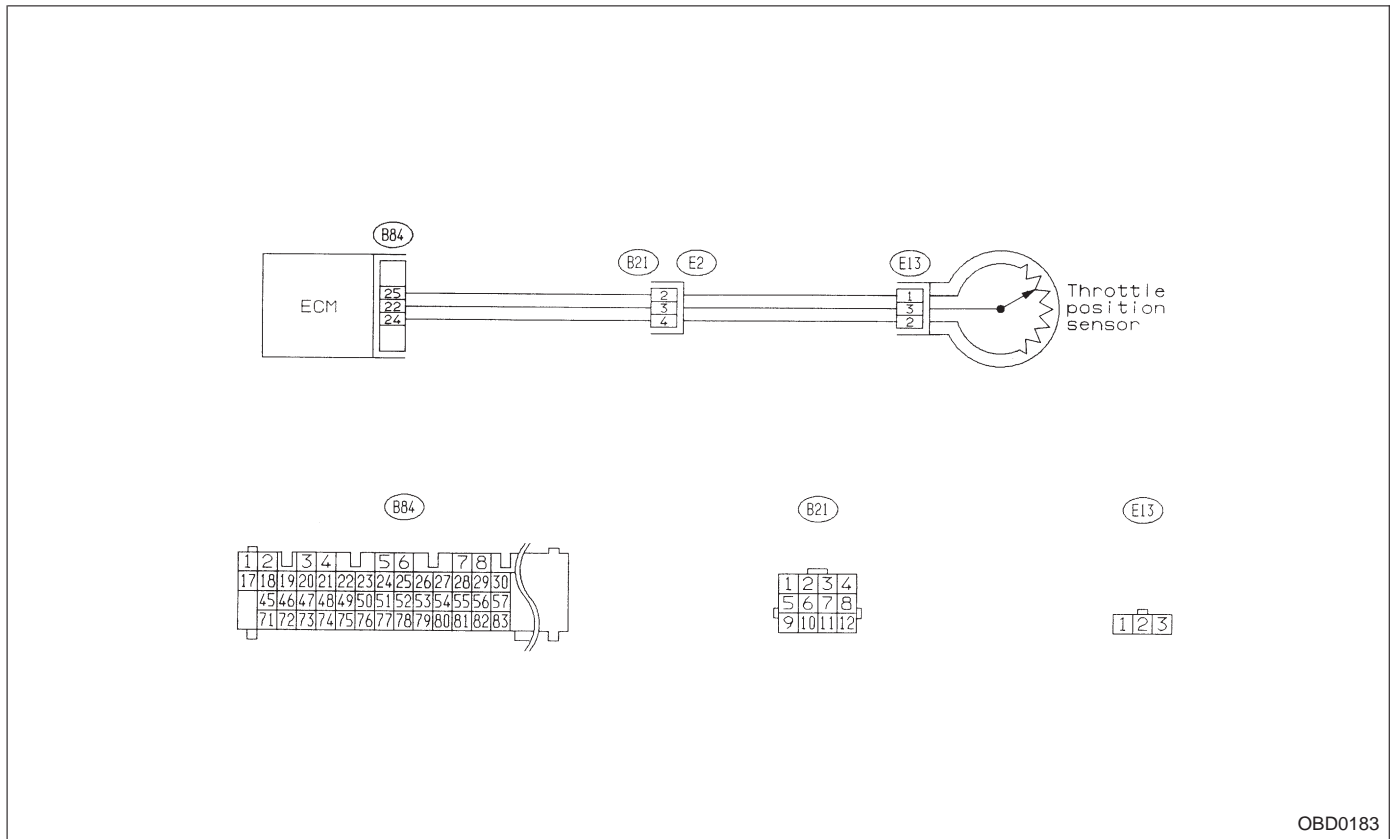
TROUBLE SYMPTOM:

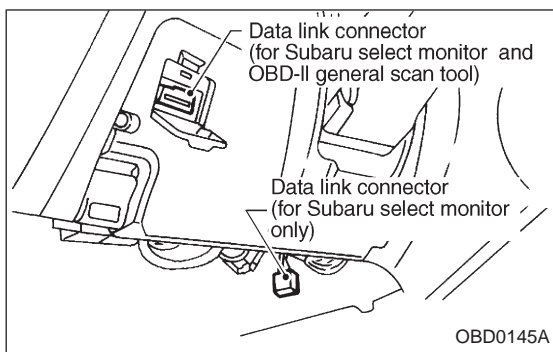
- Erroneous idling
- Engine stalls.
- Poor driving performance



CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:





1 CONNECT SUBARU SELECT MONITOR OR THE OBD-II GENERAL SCAN TOOL, AND READ DATA.

- 1) Turn ignition switch to OFF.
- 2) Connect Subaru Select Monitor or the OBD-II general scan tool to data link connector.
- 3) Turn ignition switch to ON and Subaru Select Monitor or OBD-II general scan tool switch to ON.
- 4) Start engine.

THV	(F10)
4.3 V	

OBD0185

- 5) Read data on Subaru Select Monitor or OBD-II general scan tool.

- Subaru Select Monitor
Designate mode using function key.

Function mode: F10

- F10: Throttle position sensor output signal is indicated.

CHECK : *Is the voltage less than 0.1 V?*

YES : Go to step 2.

NO : Go to next **CHECK** .

CHECK : *Is the voltage more than 4.9 V?*

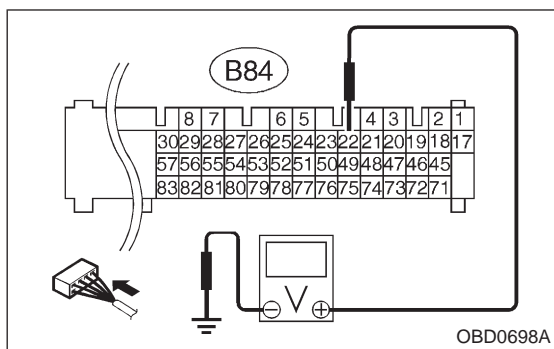
YES : Go to step 4.

NO : Even if MIL lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector may be the cause. Check and repair the following connectors.

- Throttle position sensor connector.
- ECM connector
- Coupling connector (B21)

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.



2 CHECK INPUT SIGNAL FOR ECM. (USING VOLTAGE METER AND SUBARU SELECT MONITOR.)

1) Measure voltage between ECM and body while throttle valve is fully closed.

CHECK : **Connector & terminal (B84) No. 22 — Body/4.5 V, or more**

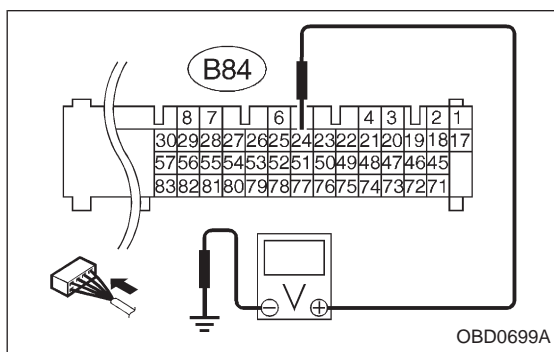
YES : Go to next step.

NO : Go to next **CHECK** .

CHECK : **Is the voltage more than 4.5 V while shaking harness and connector of ECM?**

YES : Repair poor contact in ECM connector.

NO : Replace ECM.



2) Measure signal voltage between ECM and body.

CHECK : **Connector & terminal (B84) No. 24 — Body/0.1 V, or less**

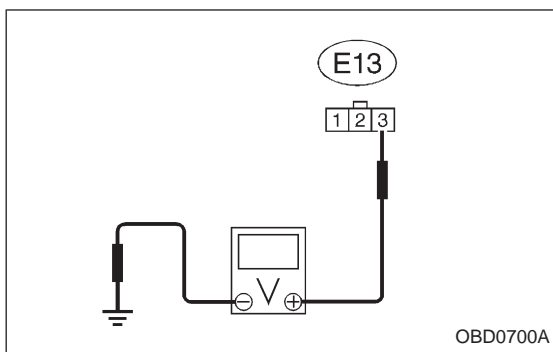
NO : Go to next **CHECK** .

YES : Go to step 3.

CHECK : **Is the voltage more than 0.1 V while shaking harness and connector of ECM and monitoring the value with Subaru select monitor?**

YES : Repair poor contact in ECM connector.

NO : Go to step 3.



3 CHECK HARNESS CONNECTOR BETWEEN ECM AND THROTTLE POSITION SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from throttle position sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between throttle position sensor connector and body.

CHECK : **Connector & terminal (E13) No. 3 — Body/4.5 V, or more**

NO : Repair harness and connector.

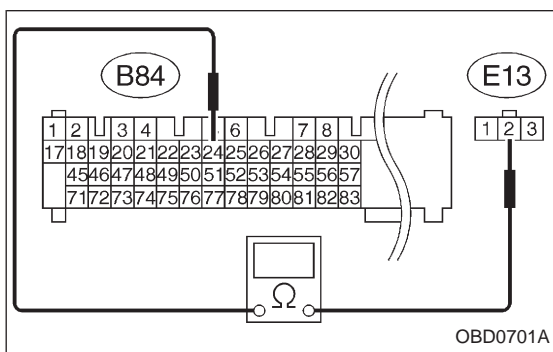
NOTE:

In this case, the possible causes are:

- ① Open circuit of the harness between connector (E13) terminal No. 3 and connector (B84) terminal No. 22, or the following:

- ② Poor contact in throttle position sensor connector
- ③ Poor contact in ECM connector
- ④ Poor contact in coupling connector (B21)

YES : Go to the next step.



- 5) Turn ignition switch to OFF.
- 6) Measure resistance of harness between ECM connector and throttle position sensor connector.

CHECK : **Connector & terminal (B84) No. 24 — (E13) No. 2/10 Ω, or less**

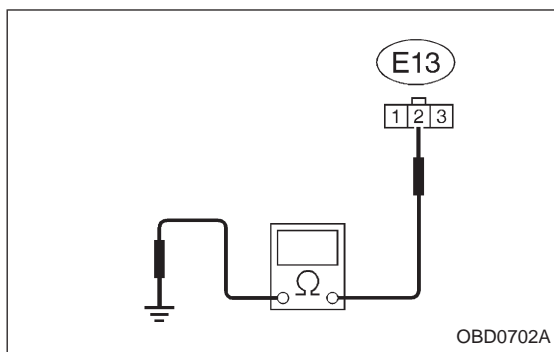
NO : Repair harness and connector.

NOTE:

In this case, the following are the possible causes.

- ① Open circuit between connector (B84) terminal No. 24 and connector (E13) terminal No. 2.
- ② Poor contact in ECM connector.
- ③ Poor contact in throttle position sensor connector
- ④ Poor contact in coupling connector (B21)

YES : Go to next step.



7) Measure resistance of harness between throttle position sensor connector and body.

CHECK : **Connector & terminal (E13) No. 2 — Body/10 Ω, or less**

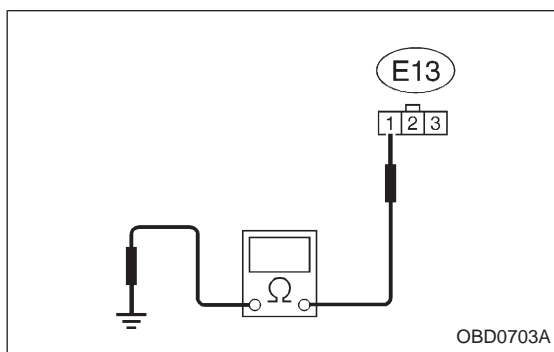
YES : Repair short circuit of harness between throttle position sensor and ECM connector.

NO : Go to next **CHECK** .

CHECK : **Is there poor contact in throttle position sensor connector?**

YES : Repair poor contact in throttle position sensor connector.

NO : Replace throttle position sensor.



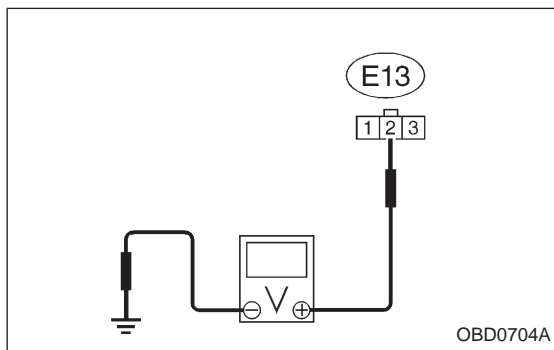
4 CHECK HARNESS CONNECTOR BETWEEN THROTTLE POSITION SENSOR AND BODY.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from throttle position sensor.
- 3) Measure resistance of harness between throttle position sensor connector and body.

CHECK : **Connector & terminal (E13) No. 1 — Body/10 Ω, or less**

NO : Repair open circuit of harness between throttle position sensor and ECM connector.

YES : Go to the next step.



- 4) Turn ignition switch to ON.
- 5) Measure voltage between throttle position sensor connector and body.

CHECK : **Connector & terminal (E13) No. 2 — Body/4.9 V, or more**

YES : Repair short circuit of harness between throttle position sensor and ECM connector.

NO : Replace throttle position sensor.

OBD	(FB1)
P0121	<TH_R>
OBD0189	

H: DTC P0121
— THROTTLE POSITION SENSOR CIRCUIT
RANGE/PERFORMANCE PROBLEM (TH — R)
—

DESCRIPTION:

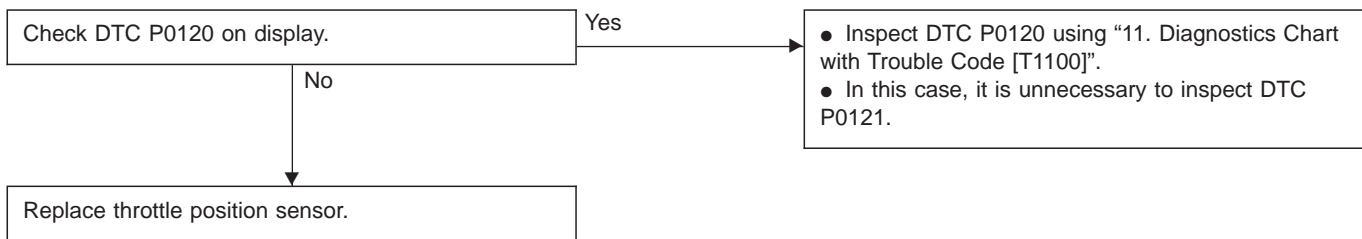
Refer to “G: DTC P0120 — THROTTLE POSITION SENSOR CIRCUIT MALFUNCTION — [T11G0]”.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

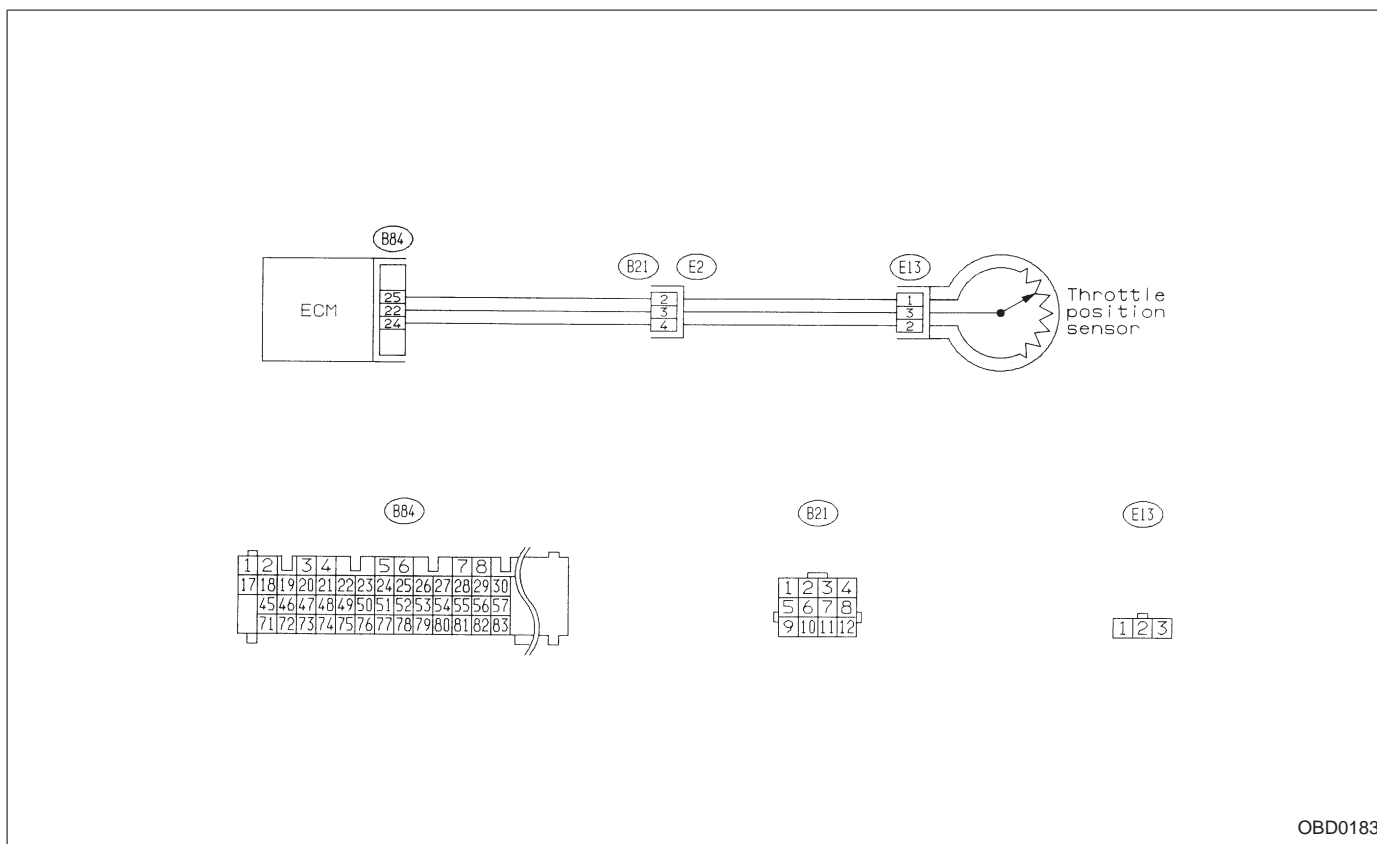
TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance



CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD	(FB1)
P0125	<TW_CL>
OBD0191	

I: DTC P0125
— INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL (TW — CL) —

DESCRIPTION:

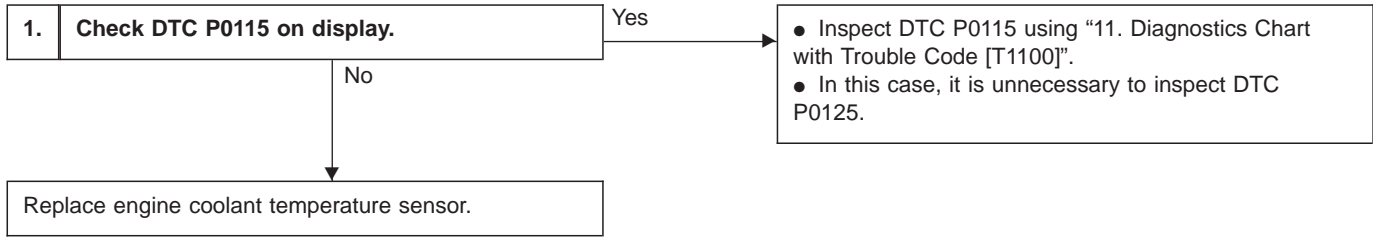
Refer to “F: DTC P0115 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT MALFUNCTION — [T11F0]”.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

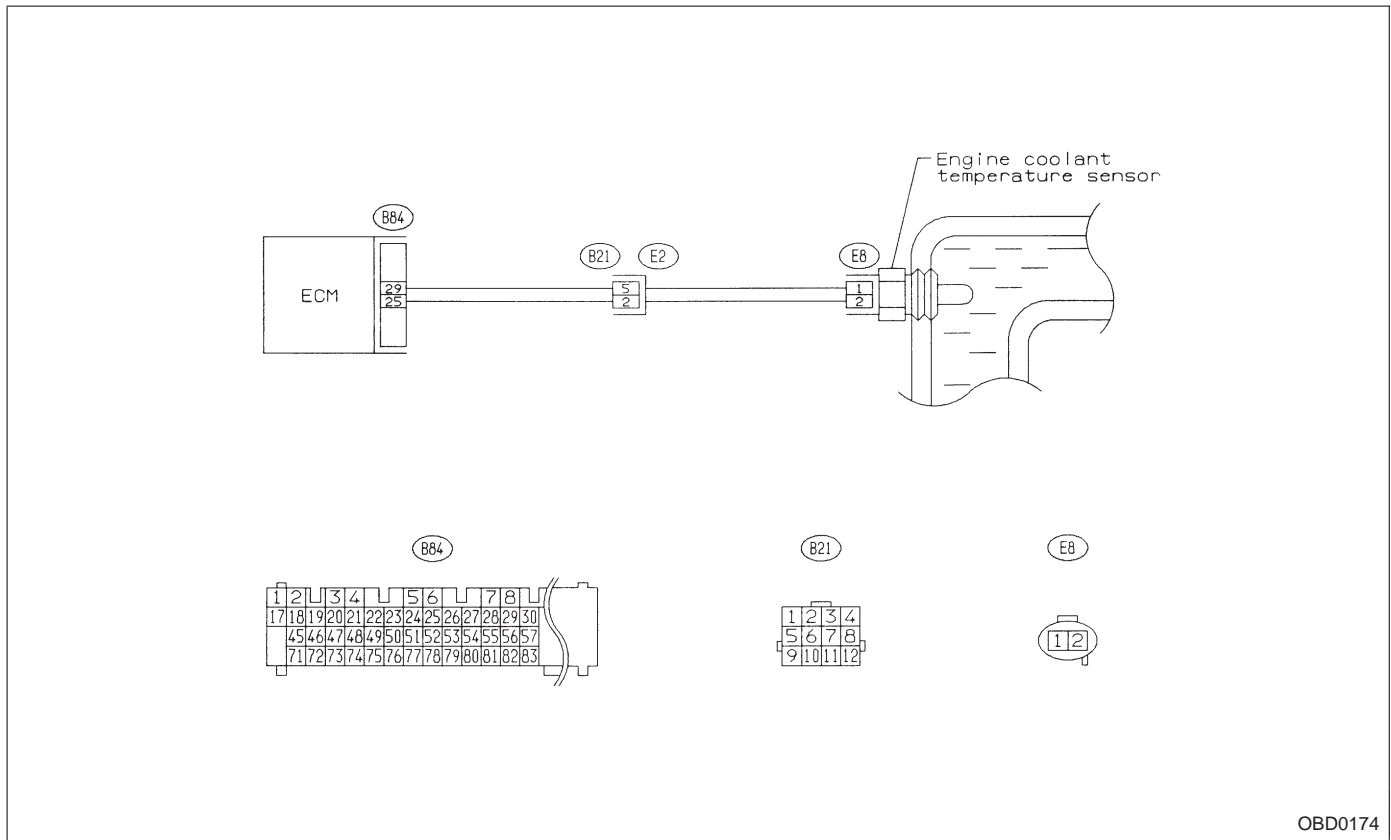
TROUBLE SYMPTOM:

- Engine would not return to idling.



CAUTION:
 After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

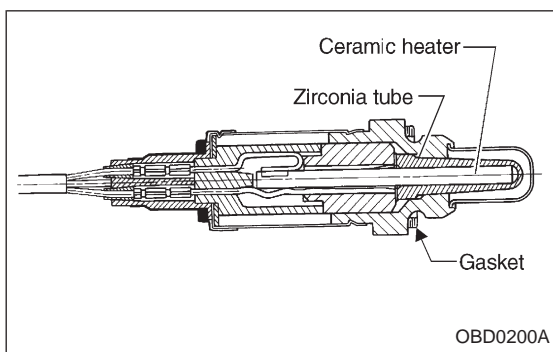


OBD0174

OBD (FB1)

P0130 <FO2_V>

OBD0199



J: DTC P0130 — FRONT OXYGEN SENSOR CIRCUIT MALFUNCTION (FO2 — V) —

DESCRIPTION:

- The oxygen sensor is used to sense oxygen concentration in the exhaust gas. If the fuel ratio is leaner than the stoichiometric ratio in the mixture (i.e. excessive amount of air), the exhaust gas contains more oxygen. To the contrary, if the fuel ratio is richer than the stoichiometric ratio, the exhaust gas contains hardly any oxygen.
- Therefore, examination of the oxygen concentration in exhaust gas makes it possible to show whether the air/fuel ratio is leaner or richer than the stoichiometric ratio.
- The oxygen sensor has a zirconia tube (ceramic) which generates voltage if there is a difference in oxygen concentration between the inside and outside of the tube. Platinum is coated on the inside and outside of the zirconia tube for the purpose of catalysis and electrode provision. The hexagon screw on the outside is grounded to the exhaust pipe, and the inside is connected to the ECM through the harness.
- A ceramic heater is employed to improve performance at low temperature.
- When rich air-fuel mixture is burnt in the cylinder, the oxygen in the exhaust gases reacts almost completely through the catalytic action of the platinum coating on the surface of the zirconia tube. This result is a very large difference in the oxygen concentration between the inside and outside, and the electromotive force generated is large.
- When a lean air-fuel mixture is burnt in the cylinder, oxygen remains in the exhaust gases even after the catalytic action, and this results in a small difference in the oxygen concentration. The electromotive force is very small.

- The difference in oxygen concentration changes greatly in the vicinity of the optimum air-fuel ratio, and hence the change in the electromotive force is also large. By inputting this information into the MFI control module, the air-fuel ratio of the supplied mixture can be determined easily. The oxygen sensor does not generate much electromotive force when the temperature is low. The characteristics of the electromotive force stabilize at temperature of approximately 300 to 400°C (572 to 752°F).

DTC DETECTING CONDITION:

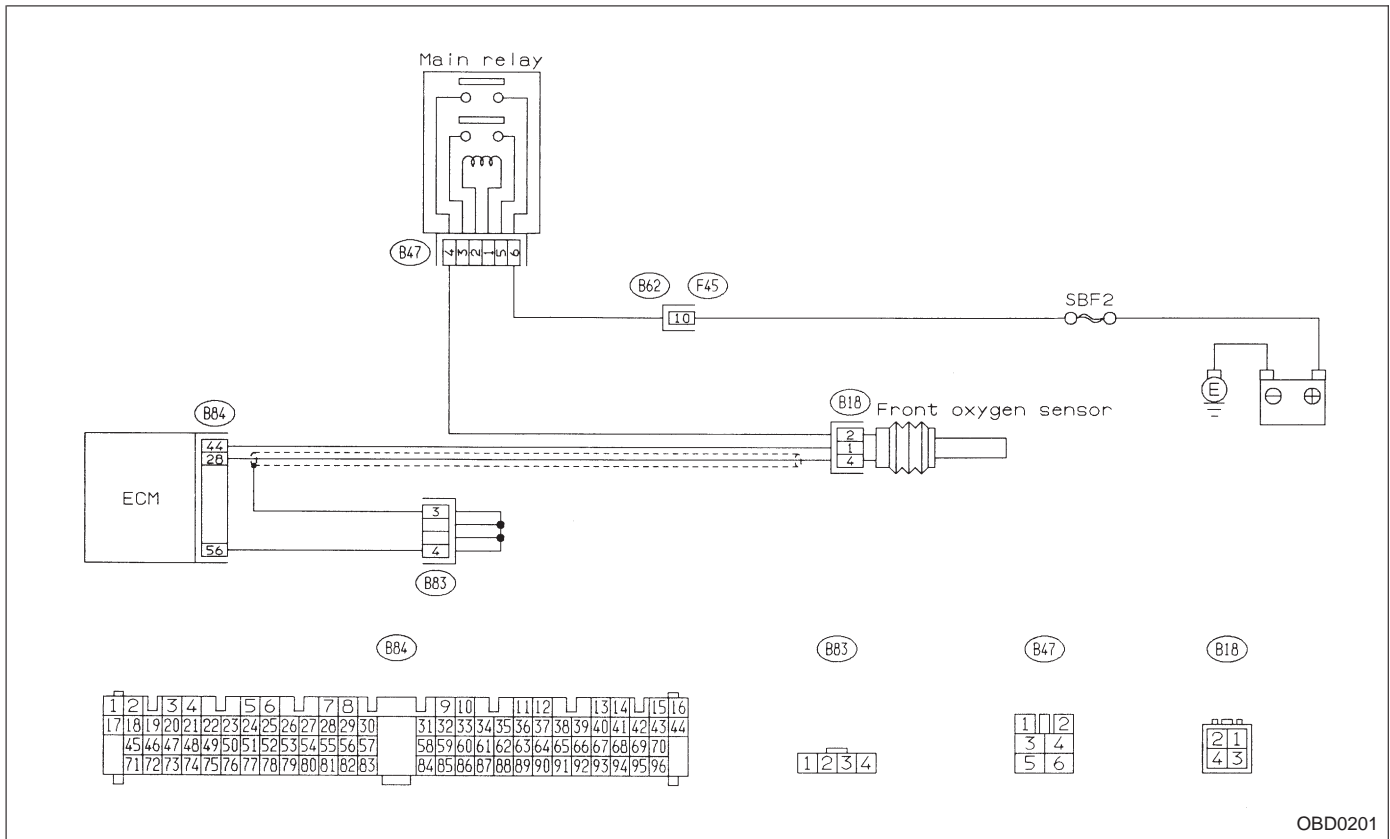
- Two consecutive trips with fault

1. Check for other causes affecting exhaust gas.
2. Check front oxygen sensor data.
3. Check harness connector.

CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

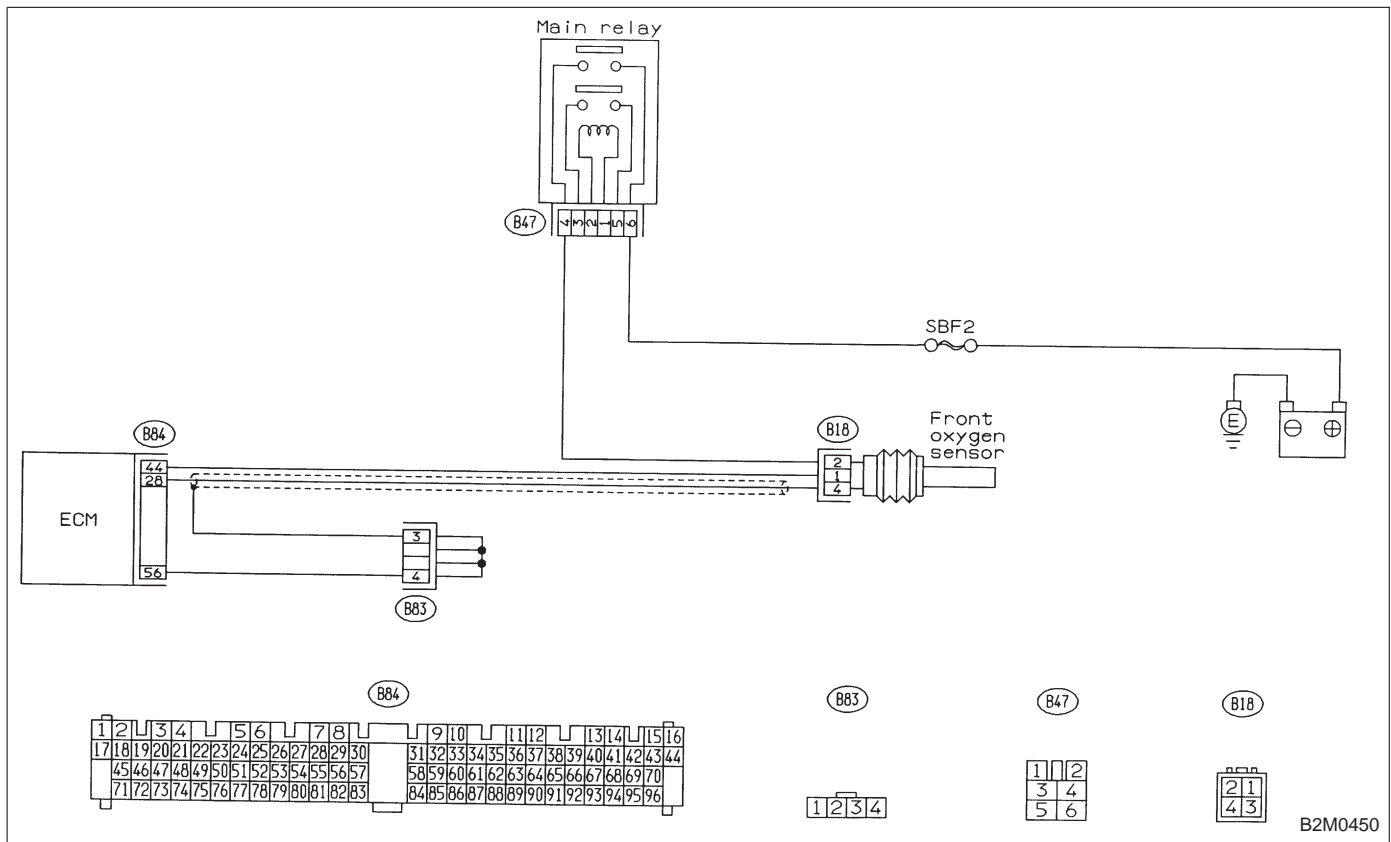
- LHD model



OBD0201

WIRING DIAGRAM:

● RHD model



B2M0450

1 CHECK FOR OTHER CAUSES AFFECTING EXHAUST GAS.

CHECK : Is CO % more than 2 % after engine warm-up?

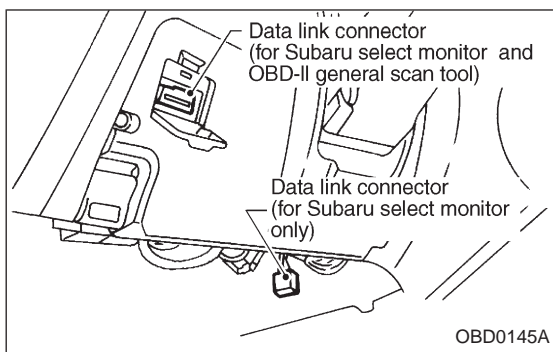
YES : Check fuel system.

NOTE:

Check for use of improper fuel.

Check if engine oil or coolant level is extremely low.

NO : Go to step 2.



2 CHECK FRONT OXYGEN SENSOR DATA.

- 1) Turn ignition switch to OFF.
- 2) Connect the Subaru Select Monitor or the OBD-II general scan tool to data link connector.
- 3) Start engine and Turn the Subaru Select Monitor and the OBD-II general scan tool switch to ON.
- 4) Warm-up the engine until coolant temperature is above 70°C (160°F) and keep the engine speed at 2,000 rpm to 3,000 rpm for one minute.
- 5) Read data on Subaru Select Monitor or the OBD-II general scan tool.

FO2max (F14)

0.80V

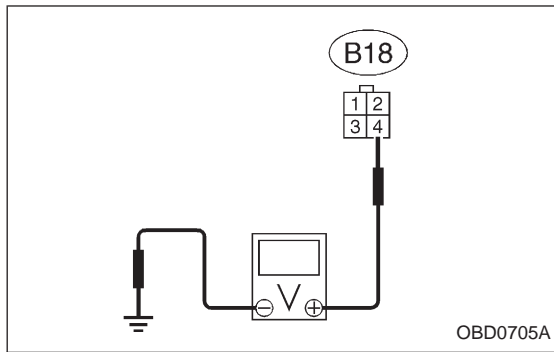
OBD0206

FO2min (F15)

0.10V

OBD0207

- Subaru Select Monitor
Designate mode using function key.
Function mode: F14 or F15
 - F14: Front oxygen sensor max. output signal is indicated.
 - F15: Front oxygen sensor min. output signal is indicated.
- CHECK** : *Is the difference of voltage between F14 and F15 0.1 V, or less?*
- YES** : Go to step 3.
- NO** : Replace front oxygen sensor.
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.



3 CHECK HARNESS CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from front oxygen sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between front oxygen sensor harness connector and body.

CHECK : **Connector & terminal (B18) No. 4 — Body/0.2 V, or more**

NO : Repair harness and connector.

NOTE:

In this case, the following are the possible causes.

- ① Open circuit of harness between ECM and front oxygen sensor.
- ② Poor contact in the ECM connector.

YES : Go to next **CHECK** .

CHECK : **Is there poor contact in front oxygen sensor connector?**

YES : Repair poor contact in front oxygen sensor connector.

NO : Replace front oxygen sensor.

OBD	(FB1)
P0133	<FO2_R>
OBD0209	

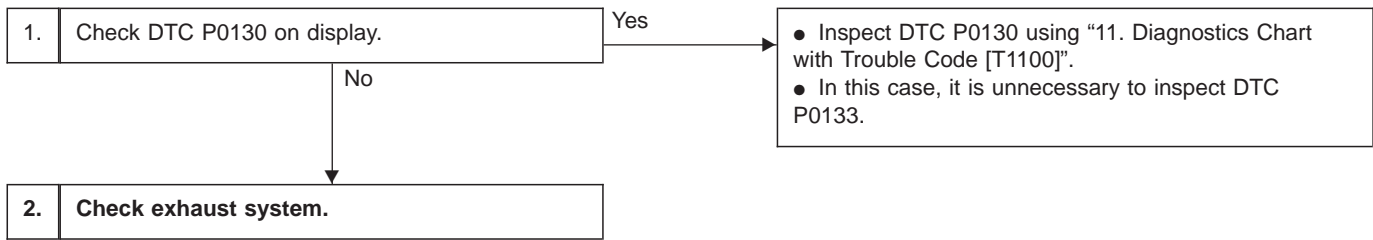
K: DTC P0133
— FRONT OXYGEN SENSOR CIRCUIT SLOW RESPONSE (FO2 – R) —

DESCRIPTION:

Refer to “J: DTC P0130 — FRONT OXYGEN SENSOR CIRCUIT MALFUNCTION — [T11J0]”.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

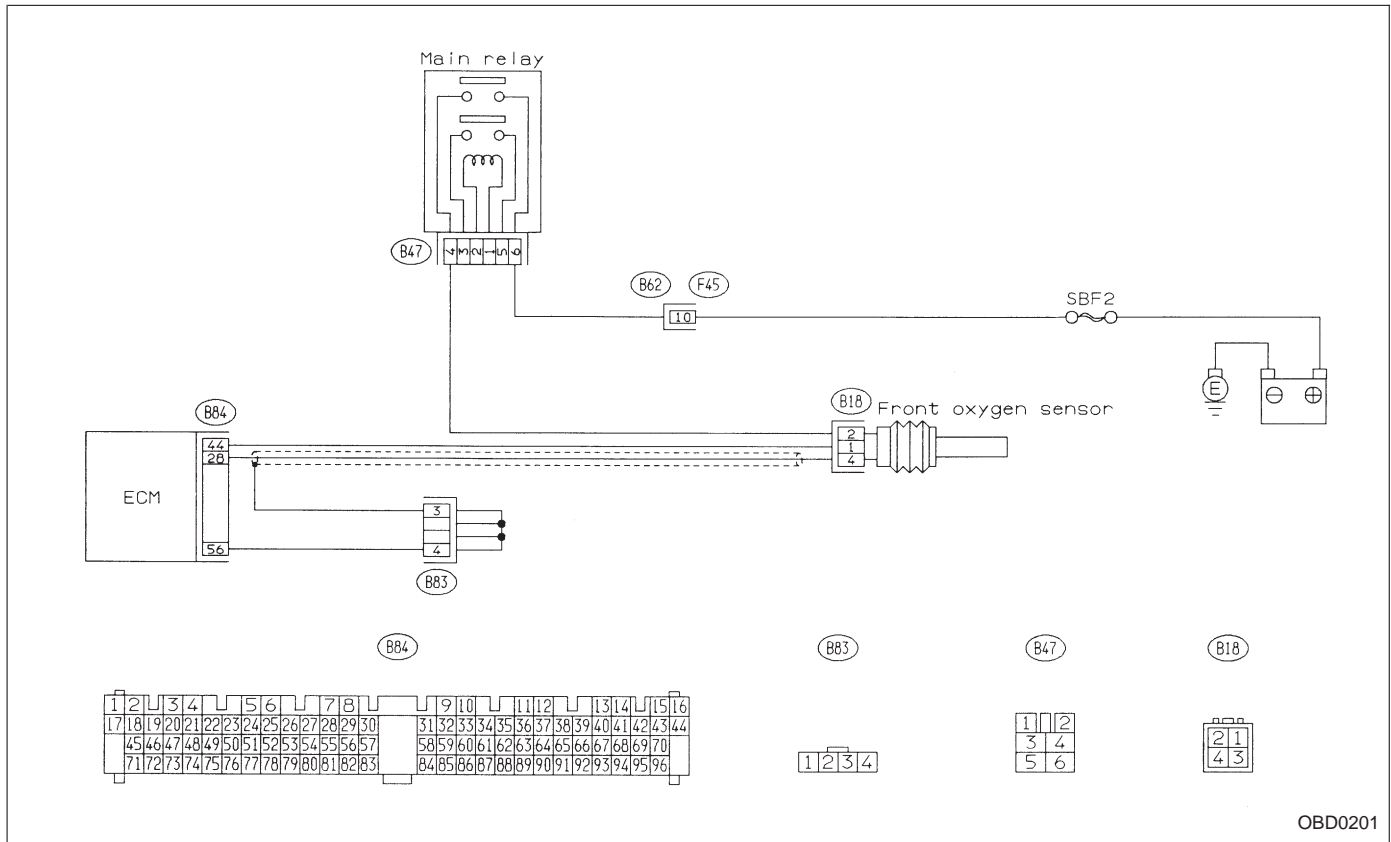


CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

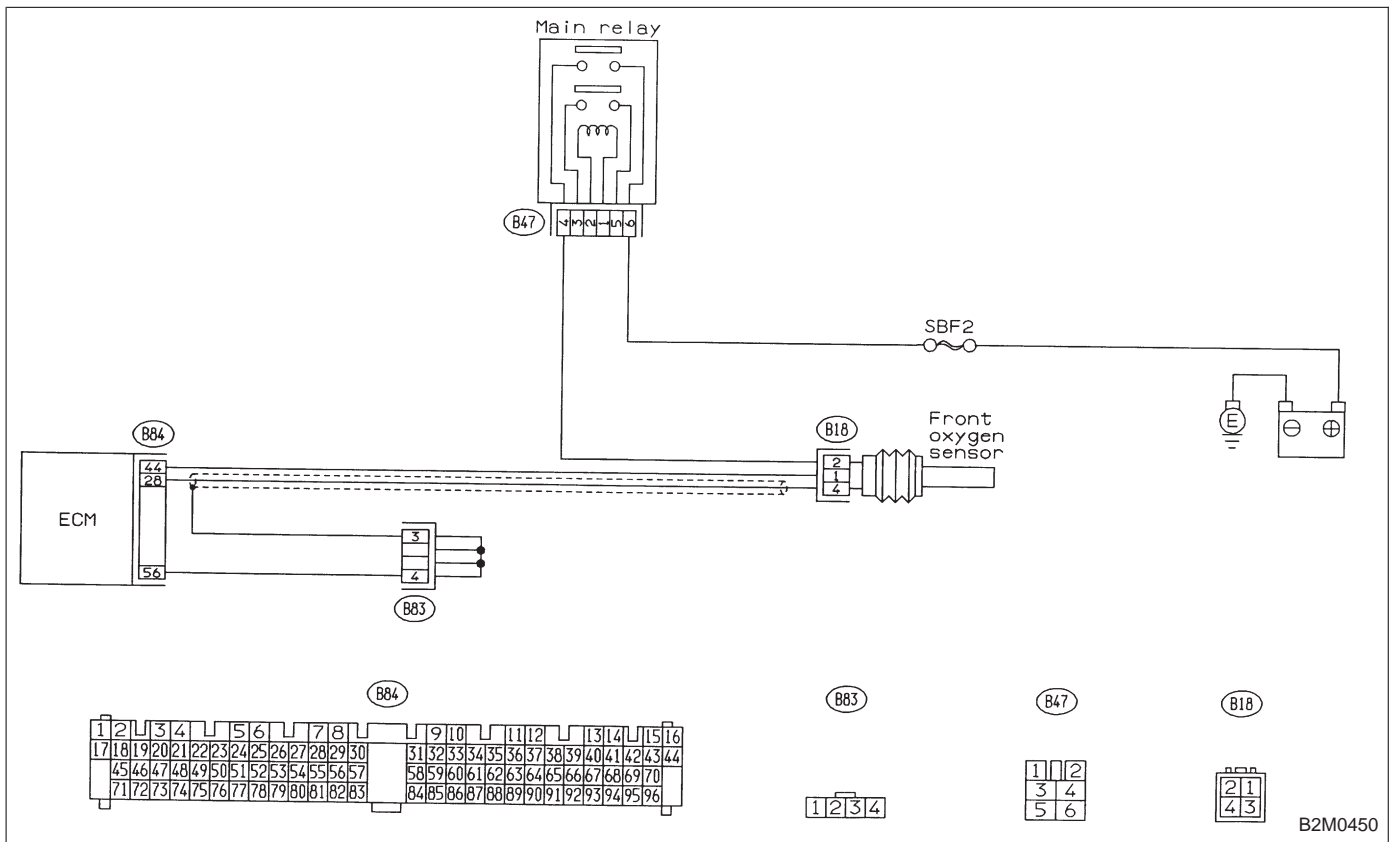
WIRING DIAGRAM:

- LHD model



WIRING DIAGRAM:

● RHD model



2 CHECK EXHAUST SYSTEM.

- CHECK** : Check the following.
- Looseness of installation portion of front exhaust pipe onto cylinder heads
 - Loosened connection of front exhaust pipe and front catalytic converter
 - Damage of exhaust pipe which make a hole
- YES** : Repair exhaust system.
- NO** : Replace front oxygen sensor.

OBD	(FB1)
P0135	<FO2H>
OBD0212	

L: DTC P0135
— FRONT OXYGEN SENSOR HEATER
CIRCUIT MALFUNCTION (FO2H) —

DESCRIPTION:

Refer to “J: DTC P0130 — FRONT OXYGEN SENSOR CIRCUIT MALFUNCTION — [T11J0]”.

DTC DETECTING CONDITION:

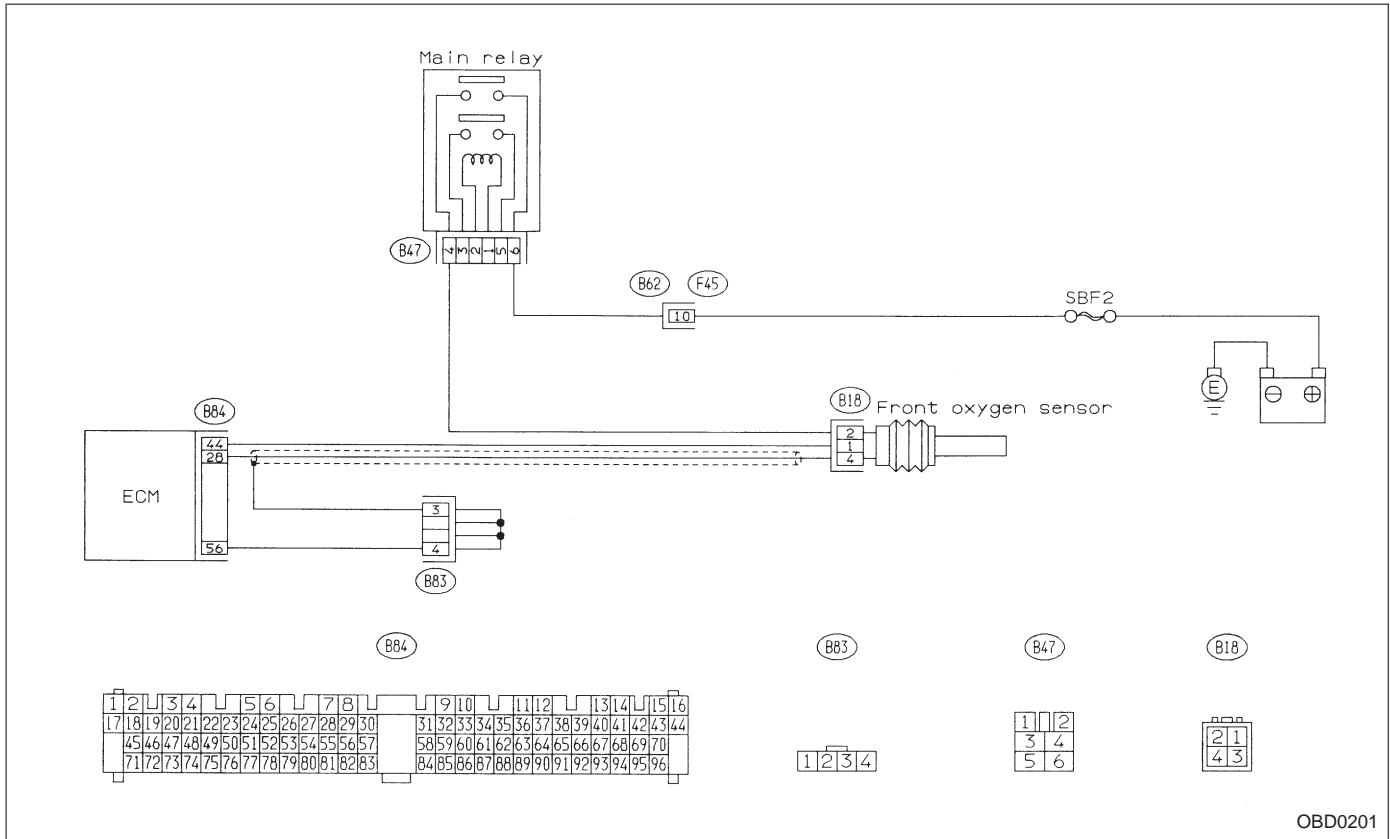
- Two consecutive trips with fault

1. Connect Subaru Select Monitor or the OBD-II general scan tool, and read data.
2. Check output signal from ECM. (Using voltage meter.)
3. Check power supply to front oxygen sensor.
4. Check front oxygen sensor.

CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

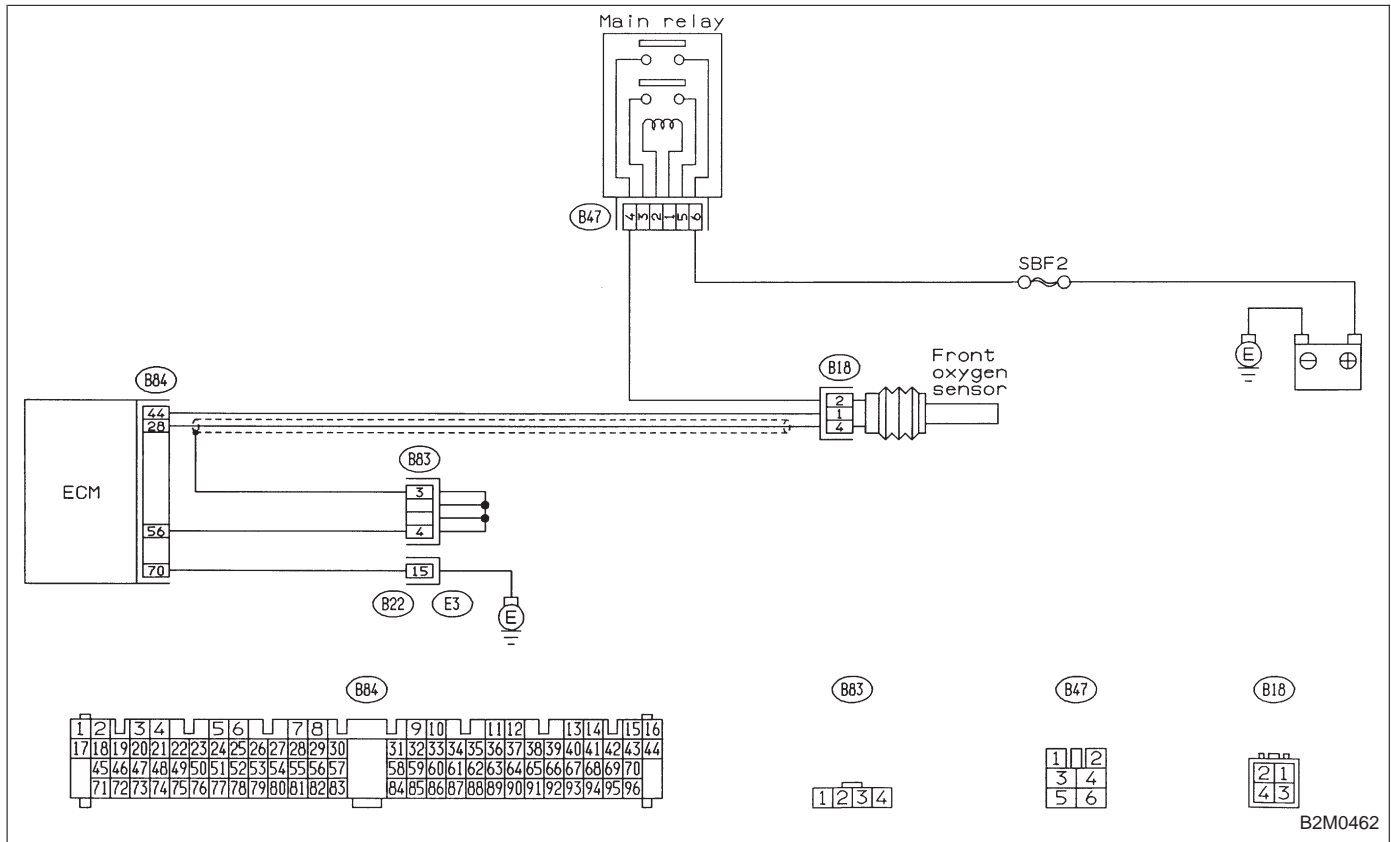
- LHD model

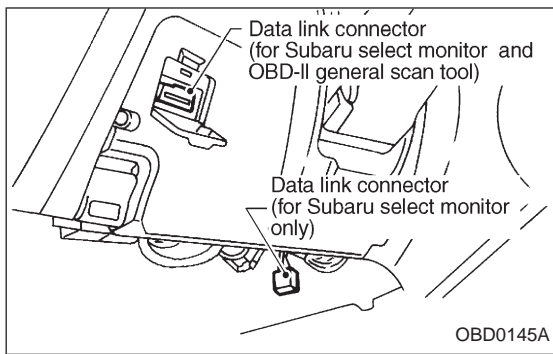


OBD0201

WIRING DIAGRAM:

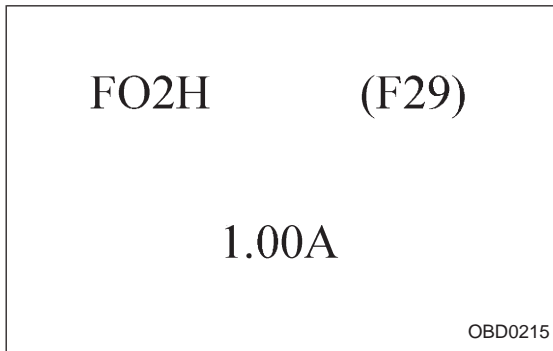
● RHD model





1 CONNECT SUBARU SELECT MONITOR OR THE OBD-II GENERAL SCAN TOOL, AND READ DATA.

- 1) Turn ignition switch to OFF.
- 2) Connect Subaru Select Monitor or the OBD-II general scan tool to data link connector.
- 3) Turn ignition switch to ON and Subaru Select Monitor or OBD-II general scan tool switch to ON.
- 4) Start engine.



- 5) Read data on Subaru Select Monitor or OBD-II general scan tool.

- Subaru Select Monitor
Designate mode using function key.

Function mode: F29

- F29: Front oxygen sensor heater current is indicated.

CHECK : *Is the reading of F29 0.2 A, or more?*

NO : Go to step 2.

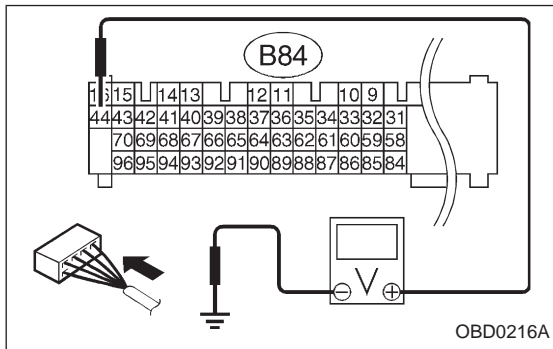
YES : Repair connector.

NOTE:

In this case, poor contact in front oxygen sensor connector and ECM connector can be the possible cause.

- OBD-II scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.



2 CHECK OUTPUT SIGNAL FROM ECM. (USING VOLTAGE METER.)

- 1) Start and idle the engine.
- 2) Measure voltage between ECM and body.

CHECK : **Connector & terminal (B84) No. 44 — Body/1.0 V, or less**

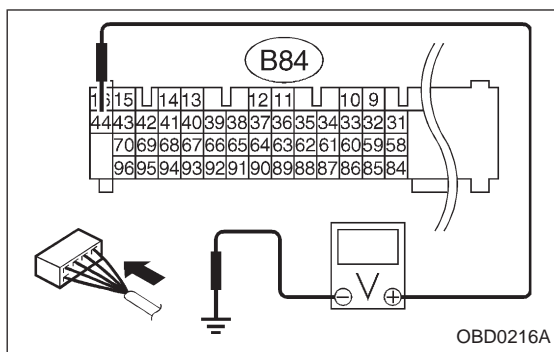
YES : Go to step 3.

NO : Go to next **CHECK** .

CHECK : **Is the voltage less than 1.0 V while shaking harness and connector of ECM?**

YES : Repair poor contact in ECM connector.

NO : Go to next step.

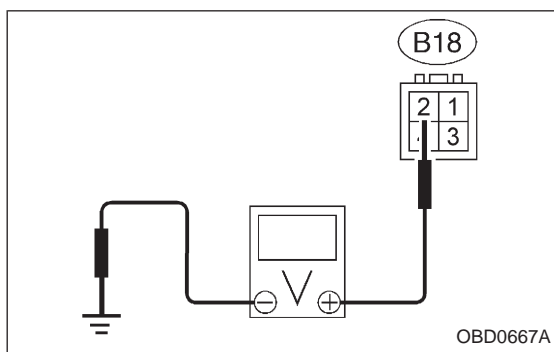


- 3) Disconnect connector from front oxygen sensor.
- 4) Measure voltage between ECM and body.

CHECK : **Connector & terminal**
(B84) No. 44 — Body/1.0 V, or less

YES : Replace ECM.

NO : Repair short circuit of harness between ECM and front oxygen sensor connector. After repair short circuit of harness, replace ECM.



3 CHECK POWER SUPPLY TO FRONT OXYGEN SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from front oxygen sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between front oxygen sensor connector and body.

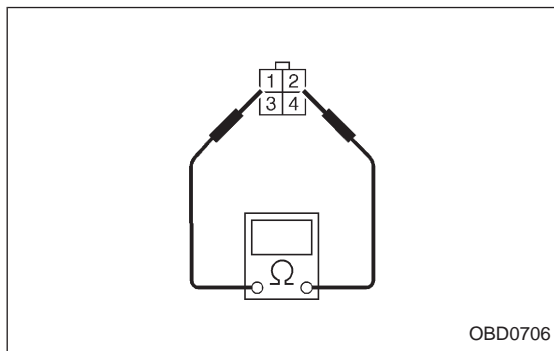
CHECK : **Connector & terminal**
(B18) No. 2 — Body/10 V, or more

YES : Go to step 4.

NO : Repair power supply line.

NOTE:

In this case, repair poor contact in connector or open circuit of harness between main relay and front oxygen sensor.



4 CHECK FRONT OXYGEN SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between front oxygen sensor connector terminals.

CHECK : **Terminals**
No. 1 — No. 2/30 Ω, or less

YES : Repair harness and connector.

NOTE:

In this case, repair the following:

- ① Open circuit of harness between the front oxygen sensor connector and the ECM connector
- ② Poor contact in front oxygen sensor connector
- ③ Poor contact in ECM connector

NO : Replace front oxygen sensor.

OBD	(FB1)
P0136	<RO2_V>
OBD0220	

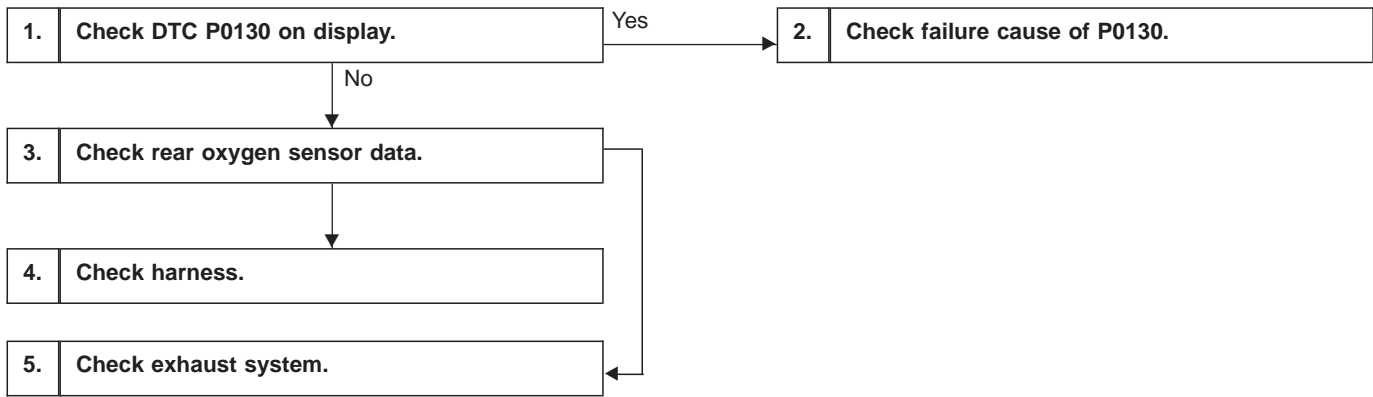
M: DTC P0136
— REAR OXYGEN SENSOR CIRCUIT
MALFUNCTION (RO2 – V) —

DESCRIPTION:

- In order to monitor purifying efficiency of the catalyzer, the rear oxygen sensor sends a signal to the ECM.
- Refer to “J: DTC P0130 — FRONT OXYGEN SENSOR CIRCUIT MALFUNCTION — [T11J0]”.

DTC DETECTING CONDITION:

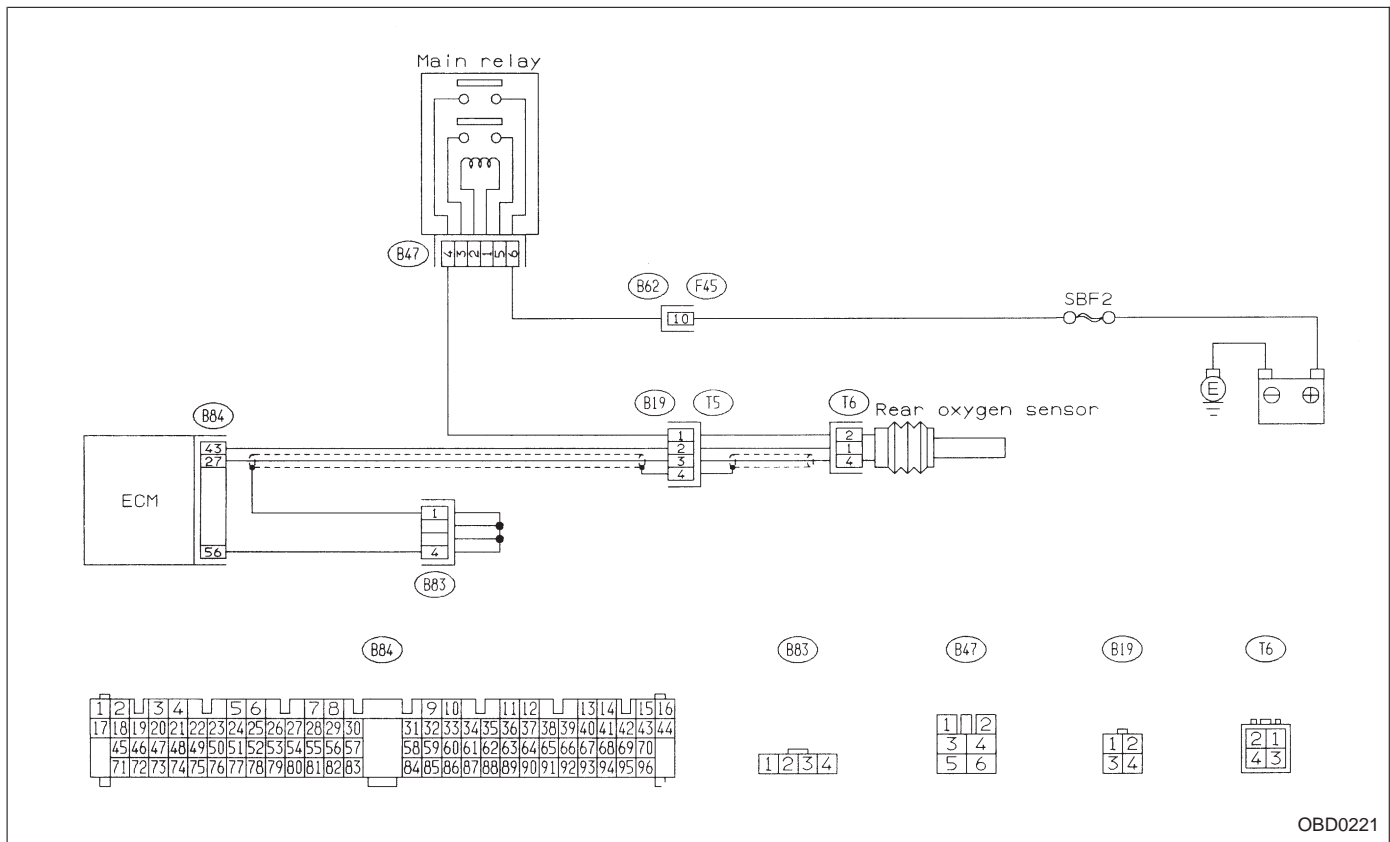
- Two consecutive trips with fault



CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

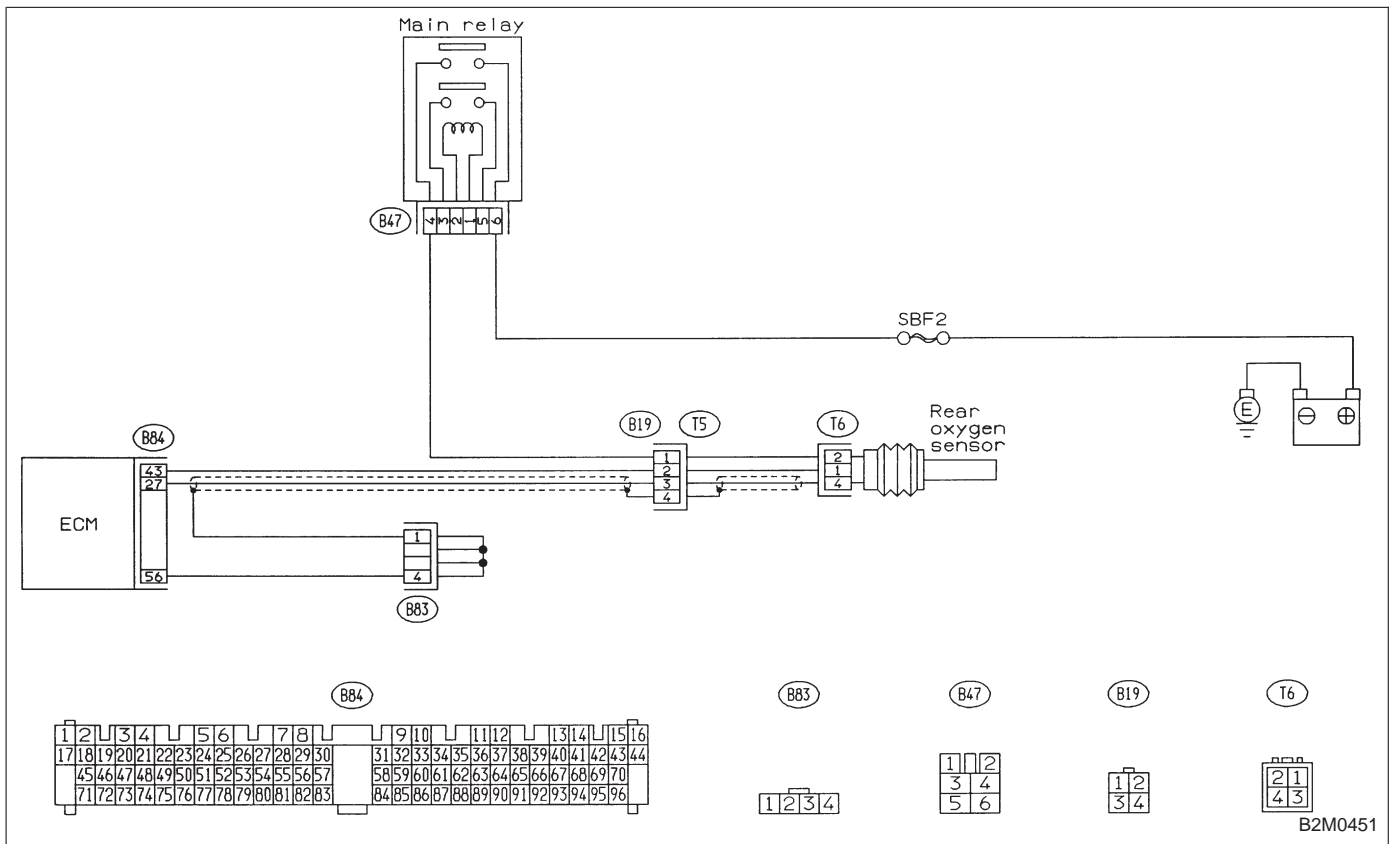
- LHD model



OBD0221

WIRING DIAGRAM:

- RHD model



1 CHECK DTC P0130 ON DISPLAY.

CHECK : Check that Subaru Select Monitor or the OBD-II general scan tool shows P0130.

YES : Go to step 2.

NO : Go to step 3.

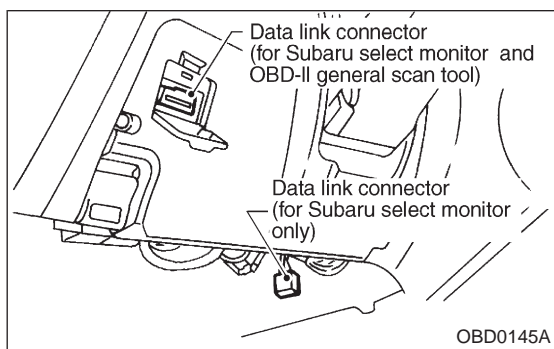
2 CHECK FAILURE CAUSE OF P0130.

Perform the step 1 of DTC P0130.

CHECK : Is the failure cause of P0130 in the fuel system?

YES : Check fuel system. In this case, inspection of P0136 is not necessary.

NO : Go to step 3.

**3 CHECK REAR OXYGEN SENSOR DATA.**

- 1) Turn ignition switch to OFF.
- 2) Connect Subaru Select Monitor or OBD-II general scan tool to data link connector.
- 3) Start the engine, and turn Subaru Select Monitor or OBD-II general scan tool switch to ON.
- 4) Warm-up the engine until engine coolant temperature is above 70°C (160°F), and keep the engine speed at 2,000 rpm to 3,000 rpm for two minutes.

5) Read data on Subaru Select Monitor or OBD-II general scan tool.

- Subaru Select Monitor
Designate mode using function key.

Function mode: F16

- F16: Rear oxygen sensor output signal is indicated.

CHECK : Is the indicated data fluctuate?

YES : Go to step 5.

NO : Go to next **CHECK** .

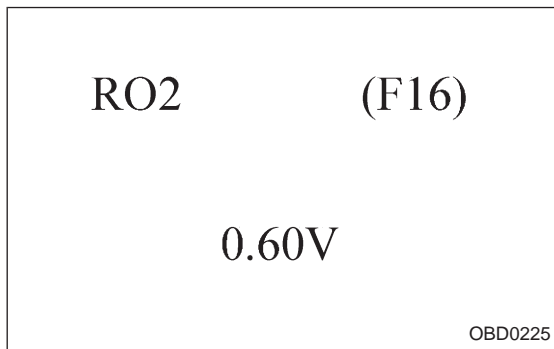
CHECK : Is the indicated data fixed at 0.3±0.1 V?

YES : Go to step 4.

NO : Replace rear oxygen sensor.

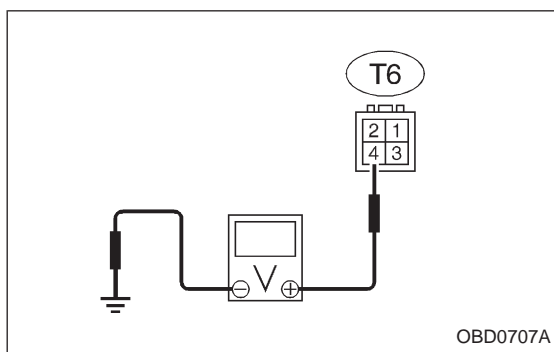
- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.



4 CHECK HARNESS.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from rear oxygen sensor.
- 3) Turn ignition switch to ON.



- 4) Measure voltage between rear oxygen sensor harness connector and body.

CHECK : **Connector & terminal**
(T6) No. 4 — Body/0.2 V, or more

NO : Repair harness and connector.

NOTE:

In this case, the following are the possible causes.

- ① Open circuit of harness between rear oxygen sensor and ECM connector.
- ② Poor contact in rear oxygen sensor connector.
- ③ Poor contact in ECM connector.
- ④ Poor contact in rear oxygen sensor connecting harness connector.

YES : Replace rear oxygen sensor.

5 CHECK EXHAUST SYSTEM.

CHECK : **Check the following items.**

- **Looseness of installation portions**
- **Damage (crack, hole etc.) of parts**
- **Looseness and opening of parts between front oxygen sensor and rear oxygen sensor.**

YES : Repair or replace faulty parts.

NO : Replace rear oxygen sensor.

OBD	(FB1)
P0139	<RO2_R>
OBD0229	

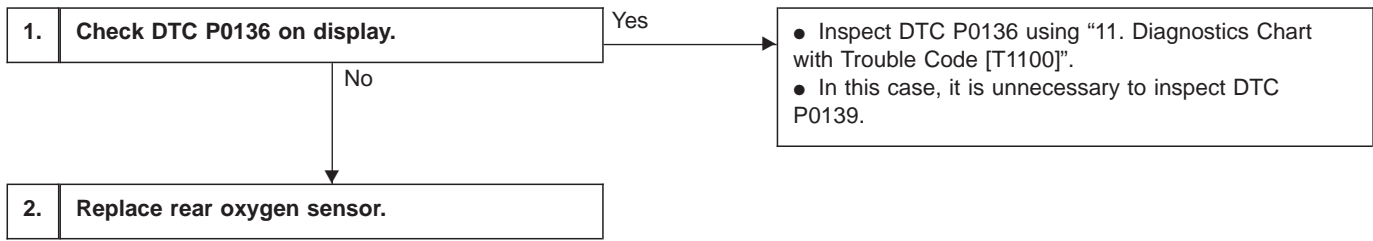
N: DTC P0139
— REAR OXYGEN SENSOR CIRCUIT SLOW
RESPONSE (RO2 – R) —

DESCRIPTION:

Refer to “M: DTC P0136 — REAR OXYGEN SENSOR CIRCUIT MALFUNCTION — [T11M0]”.

DTC DETECTING CONDITION:

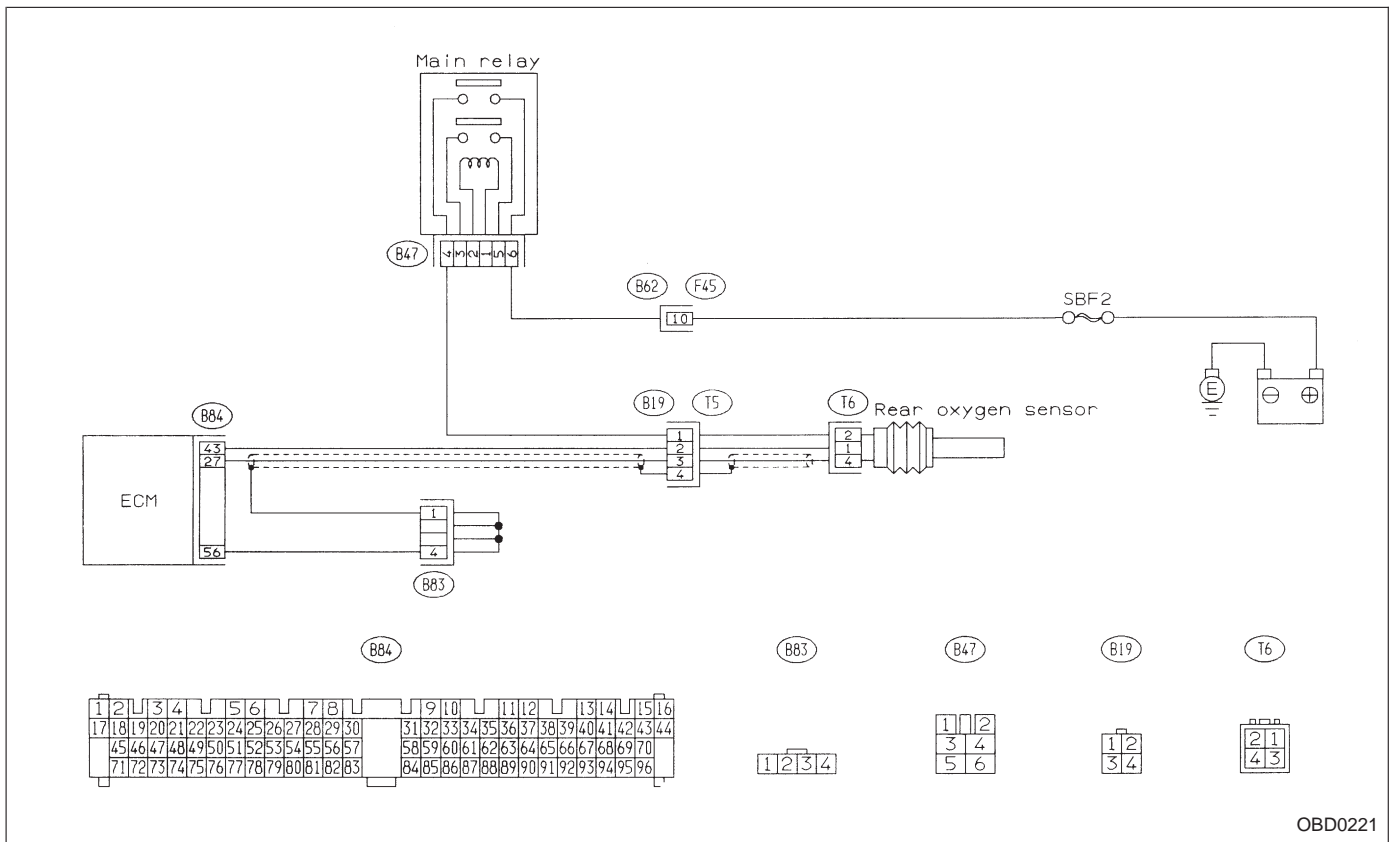
- Two consecutive trips with fault



CAUTION:
 After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

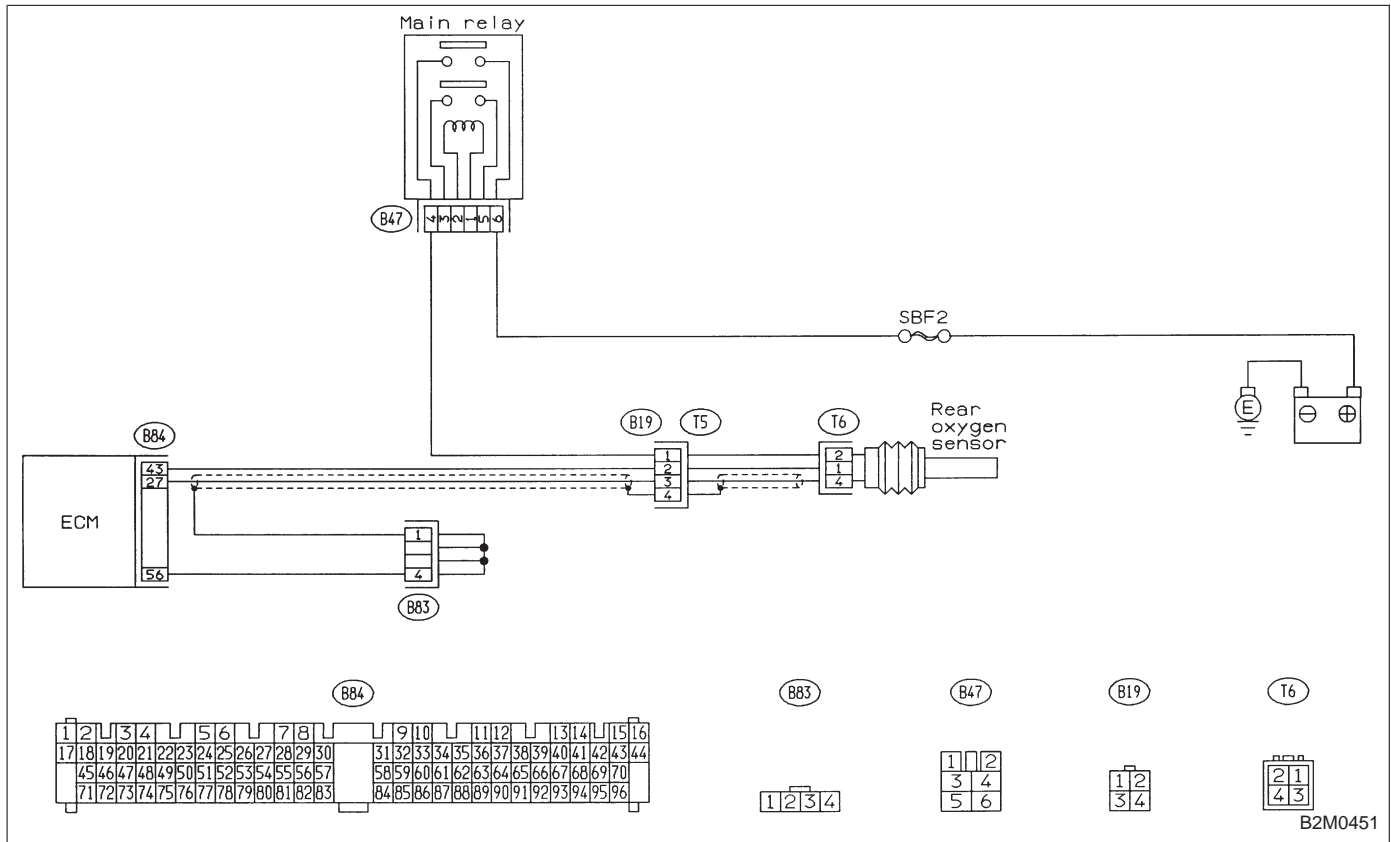
• LHD model



OBD0221

WIRING DIAGRAM:

- RHD model



OBD	(FB1)
P0141	<RO2H>
OBD0232	

O: DTC P0141
— REAR OXYGEN SENSOR HEATER
CIRCUIT MALFUNCTION (RO2H) —

DESCRIPTION:

Refer to “M: DTC P0136 — REAR OXYGEN SENSOR CIRCUIT MALFUNCTION — [T11M0]”.

DTC DETECTING CONDITION:

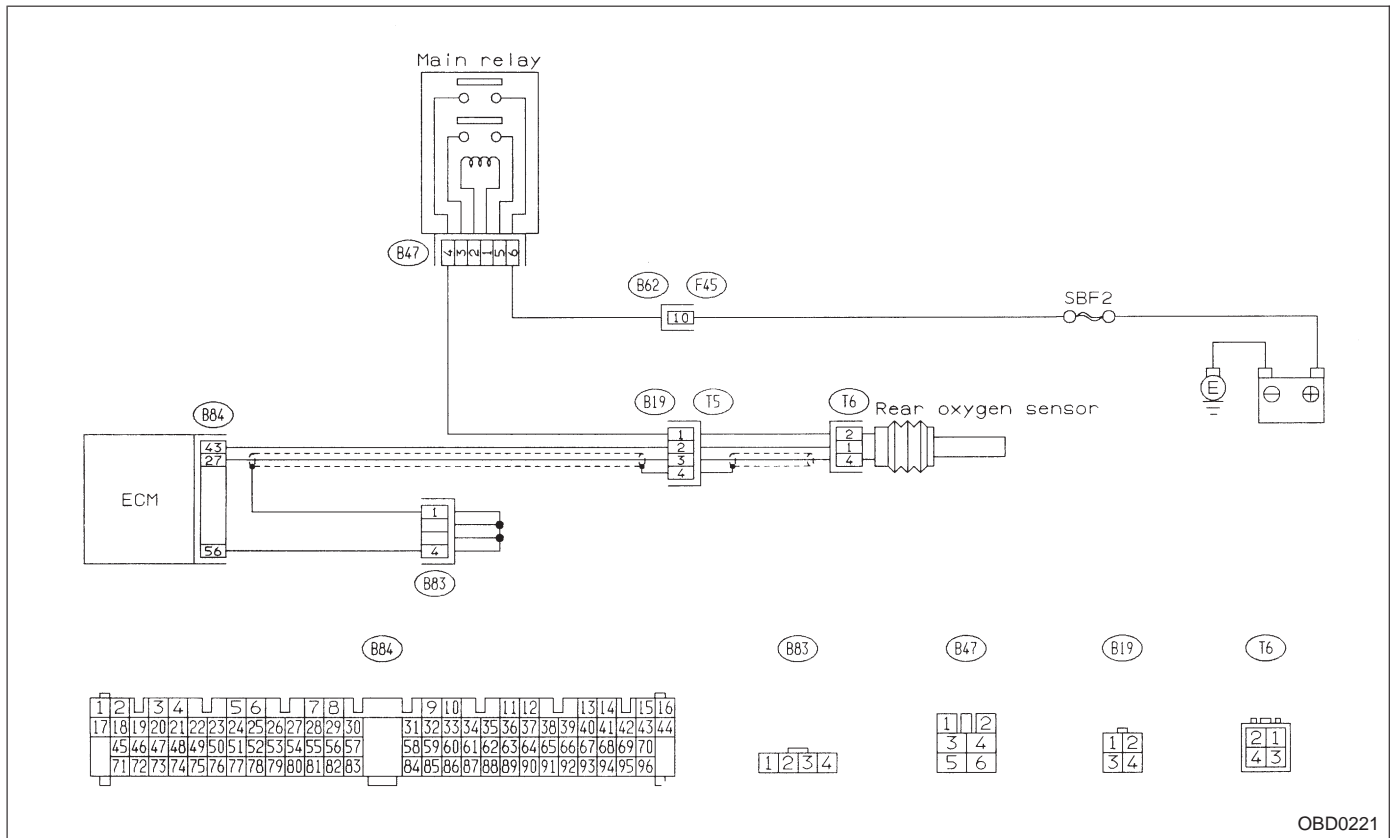
- Two consecutive trips with fault

1. Connect Subaru Select Monitor or the OBD-II general scan tool, and read data.
2. Check output signal from ECM. (Using voltage meter.)
3. Check power supply to rear oxygen sensor.
4. Check rear oxygen sensor.

CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

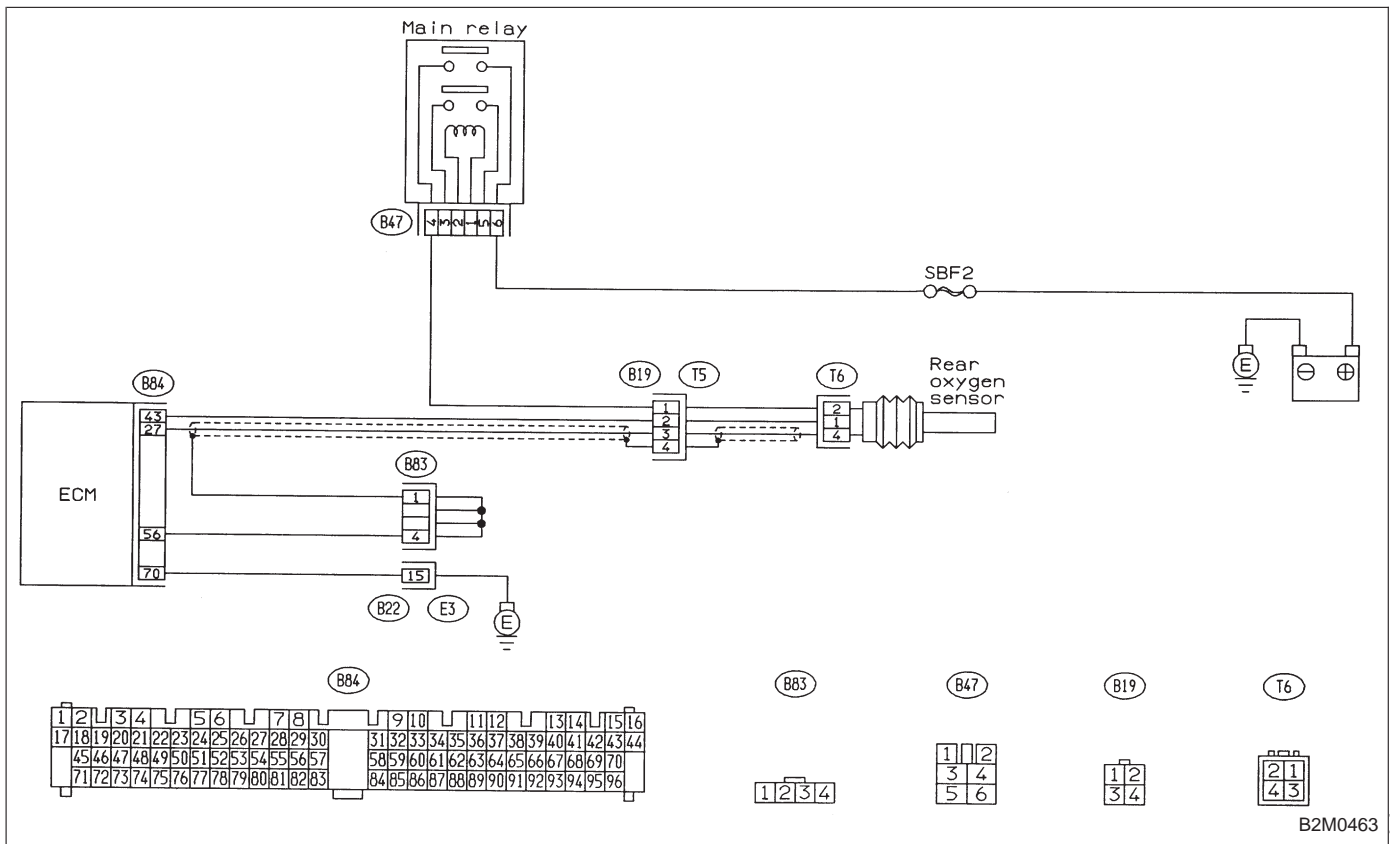
- LHD model

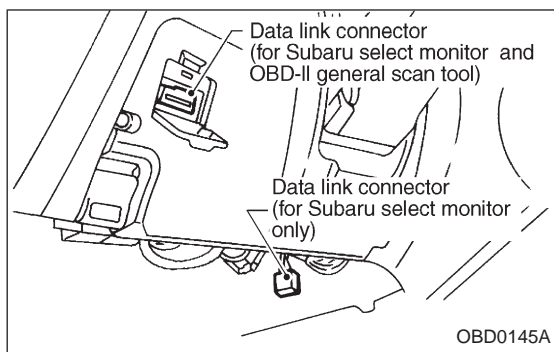


OBD0221

WIRING DIAGRAM:

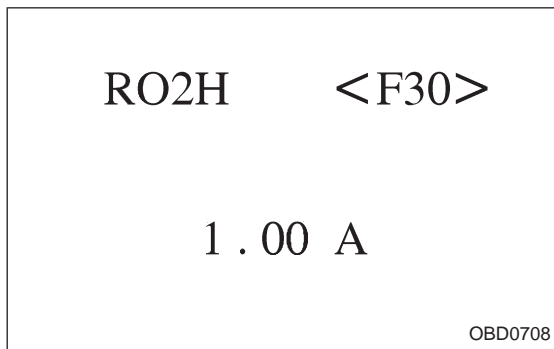
- RHD model





1 CONNECT SUBARU SELECT MONITOR OR THE OBD-II GENERAL SCAN TOOL, AND READ DATA.

- 1) Turn ignition switch to OFF.
- 2) Connect Subaru Select Monitor or the OBD-II general scan tool to data link connector.
- 3) Turn ignition switch to ON and Subaru Select Monitor or OBD-II general scan tool switch to ON.
- 4) Start engine.



- 5) Read data on Subaru Select Monitor or OBD-II general scan tool.

- Subaru Select Monitor
Designate mode using function key.

Function mode: F30

- F30: Rear oxygen sensor heater current is indicated.

CHECK : *Is the reading of F30 0.2 A, or more?*

NO : Go to step 2.

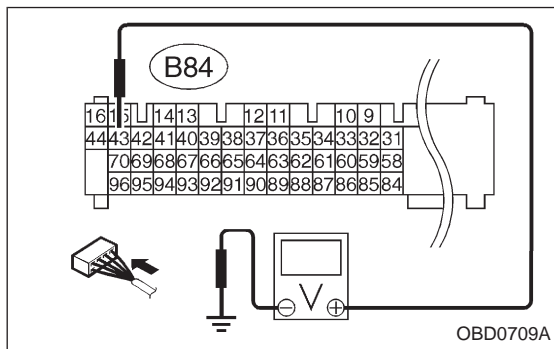
YES : Repair connector.

NOTE:

In this case, poor contact of rear oxygen sensor connector and ECM connector can be the possible cause.

- OBD-II scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.



2 CHECK OUTPUT SIGNAL FROM ECM. (USING VOLTAGE METER.)

- 1) Start and idle the engine.
- 2) Measure voltage between ECM and body.

CHECK : **Connector & terminal (B84) No. 43 — Body/1.0 V, or less**

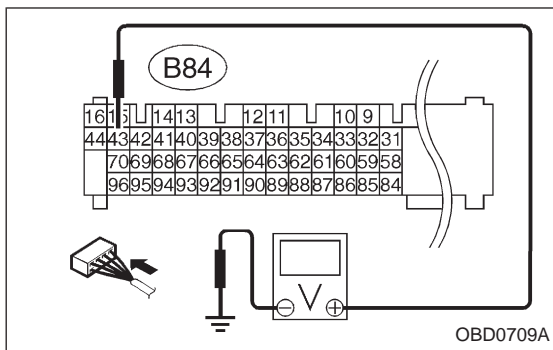
YES : Go to step 3.

NO : Go to next **CHECK** .

CHECK : **Is the voltage less than 1.0 V while shaking harness and connector of ECM?**

YES : Repair poor contact in ECM connector.

NO : Go to next step.

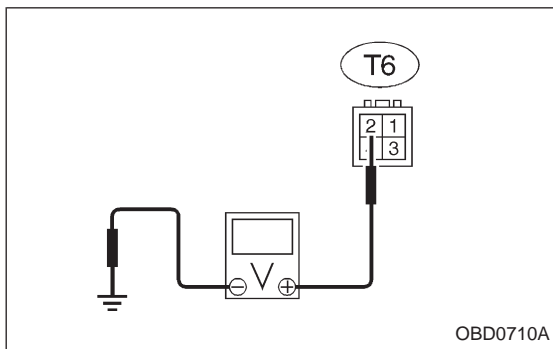


- 3) Disconnect connector from rear oxygen sensor.
- 4) Measure voltage between ECM and body.

CHECK : **Connector & terminal**
(B84) No. 43 — Body/1.0 V, or less

YES : Replace ECM.

NO : Repair short circuit of harness between ECM and rear oxygen sensor connector. After repair short circuit of harness, replace ECM.



3 CHECK POWER SUPPLY TO REAR OXYGEN SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from rear oxygen sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between rear oxygen sensor connector and body.

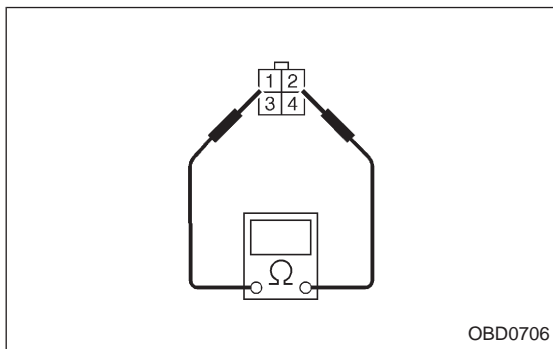
CHECK : **Connector & terminal**
(T6) No. 2 — Body/10 V, or more

YES : Go to step 4.

NO : Repair power supply line.

NOTE:

In this case, repair poor contact in connector or open circuit of harness between main relay and rear oxygen sensor.



4 CHECK REAR OXYGEN SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between rear oxygen sensor connector terminals.

CHECK : **Terminals**
No. 1 — No. 2/30 Ω, or less

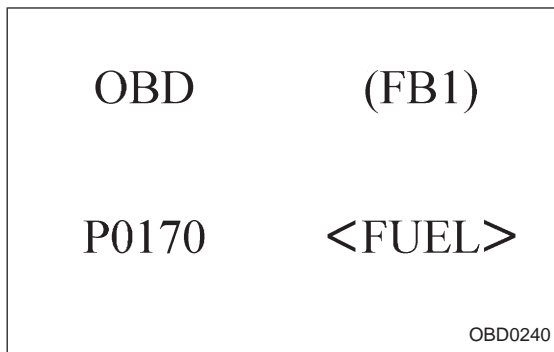
YES : Repair harness and connector.

NOTE:

In this case, repair the following.

- ① Open circuit of harness between rear oxygen sensor connector and ECM connector
- ② Poor contact in rear oxygen sensor connector
- ③ Poor contact in ECM connector
- ④ Poor contact in rear oxygen sensor connecting harness connector

NO : Replace rear oxygen sensor.



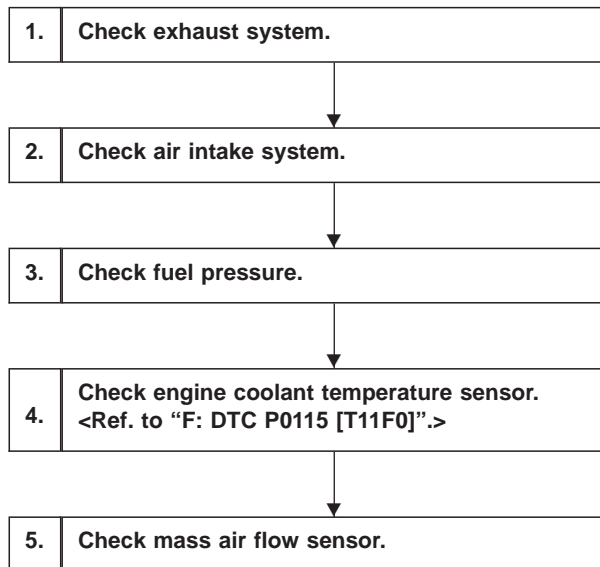
P: DTC P0170
— FUEL TRIM MALFUNCTION (FUEL) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance



CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODE. <Ref. to [T3D0] and [T3E0].>

1 CHECK EXHAUST SYSTEM.

CHECK : *Are there holes or loose bolts on exhaust system?*

YES : Repair exhaust system.

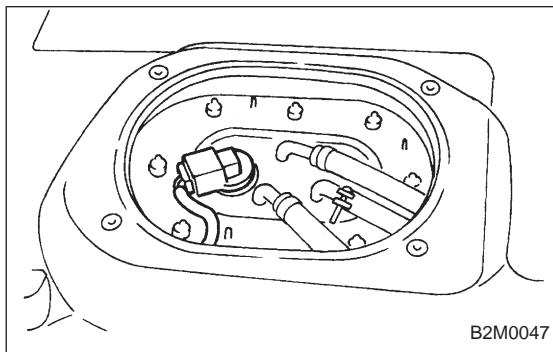
NO : Go to step 2.

2 CHECK AIR INTAKE SYSTEM.

CHECK : *Are there holes, loose bolts or disconnection of hose on air intake system?*

YES : Repair air intake system.

NO : Go to step 3.

**3 CHECK FUEL PRESSURE.**

1) Release fuel pressure.

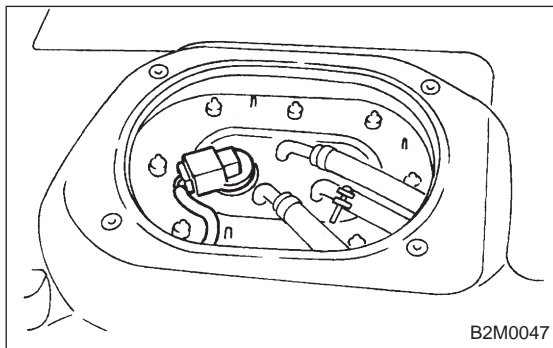
(1) Remove fuel pump access hole lid located on the right rear of trunk compartment floor (Sedan) or luggage compartment floor (Wagon).

(2) Disconnect connector from fuel tank.

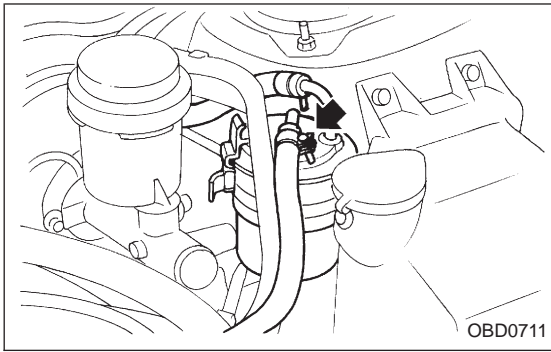
(3) Start the engine, and run it until it stalls.

(4) After stopping the engine, crank the engine for 5 to 7 seconds to reduce fuel pressure.

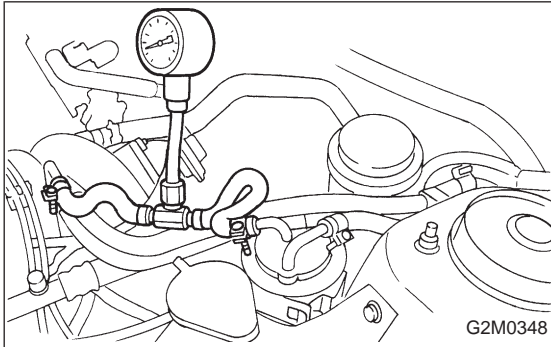
(5) Turn ignition switch to OFF.



2) Connect connector to fuel tank.



3) Disconnect fuel delivery hose from fuel filter, and connect fuel pressure gauge.



4) Start the engine and idle while gear position is neutral.
5) Measure fuel pressure while disconnecting pressure regulator vacuum hose from intake manifold.

CHECK : **Fuel pressure:**
226 — 275 kPa (2.3 — 2.8 kg/cm²,
33 — 40 psi)

YES : Go to next step.

NO : Repair the following items.

Fuel pressure too high	<ul style="list-style-type: none"> ● Clogged fuel return line or bent hose
Fuel pressure too low	<ul style="list-style-type: none"> ● Improper fuel pump discharge ● Clogged fuel supply line

6) After connecting pressure regulator vacuum hose, measure fuel pressure.

CHECK : **Fuel pressure:**
157 — 206 kPa (1.6 — 2.1 kg/cm²,
23 — 30 psi)

YES : Go to step 4.

NO : Repair the following items.

Fuel pressure too high	<ul style="list-style-type: none"> ● Faulty pressure regulator ● Clogged fuel return line or bent hose
Fuel pressure too low	<ul style="list-style-type: none"> ● Faulty pressure regulator ● Improper fuel pump discharge ● Clogged fuel supply line

WARNING:

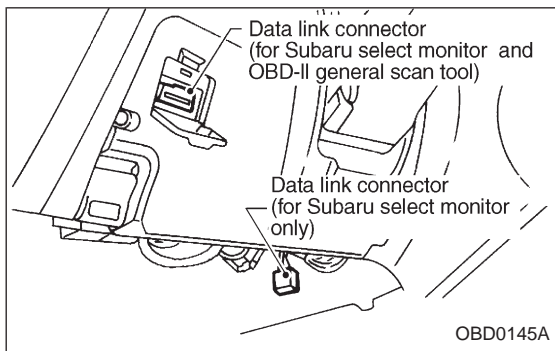
Before removing fuel pressure gauge, release fuel pressure.

NOTE:

- If fuel pressure does not increase, squeeze fuel return hose 2 to 3 times, then measure fuel pressure again.
- If out of specification as measured at step 6), check or replace pressure regulator and pressure regulator vacuum hose.

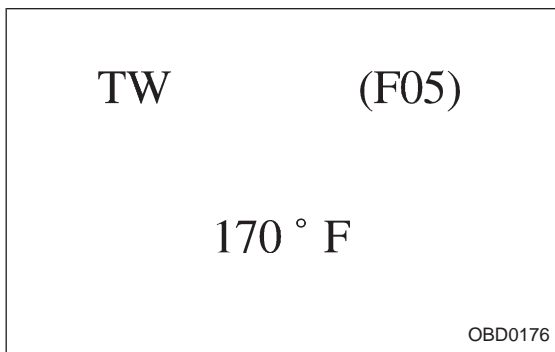
4 CHECK ENGINE COOLANT TEMPERATURE SENSOR.
< REF. TO "F: DTC P0115 [T11F0]." >

1) Turn ignition switch to OFF.



2) Connect the Subaru Select Monitor or the OBD-II general scan tool to data link connector.

3) Start the engine and warm-up completely.



4) Read data on Subaru Select Monitor or the OBD-II general scan tool.

- Subaru Select Monitor
Designate mode using function key.

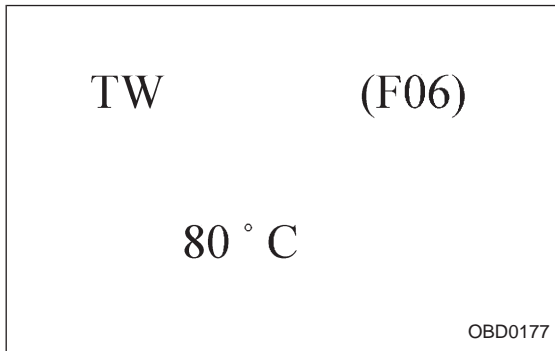
Function mode: F05 or F06

- F05: Water temperature is indicated in "°F".
- F06: Water temperature is indicated in "°C".

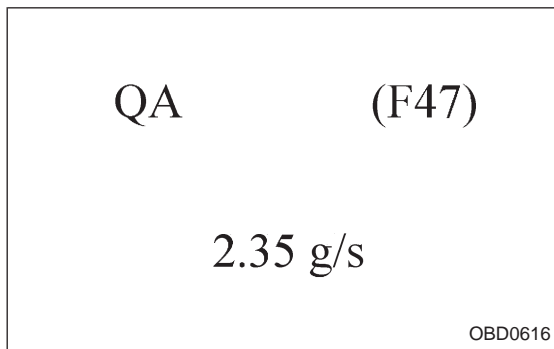
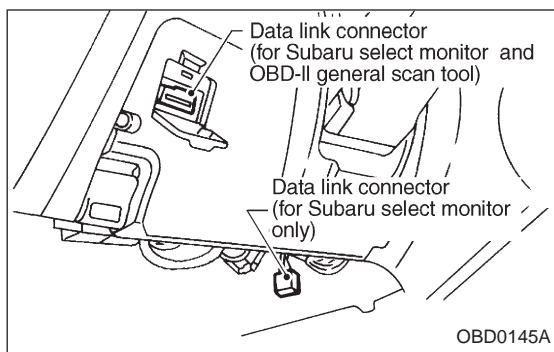
CHECK : **Is temperature indicated on Subaru Select Monitor (F05) greater than 140°F?**
Is temperature indicated on Subaru Select Monitor (F06) greater than 60°C?

YES : Go to step 5.

NO : Replace engine coolant temperature sensor.



- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.



5 CHECK MASS AIR FLOW SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Connect the Subaru Select Monitor or the OBD-II general scan tool to data link connector.
- 3) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F).

4) Read data on Subaru Select Monitor or OBD-II general scan tool.

- Subaru Select Monitor
Designate mode using function key.

Function mode: F47

- F47: Mass air flow is shown on display.

CHECK : *Is the voltage within the specifications shown in the following table?*

Engine speed	Specified value
Idling	1.9 — 3.6 (g/sec)
2,500 rpm	7.0 — 14.8 (g/sec)

NO : Replace mass air flow sensor.

YES : Contact with SOA service.

Note: Inspection by DTM is required.

Probable cause: Deterioration of plural parts

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

OBD	(FB1)
P0201	<INJ1>
OBD0261	

Q: DTC P0201
— FUEL INJECTOR CIRCUIT MALFUNCTION - #1 (INJ1) —

OBD	(FB1)
P0202	<INJ2>
OBD0262	

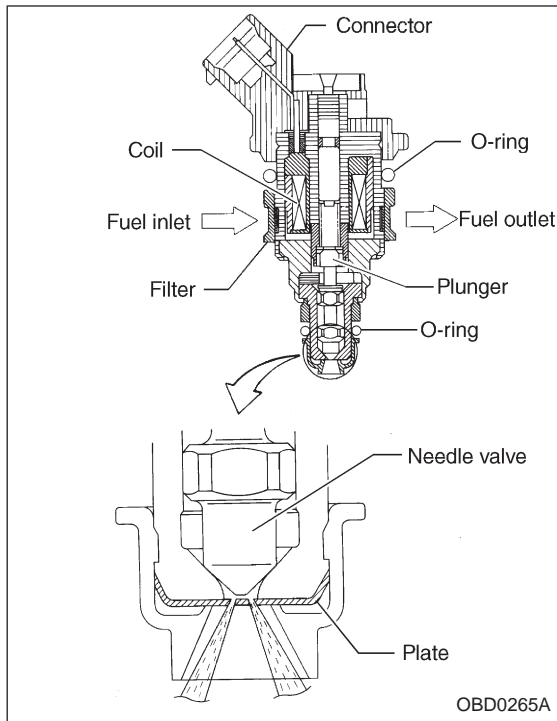
R: DTC P0202
— FUEL INJECTOR CIRCUIT MALFUNCTION - #2 (INJ2) —

OBD	(FB1)
P0203	<INJ3>
OBD0263	

S: DTC P0203
— FUEL INJECTOR CIRCUIT MALFUNCTION - #3 (INJ3) —

OBD	(FB1)
P0204	<INJ4>
OBD0264	

T: DTC P0204
— FUEL INJECTOR CIRCUIT MALFUNCTION - #4 (INJ4) —

**DESCRIPTION:**

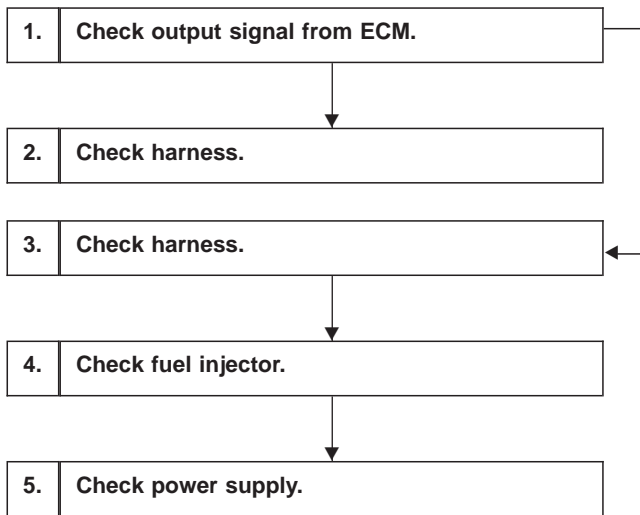
- The MFI system employs a gallery type (side-feed type) fuel injector.
- The gallery type fuel injector is installed in the fuel pipe to allow cooling of the injector by the fuel.
- The features of this type of fuel injector are as follows:
 - 1) High heat resistance
 - 2) Low driving noise
 - 3) Easy to service
 - 4) Small size
- The fuel injector injects fuel according to the valve open signal received from the ECM.
- The nozzle is attached on the top of the fuel injector. The needle valve is lifted by the solenoid coil through the plunger on arrival of the valve open signal.
- Since the injection opening, the lifted level of valve and the regulator-controlled fuel pressure are kept constant, the amount of fuel to be injected can be controlled only by the valve open signal from the ECM.

DTC DETECTING CONDITION:

- Immediately at fault recognition

TROUBLE SYMPTOM:

- Failure of engine to start
- Engine stalls.
- Erroneous idling
- Rough driving

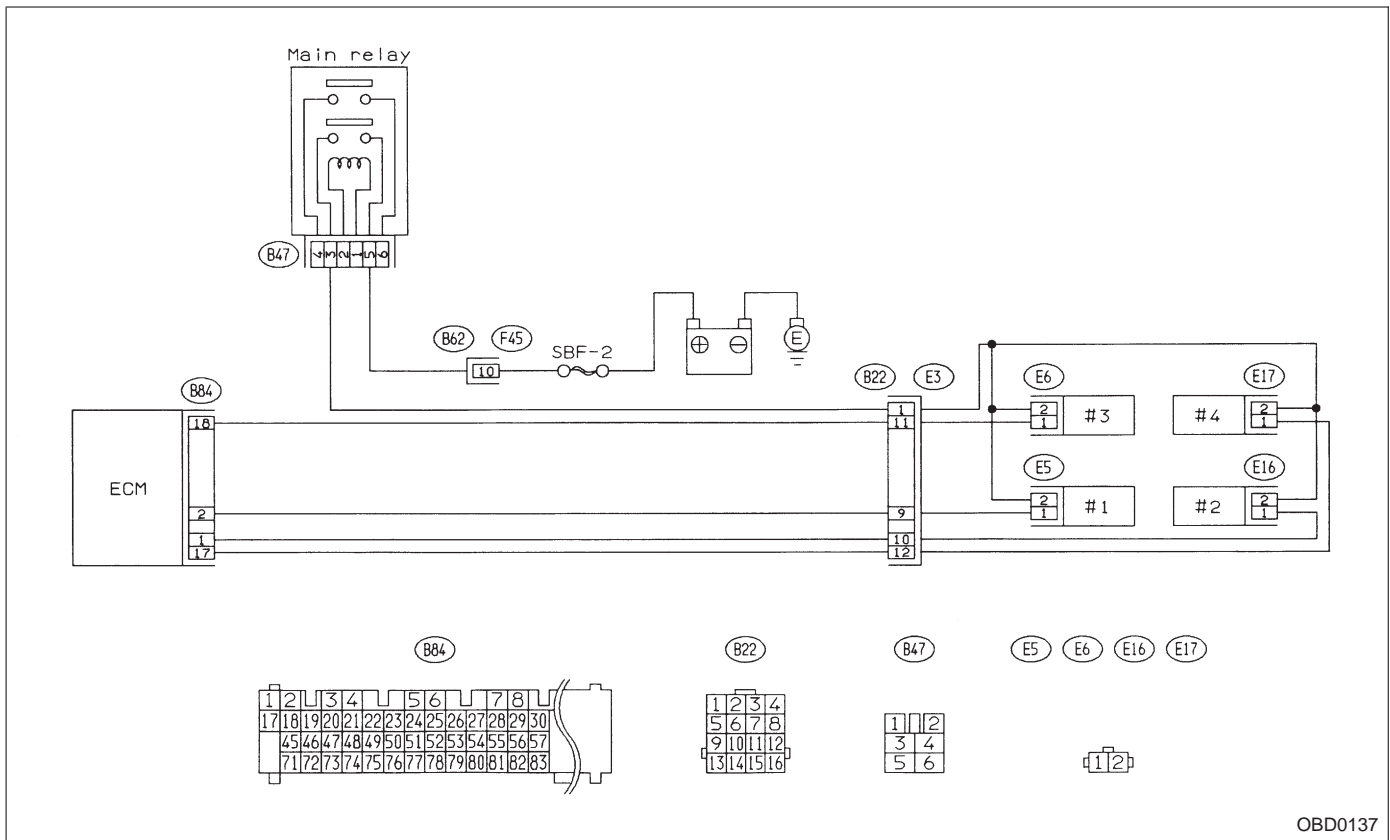


CAUTION:

- Check or repair only faulty cylinders.
- After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

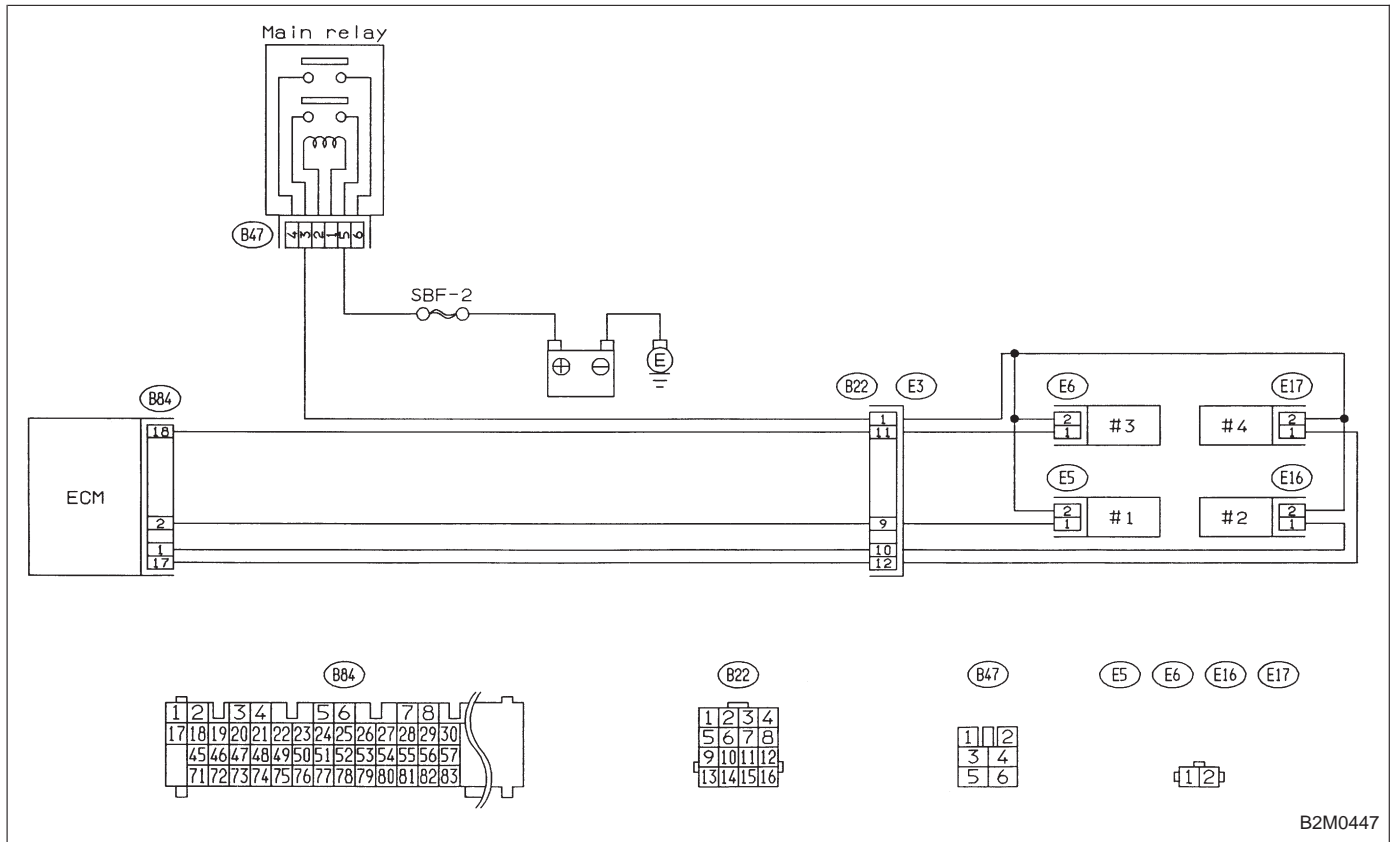
- LHD model



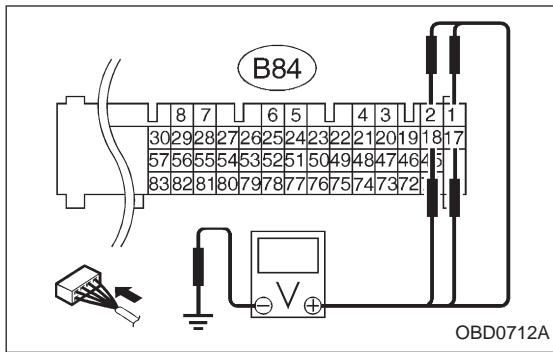
OBD0137

WIRING DIAGRAM:

- RHD model



B2M0447



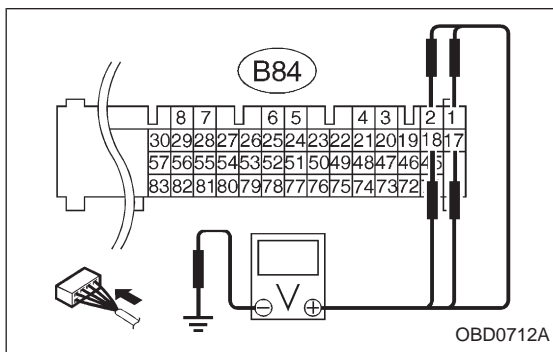
1 CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM connector and body on faulty cylinders.

CHECK : **Connector & terminal**
 #1 (B84) No. 2 — Body/10 V, or more
 #2 (B84) No. 1 — Body/10 V, or more
 #3 (B84) No. 18 — Body/10 V, or more
 #4 (B84) No. 17 — Body/10 V, or more

YES : Go to step 2.

NO : Go to step 3.



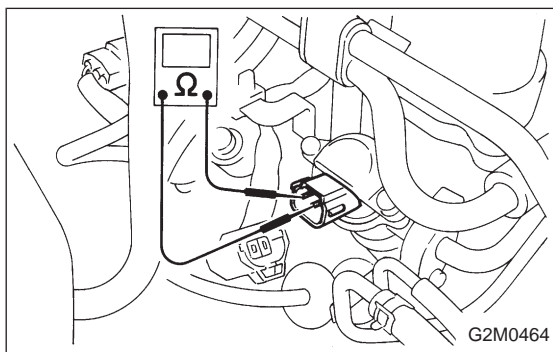
2 CHECK HARNESS.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from fuel injector on faulty cylinder.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM connector and body on faulty cylinders.

CHECK : **Connector & terminal**
 #1 (B84) No. 2 — Body/10 V, or more
 #2 (B84) No. 1 — Body/10 V, or more
 #3 (B84) No. 18 — Body/10 V, or more
 #4 (B84) No. 17 — Body/10 V, or more

YES : Repair short circuit of harness between ECM and fuel injector. After repair, replace ECM.

NO : Go to next step.



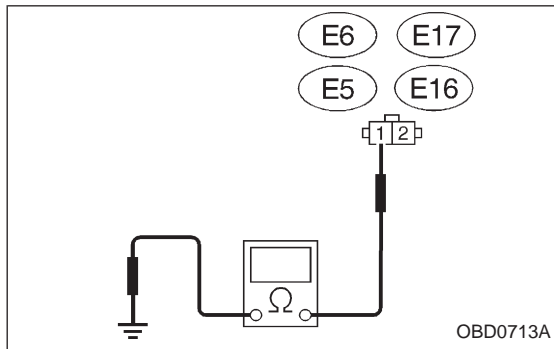
- 5) Turn ignition switch to OFF.
- 6) Measure resistance between fuel injector terminals on faulty cylinder.

CHECK : **Terminals**
 No. 1 — No. 2/1 Ω, or less

YES : Replace faulty fuel injector and ECM.

NO : Go to next **CHECK** .

- CHECK** : *Is there poor contact in ECM connector?*
NO : Repair poor contact in ECM connector.
YES : Replace ECM.



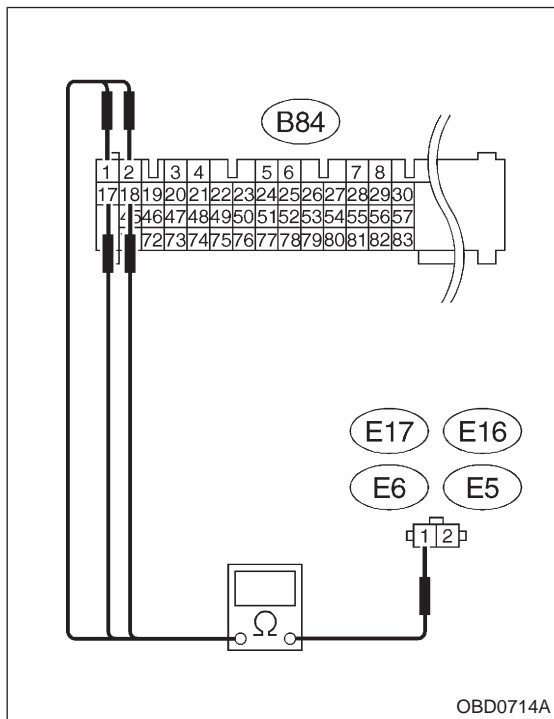
3 CHECK HARNESS.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from fuel injector on faulty cylinders.
- 3) Measure resistance between fuel injector on faulty cylinders and body.

- CHECK** : **Connector & terminal**
#1 (E5) No. 1 — Body/10 Ω, or less
#2 (E16) No. 1 — Body/10 Ω, or less
#3 (E6) No. 1 — Body/10 Ω, or less
#4 (E17) No. 1 — Body/10 Ω, or less

YES : Repair short circuit of harness between fuel injector and body.

NO : Go to the next step.

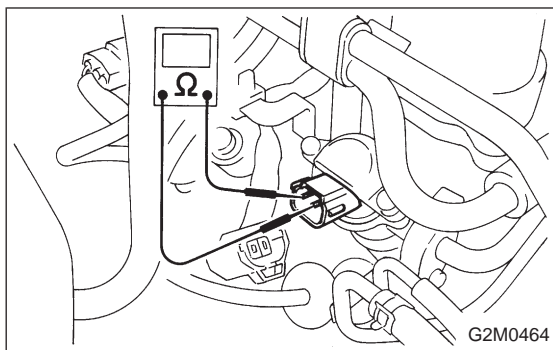


- 4) Measure resistance of harness connector between ECM connector and fuel injector on faulty cylinders.

- CHECK** : **Connector & terminal**
#1 (B84) No. 2 — (E5) No. 1/10 Ω, or less
#2 (B84) No. 1 — (E16) No. 1/10 Ω, or less
#3 (B84) No. 18 — (E6) No. 1/10 Ω, or less
#4 (B84) No. 17 — (E17) No. 1/10 Ω, or less

NO : Repair open circuit of harness between ECM and fuel injector.

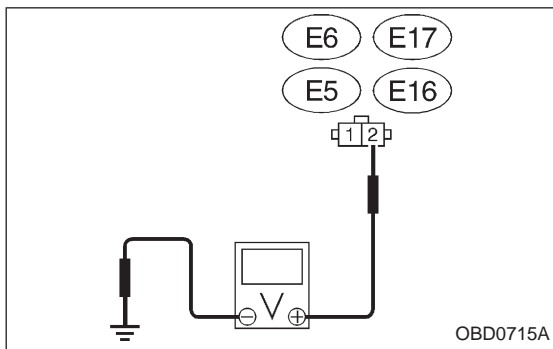
YES : Go to step 4.



4 CHECK FUEL INJECTOR.

Measure resistance between fuel injector terminals on faulty cylinder.

- CHECK** : **Terminals**
No. 1 — No. 2/5 — 20 Ω
- NO** : Replace faulty fuel injector.
- YES** : Go to step 5.



5 CHECK POWER SUPPLY.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between fuel injector and body on faulty cylinders.

- CHECK** : **Connector & terminal**
#1 (E5) No. 2 — Body/10 V, or more
#2 (E16) No. 2 — Body/10 V, or more
#3 (E6) No. 2 — Body/10 V, or more
#4 (E17) No. 2 — Body/10 V, or more
- NO** : Check and repair the following items.
 - Open circuit of harness between main relay and fuel injector for faulty cylinders
 - Poor contact in main relay connector
 - Poor contact in fuel injector connector for the faulty cylinders
- YES** : Check for poor contact of all connectors in WIRING DIAGRAM on page 205, 206.

OBD	(FB1)
P0301	<MIS_1>
OBD0277	

U: DTC P0301
 — CYLINDER 1 MISFIRE DETECTED (MIS – 1)
 —

OBD	(FB1)
P0302	<MIS_2>
OBD0278	

V: DTC P0302
 — CYLINDER 2 MISFIRE DETECTED (MIS – 2)
 —

OBD	(FB1)
P0303	<MIS_3>
OBD0279	

W: DTC P0303
 — CYLINDER 3 MISFIRE DETECTED (MIS – 3)
 —

OBD	(FB1)
P0304	<MIS_4>
OBD0280	

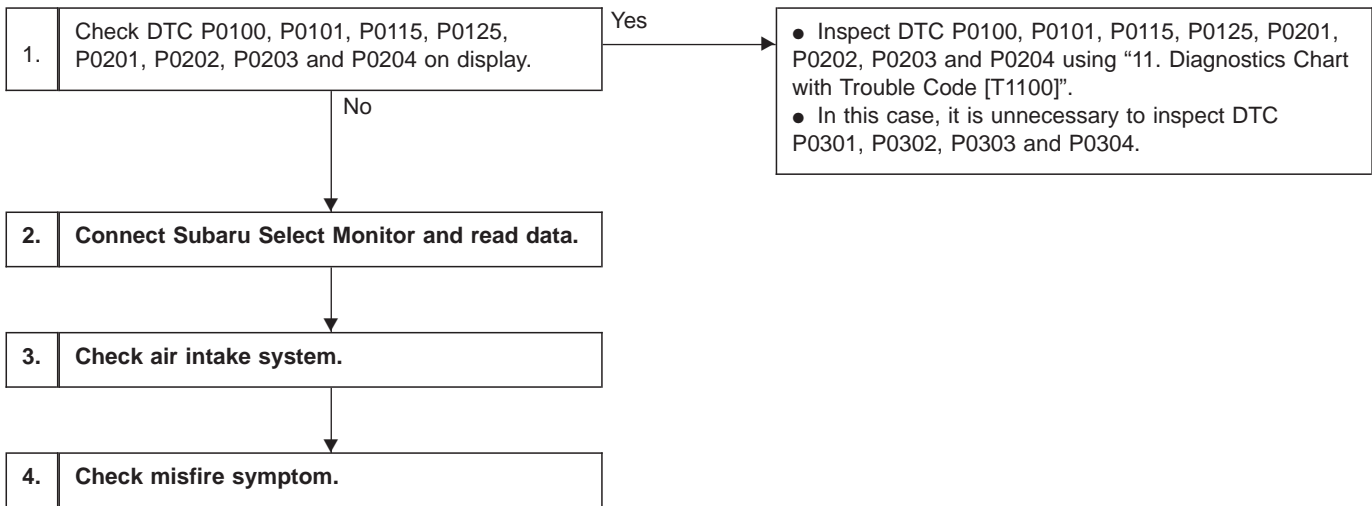
X: DTC P0304
 — CYLINDER 4 MISFIRE DETECTED (MIS – 4)
 —

DTC DETECTING CONDITION:

- Two consecutive trips with fault
- Immediately at fault recognition (A misfire which could damage catalyst occurs.)

TROUBLE SYMPTOM:

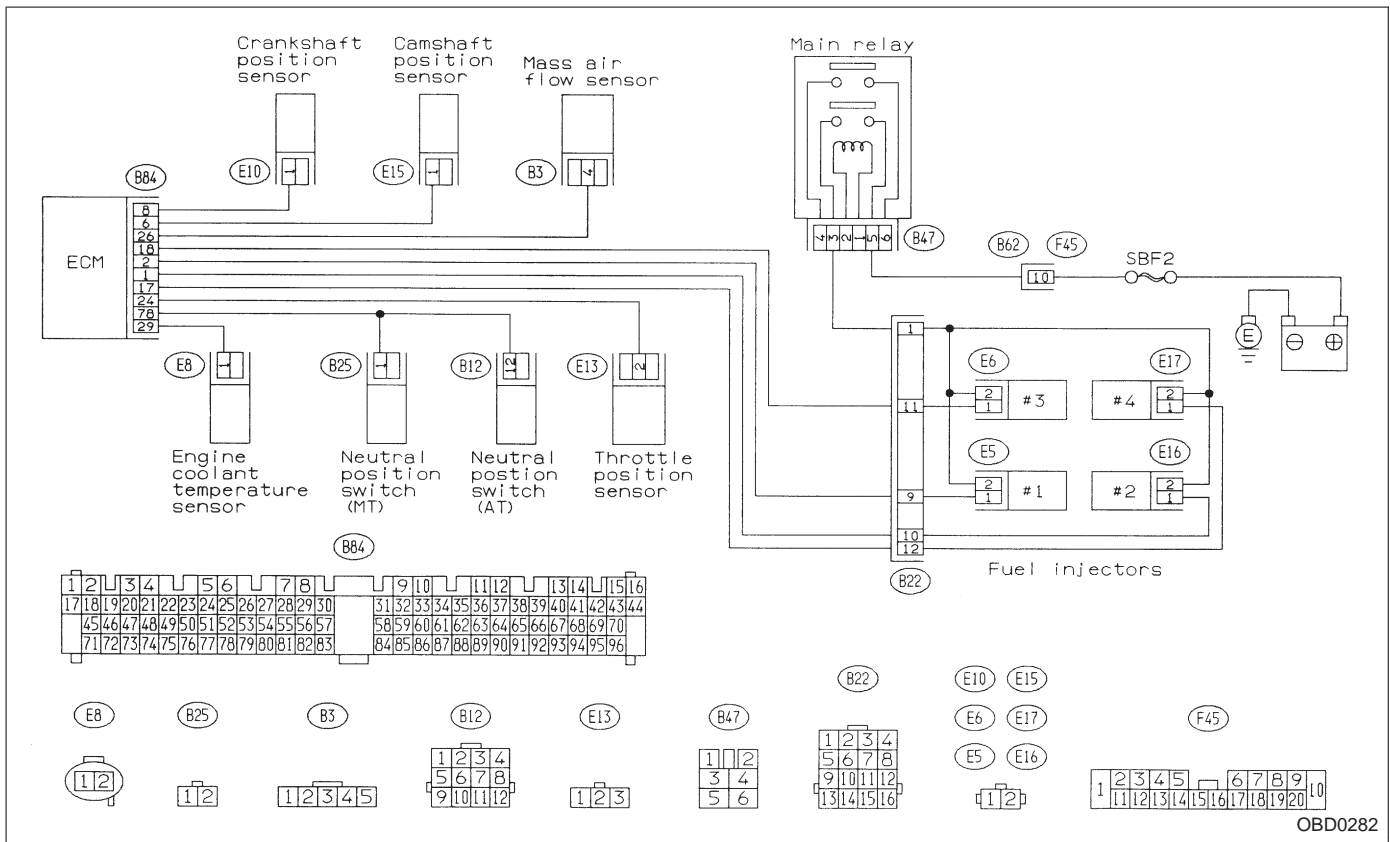
- Engine stalls.
- Erroneous idling
- Rough driving



CAUTION:
 After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

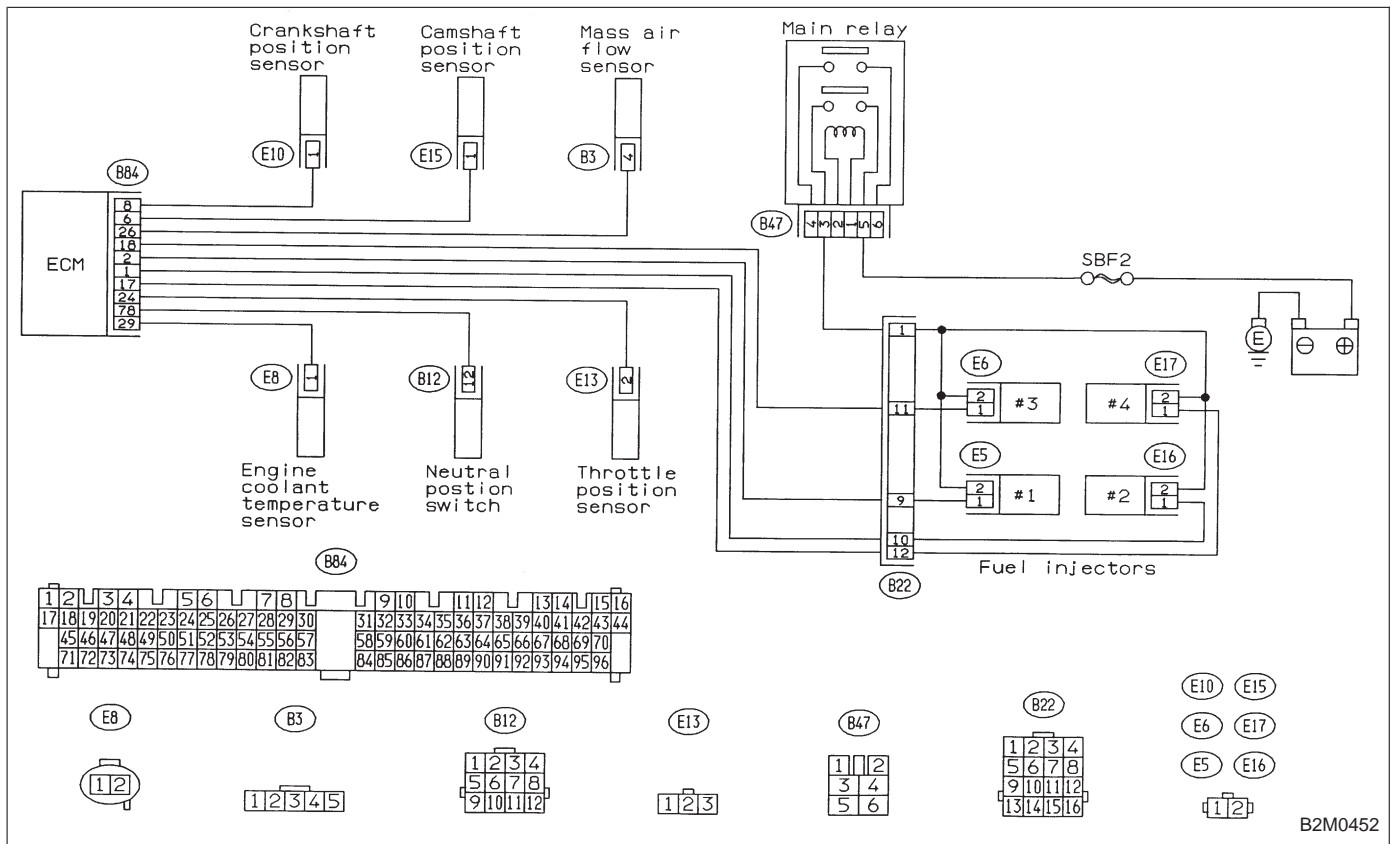
- LHD model

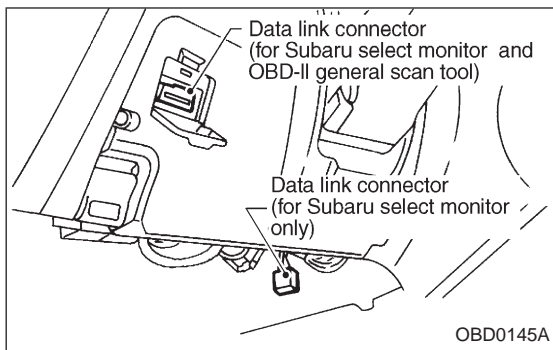


OBD0282

WIRING DIAGRAM:

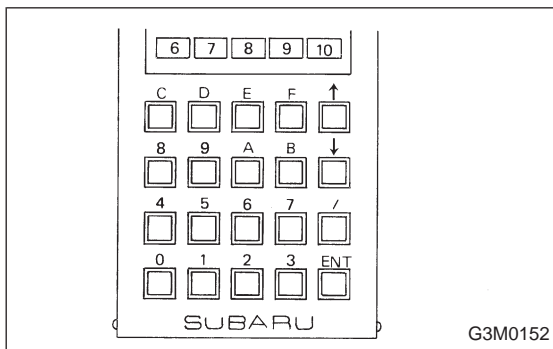
● RHD model





2 CONNECT SUBARU SELECT MONITOR AND READ DATA.

- 1) Turn ignition switch to OFF.
- 2) Connect Subaru Select Monitor to the data link connector.
- 3) Turn ignition switch to ON, and turn Subaru Select Monitor switch to ON.



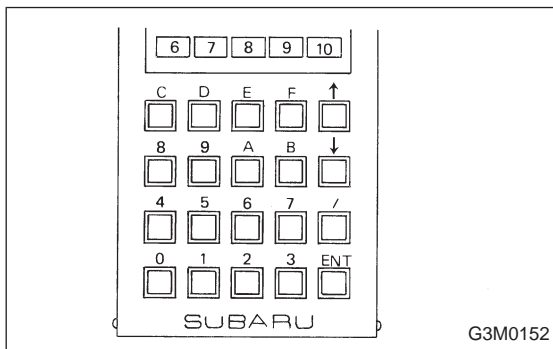
- 4) Read data on Subaru Select Monitor. Designate mode use function key.

Function mode: F33, F34, F35, F36, F37 and F38

NOTE:

F37 and F38 are AT models only.

- F33: Maximum misfire rate of cylinder #1 is indicated.
- F34: Maximum misfire rate of cylinder #2 is indicated.
- F35: Maximum misfire rate of cylinder #3 is indicated.
- F36: Maximum misfire rate of cylinder #4 is indicated.
- F37: Maximum EGR system pressure value is indicated.
- F38: Minimum EGR system pressure value is indicated.



- 5) Clear memory on Subaru Select Monitor. Designate mode use function key.

Press [F], [C], [0], [ENT] in that order.

- 6) Start engine, and drive the vehicle more than 10 minutes.

<p>MF1</p> <p style="margin-left: 150px;">(F33)</p> <p style="margin-left: 100px;">0 %</p> <p style="text-align: right; font-size: small;">OBD0627</p>
--

7) Read data on Subaru Select Monitor.

Designate mode use function key.

Function mode: F33, F34, F35 and F36

CHECK : **Is the maximum misfire rate of each cylinder less than 2 %?**

YES : Go to next **CHECK** .

NO : Go to step 3.

CHECK : **The vehicle has been empty of fuel.**

YES : ● The engine has no abnormality.
● Finish diagnostics operation.

NO : Go to next **CHECK** .

CHECK : **Check if the cause of misfire was made when the engine is running.**
Ex. Remove spark plug cord, etc.

YES : ● The engine has no abnormality.
● Finish diagnostics operation.

NO : Repair poor contact in ignitor, ignition coil, fuel injector, ECM and coupling harness connector.

3

CHECK AIR INTAKE SYSTEM.

CHECK : **Check the following items.**

① **Are there air leaks or air suction caused by loose or dislocated nuts and bolts?**

② **Are there cracks or any disconnection of hoses?**

YES : Repair air intake system.

NO : Go to step 4.

4	CHECK MISFIRE SYMPTOM.
----------	-------------------------------

NOTE:

- Perform diagnosis according to the items listed below.
- Use the MAX. misfire rate values read in step 2-4).

DTC	MAX. misfire rate	Next CHECK
Only one cylinder	—	Go to step ①.
P0301 and P0302	Both rate are at 100 %, or more.	Go to step ②.
P0303 and P0304	Both rate are at 100 %, or more.	Go to step ③.
P0301 and P0303	Both rate are at 100 %, or more.	Go to step ④.
P0302 and P0304	Both rate are at 100 %, or more.	Go to step ⑤.
Others	—	Go to step ⑥.

① ONLY ONE CYLINDER

- CHECK : **Check the following items for that cylinder.**
- **Spark plug**
 - **Spark plug cord**
 - **Fuel injector**
 - **Compression ratio**

② GROUP OF #1 AND #2 CYLINDERS

- CHECK : **Check the following items for #1 and #2 cylinders.**
- **Spark plugs**
 - **Fuel injectors**

NOTE:

If no abnormal is discovered, check for “9. F: IGNITION SYSTEM” of #1 and #2 cylinders side.

③ GROUP OF #3 AND #4 CYLINDERS

- CHECK : **Check the following items for #3 and #4 cylinders.**
- **Spark plugs**
 - **Fuel injectors**

NOTE:

If no abnormal is discovered, check for “9. F: IGNITION SYSTEM” of #3 and #4 cylinders side.

④ GROUP OF #1 AND #3 CYLINDERS

- CHECK : **Check the following items for #1 and #3 cylinders.**
- **Spark plugs**
 - **Fuel injectors**
 - **Skipping timing belt teeth**

⑤ GROUP OF #2 AND #4 CYLINDERS

CHECK : Check the following items for #2 and #4 cylinders.

- Spark plugs
- Fuel injectors
- Skipping timing belt teeth

⑥ THE CYLINDER AT RANDOM

CHECK : Is the engine idle rough?

YES : Go to next **CHECK** . (AT models only)

NO : Go to DTC P0170 [T11P3], [T11P4] and [T11P5].

NOTE:

On MT models, go to DTC P0170 [T11P3], [T11P4] and [T11P5].

EGRmax (F37)

161 mmHg

OBD0631

CHECK : Is the differential pressure between maximum EGR system pressure (value of function mode F37) and minimum EGR system pressure (value of function mode F38) less than 10 mmHg?

NOTE:

Use the values read in step 3 for function modes F37 and F38.

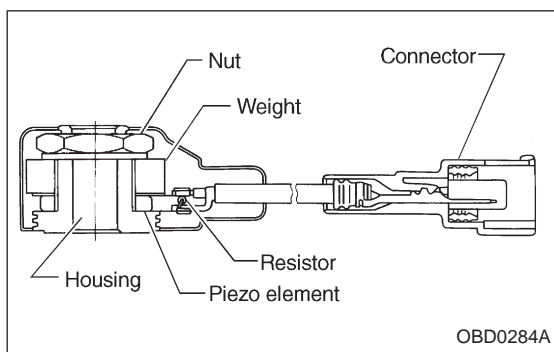
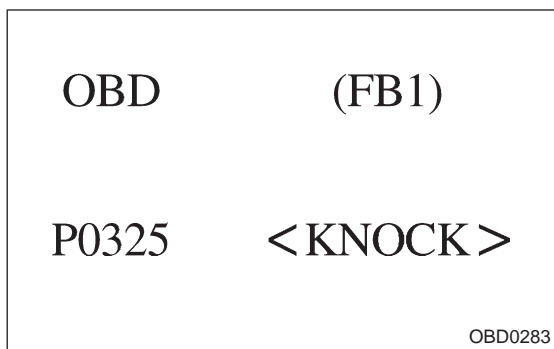
YES : Replace EGR valve.

NO : Go to DTC P0170 [T11P3], [T11P4] and [T11P5].

EGRmin (F38)

161 mmHg

OBD0632



Y: DTC P0325
— KNOCK SENSOR CIRCUIT MALFUNCTION
(KNOCK) —

DESCRIPTION:

The knock sensor senses engine knocks and send a voltage signal to the ECM depending on the degree of the knock.

This signal information is used for spark timing learning control to provide optimal spark timing.

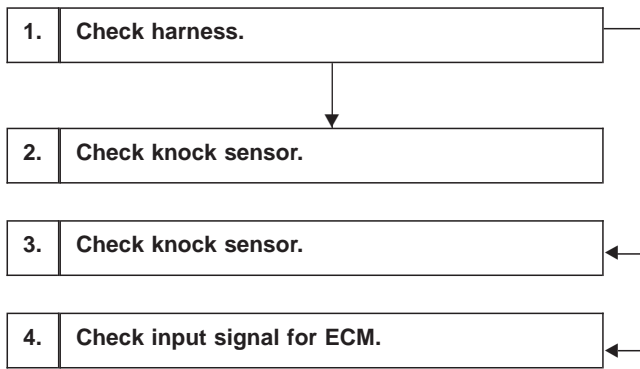
The knock sensor is bolted to the cylinder block at #4 piston. It senses knocks which can occur in any cylinder. Its components are a weight, which moves up and down when it senses vibrations, a piezo element, which produces a voltage, and a resistor, which senses a broken circuit (all these are molded into a single unit). When the sensor senses engine knocks, knocking vibration is conveyed to the weight. The up or down movement of the weight is applied to the piezo element as a pressure difference. The knock sensor will then produce a voltage signal in relation to the degree of the knock.

DTC DETECTING CONDITION:

- Immediately at fault recognition

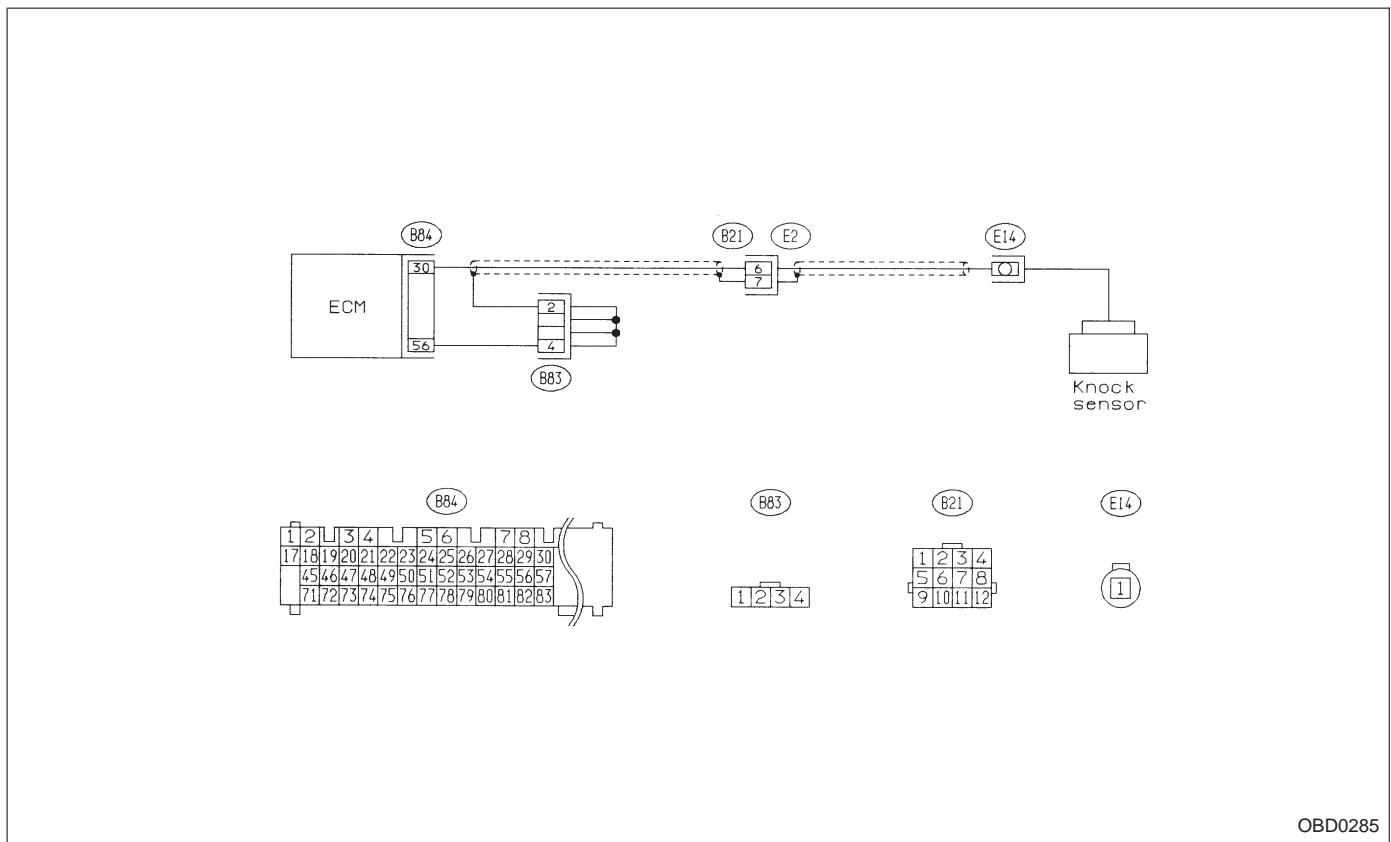
TROUBLE SYMPTOM:

- Poor driving performance
- Knocking occurs.

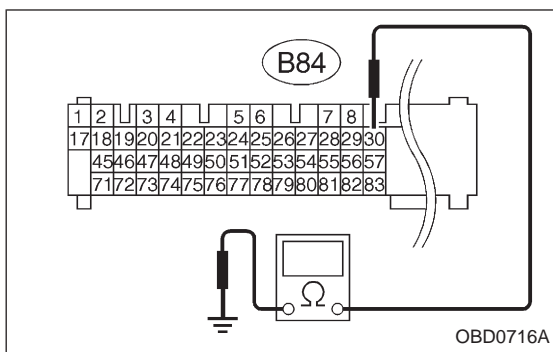


CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES.
<Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD0285



1 CHECK HARNESS.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ECM.
- 3) Measure resistance between ECM harness connector and body.

CHECK : **Connector & terminal (B84) No. 30 — Body/700 kΩ, or more**

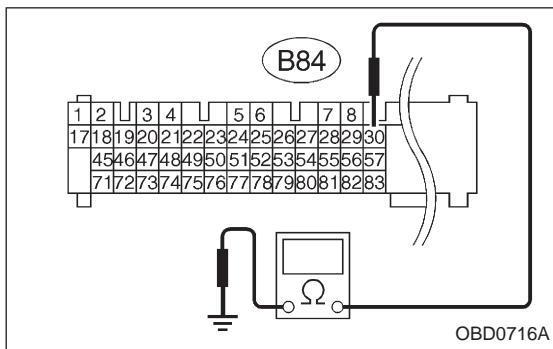
YES : Go to step 2.

NO : Go to next **CHECK** .

CHECK : **Connector & terminal (B84) No. 30 — Body/400 kΩ, or less**

YES : Go to step 3.

NO : Go to step 4.



2 CHECK KNOCK SENSOR.

- 1) Disconnect connector from knock sensor.
- 2) Measure voltage between knock sensor connector and body.

CHECK : **Connector & terminal (E14) No. 1 — Body/700 kΩ, or more**

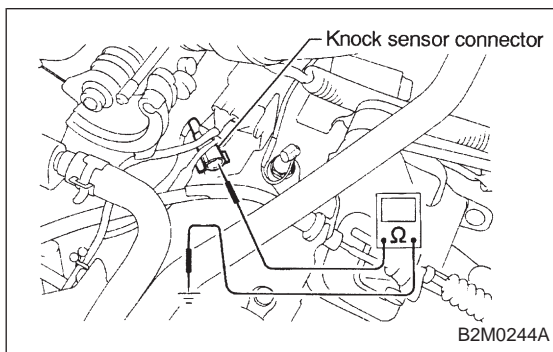
- NO** : Check and repair the following items.
- Open circuit of the harness between knock sensor connector and ECM connector
 - Poor contact of the knock sensor connector
 - Poor contact of coupling connector (B21)

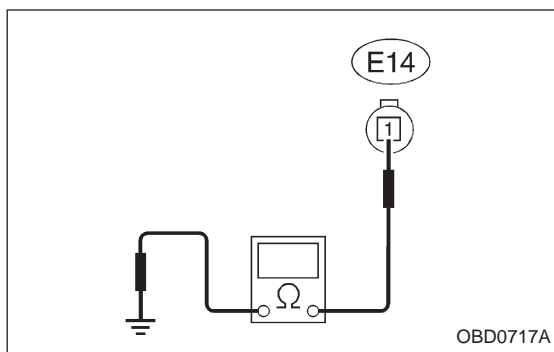
YES : Go to next **CHECK** .

CHECK : **Check for secure tightening of the knock sensor installation bolts.**

NO : Tighten knock sensor installation bolts securely.

YES : Replace knock sensor.





3 CHECK KNOCK SENSOR.

- 1) Disconnect connector from knock sensor.
- 2) Measure resistance of harness between knock sensor connector and body.

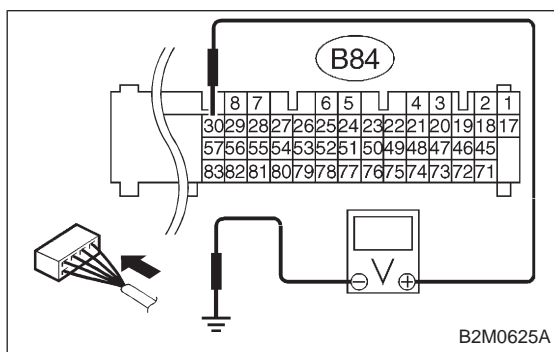
CHECK : **Connector & terminal**
(E14) No. 1 — Body/400 kΩ, or less

YES : Replace knock sensor.

NO : Repair short circuit of harness between knock sensor connector and ECM connector.

NOTE:

The harness between both connectors is shielded. Repair short circuit of harness together with shield.



4 CHECK INPUT SIGNAL FOR ECM.

- 1) Connect connectors to ECM and knock sensor.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between ECM and body.

CHECK : **Connector & terminal**
(B84) No. 30 — Body/2 V, or more

NO : Repair poor contact in ECM connector.

YES : Even if MIL lights up, the circuit has returned to a normal condition at this time. (However, the possibility of poor contact still remains.)
Check and repair the following connectors.

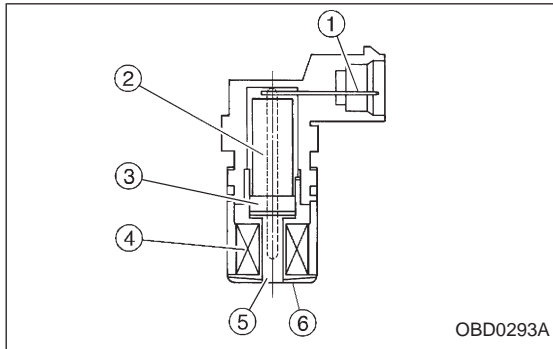
- Knock sensor connector
- ECM connector
- Coupling connector (B21)

OBD (FB1)

P0335 <CRANK>

OBD0292

Z: DTC P0335
— CRANKSHAFT POSITION SENSOR
CIRCUIT MALFUNCTION (CRANK) —

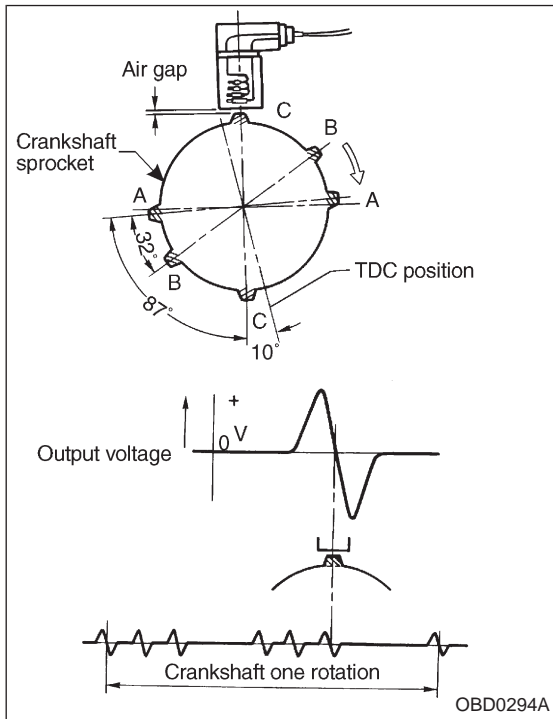


DESCRIPTION:

- The crankshaft position sensor is installed on the oil pump, located in the front center portion of the cylinder block, to detect the crankshaft position. It is designed so that the ECM accurately reads the number of pulses which occur when protrusions provided at the perimeter of the crankshaft sprocket (rotating together with the crankshaft) cross the crankshaft position sensor.

- The crankshaft position sensor is a molded type which consists of a magnet, core, coil, terminals, etc.

- ① Terminal
- ② Yoke core
- ③ Magnet
- ④ Coil
- ⑤ Core
- ⑥ Cover



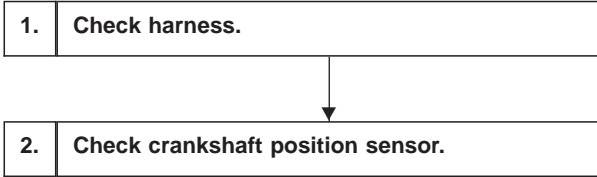
- The crankshaft sprocket is provided with six protrusions. Crankshaft rotation causes these protrusions to cross the crankshaft position sensor so that magnetic fluxes in the coil change with the change in air gap between the sensor pick-up and the sprocket. The change in air gap induces an electromotive force which is transmitted to the ECM.

DTC DETECTING CONDITION:

- Immediately at fault recognition

TROUBLE SYMPTOM:

- Engine stalls.
- Failure of engine to start

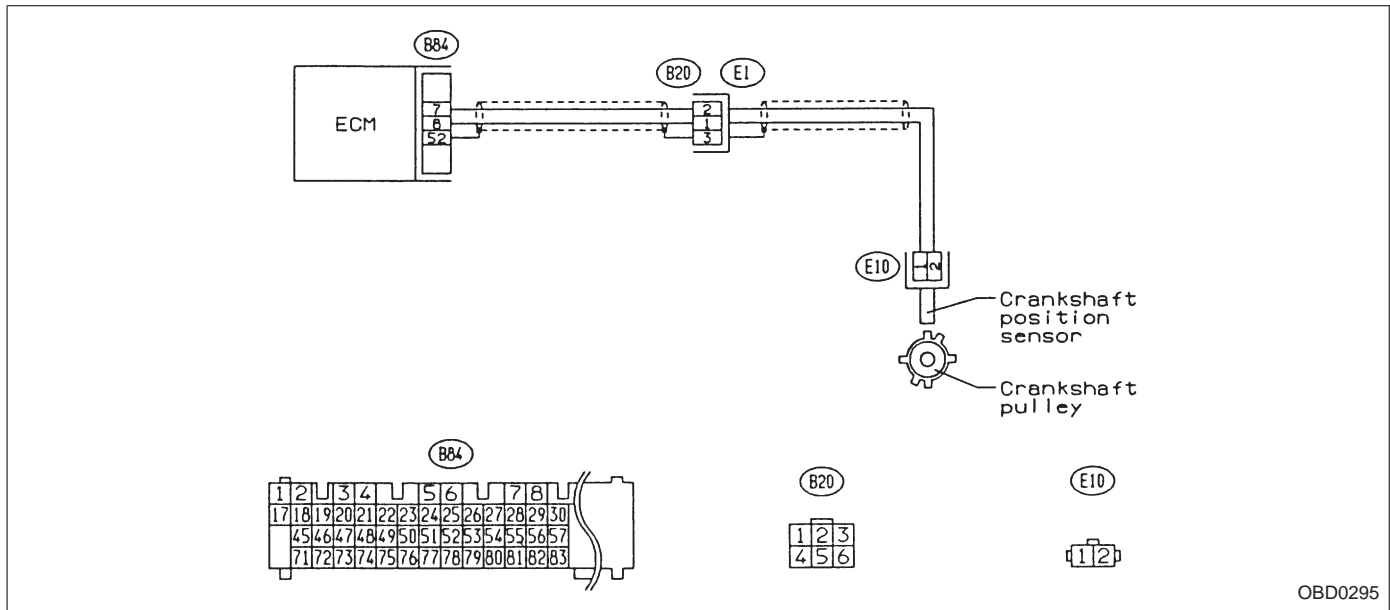


CAUTION:

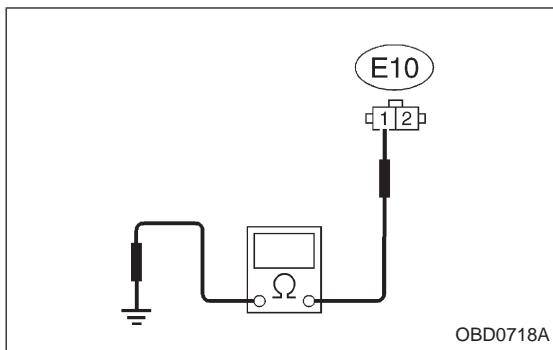
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES.

<Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD0295



1 CHECK HARNESS.

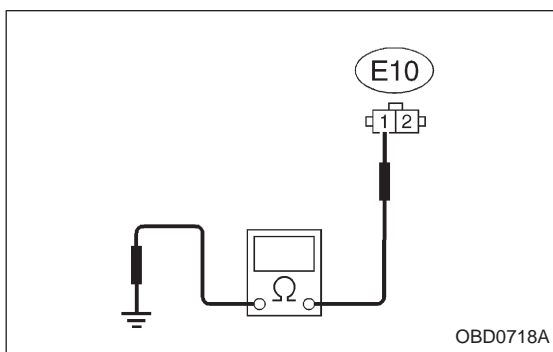
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from crankshaft position sensor.
- 3) Measure resistance of harness between crankshaft position sensor connector and body.

CHECK : **Connector & terminal (E10) No. 1 — Body/100 kΩ, or more**

YES : Check and repair the following items.

- Open circuit of harness between crankshaft position sensor connector and ECM connector
- Poor contact in ECM connector
- Poor contact in the coupling connector (B20)

NO : Go to next **CHECK** .

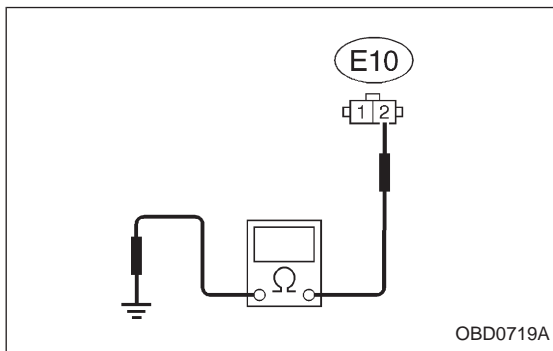


CHECK : **Connector & terminal (E10) No. 1 — Body/10 Ω, or less**

YES : Repair short circuit of harness between crankshaft position sensor connector and ECM connector.

NOTE:
The harness between both connectors is shielded. Repair short circuit of harness together with shield.

NO : Go to next **CHECK** .



CHECK : **Connector & terminal (E10) No. 2 — Body/10 Ω, or less**

NO : Check and repair the following items.

- Open circuit of harness between crankshaft position sensor connector and ECM connector
- Poor contact in ECM connector
- Poor contact in the coupling connector (B20)

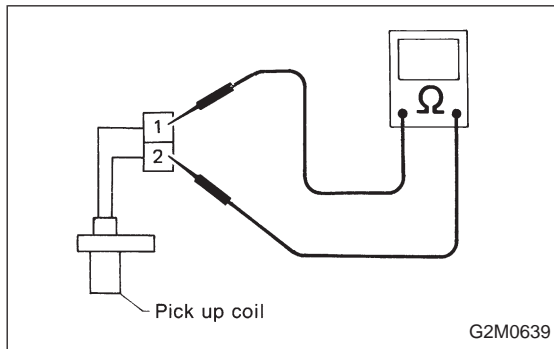
YES : Go to step 2.

2	CHECK CRANKSHAFT POSITION SENSOR.
----------	--

CHECK : *Check for secure tightening of the installation bolts of the crankshaft position sensor.*

NO : Tighten securely.

YES : Go to the next step.



1) Remove crankshaft position sensor.

2) Measure resistance between connector terminals of crankshaft position sensor.

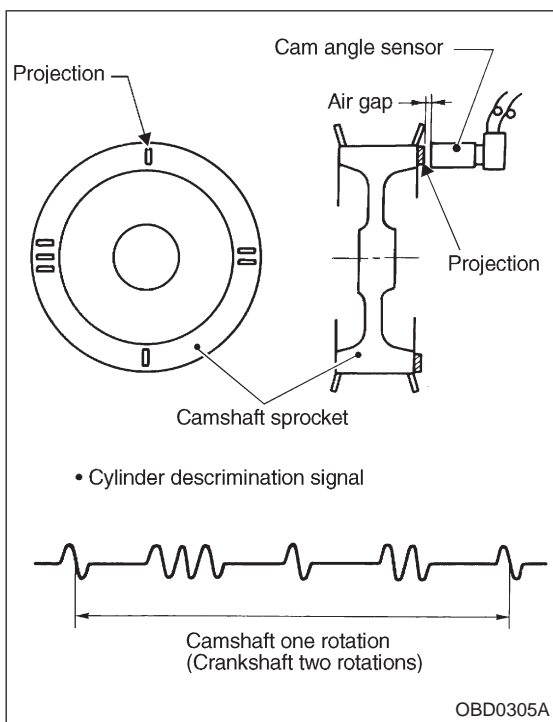
CHECK : **Terminals**
No. 1 — No. 2/1 — 4 kΩ

YES : Repair poor contact in crankshaft position sensor connector.

NO : Replace crankshaft position sensor.

OBD	(FB1)
P0340	<CAM>
OBD0304	

AA: DTC P0340
— CAMSHAFT POSITION SENSOR CIRCUIT
MALFUNCTION (CAM) —



DESCRIPTION:

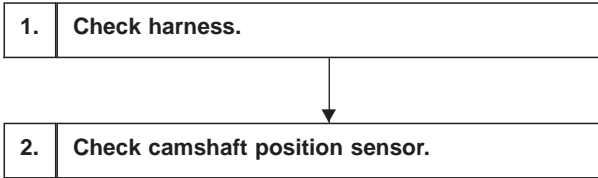
- The camshaft position sensor is located on the left-hand camshaft support to detect the combustion cylinder at any one moment.
 - It is designed so that the ECM accurately reads the number of pulses which occur when protrusions provided on the back of the LH camshaft-drive sprocket cross the sensor.
- Internal construction and the basic operating principle of the camshaft position sensor are similar to those of the crankshaft position sensor. A total of seven protrusions (one each at two locations, two at one location and three at one location) are arranged in four equal parts of the sprocket.

DTC DETECTING CONDITION:

- Immediately at fault recognition

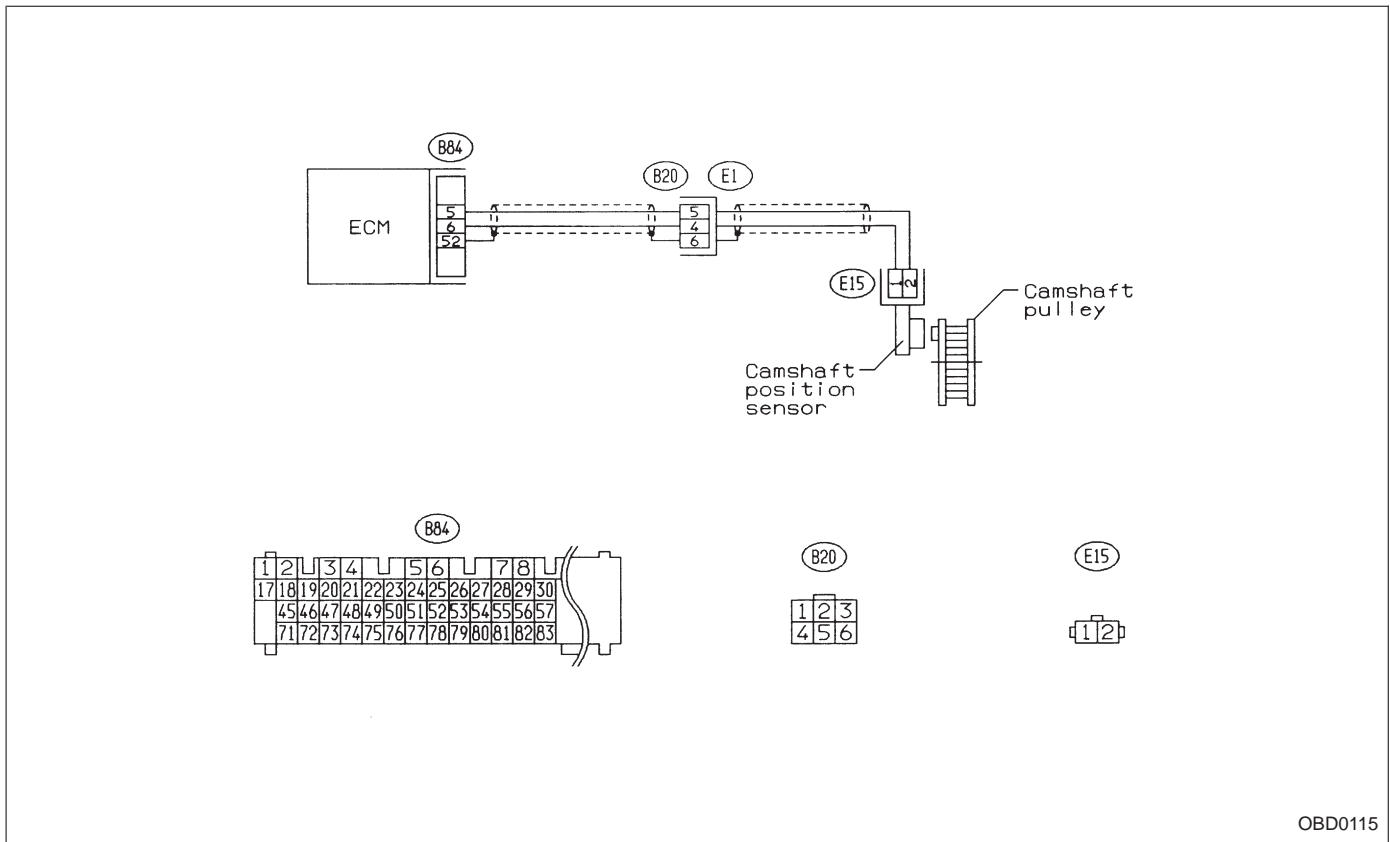
TROUBLE SYMPTOM:

- Engine stalls.
- Failure of engine to start

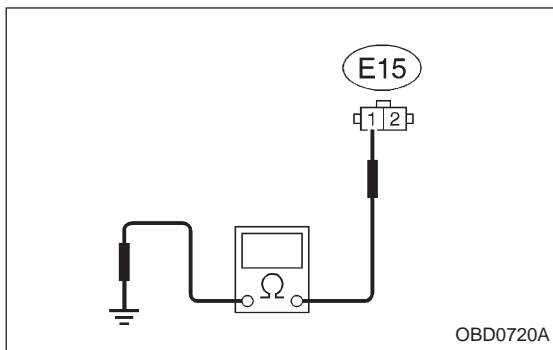


CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES.
 <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD0115



1 CHECK HARNESS.

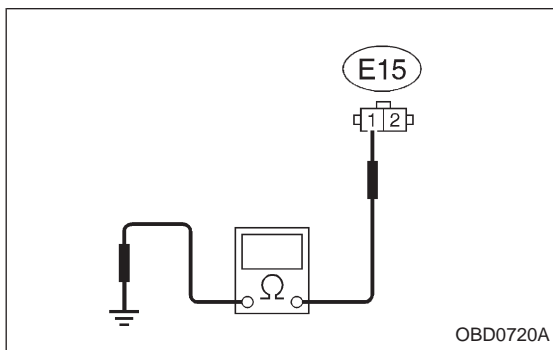
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from camshaft position sensor.
- 3) Measure resistance of harness between camshaft position sensor connector and body.

CHECK : **Connector & terminal (E15) No. 1 — Body/100 kΩ, or more**

YES : Check and repair the following items.

- Open circuit of harness between camshaft position sensor connector and ECM connector
- Poor contact in ECM connector
- Poor contact in the coupling connector (B20)

NO : Go to next **CHECK** .

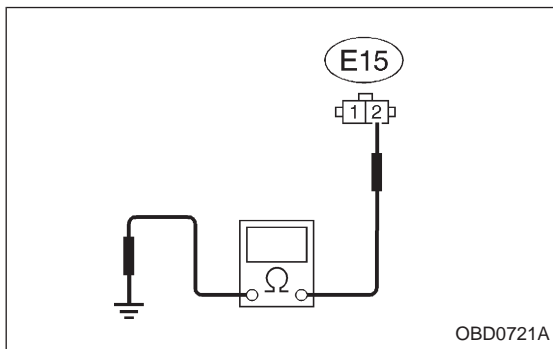


CHECK : **Connector & terminal (E15) No. 1 — Body/10 Ω, or less**

YES : Repair short circuit of harness between camshaft position sensor connector and ECM connector.

NOTE:
The harness between both connectors is shielded. Repair short circuit of harness together with shield.

NO : Go to next **CHECK** .



CHECK : **Connector & terminal (E15) No. 2 — Body/10 Ω, or less**

NO : Check and repair the following items.

- Open circuit of harness between camshaft position sensor connector and ECM connector
- Poor contact in ECM connector
- Poor contact in the coupling connector (B20)

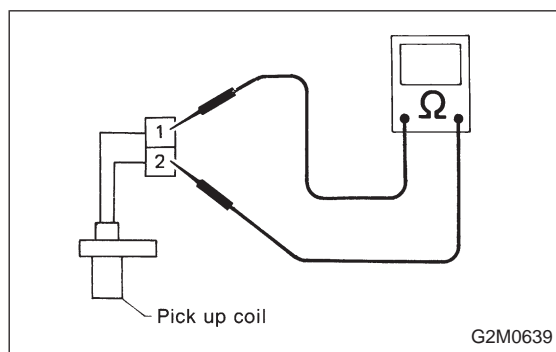
YES : Go to step 2.

2	CHECK CAMSHAFT POSITION SENSOR.
----------	--

CHECK : *Check for secure tightening of the installation bolts of the camshaft position sensor.*

NO : Tighten securely.

YES : Go to the next step.



1) Remove camshaft position sensor.

2) Measure resistance between connector terminals of camshaft position sensor.

CHECK : **Terminals**
No. 1 — No. 2/1 — 4 kΩ

YES : Repair poor contact in camshaft position sensor connector.

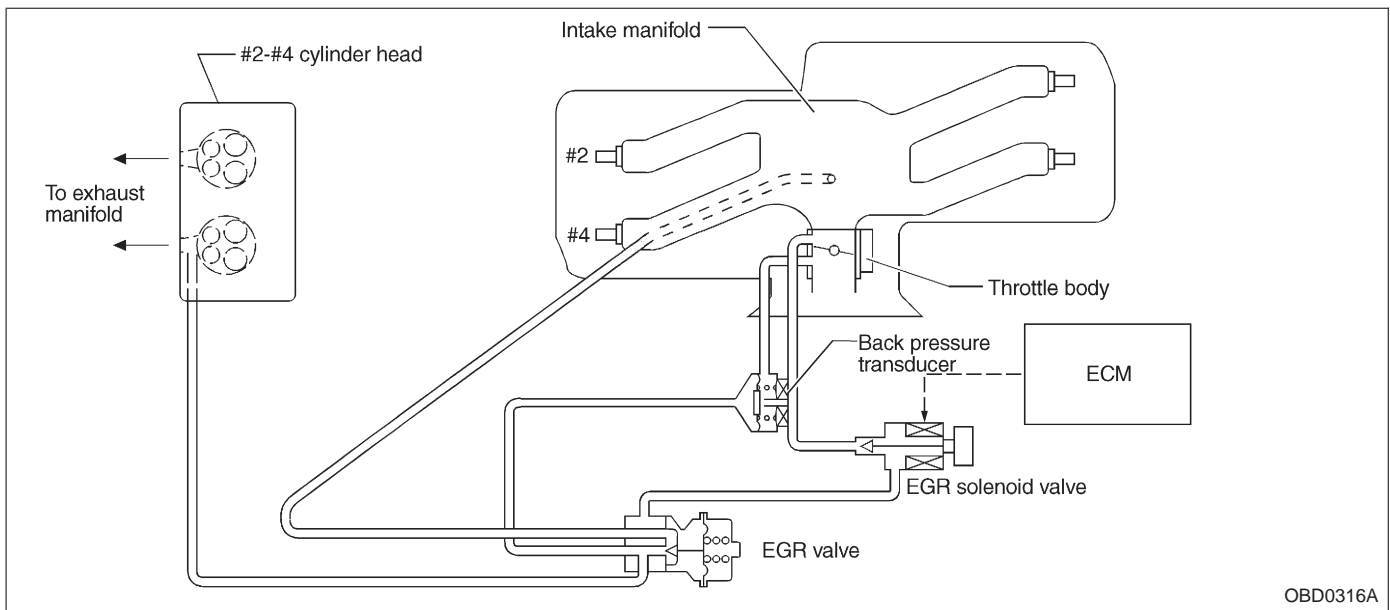
NO : Replace camshaft position sensor.

OBD	(FB1)
P0400	<EGR>
OBD0315	

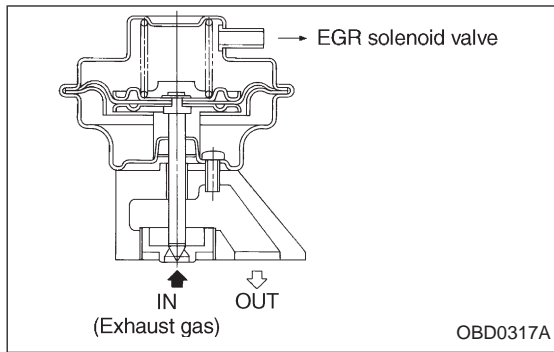
AB: DTC P0400
— EXHAUST GAS RECIRCULATION FLOW
MALFUNCTION (EGR) —

DESCRIPTION:

- The EGR system aims at reduction of NOx by lowering the combustion temperature through recirculation of a part of exhaust gas into cylinders via the intake manifold.
 - This system consists of the EGR valve, the EGR solenoid valve and BPT (Back Pressure Transducer). The EGR valve is operated by the vacuum pressure from throttle body via BPT and controls the exhaust gas flow from the exhaust manifold to the intake manifold by open/close operation of the EGR valve.
- The EGR solenoid valve is controlled by the ECM according to the engine driving condition and opens/closes the vacuum line from the BPT to the EGR valve diaphragm. The BPT controls the vacuum pressure to control the amount of EGR according to the engine load.



OBD0316A



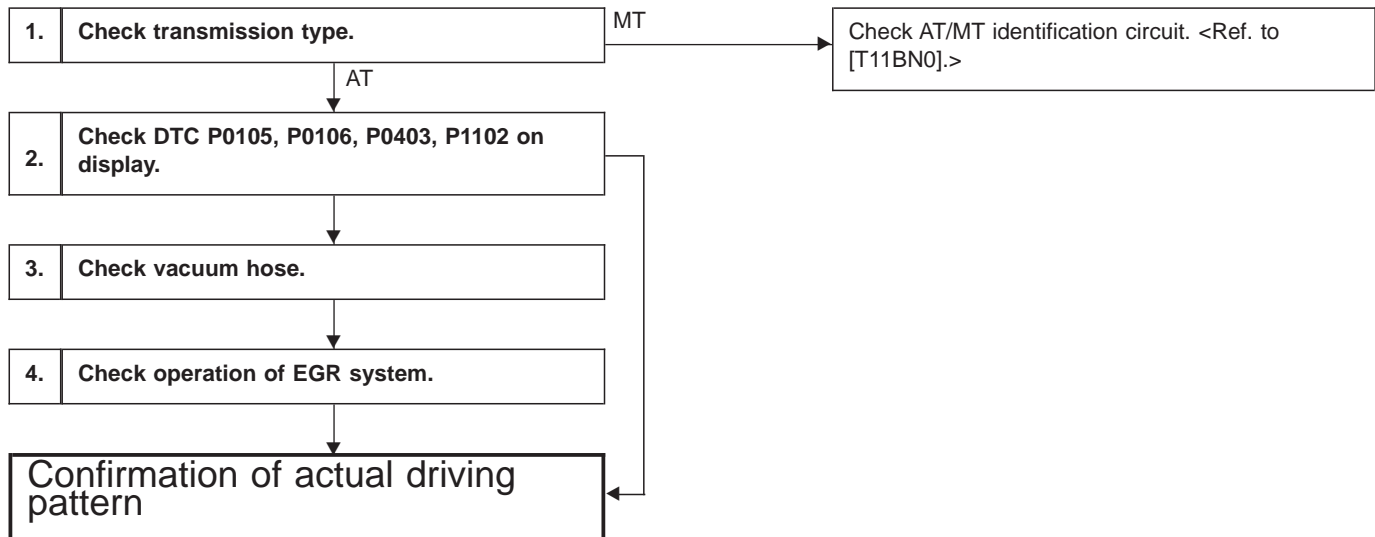
- The EGR valve is situated between the exhaust manifold and intake manifold. After opening EGR solenoid valve, EGR valve is opened for receiving throttle port pressure on diaphragm. Then, part of the exhaust gas is recirculated into intake manifold.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

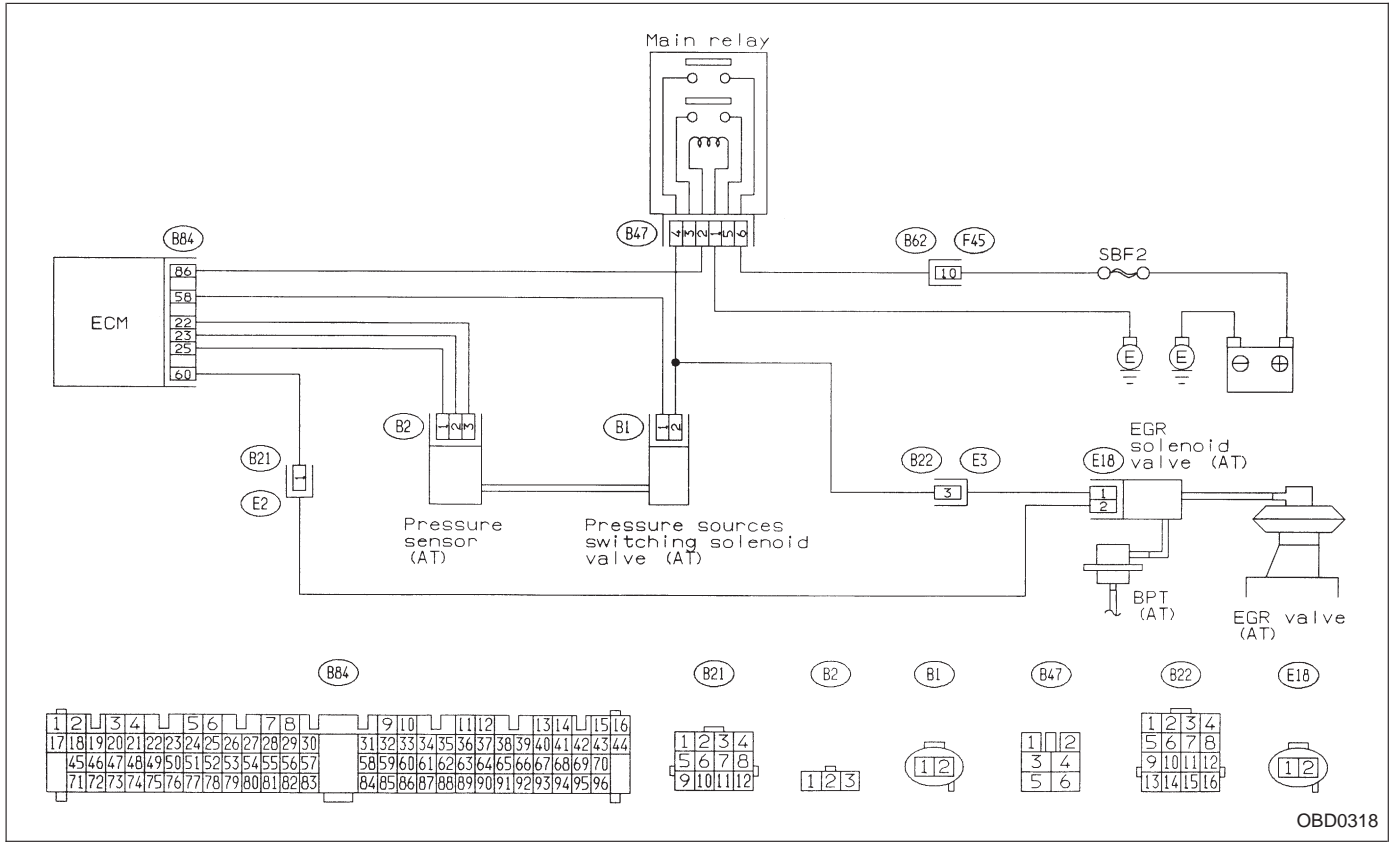
- Poor driving performance on low engine speed

**CAUTION:**

Before confirmation of actual driving pattern, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

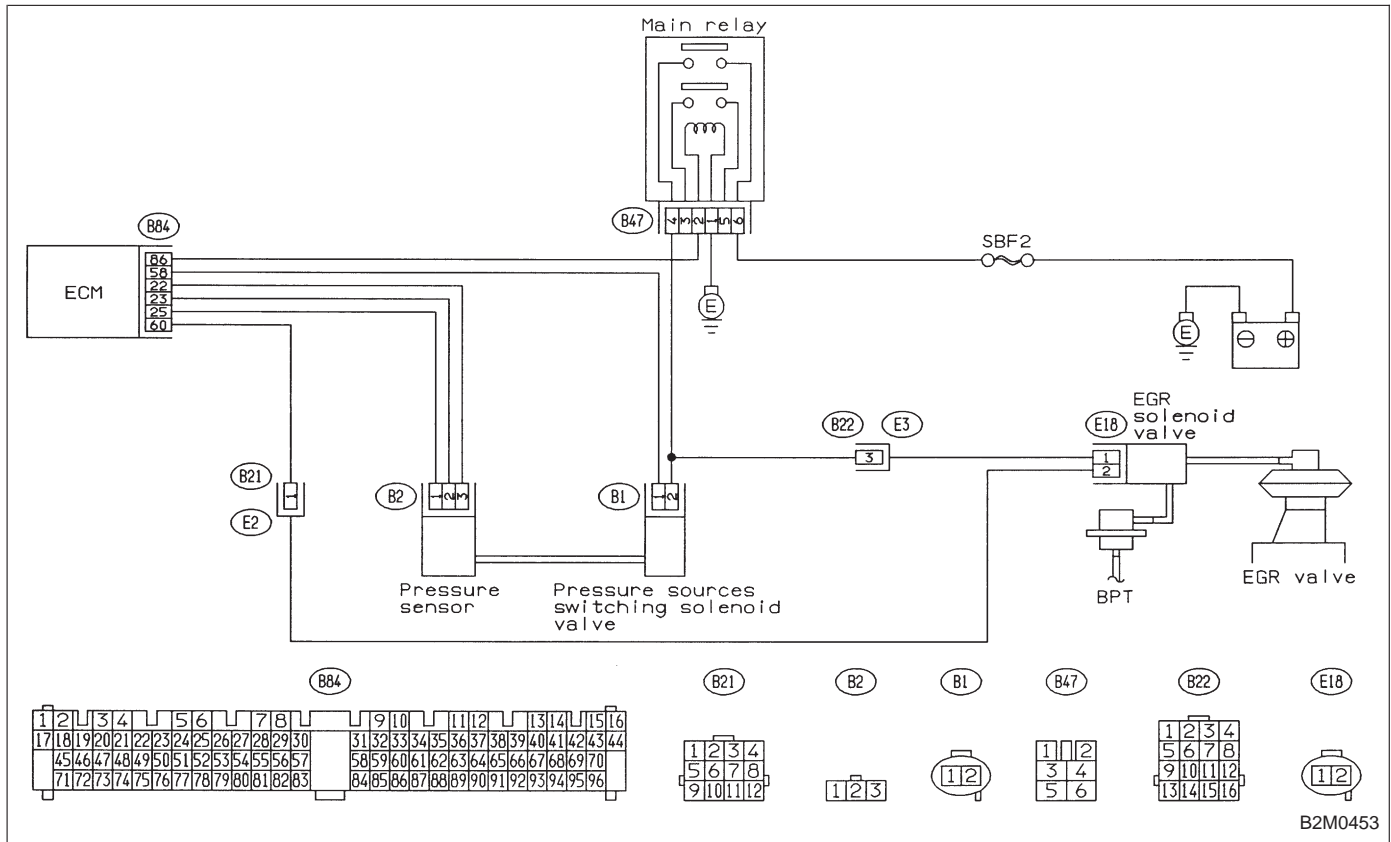
● LHD model



OBD0318

WIRING DIAGRAM:

● RHD model



- 1** CHECK TRANSMISSION TYPE.
Refer to flow chart on page 230.
- 2** CHECK DTC P0105, P0106, P0403, P1102 ON DISPLAY.

- CHECK** : Check that Subaru Select Monitor or OBD-II general scan tool shows P0105, P0106, P0403 and P1102.
- YES** : ● Inspect the relevant DTC using “11. Diagnostics Chart with Trouble Code [T1100]”.
● Manually check that EGR valve diaphragm is not stuck.
● In this case, inspection of P0400 is not necessary after the above items.

WARNING:
Be careful when checking EGR valve, since it may be extremely hot.

After checking the above item, go to **CONFIRMATION OF ACTUAL DRIVING PATTERN.**

NO : Go to step 3.

3	CHECK VACUUM HOSE.
----------	---------------------------

CHECK : **Check vacuum hoses for disconnection, leakage and clogging.**

YES : Check and repair the following items.

- Two lines of pipes and hoses running between throttle body and BPT
- Pipe and hose line connecting BPT and EGR solenoid valve
- Hose between EGR solenoid valve and EGR valve
- BPT pressure transmitting hose

NO : Go to step 4.

4	CHECK OPERATION OF EGR SYSTEM.
----------	---------------------------------------

- 1) Turn ignition switch to OFF.
- 2) Connect the test mode connector.
- 3) Turn ignition switch to ON.

CHECK : **Does EGR solenoid valve produce operating sound?**

NO : Replace EGR solenoid valve.

YES : Go to next step.

- 4) Turn ignition switch to OFF.
- 5) Disconnect connector from EGR solenoid valve.
- 6) Connect 12 V battery's ground \ominus terminal to one terminal of the EGR solenoid valve. Then connect 12 V battery's \oplus terminal to the other terminal of it.

CAUTION:

Do not use the 12 V battery installed in the vehicle, because the electrical system may be damaged.

- 7) Start the engine.

CHECK : **Open throttle valve by 5 to 10 degrees and visually check EGR valve operation.**

YES : Possibly EGR valve malfunction may be due to freezing or clogging by foreign matter. At this point in time do not replace EGR valve, since it is not faulty. And after the checking, go to **CONFIRMATION OF ACTUAL DRIVING PATTERN.**

NOTE:

If malfunction is detected again in the confirmation of actual driving pattern, EGR valve is faulty. Go to next **CHECK** .

NO : Go to next **CHECK** .

CHECK : *Is there clogging in the gas outlets of intake manifold or cylinder head, checking by breathing into the outlets?*

YES : Repair or replace intake manifold or cylinder head. And go to **CONFIRMATION OF ACTUAL DRIVING PATTERN.**

NO : Replace EGR valve. And go to **CONFIRMATION OF ACTUAL DRIVING PATTERN.**

<p>CONFIRMATION OF ACTUAL DRIVING PATTERN.</p>

1) Conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

2) Connect Subaru select monitor to its data link connector.

3) Start and warm-up the engine until the radiator fan makes one complete rotation. (All accessory switches are OFF.)

4) Turn Subaru select monitor switch to ON.

5) Designate mode using function key.

Function mode: FA4

6) Drive at 55 ± 3 MPH (88 ± 5 km/h) until the LED No. 5 is turned on.

NOTE:

Keep the throttle valve opening at the same degree, since diagnosis will be interrupted when the opening varies.

Diagnosis starts in 190 seconds after starting engine and takes 4 seconds.

Put the gear to "D" range for the diagnosis.

7) Designate mode using function key.

Function mode: FB0

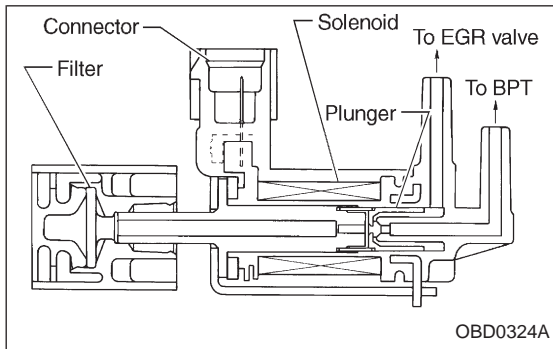
8) Confirm the "No trouble" indication on Subaru select monitor.

OBD (FB1)

P0403 <EGRSOL>

OBD0323

AC: DTC P0403
— EXHAUST GAS RECIRCULATION CIRCUIT MALFUNCTION (EGRSOL) —



DESCRIPTION:

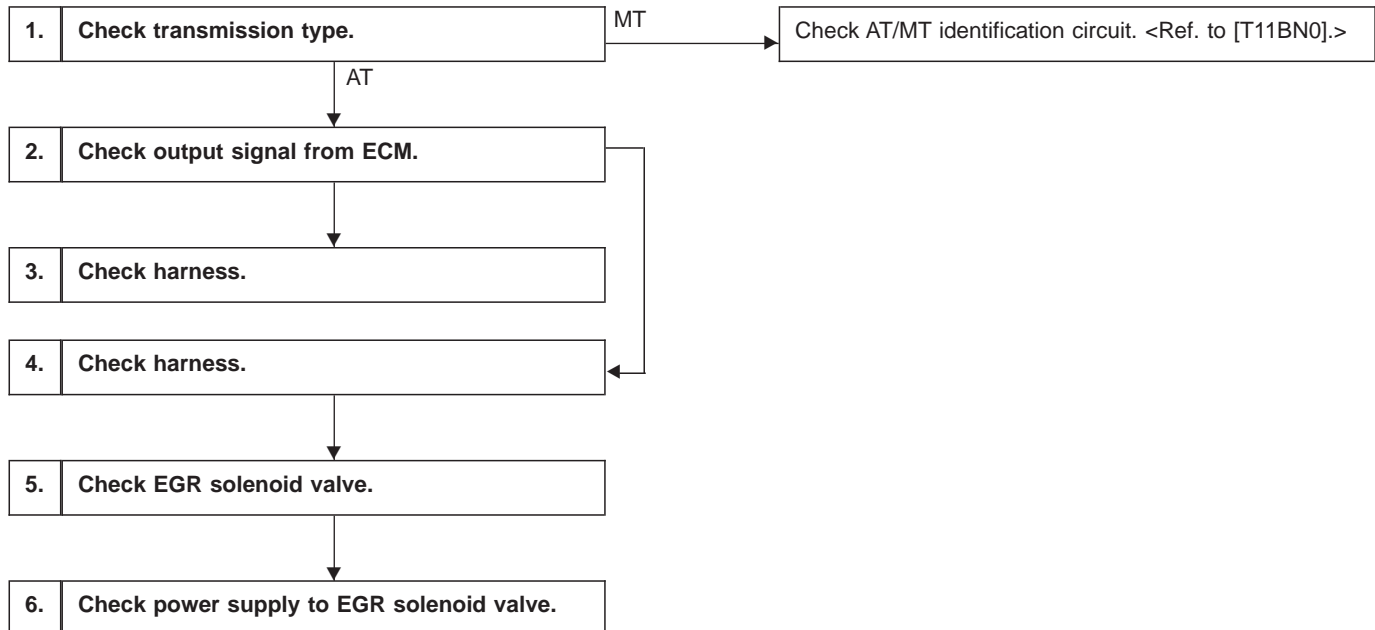
The EGR solenoid valve is situated between the BPT and EGR valve. EGR solenoid valve is opened by a signal emitted from the ECM. Therefore, throttle port pressure is transmitted to diaphragm of EGR valve.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

- Poor driving performance on low engine speed

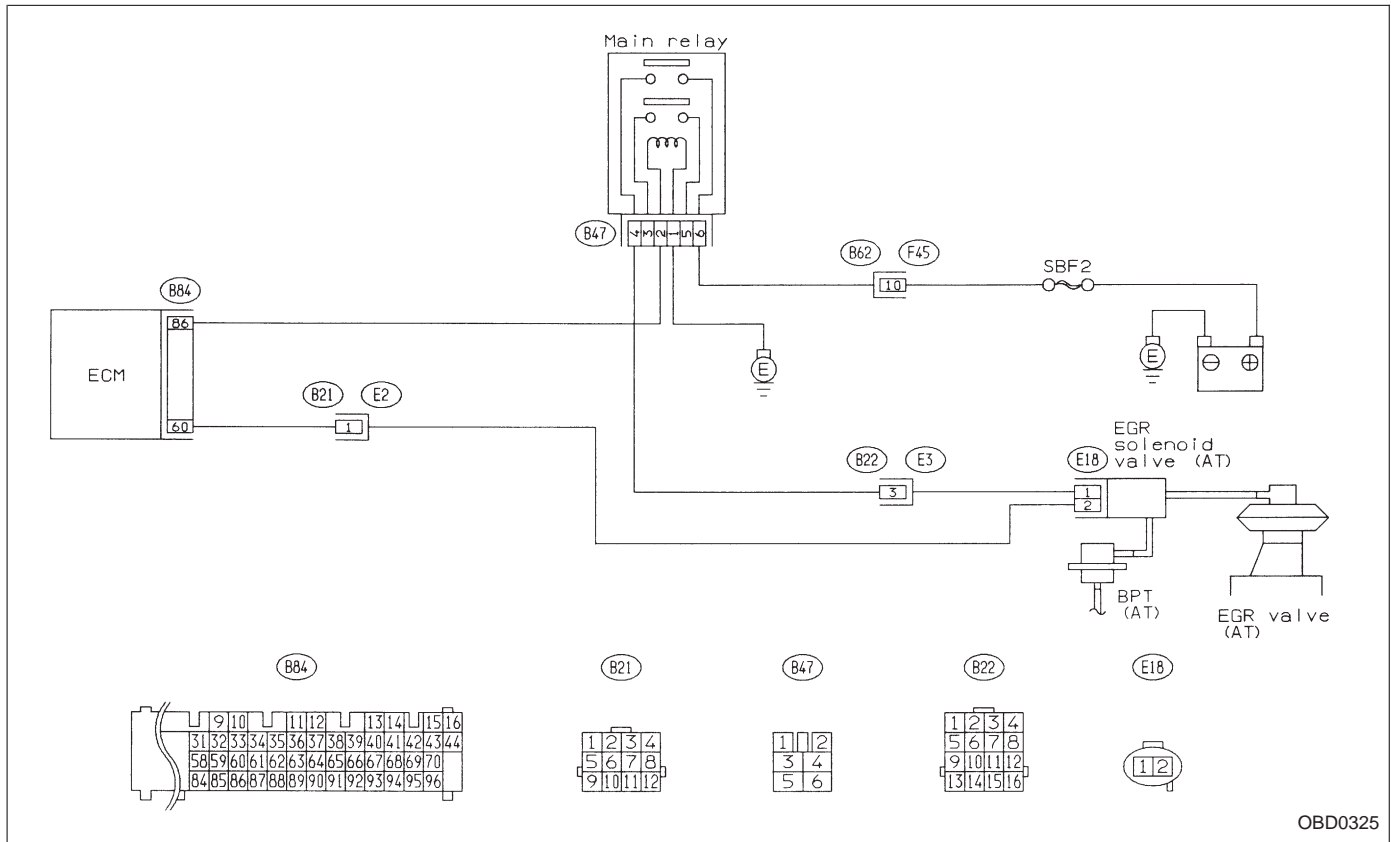


CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

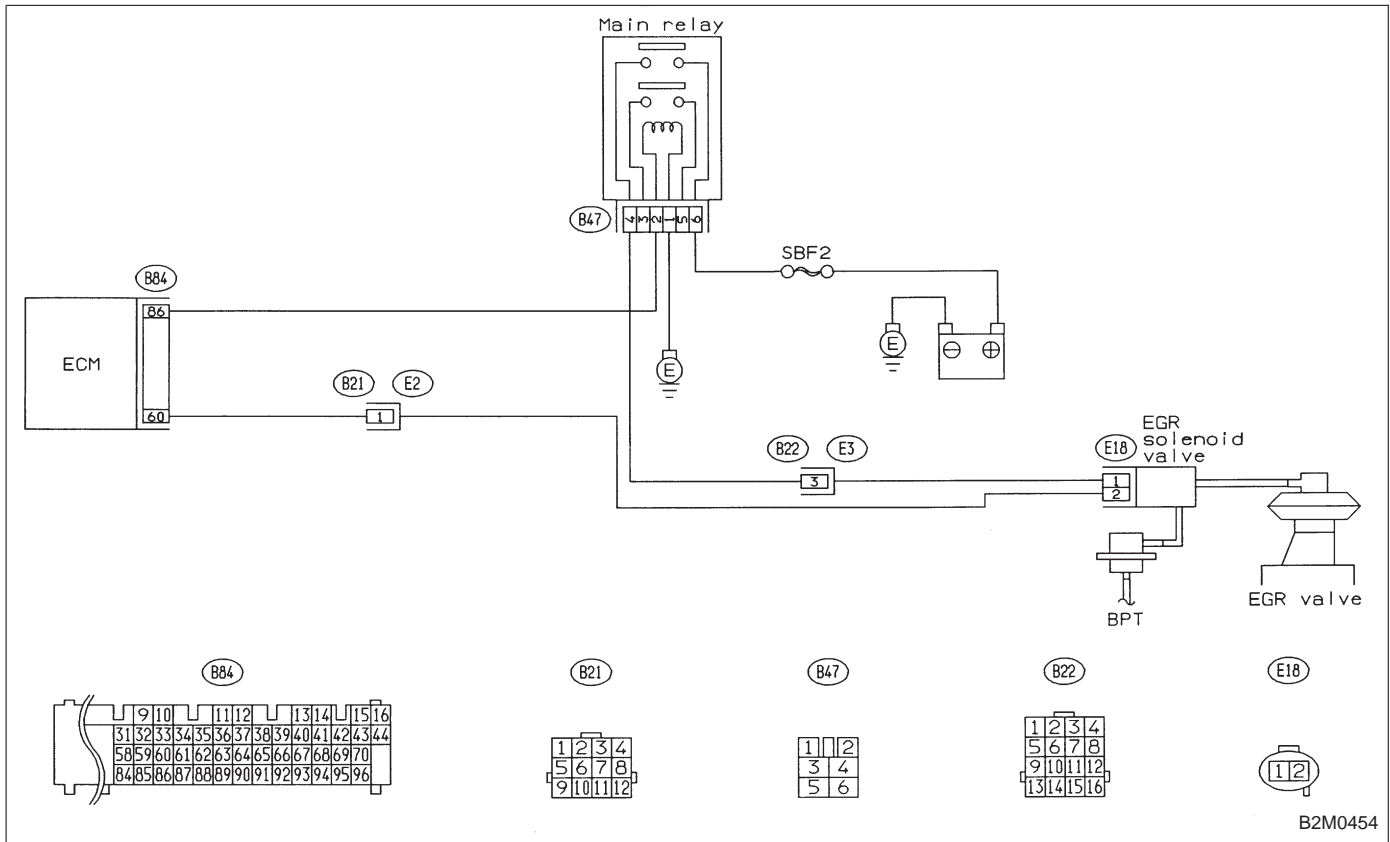
WIRING DIAGRAM:

● LHD model



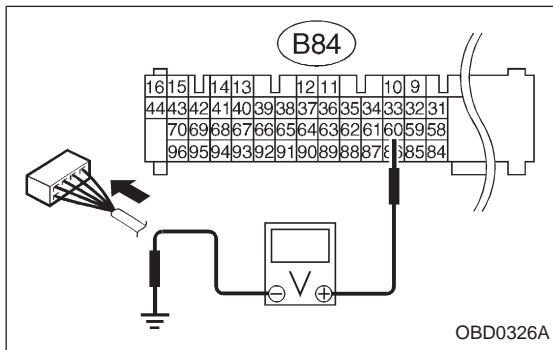
WIRING DIAGRAM:

- RHD model



1 CHECK TRANSMISSION TYPE.

Refer to flow chart on page 235.



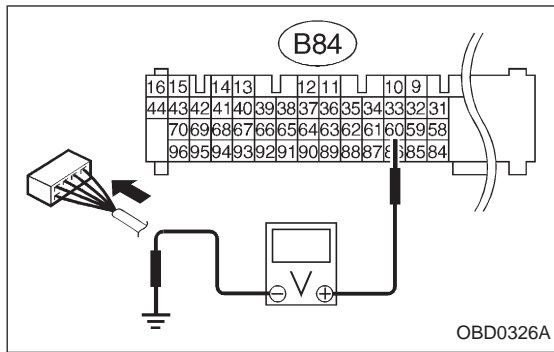
2 CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to ON.
- 2) Measure signal voltage between ECM and body.

CHECK : **Connector & terminal (B84) No. 60 — Body / 10 V, or more**

YES : Go to step 3.

NO : Go to step 4.

**3 CHECK HARNESS.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from EGR solenoid valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM and body.

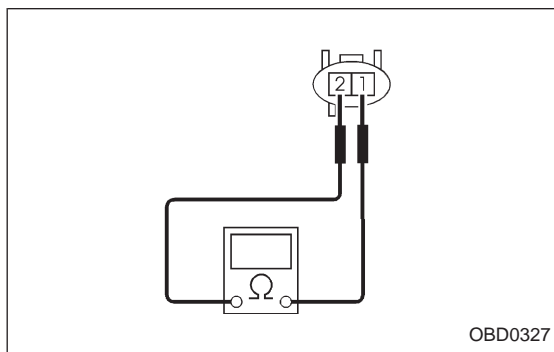
CHECK : **Connector & terminal**
(B84) No. 60 — Body / 10 V, or more

YES : Repair short circuit of harness and replace ECM.

NOTE:

The harness between ECM and EGR solenoid valve is in short circuit.

NO : Go to next step.



- 5) Turn ignition switch to OFF.
- 6) Measure resistance between EGR solenoid valve terminals.

CHECK : **Terminals**
No. 1 — No. 2 / 1 Ω, or less

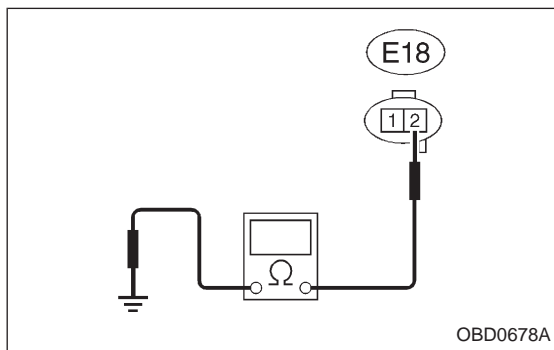
YES : Replace EGR solenoid valve and ECM.

NO : Go to next **CHECK** .

CHECK : **Is there poor contact in ECM connector?**

NO : Replace ECM.

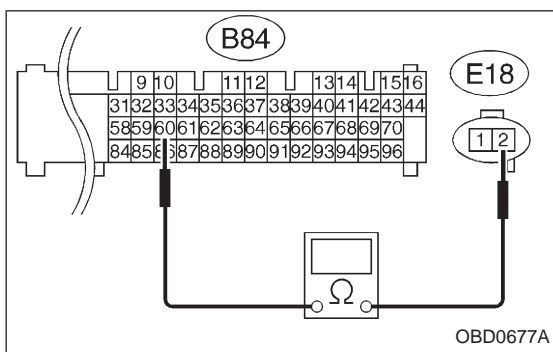
YES : Repair poor contact in ECM connector.

**4 CHECK HARNESS.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from EGR solenoid valve and ECM.
- 3) Measure resistance of harness connector between EGR solenoid valve and body.

CHECK : **Connector & terminal**
(E18) No. 2 — Body / 10 Ω, or less

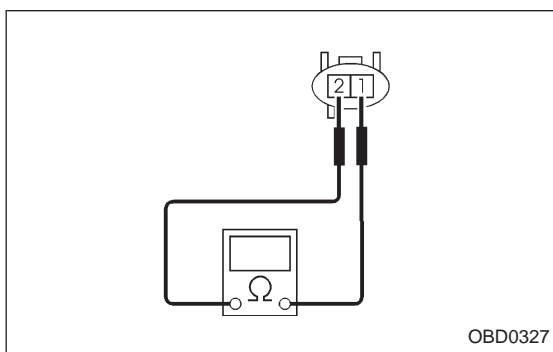
- YES** : Repair short circuit of harness between ECM connector and EGR solenoid valve connector.
- NO** : Go to the next step.



4) Measure resistance of harness connector between ECM and EGR solenoid valve.

CHECK : **Connector & terminal**
(B84) No. 60 — (E18) No. 2 / 10 Ω, or less

- YES** : Go to step 5.
- NO** : Repair open circuit of harness between ECM connector and EGR solenoid valve connector.

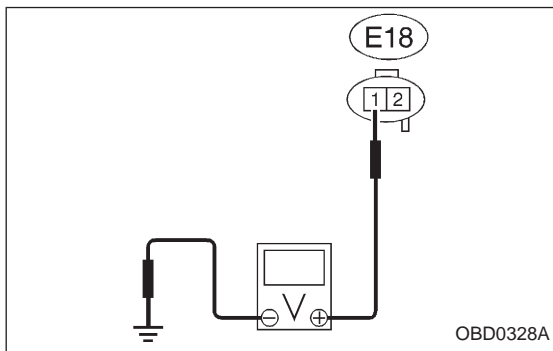


5 CHECK EGR SOLENOID VALVE.

Measure resistance between connector terminals of EGR solenoid valve.

CHECK : **Terminals**
No. 1 — No. 2 / 10 — 100 Ω

- YES** : Go to step 6.
- NO** : Replace EGR solenoid valve.



6 CHECK POWER SUPPLY TO EGR SOLENOID VALVE.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between EGR solenoid valve harness connector and body.

CHECK : **Connector & terminal**
(E18) No. 1 — Body / 10 V, or more

- YES** : Confirm good connection at EGR solenoid valve connector.
- NO** : Repair open circuit of harness between main relay connector and EGR solenoid valve connector.

OBD	(FB1)
P0420	<CAT>
OBD0329	

AD: DTC P0420
— CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (CAT) —

DESCRIPTION:

- The three-way catalyst is an oval shaped honeycomb monolith ceramic. Its porous surface is coated with platinum and rhodium.
- The catalyst is used to reduce HC, CO and NOx in exhaust gases, and permits simultaneous oxidation and reduction.

DTC DETECTING CONDITION:

- Immediately at fault recognition

TROUBLE SYMPTOM:

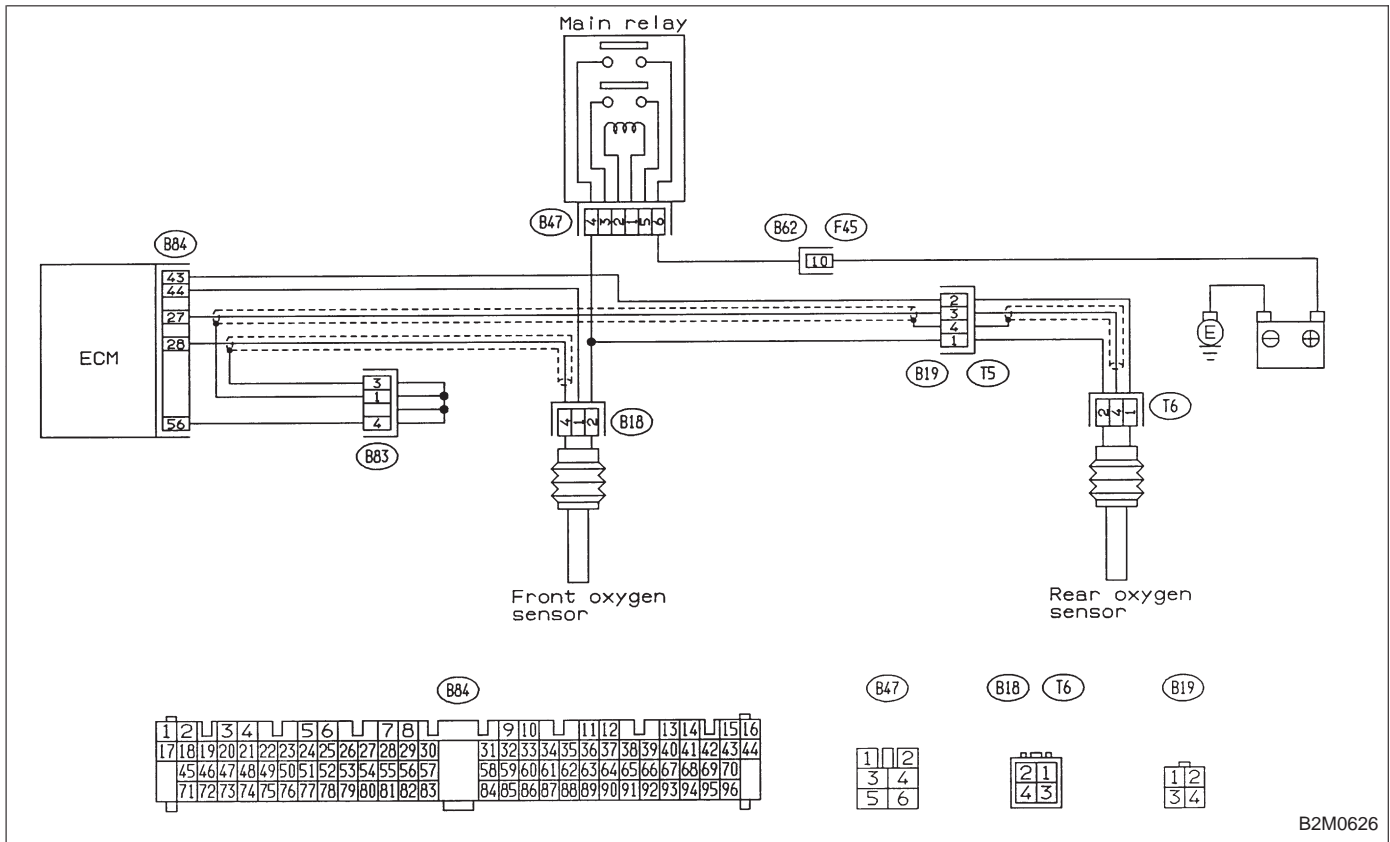
- Engine stalls.
- Idle mixture is out of specifications.

1. Check any other DTC P0130, P0133, P0135, P0136, P0139 and P0141 on display.
2. Check exhaust system.
3. Check rear catalytic converter.

CAUTION:
 After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

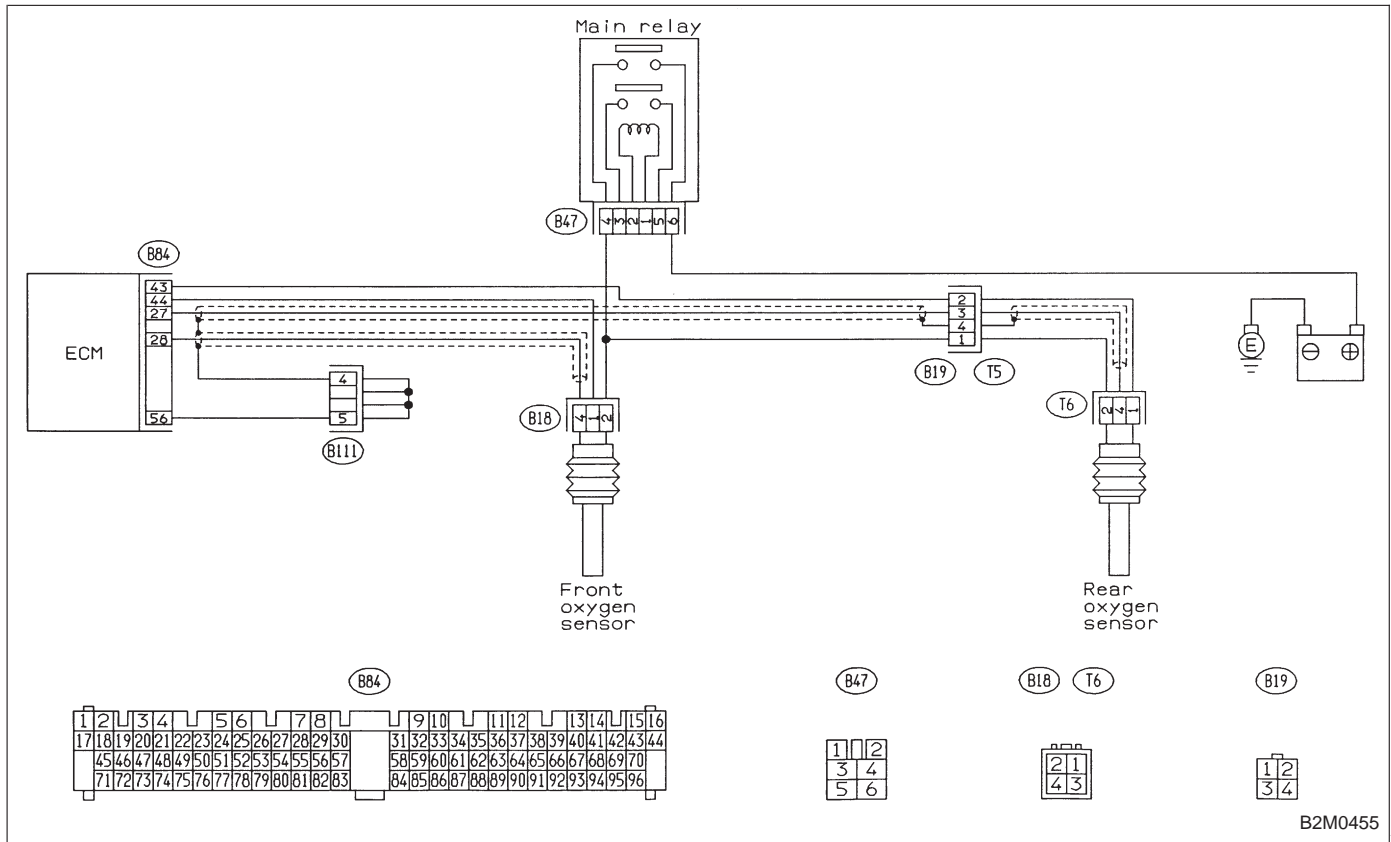
- LHD model



B2M0626

WIRING DIAGRAM:

● RHD model



B2M0455

1	CHECK ANY OTHER DTC P0130, P0133, P0135, P0136, P0139 AND P0141 ON DISPLAY.
----------	--

CHECK : *Check that Subaru Select Monitor or the OBD-II general scan tool shows P0130, P0133, P0135, P0136, P0139 and P0141.*

YES : Inspect the relevant DTC using "11. Diagnostics Chart with Trouble Code".
Inspection of P0420 is not necessary after above.

NO : Go to step 2.

2	CHECK EXHAUST SYSTEM.
----------	------------------------------

Check for gas leaks or air suction caused by loose or dislocated nuts and bolts, and open hole at exhaust pipes.

CHECK : *Check the following position of exhaust system.*

- *Between cylinder head and front exhaust pipe.*
- *Between front exhaust pipe and front catalytic converter.*
- *Between front catalytic converter and rear catalytic converter.*

YES : Repair or replace exhaust system.

NO : Go to step 3.

3	CHECK REAR CATALYTIC CONVERTER.
----------	--

1) Separate rear catalytic converter from rear exhaust pipe.

CHECK : *Is there damage at rear face of rear catalyst?*

YES : Replace front and rear catalytic converters.

NO : Go to next step.

2) Remove front catalytic converter.

CHECK : *Is there damage at rear face or front face of front catalyst?*

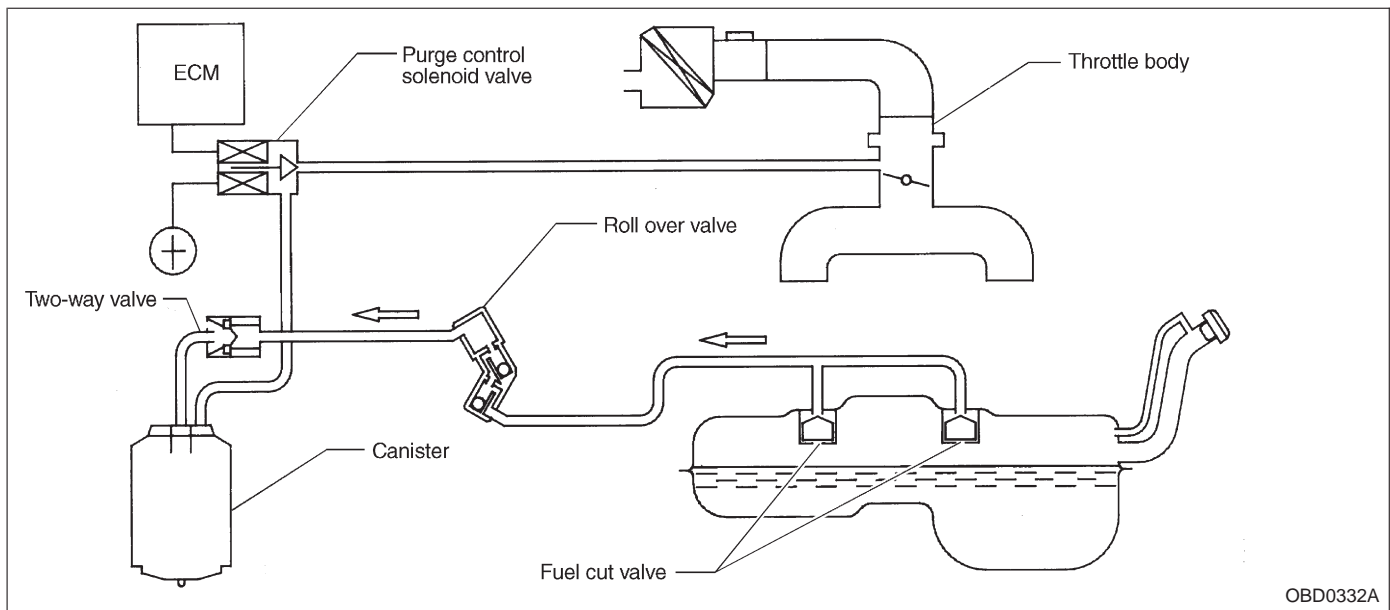
If there is damage in front catalyst, replace front catalytic converter.

OBD	(FB1)
P0441	<CPC_F>
OBD0331	

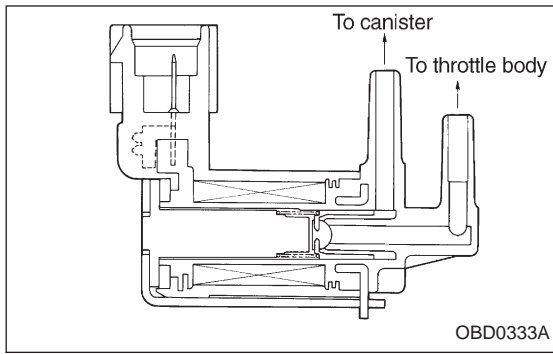
AE: DTC P0441
— EVAPORATIVE EMISSION CONTROL
SYSTEM INCORRECT PURGE FLOW
(CPC – F) —

DESCRIPTION:

- The evaporative emission control system is employed to prevent evaporative fuel from being discharged into ambient atmosphere. This system includes a canister, purge control solenoid valve, fuel cut valve, their connecting lines, etc.
- Gasoline vapor evaporated from the fuel tank is introduced into the canister located in the engine compartment through the evaporation line, and is absorbed on activated carbon in it. A fuel cut valve is also incorporated on the tank fuel line.
- The purge control solenoid valve is controlled by the ECM and provides optimal purge control according to the engine coolant temperature, engine load and vehicle speed.



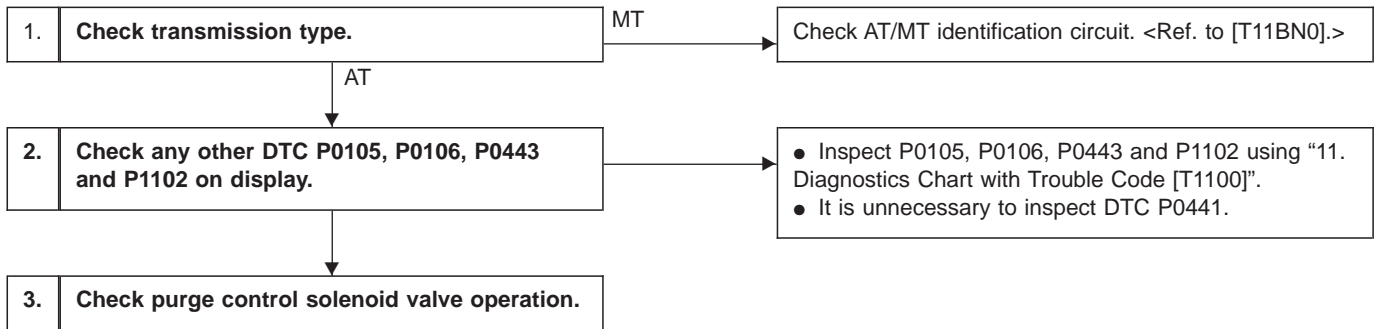
OBD0332A



- The purge control solenoid valve is on the evaporation line between canister and throttle body. It is built on the below of intake manifold.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

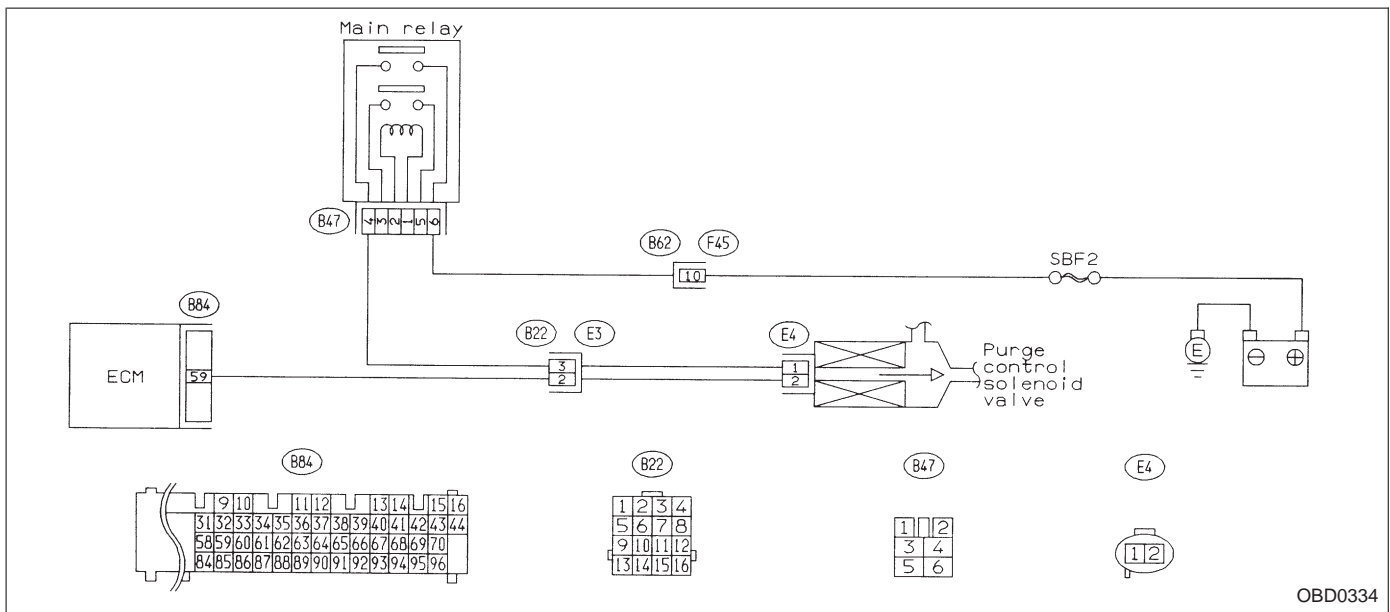


CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

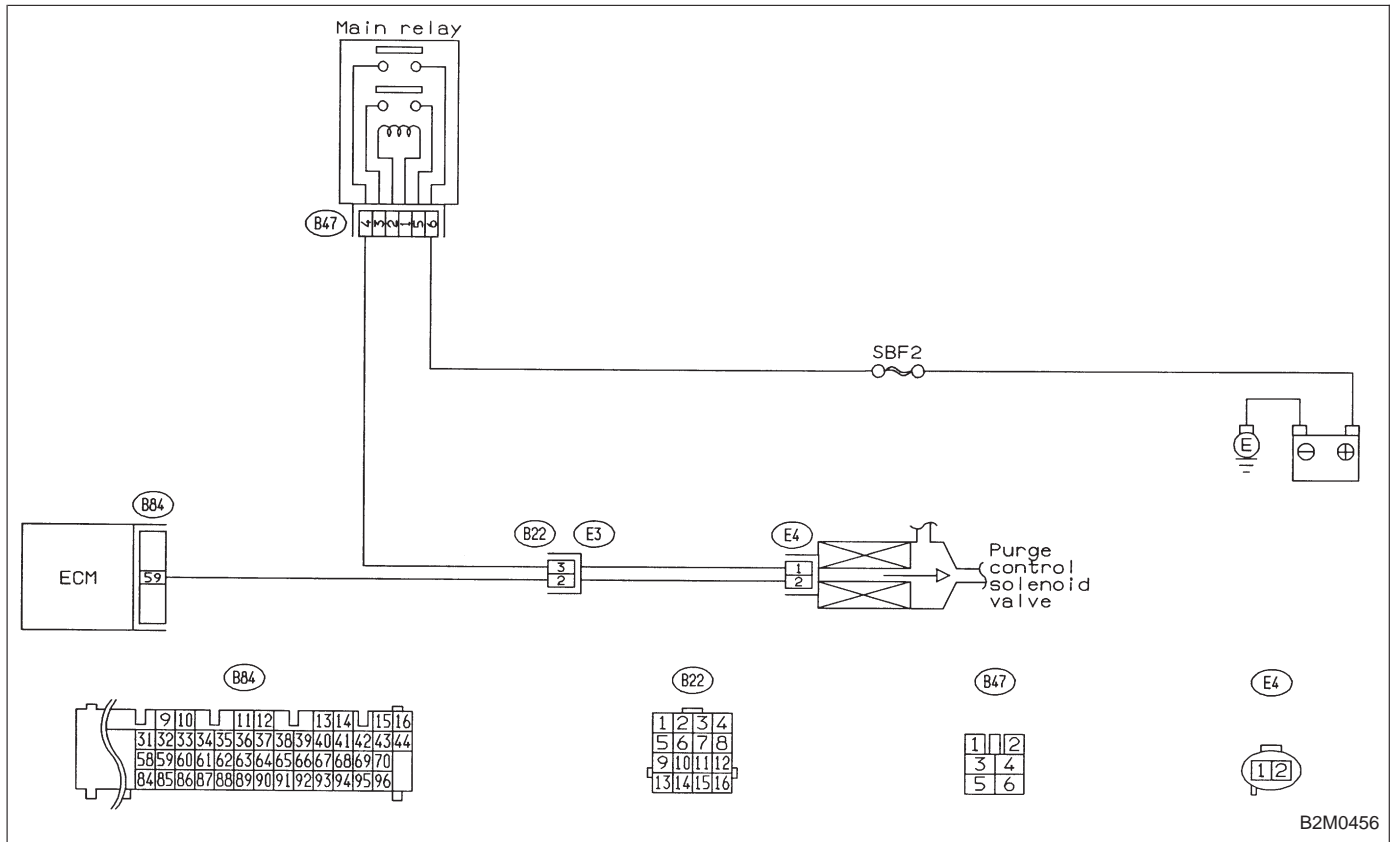
WIRING DIAGRAM:

- LHD model



WIRING DIAGRAM:

- RHD model



B2M0456

1 CHECK TRANSMISSION TYPE.

Refer to flow chart on page 245.

2 CHECK ANY OTHER DTC P0105, P0106, P0443 AND P1102 ON DISPLAY.

CHECK : *Check that Subaru select monitor or the OBD-II general scan tool shows P0105, P0106, P0443 and P1102.*

YES : Inspect the relevant DTC using "11. Diagnostics chart with Trouble Code".

NO : Go to step 3.

3 CHECK PURGE CONTROL SOLENOID VALVE OPERATION.

- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.
- 3) Turn ignition switch to ON.

CHECK : *Make sure that the ON/OFF operating sound of purge control solenoid valve occurs at about 0.3 Hz.*

NO : Replace purge control solenoid valve.

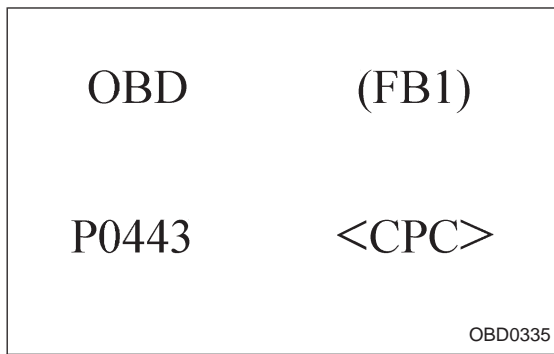
YES : Go to next step.

- 4) Disconnect canister purge hose from canister.

CHECK : *Blow through the canister purge hose to check if pulsations occur.*

YES : Check and repair loose connections, cracks, and clogging in evaporation line.

NO : Replace purge control solenoid valve.



AF: DTC P0443
— EVAPORATIVE EMISSION CONTROL
SYSTEM PURGE CONTROL VALVE CIRCUIT
MALFUNCTION (CPC) —

DESCRIPTION:

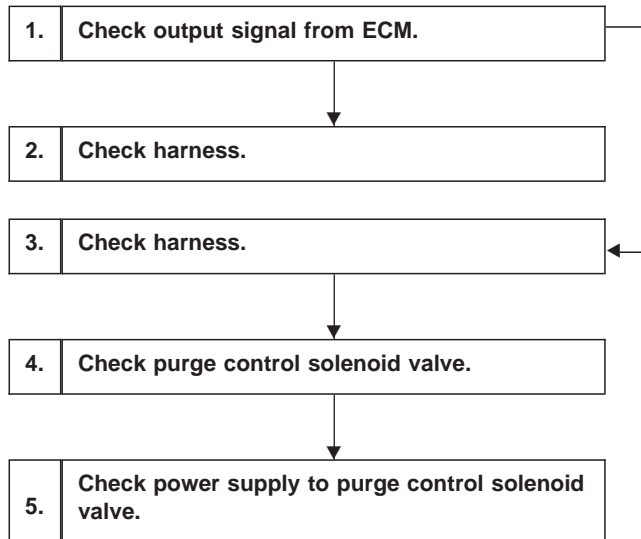
Refer to “AE: DTC P0441 — EVAPORATIVE EMISSION CONTROL SYSTEM INCORRECT PURGE FLOW — [T11AE0]”.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

- Erroneous idling

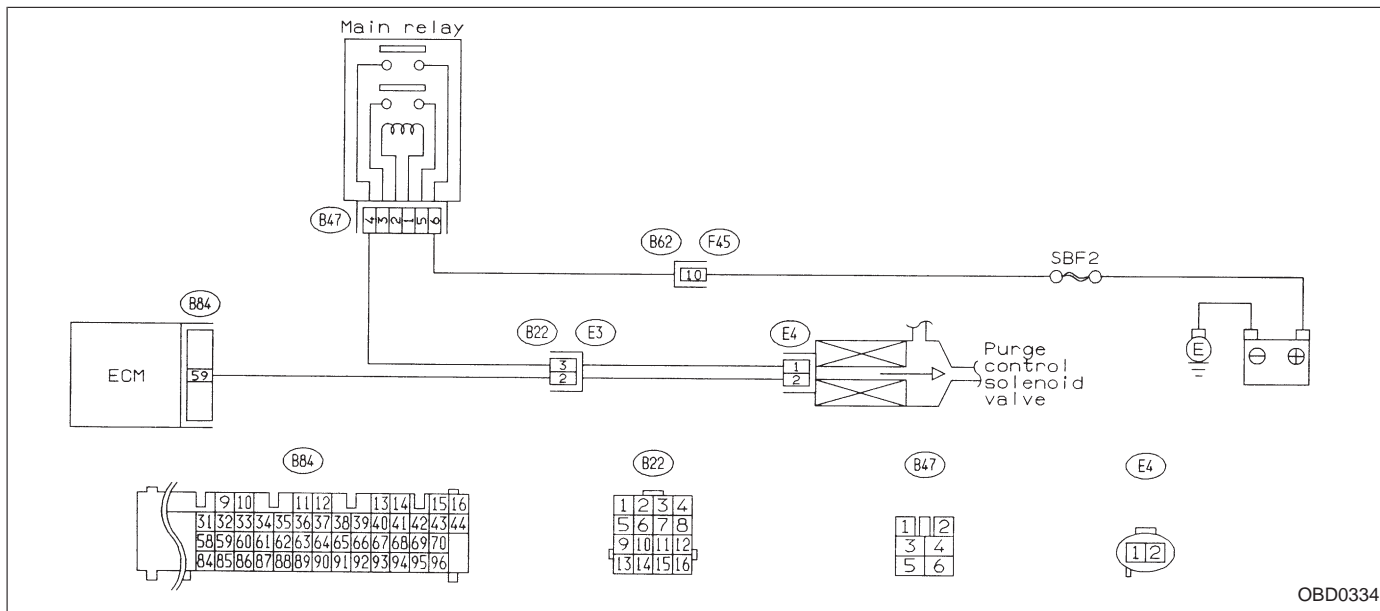


CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

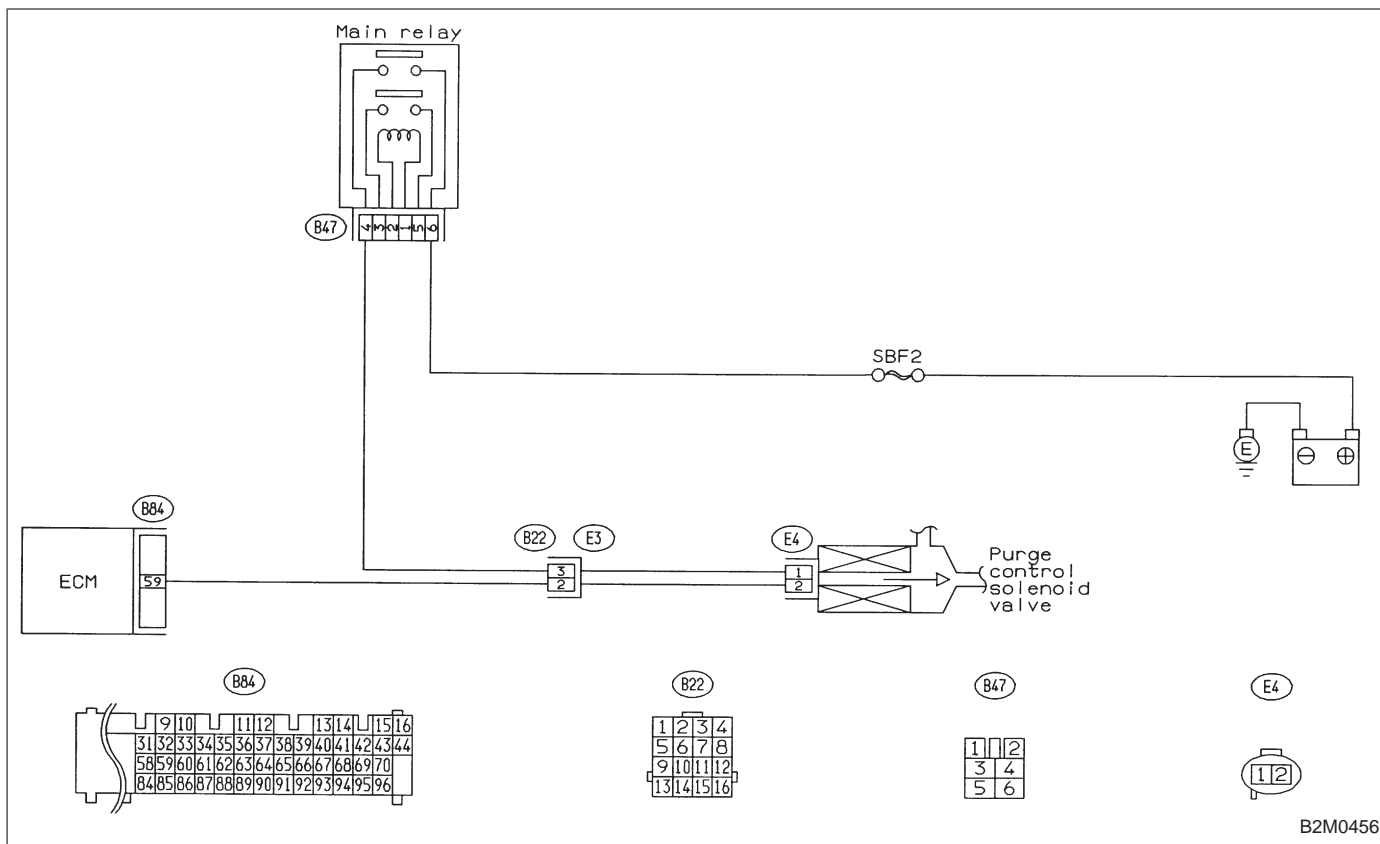
WIRING DIAGRAM:

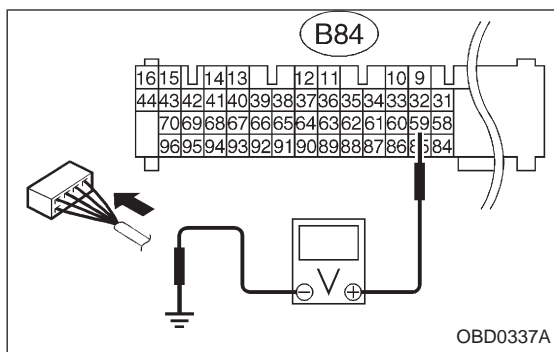
● LHD model



WIRING DIAGRAM:

● RHD model



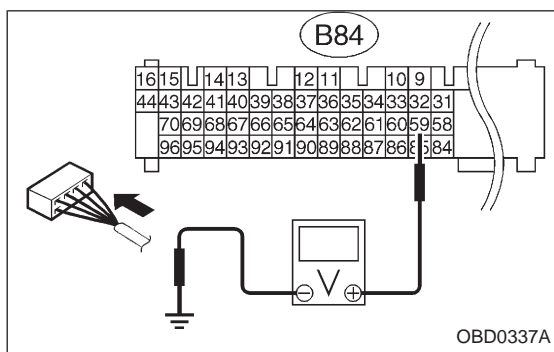
**1 CHECK OUTPUT SIGNAL FROM ECM.**

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM connector terminal and body.

CHECK : **Connector & terminal (B84) No. 59 — Body / 10 V, or more**

YES : Go to step 2.

NO : Go to step 3.

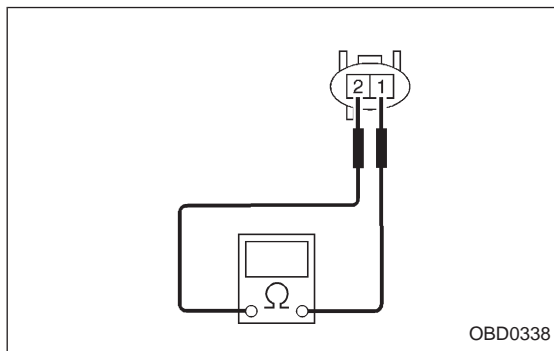
**2 CHECK HARNESS.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from purge control solenoid valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM connector and body.

CHECK : **Connector & terminal (B84) No. 59 — Body / 10 V, or more**

YES : Repair short circuit of harness between ECM connector and purge control solenoid valve connector.

NO : Go to next step.



- 5) Turn ignition switch to OFF.
- 6) Measure resistance between purge control solenoid valve terminals .

CHECK : **Terminals No. 1 — No. 2/1 Ω , or less**

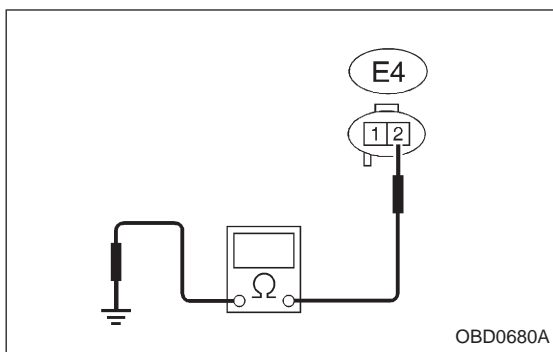
YES : Replace purge control solenoid valve and ECM.

NO : Go to next **CHECK** .

CHECK : **Is there poor contact in ECM connector?**

YES : Repair poor contact in ECM connector.

NO : Replace ECM.



3 CHECK HARNESS.

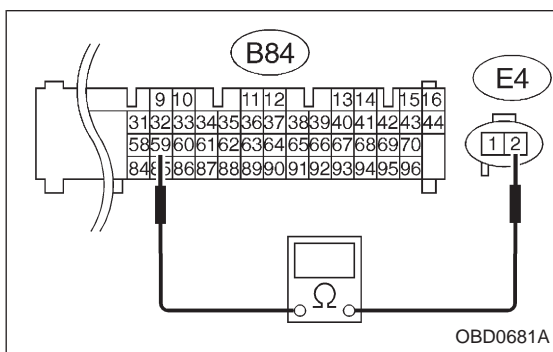
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from purge control solenoid valve and ECM.
- 3) Measure resistance between purge control solenoid valve connector and body.

CHECK : **Connector & terminal (E4) No. 2 — Body / 10 Ω, or less**

YES : Repair short circuit of harness between ECM connector and purge control solenoid valve connector.

NO : Go to the next step.

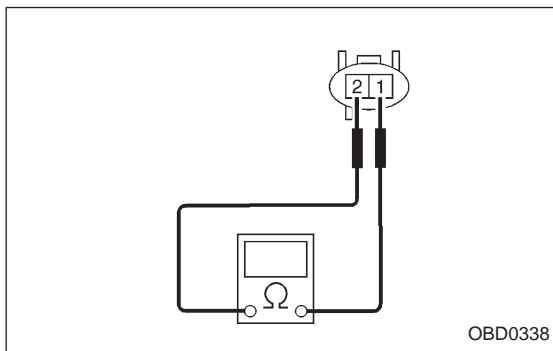
- 4) Measure resistance between ECM and purge control solenoid valve of harness connector.



CHECK : **Connector & terminal (B84) No. 59 — (E4) No. 2 / 10 Ω, or less**

YES : Go to step 4.

NO : Repair open circuit of harness between ECM connector and purge control solenoid valve connector.



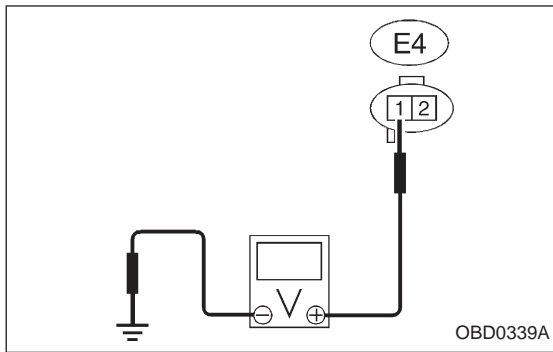
4 CHECK PURGE CONTROL SOLENOID VALVE.

- 1) Remove purge control solenoid valve.
- 2) Measure resistance between purge control solenoid valve terminals.

CHECK : **Terminals No. 1 — No. 2 / 10 — 100 Ω**

YES : Go to step 5.

NO : Replace purge control solenoid valve.



5

CHECK POWER SUPPLY TO PURGE CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between purge control solenoid valve connector and body.

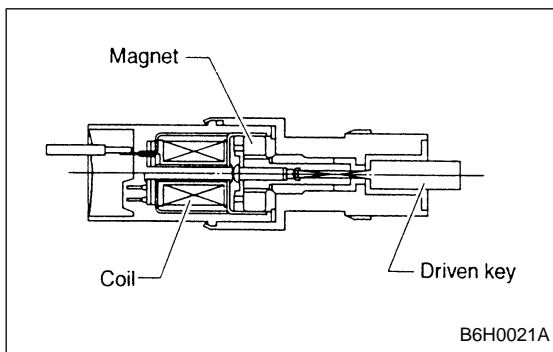
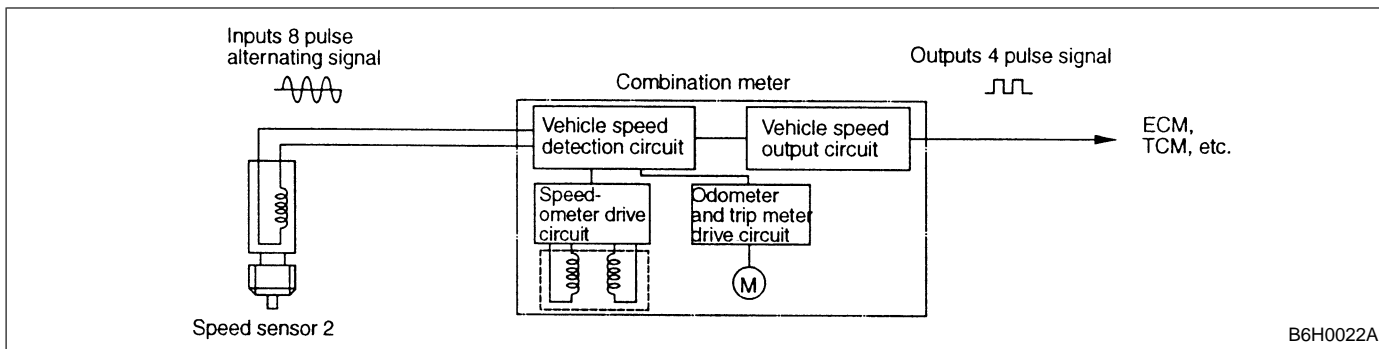
- CHECK** : **Connector & terminal (E4) No. 1 — Body / 10 V, or more**
- YES** : Confirm good connection at purge control solenoid valve connector.
- NO** : Repair open circuit of harness between main relay connector and purge control solenoid valve connector.

OBD	(FB1)
P0500	<VSP>
OBD0340	

AG: DTC P0500
— VEHICLE SPEED SENSOR MALFUNCTION (VSP) —

DESCRIPTION:

- The speedometer system is an electric type; it uses no speedometer cable and drives the speedometer according to electric pick-up sensor (vehicle speed sensor 2). The speed sensor 2 is installed on the transmission. The speed sensor 2 sends the vehicle speed signal (8 pulses per one turn of speed sensor driven shaft) to the speed detection circuit in the speedometer where this signal pulse wave is regulated.
- The regulated pulse signal (4 pulses per one turn of speed sensor driven shaft) is sent to the speedometer drive circuit and odometer (trip meter) drive circuit.
- The output signal from vehicle speed detection circuit is also used in ECM, TCM, etc.



- The speed sensor 2 consists of a magnetic resistance element, magnet ring, driven shaft, spring, etc. As the driven key rotates, the magnet turns to change the magnetic field of the coil. The coil generates power corresponding to a change in the magnetic field. One turn of the driven key in the vehicle speed sensor 2 sends 8 pulses of AC signal to the combination meter.

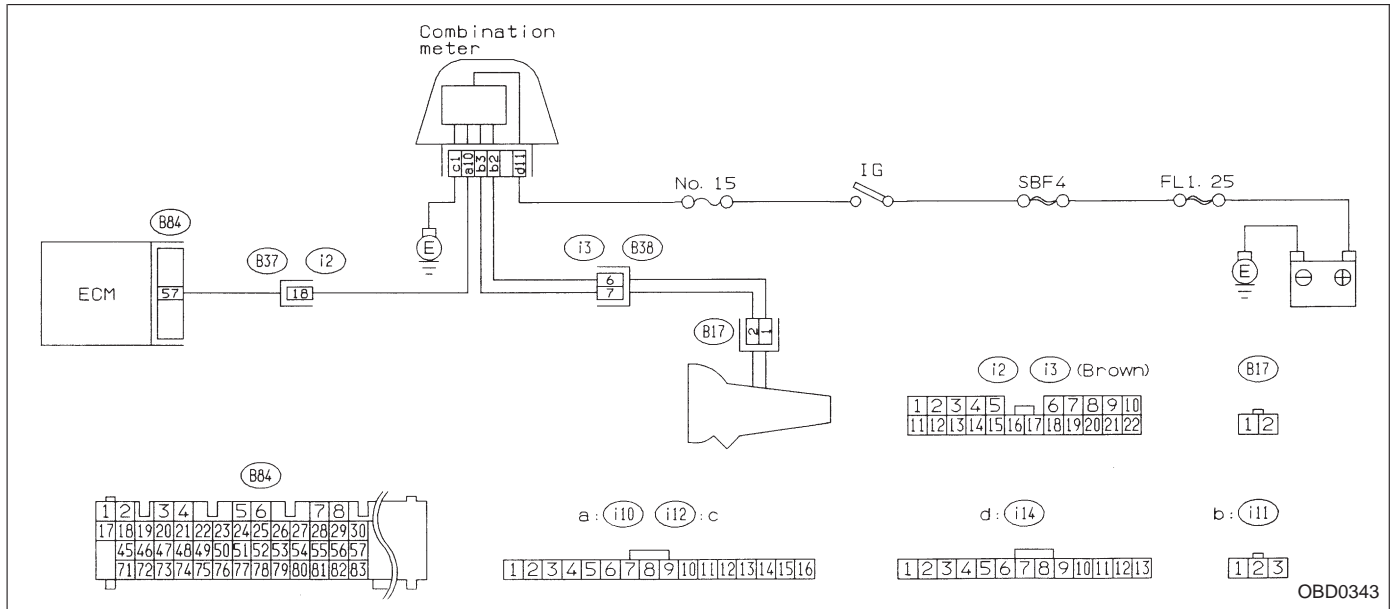
DTC DETECTING CONDITION:

- Immediately at fault recognition

1. Check speedometer operation in combination meter.
2. Check harness.
3. Check harness.

CAUTION:
 After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

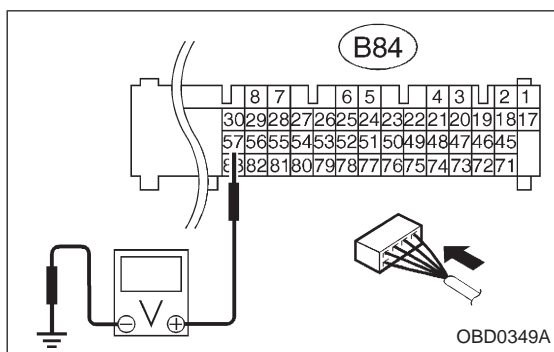
WIRING DIAGRAM:



OBD0343

1 CHECK SPEEDOMETER OPERATION IN COMBINATION METER.

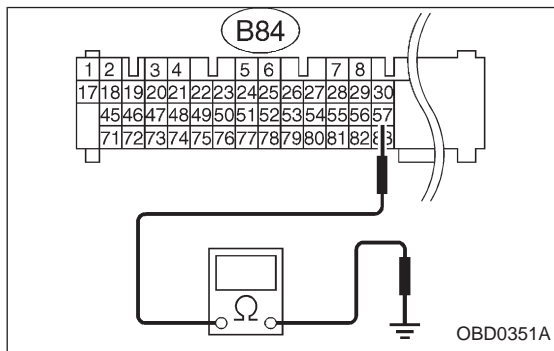
- CHECK** : Check normal operation of speedometer.
- NO** : Check speedometer and vehicle speed sensor <Ref. to 6-2 [K3A0].>.
- YES** : Go to step 2.



2 CHECK HARNESS.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from TCM.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM and body.

- CHECK** : **Connector & terminal (B84) No. 57 — Body / 2 V, or more**
- YES** : Check the following and repair if necessary.
 - Open circuit of harness between ECM connector and combination meter connector
 - Poor contact in ECM connector
 - Poor contact in combination meter connector
 - Poor contact in coupling connector (B37)
- NO** : Go to step 3.



3 CHECK HARNESS.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ECM.
- 3) Measure resistance of harness between ECM connector and body.

- CHECK** : **Connector & terminal (B84) No. 57 — Body / 10 Ω, or less**
- YES** : Repair short circuit of harness between ECM connector and combination meter connector.
- NO** : Repair poor contact in ECM connector.

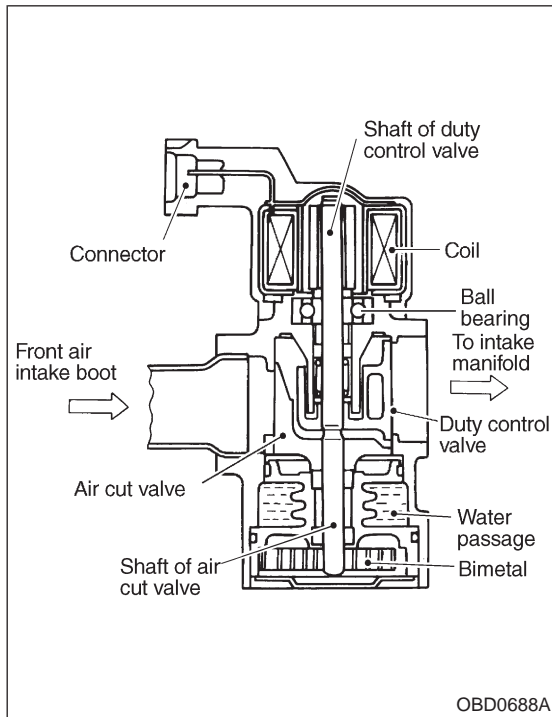
OBD

(FB1)

P0505

<ISC>

OBD0358



OBD0688A

AH: DTC P0505 — IDLE CONTROL SYSTEM MALFUNCTION (ISC) —

DESCRIPTION:

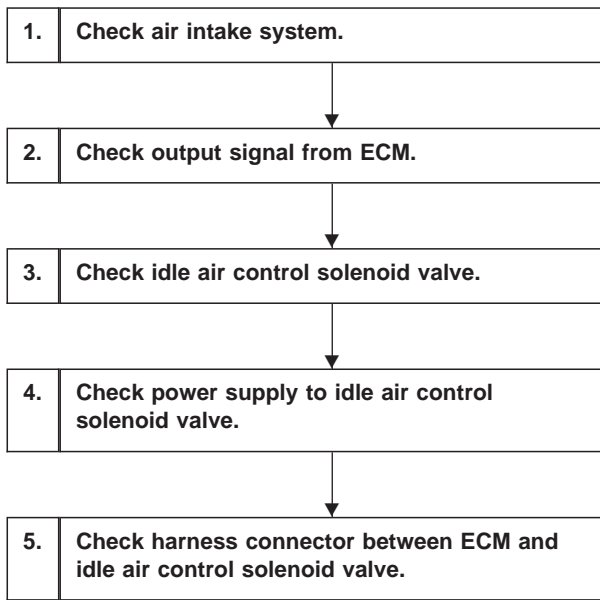
- Idle air control solenoid valve consists of an air cut valve, duty control valve, intake air passage and a coolant passage.
- Air cut valve contains a bimetallic substance which responds to coolant temperature, and a duty control valve which is operated by a signal sent from ECM.
- When engine coolant temperature is low, air cut valve is fully opened by the action of the bimetallic substance so that the air flow required for low engine coolant temperatures is maintained.
- ECM controls duty control valve to bring the operating engine speed as close to preset idle speed as possible.

DTC DETECTING CONDITION:

- Immediately at fault recognition

TROUBLE SYMPTOM:

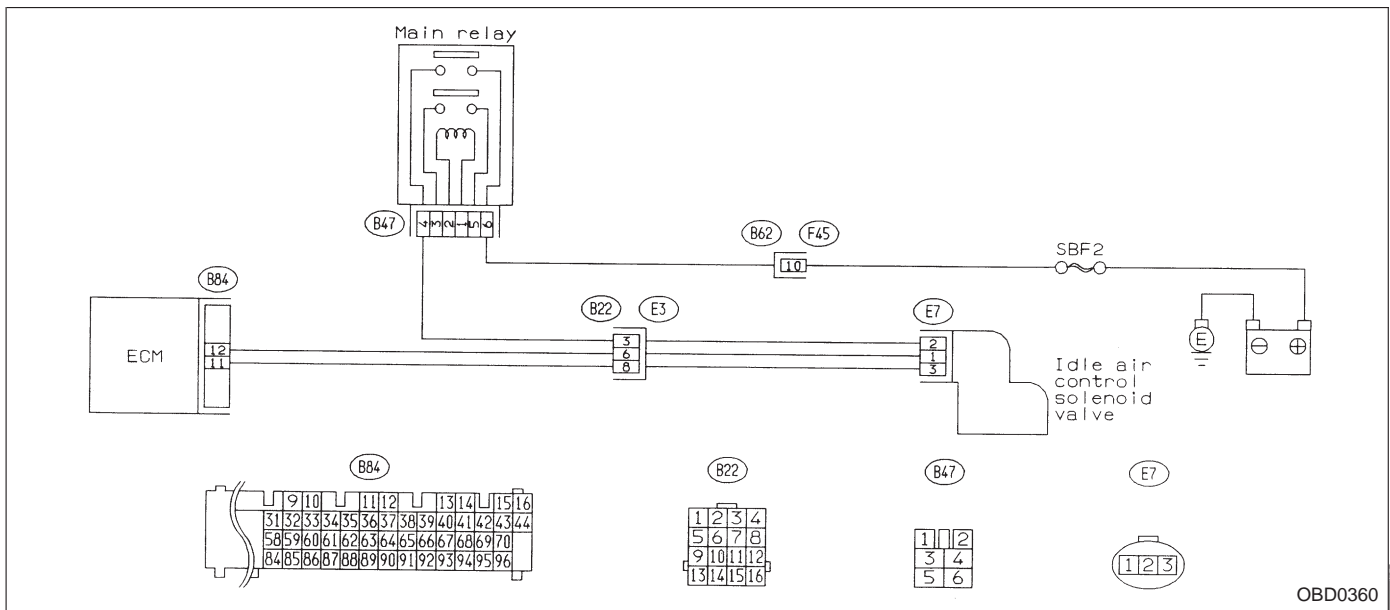
- Erroneous idling
- Engine stalls.
- Engine breathing



CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

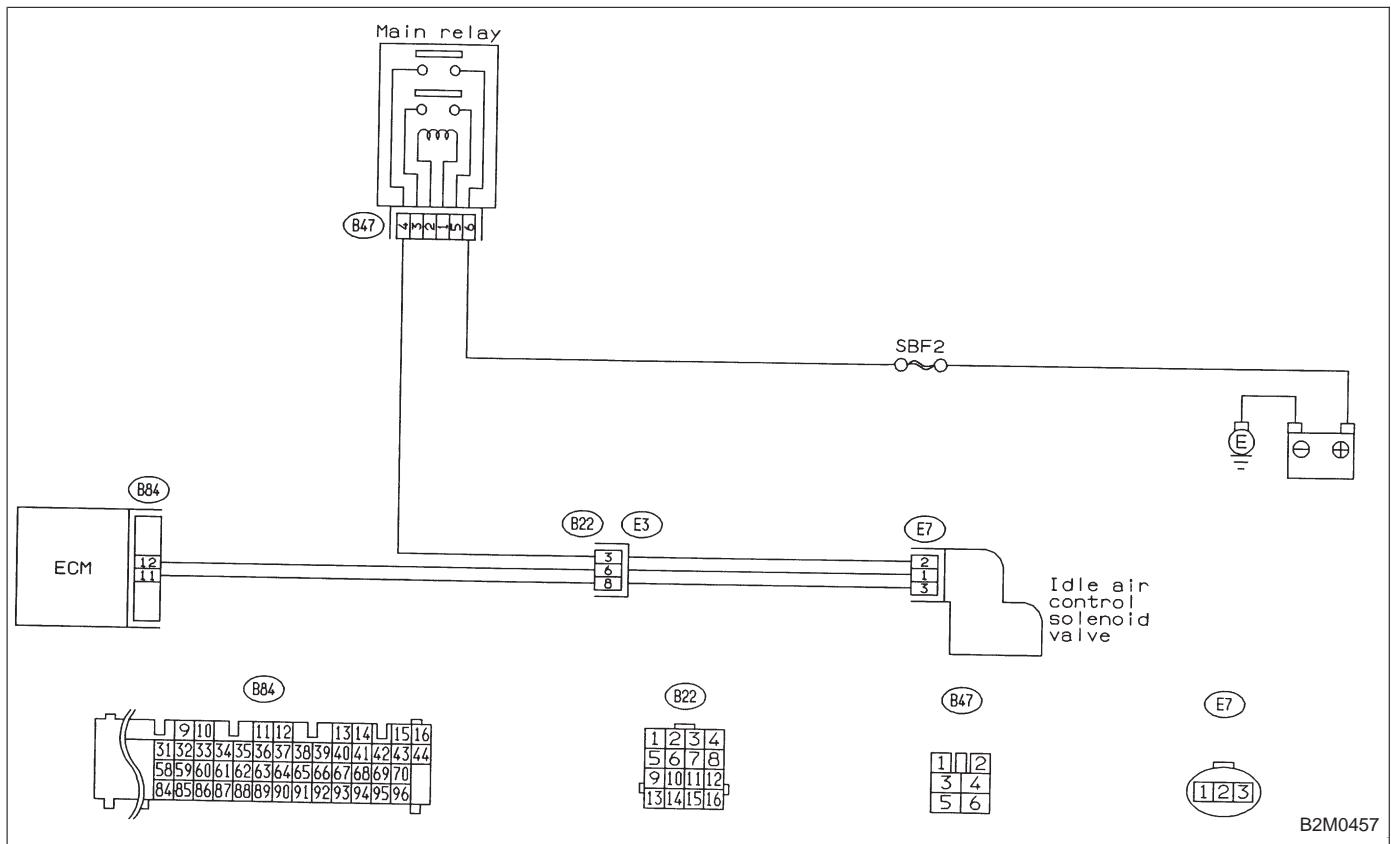
WIRING DIAGRAM:

- LHD model



WIRING DIAGRAM:

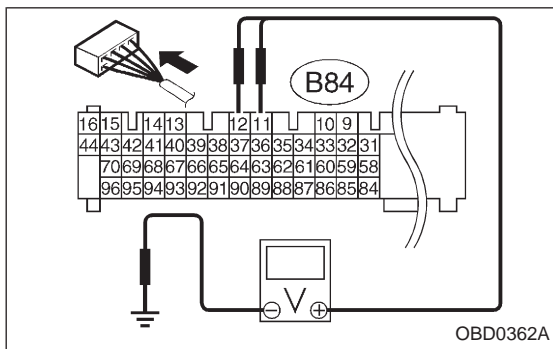
- RHD model



B2M0457

1 CHECK AIR INTAKE SYSTEM.

- 1) Turn ignition switch to ON.
- 2) Start engine, and idle it.
- 3) Check intake manifold, idle air control solenoid valve and throttle body for loose installation and gasket for cracks.
- 4) Check by-pass hoses for loose connections and cracks.
- 5) Check vacuum hoses for disconnections.

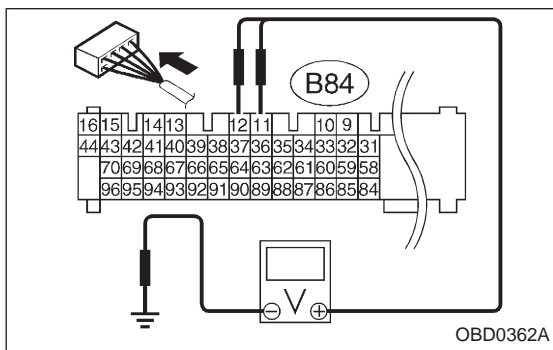


2 CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM and body.

CHECK : **Connector & terminal**
(B84) No. 11 — Body / 3 V, or more
(B84) No. 12 — Body / 3 V, or more

NO : Go to step 4.
YES : Go to the next step.



- 3) Turn ignition switch to OFF.
- 4) Disconnect connector from idle air control solenoid valve.
- 5) Turn ignition switch to ON.
- 6) Measure voltage between ECM and body.

CHECK : **Connector & terminal**
(B84) No. 11 — Body / 10 V, or more
(B84) No. 12 — Body / 10 V, or more

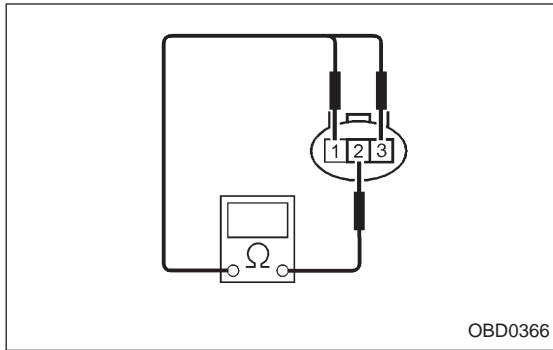
YES : Repair short circuit of harness and replace ECM.

NO : Go to next **CHECK** .

CHECK : **Is there poor contact in ECM connector?**

YES : Repair poor contact in ECM connector.

NO : Go to step 3.



3 CHECK IDLE AIR CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between solenoid valve terminals.

CHECK : **Terminals**
No. 1 — No. 2 / 20 Ω, or more
No. 2 — No. 3 / 20 Ω, or more

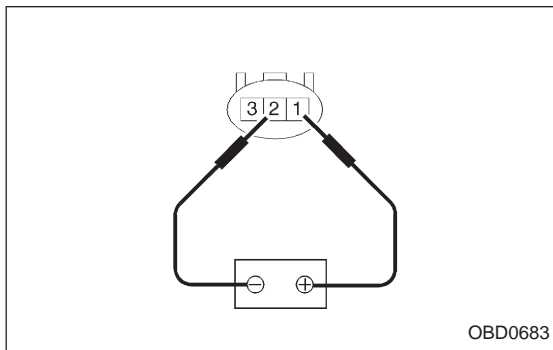
YES : Replace idle air control solenoid valve.

NO : Go to next **CHECK** .

CHECK : **Terminals**
No. 1 — No. 2 / 5 Ω, or less
No. 2 — No. 3 / 5 Ω, or less

YES : Replace idle air control solenoid valve and ECM.

NO : Go to next step.



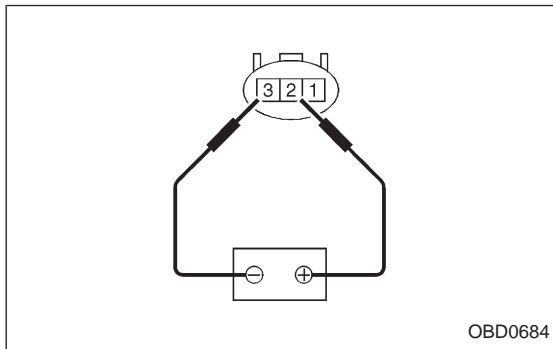
- 3) Remove idle air control solenoid valve. <Ref. to 2-7 [W12A0].>

- 4) Check operation of idle air control solenoid valve.

CHECK : **When connecting the battery to terminals No. 1 and No. 2 of idle air control solenoid valve, check if it is fully opened.**

YES : Go to next **CHECK** .

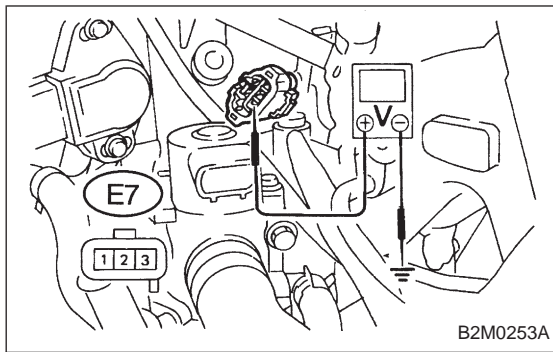
NO : Clean idle air control solenoid valve. <Ref. to 2-7 [W12B0].>



CHECK : **When connecting the battery to terminals No. 3 and No. 2 of idle air control solenoid valve, check if it is fully closed.**

YES : Go to step 4.

NO : Clean idle air control solenoid valve. <Ref. to 2-7 [W12B0].>



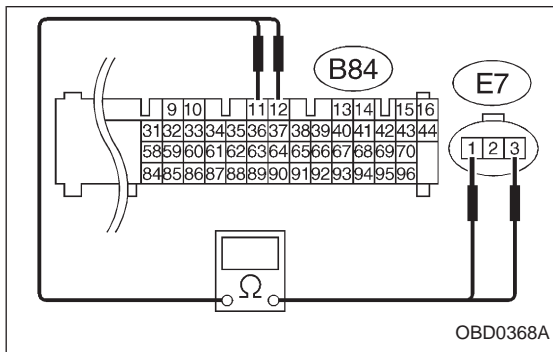
4 CHECK POWER SUPPLY TO IDLE AIR CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from idle air control solenoid valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between idle air control solenoid valve and body.

CHECK : **Connector & terminal (E7) No. 2 — Body / 10 V, or more**

YES : Go to step 5.

NO : Repair open circuit of harness between idle air control solenoid valve connector and ECM connector.



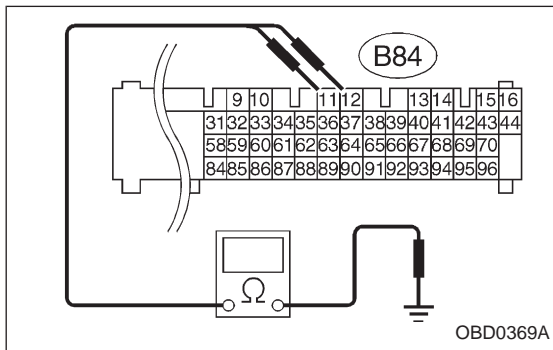
5 CHECK HARNESS CONNECTOR BETWEEN ECM AND IDLE AIR CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ECM.
- 3) Measure resistance of harness connector between ECM and idle air control solenoid valve.

CHECK : **Connector & terminal (B84) No. 11 — (E7) No. 3 / 10 Ω, or less (B84) No. 12 — (E7) No. 1 / 10 Ω, or less**

NO : Repair open circuit of harness between ECM connector and idle air control solenoid valve connector.

YES : Go to the next step.



- 4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

CHECK : **Connector & terminal (B84) No. 11 — Body / 1 MΩ, or more (B84) No. 12 — Body / 1 MΩ, or more**

YES : Confirm good condition in connectors of idle air control solenoid valve circuit.

NO : Repair short circuit of harness between ECM connector and idle air control solenoid valve connector.

OBD	(FB1)
P0506	<ISC_L>
OBD0370	

AI: DTC P0506
— IDLE CONTROL SYSTEM RPM LOWER THAN EXPECTED (ISC – L) —

DESCRIPTION:

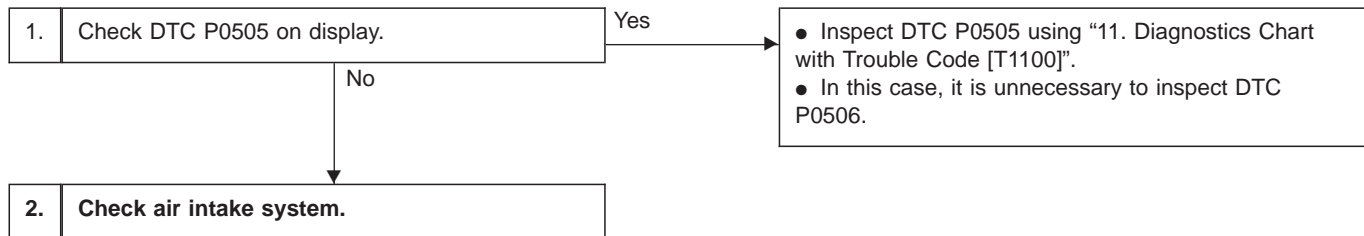
Refer to “AH: DTC P0505 — IDLE CONTROL SYSTEM MALFUNCTION — [T11AH0]”.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

- Engine is difficult to start.
- Engine does not start.
- Erroneous idling
- Engine stalls.



CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

2	CHECK AIR INTAKE SYSTEM.
----------	---------------------------------

- 1) Turn ignition switch to ON.
- 2) Start engine, and idle it.

CHECK : *Is clogging the by-pass line between by-pass hose and intake duct?*

YES : Repair the by-pass line.

NO : Replace idle air control solenoid valve.

OBD	(FB1)
P0507	<ISC_H>
OBD0371	

AJ: DTC P0507
— IDLE CONTROL SYSTEM RPM HIGHER THAN EXPECTED (ISC — H) —

DESCRIPTION:

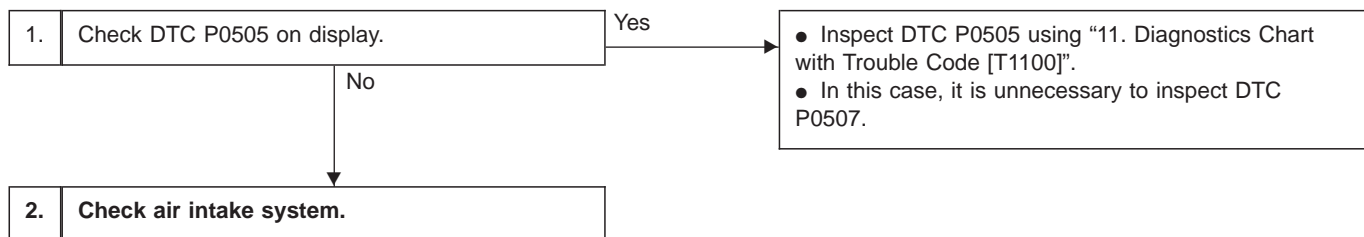
Refer to “AH: DTC P0505 — IDLE CONTROL SYSTEM MALFUNCTION — [T11AH0]”.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

- Engine keeps running at higher revolution than specified idling revolution.



CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

2	CHECK AIR INTAKE SYSTEM.
----------	---------------------------------

- 1) Turn ignition switch to ON.
- 2) Start engine, and idle it.

CHECK : ● ***Check intake manifold, idle air control solenoid valve and throttle body for loose installation and gasket for cracks.***
● ***Check by-pass hose for loose connection and cracks.***
● ***Check vacuum hoses for disconnections.***

YES : Repair air suction and leaks.

NO : Replace idle air control solenoid valve.

AK: DTC P0600
— SERIAL COMMUNICATION LINK MALFUNCTION —

DESCRIPTION:

The serial communication link circuit monitors data communication between scan tool and ECM.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

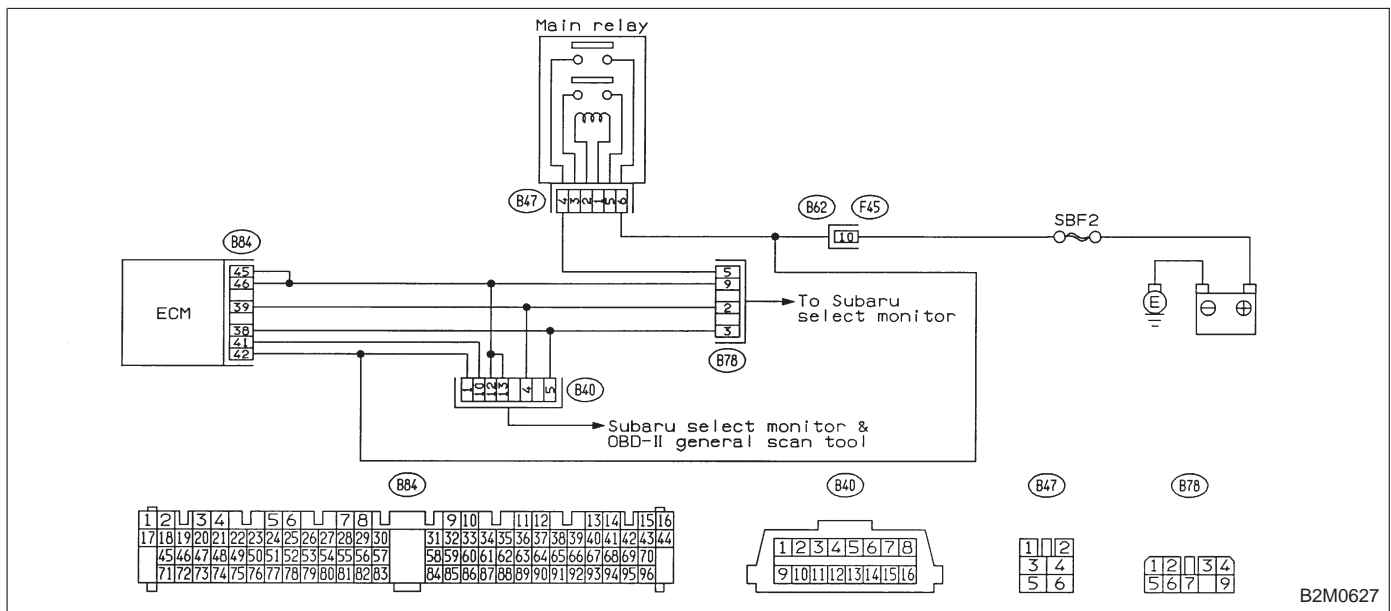
1.	Check harness.
----	----------------

CAUTION:

After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

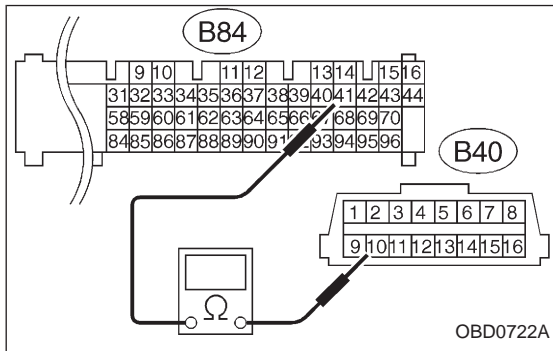
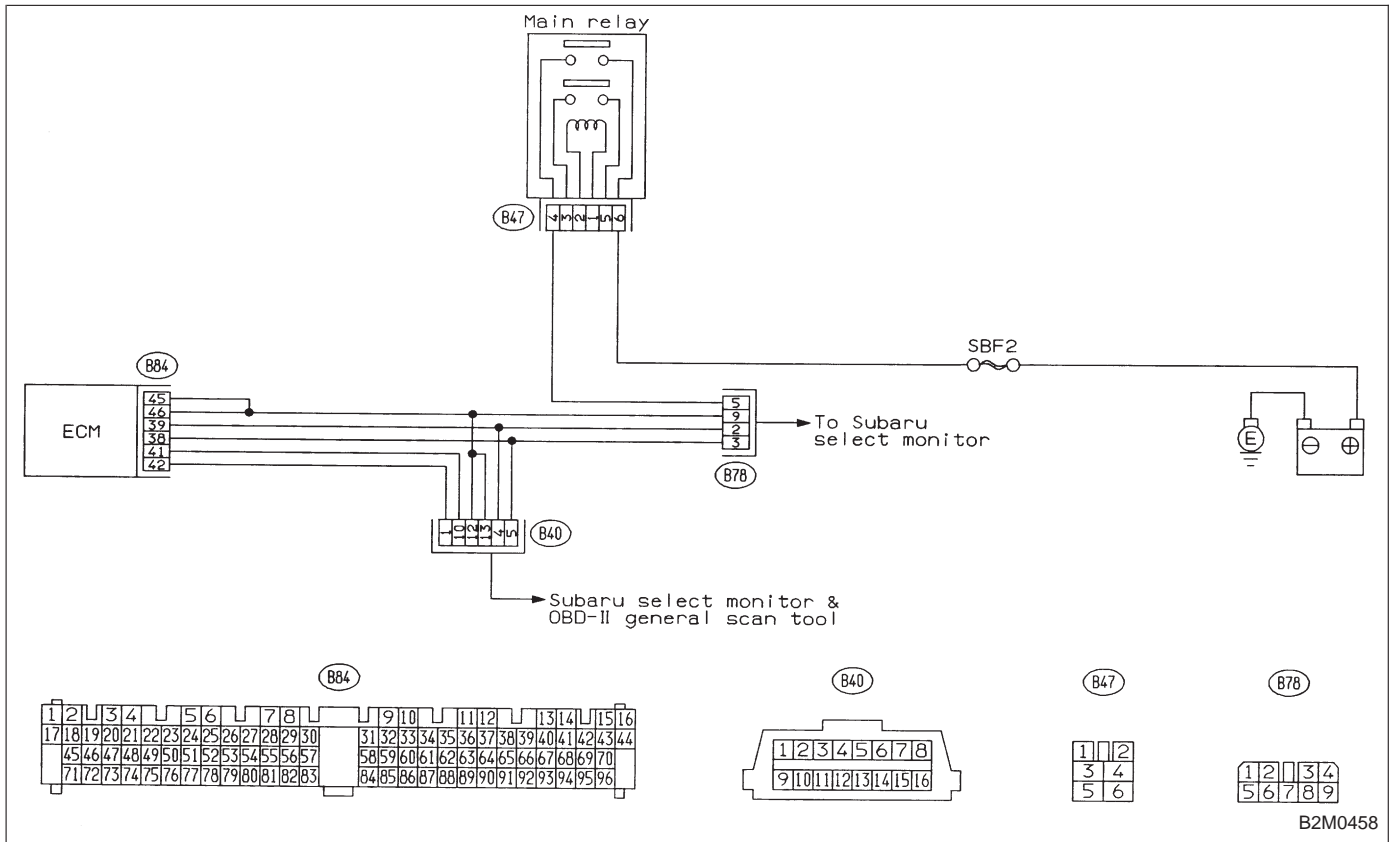
- LHD model



B2M0627

WIRING DIAGRAM:

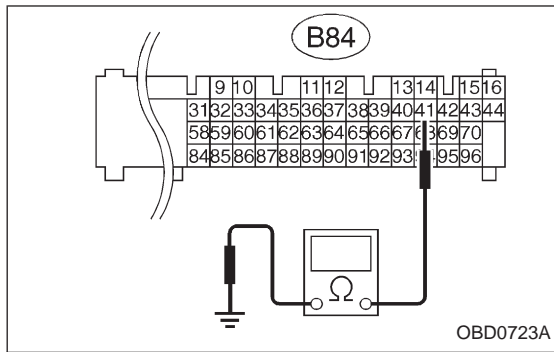
● RHD model



1 CHECK HARNESS.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ECM.
- 3) Measure resistance of harness connector between ECM and data link connector (for OBD-II general scan tool).

- CHECK** : **Connector & terminal (B84) No. 41 — (B40) No. 10 / 10 Ω, or less**
- NO** : Repair open circuit of harness between ECM connector and data link connector.
- YES** : Go to the next step.

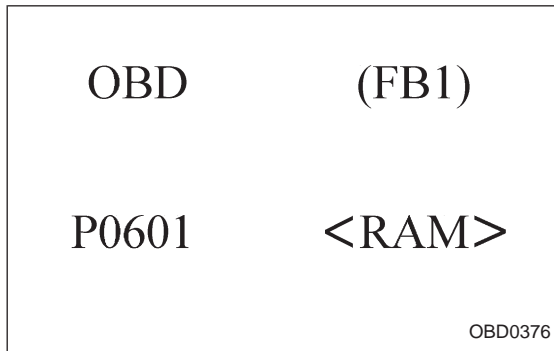


4) Measure resistance between ECM harness connector and body.

CHECK : **Connector & terminal (B84) No. 41 — Body / 10 Ω, or less**

YES : Repair short circuit of harness between ECM connector and data link connector.

NO : Repair poor contact in ECM connector and data link connector.



AL: DTC P0601 — INTERNAL CONTROL MODULE MEMORY CHECK SUM ERROR (RAM) —

DESCRIPTION:

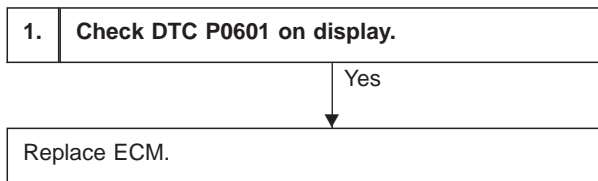
The RAM monitors the ECM microcomputer operation.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

- Engine does not start.
- Engine stalls.

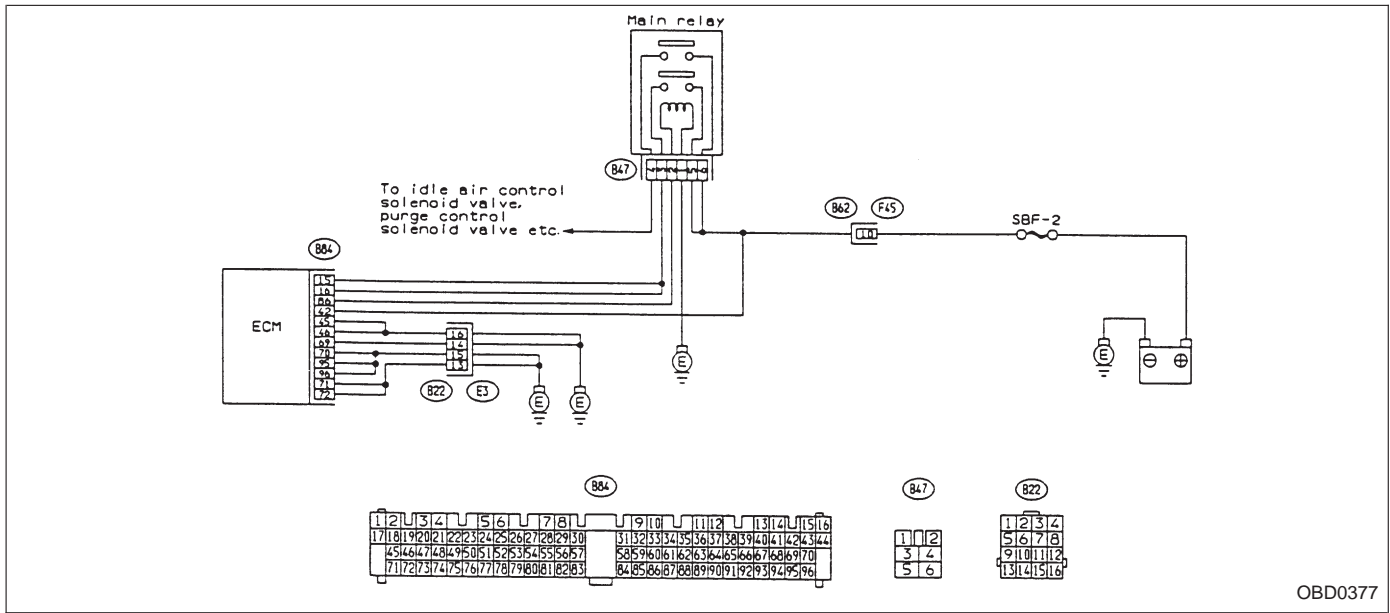


CAUTION:

After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

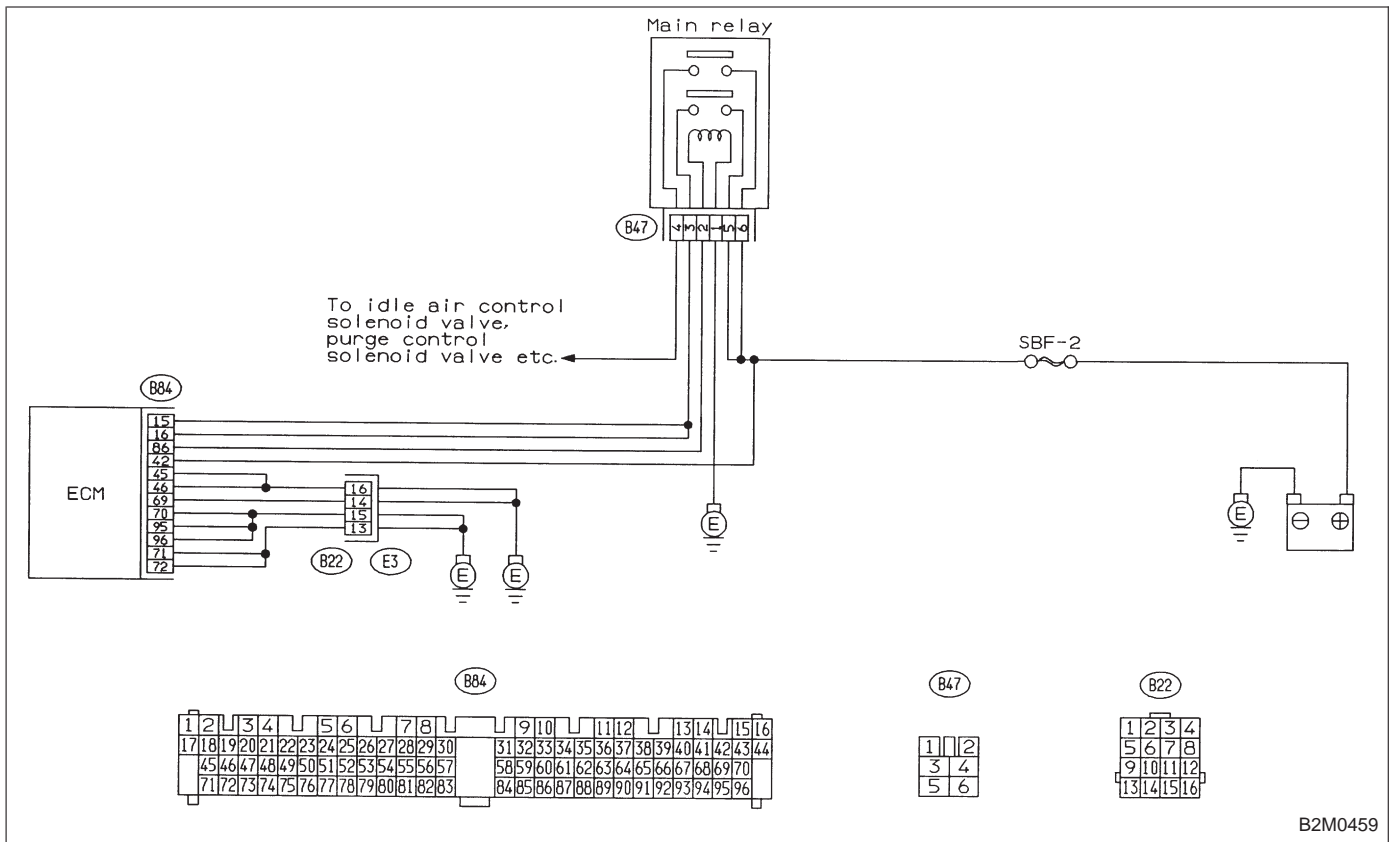
● LHD model



OBD0377

WIRING DIAGRAM:

● RHD model

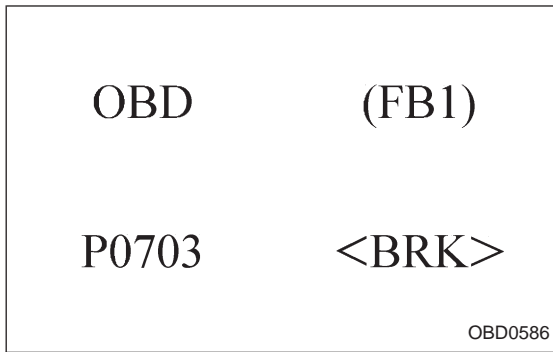


B2M0459

1	CHECK DTC P0601 ON DISPLAY.
----------	------------------------------------

CHECK : *Check that DTC P0601 is indicated on Subaru Select Monitor or OBD-II general scan tool.*

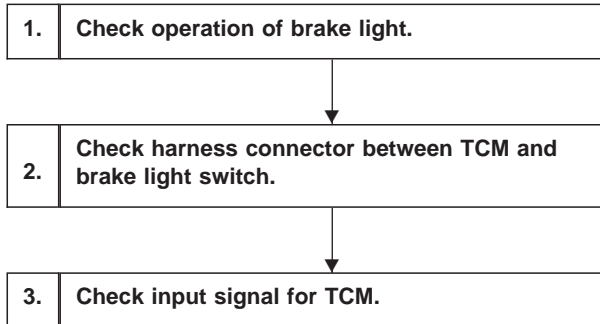
YES : Replace ECM.



**AM: DTC P0703
— BRAKE SWITCH INPUT MALFUNCTION
(BRK) —**

DTC DETECTING CONDITION:

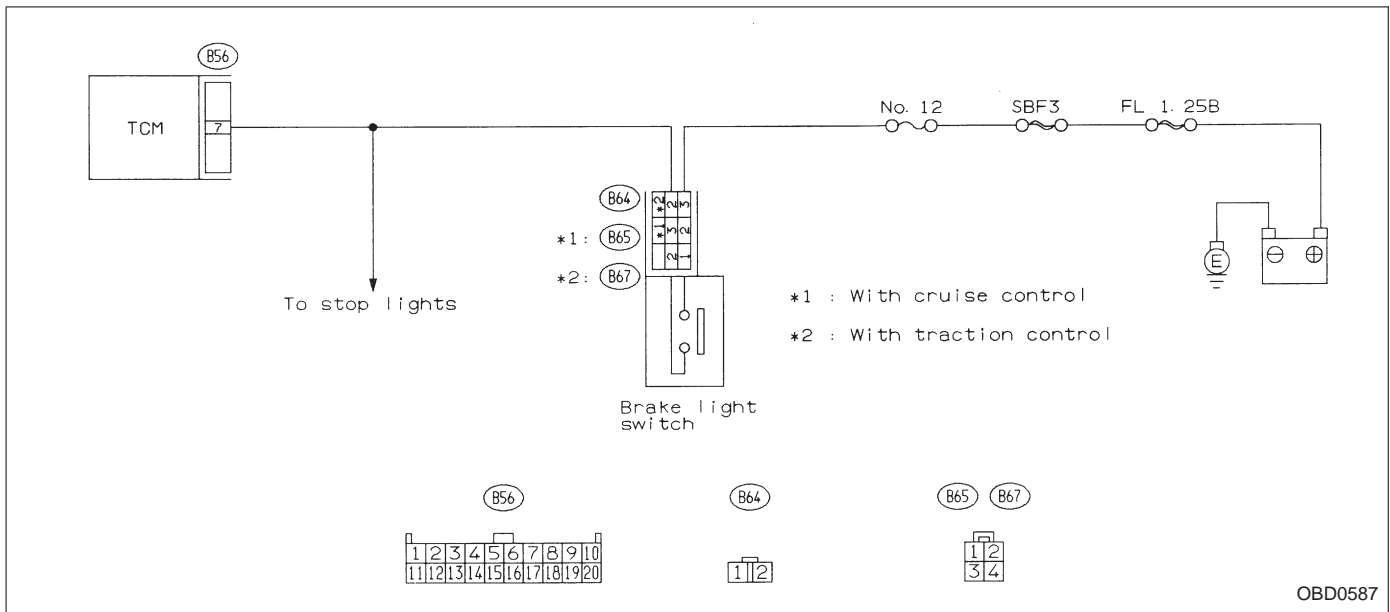
- Two consecutive trips with fault



CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

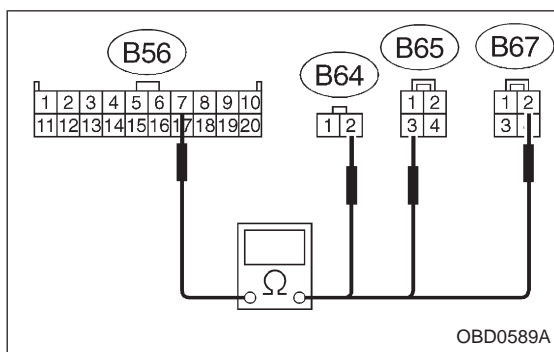


1 CHECK OPERATION OF BRAKE LIGHT.

CHECK : Depress brake pedal to ensure that brake light comes on.

YES : Go to step 2.

NO : Repair or replace brake light circuit.

**2 CHECK HARNESS CONNECTOR BETWEEN TCM AND BRAKE LIGHT SWITCH.**

1) Disconnect connectors from TCM and brake light switch.

2) Measure resistance of harness connector between TCM and brake light switch.

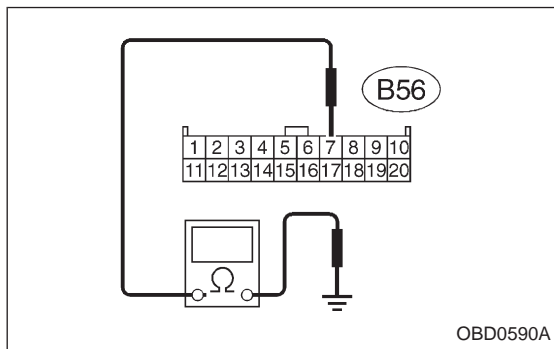
CHECK : **Connector & terminal**
 (B56) No. 7 — (B64) No. 2 / 1 Ω, or less
 (B56) No. 7 — (B65) No. 3 / 1 Ω, or less
 (With cruise control)
 (B56) No. 7 — (B67) No. 2 / 1 Ω, or less
 (With traction control)

YES : Go to next step.

NO : Repair or replace harness and connector.

NOTE:

In this case, there is a possibility of open circuit in the harness between the brake light switch connector and TCM connector.

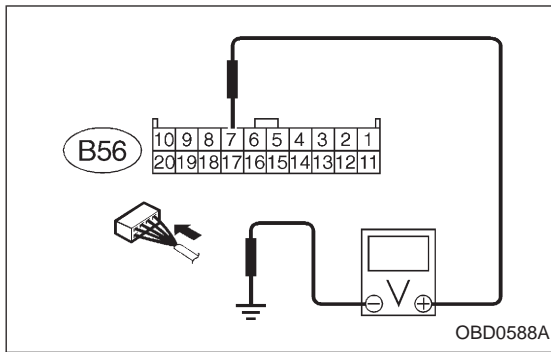


3) Measure resistance of harness connector between TCM and body.

CHECK : **Connector & terminal**
 (B56) No. 7 — Body / 1 MΩ, or more

YES : Go to step 3.

NO : Repair short circuit of harness between TCM connector and body.



3 CHECK INPUT SIGNAL FOR TCM.

- 1) Connect connectors to TCM and brake light switch.
- 2) Measure voltage between TCM and body.

CHECK : **Connector & terminal**
(B56) No. 7 — Body / 1 V, or less [When release the brake pedal.]
(B56) No. 7 — Body / 10 V, or more [When depress the brake pedal.]

YES : Go to next **CHECK** .

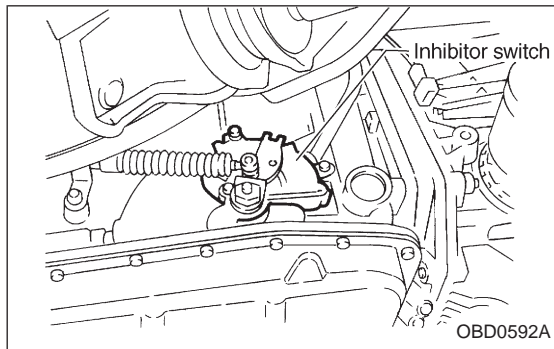
NO : Adjust or replace brake light switch.

CHECK : **Is there poor contact in TCM connector?**

YES : Repair poor contact in TCM connector.

NO : Replace TCM with a new one.

OBD	(FB1)
P0705	<RNG>
OBD0591	



AN: DTC P0705
— TRANSMISSION RANGE SENSOR CIRCUIT
MALFUNCTION (RNG) —

DESCRIPTION:

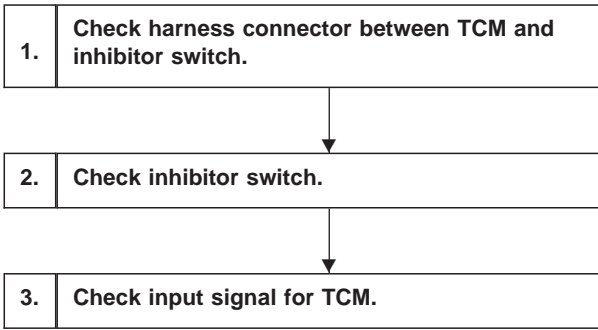
- The inhibitor switch assures safety when starting the engine. This switch is mounted on the right side of the transmission case, and is operated by the range selector lever.
- When the selector lever is set to “P” or “N”, the electrical circuit is connected in the inhibitor switch and the starter circuit is energized for cranking the engine.
- When the selector lever is set to “R”, “D”, “3”, “2”, or “1” range, the electrical circuit is disconnected in the inhibitor switch. Hence engine cranking is disabled. In the “R” range, the back-up light circuit is completed in the switch, and the back-up lights come on.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

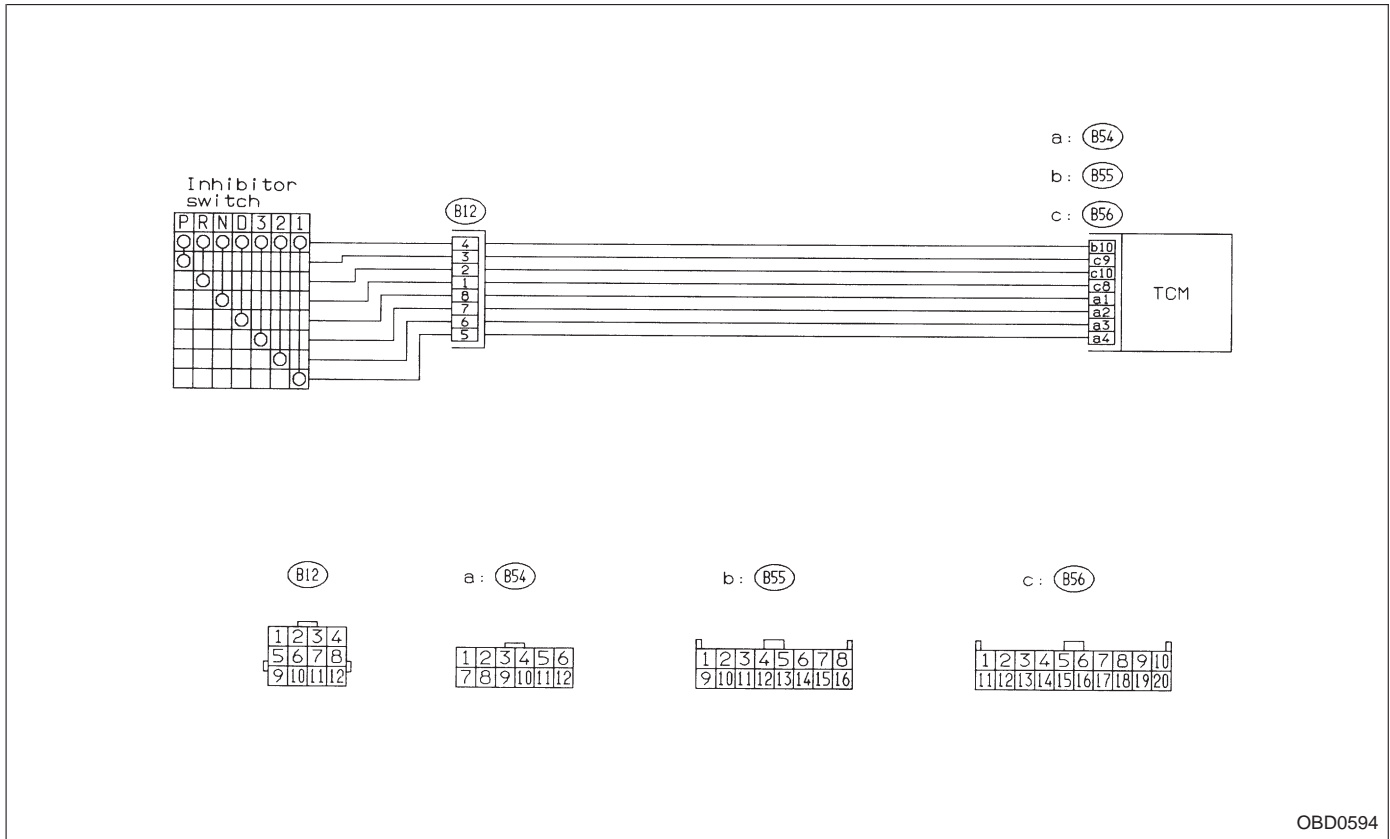
TROUBLE SYMPTOM:

- Starter does not rotate when selector lever is in “P” or “N” range.
- Starter rotates when selector lever is in “R”, “D”, “3”, “2” or “1” range.
- Engine brake is not effected when selector lever is in “3” range.
- Shift characteristics are erroneous.

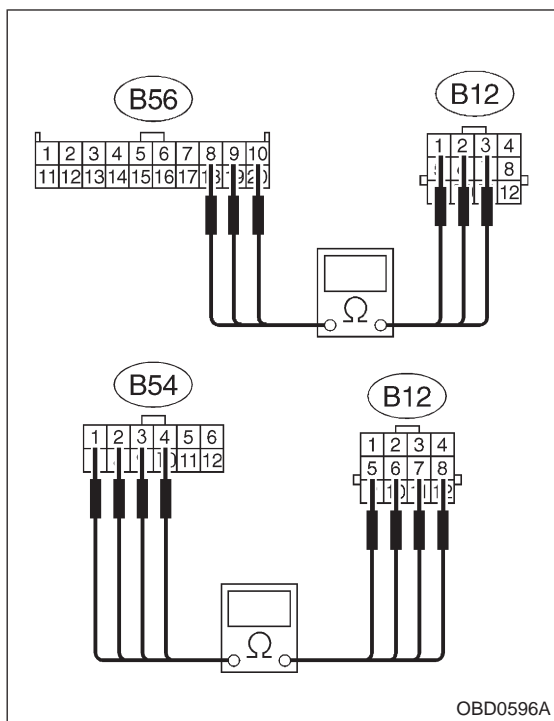


CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD0594



1

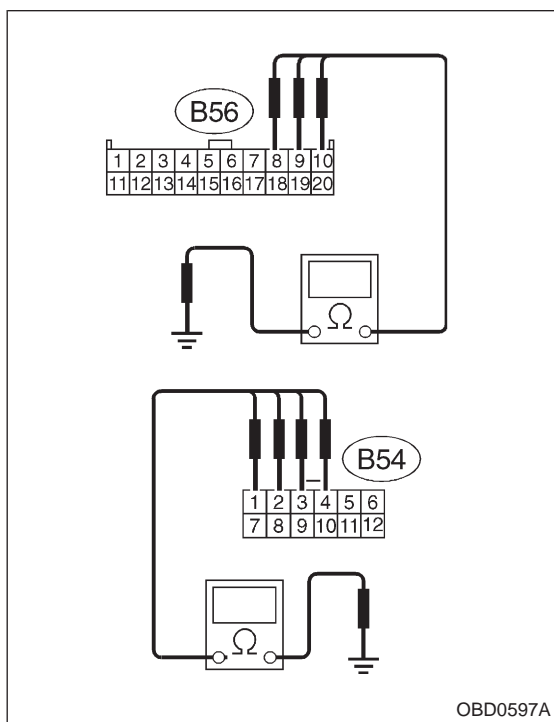
CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and transmission.
- 3) Measure resistance of harness connector between TCM and transmission.

CHECK : **Connector & terminal**
 (B56) No. 9 — (B12) No. 3 / 1 Ω, or less
 (B56) No. 10 — (B12) No. 2 / 1 Ω, or less
 (B56) No. 8 — (B12) No. 1 / 1 Ω, or less
 (B54) No. 1 — (B12) No. 8 / 1 Ω, or less
 (B54) No. 2 — (B12) No. 7 / 1 Ω, or less
 (B54) No. 3 — (B12) No. 6 / 1 Ω, or less
 (B54) No. 4 — (B12) No. 5 / 1 Ω, or less

NO : Repair open circuit of harness between TCM and transmission.

YES : Go to next step.

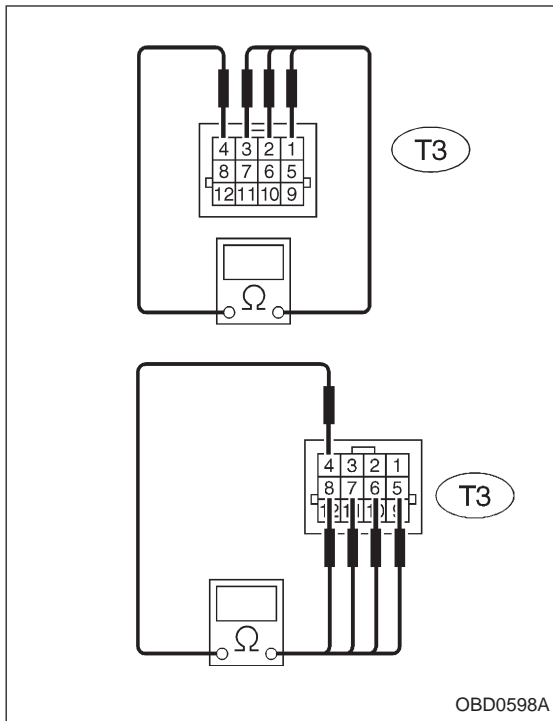


- 4) Measure resistance of harness connector between TCM and body.

CHECK : **Connector & terminal**
 (B56) No. 9 — Body / 1 MΩ, or more
 (B56) No. 10 — Body / 1 MΩ, or more
 (B56) No. 8 — Body / 1 MΩ, or more
 (B54) No. 1 — Body / 1 MΩ, or more
 (B54) No. 2 — Body / 1 MΩ, or more
 (B54) No. 3 — Body / 1 MΩ, or more
 (B54) No. 4 — Body / 1 MΩ, or more

YES : Go to step 2.

NO : Repair short circuit of harness between TCM and body.

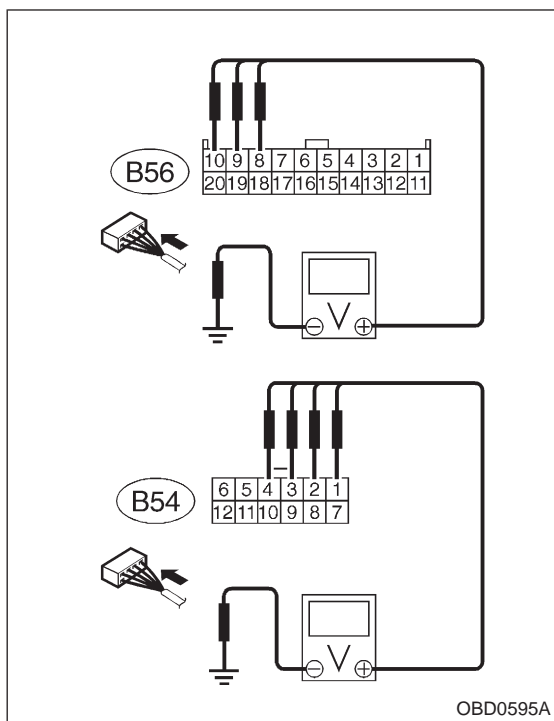


2 CHECK INHIBITOR SWITCH.

Measure resistance between transmission connector receptacle's terminals.

- CHECK** : **Connector & terminal**
 (T3) No. 3 — No. 4 / 1 Ω, or less ("P" position)
 (T3) No. 3 — No. 4 / 1 MΩ, or more (Other positions)
 (T3) No. 2 — No. 4 / 1 Ω, or less ("R" position)
 (T3) No. 2 — No. 4 / 1 MΩ, or more (Other positions)
 (T3) No. 1 — No. 4 / 1 Ω, or less ("N" position)
 (T3) No. 1 — No. 4 / 1 MΩ, or more (Other positions)
 (T3) No. 8 — No. 4 / 1 Ω, or less ("D" position)
 (T3) No. 8 — No. 4 / 1 MΩ, or more (Other positions)
 (T3) No. 7 — No. 4 / 1 Ω, or less ("3" position)
 (T3) No. 7 — No. 4 / 1 MΩ, or more (Other positions)
 (T3) No. 6 — No. 4 / 1 Ω, or less ("2" position)
 (T3) No. 6 — No. 4 / 1 MΩ, or more (Other positions)
 (T3) No. 5 — No. 4 / 1 Ω, or less ("1" position)
 (T3) No. 5 — No. 4 / 1 MΩ, or more (Other positions)

- YES** : Go to step 3.
- NO** : Go to next **CHECK** .
- CHECK** : **Is there faulty connection in the selector cable?**
- YES** : Repair connection of selector cable.
- NO** : Replace inhibitor switch.



3 CHECK INPUT SIGNAL FOR TCM.

- 1) Turn ignition switch to OFF.
- 2) Connect connector to TCM and transmission.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between TCM and body.

CHECK : **Connector & terminal**

(B56) No. 9 — Body / 1 V, or less (“P” and “N” positions)
(B56) No. 9 — Body / 8 V, or more (Other positions)
(B56) No. 10 — Body / 1 V, or less (“R” position)
(B56) No. 10 — Body / 6 V, or more (Other positions)
(B56) No. 8 — Body / 1 V, or less (“N” and “P” positions)
(B56) No. 8 — Body / 8 V, or more (Other positions)
(B54) No. 1 — Body / 1 V, or less (“D” position)
(B54) No. 1 — Body / 6 V, or more (Other positions)
(B54) No. 2 — Body / 1 V, or less (“3” position)
(B54) No. 2 — Body / 6 V, or more (Other positions)
(B54) No. 3 — Body / 1 V, or less (“2” position)
(B54) No. 3 — Body / 6 V, or more (Other positions)
(B54) No. 4 — Body / 1 V, or less (“1” position)
(B54) No. 4 — Body / 6 V, or more (Other positions)

YES : Repair poor contact in TCM connector.

NO : Go to next **CHECK** .

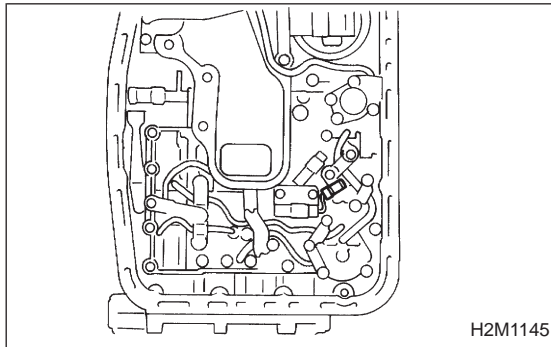
CHECK : **Is there poor contact in TCM connector?**

YES : Repair poor contact in TCM connector.

NO : Replace TCM with a new one.



AO: DTC P0710
— TRANSMISSION FLUID TEMPERATURE
SENSOR CIRCUIT MALFUNCTION (ATF) —



DESCRIPTION:

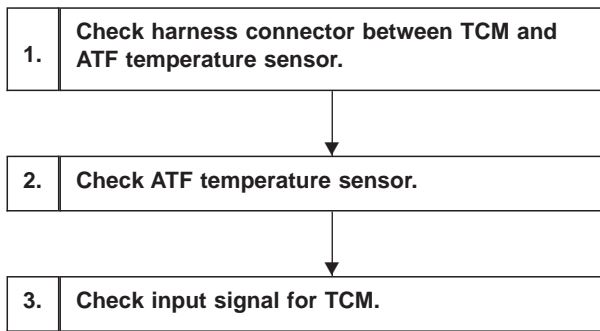
This sensor is mounted to the control valve in the transmission. It detects temperature change as an analog electrical signal. The output characteristics of the sensor are shown in the illustration.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

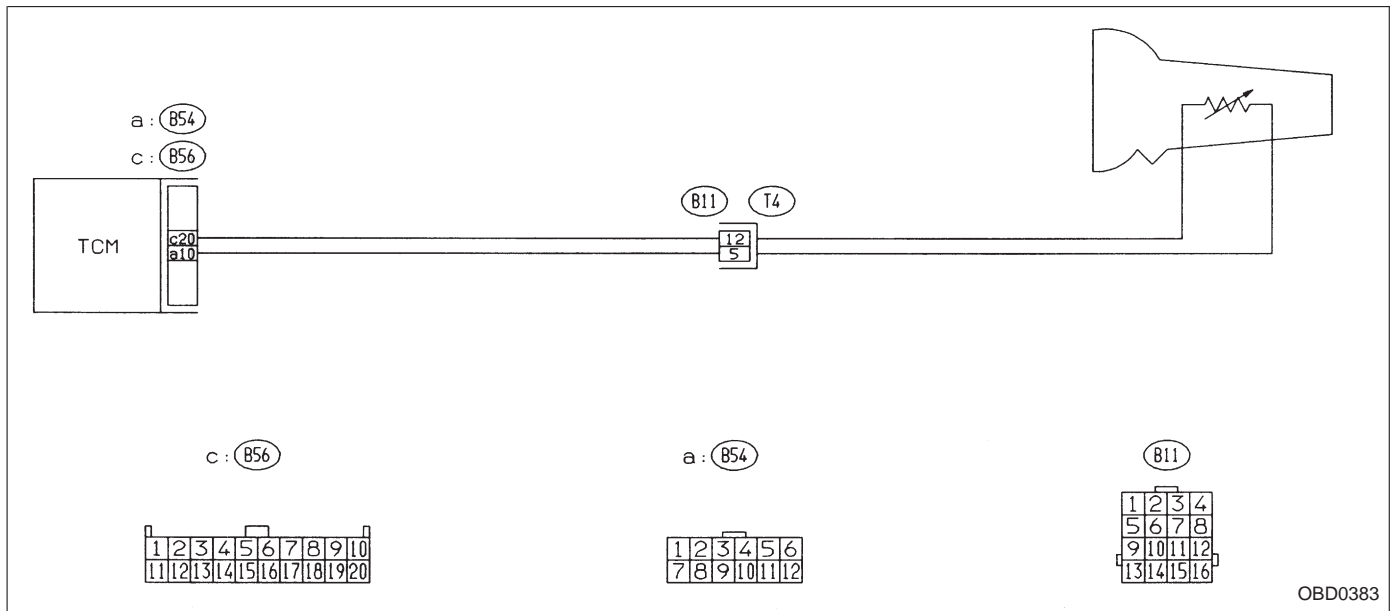
TROUBLE SYMPTOM:

- No shift up to 4th speed (after engine warm-up)
- No lock-up occurs. (after engine warm-up)
- Excessive shift shock



CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD0383

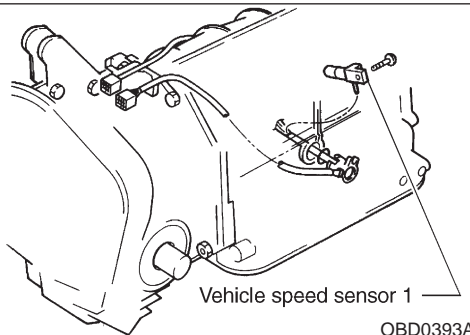
NOTE:
 For the diagnostic procedure on transmission fluid temperature sensor circuit, refer to "3-2 [T7G0]".

OBD (FB1)

P0720 <ATVSP>

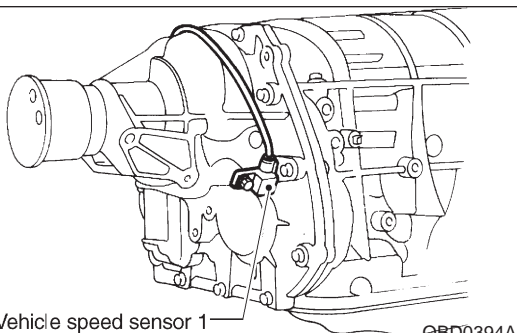
OBD0392

AP: DTC P0720
— OUTPUT SPEED SENSOR (VEHICLE SPEED SENSOR 1) CIRCUIT MALFUNCTION (ATVSP) —



DESCRIPTION:
[FWD model]

- The vehicle speed sensor 1 is mounted to the transmission case (at the rear side of the case). The sensor outputs a pulse signal which is transmitted to the TCM where it is converted to vehicle speed.
- Vehicle speed sensor 1 on FWD model detects front-wheel speed.



[AWD]

- The vehicle speed sensor 1 (output shaft rotation sensor) is mounted to the extension case (from the outside of the case). The sensor outputs a pulse signal which is transmitted to the TCM where it is converted to vehicle speed.
- The transfer clutch drum is connected directly to the rear wheel driving propeller shaft. Vehicle speed sensor 1 on the AWD model detects rear-wheel speed.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

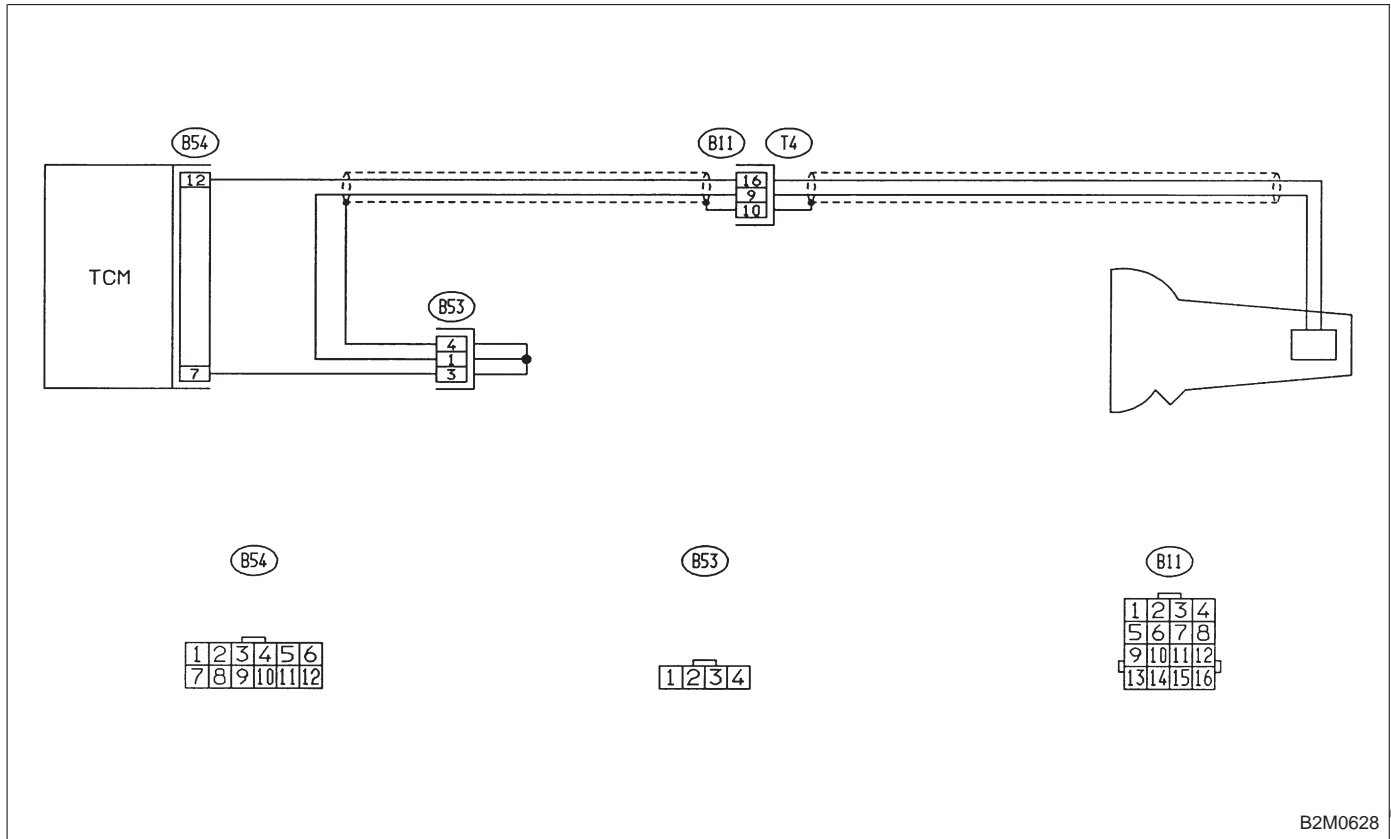
TROUBLE SYMPTOM:

- No shift or excessive tight corner “braking”

1. Check harness connector between TCM and vehicle speed sensor 1.
2. Check vehicle speed sensor 1.
3. Check input signal for TCM.

CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



B2M0628

NOTE:
 For the diagnostic procedure on vehicle speed sensor 1 circuit, refer to "3-2 [T7M0]".

OBD	(FB1)
P0725	<ATNE>
OBD0404	

AQ: DTC P0725
— ENGINE SPEED INPUT CIRCUIT
MALFUNCTION (ATNE) —

DESCRIPTION:

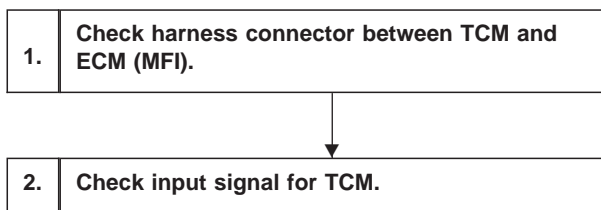
The engine speed signal is sent to TCM from ECM. This signal is used for lock-up clutch control and line pressure control.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

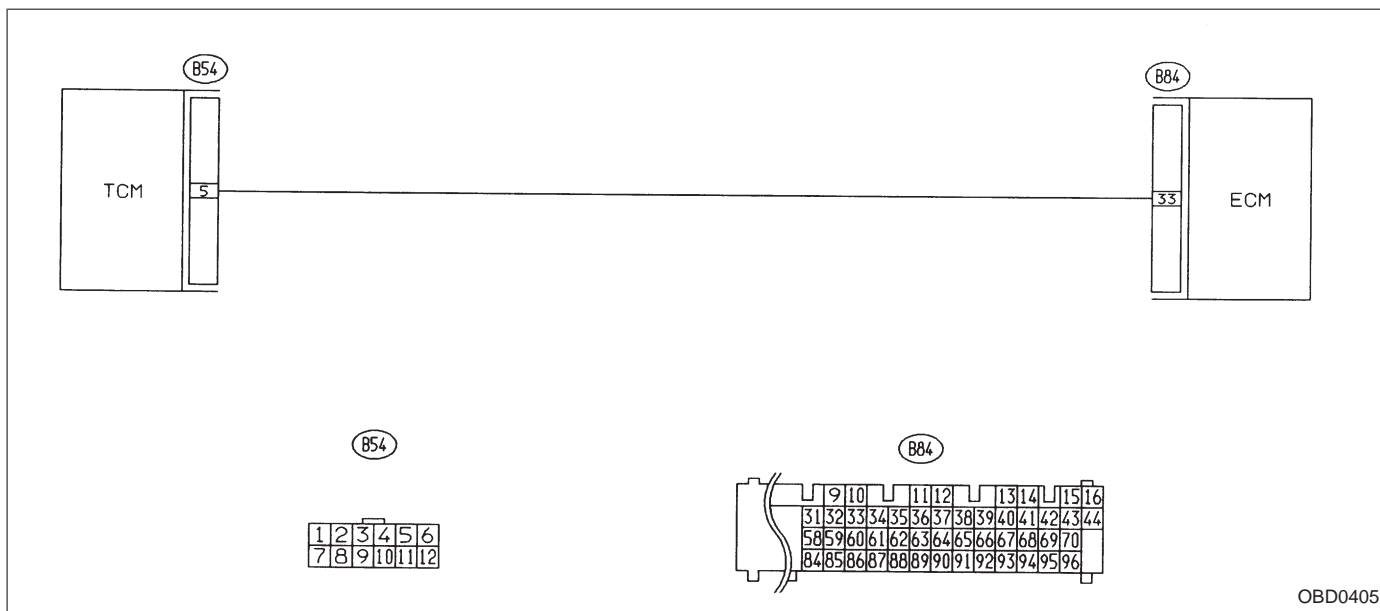
TROUBLE SYMPTOM:

- No lock-up occurs. (after engine warm-up)
- AT diagnostic indicator light (AT OIL TEMP indicator light) remains on when vehicle speed is "0".



CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD0405

NOTE:
 For the diagnostic procedure on engine speed input circuit, refer to "3-2 [T710]".

OBD (FB1)
 P0731 <GR_1>
 OBD0599

AR: DTC P0731
— GEAR 1 INCORRECT RATIO (GR – 1) —

OBD (FB1)
 P0732 <GR_2>
 OBD0600

AS: DTC P0732
— GEAR 2 INCORRECT RATIO (GR – 2) —

OBD (FB1)
 P0733 <GR_3>
 OBD0601

AT: DTC P0733
— GEAR 3 INCORRECT RATIO (GR – 3) —

OBD (FB1)
 P0734 <GR_4>
 OBD0602

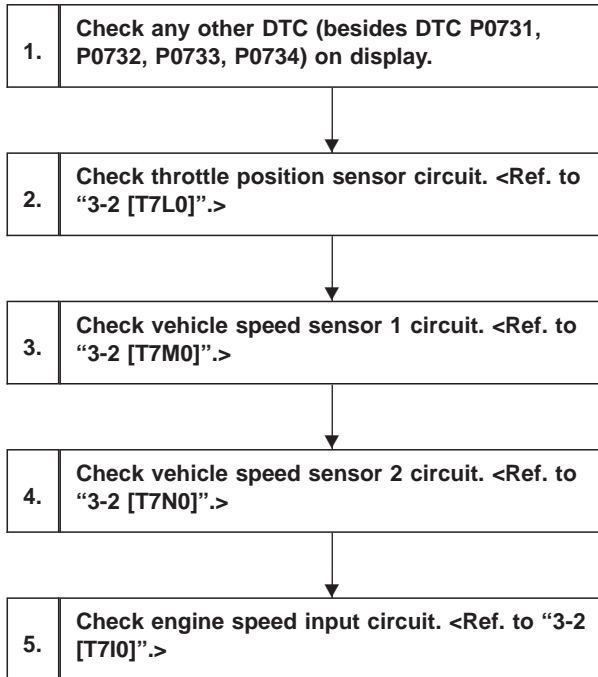
AU: DTC P0734
— GEAR 4 INCORRECT RATIO (GR – 4) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

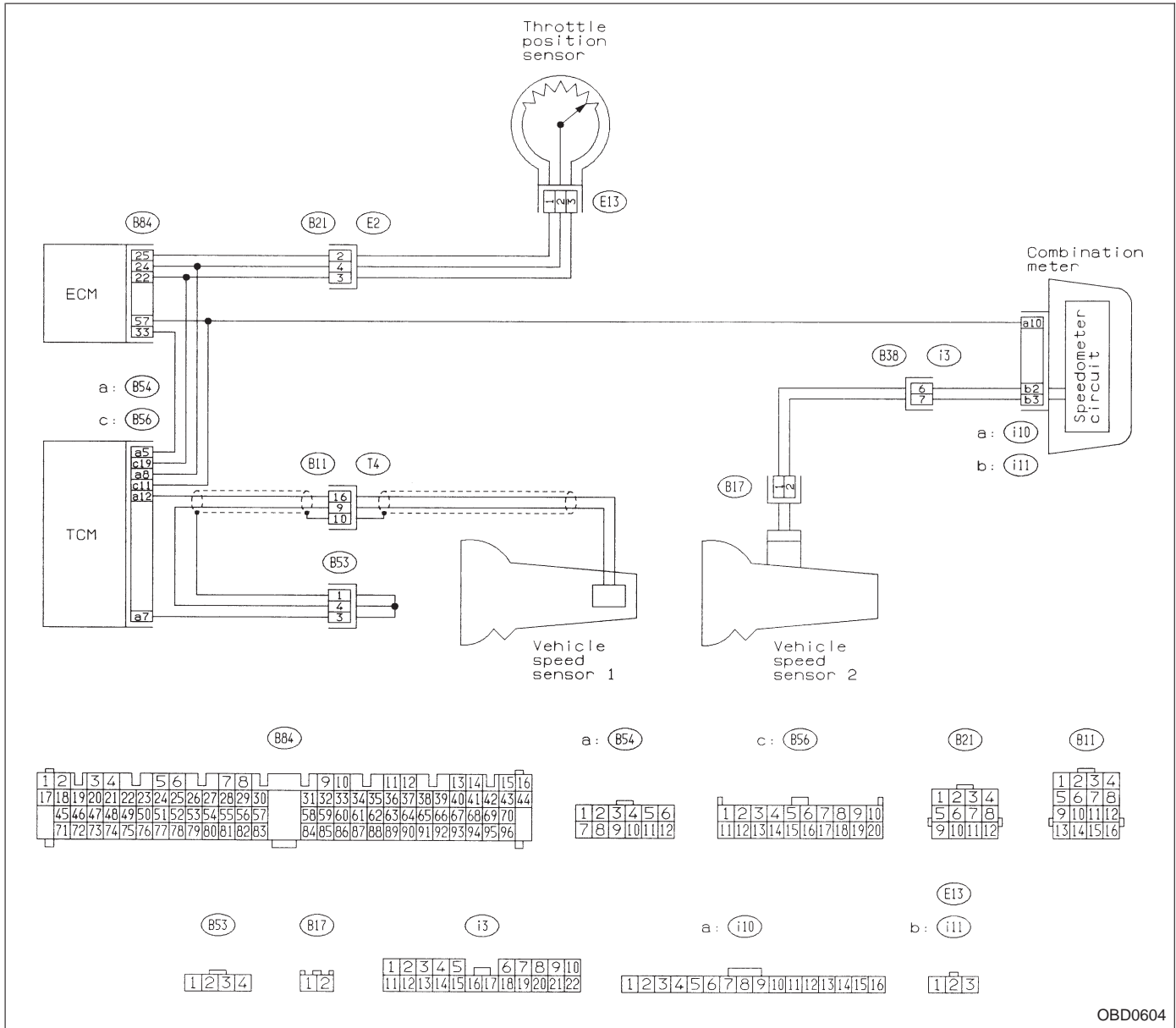
TROUBLE SYMPTOM:

- Shift point too high or too low; engine brake not effected in “3” range; excessive shift shock; excessive tight corner “braking”

**CAUTION:**

After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD0604

1 CHECK ANY OTHER DTC (BESIDES DTC P0731, P0732, P0733, P0734) ON DISPLAY.

- CHECK** : Is there any other DTC on display?
- YES** : Inspect relevant DTC using "11. Diagnostics Chart with Trouble Code".
- NO** : Go to step 2.

2 CHECK THROTTLE POSITION SENSOR CIRCUIT.

CHECK : *Is there any trouble in throttle position sensor circuit?*

YES : Repair or replace throttle position sensor circuit.

NO : Go to step 3.

3 CHECK VEHICLE SPEED SENSOR 1 CIRCUIT.

CHECK : *Is there any trouble in vehicle speed sensor 1 circuit?*

YES : Repair or replace vehicle speed sensor 1 circuit.

NO : Go to step 4.

4 CHECK VEHICLE SPEED SENSOR 2 CIRCUIT.

CHECK : *Is there any trouble in vehicle speed sensor 2 circuit?*

YES : Repair or replace vehicle speed sensor 2 circuit.

NO : Go to step 5.

5 CHECK ENGINE SPEED INPUT CIRCUIT.

CHECK : *Is there any trouble in engine speed input circuit?*

YES : Repair or replace engine speed input circuit.

NO : Go to next **CHECK** .

CHECK : *Is there poor contact in TCM connector?*

YES : Repair poor contact in TCM connector.

NO : Go to next **CHECK** .

CHECK : *Is there any mechanical trouble in automatic transmission?*

YES : Repair or replace automatic transmission.

NO : Replace TCM with a new one.

OBD	(FB1)
P0740	<LU_F>
OBD0605	

AV: DTC P0740
— TORQUE CONVERTER CLUTCH SYSTEM
MALFUNCTION (LU – F) —

DESCRIPTION:

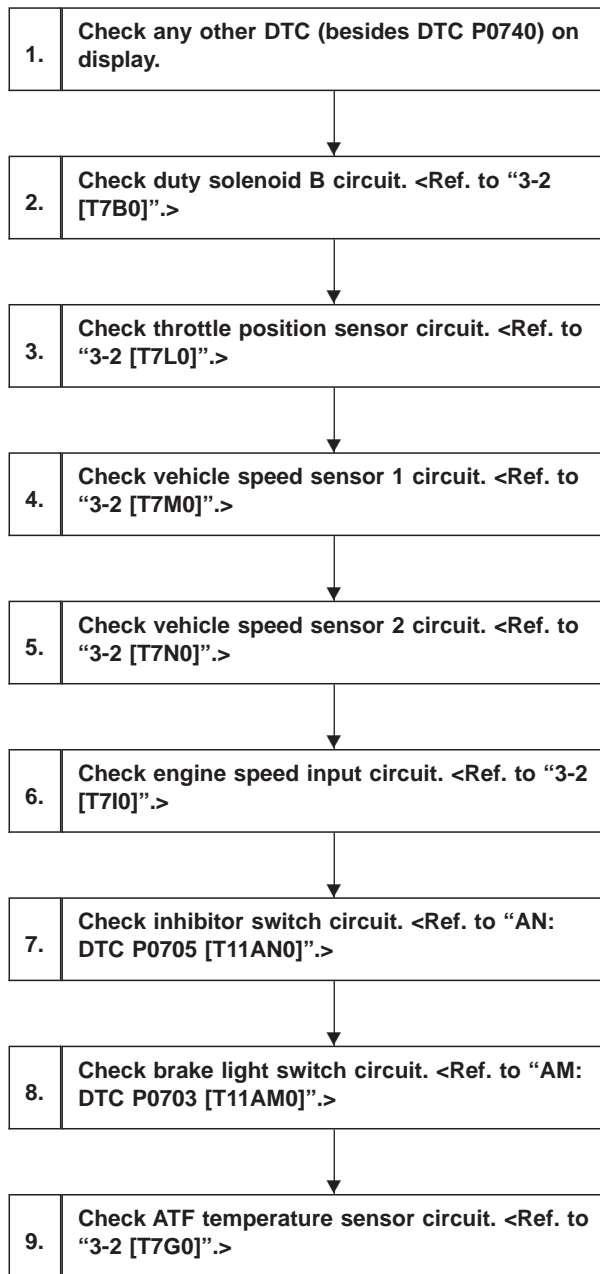
The lock-up engaging and disengaging conditions are set for each gear shift range, gear position and shift pattern and correspond to the throttle position and vehicle speed, and the duty solenoid is electronically controlled by TCM controls the lock-up clutch. The lock-up clutch engagement and disengagement are controlled by the lock-up control valve.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

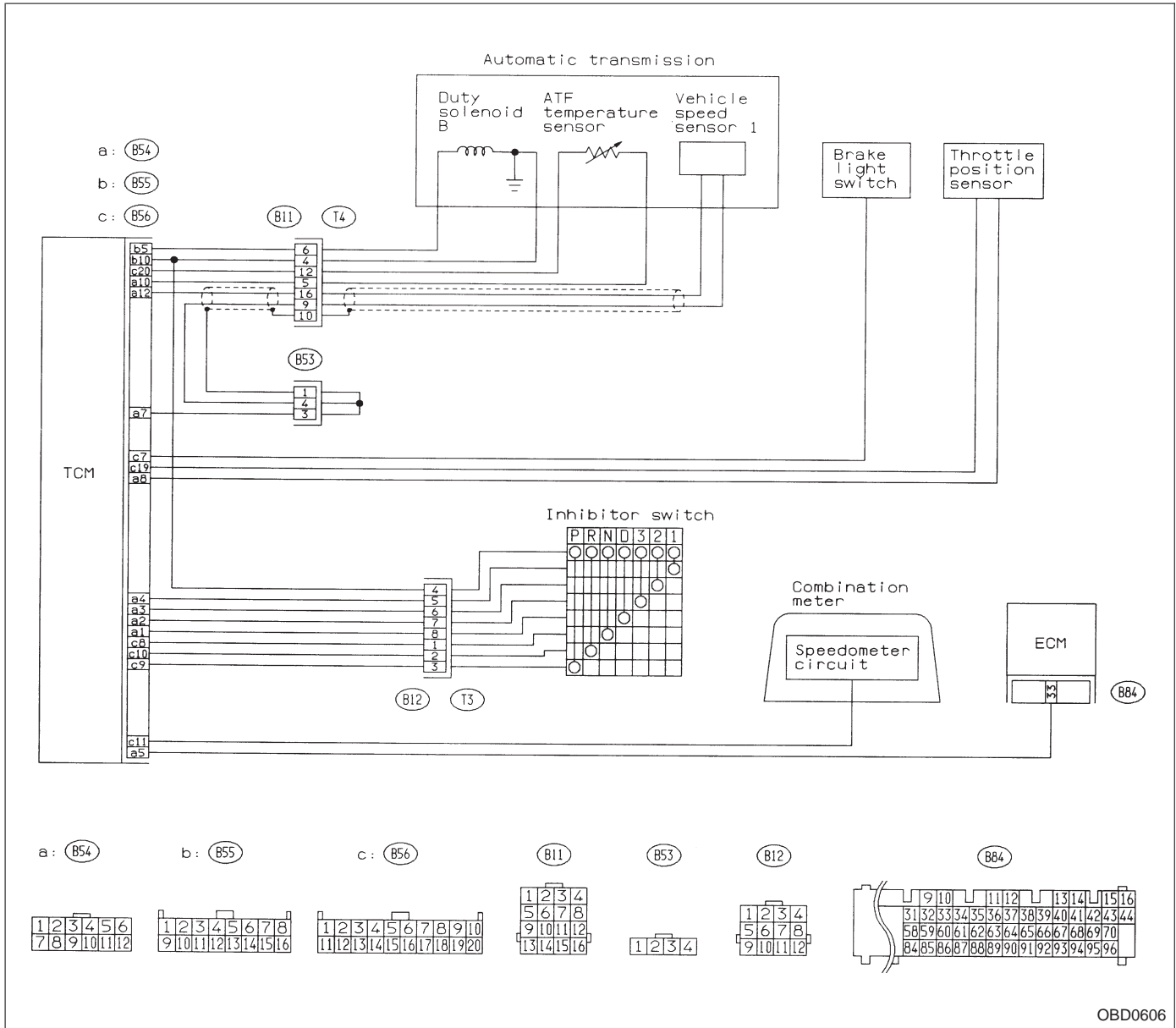
TROUBLE SYMPTOM:

- No lock-up occurs. (after engine warm-up)
- No shift or excessive tight corner “braking”

**CAUTION:**

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD0606

1 CHECK ANY OTHER DTC (BESIDES DTC P0740) ON DISPLAY.

- CHECK** : Is there any other DTC on display?
- YES** : Inspect the relevant DTC using "11. Diagnostics Chart with Trouble Code".
- NO** : Go to step 2.

2 CHECK DUTY SOLENOID B CIRCUIT.

CHECK : *Is there any trouble in duty solenoid B circuit?*

YES : Repair or replace duty solenoid B circuit.

NO : Go to step 3.

3 CHECK THROTTLE POSITION SENSOR CIRCUIT.

CHECK : *Is there any trouble in throttle position sensor circuit?*

YES : Repair or replace throttle position sensor circuit.

NO : Go to step 4.

4 CHECK VEHICLE SPEED SENSOR 1 CIRCUIT.

CHECK : *Is there any trouble in vehicle speed sensor 1 circuit?*

YES : Repair or replace vehicle speed sensor 1 circuit.

NO : Go to step 5.

5 CHECK VEHICLE SPEED SENSOR 2 CIRCUIT.

CHECK : *Is there any trouble in vehicle speed sensor 2 circuit?*

YES : Repair or replace vehicle speed sensor 2 circuit.

NO : Go to step 6.

6 CHECK ENGINE SPEED INPUT CIRCUIT.

CHECK : *Is there any trouble in engine speed input circuit?*

YES : Repair or replace engine speed input circuit.

NO : Go to step 7.

7 CHECK INHIBITOR SWITCH CIRCUIT.

CHECK : *Is there any trouble in inhibitor switch circuit?*

YES : Repair or replace inhibitor switch circuit.

NO : Go to step 8.

8 CHECK BRAKE LIGHT SWITCH CIRCUIT.

CHECK : *Is there any trouble in brake light switch circuit?*

YES : Repair or replace brake light switch circuit.

NO : Go to step 9.

9 CHECK ATF TEMPERATURE SENSOR CIRCUIT.

CHECK : *Is there any trouble in ATF temperature sensor circuit?*

YES : Repair or replace ATF temperature sensor circuit.

NO : Go to next **CHECK** .

CHECK : *Is there poor contact in TCM connector?*

YES : Repair poor contact in TCM connector.

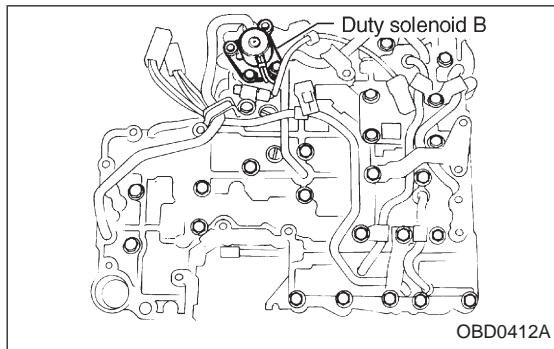
NO : Go to next **CHECK** .

CHECK : *Is there any mechanical trouble in automatic transmission?*

YES : Repair or replace automatic transmission.

NO : Replace TCM with a new one.

OBD	(FB1)
P0743	<LU>
OBD0411	



AW: DTC P0743
— TORQUE CONVERTER CLUTCH SYSTEM
(DUTY SOLENOID B) ELECTRICAL (LU) —

DESCRIPTION:

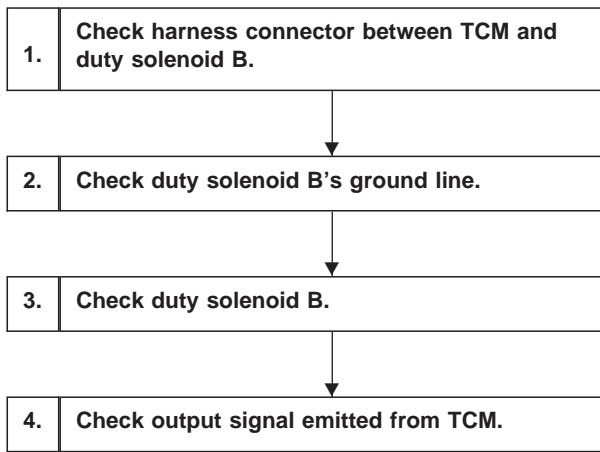
- This solenoid is mounted to the control valve, and its duty ratio is controlled by the signal sent from TCM. It then controls the lock-up control valve to provide smooth engagement and disengagement of the lock-up clutch.
- Regulates the hydraulic pressure of the lock-up clutch and operates in three modes (open, smooth and lock-up).

DTC DETECTING CONDITION:

- Two consecutive trips with fault

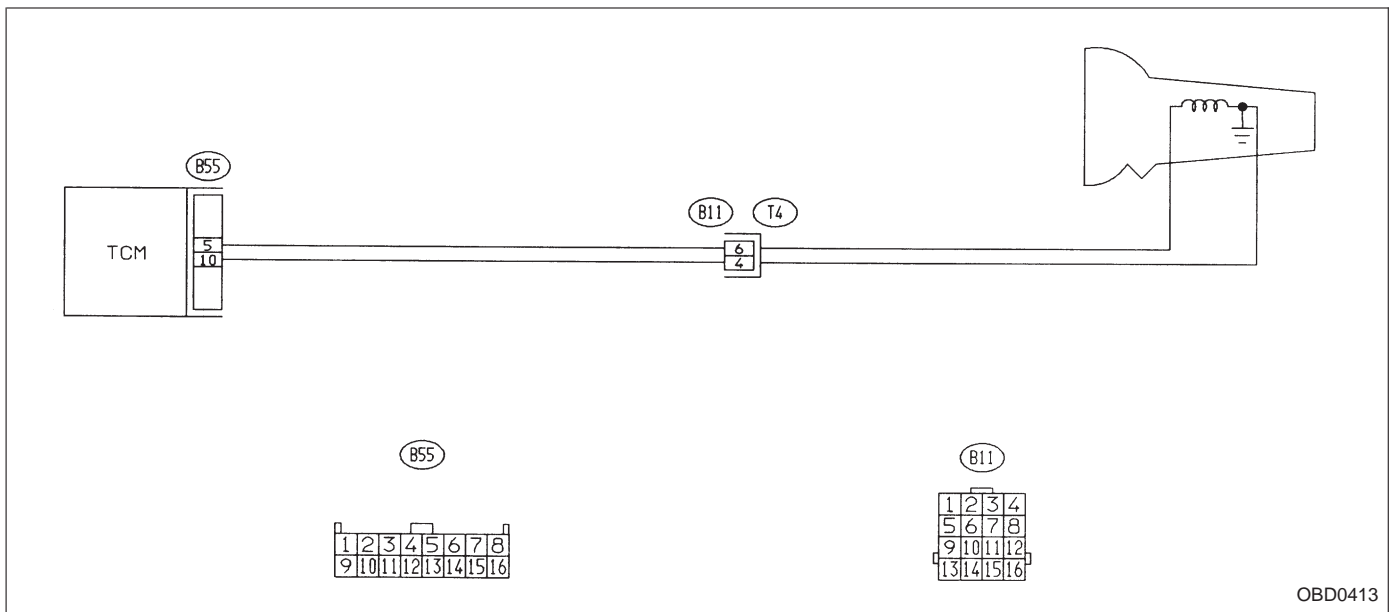
TROUBLE SYMPTOM:

- No “locking-up” (after engine warm-up)



CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

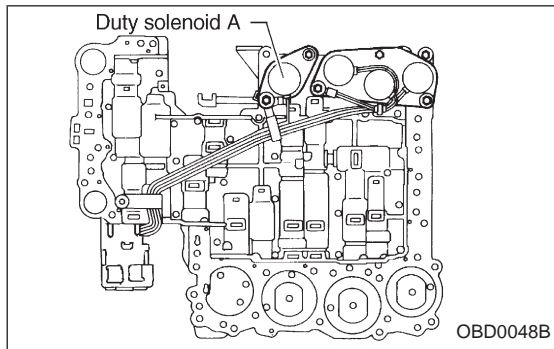
WIRING DIAGRAM:



OBD0413

NOTE:
 For the diagnostic procedure on duty solenoid B circuit, refer to “3-2 [T7B0]”.

OBD	(FB1)
P0748	<PL>
OBD0422	

**AX: DTC P0748****— PRESSURE CONTROL SOLENOID (DUTY SOLENOID A) ELECTRICAL (PL) —****DESCRIPTION:**

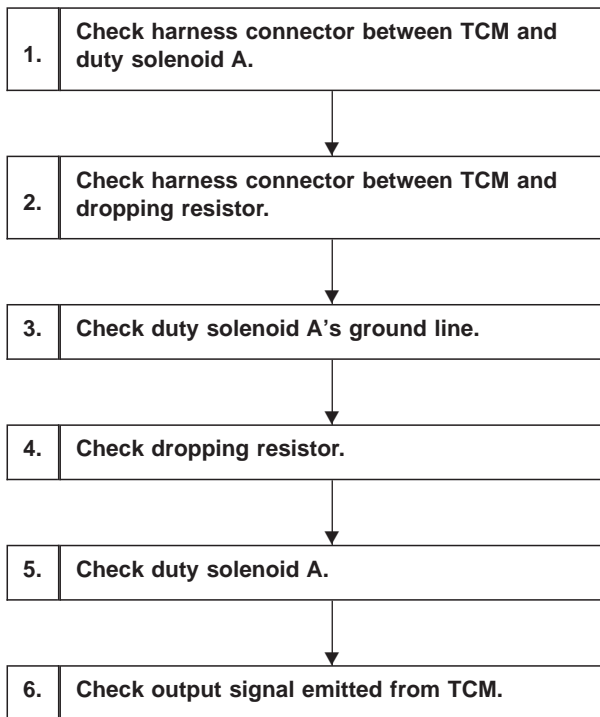
- This solenoid is mounted to the control valve, and its duty ratio is controlled by the signal sent from TCM. This solenoid then controls the pressure modifier valve and pressure regulator valve to adjust the line pressure to an optimum pressure level suitable for operating conditions.
- Regulates the line pressure according to driving conditions.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

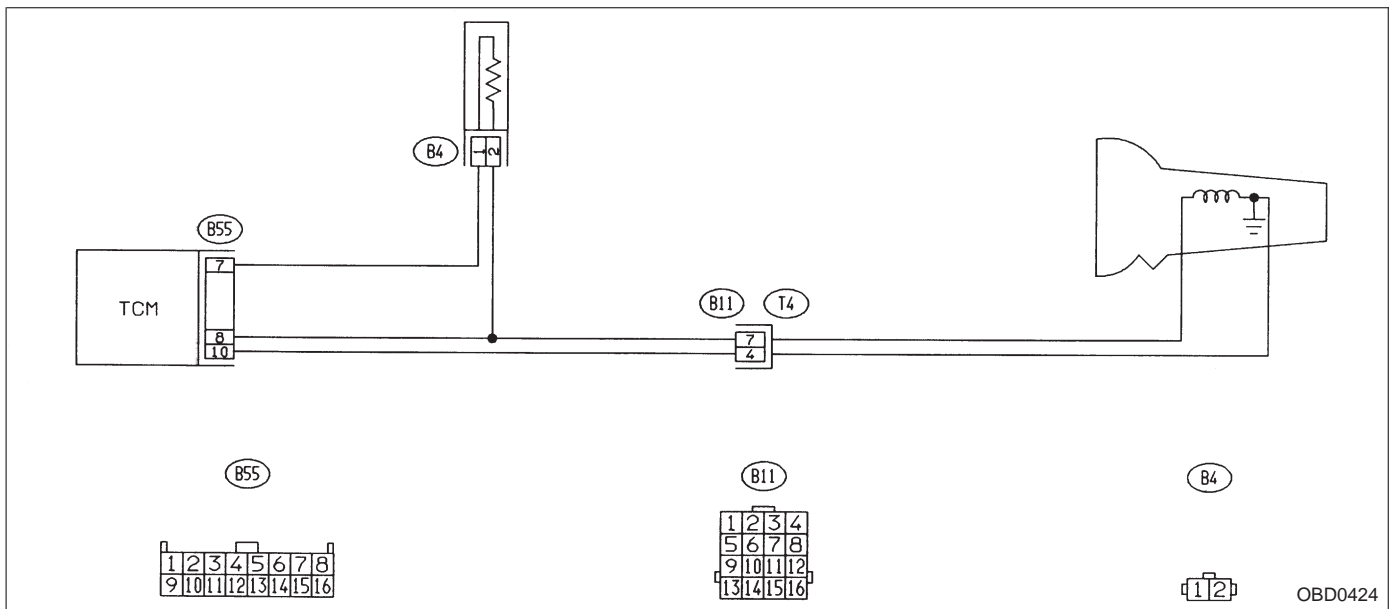
- Excessive shift shock



CAUTION:

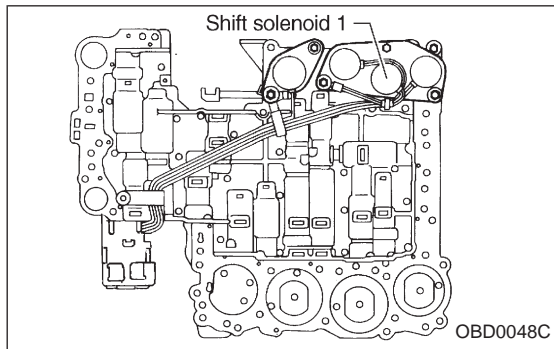
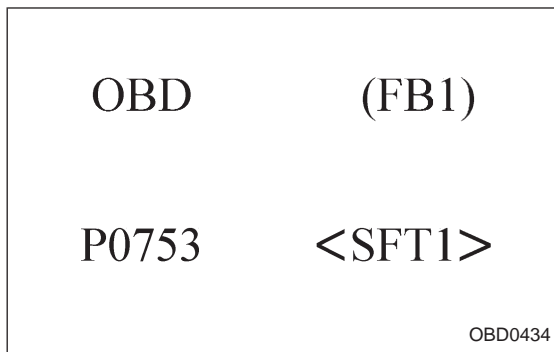
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



NOTE:

For the diagnostic procedure on duty solenoid A circuit, refer to "3-2 [T7A0]".



AY: DTC P0753
— SHIFT SOLENOID A (SHIFT SOLENOID 1)
ELECTRICAL (SFT1) —

DESCRIPTION:

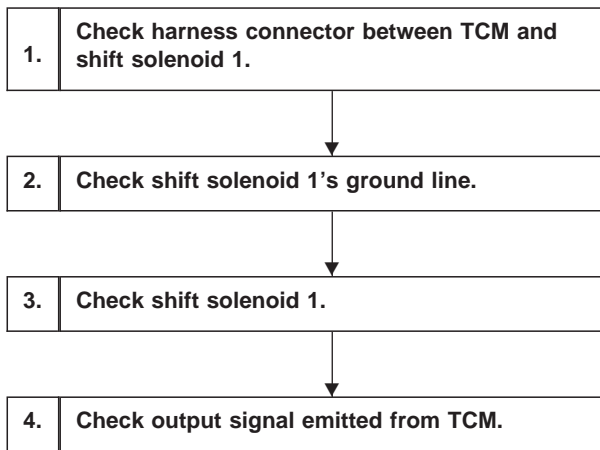
- These solenoids are mounted to the control valve. They are turned ON or OFF according to signals sent from the TCM. The gear positions are changed according to the ON and OFF condition of these solenoids.
- Controls shift stage by turning solenoid ON/OFF. Relationship between solenoid operation and shifting stage is shown in table below. When shifting, timing is controlled for each solenoid to reduce shock.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

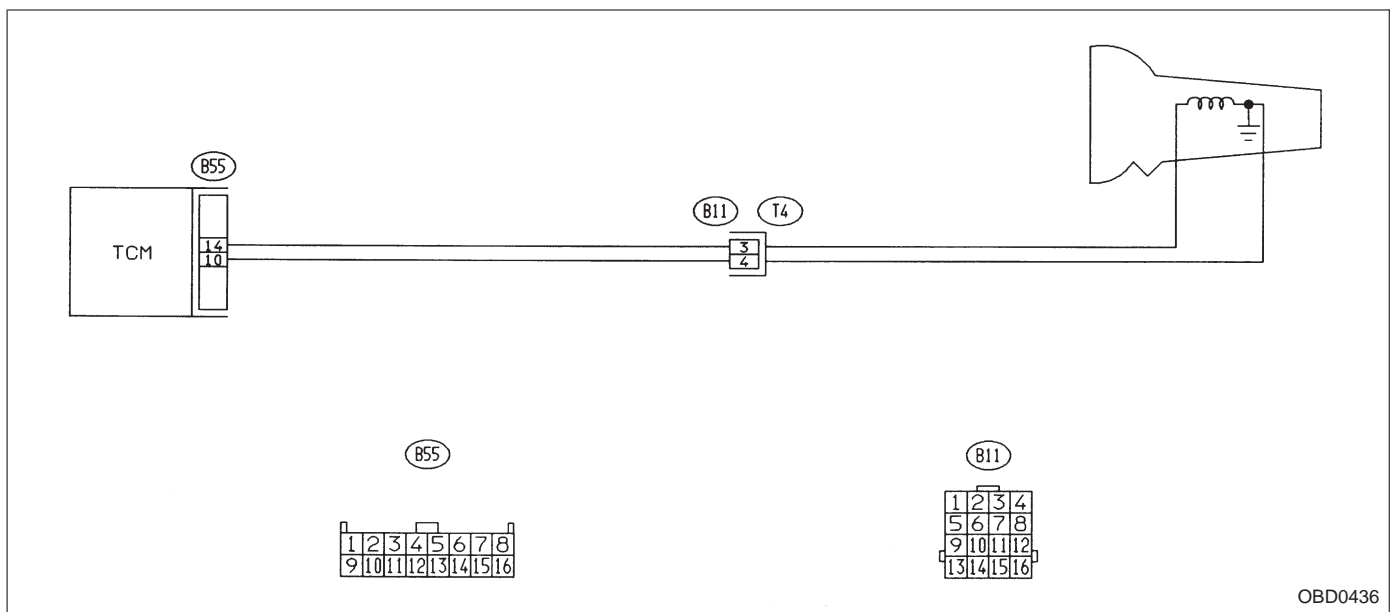
TROUBLE SYMPTOM:

- No shift



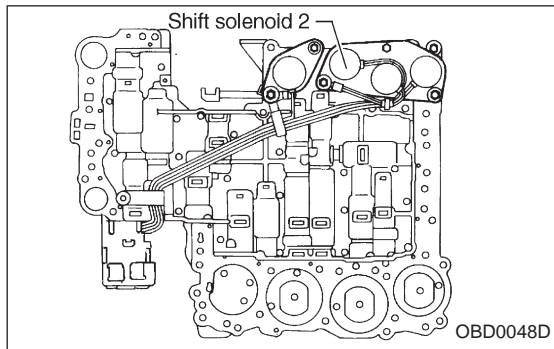
CAUTION:
 After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD0436

NOTE:
 For the diagnostic procedure on shift solenoid 1 circuit, refer to “3-2 [T7E0]”.



AZ: DTC P0758
— SHIFT SOLENOID B (SHIFT SOLENOID 2)
ELECTRICAL (SFT2) —

DESCRIPTION:

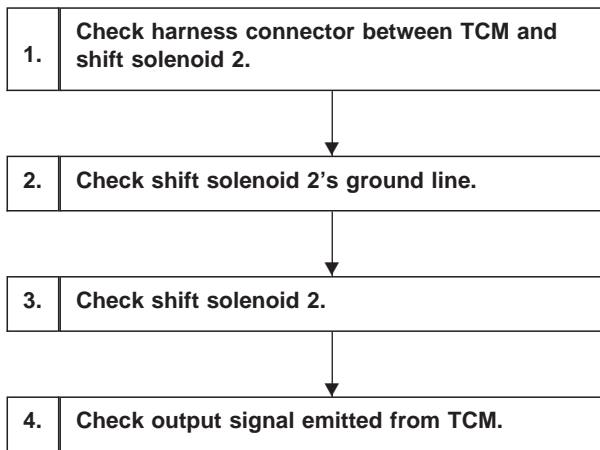
- These solenoids are mounted to the control valve. They are turned ON or OFF according to signals sent from the TCM. The gear positions are changed according to the ON and OFF condition of these solenoids.
- Controls shift stage by turning solenoid ON/OFF. Relationship between solenoid operation and shifting stage is shown in table below. When shifting, timing is controlled for each solenoid to reduce shock.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

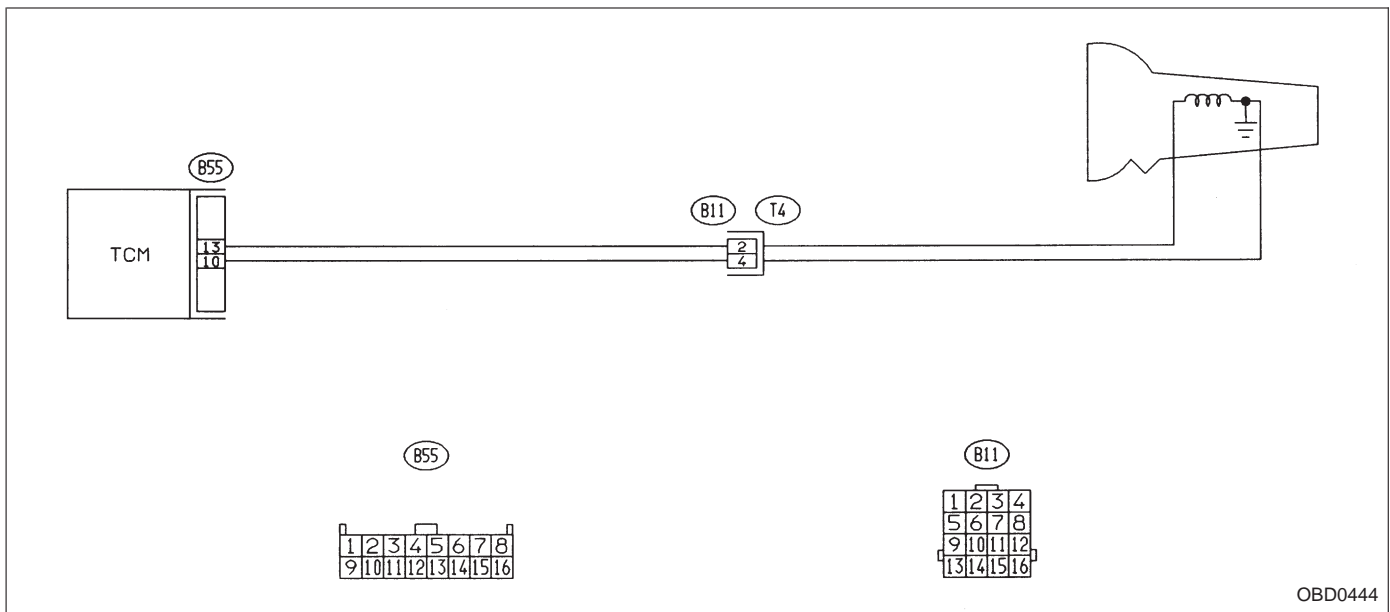
TROUBLE SYMPTOM:

- No shift



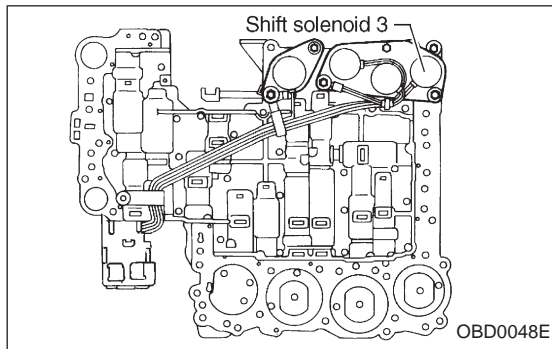
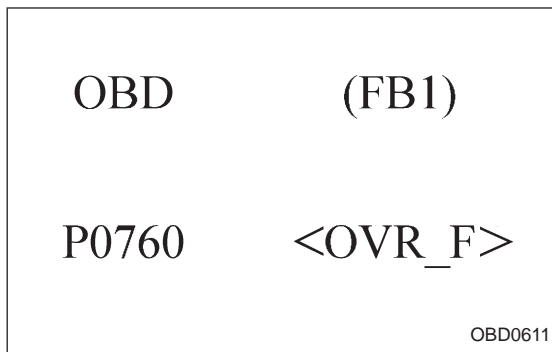
CAUTION:
 After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD0444

NOTE:
 For the diagnostic procedure on shift solenoid 2 circuit, refer to “3-2 [T7D0]”.



BA: DTC P0760
— SHIFT SOLENOID C (SHIFT SOLENOID 3)
MALFUNCTION (OVR — F) —

DESCRIPTION:

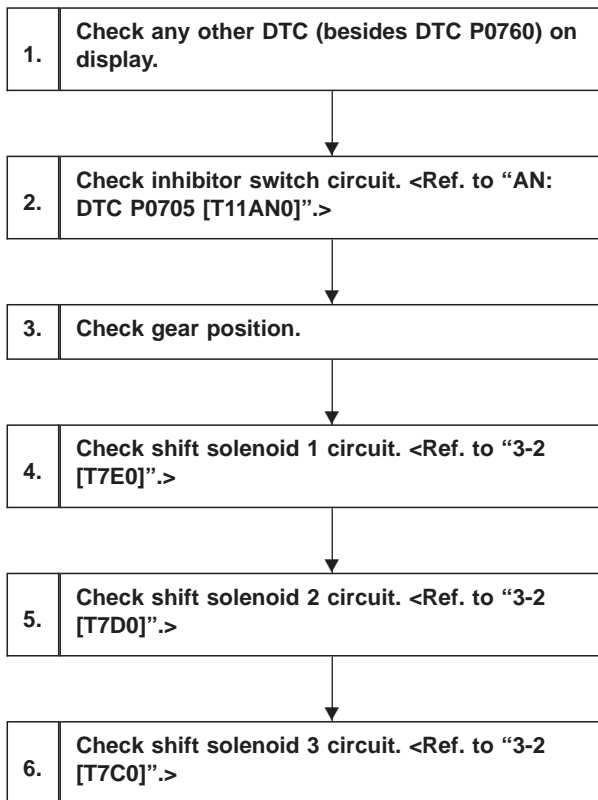
- This solenoid is also mounted to the control valve. It is turned ON or OFF according to the signal sent from the TCM. This operation controls the engagement and disengagement of the overrunning clutch.
- Controls 3-2 shift timing and overrunning clutch operation. Shift timing is controlled by controlling release speed of oil pressure to reduce shock while down shifting. The overrunning clutch is controlled so that it will operate during coasting to apply engine brake.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

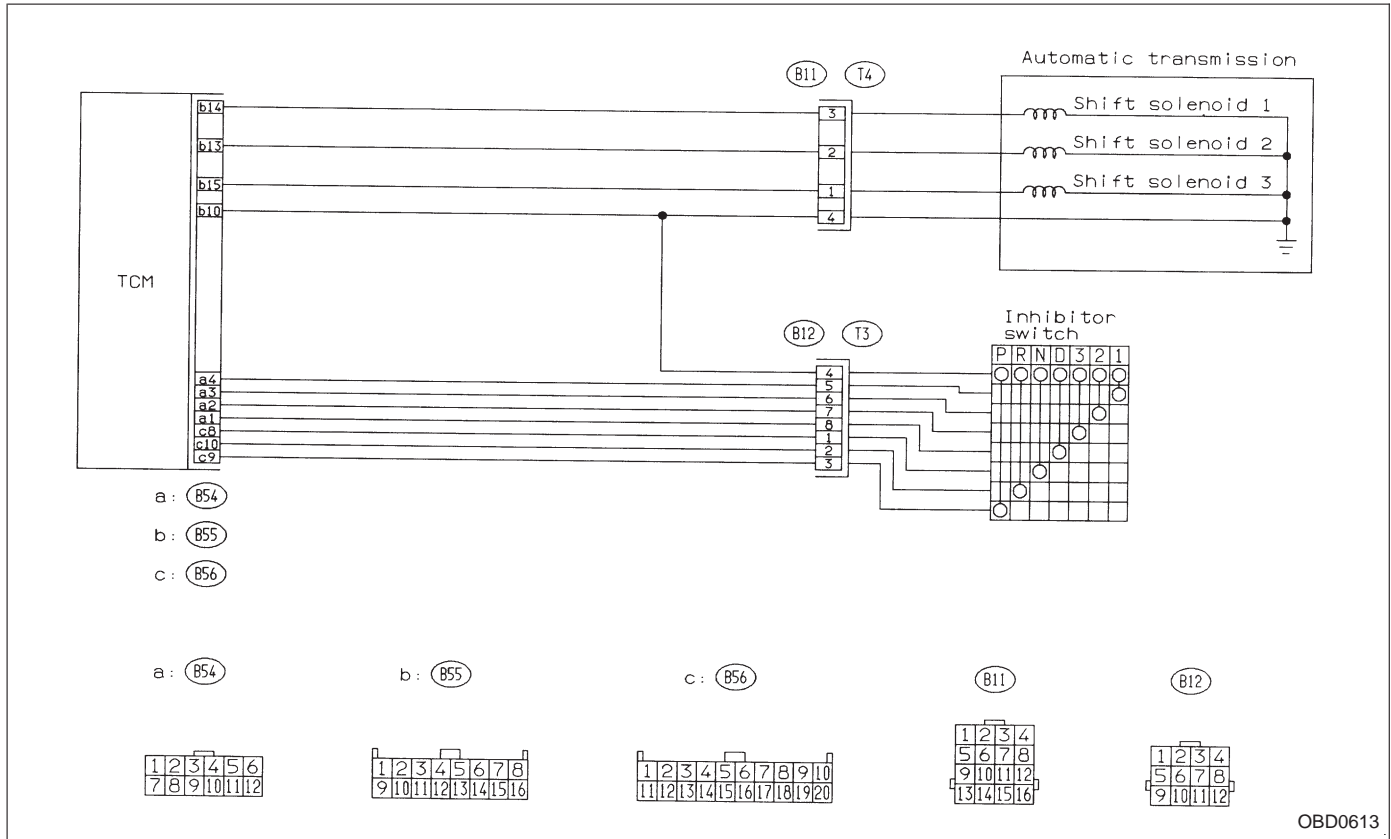
TROUBLE SYMPTOM:

- Ineffective engine brake with selector lever in “3”

**CAUTION:**

After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

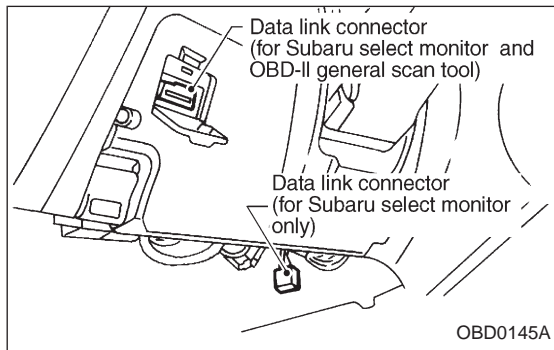


1 CHECK ANY OTHER DTC (BESIDES DTC P0760) ON DISPLAY.

- CHECK** : *Is there any other DTC on display?*
- YES** : Inspect relevant DTC using "11. Diagnostics Chart with Trouble Code".
- NO** : Go to step 2.

2 CHECK INHIBITOR SWITCH CIRCUIT.

- CHECK** : *Is there any trouble in inhibitor switch circuit?*
- YES** : Repair or replace inhibitor switch circuit.
- NO** : Go to step 3.



3 CHECK GEAR POSITION.

- 1) Turn ignition switch to OFF.
- 2) Connect the Subaru select monitor to data link connector.

GEAR (F10)

1 st

OBD0615

3) Lift-up or raise the vehicle and support with safety stands.

CAUTION:

On AWD models, raise all wheels off ground.

- 4) Start and warm-up the engine and transmission.
- 5) Subaru select monitor switch to ON.
- 6) Designate mode using function key.

Function mode for AT: F10

- 7) Move selector lever to "D" and drive the vehicle.
- 8) Read data on Subaru select monitor.

CHECK : **Change gear position according to throttle position and vehicle speed.**

YES : Go to next **CHECK** .

NO : Go to step 4.

CHECK : **Is there poor contact in TCM connector?**

YES : Repair poor contact in TCM connector.

NO : Go to next **CHECK** .

CHECK : **Is there any mechanical trouble in automatic transmission?**

YES : Repair or replace automatic transmission.

NO : Replace TCM with a new one.

4	CHECK SHIFT SOLENOID 1 CIRCUIT.
----------	--

CHECK : **Is there any trouble in shift solenoid 1 circuit?**

YES : Repair or replace shift solenoid 1 circuit.

NO : Go to step 5.

5	CHECK SHIFT SOLENOID 2 CIRCUIT.
----------	--

CHECK : **Is there any trouble in shift solenoid 2 circuit?**

YES : Repair or replace shift solenoid 2 circuit.

NO : Go to step 6.

6	CHECK SHIFT SOLENOID 3 CIRCUIT.
----------	--

CHECK : *Is there any trouble in shift solenoid 3 circuit?*

YES : Repair or replace shift solenoid 3 circuit.

NO : Go to next **CHECK** .

CHECK : *Is there poor contact in TCM connector?*

YES : Repair poor contact in TCM connector.

NO : Go to next **CHECK** .

CHECK : *Is there any mechanical trouble in automatic transmission?*

YES : Repair or replace automatic transmission.

NO : Replace TCM with a new one.

OBD	(FB1)
P0763	<OVR>
OBD0450	

BB: DTC P0763
— SHIFT SOLENOID C (SHIFT SOLENOID 3)
ELECTRICAL (OVR) —

DESCRIPTION:

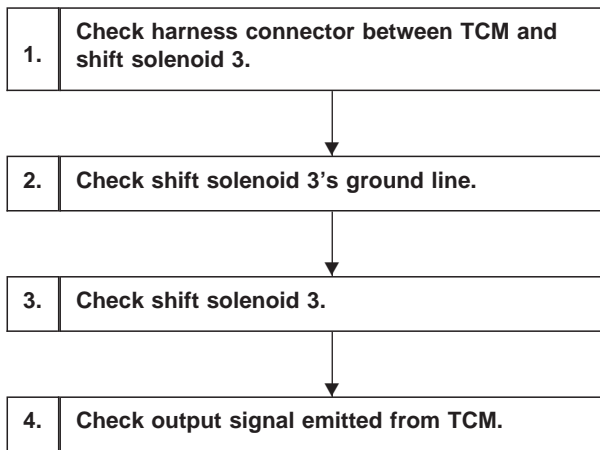
Refer to “BA: DTC P0760 — SHIFT SOLENOID C MALFUNCTION — [T11BA0]”.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

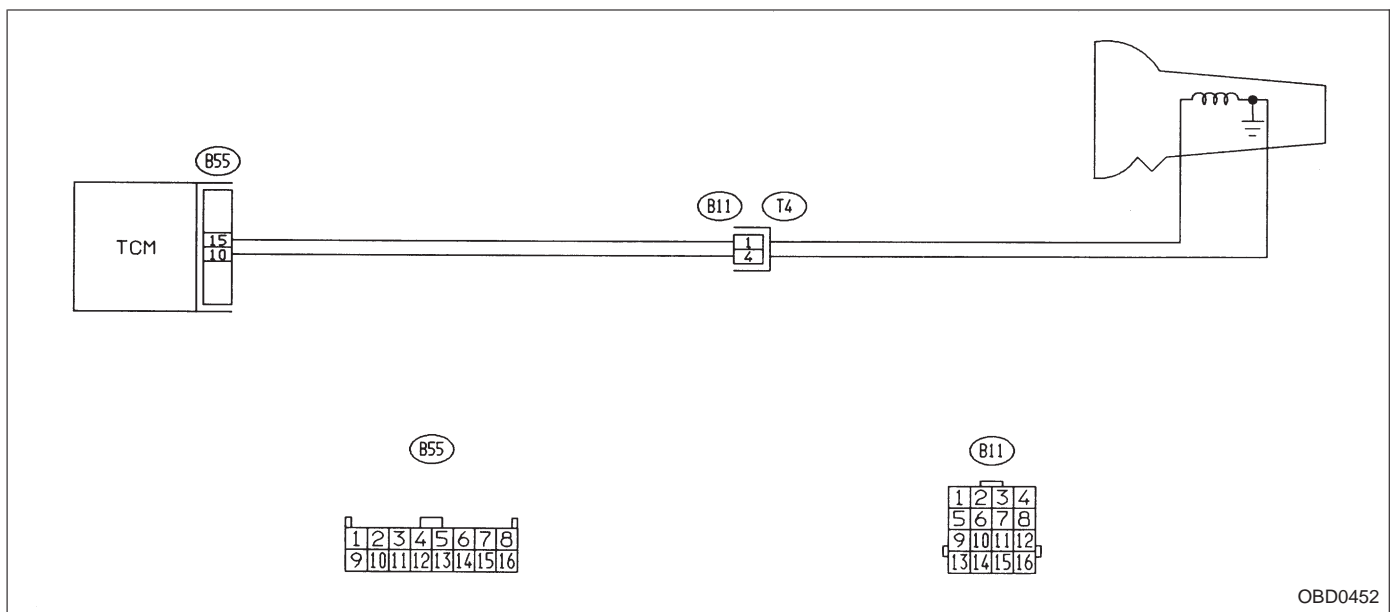
TROUBLE SYMPTOM:

- Ineffective engine brake with selector lever in “3”



CAUTION:
 After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD0452

NOTE:
 For the diagnostic procedure on shift solenoid 3 circuit, refer to “3-2 [T7C0]”.

OBD	(FB1)
P1100	<ST_SW>
OBD0458	

**BC: DTC P1100
— STARTER SWITCH CIRCUIT
MALFUNCTION (ST – SW) —**

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

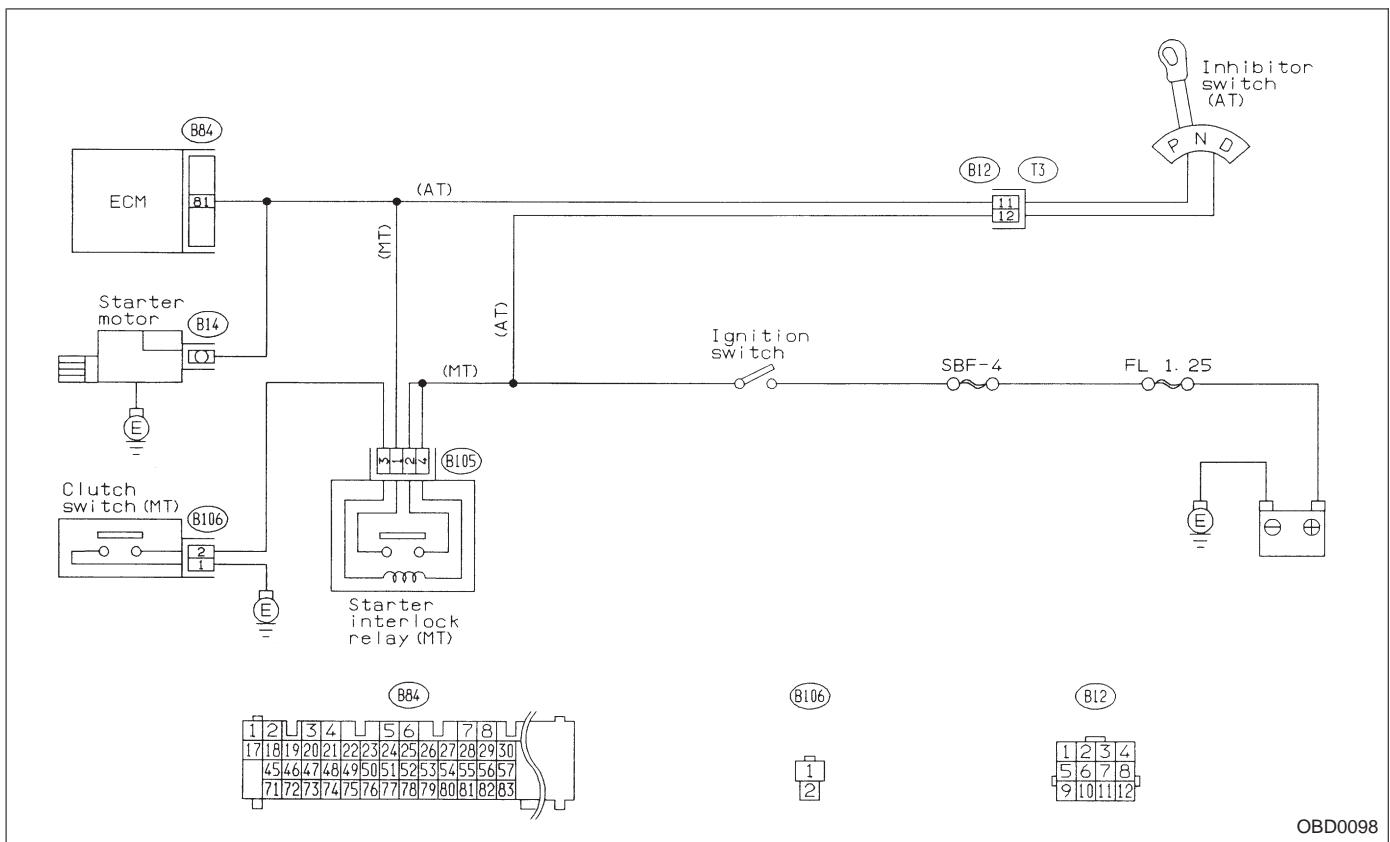
- Failure of engine to start

- | | |
|----|-----------------------------------|
| 1. | Check operation of starter motor. |
|----|-----------------------------------|

CAUTION:

After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD0098

1	CHECK OPERATION OF STARTER MOTOR.
----------	--

CHECK : *Turn ignition switch to “ST” to ensure that starter motor operates.*

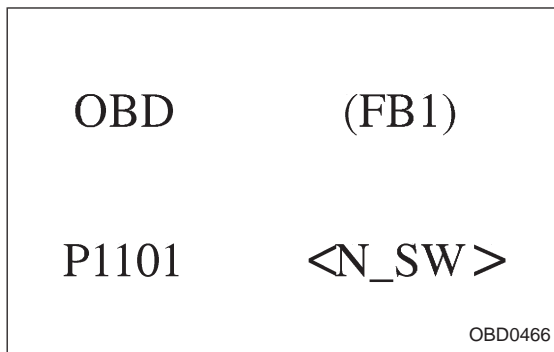
NOTE:

- On AT vehicles, place the inhibitor switch in the “P” or “N” position.

- On MT vehicles, depress the clutch pedal.

NO : Diagnose starter motor circuit <Ref. to [T9B0].>

YES : Repair open circuit or poor contact in ECM connector.



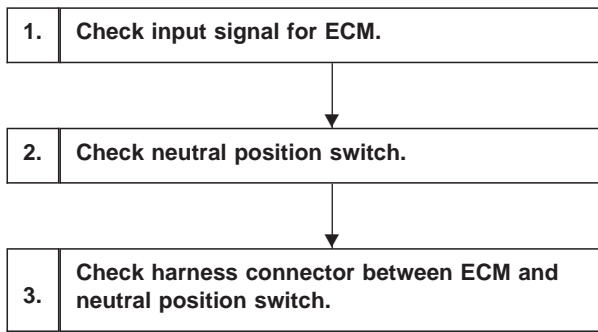
BD: DTC P1101
— NEUTRAL POSITION SWITCH CIRCUIT
MALFUNCTION [MT VEHICLES] (N — SW) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

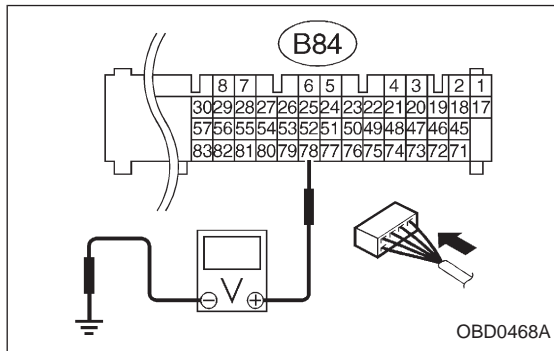
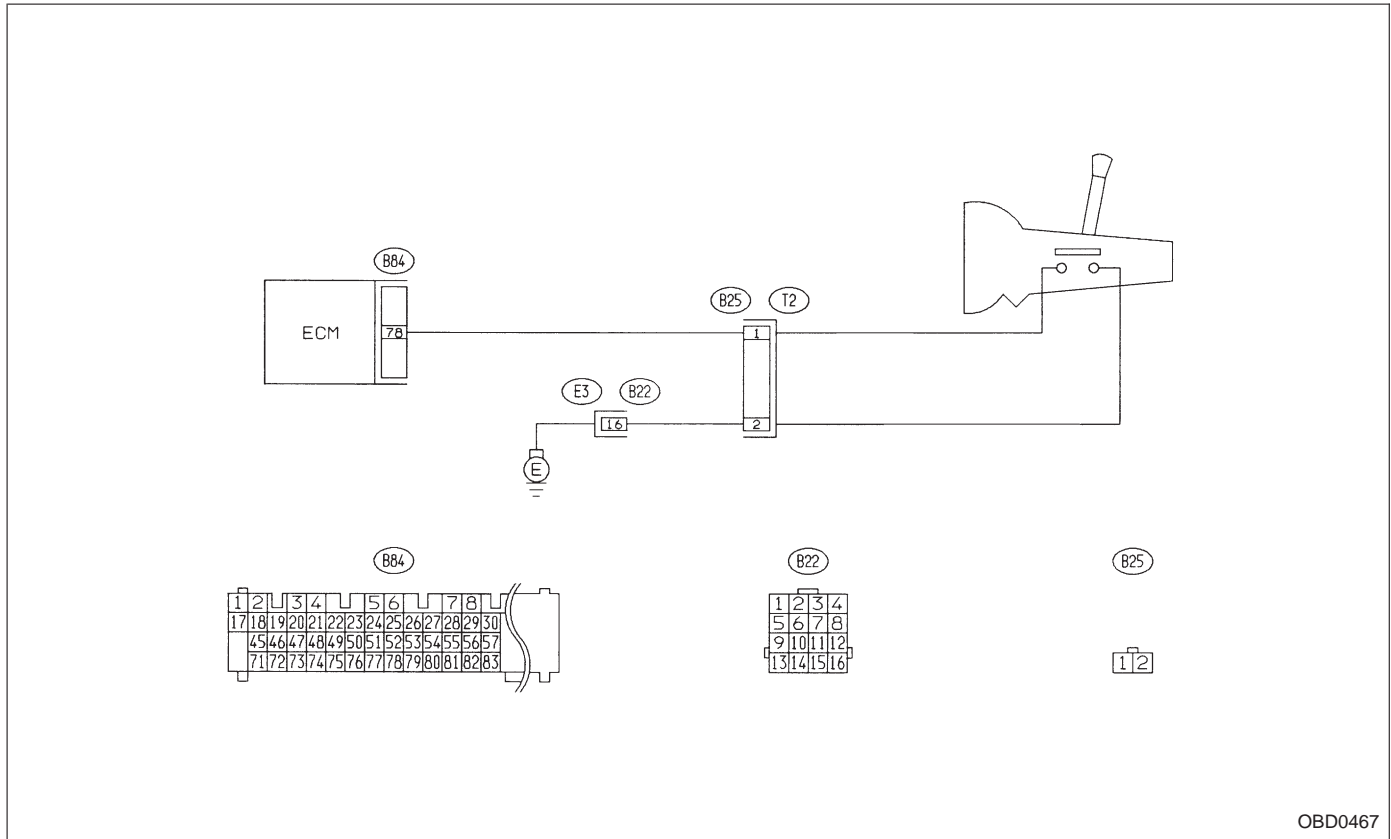
- Erroneous idling



CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



1 CHECK INPUT SIGNAL FOR ECM.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM and body.

CHECK : **Connector & terminal**
(B84) No. 78 — Body / 5.0±0.5 V (Neutral position)
(B84) No. 78 — Body / 0 V (Other positions)

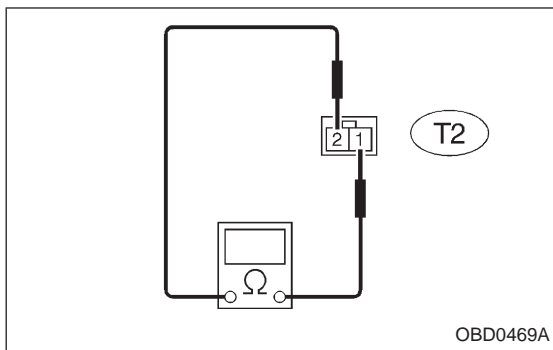
YES : Go to next **CHECK** .

NO : Go to step 2.

CHECK : **Is there poor contact in ECM connector?**

YES : Repair poor contact in ECM connector.

NO : Replace ECM with a new one.

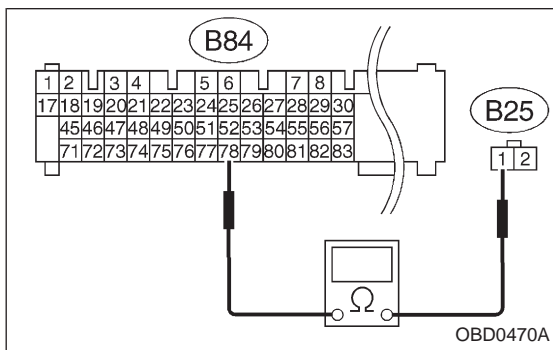


2 CHECK NEUTRAL POSITION SWITCH.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from transmission harness.
- 3) Measure resistance between connector terminals of transmission harness.

CHECK : **Connector & terminal**
(T2) No. 1 — No. 2 / 1 MΩ, or more (Neutral position)
(T2) No. 1 — No. 2 / 10 Ω, or less (Other positions)

- YES** : Go to step 3.
NO : Repair transmission harness or replace neutral position switch.

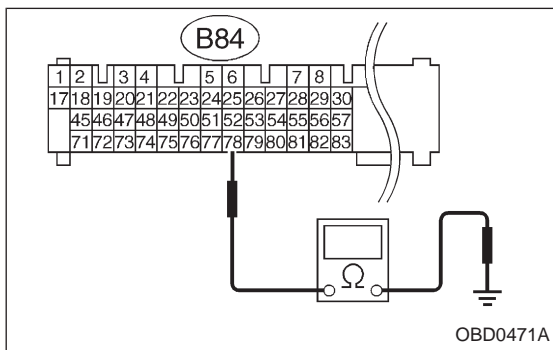


3 CHECK HARNESS CONNECTOR BETWEEN ECM AND NEUTRAL POSITION SWITCH.

- 1) Disconnect connector from ECM.
- 2) Measure resistance of harness connector between ECM and neutral position switch.

CHECK : **Connector & terminal**
(B84) No. 78 — (B25) No. 1 / 10 Ω, or less
NO : Repair open circuit of harness between ECM connector and neutral position switch connector.

YES : Go to next step.

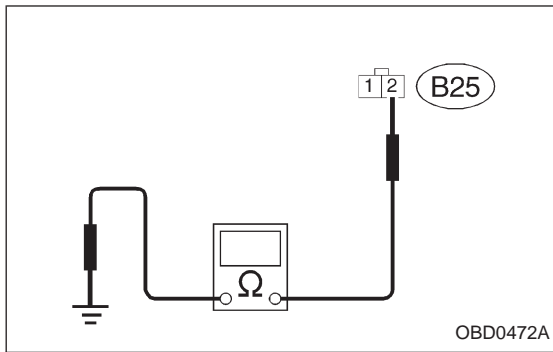


- 3) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

CHECK : **Connector & terminal**
(B84) No. 78 — Body / 1 MΩ, or more

NO : Repair short circuit of harness between ECM connector and neutral position switch connector.

YES : Go to next step.



4) Measure resistance of harness connector between neutral position switch and body.

CHECK : **Connector & terminal (B25) No. 2 — Body / 10 Ω , or less**

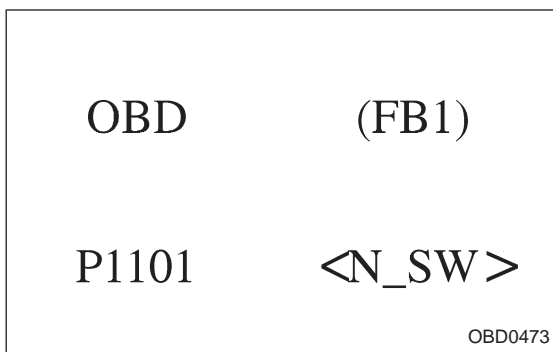
YES : Go to next **CHECK** .

NO : Repair open circuit of harness between neutral position switch connector and body.

CHECK : **Is there poor contact in neutral position switch connector?**

YES : Repair poor contact in neutral position switch connector.

NO : Replace ECM with a new one.



BE: DTC P1101
— NEUTRAL POSITION SWITCH CIRCUIT
MALFUNCTION [AT VEHICLES] (N – SW) —

DESCRIPTION:

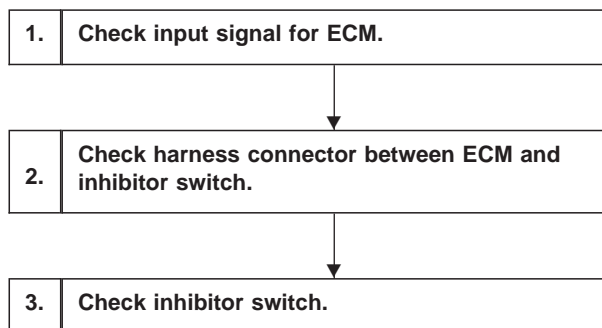
Refer to “AN: DTC P0705 — TRANSMISSION RANGE SENSOR CIRCUIT MALFUNCTION — [T11AN0]”.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

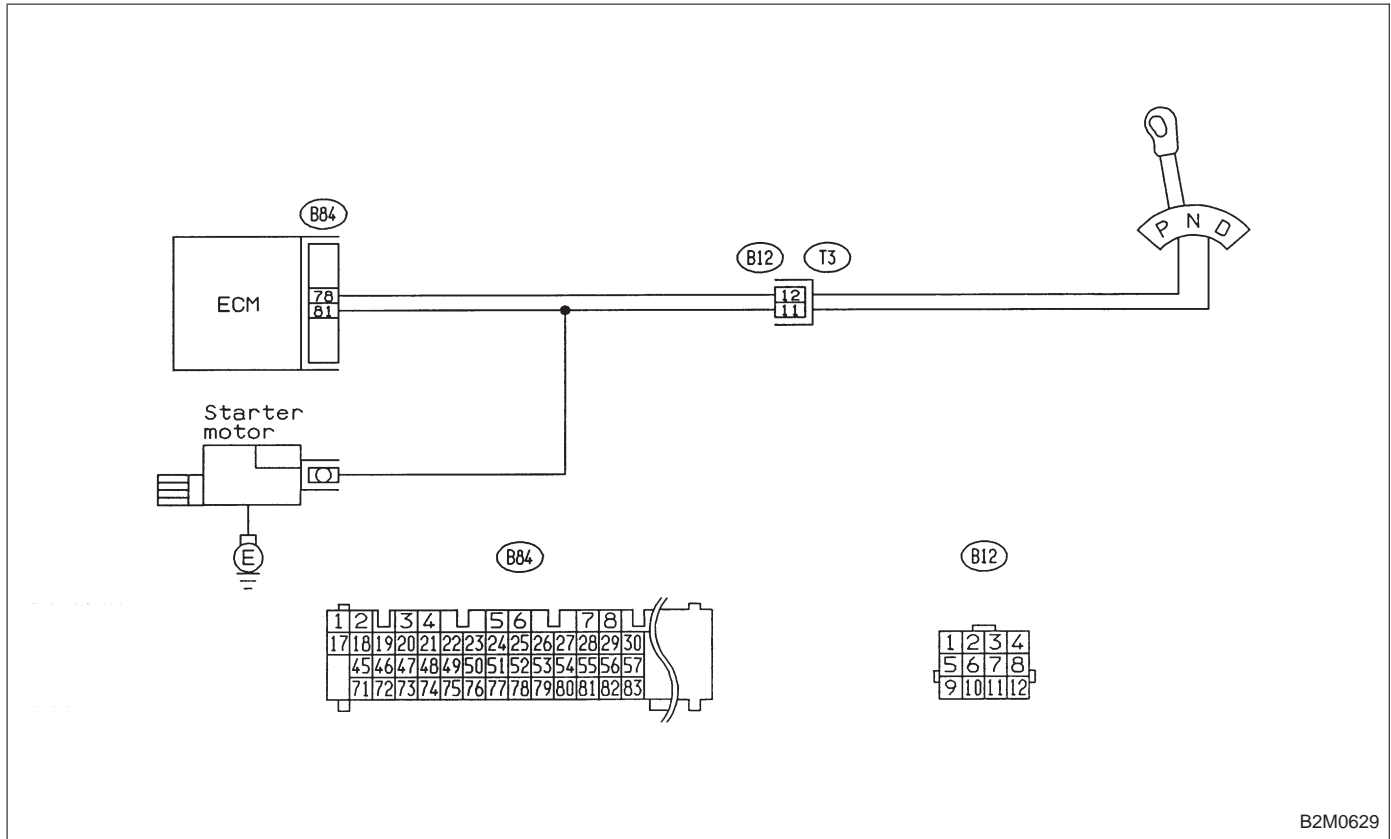
- Erroneous idling



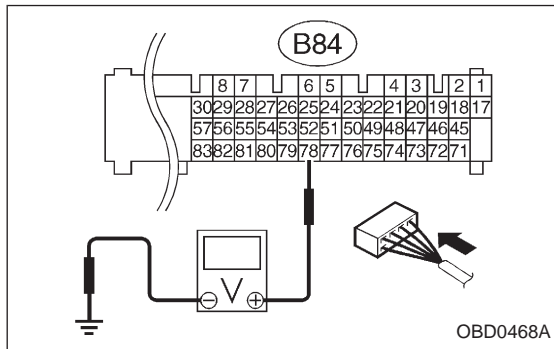
CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



B2M0629



1 CHECK INPUT SIGNAL FOR ECM.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM and body.

CHECK : **Connector & terminal**
(B84) No. 78 — Body / 0 V (“N” and “P” positions)
(B84) No. 78 — Body / 5.0±0.5 V (Other positions)

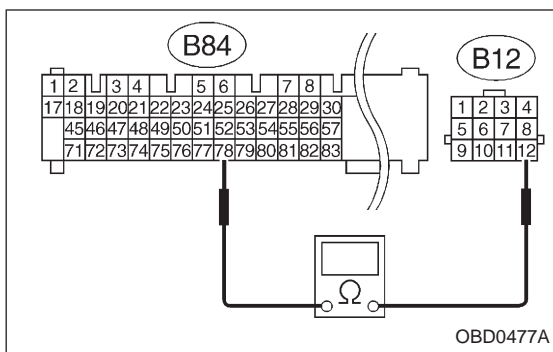
YES : Go to next **CHECK** .

NO : Go to step 2.

CHECK : **Is there poor contact in ECM connector?**

YES : Repair poor contact in ECM connector.

NO : Replace ECM with a new one.



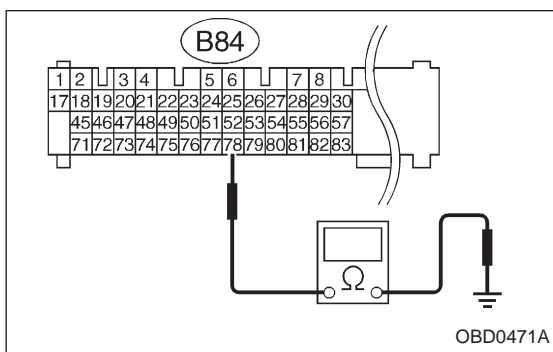
2 CHECK HARNESS CONNECTOR BETWEEN ECM AND INHIBITOR SWITCH.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from ECM and transmission.
- 3) Measure resistance of harness connector between ECM and transmission.

CHECK : Connector & terminal
(B84) No. 78 — (B12) No. 12 / 10 Ω, or less

NO : Repair open circuit of harness between ECM connector and transmission connector.

YES : Go to next step.

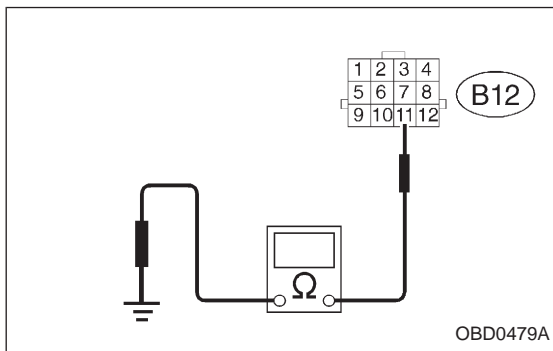


- 4) Measure resistance of harness connector between ECM and body.

CHECK : Connector & terminal
(B84) No. 78 — Body / 1 MΩ, or more

NO : Repair short circuit of harness between ECM connector and transmission connector.

YES : Go to next step.

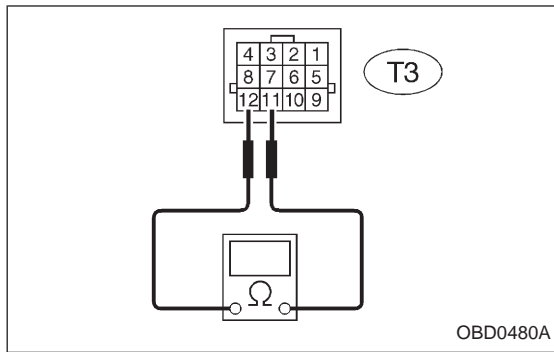


- 5) Measure resistance of harness connector between inhibitor switch and body.

CHECK : Connector & terminal
(B12) No. 11 — Body / 10 Ω, or less

YES : Go to step 3.

NO : Repair open circuit of inhibitor switch ground line.



3 CHECK INHIBITOR SWITCH.

Measure resistance between transmission connector receptacle's terminals.

- CHECK** : **Connector & terminal**
(T3) No. 12 — No. 11 / 10 Ω, or less
(“N” and “P” positions)
(T3) No. 12 — No. 11 / 1 MΩ, or more
(Other positions)
- YES** : Go to next **CHECK** .
- NO** : Replace inhibitor switch.
- CHECK** : **Is there any fault in selector cable connection to inhibitor switch?**
- YES** : Repair selector cable connection. <Ref. to 3-2 [W2B2].>
- NO** : Replace ECM with a new one.

OBD	(FB1)
P1102	
OBD0481	

BF: DTC P1102
— PRESSURE SOURCES SWITCHING
SOLENOID VALVE CIRCUIT MALFUNCTION
(BR) —

DESCRIPTION:

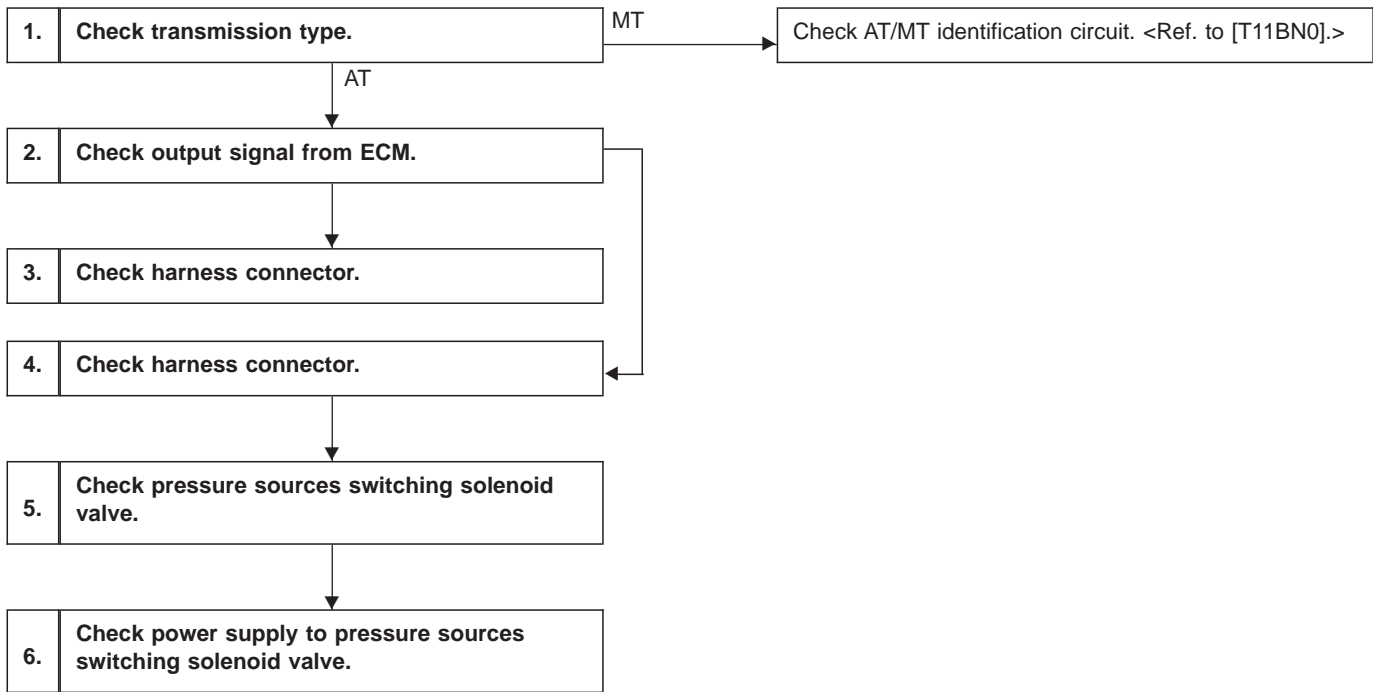
Refer to “D: DTC P0105 — PRESSURE SENSOR CIRCUIT MALFUNCTION — [T11D0]”.

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

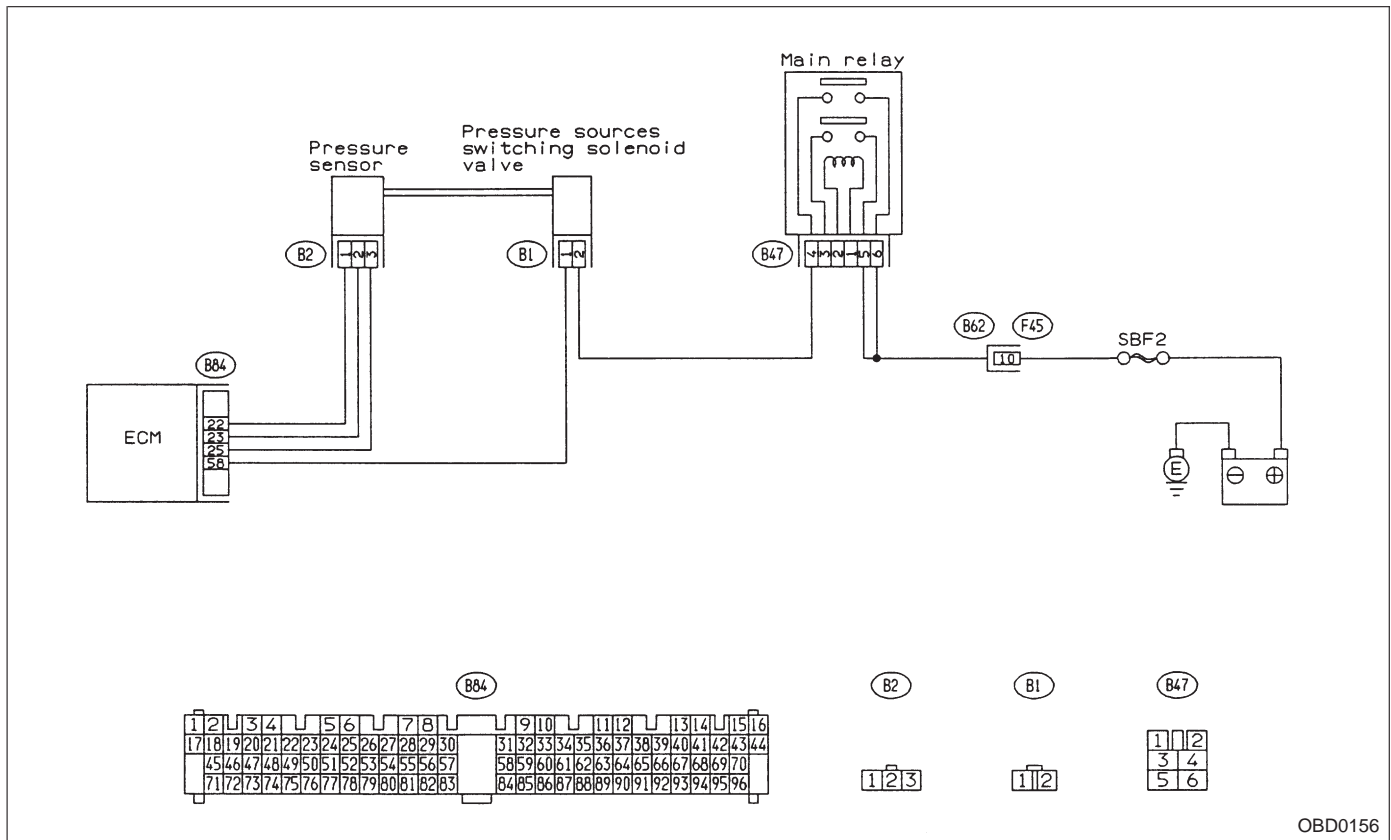
- Erroneous idling
- Failure of engine to start



CAUTION:
 After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODE**. <Ref. to [T3D0] and [T3E0].>

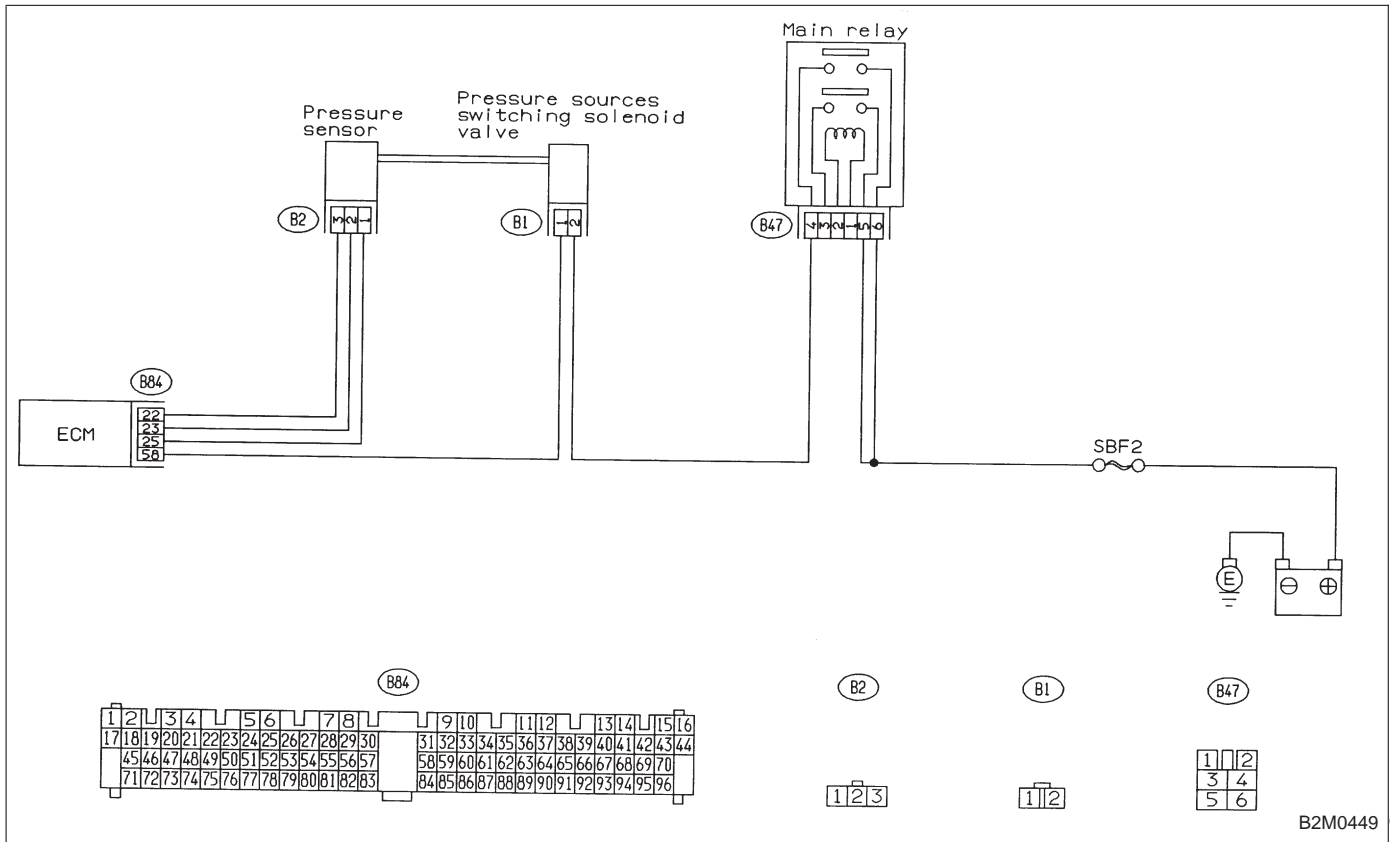
WIRING DIAGRAM:

- LHD model



WIRING DIAGRAM:

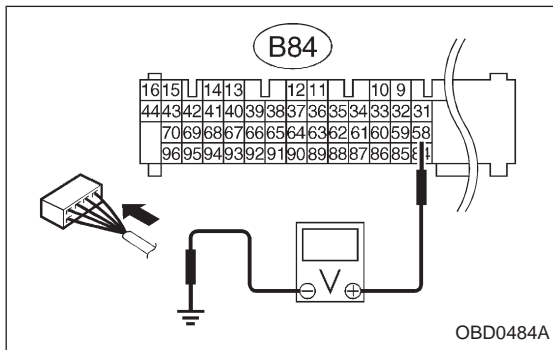
● RHD model



B2M0449

1 CHECK TRANSMISSION TYPE.

Refer to flow chart on page 320.



OBD0484A

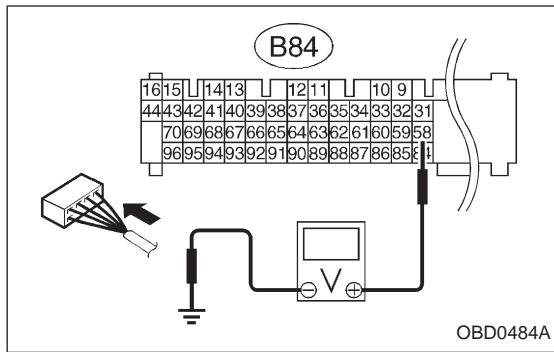
2 CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM and body.

CHECK : **Connector & terminal (B84) No. 58 — Body / 10 V, or more**

YES : Go to step 3.

NO : Go to step 4.



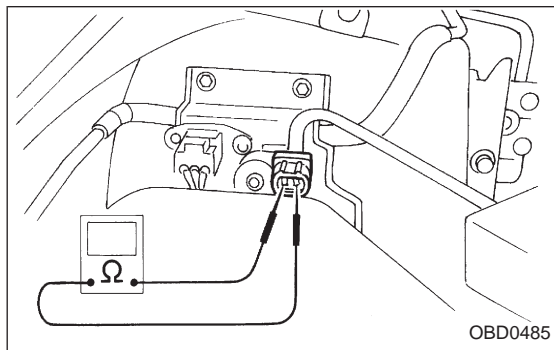
3 CHECK HARNESS CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from pressure sources switching solenoid valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM and body.

CHECK : **Connector & terminal**
(B84) No. 58 — Body / 10 V, or more

YES : Repair short circuit of harness between ECM connector and pressure sources switching solenoid valve connector and replace ECM.

NO : Go to next step.



- 5) Turn ignition switch to OFF.
- 6) Measure resistance between pressure sources switching solenoid valve terminals.

CHECK : **Terminals**
No. 1 — No. 2 / 1 Ω, or less

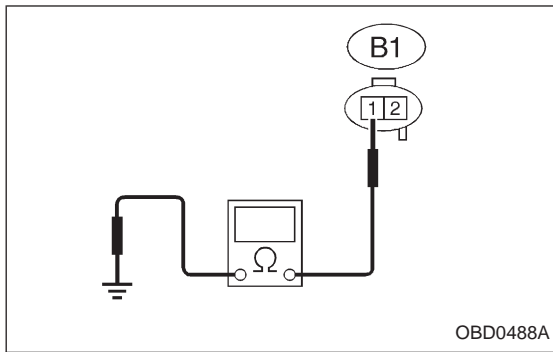
YES : Replace pressure sources switching solenoid valve and ECM.

NO : Go to next **CHECK** .

CHECK : **Is there poor contact in ECM connector?**

YES : Repair poor contact in ECM connector.

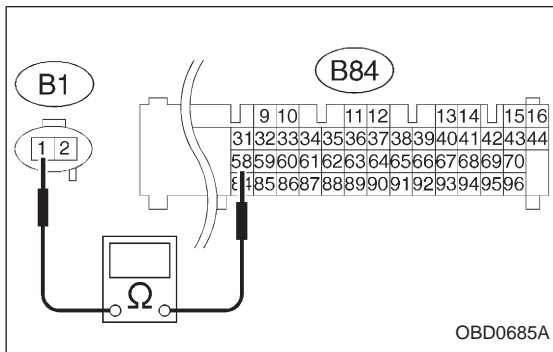
NO : Replace ECM with a new one.



4 CHECK HARNESS CONNECTOR.

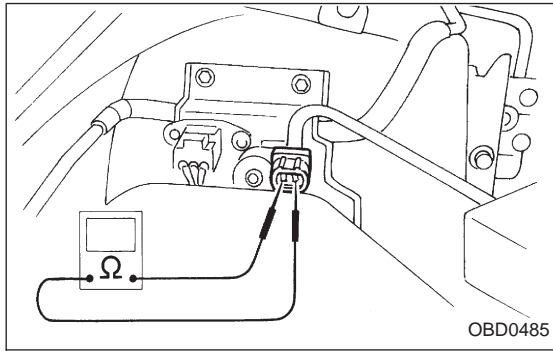
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from pressure sources switching solenoid valve and ECM.
- 3) Measure resistance of harness connector between pressure sources switching solenoid valve and body.

- CHECK** : **Connector & terminal (B1) No. 1 — Body / 10 Ω, or less**
- YES** : Repair short circuit of harness between ECM connector and pressure sources switching solenoid valve connector.
- NO** : Go to next step.



- 4) Measure resistance of harness connector between ECM and pressure sources switching solenoid valve.

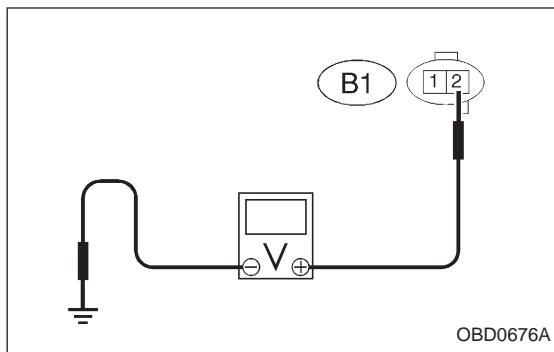
- CHECK** : **Connector & terminal (B84) No. 58 — (B1) No. 1 / 10 Ω, or less**
- YES** : Go to step 5.
- NO** : Repair open circuit of harness between ECM connector and pressure sources switching solenoid valve connector.



5 CHECK PRESSURE SOURCES SWITCHING SOLENOID VALVE.

Measure resistance between pressure sources switching solenoid valve connector terminals.

- CHECK** : **Terminals No. 1 — No. 2 / 10 — 100 Ω**
- YES** : Go to step 6.
- NO** : Replace pressure sources switching solenoid valve.

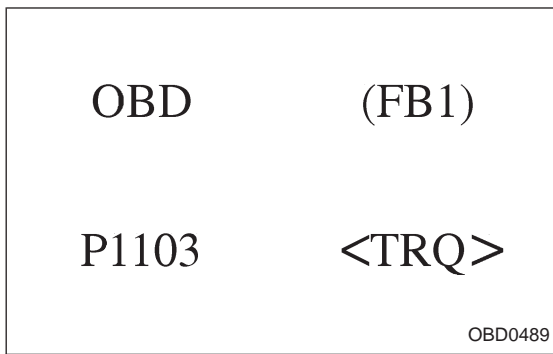


6

CHECK POWER SUPPLY TO PRESSURE SOURCES SWITCHING SOLENOID VALVE.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between pressure sources switching solenoid valve harness connector and body.

- CHECK** : **Connector & terminal (B1) No. 2 — Body / 10 V, or more**
- YES** : Confirm good connection at pressure sources switching solenoid valve connector.
- NO** : Repair open circuit of harness between main relay connector and pressure sources switching solenoid valve connector.



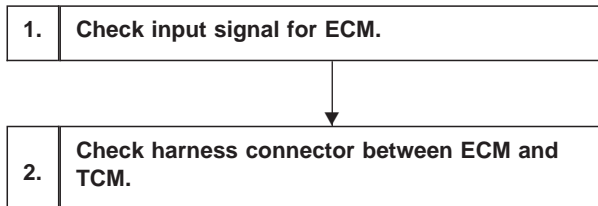
BG: DTC P1103
— ENGINE TORQUE CONTROL SIGNAL
CIRCUIT MALFUNCTION (TRQ) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

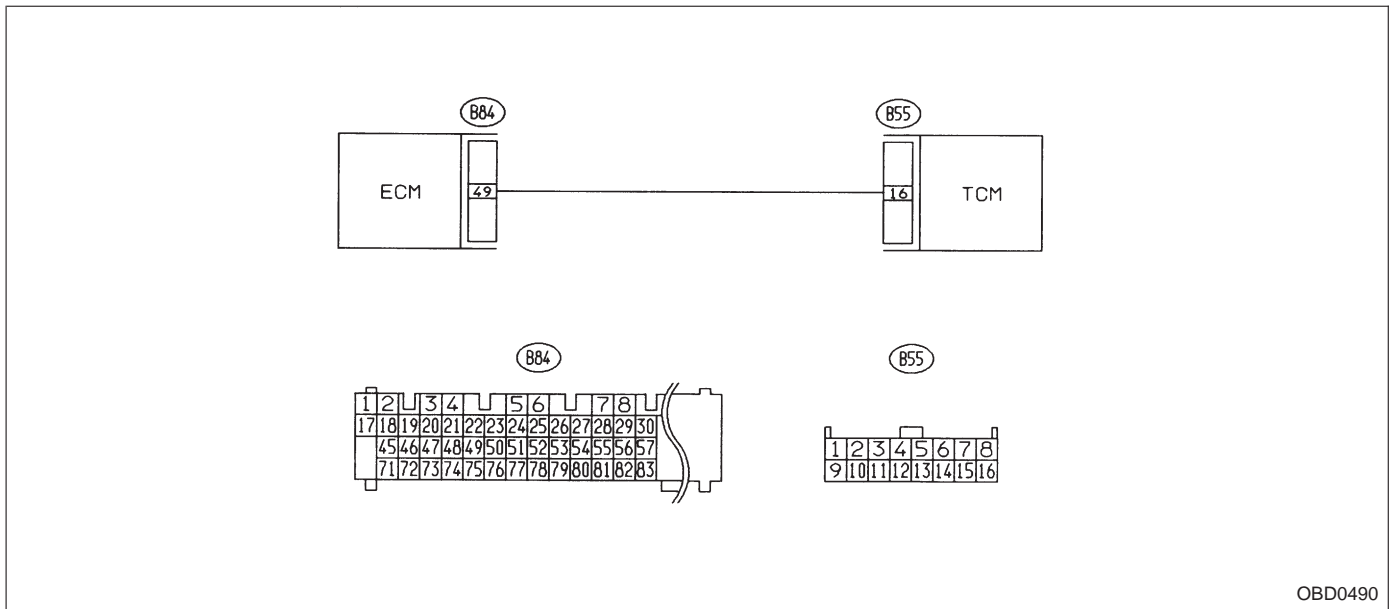
- Excessive shift shock



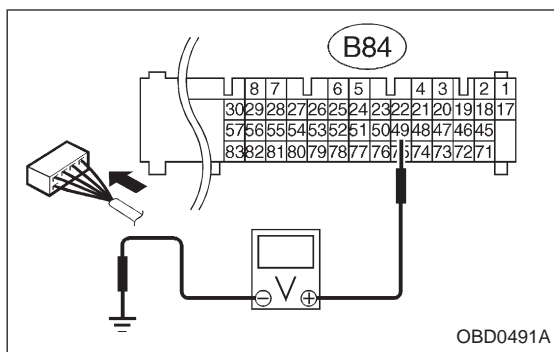
CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD0490



1 CHECK INPUT SIGNAL FOR ECM.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM and body.

CHECK : **Connector & terminal (B84) No. 49 — Body / 4.5V, or more**

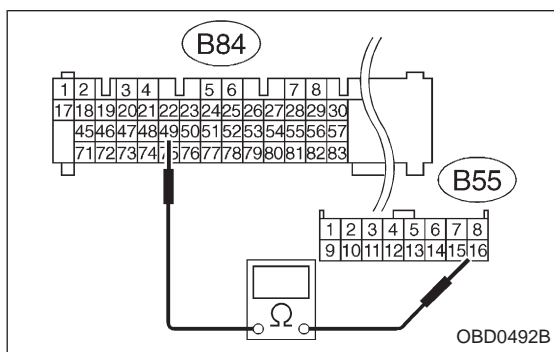
YES : Go to next **CHECK** .

NO : Go to step 2.

CHECK : **Is there poor contact in ECM connector?**

YES : Repair poor contact in ECM connector.

NO : Replace ECM with a new one.



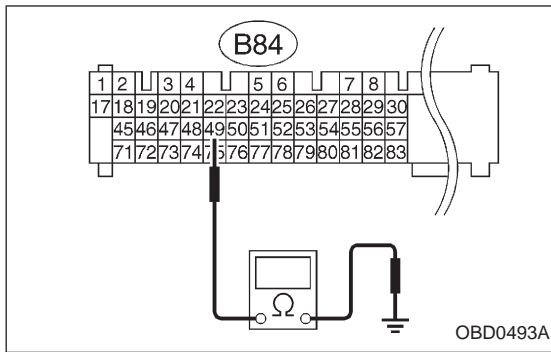
2 CHECK HARNESS CONNECTOR BETWEEN ECM AND TCM.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from ECM and TCM.
- 3) Measure resistance of harness connector between ECM and TCM.

CHECK : **Connector & terminal (B84) No. 49 — (B55) No. 16 / 10 Ω, or less**

YES : Go to next step.

NO : Repair open circuit of harness between ECM connector and TCM connector.



4) Measure resistance of harness connector between ECM and body.

CHECK : **Connector & terminal (B84) No. 49 — Body / 1 MΩ, or more**

YES : Go to next **CHECK** .

NO : Repair short circuit of harness between ECM connector and TCM connector.

CHECK : **Is there poor contact in TCM connector?**

YES : Repair poor contact in TCM connector.

NO : Replace TCM with a new one.

OBD	(FB1)
P1104	<TCS>

OBD0494

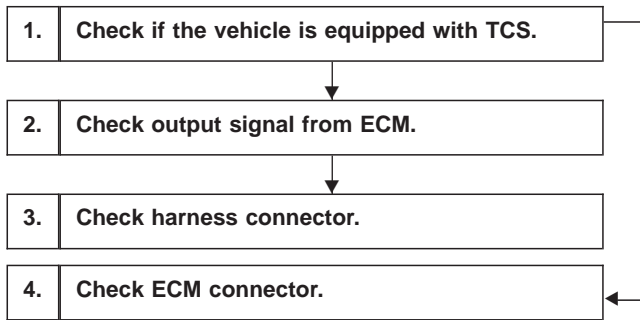
**BH: DTC P1104
— TCS SIGNAL CIRCUIT MALFUNCTION
(TCS) —**

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

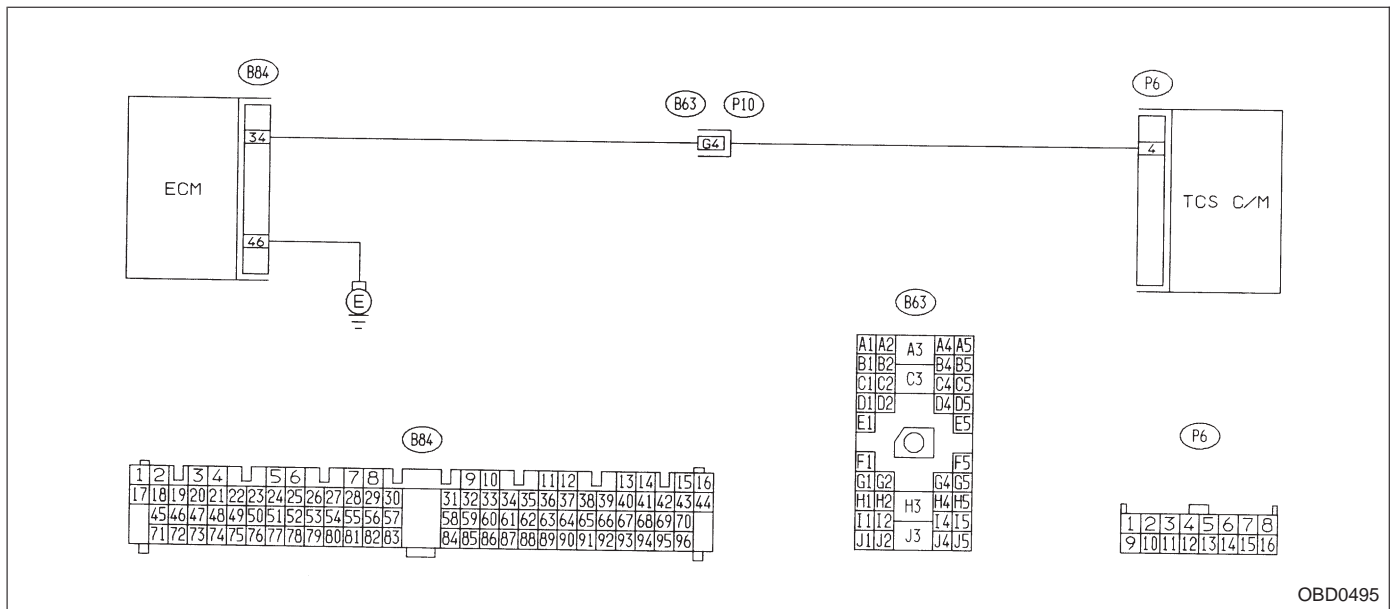
- No operation TCS
- TCS warning light remains illuminated.



CAUTION:

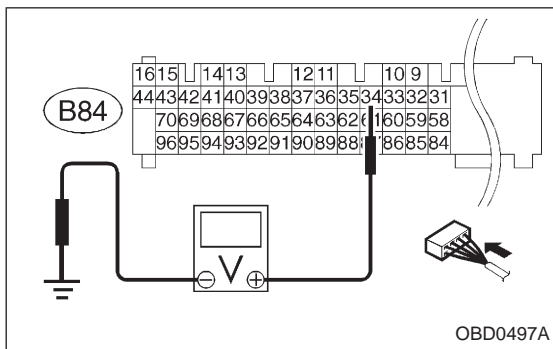
After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



1 CHECK IF THE VEHICLE IS EQUIPPED WITH TCS.

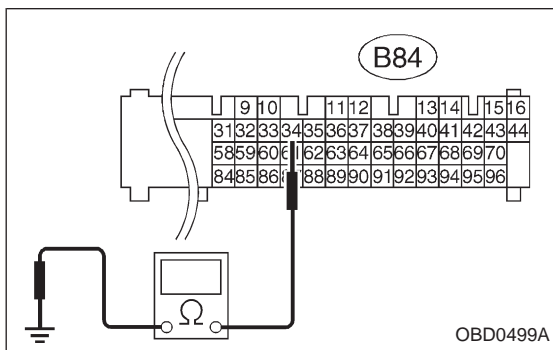
- CHECK** : *Is the vehicle equipped with TCS?*
- NO** : Go to step 4.
- YES** : Go to step 2.



2 CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM connector and body.

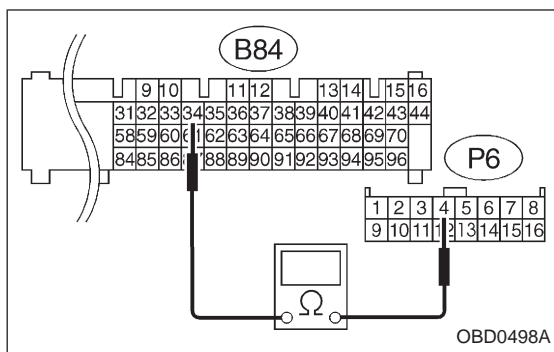
- CHECK** : **Connector & terminal (B84) No. 34 — Body / 2 V, or more**
- YES** : Repair poor contact in ECM connector.
- NO** : Go to step 3.



3 CHECK HARNESS CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Remove front passenger side seat.
- 3) Tear off the floor mat.
- 4) Disconnect connectors from ECM and TCS C/M.
- 5) Measure resistance between ECM harness connector and body.

- CHECK** : **Connector & terminal (B84) No. 34 — Body / 10 Ω, or less**
- YES** : Repair short circuit of harness between ECM connector and TCS C/M connector.
- NO** : Go to next step.

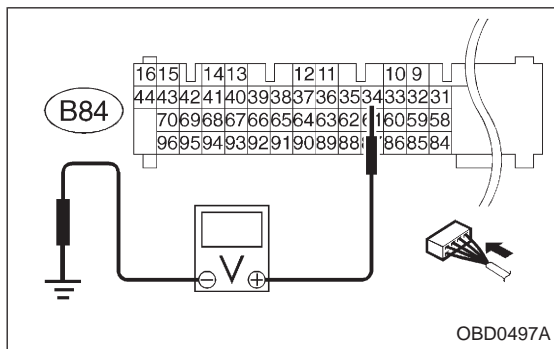


6) Measure resistance of harness connector between ECM and TCS C/M.

CHECK : **Connector & terminal**
(B84) No. 34 — (P6) No. 4 / 10 Ω , or less

NO : ● Open circuit of harness between ECM connector and TCS C/M connector
● Poor contact in ECM connector
● Poor contact in TCS C/M connector
Check above points and repair if necessary.

YES : Go to next step.



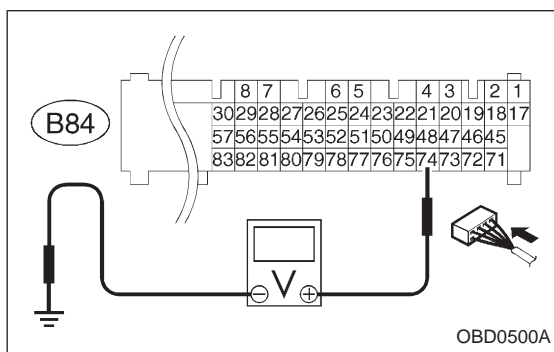
7) Turn ignition switch to ON.

8) Measure voltage between ECM connector and body.

CHECK : **Connector & terminal**
(B84) No. 34 — Body/2 V, or more

YES : Repair short circuit of harness between ECM and TCS C/M connector.

NO : Repair poor contact in TCS C/M connector.



4 CHECK ECM CONNECTOR.

1) Turn ignition switch to ON.

2) Measure voltage between ECM connector and body.

CHECK : **Connector & terminal**
(B84) No. 74 — Body / 2 V, or more

YES : Repair open circuit of harness between ECM connector and body.

NO : Repair poor contact in ECM connector.

OBD	(FB1)
P1500	<FAN_1>
OBD0527	

**BI: DTC P1500
— RADIATOR FAN RELAY 1 CIRCUIT
MALFUNCTION (FAN — 1) —**

DESCRIPTION:

- The engine cooling system consists of a down-flow radiator which features high heat-dissipation performance, an electric motor fan, an engine coolant pump, a thermostat, and an engine coolant temperature sensor.
- The ON-OFF control of the radiator fan is governed by the ECM which receives signals sent from the engine coolant temperature sensor. On models which are equipped with an air conditioning system, the ECM receives signals sent from the engine coolant temperature sensor, vehicle speed sensor 2 and A/C switch. These signals simultaneously turn ON or OFF the radiator main fan and radiator sub fan as well as setting them at “HI” or “LO” speed.

[Without A/C models]

Engine coolant temperature signal *1	ECM output signal		Operation of radiator fan
	Radiator fan relay 1		Main
ON	ON		ON
OFF	OFF		OFF

*1 ON: Above 95 °C (203 °F), OFF: Below 89 °C (192 °F)

[With A/C models]

Engine coolant temperature signal *2	A/C compressor	Vehicle speed signal *3	ECM output signal		Operation of radiator fan	
			Radiator fan relay 1	Radiator fan relay 2	Main	Sub
ON	ON	ON	ON	ON	HI	HI
		OFF	ON	ON	HI	HI
	OFF	ON	ON	ON	HI	HI
		OFF	ON	OFF	LO	LO
OFF	ON	ON	ON	ON	HI	HI
		OFF	ON	OFF	LO	LO
	OFF	ON	OFF	OFF	OFF	OFF
		OFF	OFF	OFF	OFF	OFF

*2 ON: Above 95 °C (203 °F), OFF: Below 89 °C (192 °F)

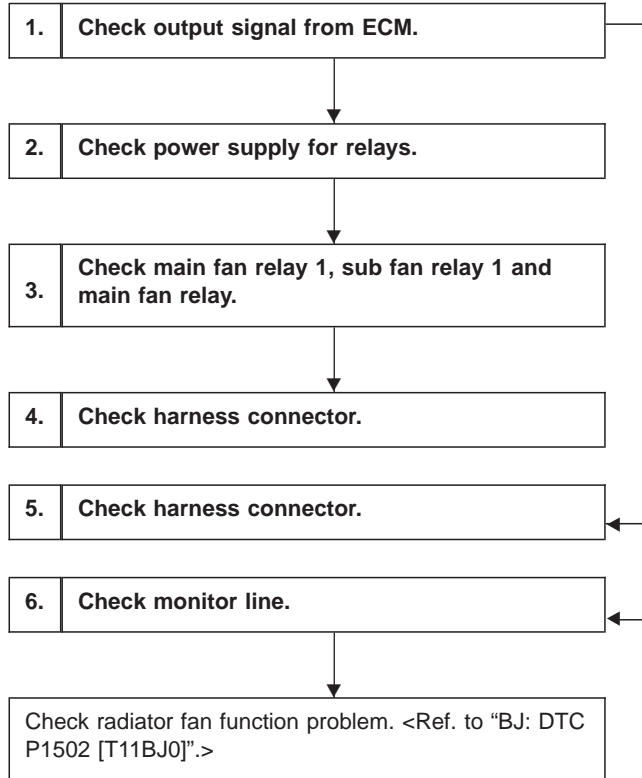
*3 ON: Above 20 km/h (12 MPH), OFF: Below 10 km/h (6 MPH)

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

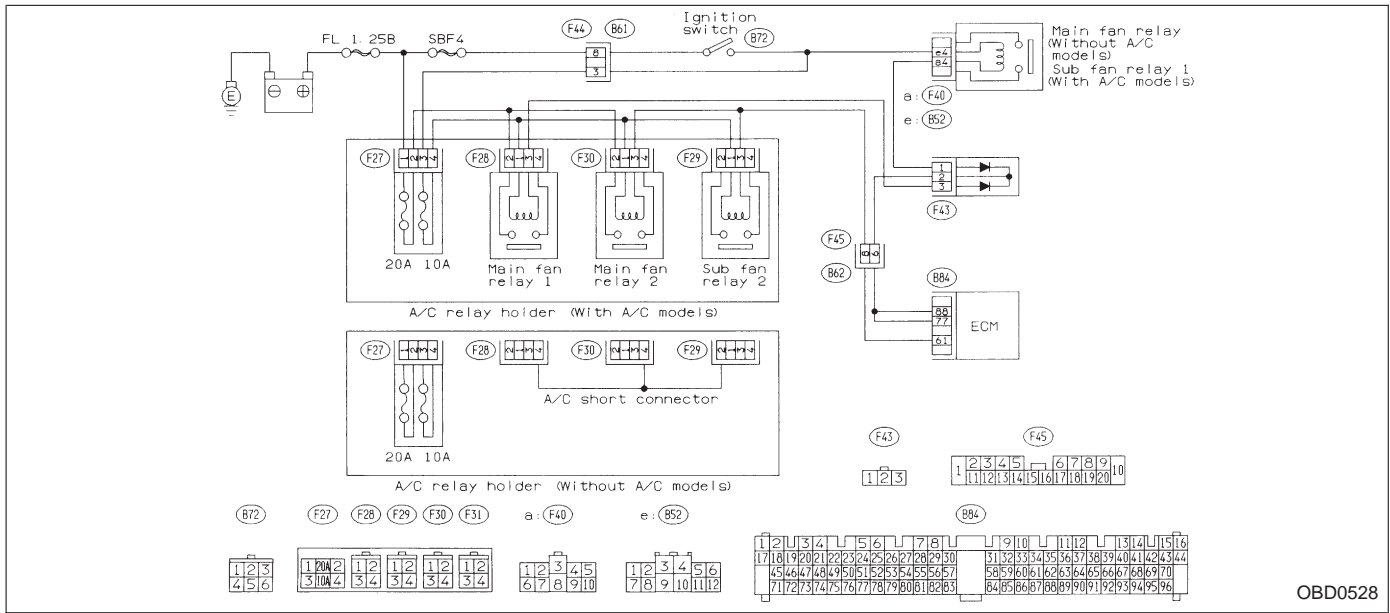
- Radiator fan does not operate properly.
- Overheating

**CAUTION:**

After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODE**. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:

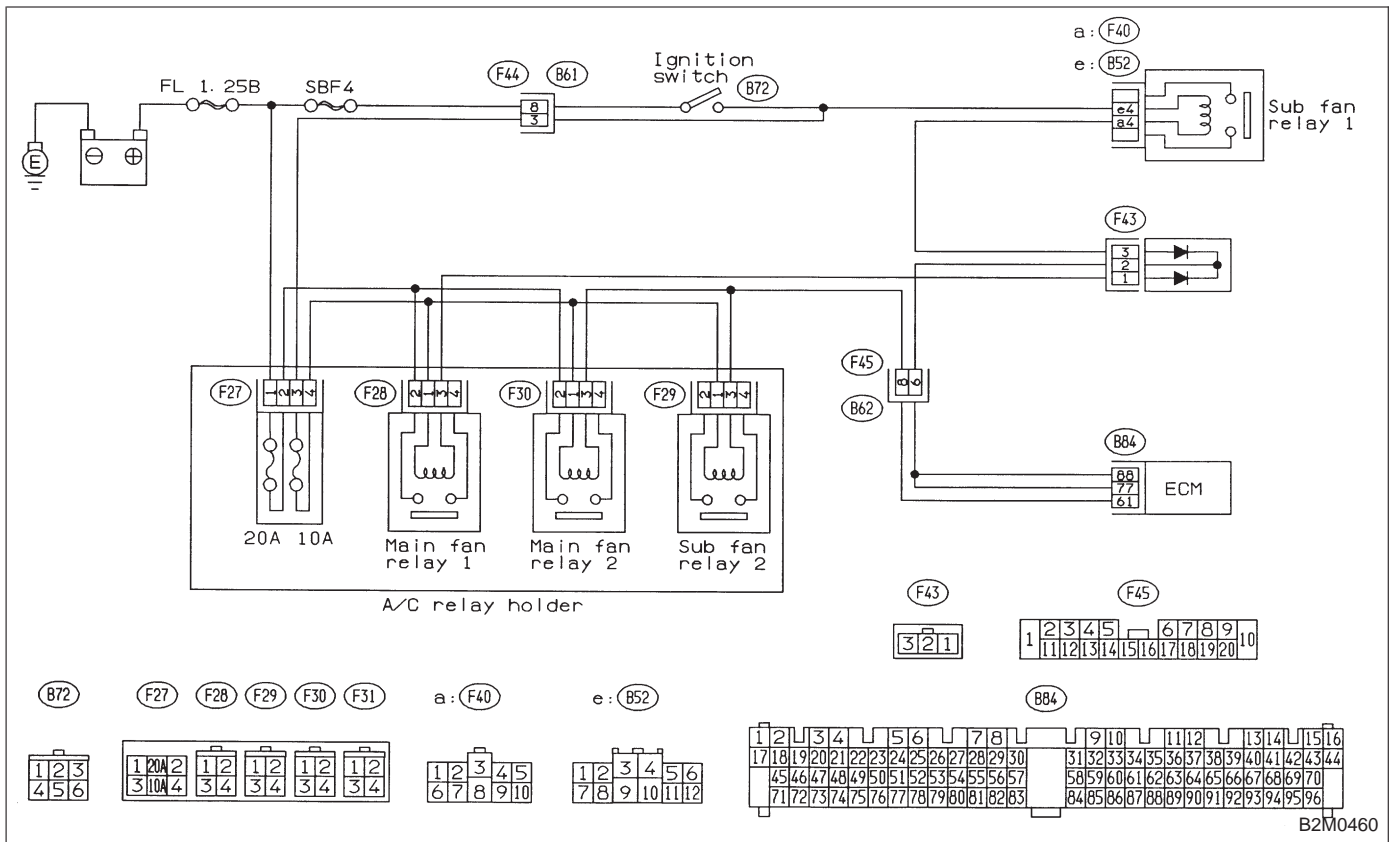
● LHD model



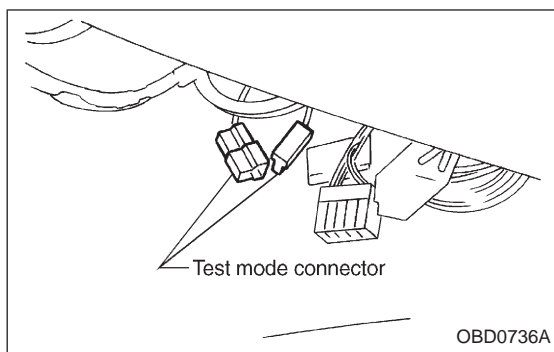
OBD0528

WIRING DIAGRAM:

● RHD model

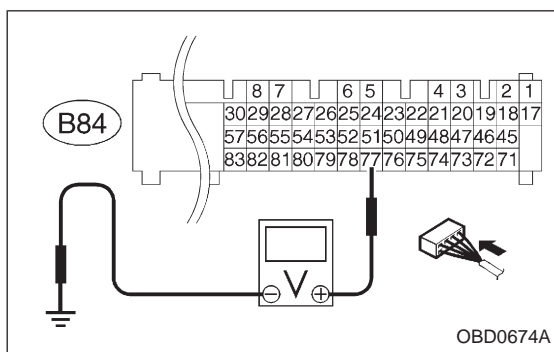


B2M0460



1 CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.
- 3) Turn ignition switch to ON.

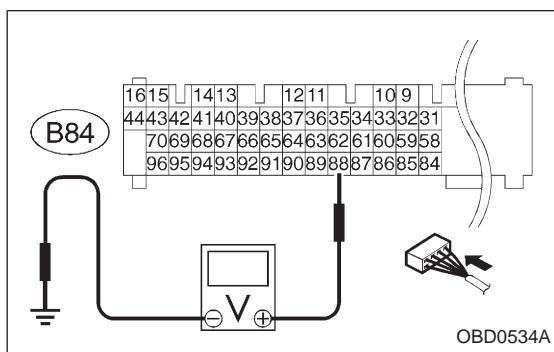


- 4) Measure voltage between ECM and body.

CHECK : **Connector & terminal (B84) No. 77 — Body/10 V, or more and 1 V or less at every 2 seconds**

YES : Go to step 6.

NO : Go to next **CHECK** .



CHECK : **Connector & terminal (B84) No. 88 — Body/10 V, or more**

YES : Go to step 5.

NO : Go to step 2.

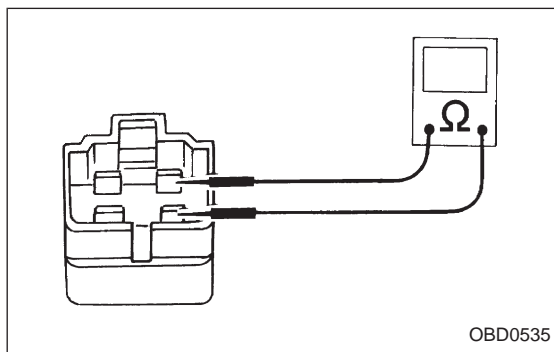
2 CHECK POWER SUPPLY FOR RELAYS.

Turn ignition switch to OFF.

CHECK : **Is the fuse in power supply circuit broken?**

YES : Replace the fuse.

NO : Go to step 3.



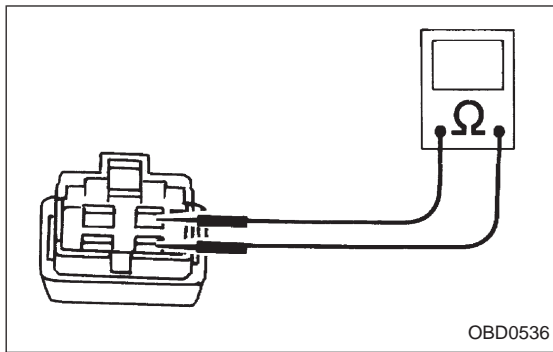
3 CHECK MAIN FAN RELAY 1, SUB FAN RELAY 1 AND MAIN FAN RELAY.

- 1) Remove main fan relay 1. (With A/C models only)
- 2) Measure resistance between main fan relay 1 terminals.

CHECK : **Terminal No. 1 — No. 3/97±10 Ω**

YES : Go to next step.

NO : Replace main fan relay 1.

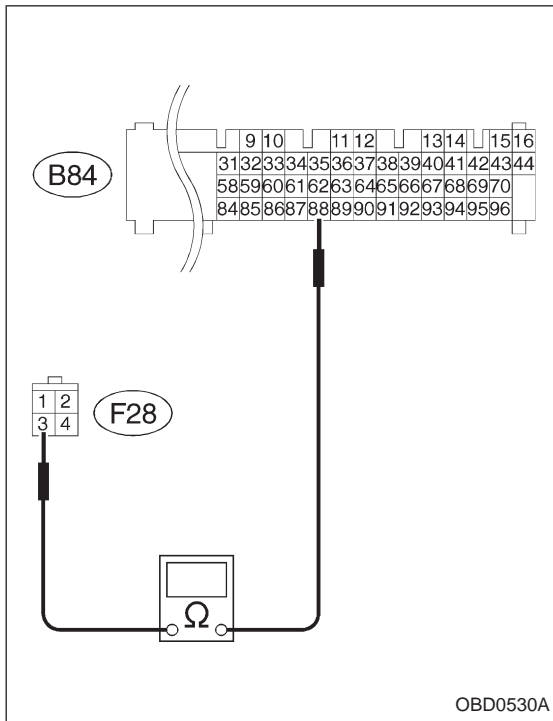


- 3) Remove sub fan relay 1. (With A/C models only)
Remove main fan relay. (Without A/C models only)
- 4) Measure resistance between sub fan relay 1 or main fan relay terminals.

CHECK : **Terminal**
No. 1 — No. 3/100±17 Ω

YES : Go to step 4.

NO : Replace sub fan relay 1 or main fan relay.



4 CHECK HARNESS CONNECTOR.

- 1) Disconnect connector from ECM.
- 2) Disconnect connector from sub fan relay 1 or main fan relay.
- 3) Check if the harness connector is open circuit or has poor contact with the following circuits.

CHECK : **Connector & terminal**
(B84) No. 88 — (F28) No. 3 / 10 Ω, or less

NOTE:
With A/C models only.

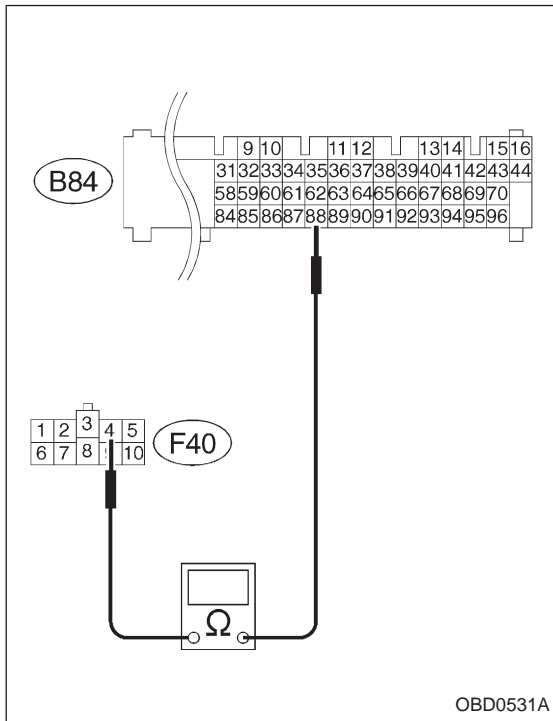
YES : Go to next **CHECK** .

NO : Repair open circuit of harness between ECM connector and main fan relay 1 connector.

CHECK : **Is there poor contact in ECM or main fan relay 1 connector?**

YES : Repair ECM or main fan relay 1 connector.

NO : Go to next **CHECK** .



CHECK : **Connector & terminal**
(B84) No. 88 — (F40) No. 4 / 10 Ω, or less

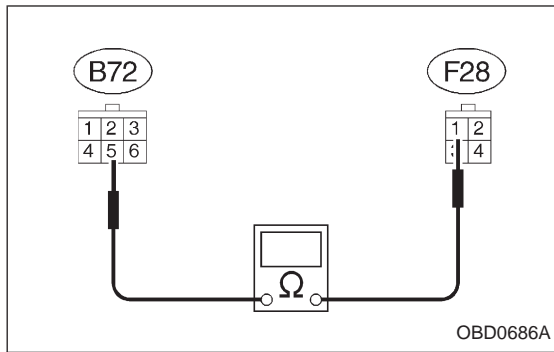
YES : Go to next **CHECK** .

NO : Repair open circuit of harness between ECM connector and sub fan relay 1 (with A/C models) or main fan relay (without A/C models) connector.

CHECK : **Is there poor contact in ECM or sub fan relay 1 (with A/C models) or main fan relay (without A/C models) connector?**

YES : Repair ECM or sub fan relay 1 (with A/C models) or main fan relay (without A/C models) connector.

NO : Go to next **CHECK** .



CHECK : **Connector & terminal (F28) No. 1 — (B72) No. 5 / 10 Ω, or less**

YES : Go to next **CHECK** .

NO : Repair open circuit of harness between main fan relay 1 connector and ignition switch connector.

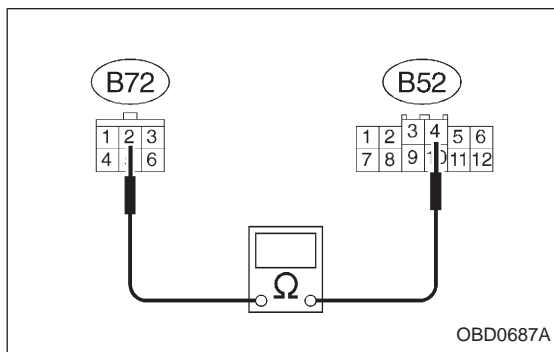
CHECK : **Is there poor contact in main fan relay 1 or ignition switch connector?**

YES : Repair main fan relay 1 or ignition switch connector.

NO : Go to next **CHECK** .

NOTE:

With A/C models only.



CHECK : **Connector & terminal (B52) No. 4 — (B72) No. 2 / 10 Ω, or less**

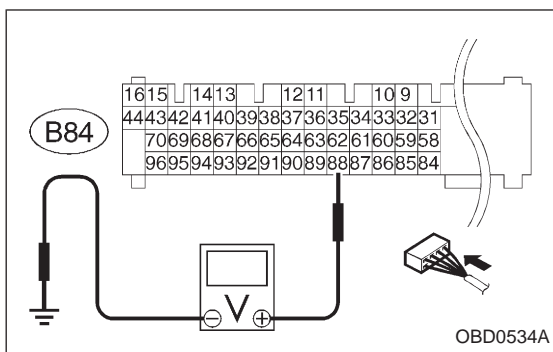
YES : Go to next **CHECK** .

NO : Repair open circuit of harness between sub fan relay 1 (with A/C models) or main fan relay (without A/C models) connector and ignition switch connector.

CHECK : **Is there poor contact in sub fan relay 1 (with A/C models) or main fan relay (without A/C models) or ignition switch connector?**

YES : Repair sub fan relay 1 (with A/C models) or main fan relay (without A/C models) or ignition switch connector.

NO : Replace ECM with a new one.



5 CHECK HARNESS CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Remove main fan relay 1 and sub fan relay 1. (with A/C models)
Remove main fan relay. (without A/C models)
- 3) Disconnect test mode connector.
- 4) Turn ignition switch to ON.
- 5) Measure voltage between ECM and body.

CHECK : **Connector & terminal (B84) No. 88 — Body / 10 V, or more**

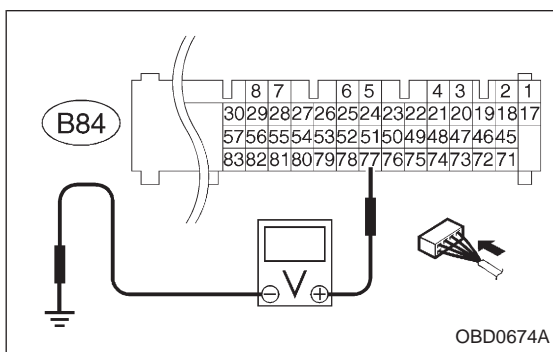
YES : Repair short circuit of harness and replace ECM.

NO : Go to next **CHECK** .

CHECK : **Is there poor contact in ECM connector?**

YES : Repair poor contact in ECM connector.

NO : Replace ECM.



6 CHECK MONITOR LINE.

- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM and body.

CHECK : **Connector & terminal (B84) No. 77 — Body / 10 V, or more and 1 V, or less at every 2 seconds.**

YES : Repair poor contact in ECM connector.

NO : Repair open circuit of harness between ECM connector and sub fan relay 1 (with A/C models) or main fan relay (without A/C models).

OBD	(FB1)
P1502	<FAN_F>
OBD0538	

BJ: DTC P1502
— RADIATOR FAN FUNCTION PROBLEM
(FAN — F) —

DESCRIPTION:

Refer to “BI: DTC P1500 — RADIATOR FAN RELAY 1 CIRCUIT MALFUNCTION — [T11B10]”.

DTC DETECTING CONDITION:

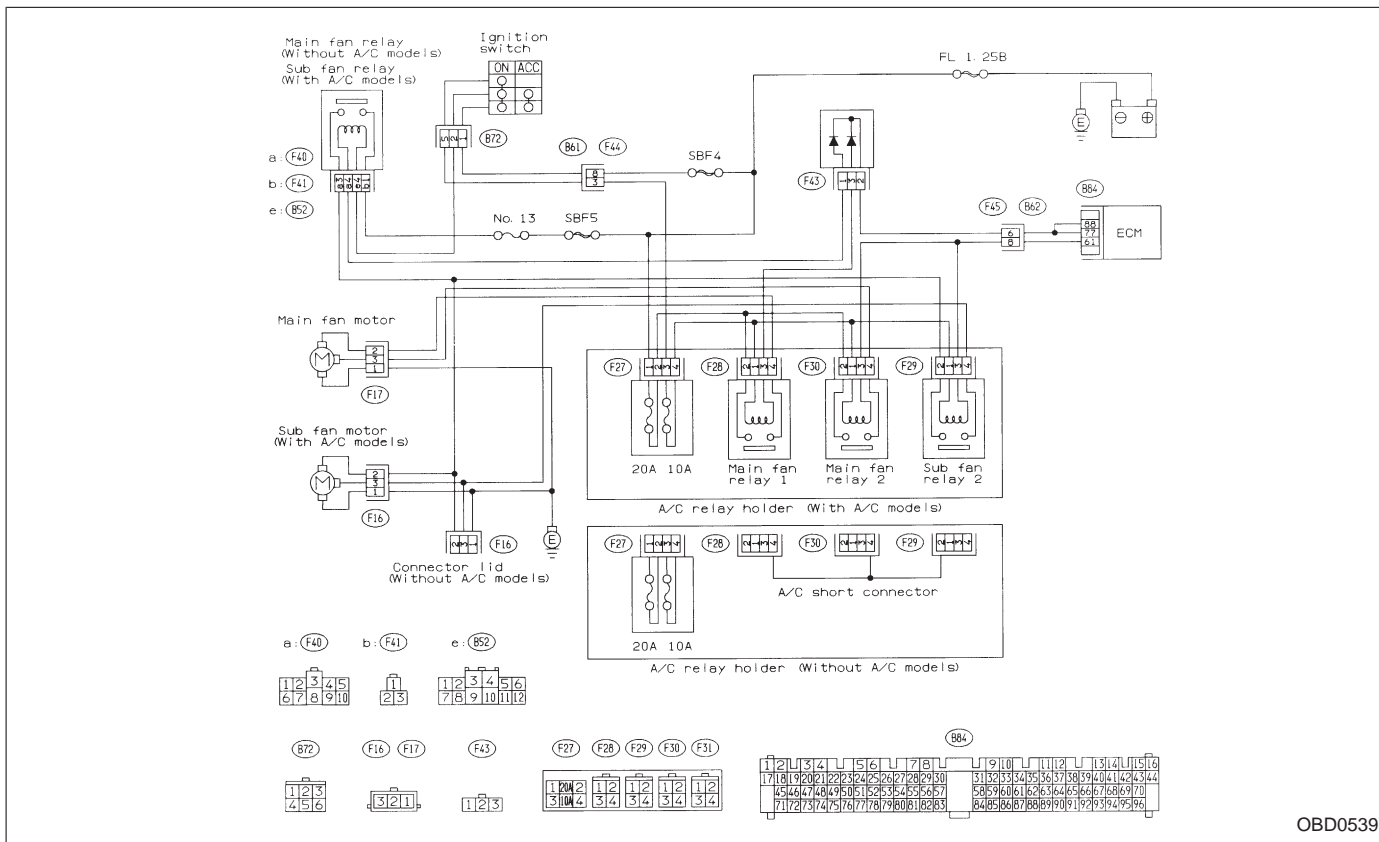
- Two consecutive trips with fault

TROUBLE SYMPTOM:

- Occurrence of noise
- Overheating

WIRING DIAGRAM:

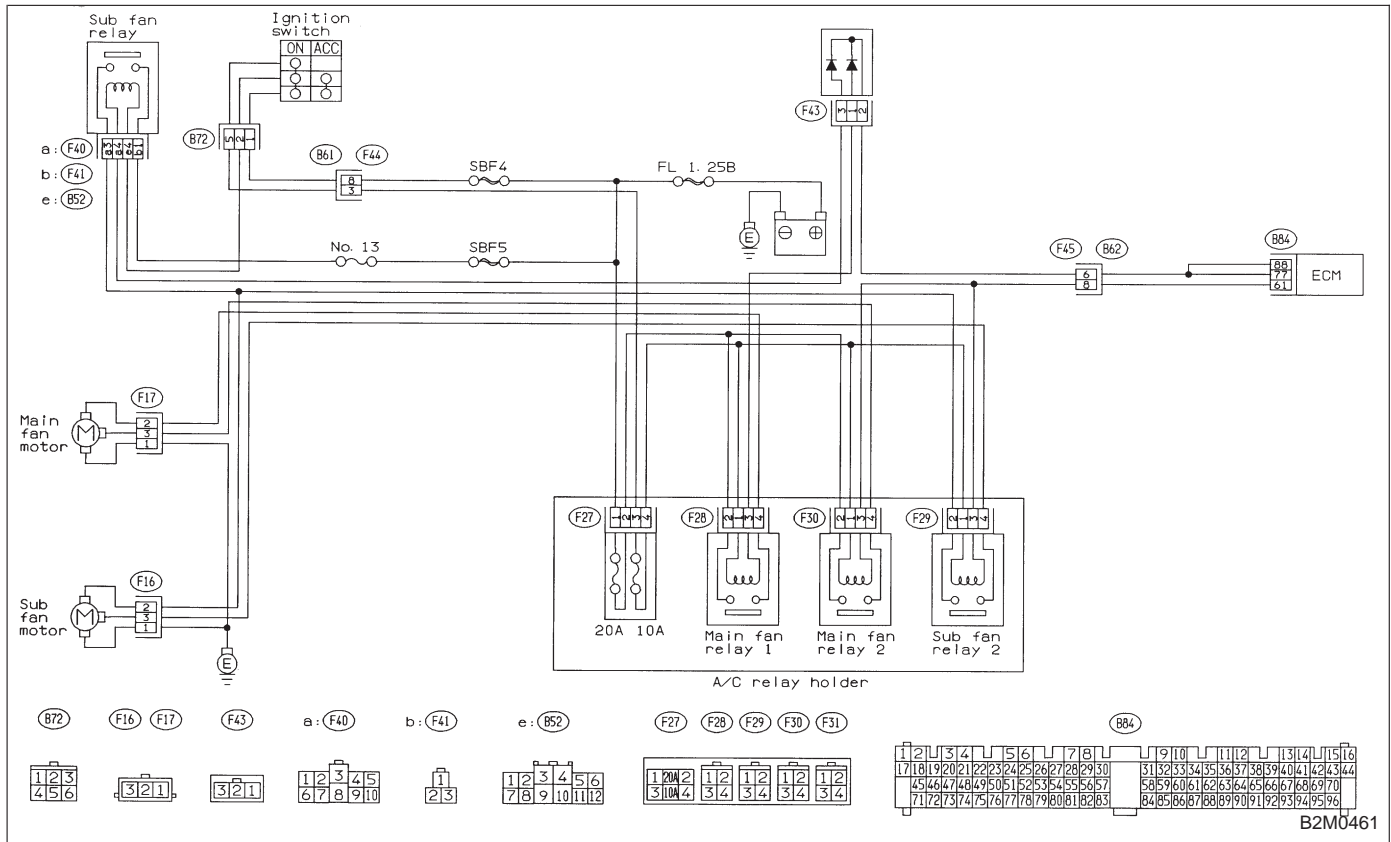
● LHD model



OBD0539

WIRING DIAGRAM:

● RHD model



When DTC P1104 is on display, check engine cooling system. <Ref. to 2-5 [K100].>

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

NOTE:

If the vehicle, with the engine idling, is placed very close to a wall or another vehicle, preventing normal cooling function, the OBD system may detect malfunction.

OBD	(FB1)
P1700	<ATTH>
OBD0501	

BK: DTC P1700
— THROTTLE POSITION SENSOR CIRCUIT
MALFUNCTION FOR AUTOMATIC
TRANSMISSION (ATTH) —

DESCRIPTION:

- The throttle position sensor provides electrical signals corresponding to the throttle opening. The throttle opening and accelerator depression speed are detected by this throttle position sensor output.

- Detects throttle opening and determines shift point, line pressure and lockup vehicle speed according to engine load.

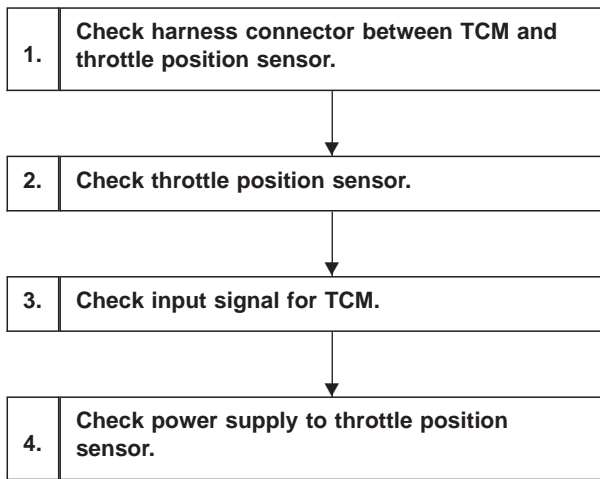
<Ref. to “G: DTC P0120 — THROTTLE POSITION SENSOR CIRCUIT MALFUNCTION — [T11G0]”.>

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

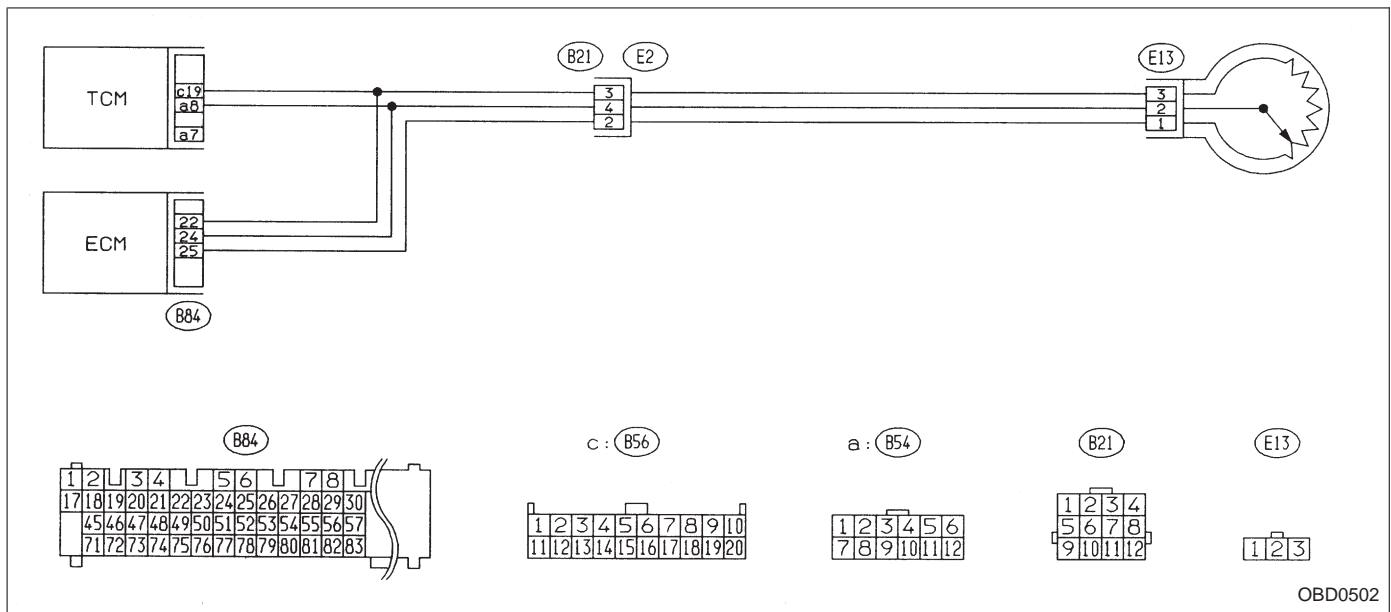
- Shift point too high or too low; engine brake not effected in “3” range; excessive shift shock; excessive tight corner “braking”



CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



NOTE:

For the diagnostic procedure on throttle position sensor circuit, refer to "3-2 [T7L0]".

OBD	(FB1)
P1701	<CRS>
OBD0511	

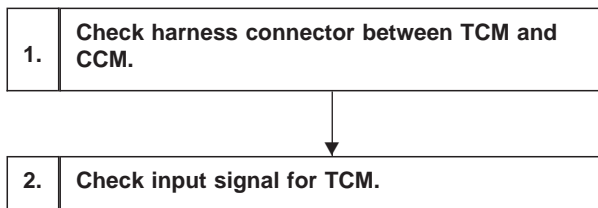
**BL: DTC P1701
 — CRUISE CONTROL SET SIGNAL CIRCUIT
 MALFUNCTION FOR AUTOMATIC
 TRANSMISSION (CRS) —**

DESCRIPTION:

Detects operation of cruise control, and expands “4th” operating range.

DTC DETECTING CONDITION:

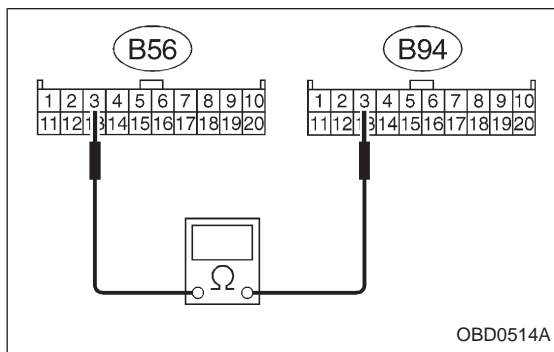
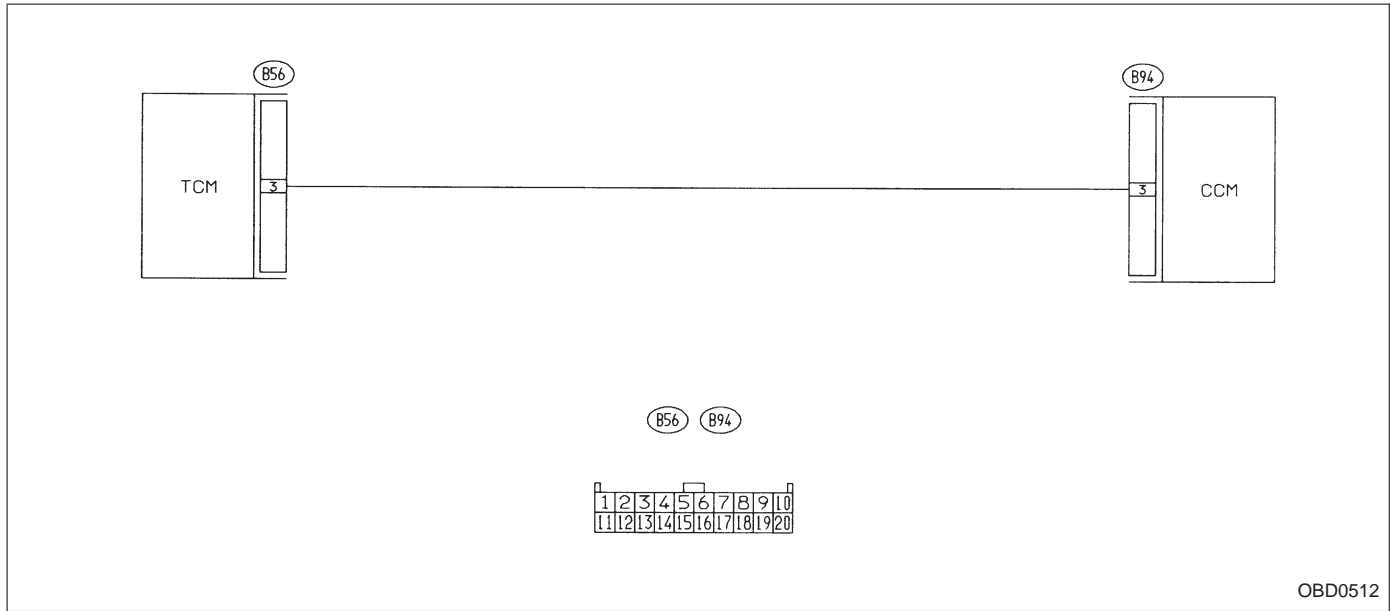
- Two consecutive trips with fault



CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

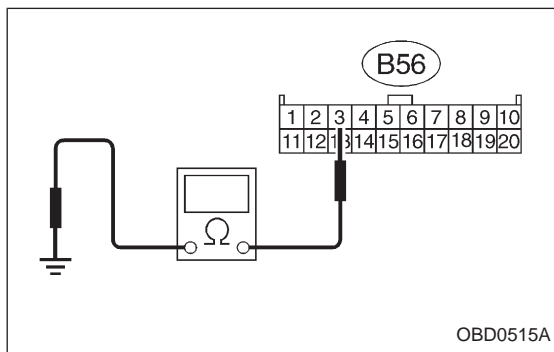
WIRING DIAGRAM:



1. CHECK HARNESS CONNECTOR BETWEEN TCM AND CCM.

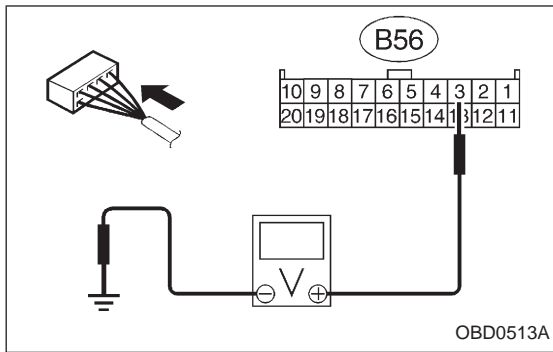
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and CCM.
- 3) Measure resistance of harness connector between TCM and CCM.

- CHECK** : Connector & terminal (B56) No. 3 — (B94) No. 3 / 10 Ω, or less
- NO** : Repair open circuit of harness between TCM connector and CCM connector.
- YES** : Go to next step.



- 4) Measure resistance of harness connector between TCM and body.

- CHECK** : Connector & terminal (B56) No. 3 — Body / 1 MΩ, or more
- NO** : Repair short circuit of harness between TCM connector and CCM connector.
- YES** : Go to step 2.



2 CHECK INPUT SIGNAL FOR TCM.

- 1) Connect connector to TCM and CCM.
- 2) Lift-up the vehicle or set the vehicle on free rollers.

CAUTION:
On AWD models, raise all wheels off ground.

- 3) Start the engine.
- 4) Cruise control main switch to ON.
- 5) TCS OFF switch to ON. (with TCS models only)
- 6) Move selector lever to "D" and slowly increase vehicle speed to 50 km/h (31 MPH).
- 7) Cruise control set switch to ON.
- 8) Measure voltage between TCM and body.

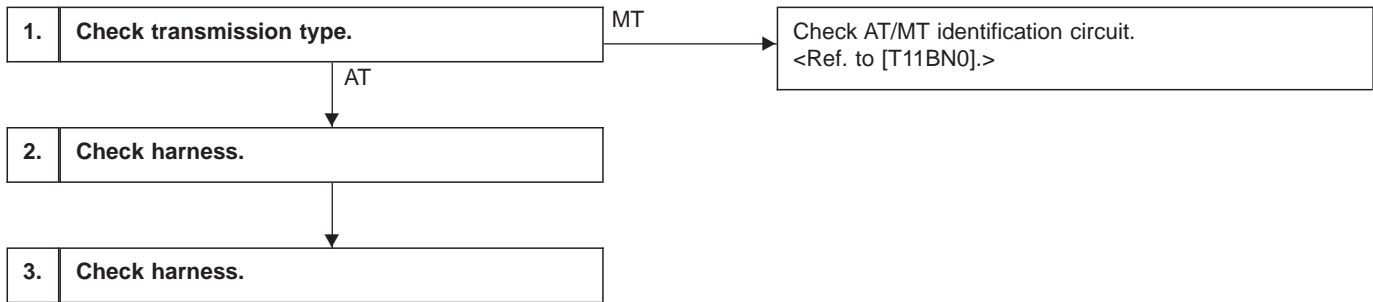
- CHECK** : **Connector & terminal (B56) No. 3 — Body / 1 V, or less**
- NO** : Check cruise control set circuit. <Ref. to 6-2 [T7A0].>
- YES** : Go to next **CHECK** .
- CHECK** : **Is there poor contact in TCM connector?**
- YES** : Repair poor contact in TCM connector.
- NO** : Replace TCM with a new one.

OBD	(FB1)
P1702	<ATDIAG>
OBD0516	

**BM: DTC P1702
 — AUTOMATIC TRANSMISSION DIAGNOSIS
 INPUT SIGNAL CIRCUIT MALFUNCTION
 (ATDIAG) —**

DTC DETECTING CONDITION:

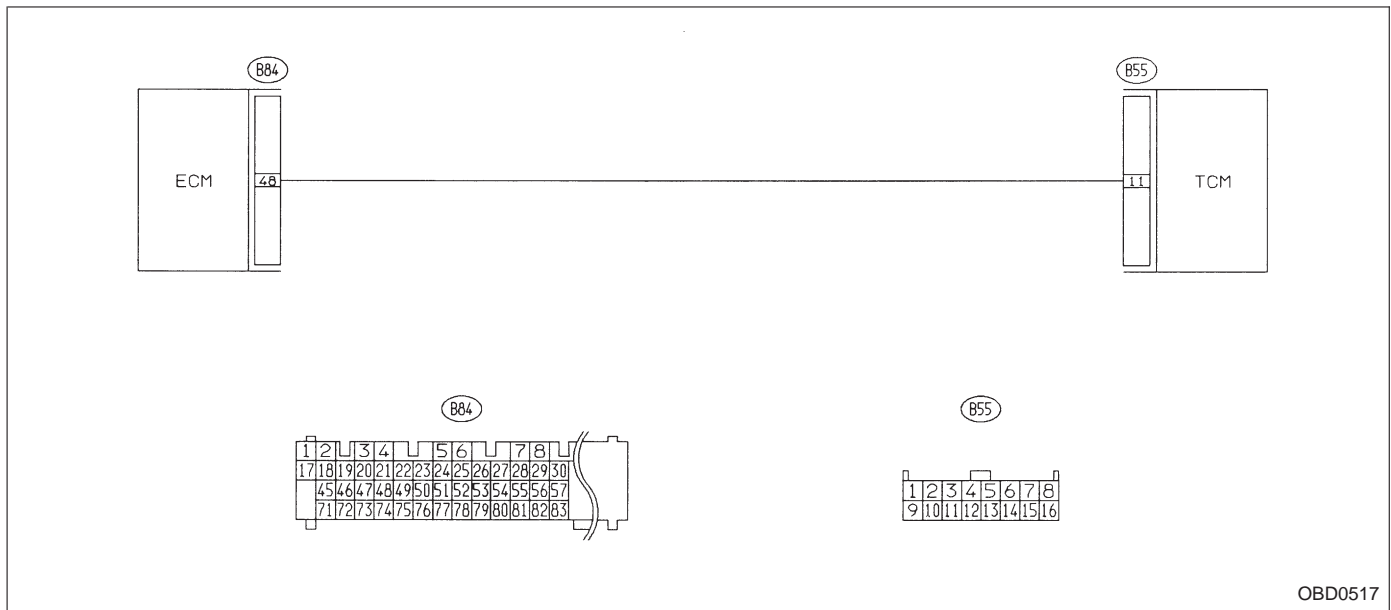
- Two consecutive trips with fault



CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to [T3D0] and [T3E0].>

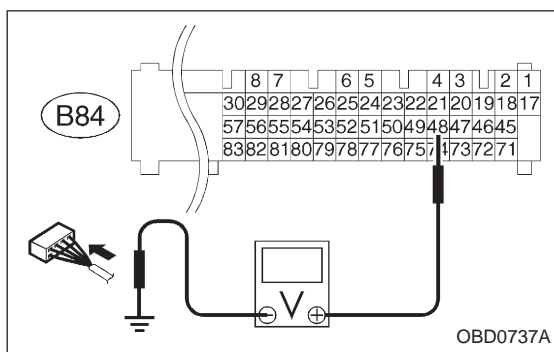
WIRING DIAGRAM:



OBD0517

1 CHECK TRANSMISSION TYPE.

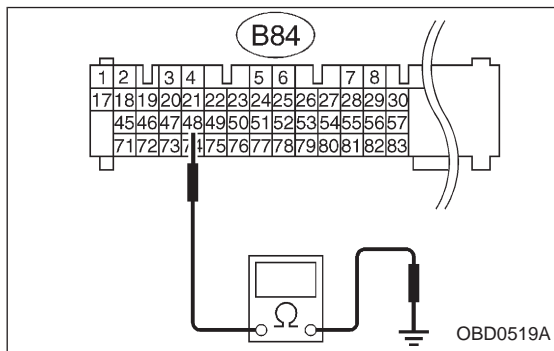
Refer to flow chart on page 346.



2 CHECK HARNESS.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM connector and body.

- CHECK** : **Connector & terminal (B84) No. 48 — Body / 4 V, or more**
- YES** : ● Open circuit of harness between ECM connector and TCM connector
● Poor contact in ECM connector
● Poor contact in TCM connector
Check the above and repair if necessary.
- NO** : Go to next **CHECK** .
- CHECK** : **Connector & terminal (B84) No. 48 — Body / 1 V, or less**
- YES** : Go to step 3.
- NO** : Although MIL illuminates, circuit is now normal. Check all connectors for possible poor contact between ECM connector and TCM connector.



3 CHECK HARNESS.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ECM.
- 3) Measure resistance between ECM harness connector and body.

- CHECK** : **Connector & terminal (B84) No. 48 — Body / 10 Ω, or less**
- YES** : Repair short circuit of harness between ECM connector and TCM connector.
- NO** : Repair poor contact in ECM connector.

BN: — AT/MT IDENTIFICATION CIRCUIT MALFUNCTION [MT VEHICLES] —

DESCRIPTION:

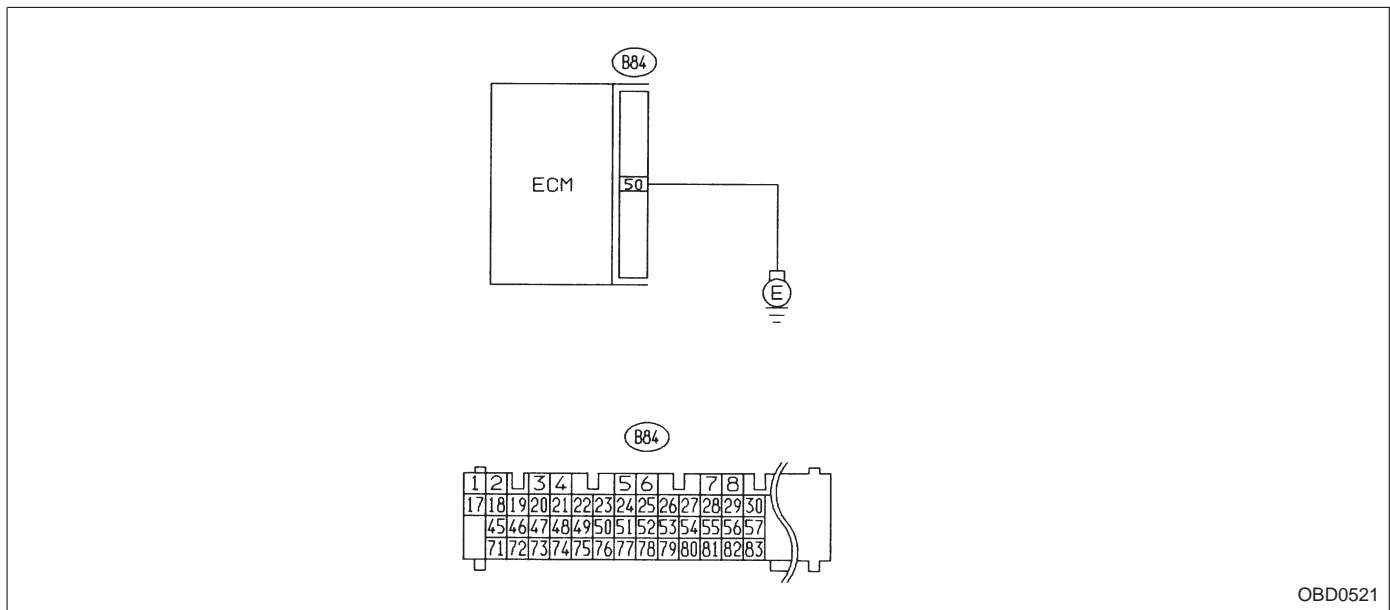
The circuit allows the ECM to identify the vehicle as an AT or MT vehicle.

- | | |
|----|--------------------------|
| 1. | Check harness connector. |
|----|--------------------------|

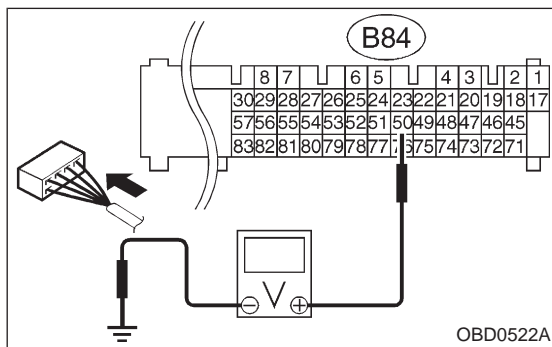
CAUTION:

After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**. <Ref. to [T3D0] and [T3E0].>

WIRING DIAGRAM:



OBD0521



OBD0522A

1 CHECK HARNESS CONNECTOR.

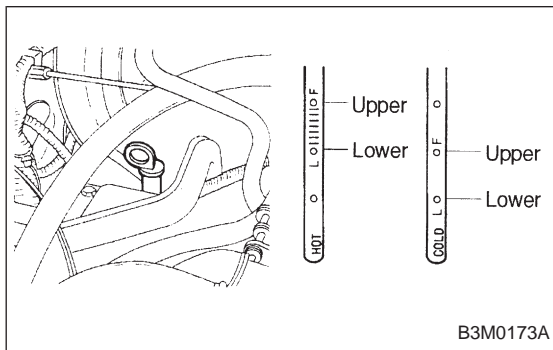
- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM and body.

- CHECK** : **Connector & terminal (B84) No. 50 — Body / 2 V, or more**
- YES** : Repair open circuit of harness between ECM connector and body.
- NO** : Confirm good connection at ECM connector.

1. Supplemental Restraint System "Airbag"

Airbag system wiring harness is routed near the transmission control module (TCM).

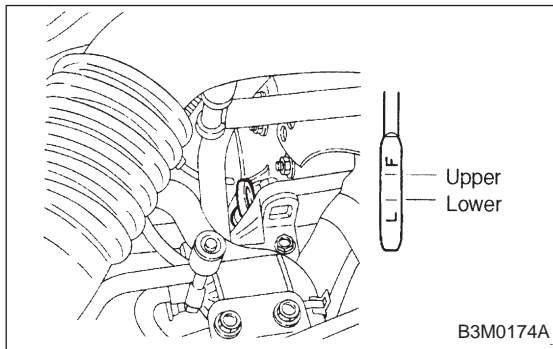
- All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuit.
- Be careful not to damage Airbag system wiring harness when performing diagnostics and servicing the TCM.



2. Pre-inspection

1. ATF LEVEL

Make sure that ATF level is in the specification.



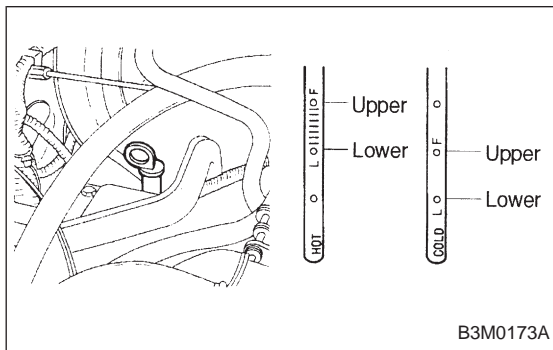
2. FRONT DIFFERENTIAL OIL LEVEL

Make sure that front differential oil level is in the specification.

1. Supplemental Restraint System "Airbag"

Airbag system wiring harness is routed near the transmission control module (TCM).

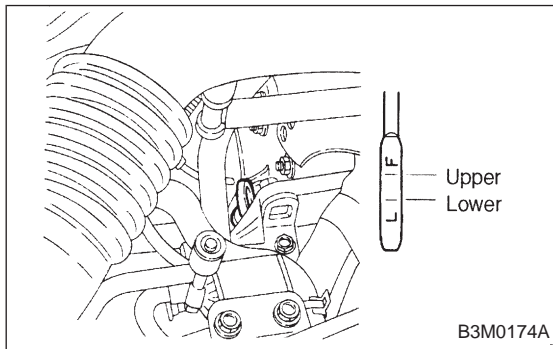
- All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuit.
- Be careful not to damage Airbag system wiring harness when performing diagnostics and servicing the TCM.



2. Pre-inspection

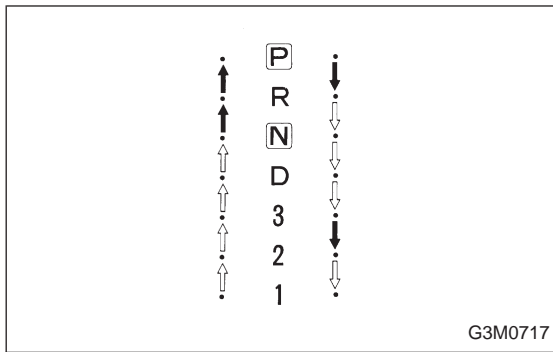
1. ATF LEVEL

Make sure that ATF level is in the specification.



2. FRONT DIFFERENTIAL OIL LEVEL

Make sure that front differential oil level is in the specification.



3. OPERATION OF SHIFT SELECTOR LEVER

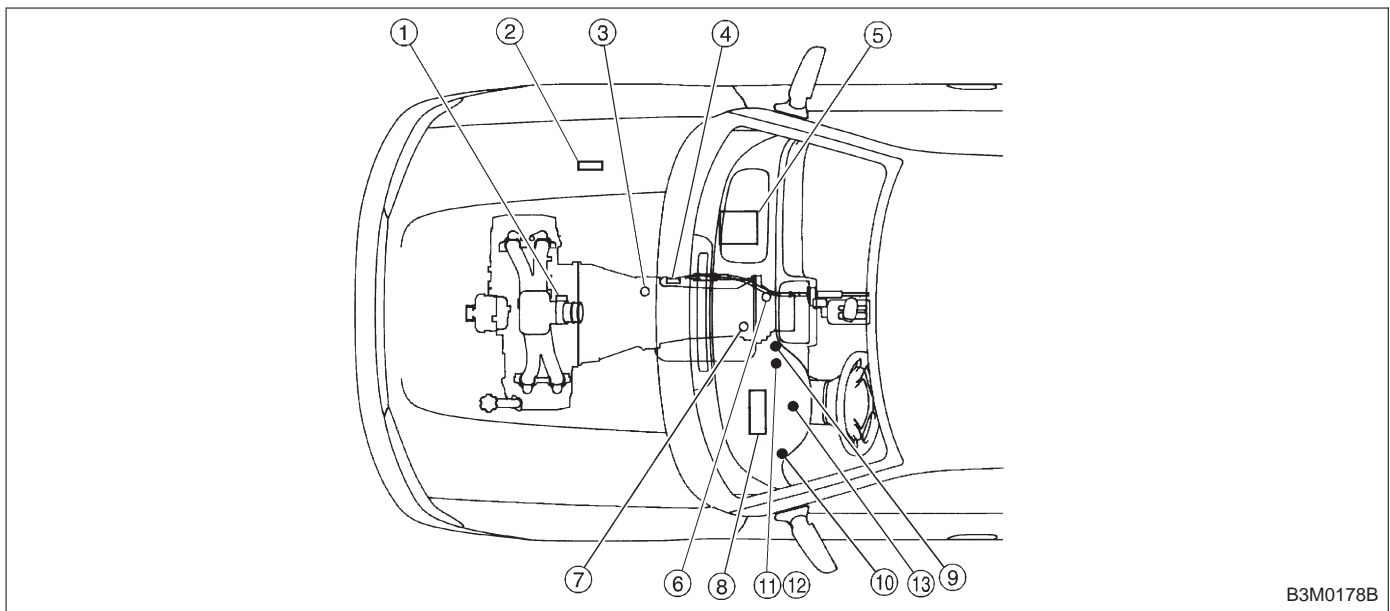
WARNING:

Stop the engine while checking operation of selector lever.

- 1) Check that selector lever does not move from “N” to “R” without pushing the button.
- 2) Check that selector lever does not move from “R” to “P” without pushing the button.
- 3) Check that selector lever does not move from “P” to “R” without pushing the button.
- 4) Check that selector lever does not move from “3” to “2” without pushing the button.

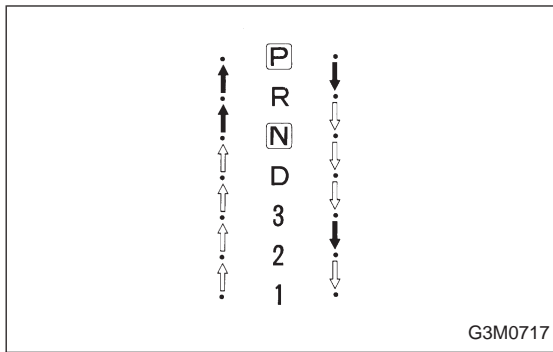
3. Electrical Components Location

1. SENSOR AND CONTROL MODULE



- ① Throttle position sensor
- ② Dropping resistor
- ③ Vehicle speed sensor 2
- ④ Inhibitor switch
- ⑤ ECM
- ⑥ Vehicle speed sensor 1 (AWD)
- ⑦ Vehicle speed sensor 1 (FWD)
- ⑧ TCM

- ⑨ Data link connector (for Subaru select monitor only)
- ⑩ Data link connector (for Subaru select monitor and OBD-II general scan tool)
- ⑪ Diagnosis connector
- ⑫ Diagnosis terminal
- ⑬ AT OIL TEMP indicator light (AT diagnostic indicator light)



3. OPERATION OF SHIFT SELECTOR LEVER

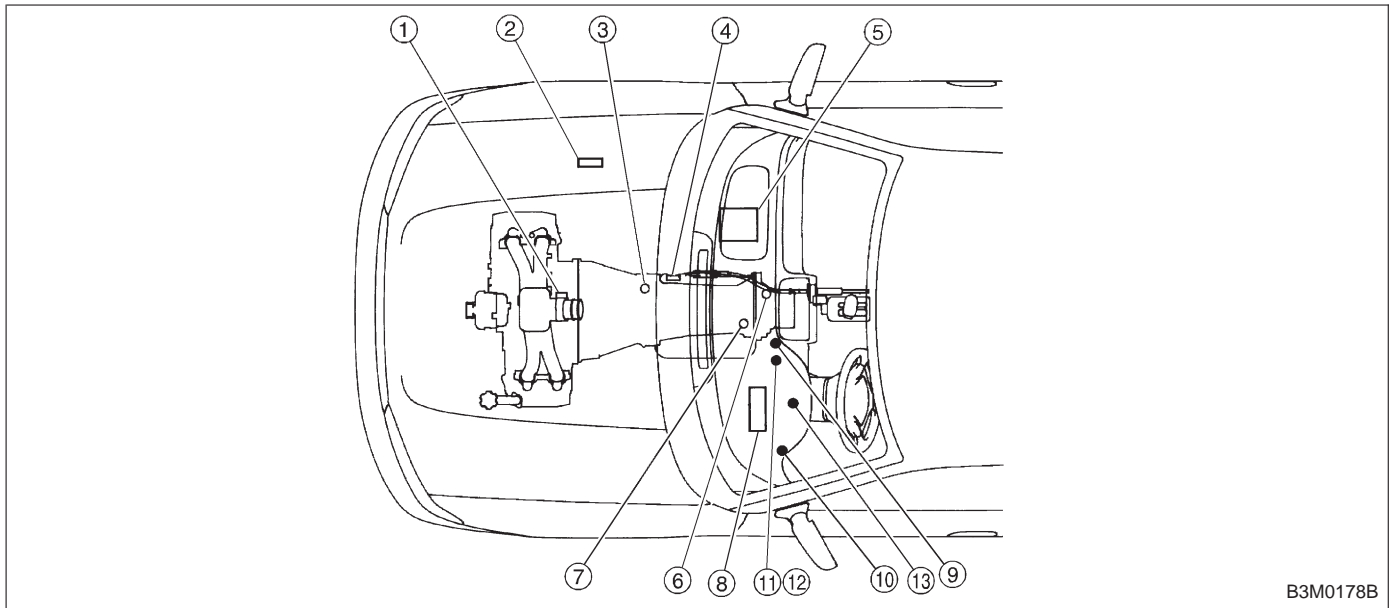
WARNING:

Stop the engine while checking operation of selector lever.

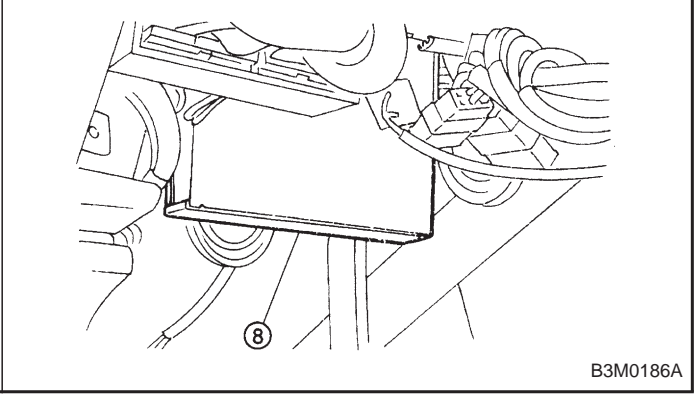
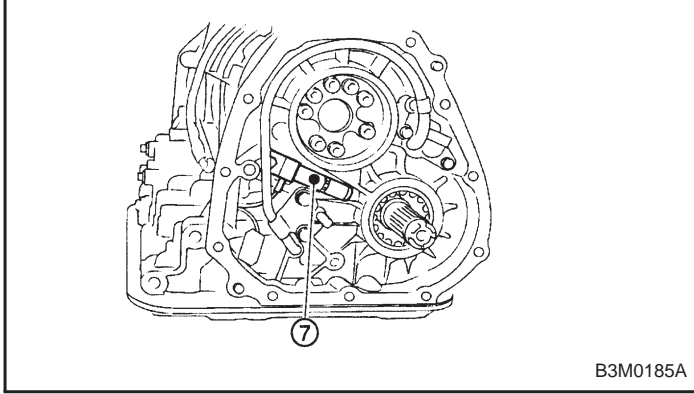
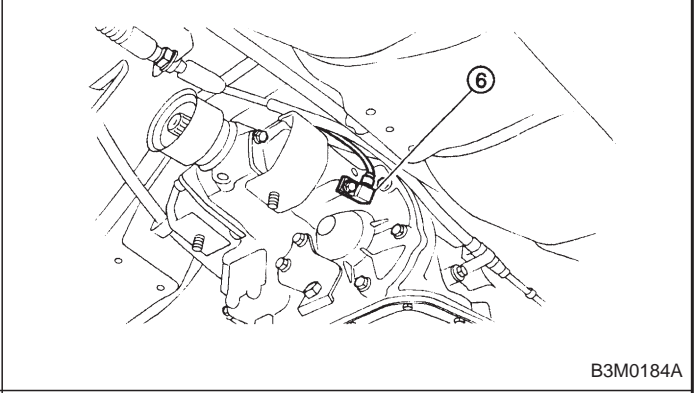
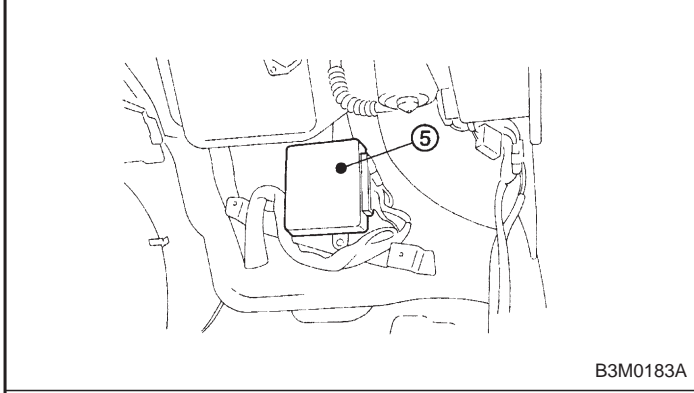
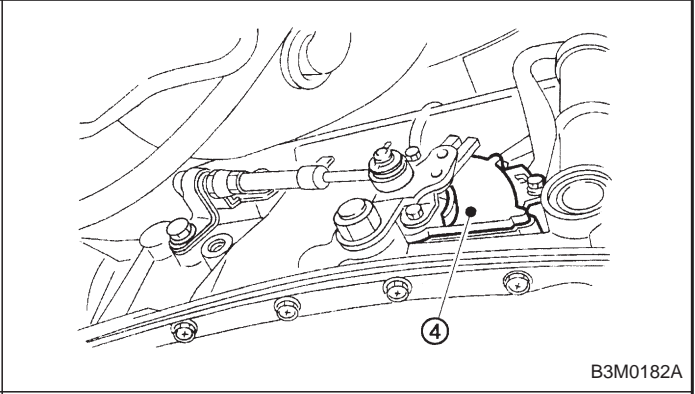
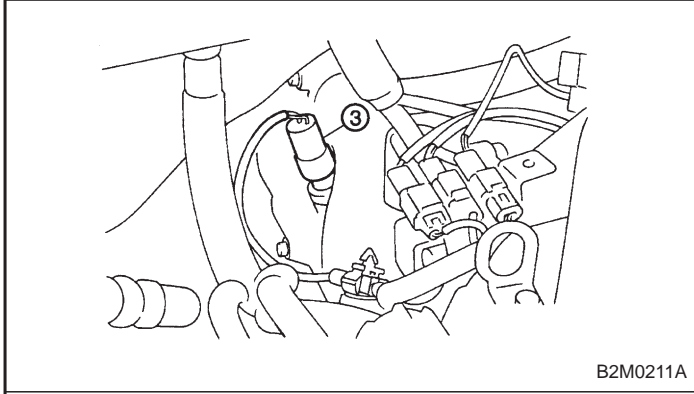
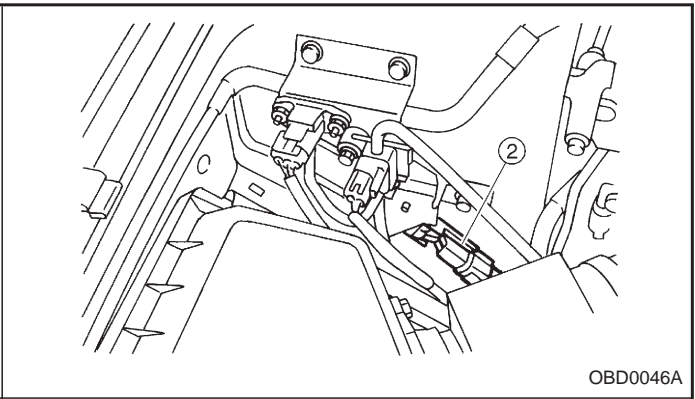
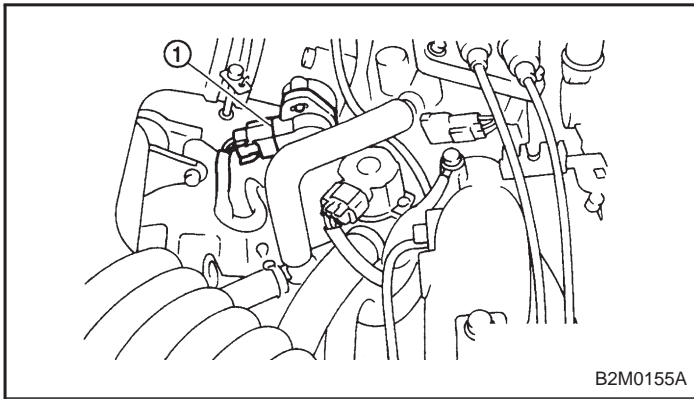
- 1) Check that selector lever does not move from “N” to “R” without pushing the button.
- 2) Check that selector lever does not move from “R” to “P” without pushing the button.
- 3) Check that selector lever does not move from “P” to “R” without pushing the button.
- 4) Check that selector lever does not move from “3” to “2” without pushing the button.

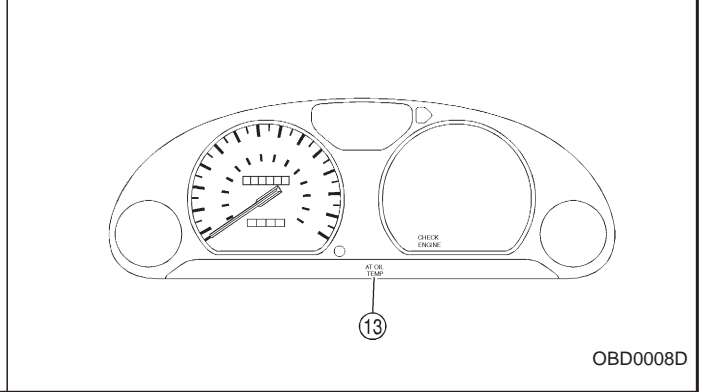
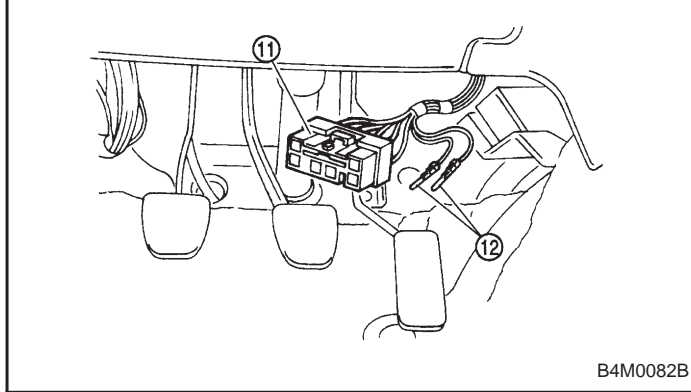
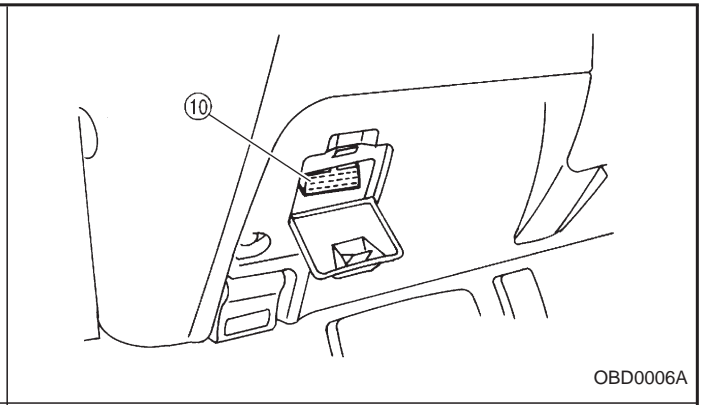
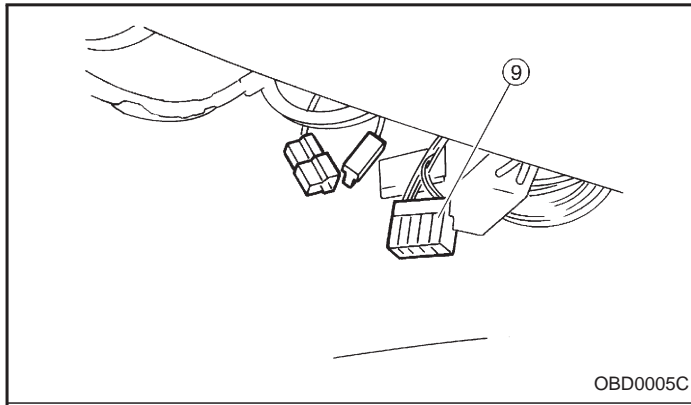
3. Electrical Components Location

1. SENSOR AND CONTROL MODULE

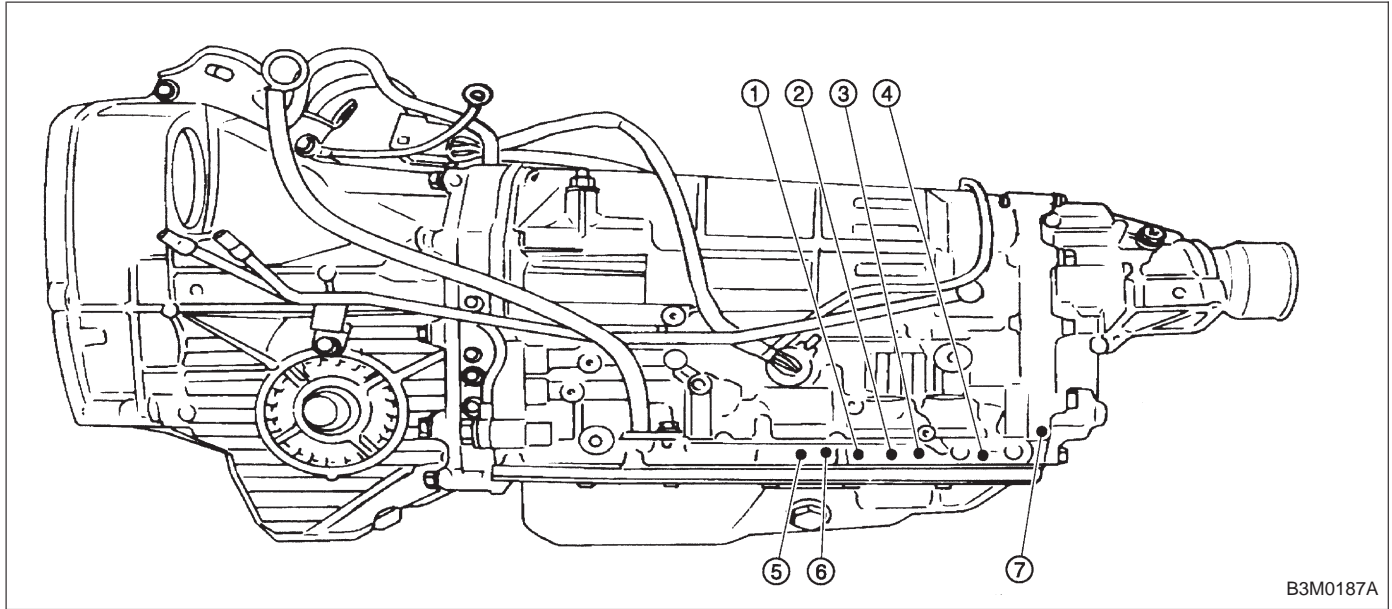


- | | |
|---|--|
| <ul style="list-style-type: none"> ① Throttle position sensor ② Dropping resistor ③ Vehicle speed sensor 2 ④ Inhibitor switch ⑤ ECM ⑥ Vehicle speed sensor 1 (AWD) ⑦ Vehicle speed sensor 1 (FWD) ⑧ TCM | <ul style="list-style-type: none"> ⑨ Data link connector (for Subaru select monitor only) ⑩ Data link connector (for Subaru select monitor and OBD-II general scan tool) ⑪ Diagnosis connector ⑫ Diagnosis terminal ⑬ AT OIL TEMP indicator light (AT diagnostic indicator light) |
|---|--|





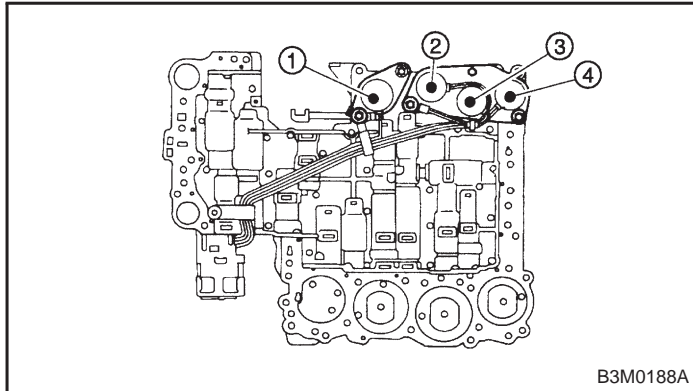
2. SOLENOID



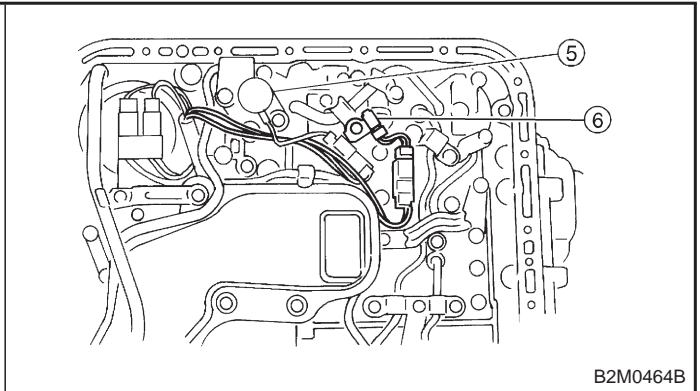
B3M0187A

- ① Duty solenoid A
- ② Solenoid 2
- ③ Solenoid 1
- ④ Solenoid 3

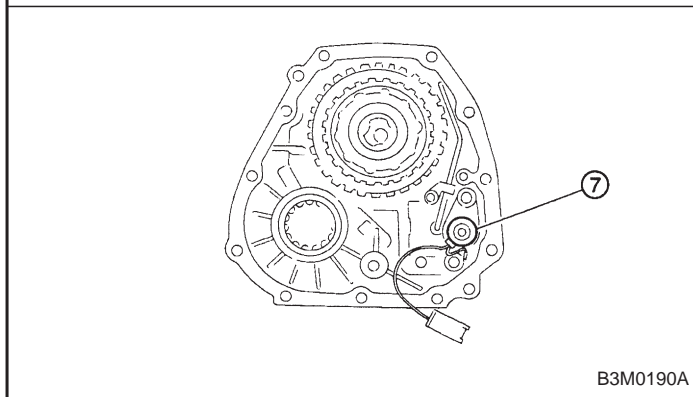
- ⑤ Duty solenoid B
- ⑥ ATF temperature sensor
- ⑦ Duty solenoid C (AWD)



B3M0188A



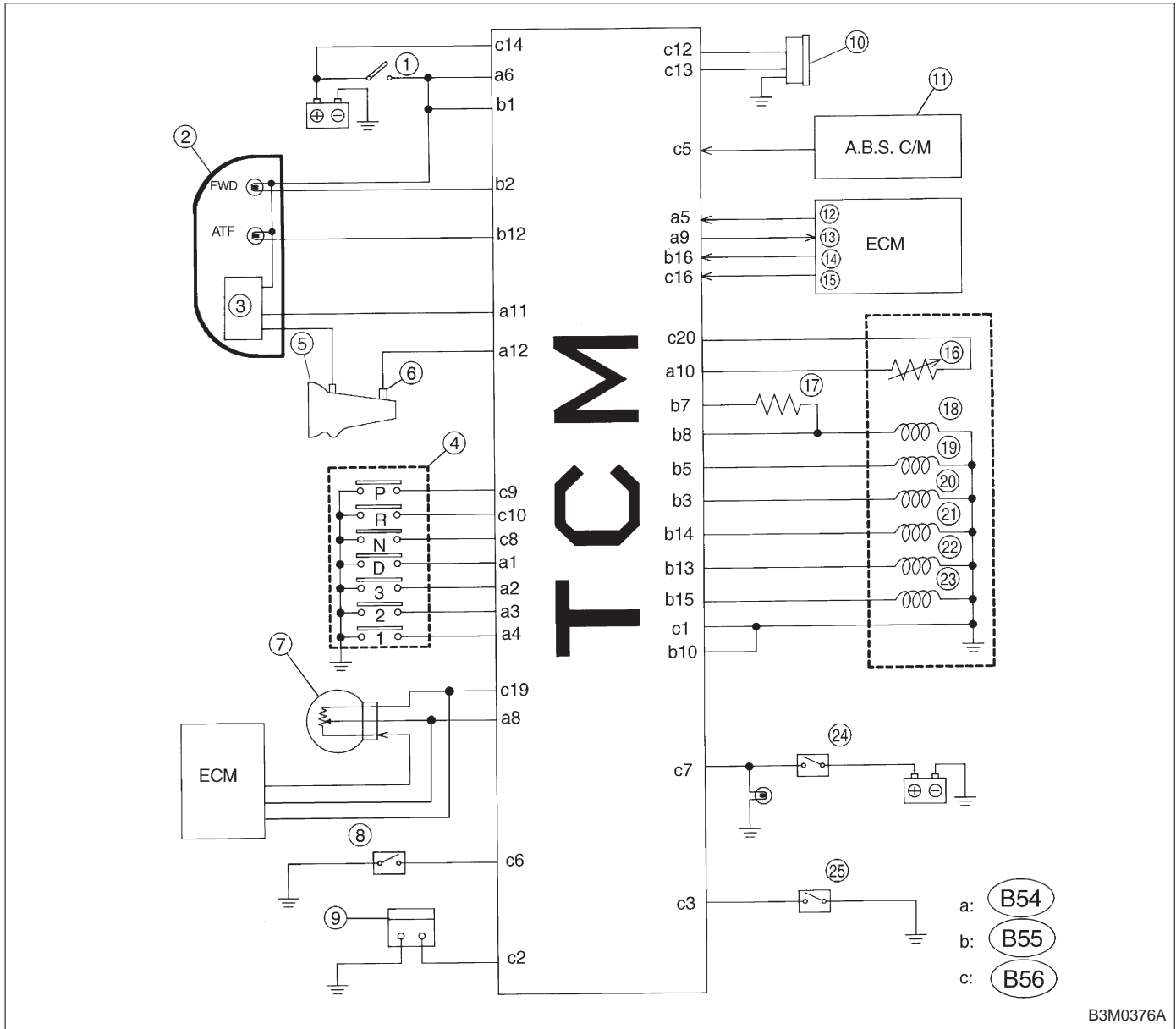
B2M0464B



B3M0190A

SUBARU.

4. Schematic



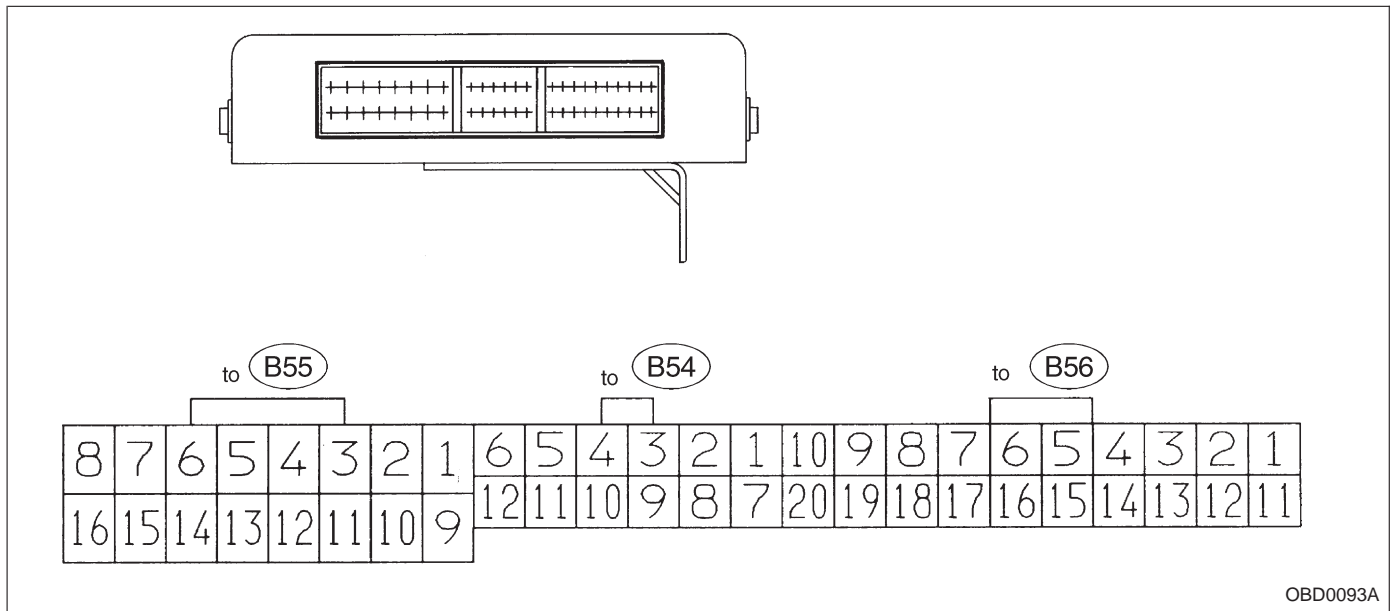
B3M0376A

- ① Ignition switch
- ② Combination meter
- ③ Speedometer circuit
- ④ Inhibitor switch
- ⑤ Vehicle speed sensor 2
- ⑥ Vehicle speed sensor 1
- ⑦ Throttle position sensor
- ⑧ Diagnosis switch
- ⑨ FWD switch (AWD)

- ⑩ Data link connector
- ⑪ ABS control module
- ⑫ Engine speed signal
- ⑬ Torque control signal
- ⑭ Torque control cut signal
- ⑮ Mass air flow signal
- ⑯ ATF temperature sensor
- ⑰ Dropping resistor

- ⑱ Duty solenoid A
- ⑲ Duty solenoid B
- ⑳ Duty solenoid C (AWD)
- ㉑ Shift solenoid 1
- ㉒ Shift solenoid 2
- ㉓ Shift solenoid 3
- ㉔ Brake switch
- ㉕ Cruise set switch

5. Transmission Control Module (TCM) I/O Signal



OBD0093A

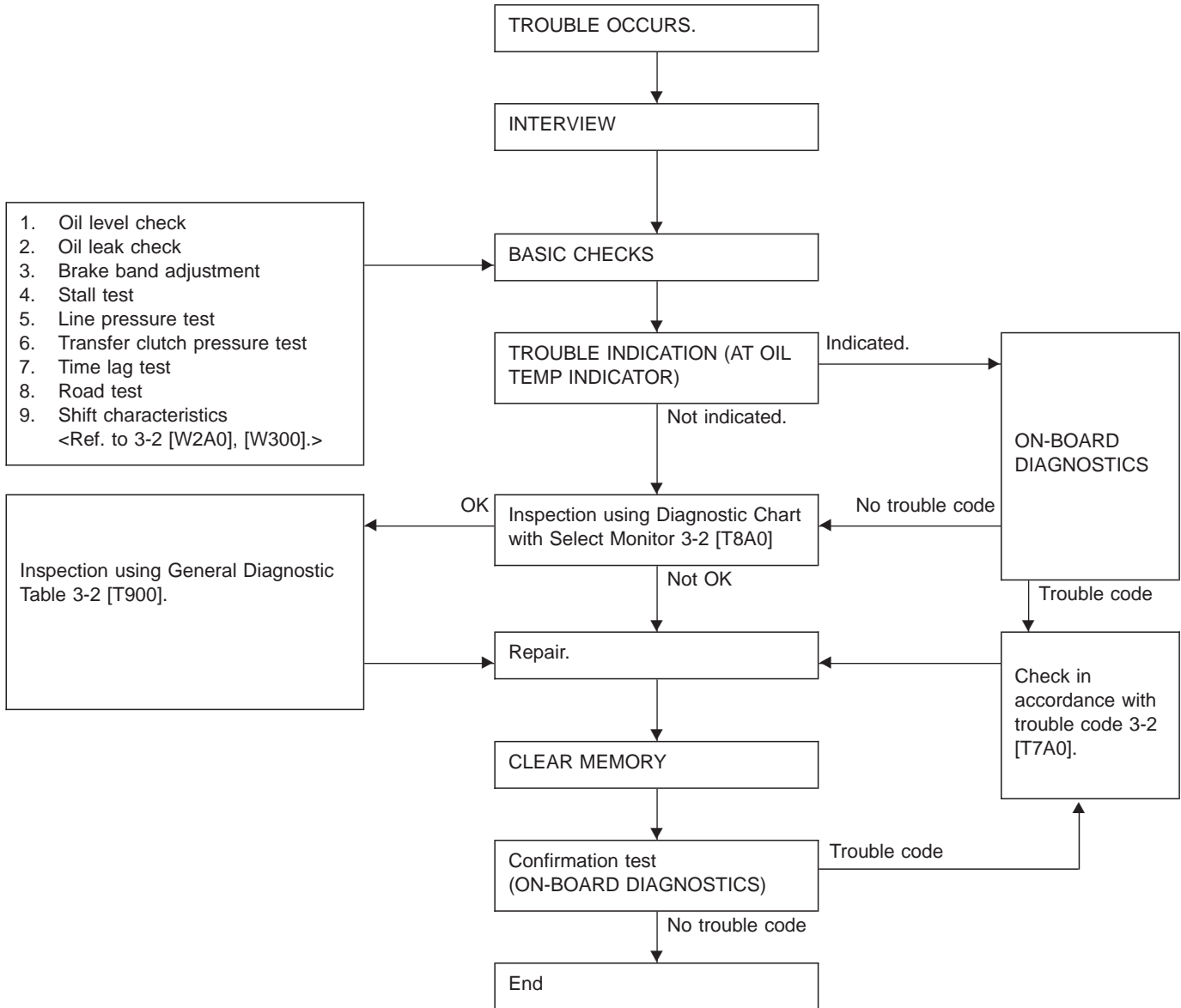
Check with ignition switch ON.

Content		Connector No.	Terminal No.	Measuring conditions	Voltage (V)
Back-up power supply		B56	14	Ignition switch OFF	10 — 16
Ignition power supply		B54	6	Ignition switch ON (with engine OFF)	10 — 16
		B55	1		
Inhibitor switch	"P" range switch	B56	9	Select lever in "P" range	Less than 1
				Select lever in any other than "P" range (except "N" range)	More than 8
	"N" range switch	B56	8	Select lever in "N" range	Less than 1
				Select lever in any other than "N" range (except "P" range)	More than 8
	"R" range switch	B56	10	Select lever in "R" range	Less than 1
				Select lever in any other than "R" range	More than 6
	"D" range switch	B54	1	Select lever in "D" range	Less than 1
				Select lever in any other than "D" range	More than 6
	"3" range switch	B54	2	Select lever in "3" range	Less than 1
				Select lever in any other than "3" range	More than 6
	"2" range switch	B54	3	Select lever in "2" range	Less than 1
				Select lever in any other than "2" range	More than 6
	"1" range switch	B54	4	Select lever in "1" range	Less than 1
				Select lever in any other than "1" range	More than 6
Diagnosis switch		B56	6	Diagnosis connector connected	Less than 1
				Diagnosis connector disconnected	More than 6
Brake switch		B56	7	Brake pedal depressed.	More than 10.5
				Brake pedal released.	Less than 1
ABS signal		B56	5	ABS switch ON	Less than 1
				ABS switch OFF	More than 6.5
AT diagnostic signal		B55	12	Ignition switch ON (With engine OFF)	Less than 1
				Ignition switch ON (With engine ON)	More than 10

Content	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
Throttle position sensor	B54	8	Throttle fully closed.	0.5±0.2	—
			Throttle fully open.	4.6±0.3	
Throttle position sensor power supply	B56	19	Ignition switch ON (With engine OFF)	5.05±0.25	—
ATF temperature sensor	B54	10	ATF temperature 20°C (68°F)	3.45±0.55	2.1 — 2.9 k
			ATF temperature 80°C (176°F)	1.2±0.2	275 — 375
Vehicle speed sensor 1	B54	12	Vehicle stopped.	0	450 — 720
			Vehicle speed at least 20 km/h (12 MPH)	More than 1 (AC range)	
Vehicle speed sensor 2	B56	11	When vehicle is slowly moved at least 2 meters (7ft).	Less than 1↔More than 9	—
Engine speed signal	B54	5	Ignition switch ON (with engine OFF).	More than 10.5	—
			Ignition switch ON (with engine ON).	8 — 11	
Cruise set signal	B56	3	When cruise control is set (SET lamp ON).	Less than 1	—
			When cruise control is not set (SET lamp OFF).	More than 6.5	
Torque control signal	B55	16	Ignition switch ON	5±1	—
Torque control cut signal	B56	16	Ignition switch ON	6 — 9	—
Mass air flow signal	B54	9	Engine idling after warm-up	0.5 — 1.2	—
Shift solenoid 1	B55	14	1st or 4th gear	More than 9	20 — 32
			2nd or 3rd gear	Less than 1	
Shift solenoid 2	B55	13	1st or 2nd gear	More than 9	20 — 32
			3rd or 4th gear	Less than 1	
Shift solenoid 3	B55	15	Select lever in "N" range (with throttle fully closed).	Less than 1	20 — 32
			Select lever in "D" range (with throttle fully closed).	More than 9	
Duty solenoid A	B55	8	Throttle fully closed (with engine OFF) after warm-up.	1.5 — 4.0	2.0 — 4.5
			Throttle fully open (with engine OFF) after warm-up.	Less than 1	
Dropping resistor	B55	7	Throttle fully closed (with engine OFF) after warm-up.	More than 8.5	12 — 18
			Throttle fully open (with engine OFF) after warm-up.	Less than 1	
Duty solenoid B	B55	5	When lock up occurs.	More than 8.5	9 — 17
			When lock up is released.	Less than 0.5	
Duty solenoid C (AWD model only)	B55	3	Fuse on FWD switch	More than 8.5	9 — 17
			Fuse removed from FWD switch (with throttle fully open and with select lever in 1st gear).	Less than 0.5	
Sensor ground line 1	B54	7	—	0	Less than 1
Sensor ground line 2	B56	20	—	0	Less than 1
System ground line	B56	1	—	0	Less than 1
Power system ground line	B55	10	—	0	Less than 1
FWD switch (AWD model only)	B56	2	Fuse removed.	6 — 9.1	—
			Fuse installed.	Less than 1	

6. Diagnostic Chart for On-board Diagnostic System

A: BASIC DIAGNOSTICS PROCEDURE



B: ABNORMAL DISPLAY ON AT OIL TEMP INDICATOR

When any on-board diagnostic item is malfunctioning, the display on the AT OIL TEMP indicator blinks immediately after the engine starts.

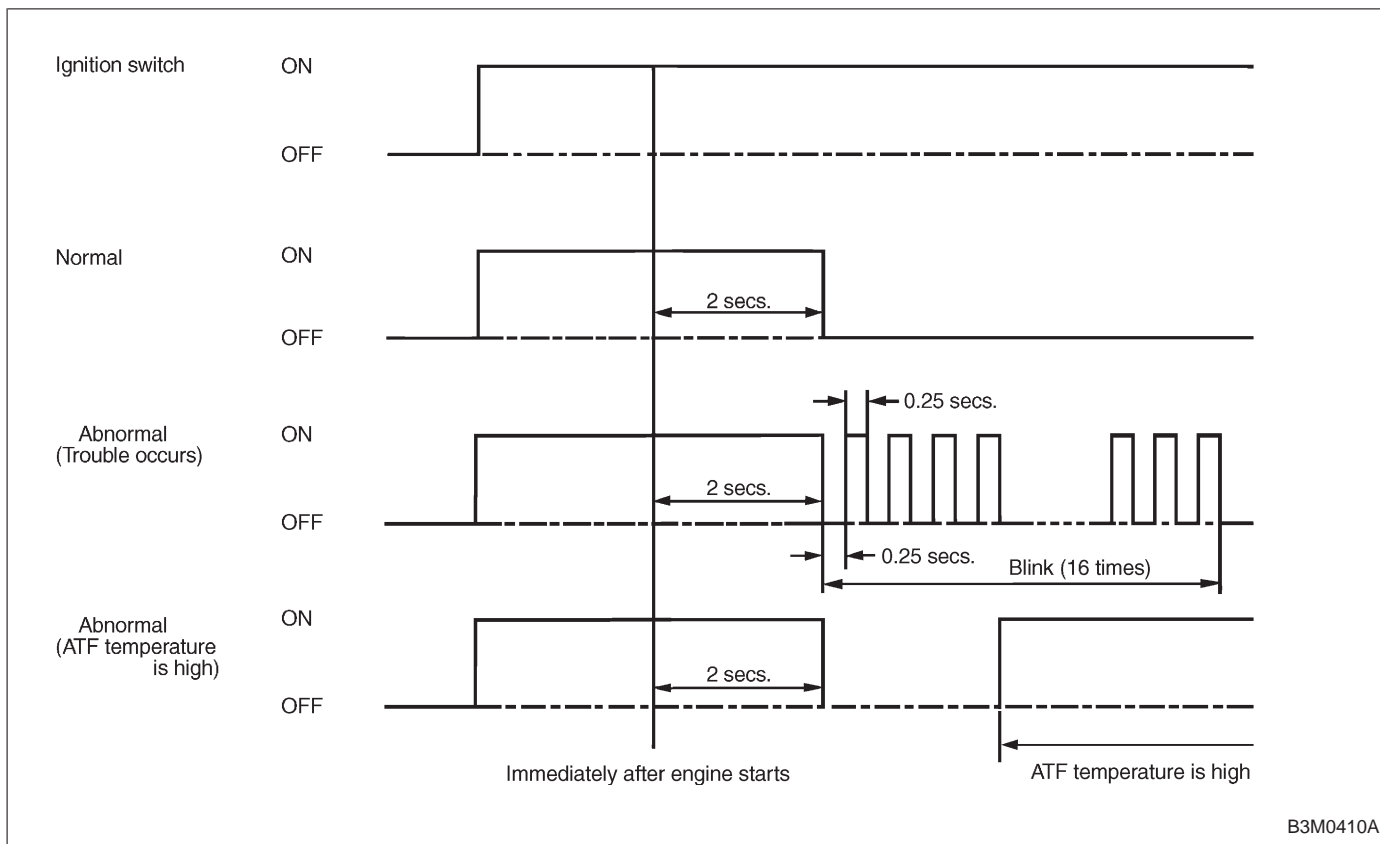
The malfunctioning part or unit can be determined by a trouble code during on-board diagnostic operation. Problems which occurred previously can also be identified through the memory function.

If the AT OIL TEMP indicator does not show a problem (although a problem is occurring), the problem can be determined by checking the performance characteristics of each sensor using the select monitor.

Indicator signal is as shown in the figure.

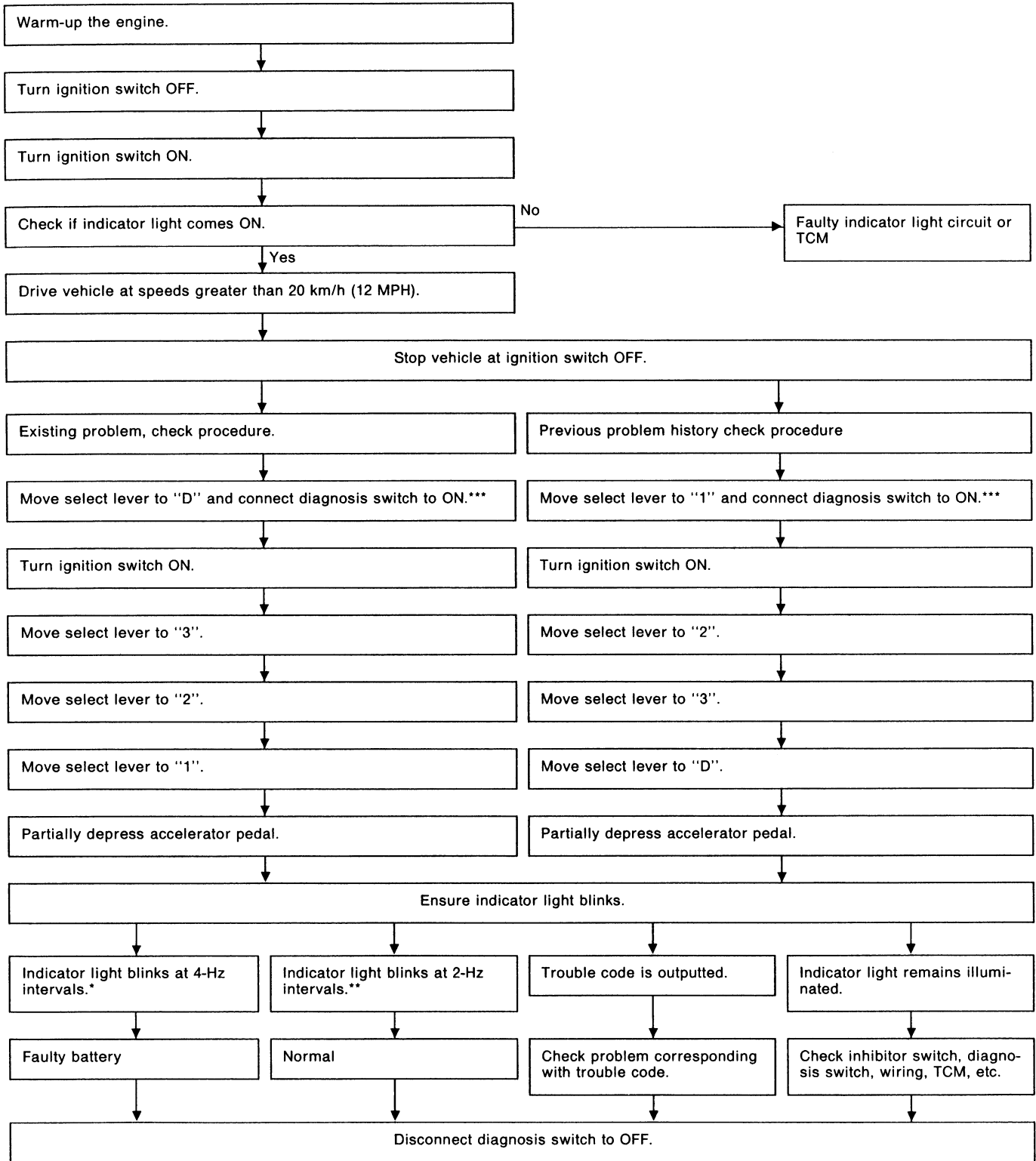
WARNING:

Warning can be noticed only when the engine is initially started.



B3M0410A

C: ON-BOARD DIAGNOSTICS



* : Blinks every 0.125 (1/8) seconds (until ignition switch is turned OFF).

** : Blinks every 0.25 (1/4) seconds (until ignition switch is turned OFF).

*** : Plug in diagnosis terminal to diagnosis connector No. 5 located below instrument lower cover.

D: LIST OF TROUBLE CODE

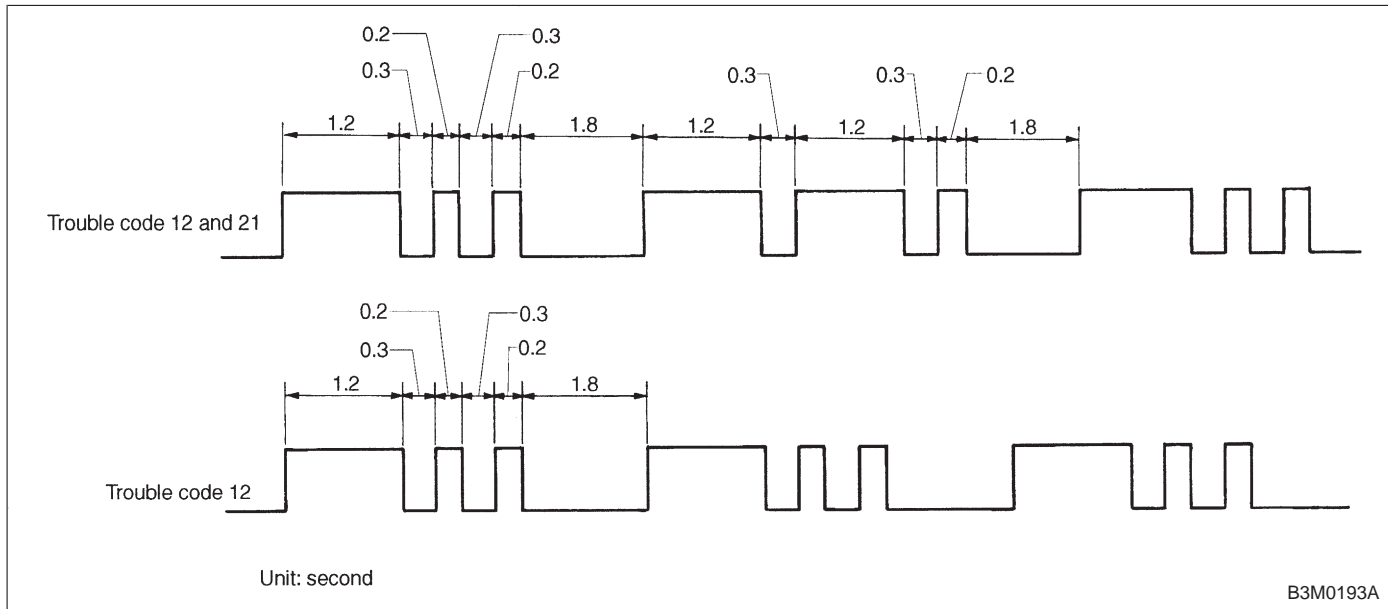
1. TROUBLE CODE

Trouble code	Item	Content of diagnosis	Abbr. (Select monitor)	Page
11	Duty solenoid A	Detects open or shorted drive circuit, as well as valve seizure.	PLDTY	16
12	Duty solenoid B	Detects open or shorted drive circuit, as well as valve seizure.	LUPTY	20
13	Shift solenoid 3	Detects open or shorted drive circuit, as well as valve seizure.	OVR	24
14	Shift solenoid 2	Detects open or shorted drive circuit, as well as valve seizure.	SFT2	26
15	Shift solenoid 1	Detects open or shorted drive circuit, as well as valve seizure.	SFT1	28
16	Torque control cut signal	Detects open or shorted input signal circuit.	TQ.DS	30
21	ATF temperature sensor	Detects open or shorted input signal circuit.	ATFT	32
22	Mass air flow signal	Detects open or shorted input signal circuit.	AFM	36
23	Engine speed signal	Detects open or shorted input signal circuit.	EREV	38
24	Duty solenoid C	Detects open or shorted drive circuit, as well as valve seizure.	4WPTY	40
25	Torque control signal	Detects open or shorted input signal circuit.	TQ.CT	42
31	Throttle position sensor	Detects open or shorted input signal circuit.	THV	44
32	Vehicle speed sensor 1	Detects open or shorted input signal circuit.	VSP1	48
33	Vehicle speed sensor 2	Detects open or shorted input signal circuit.	VSP2	52

2. HOW TO READ TROUBLE CODE OF INDICATOR LIGHT

The AT OIL TEMP indicator light flashes the code corresponding to the faulty part.

The long segment (1.2 sec on) indicates a "ten", and the short segment (0.2 sec on) signifies a "one".



E: CLEAR MEMORY

Current trouble codes shown on the display are cleared by turning the ignition switch OFF after conducting on-board diagnostic operation. Previous trouble codes, however, cannot be cleared since they are stored in the TCM memory which is operating on the back-up power supply. These trouble codes can be cleared by removing the specified fuse (located under the right lower portion of the instrument panel).

CLEAR MEMORY:

Removal of No. 14 fuse (for at least one minute)

- The No. 14 fuse is located in the line to the memory back-up power supply of the TCM and ABS/TCS control module. Removal of this fuse clears the previous trouble codes stored in the TCM and ABS/TCS control module memory.
- Be sure to remove the No. 14 fuse for at least the specified length of time. Otherwise, trouble codes may not be cleared.

7. Diagnostic Chart with Trouble Code

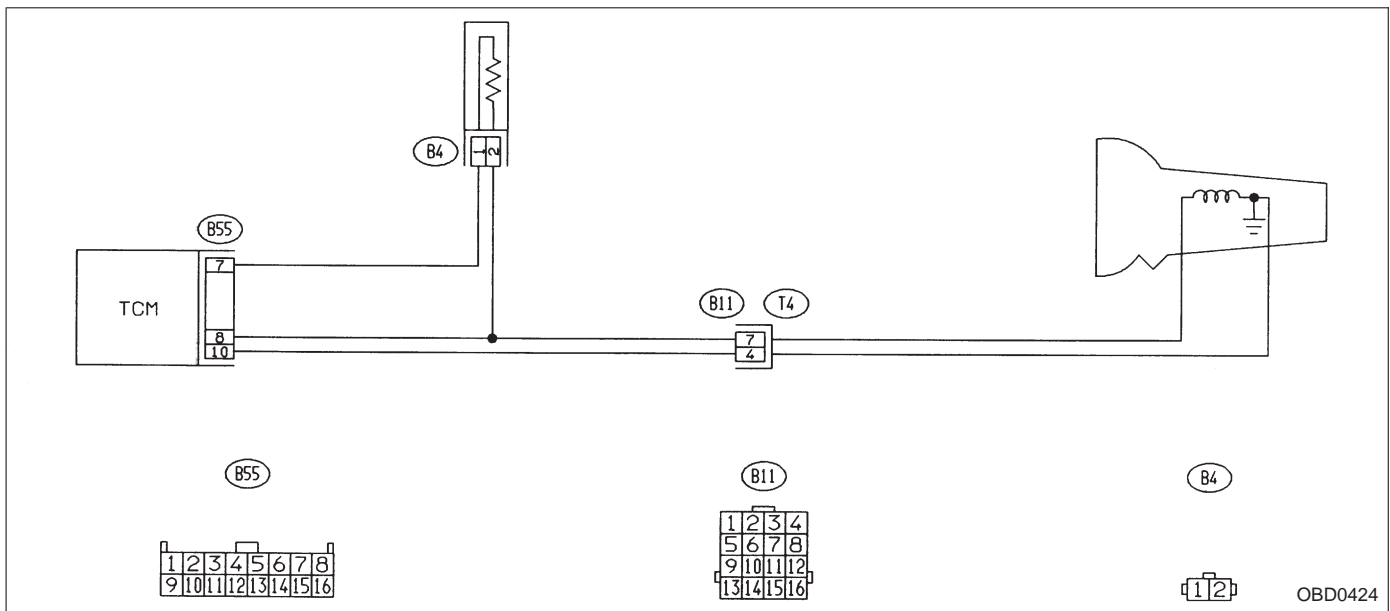
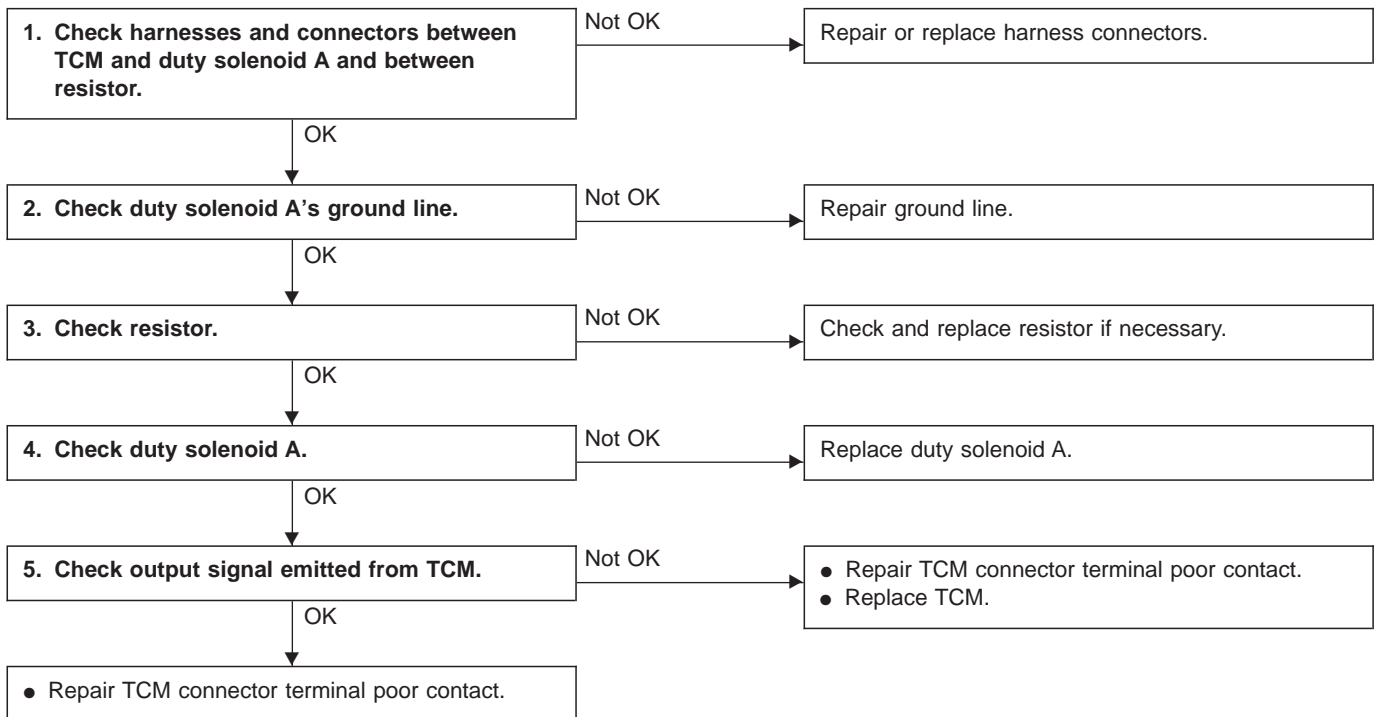
A: TROUBLE CODE 11 — DUTY SOLENOID A —

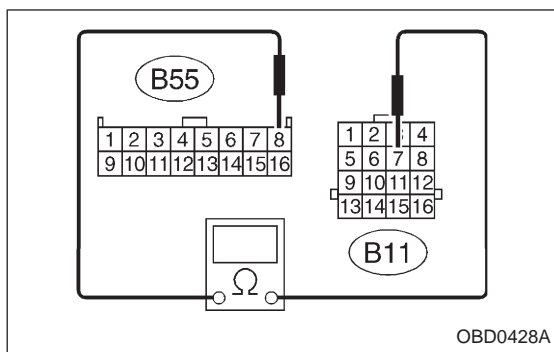
DIAGNOSIS:

Output signal circuit of duty solenoid A or resistor is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock

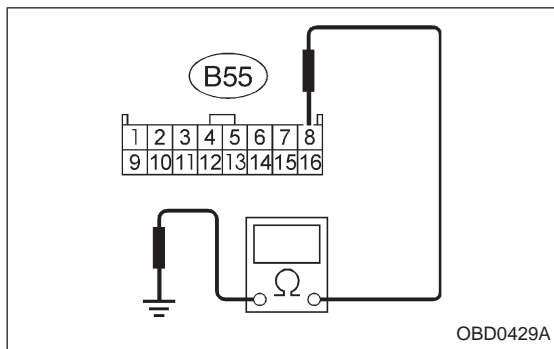




1. CHECK HARNESSES AND CONNECTORS BETWEEN TCM AND DUTY SOLENOID A AND BETWEEN RESISTOR.

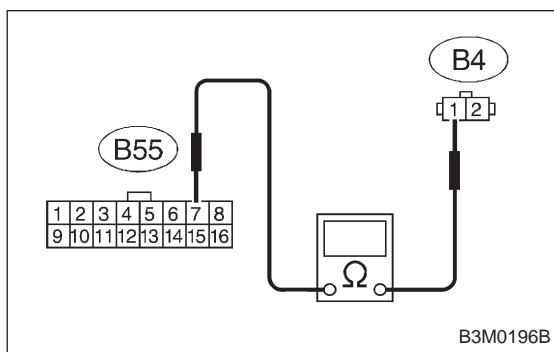
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM, transmission and resistor.
- 3) Measure resistance of harness connector between TCM and transmission.

Connector & terminal / Specified resistance:
(B55) No. 8 — (B11) No. 7 / 1 Ω, or less



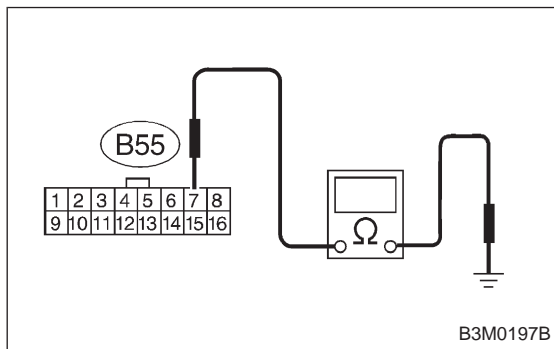
- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:
(B55) No. 8 — Body / 1 MΩ, or more



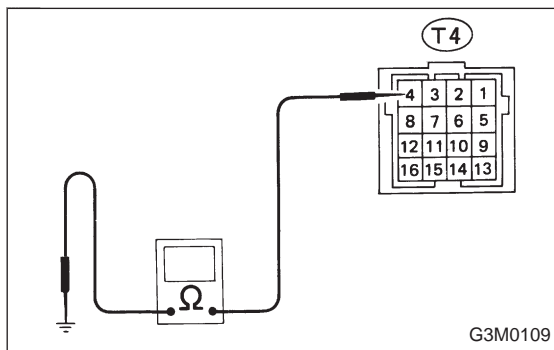
- 5) Measure resistance of harness connector between TCM and resistor connector.

Connector & terminal / Specified resistance:
(B55) No. 7 — (B4) No. 1 / 1 Ω, or less



- 6) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

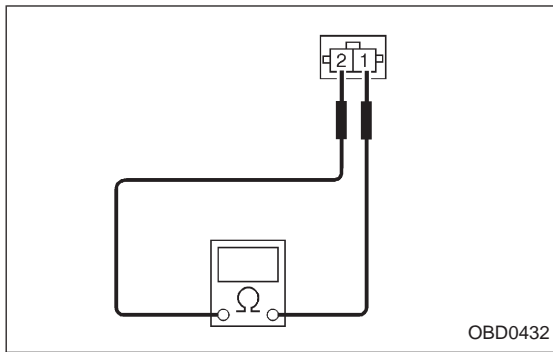
Connector & terminal / Specified resistance:
(B55) No. 7 — Body / 1 MΩ, or more



2. CHECK DUTY SOLENOID A's GROUND LINE.

Measure resistance between transmission connector receptacle (on transmission) and transmission case.

Connector & terminal / Specified resistance:
(T4) No. 4 — Transmission / 1 Ω, or less

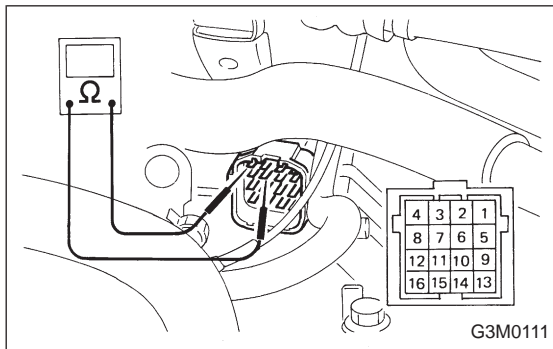


3. CHECK RESISTOR.

Measure resistance between resistor terminals.

Specified resistance:

(B4) No. 1 — No. 2 / 9 — 15 Ω

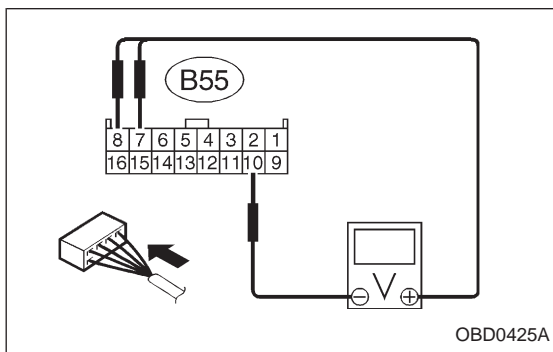


4. CHECK DUTY SOLENOID A.

Measure resistance between transmission connector receptacle (on transmission) terminals.

Connector & terminal / Specified resistance:

(T4) No. 7 — No. 4 / 1.5 — 4.5 Ω



5. CHECK OUTPUT SIGNAL EMITTED FROM TCM.

- 1) Connect connectors to TCM, transmission and resistor.
- 2) Start and warm-up the engine and transmission.
- 3) Ignition switch ON (Engine OFF).
- 4) Move selector lever to "N".
- 5) Measure voltage between TCM connector and body while opening and closing throttle position sensor.

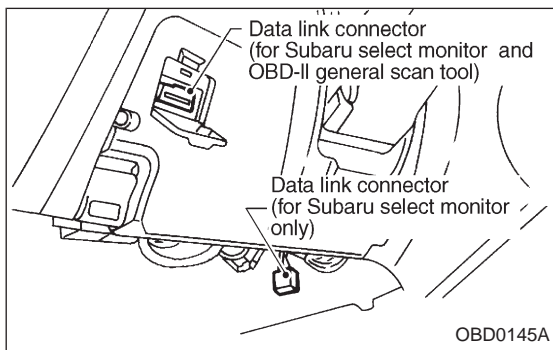
Connector & terminal / Specified resistance:

(B55) No. 8 — No. 10 / 1.5 — 4.0 V (Throttle is fully closed.)

(B55) No. 8 — No. 10 / 1 V, or less (Throttle is fully open.)

(B55) No. 7 — No. 10 / 5 — 14 V (Throttle is fully closed.)

(B55) No. 7 — No. 10 / 1 V, or less (Throttle is fully open.)



● Using Subaru select monitor:

- (1) Connect connectors to TCM, transmission and resistor.
- (2) Turn ignition switch to OFF.
- (3) Connect the Subaru select monitor to data link connector.
- (4) Turn ignition switch to ON and Subaru select monitor switch to ON.

PLDTY (F11)

100%

OBD0427

- (5) Start and warm-up the engine and transmission.
- (6) Stop the engine and turn ignition switch to ON (Engine OFF).
- (7) Move selector lever to "N".
- (8) Read data on Subaru select monitor.
- (9) Designate mode using function key.

Function mode: F11

SPECIFIED DATA:

- 100% (Throttle is fully closed.)
- 15% (Throttle is fully open.)

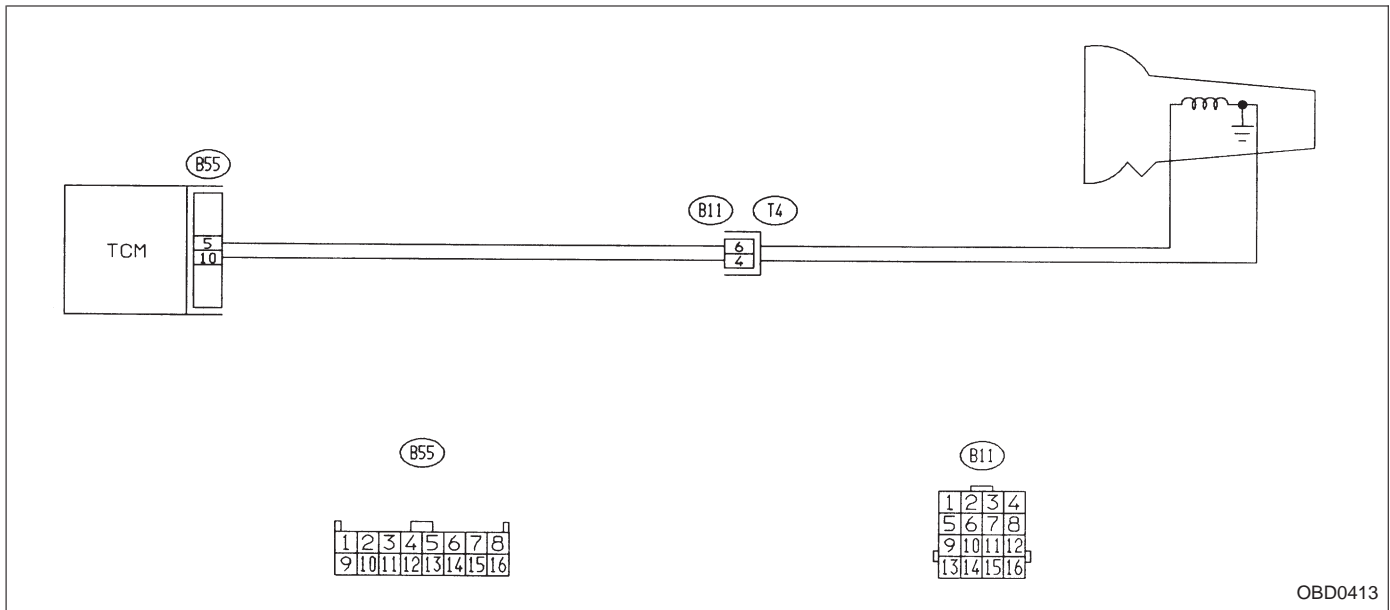
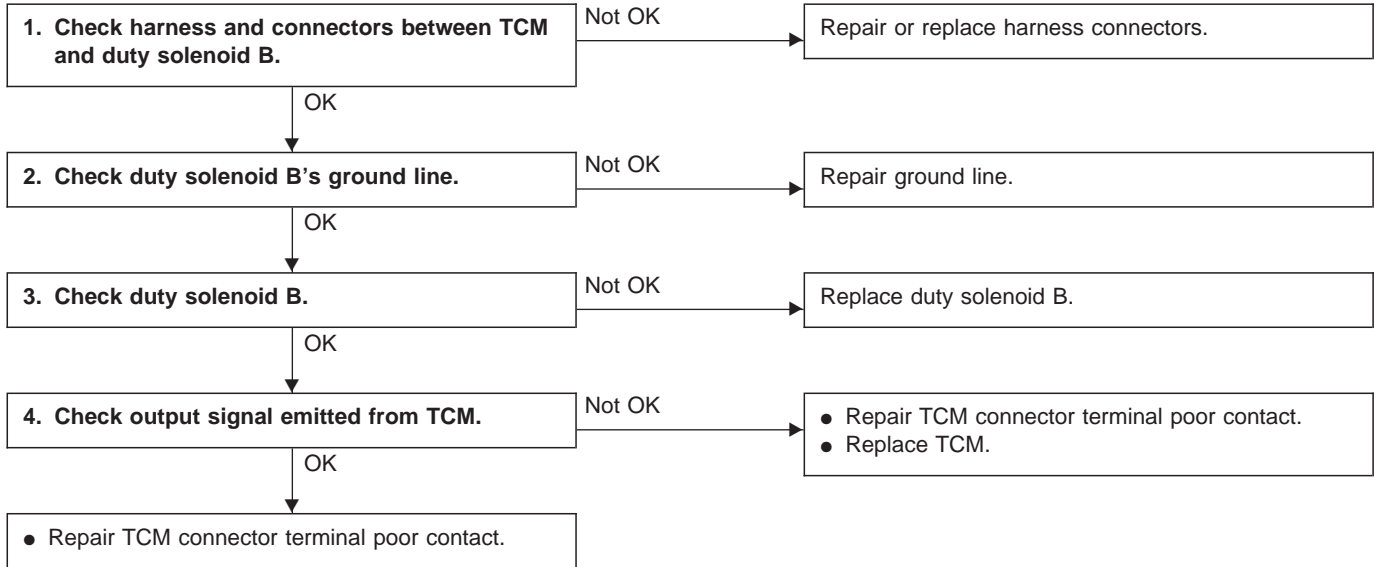
**B: TROUBLE CODE 12
— DUTY SOLENOID B —**

DIAGNOSIS:

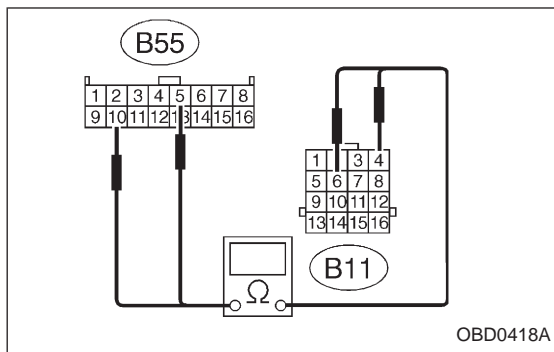
Output signal circuit of duty solenoid B is open or shorted.

TROUBLE SYMPTOM:

No “locking-up” (after engine warm-up)



OBD0413



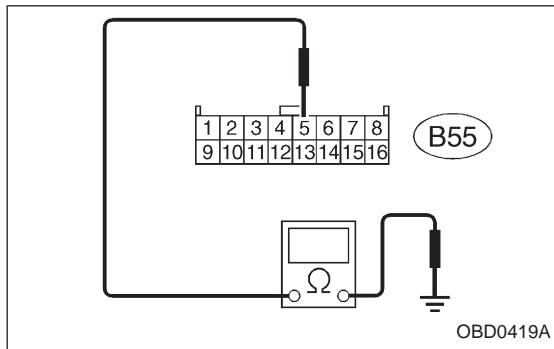
1. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND DUTY SOLENOID B.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and transmission.
- 3) Measure resistance of harness connector between TCM and transmission connector.

Connector & terminal / Specified resistance:

(B55) No. 5 — (B11) No. 6 / 1 Ω , or less

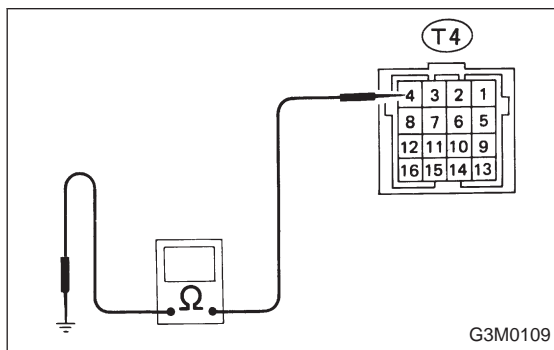
(B55) No. 10 — (B11) No. 4 / 1 Ω , or less



- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B55) No. 5 — Body / 1 M Ω , or more

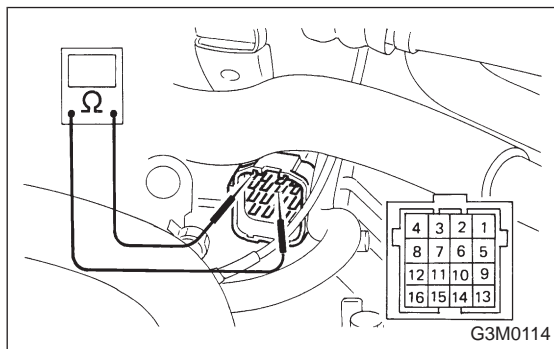


2. CHECK DUTY SOLENOID B's GROUND LINE.

Measure resistance between transmission connector receptacle and transmission case.

Connector & terminal / Specified resistance:

(T4) No. 4 — Transmission / 1 Ω , or less

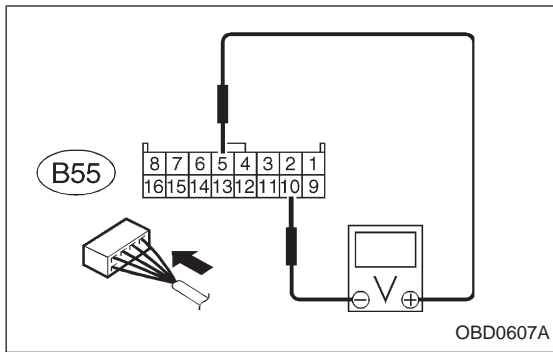


3. CHECK DUTY SOLENOID B.

Measure resistance between transmission connector receptacle's terminals.

Connector & terminal / Specified resistance:

(T4) No. 6 — No. 4 / 9 — 17 Ω



4. CHECK OUTPUT SIGNAL EMITTED FROM TCM.

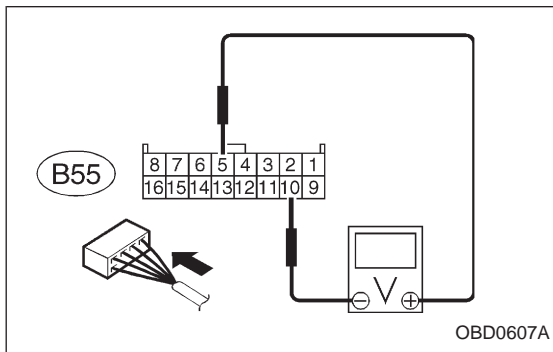
- 1) Connect connectors to TCM and transmission.
- 2) Lift-up the vehicle or set the vehicle on free roller.

CAUTION:

On AWD models, raise all wheels off floor.

- 3) Start and warm-up the engine and transmission.
- 4) Push the TCS OFF switch to ON. (With TCS models)
- 5) Move selector lever to "D" and slowly increase vehicle speed to 75 km/h (47 MPH).
- 6) Measure voltage between TCM connector terminals.

Connector & terminal / Specified voltage:
(B55) No. 5 — No. 10 / 8.5 V, or more (when wheels are locked-up.)

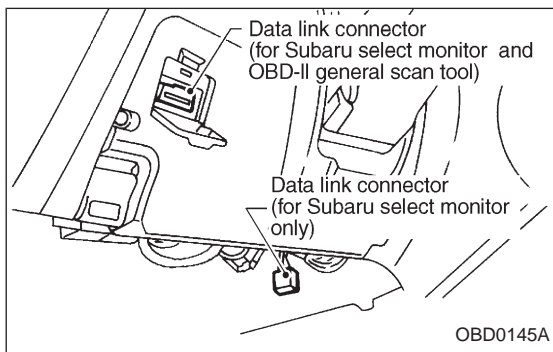


- 7) Return the engine to idling speed and move selector lever to "N".
- 8) Measure voltage between TCM connector terminals.

Connector & terminal / Specified voltage:
(B55) No. 5 — No. 10 / 0.5 V, or less

NOTE:

The speed difference between front and rear wheels may light either the ABS or the ABS/TCS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS or the ABS/TCS memory clearance procedure of self-diagnosis system.
 <Ref. to 4-4a [T6C2], or 4-4b [T6D2], [T9K0].>



● **Using Subaru select monitor:**

- (1) Connect connectors to TCM and transmission.
- (2) Lift-up the vehicle or set the vehicle on free roller.

CAUTION:

On AWD models, raise all wheels off floor.

- (3) Turn ignition switch to OFF.
- (4) Connect the Subaru select monitor to data link connector.
- (5) Turn ignition switch to ON and Subaru select monitor switch to ON.

LUPTY	(F12)
5 %	
	OBD0417

- (6) Start and warm-up the engine and transmission.
- (7) Push the TCS OFF switch to ON. (With TCS models)
- (8) Designate mode using function key.

Function mode: F12

- (9) Move selector lever to "D" and slowly increase vehicle speed to 75 km/h (47 MPH).
- (10) Read data on Subaru select monitor.

SPECIFIED DATA:

- **95% (Wheel locked-up)**
- **5% (Released)**

NOTE:

The speed difference between front and rear wheels may light either the ABS or the ABS/TCS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS or the ABS/TCS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4a [T6C2], or 4-4b [T6D2], [T9K0].>

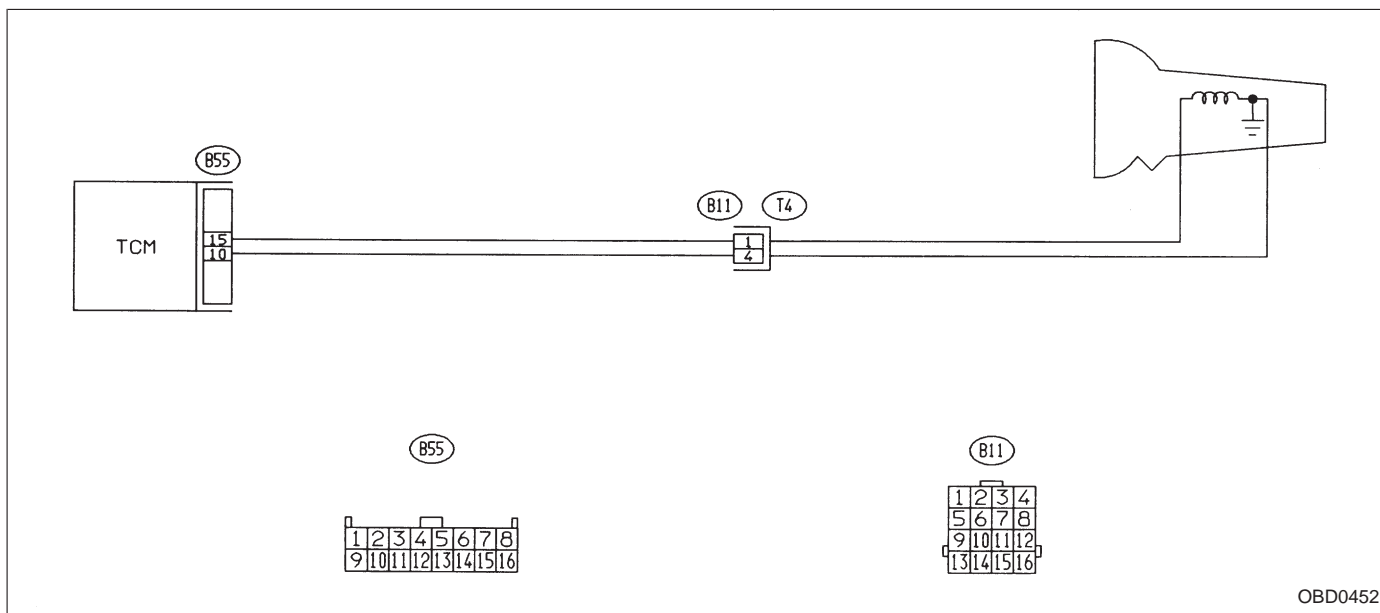
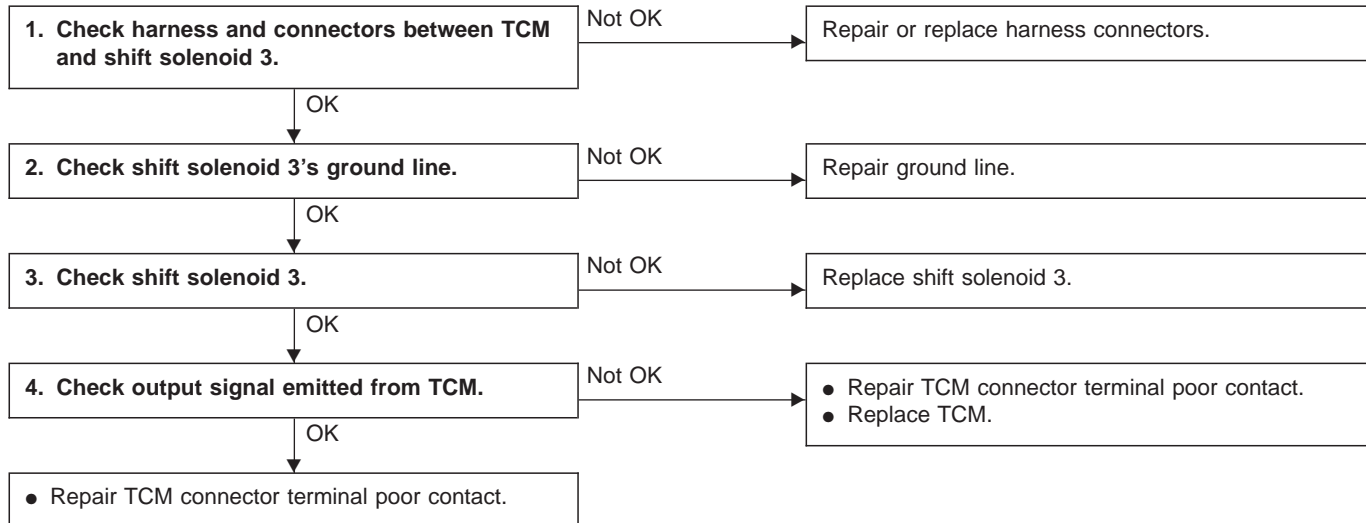
**C: TROUBLE CODE 13
— SHIFT SOLENOID 3 —**

DIAGNOSIS:

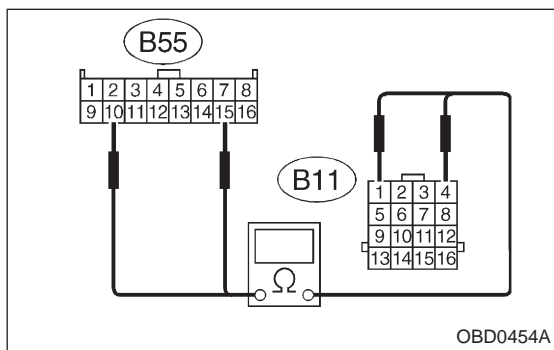
Output signal circuit of shift solenoid 3 is open or shorted.

TROUBLE SYMPTOM:

Ineffective engine brake with shift lever in “3”



OBD0452



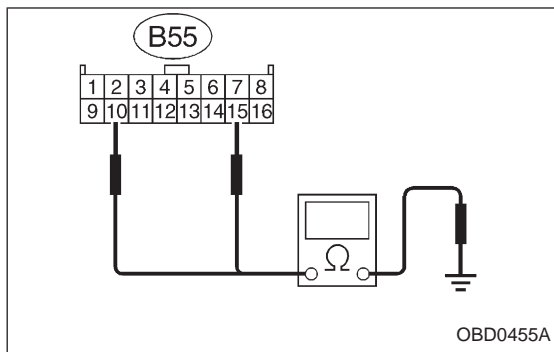
OBD0454A

1. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND SHIFT SOLENOID 3.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and transmission.
- 3) Measure resistance of harness connector between TCM and transmission connector.

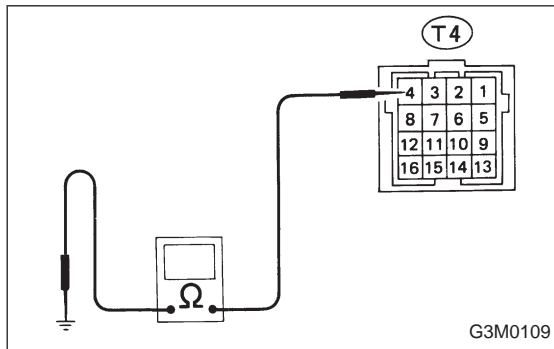
Connector & terminal / Specified resistance:

- (B55) No. 15 — (B11) No. 1 / 1 Ω, or less
- (B55) No. 10 — (B11) No. 4 / 1 Ω, or less



4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

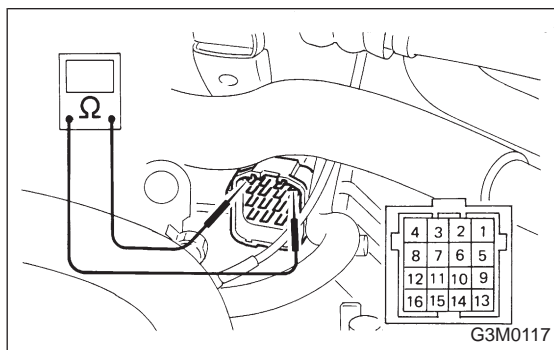
Connector & terminal / Specified resistance:
 (B55) No. 15 — Body / 1 MΩ, or more
 (B55) No. 10 — Body / 1 MΩ, or more



2. CHECK SHIFT SOLENOID 3's GROUND LINE.

Measure resistance between transmission connector receptacle and transmission case.

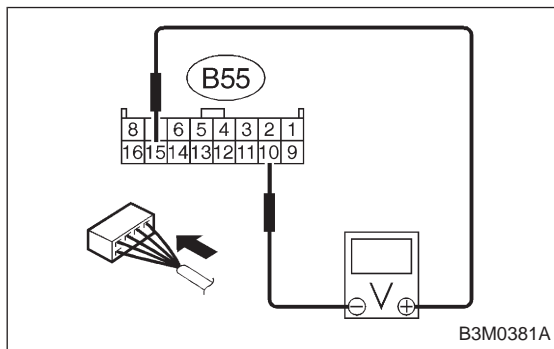
Connector & terminal / Specified resistance:
 (T4) No. 4 — Transmission / 1 Ω, or less



3. CHECK SHIFT SOLENOID 3.

Measure resistance between transmission connector receptacle's terminals.

Connector & terminal / Specified resistance:
 (T4) No. 1 — No. 4 / 20 — 32 Ω



4. CHECK OUTPUT SIGNAL EMITTED FROM TCM.

- 1) Connect connectors to TCM and transmission.
- 2) Lift-up or raise the vehicle and support with safety stands.

CAUTION:

On AWD models, raise all wheels off ground.

- 3) Start and warm-up the engine and transmission.
- 4) Idle the engine.
- 5) Move selector lever to "D".
- 6) Measure voltage between TCM connector terminals.

Connector & terminal / Specified voltage:
 (B55) No. 15 — No. 10 / 9 V, or more

NOTE:

The speed difference between front and rear wheels may light either the ABS or the ABS/TCS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS or the ABS/TCS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4a [T6C2], or 4-4b [T6D2], [T9K0].>

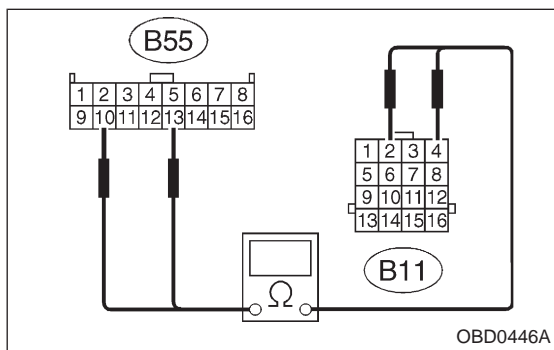
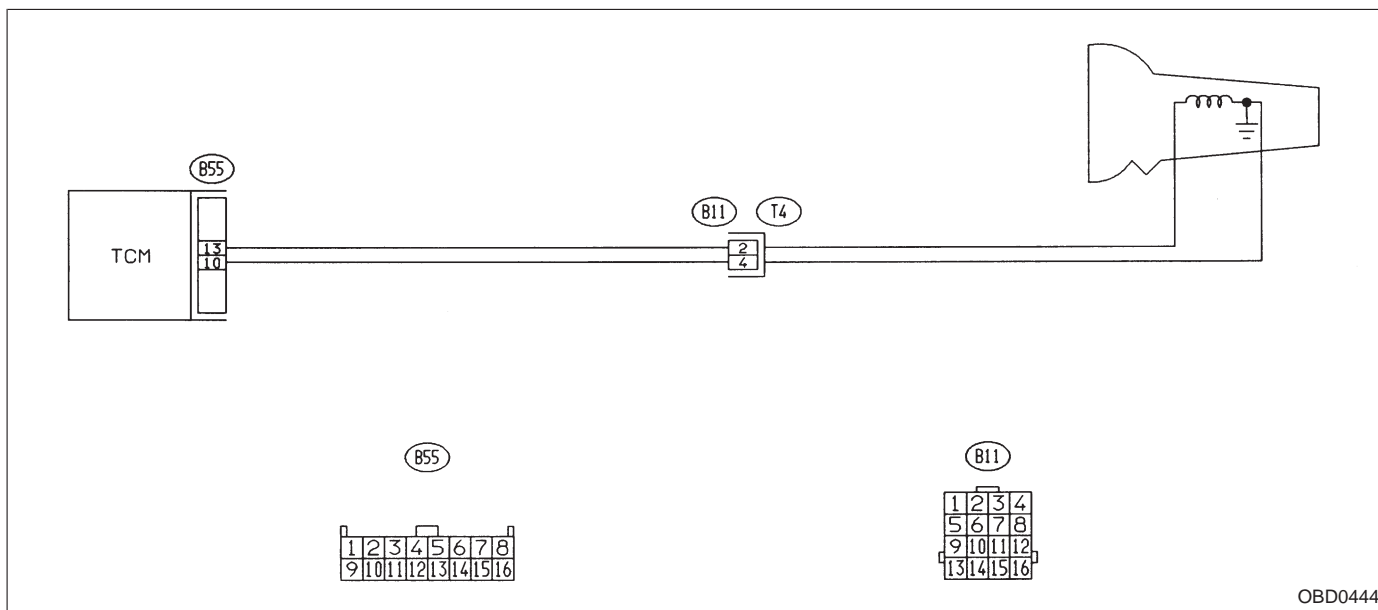
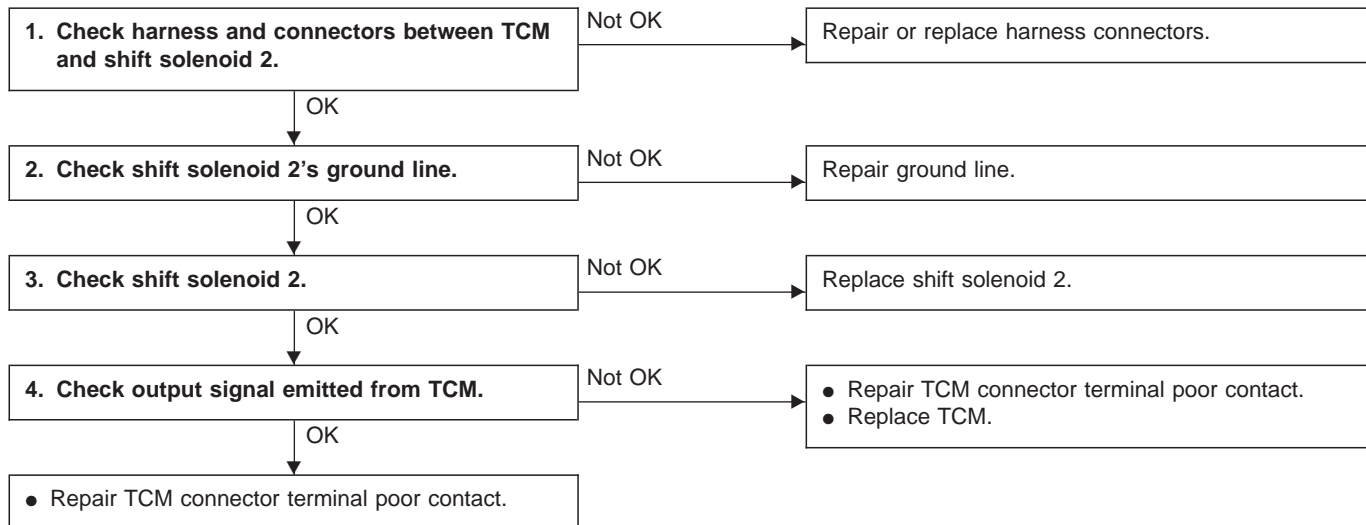
D: TROUBLE CODE 14
— SHIFT SOLENOID 2 —

DIAGNOSIS:

Output signal circuit of shift solenoid 2 is open or shorted.

TROUBLE SYMPTOM:

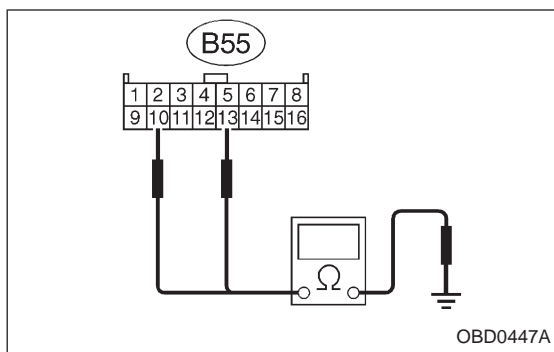
No shift



1. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND SHIFT SOLENOID 2.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and transmission.
- 3) Measure resistance of harness connector between TCM and transmission connector.

Connector & terminal / Specified resistance:
 (B55) No. 13 — (B11) No. 2 / 1 Ω, or less
 (B55) No. 10 — (B11) No. 4 / 1 Ω, or less

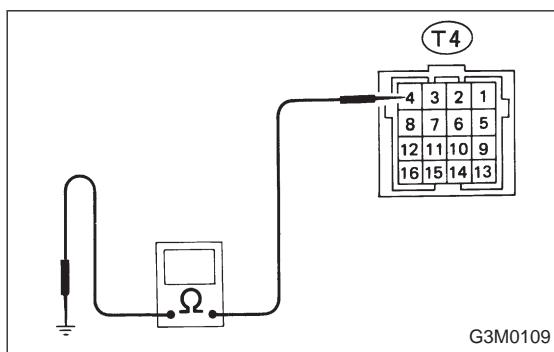


4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B55) No. 13 — Body / 1 MΩ, or more

(B55) No. 10 — Body / 1 MΩ, or more

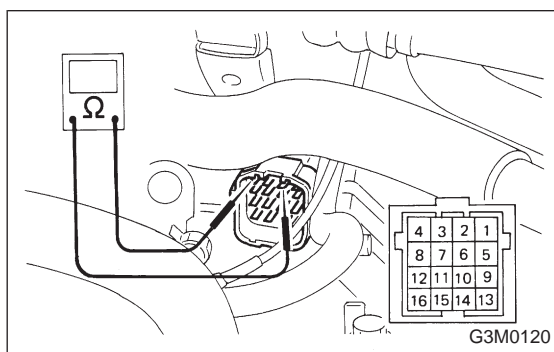


2. CHECK SHIFT SOLENOID 2's GROUND LINE.

Measure resistance between transmission connector receptacle and transmission case.

Connector & terminal / Specified resistance:

(T4) No. 4 — Transmission / 1 Ω, or less

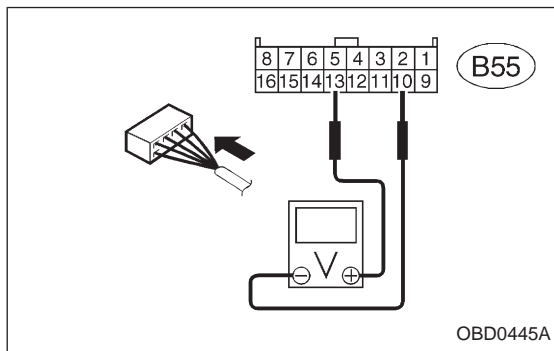


3. CHECK SHIFT SOLENOID 2.

Measure resistance between transmission connector receptacle's terminals.

Connector & terminal / Specified resistance:

(T4) No. 2 — No. 4 / 20 — 32 Ω



4. CHECK OUTPUT SIGNAL EMITTED FROM TCM.

- 1) Connect connectors to TCM and transmission.
- 2) Lift-up or raise the vehicle and support with safety stands.

CAUTION:

On AWD models, raise all wheels off ground.

- 3) Start and warm-up the engine and transmission.
- 4) Idle the engine.
- 5) Move selector lever to "D".
- 6) Measure voltage between TCM connector terminals.

Connector & terminal / Specified voltage:

(B55) No. 13 — No. 10 / 9 V, or more

NOTE:

The speed difference between front and rear wheels may light either the ABS or the ABS/TCS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS or the ABS/TCS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4a [T6C2], or 4-4b [T6D2], [T9K0].>

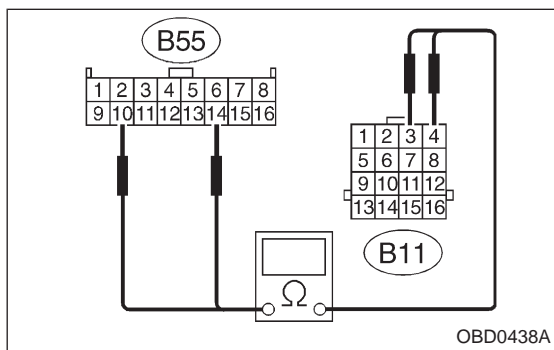
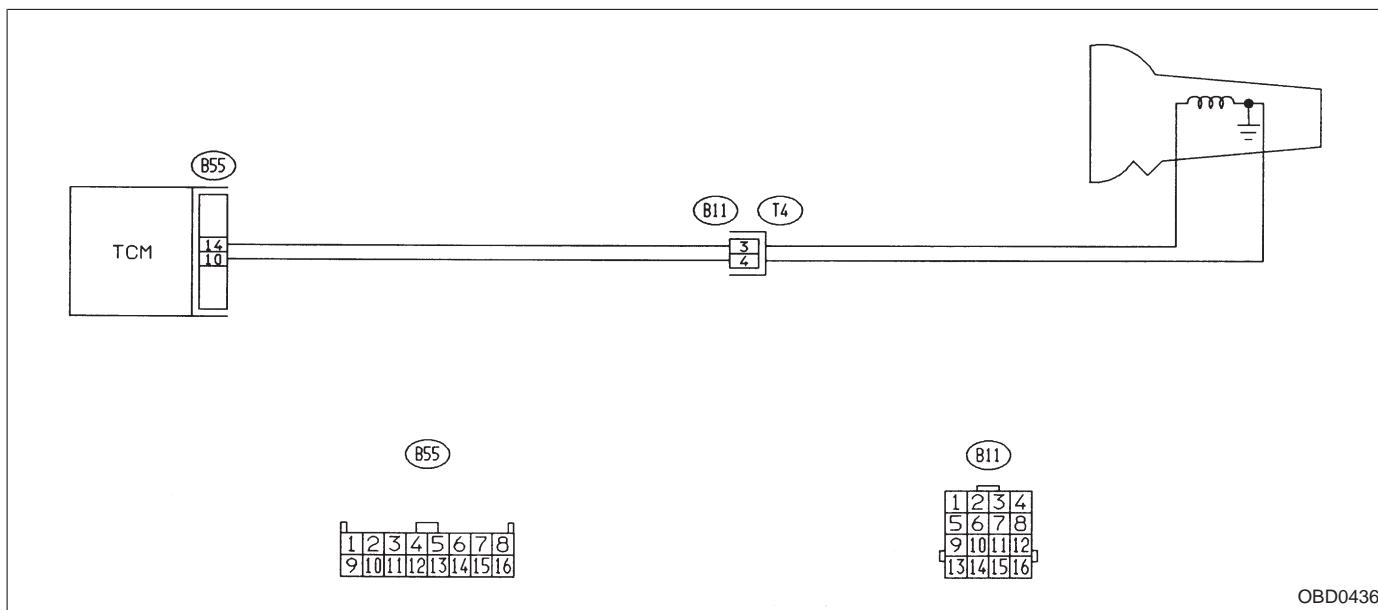
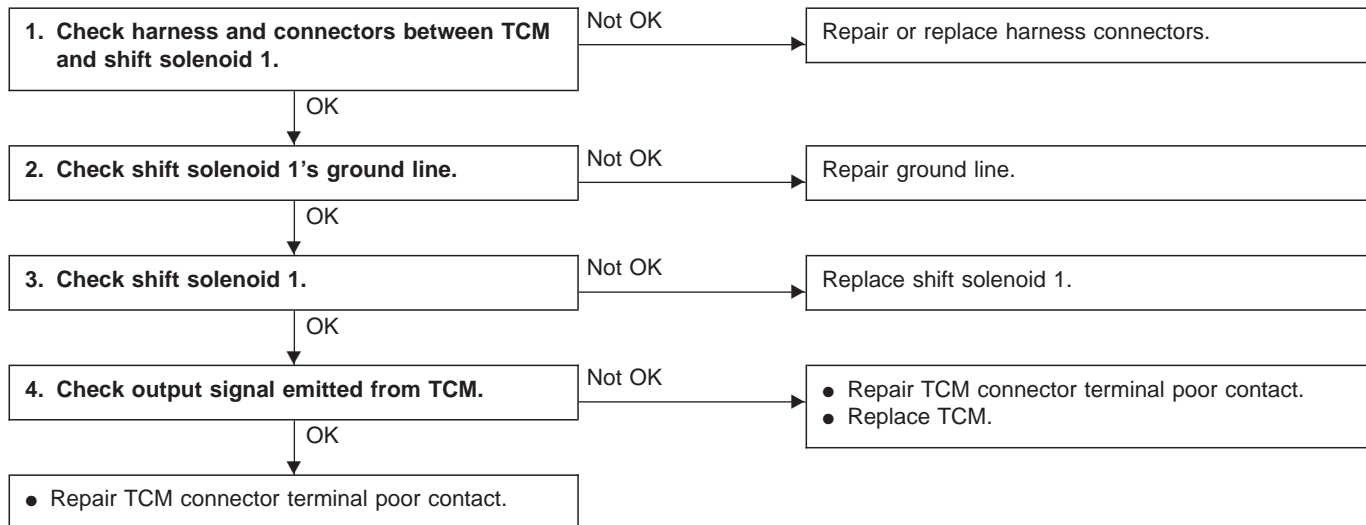
**E: TROUBLE CODE 15
— SHIFT SOLENOID 1 —**

DIAGNOSIS:

Output signal circuit of shift solenoid 1 is open or shorted.

TROUBLE SYMPTOM:

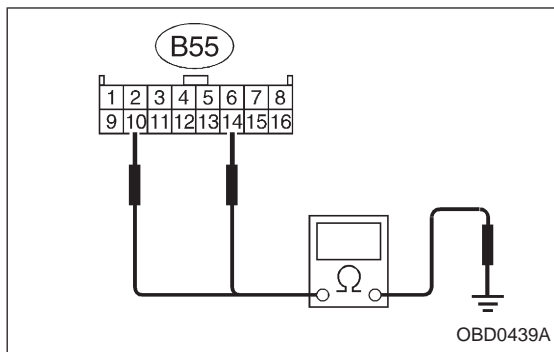
No shift



1. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND SHIFT SOLENOID 1.

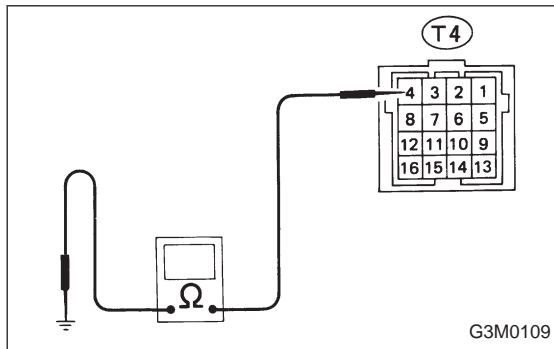
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and transmission.
- 3) Measure resistance of harness connector between TCM and transmission connector.

Connector & terminal / Specified resistance:
 (B55) No. 14 — (B11) No. 3 / 1 Ω, or less
 (B55) No. 10 — (B11) No. 4 / 1 Ω, or less



4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

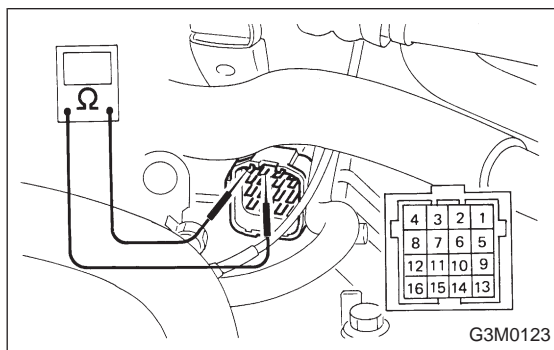
Connector & terminal / Specified resistance:
 (B55) No. 14 — Body / 1 M Ω , or more
 (B55) No. 10 — Body / 1 M Ω , or more



2. CHECK SHIFT SOLENOID 1's GROUND LINE.

Measure resistance between transmission connector receptacle and transmission case.

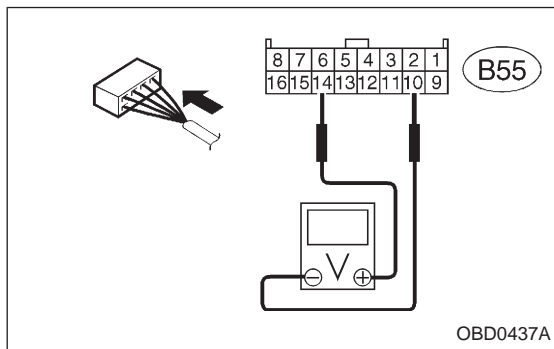
Connector & terminal / Specified resistance:
 (T4) No. 4 — Transmission / 1 Ω , or less



3. CHECK SHIFT SOLENOID 1.

Measure resistance between transmission connector receptacle's terminals.

Connector & terminal / Specified resistance:
 (T4) No. 3 — No. 4 / 20 — 32 Ω



4. CHECK OUTPUT SIGNAL EMITTED FROM TCM.

- 1) Connect connectors to TCM and transmission.
- 2) Lift-up or raise the vehicle and support with safety stands.

CAUTION:

On AWD models, raise all wheels off ground.

- 3) Start and warm-up the engine and transmission.
- 4) Idle the engine.
- 5) Move selector lever to "D".
- 6) Measure voltage between TCM connector terminals.

Connector & terminal / Specified voltage:
 (B55) No. 14 — No. 10 / 9 V, or more

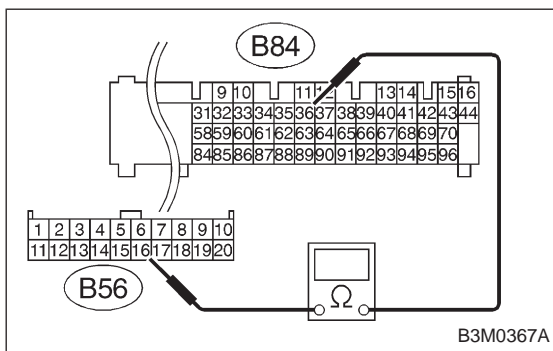
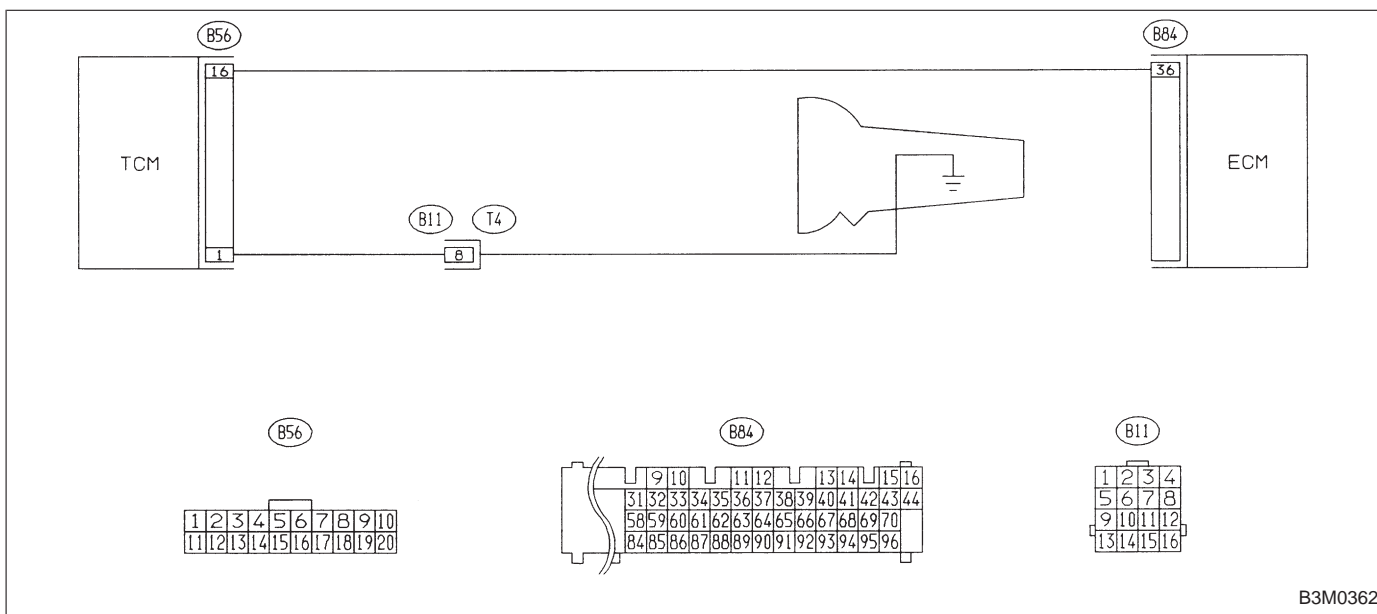
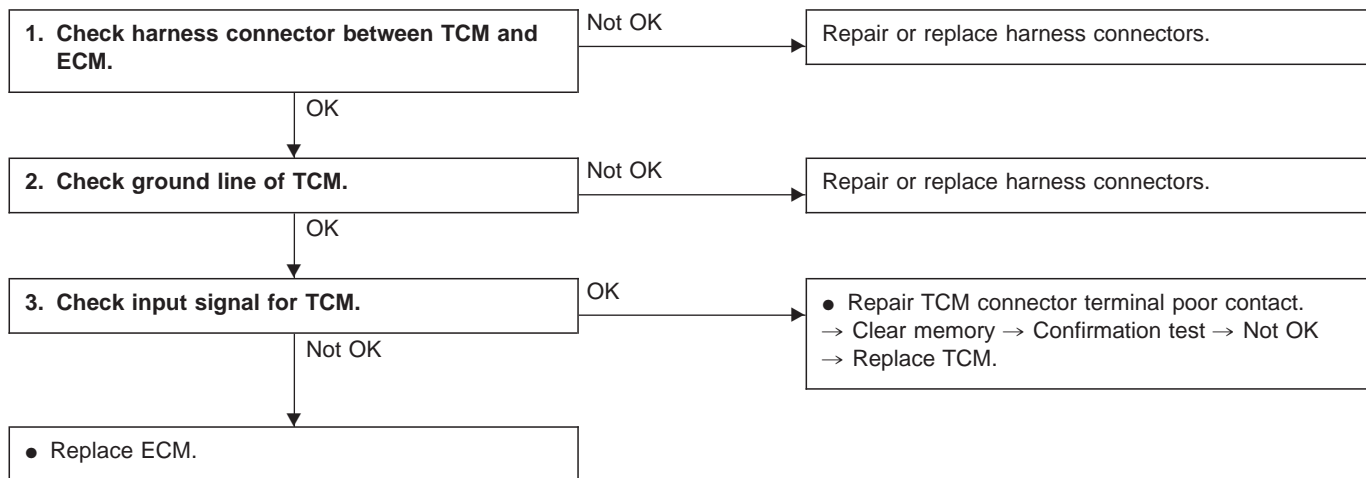
NOTE:

The speed difference between front and rear wheels may light either the ABS or the ABS/TCS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS or the ABS/TCS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4a [T6C2], or 4-4b [T6D2], [T9K0].>

**F: TROUBLE CODE 16
— TORQUE CONTROL CUT SIGNAL —
DIAGNOSIS:**

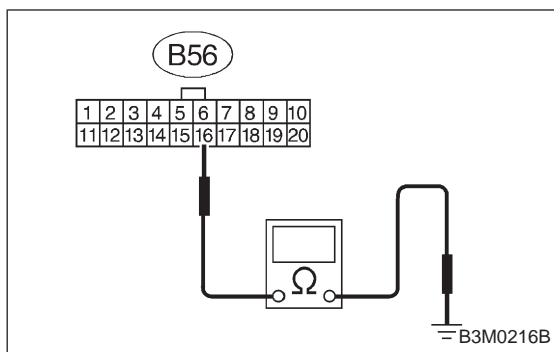
- Torque control cut signal is not emitted from ECM.
- The signal circuit is open or shorted.



1. CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.

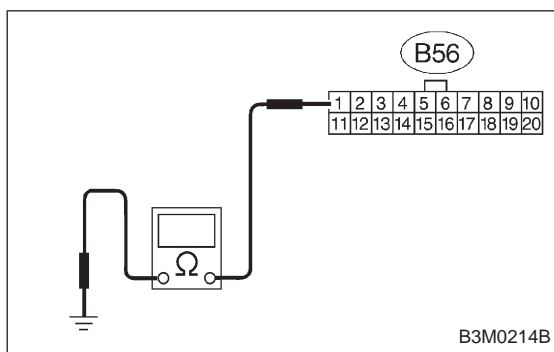
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from ECM and TCM.
- 3) Measure resistance of harness connector between TCM and ECM.

Connector & terminal / Specified resistance:
(B56) No. 16 — (B84) No. 36/ 1 Ω, or less



4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

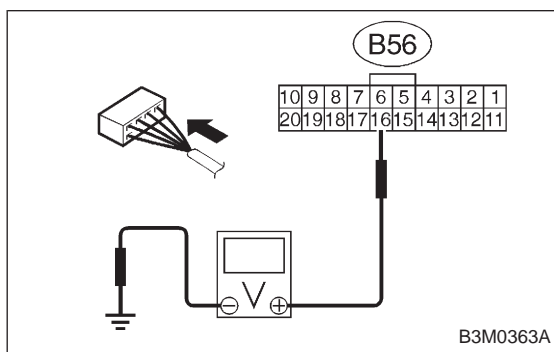
Connector & terminal / Specified resistance:
(B56) No. 16 — Body / 1 MΩ, or more



2. CHECK GROUND LINE OF TCM.

Measure resistance of harness connector between TCM and body.

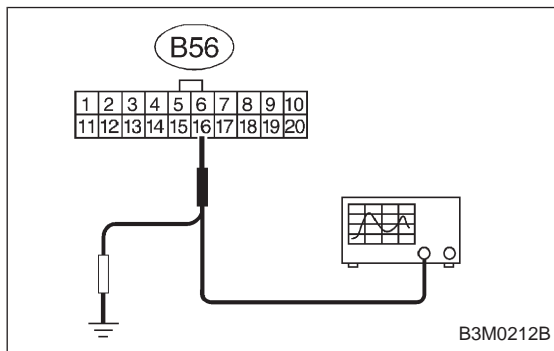
Connector & terminal / Specified resistance:
(B56) No. 1 — Body / 1 Ω, or less



3. CHECK INPUT SIGNAL FOR TCM.

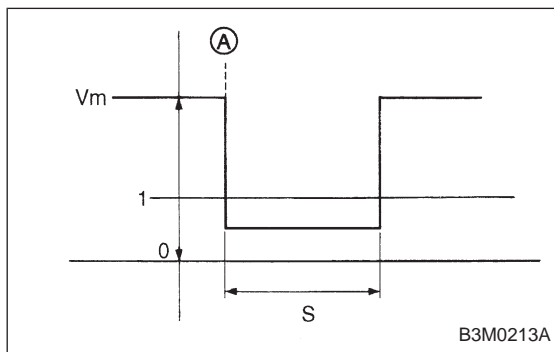
- 1) Connect connectors to ECM and TCM.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between TCM and body.

Connector & terminal / Specified voltage:
(B56) No. 16 — Body / 6 — 9 V



- Using oscilloscope:
 - (1) Connect connectors to ECM and TCM.
 - (2) Set oscilloscope to TCM connector terminals.

Connector & terminals:
Positive probe; (B56) No. 16
Earth lead; Body



(3) Measure voltage while starting the engine.

CAUTION:
Make sure that signal voltage is below 1 V for one second after starting the engine (point A).

V_m: 6 — 9 V
S: 1 second

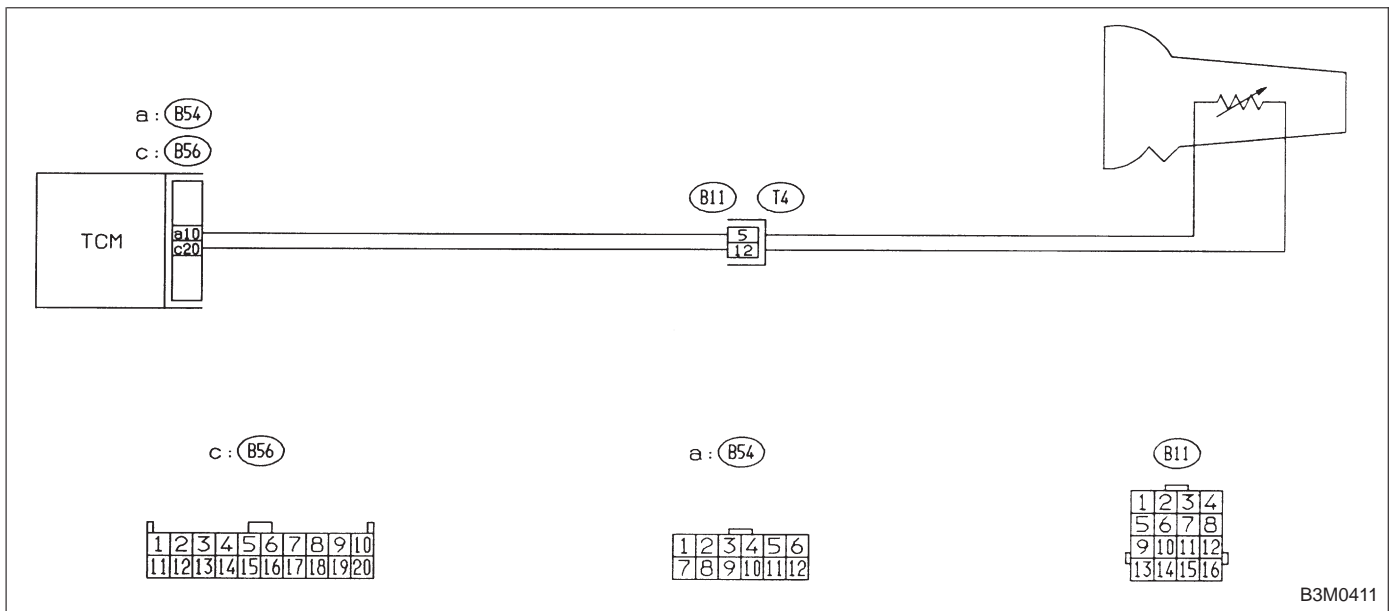
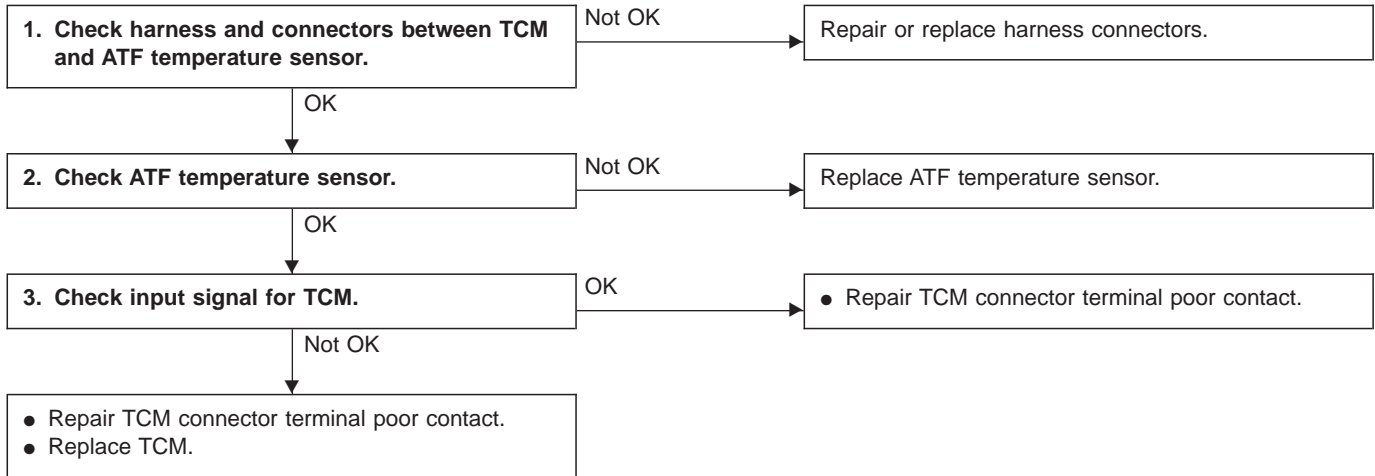
**G: TROUBLE CODE 21
— ATF TEMPERATURE SENSOR —**

DIAGNOSIS:

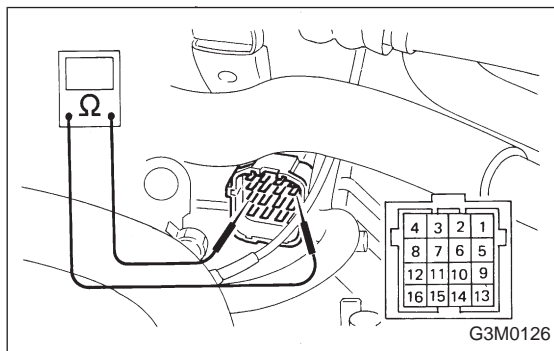
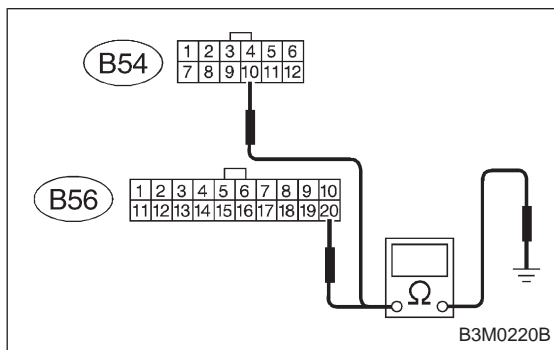
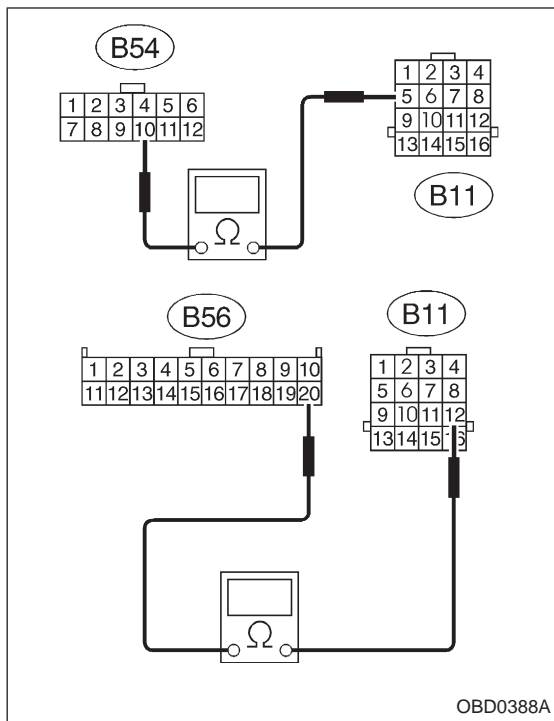
Input signal circuit of TCM to ATF temperature sensor is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock



B3M0411



1. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND ATF TEMPERATURE SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and transmission.
- 3) Measure resistance of harness connector between TCM and transmission connector.

Connector & terminal / Specified voltage:

(B54) No. 10 — (B11) No. 5 / 1 Ω , or less

(B56) No. 20 — (B11) No. 12 / 1 Ω , or less

- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B54) No. 10 — Body / 1 M Ω , or more

(B56) No. 20 — Body / 1 M Ω , or more

2. CHECK ATF TEMPERATURE SENSOR.

- 1) Measure resistance between transmission connector receptacle's terminals.

Connector & terminal / Specified resistance:

(T4) No. 5 — No. 12 /

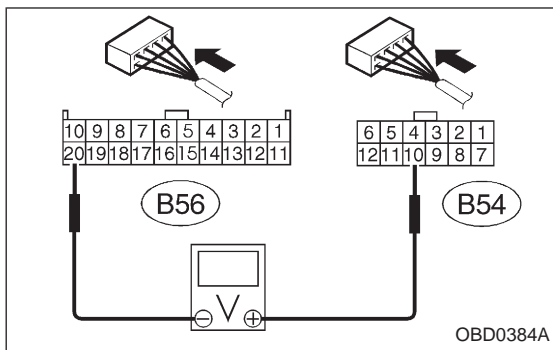
2.1 — 2.9 k Ω [ATF temperature: 20°C (68°F)]

- 2) Connect connectors to transmission and TCM.
- 3) Start and warm-up the engine until ATF temperature has increased.
- 4) Stop the engine and disconnect connector from transmission.
- 5) Measure resistance between transmission connector receptacle's terminals.

Connector & terminal / Specified resistance:

(T4) No. 5 — No. 12 /

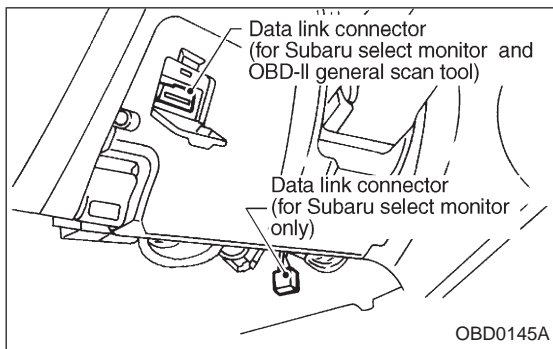
275 — 375 Ω [ATF temperature: 80°C (176°F)]



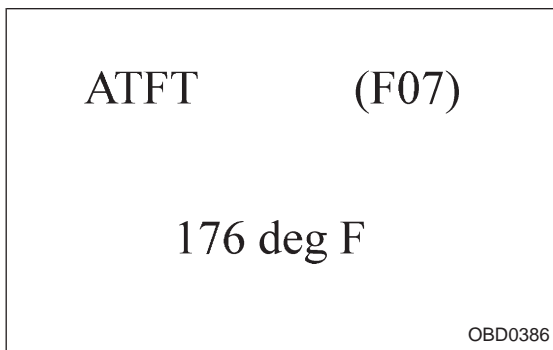
3. CHECK INPUT SIGNAL FOR TCM.

- 1) Turn ignition switch ON (with engine OFF) and measure signal voltage input of TCM.
- 2) Start and warm-up the engine. Measure signal voltage input of TCM.

Connector & terminal / Specified voltage:
(B54) No. 10 — (B56) No. 20 /
3.45±0.55 V [ATF temperature: 20°C (68°F)]
1.2±0.2 V [ATF temperature: 80°C (176°F)]



- Using Subaru select monitor:
 - (1) Turn ignition switch to OFF.
 - (2) Connect the Subaru select monitor to data link connector.
 - (3) Turn ignition switch to ON and Subaru select monitor switch to ON.

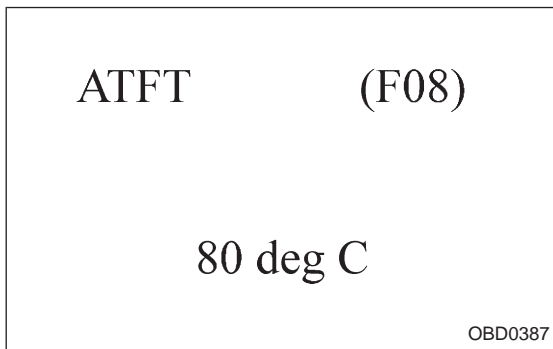


- (4) Start and warm-up the engine.
- (5) Read data on Subaru select monitor.
- (6) Designate mode using function key.

Function mode: F07 or F08

SPECIFIED DATA:

- F07:**
 - Ambient temperature: ±50 deg F
 - ATF temperature: 158 — 230 deg F
 - Open harness: 176 deg F
 - Shorted harness: 320 deg F
- F08:**
 - Ambient temperature: ±10 deg C
 - ATF temperature: 70 — 110 deg C
 - Open harness: 80 deg C
 - Shorted harness: 160 deg C

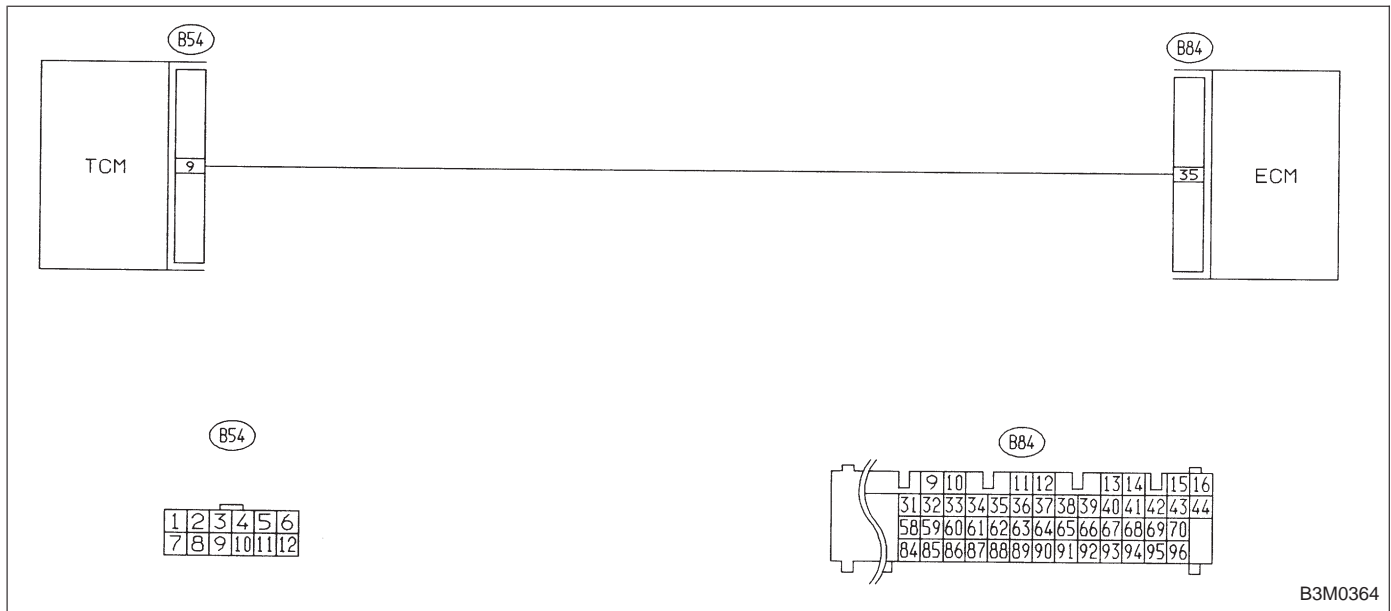
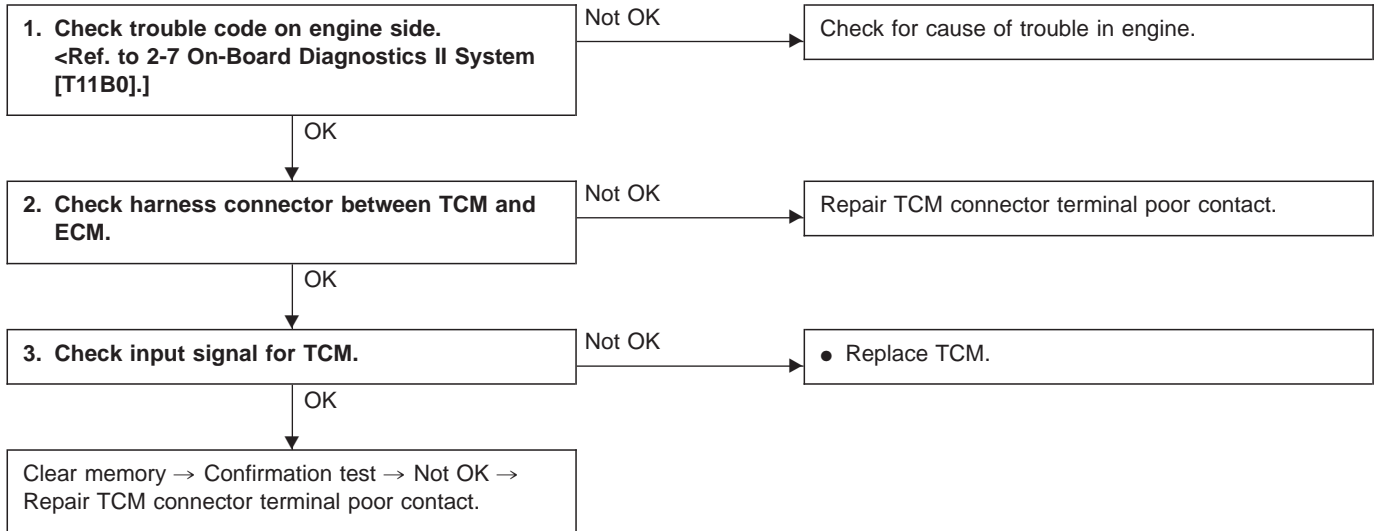


- F07: ATF temperature is indicated in “deg F”.
- F08: ATF temperature is indicated in “deg C”.

**H: TROUBLE CODE 22
— MASS AIR FLOW SIGNAL —**

DIAGNOSIS:

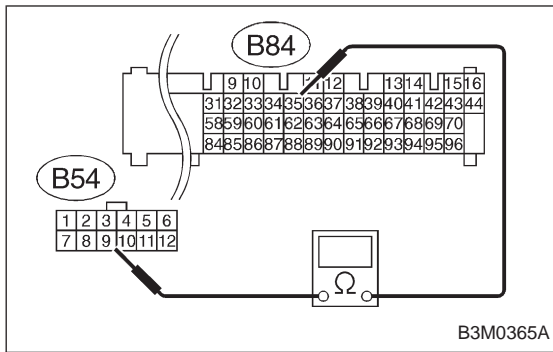
Input signal circuit of TCM from ECM is open or shorted.



B3M0364

1. CHECK TROUBLE CODE ON ENGINE SIDE.

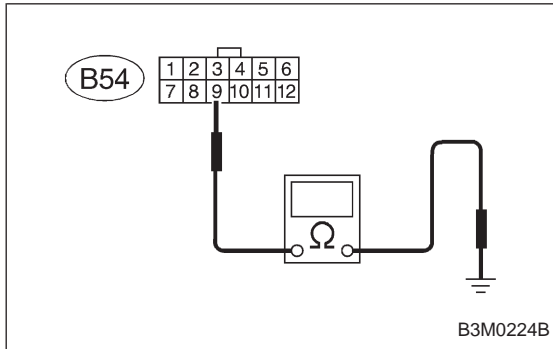
Using Subaru select monitor or OBD-general scan tool, check trouble code of mass air flow sensor on engine side.



2. CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.

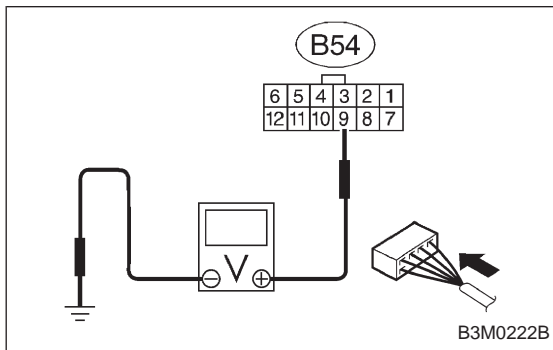
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and ECM.
- 3) Measure resistance of harness connector between TCM and ECM.

Connector & terminal / Specified resistance:
(B54) No. 9 — (B84) No. 35 / 1 Ω, or less



- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

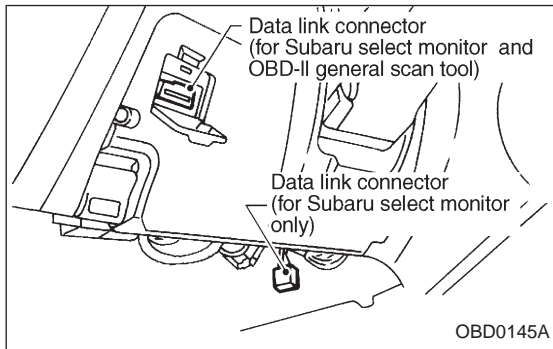
Connector & terminal / Specified resistance:
(B54) No. 9 — Body / 1 MΩ, or more



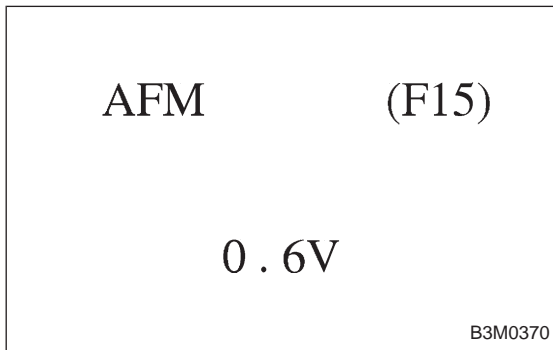
3. CHECK INPUT SIGNAL FOR TCM.

- 1) Connect connectors to TCM and ECM.
- 2) Start the engine. (engine idling after warm-up)
- 3) Measure signal voltage between TCM connector terminal and body.

Connector & terminal / Specified voltage:
Engine warm-up;
(B54) No. 9 — Body / 0.5 — 1.2 V



- Using Subaru select monitor:
 - (1) Connect connectors to TCM and ECM.
 - (2) Turn ignition switch to OFF.
 - (3) Connect the Subaru select monitor to data link connector.
 - (4) Turn ignition switch to ON and Subaru select monitor switch to ON.
 - (5) Start and warm-up the engine.



- (6) Read data on Subaru select monitor.
- (7) Designate mode using function key.

Function mode: F15
SPECIFIED DATA:
0.5 — 1.2 V (Engine warm-up)

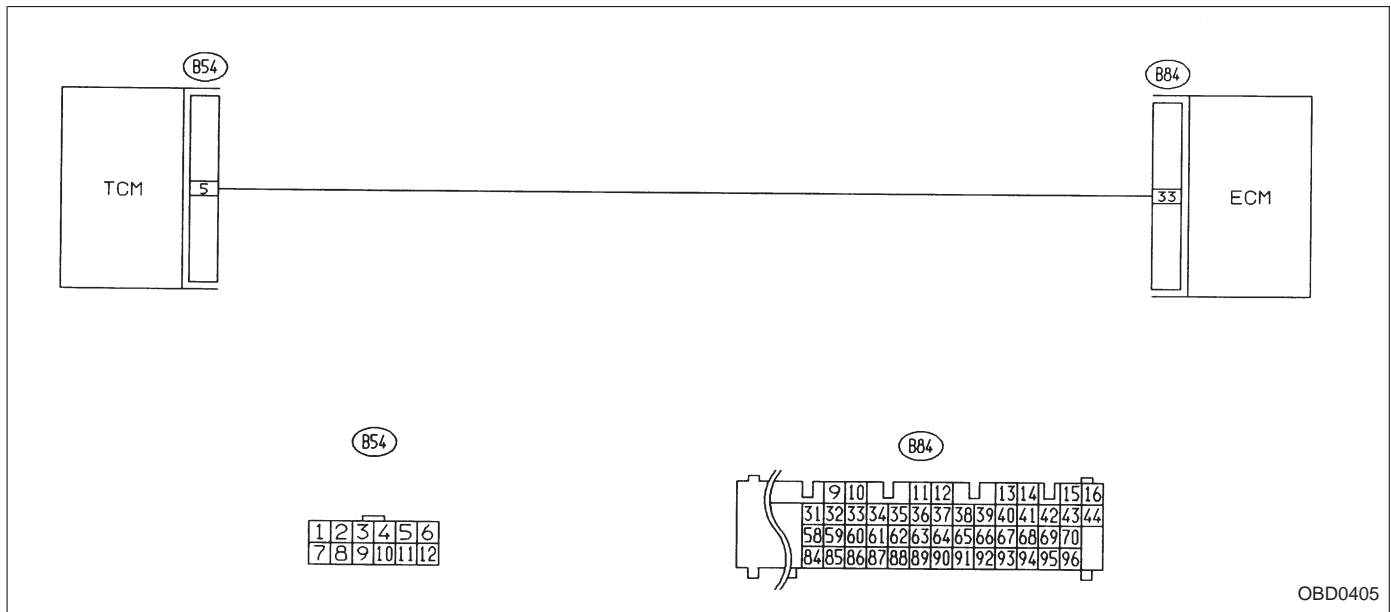
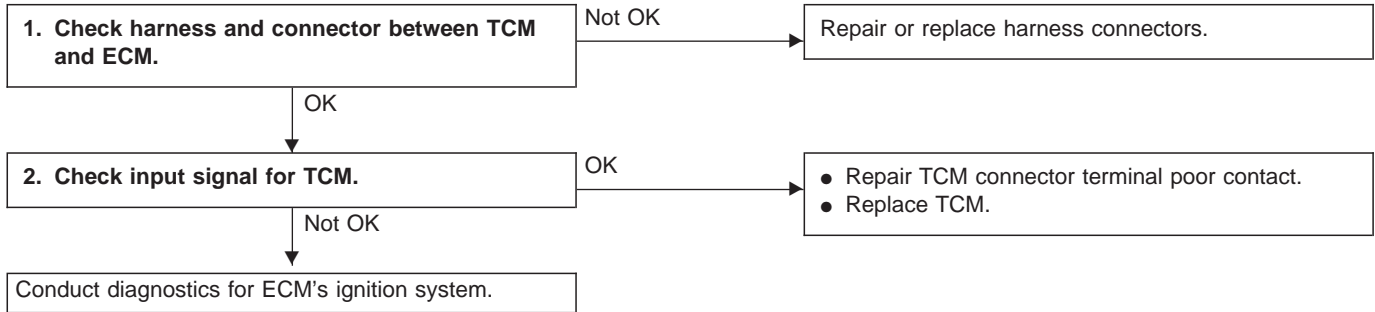
**I: TROUBLE CODE 23
— ENGINE SPEED SIGNAL —**

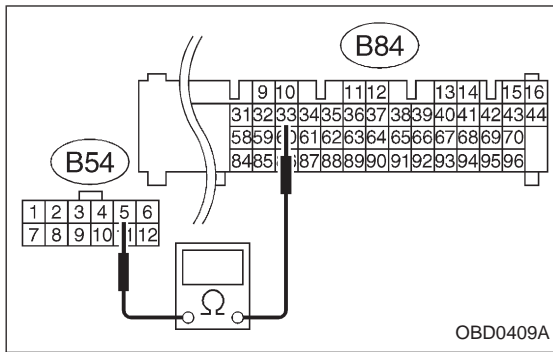
DIAGNOSIS:

Engine speed input signal circuit is open or shorted.

TROUBLE SYMPTOM:

- No lock-up (after engine warm-up)
- AT OIL TEMP indicator remains on when vehicle speed is "0".

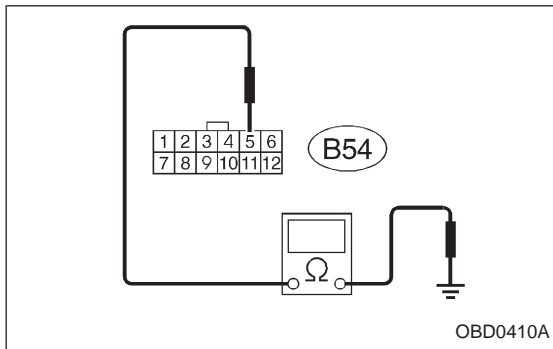




1. CHECK HARNESS AND CONNECTOR BETWEEN TCM AND ECM.

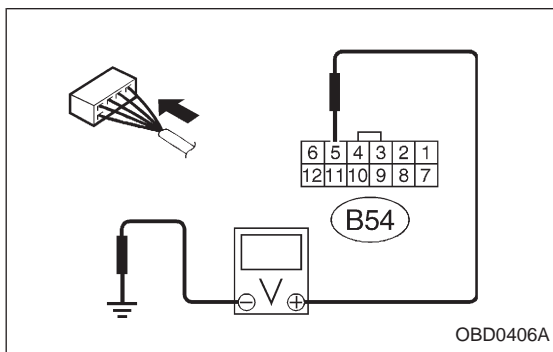
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and ECM.
- 3) Measure resistance of harness connector between TCM and ECM.

Connector & terminal / Specified resistance:
(B54) No. 5 — (B84) No. 33 / 1 Ω, or less



- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

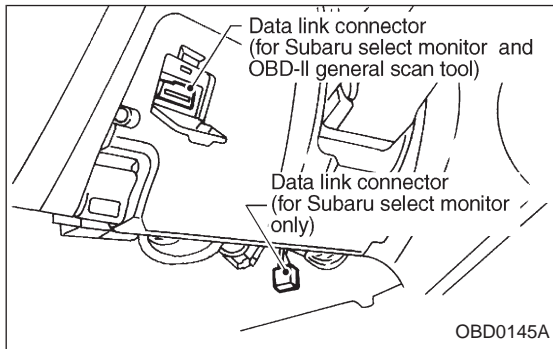
Connector & terminal / Specified resistance:
(B54) No. 5 — Body / 1 MΩ, or more



2. CHECK INPUT SIGNAL FOR TCM.

- 1) Connect connectors to ECM and TCM.
- 2) Turn ignition switch ON (with engine OFF).
- 3) Measure signal voltage for TCM.

Connector & terminal / Specified voltage:
(B54) No. 5 — Body / 10.5 V, or more



● Using Subaru select monitor:

- (1) Connect connectors to ECM and TCM.
- (2) Turn ignition switch to OFF.
- (3) Connect the Subaru select monitor to data link connector.
- (4) Turn ignition switch to ON and Subaru select monitor switch to ON.

EREV (F06)

1,500 rpm

G3M0727

- (5) Start and warm-up the engine.
- (6) Operate at constant engine speed.
- (7) Read data on Subaru select monitor.
- (8) Designate mode using function key.

Function mode: F06

SPECIFIED DATA:

Same as tachometer reading (in combination meter)

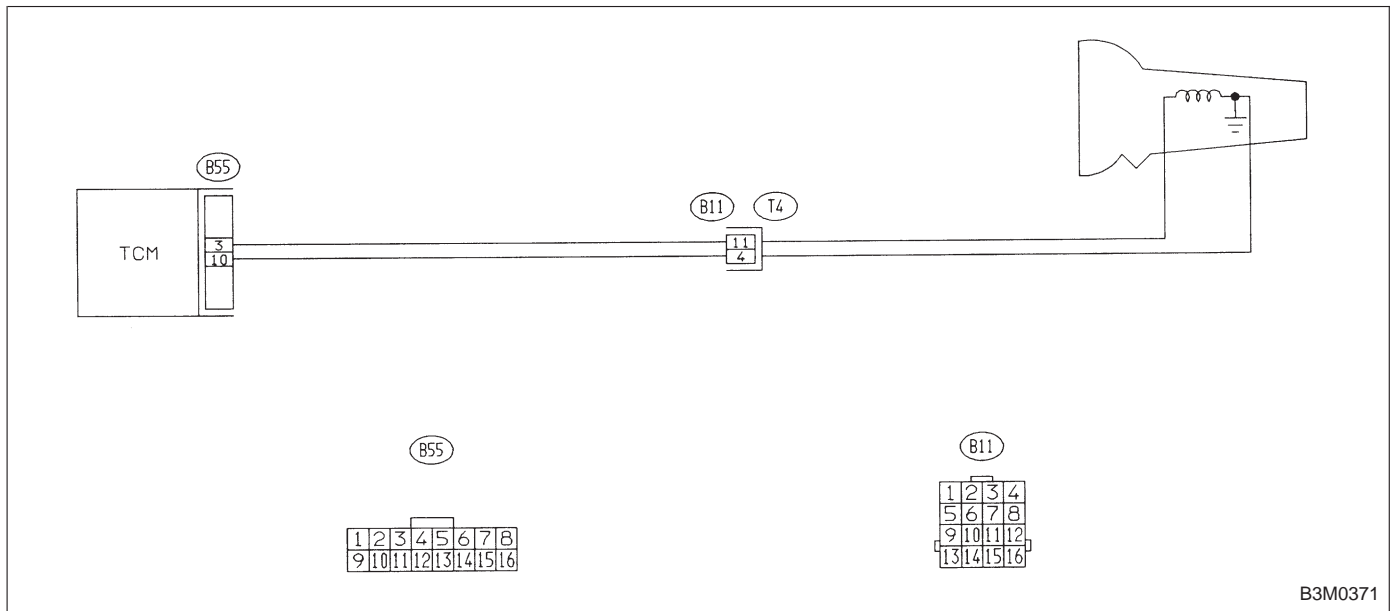
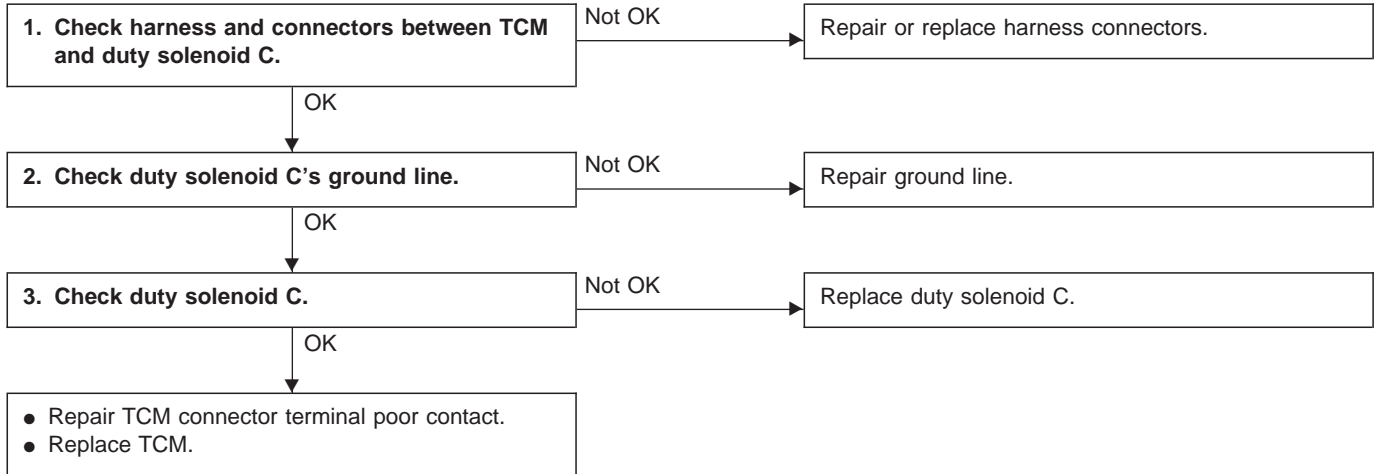
**J: TROUBLE CODE 24
— DUTY SOLENOID C —**

DIAGNOSIS:

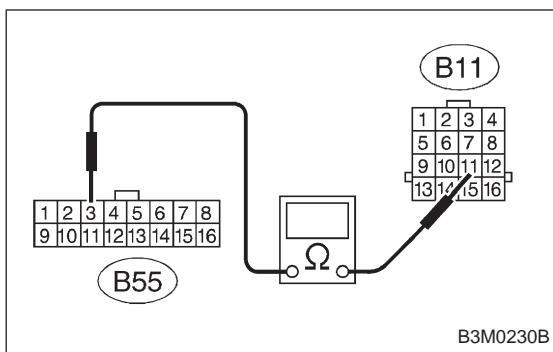
Output signal circuit of duty solenoid C is open or shorted.

TROUBLE SYMPTOM:

Excessive “braking” in tight corners



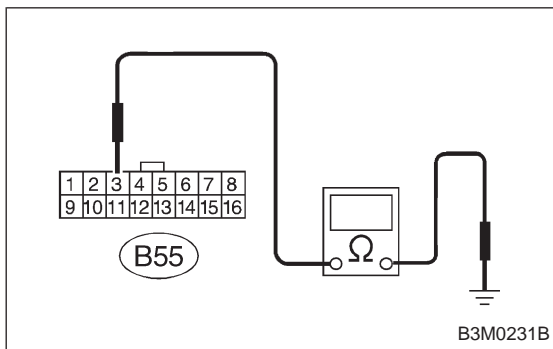
B3M0371



1. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND DUTY SOLENOID C.

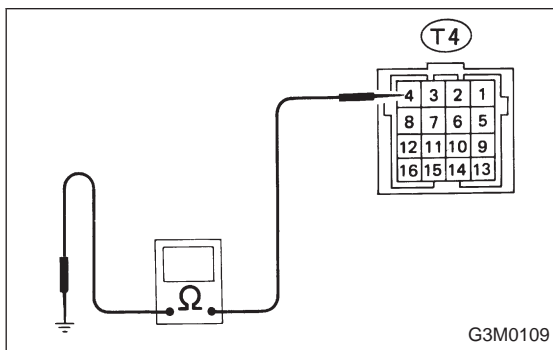
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and transmission.
- 3) Measure resistance of harness connector between TCM and transmission.

Connector & terminal / Specified resistance:
(B55) No. 3 — (B11) No. 11 / 1 Ω, or less



- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

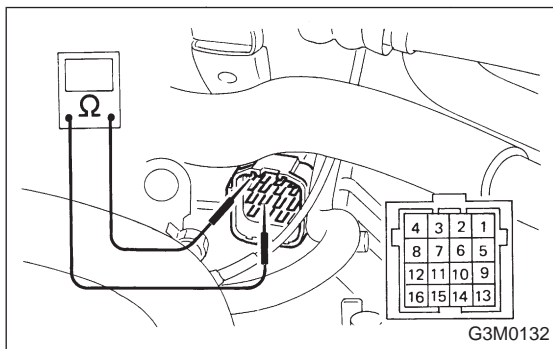
Connector & terminal / Specified resistance:
(B55) No. 3 — Body / 1 MΩ, or more



2. CHECK DUTY SOLENOID C's GROUND LINE.

Measure resistance between transmission connector receptacle and transmission case.

Connector & terminal / Specified resistance:
(T4) No. 4 — Transmission / 1 Ω, or less



3. CHECK DUTY SOLENOID C.

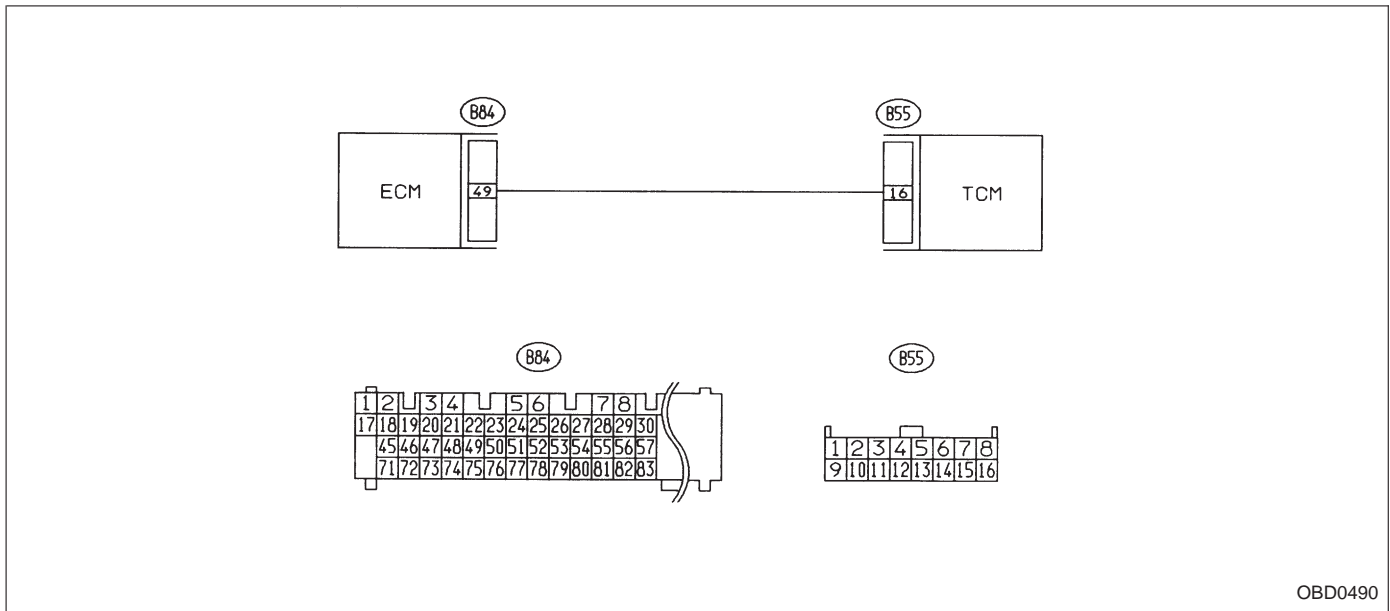
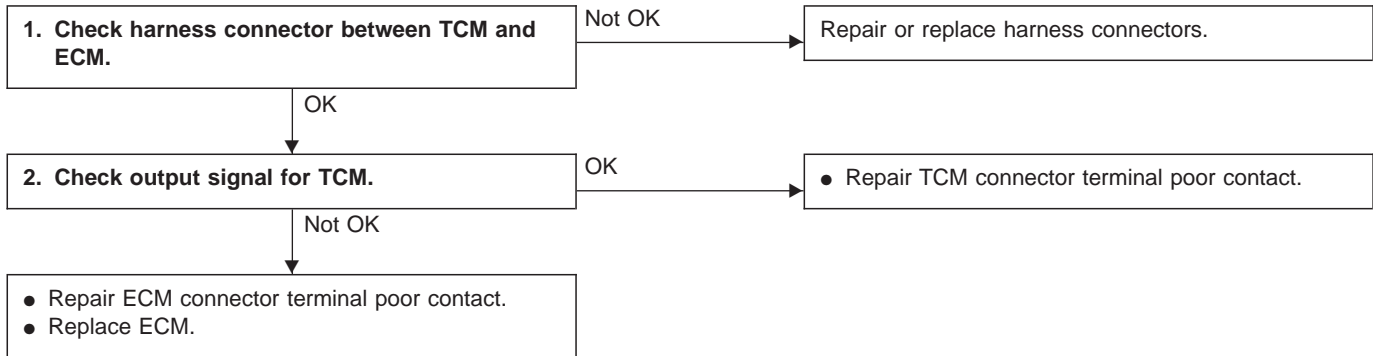
Measure resistance between transmission connector receptacle's terminals.

Connector & terminal / Specified resistance:
(T4) No. 11 — No. 4 / 9 — 17 Ω

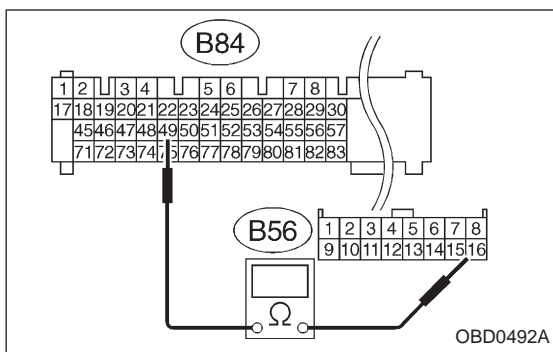
**K: TROUBLE CODE 25
— TORQUE CONTROL SIGNAL —**

DIAGNOSIS:

- Torque control signal is not emitted from TCM.
- The signal circuit is open or shorted.



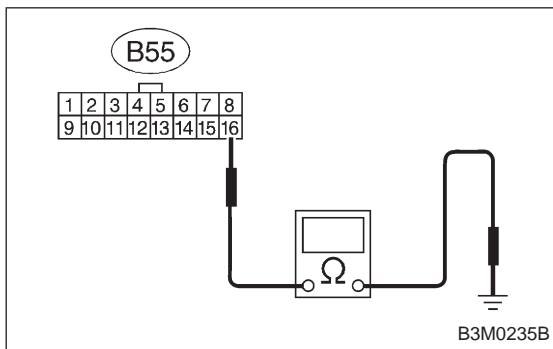
OBD0490



1. CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.

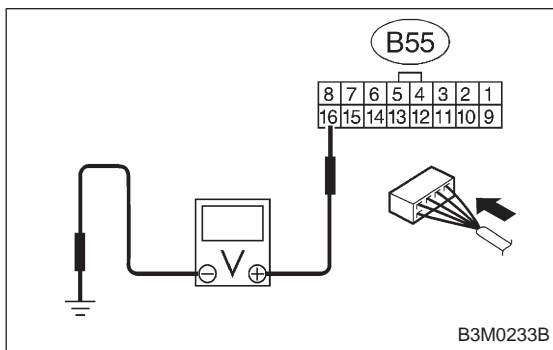
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and ECM.
- 3) Measure resistance of harness connector between TCM and ECM.

Connector & terminal / Specified resistance:
(B55) No. 16 — (B84) No. 49 / 1 Ω, or less



- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:
(B55) No. 16 — Body / 1 MΩ, or more



2. CHECK OUTPUT SIGNAL FOR TCM.

- 1) Connect connectors to TCM and ECM.
- 2) Turn ignition switch to ON.
- 3) Measure signal voltage between TCM connector terminal and body.

Connector & terminal / Specified voltage:
(B55) No. 16 — Body / 5±1 V

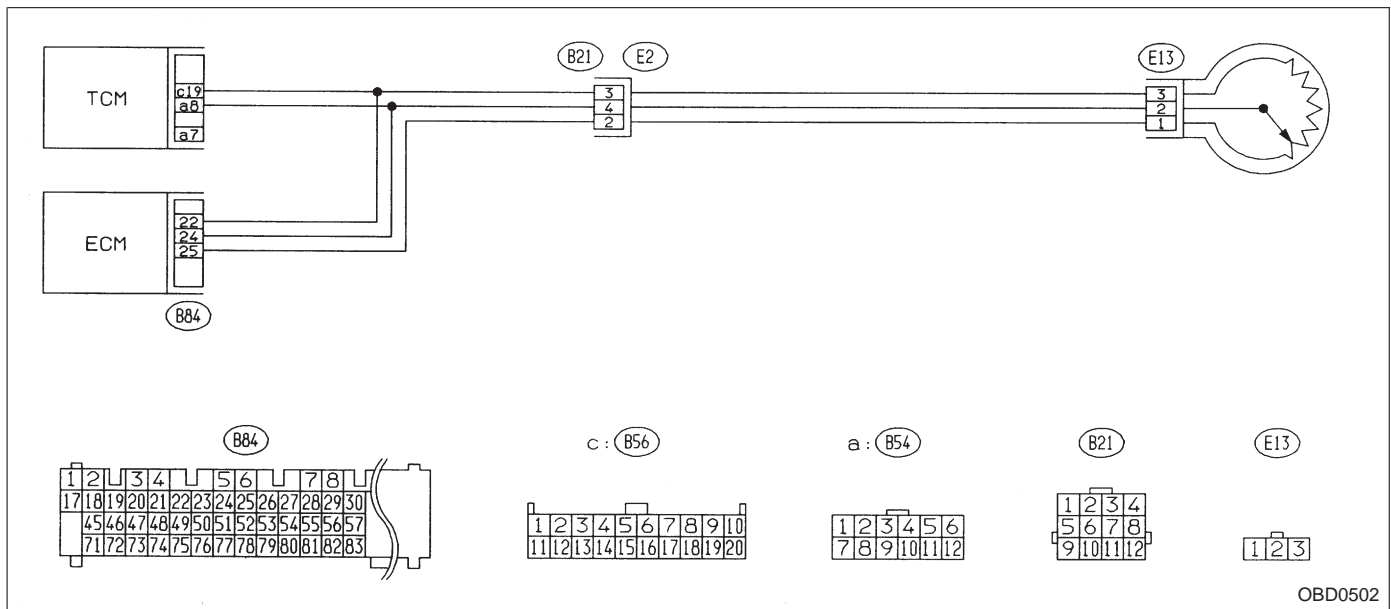
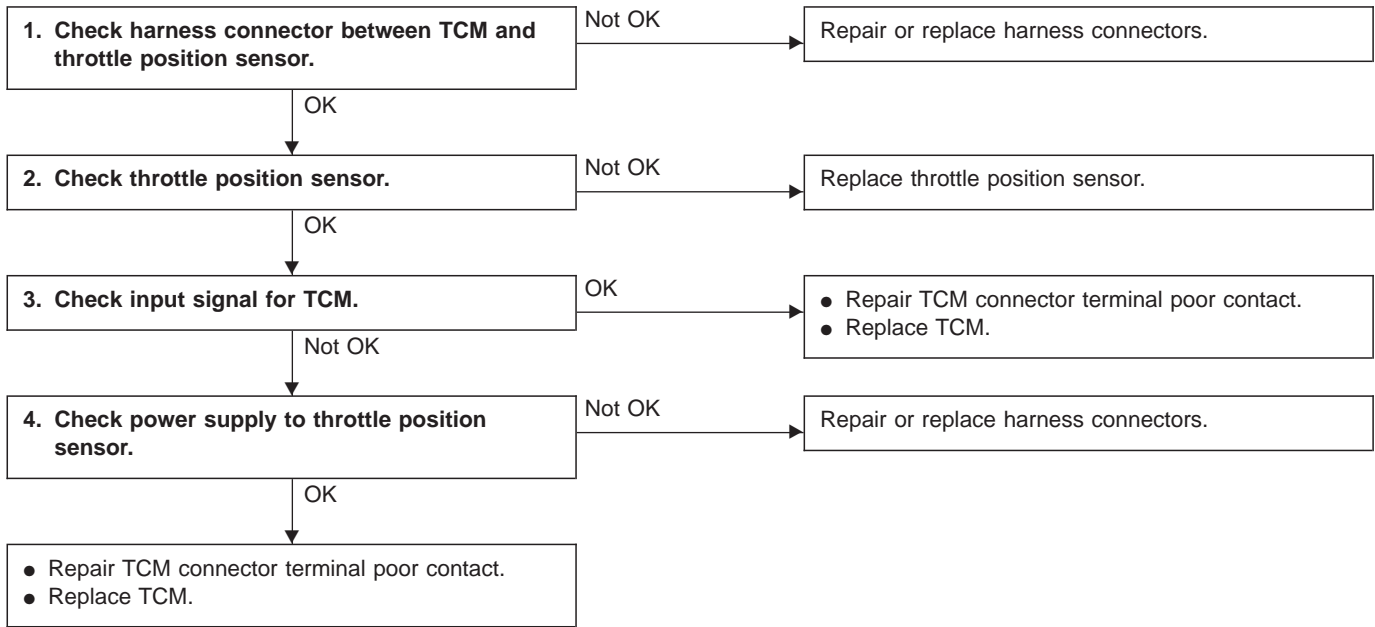
**L: TROUBLE CODE 31
— THROTTLE POSITION SENSOR —**

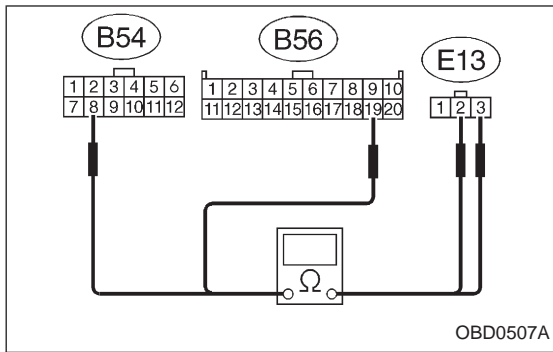
DIAGNOSIS:

Input signal circuit of throttle position sensor is open or shorted.

TROUBLE SYMPTOM:

Shift point too high or too low; engine brake not effected in "3" range; excessive shift shock; excessive tight corner "braking"

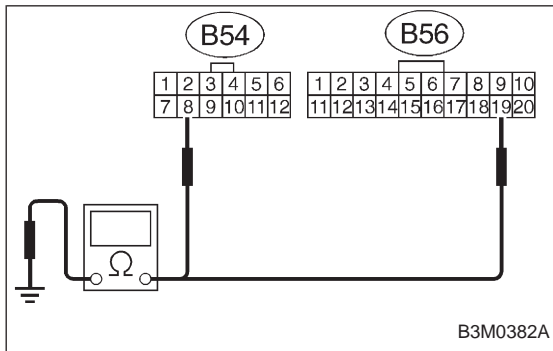




1. CHECK HARNESS CONNECTOR BETWEEN TCM AND THROTTLE POSITION SENSOR.

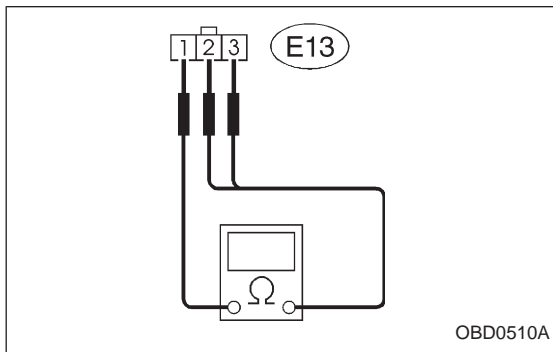
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from TCM and throttle position sensor.
- 3) Measure resistance of harness connector between TCM and throttle position sensor.

Connector & terminal / Specified resistance:
(B54) No. 8 — (E13) No. 2 / 1 Ω, or less
(B56) No. 19 — (E13) No. 3 / 1 Ω, or less



- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

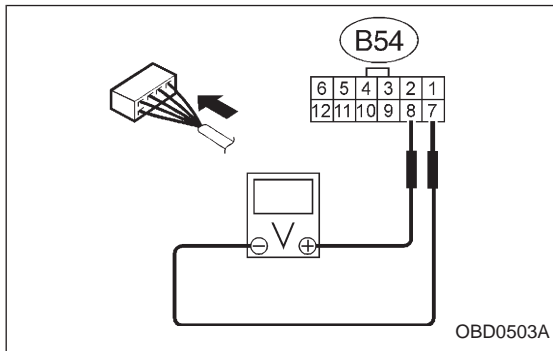
Connector & terminal / Specified resistance:
(B54) No. 8 — Body / 1 MΩ, or more
(B56) No. 19 — Body / 1 MΩ, or more



2. CHECK THROTTLE POSITION SENSOR.

Measure resistance between throttle position sensor terminals.

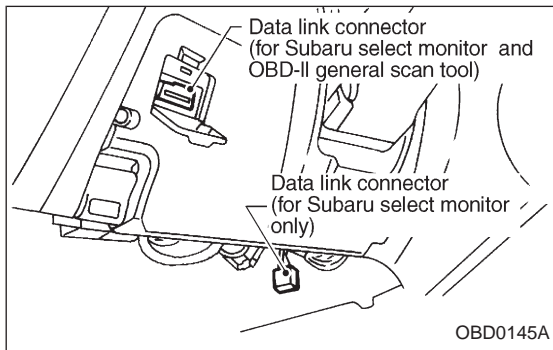
Terminals / Specified resistance:
(E13) No. 1 — No. 2 / 0.3 — 0.7 kΩ
(Throttle fully closed.)
3 — 6 kΩ
(Throttle fully open.)
(E13) No. 1 — No. 3 / 3.5 — 6.5 kΩ



3. CHECK INPUT SIGNAL FOR TCM.

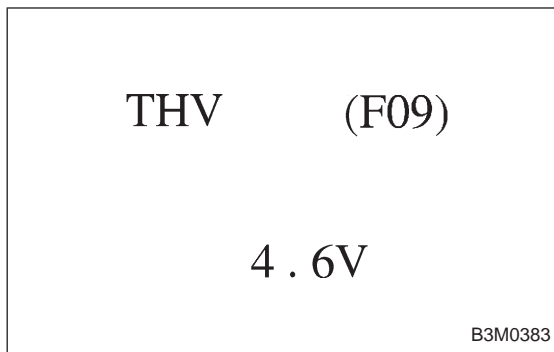
- 1) Connect connectors to TCM and throttle position sensor.
- 2) Turn ignition switch ON (with engine OFF).
- 3) Measure signal voltage input emitted from throttle position sensor with accelerator pedal fully depressed.

Connector & terminal / Specified voltage:
(B54) No. 8 — No. 7 /
0.5±0.2 V (Throttle fully closed.)
4.6±0.3 V (Throttle fully open.)



● Using Subaru select monitor:

- (1) Connect connectors to TCM and throttle position sensor.
- (2) Turn ignition switch to OFF.
- (3) Connect the Subaru select monitor to data link connector.
- (4) Turn ignition switch to ON and Subaru select monitor switch to ON.



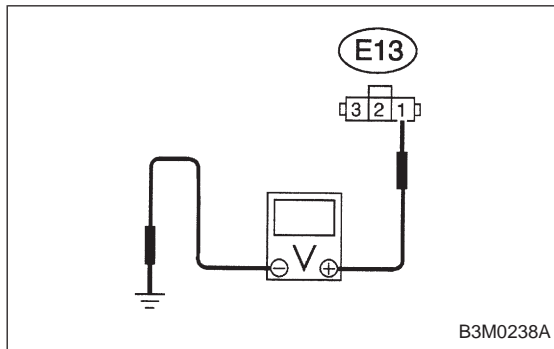
- (5) Designate mode using function key.
- (6) Read data on Subaru select monitor.

Function mode: F09**SPECIFIED DATA:**

0.5±0.2 V (Throttle fully closed.)

4.6±0.3 V (Throttle fully open.)

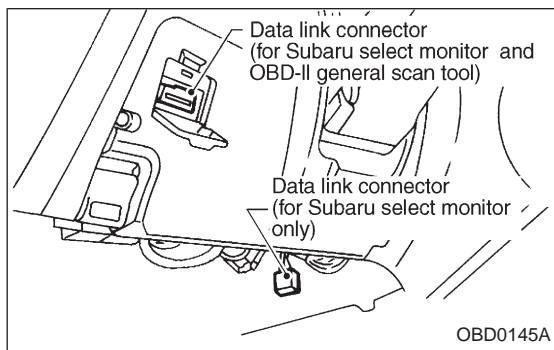
[Must be changed correspondingly with accelerator pedal operation (from “released” to “depressed” position).]

**4. CHECK POWER SUPPLY TO THROTTLE POSITION SENSOR.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from throttle position sensor.
- 3) Turn ignition switch to ON.
- 4) Measure power supply voltage to throttle position sensor.

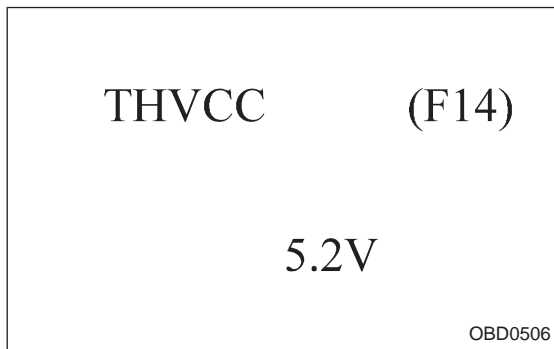
Connector & terminal / Specified voltage:

(E13) No. 1 — Body / 5.12±0.1 V



- Using Subaru select monitor:

- (1) Turn ignition switch to OFF.
- (2) Connect the Subaru select monitor to data link connector.
- (3) Turn ignition switch to ON and Subaru select monitor switch to ON.



- (4) Designate mode using function key.
- (5) Read data on Subaru select monitor.

Function mode: F14**SPECIFIED DATA:**

5.12±0.1 V

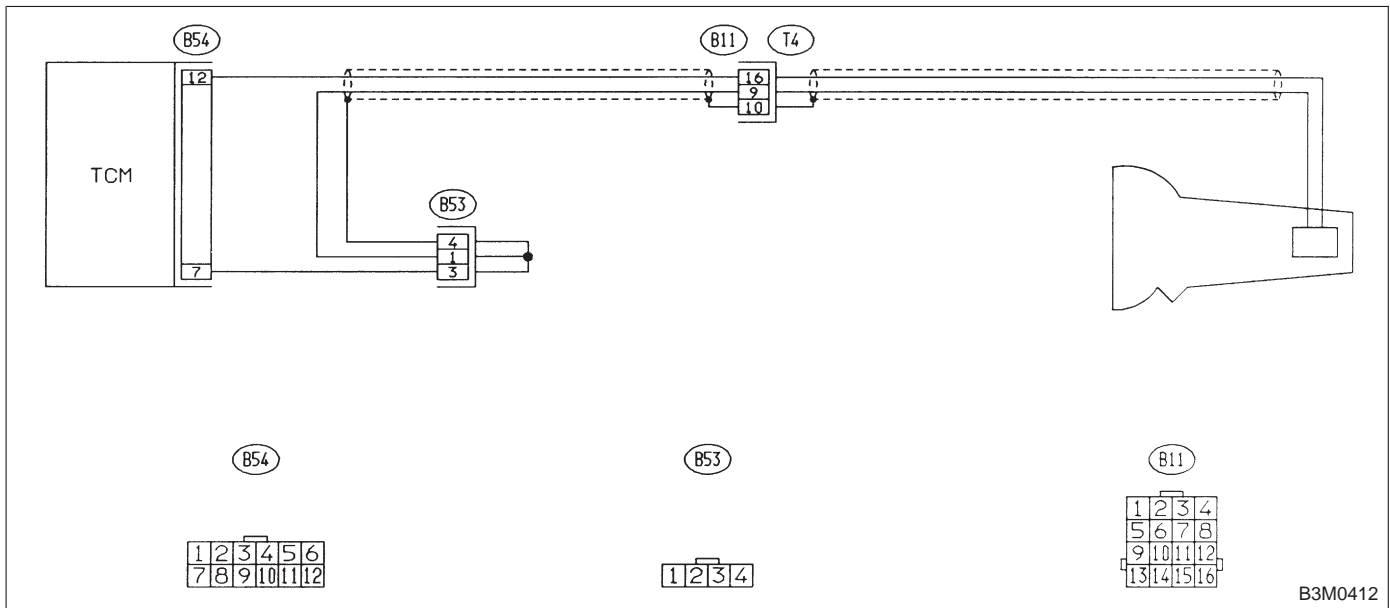
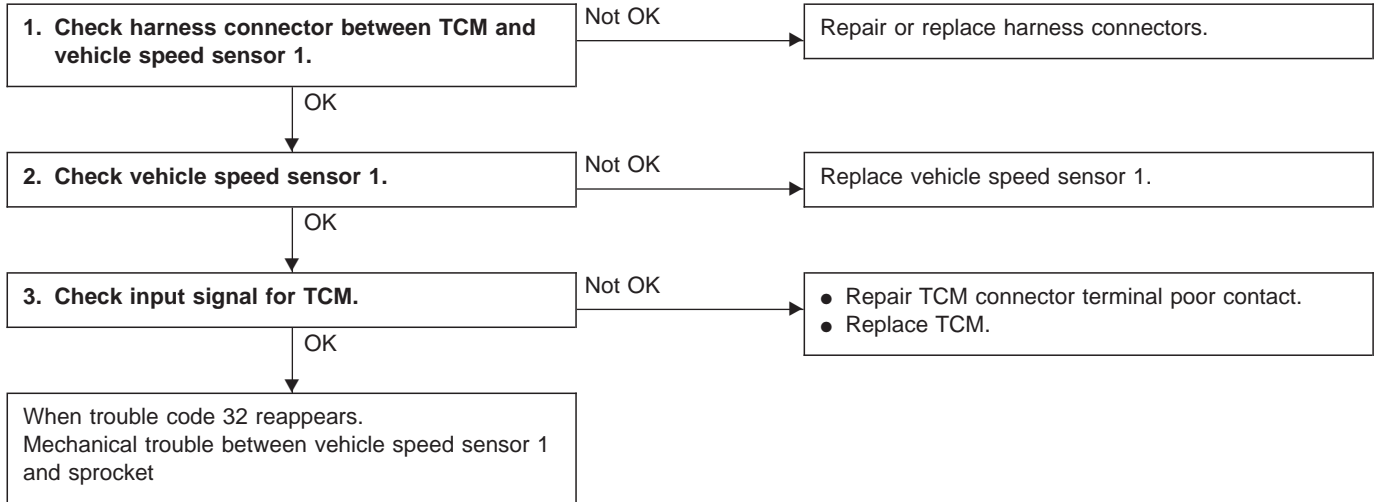
**M: TROUBLE CODE 32
— VEHICLE SPEED SENSOR 1 —**

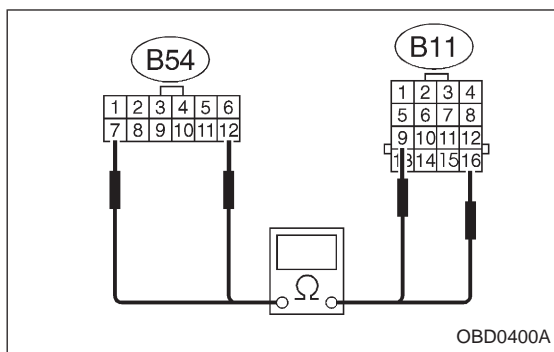
DIAGNOSIS:

Input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

No locking-up or excessive tight corner “braking”





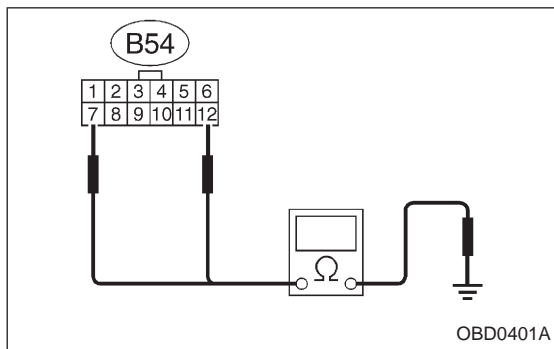
1. CHECK HARNESS CONNECTOR BETWEEN TCM AND VEHICLE SPEED SENSOR 1.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and transmission.
- 3) Measure resistance of harness connector between TCM and transmission connector.

Connector & terminal / Specified resistance:

(B54) No. 12 — (B11) No. 16 / 1 Ω , or less

(B54) No. 7 — (B11) No. 9 / 1 Ω , or less

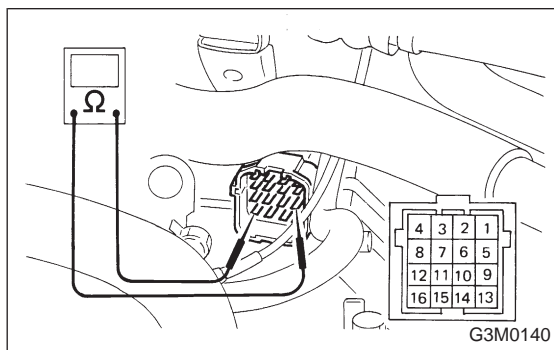


- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B54) No. 7 — Body / 1 M Ω , or more

(B54) No. 12 — Body / 1 M Ω , or more

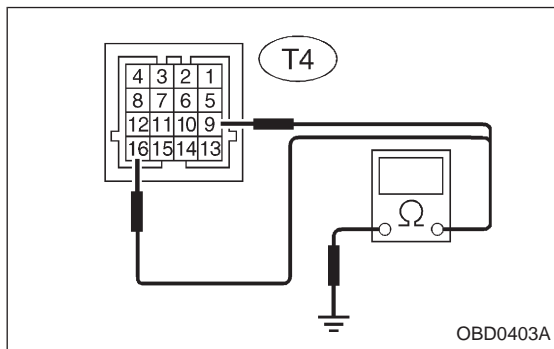


2. CHECK VEHICLE SPEED SENSOR 1.

- 1) Measure resistance between transmission connector receptacle's terminals.

Connector & terminal / Specified resistance:

(T4) No. 16 — No. 9 / 450 — 720 Ω

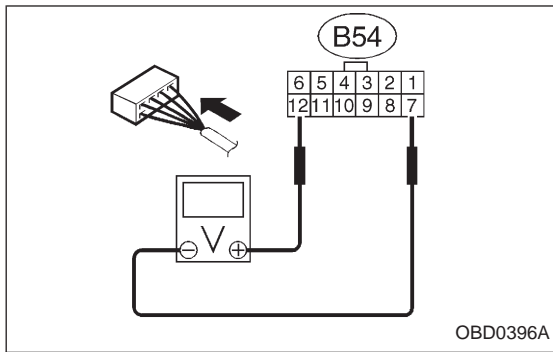


- 2) Measure resistance of harness connector between transmission connector and transmission case to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(T4) No. 16 — Transmission / 1 M Ω , or more

(T4) No. 9 — Transmission / 1 M Ω , or more



3. CHECK INPUT SIGNAL FOR TCM.

- 1) Connect connectors to TCM and transmission.
- 2) Lift-up or raise the vehicle and place safety stands.

CAUTION:

On AWD models, raise all wheels off floor.

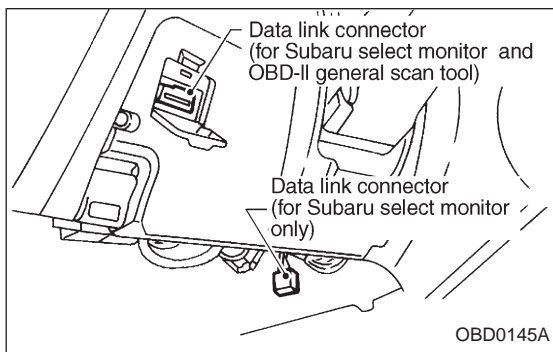
- 3) Push the TCS OFF switch to ON. (With TCS models)
- 4) Start the engine and set vehicle in 20 km/h (12 MPH) condition.
- 5) Measure voltage between TCM connector terminals.

Connector & terminal / Specified voltage:
(B54) No. 12 — No. 7 / AC 1 V, or more

NOTE:

The speed difference between front and rear wheels may light either the ABS or the ABS/TCS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS or the ABS/TCS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4a [T6C2], or 4-4b [T6D2], [T9K0].>



● Using Subaru select monitor:

- (1) Connect connectors to TCM and transmission.
- (2) Turn ignition switch to OFF.
- (3) Connect the Subaru select monitor to data link connector.
- (4) Lift-up or raise the vehicle and place safety stands.

CAUTION:

On AWD models, raise all wheels off floor.

- (5) Turn ignition switch to ON and Subaru select monitor switch to ON.
- (6) Push the TCS OFF switch to ON. (With TCS models)
- (7) Start the engine and operate at constant speed.
- (8) Read data on Subaru select monitor.
- (9) Designate mode using function key.

Function mode: F02 or F03

SPECIFIED DATA:

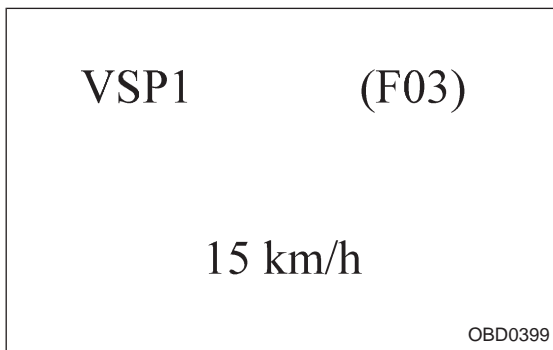
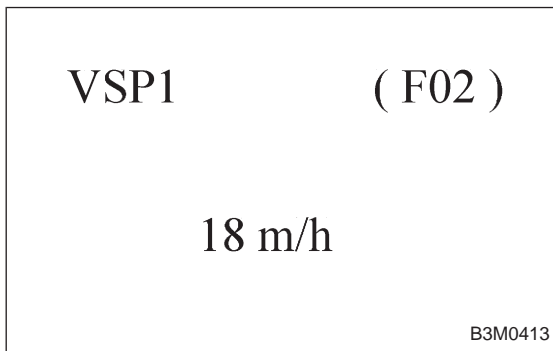
- F02: Compare speedometer with monitor indications.**
- F03: Compare speedometer with monitor indications.**

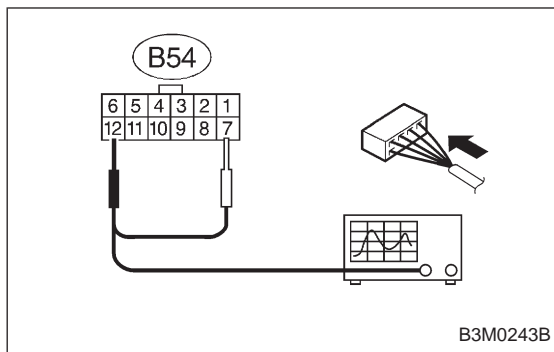
- F02: Vehicle speed is indicated in "m/h".
- F03: Vehicle speed is indicated in "km/h".

NOTE:

The speed difference between front and rear wheels may light either the ABS or the ABS/TCS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS or the ABS/TCS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4a [T6C2], or 4-4b [T6D2], [T9K0].>





- Using oscilloscope:
 - (1) Connect connectors to TCM and transmission.
 - (2) Lift-up the vehicle and place safety stands.

WARNING:

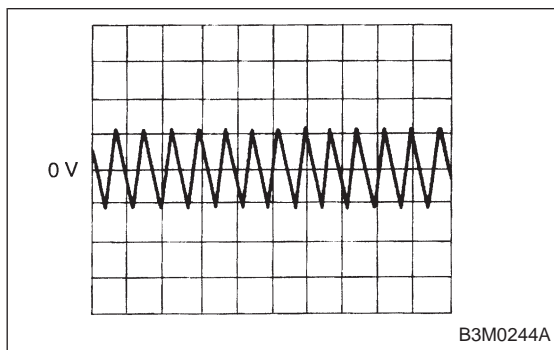
On AWD models, make sure that all wheels are raised off floor.

- (3) Set oscilloscope to TCM connector terminals.

Connector & terminals:

Positive probe; (B54) No. 12

Earth lead; (B54) No. 7



- (4) Push the TCS OFF switch to ON. (With TCS models)
- (5) Start the engine, and set vehicle in 20 km/h (12 MPH) condition.
- (6) Measure signal voltage indicated on oscilloscope.

Specified voltage: AC 1 V, or more**NOTE:**

The speed difference between front and rear wheels may light either the ABS or the ABS/TCS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS or the ABS/TCS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4a [T6C2], or 4-4b [T6D2], [T9K0].>

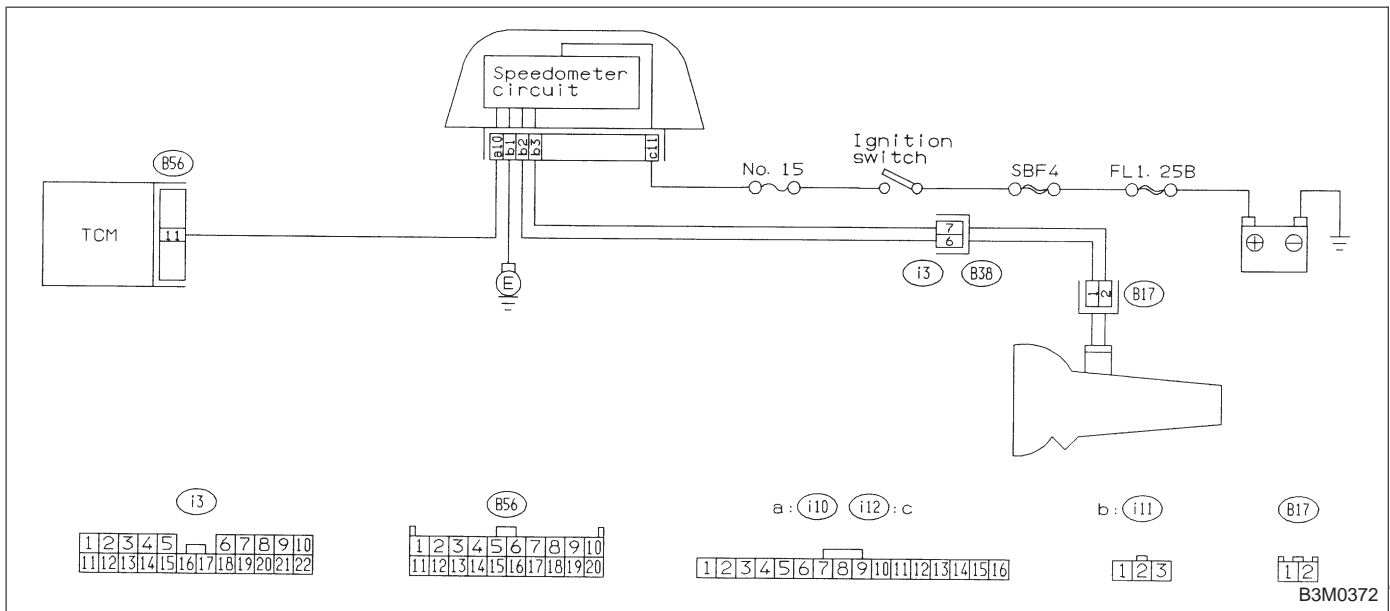
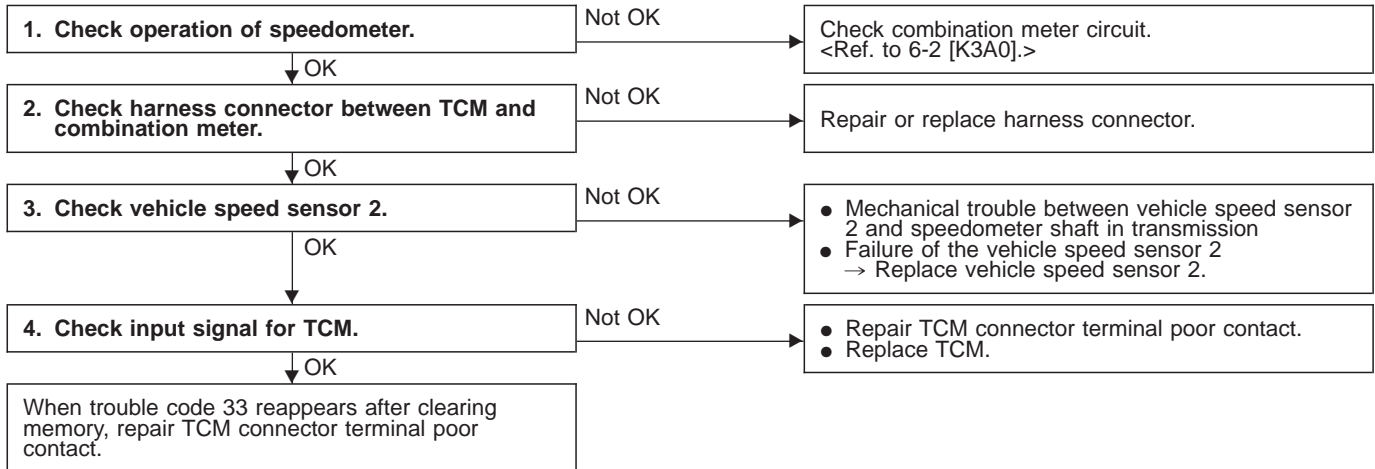
N: TROUBLE CODE 33
— VEHICLE SPEED SENSOR 2 —

DIAGNOSIS:

- The vehicle speed signal is abnormal.
- The circuit in combination meter is faulty.
- The harness connector between TCM and vehicle speed sensor is in short or open.

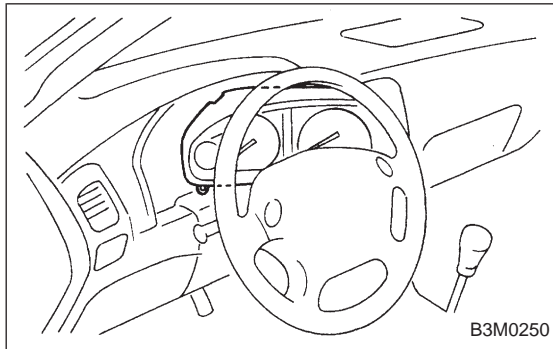
TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

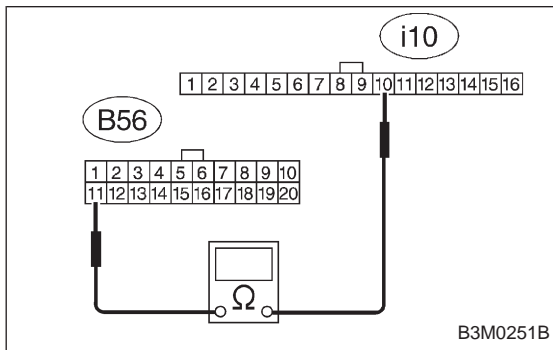


1. CHECK OPERATION OF SPEEDOMETER.

Make sure that speedometer indicates the vehicle speed by driving the vehicle.

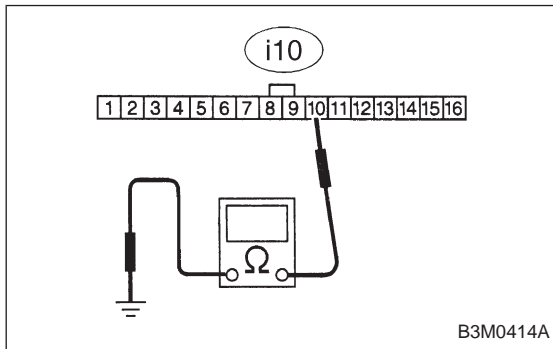
**2. CHECK HARNESS CONNECTOR BETWEEN TCM AND COMBINATION METER.**

- 1) Turn ignition switch to OFF.
- 2) Remove combination meter.



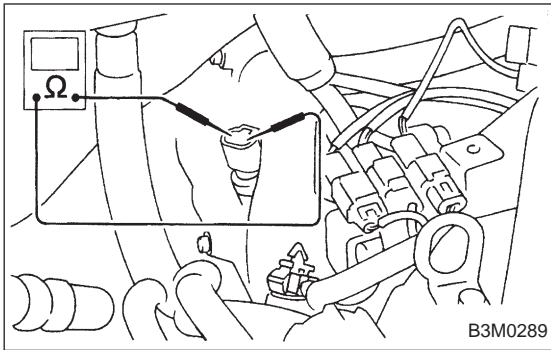
- 3) Disconnect connectors from TCM.
- 4) Measure resistance of harness connector between TCM and combination meter.

Connector & terminal / Specified resistance:
(B56) No. 11 — (i10) No. 10 / 1 Ω, or less



- 5) Measure resistance of harness connector between combination meter and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:
(i10) No. 10 — Body / 1 MΩ, or more



3. CHECK VEHICLE SPEED SENSOR 2.

- 1) Install combination meter.
- 2) Connect connector to TCM.
- 3) Lift-up the vehicle and place safety stand.

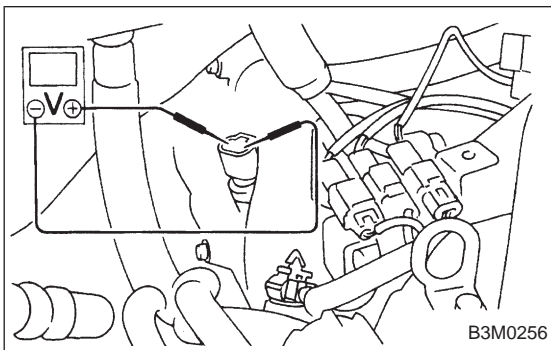
CAUTION:

On AWD models, raise all wheels off floor.

- 4) Disconnect connector from vehicle speed sensor 2.
- 5) Measure resistance between terminals of vehicle speed sensor 2.

Terminals / Specified resistance:

- (B17) No. 1 — No. 2 / 350 — 450 Ω
- No. 1 — Body / 1 MΩ, or more
- No. 2 — Body / 1 MΩ, or more



- 6) Push the TCS OFF switch to ON. (With TCS models)
- 7) Start the engine and set vehicle in 20 km/h (12 MPH) condition.
- 8) Measure output signal of vehicle speed sensor 2.

WARNING:

Be careful not to be caught up by the running wheels.

- 9) Using a voltage meter; measure voltage between terminals of vehicle speed sensor 2.

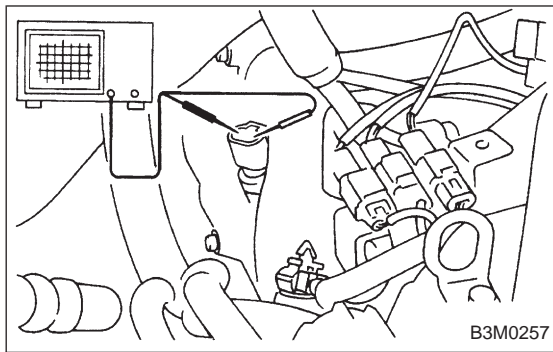
Terminals / Specified voltage:

- (B17) No. 1 — No. 2 / AC 2 V, or more

NOTE:

The speed difference between front and rear wheels may light either the ABS or the ABS/TCS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS or the ABS/TCS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4a [T6C2], or 4-4b [T6D2], [T9K0].>



- Using oscilloscope:
 - (1) Install combination meter.
 - (2) Connect connector to TCM.
 - (3) Lift-up the vehicle and place safety stand.

WARNING:

On AWD models, make sure that all wheels are raised off floor.

- (4) Set oscilloscope to vehicle speed sensor 2.

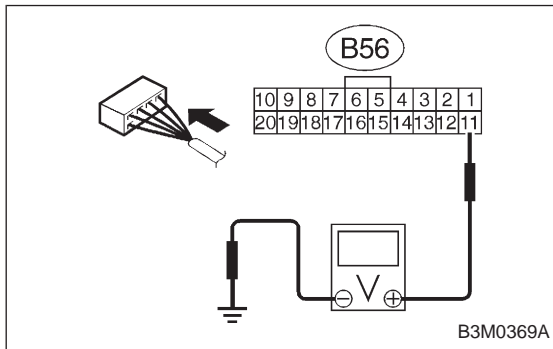
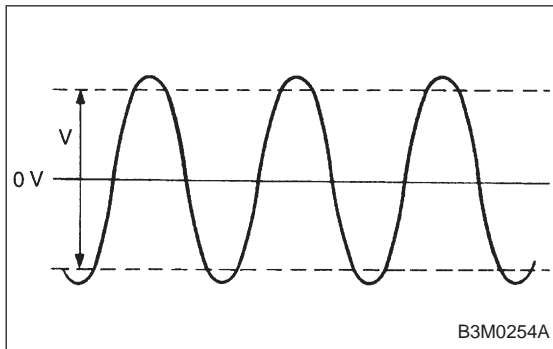
Connector & terminal / No. 1 — No. 2

- (5) Push the TCS OFF switch to ON. (With TCS models)
- (6) Start the engine, and drive the wheels slowly.
- (7) Measure signal voltage indicated on oscilloscope.

Specified voltage: AC 2 V, or more**NOTE:**

The speed difference between front and rear wheels may light either the ABS or the ABS/TCS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS or the ABS/TCS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4a [T6C2], or 4-4b [T6D2], [T9K0].>

**4. CHECK INPUT SIGNAL FOR TCM.**

- 1) Connect connector to vehicle speed sensor 2.
- 2) Lift-up the vehicle or set the vehicle on free roller.

CAUTION:

On AWD models, raise all wheels off floor.

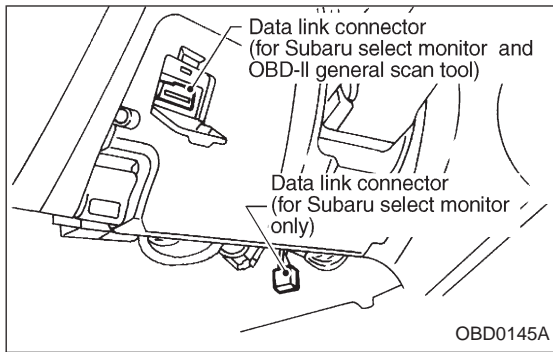
- 3) Push the TCS OFF switch to ON. (With TCS models)
- 4) Start the engine, and drive the wheels slowly.
- 5) Measure voltage between TCM and body.

Connector & terminal / Specified voltage:
(B56) No. 11 — Body / Less than 1 ↔ more than 9 V

NOTE:

The speed difference between front and rear wheels may light either the ABS or the ABS/TCS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS or the ABS/TCS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4a [T6C2], or 4-4b [T6D2], [T9K0].>

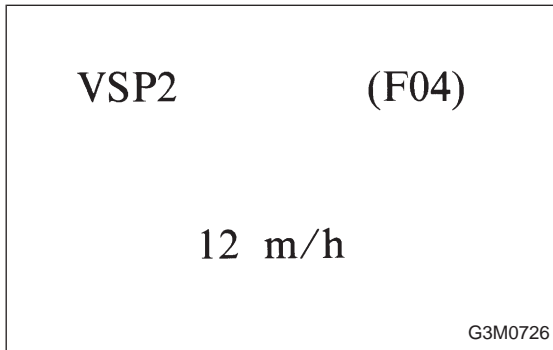


- Using Subaru select monitor:
 - (1) Install combination meter.
 - (2) Connect connectors to TCM and vehicle speed sensor 2.
 - (3) Lift-up the vehicle or set the vehicle on free roller.
 - (4) Turn ignition switch to OFF.
 - (5) Connect the Subaru select monitor to data link connector.
 - (6) Turn ignition switch to ON and Subaru select monitor switch to ON.

CAUTION:

On AWD models, raise all wheels off floor.

- (7) Push the TCS OFF switch to ON. (With TCS models)



- (8) Start the engine, and drive the wheels.
- (9) Read data on Subaru select monitor.
- (10) Designate mode using function key.

Function mode: F04 or F05

SPECIFIED DATA:

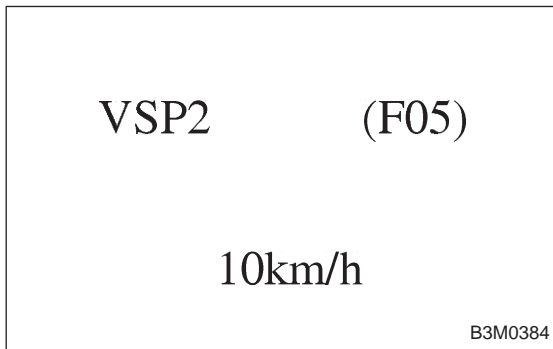
Compare speedometer with select monitor indications.

- F04: Vehicle speed is indicated in mile per hour (MPH).
- F05: Vehicle speed is indicated in kilometer per hour (km/h).

NOTE:

The speed difference between front and rear wheels may light either the ABS or the ABS/TCS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS or the ABS/TCS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4a [T6C2], or 4-4b [T6D2], [T9K0].>



- Using oscilloscope:
 - (1) Connect connector to vehicle speed sensor 2.
 - (2) Lift-up the vehicle or set the vehicle on free rollers.

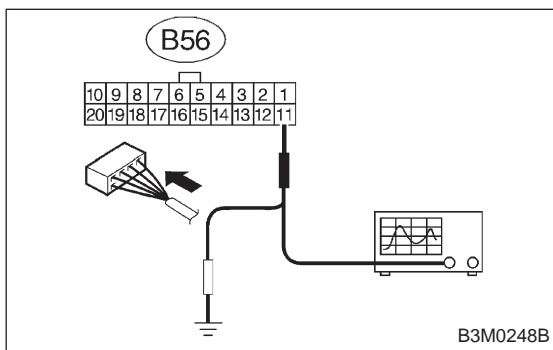
CAUTION:

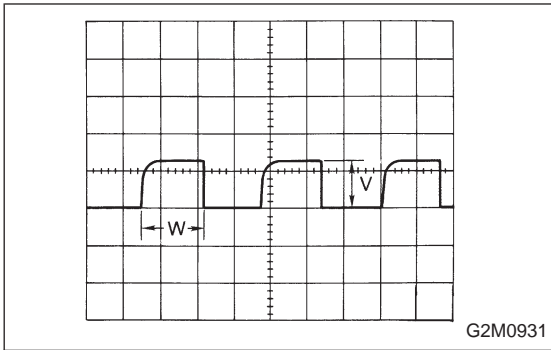
On AWD models, raise all wheels off floor.

- (3) Set oscilloscope to TCM connector terminals.

Connector & terminals:

Positive probe; (B56) No. 11
Earth lead; Body





- (4) Push the TCS OFF switch to ON. (with TCS models)
- (5) Start the engine.
- (6) Shift on the gear position, and keep the vehicle speed at constant.
- (7) Measure signal voltage.

Specified voltage: 2 V, or more

NOTE:

If vehicle speed increases, the width of amplitude (W) decreases.

NOTE:

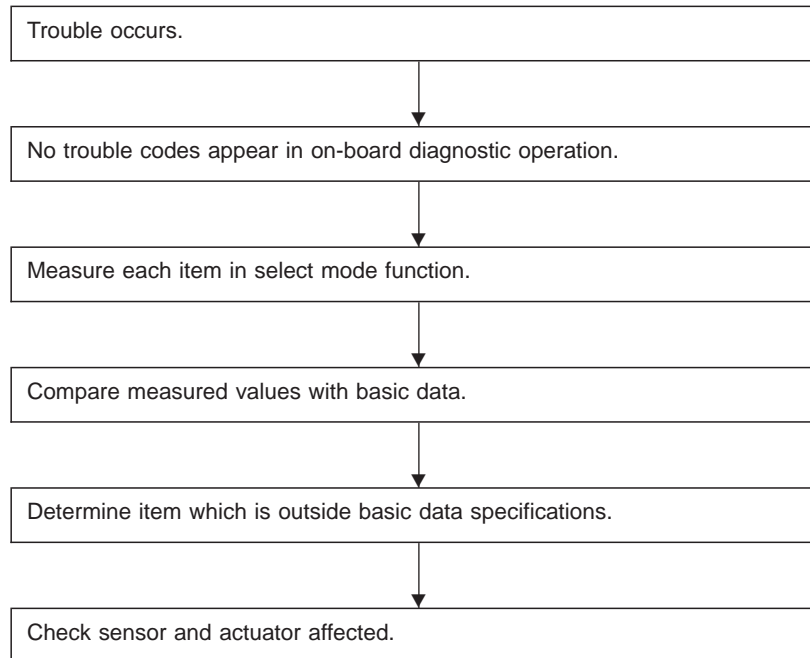
The speed difference between front and rear wheels may light either the ABS or the ABS/TCS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS or the ABS/TCS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4a [T6C2], or 4-4b [T6D2], [T9K0].>

8. Diagnostic Chart with Select Monitor

A: BASIC DIAGNOSTIC CHART

If no trouble codes appear in the on-board diagnostic operation (although problems have occurred or are occurring), measure performance characteristics of sensors, actuators, etc., in the "F" mode (select monitor function), and compare with the "basic data" to determine the cause of problems.



B: LIST OF OUTPUT MODES**1. FUNCTION MODE**

Mode	Contents	Abbr.	Unit	Contents of display	Page
F00	Mode display	—	—	AT or EGI mode (when monitor is connected.)	61
F01	Battery voltage	VB	V	Battery voltage applied to control unit.	61
F02	Vehicle speed sensor 1	VSP1	m/h	Vehicle speed (miles/h) sent from vehicle speed sensor 1.	62
F03	Vehicle speed sensor 1	VSP1	km/h	Vehicle speed (km/h) sent from vehicle speed sensor 1.	62
F04	Vehicle speed sensor 2	VSP2	m/h	Vehicle speed (miles/h) sent from vehicle speed sensor 2.	62
F05	Vehicle speed sensor 2	VSP2	km/h	Vehicle speed (km/h) sent from vehicle speed sensor 2.	62
F06	Engine speed	EREV	rpm	Engine speed sent from ECM.	63
F07	ATF temperature sensor	ATFT	°F	ATF temperature (°F) sent from ATF temperature sensor.	63
F08	ATF temperature sensor	ATFT	°C	ATF temperature (°C) sent from ATF temperature sensor.	63
F09	Throttle position sensor	THV	V	Voltage sent from throttle position sensor.	64
F10	Gear position	GEAR	—	Transmission gear position	64
F11	Line pressure duty	PLDTY	%	Duty ratio flowing through duty solenoid A.	65
F12	Lock-up duty	LUPTY	%	Duty ratio flowing through duty solenoid B.	66
F13	AWD duty	4WDTY	%	Duty ratio flowing through duty solenoid C.	67
F14	Throttle position sensor power supply	THVCC	V	Power supply voltage to throttle position sensor	68
F15	Mass air flow signal	AFM	V	Output voltage from air flow sensor	68

2. ON ↔ OFF SIGNAL LIST

Mode	LED No.	Signal name	Display	LED "ON" requirements	Page
FA0	1	FWD switch	FF	When fuse is installed in FWD switch.	—
	2	Kick-down switch	KD		—
	3	—	—		—
	4	—	—		—
	5	Brake switch	BR	When brake switch is turned ON.	—
	6	ABS switch	AB	When ABS signal is entered.	—
	7	Cruise control set	CR	When cruise control is set.	—
	8	Power switch	PW		—
	9	—	—		—
	10	—	—		—
FA1	1	P/N range switch	NP	When P or N range is selected.	—
	2	R range switch	RR	When R range is selected.	—
	3	D range switch	RD	When D range is selected.	—
	4	3 range switch	R3	When 3 range is selected.	—
	5	2 range switch	R2	When 2 range is selected.	—
	6	1 range switch	R1	When 1 range is selected.	—
	7	Diagnosis switch	SS	When diagnosis switch is turned ON.	70
	8	—	—		—
	9	—	—		—
	10	—	—		—

NOTE; LED Nos. 2 and 8 cannot be turned on.

3. DIAGNOSIS MODE

Mode	Contents	Abbr.	Contents of display
FB0	On-board diagnostics	DIAG.U	Current trouble code determined by on-board diagnostics.
FB1	On-board diagnostics	DIAG.M	Previous trouble code stored in memory by on-board diagnostics.
FC0	Back-up clear	—	Function of clearing trouble code stored in memory.

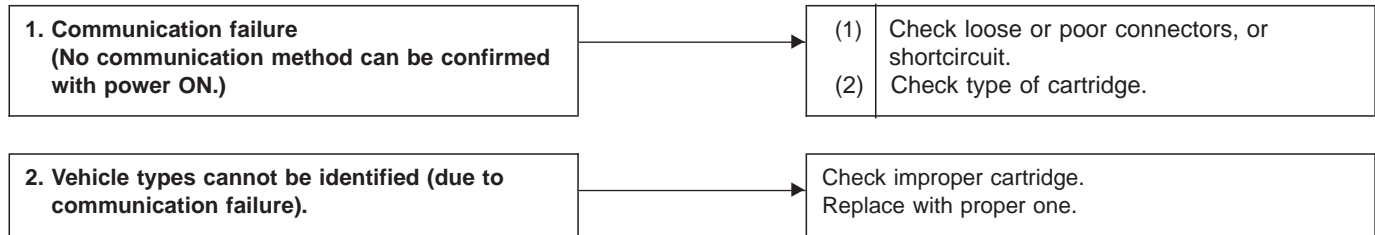
<p>E-4AT (F00)</p> <p>4WD 1993</p>
G3M0723

C: MODE F00 — MODE DISPLAY —

SPECIFIED DATA:

Data at the left should be indicated.

Probable cause (if outside "specified data")



<p>VB (F01)</p> <p>12 V</p>
G3M0724

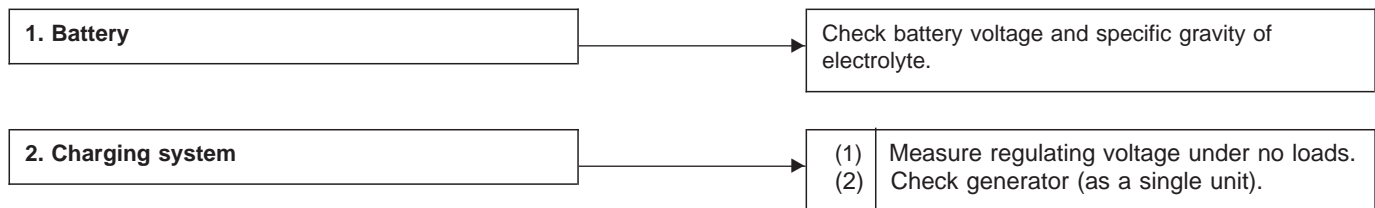
D: MODE F01 — BATTERY VOLTAGE (VB) —

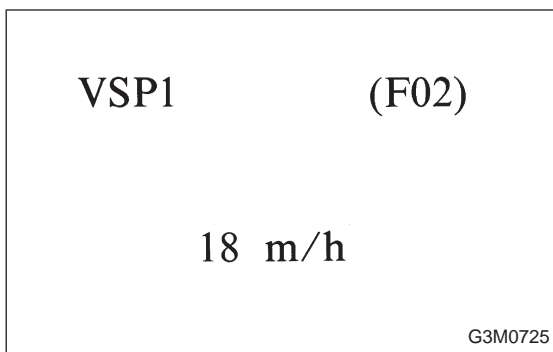
CONDITION:

- Ignition switch ON
- Engine idling after warm-up

SPECIFIED DATA:

VB: 10 — 16 V





E: MODE F02
— VEHICLE SPEED SENSOR 1 (VSP1) —

F03 = vehicle speed (VSP1):
to be indicated in “km/h”.

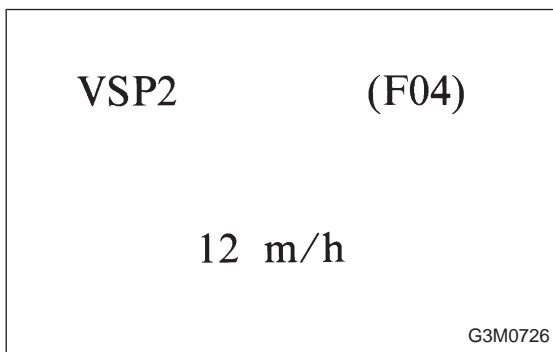
CONDITION:

Raise vehicle off ground and operate at constant speed.

SPECIFIED DATA:

Compare speedometer with monitor indications.

Probable cause (if outside “specified data”)



F: MODE F04
— VEHICLE SPEED SENSOR 2 (VSP2) —

F05 = vehicle speed (VSP2):
to be indicated in “km/h”.

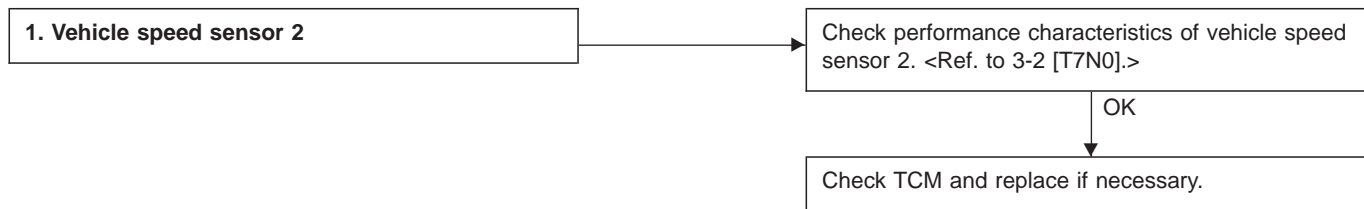
CONDITION:

Raise vehicle off ground and operate at constant speed.

SPECIFIED DATA:

Compare speedometer with monitor indications.

Probable cause (if outside “specified data”)



EREV (F06)

1,500 rpm

G3M0727

G: MODE F06 — ENGINE SPEED (EREV) —

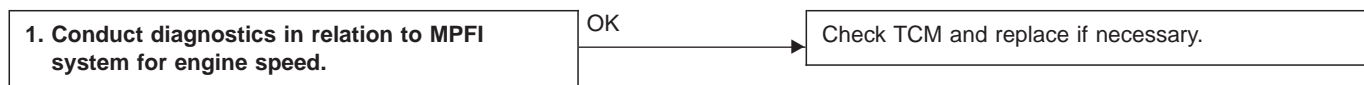
CONDITION:

Measure with engine operating at constant speed.

SPECIFIED DATA:

Same as tachometer reading (in combination meter)

Probable cause (if outside "specified data")



ATFT (F07)

176 deg F

OBD0386

H: MODE F07

— ATF TEMPERATURE SENSOR (ATFT) —

F08 = ATF temperature (ATFT): to be indicated in "deg C".

CONDITION:

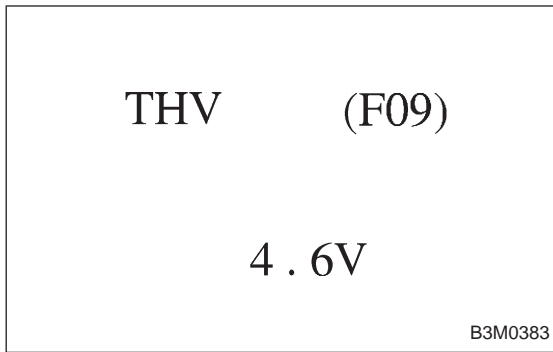
- Low ATF temperature (before engine/vehicle starts.)
- High ATF temperature (after driving vehicle for warm-up.)

SPECIFIED DATA:

- Ambient temperature: ±50°F (±10°C)
(Low ATF temperature)
- ATF temperature: 158 — 230°F (70 — 110° C)
(High ATF temperature)
- Open harness: 176 deg F (80 deg C)
- Shorted harness: 320 deg F (160 deg C)

Probable cause (if outside "specified data")





I: MODE F09 — THROTTLE POSITION SENSOR (THV) —

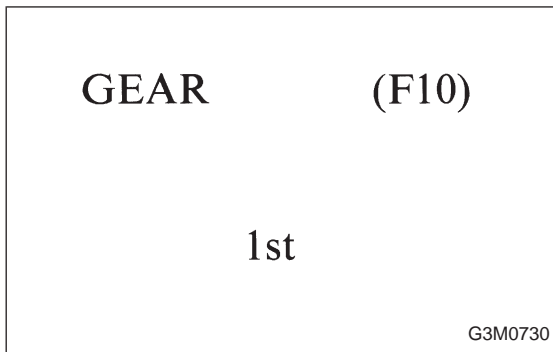
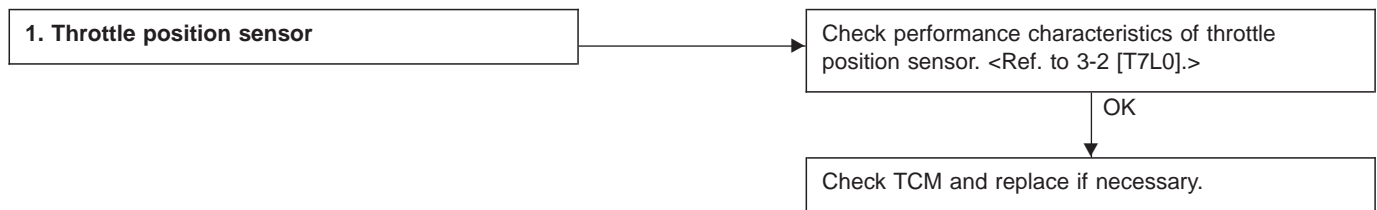
CONDITION:

- Ignition switch ON (with engine OFF)
- Measure voltage while operating throttle valve from a fully closed position to a fully open position.

SPECIFIED DATA:

- Fully closed position: 0.5±0.2 V
- Fully open position: 4.6±0.3 V
- From fully closed to fully open position: Voltage must smoothly decrease.
- Open harness: 5.0±0.3 V
- Shorted harness: 0.00 V

Probable cause (if outside “specified data”)



J: MODE F10 — GEAR POSITION (GEAR) —

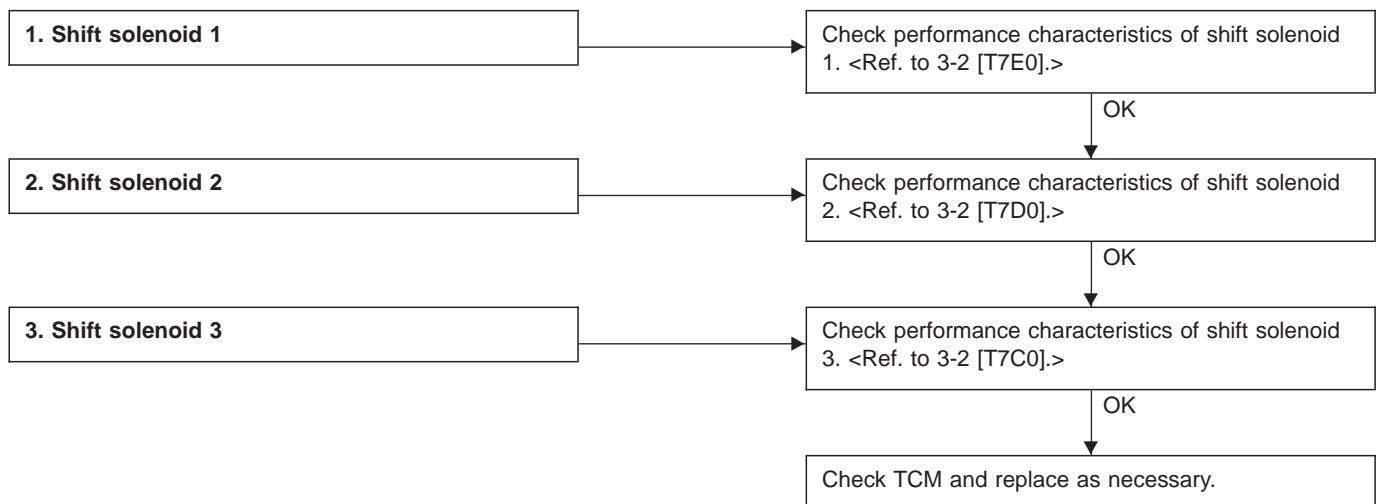
CONDITION:

Check while driving vehicle (after warm-up).

SPECIFIED DATA:

Gear position (Refer to shift performance characteristics chart.)

Probable cause (item outside “specified data”)



PLDTY (F11)

50%

G3M0731

K: MODE F11
— LINE PRESSURE DUTY (PLDTY) —

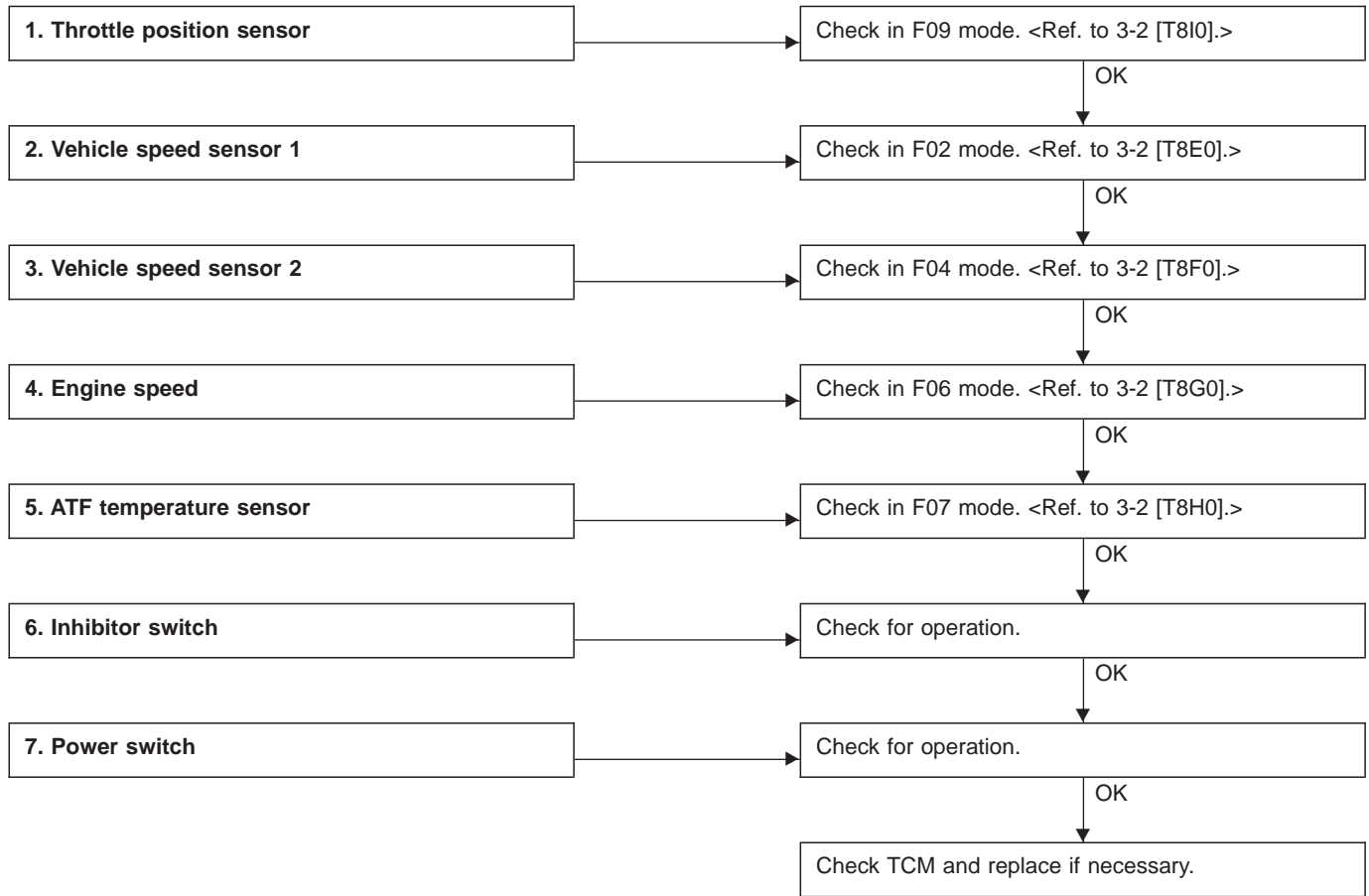
CONDITION:

- After sufficient warm-up
- Ignition ON (engine OFF)
- N range

SPECIFIED DATA:

- Throttle fully closed: 100%
- Throttle fully open : 15% or less

Probable cause (if outside "specified data")



LUPTY **(F12)**

5%

G3M0732

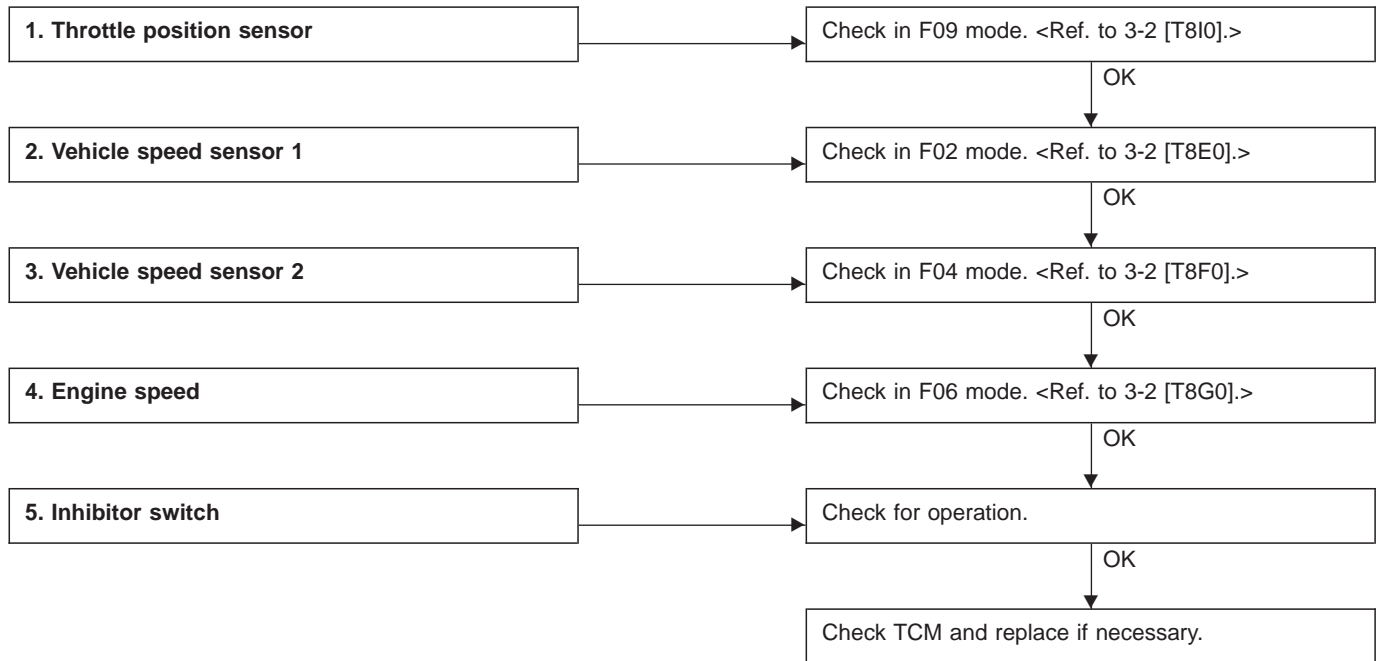
**L: MODE F12 — LOCK-UP DUTY (LUPTY) —
CONDITION:**

- Idling (after sufficient warm-up) with lock-up system released.
- Driving at 75 km/h (47 MPH) (after sufficient warm-up) with lock-up system applied.

SPECIFIED DATA:

- Lock-up system released: 5%
- Lock-up system applied: 95%

Probable cause (if outside "specified data")



4WDTY (F13)

95%

G3M0733

M: MODE F13 — AWD DUTY (4WDTY) —

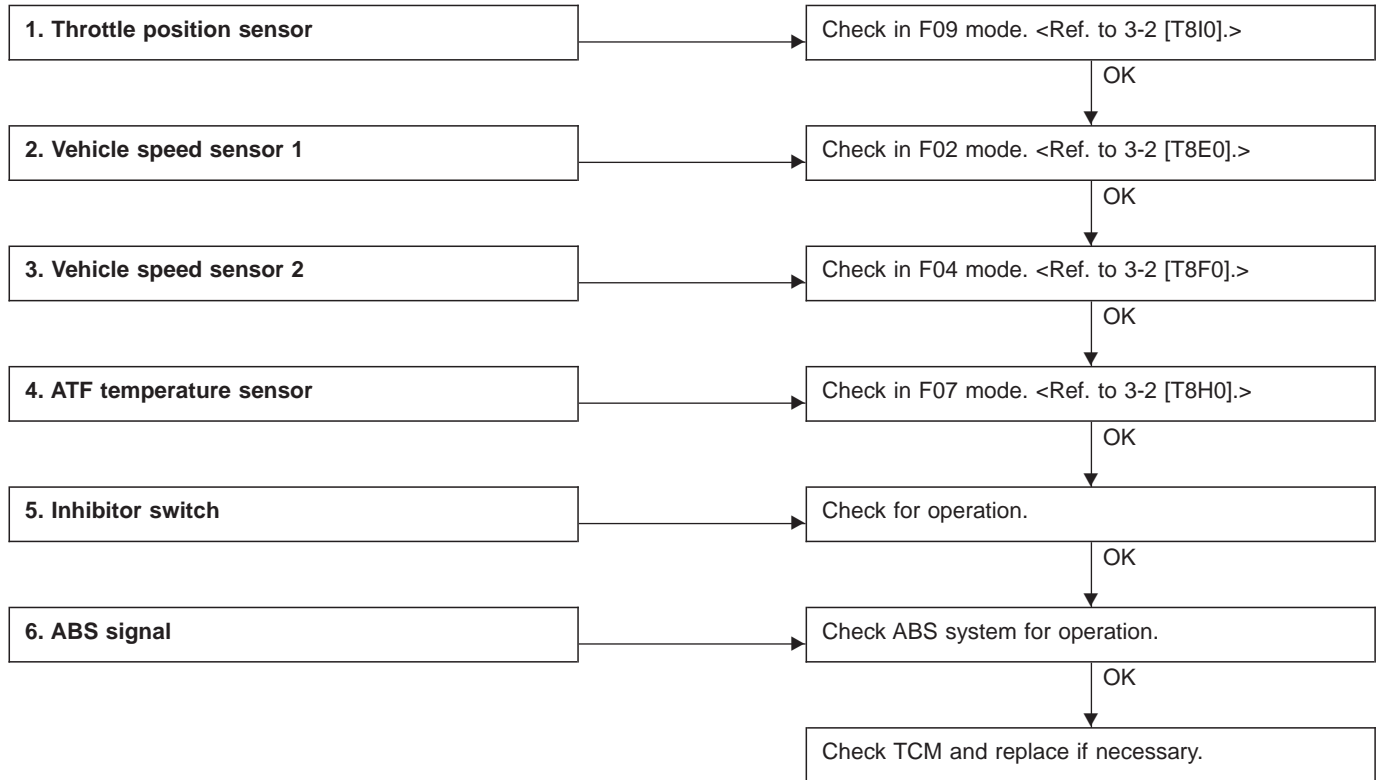
CONDITION:

- After sufficient warm-up
- Ignition switch ON (engine OFF)
- FWD mode
- AWD mode, D range, full throttle

SPECIFIED DATA:

- 95% (FWD mode)
- 25%, max. (vehicle speed 0 m/h) (AWD mode)

Probable cause (if outside "specified data")



THVCC (F14)

5.2 V

B3M0259

N: MODE F14
— THROTTLE POSITION SENSOR POWER SUPPLY (THVCC) —

CONDITION:

Ignition switch ON (engine OFF)

SPECIFIED DATA:

5.12±0.1 V

Probable cause (Item outside "specified data")



AFM (F15)

0.6V

B3M0370

O: MODE F15
— MASS AIR FLOW SIGNAL (AFM) —

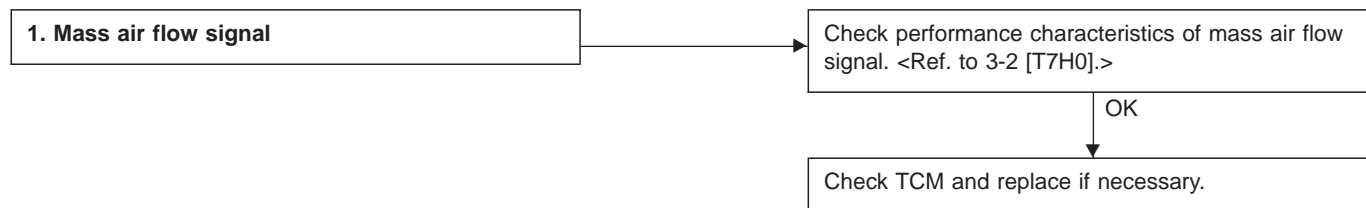
CONDITION:

- Ignition switch ON (engine ON)
- N range
- Idling

SPECIFIED DATA:

Engine warm-up: 0.5 — 1.2 V

Probable cause (if outside "specified data")



DISPLAY

LED No.	Signal name	Symbol
1	FWD switch	FF
2	Kick-down switch	KD
3	—	—
4	—	—
5	Brake	BR
6	ABS switch	AB
7	Cruise control set	CR
8	Power switch	PW
9	—	—
10	—	—

FF	KD	—	—	BR
AB	CR	PW	—	—

1	2	3	4	5
6	7	8	9	10

P: MODE FA0

— SWITCH 1 (SW1) —

Reference values

- Lights up when the fuse is installed in FWD switch (No. 1).
- Light up when the brake pedal is depressed (No. 5).
- Light up when the ABS signal is entered (No. 6).
- Lights up when the cruise control is set (No. 7).

NOTE:

LED Nos. 2 and 8 do not come on.

DISPLAY

LED No.	Signal name	Symbol
1	N/P range switch	NP
2	R range switch	RR
3	D range switch	RD
4	3 range switch	R3
5	2 range switch	R2
6	1 range switch	R1
7	Diagnosis switch	SS
8	—	—
9	—	—
10	—	—

NP	RR	RD	R3	R2
R1	SS	—	—	—

1	2	3	4	5
6	7	8	9	10

Q: MODE FA1

— SWITCH 2 (SW2) —

Reference values

- Lights up when the N or P range is selected (No. 1).
- Lights up when the R range is selected (No. 2).
- Lights up when the D range is selected (No. 3).
- Lights up when the 3 range is selected (No. 4).
- Lights up when the 2 range is selected (No. 5).
- Lights up when the 1 range is selected (No. 6).
- Lights up when the diagnosis switch is connected (No. 7).

NOTE:

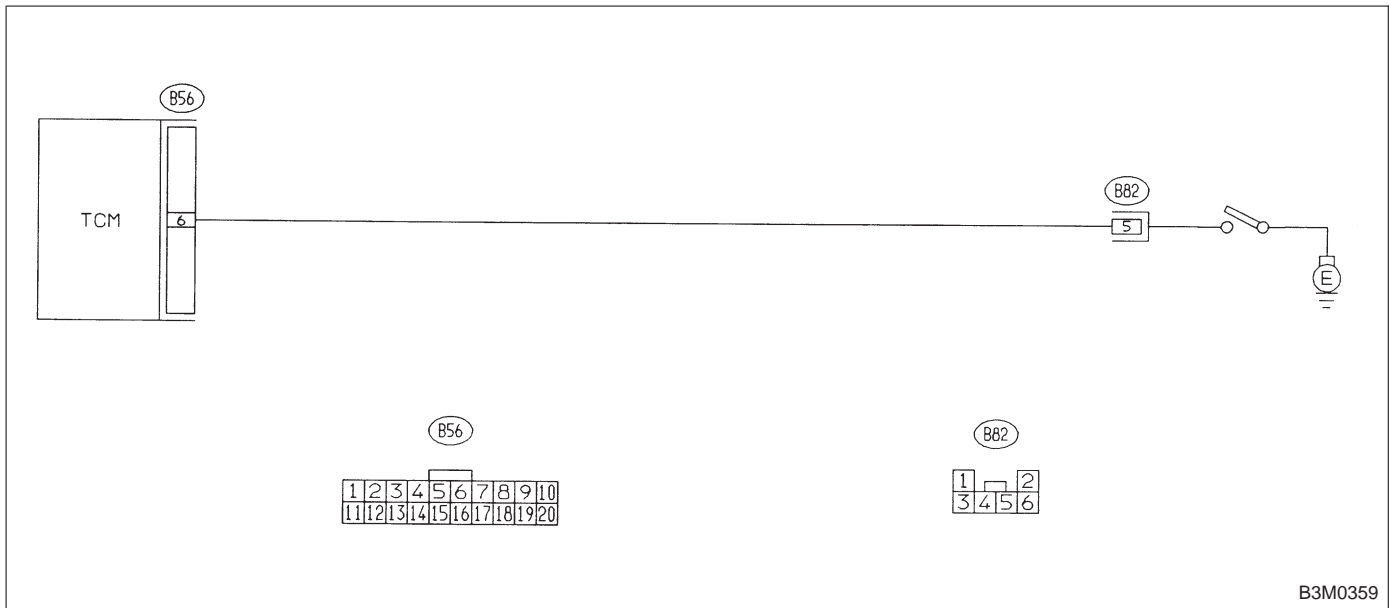
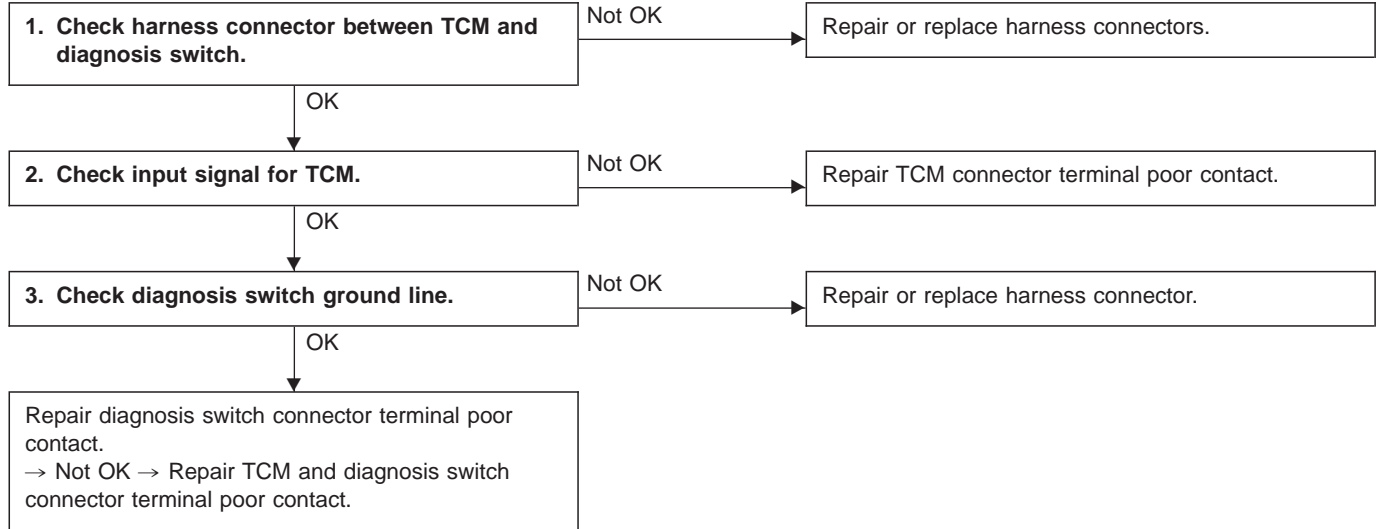
If each LED does not illuminate in the above conditions, inhibitor switch malfunction may occur. Perform diagnostics on inhibitor switch. <Ref. to 2-7 [T11AN0].>

**R: MODE FA1
— LED No. 7, DIAGNOSIS SWITCH —**

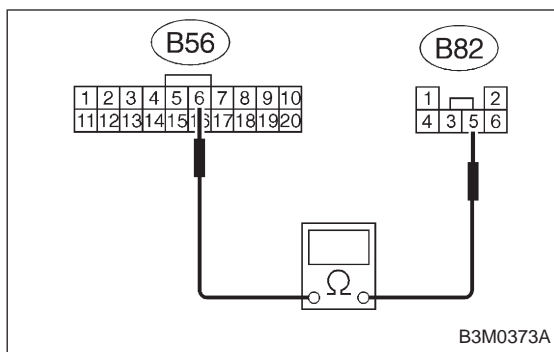
DIAGNOSIS:

- LED does not come on when diagnosis switch is ON.
- Diagnosis switch circuit is open or shorted.

Probable cause (if outside "specified data")



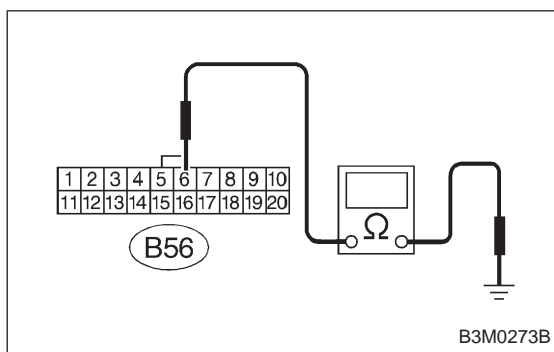
B3M0359



1. CHECK HARNESS CONNECTOR BETWEEN TCM AND DIAGNOSIS SWITCH.

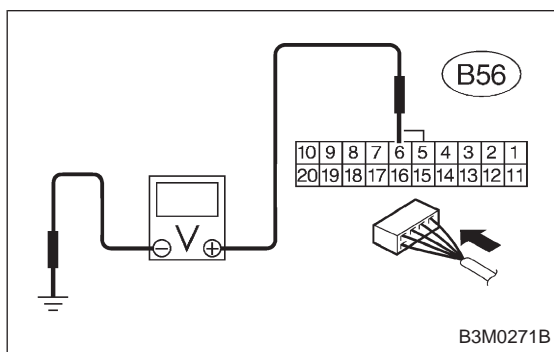
- 1) Turn ignition switch OFF.
- 2) Disconnect connector from TCM.
- 3) Measure resistance of harness connector between TCM and diagnosis switch.

Connector & terminal / Specified resistance:
(B56) No. 6 — (B82) No. 5 / 1 Ω , or less.



- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

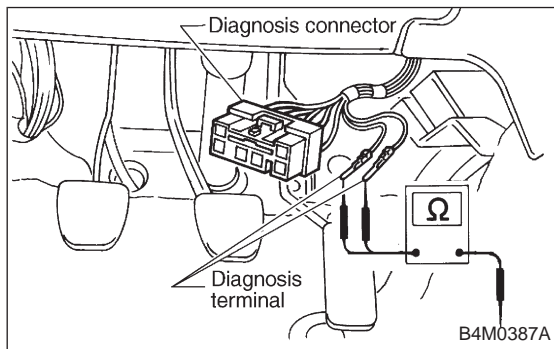
Connector & terminal / Specified resistance:
(B56) No.6 — Body / 1 M Ω , or more



2. CHECK INPUT SIGNAL FOR TCM.

- 1) Connect connector to TCM.
- 2) Turn ignition switch ON (with engine OFF).
- 3) Measure signal voltage for TCM while connecting and disconnecting the diagnosis terminal to diagnosis connector.

Connector & terminal / Specified voltage:
(B56) No. 6 — Body / Less than 1 V (Connected)
More than 6 V (Disconnected)



3. CHECK DIAGNOSIS SWITCH GROUND LINE.

Measure resistance of harness terminal between diagnosis terminal and body.

Connector & terminal / Specified resistance:
(B81) — Body / 1 Ω , or less

9. General Diagnostic Table

Symptom	Problem parts																													
	Inhibitor switch	Control module	Vehicle speed sensor 1	Vehicle speed sensor 2	Select cable	Select lever	FWD switch	Starter motor and harness	Throttle position sensor	Diagnosis switch	Accumulator ("N" — "D")	Accumulator (2A)	Accumulator (4A)	Accumulator (3R)	ATF temperature sensor	Strainer	Duty solenoid A	Duty solenoid B	Shift solenoid 1	Shift solenoid 2	Shift solenoid 3	Control valve	Detent spring	Manual plate	Transfer clutch	Transfer valve	Transfer pipe	Duty solenoid C	Forward clutch	
Starter does not rotate when select lever is in "P" or "N."; starter rotates when select lever is "R", "D", "3" or "2."	X				X	X		X																						
Abnormal noise when select lever is in "P" or "N."																X													X	
Hissing noise occurs during standing starts.																X														
Noise occurs while driving in "D ₁ " range.																														
Noise occurs while driving in "D ₂ " range.																														
Noise occurs while driving in "D ₃ " range.																														
Noise occurs while driving in "D ₄ " range.																														
Engine stalls while shifting from one range to another.																						X								
Vehicle moves when select lever is in "N."																													X	
Shock occurs when select lever is moved from "N" to "D."		X									X											X								
Excessive time lag occurs when select lever is moved from "N" to "D."																						X							X	
Shock occurs when select lever is moved from "N" to "R."		X										X										X								
Excessive time lag occurs when select lever is moved from "N" to "R."																						X								
Vehicle does not start in any shift range (engine revving up).																X						X								
Vehicle does not start in any shift range (engine stall).																														
Vehicle does not start in "R" range only (engine revving up).					X	X																X								
Vehicle does not start in "R" range only (engine stall).																													X	
Vehicle does not start in "D" or "3" range (engine revving up).																													X	
Vehicle does not start in "D", "3" or "2" range (engine revving up).																													X	
Vehicle does not start in "D", "3" or "2" range (engine stall).																														
Vehicle starts in "R" range only (engine revving up).																						X								
Acceleration during standing starts is poor (high stall rpm).																						X							X	
Acceleration during standing starts is poor (low stall rpm).																														
Acceleration is poor when select lever is in "D", "3" or "2" range (normal stall rpm).		X																				X								
Acceleration is poor when select lever is in "R" (normal stall rpm).																						X								
No shift occurs from 1st to 2nd gear.		X	X	X					X											X	X	X								
No shift occurs from 2nd to 3rd gear.		X																				X								
No shift occurs from 3rd to 4th gear.		X											X	X								X	X							
No "kick-down" shifts occur.		X							X																					
Engine brake is not effected when select lever is in "3" range.	X	X							X													X								

30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	Problem parts	Symptom
																													Starter does not rotate when select lever is in "P" or "N.," starter rotates when select lever is "R," "D," "3" or "2."	
							X												X					X					Abnormal noise when select lever is in "P" or "N."	
																								X					Hissing noise occurs during standing starts.	
					X											X	X								X				Noise occurs while driving in "D ₁ " range.	
					X											X	X								X				Noise occurs while driving in "D ₂ " range.	
					X											X	X								X				Noise occurs while driving in "D ₃ " range.	
					X											X	X							X					Noise occurs while driving in "D ₄ " range.	
																					X				X				Engine stalls while shifting from one range to another.	
																													Vehicle moves when select lever is in "N."	
																								X					Shock occurs when select lever is moved from "N" to "D."	
																								X					Excessive time lag occurs when select lever is moved from "N" to "D."	
																								X					Shock occurs when select lever is moved from "N" to "R."	
									X	X																			Excessive time lag occurs when select lever is moved from "N" to "R."	
X	X	X	X			X									X	X	X		X					X					Vehicle does not start in any shift range (engine revving up).	
																										X			Vehicle does not start in any shift range (engine stall).	
									X	X																			Vehicle does not start in "R" range only (engine revving up).	
								X								X													Vehicle does not start in "R" range only (engine stall).	
											X																		Vehicle does not start in "D" or "3" range (engine revving up).	
											X																		Vehicle does not start in "D," "3" or "2" range (engine revving up).	
											X														X				Vehicle does not start in "D," "3" or "2" range (engine stall).	
											X														X				Vehicle starts in "R" range only (engine revving up).	
											X														X				Acceleration during standing starts is poor (high stall rpm).	
							X												X						X				Acceleration during standing starts is poor (low stall rpm).	
							X	X									X												Acceleration is poor when select lever is in "D," "3" or "2" range (normal stall rpm).	
X							X	X									X												Acceleration is poor when select lever is in "R" (normal stall rpm).	
								X																					No shift occurs from 1st to 2nd gear.	
								X				X																	No shift occurs from 2nd to 3rd gear.	
								X																					No shift occurs from 3rd to 4th gear.	
																													No "kick-down" shifts occur.	
																													Engine brake is not effected when select lever is in "3" range.	

Symptom	Problem parts																												
	Inhibitor switch	Control module	Vehicle speed sensor 1	Vehicle speed sensor 2	Select cable	Select lever	FWD switch	Starter motor and harness	Throttle position sensor	Diagnosis switch	Accumulator ("N" — "D")	Accumulator (2A)	Accumulator (4A)	Accumulator (3R)	ATF temperature sensor	Strainer	Duty solenoid A	Duty solenoid B	Shift solenoid 1	Shift solenoid 2	Shift solenoid 3	Control valve	Detent spring	Manual plate	Transfer clutch	Transfer valve	Transfer pipe	Duty solenoid C	Forward clutch
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Engine brake is not effected when select lever is in "3" or "2" range.																													
Engine brake is not effected when select lever is in "1" range.																							X						
Shift characteristics are erroneous.	X	X	X	X					X													X							
No lock-up occurs.		X							X						X							X							
Vehicle cannot be set in "D" range power mode.		X							X																				
"D" range power mode cannot be released.		X							X						X														
Parking brake is not effected.					X	X																							
Shift lever cannot be moved or is hard to move from "P" range.					X	X																							
Select lever is hard to move.					X	X																		X	X				
Select lever is too light to move (unreasonable resistance).																							X	X					
ATF spurts out.																													
Differential oil spurts out.																													
Differential oil level changes excessively.																													
Odor is produced from oil supply pipe.																										X			X
Shock occurs when select lever is moved from "1" to "2" range.		X							X			X			X		X					X							
Slippage occurs when select lever is moved from "1" to "2" range.		X							X			X			X		X					X							
Shock occurs when select lever is moved from "2" to "3" range.		X							X				X	X	X		X					X							
Slippage occurs when select lever is moved from "2" to "3" range.		X							X				X	X	X		X					X							
Shock occurs when select lever is moved from "3" to "4" range.		X							X			X	X	X	X		X					X							
Slippage occurs when select lever is moved from "3" to "4" range.		X							X			X	X	X	X		X					X							
Shock occurs when select lever is moved from "3" to "2" range.		X							X						X		X					X							
Shock occurs when select lever is moved from "D" to "1" range.		X							X						X		X					X							
Shock occurs when select lever is moved from "2" to "1" range.		X							X						X		X					X							
Shock occurs when accelerator pedal is released at medium speeds.		X							X						X		X					X							
Vibration occurs during straight-forward operation.		X																											
Select lever slips out of position during acceleration or while driving on rough terrain.					X	X																	X	X					
Vibration occurs during turns (tight corner "braking" phenomenon).		X	X	X					X						X										X	X		X	X
Front wheel slippage occurs during standing starts.		X		X			X		X						X							X			X	X	X	X	X
Vehicle is not set in FWD mode.		X					X																		X	X		X	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29

30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	Problem parts	Symptom
X																													Engine brake is not effected when select lever is in "3" or "2" range.	
									X																				Engine brake is not effected when select lever is in "1" range.	
																													Shift characteristics are erroneous.	
																					X						X		No lock-up occurs.	
																													Vehicle cannot be set in "D" range power mode.	
																													"D" range power mode cannot be released.	
																											X		Parking brake is not effected.	
																											X		Shift lever cannot be moved or is hard to move from "P" range.	
																													Select lever is hard to move.	
																													Select lever is too light to move (unreasonable resistance).	
																								X					ATF spurts out.	
																									X				Differential oil spurts out.	
					X									X															Differential oil level changes excessively.	
X							X	X	X	X											X	X							Odor is produced from oil supply pipe.	
								X															X						Shock occurs when select lever is moved from "1" to "2" range.	
								X																					Slippage occurs when select lever is moved from "1" to "2" range.	
							X	X															X			X			Shock occurs when select lever is moved from "2" to "3" range.	
							X	X																					Slippage occurs when select lever is moved from "2" to "3" range.	
X								X															X			X			Shock occurs when select lever is moved from "3" to "4" range.	
								X																					Slippage occurs when select lever is moved from "3" to "4" range.	
X								X															X						Shock occurs when select lever is moved from "3" to "2" range.	
																							X						Shock occurs when select lever is moved from "D" to "1" range.	
									X														X						Shock occurs when select lever is moved from "2" to "1" range.	
																								X		X			Shock occurs when accelerator pedal is released at medium speeds.	
																						X	X						Vibration occurs during straight-forward operation.	
																								X					Select lever slips out of position during acceleration or while driving on rough terrain.	
																							X						Vibration occurs during turns (tight corner "braking" phenomenon).	
																													Front wheel slippage occurs during standing starts.	
																													Vehicle is not set in FWD mode.	

1. Supplemental Restraint System "Airbag"

Airbag system wiring harness is routed near the A.B.S. control module, A.B.S. sensor and hydraulic control unit.

CAUTION:

- All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuit.
- Be careful not to damage Airbag system wiring harness when servicing the A.B.S. control module, A.B.S. sensor and hydraulic control unit.

2. Pre-inspection

Before performing diagnostics, check the following items which might affect A.B.S. problems:

1. POWER SUPPLY

1) Measure battery voltage and specific gravity of electrolyte.

Standard voltage: 12 V, or more

Specific gravity: Above 1.260

2) Check the condition of the main and other fuses, and harnesses and connectors. Also check for proper grounding.

2. BRAKE FLUID

1) Check brake fluid level.

2) Check brake fluid leakage.

3. BRAKE DRAG

Check brake drag. <Ref. to 4-4 [K100].>

4. BRAKE PAD AND ROTOR

Check brake pad and rotor. <Ref. to 4-4 [K100].>

5. TIRE SPECIFICATIONS, TIRE WEAR AND AIR PRESSURE

Check tire specifications, tire wear and air pressure. <Ref. to 4-2 [S1A0].>

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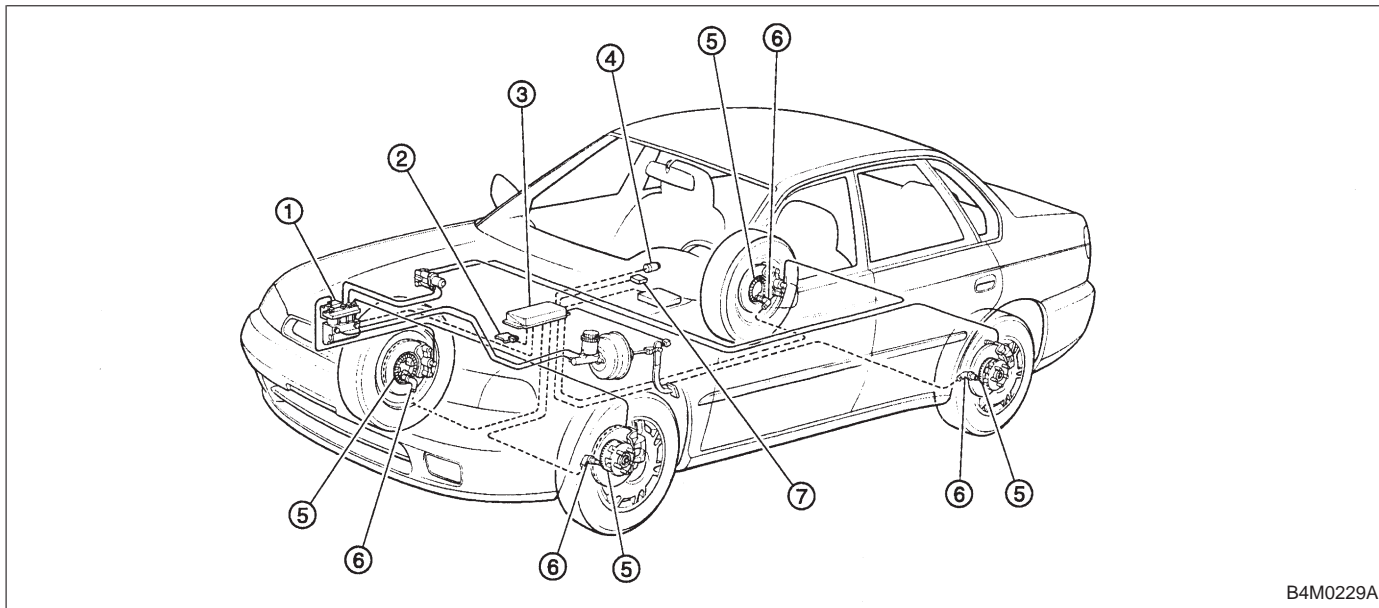
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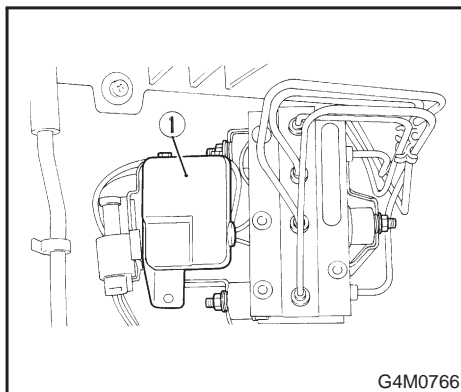
3. Electrical Components Location



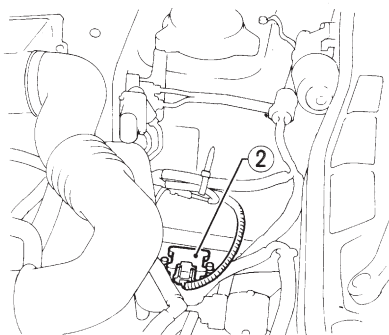
B4M0229A

- ① Hydraulic control unit
- ② G sensor (AWD MT model)
- ③ A.B.S. control module
- ④ Warning light

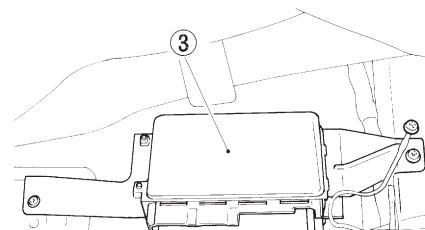
- ⑤ Tone wheel
- ⑥ A.B.S. sensor
- ⑦ Diagnosis connector



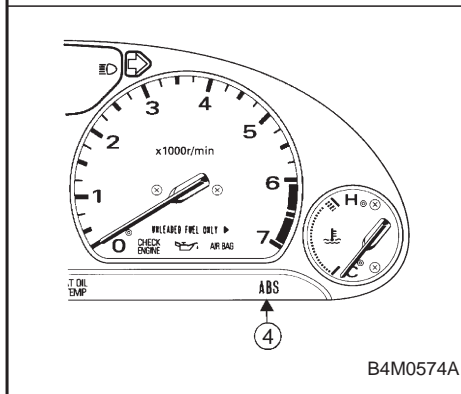
G4M0766



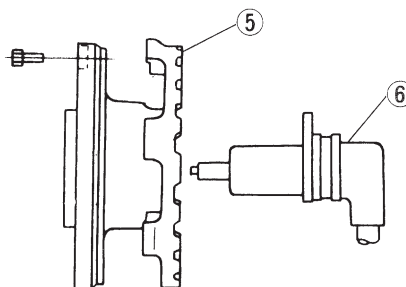
G4M0767



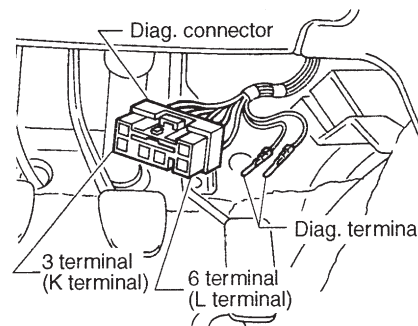
G4M0917



B4M0574A

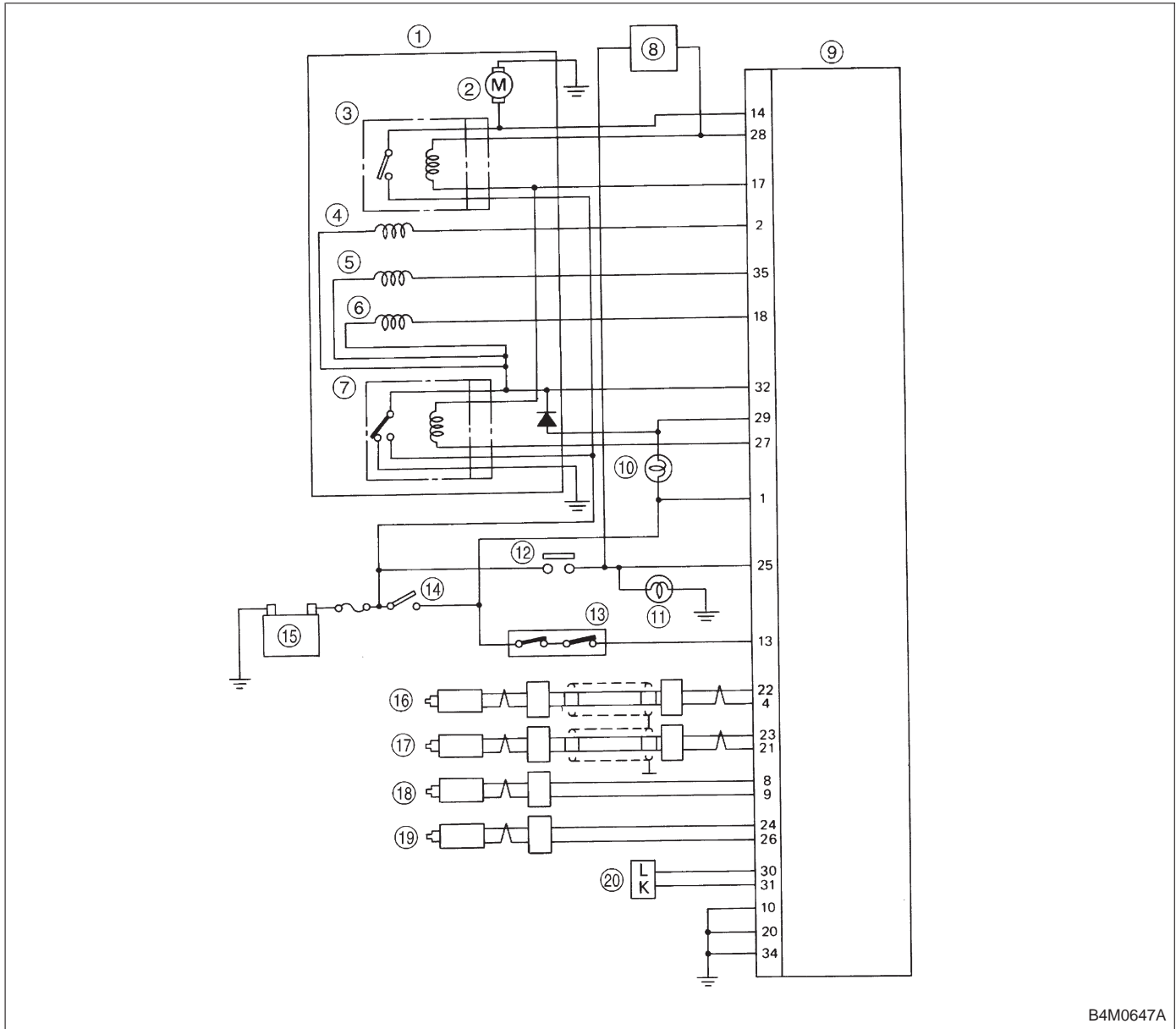


G4M0769



B4M0231A

4. Schematic



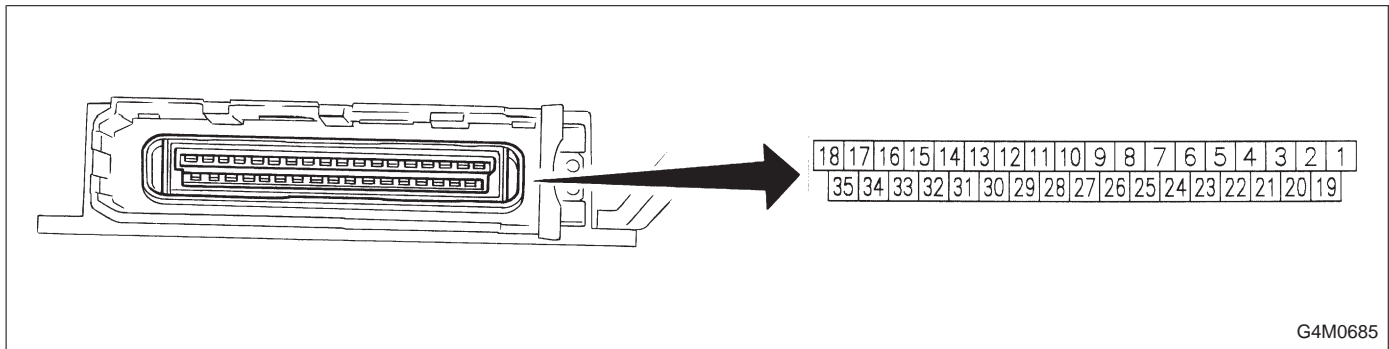
B4M0647A

- ① Hydraulic control unit
- ② Motor
- ③ Motor relay
- ④ Front left solenoid valve
- ⑤ Front right solenoid valve
- ⑥ Rear solenoid valve
- ⑦ Valve relay
- ⑧ AT control module
- ⑨ A.B.S. control module
- ⑩ Warning light

- ⑪ Stop light
- ⑫ Stop light switch
- ⑬ G sensor (AWD MT model)
- ⑭ Ignition switch
- ⑮ Battery
- ⑯ Front left sensor
- ⑰ Front right sensor
- ⑱ Rear left sensor
- ⑲ Rear right sensor
- ⑳ Diagnosis connector

5. Control Module I/O Signal

1. I/O SIGNAL VOLTAGE



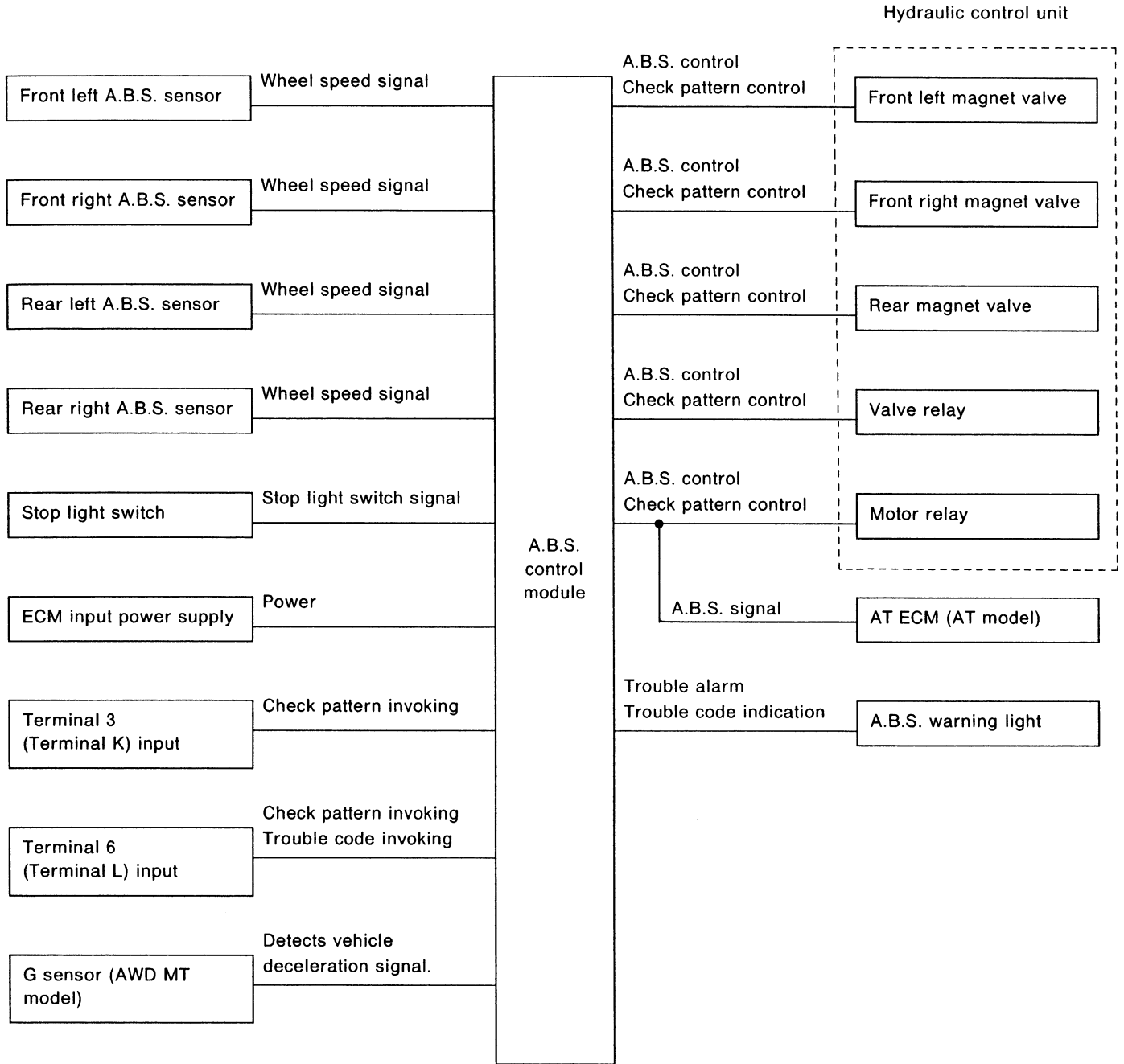
Contents		Terminal No.	Ignition switch ON, engine OFF	Input/output signals		
				Measured value	Measuring conditions	
A.B.S. sensor	Front left wheel	22	0 V	0.12 — 1 V	● No. 22 — No. 4 (When it is 10 Hz.)	
	GND	4				
	Front right wheel	23	0 V	0.12 — 1 V	● No. 23 — No. 21 (When it is 10 Hz.)	
	GND	21				
	Rear left wheel	8	0 V	0.12 — 1 V	● No. 8 — No. 9 (When it is 10 Hz.)	
	GND	9				
	Rear right wheel	24	0 V	0.12 — 1 V	● No. 24 — No. 26 (When it is 10 Hz.)	
	GND	26				
G sensor (AWD MT model)		13	10 — 12 V	0 V	When slanting about 14° — 21.3° (θ)	
Diagnosis connector		30	—	—	—	
		31				
Stop light switch		25	0 V	10 — 12 V	When brake pedal is depressed.	
Motor monitoring		14	0 V	10 — 12 V	When motor operates.	
Valve power supply monitoring		32	10 — 12 V	10 — 12 V	Ignition switch ON*1	
Hydraulic control unit	Solenoid	Front left wheel	2	10 — 12 V	0 V	When solenoid is energized to produce output.
		Front right wheel	35	10 — 12 V	0 V	
		Rear wheel	18	10 — 12 V	0 V	
	Valve relay coil		27	0 V	0 V	Ignition switch ON*2
	Motor relay coil		28	10 — 12 V	0 V	When motor operates to produce output.
Warning light		29	10 — 12 V	10 — 12 V	Ignition switch ON*3	
Power supply	Ignition	1	10 — 12 V	10 — 12 V	Ignition switch ON	
	Relay coil (valve, motor, etc.)	17	10 — 12 V	10 — 12 V	Ignition switch ON	
Grounding line		10	0 V	0 V	—	
		20	0 V	0 V	—	
		34	0 V	0 V	—	

*1: When ignition switch is OFF or the A.B.S. system is inactive: 0 V

*2: When ignition switch is OFF or the A.B.S. system is inactive: 10 — 12 V

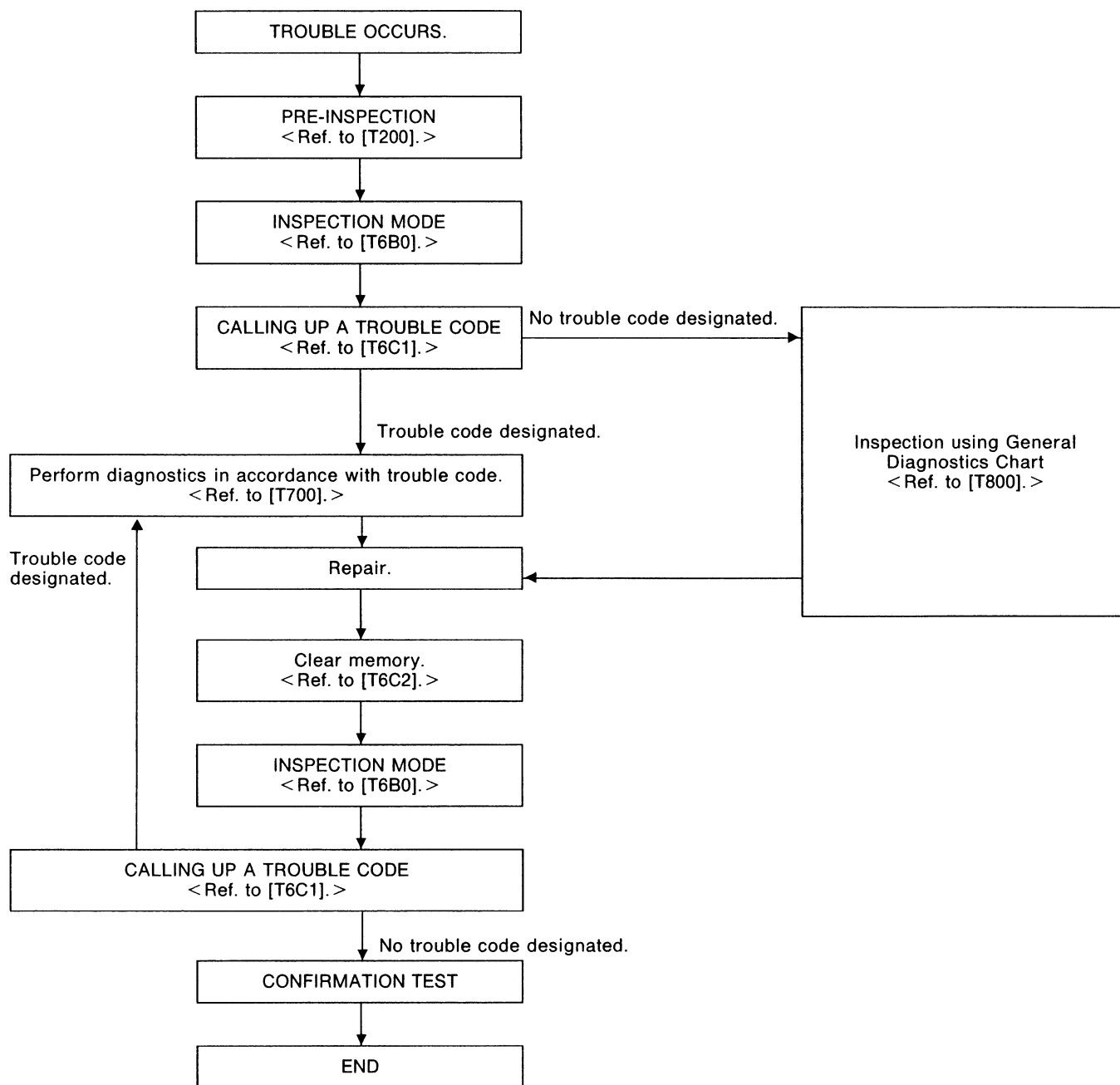
*3: When ignition switch is OFF or the A.B.S. system is inactive, or during 1.5 seconds from ignition switch ON: 0 V

2. I/O SIGNAL DIAGRAM



6. Diagnostics Chart for On-board Diagnosis System

A: BASIC DIAGNOSTICS PROCEDURE



NOTE:

- To check harness for broken wires or short circuits, shake it while holding it or the connector.
- When A.B.S. warning light illuminates, read and record trouble code indicated by A.B.S. warning light.

B: INSPECTION MODE

The on-board diagnosis system is designed to detect problems after the vehicle has been driven at 10 km/h (6 MPH) or more for at least 20 seconds. If a problem is found, the A.B.S. warning light will illuminate to inform the driver of the occurrence of a problem. When the warning light is on, the A.B.S. system will be inactive and the normal braking function will work. It is possible for a maximum of three trouble codes to be stored in memory until cleared.

C: TROUBLE CODES

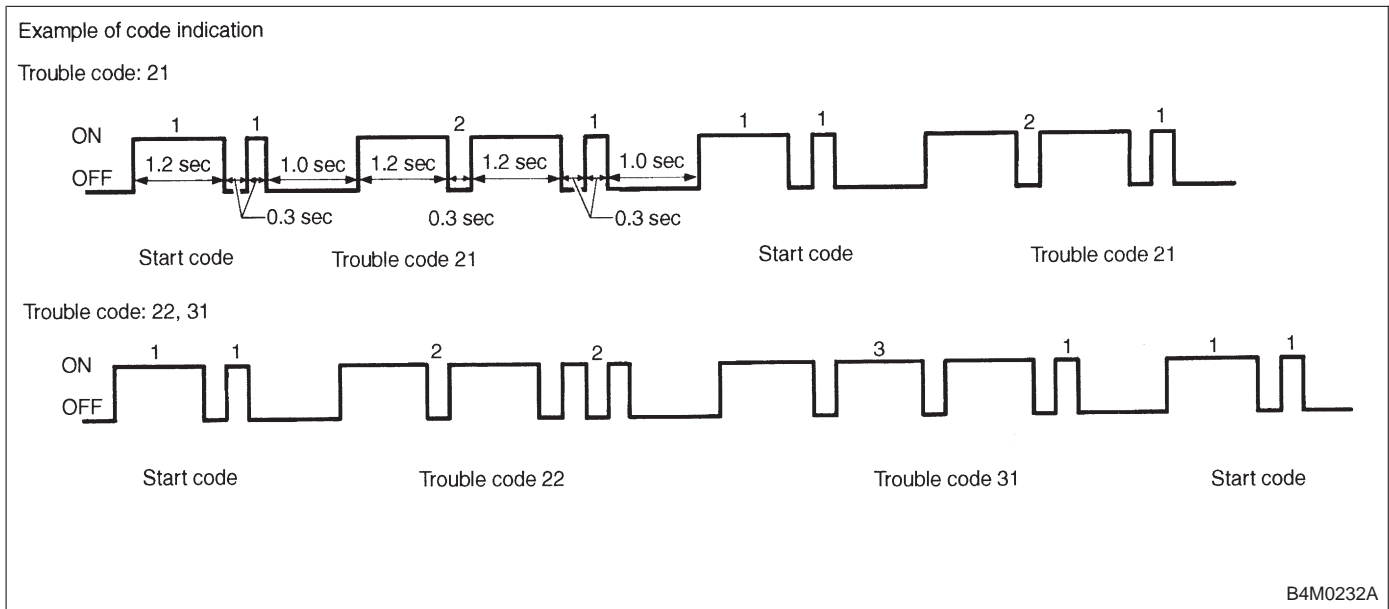
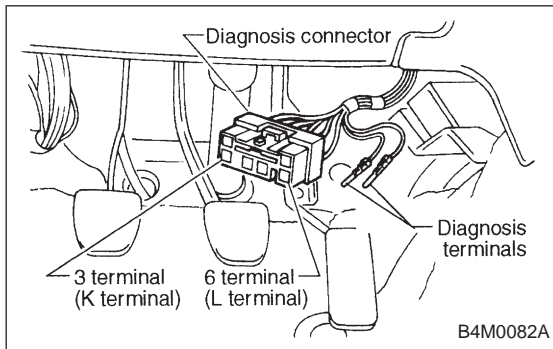
When on-board diagnosis of the A.B.S. control module detects a problem, the information (up to a maximum of three) will be stored in the EEP ROM as a trouble code. When there are more than three, the most recent three will be stored. (Stored codes will stay in memory until they are cleared.)

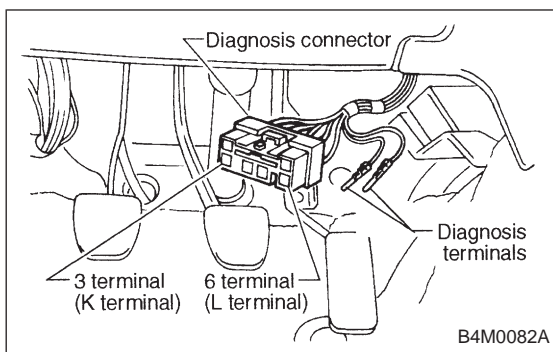
1. CALLING UP A TROUBLE CODE

- 1) Take out diagnosis connector from side of driver's seat heater unit.
- 2) Turn ignition switch OFF.
- 3) Connect diagnosis connector terminal 6 (terminal L) to diagnosis terminal.
- 4) Turn ignition switch ON.
- 5) A.B.S. warning light is set in the diagnostic mode and blinks to identify trouble code.
- 6) After the start code (11) is shown, the trouble codes will be shown in order of the last information first. These repeat for a maximum of 5 minutes.

NOTE:

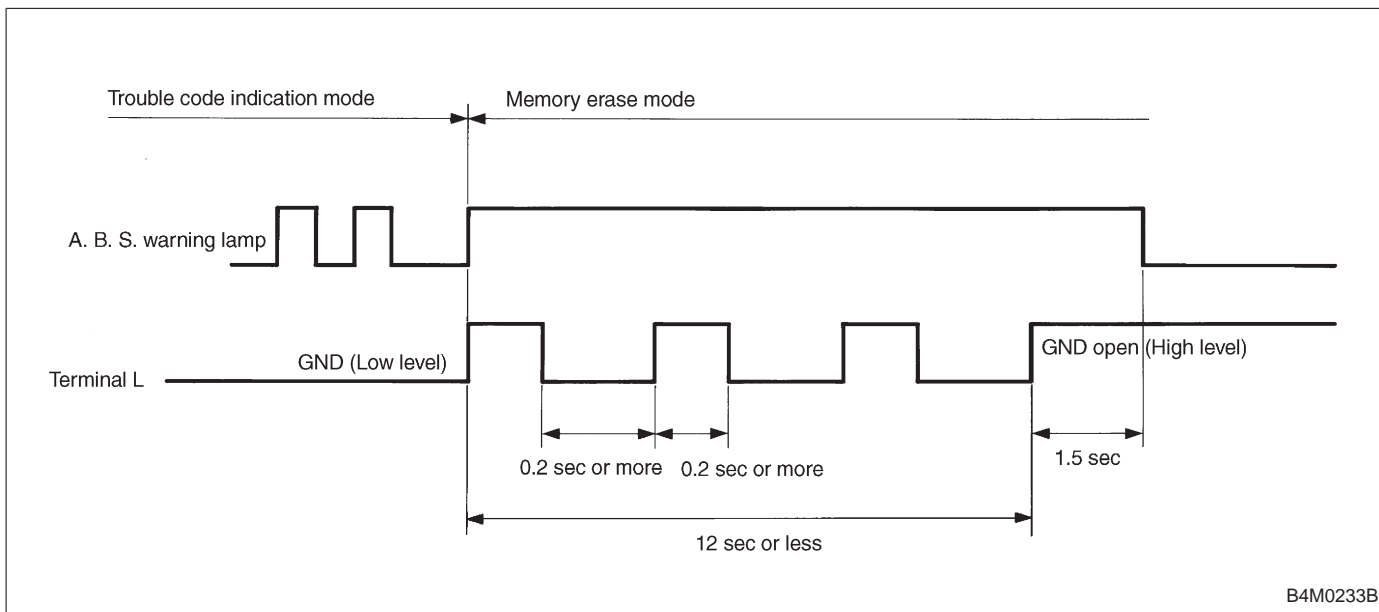
When there are no trouble codes in memory, only the start code (11) is shown.





2. CLEARING MEMORY

- 1) After calling up a trouble code, disconnect diagnosis connector terminal 6 (terminal L) from diagnosis terminal.
- 2) Repeat 3 times within approx. 12 seconds; connecting and disconnecting terminal 6 (terminal L) and diagnosis terminal for at least 0.2 seconds each time.



NOTE:
 After diagnostics is completed, make sure to clear memory. Make sure only start code (11) is shown after memory is cleared.

7. Diagnostics Chart with Trouble Code

Trouble code	Contents of diagnosis		Ref. to 4-4a
NONE: A [Warning light OFF]	Trouble in warning light drive circuit (Warning light is not on for 1.5 seconds after ignition switch is on.)		[T7A0]
NONE: B [Warning light ON] or [Abnormal trouble code output]	Trouble in warning light drive circuit		[T7B0]
11	Start code: ● Trouble code is shown after start code. ● Only start code is shown in normal condition.		—
21	Faulty A.B.S. sensor (Open circuit or input voltage excessive)	Front right wheel sensor	[T7C0]
23		Front left wheel sensor	[T7C0]
25		Rear right wheel sensor	[T7C0]
27		Rear left wheel sensor	[T7C0]
22	Faulty A.B.S. sensor (When there is no open circuit or speed signal input.)	Front right wheel sensor	[T7D0]
24		Front left wheel sensor	[T7D0]
26		Rear right wheel sensor	[T7D0]
28		Rear left wheel sensor	[T7D0]
29	Faulty tone wheel, etc.		[T7E0]
31	Faulty solenoid valve circuit(s) in hydraulic control unit	Front right wheel control	[T7F0]
33		Front left wheel control	[T7F0]
39		Rear wheels control	[T7F0]
41	Faulty A.B.S. control module		[T7G0]
42	Source voltage is low.		[T7H0]
51	Faulty valve relay		[T7I0]
52	Faulty hydraulic motor and/or motor relay		[T7J0]
54	Faulty stop light circuit		[T7K0]
56	Use of improper A.B.S. control module specification, or faulty G sensor		[T7L0]

NOTE:

After diagnostics is completed, make sure to clear memory. Make sure only start code (11) is shown after memory is cleared.

**A: TROUBLE CODE (NONE: A)
— TROUBLE IN WARNING LIGHT DRIVE
CIRCUIT —**

DIAGNOSIS:

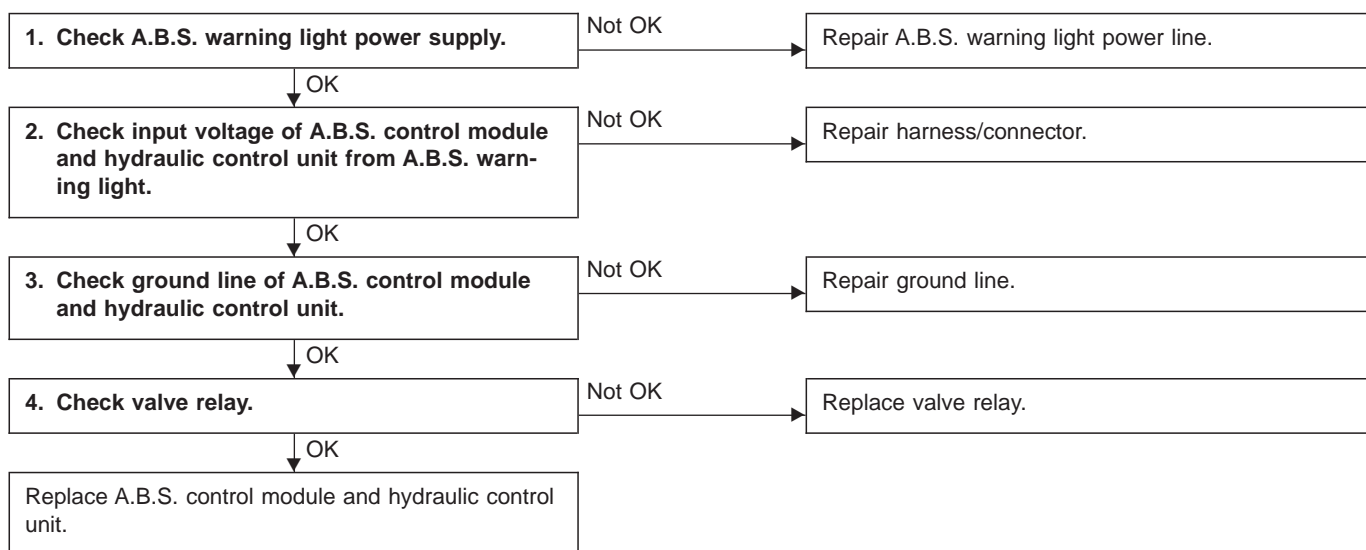
- Faulty A.B.S. warning light
- Faulty harness connector
- Faulty A.B.S. control module
- Faulty valve relay

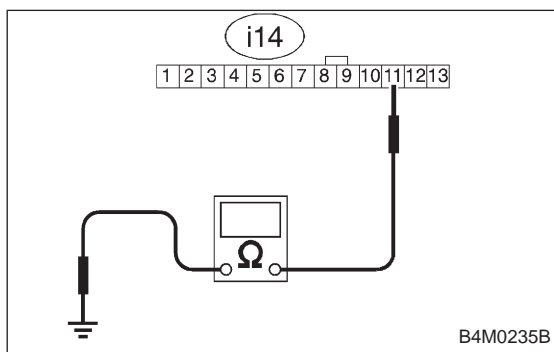
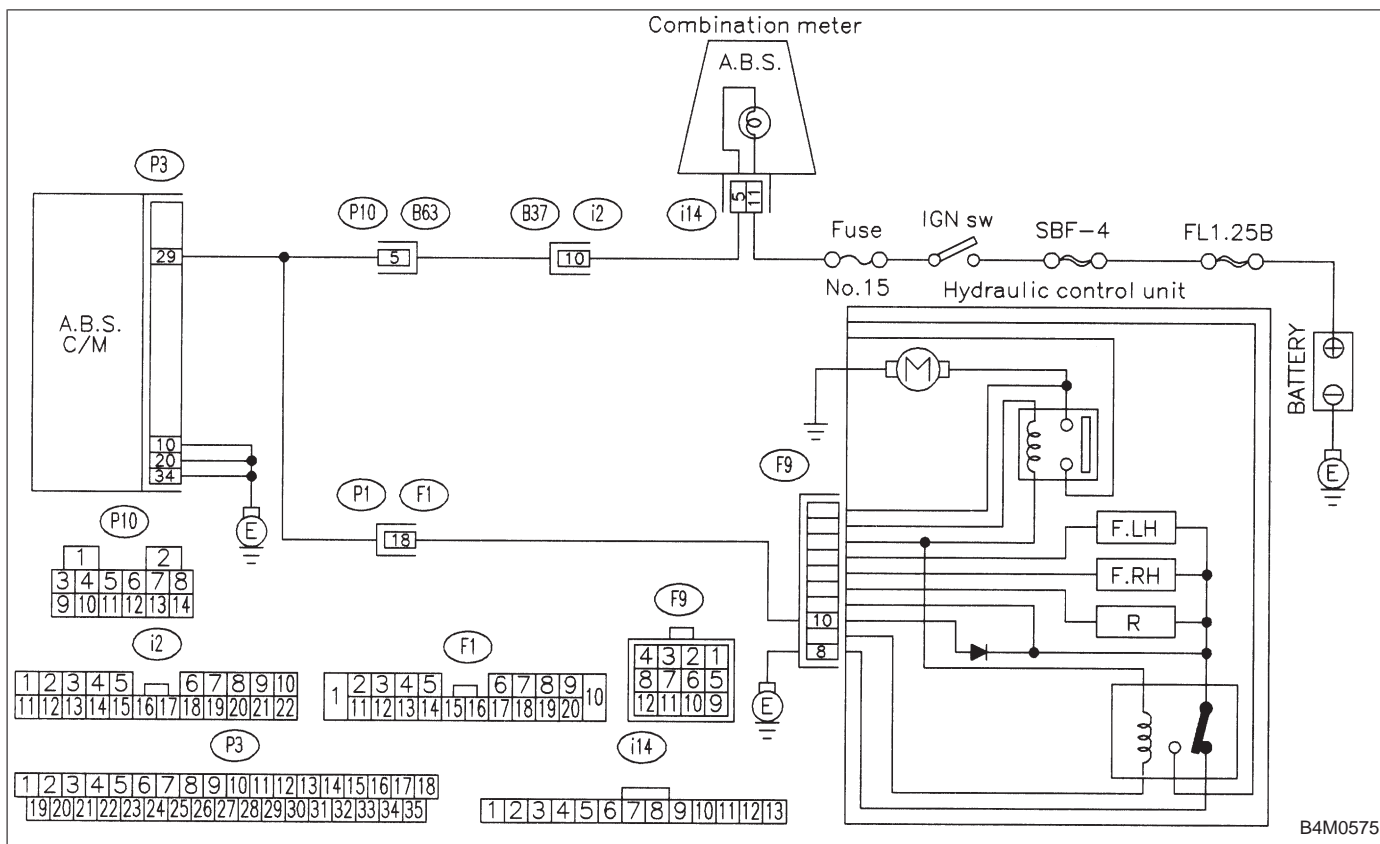
TROUBLE SYMPTOM:

- Warning light does not illuminate.
- Impossible to read trouble code.

NOTE:

When ignition key is on, warning light should turn off after 1.5 seconds if system is normal.



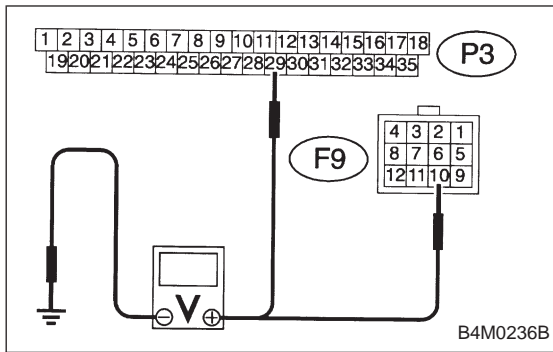


1. CHECK A.B.S. WARNING LIGHT POWER SUPPLY.

- 1) Turn ignition switch OFF.
- 2) Disconnect combination meter.
- 3) Check A.B.S. warning light valve.
- 4) Turn ignition switch ON.
- 5) Measure voltage between combination meter connector and body.

Connector & terminal / Specified voltage:
(i14) No. 11 — Body / 10 — 12 V

B4M0235B



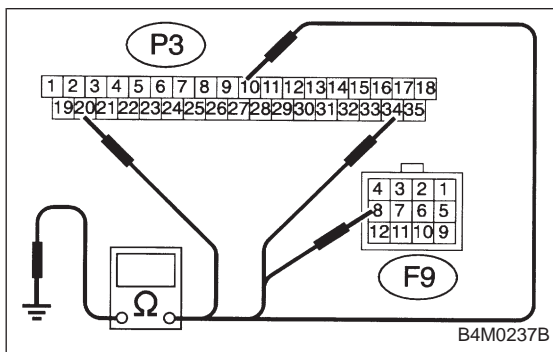
2. CHECK INPUT VOLTAGE OF A.B.S. CONTROL MODULE AND HYDRAULIC CONTROL UNIT FROM A.B.S. WARNING LIGHT.

- 1) Turn ignition switch OFF and remove combination meter.
- 2) Disconnect connector from A.B.S. control module and hydraulic control unit.
- 3) Turn ignition switch ON.
- 4) Measure voltage between A.B.S. control module and body, and between hydraulic control unit and body.

Connector & terminal / Specified voltage:

(P3) No. 29 — body / 10 — 12 V

(F9) No. 10 — body / 10 — 12 V



3. CHECK GROUND LINE OF A.B.S. CONTROL MODULE AND HYDRAULIC CONTROL UNIT.

Measure resistance between A.B.S. control module and body, and between hydraulic control unit and body.

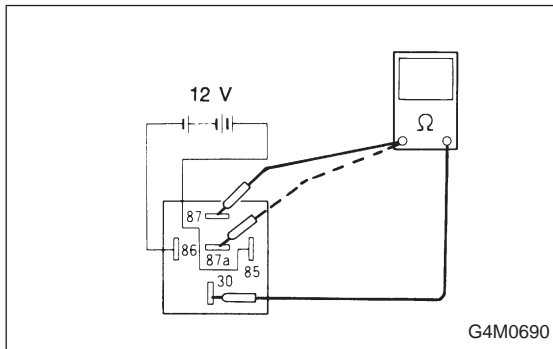
Connector & terminal / Specified resistance:

(P3) No. 10 — body / 0 Ω

(P3) No. 20 — body / 0 Ω

(P3) No. 34 — body / 0 Ω

(F9) No. 8 — body / 0 Ω



4. CHECK VALVE RELAY.

- 1) Remove valve relay.
- 2) Attach circuit tester probes to terminals, as shown in figure.
- 3) Measure resistance between respective terminals.

Terminal / Specified resistance:

No. 87 — No. 30 / 0 Ω (when 12 volts applied.)

No. 87 — No. 30 / 1 MΩ (when no volts applied.)

No. 87a — No. 30 / 1 MΩ (when 12 volts applied.)

No. 87a — No. 30 / 0 Ω (when no volts applied.)

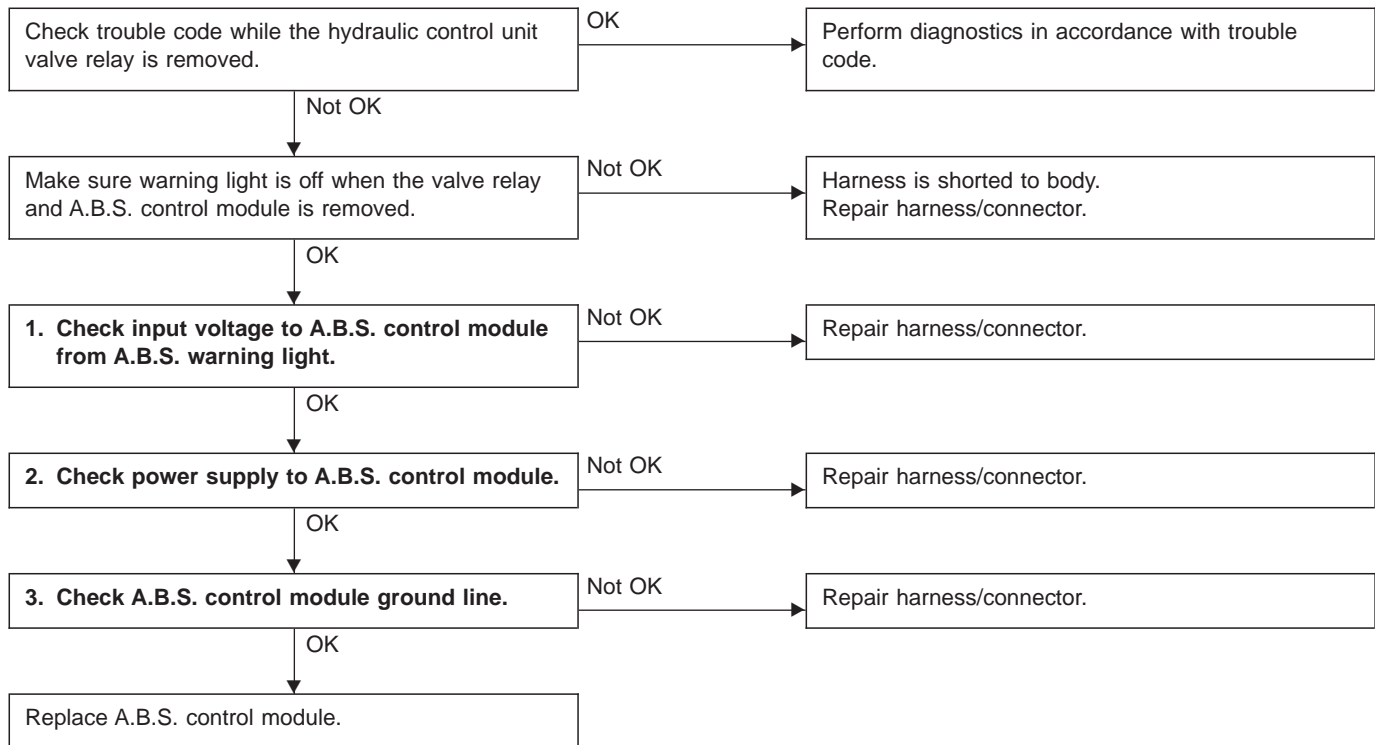
**B: TROUBLE CODE (NONE: B)
— TROUBLE IN WARNING LIGHT DRIVE
CIRCUIT —**

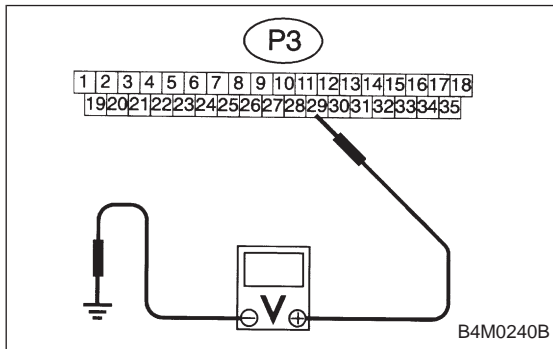
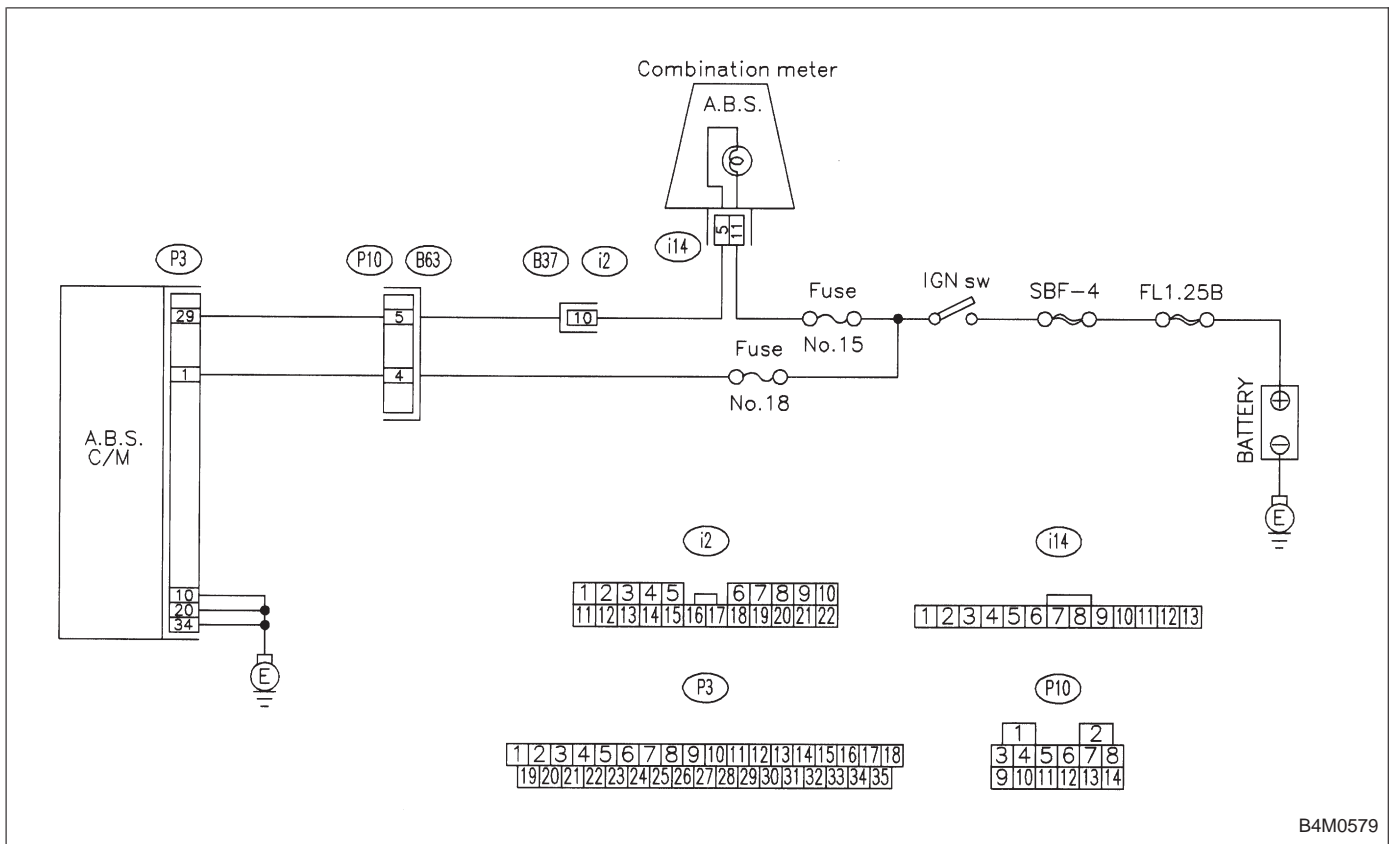
DIAGNOSIS:

- Faulty harness
- Faulty A.B.S. control module

TROUBLE SYMPTOM:

- Warning light remains on.
- Impossible to read trouble code.

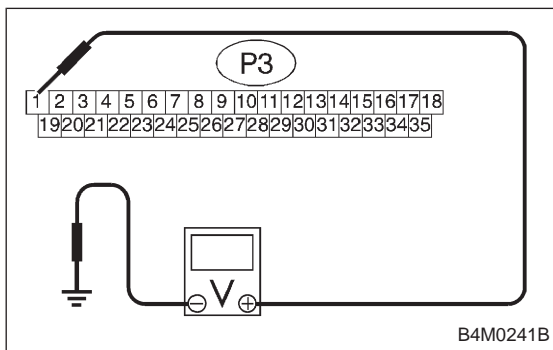




1. CHECK INPUT VOLTAGE TO A.B.S. CONTROL MODULE FROM A.B.S. WARNING LIGHT.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module.
- 3) Turn ignition switch ON.
- 4) Measure voltage between A.B.S. control module connector and body.

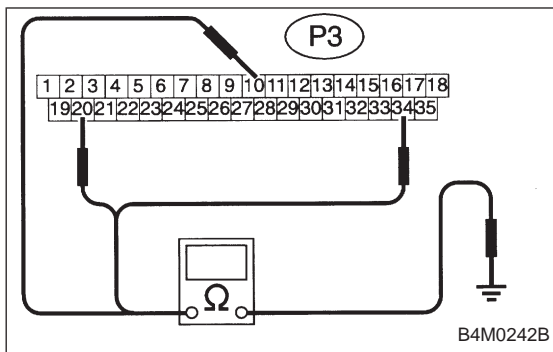
Connector & terminal / Specified voltage:
(P3) No. 29 — Body / 10 — 12 V



2. CHECK POWER SUPPLY TO A.B.S. CONTROL MODULE.

- 1) Turn ignition switch ON.
- 2) Measure voltage between A.B.S. control module connector and body.

Connector & terminal / Specified voltage:
(P3) No. 1 — Body / 10 — 12 V



3. CHECK A.B.S. CONTROL MODULE GROUND LINE.
 Measure resistance between A.B.S. control module and body.

Connector & terminal / Specified resistance:

(P3) No. 10 — body / 0 Ω

(P3) No. 20 — body / 0 Ω

(P3) No. 34 — body / 0 Ω

**C: TROUBLE CODE 21, 23, 25 AND 27
— FAULTY A.B.S. SENSOR (OPEN CIRCUIT
OR INPUT VOLTAGE EXCESSIVE) —**

DIAGNOSIS:

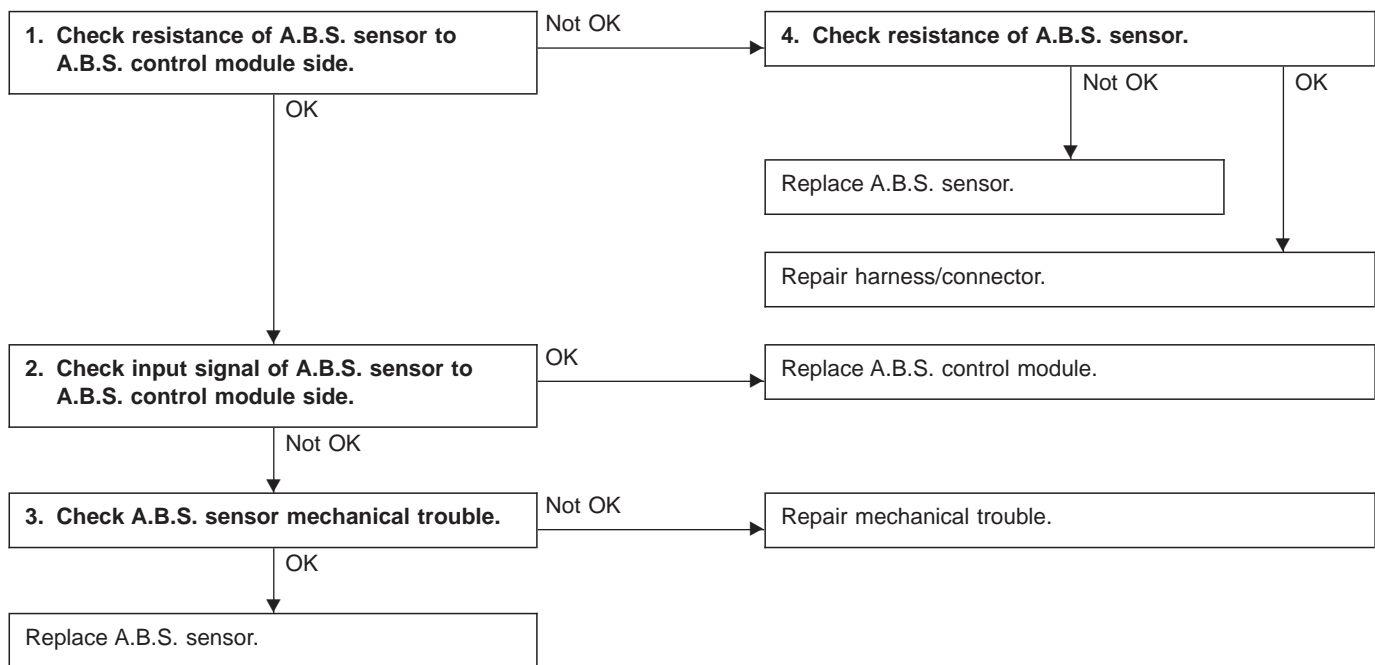
- Faulty A.B.S. sensor
- Faulty harness
- Faulty A.B.S. control module

TROUBLE SYMPTOM:

- A.B.S. does not operate.

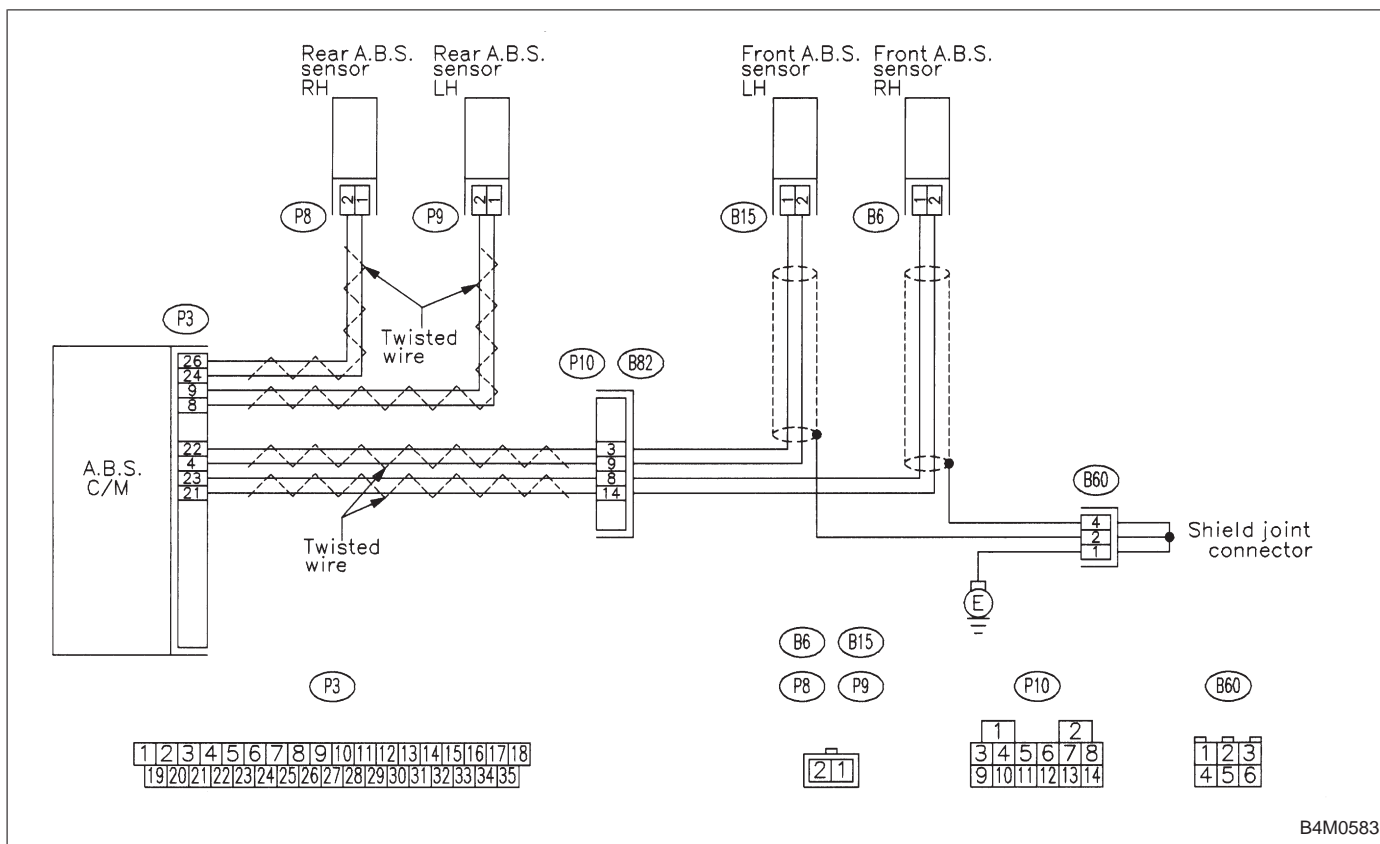
NOTE:

Trouble codes 21, 23, 25, and 27 will not be stored while vehicle is stationary and can't specify problem location. Drive vehicle first, perform diagnosis and read trouble code.

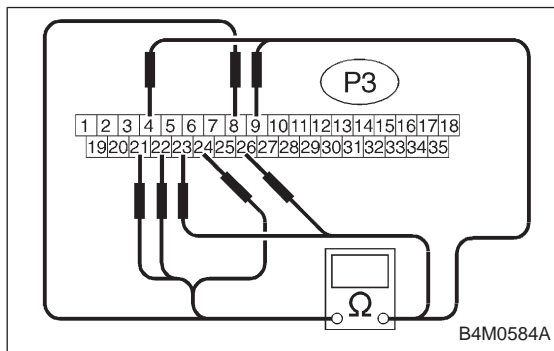


NOTE:

When checking A.B.S. sensor, carefully bend or swing connector and harness to check for improper contacts or open circuits.



B4M0583



B4M0584A

1. CHECK RESISTANCE OF A.B.S. SENSOR TO A.B.S. CONTROL MODULE SIDE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module.
- 3) Measure resistance between A.B.S. control module connector terminals.

TROUBLE CODE / Connector & terminal:

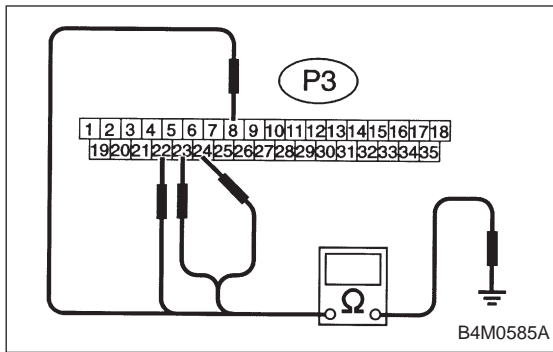
21 / (P3) No. 23 — No. 21

23 / (P3) No. 22 — No. 4

25 / (P3) No. 24 — No. 26

27 / (P3) No. 8 — No. 9

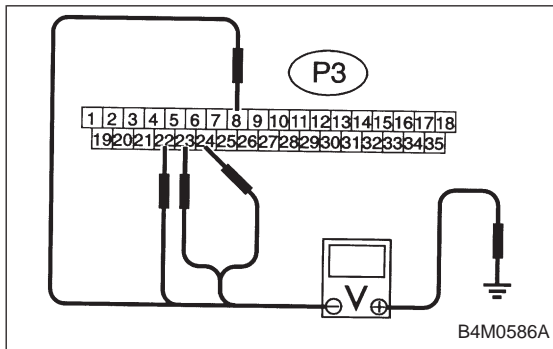
Specified resistance: 0.8 — 1.2 kΩ



4) Measure resistance between A.B.S. control module connector and body.

TRouble CODE / Connector & terminal:

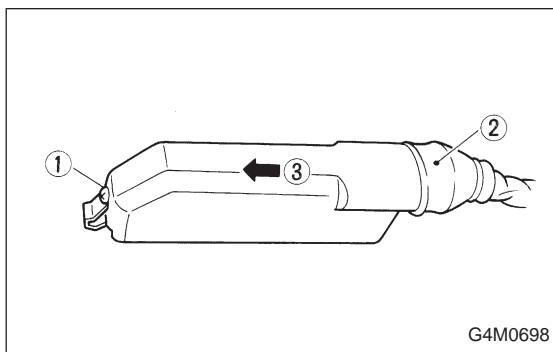
- 21 / (P3) No. 23 — body
 - 23 / (P3) No. 22 — body
 - 25 / (P3) No. 24 — body
 - 27 / (P3) No. 8 — body
- Specified resistance: 1 MΩ, min.**



5) Turn ignition switch ON.
6) Measure voltage between A.B.S. control module connector and body.

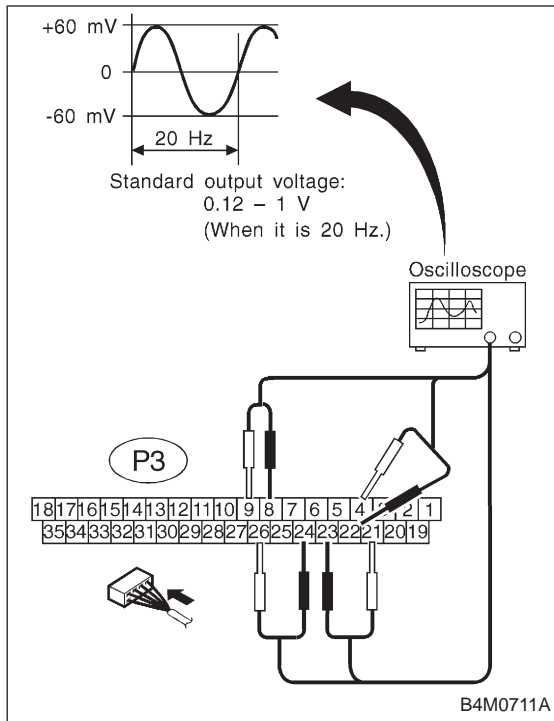
TRouble CODE / Connector & terminal:

- 21 / (P3) No. 23 — body
 - 23 / (P3) No. 22 — body
 - 25 / (P3) No. 24 — body
 - 27 / (P3) No. 8 — body
- Specified voltage: 0 V**



2. CHECK INPUT SIGNAL OF A.B.S. SENSOR TO A.B.S. CONTROL MODULE SIDE.

- 1) Raise all four wheels of ground.
- 2) Turn ignition switch OFF.
- 3) Disconnect connector from A.B.S. control module.
- 4) Disconnect connector cover from connector.
 - (a) Remove screw from portion ①.
 - (b) Move rubber boot ② back (toward harness).
 - (c) Slide cover ③ in direction shown by arrow and remove.
- 5) Connect connector to A.B.S. control module.
- 6) Connect the oscilloscope to the A.B.S. control module connector in accordance with trouble code.
- 7) Turn ignition switch ON.



8) Rotate wheels and measure voltage at specified frequency.

NOTE:

When this inspection is completed, the A.B.S. control module sometimes stores the trouble code 29.

TROUBLE CODE / Connector & terminal:

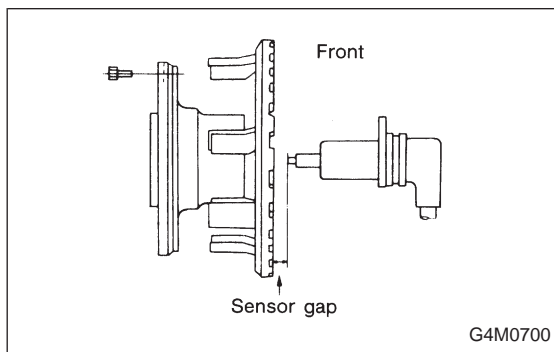
21 / (P3) No. 23 (+) — No. 21 (-)

23 / (P3) No. 22 (+) — No. 4 (-)

25 / (P3) No. 24 (+) — No. 26 (-)

27 / (P3) No. 8 (+) — No. 9 (-)

Specified voltage: 0.12 — 1 V (When it is 20 Hz.)



3. CHECK A.B.S. SENSOR MECHANICAL TROUBLE.

1) Dismount brake as outlined in manual to gain access to A.B.S. sensor and tone wheel for inspection.

2) Check pole piece and tone wheel for accumulation of foreign particles. If necessary, remove foreign particles and clean.

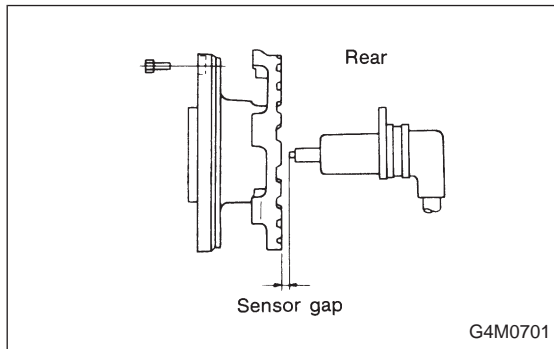
3) Check tone wheel teeth for cracks for deformities. If necessary, replace tone wheel (No. of teeth: 44) with a new one.

4) Check tone wheel for looseness.

Tightening torque:

10 — 16 N·m (1.0 — 1.6 kg·m, 7 — 12 ft·lb)

5) Measure tone wheel-to-pole piece gap over entire perimeter of the wheel.

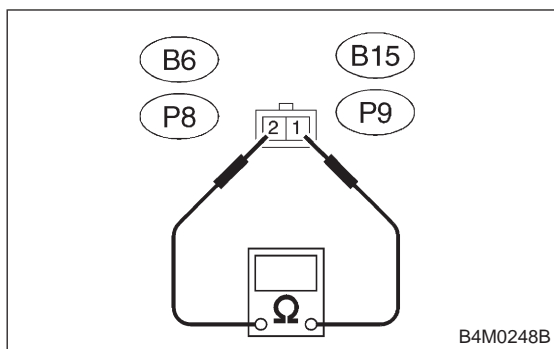


Specifications	Front wheel	Rear wheel
	0.9 — 1.4 mm (0.035 — 0.055 in)	0.7 — 1.2 mm (0.028 — 0.047 in)

If measurements check out "Not OK", adjust the gap using spacers (Part No. 26755AA000). If spacers cannot correct the gap, replace worn sensor or worn tone wheel.

6) Check hub runout.

Specifications	0.05 mm (0.0020 in)
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**4. CHECK RESISTANCE OF A.B.S. SENSOR.**

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. sensor.
- 3) Measure resistance between A.B.S. sensor connector terminals.

TROUBLE CODE / Connector & terminal:***21 / (B6) No. 1 — No. 2******23 / (B15) No. 1 — No. 2******25 / (P8) No. 1 — No. 2******27 / (P9) No. 1 — No. 2******Specified resistance: 0.8 — 1.2 k Ω***

**D: TROUBLE CODE 22, 24, 26 AND 28
— FAULTY A.B.S. SENSOR
(WHEN THERE IS NO OPEN CIRCUIT OR
SPEED SIGNAL INPUT.) —**

DIAGNOSIS:

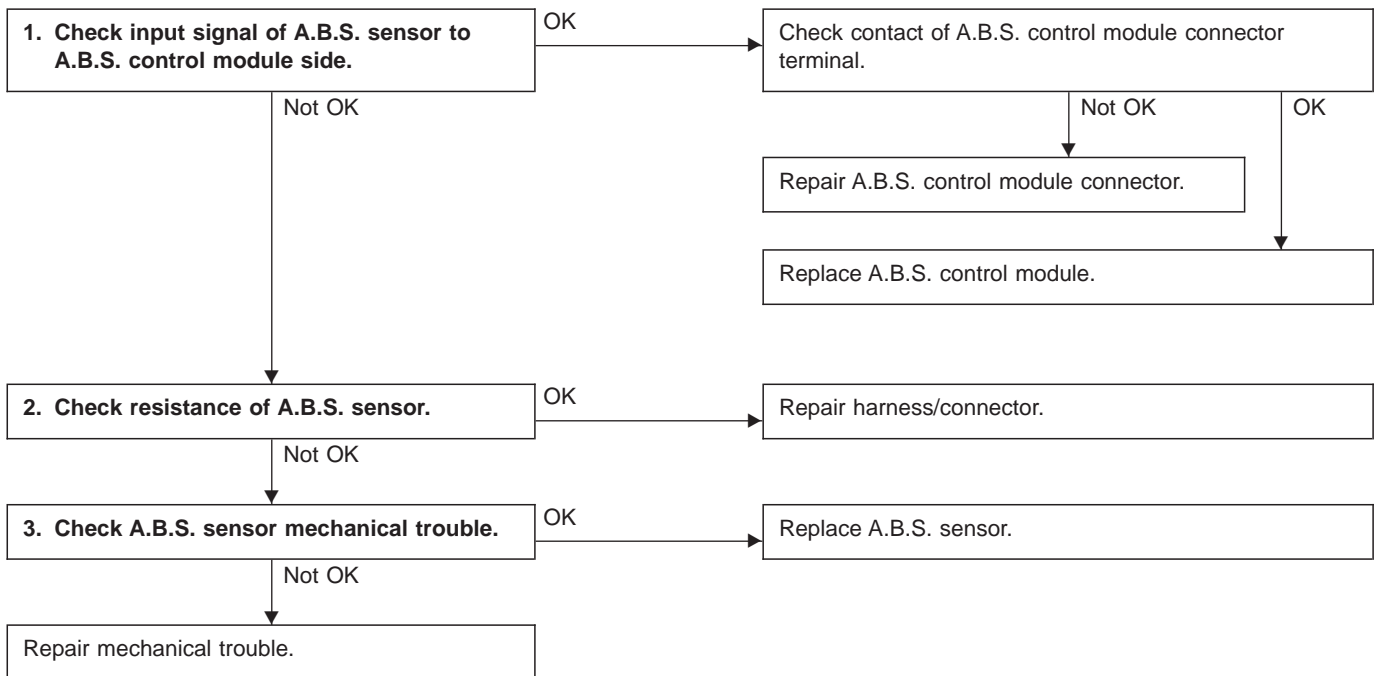
- Faulty A.B.S. sensor/harness
- Faulty tone wheel
- Faulty A.B.S. control module

TROUBLE SYMPTOM:

- A.B.S. does not operate.

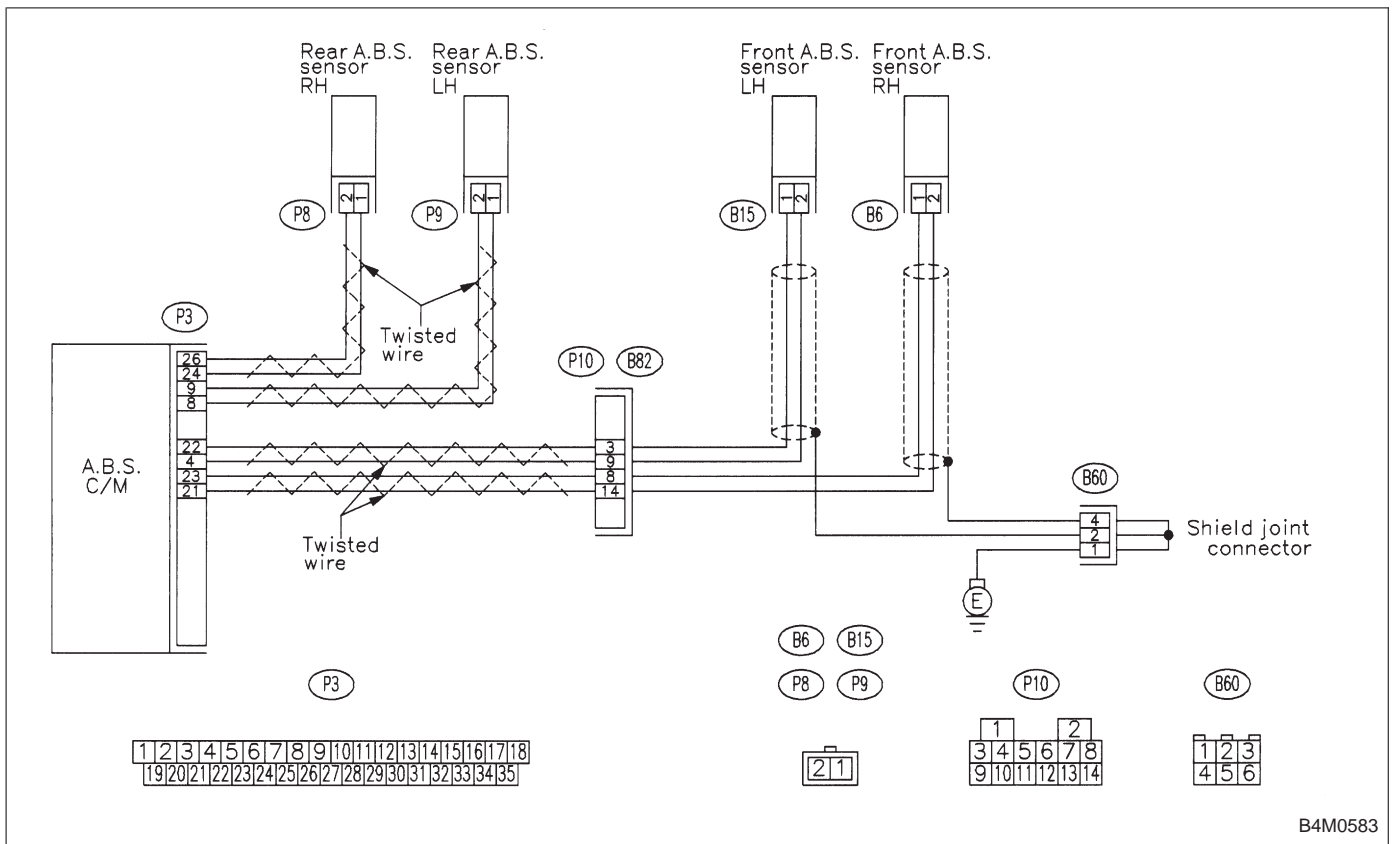
NOTE:

The A.B.S. control module will sense that the A.B.S. sensor circuit is “open” due to increased resistance but this trouble code will appear when the speed signal is not present or when it suddenly disappears while driving.

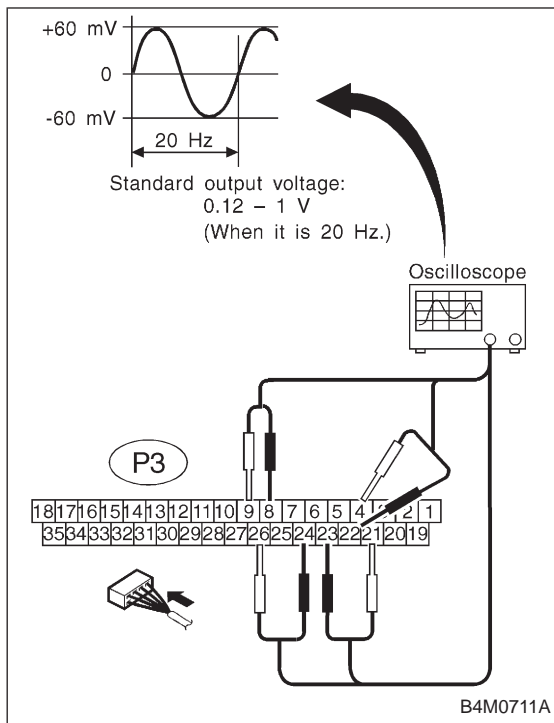


NOTE:

When checking A.B.S. sensor, carefully bend or swing connector and harness to check for improper contact or open circuits.



B4M0583



1. CHECK INPUT SIGNAL OF A.B.S. SENSOR TO A.B.S. CONTROL MODULE SIDE.

- 1) Raise all four wheels of ground.
- 2) Turn ignition switch OFF.
- 3) Disconnect connector from A.B.S. control module.
- 4) Disconnect connector cover from connector. <Ref. to 4-4a [T7C2].>
- 5) Connect connector to A.B.S. control module.
- 6) Connect the oscilloscope to the A.B.S. control module connector in accordance with the trouble code.
- 7) Turn ignition switch ON.
- 8) Rotate wheels and measure voltage at specified frequency.

NOTE:

When this inspection is completed, the A.B.S. control module sometimes memorizes the trouble code 29.

TROUBLE CODE / Connector & terminal:

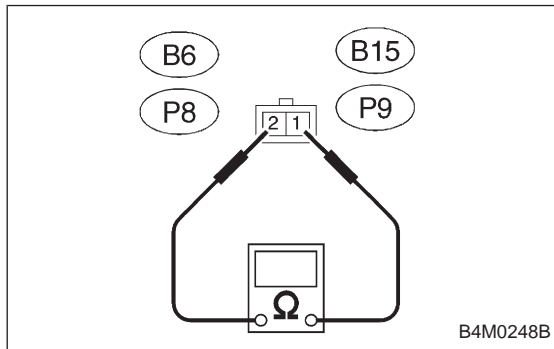
22 / (P3) No. 23 (+) — No. 21 (-)

24 / (P3) No. 22 (+) — No. 4 (-)

26 / (P3) No. 24 (+) — No. 26 (-)

28 / (P3) No. 8 (+) — No. 9 (-)

Specified voltage: 0.12 — 1 V (When it is 20 Hz.)



2. CHECK RESISTANCE OF A.B.S. SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. sensor.
- 3) Measure resistance between A.B.S. sensor connector terminals.

TROUBLE CODE / Connector & terminal:

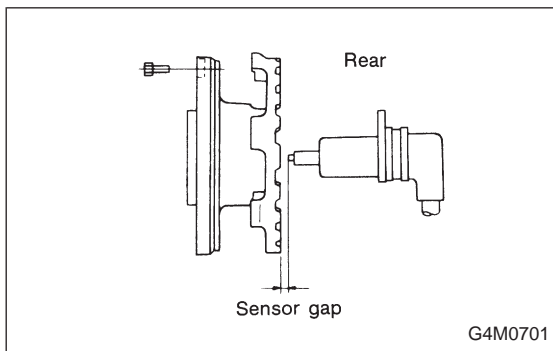
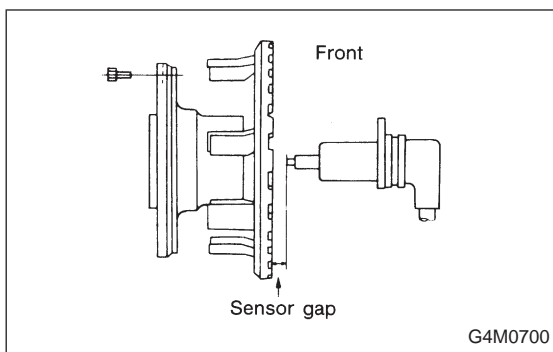
22 / (B6) No. 1 — No. 2

24 / (B15) No. 1 — No. 2

26 / (P8) No. 1 — No. 2

28 / (P9) No. 1 — No. 2

Specified resistance: 0.8 — 1.2 kΩ



3. CHECK A.B.S. SENSOR MECHANICAL TROUBLE.

- 1) Dismount brake as outlined in manual to gain access to A.B.S. sensor and tone wheel for inspection.
- 2) Check pole piece and tone wheel for accumulation of foreign particles. If necessary, remove foreign particles and clean.
- 3) Check tone wheel teeth for cracks for deformities. If necessary, replace tone wheel (No. of teeth: 44) with a new one.
- 4) Check tone wheel for looseness.

Tightening torque:

10 — 16 N·m (1.0 — 1.6 kg-m, 7 — 12 ft-lb)

- 5) Measure tone wheel-to-pole piece gap over entire perimeter of the wheel.

	Front wheel	Rear wheel
Specifications	0.9 — 1.4 mm (0.035 — 0.055 in)	0.7 — 1.2 mm (0.028 — 0.047 in)

If measurements check out “Not OK”, adjust the gap using spacers (Part No. 26755AA000). If spacers cannot correct the gap, replace worn sensor or worn tone wheel.

- 6) Check hub runout.

Specifications	0.05 mm (0.0020 in)
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**E: TROUBLE CODE 29
— FAULTY TONE WHEEL, ETC. —**

DIAGNOSIS:

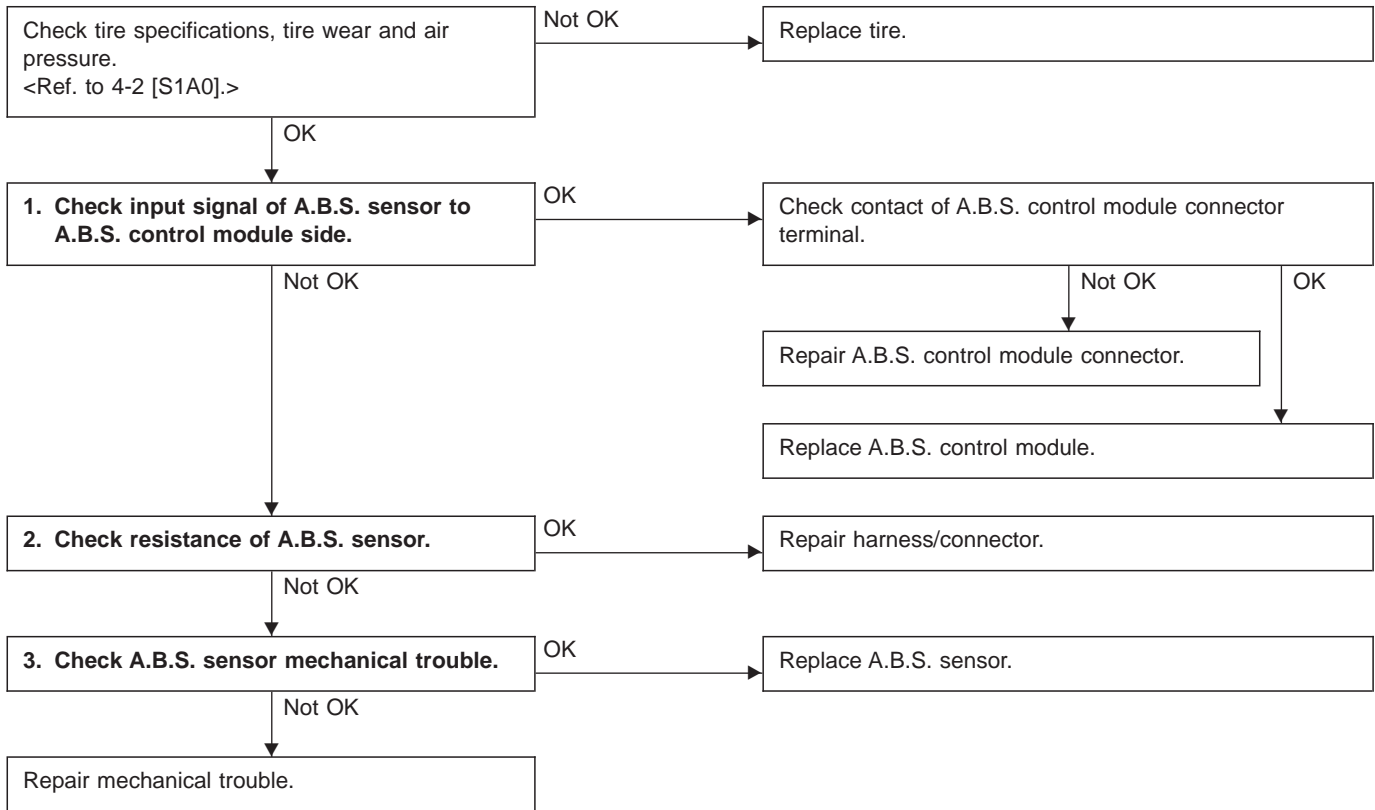
- Faulty tone wheel
- Faulty A.B.S. control module

TROUBLE SYMPTOM:

- A.B.S. does not operate.

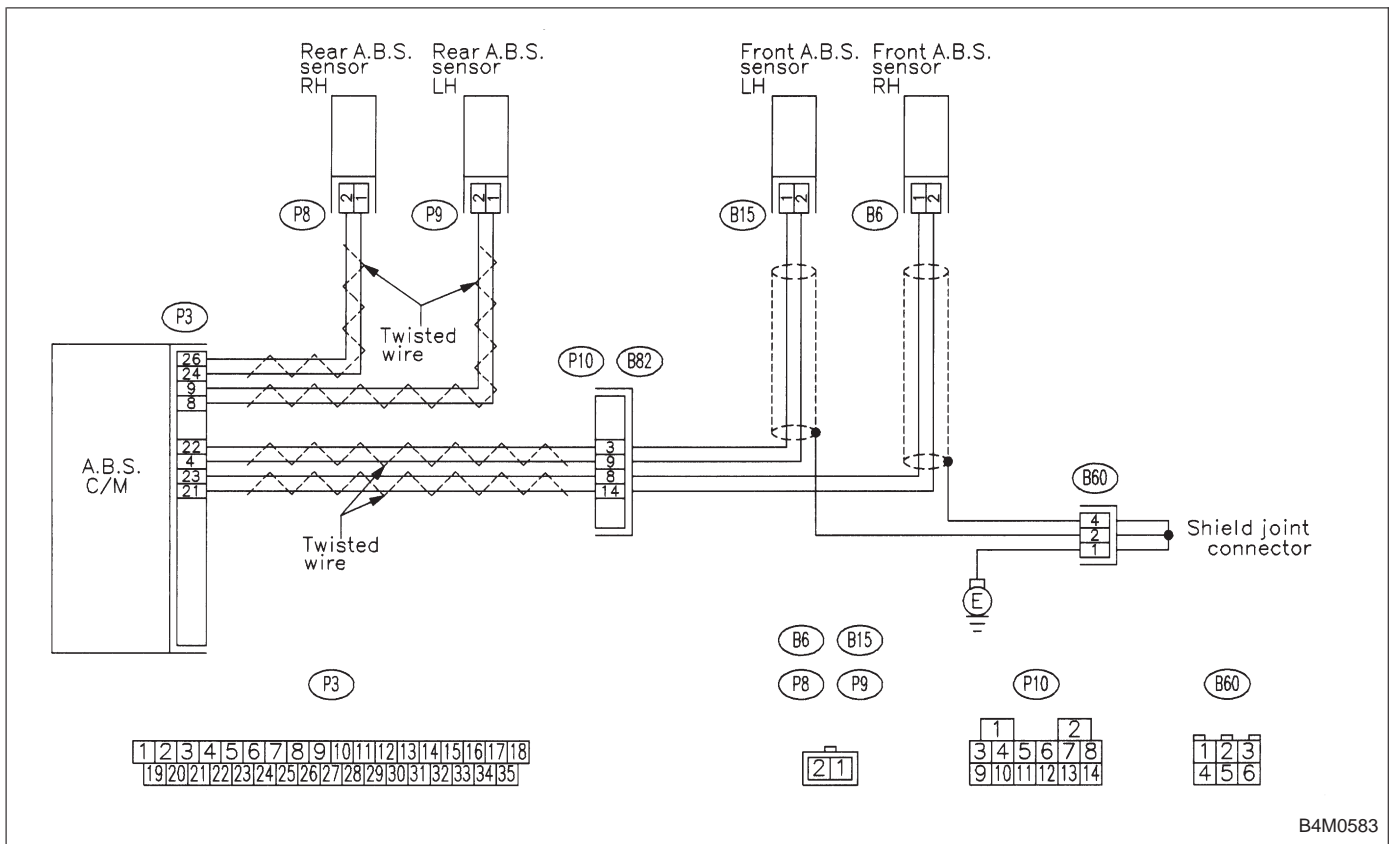
NOTE:

When the wheels turn freely for a long time, such as when the vehicle is towed or jacked-up, or when steering wheel is continuously turned all the way, this trouble code may sometimes occur.

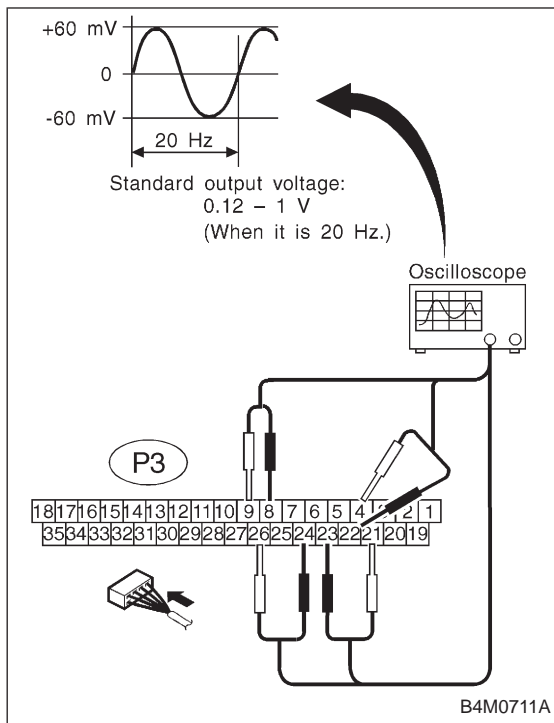


NOTE:

When checking A.B.S. sensor, carefully bend or swing connector and harness to check for improper contact or open circuits.



B4M0583



1. CHECK INPUT SIGNAL OF A.B.S. SENSOR TO A.B.S. CONTROL MODULE SIDE.

- 1) Raise all four wheels of ground.
- 2) Turn ignition switch OFF.
- 3) Disconnect connector from A.B.S. control module.
- 4) Disconnect connector cover from connector. <Ref. to 4-4a [T7C2].>
- 5) Connect connector to A.B.S. control module.
- 6) Connect the oscilloscope to the A.B.S. control module connector in accordance with the trouble code.
- 7) Turn ignition switch ON.
- 8) Rotate wheels and measure voltage at specified frequency.

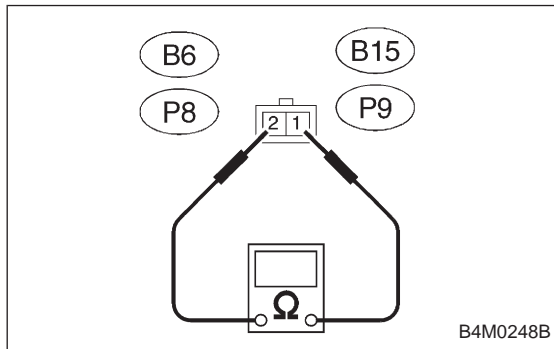
NOTE:

When this inspection is completed, the A.B.S. control module sometimes memorizes the trouble code 29.

Connector & terminal:

- (P3) No. 23 (+) — No. 21 (-)
- (P3) No. 22 (+) — No. 4 (-)
- (P3) No. 24 (+) — No. 26 (-)
- (P3) No. 8 (+) — No. 9 (-)

Specified voltage: 0.12 — 1 V (When it is 20 Hz.)



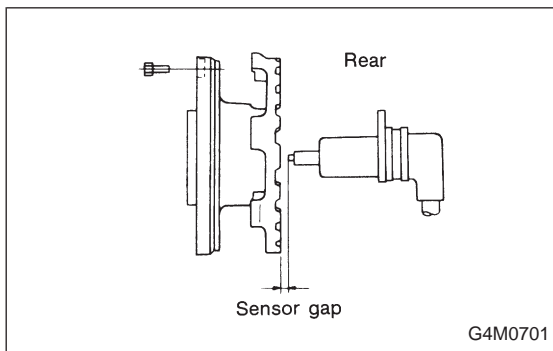
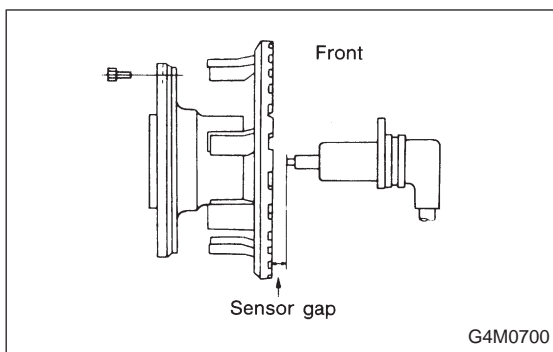
2. CHECK RESISTANCE OF A.B.S. SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. sensor.
- 3) Measure resistance between A.B.S. sensor connector terminals.

Connector & terminal:

- (B6) No. 1 — No. 2
- (B15) No. 1 — No. 2
- (P8) No. 1 — No. 2
- (P9) No. 1 — No. 2

Specified resistance: 0.8 — 1.2 kΩ



3. CHECK A.B.S. SENSOR MECHANICAL TROUBLE.

- 1) Dismount brake as outlined in manual to gain access to A.B.S. sensor and tone wheel for inspection.
- 2) Check pole piece and tone wheel for accumulation of foreign particles. If necessary, remove foreign particles and clean.
- 3) Check tone wheel teeth for cracks for deformities. If necessary, replace tone wheel (No. of teeth: 44) with a new one.
- 4) Check tone wheel for looseness.

Tightening torque:

10 — 16 N·m (1.0 — 1.6 kg-m, 7 — 12 ft-lb)

- 5) Measure tone wheel-to-pole piece gap over entire perimeter of the wheel.

	Front wheel	Rear wheel
Specifications	0.9 — 1.4 mm (0.035 — 0.055 in)	0.7 — 1.2 mm (0.028 — 0.047 in)

If measurements check out "Not OK", adjust the gap using spacers (Part No. 26755AA000). If spacers cannot correct the gap, replace worn sensor or worn tone wheel.

- 6) Check hub runout.

Specifications	0.05 mm (0.0020 in)
----------------	---------------------

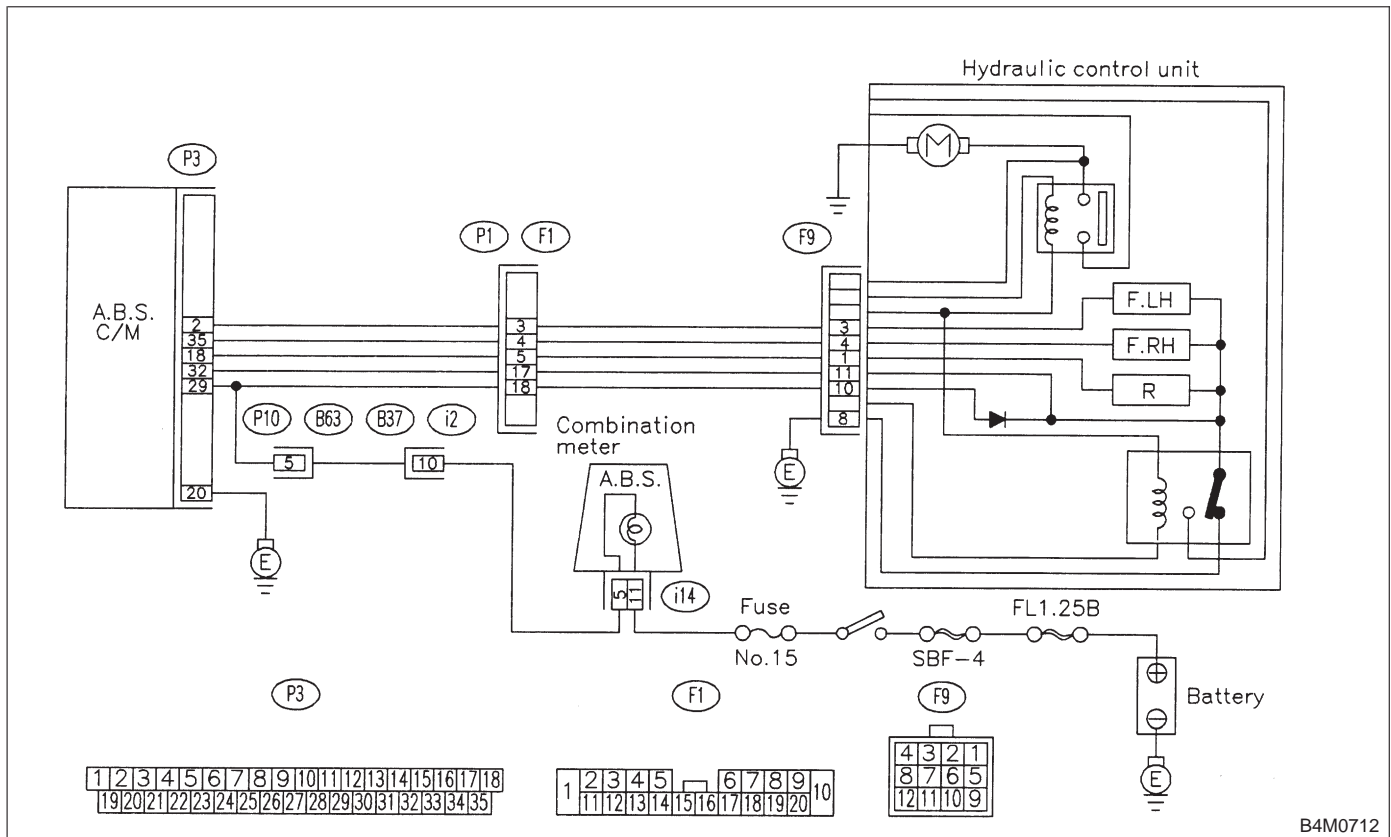
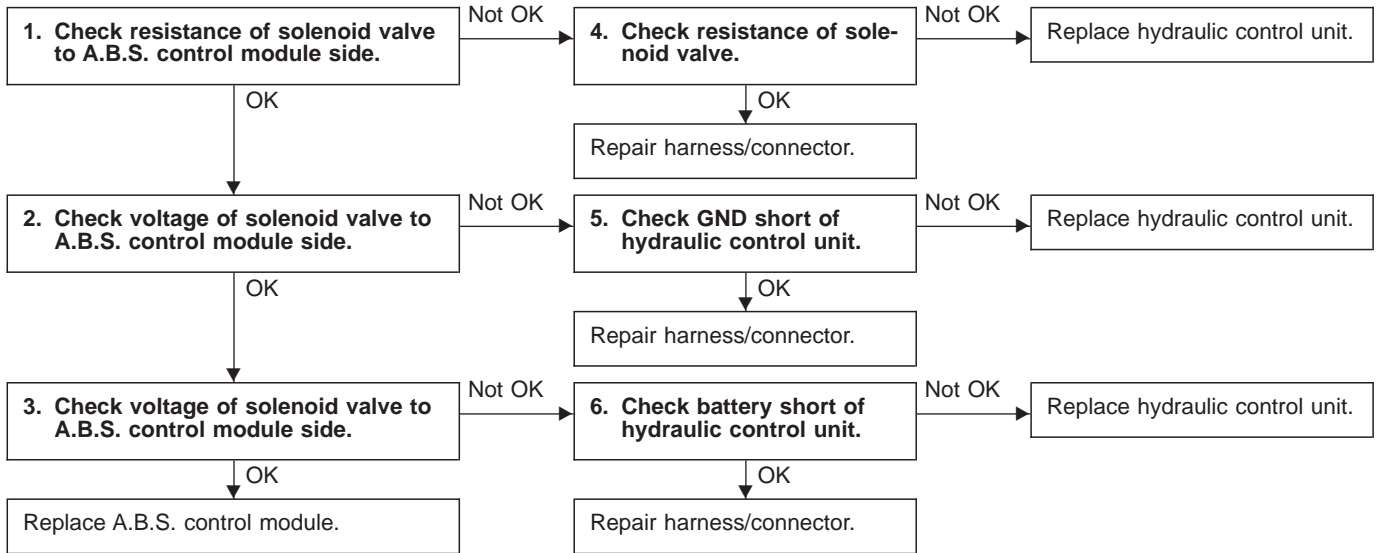
**F: TROUBLE CODE 31, 33 AND 39
— FAULTY SOLENOID VALVE CIRCUIT(S) IN
HYDRAULIC CONTROL UNIT —**

DIAGNOSIS:

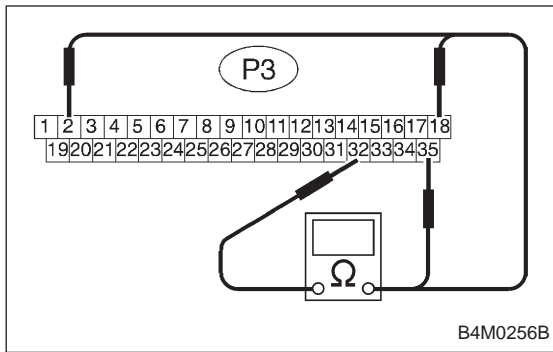
- Faulty harness/connector
- Faulty solenoid valve in hydraulic control unit
- Faulty A.B.S. control module

TROUBLE SYMPTOM:

- A.B.S. does not operate.



B4M0712



1. CHECK RESISTANCE OF SOLENOID VALVE TO A.B.S. CONTROL MODULE SIDE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module.
- 3) Measure resistance between A.B.S. control module connector terminals.

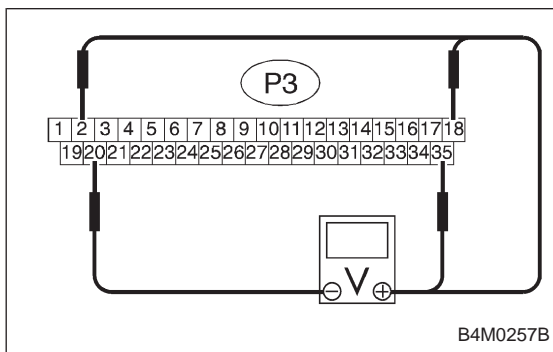
TRUBLE CODE / Connector & terminal:

31 / (P3) No. 35 — No. 32

33 / (P3) No. 2 — No. 32

39 / (P3) No. 18 — No. 32

Specified resistance: approx. 1 Ω



2. CHECK VOLTAGE OF SOLENOID VALVE TO A.B.S. CONTROL MODULE SIDE.

- 1) Turn ignition switch OFF.
- 2) Disconnect valve relay from hydraulic control unit.
- 3) Turn ignition switch ON.
- 4) Measure voltage between A.B.S. control module connector terminals.

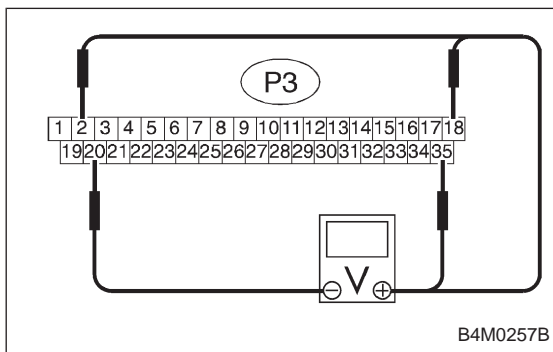
TRUBLE CODE / Connector & terminal:

31 / (P3) No. 35 — No. 20

33 / (P3) No. 2 — No. 20

39 / (P3) No. 18 — No. 20

Specified voltage: 10 — 12 V



3. CHECK VOLTAGE OF SOLENOID VALVE TO A.B.S. CONTROL MODULE SIDE.

- 1) Turn ignition switch OFF.
- 2) Disconnect combination meter fuse No. 15.
- 3) Turn ignition switch ON.
- 4) Measure voltage between A.B.S. control module connector terminals.

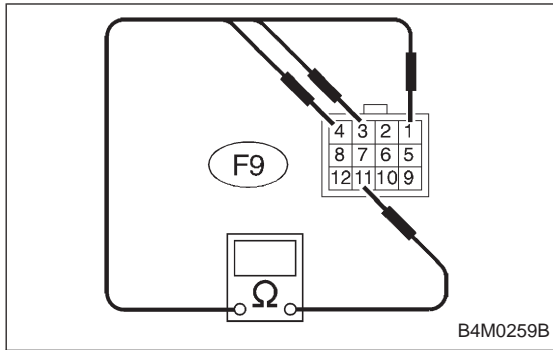
TRUBLE CODE / Connector & terminal:

31 / (P3) No. 35 — No. 20

33 / (P3) No. 2 — No. 20

39 / (P3) No. 18 — No. 20

Specified voltage: 0 V

**4. CHECK RESISTANCE OF SOLENOID VALVE.**

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic control unit.
- 3) Measure resistance between hydraulic control unit terminals.

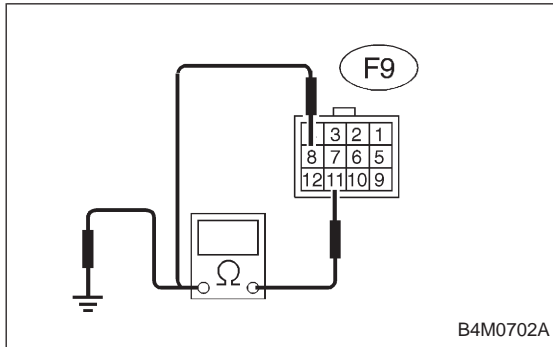
TROUBLE CODE / Connector & terminal:

31 / to (F9) No. 4 — No. 11

33 / to (F9) No. 3 — No. 11

39 / to (F9) No. 1 — No. 11

Specified resistance: approx. 1 Ω

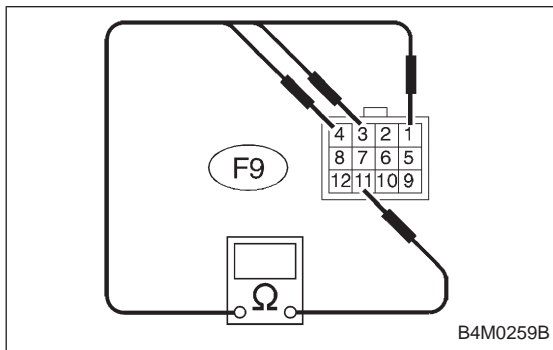
**5. CHECK GND SHORT OF HYDRAULIC CONTROL UNIT.**

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic control unit.
- 3) Measure resistance between hydraulic control unit terminals.

Connector & terminal / Specified resistance:

(F9) No. 11 — body / 1 MΩ

(F9) No. 11 — No. 8 / 1 MΩ

**6. CHECK BATTERY SHORT OF HYDRAULIC CONTROL UNIT.**

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic control unit.
- 3) Measure resistance between hydraulic control unit terminals.

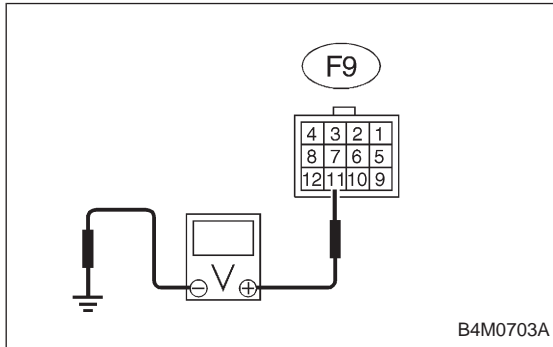
TRUBLE CODE / Connector & terminal:

31 / to (F9) No. 4 — No. 11

33 / to (F9) No. 3 — No. 11

39 / to (F9) No. 1 — No. 11

Specified resistance: approx. 1 Ω



- 4) Turn ignition ON.
- 5) Measure voltage between hydraulic control unit terminals.

Connector & terminal / Specified voltage:

(F9) No. 11 — body / 0 V

**G: TROUBLE CODE 41
— FAULTY A.B.S. CONTROL MODULE —****DIAGNOSIS:**

- Faulty A.B.S. control module

TROUBLE SYMPTOM:

- A.B.S. does not operate.

Replace A.B.S. control module.

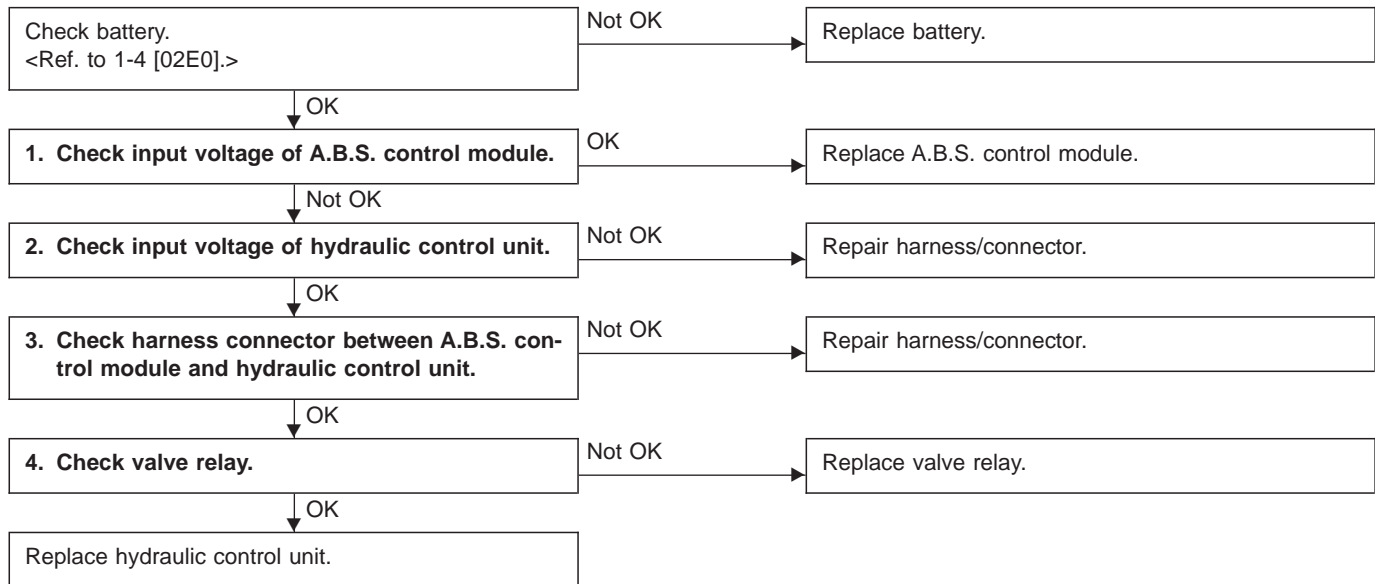
**H: TROUBLE CODE 42
— SOURCE VOLTAGE IS LOW. —**

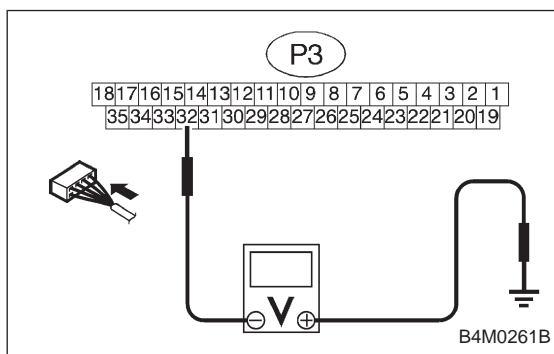
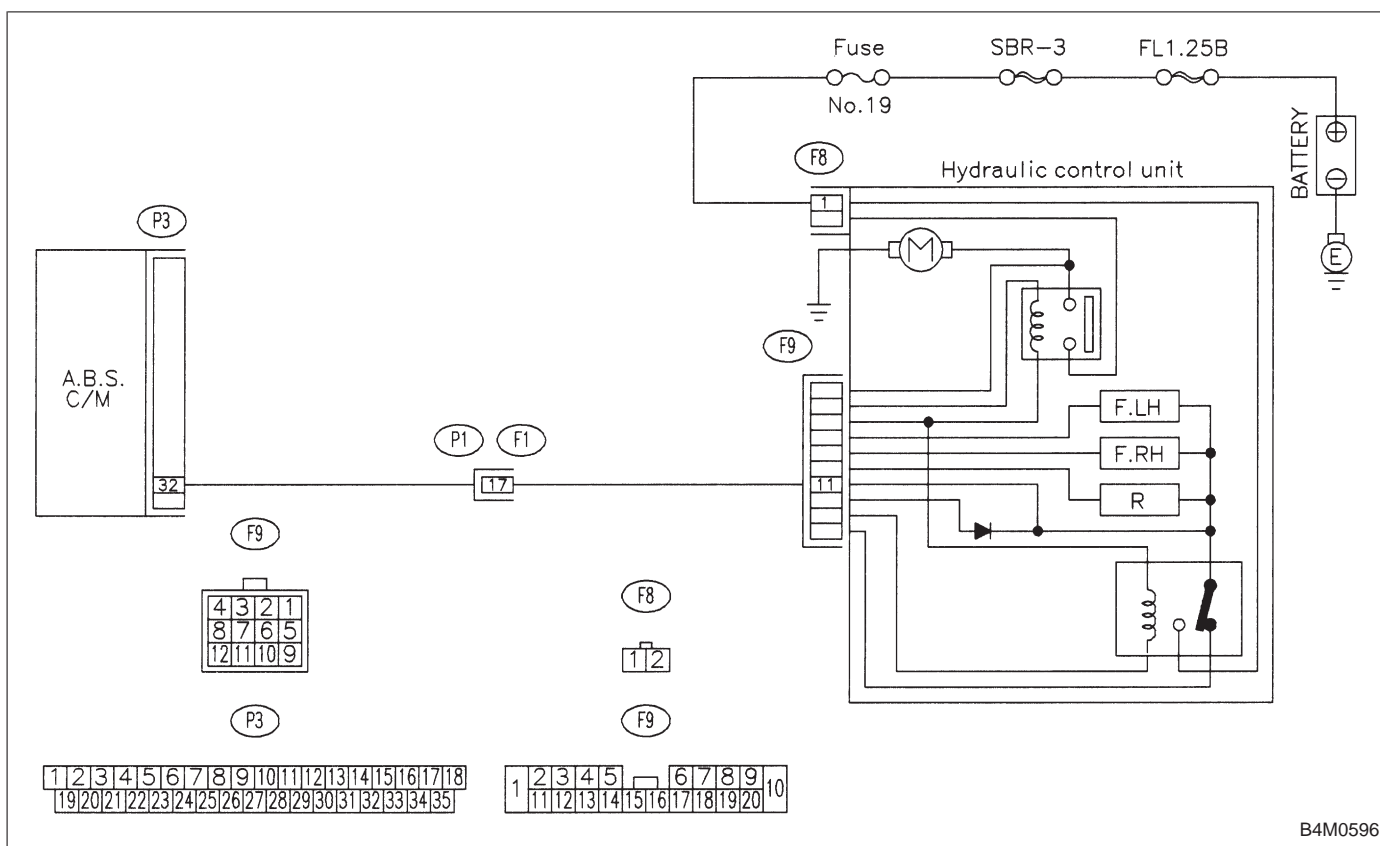
DIAGNOSIS:

- Faulty battery
- Faulty A.B.S. control module
- Faulty harness
- Faulty valve relay

TROUBLE SYMPTOM:

- A.B.S. does not operate.

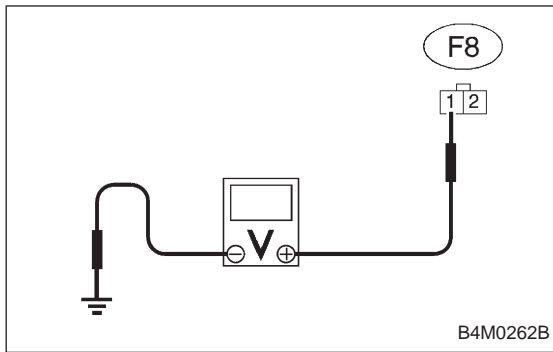




1. CHECK INPUT VOLTAGE OF A.B.S. CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module.
- 3) Disconnect connector cover from connector. <Ref. to 4-4a [T7C2].>
- 4) Connect connector to A.B.S. control module.
- 5) Turn ignition switch ON.
- 6) Measure input voltage between A.B.S. control module connector and body.

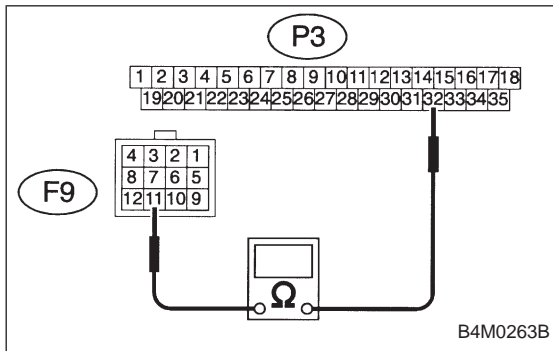
Connector & terminal / Specified voltage:
 (P3) No. 32 — Body / 10 — 12 V



2. CHECK INPUT VOLTAGE OF HYDRAULIC CONTROL UNIT.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic control unit.
- 3) Turn ignition switch ON.
- 4) Measure input voltage between hydraulic control unit connector and body.

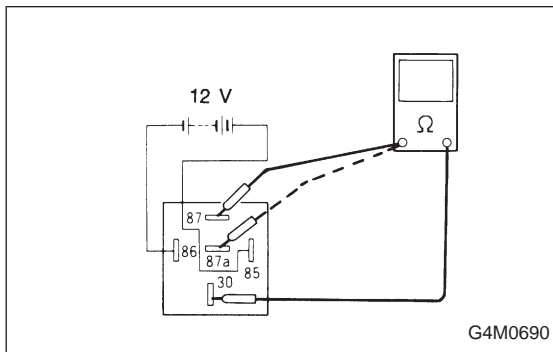
Connector & terminal / Specified voltage:
(F8) No. 1 — Body / 10 — 12 V



3. CHECK HARNESS CONNECTOR BETWEEN A.B.S. CONTROL MODULE AND HYDRAULIC CONTROL UNIT.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module and hydraulic control unit.
- 3) Measure resistance between A.B.S. control module and hydraulic control unit.

Connector & terminal / Specified resistance:
(P3) No. 32 — (F9) No. 11 / 0 Ω



4. CHECK VALVE RELAY.

- 1) Remove valve relay.
- 2) Attach circuit tester probes to terminals, as shown in figure.
- 3) Measure resistance between respective terminals.

Terminal / Specified resistance:
No. 87 — No. 30 / 0 Ω (when 12 volts applied.)
No. 87 — No. 30 / 1 MΩ (when no volts applied.)
No. 87a — No. 30 / 1 MΩ (when 12 volts applied.)
No. 87a — No. 30 / 0 Ω (when no volts applied.)

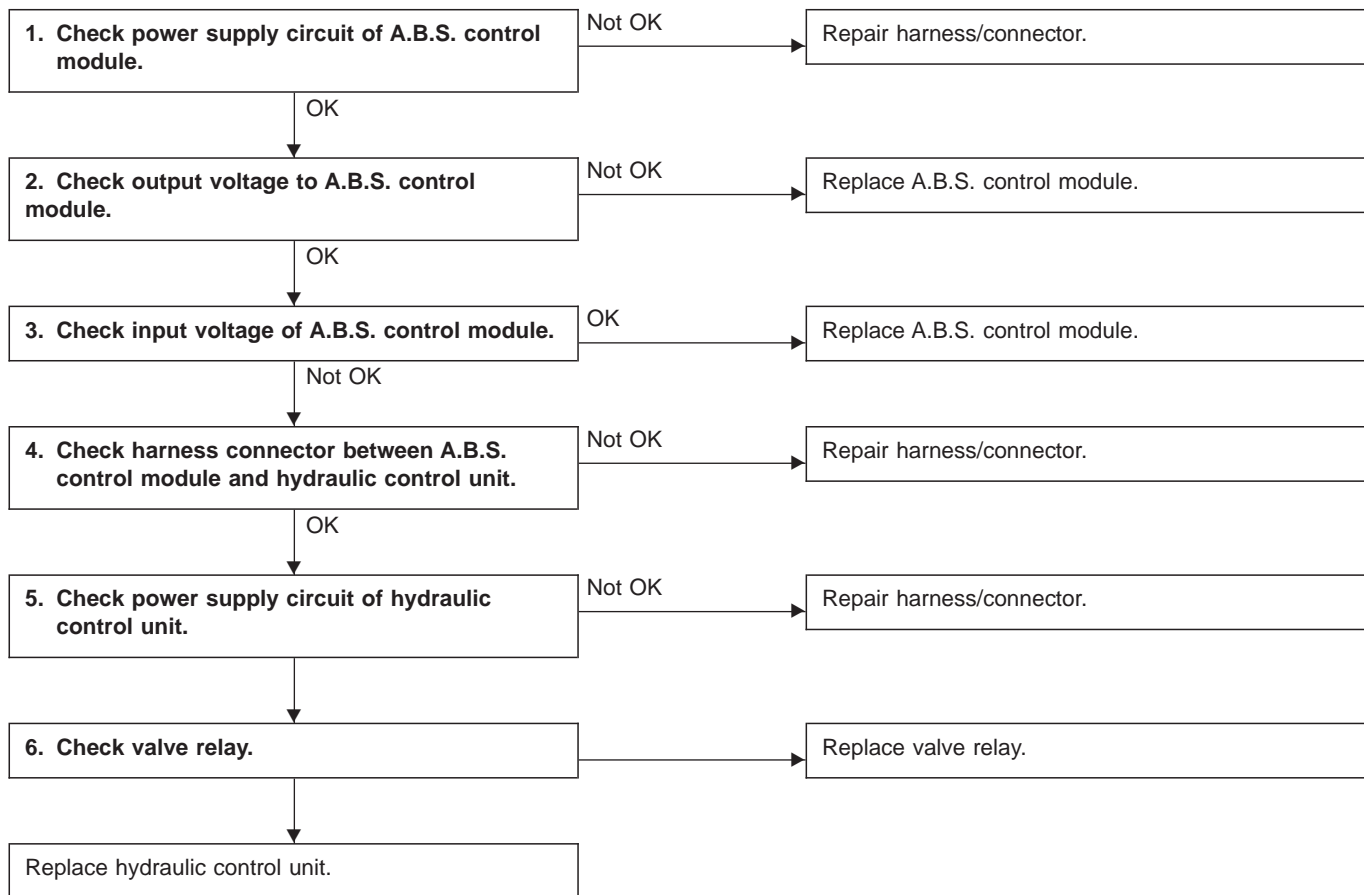
**I: TROUBLE CODE 51
— FAULTY VALVE RELAY —**

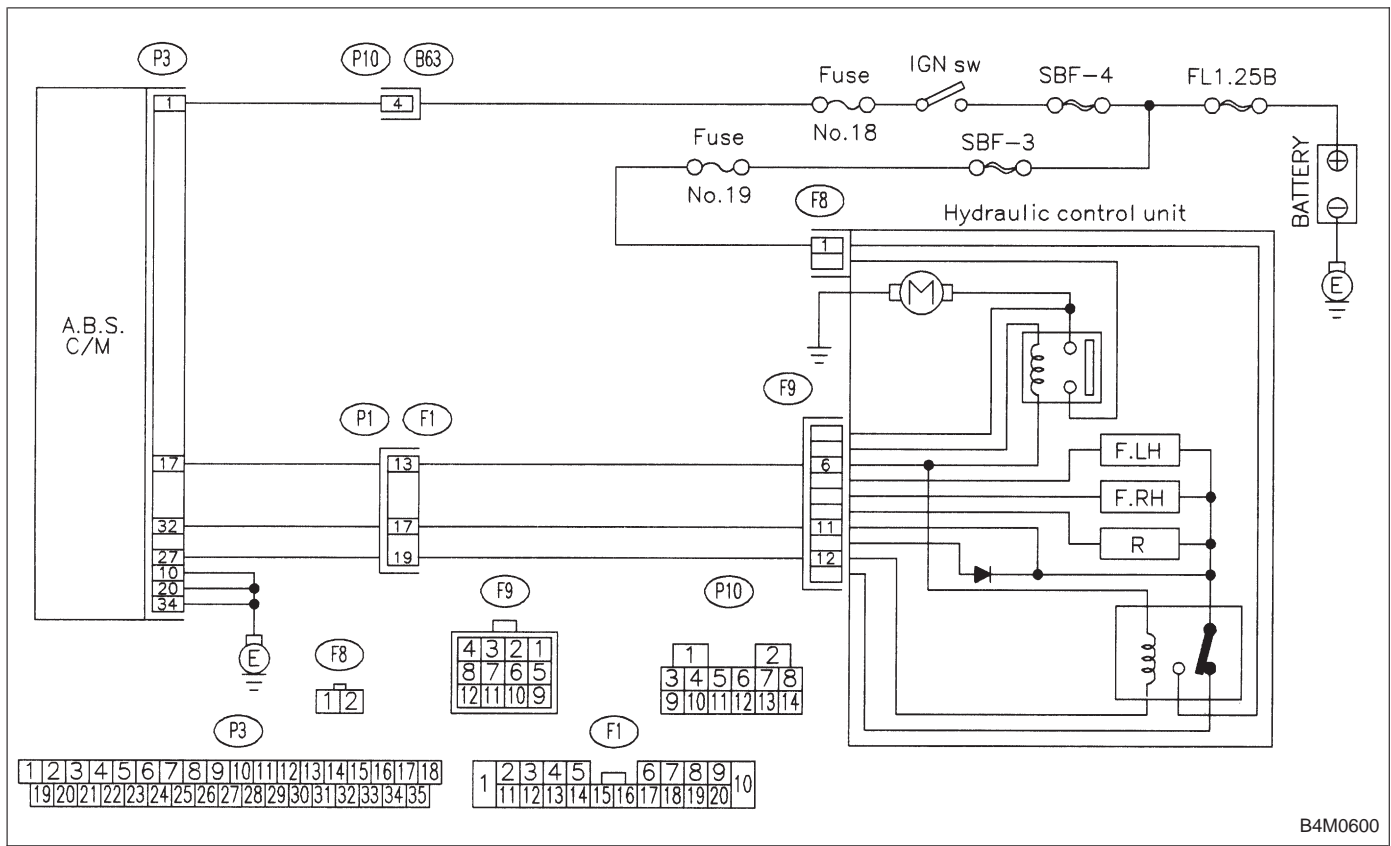
DIAGNOSIS:

- Faulty valve relay
- Faulty harness
- Faulty A.B.S. control module

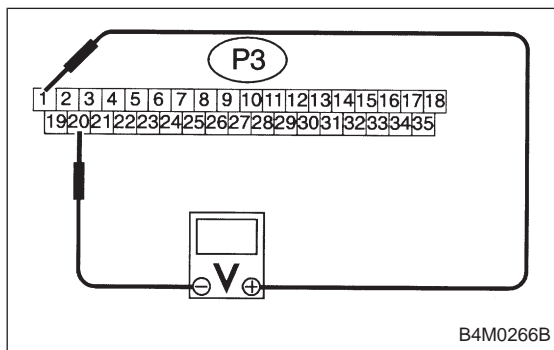
TROUBLE SYMPTOM:

- A.B.S. does not operate.





B4M0600

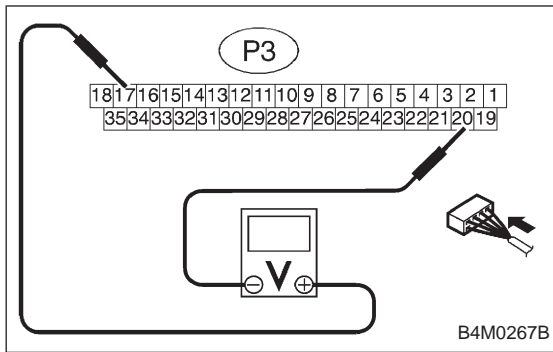


B4M0266B

1. CHECK POWER SUPPLY CIRCUIT OF A.B.S. CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module.
- 3) Turn ignition switch ON.
- 4) Measure voltage between A.B.S. control module connector terminals.

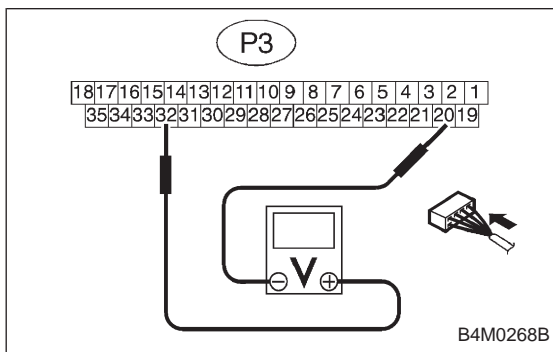
Connector & terminal / Specified voltage:
(P3) No. 1 — No. 20 / 10 — 12 V



2. CHECK OUTPUT VOLTAGE TO A.B.S. CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module.
- 3) Disconnect connector cover from connector. <Ref. to 4-4a [T7C2].>
- 4) Connect connector to A.B.S. control module.
- 5) Turn ignition switch ON.
- 6) Measure voltage between A.B.S. control module connector terminals.

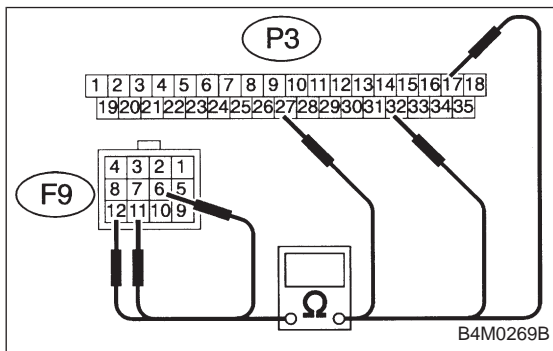
Connector & terminal / Specified voltage:
 (P3) No. 17 — No. 20 / 10 — 12 V



3. CHECK INPUT VOLTAGE OF A.B.S. CONTROL MODULE.

- 1) Turn ignition switch ON.
- 2) Measure voltage between A.B.S. control module connector terminals.

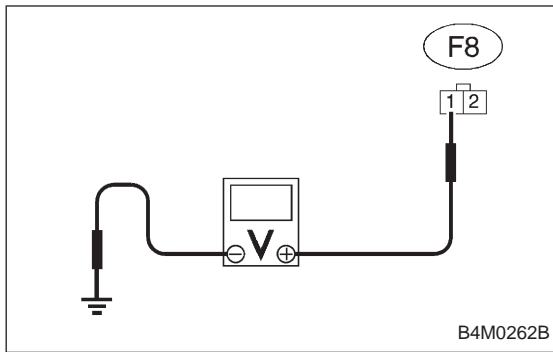
Connector & terminal / Specified voltage:
 (P3) No. 32 — No. 20 / 10 — 12 V



4. CHECK HARNESS CONNECTOR BETWEEN A.B.S. CONTROL MODULE AND HYDRAULIC CONTROL UNIT.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module and hydraulic control unit.
- 3) Measure resistance between A.B.S. control module and hydraulic control unit.

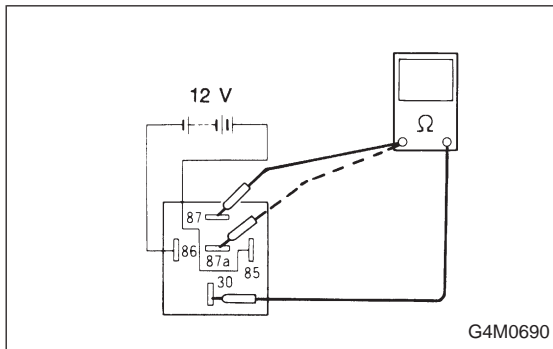
Connector & terminal / Specified resistance:
 (P3) No. 17 — (F9) No. 6 / 0 Ω
 (P3) No. 32 — (F9) No. 11 / 0 Ω
 (P3) No. 27 — (F9) No. 12 / 0 Ω



5. CHECK POWER SUPPLY CIRCUIT OF HYDRAULIC CONTROL UNIT.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic control unit.
- 3) Turn ignition switch ON.
- 4) Measure voltage between hydraulic control unit and body.

Connector & terminal / Specified voltage:
(F8) No. 1 — Body / 10 — 12 V



6. CHECK VALVE RELAY.

- 1) Remove valve relay.
- 2) Attach circuit tester probes to terminals, as shown in figure.
- 3) Measure resistance between respective terminals.

Terminal / Specified resistance:

No. 87 — No. 30 / 0 Ω (when 12 volts applied.)

No. 87 — No. 30 / 1 MΩ (when no volts applied.)

No. 87a — No. 30 / 1 MΩ (when 12 volts applied.)

No. 87a — No. 30 / 0 Ω (when no volts applied.)

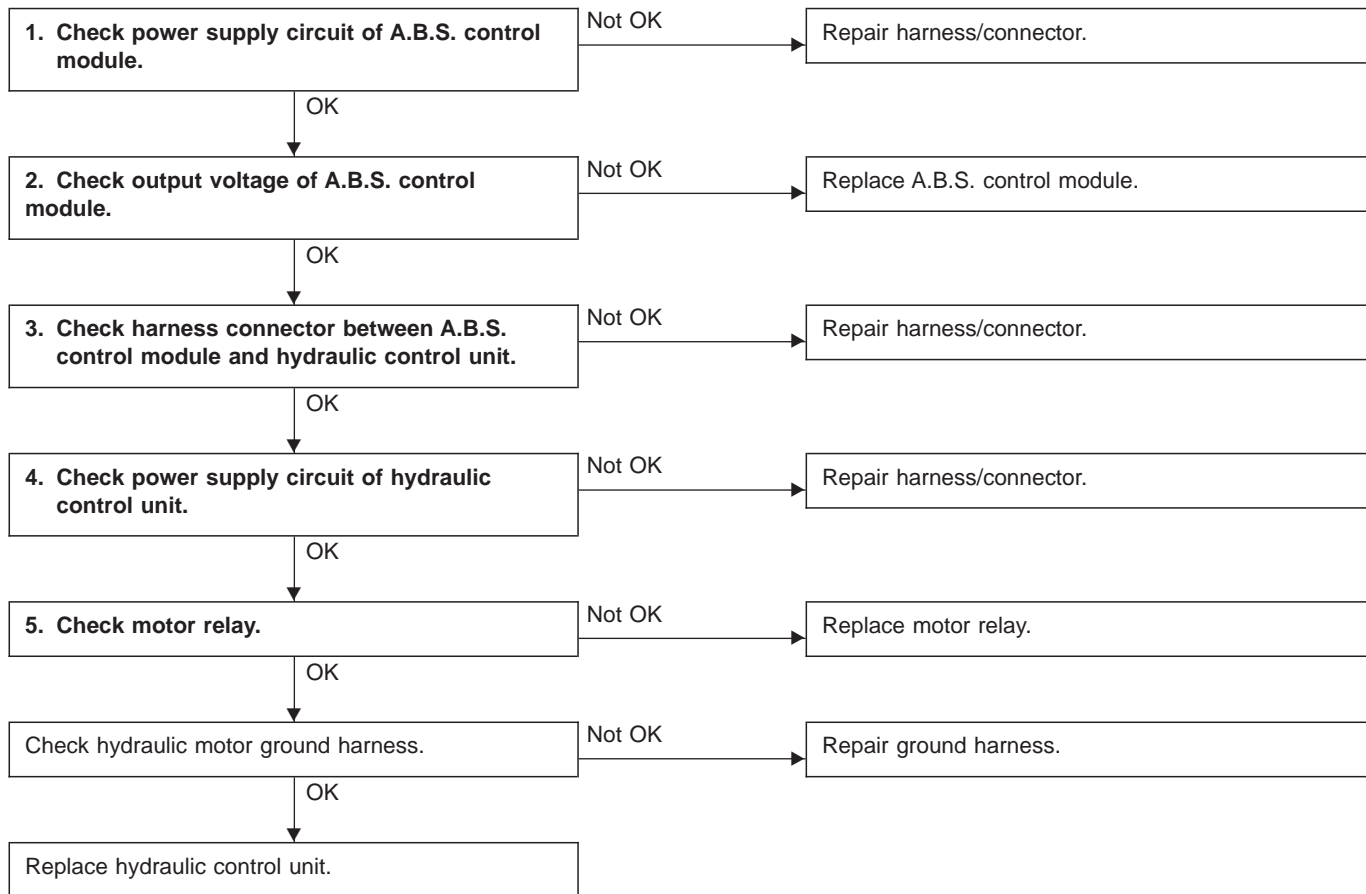
**J: TROUBLE CODE 52
— FAULTY HYDRAULIC MOTOR AND/OR
MOTOR RELAY —**

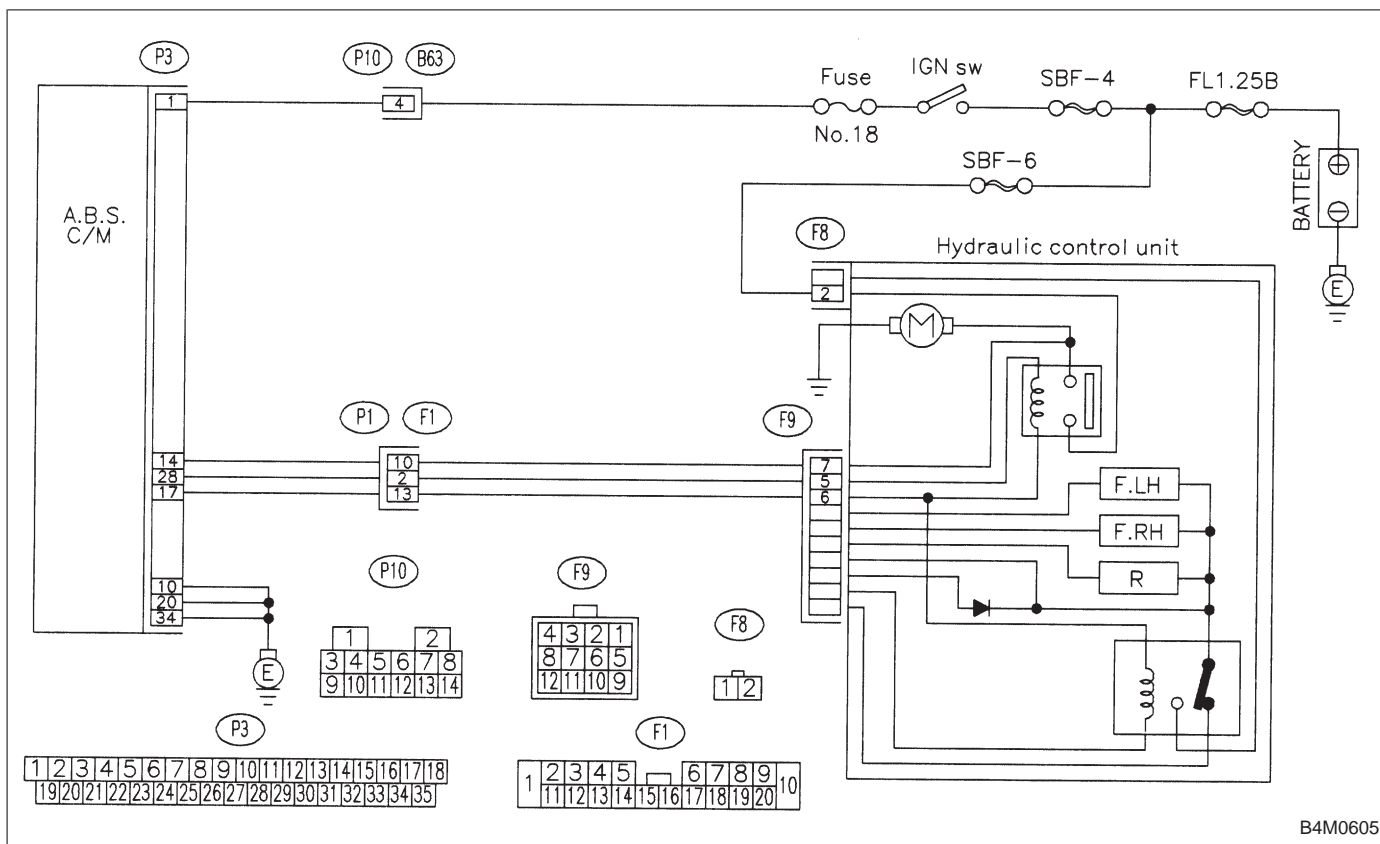
DIAGNOSIS:

- Faulty motor relay
- Faulty hydraulic control unit
- Faulty harness
- Faulty A.B.S. control module

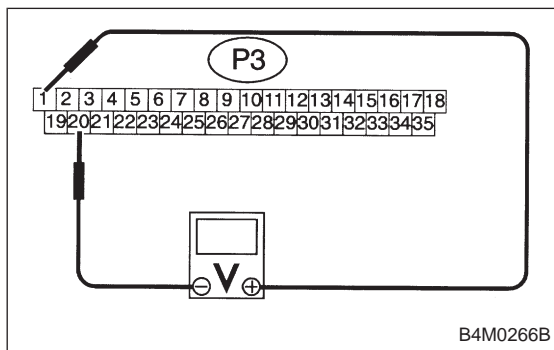
TROUBLE SYMPTOM:

- A.B.S. does not operate.





B4M0605

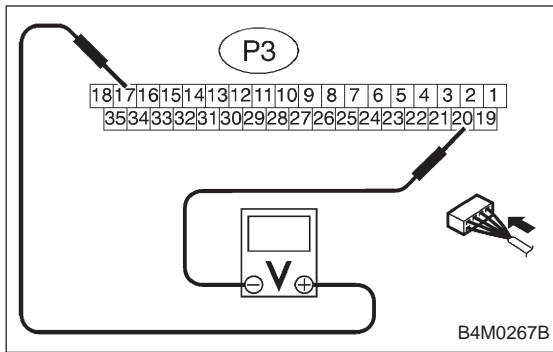


B4M0266B

1. CHECK POWER SUPPLY CIRCUIT OF A.B.S. CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module.
- 3) Turn ignition switch ON.
- 4) Measure voltage between A.B.S. control module connector terminals.

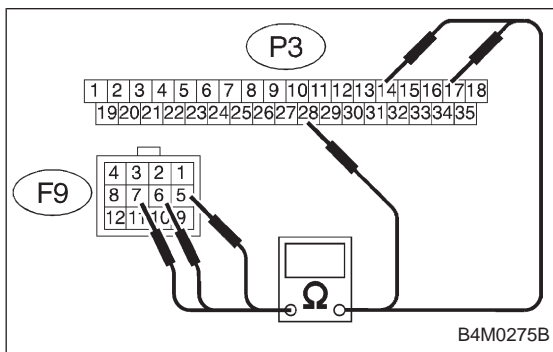
Connector & terminal / Specified voltage:
(P3) No. 1 — No. 20 / 10 — 12 V



2. CHECK OUTPUT VOLTAGE OF A.B.S. CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module.
- 3) Disconnect connector cover from connector. <Ref. to 4-4a [T7C2].>
- 4) Connect connector to A.B.S. control module.
- 5) Turn ignition switch ON.
- 6) Measure voltage between A.B.S. control module connector terminals.

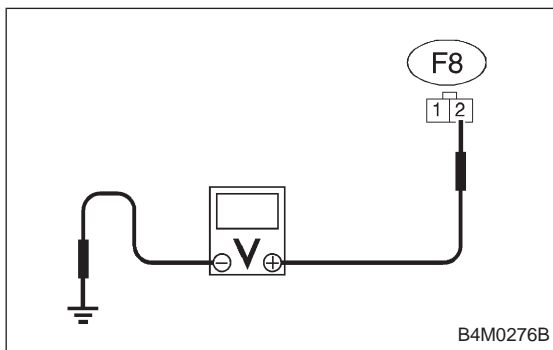
Connector & terminal / Specified voltage:
 (P3) No. 17 — No. 20 / 10 — 12 V



3. CHECK HARNESS CONNECTOR BETWEEN A.B.S. CONTROL MODULE AND HYDRAULIC CONTROL UNIT.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module.
- 3) Disconnect connector from hydraulic control unit.
- 4) Measure resistance between A.B.S. control module connector and hydraulic control unit connector.

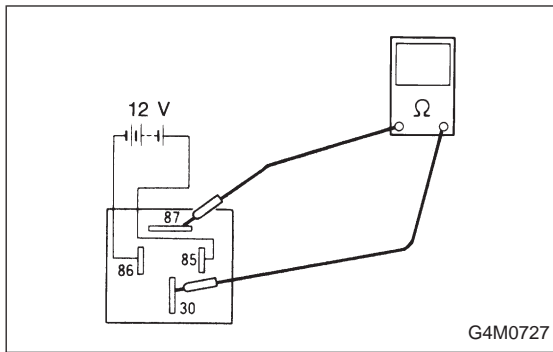
Connector & terminal / Specified resistance:
 (P3) No. 17 — (F9) No. 6 / 0 Ω
 (P3) No. 28 — (F9) No. 5 / 0 Ω
 (P3) No. 14 — (F9) No. 7 / 0 Ω



4. CHECK POWER SUPPLY CIRCUIT OF HYDRAULIC CONTROL UNIT.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic control unit.
- 3) Measure voltage between hydraulic control unit connector and body.

Connector & terminal / Specified voltage:
 (F8) No. 2 — Body / 10 — 12 V

**5. CHECK MOTOR RELAY.**

- 1) Remove motor relay.
- 2) Attach circuit tester probes to terminals, as shown in figure.
- 3) Measure resistance between terminals.

Terminal / Specified resistance:

No. 30 — No. 87 / 0 Ω (when 12 volts applied.)

No. 30 — No. 87 / 1 MΩ, min. (when no volts applied.)

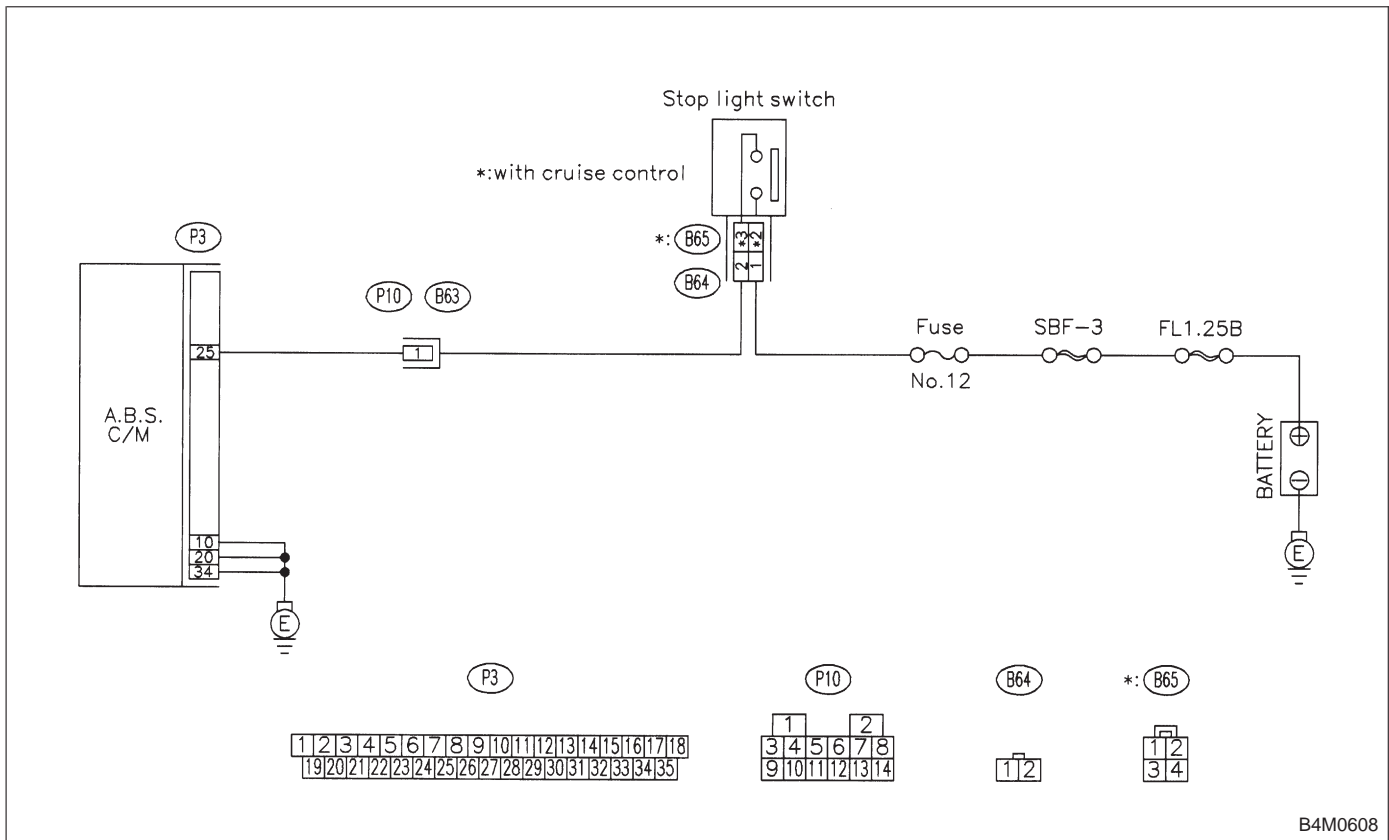
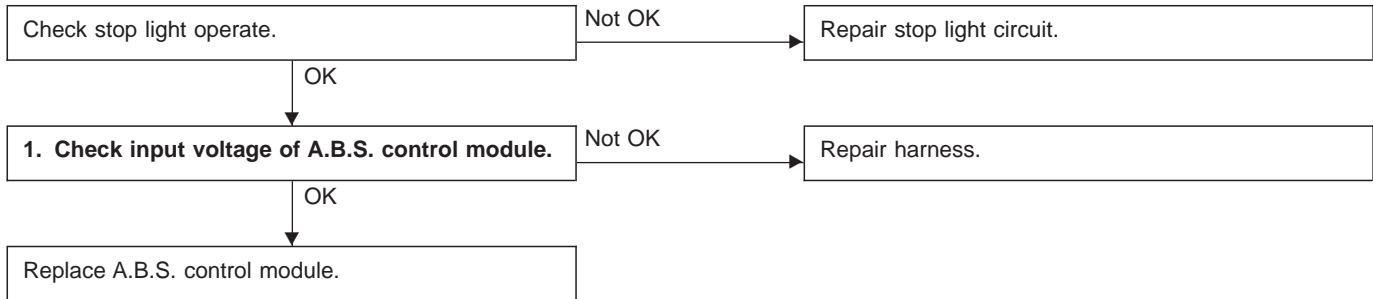
**K: TROUBLE CODE 54
— FAULTY STOP LIGHT CIRCUIT —**

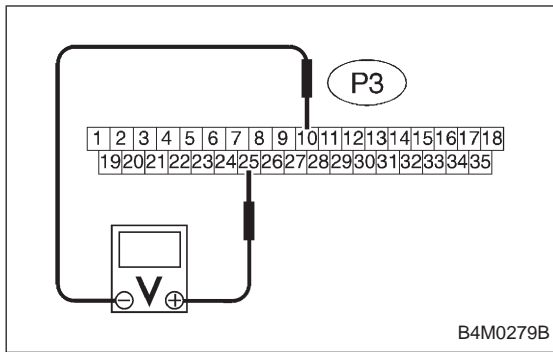
DIAGNOSIS:

- Faulty stop light circuit
- Faulty harness
- Faulty A.B.S. control module

TROUBLE SYMPTOM:

- A.B.S. does not operate.





1. CHECK INPUT VOLTAGE OF A.B.S. CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module.
- 3) Measure voltage between A.B.S. control module connector terminals.

Connector & terminal / Specified voltage:

(P3) No. 25 — No. 10 / More than 4 V (when brake pedal is depressed.)

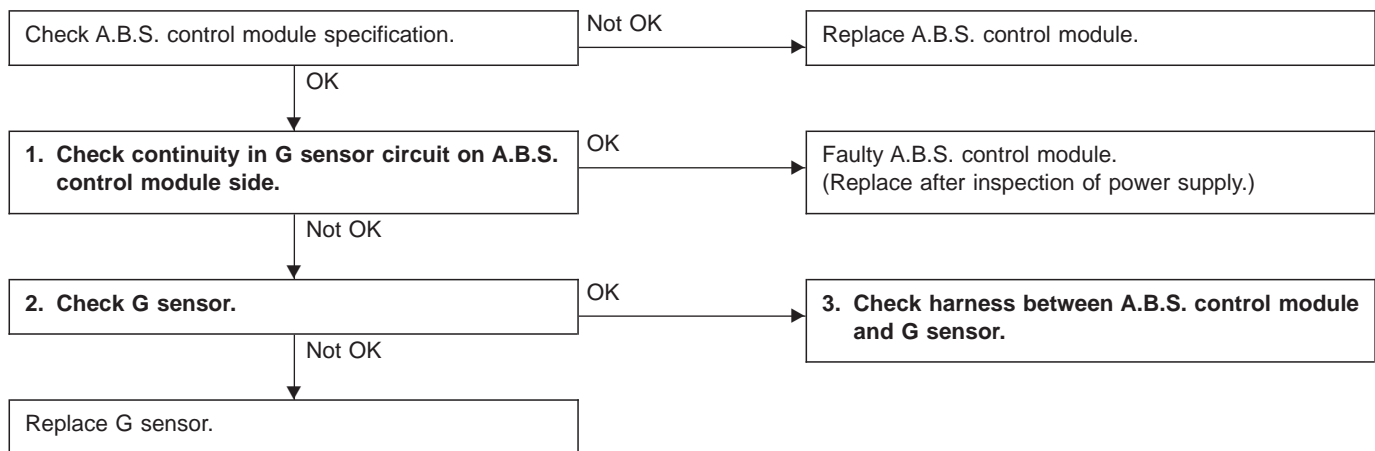
L: TROUBLE CODE 56
— USE OF IMPROPER A.B.S. CONTROL
MODULE SPECIFICATION, OR FAULTY G
SENSOR —

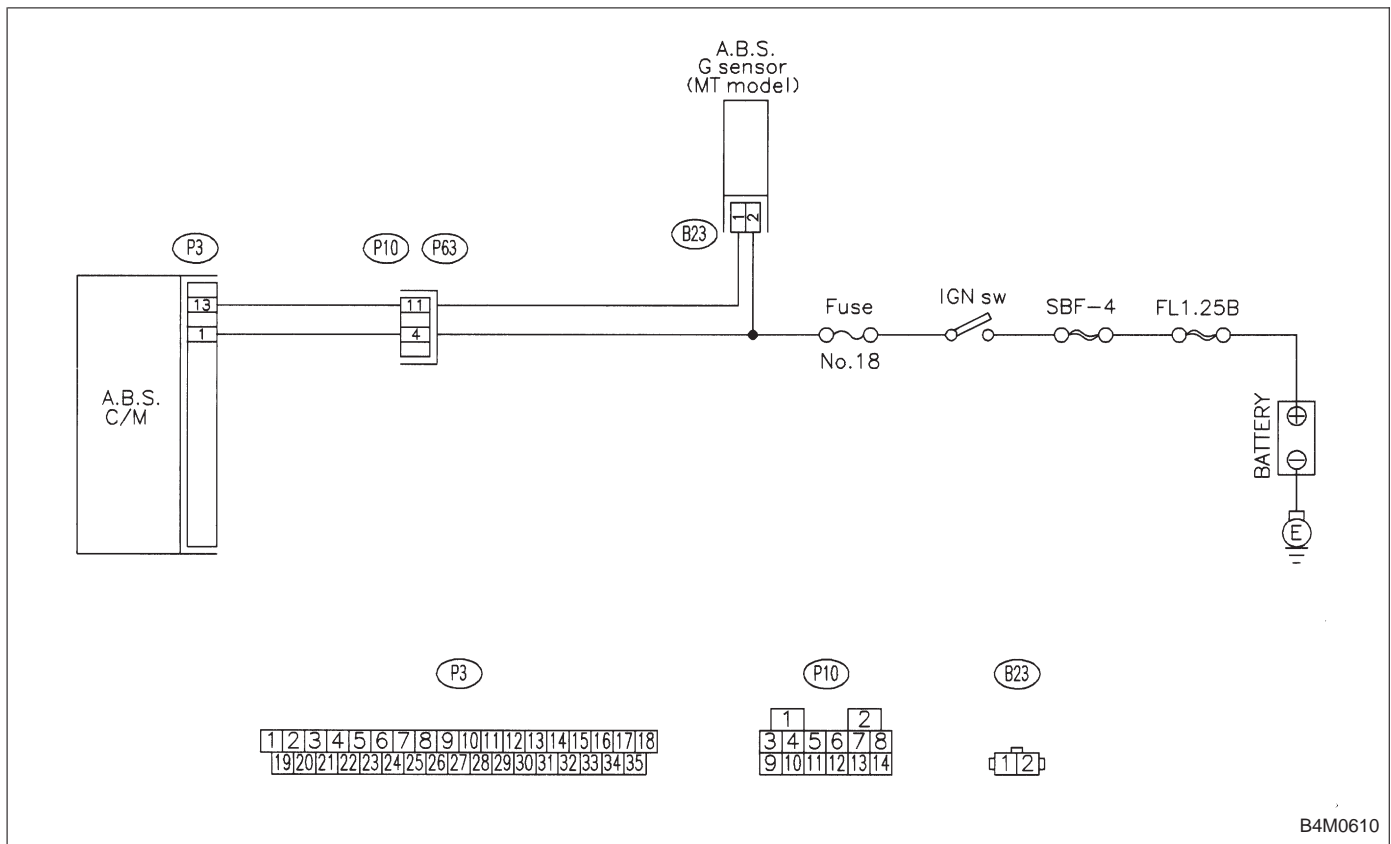
DIAGNOSIS:

- Improper A.B.S. control module specification
- Faulty G sensor
- Faulty G sensor harness and connector

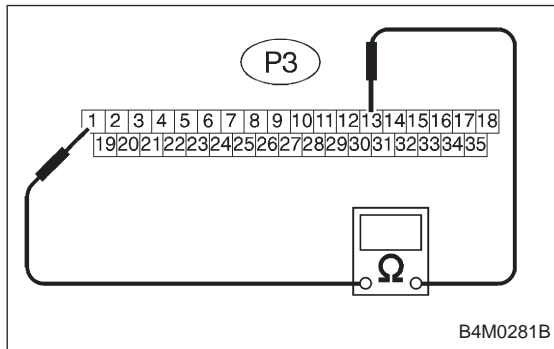
TROUBLE SYMPTOM:

- A.B.S. does not operate.
- A.B.S. activates faster than specifications when braking on high “μ” (dry asphalt) road.
- Warning light comes on and trouble code “56” is displayed approximately 20 seconds after vehicle starts.





B4M0610

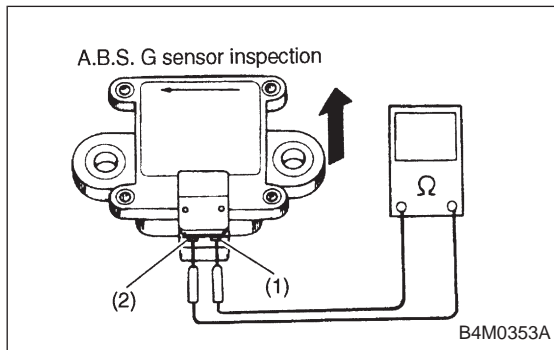


B4M0281B

1. CHECK CONTINUITY IN G SENSOR CIRCUIT ON A.B.S. CONTROL MODULE SIDE.

- 1) Position vehicle on a flat surface.
- 2) Disconnect connector from A.B.S. control module.
- 3) Measure resistance between A.B.S. control module connector terminals.

Connector & terminal / Specified resistance:
(P3) No. 1 — No. 13 / 550 — 670 Ω

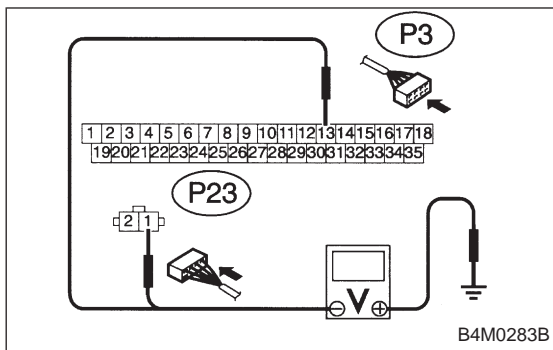


B4M0353A

2. CHECK G SENSOR.

- 1) Disconnect G sensor connector.
- 2) Measure resistance between G sensor terminals. (Ensure that G sensor is horizontal during measurement.)

Specified resistance:
550 — 670 Ω



3. CHECK HARNESS BETWEEN A.B.S. CONTROL MODULE AND G SENSOR.

- 1) Turn ignition switch ON.
- 2) Connect G sensor connector.
- 3) Measure voltage between connector and body.

Connector & terminal / Specified voltage:

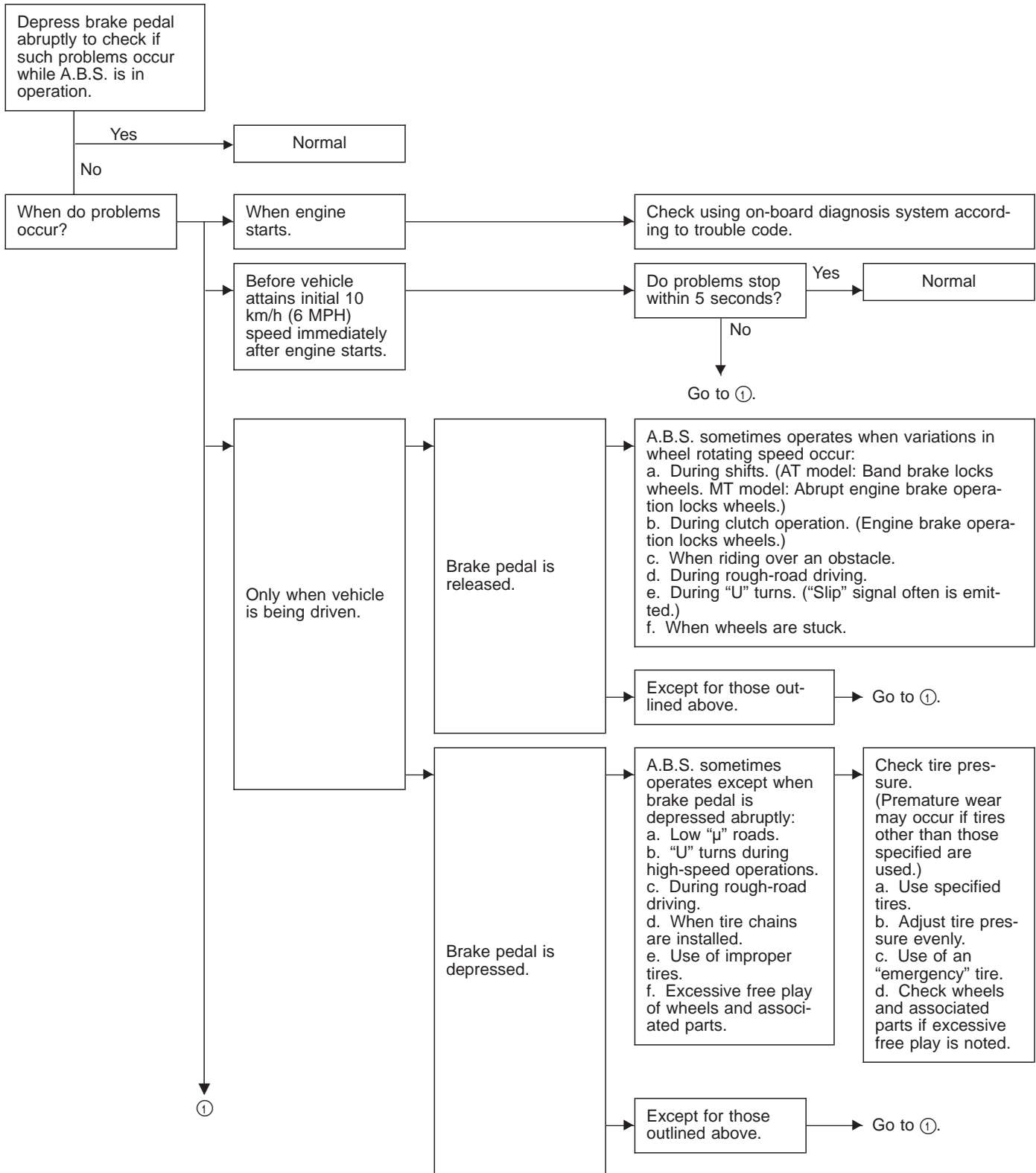
(B23) No. 1 — Body / 10 — 12 V

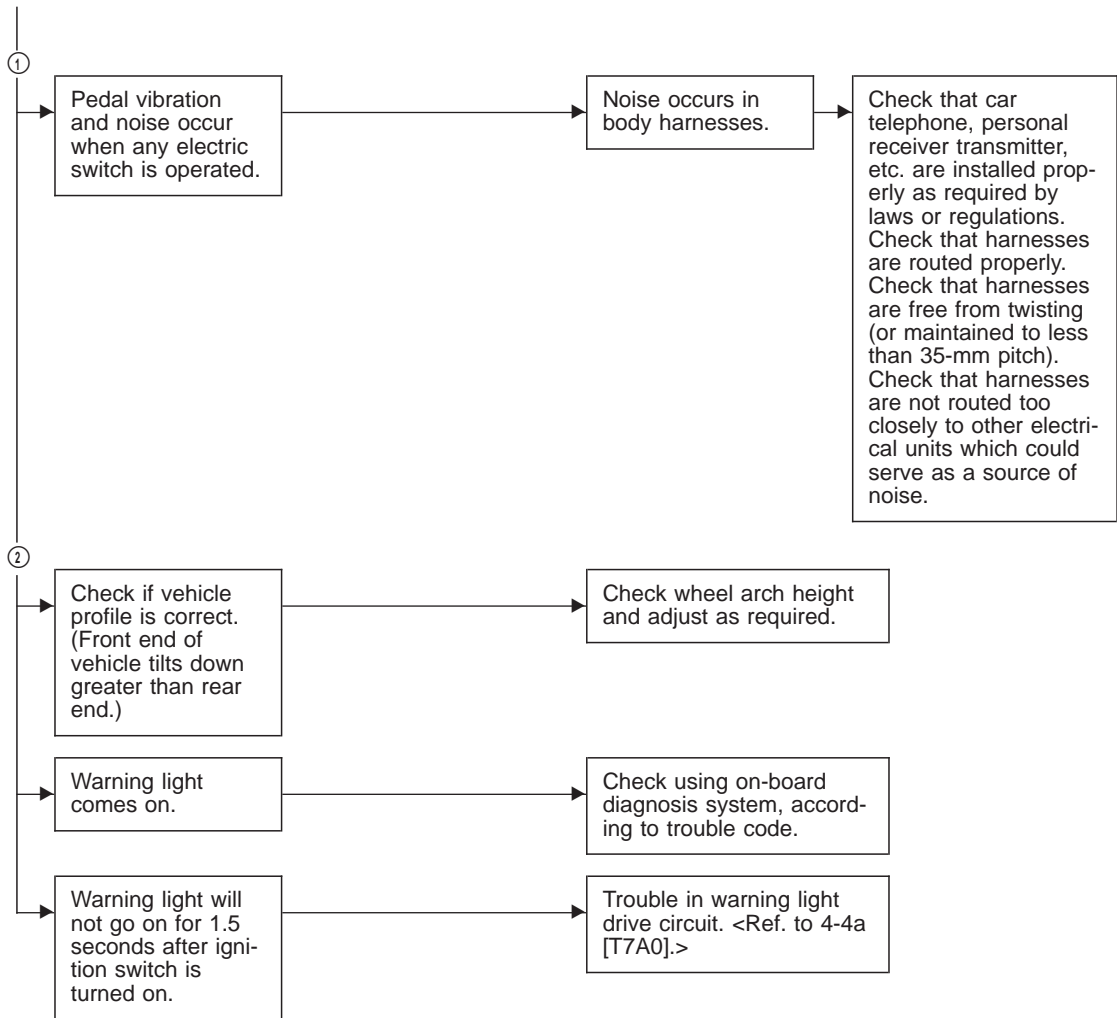
(P3) No. 13 — Body / 10 — 12 V

NOTE:

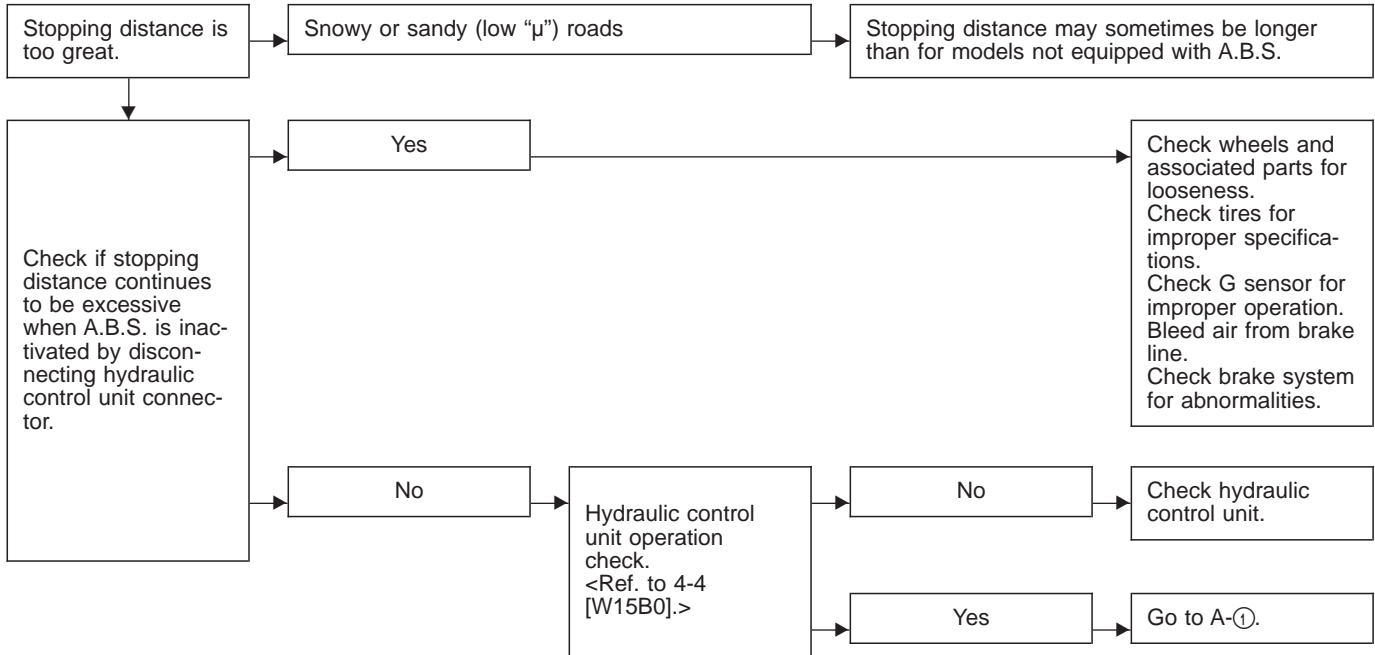
When voltage checks out "OK", replace A.B.S. control module.

8. General Diagnostics Chart A: VIBRATING PEDAL AND NOISE

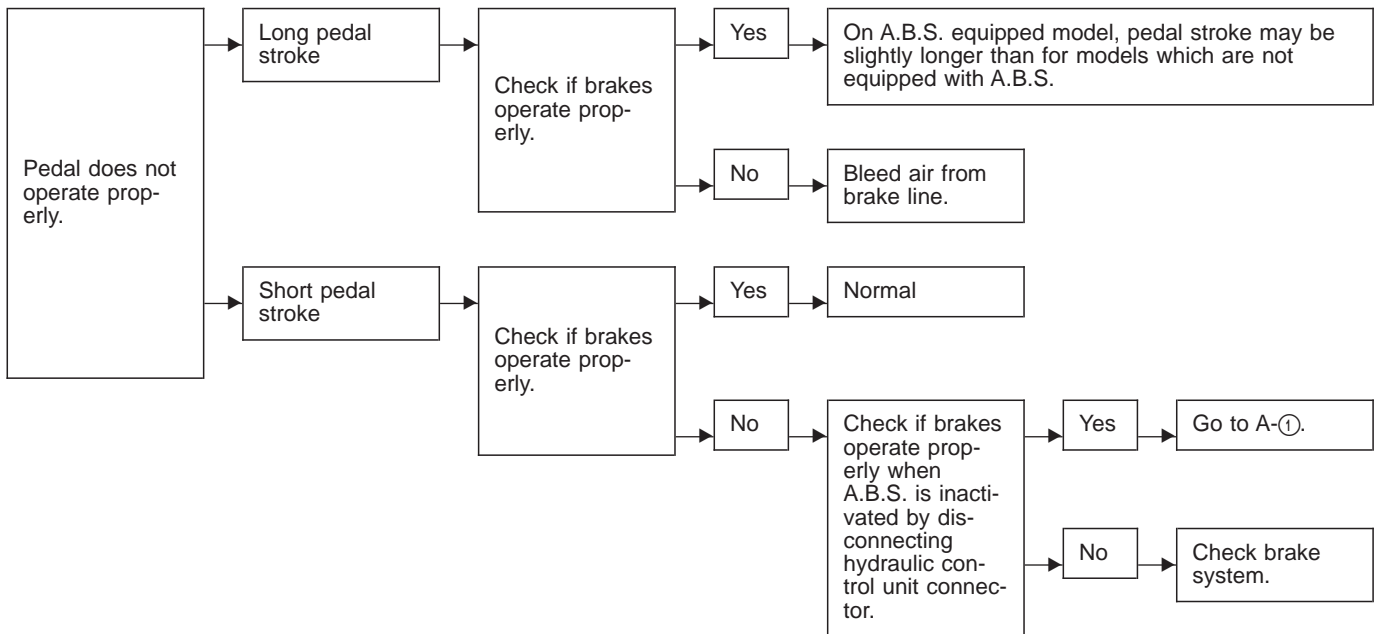




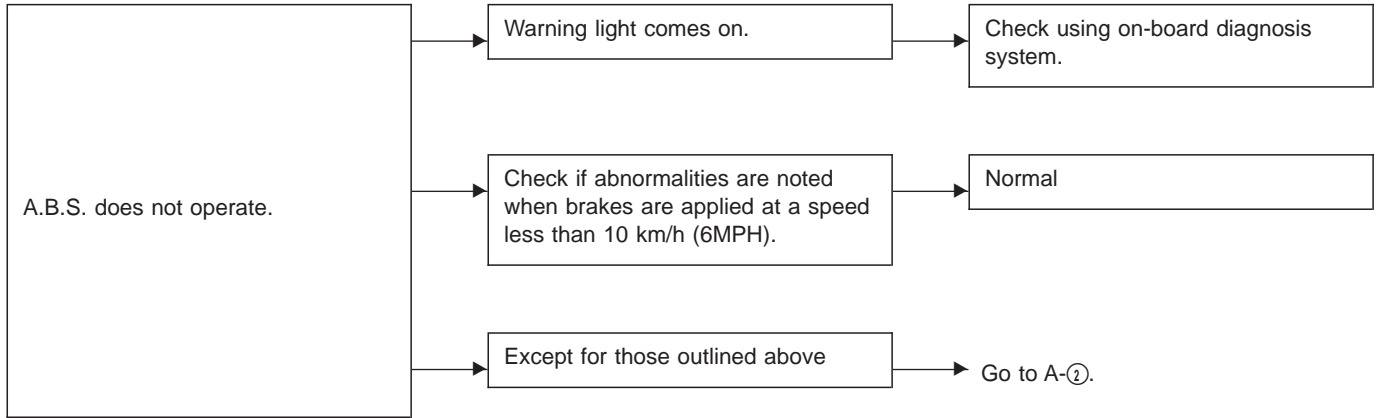
B: EXCESSIVE STOPPING DISTANCE



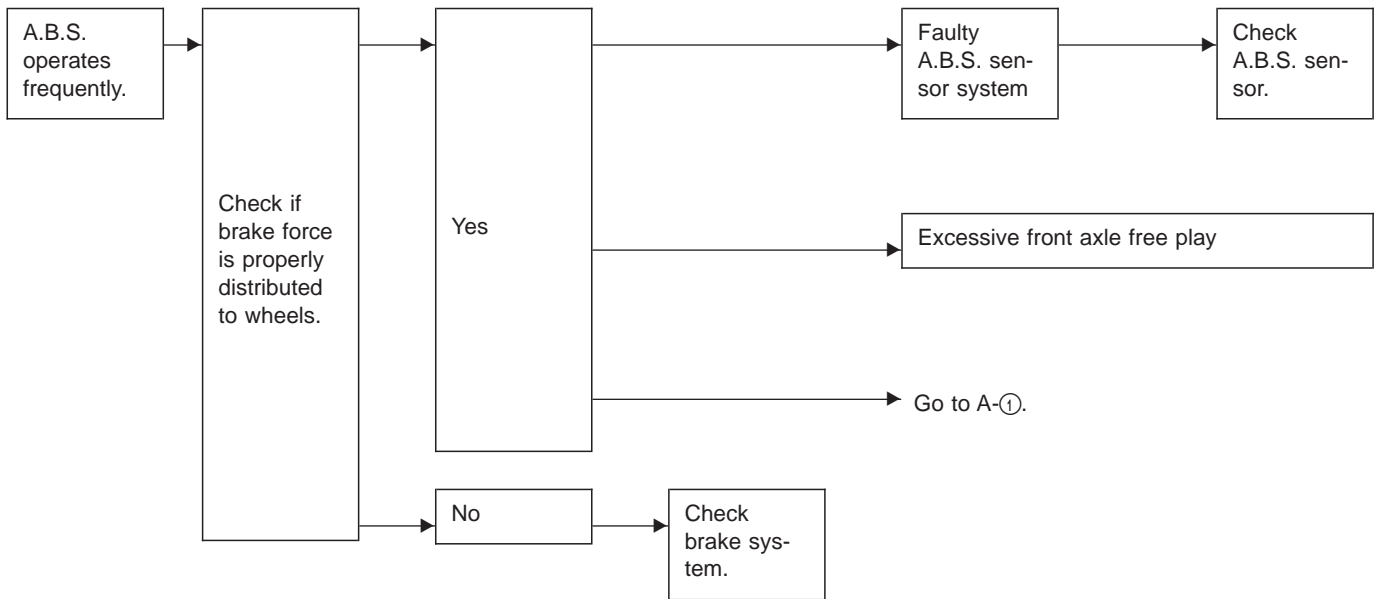
C: IMPROPER PEDAL OPERATION



D: A.B.S. INOPERATIVE



E: FREQUENT A.B.S. OPERATION



BRAKES [ABS/TCS]

4-4b

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1. Supplemental Restraint System "Airbag"

Airbag system wiring harness is routed near the ABS/TCS control module, ABS sensor and hydraulic control unit.

CAUTION:

- All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuit.
- Be careful not to damage Airbag system wiring harness when servicing the ABS/TCS control module, ABS sensor and hydraulic control unit.

2. Pre-inspection

Before performing diagnostics, check the following items which might affect ABS/TCS problems:

A: MECHANICAL INSPECTION

1. POWER SUPPLY

1) Measure battery voltage and specific gravity of electrolyte.

Standard voltage: 12 V, or more

Specific gravity: Above 1.260

2) Check the condition of the main and other fuses, and harnesses and connectors. Also check for proper grounding.

2. BRAKE FLUID

- 1) Check brake fluid level.
- 2) Check brake fluid leakage.

3. BRAKE DRAG

Check brake drag. <Ref. to 4-4 [K100].>

4. BRAKE PAD AND ROTOR

Check brake pad and rotor. <Ref. to 4-4 [K100].>

5. TIRE SPECIFICATIONS, TIRE WEAR AND AIR PRESSURE

Check tire specifications, tire wear and air pressure. <Ref. to 4-2 [S1A0].>

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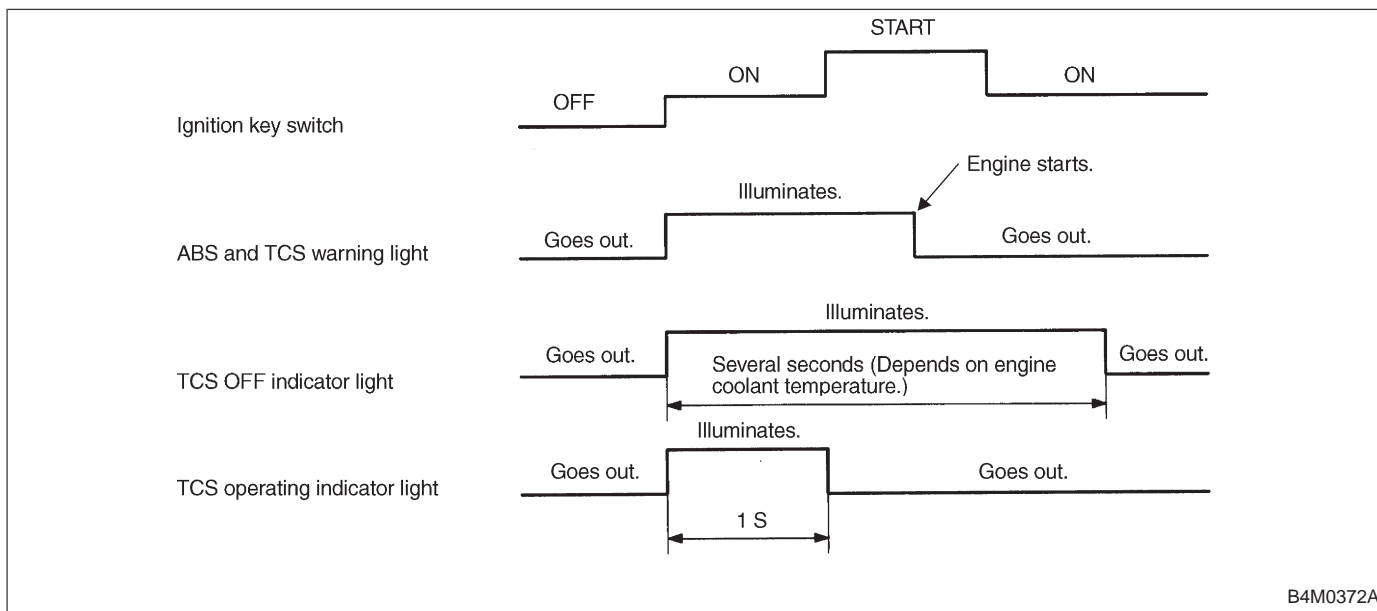
Check brake pad and rotor. <Ref. to 4-4 [K100].>

5. TIRE SPECIFICATIONS, TIRE WEAR AND AIR PRESSURE

Check tire specifications, tire wear and air pressure. <Ref. to 4-2 [S1A0].>

B: ELECTRICAL INSPECTION

1. WARNING LAMP ILLUMINATION PATTERN



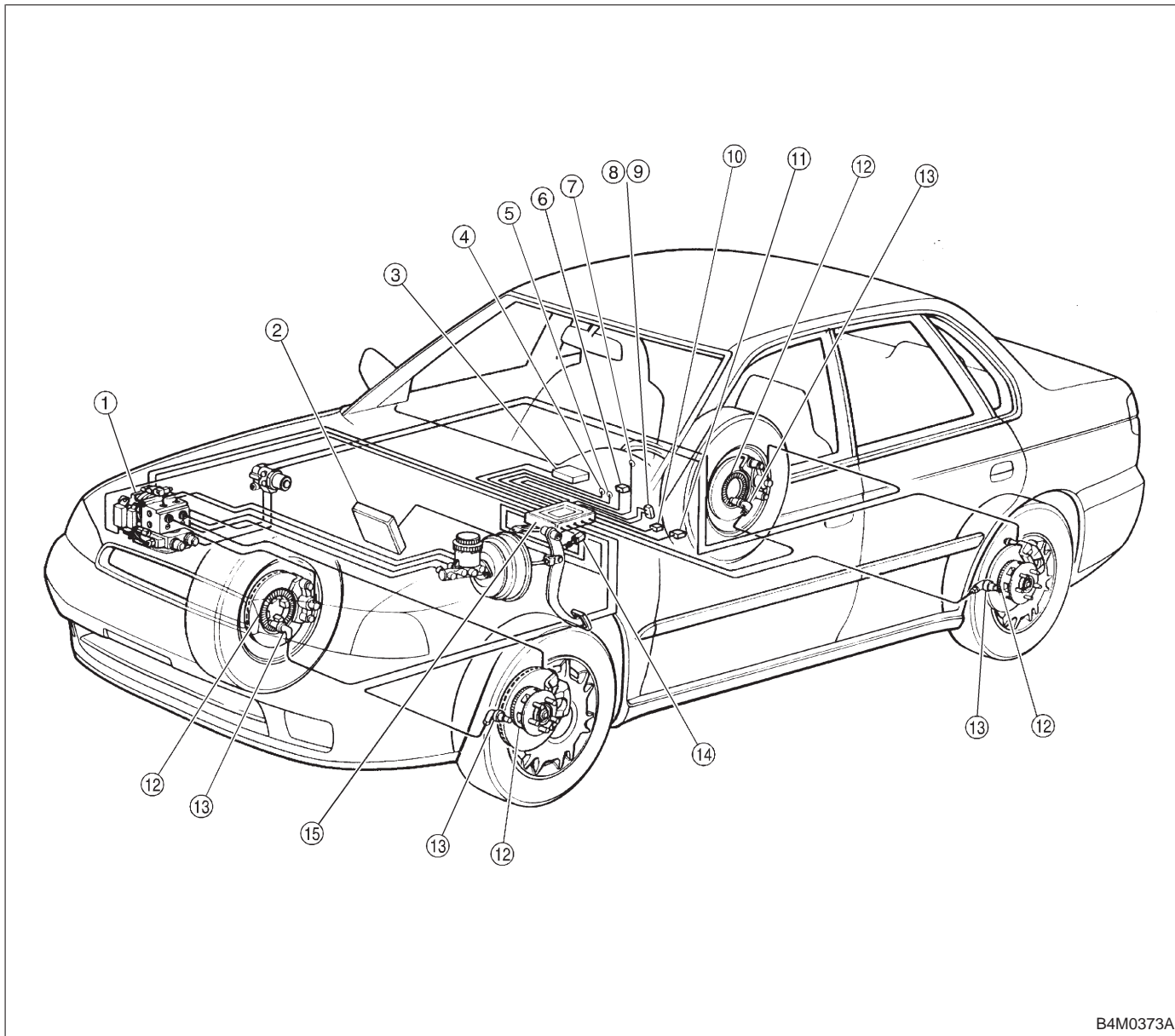
B4M0372A

2. DISPLAY SYSTEM TYPE AND LIGHTING CONDITIONS

○: Illuminated

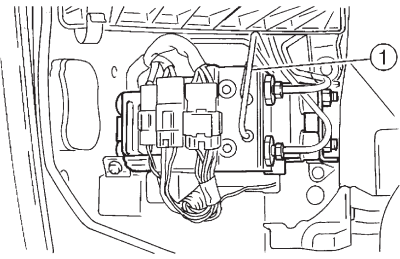
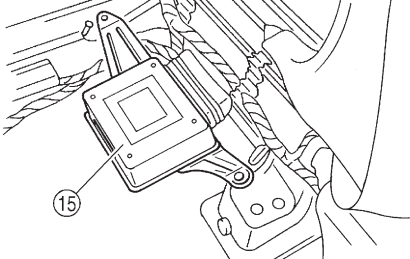
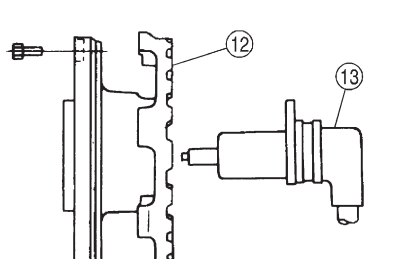
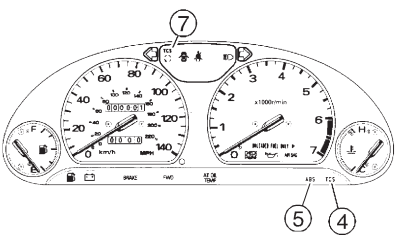
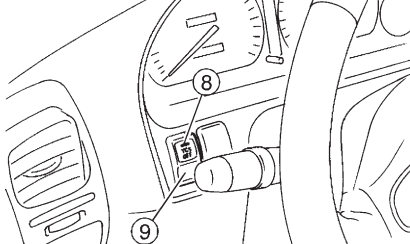
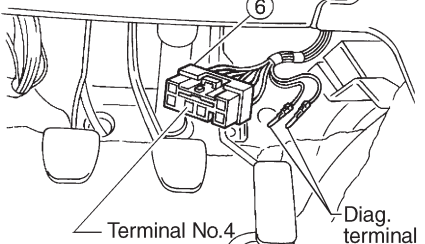
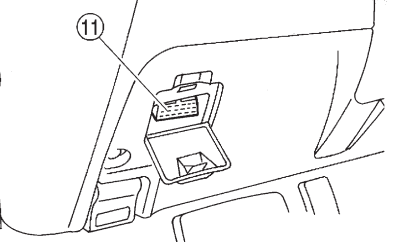
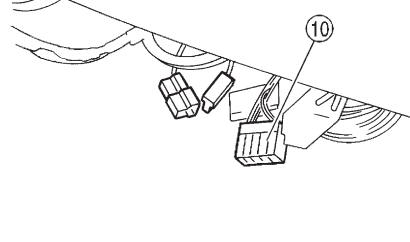
Mode	ABS warning	TCS warning	TCS OFF	TCS operating	Lighting conditions
Bulb check	○	○			Illuminated with IGN. ON, extinguished with E/G RUN
			○		Illuminated with IGN. ON, extinguished after a few seconds.
				○	Illuminated with IGN. ON, extinguished after 1 second.
ABS failure	○	○			Illuminated during ABS failure (ABS and TCS functions stop)
TCS failure		○			Illuminated during TCS failure (Only TCS functions stop)
TCS OFF			○		Illuminated when TCS operation is prohibited by E/G (low temperature, high temperature, etc.); illuminated during TCS OFF conditions resulting from operation of TCS OFF SW.
TCS operation				○	Illuminated during TCS operation
Pad temperature warning			○		Illuminated when pad temperature reaches 400°C (752°F) or more when TCS is functioning, and extinguished when temperature drops below 350°C (662°F).

3. Electrical Components Location

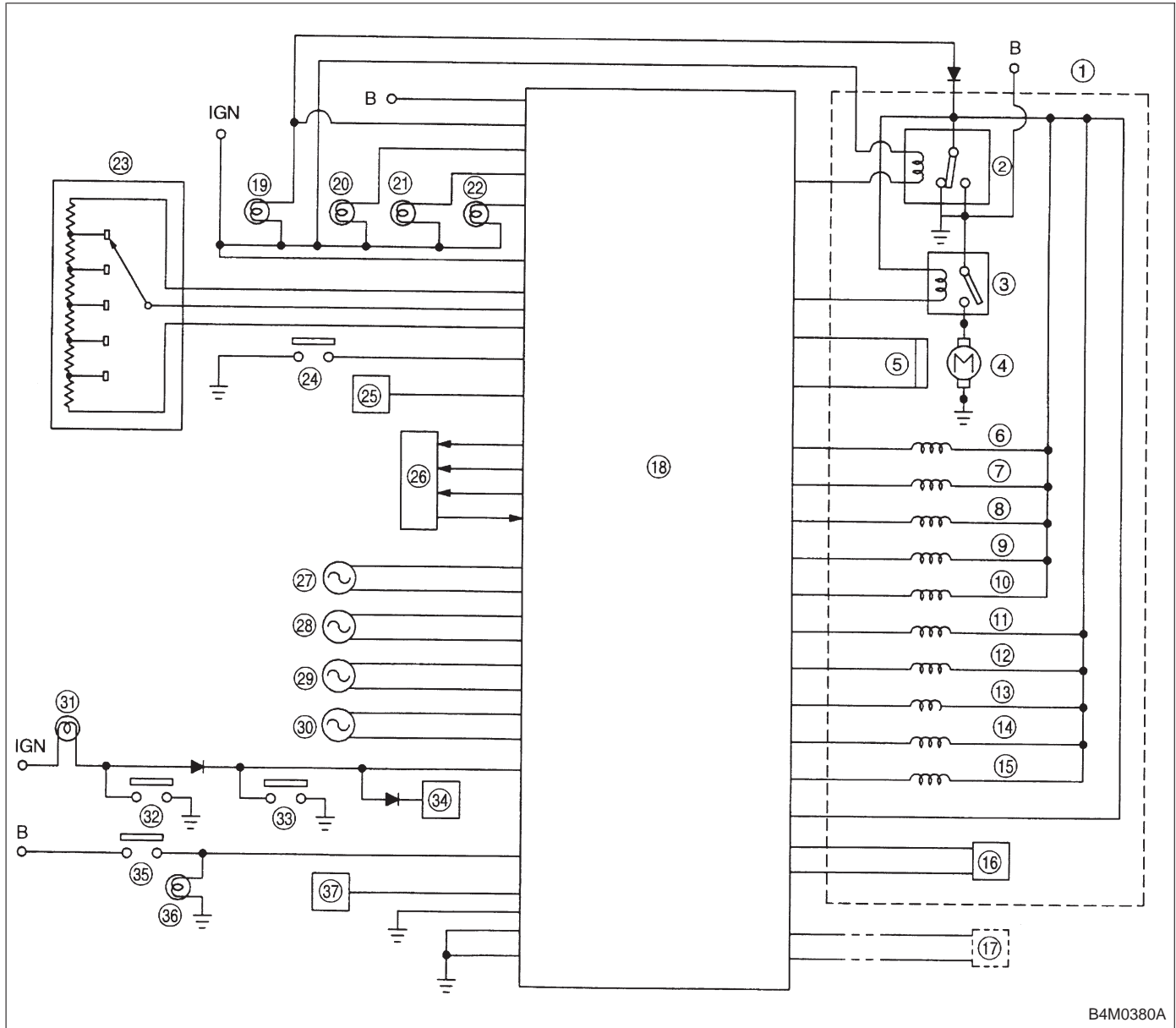


B4M0373A

- | | |
|---------------------------------|--|
| ① Hydraulic control unit | ⑨ TCS OFF switch |
| ② Engine control module | ⑩ Data link connector (for Subaru select monitor) |
| ③ AT control module | ⑪ Data link connector (for Subaru select monitor and OBD-II general scan tool) |
| ④ TCS warning light | ⑫ Tone wheel |
| ⑤ ABS warning light | ⑬ ABS sensor |
| ⑥ Diagnosis connector | ⑭ Stroke sensor |
| ⑦ TCS operating indicator light | ⑮ ABS/TCS control module |
| ⑧ TCS OFF indicator light | |

 <p>B4M0374A</p>	 <p>B4M0376A</p>	 <p>B4M0646A</p>
 <p>B4M0377A</p>	 <p>B4M0379A</p>	 <p>B4M0378A</p>
 <p>B4M0375A</p>	 <p>B4M0645A</p>	<p>SUBARU.</p>

4. Schematic



B4M0380A

- | | | |
|-------------------------------------|-----------------------------------|----------------------------|
| ① Hydraulic control unit | ⑭ Rear left outlet solenoid valve | ⑳ Engine control module |
| ② Valve relay | ⑮ TCS solenoid valve 1 | ㉑ Rear right ABS sensor |
| ③ Motor relay | ⑯ Pressure switch | ㉒ Front right ABS sensor |
| ④ Motor | ⑰ Data link connector | ㉓ Front left ABS sensor |
| ⑤ Motor sensor | ⑱ ABS/TCS control module | ㉔ Rear left ABS sensor |
| ⑥ Front left inlet solenoid valve | ㉑ ABS warning light | ㉕ Brake warning light |
| ⑦ Front left outlet solenoid valve | ㉒ TCS operating indicator light | ㉖ Parking brake switch |
| ⑧ Rear right inlet solenoid valve | ㉓ TCS OFF indicator light | ㉗ Brake fluid level sensor |
| ⑨ Rear right outlet solenoid valve | ㉔ TCS warning light | ㉘ Generator |
| ⑩ TCS solenoid valve 2 | ㉕ Stroke sensor | ㉙ Stop lamp switch |
| ⑪ Front right inlet solenoid valve | ㉖ TCS OFF switch | ㉚ Stop lamp |
| ⑫ Front right outlet solenoid valve | ㉗ Diagnosis connector | ㉛ AT control module |
| ⑬ Rear left inlet solenoid valve | | |

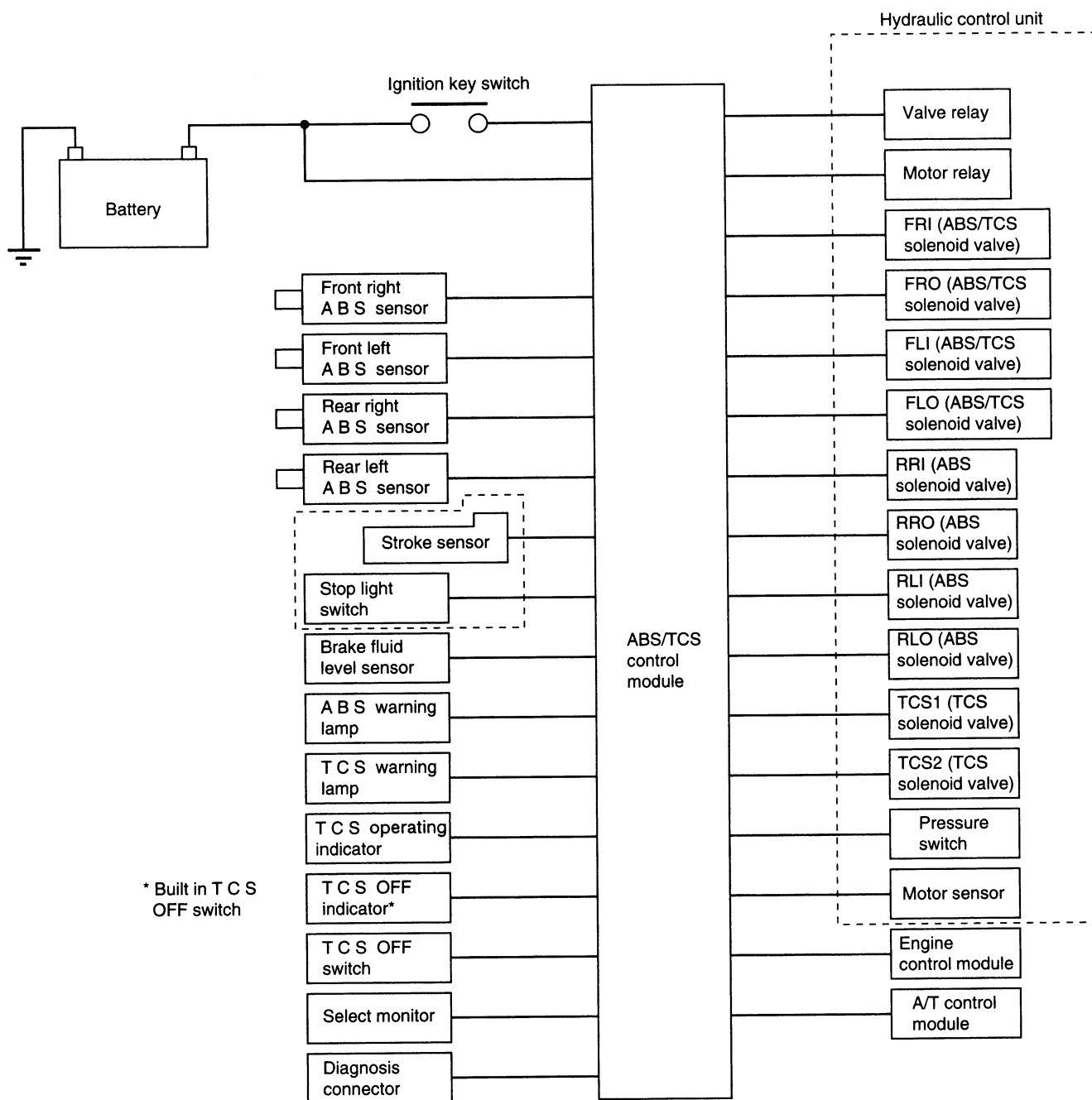
5. Control Module I/O Signal

1. I/O SIGNAL VOLTAGE

Contents		Connector No.	Terminal No.	Input/Output signals	
				Measured value and measuring conditions	
ABS sensor (Wheel speed sensor)	Front left wheel	P7	1—11	0.12 — 1 V (When it is 10 Hz.)	
	Front right wheel	P6	8—16	0.12 — 1 V (When it is 10 Hz.)	
	Rear left wheel	P6	7—15	0.12 — 1 V (When it is 10 Hz.)	
	Rear right wheel	P7	2—12	0.12 — 1 V (When it is 10 Hz.)	
Hydraulic unit	Solenoid valve	Front left outlet	P4	1—GND	10 — 14 V when the valve is OFF. Less than 1.5 V when the valve is ON.
		Front right outlet	P5	3—GND	
		Rear left outlet	P5	8—GND	
		Rear right outlet	P4	3—GND	
		Front left inlet	P4	2—GND	10 — 14 V when the valve is OFF. Less than 1.0 V when the valve is ON.
		Front right inlet	P5	2—GND	
		Rear left inlet	P5	7—GND	
		Rear right inlet	P4	4—GND	
	TCS 1	P4	5—GND	10 — 14 V when the valve is OFF. Less than 1.0 V when the valve is ON.	
	TCS 2	P5	6—GND		
	Valve power supply	P6	6—GND	Ignition switch ON, 10 — 14 V	
	Valve relay power supply	P6	1—GND	Less than 1.2 V when IGN is ON. 10 — 14 V when the system is down.	
	Motor relay power supply	P6	9—GND	Less than 1.0 V when the motor is ON. 10 — 14 V when the motor is OFF.	
	Motor sensor signals	P7	3—GND	Cyclic waveform of more than 180 Hz when the motor across terminals is ON. Less than 70 Hz when the motor is OFF.	
P7		13—GND			
Pressure switch	P7	6—GND	H/L toggle signal with the brake pedal off (Cycle 14 mS, H: 10 —14 V, L: less than 0.7 V). 10 — 14 V with the brake pedal depressed.		
Pedal stroke sensor	Output signals	P7	5—GND	0.7 — 0.9 V with the brake pedal off.	
	Power supply	P7	4—14	5±0.4 V	
Stop light switch	Switch	P7	7—GND	Less than 2 V when the stop light is off. 10 — 12 V when the stop light is on.	
	Switch test signal	P7	18—GND	H/L toggle signal with the brake pedal off (Cycle 14 mS, H: 10 —12 V, L: less than 0.7 V). Less than 2 V with the brake pedal depressed.	
TCS OFF switch		P7	16—GND	Less than 2.0 V with the switch pressed and 10 — 12 V with it released.	
Indicator light	TCS OFF	P6	10—GND	Less than 2 V when the light is on and 10 — 12 V when it is off.	
	TCS operation	P6	11—GND		
	TCS warning	P6	3—GND		
	ABS warning	P6	2—GND		

Contents		Connector No.	Terminal No.	Input/Output signals
				Measured value and measuring conditions
TCS control unit ECM communication	TCS → ECM communication (torque command)	P6	14—GND	Less than 0.7 V when the vehicle stands still.
	TCS → ECM communication (torque command)	P6	5—GND	Less than 5 V when the vehicle stands still.
	TCS → ECM communication (TCS operates)	P6	12—GND	4 — 5.4 V when TCS controls no operations. Less than 0.7 V when it controls operations.
	ECM → TCS communication (engine control)	P6	4—GND	H/L toggle signal with the accelerator pedal off (Cycle 20 mS, H: 10 — 14 V, L: less than 0.7 V). Less than 2.0 V with the accelerator pedal depressed. Also when TCS OFF indicator light comes on by TCS OFF switch.
ABS operation signal		P6	13—GND	10 — 14 V when the ABS control does not operate still and less than 0.7 V when ABS operates.
Fluid level sensor		P7	20—GND	Less than 2 V when IGN is ON and 10 — 14 V when idling.
Select monitor	Data is received.	P7	9—GND	4 — 4.5 V when no data is received.
	Data is sent.	P7	19—GND	4 — 4.5 V when no data is sent.
Diagnosis connector		P7	8—GND	10 — 14 V when IGN is ON.
Power supply	Ignition	P5	1—GND	10 — 14 V when IGN is ON.
	Battery	P5	4—GND	10 — 14 V
Grounding line	Power	P5	5—body	1 Ω or less
	Digital	P7	15—body	1 Ω or less
	Power	P4	6—body	1 Ω or less

2. I/O SIGNAL DIAGRAM



B4H0336

3. LIST OF ABS/TCS ON-BOARD DIAGNOSTICS FUNCTIONS

Trouble code	Diagnostic items <detailed diagnostic items>	Detection timing					Indicator light ON			Parts concerned
		At initial checking	Under no control	Under ABS control	Under TCS control	In diagnostic mode	ABS warning light	TCS warning light	TCS OFF indicator light	
21 FR 23 FL 25 RR 27 RL	Detection of fault in ABS sensor hardware <open/short circuits of sensor>	○	○	○	○		○	○	—	ABS sensor (ABS/TCS C/M)
22 FR 24 FL 26 RR 28 RL	Detection of fault in ABS sensor software <variations in wheel speed>		○	○	○		○	○	—	ABS sensor (ABS/TCS C/M)
	Detection of fault in ABS sensor software <decompression mode>		○	○	○		○	○	—	ABS sensor harness circuit (ABS/TCS C/M)
				○			○	○	—	ABS sensor and solenoid valve (ABS/TCS C/M)
	Detection of fault in sensor software <speed higher than prescribed>		○	○	○		○	○	—	ABS sensor (ABS/TCS C/M)
31 FRI 32 FRO 33 FLI 34 FLO 35 RRI 36 RRO 37 RLI 38 RLO 61 TCS1 62 TCS2	Abnormal valve <Abnormal valve>	○	○	○	○	○*	○	○	—	Solenoid valve (ABS/TCS C/M)
41	Abnormal ABS/TCS C/M <Abnormal ABS/TCS C/M>	○	○	○	○		○	○	—	ABS/TCS C/M
42	Abnormal line voltage <Abnormal line voltage>	○	○	○	○	○	○	○	—	Power source operating environment (ABS/TCS C/M)
—	Power source voltage drop <Power source voltage drop>	○	○	○	○	○	○	○	—	

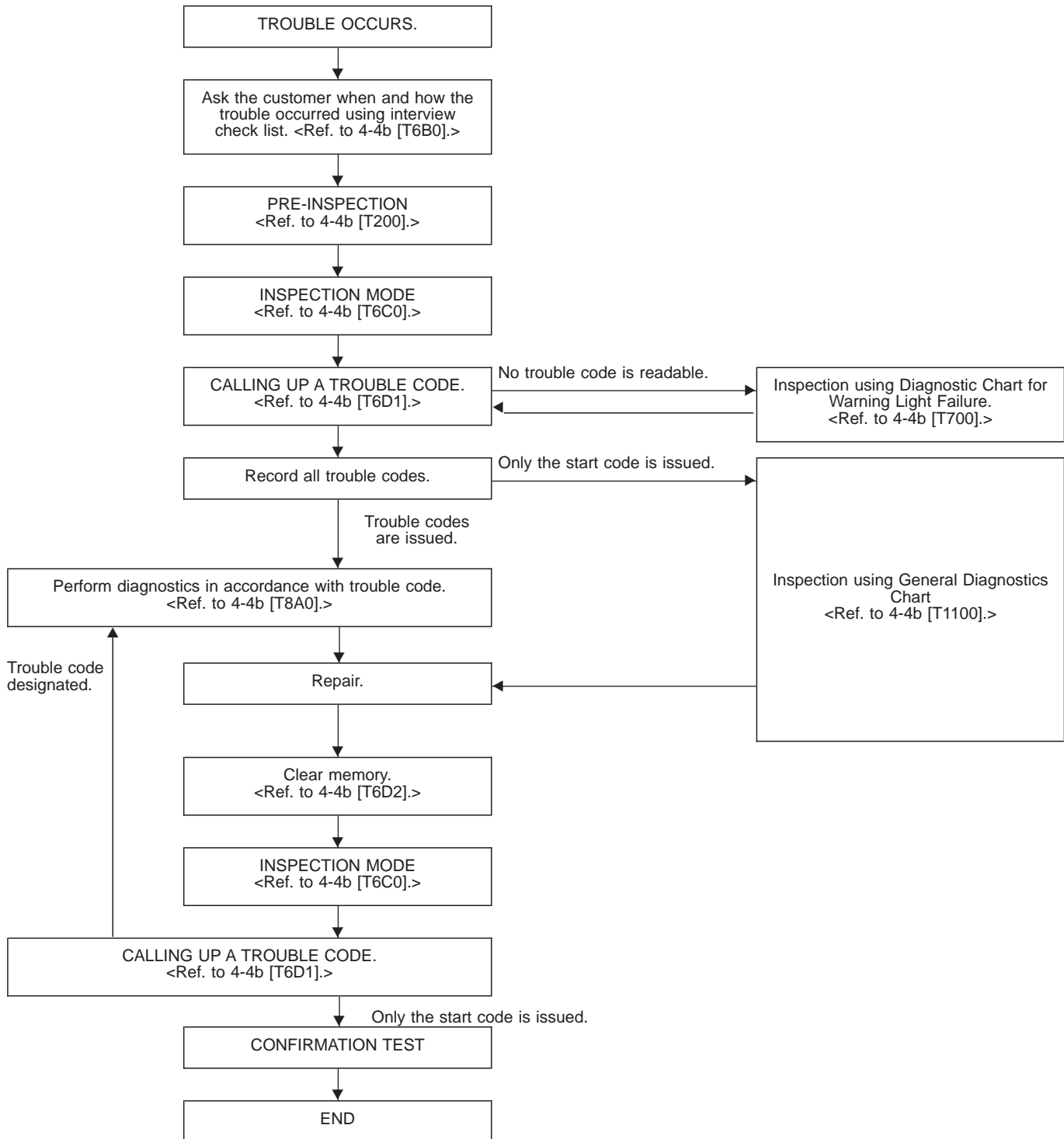
*: Except when trouble code is being displayed.

Trouble code	Diagnostic items <detailed diagnostic items>	Detection timing					Indicator light ON			Parts concerned
		At initial checking	Under no control	Under ABS control	Under TCS control	In diagnostic mode	ABS warning light	TCS warning light	TCS OFF indicator light	
43	Abnormal EGI communication line <Abnormal EGI communication line>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			—	<input type="radio"/>	—	AET communication line (ABS/TCS C/M)
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			—	<input type="radio"/>	—	
					<input type="radio"/>		—	<input type="radio"/>	—	
		AEB communication line (ABS/TCS C/M)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		—	<input type="radio"/>	—
			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		—	<input type="radio"/>	—
					<input type="radio"/>	<input type="radio"/>		—	<input type="radio"/>	—
			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		—	<input type="radio"/>	—
		AEC communication line (ABS/TCS C/M)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		—	<input type="radio"/>	—
<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>		—	<input type="radio"/>	—		
—	Abnormal EGI communication line <Abnormal EGI communication line>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			—	<input type="radio"/>	EAM communication line (ABS/TCS C/M)	
51	Abnormal valve relay <failure of valve relay ON> <failure of valve relay OFF>	<input type="radio"/>					<input type="radio"/>	<input type="radio"/>	—	Valve relay (ABS/TCS C/M)
	Abnormal valve relay <failure of valve relay OFF>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	—	Valve relay (ABS/TCS C/M)
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	—	
52	Abnormal motor system <failure of motor relay OFF>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	—	Motor (ABS/TCS C/M)
	Abnormal motor system <failure of motor relay ON>		<input type="radio"/>	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>	—	Motor (ABS/TCS C/M)
	Abnormal motor system <failure of motor relay OFF>		<input type="radio"/>				<input type="radio"/>	<input type="radio"/>	—	

Trouble code	Diagnostic items <detailed diagnostic items>	Detection timing					Indicator light ON			Parts concerned
		At initial checking	Under no control	Under ABS control	Under TCS control	In diagnostic mode	ABS warning light	TCS warning light	TCS OFF indicator light	
54	Abnormal pedal stroke sensor and stop light switch <open/short circuits of stroke sensor>	○	○	○			○	○	—	Pedal stroke sensor (ABS/TCS C/M)
	Abnormal pedal stroke sensor and stop light switch <comparison of acceleration and stroke sensor>		○				○	○	—	Pedal stroke sensor (ABS/TCS C/M)
	Abnormal pedal stroke sensor and stop light switch <comparison of stroke sensor and brake lamp switch>		○				○	○	—	Stop light switch, pedal stroke sensor (ABS/TCS C/M)
	Abnormal pedal stroke sensor and stop light switch <comparison of stroke sensor and pump excitation>			○			○	○	—	Pump, pedal stroke sensor (ABS/TCS C/M)
	Abnormal stroke sensor and stop light switch <open circuit of stop light switch>		○	○	○		—	○	—	Stop light switch circuit (ABS/TCS C/M)
57	Abnormal fluid level sensor <Abnormal fluid level sensor>	○					○	○	—	Fluid level sensor circuit
—	Abnormal fluid level sensor <Abnormal fluid level sensor> <Insufficient brake fluid>	○	○	○	○		○	○	—	Fluid level sensor circuit, reservoir
58	Abnormal pressure switch <Abnormal pressure switch>	○	○	○	○		—	○	—	Pressure switch (ABS/TCS C/M)
		○	○	○			—	○	—	Pressure switch, stop light switch (ABS/TCS C/M)
			○	○	○		—	○	—	Pressure switch (ABS/TCS C/M)

6. Diagnostics Chart for On-board Diagnosis System

A: BASIC DIAGNOSTICS PROCEDURE



NOTE:

- To check harness for broken wires or short circuits, shake it while holding it or the connector.
- When TCS warning light illuminates, read and record trouble code indicated by TCS warning light.

B: CHECK LIST FOR INTERVIEW

Check the following items about the vehicle's state.

1. THE STATE OF THE WARNING LIGHTS

a. ABS warning light	
① Is always on. ② Sometimes comes on. ③ Comes on only once. ④ Does not come on.	
When/how long does it come on?	
Ignition key position	① Lock ② Acc ③ On (before starting engine) ④ Start ⑤ On after starting (Engine: run) ⑥ On after starting (Engine: stop)
Timing	① Immediately after ignition is on. ② Immediately after ignition starts. ③ When advancing (Speed ___ miles/h → ___ miles/h) ④ While traveling at a constant speed (Speed ___ miles/h) ⑤ When decelerating (Speed ___ miles/h → ___ miles/h) ⑥ When turning (To right, to left, steering angle ___ deg., steering time ___ sec) ⑦ When other electrical parts move (Part name: ____, Operating condition _____) ⑧ When moving other electrical parts (Part name: ____, Operating condition _____)
b. TCS warning light	
① Is always on. ② Sometimes comes on. ③ Comes on only once. ④ Does not come on.	
When does it come on?	
Ignition key position	① Lock ② Acc ③ On (before starting engine) ④ Start ⑤ On after starting (Engine: run) ⑥ On after starting (Engine: stop)
Timing	① Immediately after ignition is on. ② Immediately after ignition starts. ③ When advancing (Speed ___ miles/h → ___ miles/h) ④ While traveling at a constant speed (Speed ___ miles/h) ⑤ When decelerating (Speed ___ miles/h → ___ miles/h) ⑥ When turning (To right, to left, steering angle ___ deg., steering time ___ sec) ⑦ When other electrical parts move (Part name: ____, Operating condition _____) ⑧ When moving other electrical parts (Part name: ____, Operating condition _____)
c. TCS OFF indicator light	
① Is always on. ② Sometimes comes on. ③ Comes on only once. ④ Does not come on.	
When/how long does it come on?	
Ignition key position	① Lock ② Acc ③ On (before starting engine) ④ Start ⑤ On after starting (Engine: run) ⑥ On after starting (Engine: stop)
Timing	① Immediately after ignition is on. ② Immediately after ignition starts. ③ When advancing (Speed ___ miles/h → ___ miles/h) ④ While traveling at a constant speed (Speed ___ miles/h) ⑤ When decelerating (Speed ___ miles/h → ___ miles/h) ⑥ When turning (To right, to left, steering angle ___ deg., steering time ___ sec) ⑦ When other electrical parts move (Part name: ____, Operating condition _____) ⑧ When moving other electrical parts (Part name: ____, Operating condition _____)
d. TCS operation indicator light	
① Is always on. ② Sometimes comes on. ③ Comes on only once. ④ Does not come on.	
When does it come on?	
Ignition key position	① Lock ② Acc ③ On (before starting engine) ④ Start ⑤ On after starting (Engine: run) ⑥ On after starting (Engine: stop)
Timing	① Immediately after ignition is on. ② Immediately after ignition starts. ③ When advancing (Speed ___ miles/h → ___ miles/h) ④ While traveling at a constant speed (Speed ___ miles/h) ⑤ When decelerating (Speed ___ miles/h → ___ miles/h) ⑥ When turning (To right, to left, steering angle ___ deg., steering time ___ sec) ⑦ When other electrical parts move (Part name: ____, Operating condition _____) ⑧ When moving other electrical parts (Part name: ____, Operating condition _____)

e. Malfunction indicator light	
① Is always on. ② Sometimes comes on. ③ Comes on only once. ④ Does not come on.	
When does it come on?	
Ignition key position	① Lock ② Acc ③ On (before starting engine) ④ Start ⑤ On after starting (Engine: run) ⑥ On after starting (Engine: stop)
Timing	① Immediately after ignition is on. ② Immediately after ignition starts. ③ When advancing (Speed ___ miles/h → ___ miles/h) ④ While traveling at a constant speed (Speed ___ miles/h) ⑤ When decelerating (Speed ___ miles/h → ___ miles/h) ⑥ When turning (To right, to left, steering angle ___ deg., steering time ___ sec) ⑦ When other electrical parts move (Part name: ____, Operating condition _____) ⑧ When moving other electrical parts (Part name: ____, Operating condition _____)

2. SYMPTOMS

ABS operating condition	① Performs no work. ② Operates only when abruptly applying brakes. (Conditions: vehicle speed ___ miles/h, how to step on brake pedal ___) ③ Operating time (___ sec., etc. _____) ④ Operating noise (Produced/Not produced) ⑤ What kind of noise? (Knock, gong gong, bong, buzz, gong gong buzz, etc. _____) ⑥ Reaction force of brake pedal (Stick, pressed down once with a clunk, pressed and released, etc. _____)
TCS operating condition	① Performs no work. ② Operates only when abruptly accelerating. (Conditions: vehicle speed ___ miles/h, how to step on accelerator pedal ___) ③ Operating time (___ sec., etc. _____) ④ Operating noise (Produced/Not produced) ⑤ What kind of noise? (Knock, gong gong, bong, buzz, gong gong buzz, etc. _____) ⑥ Whether or not operation indicator light comes on. (Come on/Does not come on, Others _____)
Behavior of vehicle	① Directional stability cannot be obtained or steering arm refuses to work when applying brakes (vehicle turns to right, turns to left, spins, etc. _____). ② Directional stability cannot be obtained or steering arm refuses to work when accelerating (vehicle turns to right, turns to left, spins, etc. _____). ③ Brakes are out of order (braking distance is long, brakes lock or drag, pedal stroke is long, pedal sticks, etc. _____). ④ Poor acceleration (fails to accelerate, engine stalls, etc. _____). ⑤ Vibration, abnormal noise (operating noise is loud, noise is produced during operation from the front of vehicle (right, left) (tones: ___), noise is produced during operation from the rear of vehicle (tones: ____, others _____)) ⑥ Other phenomena (concrete symptoms _____)

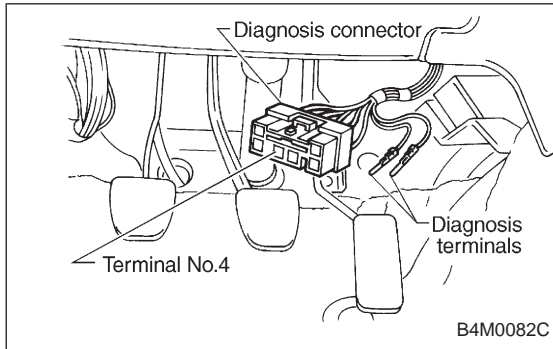
3. CONDITIONS UNDER WHICH TROUBLE OCCURS

Environment	① Weather (fine, cloudy, rain, snow, etc. ___) ② Ambient temperature (___ °C/°F) ③ Road (urban area, suburbs, highway, general road, ascending slope, descending slope, paved road, gravel road, muddy road, sandy place, etc. ___) ④ Road surface (dry, wet, new-fallen snow, compressed snow, frozen slope, etc. _____)
Conditions	① Brakes (deceleration ___ g, continuous/intermittent) ② Accelerator (acceleration ___ g, continuous/intermittent) ③ Travel speed (___ miles, advancing, accelerating, reducing speed, low speed, turning, etc. _____) ④ Condition of tire of each wheel (air pressure ____, degree of wear ____, whether or not genuine parts are used, whether or not chain is passed around tires, whether or not T tire is used.) others (_____) ⑤ Condition of suspension alignment (_____) ⑥ Loading state (_____)

4. REPAIRED PARTS ARE USED OR NOT

C: INSPECTION MODE

The on-board diagnosis system is designed to detect problems while the vehicle is being driven. If a problem is found, the ABS and TCS warning light will illuminate to inform the driver of the occurrence of a problem. When the warning light is on, the ABS/TCS system will be inactive and the normal braking function will work. It is possible for the most recent trouble code and history of problem to be stored in memory until cleared.



D: TROUBLE CODES

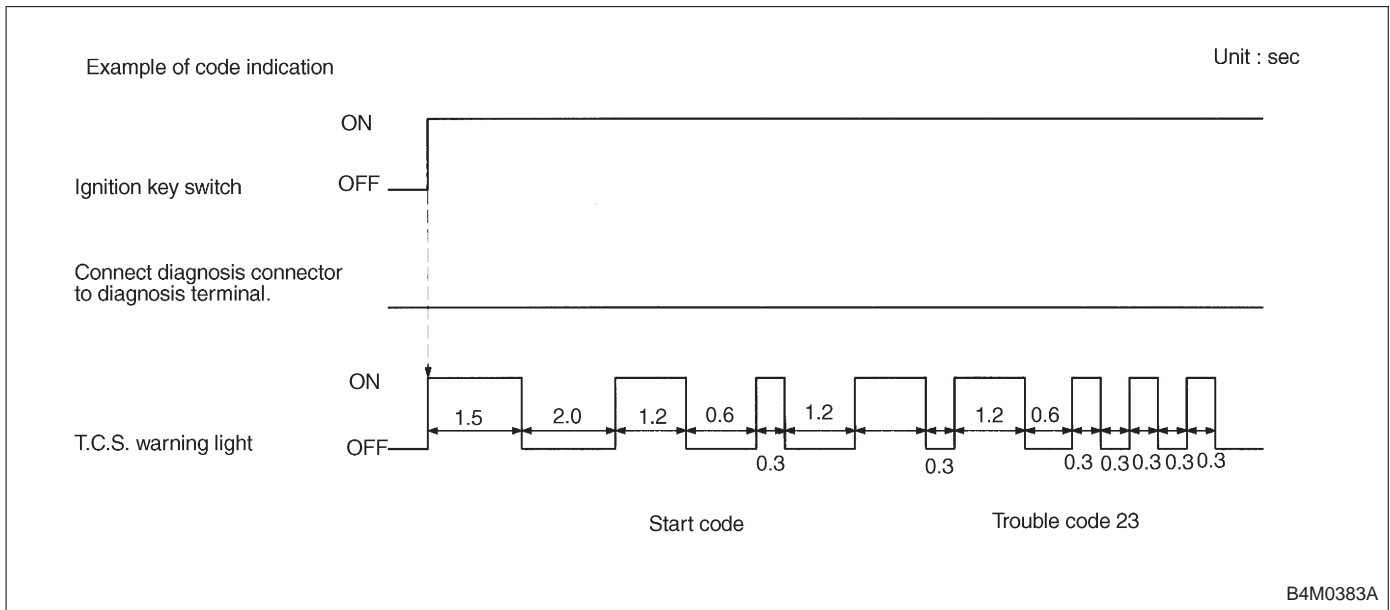
When on-board diagnosis of the ABS/TCS control module detects a problem, the information will be stored in the EEPROM as a trouble code. (Stored codes will stay in memory until they are cleared.)

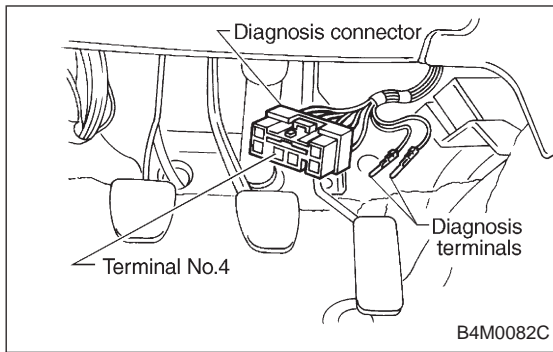
1. CALLING UP A TROUBLE CODE

- 1) Take out diagnosis connector from side of driver's seat heater unit.
- 2) Turn ignition switch OFF.
- 3) Connect diagnosis connector terminal No. 4 to diagnosis terminal.
- 4) Turn ignition switch ON.
- 5) TCS warning light is set in the diagnostic mode and blinks to identify trouble code.
- 6) After the start code (11) is shown, the trouble codes will be shown in order of the last information first.

NOTE:

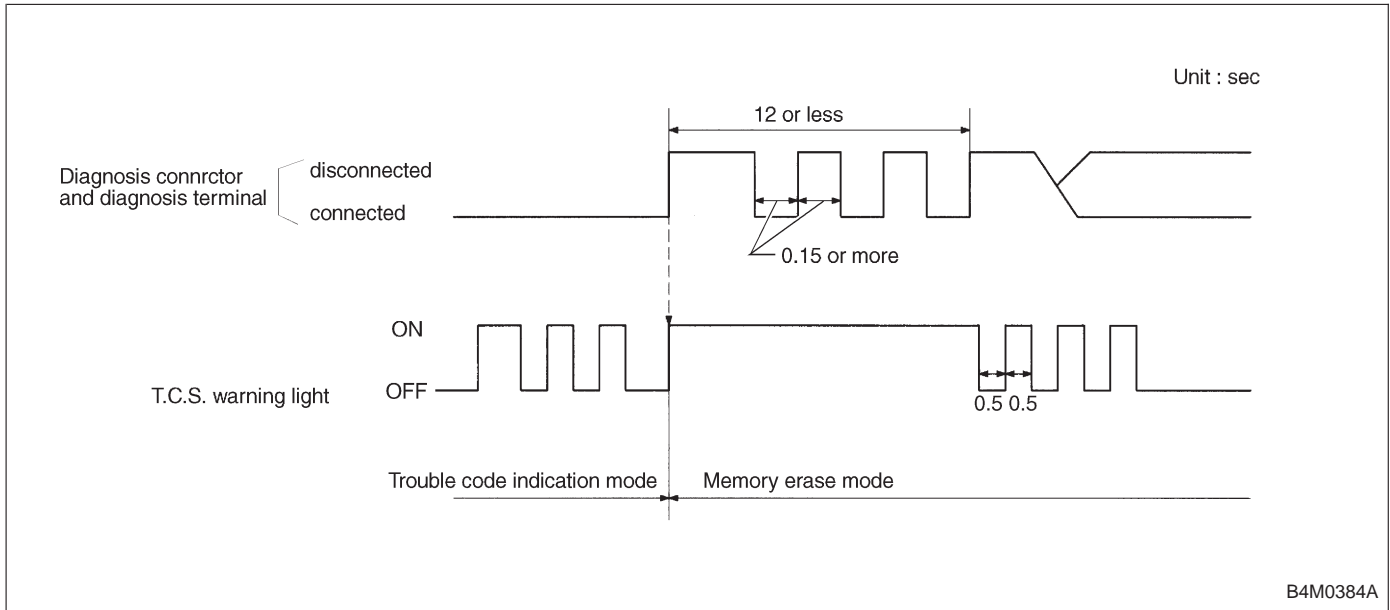
When there are no trouble codes in memory, only the start code (11) is shown.





2. CLEARING MEMORY

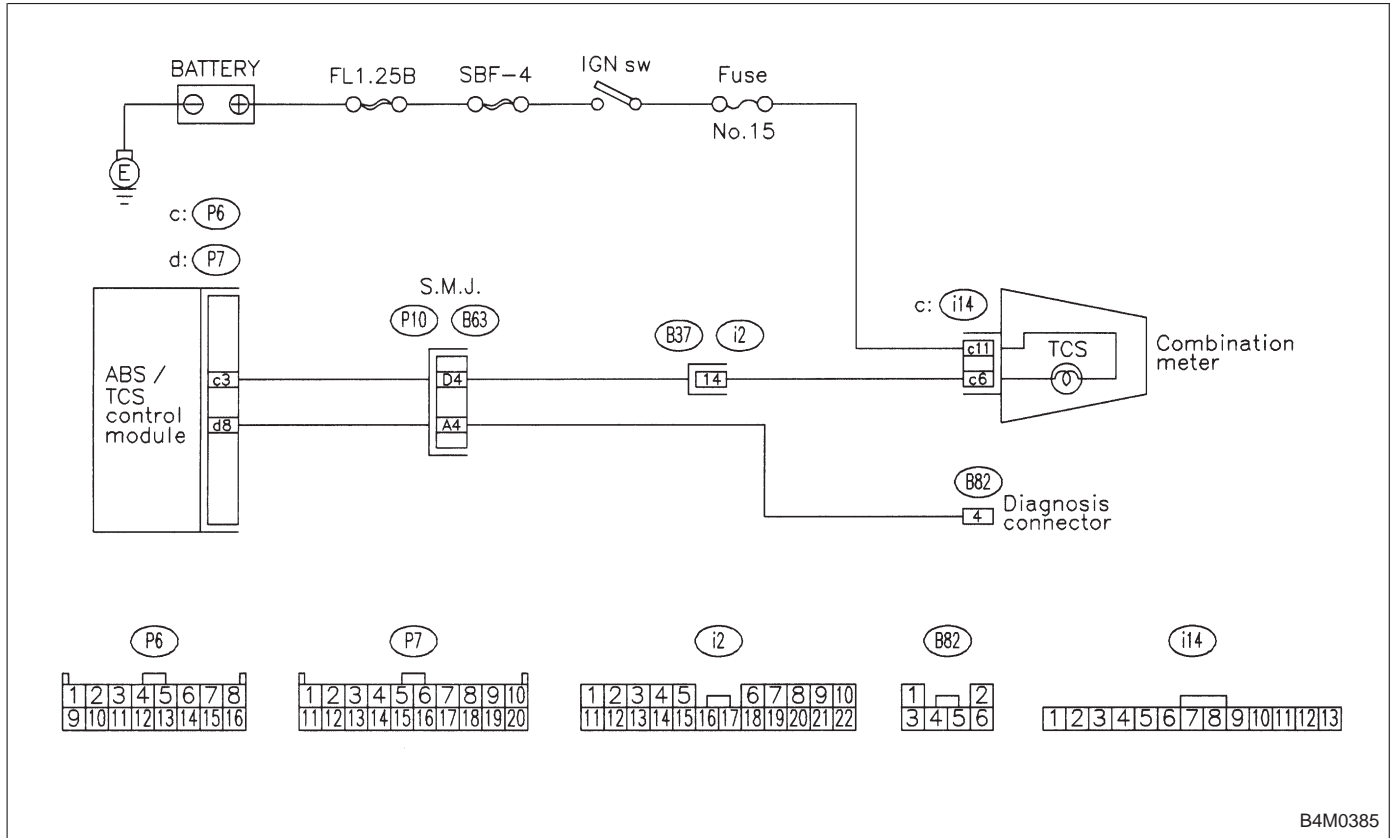
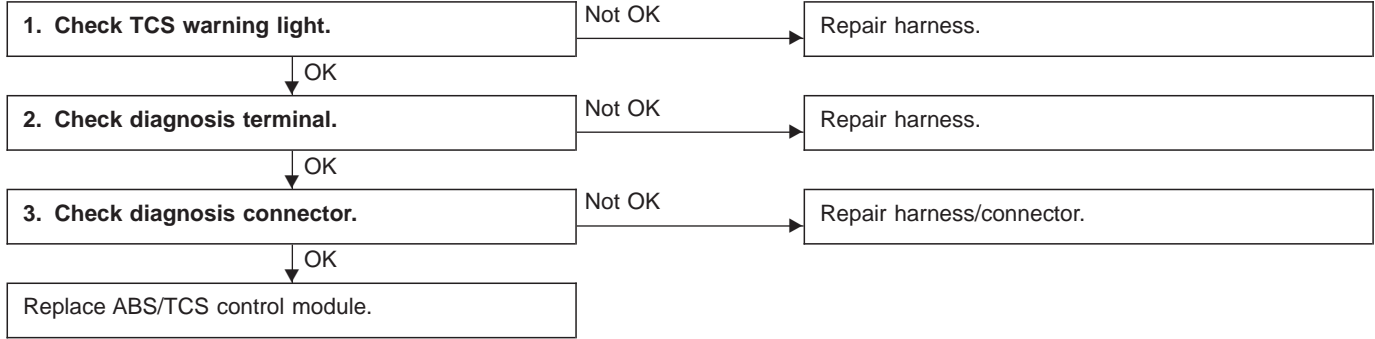
- 1) After calling up a trouble code, disconnect ABS check connector terminal No. 4 from diagnosis terminal.
- 2) Repeat 3 times within approx. 12 seconds; connecting and disconnecting terminal No. 4 and diagnosis terminal for at least 0.15 seconds each time.
- 3) Turn off the ignition key.



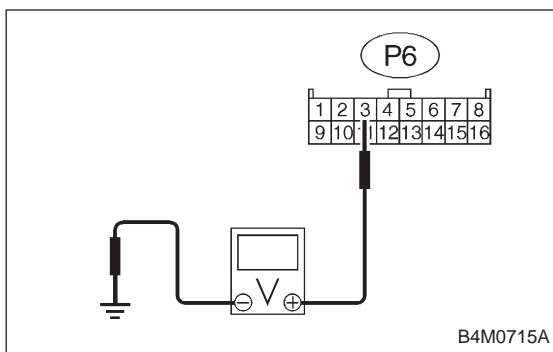
NOTE:
 After diagnostics is completed, make sure to clear memory. Make sure only start code (11) is shown after memory is cleared.

7. Diagnostics Chart for Warning Light Circuit Failure

A: TROUBLE CODE DOES NOT APPEAR. — TCS WARNING LIGHT COMES ON WHEN STARTING THE ENGINE. —



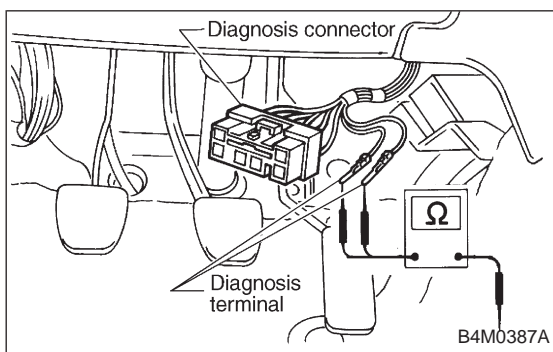
B4M0385



1. CHECK TCS WARNING LIGHT.

- 1) Turn ignition switch OFF.
- 2) Disconnect all connectors from ABS/TCS control module.
- 3) Turn ignition switch ON.
- 4) Measure voltage between ABS/TCS control module connector and body.

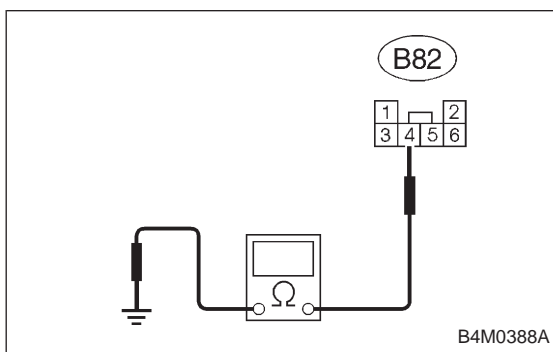
Connector & terminal / Specified voltage:
(P6) No. 3 — body / 10 — 14 V



2. CHECK DIAGNOSIS TERMINAL.

- 1) Turn ignition switch OFF.
- 2) Measure resistance between diagnosis terminal and body.

Connector/Specified resistance:
B81 — body / 0 Ω

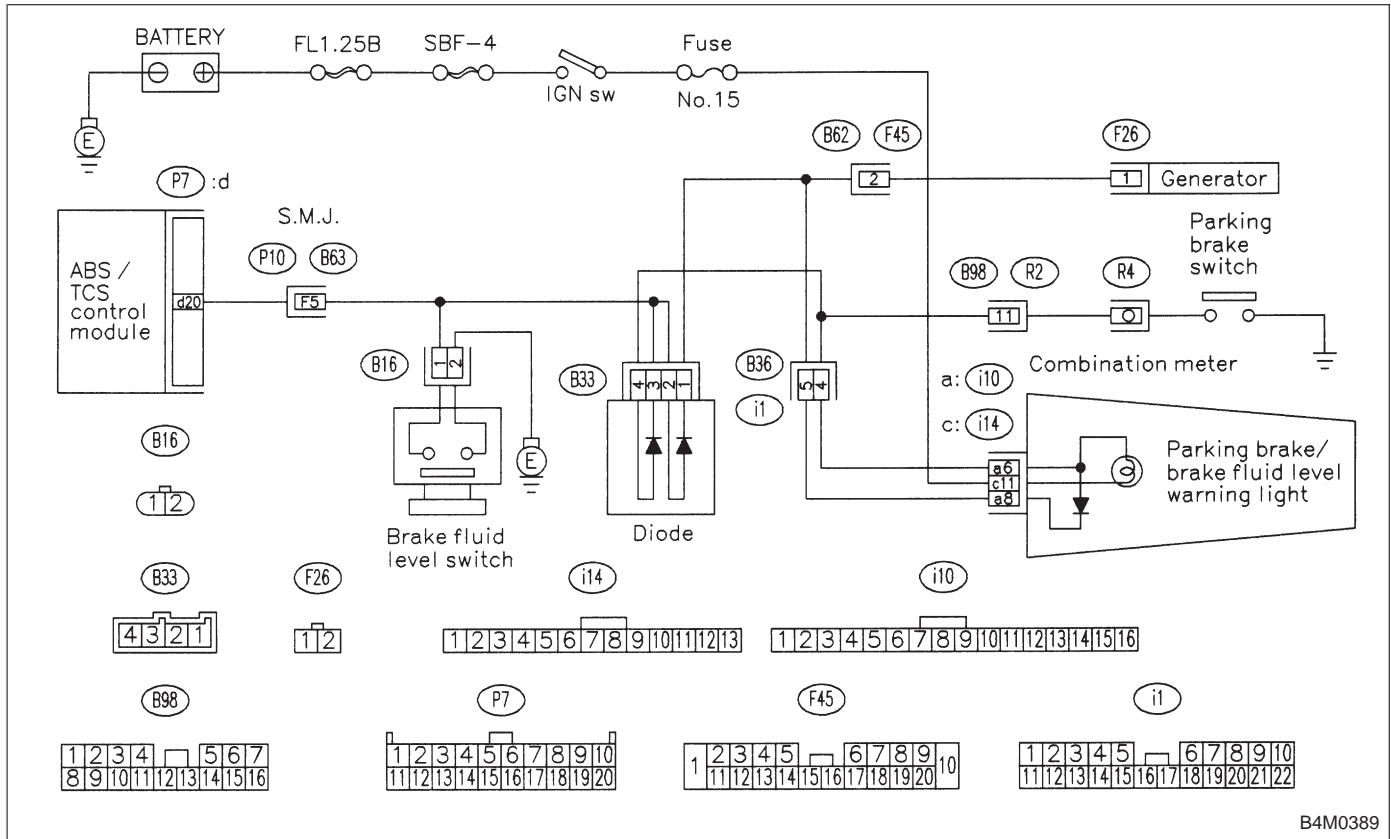
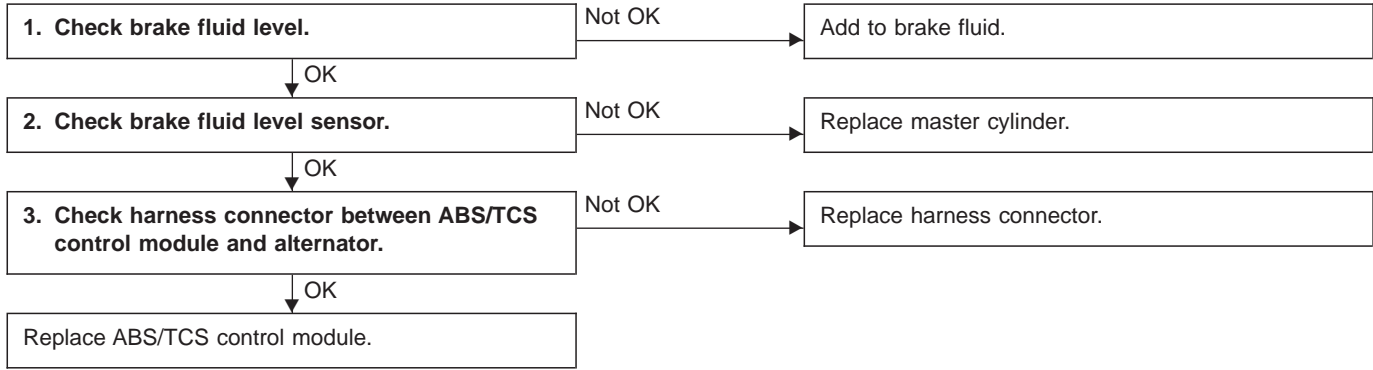


3. CHECK DIAGNOSIS CONNECTOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect all connectors from ABS/TCS control module.
- 3) Measure resistance between diagnosis connector and body.

Connector & terminal / Specified resistance:
(B82) No. 4 — body / 0 Ω

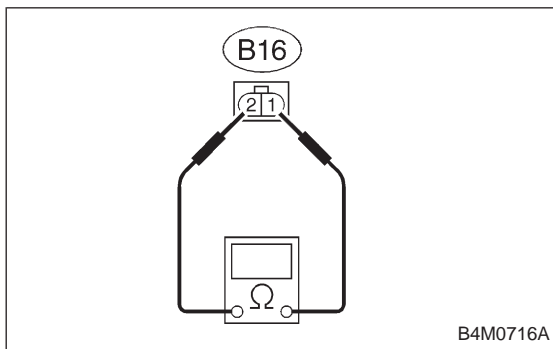
B: ABS AND TCS WARNING LIGHT DO NOT GO OFF.
— TCS OFF AND TCS OPERATING INDICATOR LIGHTS COME ON AND GO OFF PROPERLY WHEN STARTING THE ENGINE, WHILE ABS WARNING AND TCS WARNING LIGHTS KEEP ON. —



B4M0389

1. CHECK BRAKE FLUID LEVEL.

Check that brake fluid level is above the MIN indication on the reservoir tank.



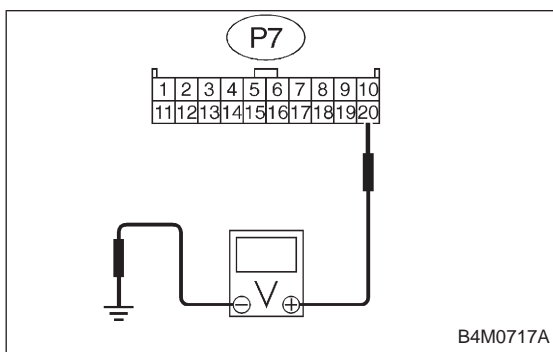
2. CHECK BRAKE FLUID LEVEL SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from brake fluid level sensor.

Connector & terminal / Specified resistance:

(B16) No. 1 — No. 2 / 0 Ω (Leaving float where it is.)

(B16) No. 1 — No. 2 / 1 MΩ (When pushing float down.)



3. CHECK HARNESS CONNECTOR BETWEEN ABS/ TCS CONTROL MODULE AND ALTERNATOR.

- 1) Turn ignition switch OFF.
- 2) Connect connector from brake fluid level sensor.
- 3) Disconnect all connectors from ABS/TCS control module.
- 4) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:

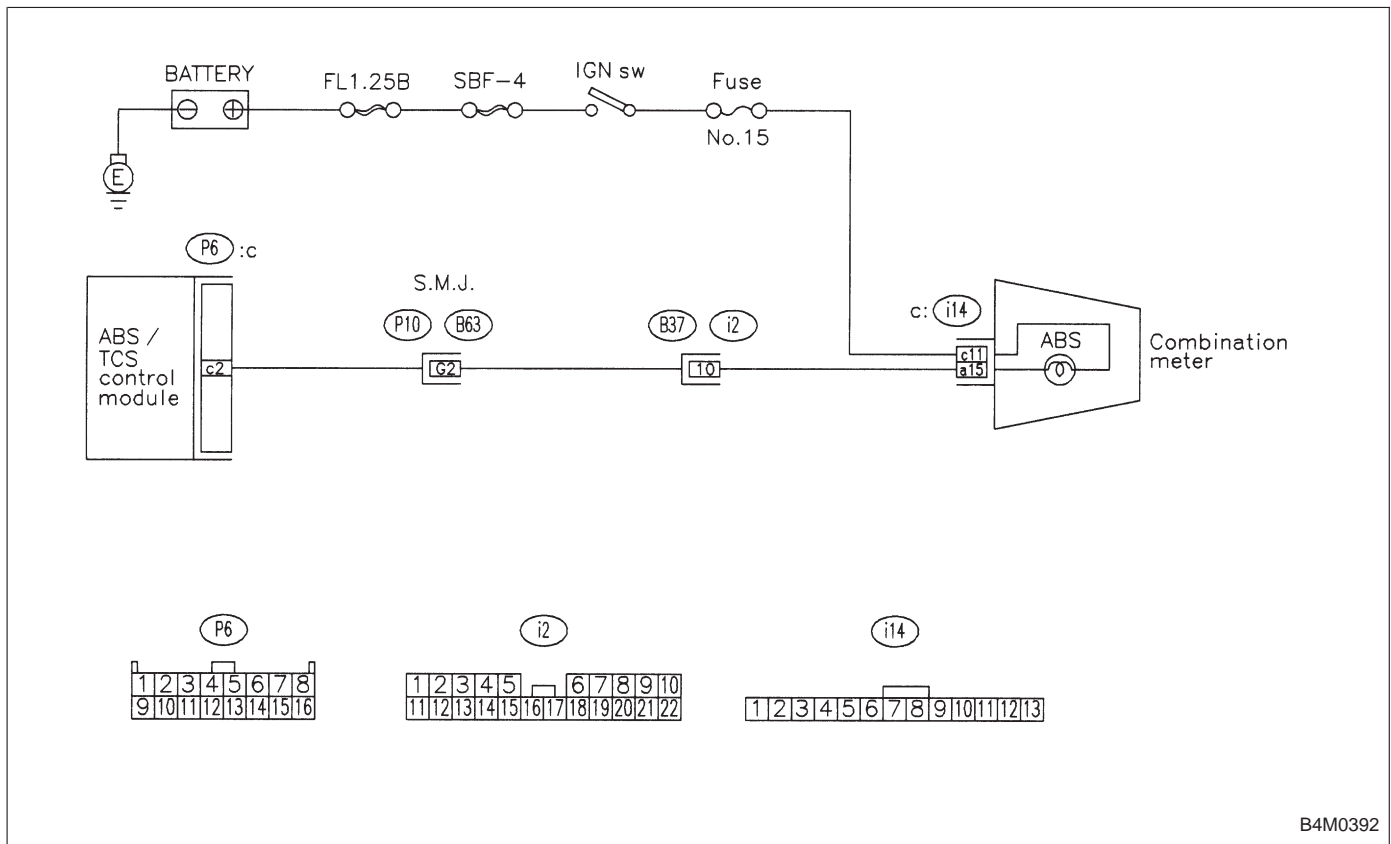
(P7) No. 20 — body / 2 V or less

- 5) Start the engine.
- 6) Measure voltage between ABS/TCS control module connector and body.

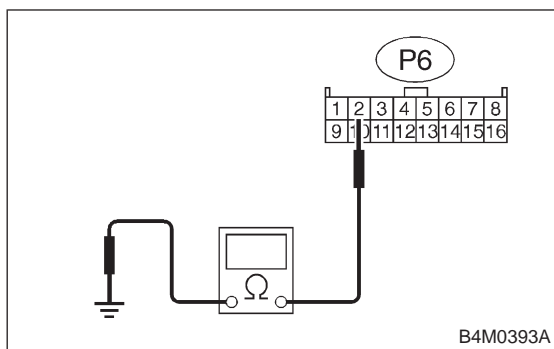
Connector & terminal / Specified voltage:

(P7) No. 20 — body / 10 — 14 V

C: TCS WARNING LIGHT AND TCS INDICATOR OFF AND TCS OPERATING INDICATOR LIGHTS COME ON AND GO OFF PROPERLY, WHILE ABS WARNING LIGHT DOES NOT GO OFF.
— TCS WARNING LIGHT AND TCS OFF INDICATOR AND TCS OPERATING INDICATOR LIGHTS COME ON AND GO OFF PROPERLY WHEN STARTING THE ENGINE, WHILE ABS WARNING LIGHT DOES NOT GO OFF. —



B4M0392

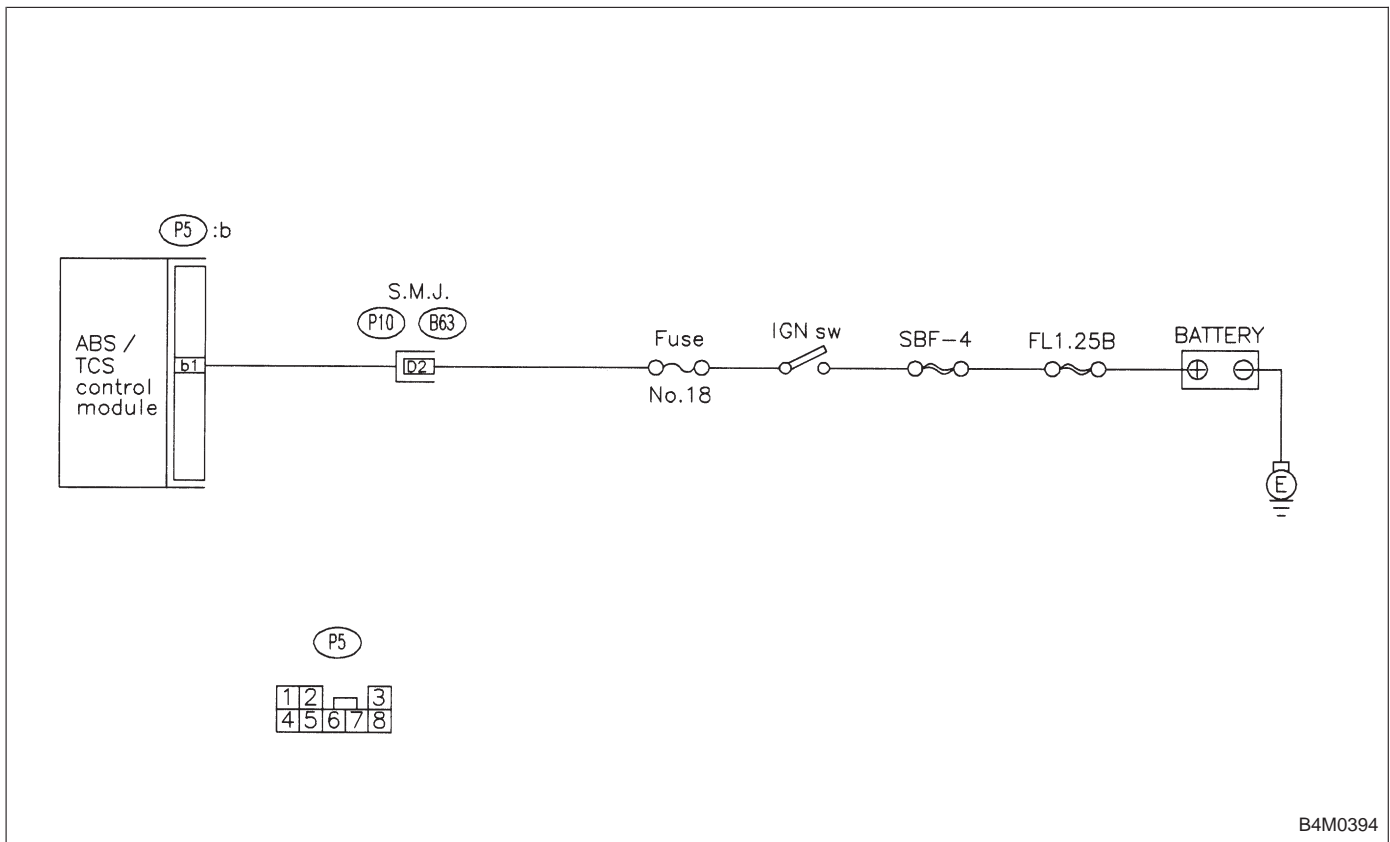
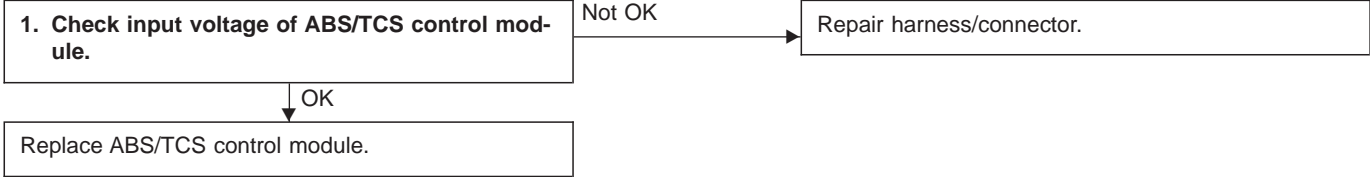


1. CHECK HARNESS CONNECTOR BETWEEN ABS/TCS CONTROL MODULE AND ABS WARNING LIGHT.

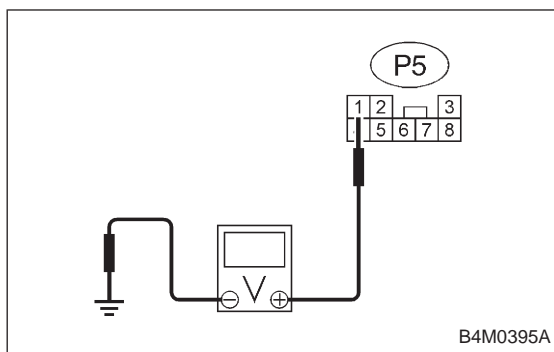
- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS/TCS control module and TCS valve relay.
- 3) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:
(P6) No. 2 — body / 1 MΩ or more

D: ABS WARNING LIGHT ONLY REMAINS ILLUMINATED.
— WHEN STARTING THE ENGINE, NEITHER TCS WARNING, TCS OFF INDICATOR NOR TCS OPERATING INDICATOR LIGHT COMES ON EVEN ONCE, AND ABS WARNING LIGHT AND MALFUNCTION INDICATOR LAMP ILLUMINATE. —



B4M0394



1. CHECK INPUT VOLTAGE OF ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS/TCS control module.
- 3) Turn ignition switch ON.
- 4) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:

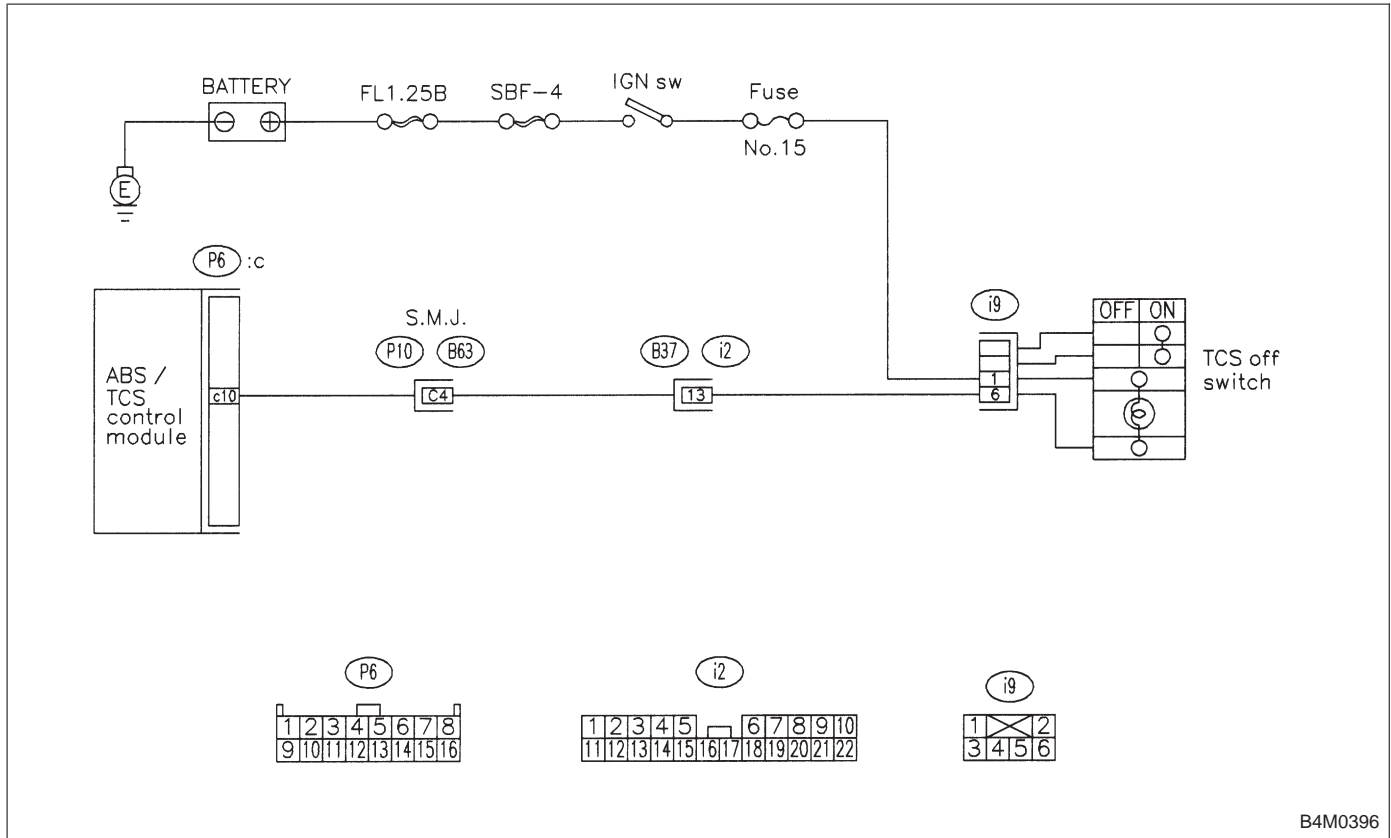
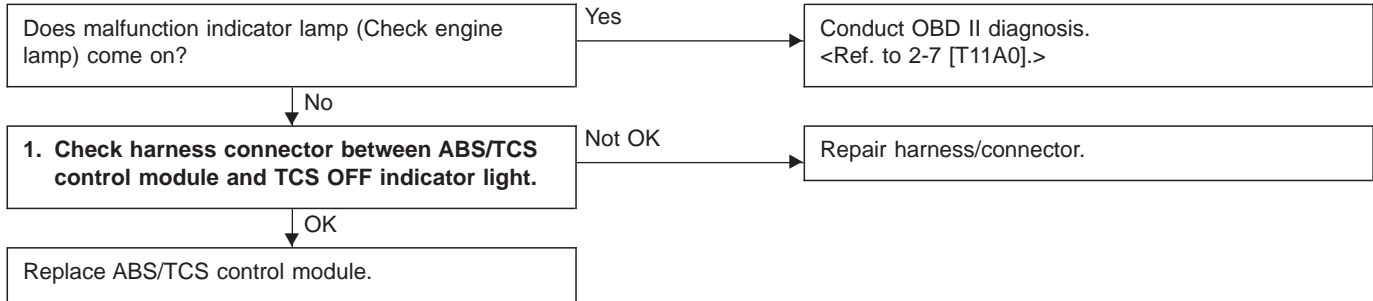
(P5) No. 1 — body / 10 — 13 V

NOTE:

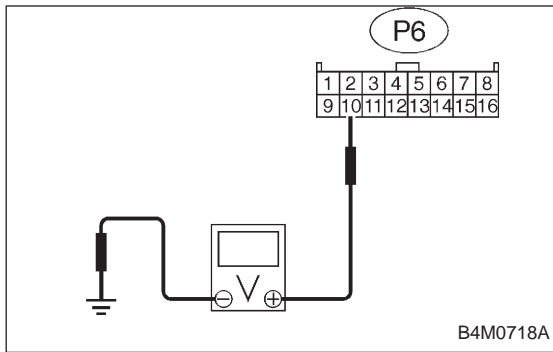
- When ABS/TCS control module is defective, the same condition occurs.
- Confirm that ABS/TCS control module is installed.

E: TCS OFF INDICATOR LIGHT DOES NOT GO OFF.

— ABS WARNING, TCS WARNING AND TCS OPERATING INDICATOR LIGHTS COME ON AND GO OFF PROPERLY WHEN STARTING THE ENGINE, BUT TCS OFF INDICATOR DOES NOT GO OFF FOR MORE THAN 30 SECONDS AFTER ENGINE RUNNING. —



B4M0396



1. CHECK HARNESS CONNECTOR BETWEEN ABS/TCS CONTROL MODULE AND TCS OFF INDICATOR LIGHT.

- 1) Turn ignition switch OFF.
- 2) Disconnect all connectors from ABS/TCS control module.
- 3) Turn ignition switch ON.
- 4) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:
(P6) No. 10 — body / 10 — 13 V

F: TCS OPERATING INDICATOR LIGHT DOES NOT GO OFF.
— WHEN STARTING THE ENGINE, ABS WARNING, TCS WARNING AND TCS OFF INDICATOR LIGHTS COME ON AND GO OFF PROPERLY BUT TCS OPERATING INDICATOR LIGHT ONLY KEEPS ON. —

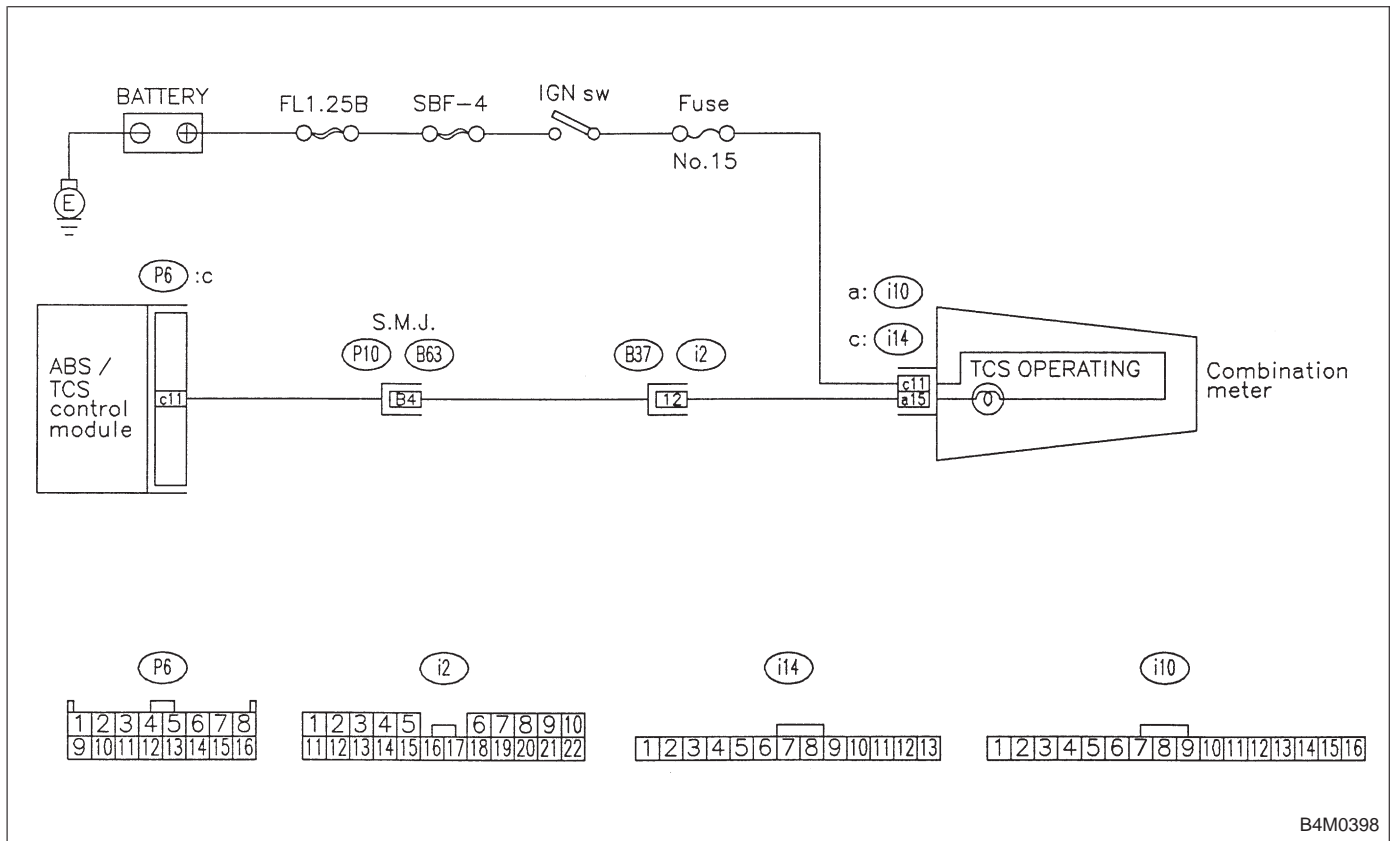
1. Check harness connector between ABS/TCS control module and TCS operating indicator light.

Not OK

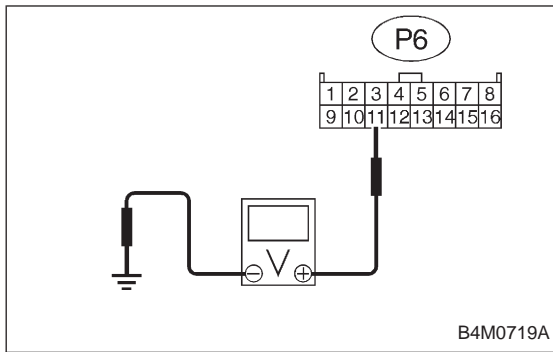
Repair harness/connector.

OK

Replace ABS/TCS control module.



B4M0398

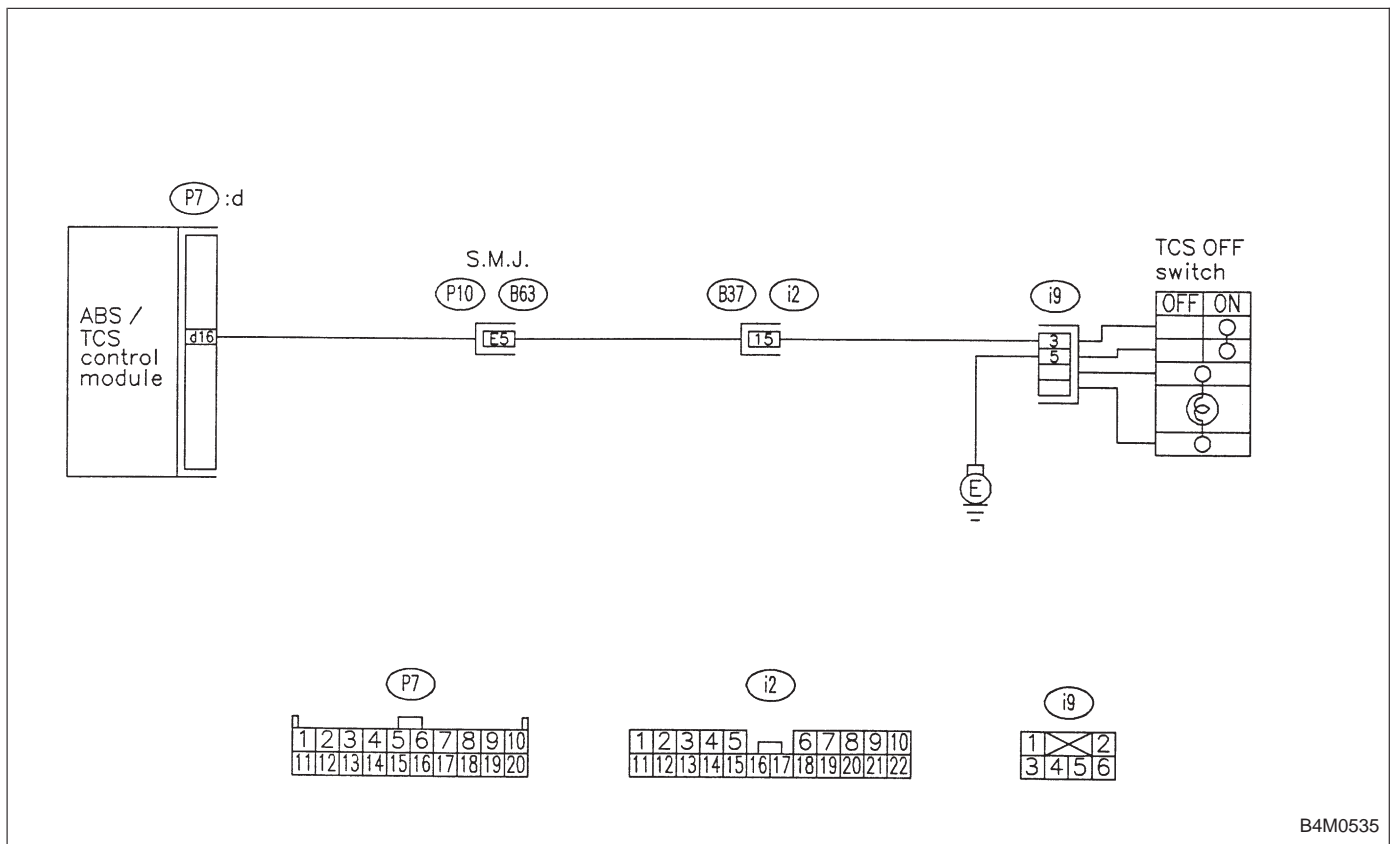
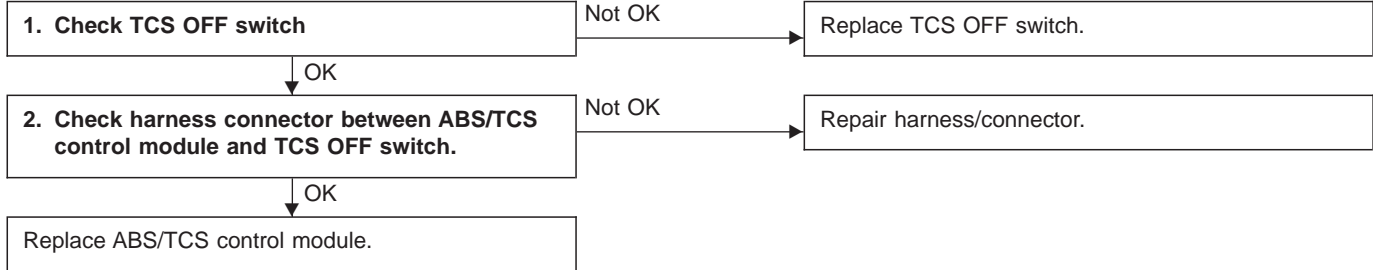


1. CHECK HARNESS CONNECTOR BETWEEN ABS/TCS CONTROL MODULE AND TCS OPERATING INDICATOR LIGHT.

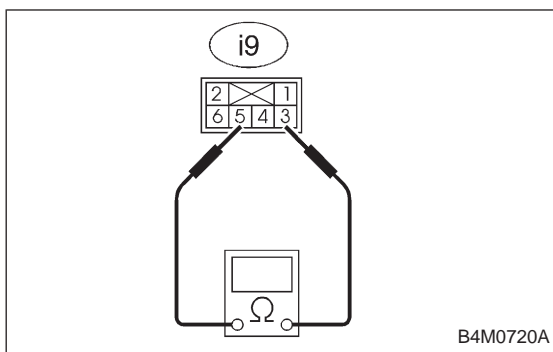
- 1) Turn ignition switch OFF.
- 2) Disconnect all connectors from ABS/TCS control module.
- 3) Turn ignition switch ON.
- 4) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:
(P6) No. 11 — body / 10 — 13 V

G: TCS OFF SWITCH DOES NOT FUNCTION. — TCS OFF INDICATOR LIGHT COMES ON AND GOES OFF PROPERLY WHEN STARTING THE ENGINE, WHILE THIS LIGHT NEITHER COMES ON NOR GOES OFF WHEN PUSHING THE TCS OFF SWITCH. —



B4M0535



1. CHECK TCS OFF SWITCH.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from TCS OFF switch.
- 3) Measure resistance between TCS OFF switch terminals.

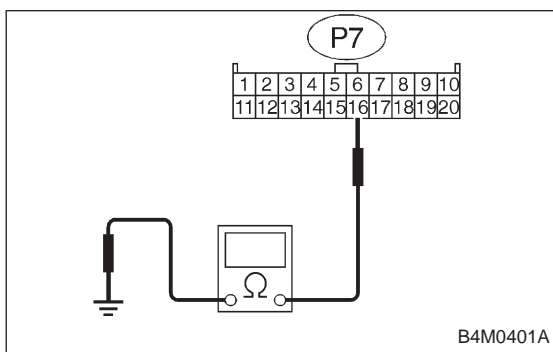
Connector & terminal / Specified resistance:

(i9) No. 5 — No. 3 / 1 Ω or less

(When the switch is pressed, turns ON.)

/ 1 MΩ or less

(When the switch is released, turns OFF.)



2. CHECK HARNESS CONNECTOR BETWEEN ABS/ TCS CONTROL MODULE AND TCS OFF SWITCH.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector to TCS OFF switch.
- 3) Disconnect connector from ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

Connector & terminal / Specified resistance:

(P7) No. 16 — body / 1 Ω or less (When the switch is pressed, turns ON.)

/ 1 MΩ or more (When the switch is released, turns OFF.)

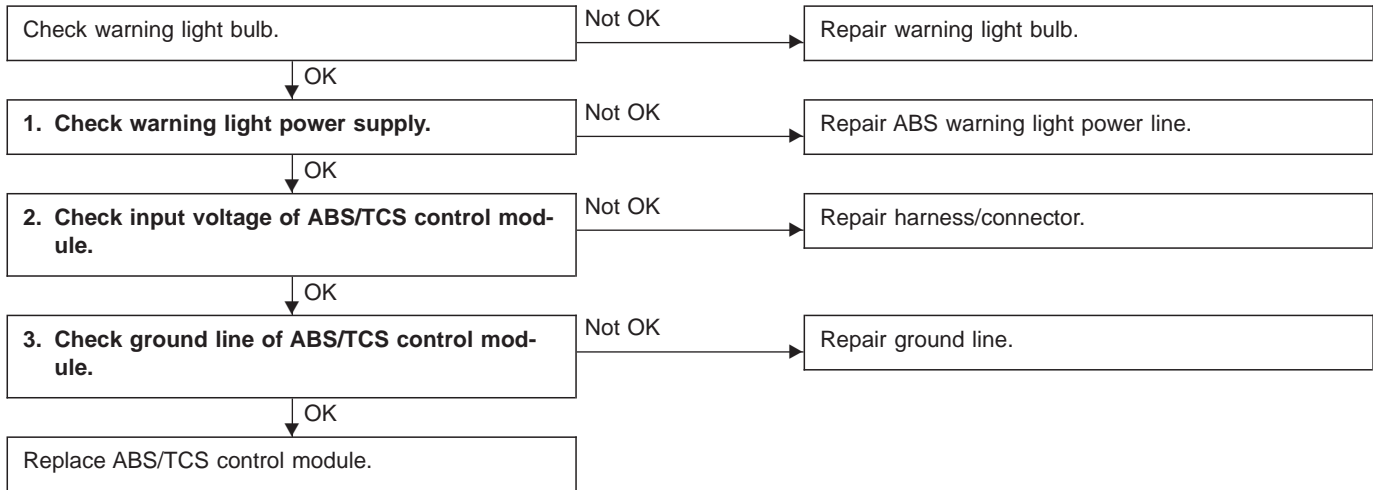
H: ABS WARNING, TCS WARNING, TCS OPERATING INDICATOR AND/OR TCS OFF INDICATOR LIGHTS DO NOT COME ON. — TROUBLE IN WARNING LIGHT DRIVE CIRCUIT —

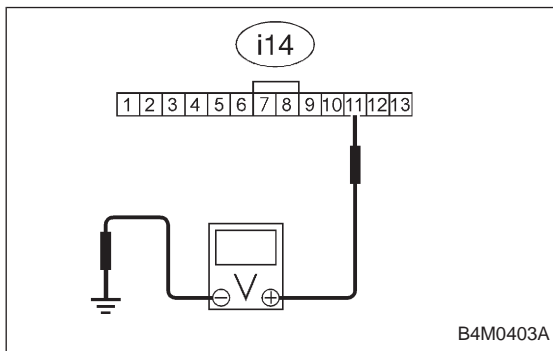
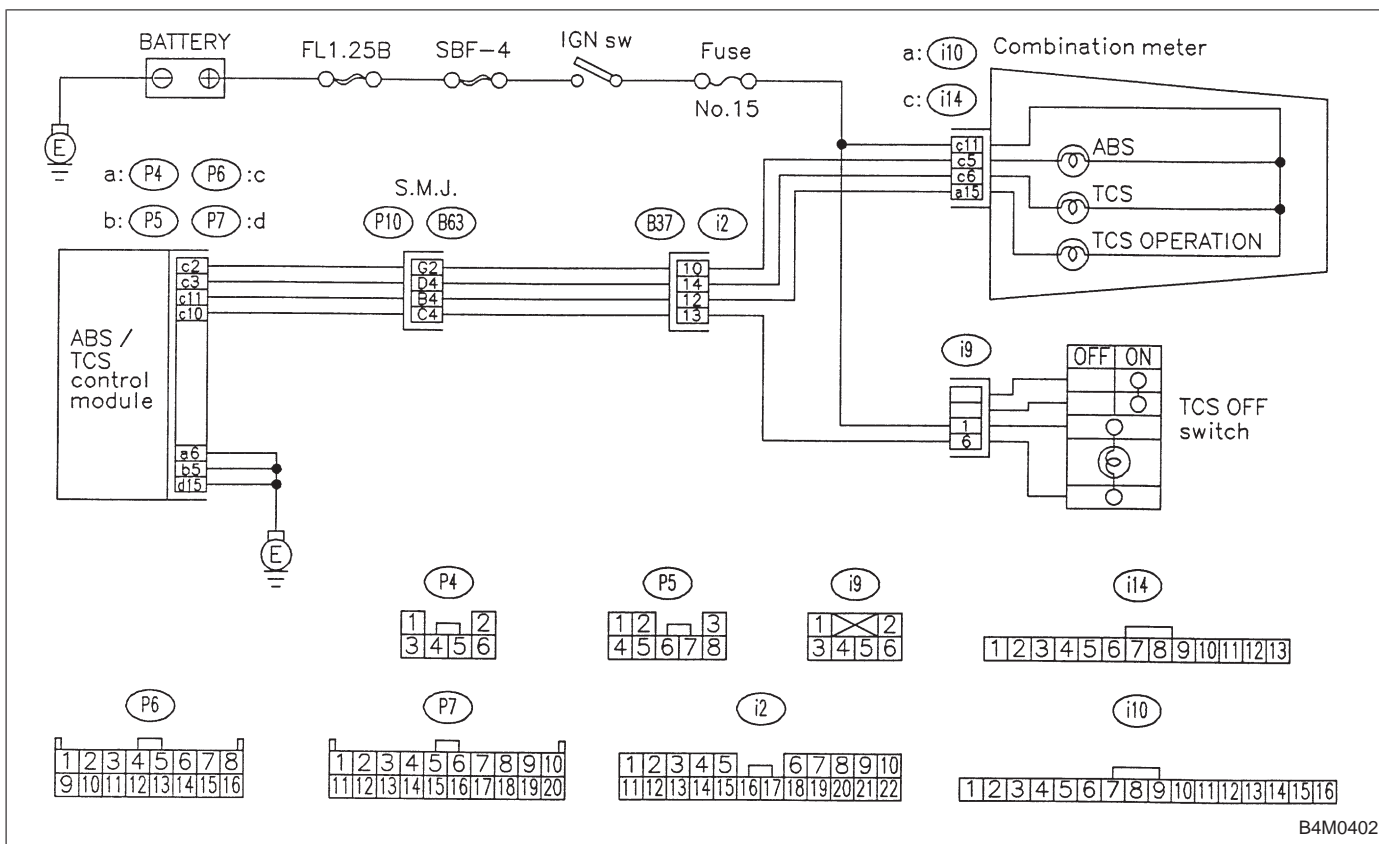
DIAGNOSIS:

- Faulty ABS warning light
- Faulty TCS warning light
- Faulty TCS OFF light
- Faulty TCS operating indicator light
- Faulty harness connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- Warning light does not illuminate.
- Impossible to read trouble code.

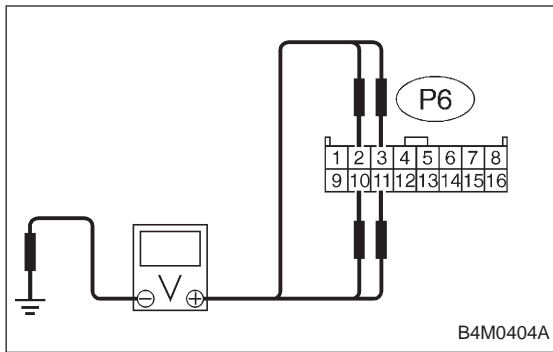




1. CHECK WARNING LIGHT POWER SUPPLY.

- 1) Turn ignition switch OFF.
- 2) Disconnect combination meter.
- 3) Turn ignition switch ON.
- 4) Measure voltage between combination meter connector and body.

Connector & terminal / Specified voltage:
(i14) No. 11 — body / 10 — 13 V



2. CHECK INPUT VOLTAGE OF ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF and connect combination meter connector.
- 2) Disconnect all connectors from ABS/TCS control module.
- 3) Remove ABS/TCS valve relay.
- 4) Turn ignition switch ON.
- 5) Measure voltage between ABS/TCS control module and body.

Connector & terminal / Specified voltage:

ABS warning:

(P6) No. 2 — body / 10 — 13 V

TCS warning:

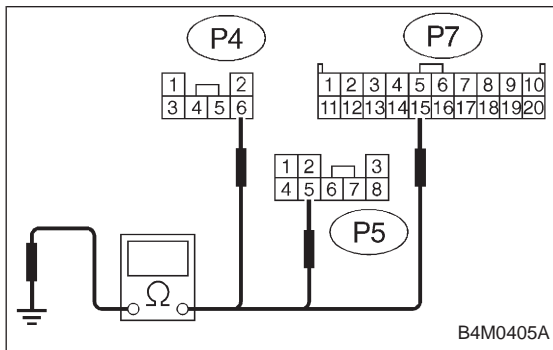
(P6) No. 3 — body / 10 — 13 V

TCS operation:

(P6) No. 11 — body / 10 — 13 V

TCS OFF:

(P6) No. 10 — body / 10 — 13 V



3. CHECK GROUND LINE OF ABS/TCS CONTROL MODULE.

Measure resistance between ABS/TCS control module and body.

Connector & terminal / Specified resistance:

(P4) No. 6 — body / 1 Ω or less

(P5) No. 5 — body / 1 Ω or less

(P7) No. 15 — body / 1 Ω or less

8. Diagnostics Chart with Trouble Code

A: LIST OF TROUBLE CODE

Trouble code	Contents of diagnosis		Ref. to 4-4b
11	Start code ● Trouble code is shown after start code. ● Only start code is shown in normal condition.		—
21	Faulty ABS sensor (Open circuit or short circuit)	Front right wheel speed sensor	[T8B0]
23		Front left wheel speed sensor	
25		Rear right wheel speed sensor	
27		Rear left wheel speed sensor	
22	Faulty ABS sensor (Faulty ABS sensor signal)	Front right wheel speed sensor	[T8C0]
24		Front left wheel speed sensor	
26		Rear right wheel speed sensor	
28		Rear left wheel speed sensor	
31	Faulty solenoid valve circuit(s) in hydraulic unit	Front right inlet valve	[T8D0]
32		Front right outlet valve	[T8E0]
33		Front left inlet valve	[T8D0]
34		Front left outlet valve	[T8E0]
35		Rear right inlet valve	[T8D0]
36		Rear right outlet valve	[T8E0]
37		Rear left inlet valve	[T8D0]
38		Rear left outlet valve	[T8E0]
41	Faulty ABS/TCS control module		[T8F0]
42	Source voltage is high.		[T8G0]
43	Faulty engine control module communication cables		[T8H0]
51	Faulty valve relay		[T8I0]
52	Faulty motor, motor sensor and/or motor relay		[T8J0]
54	Faulty stroke sensor and/or stop light switch		[T8K0]
57	Faulty fluid level sensor		[T8L0]
58	Faulty pressure switch		[T8M0]
61	Faulty solenoid valve circuit(s) in hydraulic unit	TCS 1 valve	[T8D0]
62		TCS 2 valve	[T8D0]

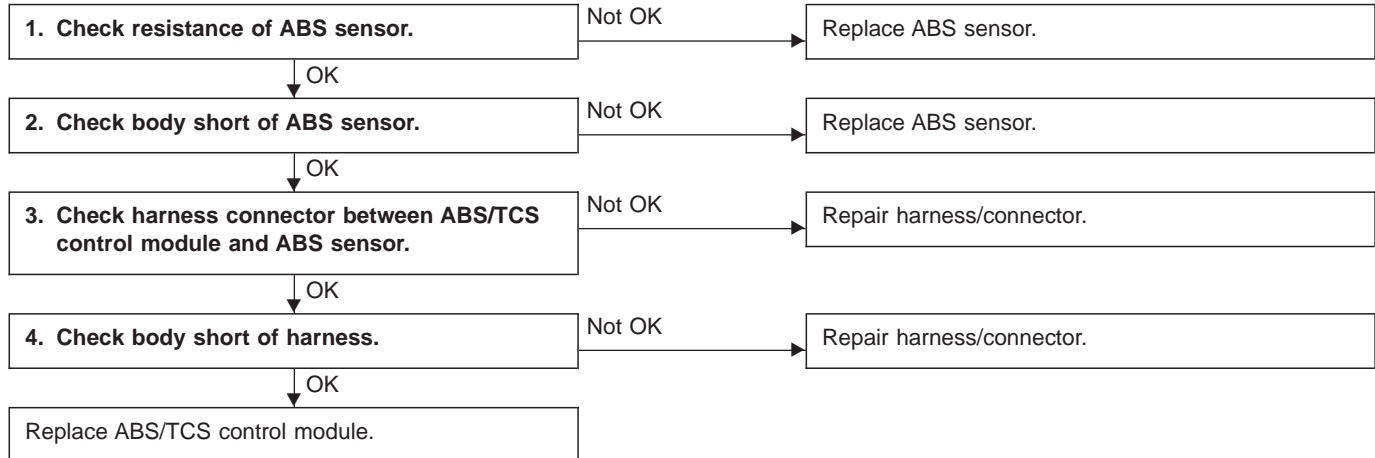
B: TROUBLE CODE 21, 23, 25 AND 27 — FAULTY ABS SENSOR (OPEN CIRCUIT OR SHORT CIRCUIT) —

DIAGNOSIS:

- Faulty ABS sensor
- Faulty harness/connector
- Faulty ABS/TCS control module

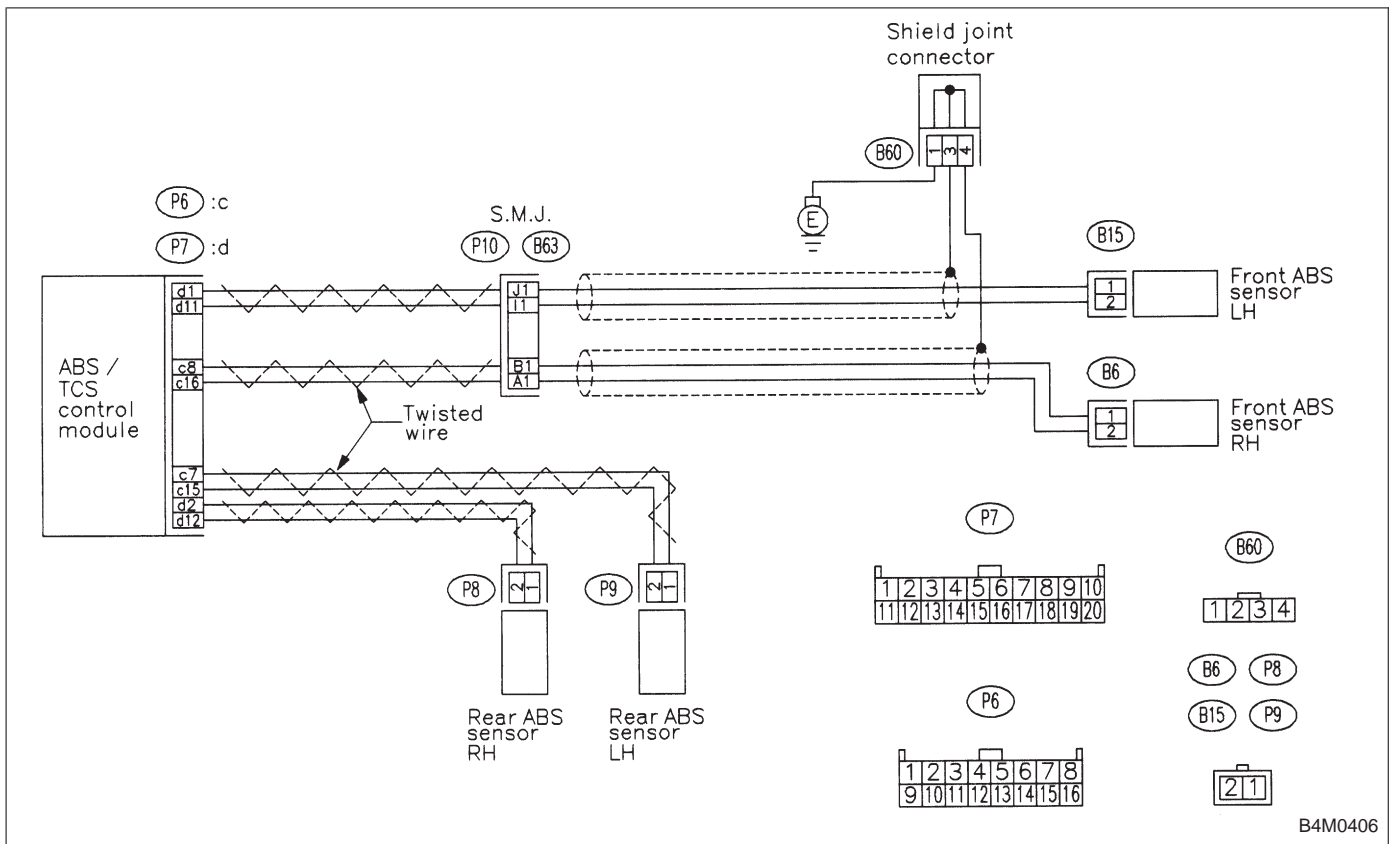
TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.

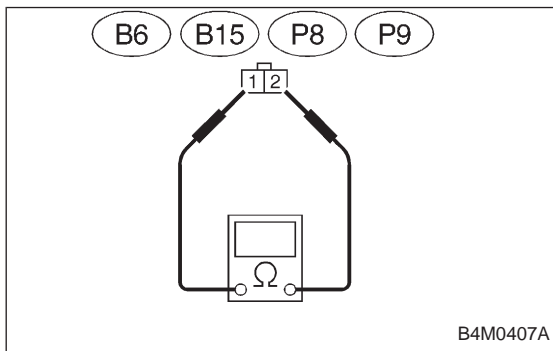


NOTE:

When checking ABS sensor, carefully bend or swing connector and harness to check for improper contacts or open circuits.



B4M0406



B4M0407A

1. CHECK RESISTANCE OF ABS SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS sensor.
- 3) Measure resistance between ABS sensor connector terminals.

TRUBLE CODE / Connector & terminal:

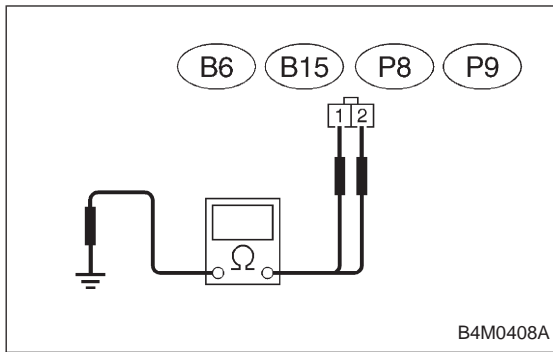
21 / (B6) No. 1 — No. 2

23 / (B15) No. 1 — No. 2

25 / (P8) No. 1 — No. 2

27 / (P9) No. 1 — No. 2

Specified resistance: 0.8 — 1.2 kΩ

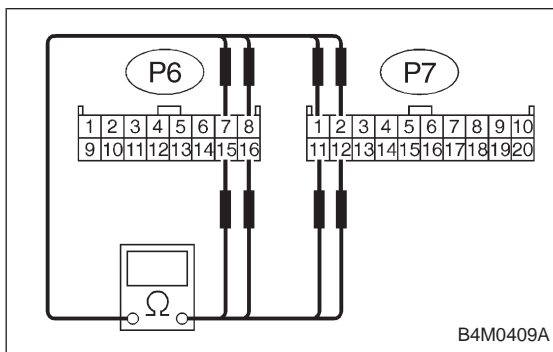


2. CHECK BODY SHORT OF ABS SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS sensor.
- 3) Measure resistance between ABS sensor connector terminal and body.

TROUBLE CODE / Connector & terminal:

- 21 / (B6) No. 1 — body
 - / (B6) No. 2 — body
 - 23 / (B15) No. 1 — body
 - / (B15) No. 2 — body
 - 25 / (P8) No. 1 — body
 - / (P8) No. 2 — body
 - 27 / (P9) No. 1 — body
 - / (P9) No. 2 — body
- Specified resistance: 1 MΩ or more**

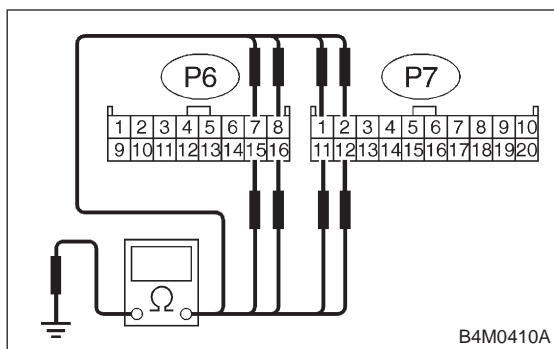


3. CHECK HARNESS CONNECTOR BETWEEN ABS/ TCS CONTROL MODULE AND ABS SENSOR.

- 1) Turn ignition switch OFF.
- 2) Connect connector to ABS sensor.
- 3) Disconnect all connectors from ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

TROUBLE CODE / Connector & terminal:

- 21 / (P6) No. 8 — No. 16
 - 23 / (P7) No. 1 — No. 11
 - 25 / (P7) No. 2 — No. 12
 - 27 / (P6) No. 7 — No. 15
- Specified resistance: 0.8 — 1.2 kΩ**



4. CHECK BODY SHORT OF HARNESS.

- 1) Turn ignition switch OFF.
- 2) Connect connector to ABS sensor.
- 3) Disconnect all connectors from ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

TROUBLE CODE / Connector & terminal:

- 21 / (P6) No. 8 — body***
- / (P6) No. 16 — body***
- 23 / (P7) No. 1 — body***
- / (P7) No. 11 — body***
- 25 / (P7) No. 2 — body***
- / (P7) No. 12 — body***
- 27 / (P6) No. 7 — body***
- / (P6) No. 15 — body***

Specified resistance: 1 M Ω or more

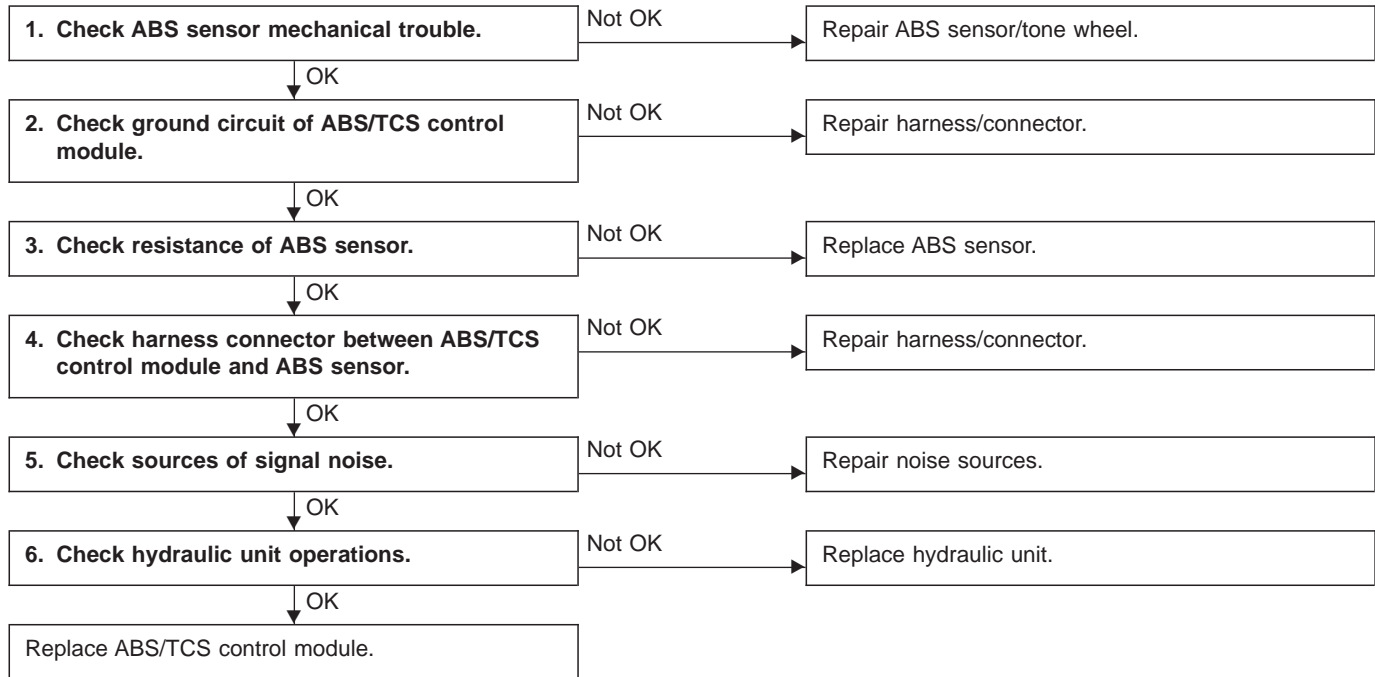
**C: TROUBLE CODE 22, 24, 26 AND 28
— FAULTY ABS SENSOR (FAULTY ABS
SENSOR SIGNAL) —**

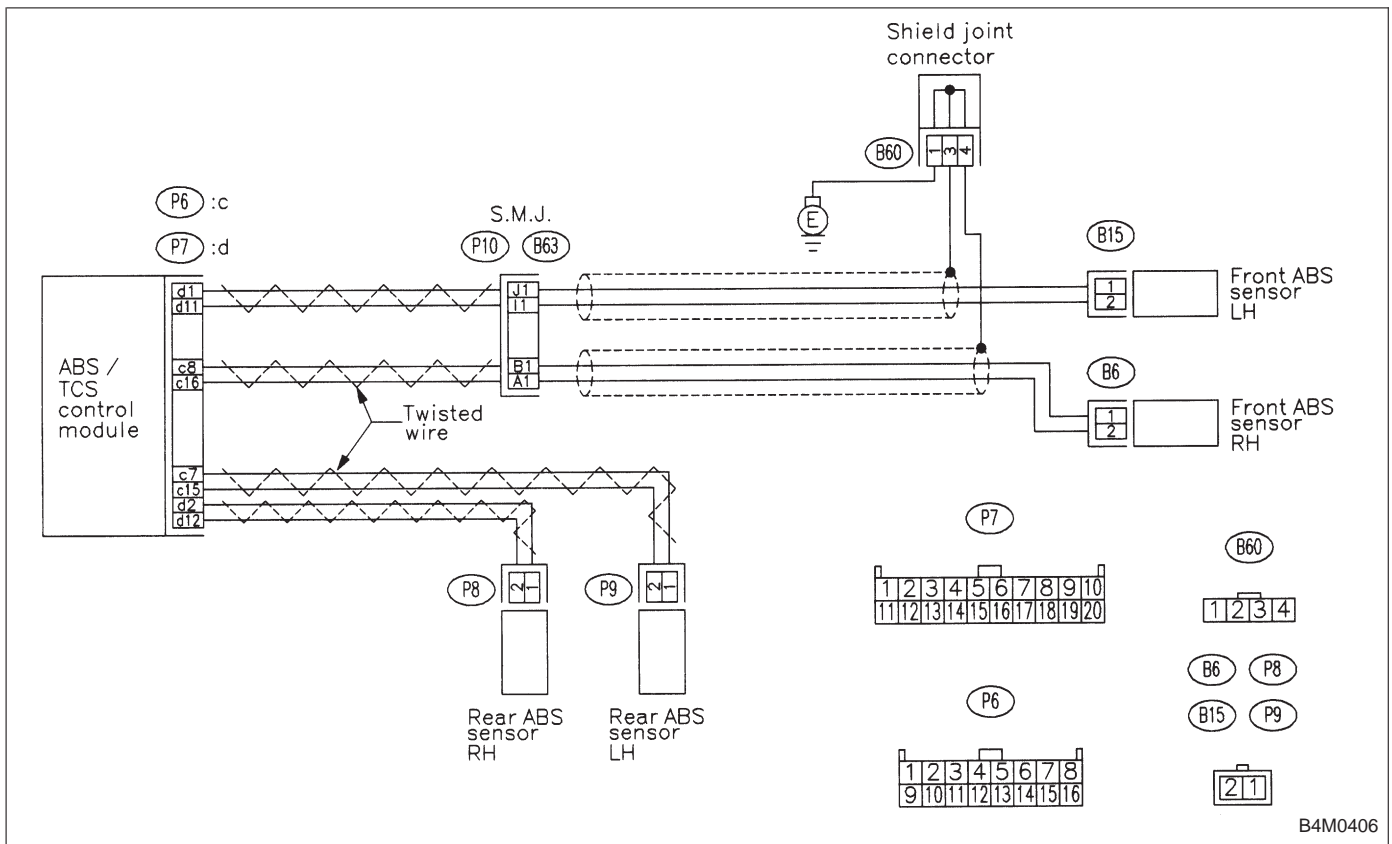
DIAGNOSIS:

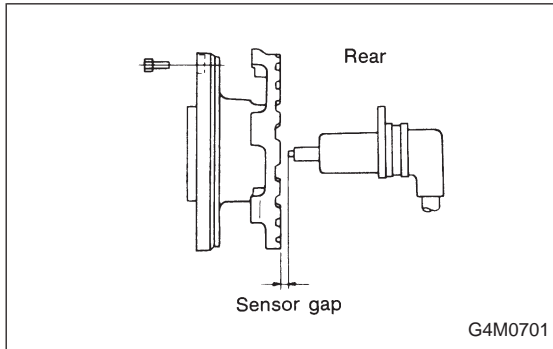
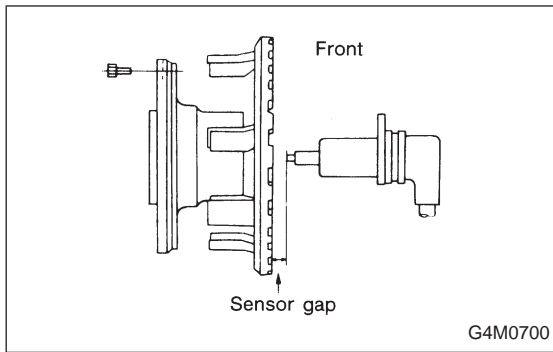
- Faulty ABS sensor signal (noise, irregular signal, etc.)
- Faulty hydraulic unit
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.
- TCS operates when should not.







1. CHECK ABS SENSOR MECHANICAL TROUBLE.

- 1) Dismount brake as outlined in manual to gain access to ABS sensor and tone wheel for inspection.
- 2) Check pole piece and tone wheel for accumulation of foreign particles. If necessary, remove foreign particles and clean.
- 3) Check tone wheel teeth for cracks for deformities. If necessary, replace tone wheel (No. of teeth: 44) with a new one.
- 4) Check tone wheel for looseness.

Tightening torque:

10 — 16 N·m (1 — 1.6 kg-m, 7 — 12 ft-lb)

- 5) Measure tone wheel-to-pole piece gap over entire perimeter of the wheel.

Specifications	Front wheel	Rear wheel
	0.9 — 1.4 mm (0.035 — 0.055 in)	0.7 — 1.2 mm (0.028 — 0.047 in)

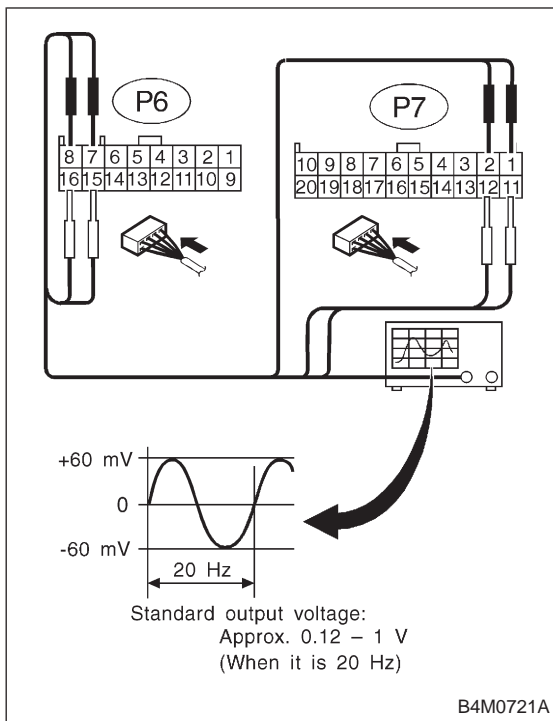
If measurements check out “Not OK”, adjust the gap using spacers (Part No. 26755AA000). If spacers cannot correct the gap, replace worn sensor or worn tone wheel.

- 6) Check hub runout.

Specifications	0.05 mm (0.0020 in)
----------------	---------------------

- 7) The following checks can be made if an oscilloscope is available.

- (1) Raise all four wheels of ground.
- (2) Turn ignition switch OFF.
- (3) Connect all connectors to ABS control module.
- (4) Connect the oscilloscope to the ABS control module connector in accordance with trouble code.
- (5) Turn ignition switch ON.



(6) Rotate wheels and measure voltage at specified frequency.

NOTE:

When this inspection is completed, the ABS/TCS control module sometimes stores the trouble code.

TROUBLE CODE / Connector & terminal:

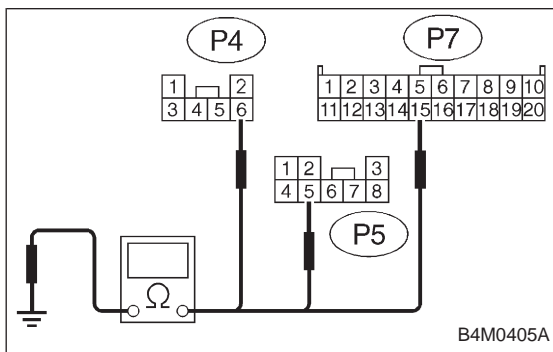
22 / (P6) No. 8 — No.16 (Connect terminal to oscilloscope earth head.)

24 / (P7) No. 1 — No.11 (Connect terminal to oscilloscope earth head.)

26 / (P7) No. 2 — No.12 (Connect terminal to oscilloscope earth head.)

28 / (P6) No. 7 — No.15 (Connect terminal to oscilloscope earth head.)

Specified voltage: 0.12 — 1 V (When it is 20 Hz.)



2. CHECK GROUND CIRCUIT OF ABS/TCS CONTROL MODULE.

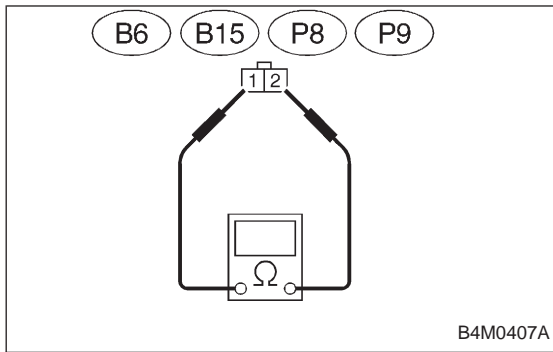
- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS/TCS control module.
- 3) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:

(P4) No. 6 — body / 1 Ω or less

(P5) No. 5 — body / 1 Ω or less

(P7) No. 15 — body / 1 Ω or less



3. CHECK RESISTANCE OF ABS SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS sensor.
- 3) Measure resistance between ABS sensor connector terminals.

TROUBLE CODE / Connector & terminal:

22 / (B6) No. 1 — No. 2

24 / (B15) No. 1 — No. 2

26 / (P8) No. 1 — No. 2

28 / (P9) No. 1 — No. 2

Specified resistance: 0.8 — 1.2 kΩ

4. CHECK HARNESS CONNECTOR BETWEEN ABS/ TCS CONTROL MODULE AND ABS SENSOR.

Check for poor contacts in plug-in connectors. Refer to "Basic checks" in "FOREWORD".

5. CHECK SOURCES OF SIGNAL NOISE.

- 1) Check that the mobile phone, personal radio and other wireless apparatus are correctly installed.
- 2) Check that the antenna and other possible noise sources are distant enough from the sensor harness.
- 3) Check that the sealed wires of the front harness sensor (in the engine room) are securely grounded.
- 4) Check that between ABS/TCS control module and the rear sensor harness has the correct twist pitch.

Twist pitch:

25 mm (0.98 in) or less

6. CHECK HYDRAULIC UNIT OPERATIONS.

- 1) Operate the ABS sequence control and check that the brake fluid pressure at the malfunctioning brake line increases and decreases properly. <Ref. to 4-4 [W20C0].>

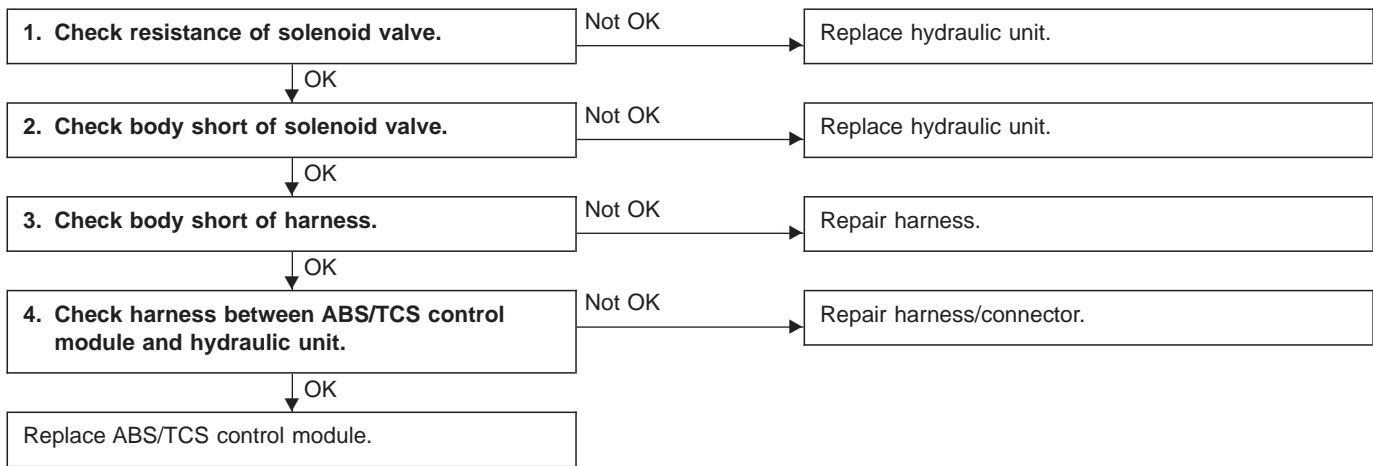
**D: TROUBLE CODE 31, 33, 35, 37, 61 AND 62
— FAULTY INLET SOLENOID VALVE
CIRCUIT(S) AND TCS SOLENOID VALVE
CIRCUIT(S) IN HYDRAULIC UNIT —**

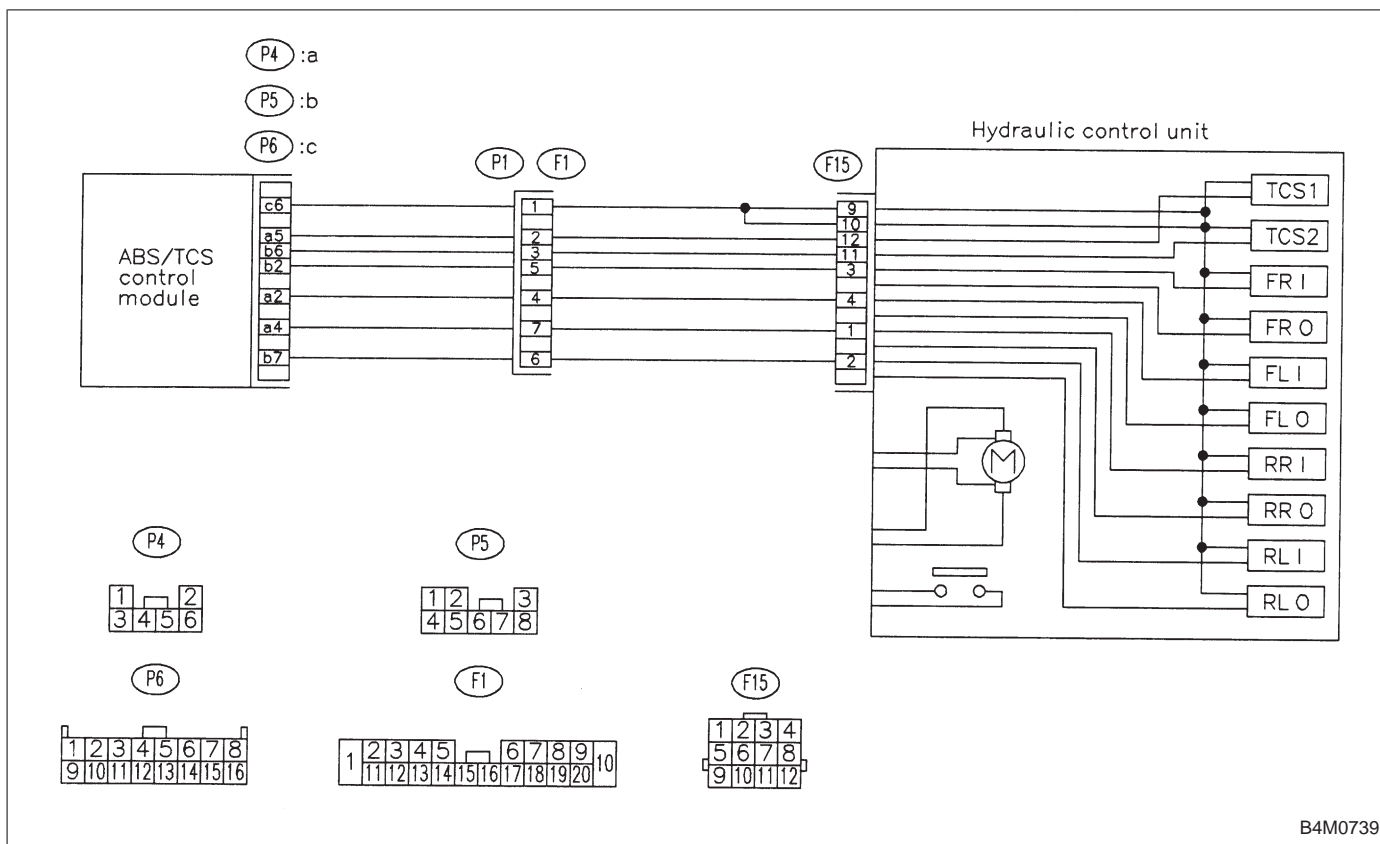
DIAGNOSIS:

- Faulty harness/connector
- Faulty solenoid valve in hydraulic unit
- Faulty ABS/TCS control module

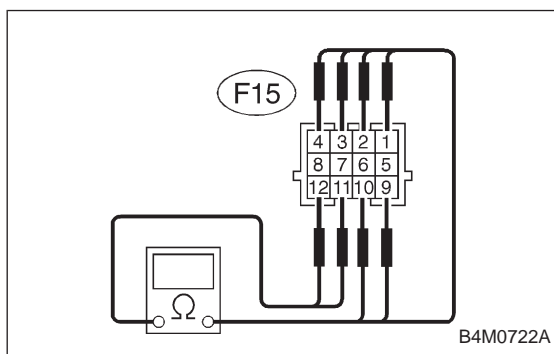
TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.
- ABS sequence control does not operate.
- TCS sequence control does not operate.
- Air bleeding mode does not operate.





B4M0739



1. CHECK RESISTANCE OF SOLENOID VALVE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic unit.
- 3) Measure resistance between hydraulic unit terminals.

TROUBLE CODE / Connector & terminal:

31 / (F15) No. 3 — No. 9

33 / (F15) No. 4 — No. 10

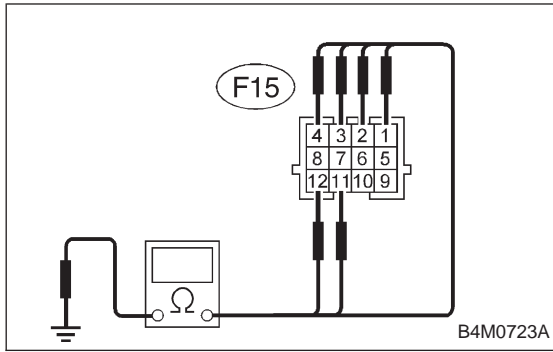
35 / (F15) No. 1 — No. 10

37 / (F15) No. 2 — No. 9

61 / (F15) No. 12 — No. 9

62 / (F15) No. 11 — No. 10

Specified resistance: approx. 6±1 Ω

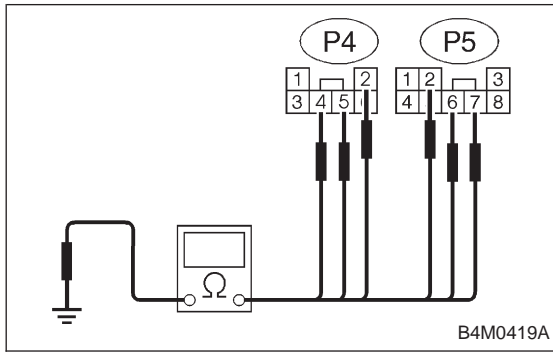


2. CHECK BODY SHORT OF SOLENOID VALVE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic unit.
- 3) Measure resistance between hydraulic unit terminals.

TROUBLE CODE / Connector & terminal:

- 31 / (F15) No. 3 — body
 - 33 / (F15) No. 4 — body
 - 35 / (F15) No. 1 — body
 - 37 / (F15) No. 2 — body
 - 61 / (F15) No. 12 — body
 - 62 / (F15) No. 11 — body
- Specified resistance: 1 MΩ or more**

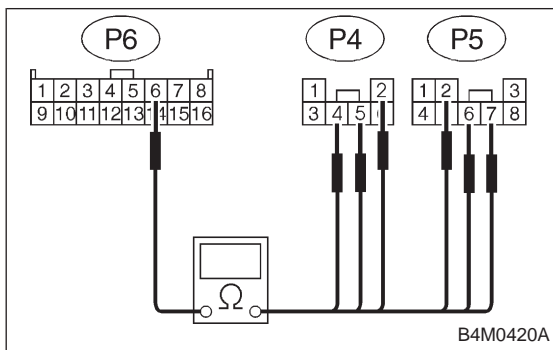


3. CHECK BODY SHORT OF HARNESS.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic unit.
- 3) Disconnect connector from ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

TROUBLE CODE / Connector & terminal:

- 31 / (P5) No. 2 — body
 - 33 / (P4) No. 2 — body
 - 35 / (P4) No. 4 — body
 - 37 / (P5) No. 7 — body
 - 61 / (P4) No. 5 — body
 - 62 / (P5) No. 6 — body
- Specified resistance: 1 MΩ or more**



4. CHECK HARNESS BETWEEN ABS/TCS CONTROL MODULE AND HYDRAULIC UNIT.

- 1) Turn ignition switch OFF.
- 2) Connect connector to hydraulic unit.
- 3) Disconnect connector from ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

TROUBLE CODE / Connector & terminal:

- 31 / (P5) No. 2 — (P6) No. 6
- 33 / (P4) No. 2 — (P6) No. 6

35 / (P4) No. 4 — (P6) No. 6

37 / (P5) No. 7 — (P6) No. 6

61 / (P4) No. 5 — (P6) No. 6

62 / (P5) No. 6 — (P6) No. 6

Specified resistance: $6.2 \pm 1.0 \Omega$

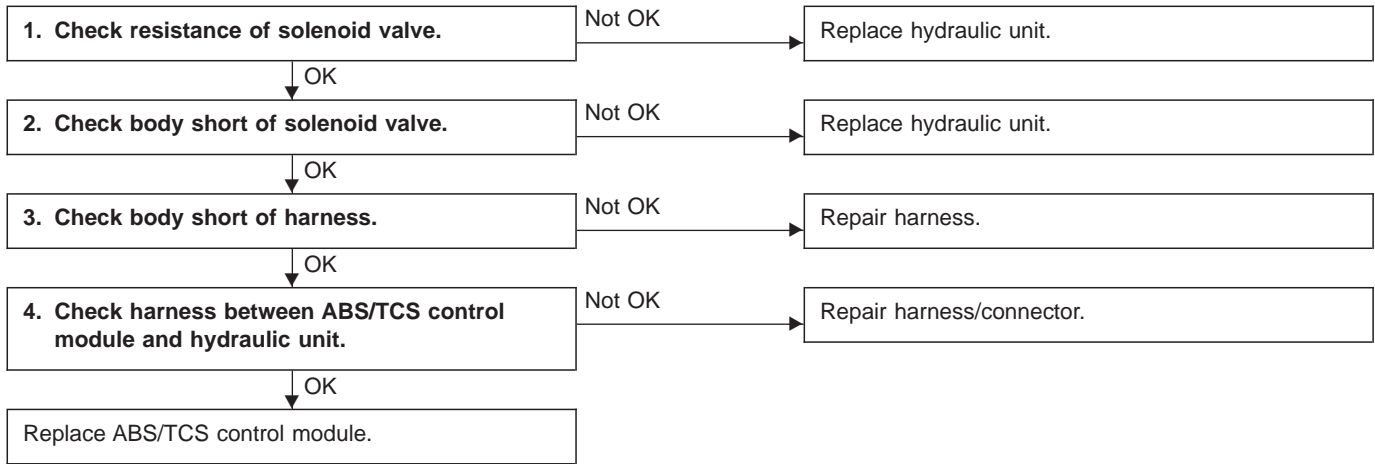
**E: TROUBLE CODE 32, 34, 36 AND 38
— FAULTY OUTLET SOLENOID VALVE
CIRCUIT(S) IN HYDRAULIC UNIT —**

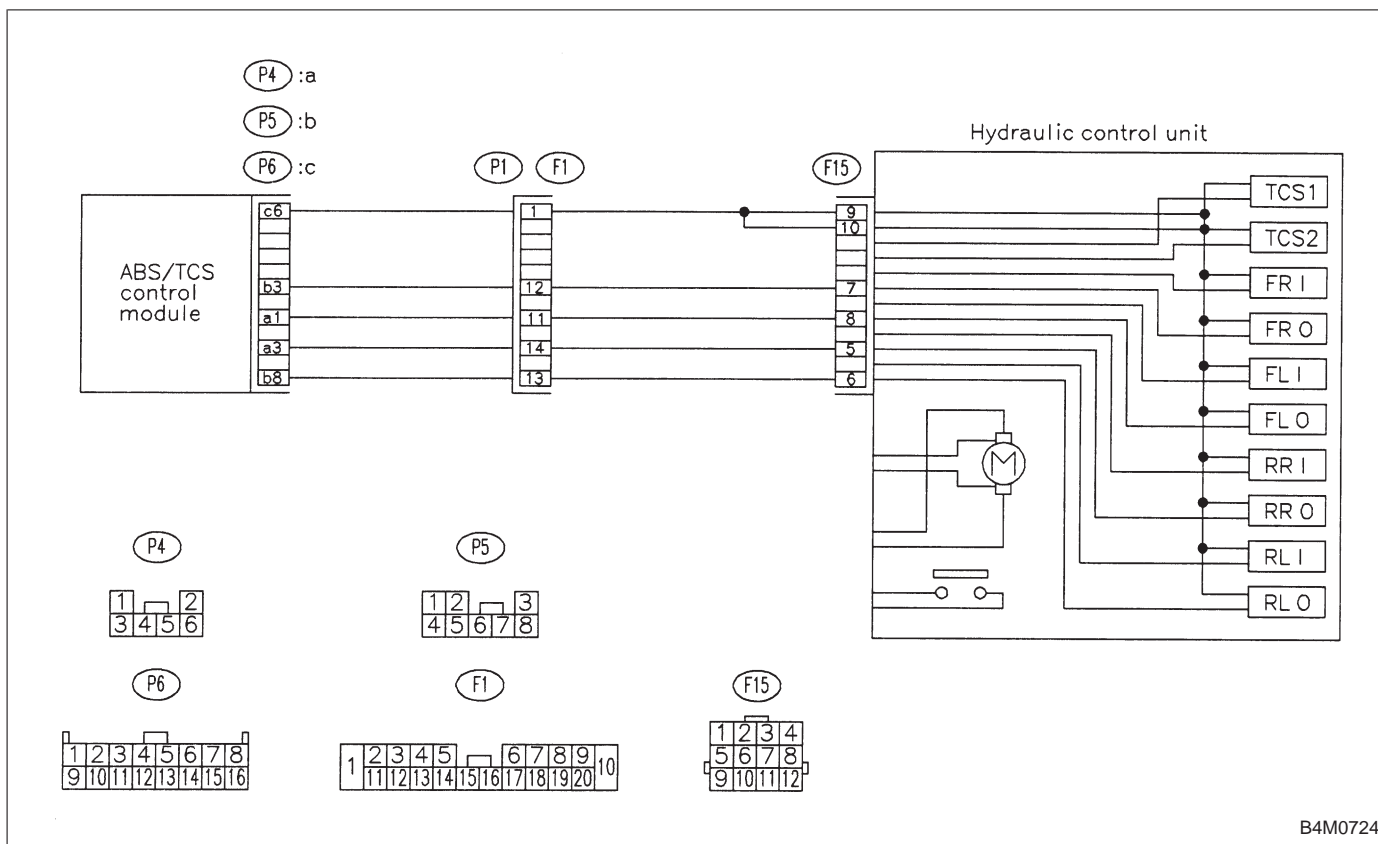
DIAGNOSIS:

- Faulty harness/connector
- Faulty solenoid valve in hydraulic unit
- Faulty ABS/TCS control module

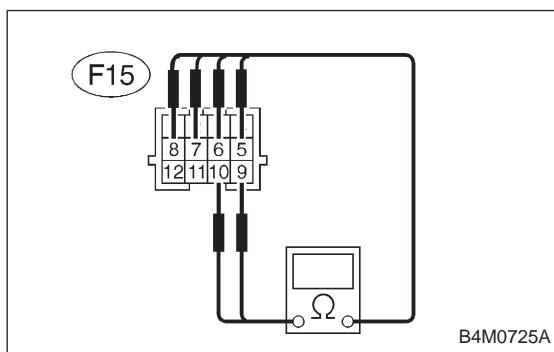
TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.
- ABS sequence control does not operate.
- TCS sequence control does not operate.
- Air bleeding mode does not operate.





B4M0724



B4M0725A

1. CHECK RESISTANCE OF SOLENOID VALVE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic unit.
- 3) Measure resistance between hydraulic unit terminals.

TROUBLE CODE / Connector & terminal:

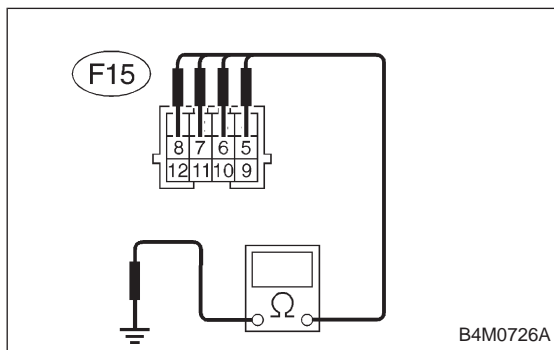
32 / (F15) No. 7 — No. 9

34 / (F15) No. 8 — No. 10

36 / (F15) No. 5 — No. 10

38 / (F15) No. 6 — No. 9

Specified resistance: 3.5±1.0 Ω



B4M0726A

2. CHECK BODY SHORT OF SOLENOID VALVE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic unit.
- 3) Measure resistance between hydraulic unit terminals.

TROUBLE CODE / Connector & terminal:

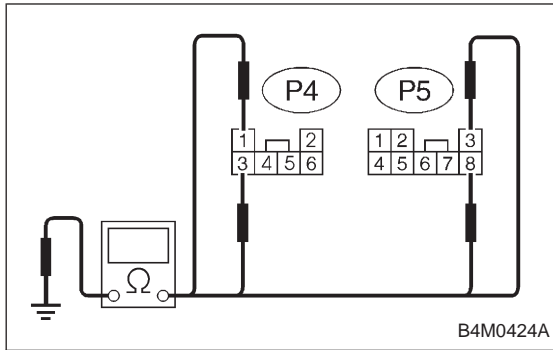
32 / (F15) No. 7 — body

34 / (F15) No. 8 — body

36 / (F15) No. 5 — body

38 / (F15) No. 6 — body

Specified resistance: 1 MΩ or more



3. CHECK BODY SHORT OF HARNESS.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic unit.
- 3) Disconnect connector from ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

TROUBLE CODE / Connector & terminal:

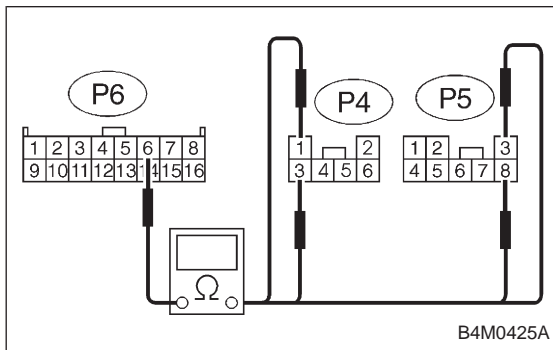
32 / (P5) No. 3 — body

34 / (P4) No. 1 — body

36 / (P4) No. 3 — body

38 / (P5) No. 8 — body

Specified resistance: 1 MΩ or more



4. CHECK HARNESS BETWEEN ABS/TCS CONTROL MODULE AND HYDRAULIC UNIT.

- 1) Turn ignition switch OFF.
- 2) Connect connector to hydraulic unit.
- 3) Disconnect connector from ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

TROUBLE CODE / Connector & terminal:

32 / (P5) No. 3 — (P6) No. 6

34 / (P4) No. 1 — (P6) No. 6

36 / (P4) No. 3 — (P6) No. 6

38 / (P5) No. 8 — (P6) No. 6

Specified resistance: 3.7±1.0 Ω

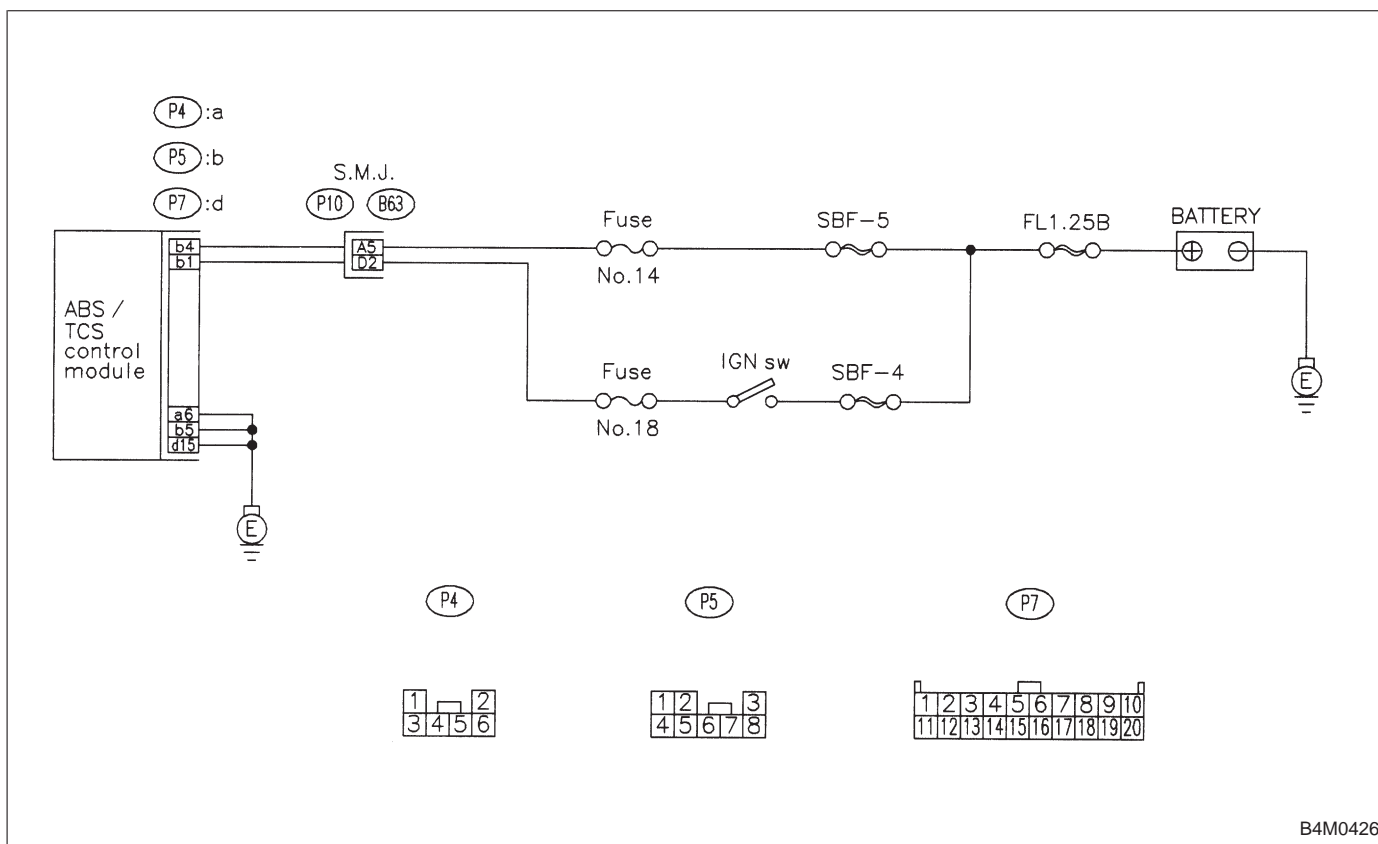
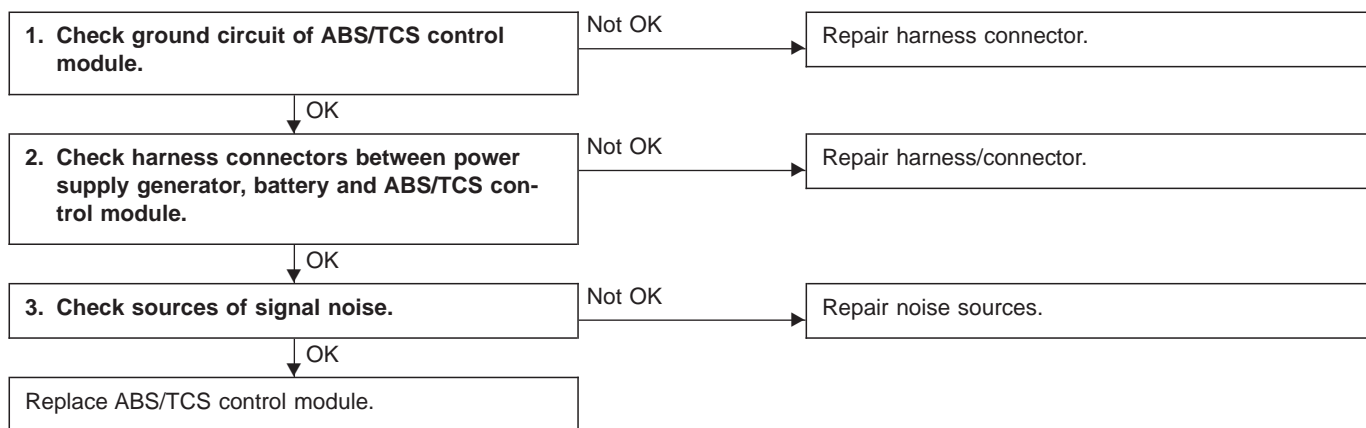
**F: TROUBLE CODE 41
— FAULTY ABS/TCS CONTROL
MODULE —**

DIAGNOSIS:

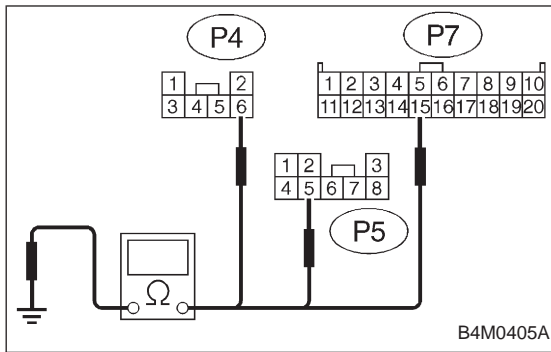
- Faulty ABS/TCS control module
- Faulty harness/connector

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.



B4M0426



1. CHECK GROUND CIRCUIT OF ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS/TCS control module.
- 3) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:

- (P4) No. 6 — body / 1 Ω or less**
- (P5) No. 5 — body / 1 Ω or less**
- (P7) No. 15 — body / 1 Ω or less**

2. CHECK HARNESS CONNECTORS BETWEEN POWER SUPPLY GENERATOR, BATTERY AND ABS/TCS CONTROL MODULE.

Check for poor contacts in plug-in connectors. Refer to "Basic checks" in "FOREWORD".

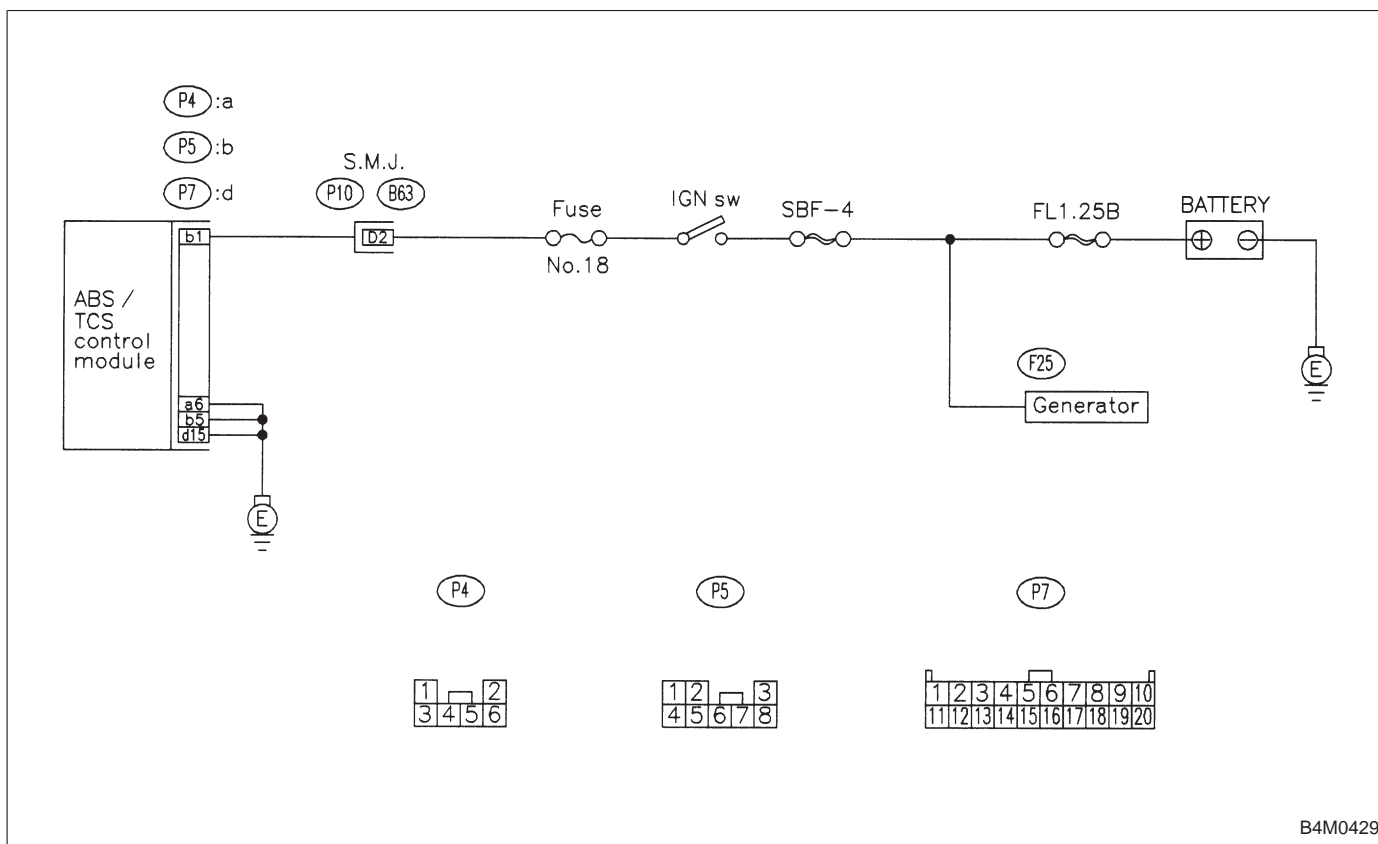
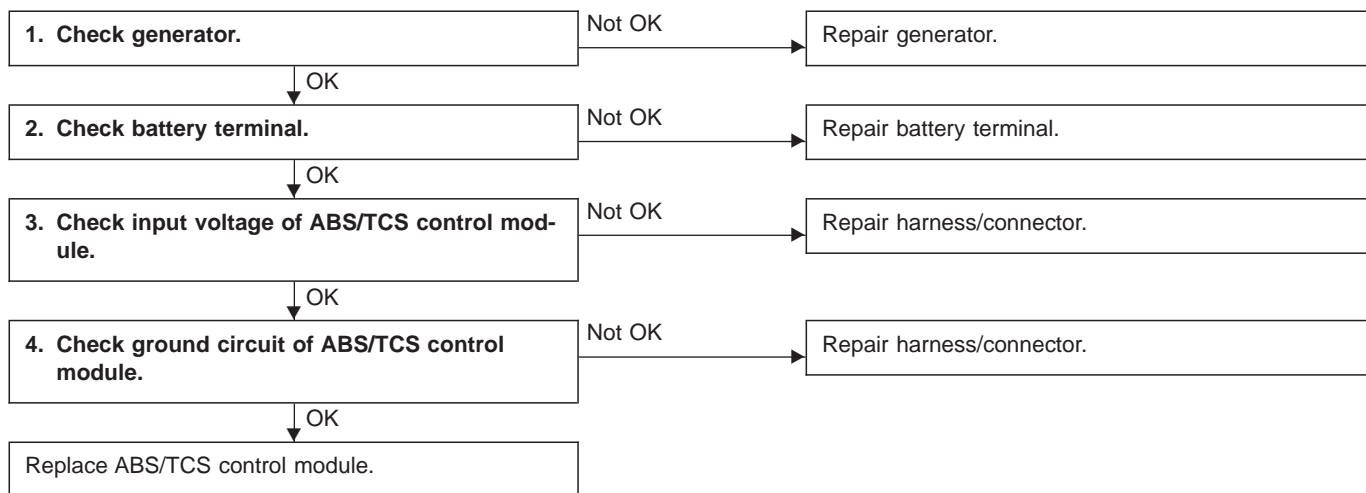
G: TROUBLE CODE 42
— SOURCE VOLTAGE IS HIGH. —

DIAGNOSIS:

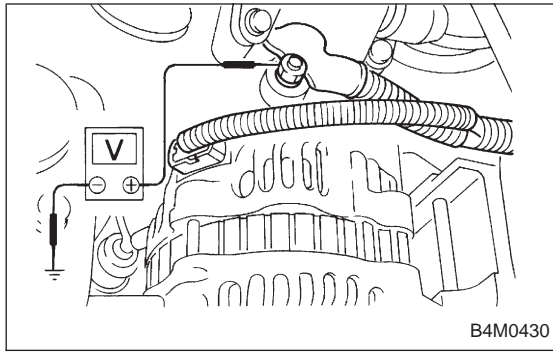
- Power source voltage of the ABS/TCS control module is more than 18 V.
- Faulty ABS/TCS control module
- Faulty harness/connector

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.



B4M0429



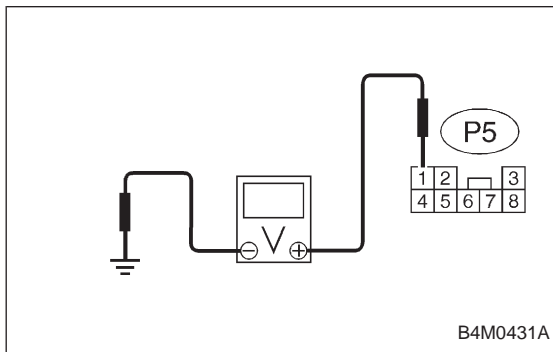
1. CHECK GENERATOR.

- 1) Idling after warm-up.
- 2) Measure voltage between generator B terminal and body.

Connector / Specified voltage:
(F25) — body / 10 — 15 V

2. CHECK BATTERY TERMINAL.

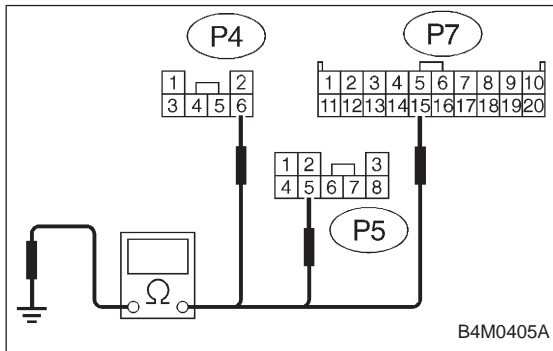
Check that the positive and negative battery terminals are firmly fixed.



3. CHECK INPUT VOLTAGE OF ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS/TCS control module.
- 3) Run the engine at idle.
- 4) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:
(P5) No. 1 — body / 10 — 15 V



4. CHECK GROUND CIRCUIT OF ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS/TCS control module.
- 3) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:
(P4) No. 6 — body / 1 Ω or less
(P5) No. 5 — body / 1 Ω or less
(P7) No. 15 — body / 1 Ω or less

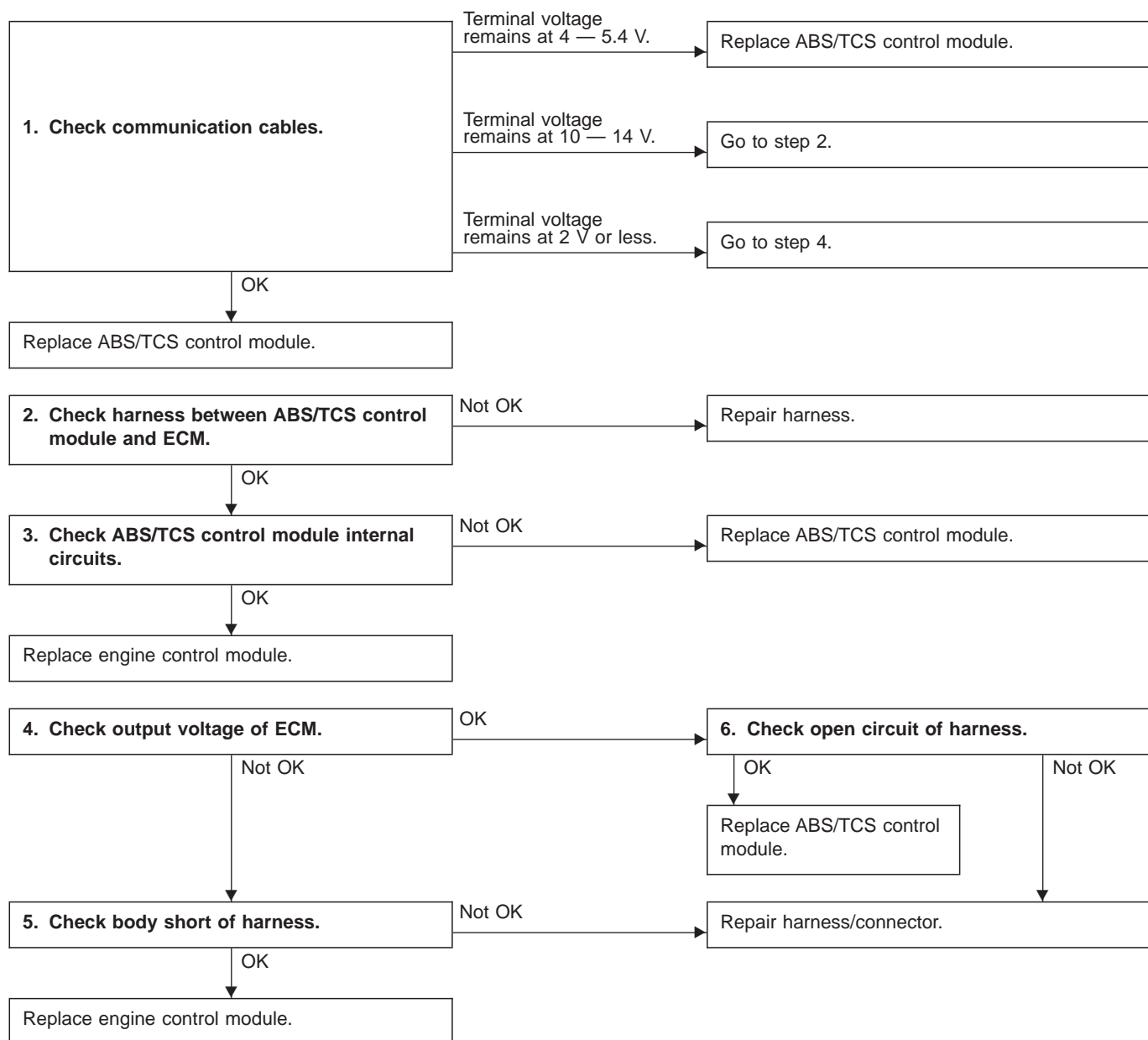
**H: TROUBLE CODE 43
— FAULTY ENGINE CONTROL MODULE
COMMUNICATION CABLES —**

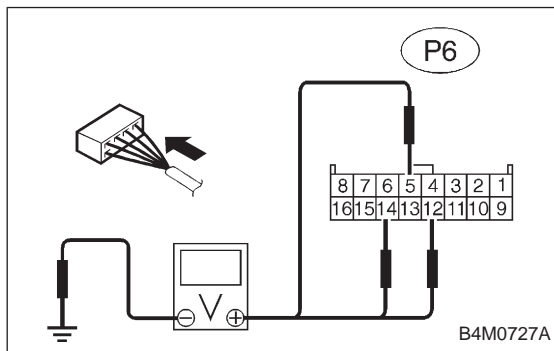
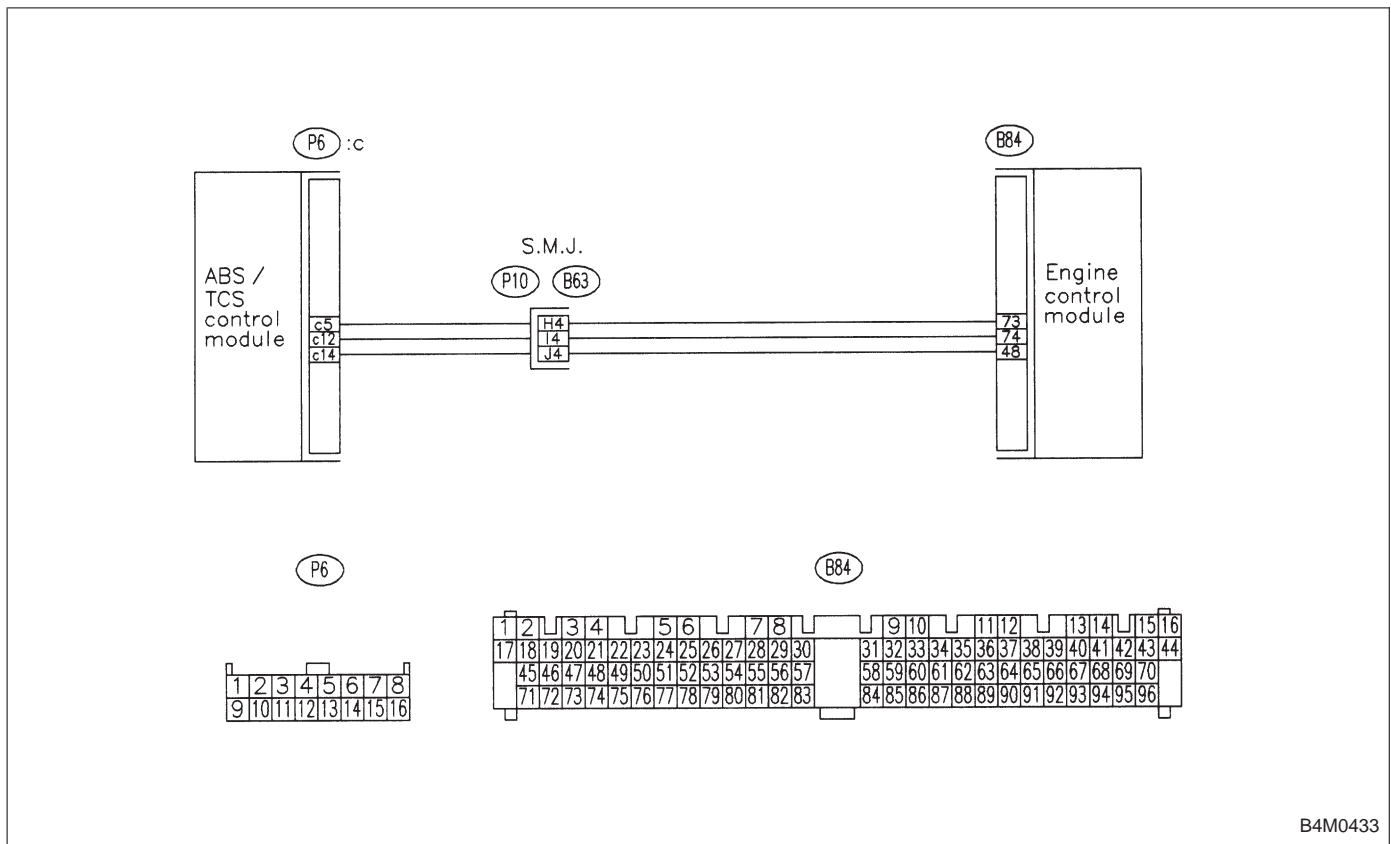
DIAGNOSIS:

- AET communication cable is broken or short circuited.
- AEB communication cable is broken or short circuited.
- AEC communication cable is broken or short circuited.
- Faulty ABS/TCS control module
- Faulty engine control module

TROUBLE SYMPTOM:

- TCS does not operate.





1. CHECK COMMUNICATION CABLES.

- 1) Operate the TCS sequence control.
<Ref. to 4-4 [W20F0].>
- 2) Measure the voltage between ABS/TCS control module and the body during the TCS check sequence operation.

Connector & terminal:

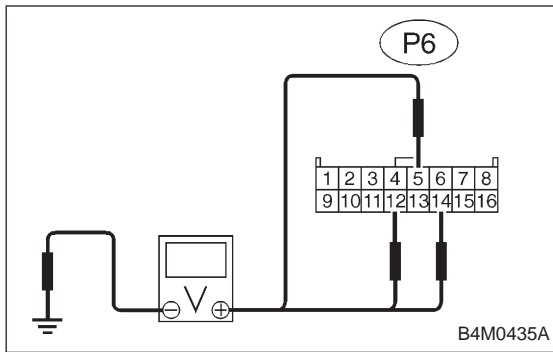
- (P6) No. 12 — body (AET communication cable)
- (P6) No. 5 — body (AEB communication cable)
- (P6) No. 14 — body (AEC communication cable)

Specified voltage:

High voltage: 4 — 5.4 V

Low voltage: 2 V or less

Check that each of the above voltage reading are displayed.



2. CHECK HARNESS BETWEEN ABS/TCS CONTROL MODULE AND ENGINE CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect engine control module.
- 3) Disconnect ABS/TCS control module.
- 4) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:

(P6) No. 12 — body / 0 V (AET communication cable)

(P6) No. 5 — body / 0 V (AEB communication cable)

(P6) No. 14 — body / 0 V (AEC communication cable)

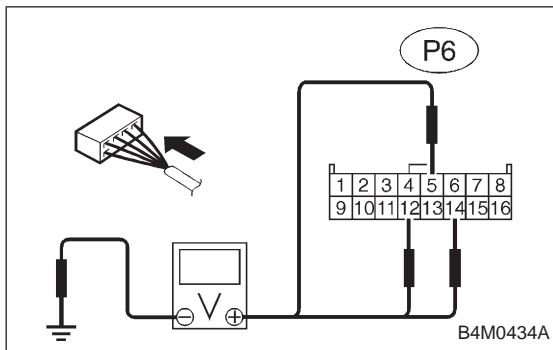
- 5) Turn ignition switch ON.
- 6) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:

(P6) No. 12 — body / 0 V (AET communication cable)

(P6) No. 5 — body / 0 V (AEB communication cable)

(P6) No. 14 — body / 0 V (AEC communication cable)



3. CHECK ABS/TCS CONTROL MODULE INTERNAL CIRCUITS.

- 1) Turn ignition switch OFF.
- 2) Disconnect engine control module.
- 3) Connect ABS/TCS control module.
- 4) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:

(P6) No. 12 — body / 2 V or less (AET communication cable)

(P6) No. 5 — body / 2 V or less (AEB communication cable)

(P6) No. 14 — body / 2 V or less (AEC communication cable)

- 5) Turn ignition switch ON.
- 6) Measure voltage between ABS/TCS control module connector and body.

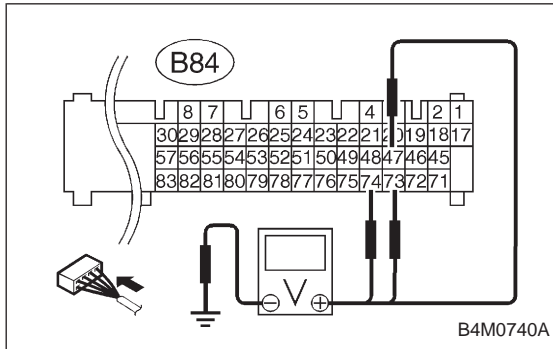
Connector & terminal / Specified voltage:

(P6) No. 12 — body / 2 V or less (AET communication cable)

(P6) No. 5 — body / 2 V or less (AEB communication cable)

tion cable)

(P6) No. 14 — body / 2 V or less (AEC communication cable)

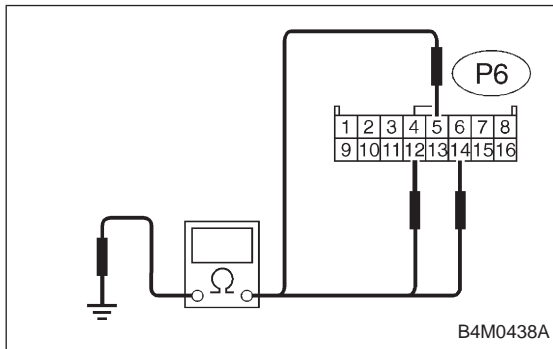


4. CHECK OUTPUT VOLTAGE OF ENGINE CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Connect engine control module.
- 3) Connect ABS/TCS control module.
- 4) Turn ignition switch ON.
- 5) Measure voltage between engine control module connector and body.

Connector & terminal / Specified voltage:

- (B84) No. 74 — body / 4 — 5.4 V (AET communication cable)*
- (B84) No. 73 — body / 4 — 5.4 V (AEB communication cable)*
- (B84) No. 47 — body / 4 — 5.4 V (AEC communication cable)*

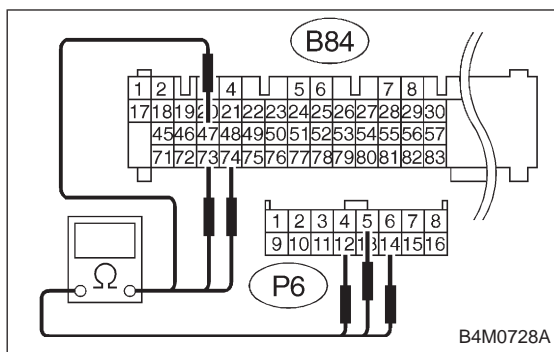


5. CHECK BODY SHORT OF HARNESS.

- 1) Turn ignition switch OFF.
- 2) Disconnect engine control module.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:

- (P6) No. 12 — body / 1 MΩ or more (AET communication cable)*
- (P6) No. 5 — body / 1 MΩ or more (AEB communication cable)*
- (P6) No. 14 — body / 1 MΩ or more (AEC communication cable)*

**6. CHECK OPEN CIRCUIT OF HARNESS.**

- 1) Turn ignition switch OFF.
- 2) Disconnect engine control module.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector and engine control module connector.

(P6) No. 12 — (B84) No. 74 / 1 Ω or less (AET communication cable)

(P6) No. 5 — (B84) No. 73 / 1 Ω or less (AEB communication cable)

(P6) No. 14 — (B84) No. 47 / 1 Ω or less (AEC communication cable)

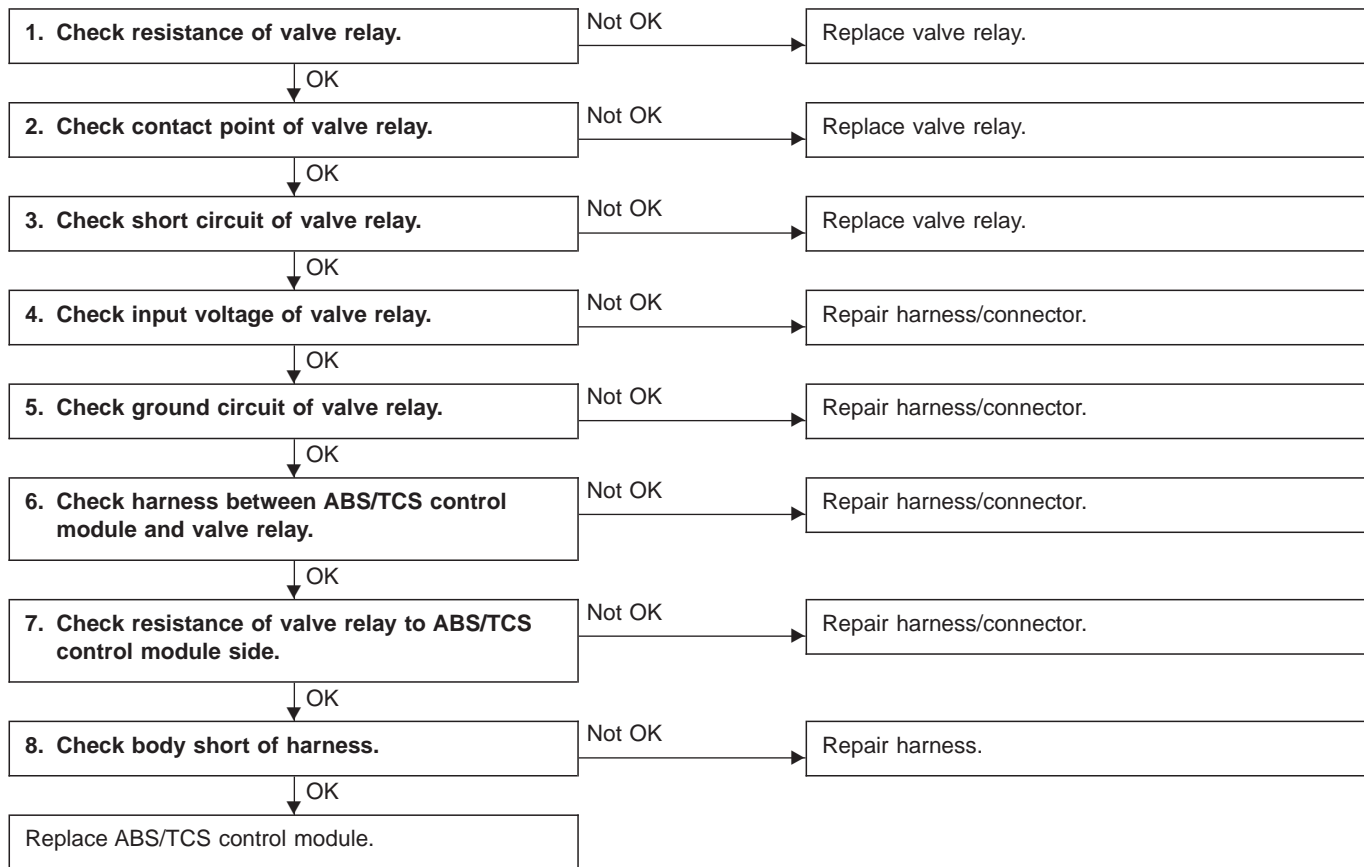
**I: TROUBLE CODE 51
— FAULTY VALVE RELAY —**

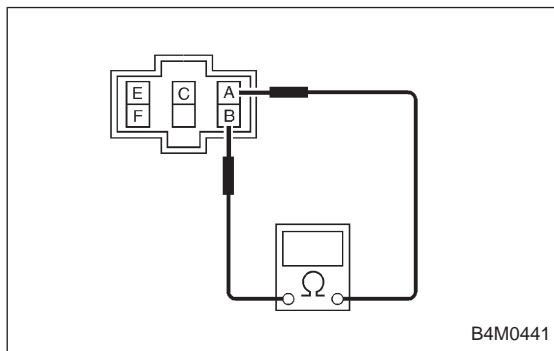
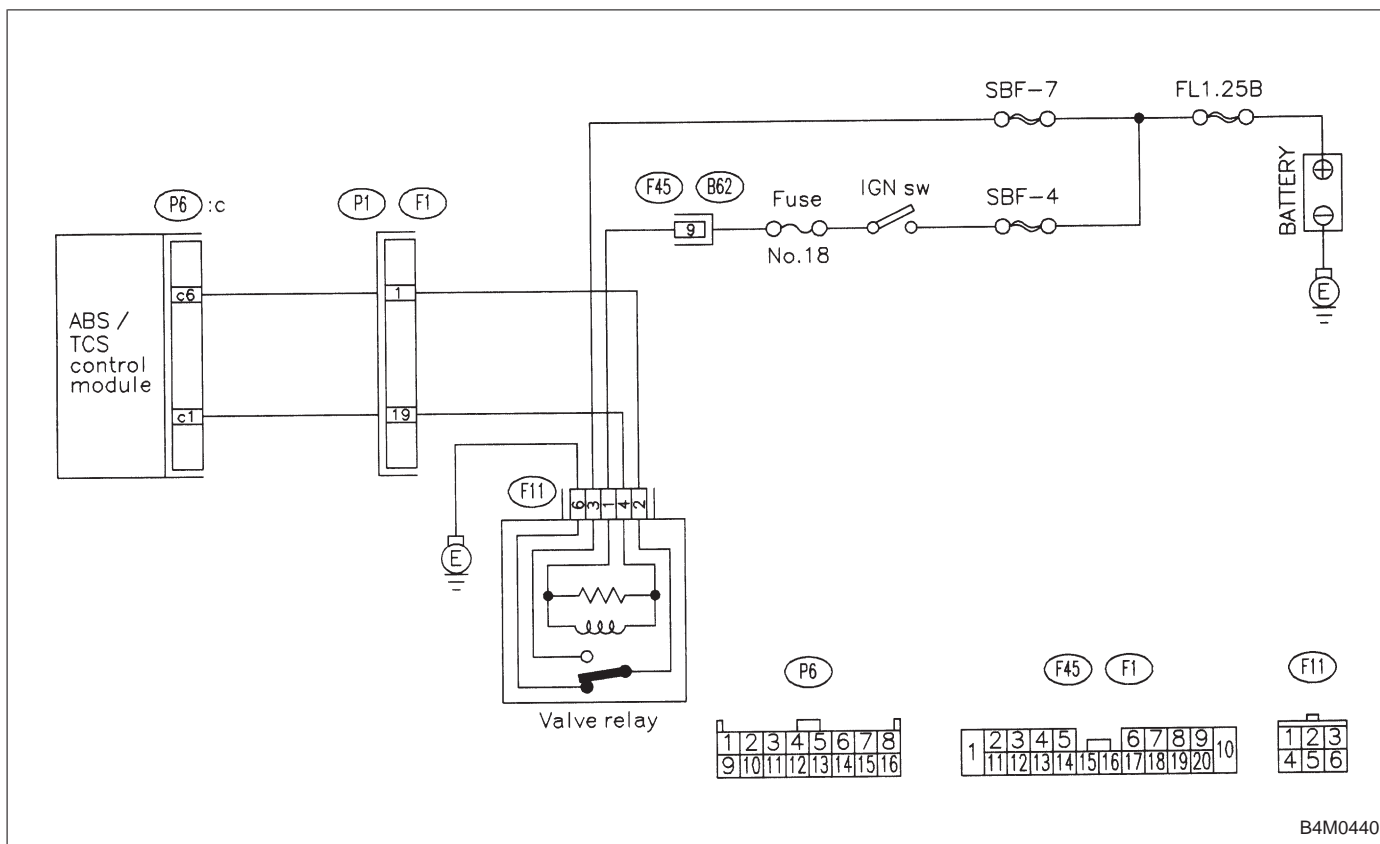
DIAGNOSIS:

- Faulty valve relay
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.





1. CHECK RESISTANCE OF VALVE RELAY.

- 1) Turn ignition switch OFF.
- 2) Remove valve relay.
- 3) Measure resistance between valve relay terminals.

Terminal / Specified resistance:

No. A — B / $90 \pm 10 \Omega$

2. CHECK CONTACT POINT OF VALVE RELAY.

- 1) Turn ignition switch OFF.
- 2) Remove valve relay.
- 3) Attach circuit tester probes to terminals as shown in figure.
- 4) Measure resistance between respective terminals.

Terminal / Specified resistance:

No. C — E / 1Ω or less (When 12 volts applied.)

No. C — E / $1 M\Omega$ or more

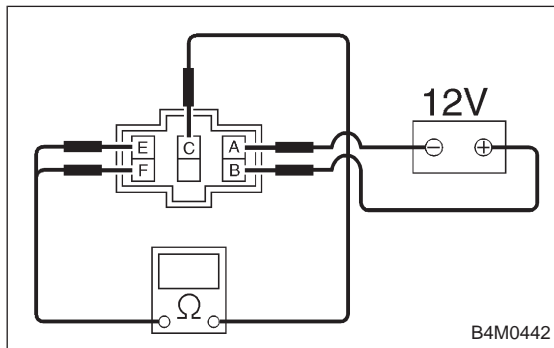
(When no voltage is applied.)

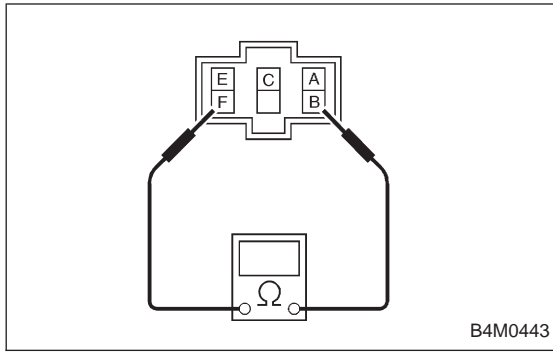
No. C — F / $1 M\Omega$ or more

(When 12 volts applied.)

No. C — F / 1Ω or less

(When no voltage is applied.)

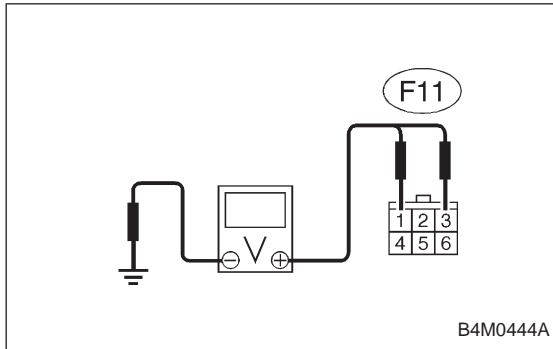


**3. CHECK SHORT CIRCUIT OF VALVE RELAY.**

- 1) Turn ignition switch OFF.
- 2) Remove valve relay.
- 3) Measure resistance between valve relay terminals.

Terminal / Specified resistance:

No. B — F / 1 M Ω or more

**4. CHECK INPUT VOLTAGE OF VALVE RELAY.**

- 1) Turn ignition switch OFF.
- 2) Disconnect valve relay.
- 3) Measure voltage between valve relay connector and body.

Connector & terminal / Specified voltage:

(F11) No. 1 — body / 0 V

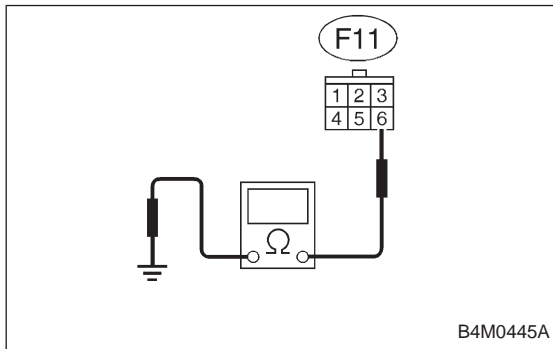
(F11) No. 3 — body / 10 — 13 V

- 4) Turn ignition switch ON.
- 5) Measure voltage between valve relay connector and body.

Connector & terminal / Specified voltage:

(F11) No. 1 — body / 10 — 13 V

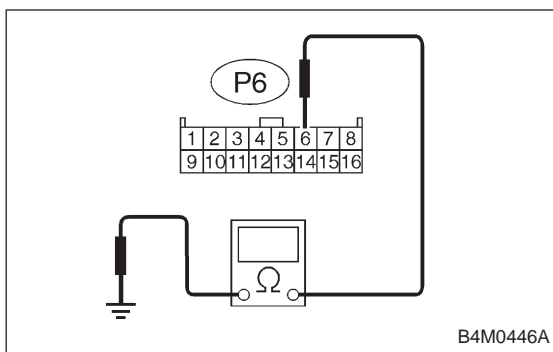
(F11) No. 3 — body / 10 — 13 V

**5. CHECK GROUND CIRCUIT OF VALVE RELAY.**

- 1) Turn ignition switch OFF.
- 2) Disconnect valve relay.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between valve relay connector and body.

Connector & terminal / Specified resistance:

(F11) No. 6 — body / 1 Ω or less



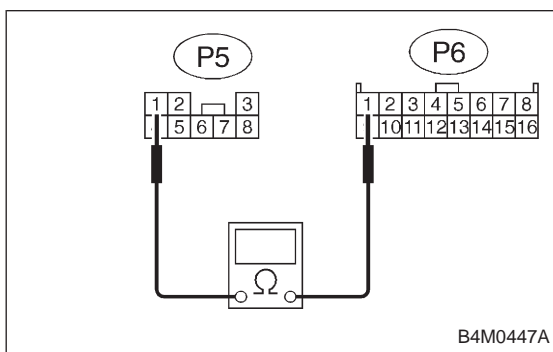
6. CHECK HARNESS BETWEEN ABS/TCS CONTROL MODULE AND VALVE RELAY.

- 1) Turn ignition switch OFF.
- 2) Disconnect valve relay.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:
(P6) No. 6 — body / 1 MΩ or more

- 5) Connect valve relay.
- 6) Measure resistance between ABS/TCS control module connector and body.

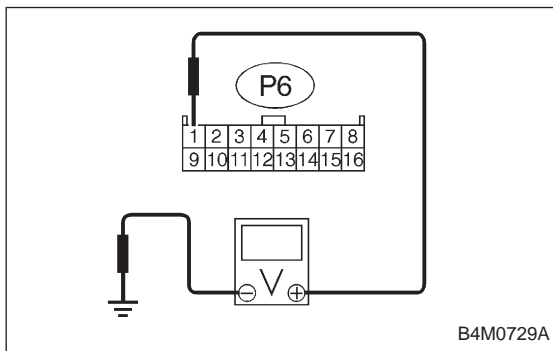
Connector & terminal / Specified resistance:
(P6) No. 6 — body / 1 Ω or less



7. CHECK RESISTANCE OF VALVE RELAY TO ABS/ TCS CONTROL MODULE SIDE.

- 1) Turn ignition switch OFF.
- 2) Connect valve relay.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

Connector & terminal / Specified resistance:
(P5) No. 1 — (P6) No. 1 / 90±10 Ω



8. CHECK BODY SHORT OF HARNESS.

- 1) Turn ignition switch OFF.
- 2) Connect valve relay.
- 3) Disconnect ABS/TCS control module.
- 4) Turn ignition switch ON.
- 5) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:
(P6) No. 1 — body / 10 — 13 V

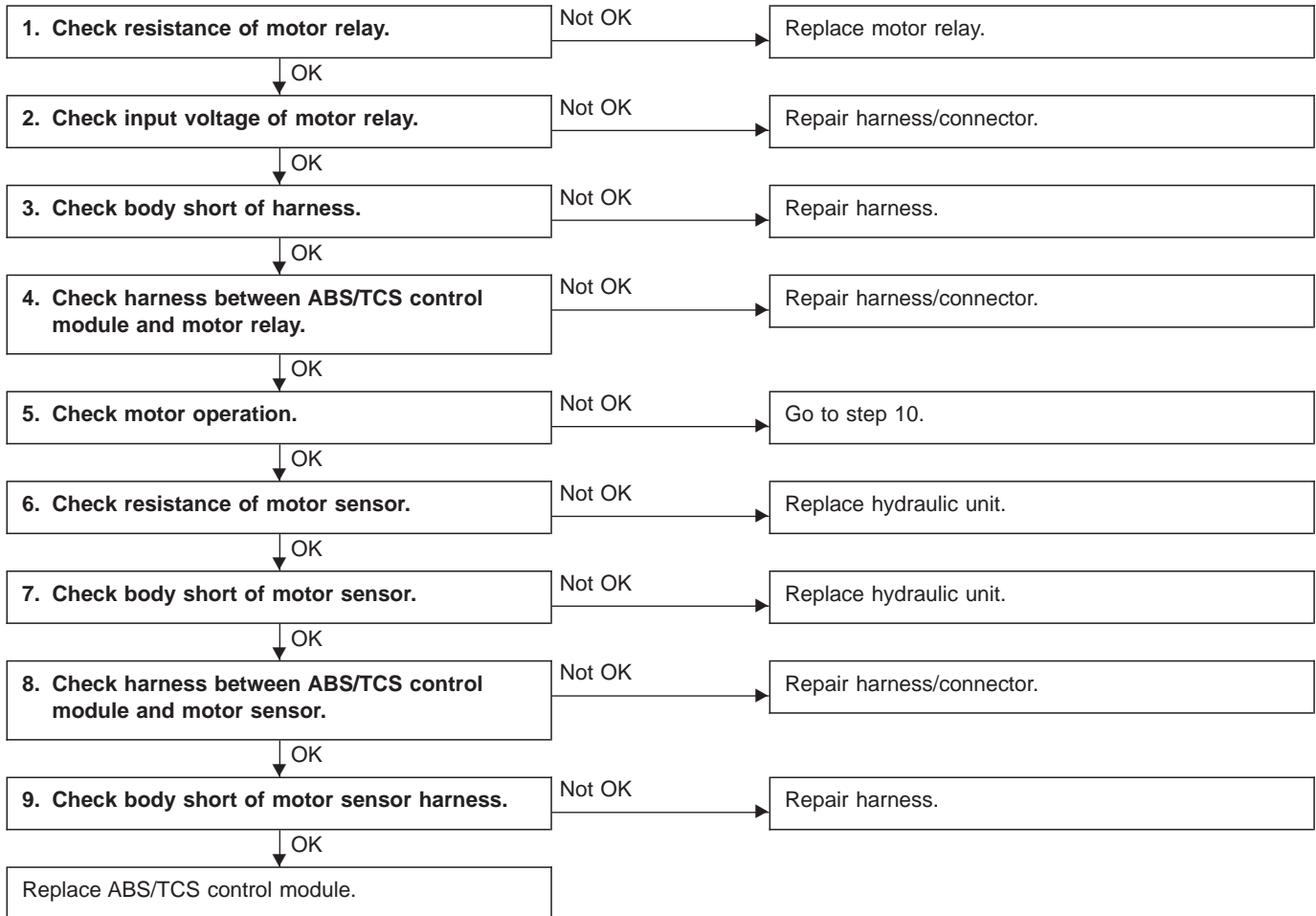
**J: TROUBLE CODE 52
— FAULTY MOTOR, MOTOR SENSOR AND/
OR MOTOR RELAY —**

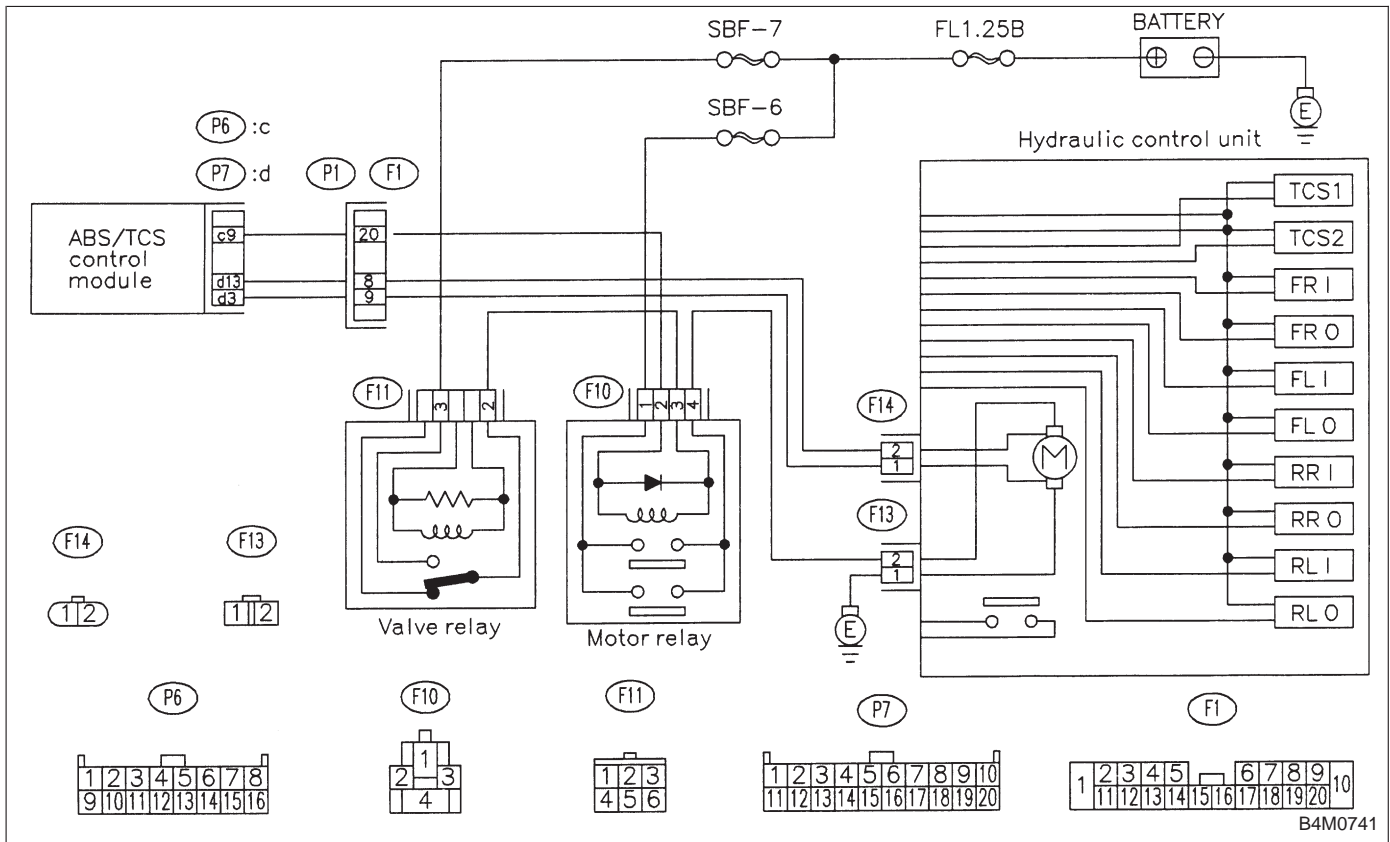
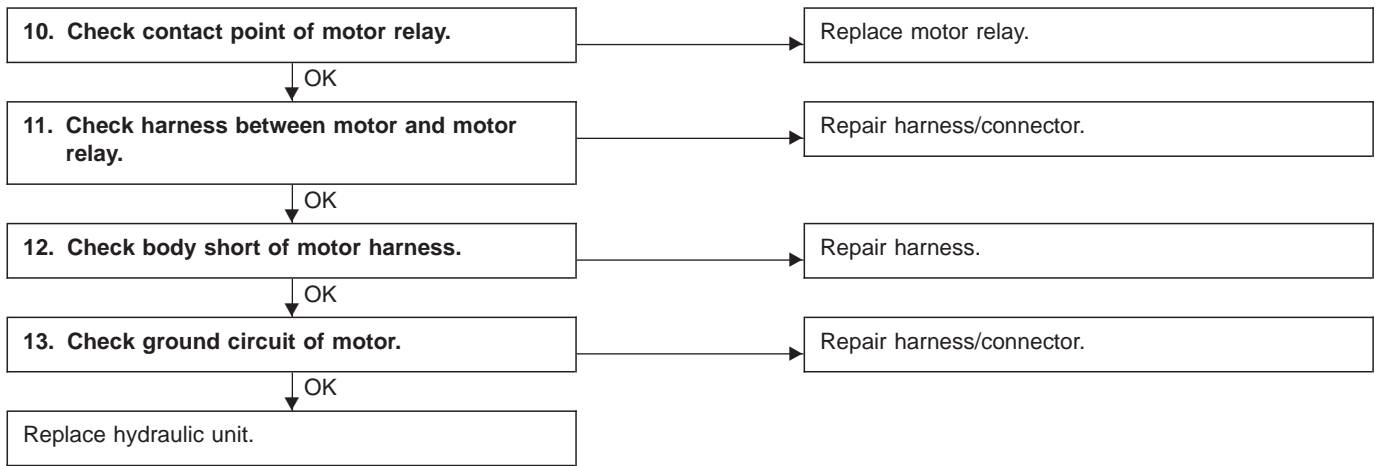
DIAGNOSIS:

- Faulty motor relay
- Faulty motor
- Faulty motor sensor
- Faulty harness/connector
- Faulty ABS/TCS control module

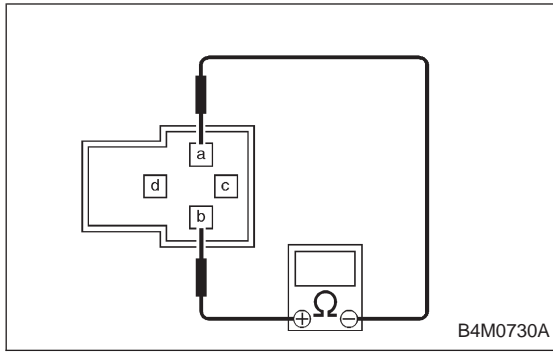
TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.





B4M0741



1. CHECK RESISTANCE OF MOTOR RELAY.

- 1) Turn ignition switch OFF.
- 2) Remove motor relay.
- 3) Measure resistance between motor relay terminals.

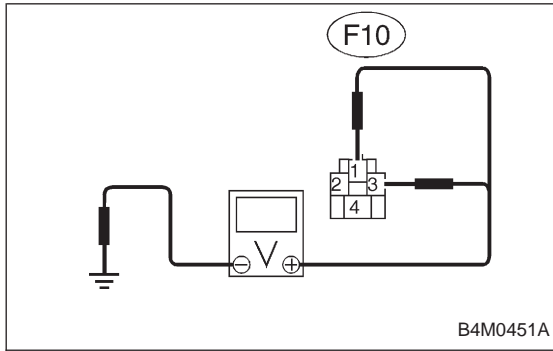
Terminal / Specified resistance:

No. a — b / 57 Ω

NOTE:

Apply + to b terminal.

Apply - to a terminal.



2. CHECK INPUT VOLTAGE OF MOTOR RELAY.

- 1) Turn ignition switch OFF.
- 2) Disconnect motor relay.
- 3) Measure voltage between motor relay connector and body.

Connector & terminal / Specified voltage:

(F10) No. 1 — body / 10 — 13 V

(F10) No. 3 — body / 0 V

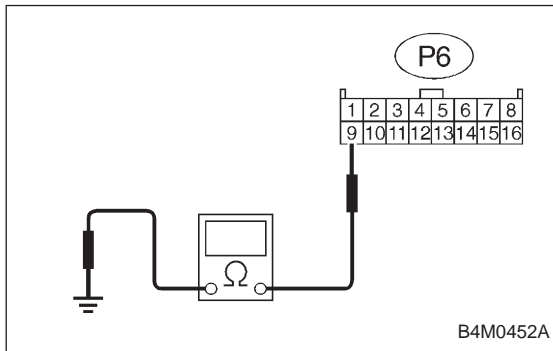
- 4) Turn ignition switch ON.

- 5) Measure voltage between motor relay connector and body.

Connector & terminal / Specified voltage:

(F10) No. 1 — body / 10 — 13 V

(F10) No. 3 — body / 10 — 13 V (In 1 second after turning ignition key ON.)

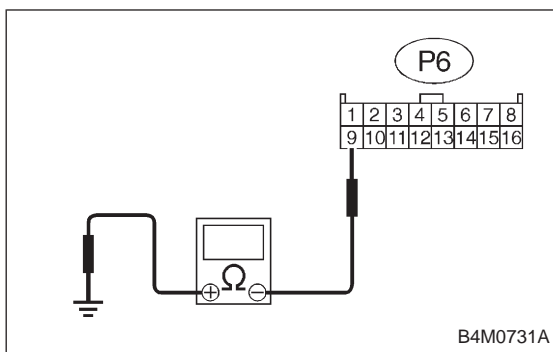


3. CHECK BODY SHORT OF HARNESS.

- 1) Turn ignition switch OFF.
- 2) Disconnect motor relay.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:

(P6) No. 9 — body / 1 MΩ or more



4. CHECK HARNESS BETWEEN ABS/TCS CONTROL MODULE AND MOTOR RELAY.

- 1) Turn ignition switch OFF.
- 2) Connect motor relay.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector and body.

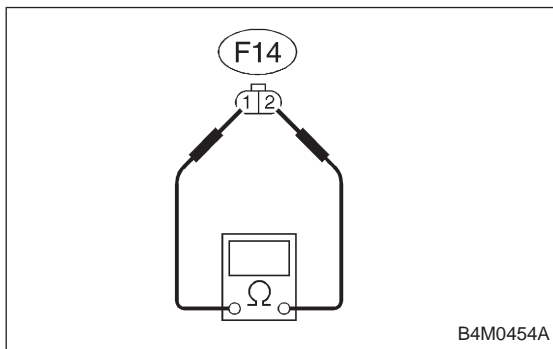
NOTE:

Apply + to GND.
Apply – to (P6) No. 9.

Connector & terminal / Specified resistance:
(P6) No. 9 — body / $57 \pm 6 \Omega$

5. CHECK MOTOR OPERATION.

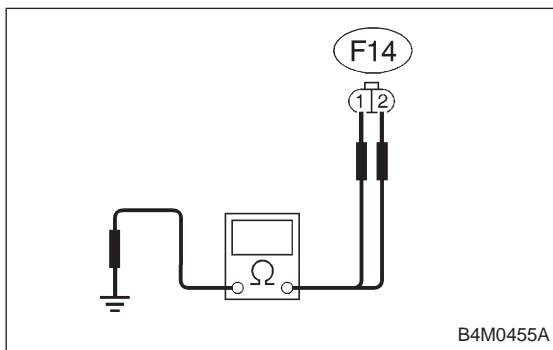
- 1) Connect motor relay.
- 2) Connect ABS/TCS control module.
- 3) Operate the TCS sequence check.
<Ref. to 4-4 [W20F0]. >
- 4) By the whirring sound check that the motor rotates.



6. CHECK RESISTANCE OF MOTOR SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect motor sensor connector.
- 3) Measure resistance between motor sensor connector terminals.

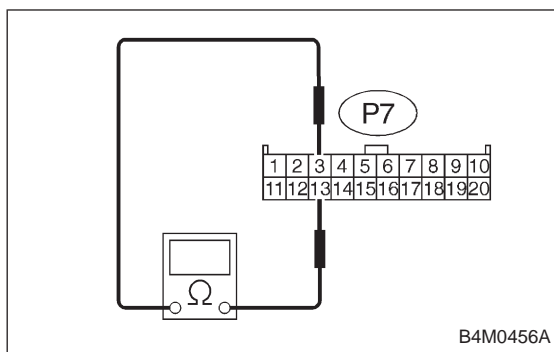
Connector & terminal / Specified resistance:
(F14) No. 1 — No. 2 / $72 - 98 \Omega$



7. CHECK BODY SHORT OF MOTOR SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect motor sensor connector.
- 3) Measure resistance between motor sensor connector and body.

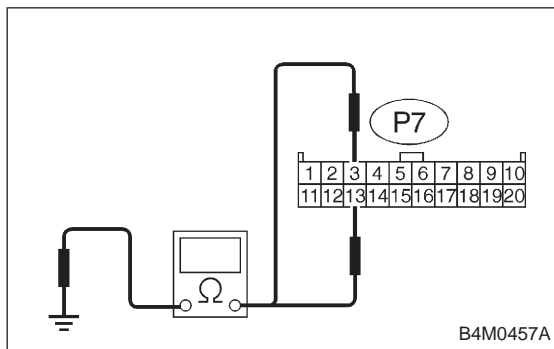
Connector & terminal / Specified resistance:
(F14) No. 1 — body / $1 M\Omega$ or more
(F14) No. 2 — body / $1 M\Omega$ or more



8. CHECK HARNESS BETWEEN ABS/TCS CONTROL MODULE AND MOTOR SENSOR.

- 1) Turn ignition switch OFF.
- 2) Connect motor sensor connector.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

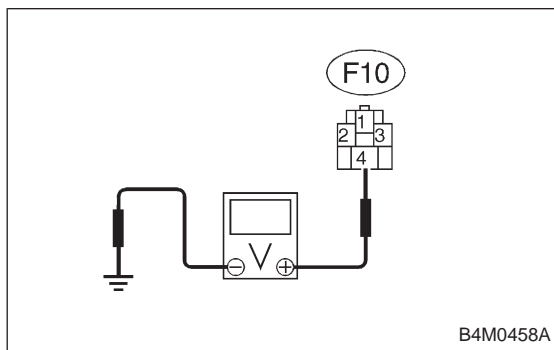
Connector & terminal / Specified resistance:
(P7) No. 3 — No. 13 / 72 — 98 Ω



9. CHECK BODY SHORT OF MOTOR SENSOR HARNESS.

- 1) Turn ignition switch OFF.
- 2) Connect motor sensor connector.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module and body.

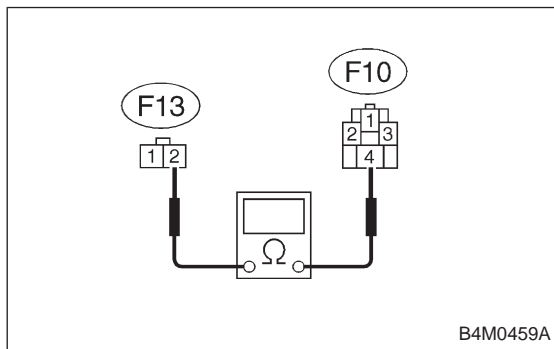
Connector & terminal / Specified resistance:
(P7) No. 3 — body / 1 MΩ or more
(P7) No. 13 — body / 1 MΩ or more



10. CHECK CONTACT POINT OF MOTOR RELAY.

- 1) Connect motor relay.
- 2) Connect ABS/TCS control module.
- 3) Operate the TCS sequence check. <Ref. to 4-4 [W20F0].>
- 4) Measure voltage between motor relay connector and body.

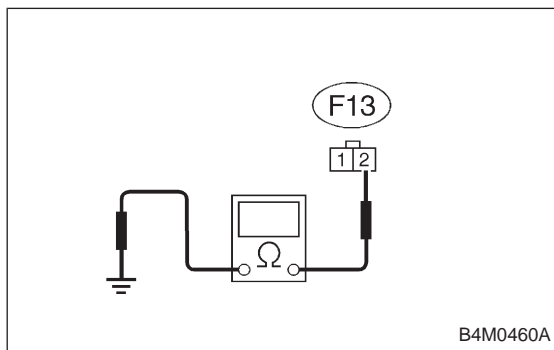
Connector & terminal / Specified voltage:
(F10) No. 4 — body / 10 — 14 V (While TCS operating indicator light is ON.)



11. CHECK HARNESS BETWEEN MOTOR AND MOTOR RELAY.

- 1) Turn ignition switch OFF.
- 2) Disconnect motor relay.
- 3) Disconnect motor connector.
- 4) Measure resistance between motor relay connector and motor connector.

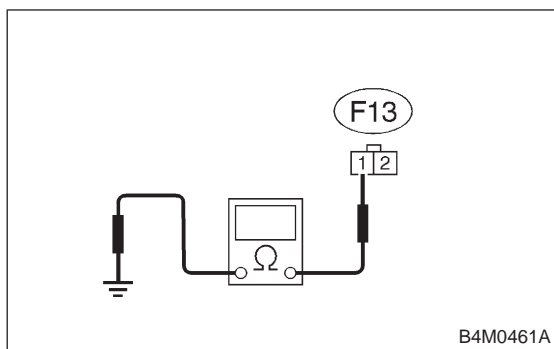
Connector & terminal / Specified resistance:
(F13) No. 2 — (F10) No. 4 / 1 Ω or less



12. CHECK BODY SHORT OF MOTOR HARNESS.

- 1) Turn ignition switch OFF.
- 2) Disconnect motor relay.
- 3) Disconnect motor connector.
- 4) Measure resistance between motor connector and body.

Connector & terminal / Specified resistance:
(F13) No. 2 — body / 1 MΩ or more

**13. CHECK GROUND CIRCUIT OF MOTOR.**

- 1) Turn ignition switch OFF.
- 2) Disconnect motor connector.
- 3) Measure resistance between motor connector and body.

Connector & terminal / Specified resistance:
(F13) No. 1 — body / 1 Ω or less

NOTE:

The check can also be made by analyzing the waves of the motor sensor output signal with oscilloscope during the TCS sequence control operation. If the ECM female connector end gives correct value, skip steps 6 through 9 above.

If not, operate the TCS sequence control again and measure the value at motor sensor male connector end with the motor sensor connector removed. If the value is OK, proceed with steps 8 and 9 above.

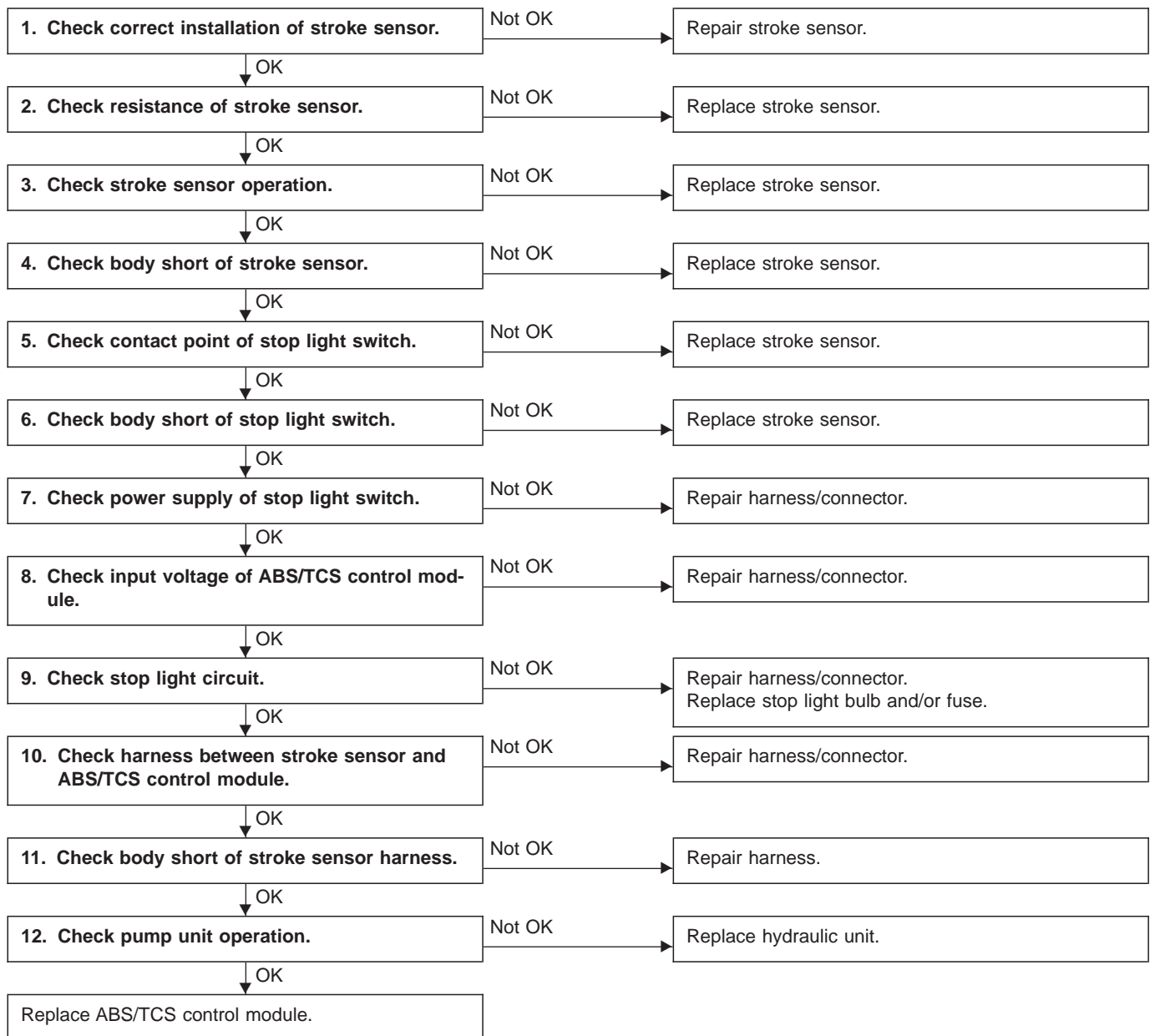
K: TROUBLE CODE 54
— FAULTY STROKE SENSOR AND/OR STOP
LIGHT SWITCH —

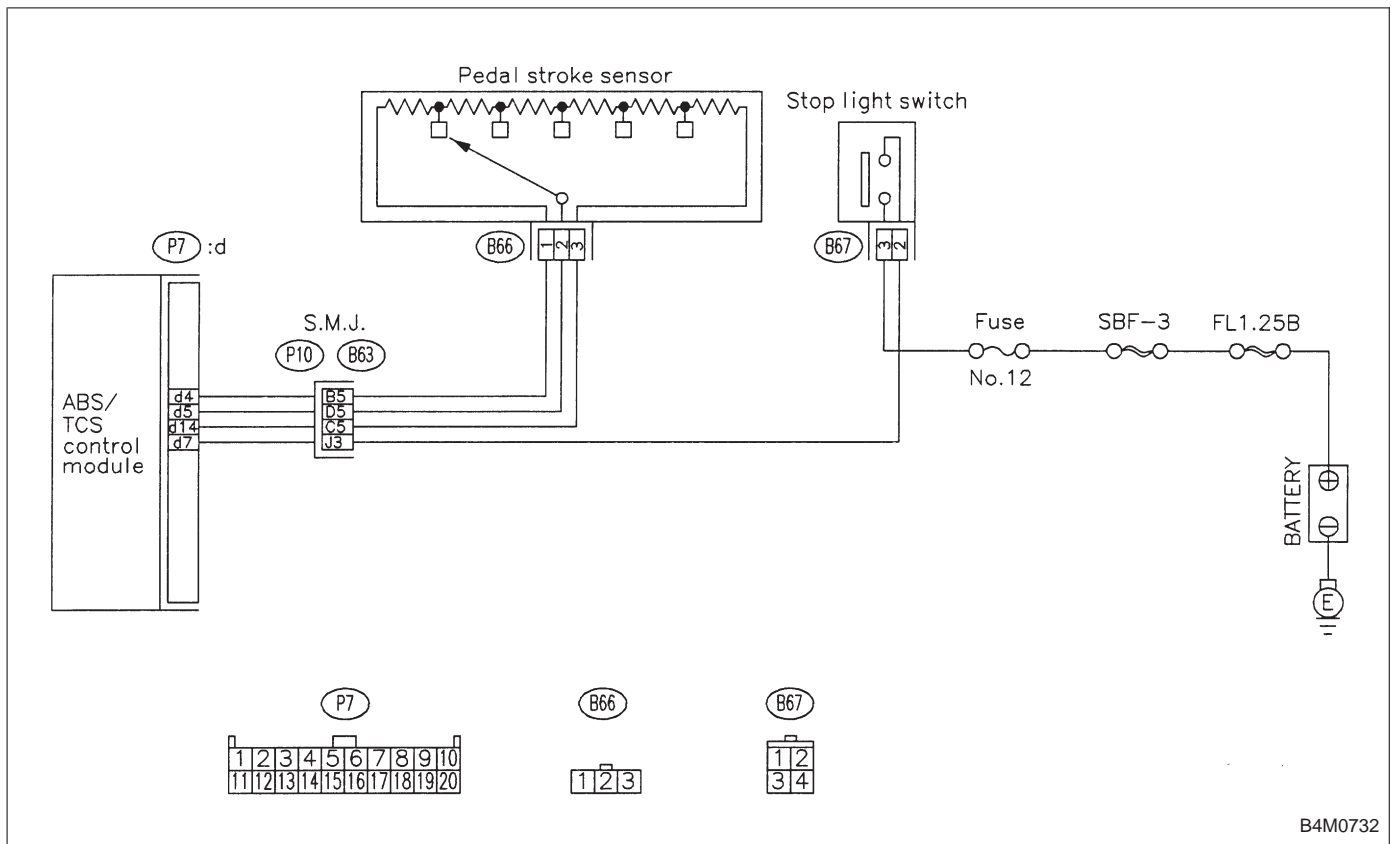
DIAGNOSIS:

- Faulty stroke sensor
- Faulty stop light switch
- Faulty pump unit in hydraulic unit
- Faulty ABS/TCS control module
- Faulty harness/connector

TROUBLE SYMPTOM:

- ABS and TCS do not operate.
- No kick-back occurs while ABS is functioning.
- Only when the stop light switch circuit is broken, the ABS functions while TCS does not. (TCS warning light only illuminates.)

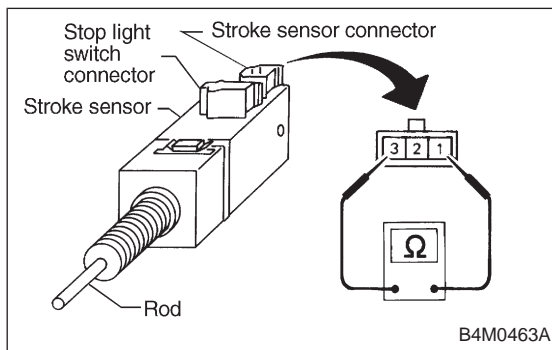




B4M0732

1. CHECK CORRECT INSTALLATION OF STROKE SENSOR.

- 1) Check that the stroke sensor is firmly installed without play.
- 2) Check that the stop lamp does not remain illuminated.

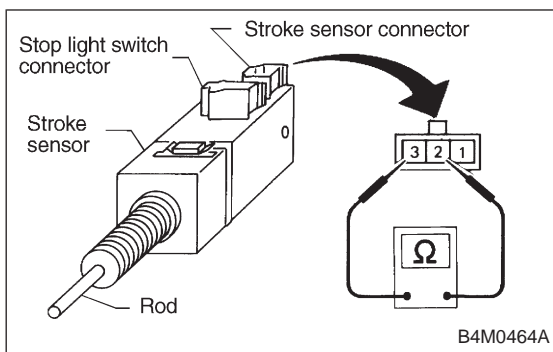


B4M0463A

2. CHECK RESISTANCE OF STROKE SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect stroke sensor connectors.
- 3) Remove stroke sensor.
- 4) Measure resistance between stroke sensor terminals.

Terminal / Specified resistance:
No. 1 — No. 3 / 570 — 630 Ω



3. CHECK STROKE SENSOR OPERATION.

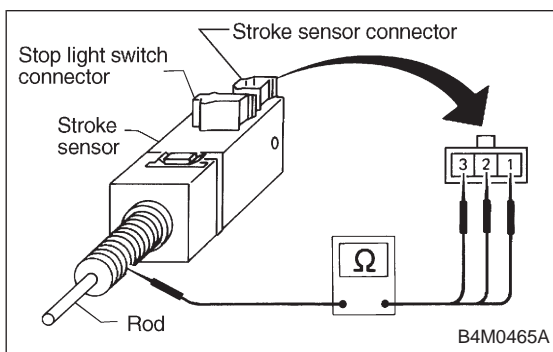
- 1) Turn ignition switch OFF.
- 2) Disconnect stroke sensor connectors.
- 3) Remove stroke sensor.
- 4) Measure the stroke sensor resistance against the rod stroke.

Terminal:
No. 3 — No. 2

Stroke	Unit: mm (in)	Specified resistance
0 — 3.1±0.5 (0 — 0.122±0.020)		95 — 105 Ω
3.1 — 5.5±0.5 (0.122 — 0.217±0.020)		190 — 210 Ω
5.5 — 7.9±0.5 (0.217 — 0.311±0.020)		285 — 315 Ω
7.9 — 10.3±0.5 (0.311 — 0.406±0.020)		380 — 420 Ω
10.3 — 18±0.5 (0.406 — 0.709±0.020)		475 — 525 Ω

NOTE:

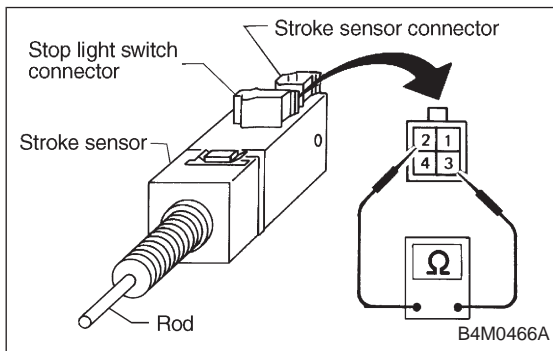
Stroke = 0 when the stroke sensor rod is completely drawn into the sensor unit.



4. CHECK BODY SHORT OF STROKE SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect stroke sensor connectors.
- 3) Remove stroke sensor.
- 4) Measure resistance between stroke sensor terminal and stroke sensor threads.

Terminal / Specified resistance:
No. 1 — stroke sensor threads/ 1 MΩ or more
No. 2 — stroke sensor threads/ 1 MΩ or more
No. 3 — stroke sensor threads/ 1 MΩ or more



5. CHECK CONTACT POINT OF STOP LIGHT SWITCH.

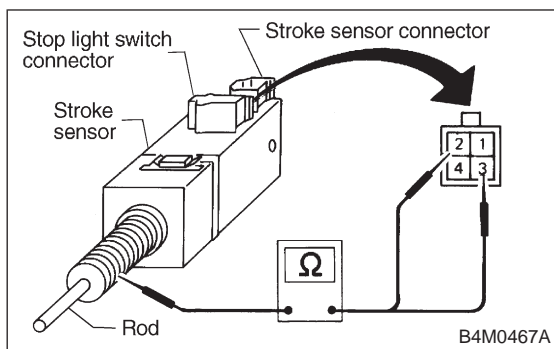
- 1) Turn ignition switch OFF.
- 2) Disconnect stroke sensor connectors.
- 3) Remove stroke sensor.
- 4) Measure resistance between stroke sensor terminals.

Terminal:
No. 2 — No. 3

Stroke	Unit mm (in)	Specified resistance
0 — 2.2±1.0 (0 — 0.087±0.039)		1 MΩ or more
2.2±1.0 — 18.0±0.5 (0.087±0.039 — 0.709±0.020)		1 Ω or less

NOTE:

Stroke = 0 when the rod is completely drawn in.

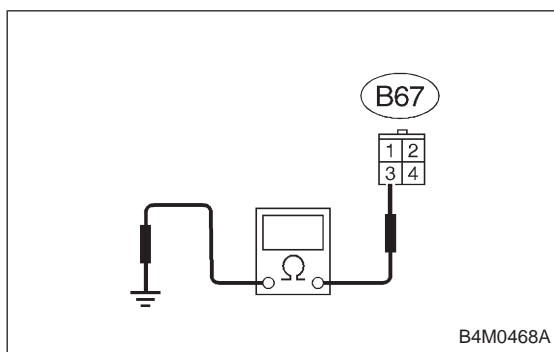
**6. CHECK BODY SHORT OF STOP LIGHT SWITCH.**

- 1) Turn ignition switch OFF.
- 2) Disconnect stroke sensor connectors.
- 3) Remove stroke sensor.
- 4) Measure resistance between stroke sensor terminal and stroke sensor threads.

Terminal / Specified resistance:

No. 2 — stroke sensor threads / 1 MΩ or more

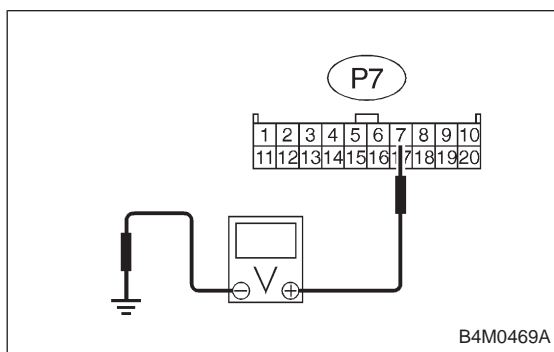
No. 3 — stroke sensor threads / 1 MΩ or more

**7. CHECK POWER SUPPLY OF STOP LIGHT SWITCH.**

- 1) Turn ignition switch OFF.
- 2) Disconnect stroke sensor connector.
- 3) Measure voltage between stroke sensor connector and body.

Connector & terminal / Specified voltage:

(B67) No. 3 — body / 10 — 13 V

**8. CHECK INPUT VOLTAGE OF ABS/TCS CONTROL MODULE.**

- 1) Turn ignition switch OFF.
- 2) Install stroke sensor.
- 3) Connect stop light switch connector.
- 4) Disconnect ABS/TCS control module connector.
- 5) Measure voltage between ABS/TCS control module connector and body.

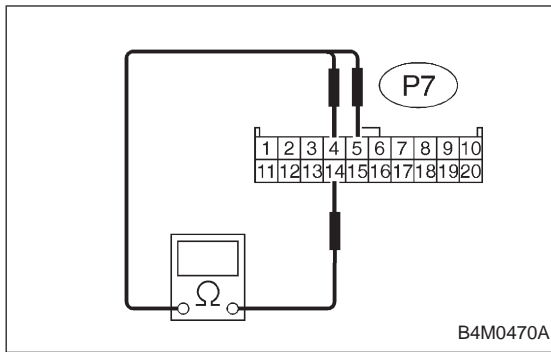
Connector & terminal / Specified voltage:

(P7) No. 7 — body / 10 — 13 V (With brake pedal depressed)

(P7) No. 7 — body / 0 V (Without brake pedal depressed)

9. CHECK STOP LIGHT CIRCUIT.

- 1) Turn ignition switch OFF.
- 2) Install stroke sensor.
- 3) Connect stroke sensor connector.
- 4) Connect ABS/TCS control module connector.
- 5) Depress brake pedal and check that the stop light comes on.



10. CHECK HARNESS BETWEEN STROKE SENSOR AND ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Install stroke sensor.
- 3) Connect stroke sensor connector.
- 4) Disconnect ABS/TCS control module connector.
- 5) Measure resistance between ABS/TCS control module connector terminals.

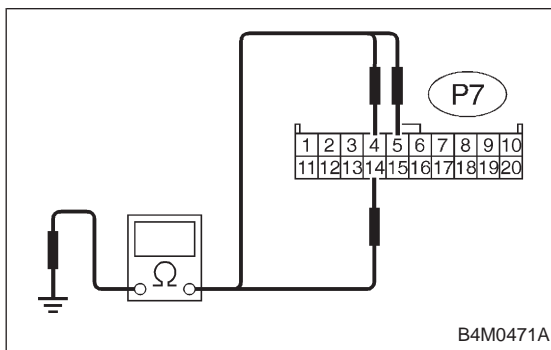
Connector & terminal / Specified resistance:

(P7) No. 4 — No. 14 / 570 — 630 Ω

(P7) No. 5 — No. 14 / 95 — 105 Ω

NOTE:

Do not depress brake pedal.



11. CHECK BODY SHORT OF STROKE SENSOR HARNESS.

- 1) Turn ignition switch OFF.
- 2) Connect stroke sensor connector.
- 3) Disconnect ABS/TCS control module connector.
- 4) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:

(P7) No. 4 — body / 1 M Ω or more

(P7) No. 5 — body / 1 M Ω or more

(P7) No. 14 — body / 1 M Ω or more

12. CHECK PUMP UNIT OPERATION.

- 1) Turn ignition switch OFF.
- 2) Connect stroke sensor connector.
- 3) Connect stop light switch connector.
- 4) Connect ABS/TCS control module connector.
- 5) Operate the TCS sequence control and check that the front brake fluid pressure increases and decreases correctly. <Ref. to 4-4 [W20F0].>

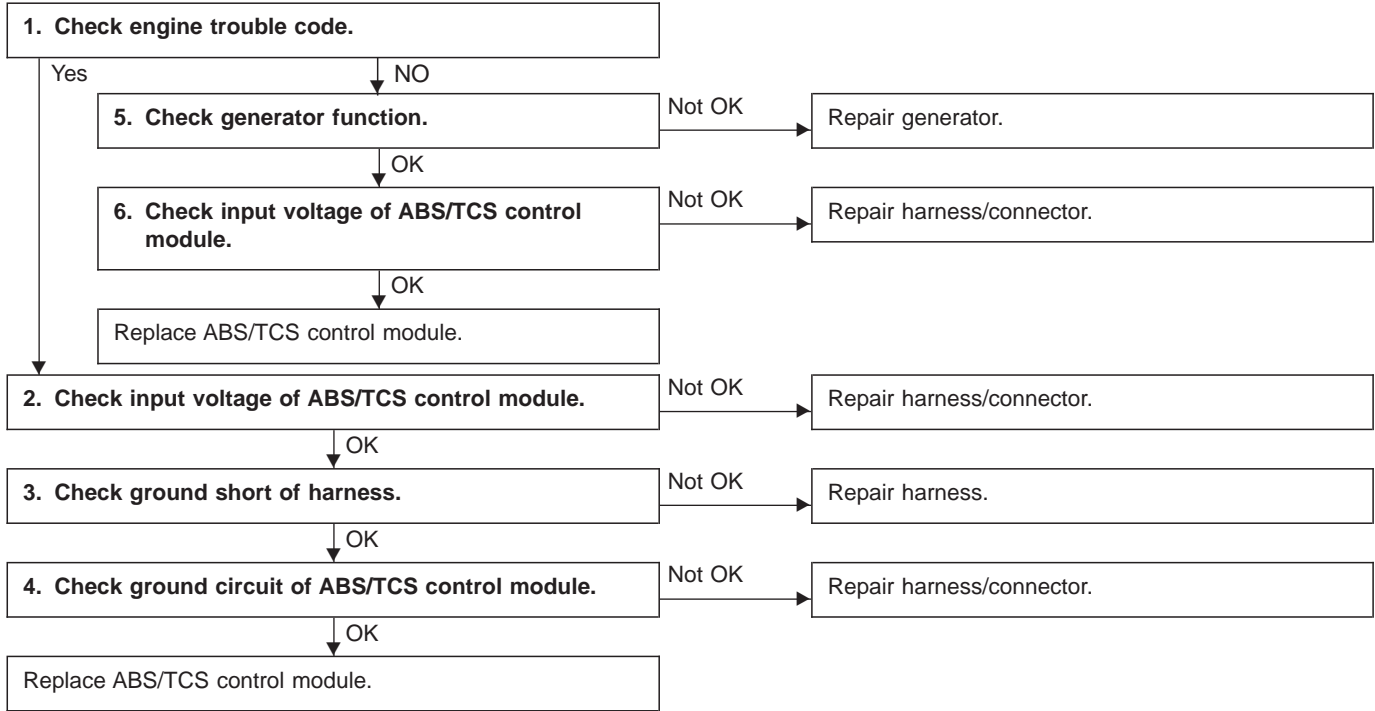
**L: TROUBLE CODE 57
— FAULTY FLUID LEVEL SENSOR —**

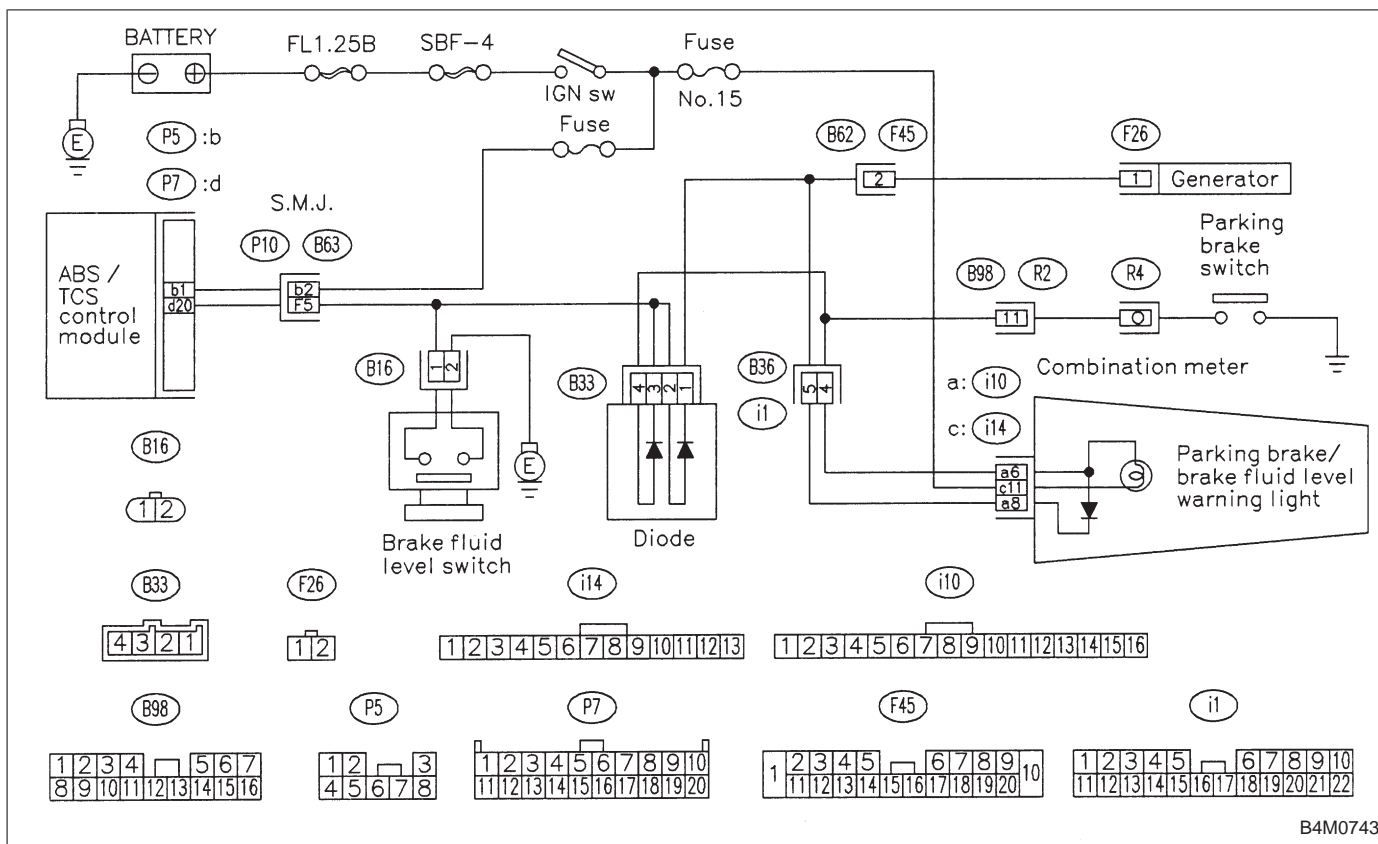
DIAGNOSIS:

- Faulty fluid level sensor circuit
- Faulty harness/connector
- Faulty ABS/TCS control module
- Faulty generator

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.

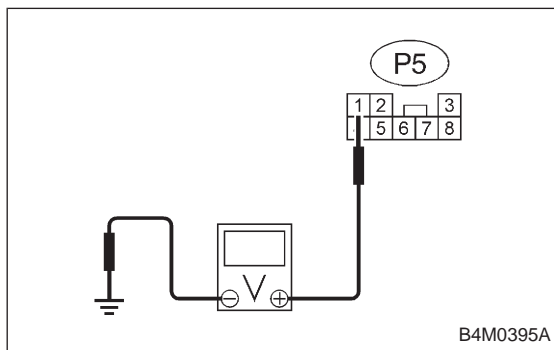




B4M0743

1. CHECK ENGINE TROUBLE CODE.

- 1) Read out engine trouble code.
- 2) Is trouble code 39 in memory?

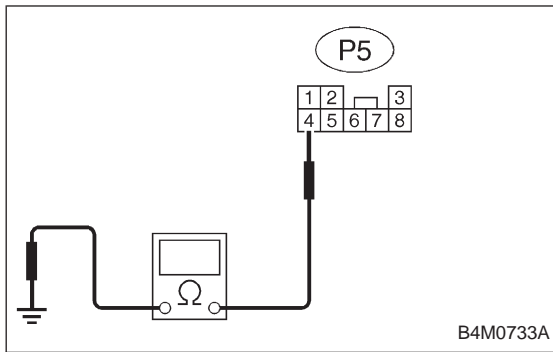


B4M0395A

2. CHECK INPUT VOLTAGE OF ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect ABS/TCS control module connectors.
- 3) Turn ignition switch ON, while engine is idling.
- 4) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:
(P5) No. 1 — body / 14.5±0.3 V

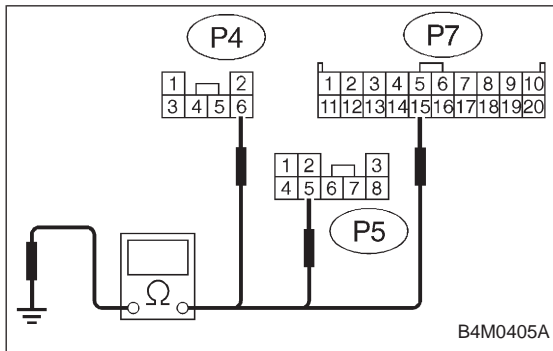


3. CHECK GROUND SHORT OF HARNESS.

- 1) Turn ignition switch OFF.
- 2) Remove No. 18 fuse from fuse and joint box.
- 3) Disconnect ABS/TCS control module connectors.
- 4) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:

(P5) No. 1 — body / 1 MΩ or more



4. CHECK GROUND CIRCUIT OF ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS/TCS control module.
- 3) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:

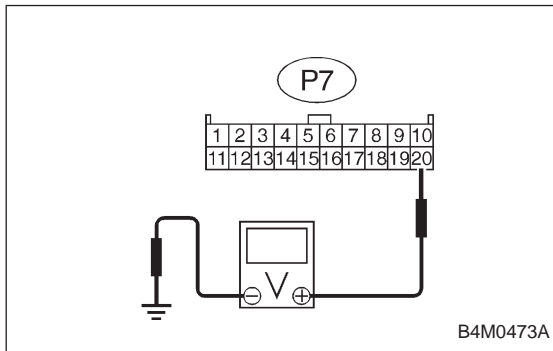
(P4) No. 6 — body / 1 Ω or less

(P5) No. 5 — body / 1 Ω or less

(P7) No. 15 — body / 1 Ω or less

5. CHECK GENERATOR FUNCTION.

- 1) When the ignition key is at OFF, check the charge warning light is off.
- 2) Turn the key ON and ensure the light comes on.
- 3) Keep the engine running at idle and ensure the light goes off.



6. CHECK INPUT VOLTAGE OF ABS/TCS CONTROL MODULE.

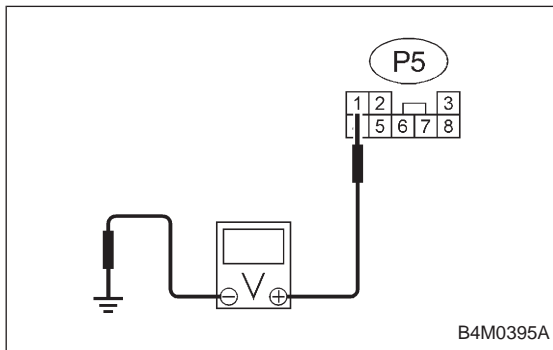
- 1) Turn ignition switch OFF.
- 2) Disconnect ABS/TCS control module connectors.
- 3) Turn ignition switch ON.
- 4) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:

(P7) No. 20 — body / 2 V or less (Engine OFF)

(P7) No. 20 — body / 10 — 14 V (Engine idling)

(P5) No. 1 — body / 10 — 13 V (Engine OFF)



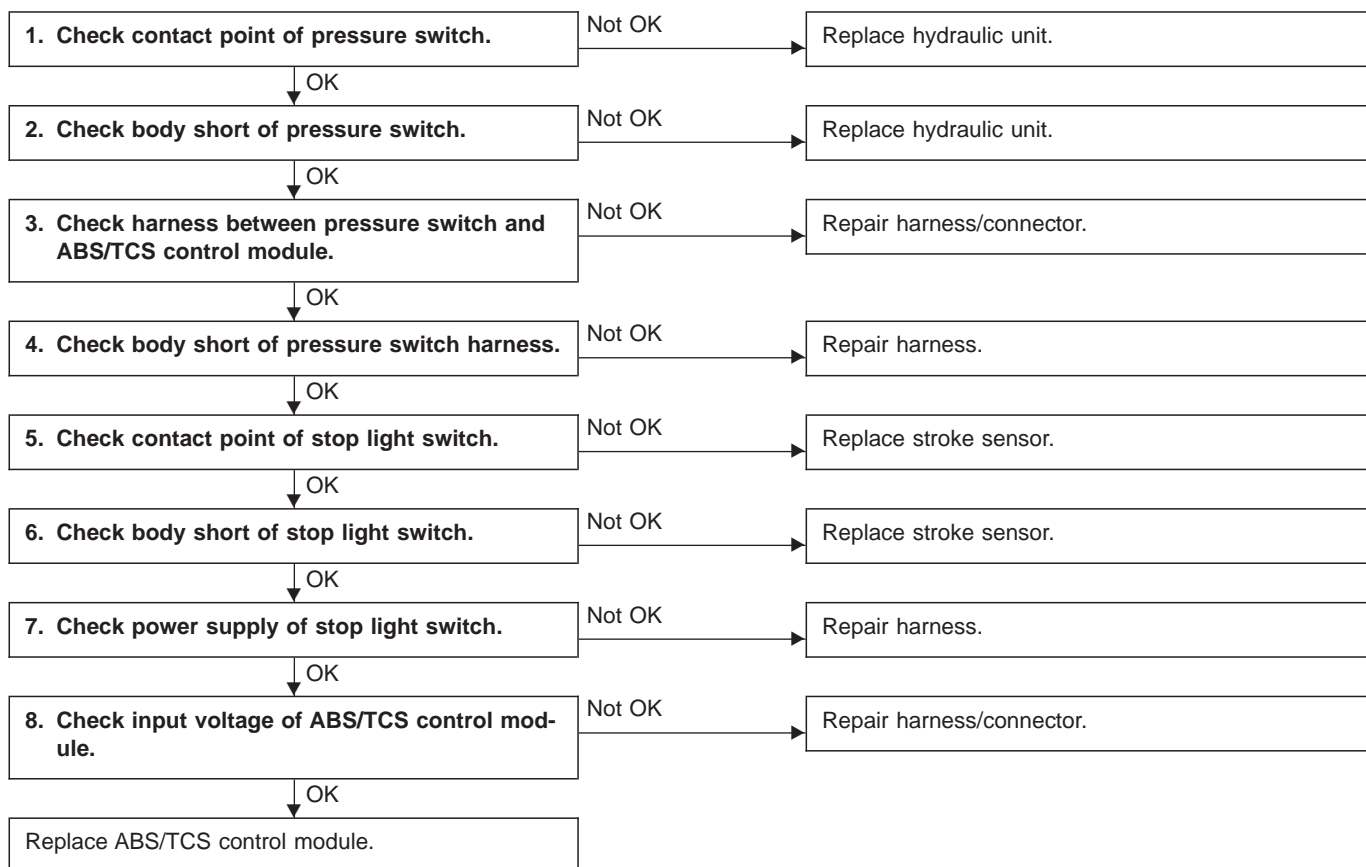
**M: TROUBLE CODE 58
— FAULTY PRESSURE SWITCH —**

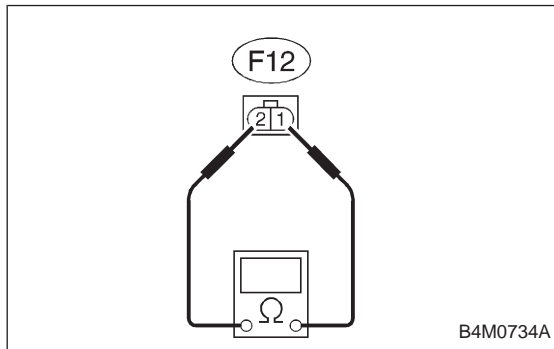
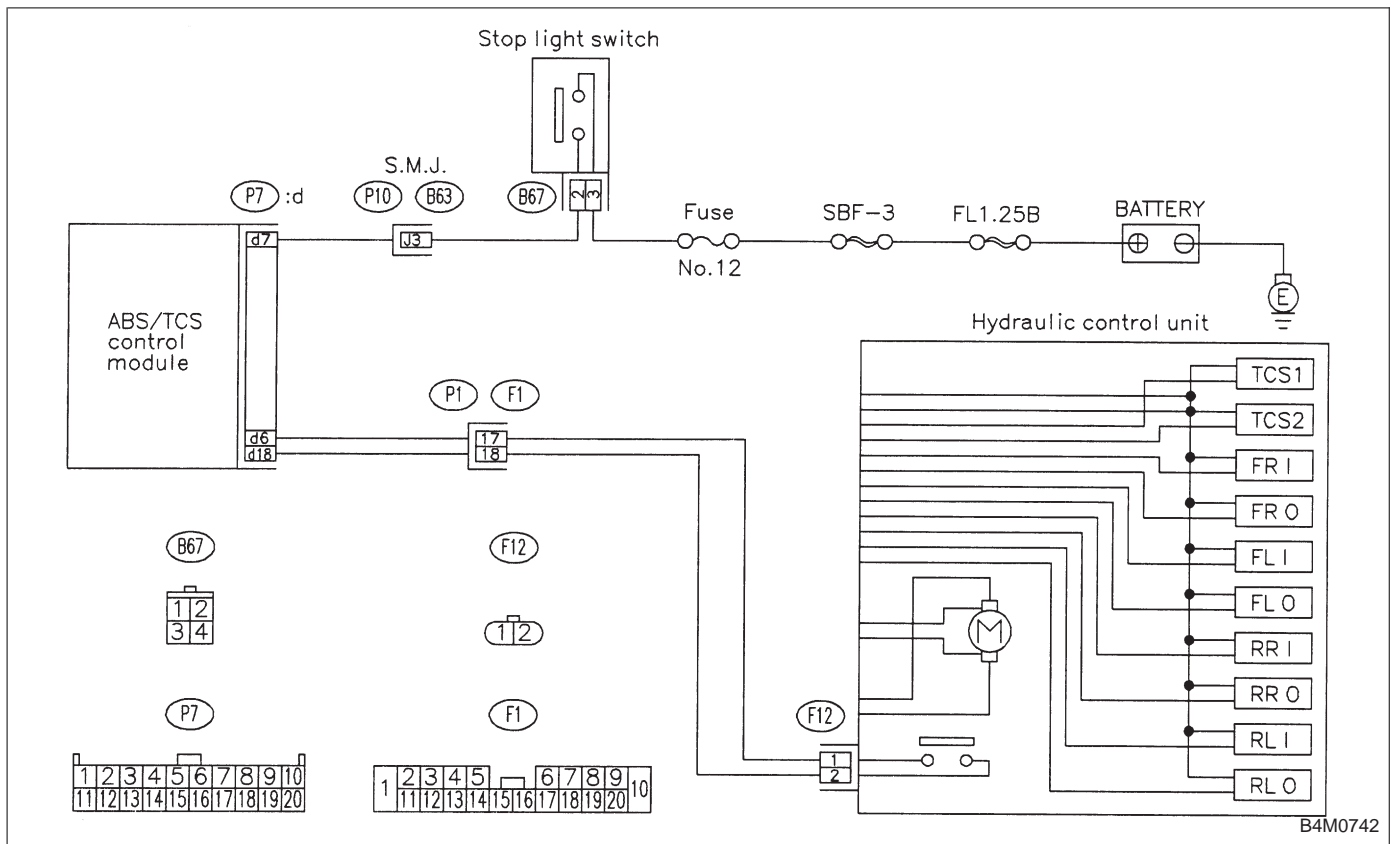
DIAGNOSIS:

- Faulty pressure switch
- Faulty stop light switch
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- TCS does not operate.





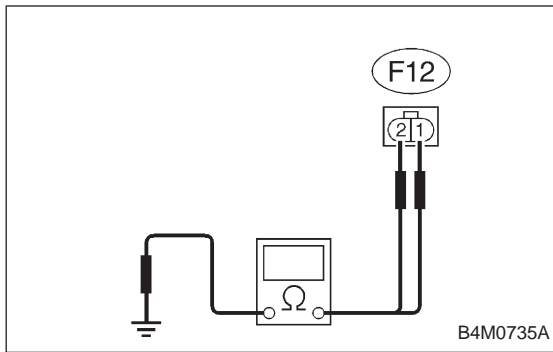
1. CHECK CONTACT POINT OF PRESSURE SWITCH.

- 1) Turn ignition switch OFF.
- 2) Disconnect hydraulic unit connector.
- 3) Measure resistance between hydraulic unit connector terminals.

Connector & terminal / Specified resistance:

(F12) No. 1 — No. 2 / 1 MΩ or more (With brake pedal depressed)

(F12) No. 1 — No. 2 / 1 Ω or less (Without brake pedal depressed)



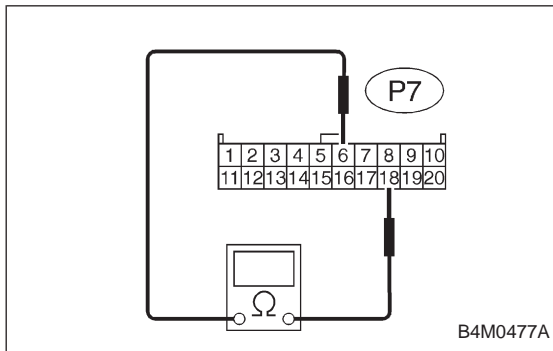
2. CHECK BODY SHORT OF PRESSURE SWITCH.

- 1) Turn ignition switch OFF.
- 2) Disconnect hydraulic unit connector.
- 3) Measure resistance between hydraulic unit connector and body.

Connector & terminal / Specified resistance:

(F12) No. 1 — body / 1 MΩ or more

(F12) No. 2 — body / 1 MΩ or more



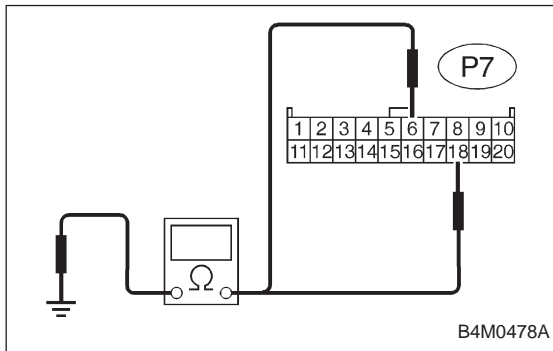
3. CHECK HARNESS BETWEEN PRESSURE SWITCH AND ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Connect hydraulic unit connector.
- 3) Disconnect ABS/TCS control module connector.
- 4) Measure resistance between ABS/TCS control module connector terminals.

Connector & terminal / Specified resistance:

(P7) No. 6 — No. 18 / 1 MΩ or more (With brake pedal depressed)

(P7) No. 6 — No. 18 / 1 Ω or less (Without brake pedal depressed)



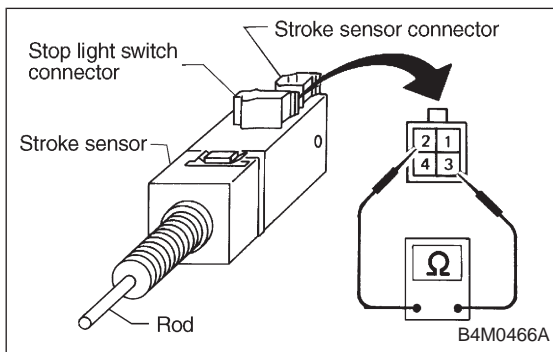
4. CHECK BODY SHORT OF PRESSURE SWITCH HARNESS.

- 1) Turn ignition switch OFF.
- 2) Disconnect ABS/TCS control module connector.
- 3) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:

(P7) No. 6 — body / 1 MΩ or more

(P7) No. 18 — body / 1 MΩ or more



5. CHECK CONTACT POINT OF STOP LIGHT SWITCH.

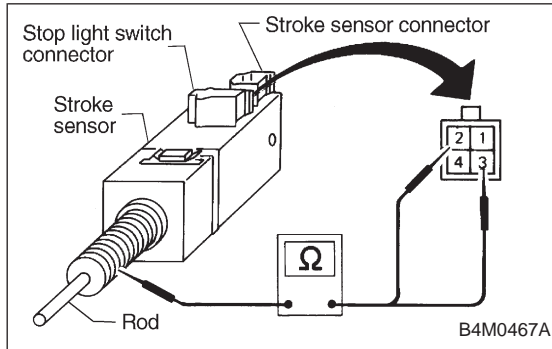
- 1) Turn ignition switch OFF.
- 2) Disconnect stop light switch connectors.
- 3) Remove stroke sensor.
- 4) Measure resistance between stroke sensor terminals.

Terminal:
No. 2 — No. 3

Stroke	Unit: mm (in)	Specified resistance
0 — 2.2±1.0 (0 — 0.087±0.039)		1 MΩ or more
2.2±1.0 — 18.0±0.5 (0.087±0.039 — 0.709±0.020)		1 Ω or less

NOTE:

Stroke = 0 when the rod is completely drawn in.



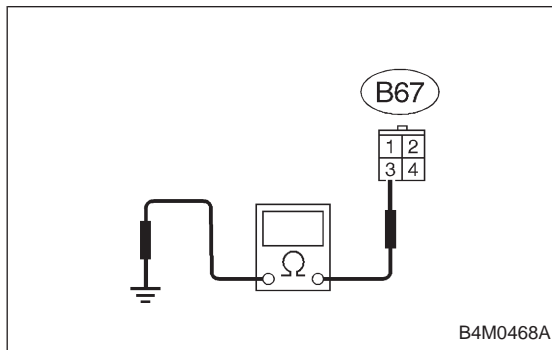
6. CHECK BODY SHORT OF STOP LIGHT SWITCH.

- 1) Turn ignition switch OFF.
- 2) Disconnect stroke sensor connectors.
- 3) Remove stroke sensor.
- 4) Measure resistance between stroke sensor terminal and stroke sensor threads.

Terminal / Specified resistance:

No. 2 — stroke sensor threads / 1 MΩ or more

No. 3 — stroke sensor threads / 1 MΩ or more

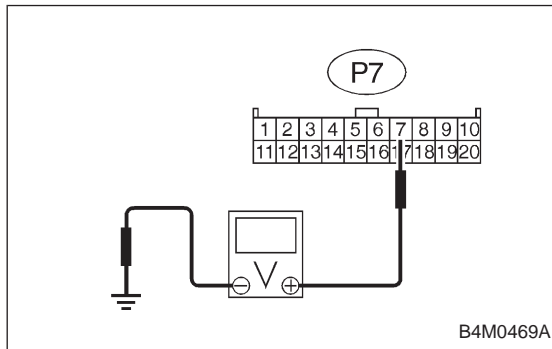


7. CHECK POWER SUPPLY OF STOP LIGHT SWITCH.

- 1) Turn ignition switch OFF.
- 2) Disconnect stroke sensor connector.
- 3) Measure voltage between stroke sensor connector and body.

Connector & terminal / Specified voltage:

(B67) No. 3 — body / 10 — 13 V



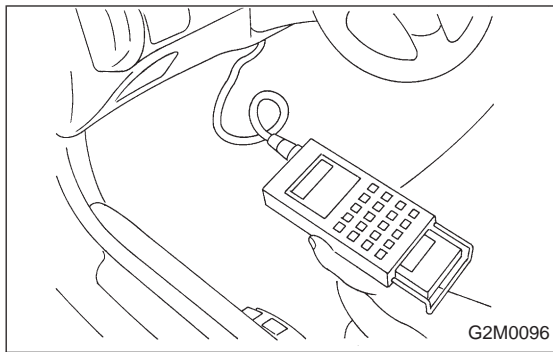
8. CHECK INPUT VOLTAGE OF ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Install stroke sensor.
- 3) Connect stroke sensor connector.
- 4) Disconnect ABS/TCS control module connector.
- 5) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:

(P7) No. 7 — body / 10 — 13 V (With brake pedal depressed)

(P7) No. 7 — body / 0 V (Without brake pedal depressed)



9. Select Monitor Function Mode

Applicable cartridge of select monitor: No. 498349601

A: LIST OF FUNCTION MODE

1. F MODE (ROM ID, ANALOG DATA ARE DISPLAYED.)

Function code		Measuring items	Contents to be monitored	Scroll	Ref. to 4-4b
Code	Abbreviation				
F00	ROM	ECM identification	ROM ID number of ECM is read and enabled communication state is displayed.	Possible	[T9B0]
F01	FR	FR wheel speed (mile/h)	Wheel speed detected by the FR wheel speed sensor is displayed in mile/h.	Possible	[T9C0]
F02	FL	FL wheel speed (mile/h)	Wheel speed detected by the FL wheel speed sensor is displayed in mile/h.	Possible	[T9D0]
F03	RR	RR wheel speed (mile/h)	Wheel speed detected by the RR wheel speed sensor is displayed in mile/h.	Possible	[T9E0]
F04	RL	RL wheel speed (mile/h)	Wheel speed detected by the RL wheel speed sensor is displayed in mile/h.	Possible	[T9F0]
F05	FR	FR wheel speed (km/h)	Wheel speed detected by the FR wheel speed sensor is displayed in km/h.	Possible	[T9C0]
F06	FL	FL wheel speed (km/h)	Wheel speed detected by the FL wheel speed sensor is displayed in km/h.	Possible	[T9D0]
F07	RR	RR wheel speed (km/h)	Wheel speed detected by the RR wheel speed sensor is displayed in km/h.	Possible	[T9E0]
F08	RL	RL wheel speed (km/h)	Wheel speed detected by the RL wheel speed sensor is displayed in km/h.	Possible	[T9F0]
F09	PSS	Pedal stroke sensor output	The number of output steps of the pedal stroke sensor is displayed.	Possible	[T9G0]

2. FA MODE (ON/OFF DATA ARE DISPLAYED.)

If the system is in normal condition with the engine run at idle speed (when the brake pedal is off), the LED of EC (AEC signal) of FA2 will come on, the LED of EM (EAM signal) blink and all other LED's go out.

Function code		Measuring items	Contents to be monitored	Scroll	Ref. to 4-4b
Code	Abbreviation				
FA0	OF	OFF.SW	LED 1 comes on with the OFF switch on.	Possible	[T9H0]
	B1	Stop light switch	LED 2 comes on with the switch on (with the brake pedal down).		
	VR	Valve relay signal	LED 3 comes on with the valve relay off.		
	VM	Valve relay monitor	LED 4 comes on with the valve relay off.		
	MR	Motor relay signal	LED 5 comes on with the motor on.		
	MS	Motor sensor	LED 6 comes on with the motor on.		
	FS	Fluid level sensor	LED 7 comes on with the sensor on (the fluid level is lowered).		
FA1	FI	FR.IN valve	LED 1 comes on when the FR.IN valve is operating.	Possible	[T9I0]
	RO	FR.OUT valve	LED 2 comes on when the FR.OUT valve is operating.		
	FL	FL.IN valve	LED 3 comes on when the FL.IN valve is operating.		
	LO	FL.OUT valve	LED 4 comes on when the FL.OUT valve is operating.		
	T1	TCS1 valve	LED 5 comes on when the TCS1 valve is operating.		
	RI	RR.IN valve	LED 6 comes on when the RR.IN valve is operating.		
	RO	RR.OUT valve	LED 7 comes on when the RR.OUT valve is operating.		
	RI	RL.IN valve	LED 8 comes on when the RL.IN valve is operating.		
	LO	RL.OUT valve	LED 9 comes on when the RL.OUT valve is operating.		
	T2	TCS2 valve	LED 10 comes on when the TCS2 valve is operating.		
FA2	AW	ABS warning light	LED 1 comes on when the warning light is on.	Possible	[T9J0]
	TW	TCS warning light	LED 2 comes on when the warning light is on.		
	TO	TCS OFF indicator light	LED 3 comes on when the indicator light is on.		
	TI	TCS operation indicator light	LED 4 comes on when the indicator light is on.		
	EC	AEC signal	With the engine run at idle speed, LED 6 (AEC) comes on and LED 7 (AEB) goes out (They go on and off depending on the behavior of a vehicle.)		
	EB	AEB signal			
	ET	AET signal	LED 8 comes on with the TCS control on.		
	EM	EAM signal	LED 9 comes on or blinks when the engine control is enabled.		
AT	AAT signal	LED 10 comes on when ABS control is on.			

3. FB MODE (TROUBLE CODES ARE DISPLAYED.)

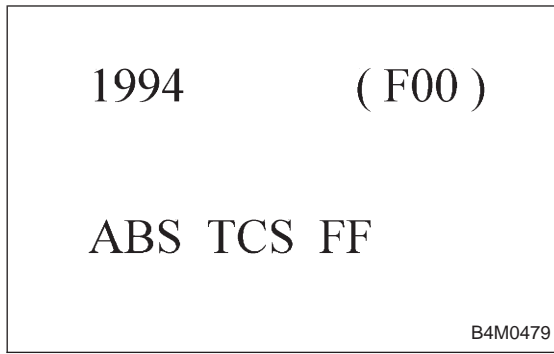
Function code		Measuring items	Contents to be monitored	Scroll	Ref. to 4-4b
Code	Abbreviation				
FB0	D-NEW	The most recent failures are displayed.	Trouble codes, trouble spots and symptoms for the most recent failure are displayed.	Possible	[T10B0]
FB1	D-ALL	Historical troubles are displayed.	Trouble codes, trouble spots and symptoms for all historical failures are displayed.	Possible	[T10B0]

4. FC MODE (TROUBLE CODES ARE ERASED.)

Function code		Measuring items	Contents to be monitored	Scroll	Ref. to 4-4b
Code	Abbreviation				
FC0	D-CLR	Trouble codes are erased.	Function of clearing trouble code stored in memory.	Possible	[T9K0]

5. FD MODE (SEQUENCE CHECK AND AIR RELEASE MODE)

Function code		Measuring items	Contents to be monitored	Scroll	Ref. to
Code	Abbreviation				
FD1	A-CHK	ABS sequence control	Perform ABS sequence control by operating valve and pump motor sequentially.	Impossible	4-4 [W20D0]
FD2	T-CHK	TCS sequence control	Perform TCS sequence control by operating the valve and pump motor sequentially.	Impossible	4-4 [W20F0]
FD3	AIR	Air bleeding control	Manually operate the valve and pump motor to bleed air.	Impossible	4-4 [W19A0]



B: MODE F00
— ROM ID NUMBER (ROM) —

CONDITION:

Ignition switch ON

SPECIFIED DATA:

Presentation display

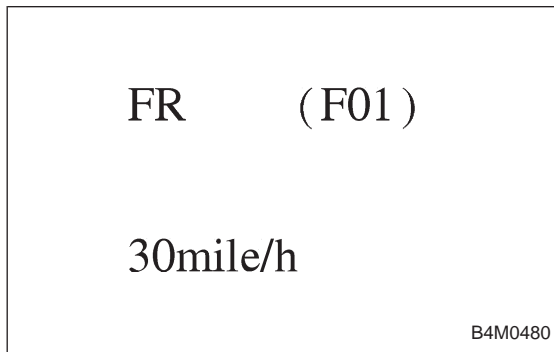
- Probable cause (Item outside "specified data")

1. Error 1

Check for loose or disconnected connector, and discontinued circuit, etc.

2. Error 2

Check for poor contact of cartridge, or different type cartridge.

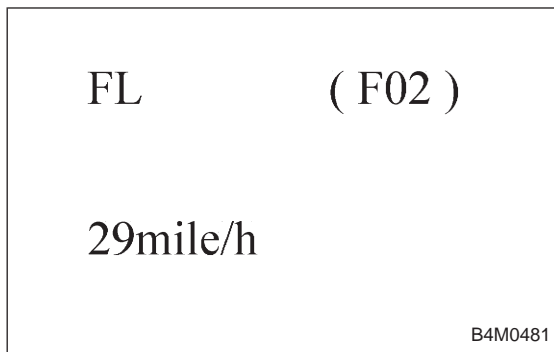


C: MODE F01 AND F05
— FRONT RIGHT WHEEL SPEED SIGNAL (FR) —

- Compare speedometer with monitor indications.
- F01: FR wheel speed is indicated in mile per hour (mile/h).
- F05: FR wheel speed is indicated in kilometer per hour (km/h).

NOTE:

The monitor as shown, indicates that FR wheel speed is 30 mile/h.

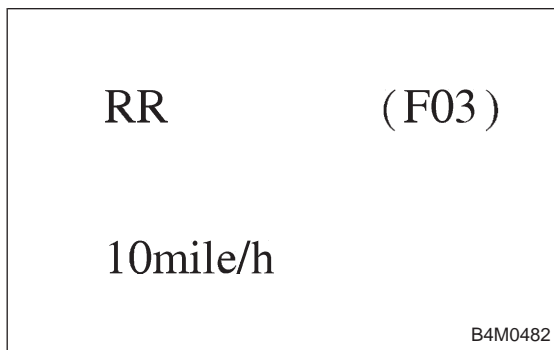


D: MODE F02 AND F06
— FRONT LEFT WHEEL SPEED SIGNAL
(FL) —

- Compare speedometer with monitor indications.
- F02: FL wheel speed is indicated in mile per hour (mile/h).
- F06: FL wheel speed is indicated in kilometer per hour (km/h).

NOTE:

The monitor as shown, indicates that FL wheel speed is 29 mile/h.

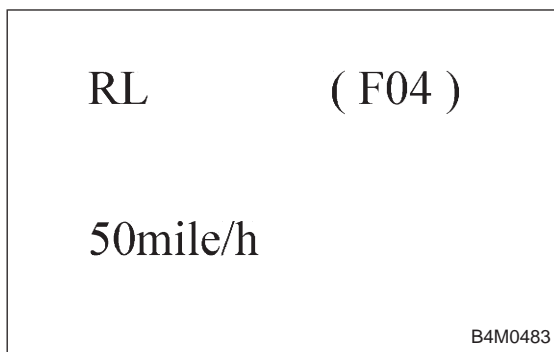


E: MODE F03 AND F07
— REAR RIGHT WHEEL SPEED SIGNAL
(RR) —

- Compare speedometer with monitor indications.
- F03: RR wheel speed is indicated in mile per hour (mile/h).
- F07: RR wheel speed is indicated in kilometer per hour (km/h).

NOTE:

The monitor as shown, indicates that RR wheel speed is 10 mile/h.

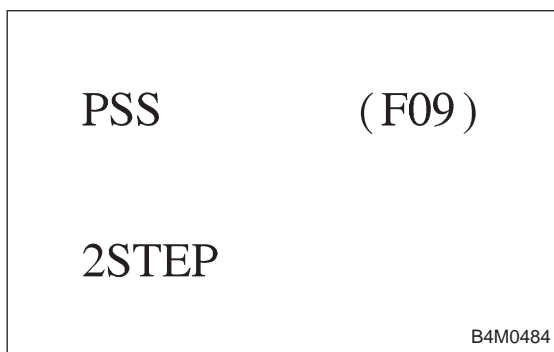


F: MODE F04 AND F08
— REAR LEFT WHEEL SPEED SIGNAL (RL)
—

- Compare speedometer with monitor indications.
- F04: RL wheel speed is indicated in mile per hour (mile/h).
- F08: RL wheel speed is indicated in kilometer per hour (km/h).

NOTE:

The monitor as shown, indicates that RL wheel speed is 50 mile/h.



G: MODE F09
— PEDAL STROKE SENSOR SIGNAL (PSS)
—

- Indicates the output step number of the pedal stroke sensor.

LED No.	Signal name	Display
1	TCS OFF switch	OF
2	Stop light switch	B1
3	Valve relay signal	VR
4	Valve relay monitor	VM
5	Motor relay signal	MR
6	Motor sensor	MS
7	Brake fluid level sensor	FS
8	—	—
9	—	—
10	—	—

H: MODE FA0
— ON ↔ OFF SIGNAL —

Requirement for LED "ON"

- LED No. 1 T.C.S OFF switch is turned ON.
- LED No. 2 Stop light switch is turned ON. (With brake pedal depressed.)
- LED No. 3 Valve relay is turned OFF.
- LED No. 4 Valve relay is turned OFF.
- LED No. 5 Motor relay is turned ON.
- LED No. 6 Motor is rotating.
- LED No. 7 Brake fluid level sensor is turned ON. (Brake fluid is insufficient.)

OF	B1	VR	VM	MR
MS	FS	—	—	—

1	2	3	4	5
6	7	8	9	10

LED No.	Signal name	Display
1	Front right inlet solenoid valve	FI
2	Front right outlet solenoid valve	RO
3	Front left inlet solenoid valve	FI
4	Front left outlet solenoid valve	LO
5	Traction control solenoid valve 1	T1
6	Rear right inlet solenoid valve	RI
7	Rear right outlet solenoid valve	RO
8	Rear left inlet solenoid valve	RI
9	Rear left outlet solenoid valve	LO
10	Traction control solenoid valve 2	T2

FI	RO	FI	LO	T1
RI	RO	RI	LO	T2

1	2	3	4	5
6	7	8	9	10

LED No.	Signal name	Display
1	ABS warning light	AW
2	TCS warning light	TW
3	TCS OFF indicator light	TO
4	TCS operating indicator light	TI
5	—	—
6	AEC signal	EC
7	AEB signal	EB
8	AET signal	ET
9	EAM signal	EM
10	AAT signal	AT

AW	TW	TO	TI	—
EC	EB	ET	EM	AT

1	2	3	4	5
6	7	8	9	10

I: MODE FA1

— ON ↔ OFF SIGNAL —

Requirement for LED “ON”

- LED No. 1 Front right inlet solenoid valve is in function.
- LED No. 2 Front right outlet solenoid valve is in function.
- LED No. 3 Front left inlet solenoid valve is in function.
- LED No. 4 Front left outlet solenoid valve is in function.
- LED No. 5 Traction control solenoid valve 1 is in function.
- LED No. 6 Rear right inlet solenoid valve is in function.
- LED No. 7 Rear right outlet solenoid valve is in function.
- LED No. 8 Rear left inlet solenoid valve is in function.
- LED No. 9 Rear left outlet solenoid valve is in function.
- LED No. 10 Traction control solenoid valve 2 is in function.

J: MODE FA2

— ON ↔ OFF SIGNAL —

Requirement for LED “ON”

- LED No. 1 ABS warning light is on.
- LED No. 2 TCS warning light is on.
- LED No. 3 TCS OFF indicator light is on.
- LED No. 4 TCS operating indicator light is on.
- LED No. 6 Engine is running at idle. (LED comes on or goes off depending on vehicle movement.)
- LED No. 7 Engine is running at idle. (LED comes on or goes off depending on vehicle movement.)
- LED No. 8 TCS control operates.
- LED No. 9 Engine control is permitted.
- LED No. 10 ABS control operates.

NOTE:

If the system is normal when idling the engine without depressing brake pedal, LED No. 6 comes on, LED No. 9 blinks and all other LED’s are off.

D . CLR (FC0)

0 : YES 1 : NO

B4M0485

K: MODE FC0**— CLEAR MEMORY MODE (D·CLR) —**

- Deletes the recorded trouble codes in ABS/TCS control module.

F C O ENT

B4M0736

1) Use function keys to put in F C O ENT.

D . CLR (FC0)

0 : YES 1 : NO

B4M0487

2) System indicates as shown.

D . CLR (FC0)

※0 : YES 1 : NO

B4M0488

3) Key in 0, to clear memories. The indication of ※ is added to screen.

PLEASE

KEY OFF

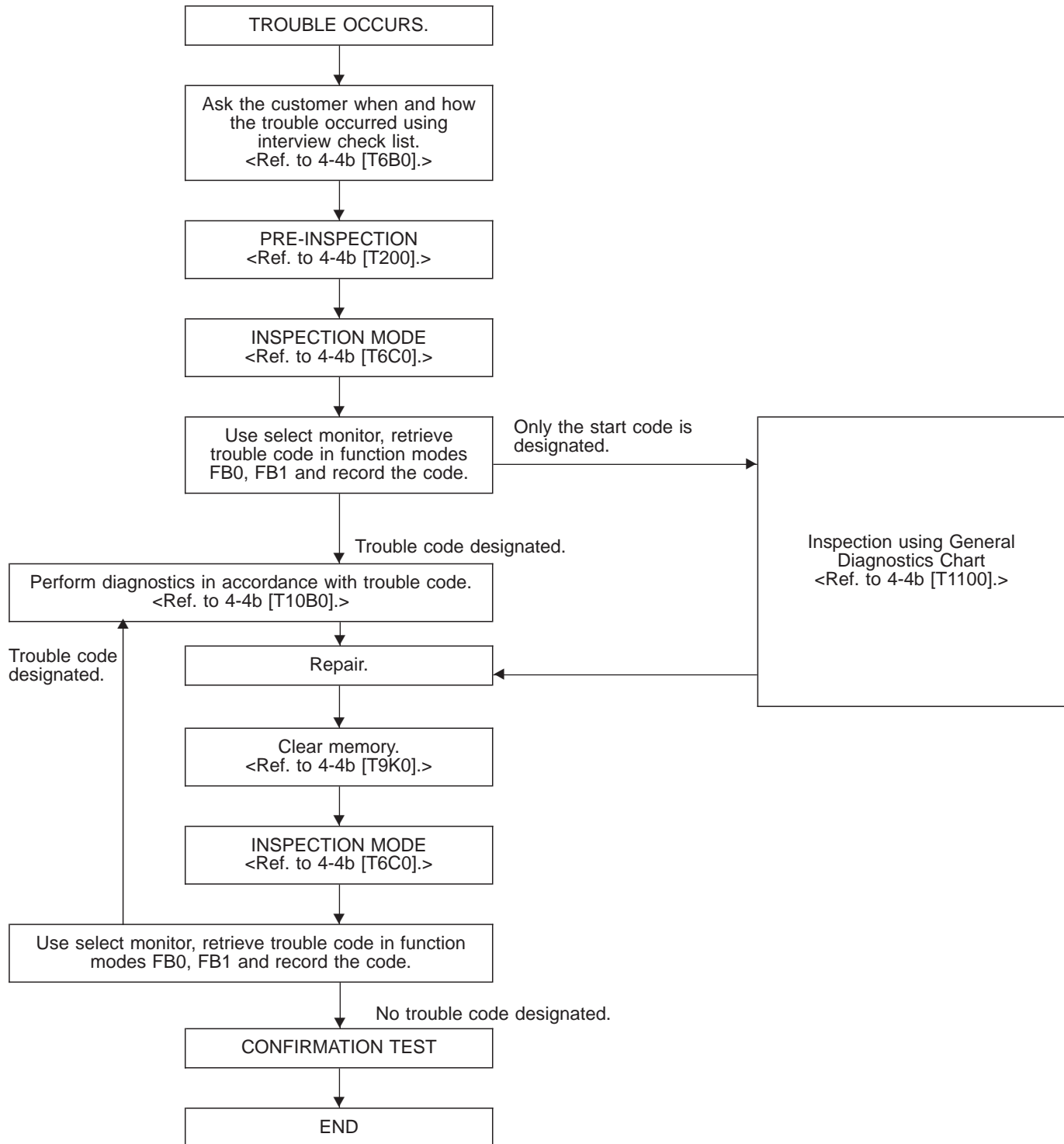
B4M0489

4) Key in ENT. System indicates as shown.

5) Turn the key OFF.

10. Diagnostic Chart with Select Monitor

A: BASIC DIAGNOSTIC CHART



NOTE:

To check harness for broken wires or short circuits, shake it while holding it or the connector.

B: LIST OF TROUBLE CODE

Diagnostic items (select monitor FB0)	Code	Display screen (FB0)	Diagnostic items (select monitor FB1)	Display screen (FB1)	Ref. to 4-4b
Normal	11	NO TROUBLE	Normal	NO TROUBLE	[T10C0]
Detection of FR sensor hardware	21	FR.SS HARD	Open circuit of FR sensor	FR.SS OPEN	[T10D1]
			Short circuit of FR sensor	FR.SS SHORT	[T10D2]
Detection of FR sensor software	22	FR.SS SOFT	FR sensor, variations in wheel speed	FR.SS W.SPEED	[T10E1]
			FR sensor, reduced pressure mode	FR.SS OR MV	[T10E2]
			FR sensor, wheel speed higher than prescribed	FR.SS OVER	[T10E3]
Detection of FL sensor hardware	23	FL.SS HARD	Open circuit of FL sensor	FL.SS OPEN	[T10F1]
			Short circuit of FL sensor	FL.SS SHORT	[T10F2]
Detection of FL sensor software	24	FL.SS SOFT	FL sensor, variations in wheel speed	FL.SS W.SPEED	[T10G1]
			FL sensor, reduced pressure mode	FL.SS OR MV	[T10G2]
			FL sensor, wheel speed higher than prescribed	FL.SS OVER	[T10G3]
Detection of RR sensor hardware	25	RR.SS HARD	Open circuit of RR sensor	RR.SS OPEN	[T10H1]
			Short circuit of RR sensor	RR.SS SHORT	[T10H2]
Detection of RR sensor software	26	RR.SS SOFT	RR sensor, variations in wheel speed	RR.SS W.SPEED	[T10I1]
			RR sensor, reduced pressure mode	RR.SS OR MV	[T10I2]
			RR sensor, wheel speed higher than prescribed	RR.SS OVER	[T10I3]
Detection of RL sensor hardware	27	RL.SS HARD	Open circuit of RL sensor	RL.SS OPEN	[T10J1]
			Short circuit of RL sensor	RL.SS SHORT	[T10J2]
Detection of RL sensor software	28	RL.SS SOFT	RL sensor, variations in wheel speed	RL.SS W.SPEED	[T10K1]
			RL sensor, reduced pressure mode	RL.SS OR MV	[T10K2]
			RL sensor, wheel speed higher than prescribed	RL.SS OVER	[T10K3]
Abnormal FR.IN valve	31	FR.IN VALVE	Abnormal FR.IN valve	FR.IN VALVE	[T10L0]
Abnormal FR.OUT valve	32	FR.OUT VALVE	Abnormal FR.OUT valve	FR.OUT VALVE	[T10M0]
Abnormal FL.IN valve	33	FL.IN VALVE	Abnormal FL.IN valve	FL.IN VALVE	[T10N0]
Abnormal FL.OUT valve	34	FL.OUT VALVE	Abnormal FL.OUT valve	FL.OUT VALVE	[T10O0]
Abnormal RR.IN valve	35	RR.IN VALVE	Abnormal RR.IN valve	RR.IN VALVE	[T10P0]
Abnormal RR.OUT valve	36	RR.OUT VALVE	Abnormal RR.OUT valve	RR.OUT VALVE	[T10Q0]
Abnormal RL.IN valve	37	RL.IN VALVE	Abnormal RL.IN valve	RL.IN VALVE	[T10R0]
Abnormal RL.OUT valve	38	RL.OUT VALVE	Abnormal RL.OUT valve	RL.OUT VALVE	[T10S0]
Abnormal ECM	41	ECU	Abnormal ECM	ECU	[T10T0]
Abnormal line voltage	42	HIGH VOLTAGE	Abnormal line voltage	HIGH VOLTAGE	[T10U0]
Abnormal EGI communication line	43	EGI LINE	Abnormal EGI communication line	EGI LINE	[T10V0]
Abnormal valve relay	51	V.RELAY	Valve relay ON failure	V.RELAY ON	[T10W1]
			Valve relay OFF failure	V.RELAY OFF	[T10W2]
Abnormal motor system	52	MOTOR	Motor relay ON failure	MOTOR ON	[T10X1]
			Motor relay OFF failure	MOTOR OFF	[T10X2]

Diagnostic items (select monitor FB0)	Code	Display screen (FB0)	Diagnostic items (select monitor FB1)	Display screen (FB1)	Ref. to 4-4b
Abnormal stroke sensor and stop light switch	54	PSS & BLS	Open/short circuits of stroke sensor	B.SW HARD	[T10Y1]
			Comparison of stroke sensor and acceleration	B.SW SOFT(G)	[T10Y2]
			Comparison of stroke sensor and stop light switch	B.SW SOFT(B)	[T10Y3]
			Comparison of stroke sensor and pump	B.SW SOFT(P)	[T10Y4]
			Open circuit of stop light switch	B.SW SOFT(O)	[T10Y5]
Abnormal fluid level sensor line	57	FLUID LEVEL SS	Abnormal fluid level sensor line	FLUID LEVEL SS	[T10Z0]
Abnormal pressure switch	58	PRESSURE SW	Abnormal pressure switch	PRESSURE SW	[T10AA0]
Abnormal TCS1 valve	61	TCS1 VALVE	Abnormal TCS1 valve	TCS1 VALVE	[T10AB0]
Abnormal TCS2 valve	62	TCS2 VALVE	Abnormal TCS2 valve	TCS2 VALVE	[T10AC0]

1. IF THE SELECT MONITOR IS USED FOR TROUBLESHOOTING, IT IS ADVISED TO FOLLOW THE PROCEDURE BELOW

- 1) Activate function FB0 to read the most recent trouble code and record it.
- 2) Activate function FB1 to read all trouble codes and record them.

(If troubles occur in the wheel speed sensor, stop & brake switch, valve relay or motor system, detailed data on troubles are displayed by the FB1 function, allowing you to easily locate points where need repair.)

- 3) Perform troubleshooting mainly in the FB1 mode.

D . ALL 11 (FB1)

NO TROUBLE

B4M0490

C: TROUBLE CODE 11

— NO TROUBLE —

DIAGNOSIS:

- ABS/TCS control module does not store troubles.

D . ALL 21 (FB1)

FR . SS OPEN

B4M0491

D: TROUBLE CODE 21

1. FR.SS OPEN

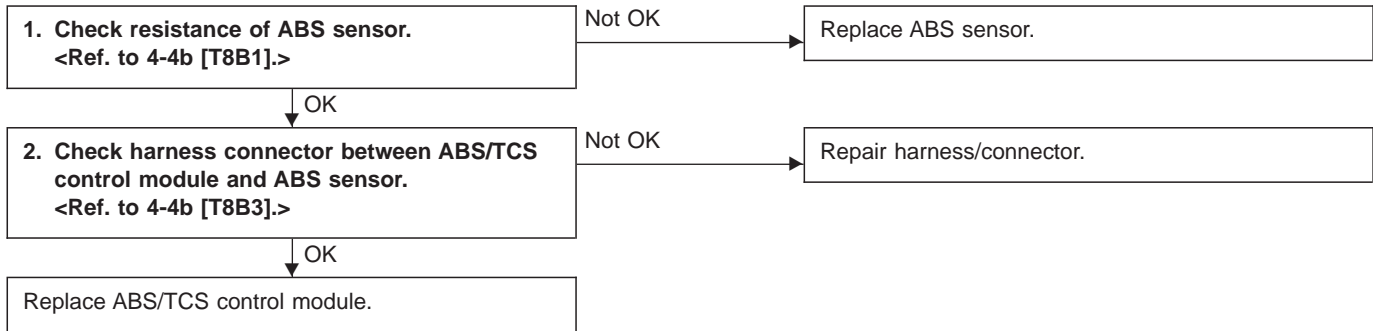
— Faulty front right ABS sensor (Open circuit) —

DIAGNOSIS:

- Faulty ABS sensor
- Faulty harness and connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.



NOTE:

When checking ABS sensor, carefully bend or swing connector and harness to check for improper contacts or open circuits.

D . ALL 21 (FB1)

FR . SS SHORT

B4M0492

2. FR.SS SHORT

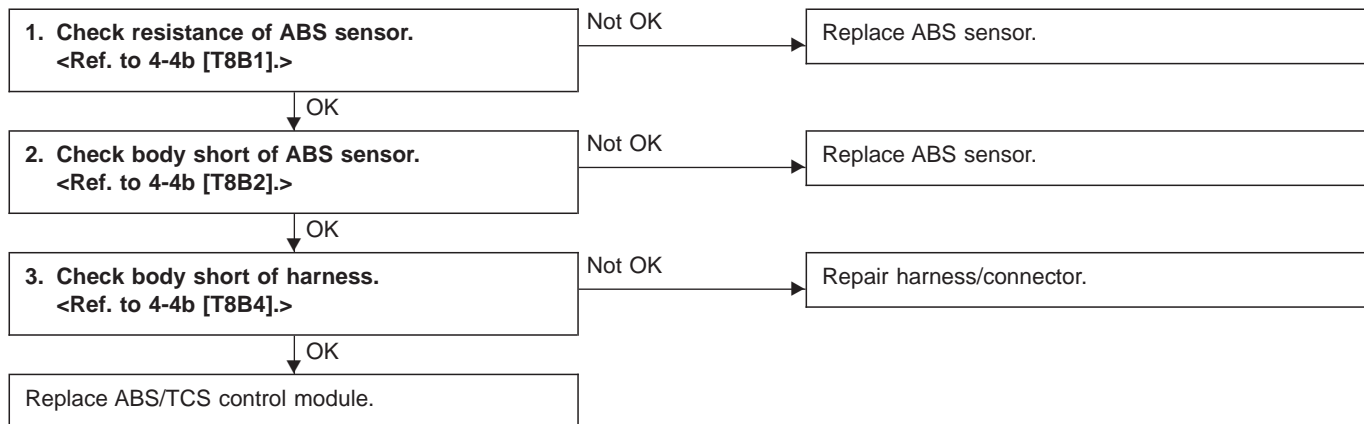
— **Faulty front right ABS sensor (Short circuit)** —

DIAGNOSIS:

- Faulty ABS sensor
- Faulty harness and connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.
- TCS does not operate.



NOTE:

When checking ABS sensor, carefully bend or swing connector and harness to check for improper contacts or open circuits.

D . ALL 22 (FB1)

FR . SS W. SPEED

B4M0493

E: TROUBLE CODE 22

1. FR.SS W.SPEED

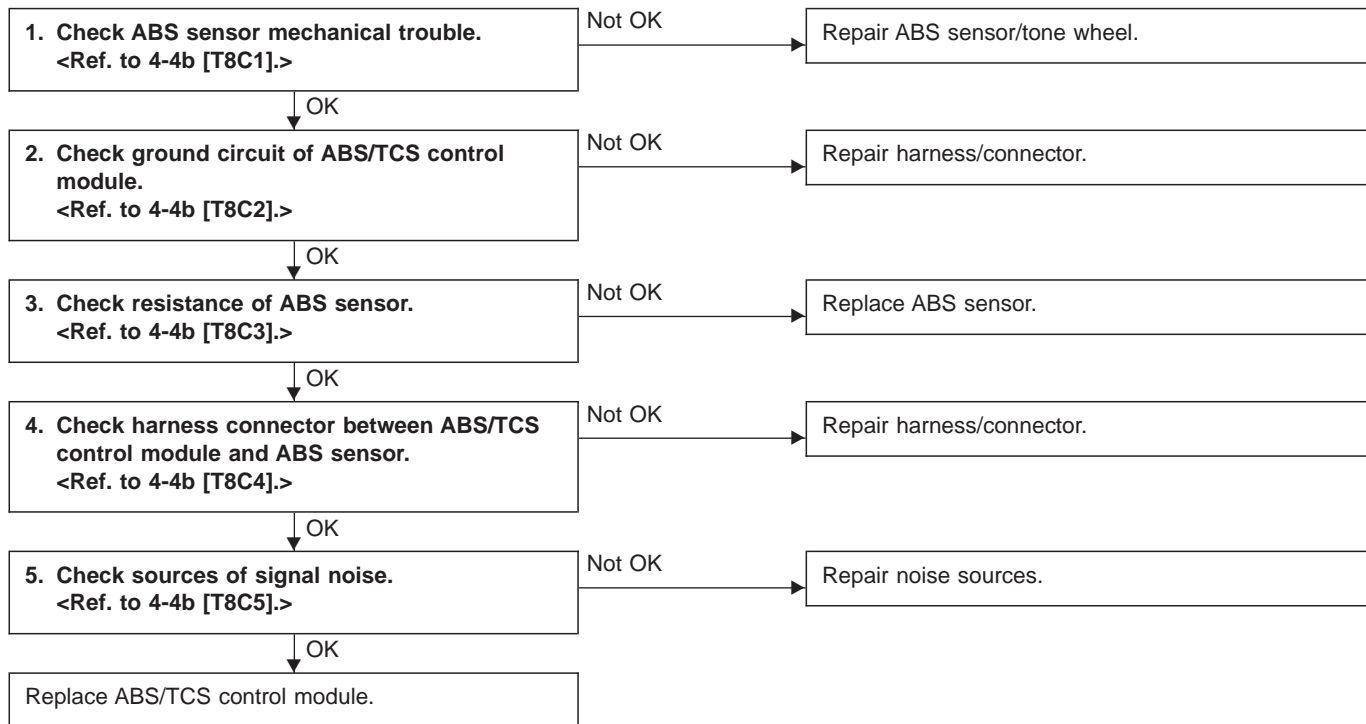
— Irregular signals from front right ABS sensor —

DIAGNOSIS:

- Faulty ABS sensor signal (noise, irregular signal, etc.)
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.



D. ALL 22 (FB1)

FR. SS OR MV

B4M0494

2. FR.SS OR MV

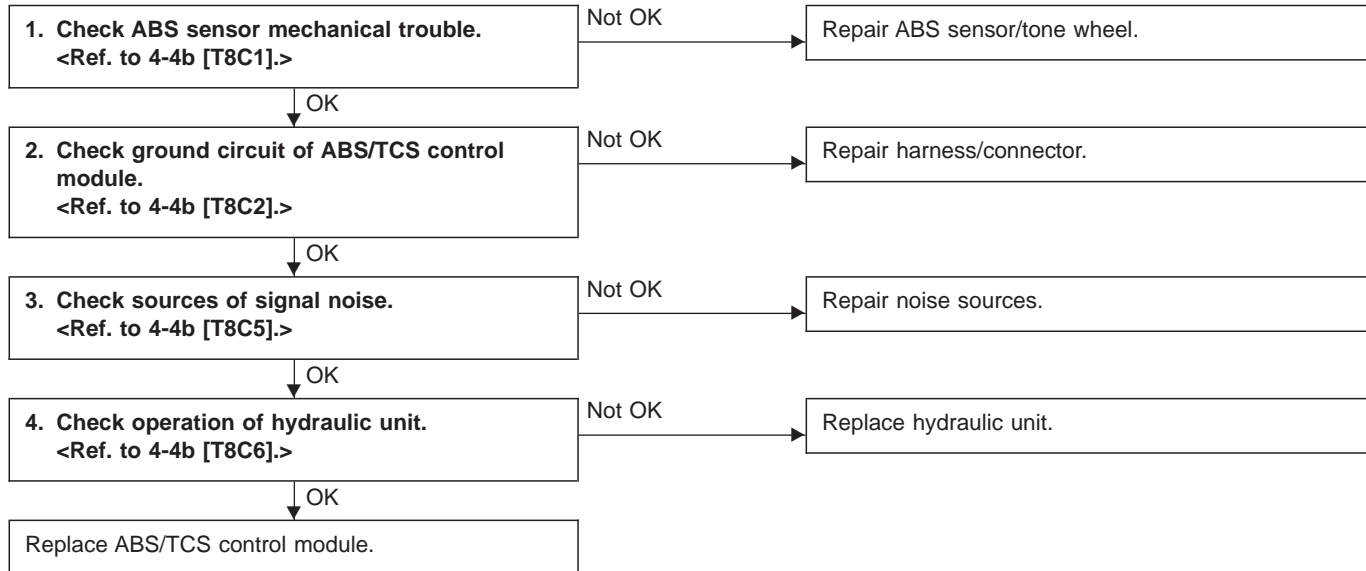
— Irregular signals from front right ABS sensor in decompressing mode —

DIAGNOSIS:

- Faulty ABS sensor signal (noise, irregular signal, etc.)
- Faulty hydraulic unit
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.



D. ALL 22 (FB1)

FR. SS OVER

B4M0495

3. FR.SS OVER

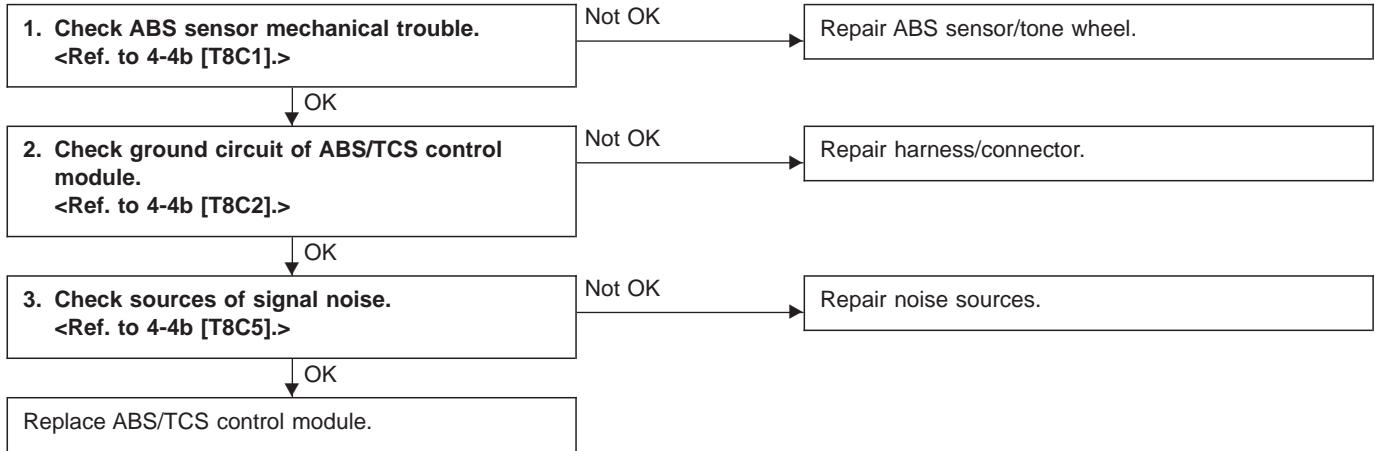
— Excessive speed of front right ABS sensor signal —

DIAGNOSIS:

- Faulty ABS sensor signal (noise, irregular signal, etc.)
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.



D . ALL 23 (FB1)

FL . SS OPEN

B4M0496

F: TROUBLE CODE 23

1. FL.SS OPEN

— Faulty front left ABS sensor (Open circuit) —

DIAGNOSIS:

- Faulty ABS sensor
- Faulty harness and connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

The procedures used are the same as those for FR.SS OPEN.

<Ref. to 4-4b [T10D1].>

D . ALL 23 (FB1)

FL . SS SHORT

B4M0497

2. FL.SS SHORT

— Faulty front left ABS sensor (Short circuit) —

DIAGNOSIS:

- Faulty ABS sensor
- Faulty harness and connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

The procedures used are the same as those for FR.SS SHORT.

<Ref. to 4-4b [T10D2].>

D . ALL 24 (FB1)

FL . SS W . SPEED

B4M0498

G: TROUBLE CODE 24

1. FL.SS W.SPEED

— Irregular signals from front left ABS sensor —

DIAGNOSIS:

- Faulty ABS sensor signal (noise, irregular signal, etc.)
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

The procedures used are the same as those for FR.SS W.SPEED.

<Ref. to 4-4b [T10E1].>

D . ALL 24 (FB1)

FL . SS OR MV

B4M0499

2. FL.SS OR MV

— Irregular signals from front left ABS sensor in decompressing mode —

DIAGNOSIS:

- Faulty ABS sensor signal (noise, irregular signal, etc.)
- Faulty hydraulic unit
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

The procedures used are the same as those for FR.SS OR MV.

<Ref. to 4-4b [T10E2].>

D . ALL 24 (FB1)

FL . SS OVER

B4M0500

3. FL.SS OVER

— Excessive speed of front left ABS sensor signal —

DIAGNOSIS:

- Faulty ABS sensor signal (noise, irregular signal, etc.)
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

The procedures used are the same as those for FR.SS OVER.

<Ref. to 4-4b [T10E3].>

D . ALL 25 (FB1)

RR . SS OPEN

B4M0501

H: TROUBLE CODE 25

1. RR.SS OPEN

— Faulty rear right ABS sensor (Open circuit) —

DIAGNOSIS:

- Faulty ABS sensor
- Faulty harness and connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

The procedures used are the same as those for FR.SS OPEN.

<Ref. to 4-4b [T10D1].>

D . ALL 25 (FB1)

RR . SS SHORT

B4M0502

2. RR.SS SHORT

— Faulty rear right ABS sensor (Short circuit) —

DIAGNOSIS:

- Faulty ABS sensor
- Faulty harness and connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

The procedures used are the same as those for FR.SS SHORT.

<Ref. to 4-4b [T10D2].>

D . ALL 26 (FB1)

RR . SS W . SPEED

B4M0503

I: TROUBLE CODE 26

1. RR.SS W.SPEED

— Irregular signals from rear right ABS sensor —

DIAGNOSIS:

- Faulty ABS sensor signal (noise, irregular signal, etc.)
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

The procedures used are the same as those for FR.SS W.SPEED.

<Ref. to 4-4b [T10E1].>

D . ALL 26 (FB1)

RR . SS OR MV

B4M0504

2. RR.SS OR MV

— Irregular signals from rear right ABS sensor in decompressing mode —

DIAGNOSIS:

- Faulty ABS sensor signal (noise, irregular signal, etc.)
- Faulty hydraulic unit
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

The procedures used are the same as those for FR.SS OR MV.

<Ref. to 4-4b [T10E2].>

D . ALL 26 (FB1)

RR . SS OVER

B4M0505

3. RR.SS OVER

— Excessive speed of rear right ABS sensor signal —

DIAGNOSIS:

- Faulty ABS sensor signal (noise, irregular signal, etc.)
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

The procedures used are the same as those for FR.SS OVER.

<Ref. to 4-4b [T10E3].>

D . ALL 27 (FB1)

RL . SS OPEN

B4M0506

J: TROUBLE CODE 27

1. RL.SS OPEN

— Faulty rear left ABS sensor (Open circuit) —

DIAGNOSIS:

- Faulty ABS sensor
- Faulty harness and connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

The procedures used are the same as those for FR.SS OPEN.

<Ref. to 4-4b [T10D1].>

D . ALL 27 (FB1)

RL . SS SHORT

B4M0507

2. RL.SS SHORT

— Faulty rear left ABS sensor (Short circuit) —

DIAGNOSIS:

- Faulty ABS sensor
- Faulty harness and connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

The procedures used are the same as those for FR.SS SHORT.

<Ref. to 4-4b [T10D2].>

D . ALL 28 (FB1)

RL . SS W . SPEED

B4M0508

K: TROUBLE CODE 28

1. RL.SS W.SPEED

— Irregular signals from rear left ABS sensor —

DIAGNOSIS:

- Faulty ABS sensor signal (noise, irregular signal, etc.)
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

The procedures used are the same as those for FR.SS W.SPEED.

<Ref. to 4-4b [T10E1].>

D . ALL 28 (FB1)

RL . SS OR MV

B4M0509

2. RL.SS OR MV

— Irregular signals from rear left ABS sensor in decompressing mode —

DIAGNOSIS:

- Faulty ABS sensor signal (noise, irregular signal, etc.)
- Faulty hydraulic unit
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

The procedures used are the same as those for FR.SS OR MV.

<Ref. to 4-4b [T10E2].>

D . ALL 28 (FB1)

RL . SS OVER

B4M0510

3. RL.SS OVER

— Excessive speed of rear left ABS sensor signal —

DIAGNOSIS:

- Faulty ABS sensor signal (noise, irregular signal, etc.)
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

The procedures used are the same as those for FR.SS OVER.

<Ref. to 4-4b [T10E3].>

D . ALL 31 (FB1)

FR . IN VALVE

B4M0511

L: TROUBLE CODE 31

FR.IN VALVE

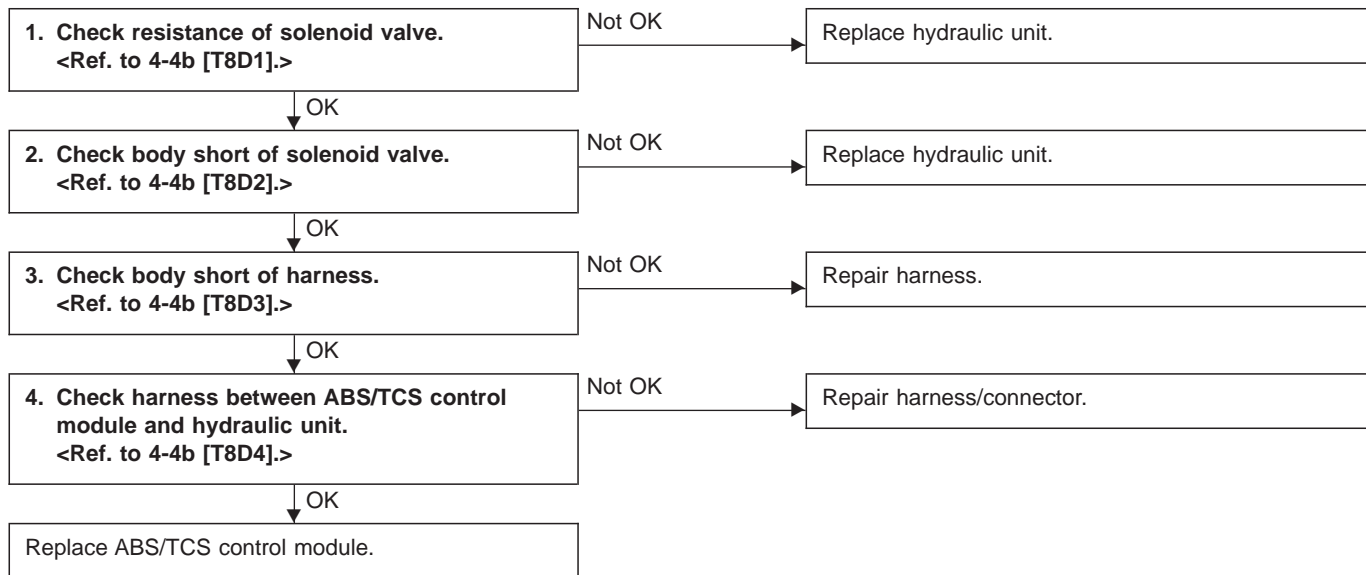
— Faulty front right inlet solenoid valve —

DIAGNOSIS:

- Faulty harness/connector
- Faulty solenoid valve in hydraulic unit
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.
- ABS sequence control does not operate.
- TCS sequence control does not operate.
- Air bleeding mode does not operate.



D . ALL 32 (FB1)

FR . OUT VALVE

B4M0512

M: TROUBLE CODE 32

FR.OUT VALVE

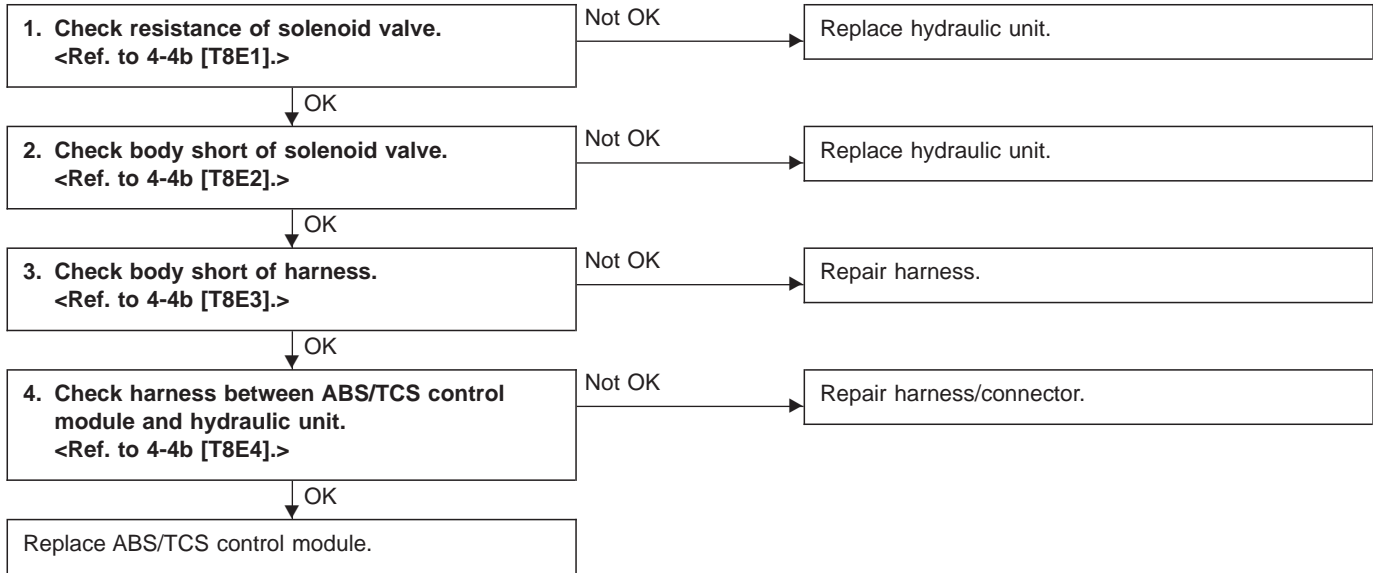
— Faulty front right outlet solenoid valve —

DIAGNOSIS:

- Faulty harness/connector
- Faulty solenoid valve in hydraulic unit
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.
- ABS sequence control does not operate.
- TCS sequence control does not operate.
- Air bleeding mode does not operate.



D . ALL 33 (FB1)

FL . IN VALVE

B4M0513

N: TROUBLE CODE 33

FL.IN VALVE

— Faulty front left inlet solenoid valve —

DIAGNOSIS:

- Faulty harness/connector
- Faulty solenoid valve in hydraulic unit
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.
- ABS sequence control does not operate.
- TCS sequence control does not operate.
- Air bleeding mode does not operate.

NOTE:

The procedures used are the same as those for FR.IN VALVE.

<Ref. to 4-4b [T10L0].>

D . ALL 34 (FB1)

FL . OUT VALVE

B4M0514

O: TROUBLE CODE 34

FL.OUT VALVE

— Faulty front left outlet solenoid valve —

DIAGNOSIS:

- Faulty harness/connector
- Faulty solenoid valve in hydraulic unit
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.
- ABS sequence control does not operate.
- TCS sequence control does not operate.
- Air bleeding mode does not operate.

NOTE:

The procedures used are the same as those for FR.OUT VALVE.

<Ref. to 4-4b [T10M0].>

D . ALL 35 (FB1)

RR . IN VALVE

B4M0515

P: TROUBLE CODE 35

RR.IN VALVE

— Faulty rear right inlet solenoid valve —

DIAGNOSIS:

- Faulty harness/connector
- Faulty solenoid valve in hydraulic unit
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.
- ABS sequence control does not operate.
- TCS sequence control does not operate.
- Air bleeding mode does not operate.

NOTE:

The procedures used are the same as those for FR.IN VALVE.

<Ref. to 4-4b [T10L0].>

D . ALL 36 (FB1)

RR . OUT VALVE

B4M0516

Q: TROUBLE CODE 36

RR.OUT VALVE

— Faulty rear right outlet solenoid valve —

DIAGNOSIS:

- Faulty harness/connector
- Faulty solenoid valve in hydraulic unit
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.
- ABS sequence control does not operate.
- TCS sequence control does not operate.
- Air bleeding mode does not operate.

NOTE:

The procedures used are the same as those for FR.OUT VALVE.

<Ref. to 4-4b [T10M0].>

D . ALL 37 (FB1)

RL . IN VALVE

B4M0517

R: TROUBLE CODE 37

RL.IN VALVE

— Faulty rear left inlet solenoid valve —

DIAGNOSIS:

- Faulty harness/connector
- Faulty solenoid valve in hydraulic unit
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.
- ABS sequence control does not operate.
- TCS sequence control does not operate.
- Air bleeding mode does not operate.

NOTE:

The procedures used are the same as those for FR.IN VALVE.

<Ref. to 4-4b [T10L0].>

D . ALL 38 (FB1)

RL . OUT VALVE

B4M0518

S: TROUBLE CODE 38

RL.OUT VALVE

— Faulty rear left outlet solenoid valve —

DIAGNOSIS:

- Faulty harness/connector
- Faulty solenoid valve in hydraulic unit
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.
- ABS sequence control does not operate.
- TCS sequence control does not operate.
- Air bleeding mode does not operate.

NOTE:

The procedures used are the same as those for FR.OUT VALVE.

<Ref. to 4-4b [T10M0].>

D . ALL 41 (FB1)

ECU

B4M0519

T: TROUBLE CODE 41

ECU

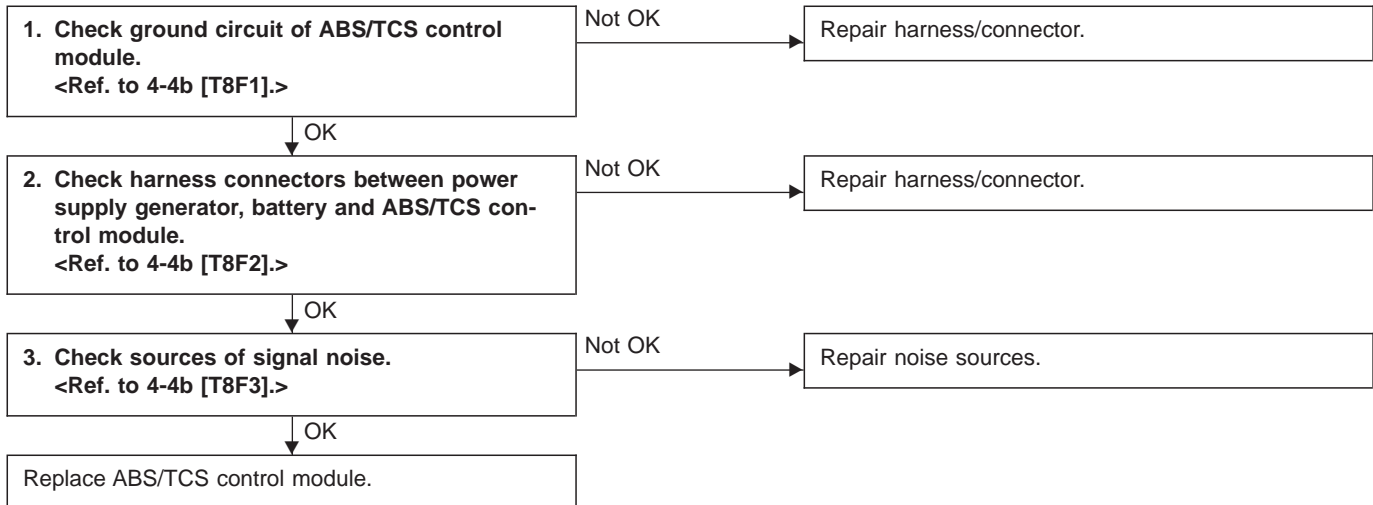
— Faulty ABS/TCS control module —

DIAGNOSIS:

- Faulty ABS/TCS control module
- Faulty harness/connector

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.



D . ALL 42 (FB1)

HIGH VOLTAGE

B4M0520

U: TROUBLE CODE 42

HIGH VOLTAGE

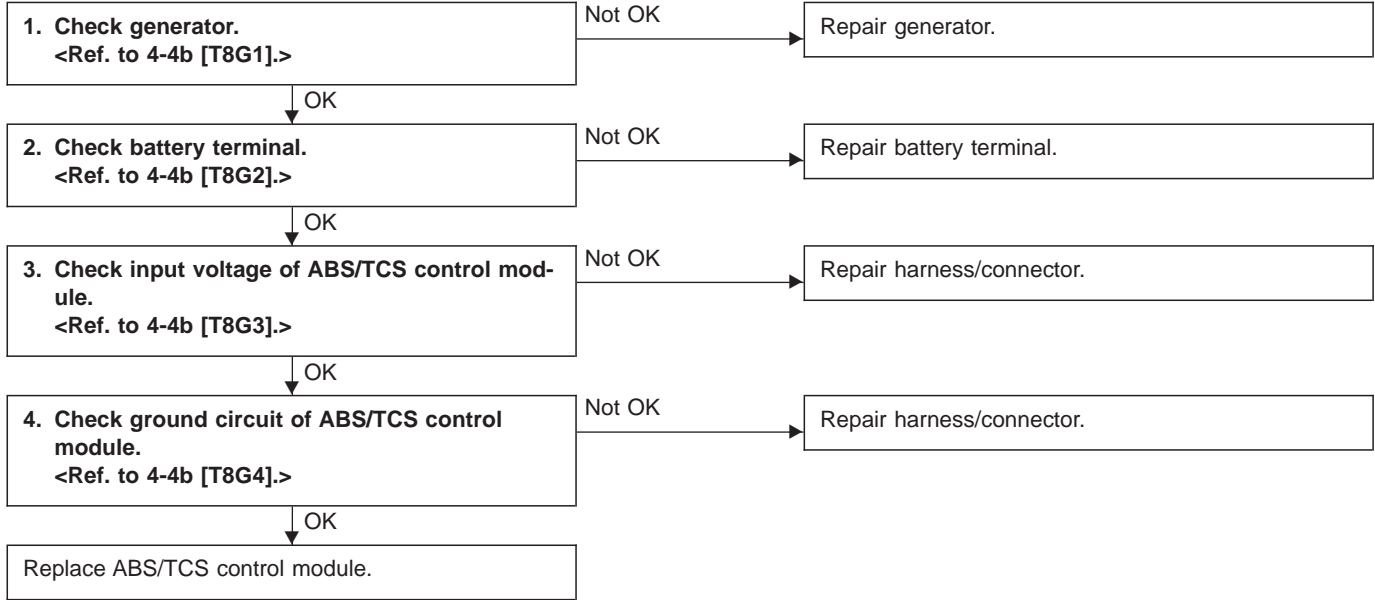
— Source voltage is high —

DIAGNOSIS:

- Power source voltage of the ABS/TCS control module is more than 18 V.
- Faulty ABS/TCS control module
- Faulty harness/connector

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.



D . ALL 43 (FB1)

EGI LINE

B4M0521

V: TROUBLE CODE 43

EGI LINE

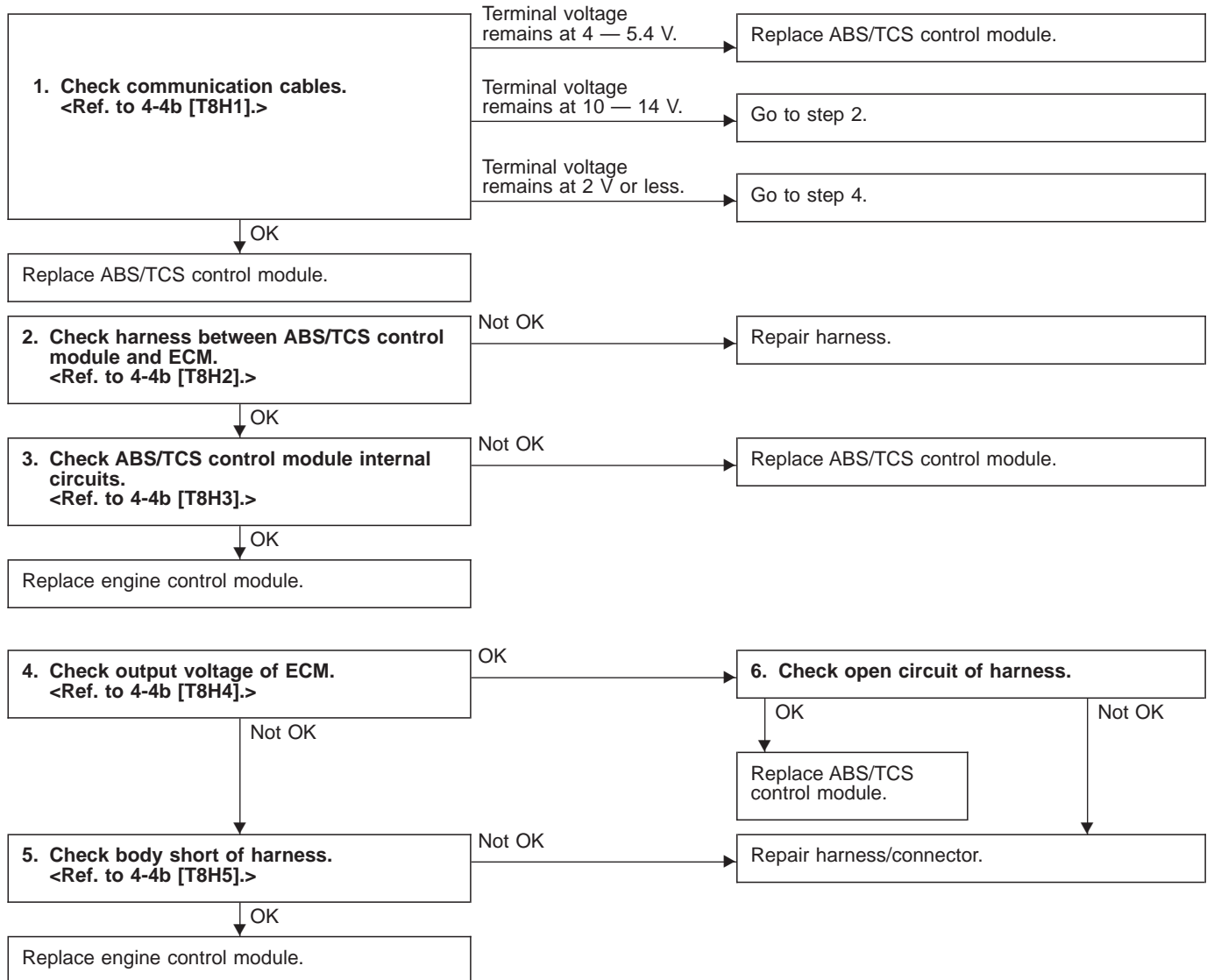
— Faulty engine control module communication cables —

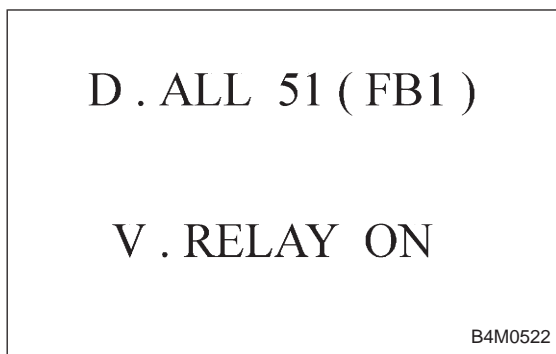
DIAGNOSIS:

- AET communication cable is broken or short circuited.
- AEB communication cable is broken or short circuited.
- AEC communication cable is broken or short circuited.
- Faulty ABS/TCS control module
- Faulty engine control module

TROUBLE SYMPTOM:

- TCS does not operate.





W: TROUBLE CODE 51

1. V.RELAY ON

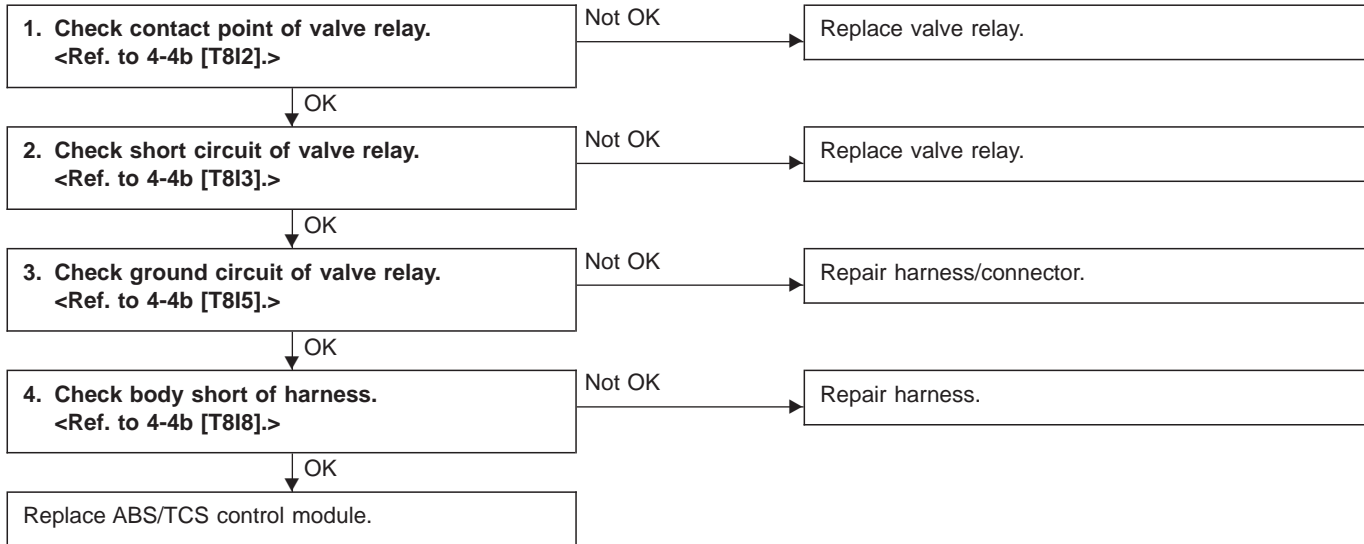
— Valve relay ON malfunction —

DIAGNOSIS:

- Faulty valve relay
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.



D . ALL 51 (FB1)

V . RELAY OFF

B4M0523

2. V.RELAY OFF

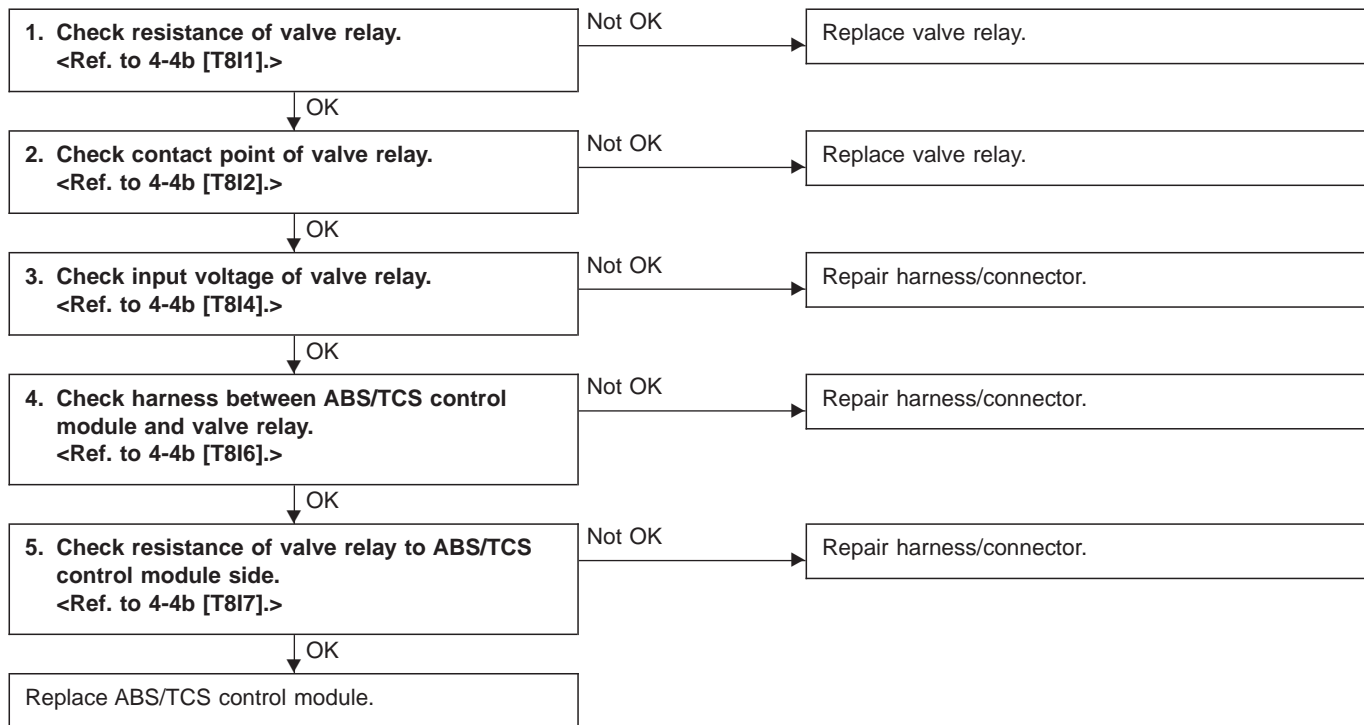
— Valve relay OFF malfunction —

DIAGNOSIS:

- Faulty valve relay
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.



D . ALL 52 (FB1)

MOTOR ON

B4M0524

X: TROUBLE CODE 52

1. MOTOR ON

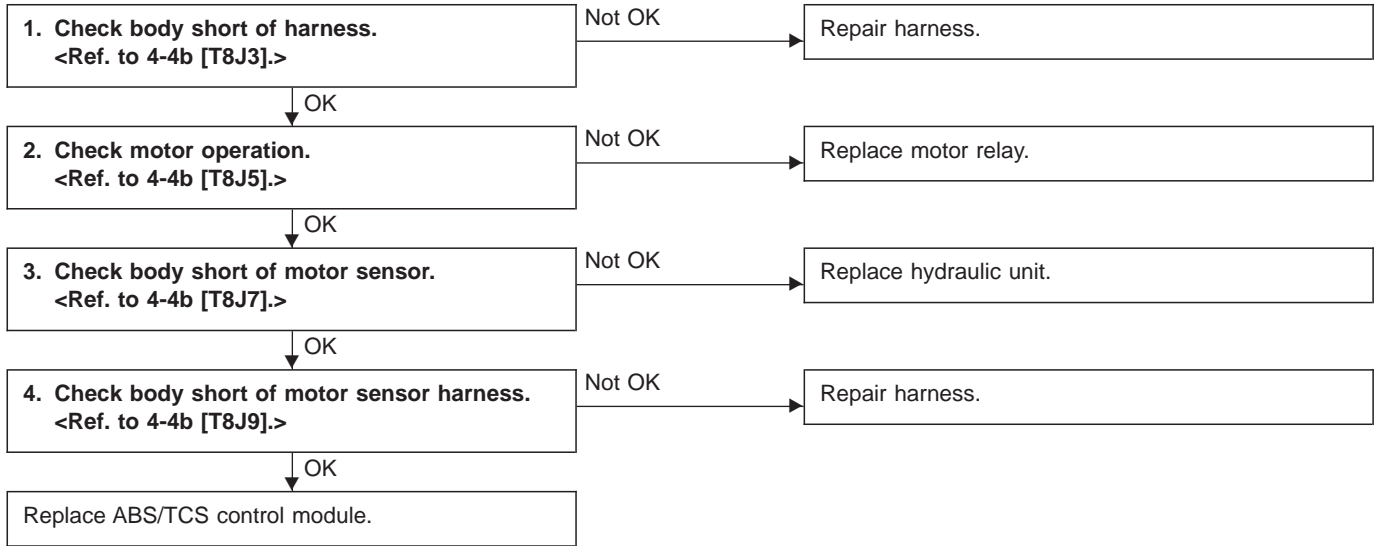
— Motor relay ON malfunction —

DIAGNOSIS:

- Faulty motor relay
- Faulty motor
- Faulty motor sensor
- Faulty harness
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.



D . ALL 52 (FB1)

MOTOR OFF

B4M0525

2. MOTOR OFF

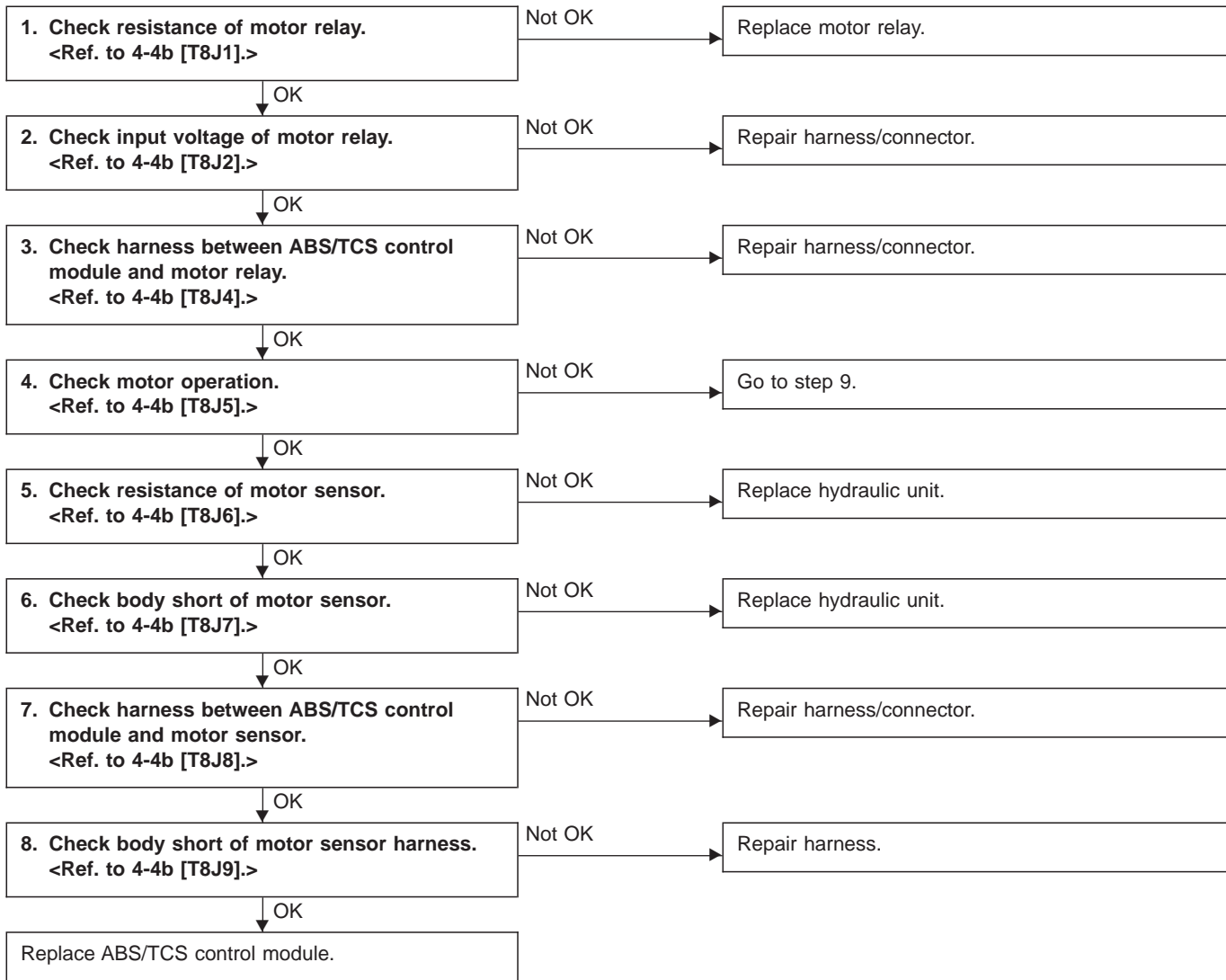
— Motor relay OFF malfunction —

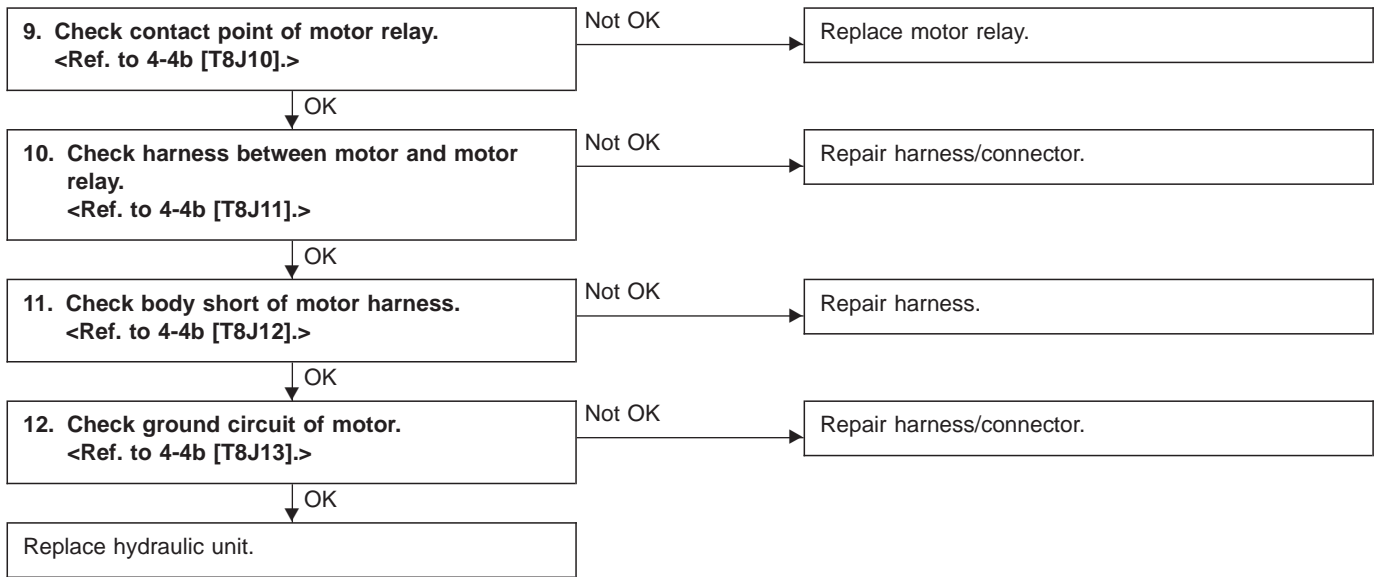
DIAGNOSIS:

- Faulty motor relay
- Faulty motor
- Faulty motor sensor
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.



**NOTE:**

The check can also be made by analyzing the sensor output signal with oscilloscope during the TCS sequence control operation. If the ECM female connector end gives correct value, skip steps 5 through 8.

If not, operate the TCS sequence control again and measure the value at motor sensor male connector end, with the motor sensor connector disconnected. If the value is OK, proceed with steps 7 through 8 above.

D . ALL 54 (FB1)

B . SW HARD

B4M0526

Y: TROUBLE CODE 54

1. B.SW HARD

— Break and short circuit at stroke sensor or its wiring —

DIAGNOSIS:

- Faulty stroke sensor
- Faulty harness/connector
- Faulty stop light switch
- Faulty ABS/TCS control module

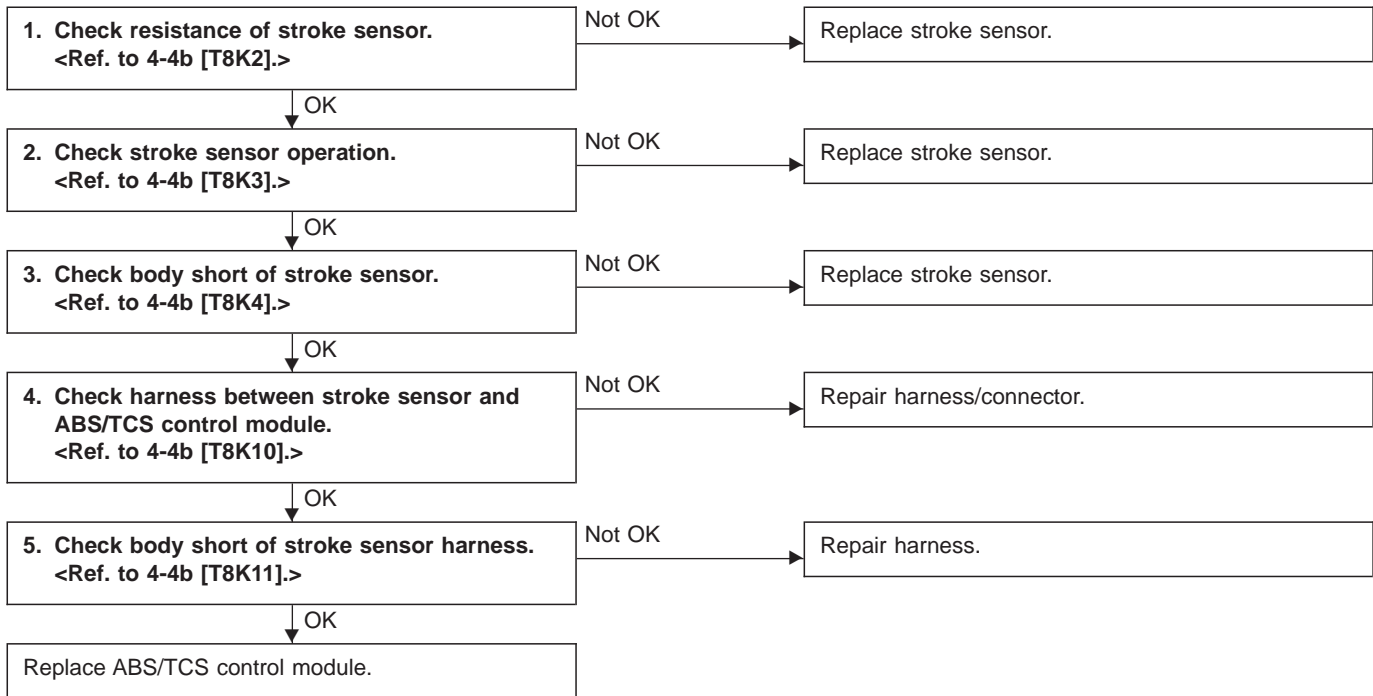
TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

Operate the function F09 in select monitor TCS mode, and read the sensor output step.

If system is normal, the output reading is 1 when brake pedal is not depressed, and it changes from 2 to 3, 4 and 5 in accordance with the brake pedal depressing. If so, skip check steps 1 through 5.



D . ALL 54 (FB1)

B . SW SOFT (G)

B4M0527

2. B.SW SOFT (G)

— Irregular value in comparison stroke sensor and vehicle acceleration comparison —

DIAGNOSIS:

- Faulty stroke sensor
- Faulty harness/connector
- Faulty stop light switch
- Faulty ABS/TCS control module

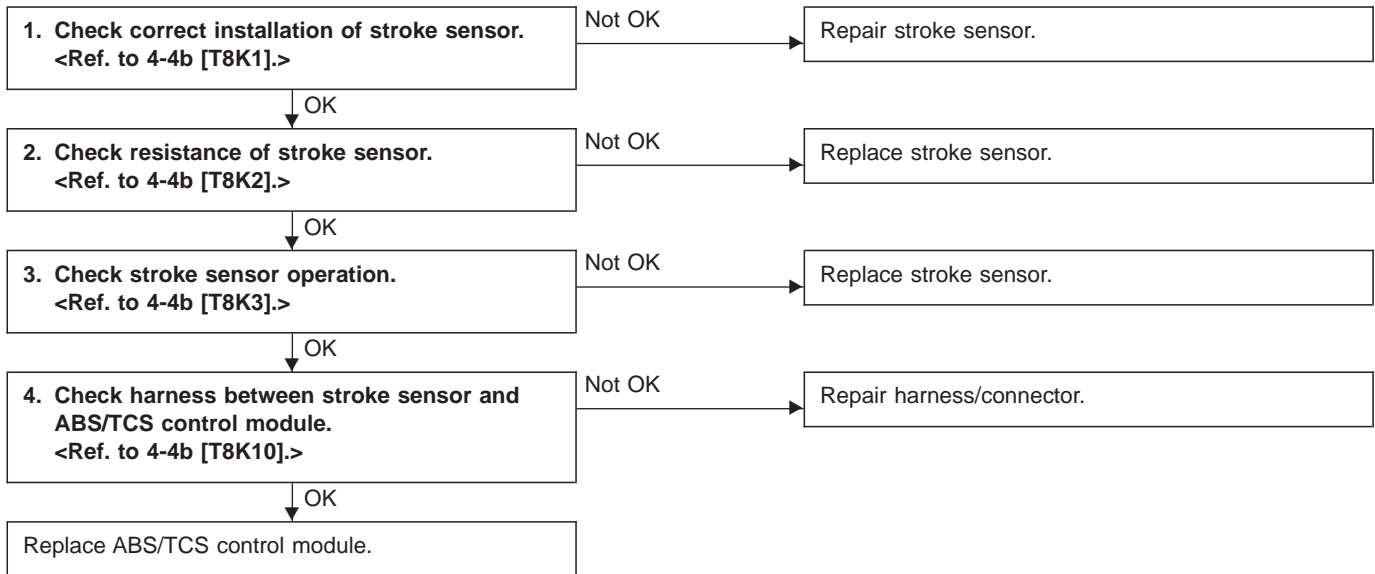
TROUBLE SYMPTOM:

- ABS and TCS do not operate.

NOTE:

Operate the function F09 in select monitor TCS mode, and read the sensor output step.

If system is normal, the output reading is 1 when brake pedal is not depressed, and it changes from 2 to 3, 4 and 5 in accordance with the brake pedal depressing. If so, skip check steps 2 through 4.



D . ALL 54 (FB1)

B . SW SOFT (B)

B4M0528

3. B.SW SOFT (B)

— Irregular value in stroke sensor and brake light switch comparison —

DIAGNOSIS:

- Faulty stroke sensor
- Faulty stop light switch
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

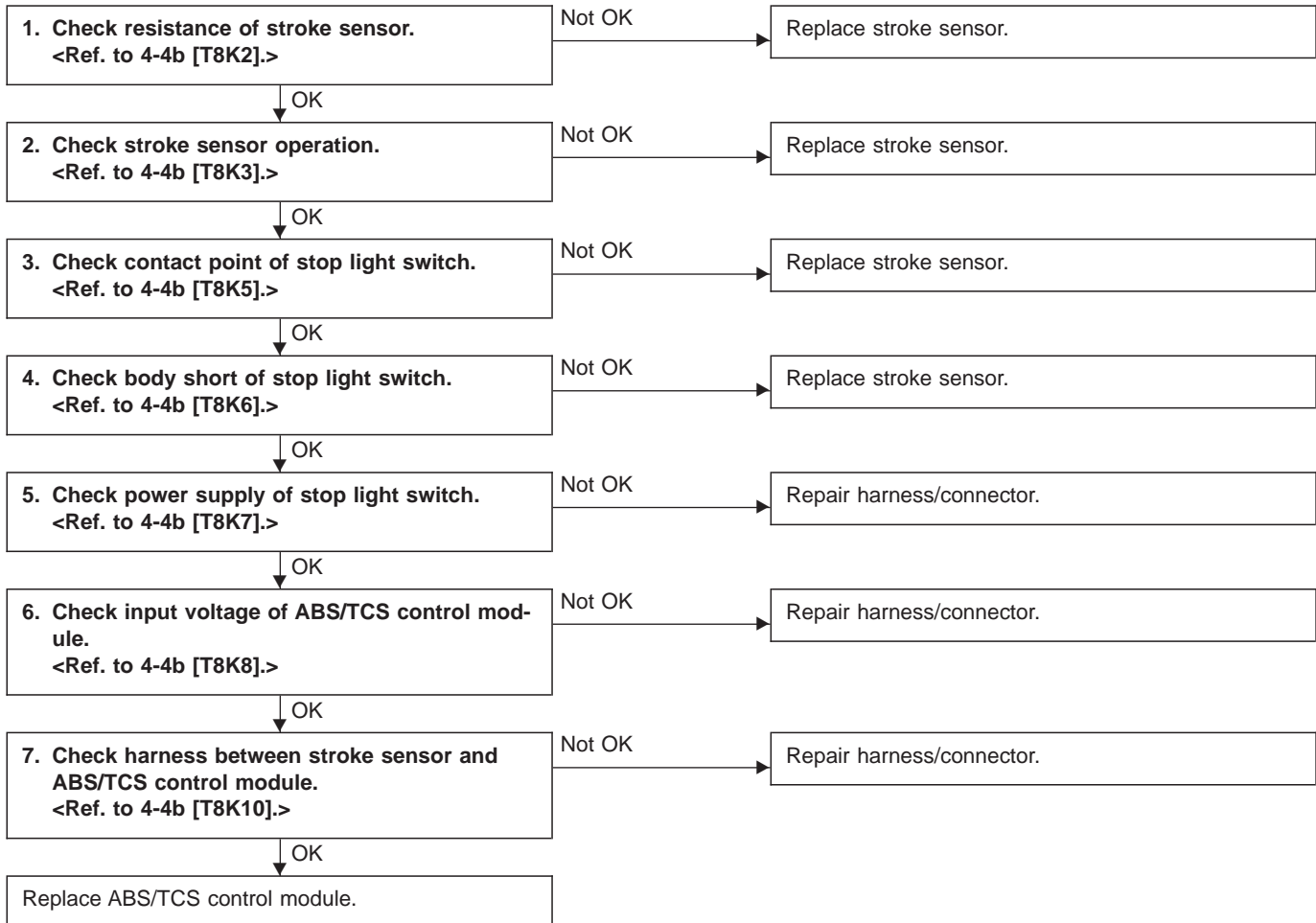
- ABS and TCS do not operate.

NOTE:

Operate the function F09 in select monitor TCS mode, and read the sensor output step.

If system is normal, the output reading is 1 when brake pedal is not depressed, and it changes from 2 to 3, 4 and 5 in accordance with the brake pedal depressing. If so, skip check steps 1 and 2 through 7.

Then, operate the function FA0 and check the stop and brake switches by B1 LED ON/OFF. If system is normal, LED comes on when depressing brake pedal, and goes off when not depressing. If so, skip check steps 3 through 6.



D . ALL 54 (FB1)

B . SW SOFT (P)

B4M0529

4. B.SW SOFT (P)

— Comparison between stroke sensor and pump output —

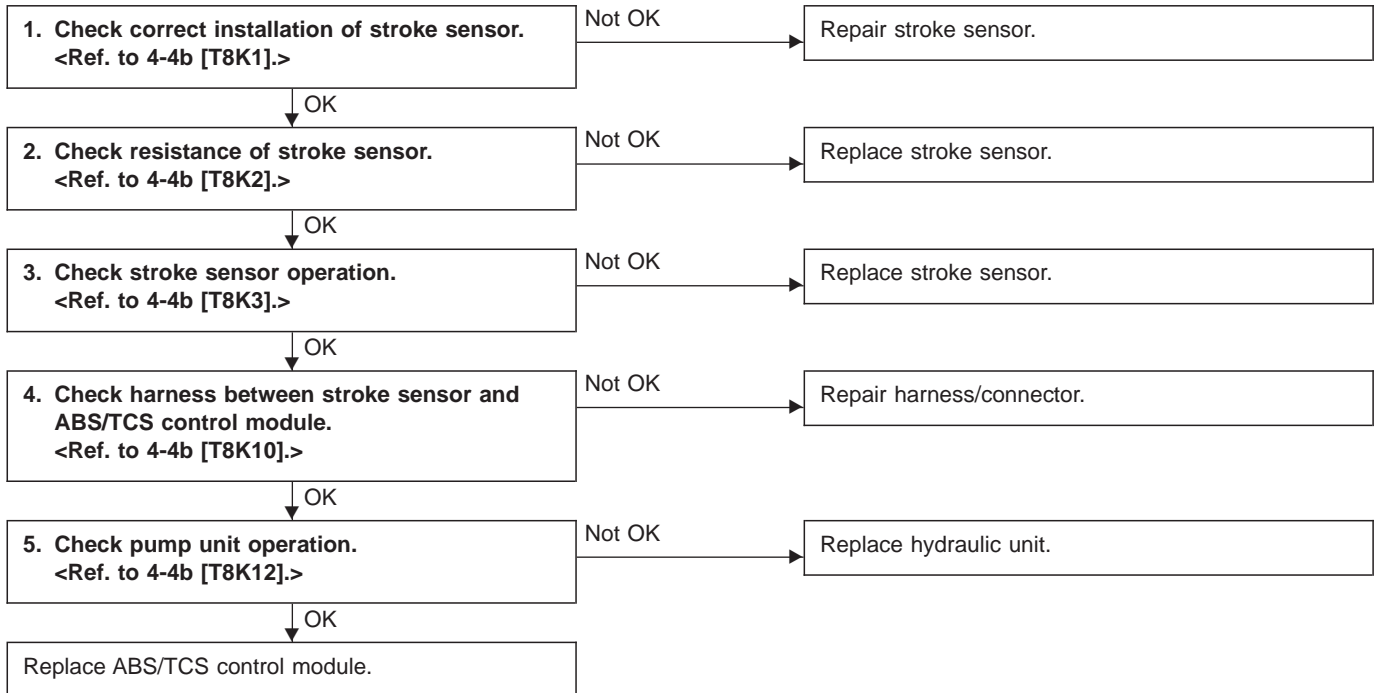
DIAGNOSIS:

- Faulty stroke sensor
- Faulty harness/connector
- Faulty pump unit in hydraulic unit
- Faulty stop light switch
- Faulty ABS/TCS control module

NOTE:

Operate the function F09 in select monitor TCS mode, and read the sensor output step.

If system is normal, the output reading is 1 when brake pedal is not depressed, and it changes from 2 to 3, 4 and 5 in accordance with the brake pedal depressing. If so, skip check steps 2 through 4.



D . ALL 54 (FB1)

B . SW SOFT (O)

B4M0530

5. B.SW SOFT (O)

— Broken brake light switch —

DIAGNOSIS:

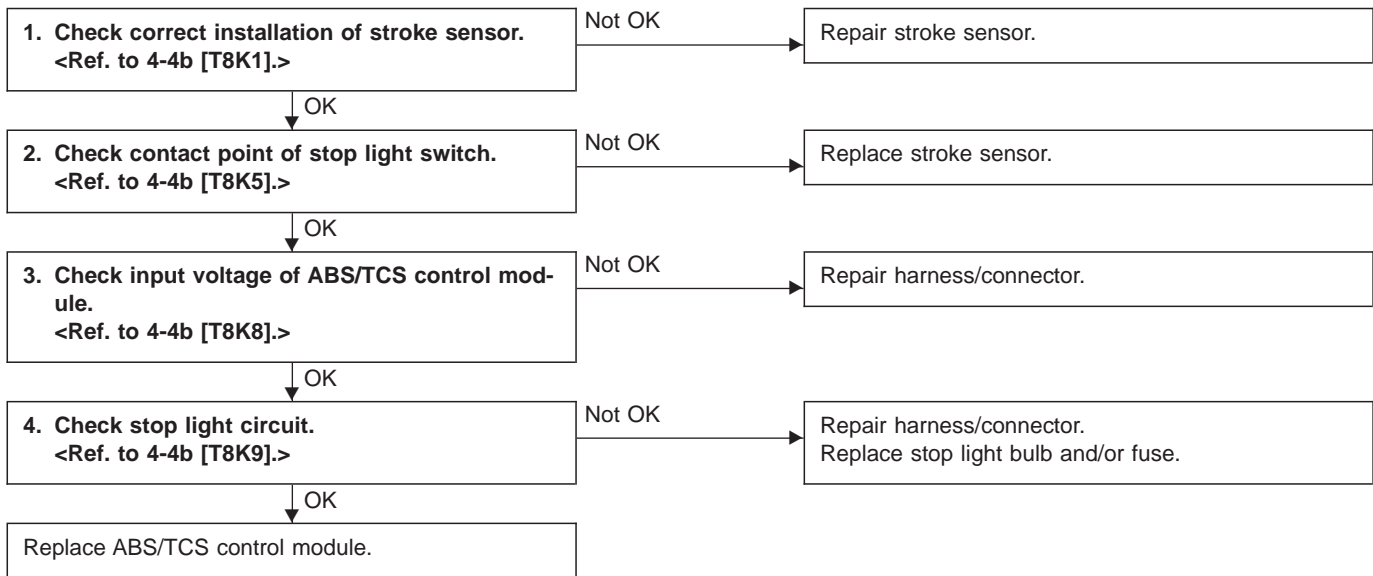
- Faulty stop light switch
- Faulty harness/connector
- Faulty stroke sensor
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- TCS does not operate.

NOTE:

Operate the function FA0 in select monitor TCS mode, and check the stop and brake switches by B1 LED ON/OFF. If system is normal, LED comes on when depressing brake pedal, and goes off when not depressing. If so, skip check steps 2 through 4.



D . ALL 57 (FB1)

FLUID LEVEL SS

B4M0531

Z: TROUBLE CODE 57

FLUID LEVEL SS

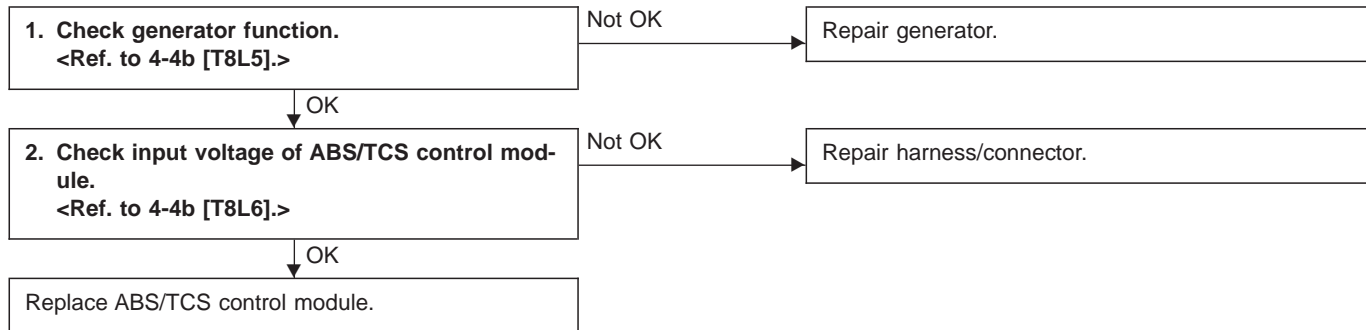
— Irregular signal from fluid level sensor —

DIAGNOSIS:

- Faulty fluid level sensor circuit
- Faulty harness/connector
- Faulty ABS/TCS control module
- Faulty generator

TROUBLE SYMPTOM:

- ABS and TCS do not operate.



D . ALL 58 (FB1)

PRESSURE SW

B4M0532

AA: TROUBLE CODE 58

PRESSURE SW

— Faulty pressure switch —

DIAGNOSIS:

- Faulty pressure
- Faulty stop light switch
- Faulty ABS/TCS control module
- Faulty harness/connector

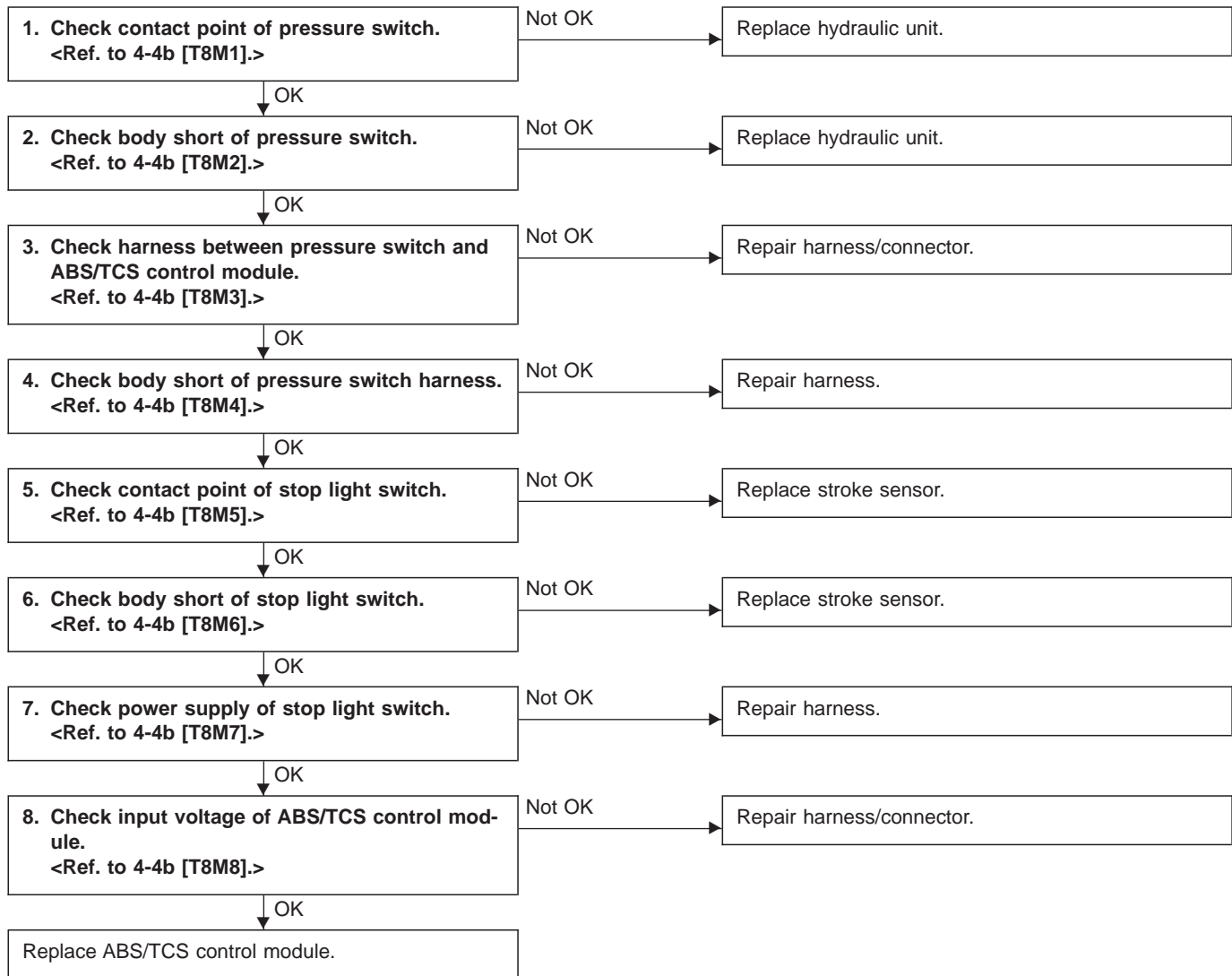
TROUBLE SYMPTOM:

- TCS does not operate.

NOTE:

Check using the select monitor.

Operate the function FA0 in select monitor TCS mode. The stop and brake switches can be checked by B1 LED ON/OFF. If system is normal, LED comes on when depressing brake pedal, and goes off when not depressing. If so, skip check steps 5 through 8.



D. ALL 61 (FB1)

TCS1 VALVE

B4M0533

AB: TROUBLE CODE 61

TCS 1 VALVE

— Faulty TCS 1 solenoid valve —

DIAGNOSIS:

- Faulty harness/connector
- Faulty solenoid valve in hydraulic unit
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.
- ABS sequence control does not operate.
- TCS sequence control does not operate.
- Air bleeding mode does not operate.

NOTE:

The procedures used are the same as those for FR.IN VALVE.

<Ref. to 4-4b [T10L0].>

D. ALL 62 (FB1)

TCS2 VALVE

B4M0534

AC: TROUBLE CODE 62

TCS 2 VALVE

— Faulty TCS 2 solenoid valve —

DIAGNOSIS:

- Faulty harness/connector
- Faulty solenoid valve in hydraulic unit
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS and TCS do not operate.
- ABS sequence control does not operate.
- TCS sequence control does not operate.
- Air bleeding mode does not operate.

NOTE:

The procedures used are the same as those for FR.OUT VALVE.

<Ref. to 4-4b [T10M0].>

11. General Diagnostics Table

⊙: Primary expected causes ○: Secondary expected causes

Symptoms	Trouble conditions	Hydraulic unit				P valve	Master cylinder	Calipers and piston	Pad	Rotor	Hand brake	Piping	Mixture of air	Brake booster and check valve	Axle and wheel	Alignment	Play of pedal	Rough road surface	Semicylindrical road surface	Loose or worn suspension	Tire	Wrong connection and wiring	Stroke sensor	
		Solenoid valve	Motor	Mount bush	Speed sensor																			
ABS function	Directional stability cannot be obtained when braking.	Vehicle turns to right or left.	⊙			⊙	○		⊙	⊙	○			○	⊙						⊙	⊙		
		Vehicle spins.	⊙			⊙	○		○	⊙												⊙	⊙	
	Out-of-order brakes	Long braking distance	⊙	○		○	○	○	○	⊙	○		○	⊙	○							⊙	⊙	
		Brakes lock.	⊙	○		⊙	○		○			○											⊙	
		Brakes drag.	⊙			⊙	○	⊙	○		⊙	○			⊙		⊙							
		Long pedal stroke	○				○	○	○			○	⊙	○			○							
		Abnormal vehicle pitching	○			○												⊙		⊙			⊙	
Unstable braking force. One-side brake refuses to work.	⊙			⊙		○	⊙	⊙	○		○			○	○		⊙	○	○	⊙	⊙			
TCS function	When accelerating abruptly, directional stability cannot be obtained when traveling on a slippery road surface.	Vehicle moves unsteadily.	⊙			⊙		⊙	⊙			○			⊙		⊙		○	⊙	⊙			
		Handle refuses to work.	⊙			⊙		⊙	⊙			○									⊙	⊙		
		Handle loses control.	⊙			⊙		⊙	⊙	○		○				○		⊙	○	○	⊙	⊙		
Bad acceleration, engine stalling (In addition to the causes listed here, check the ECM specifications.)	Engine stalls. Engine speed fails to increase.	⊙			⊙		⊙	⊙			○											⊙		
	Engine speed increases suddenly.	⊙			⊙		⊙	⊙	○	⊙	○	⊙										⊙		
Vibration occurs and abnormal noise is produced. ● When applying brakes abruptly. ● When accelerating abruptly. ● When driving on a slippery road surface.	Brake pedal heavily vibrates when applying brakes.	○	○			○							○				⊙		○		⊙	⊙		
	Loud hydraulic unit operating noise	○	○	⊙	⊙						⊙													
	Noise is produced from front of vehicle.	○		⊙	⊙		⊙	⊙	⊙	⊙	⊙		⊙	○					⊙	○				
	Noise is produced from rear of vehicle.				⊙		⊙	⊙	⊙	⊙	⊙			○					⊙	○				

NOTE:
This list includes no engine failure and transmission failure.

12. Phenomena Peculiar to the System

1. WHEN TRAVELING WITH EXTREMELY UNDER INFLATED TIRES

The TCS is apt to operate (particularly when turning) and, when it operates, acceleration can become slow*. This state is not abnormal. Immediately restore the tires to normal by traveling after releasing the TCS with the TCS OFF switch.

* Poor acceleration is sometimes caused by the engine itself. Check whether or not the TCS operating indicator light (green) comes on to determine that the failure is caused by the TCS control.

2. WHEN THE T TIRES ARE FITTED

The TCS is apt to operate (particularly when turning) and, when it operates, acceleration can become slow. This state is not abnormal. Immediately restore the tires to normal by traveling after releasing the TCS with the TCS OFF switch.

3. WHEN OPERATING THE TCS CONTINUOUSLY ON A SLOPE IMPOSSIBLE TO CLIMB OR IN STACK STATE

When operating the TCS for a long time, it can be automatically turned off (the OFF indicator light will come on), stopping braking. This state is not abnormal. It automatically resets by stopping and leaving the vehicle.

4. WHEN HEAVY LOAD IS PLACED ON THE BRAKES

If service brakes are used too often when descending a long slope, heavy load can be placed on the brakes. To prevent this problem, the TCS is automatically turned off (the OFF indicator light will come on). This state is not abnormal. Stop the vehicle and leave it in the same way as step 3, it automatically resets.

5. KICKBACK TO THE BRAKE PEDAL WHEN THE ABS IS OPERATING

Compared with ABS of the AWD model system, pedal kickback with large amplitude of vibration and long cycle can be felt. This is caused by the difference in system configuration and, therefore, not abnormal. If you receive an inquiry from your clients, fully explain this point.

6. INSPECTOR

Before advancing the vehicle after the engine starts, drive the pump motor and valve for a very short time to functionally check the ABS/TCS brakes. It is not abnormal if, at this time, operating noises of the valve and motor are produced or kickback of the brake pedal is felt when stepping on the pedal.

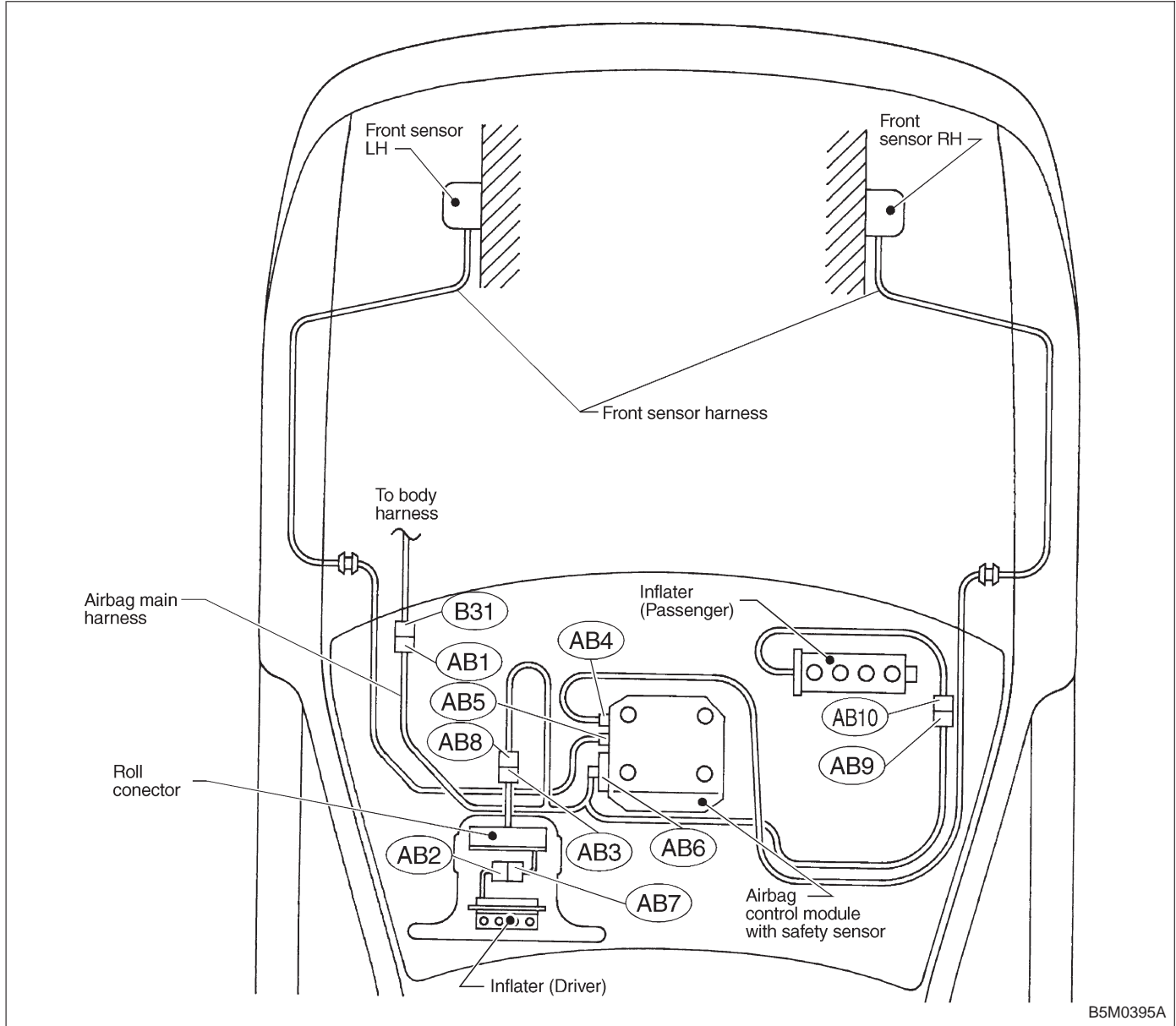
7. WHEN ATTACHING CHAINS

It is sometimes a good idea to turn off the TCS for better advancing and accelerating the vehicle.

8. WHEN A DRUM TESTER IS USED (SPEEDOMETER TEST, EXHAUST GAS TEST, BRAKE TEST, ETC.)

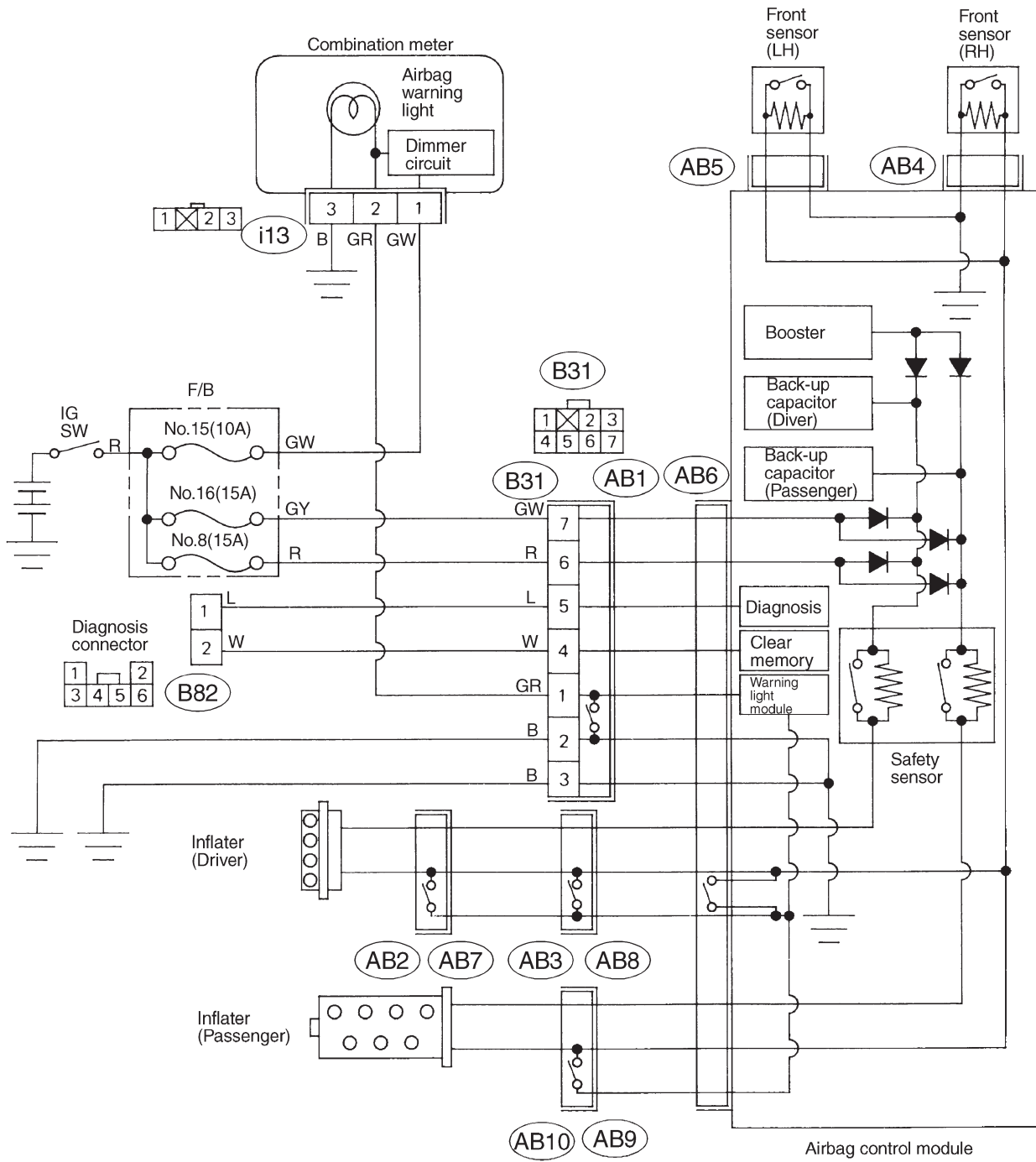
Before performing tests, turn the TCS off by operating the TCS OFF switch or disconnect the fuse of ECM input power source to put the machine out of operation. If operating other parts to put the TCS in the fail state intentionally, trouble code will be recorded. Make sure to clear the memory. Also, in a 2-wheel tester, wheel speed sensor failure can be detected, making the TCS fail. This case is also not abnormal and clearing the memory is required.

1. Electrical Components Location



Connector No.	(AB1)	(AB2)	(AB3)	(AB4)	(AB5)	(AB6)	(AB7)	(AB8)	(AB9)	(AB10)
Pole	7	3	3	2	2	12	3	3	3	3
Color	Yellow	Yellow	Yellow	Blue	Orange	Yellow	Yellow	Yellow	Yellow	Yellow
Male/Female	Male	Female	Female	Female	Female	Female	Male	Male	Male	Female

2. Schematic



B5M0111B

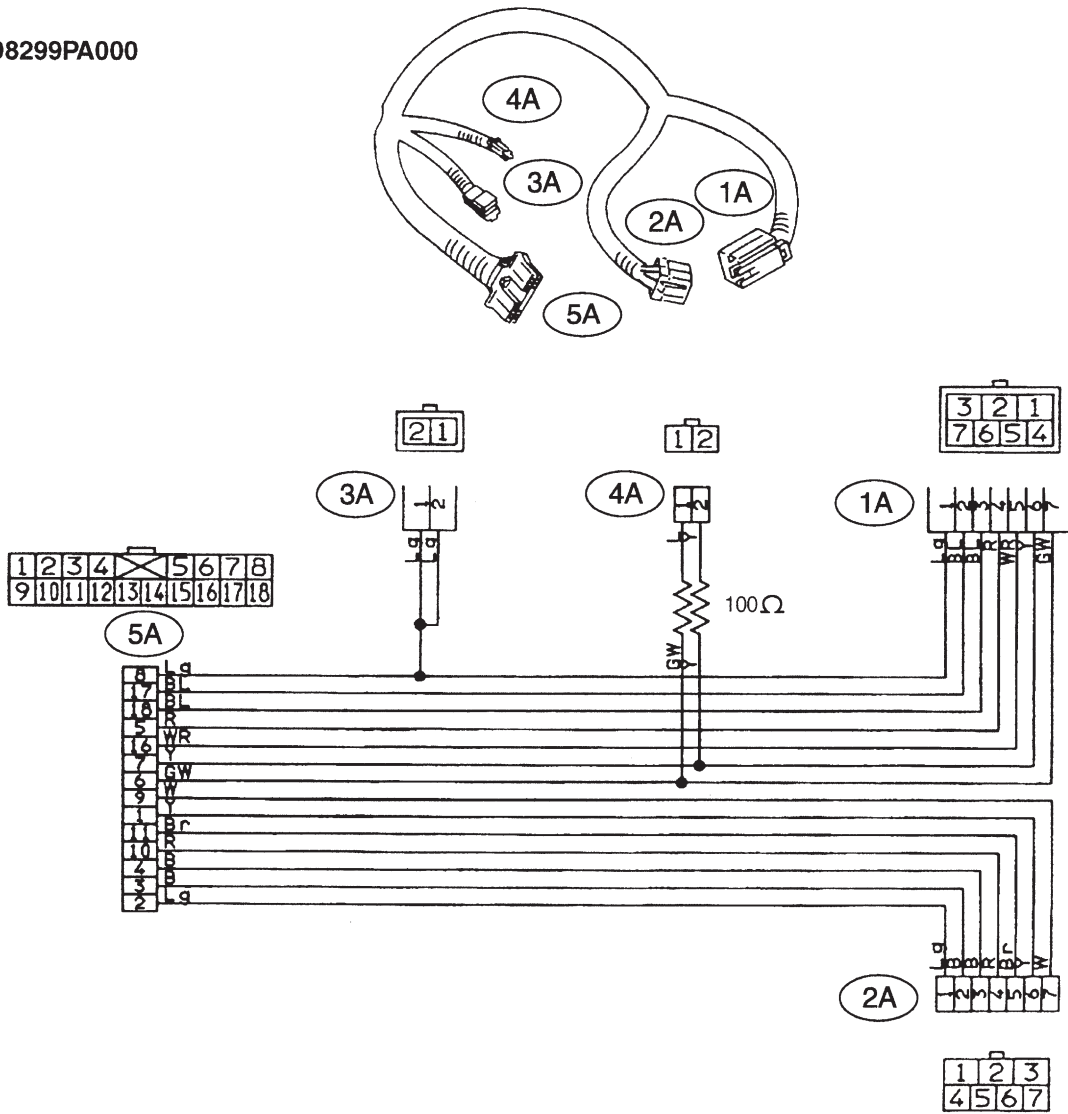
3. Tools for Diagnostics

CAUTION:

Be sure to use specified test harness A, B or C when measuring voltage, resistance, etc. of AIRBAG system component parts.

A: TEST HARNESS A

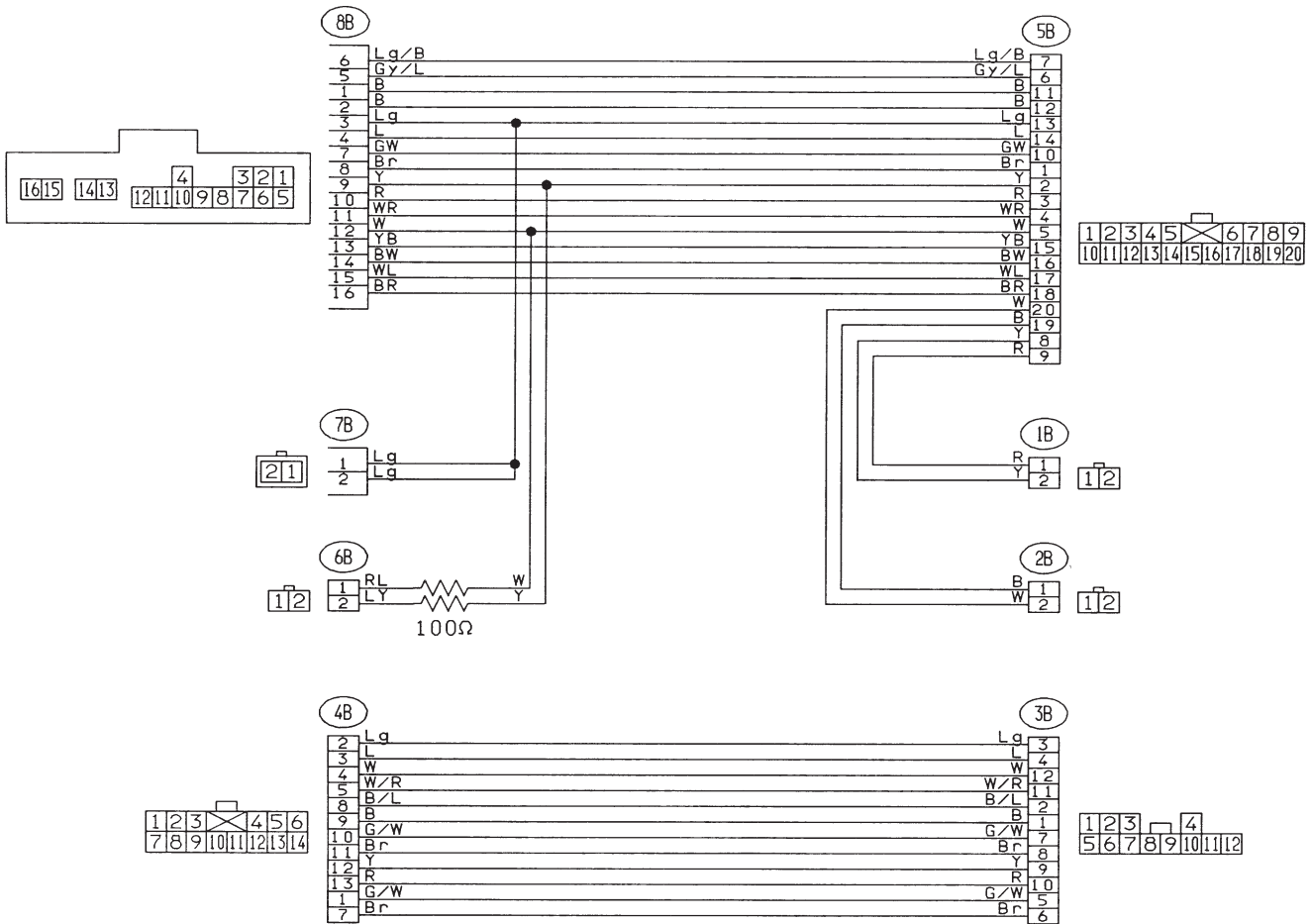
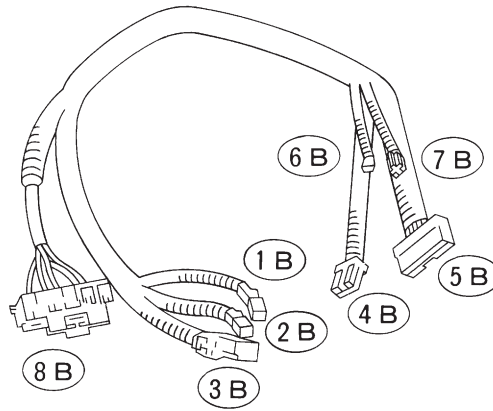
PN 98299PA000



B5M0112A

B: TEST HARNESS B2

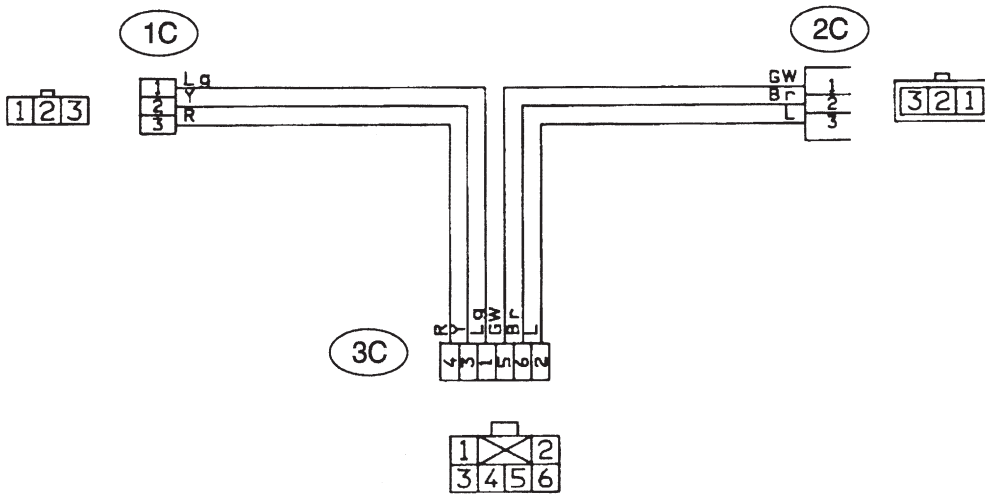
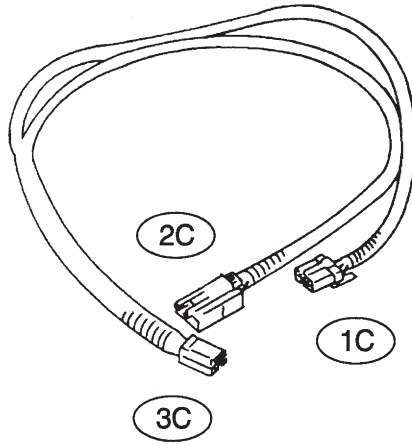
PN 98299PA011



G5M0593

C: TEST HARNESS C

PN 98299PA020

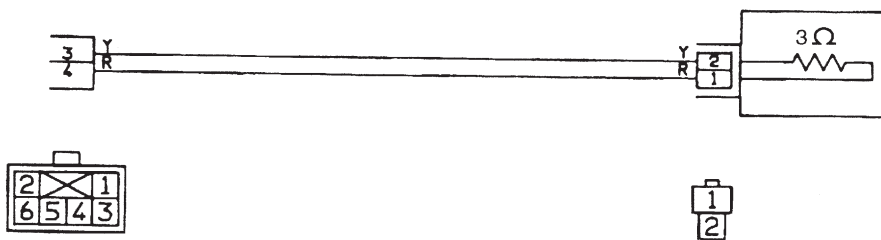
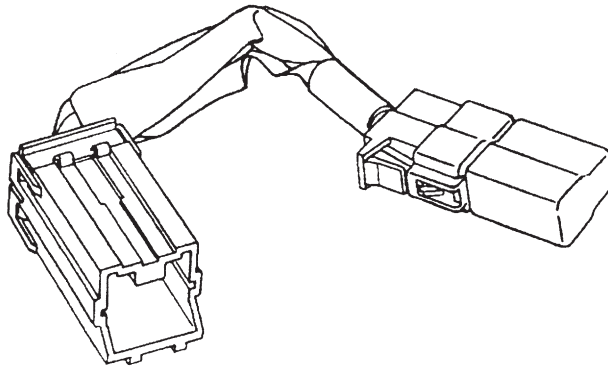


B5M0113A

D: AIRBAG RESISTOR

The airbag resistor is used during diagnostics. The airbag resistor has the same resistance as the airbag module and thus provides safety when used instead of the airbag module. It also makes it possible to finish, diagnostics in less time.

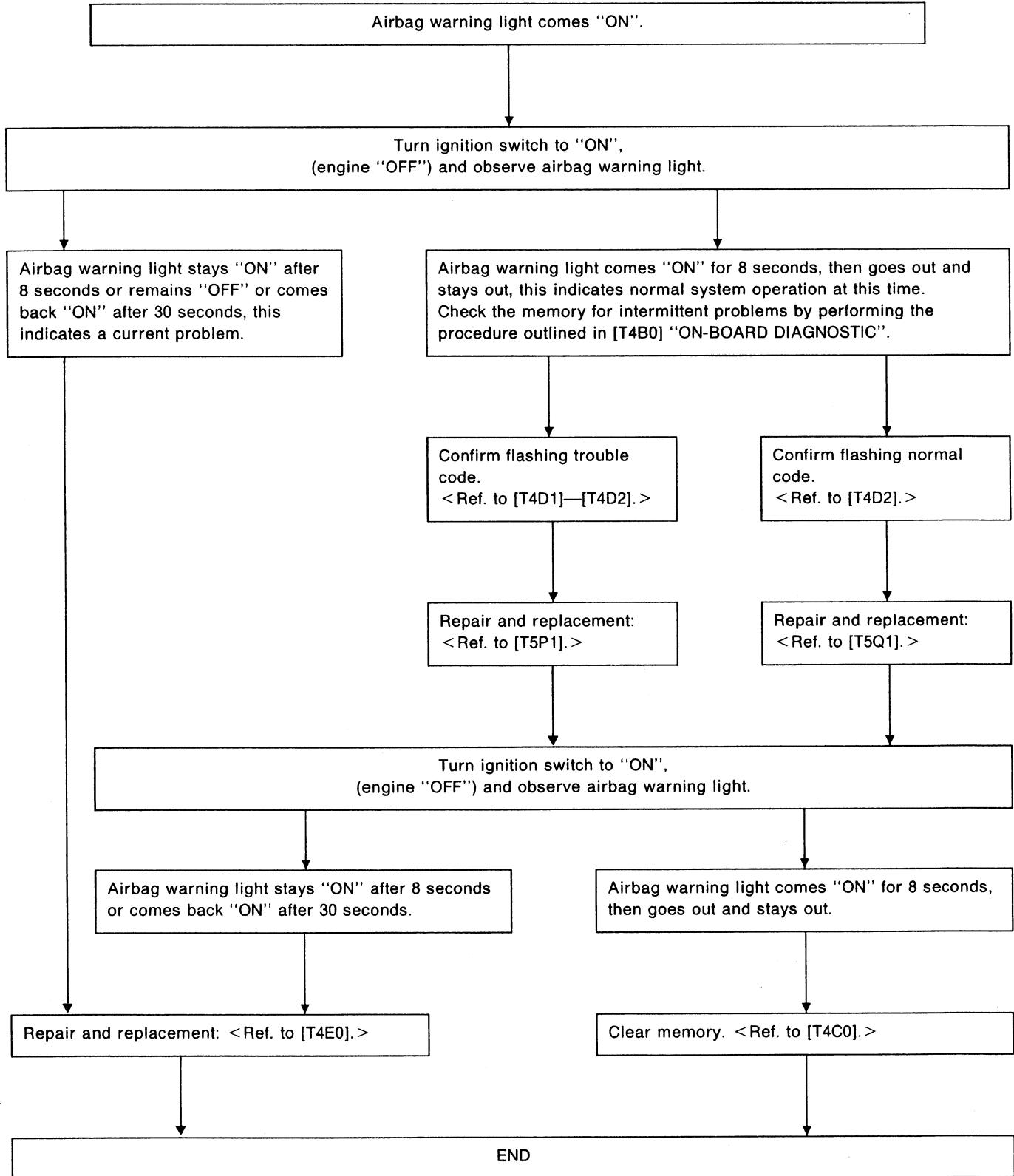
PN 98299PA040

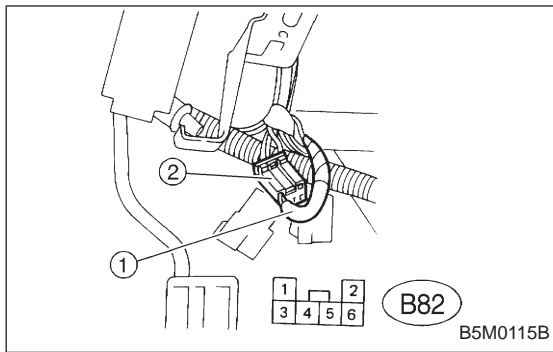


B5M0114A

4. Diagnostics Chart for On-board Diagnostic System

A: BASIC DIAGNOSTICS PROCEDURE



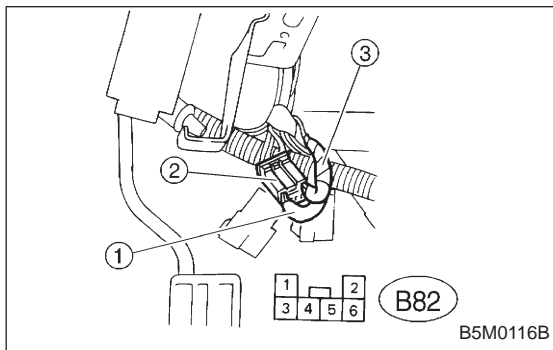


B: ON-BOARD DIAGNOSTIC

When the airbag system is in functioning condition, the airbag warning light will remain on for 8 seconds and go out when the ignition switch is set to ON.

If there is any malfunction, the airbag warning light will either stay on or off continuously. In such cases, perform on-board diagnostic in accordance with the specified procedure to determine trouble codes.

- 1) Turn ignition switch ON (with engine OFF).
- 2) Connect DIAG. terminal ① to No. 1 terminal of diagnosis connector ② located below lower cover.
- 3) Check in accordance with the trouble code indicated by the AIRBAG warning light, and record the trouble codes.
- 4) Turn the ignition switch "OFF" and remove the DIAG. terminal from No.1 terminal of diagnosis connector.



C: CLEAR MEMORY

After eliminating problem as per trouble code, clear memory as follows:

Make sure ignition switch is ON (and engine off). Connect one DIAG. terminal ① on diagnosis connector ② terminal No. 1.

While warning light is flashing, connect the other DIAG. terminal ③ on terminal No. 2 for at least three seconds.

After memory is cleared, normal warning light flashing rate resumes. (Warning light flashes every 0.6 seconds ON-OFF operation.) Memory cannot be cleared if any problem exists.

After clear memory and then DIAG. terminals ① and ③, extract from diagnosis connector ②.

D: LIST OF TROUBLE CODES**1. TROUBLE CODES**

Trouble code/Contents of troubles	Memory function	Contents of diagnosis	Page
02	Provided.	1) Front sensor harness is shorted. 2) Airbag main harness is shorted. 3) Airbag module harness (Dr/Ps) is shorted. 4) Roll connector is shorted. 5) Airbag control module is faulty.	16
03	Provided.	1) Front sensor harness circuit is open. 2) Front sensor unit circuit is open.	18
04	Provided.	1) Airbag main harness circuit is shorted. 2) Airbag module harness (Ps) circuit is shorted. 3) Airbag control module is faulty.	19
11	Provided.	1) Airbag control module is faulty. 2) Airbag main harness circuit is open. 3) Fuse No. 8 is blown. 4) Body harness circuit is open.	20
12	Provided.	1) Airbag main harness circuit is open. 2) Airbag module harness (Dr) circuit is open. 3) Roll connector circuit is open. 4) Airbag control module is faulty.	22
13	Provided.	1) Airbag main harness circuit is shorted. 2) Airbag module harness (Dr) is shorted. 3) Roll connector circuit is shorted. 4) Airbag control module is faulty.	23
14	Not provided.	1) (AB9) and (AB10) are not connected properly. 2) (AB2) and (AB7) are not connected properly. 3) (AB3) and (AB8) are not connected properly. 4) (AB4), (AB5) and (AB6) are not connected properly to airbag control module.	24
21	Provided.	Airbag control module is faulty.	26
22	Provided.	1) Airbag main harness circuit is open. 2) Airbag module harness (Ps) circuit is open. 3) Airbag control module is faulty.	27
23	Provided.	1) Airbag main harness is shorted to power supply. 2) Front sensor harness is shorted to power supply. 3) Airbag module harness (Dr/Ps) is damaged. 4) Roll connector is shorted to power supply. 5) Airbag control module is faulty.	28
24	Provided.	1) Airbag main harness circuit is open. 2) Airbag module harness (Dr) circuit is open. 3) Roll connector circuit is open. 4) Airbag control module is faulty. 5) Above diagnosis plus other faulty of airbag modular parts.	30
31	Not provided.	1) Airbag control module is faulty. 2) Airbag main harness circuit is open. 3) Fuse No. 16 is blown. 4) Body harness circuit is open.	32
32	Provided.	1) Airbag main harness circuit is open. 2) Airbag module harness (Ps) circuit is open. 3) Airbag control module is faulty. 4) Above diagnosis plus other faulty of airbag modular parts.	34

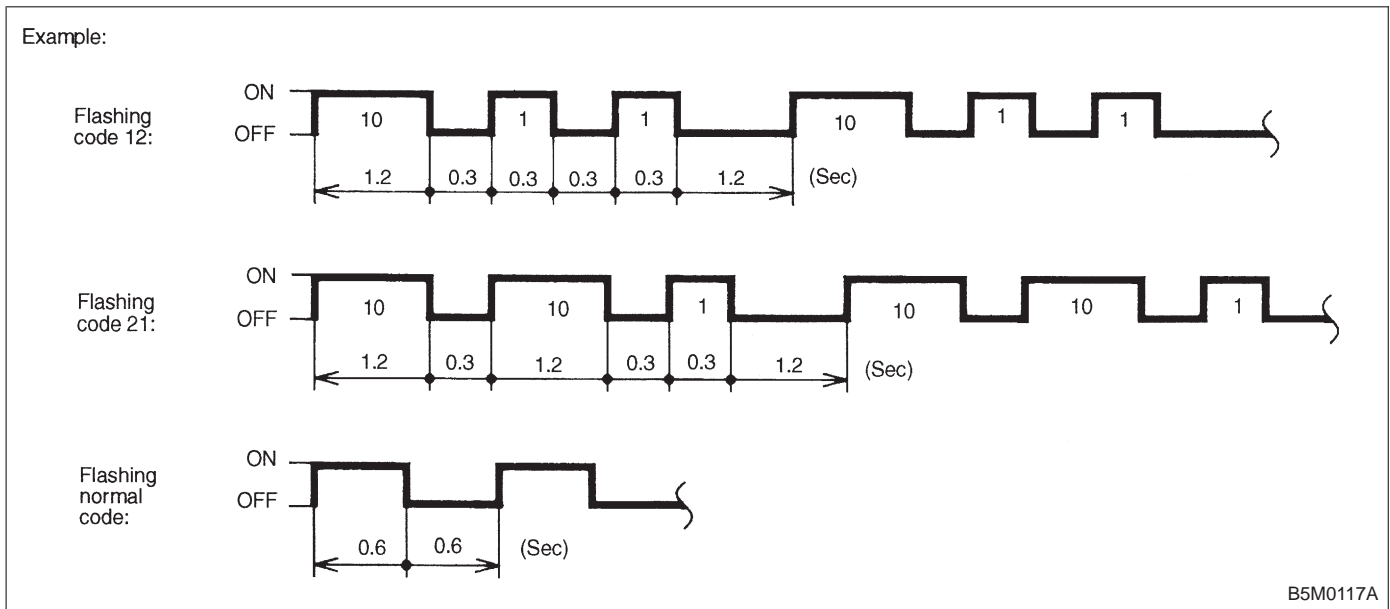
NOTE: Dr: Driver side Ps: Passenger side

Trouble code/Contents of troubles		Memory function	Contents of diagnosis	Page
Airbag warning light remains on.		Not provided.	1) Airbag warning light is faulty. 2) Airbag control module to airbag warning light harness circuit is shorted or open. 3) Grounding circuit is faulty. 4) Airbag control module is faulty. 5) (AB1) and (B31) are not connected properly.	36
Airbag warning light remains off.		Not provided.	1) Fuse No. 15 is blown. 2) Body harness circuit is open. 3) Airbag warning light is faulty. 4) Airbag main harness is faulty. 5) Airbag control module is faulty.	40
Warning light indicates trouble code, then normal code.	Flashing trouble code.	Provided.	Airbag system component parts are faulty.	42
	Flashing normal code.	Not provided.	1) Airbag connector is faulty. 2) Fuse No. 16 is blown. 3) Airbag main harness is faulty. 4) Airbag control module is faulty. 5) Body harness is faulty.	45

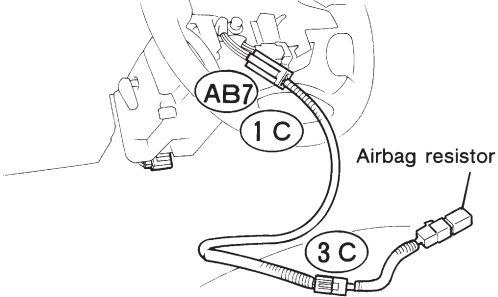
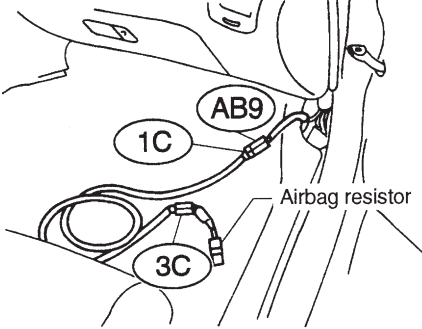
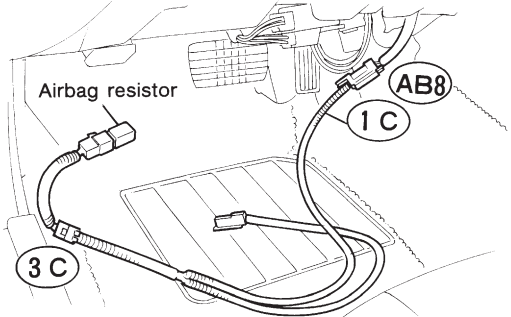
2. HOW TO READ TROUBLE CODES

The AIRBAG warning light flashes a code corresponding to the faulty parts.

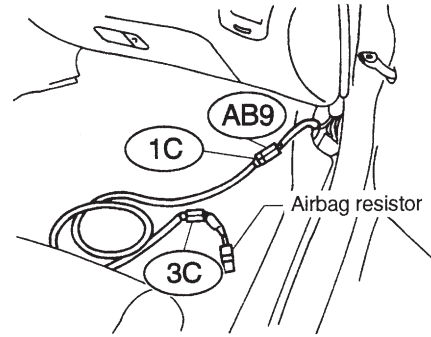
The long segment (1.2 sec on) indicates a “ten”, and the short segment (0.3 sec on) indicates a “one”.



E: DIAGNOSTICS PROCEDURE

Airbag warning light stays on after 8 seconds.	
1) Perform on-board diagnostic. <Ref. to 5-5 [T4B0].>	
2) Are trouble codes 2, 4, 12, 13, 22, 23, 24 or 32 indicated? <Ref. to 5-5 [T4D1]—[T4D2].> Record trouble codes.	
3) If "NO", proceed with diagnostics and repair according to trouble code indicated then perform step 29).	
4) If "YES", proceed by turning ignition switch "OFF", disconnect battery ground cable, and wait 20 seconds. If codes 12 or 13 are indicated proceed to step 5). If codes 12 or 13 are not indicated proceed to step 6).	
5) Remove driver side airbag module and connect test harness C connector (1C) to (AB7). <Ref. to 5-5 [W3A1].> Connect airbag resistor to test harness C connector (3C). Proceed to step 19).	 <p style="text-align: right;">G5M0430</p>
6) If codes 4 or 22 are indicated, proceed to step 7). If codes 4 or 22 are not indicated proceed to step 11).	
7) Turn ignition switch "OFF", disconnect battery ground cable, and wait 20 seconds. Disconnect passenger side airbag module connector (AB9) to (AB10). <Ref. to 5-5 [W3A2].> Connect test harness C connector (1C) to (AB9). Connect airbag resistor to test harness C connector (3C).	 <p style="text-align: right;">B5M0118A</p>
8) Reconnect battery ground cable and turn ignition switch "ON", does airbag warning light go out after 8 seconds and remain "OFF" for more than 30 seconds? See notes 1) and 2). (Refer to end of chart.)	
9) If "YES", turn ignition switch "OFF", disconnect battery ground cable, and wait 20 seconds. Install a new passenger side airbag module <Ref. to 5-5 [W3B0].> then proceed to step 29).	
10) If "NO" proceed to step 1).	
11) Remove lower cover panel and connect test harness C connector (1C) to (AB8) <Ref. to 5-4 [W1A0].> with airbag resistor attached to test harness C connector (3C). Turn ignition switch "ON". Does airbag warning light go "OFF" after 8 seconds and remain off for more than 30 seconds? See notes 1) and 2). (Refer to end of chart.) If "YES" proceed to step 5). If "NO" proceed to step 12).	 <p style="text-align: right;">G5M0429</p>

- 12) Turn ignition switch "OFF", disconnect battery ground cable, and wait 20 seconds. Connect connector (AB3) to (AB8). Disconnect passenger side airbag module connector (AB9) to (AB10). <Ref. to 5-5 [W3A2].>
Connect test harness C connector (1C) to (AB9). Connect airbag resistor to test harness C connector (3C).

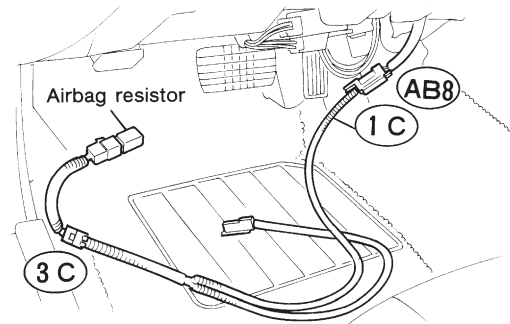


B5M0118A

- 13) Reconnect battery ground cable and turn ignition switch "ON". Does airbag warning light go "OFF" after 8 seconds and remain off for more than 30 seconds? See notes 1) and 2). (Refer to end of chart.)

- 14) If "YES", proceed to step 9).

- 15) If "NO", turn ignition switch "OFF", disconnect battery ground cable, and wait 20 seconds. Disconnect connector (AB3) to (AB8). Connect test harness C connector (1C) to (AB8). Connect airbag resistor to test harness C connector (3C).



G5M0429

- 16) Reconnect battery ground cable and turn ignition switch "ON". Does airbag warning light go "OFF" after 8 seconds and remain off for more than 30 seconds? See notes 1) and 2). (Refer to end of chart.)

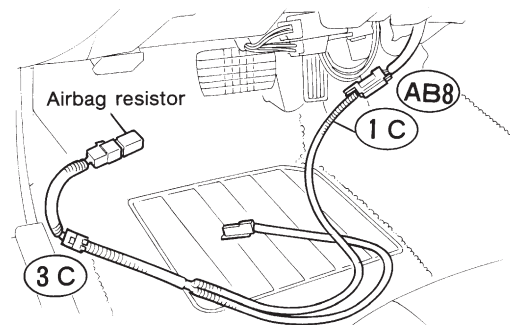
- 17) If "YES", turn ignition switch "OFF", disconnect battery ground cable and wait 20 seconds. Install a new passenger side airbag module <Ref. to 5-5 [W3B0].> then proceed to step 5).

- 18) If "NO", proceed with diagnostics according to trouble code indicated during on-board diagnostic. Proceed to step 29).

- 19) Reconnect battery ground cable and turn ignition switch "ON", does airbag warning light go out after 8 seconds and remain "OFF" for more than 30 seconds? See notes 1) and 2). (Refer to end of chart.)

- 20) If "YES", turn ignition switch "OFF", disconnect battery ground cable and wait 20 seconds. Install driver side airbag module <Ref. to 5-5 [W3B0].> and proceed to step 29).

- 21) If "NO", remove lower cover panel and connect test harness C connector (1C) to (AB8) <Ref. to 5-4 [W1A0].> with airbag resistor attached to test harness C connector (3C). Turn ignition switch "ON". Does airbag warning light go "OFF" after 8 seconds and remain off for more than 30 seconds? See notes 1) and 2). (Refer to end of chart.)
If "YES" proceed to step 22).
If "NO" proceed to step 23).

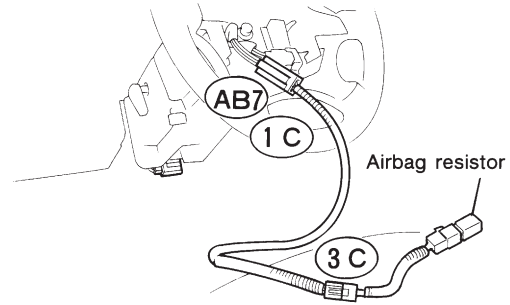


G5M0429

- 22) If "YES", replace combination switch, <Ref. to 5-5 [W7A0].> and proceed to step 26).

- 23) If "NO", proceed with diagnostics and repair according to trouble code indicated, then perform step 24).

24) Turn ignition switch "OFF", disconnect battery ground cable, and wait 20 seconds. Remove driver side airbag module and connect test harness C connector (1C) to (AB7) <Ref. to 5-5 [W3A1].> with airbag resistor attached to test harness C connector (3C).



G5M0430

25) Reconnect battery ground cable and turn ignition switch "ON". Does airbag warning light go "OFF" after 8 seconds and remain off for more than 30 seconds? See notes 1) and 2). (Refer to end of chart.) If "YES", proceed to step 26). If "NO", proceed to step 27).

26) Turn ignition switch "OFF", disconnect battery ground cable, and wait 20 seconds. Install driver side airbag module <Ref. to 5-5 [W3B0].> and proceed to step 26).

27) Replace combination switch, <Ref. to 5-5 [W7A0].> and proceed to step 26).

28) Reconnect battery and turn ignition switch "ON". Does airbag warning light go off after 8 seconds and remain off for more than 30 seconds? See notes 1) and 2). (Refer to end of chart.) If "YES", proceed to step 29). If "NO", proceed to step 31).

29) Perform clear memory procedure. <Ref. to 5-5 [T4C0].>

30) If memory cannot be cleared, another trouble code exists. Return to step 1).

31) Turn ignition switch "OFF", disconnect battery ground cable, and wait 20 seconds. Replace driver side airbag module. <Ref. to 5-5 [W3A1].> Proceed to step 28).

NOTES:

- 1) Always remember to secure the green double locks before turning the ignition switch "ON".
- 2) In some cases the airbag warning light will go "OFF" after 8 seconds but will turn "ON" again within 30 seconds. In this case continue diagnostics with the basic diagnostics procedures or trouble code procedures.

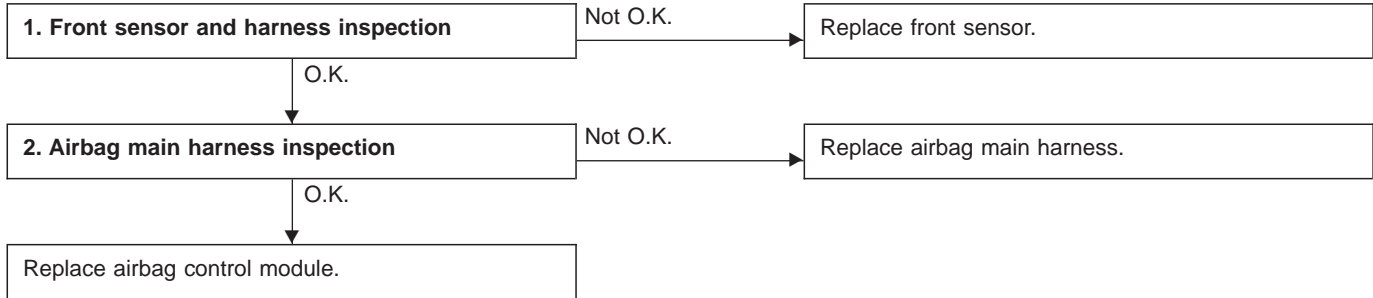
5. Diagnostics Chart with Trouble Code

<Ref. to 5-5 [T4D1].>

A: TROUBLE CODE 02

DIAGNOSIS:

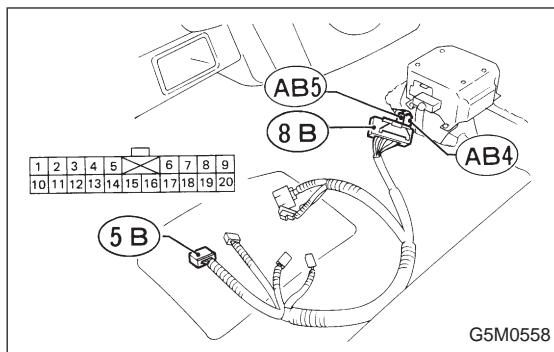
- Front sensor harness is shorted.
- Airbag main harness is shorted.
- Airbag module harness (Driver or passenger) is shorted.
- Roll connector is shorted.
- Airbag control module is faulty.



CAUTION:

Before performing diagnostics on airbag system, turn ignition switch “OFF”, disconnect battery ground terminal and then wait at least 20 seconds.

After 20 seconds elapse, remove instrument panel lower cover, and disconnect (AB3) and (AB8), (AB9) and (AB10).



1. FRONT SENSOR AND HARNESS INSPECTION

- 1) Disconnect connectors (AB4) and (AB5) from airbag control module. <Ref. to 5-5 [W6A0].>
- 2) Connect connectors (AB4) and (AB5) to connector (8B) of test harness B2.
- 3) Measure resistance between connector (5B) terminal indicated.

(5B) Terminal / Specified resistance:

(RH: AB4): No. 17 — No. 18 / 1.4 — 1.6 k Ω

(LH: AB5): No. 15 — No. 16 / 1.4 — 1.6 k Ω

- 4) Measure resistance between each connector (5B) terminal and body.

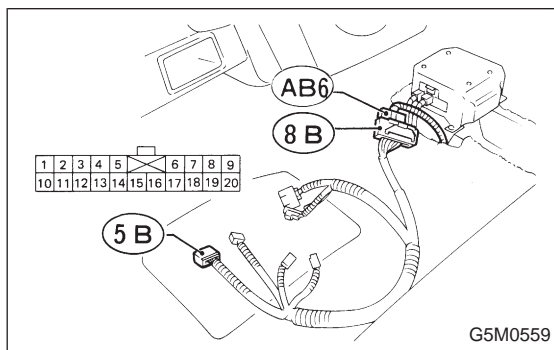
(5B) Terminal / Specified resistance:

(RH: AB4): No. 17 — Body / 1 M Ω , or more

No. 18 — Body / 1 M Ω , or more

(LH: AB5): No. 15 — Body / 1 M Ω , or more

No. 16 — Body / 1 M Ω , or more



2. AIRBAG MAIN HARNESS INSPECTION

- 1) Disconnect connector (AB6) from airbag control module <Ref. to 5-5 [W6A0].>, and connect (AB6) to test harness B2 connector (8B).
- 2) Measure resistance between each (5B) terminal and body.

(5B) Terminal / Specified resistance:

No. 1 — Body / 1 M Ω , or more

No. 14 — Body / 1 M Ω , or more

B: TROUBLE CODE 03

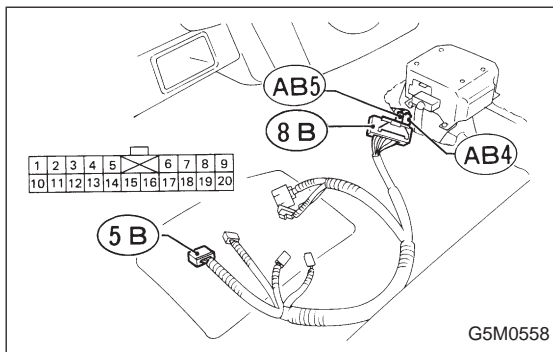
DIAGNOSIS:

- Front sensor harness circuit is open.
- Front sensor unit circuit is open.



CAUTION:

Before performing the diagnostics on airbag system, turn ignition switch "OFF", disconnect battery ground terminal and then wait at least 20 seconds.



1. FRONT SENSOR (LH AND RH) INSPECTION

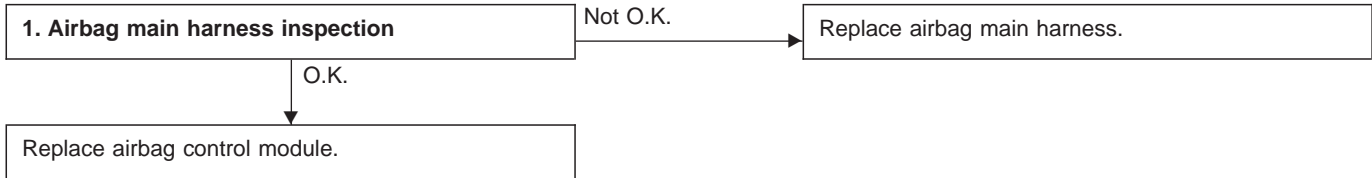
- 1) Disconnect connectors (AB4) and (AB5) from airbag control module. <Ref. to 5-5 [W6A0].>
- 2) Connect connectors (AB4) and (AB5) to test harness B2 connector (8B).
- 3) Measure resistance between connector (5B) terminal.

(5B) Terminal / Specified resistance:

- (RH: AB4): No. 17 — No. 18 / 1.4 — 1.6 kΩ
- (LH: AB5): No. 15 — No. 16 / 1.4 — 1.6 kΩ

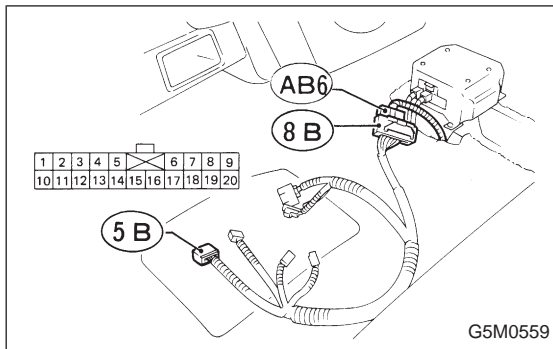
C: TROUBLE CODE 04**DIAGNOSIS:**

- Airbag main harness circuit is shorted.
- Airbag module harness (Passenger) circuit is shorted.
- Airbag control module is faulty.

**CAUTION:**

Before performing diagnostics on airbag system, turn ignition switch "OFF", disconnect battery ground cable and then wait at least 20 seconds.

After 20 seconds elapse, remove instrument panel lower cover, and disconnect (AB3) and (AB8), (AB9) and (AB10).

**1. AIRBAG MAIN HARNESS INSPECTION**

1) Disconnect connector (AB6) from airbag control module <Ref. to 5-5 [W6A0].>, and connect it to test harness B2 connector (8B).

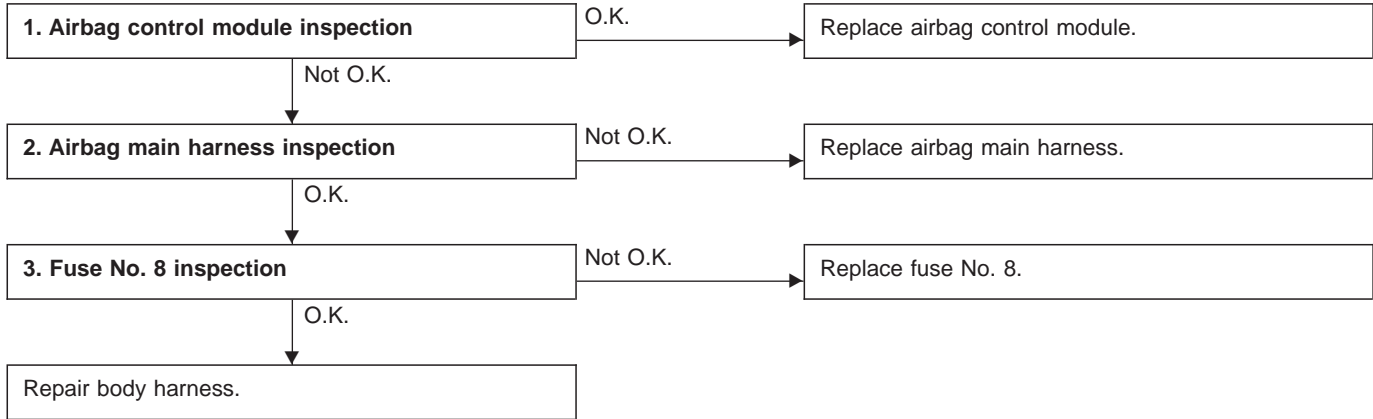
2) Measure resistance between test harness B2 connector (5B) terminal.

(5B) Terminal / Specified resistance:
No. 6 — No. 7 / 10 k Ω , or more

D: TROUBLE CODE 11

DIAGNOSIS:

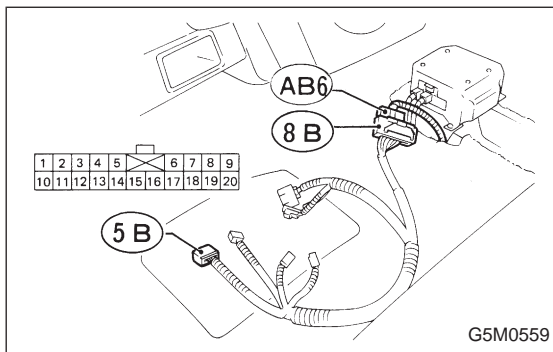
- Airbag control module is faulty.
- Airbag main harness circuit is open.
- Fuse No. 8 is blown.
- Body harness circuit is open.



CAUTION:

Before performing diagnostics on airbag system, turn ignition switch “OFF”, disconnect battery ground cable and then wait at least 20 seconds.

After 20 seconds elapse, remove instrument panel lower cover, and disconnect (AB3) and (AB8), (AB9) and (AB10).



1. AIRBAG CONTROL MODULE INSPECTION

1) Disconnect connector (AB6) from airbag control module <Ref. to 5-5 [W6A0].> and connect it to test harness B2 connector (8B).

2) Connect battery ground cable and turn ignition switch “ON”. (engine off)

3) Measure voltage across connector (5B) terminal and body.

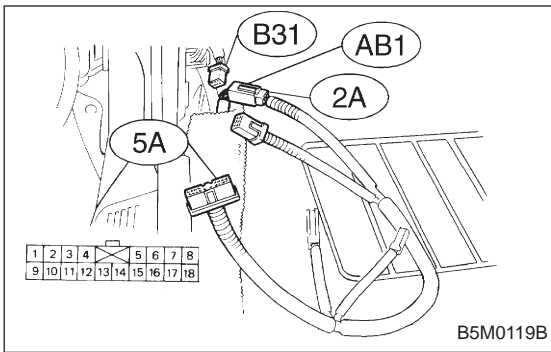
(5B) Terminal / Specified voltage:

No. 2 — Body / 10 V, or more

2. AIRBAG MAIN HARNESS INSPECTION

1) Go to step 2) below after performing diagnostics on airbag system as per flowchart under “**1. AIRBAG CONTROL MODULE INSPECTION**” previously outlined.

2) Turn ignition switch “OFF”, disconnect battery ground terminal and then wait at least 20 seconds.



3) Disconnect body harness connector (B31) from connector (AB1) at front lower pillar, and connect connector (AB1) to test harness A connector (2A).

4) Measure resistance between test harness A connector (5A) terminal and test harness B2 connector (5B) terminal.

Connector & terminal / Specified resistance:

(5A) No. 1 — (5B) No. 2 / 10 Ω, or less

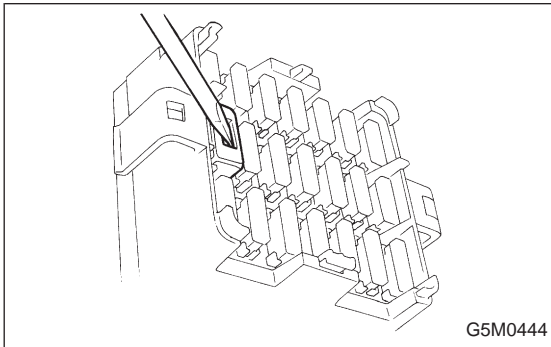
5) Measure resistance between terminals of connectors (5A) and (5B).

(5A) Terminal / Specified resistance:

No. 1 — Body / 10 kΩ, or more

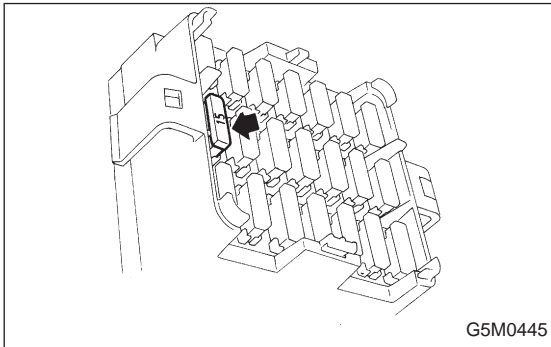
(5B) Terminal / Specified resistance:

No. 2 — Body / 10 kΩ, or more



3. FUSE No. 8 INSPECTION

1) Turn ignition switch "OFF", and remove airbag fuse protector.

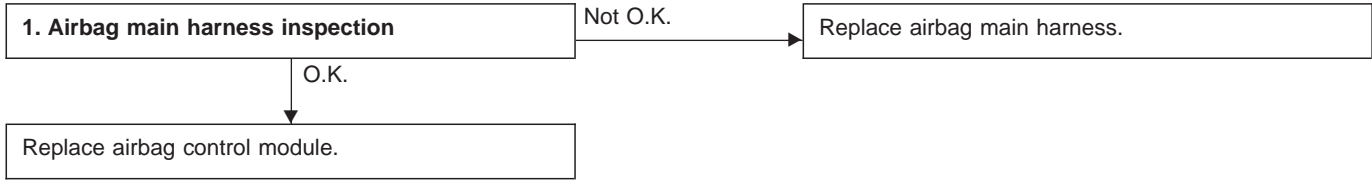


2) Remove and visually check fuse No. 8.

E: TROUBLE CODE 12

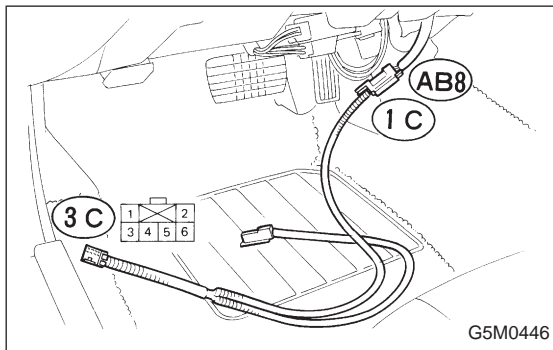
DIAGNOSIS:

- Airbag main harness circuit is open.
- Airbag module harness (Driver) circuit is open.
- Roll connector circuit is open.
- Airbag control module is faulty.



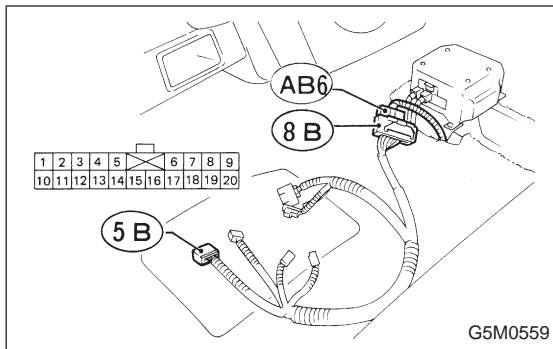
CAUTION:

Before performing diagnostics on airbag system, turn ignition switch "OFF", disconnect battery ground cable and then wait at least 20 seconds.



1. AIRBAG MAIN HARNESS INSPECTION

1) Remove lower cover panel <Ref. to 5-4 [W1A0].>, and connect connector (AB8) below steering column to test harness C connector (1C).



2) Disconnect connector (AB6) <Ref. to 5-5 [W6A0].> from airbag control module, and connect it to test harness B2 connector (8B) terminal.

3) Measure resistance between test harness B2 connector (5B) and test harness C connector (3C) terminals.

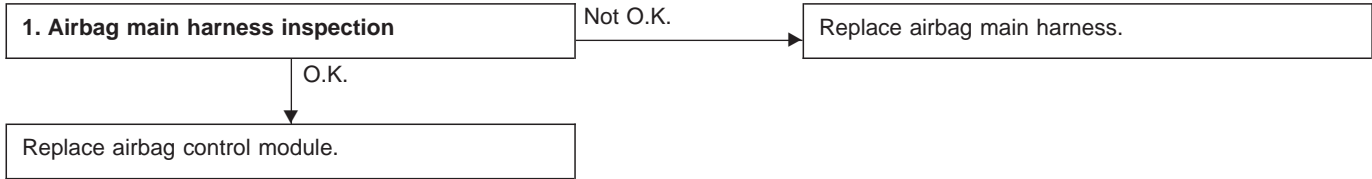
Connector & terminal / Specified resistance:

(5B) No. 14 — (3C) No. 4 / 10 Ω, or less

(5B) No. 1 — (3C) No. 3 / 10 Ω, or less

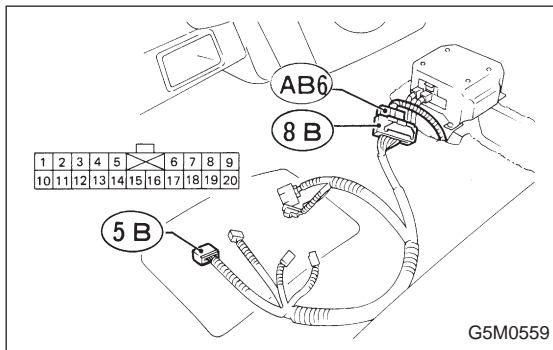
F: TROUBLE CODE 13**DIAGNOSIS:**

- Airbag main harness circuit is shorted.
- Airbag module harness (Driver) is shorted.
- Roll connector circuit is shorted.
- Airbag control module is faulty.

**CAUTION:**

Before performing diagnostics on airbag system, turn ignition switch "OFF", disconnect battery ground cable and then wait at least 20 seconds.

After 20 seconds elapse, remove instrument panel lower cover, and disconnect (AB3) and (AB8), (AB9) and (AB10).

**1. AIRBAG MAIN HARNESS INSPECTION**

1) Disconnect connector (AB6) from airbag control module <Ref. to 5-5 [W6A0].>, and connect it to test harness B2 connector (8B).

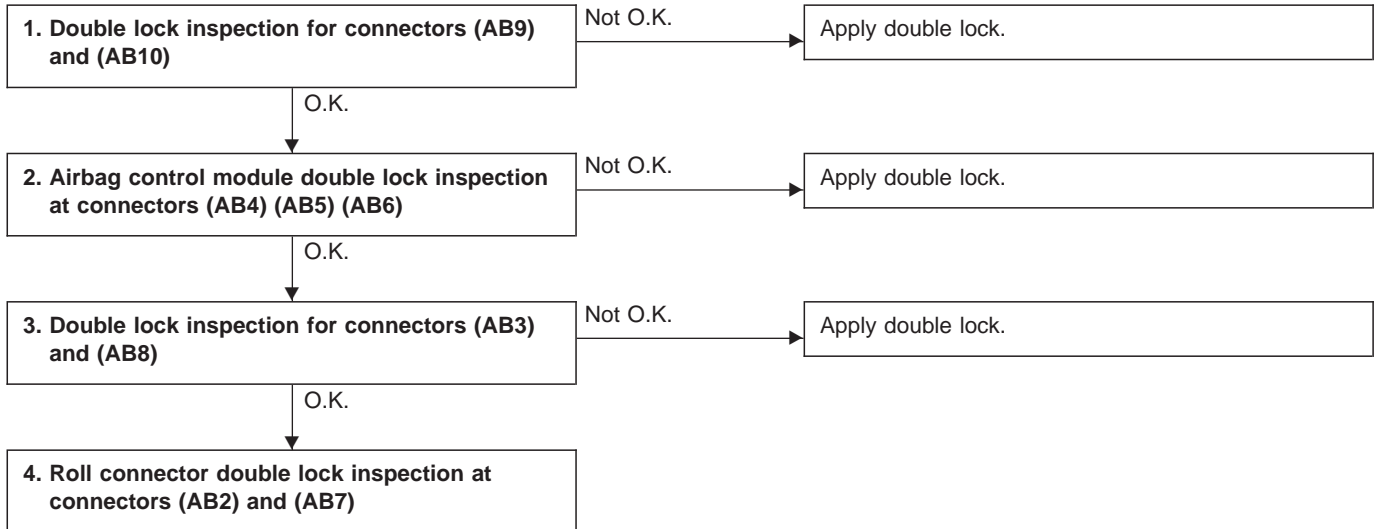
2) Measure resistance between test harness B2 connector (5B) terminal.

(5B) Terminal / Specified resistance:
No. 1 — No. 14 / 10 kΩ, or more

G: TROUBLE CODE 14

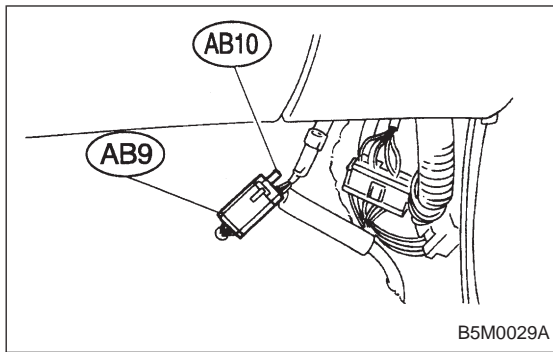
DIAGNOSIS:

- (AB9) and (AB10) are not connected properly.
- (AB2) and (AB7) are not connected properly.
- (AB3) and (AB8) are not connected properly.
- (AB4), (AB5) and (AB6) are not connected properly to airbag control module.



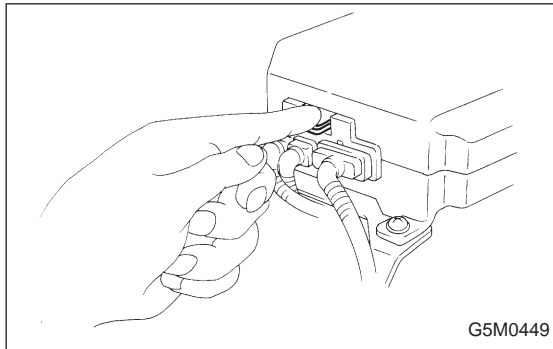
CAUTION:

Before performing diagnostics on airbag system, turn ignition switch “OFF”, disconnect battery ground cable and then wait at least 20 seconds.



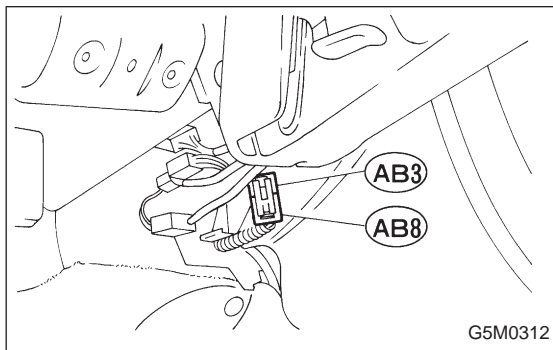
1. DOUBLE LOCK INSPECTION FOR CONNECTORS (AB9) AND (AB10)

- 1) Remove front pillar lower trim (Passenger side). <Ref. to 5-3 [W5A1].>
- 2) Check double lock of connectors (AB9) and (AB10).



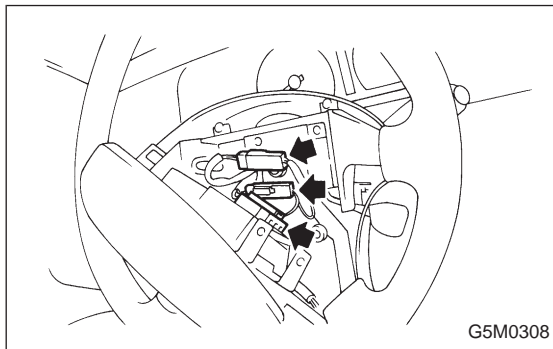
2. AIRBAG CONTROL MODULE DOUBLE LOCK INSPECTION AT CONNECTORS (AB4) (AB5) (AB6)

Check double lock of connectors (AB4) (AB5) (AB6) connected to airbag control module. <Ref. to 5-5 [W6A0].>



3. DOUBLE LOCK INSPECTION FOR CONNECTORS (AB3) AND (AB8)

- 1) Remove lower cover panel. <Ref. to 5-4 [W1A0].>
- 2) Check double lock of connectors (AB3) and (AB8) below steering column.



4. ROLL CONNECTOR DOUBLE LOCK INSPECTION AT CONNECTORS (AB2) AND (AB7)

Remove driver side airbag module <Ref. to 5-5 [W3A1].>, and check double lock of connectors (AB2) and (AB7) at roll connector.

H: TROUBLE CODE 21**DIAGNOSIS:**

- Airbag control module is faulty.

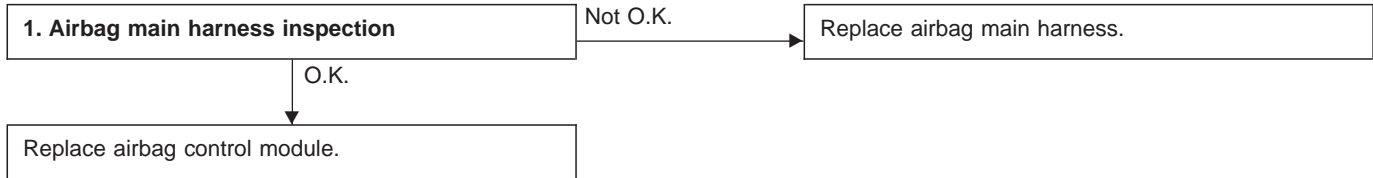
Replace airbag control module.

CAUTION:

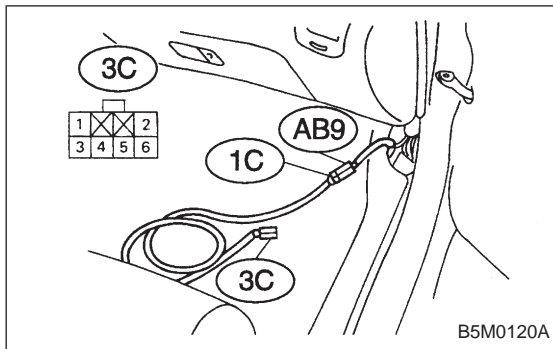
Before performing diagnostics on airbag system, turn ignition switch "OFF", disconnect battery ground terminal, and then wait at least 20 seconds. <Ref. to 5-5 [W6A0].>

I: TROUBLE CODE 22**DIAGNOSIS:**

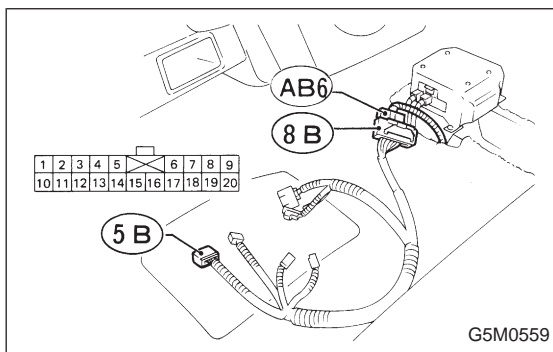
- Airbag main harness circuit is open.
- Airbag module harness (Passenger) circuit is open.
- Airbag control module is faulty.

**CAUTION:**

Before performing diagnostics on airbag system, turn ignition switch "OFF", disconnect battery ground cable and then wait at least 20 seconds.

**1. AIRBAG MAIN HARNESS INSPECTION**

1) Remove front pillar lower trim (Passenger side). <Ref. to 5-3 [W5A1].>, disconnect connector (AB9) and (AB10) and connect connector (AB9) to test harness C connector (1C).



2) Disconnect connector (AB6) <Ref. to 5-5 [W6A0].> from airbag control module, and connect it to test harness B2 connector (8B) terminal.

3) Measure resistance between test harness B2 connector (5B) and test harness C connector (3C) terminals.

Connector & terminal / Specified resistance:

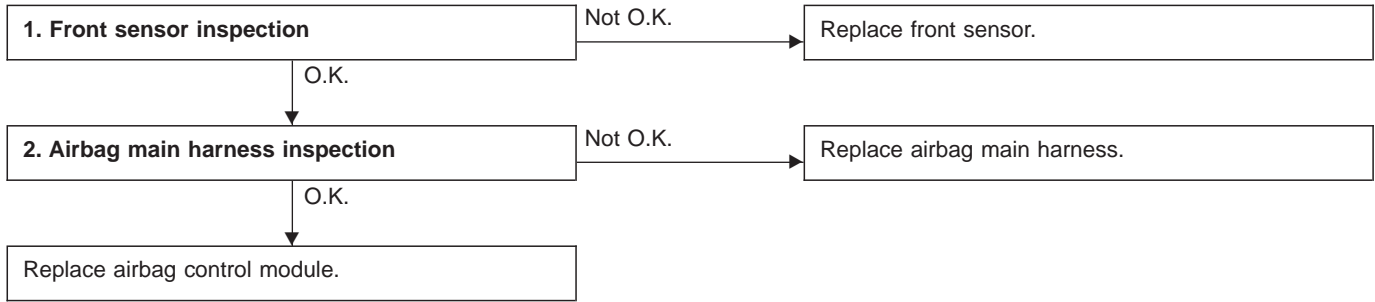
(5B) No. 6 — (3C) No. 4 / 10 Ω, or less

(5B) No. 7 — (3C) No. 3 / 10 Ω, or less

J: TROUBLE CODE 23

DIAGNOSIS:

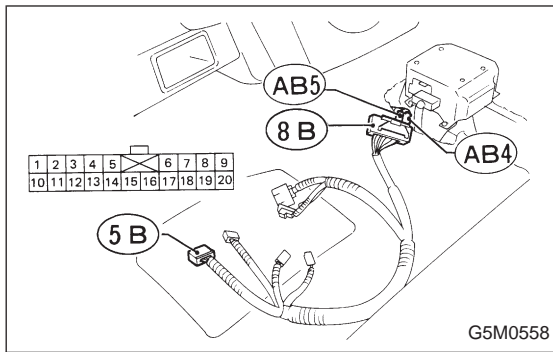
- Airbag main harness is shorted to power supply.
- Front sensor harness is shorted to power supply.
- Airbag module harness (Driver or passenger) is damaged.
- Roll connector is shorted to power supply.
- Airbag control module is faulty.



CAUTION:

Before performing diagnostics on airbag system, turn ignition switch “OFF”, disconnect battery ground terminal and then wait at least 20 seconds.

After 20 seconds elapse, remove instrument panel lower cover, and disconnect (AB3) and (AB8), (AB9) and (AB10).



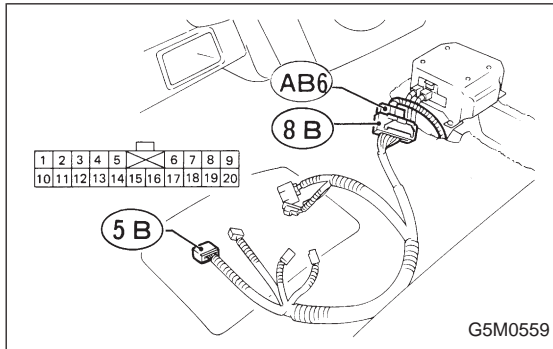
1. FRONT SENSOR INSPECTION

- 1) Disconnect connectors (AB4) and (AB5) from airbag control module. <Ref. to 5-5 [W6A0].>
- 2) Connect connectors (AB4) and (AB5) to test harness B2 connector (8B).
- 3) Measure resistance between test harness B2 connector (5B) terminal.

(5B) Terminal / Specified resistance:

(RH: AB4): No. 17 — No. 18 / 1.4 — 1.6 k Ω

(LH: AB5): No. 15 — No. 16 / 1.4 — 1.6 k Ω



2. AIRBAG MAIN HARNESS INSPECTION

- 1) Disconnect connector (AB6) from airbag control module <Ref. to 5-5 [W6A0].>, and connect it to test harness B2 connector (8B).
- 2) Connect battery ground cable and turn ignition switch "ON" (engine off).
- 3) Measure voltage across each test harness B2 connector (5B) terminal and body.

(5B) Terminal / Specified voltage:

No. 1 — Body / 1 V, or less

No. 6 — Body / 1 V, or less

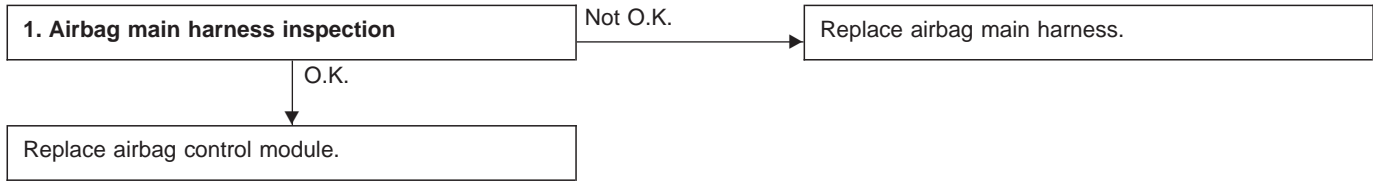
No. 7 — Body / 1 V, or less

No. 14 — Body / 1 V, or less

K: TROUBLE CODE 24

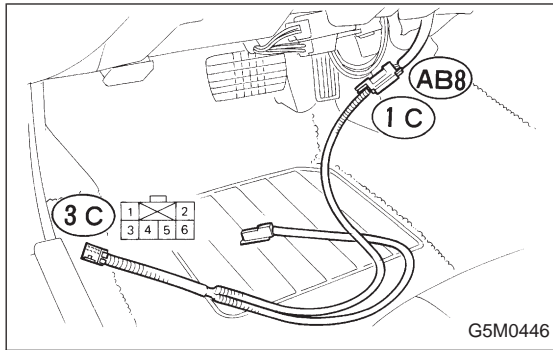
DIAGNOSIS:

- Airbag main harness circuit is open.
- Airbag module harness (Driver) circuit is open.
- Roll connector circuit is open.
- Airbag control module is faulty.
- Above diagnosis plus other faulty of airbag modular parts



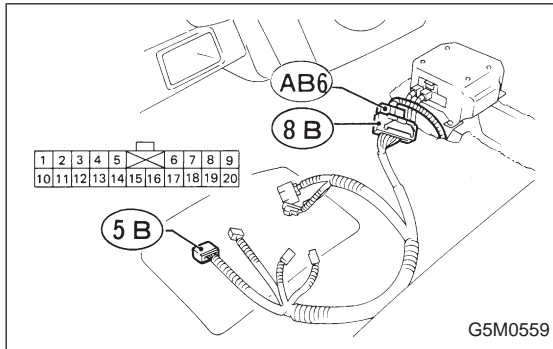
CAUTION:

Before performing diagnostics on airbag system, turn ignition switch "OFF", disconnect battery ground cable and then wait at least 20 seconds.



1. AIRBAG MAIN HARNESS INSPECTION

1) Remove lower cover panel <Ref. to 5-4 [W1A0].>, and connect connector (AB8) below steering column to test harness C connector (1C).



2) Disconnect connector (AB6) <Ref. to 5-5 [W6A0].> from airbag control module, and connect it to test harness B2 connector (8B) terminal.

3) Measure resistance between test harness B2 connector (5B) and test harness C connector (3C) terminals.

Connector & terminal / Specified resistance:

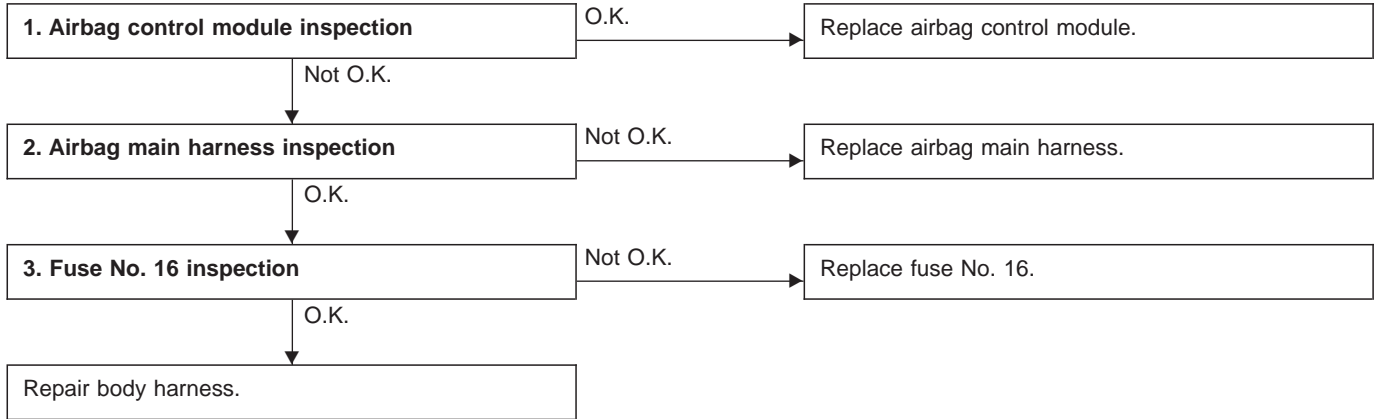
(5B) No. 14 — (3C) No. 4 / 10 Ω, or less

(5B) No. 1 — (3C) No. 3 / 10 Ω, or less

L: TROUBLE CODE 31

DIAGNOSIS:

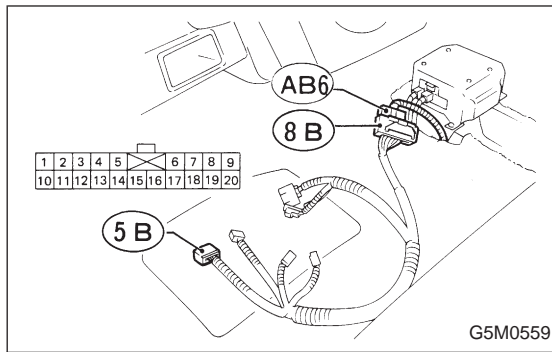
- Airbag control module is faulty.
- Airbag main harness circuit is open.
- Fuse No. 16 is blown.
- Body harness circuit is open.



CAUTION:

Before performing diagnostics on airbag system, turn ignition switch “OFF”, disconnect battery ground cable and then wait at least 20 seconds.

After 20 seconds elapse, remove instrument panel lower cover, and disconnect (AB3) and (AB8), (AB9) and (AB10).



1. AIRBAG CONTROL MODULE INSPECTION

1) Disconnect connector (AB6) from airbag control module <Ref. to 5-5 [W6A0].>, and connect it to test harness B2 connector (8B).

2) Connect battery ground cable and turn ignition switch "ON" (engine off).

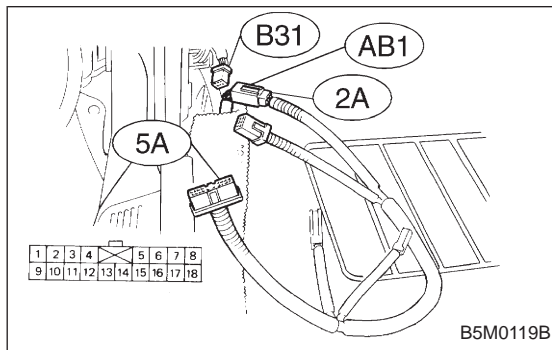
3) Measure voltage across connector (5B) terminal and body.

(5B) Terminal / Specified voltage:
No. 5 — Body / 10 V, or more

2. AIRBAG MAIN HARNESS INSPECTION

1) Go to step 2) below after performing diagnostics on airbag system as per flowchart under "1. AIRBAG CONTROL MODULE INSPECTION" previously outlined.

2) Turn ignition switch "OFF", disconnect battery ground cable and then wait at least 20 seconds.



3) Disconnect connector (AB1) from body harness connector (B31) at front lower pillar, and connect connector (AB1) to test harness A connector (2A).

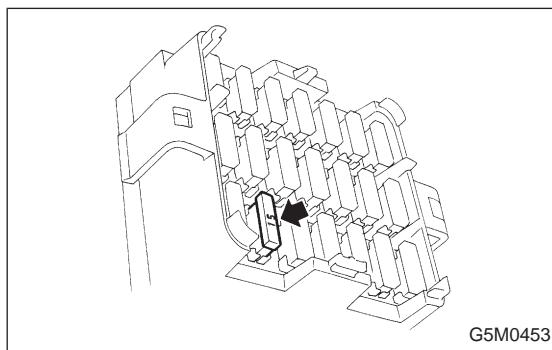
4) Measure resistance between test harness A connector (5A) and test harness B2 connector (5B) terminals.

Connector & terminal / Specified resistance:
(5A) No. 9 — (5B) No. 5 / 10 Ω, or less

5) Measure resistance between each terminal of connectors (5A) and (5B) and body.

(5A) Terminal / Specified resistance:
No. 9 — Body / 10 kΩ, or more

(5B) Terminal / Specified resistance:
No. 5 — Body / 10 kΩ, or more



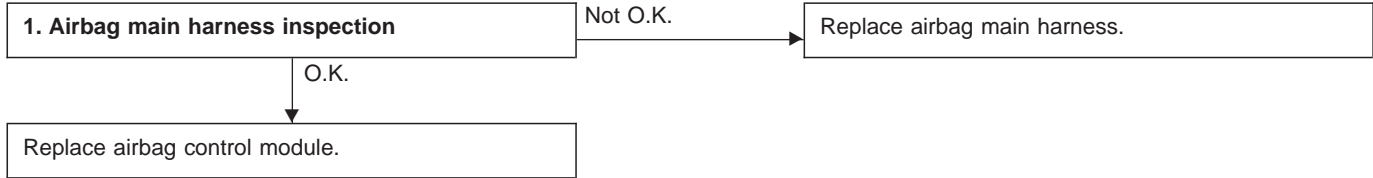
3. FUSE No. 16 INSPECTION

Make sure ignition switch is turned "OFF", then remove and visually check fuse No. 16.

M: TROUBLE CODE 32

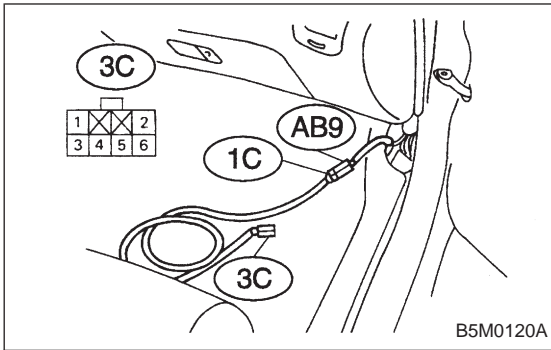
DIAGNOSIS:

- Airbag main harness circuit is open.
- Airbag module harness (Passenger) circuit is open.
- Airbag control module is faulty.
- Above diagnosis plus other faulty of airbag modular parts



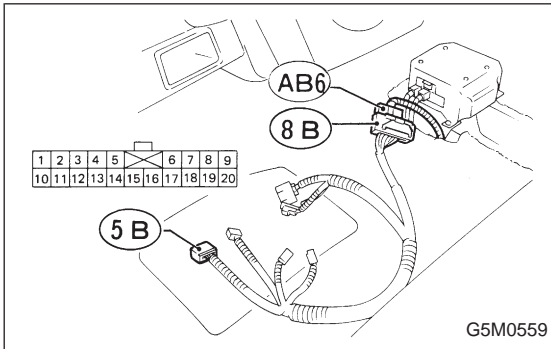
CAUTION:

Before performing diagnostics on airbag system, turn ignition switch "OFF", disconnect battery ground cable and then wait at least 20 seconds.



1. AIRBAG MAIN HARNESS INSPECTION

1) Remove front pillar lower trim (Passenger side). <Ref. to 5-3 [W5A1].>, disconnect connector (AB9) and (AB10) and connect connector (AB9) to test harness C connector (1C).



2) Disconnect connector (AB6) <Ref. to 5-5 [W6A0].> from airbag control module, and connect it to test harness B2 connector (8B) terminal.

3) Measure resistance between test harness B2 connector (5B) and test harness C connector (3C) terminals.

Connector & terminal / Specified resistance:

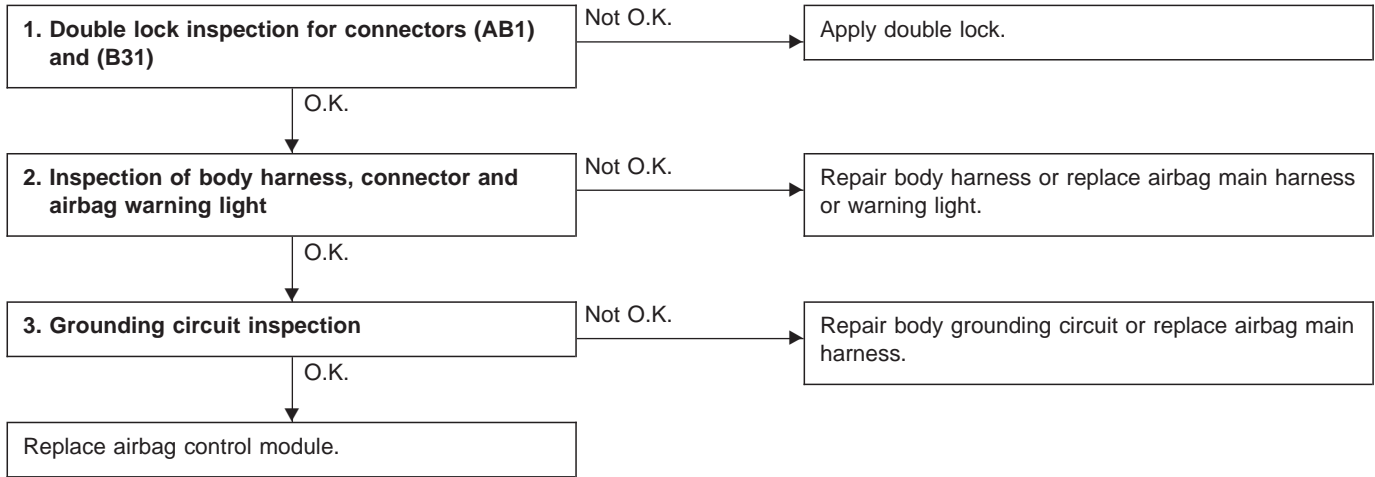
(5B) No. 6 — (3C) No. 4 / 10 Ω, or less

(5B) No. 7 — (3C) No. 3 / 10 Ω, or less

N: AIRBAG WARNING LIGHT REMAINS ON.

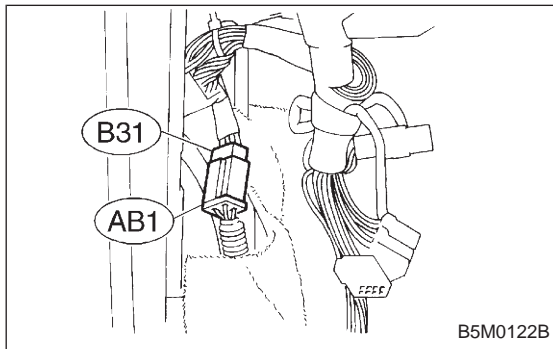
DIAGNOSIS:

- Airbag warning light is faulty.
- Airbag control module to airbag warning light harness circuit is shorted or open.
- Grounding circuit is faulty.
- Airbag control module is faulty.
- (AB1) and (B31) are not connected properly.



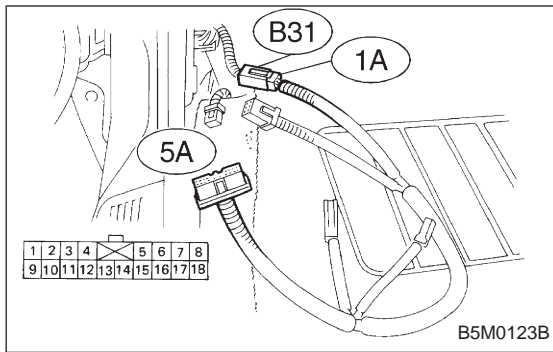
CAUTION:

Before performing diagnostics on airbag system, turn ignition switch “OFF”, disconnect battery ground cable and then wait at least 20 seconds.



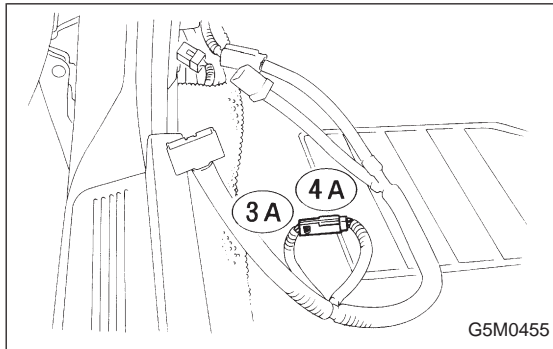
1. DOUBLE LOCK INSPECTION FOR CONNECTORS (AB1) AND (B31)

- 1) Remove front pillar lower trim (Driver side).
- 2) Check double lock of connectors (AB1) and (B31).

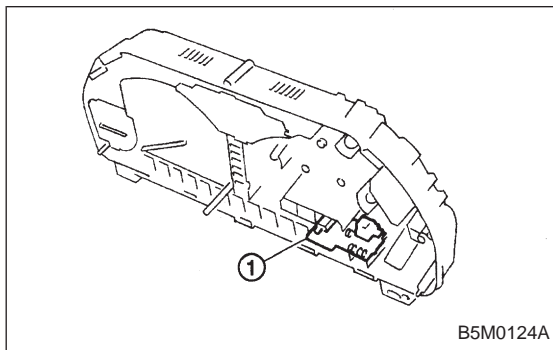


2. INSPECTION OF BODY HARNESS, CONNECTOR AND AIRBAG WARNING LIGHT

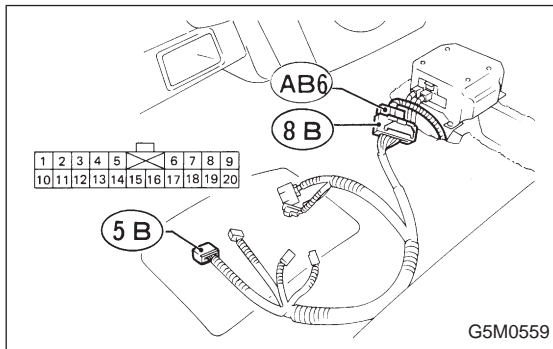
1) Turn ignition switch “OFF” and connect body harness connector (B31) to test connector A connector (1A).



2) Connect battery ground cable and turn ignition switch “ON”, (engine off) and connect connectors (3A) and (4A) to check if warning light goes out. If it does, go to step 4) below. If it remains on, check body harness and repair if necessary.

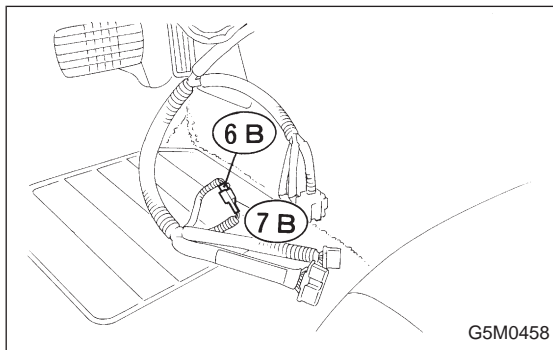


3) If body harness is satisfactory, replace airbag warning light module ①. After problem has been eliminated, disconnect connectors (3A) and (4A).

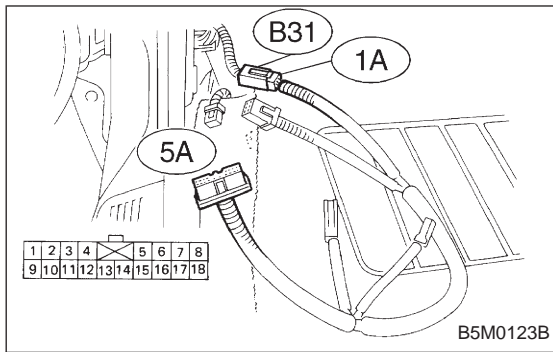


4) Turn ignition switch “OFF”, disconnect battery ground cable and then wait at least 20 seconds, and re-connect connectors (AB1) and (B31).

5) Remove instrument panel lower cover and disconnect (AB3) with (AB8), then disconnect connector (AB6) from airbag control module, <Ref. to 5-5 [W6A0].> and connect it to test harness B2 connector (8B).



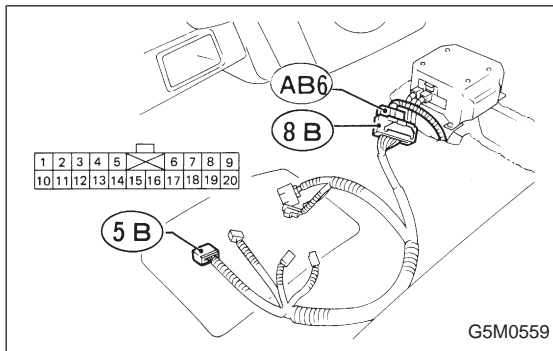
6) Connect battery ground cable and turn ignition switch “ON,” (engine off) and connect connectors (6B) and (7B) to check if warning light goes out. If it does, go to “**3. GROUNDING CIRCUIT INSPECTION**”. If it remains on, replace airbag main harness. After problem has been eliminated, disconnect connectors (6B) and (7B).



3. GROUNDING CIRCUIT INSPECTION

1) Turn ignition switch “OFF”, disconnect battery ground cable and then wait at least 20 seconds. Disconnect connector (AB1) from body harness connector (B31), and connect connector (B31) to test harness A connector (1A). Measure resistance between connector (5A) terminal and body.

(5A) Terminal / Specified resistance:
No. 17 — Body / 10 Ω, or less
No. 18 — Body / 10 Ω, or less



If resistance is greater than 10 ohms, body grounding circuit is faulty and should be repaired. If resistance is less than 10 ohms, go to step 2) below.

2) Connect connectors (AB1) and (B31). Disconnect connector (AB6) from airbag control module <Ref. to 5-5 [W6A0].>, and connect it to test harness B2 connector (8B).

3) Measure resistance between each test harness B2 connector (5B) terminal and body.

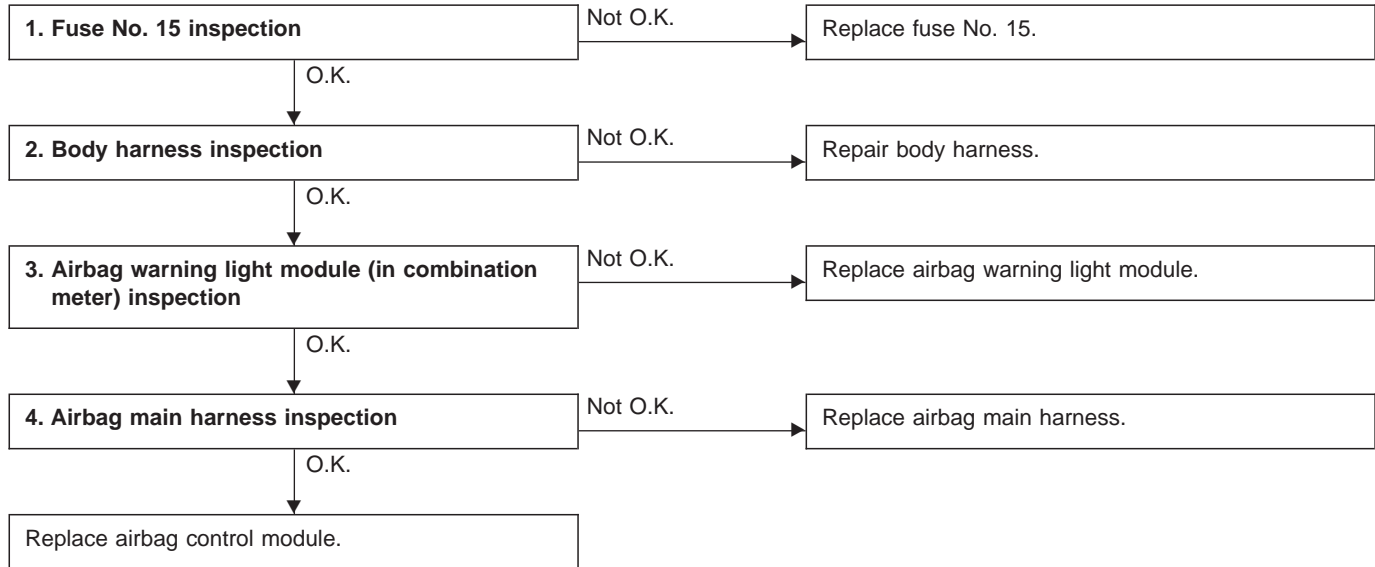
(5B) Terminal / Specified resistance:
No. 11 — Body / 10 Ω, or less
No. 12 — Body / 10 Ω, or less

If resistance is greater than 10 ohms, replace airbag main harness.

If resistance is less than 10 ohms, replace airbag control module.

O: AIRBAG WARNING LIGHT REMAINS OFF.**DIAGNOSIS:**

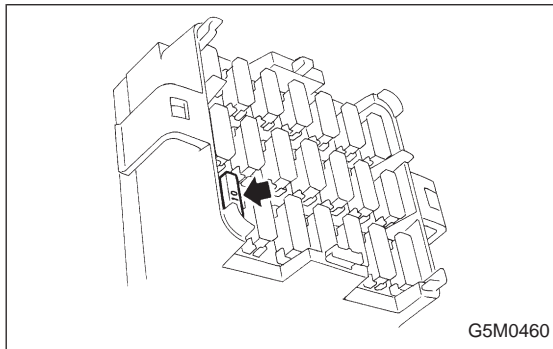
- Fuse No. 15 is blown.
- Body harness circuit is open.
- Airbag warning light is faulty.
- Airbag main harness is faulty.
- Airbag control module is faulty.

**CAUTION:**

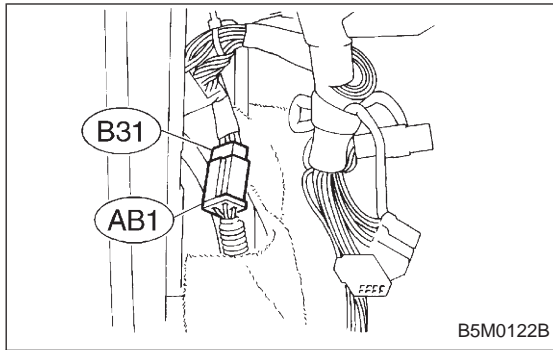
Before performing diagnostics on airbag system, turn ignition switch "OFF", disconnect battery ground terminal, and then wait at least 20 seconds.

1. FUSE No. 15 INSPECTION

- 1) Remove and visually check fuse No. 15.
- 2) If fuse is blown, replace it with a new one. After connecting battery cable and turning ignition switch "ON", if it blows again, proceed to "2. BODY HARNESS INSPECTION".

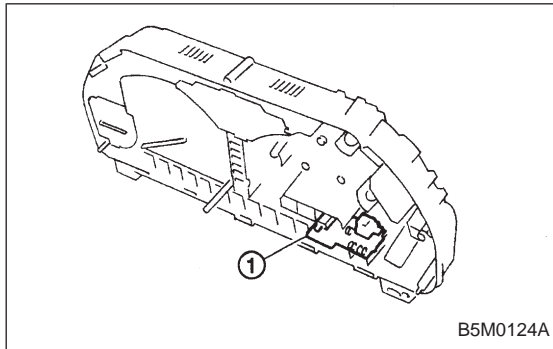
**2. BODY HARNESS INSPECTION**

Turn ignition switch "ON" (engine off) to make sure other warning lights (in combination meter) illuminate. If they do not, check body harness.

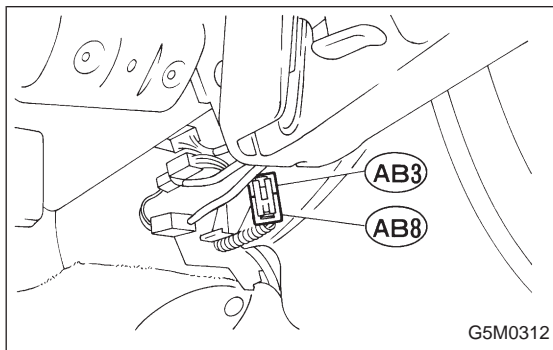


3. AIRBAG WARNING LIGHT MODULE (IN COMBINATION METER) INSPECTION

- 1) Turn ignition switch "OFF", disconnect battery ground cable and then wait at least 20 seconds.
- 2) Disconnect body harness connector (B31) from connector (AB1).

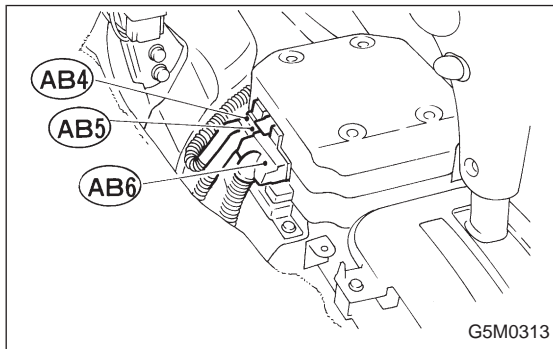


- 3) Connect battery ground cable and turn ignition switch "ON" (engine off) to make sure airbag warning light illuminates.
- If it does not, replace airbag warning light module ①.



4. AIRBAG MAIN HARNESS INSPECTION

- 1) Turn ignition switch "OFF", disconnect battery ground cable and then wait at least 20 seconds.
- 2) Connect body harness connector (B31) and connector (AB1).
- 3) Disconnect connectors (AB3) and (AB8) below steering column. <Ref. to 5-5 [M2-6].>



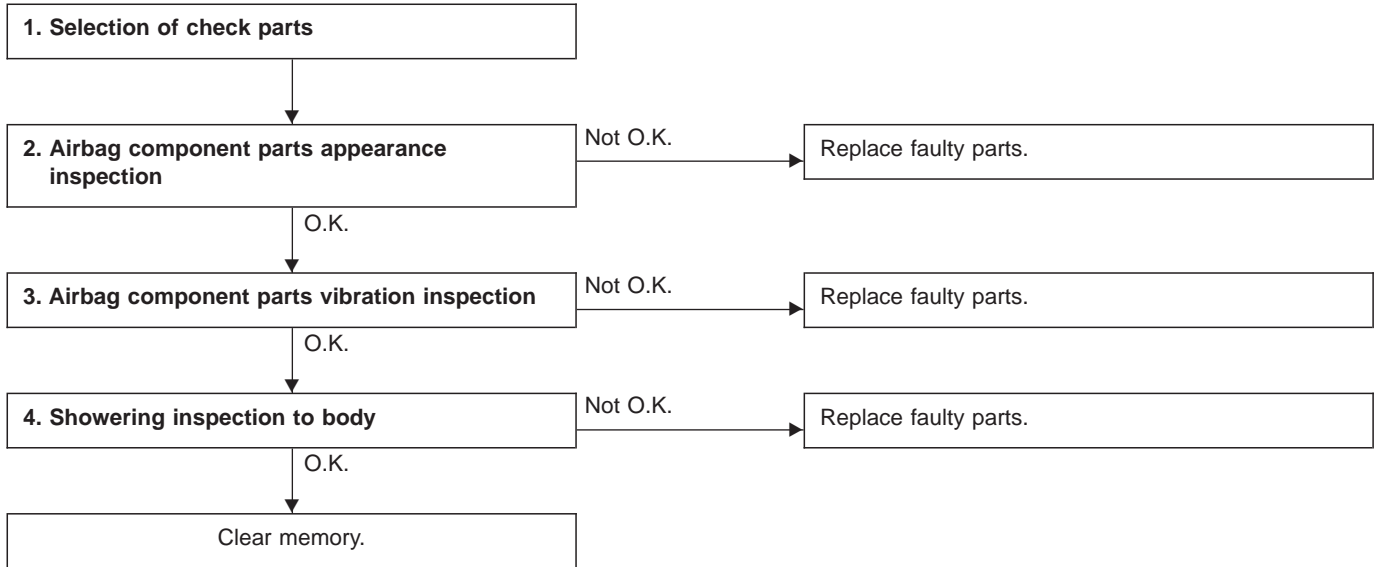
- 4) Disconnect connector (AB6) from airbag control module. <Ref. to 5-5 [W6A0].>
- 5) Connect battery ground cable and turn ignition switch "ON" to make sure airbag warning light illuminates.

P: WARNING LIGHT INDICATES TROUBLE CODE, THEN NORMAL CODE.

— FLASHING TROUBLE CODE. —

DIAGNOSIS:

- Airbag system component parts are faulty.



CAUTION:

Before performing diagnostics on airbag system, turn ignition switch “OFF”, disconnect battery ground cable, and then wait at least 20 seconds.

1. SELECTION OF CHECK PARTS

1) Conduct on-board diagnostic and call up trouble codes stored in memory. <Ref. to 5-5 [T4B0].>

2) Select trouble code required to check airbag component parts from those listed in table and reproduce symptom.

Trouble codes	Check parts	Refer to 5-5:
02	<ul style="list-style-type: none"> ● Front sensor (RH, LH) ● Airbag main harness ● Airbag module (Driver/Passenger) ● Roll connector ● Airbag control module 	W4A0 W5A0 W3A1—W3A2 W7A0 W6A0
03	<ul style="list-style-type: none"> ● Front sensor (RH, LH) ● Airbag control module 	W4A0 W6A0
04	<ul style="list-style-type: none"> ● Airbag module (Passenger) ● Airbag main harness ● Airbag control module 	W3A2 W5A0 W6A0
11	<ul style="list-style-type: none"> ● Fuse No. 8 ● Airbag main harness ● Airbag control module ● Body harness 	T5D3 W5A0 W6A0 —
12	<ul style="list-style-type: none"> ● Roll connector ● Airbag module (Driver) ● Airbag main harness ● Airbag control module 	W7A0 W3A1 W5A0 W6A0
13	<ul style="list-style-type: none"> ● Airbag module (Driver) ● Roll connector ● Airbag main harness ● Airbag control module 	W3A1 W7A0 W5A0 W6A0
21	<ul style="list-style-type: none"> ● Airbag control module 	W6A0
22	<ul style="list-style-type: none"> ● Airbag module (Passenger) ● Airbag main harness ● Airbag control module 	W3A2 W5A0 W6A0
23	<ul style="list-style-type: none"> ● Airbag main harness ● Roll connector ● Airbag module (Driver/Passenger) ● Front sensor (RH, LH) ● Airbag control module 	W5A0 W7A0 W3A1—W3A2 W4A0 W6A0
24	<ul style="list-style-type: none"> ● Airbag module (Driver) ● Roll connector ● Airbag main harness ● Airbag control module 	W3A1 W7A0 W5A0 W6A0
32	<ul style="list-style-type: none"> ● Airbag module (Passenger) ● Roll connector ● Airbag main harness ● Airbag control module 	W3A2 W7A0 W5A0 W6A0

2. AIRBAG COMPONENT PARTS APPEARANCE INSPECTION

Conduct appearance inspection on parts selected.

NOTE:

Also check connector terminals, wiring harness, case, etc. for damage.

3. AIRBAG COMPONENT PARTS VIBRATION INSPECTION

- 1) Gently shake check parts (to determine faults.).
- 2) To check airbag module or roll connector, turn and tilt steering wheel.

CAUTION:

Do not shake or vibrate airbag control module and front sensor at the same time as erroneous operation may result.



4. SHOWERING INSPECTION TO BODY

- 1) Spray water on vehicle body.

CAUTION:

Do not directly spray water on airbag components.

- 2) Check passenger compartment for traces of leaking.

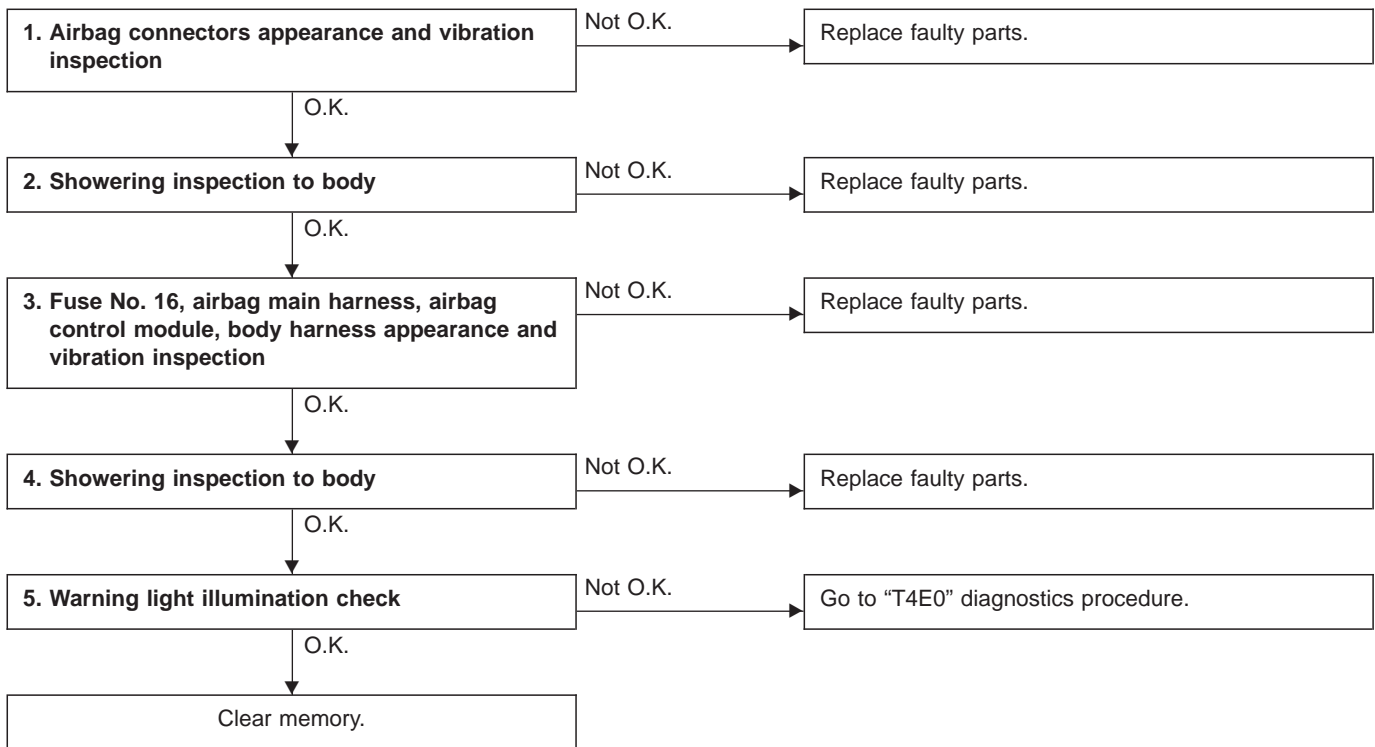
NOTE:

Also check wiring harnesses as water may leak along them and get airbag component parts wet.

**Q: WARNING LIGHT INDICATES TROUBLE CODE, THEN NORMAL CODE.
— FLASHING NORMAL CODE. —**

DIAGNOSIS:

- Airbag connector is faulty.
- Fuse No. 16 is blown.
- Airbag main harness is faulty.
- Airbag control module is faulty.
- Body harness is faulty.



CAUTION:

Before performing diagnostics on airbag system, turn ignition switch "OFF", disconnect battery ground cable, and then wait at least 20 seconds.

1. AIRBAG CONNECTORS APPEARANCE AND VIBRATION INSPECTION

1) Conduct appearance inspection on airbag connectors (AB2 through AB8). <Ref. to 5-5 [T100].>

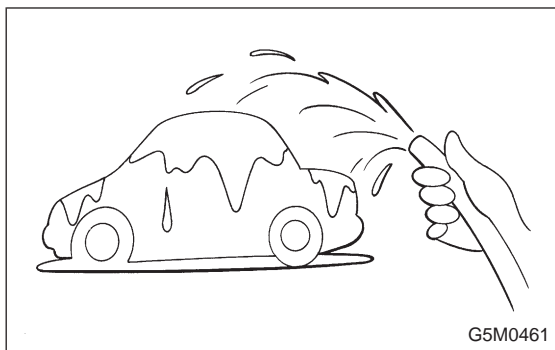
NOTE:

Check terminals, case and wiring harnesses for damage.

2) Conduct vibration inspection on airbag connectors (AB2 through AB8). <Ref. to 5-5 [T100].>

NOTE:

Gently shake each airbag connector.



2. SHOWERING INSPECTION TO BODY

1) Spray water on vehicle body.

CAUTION:

Do not directly spray water on airbag components.

2) Check passenger compartment for traces of leaking.

NOTE:

If leaks are noted, also check wiring harnesses as water may leak along them and wet airbag connectors.

3. FUSE No. 16, AIRBAG MAIN HARNESS, AIRBAG CONTROL MODULE, BODY HARNESS APPEARANCE AND VIBRATION INSPECTION

1) Conduct appearance inspection on fuse No. 16 <Ref. to 5-5 [T5L3].>, airbag main harness <Ref. to 5-5 [W5A0].>, airbag control module <Ref. to 5-5 [W6A0].> and body harness.

NOTE:

Also check connectors, terminals, wiring harness and case for damage.

2) Conduct vibration inspection on fuse No. 16, airbag main harness, airbag control module and body harness.

NOTE:

Gently shake each part.



4. SHOWERING INSPECTION TO BODY

1) Spray water on vehicle body.

CAUTION:

Do not directly spray water on each part.

2) Check passenger compartment for traces of leaking.

NOTE:

If leaks are noted, check wiring harnesses as water may leak along them and get parts wet.

5. WARNING LIGHT ILLUMINATION CHECK

Turn ignition switch "ON" (engine off) and observe airbag warning light.

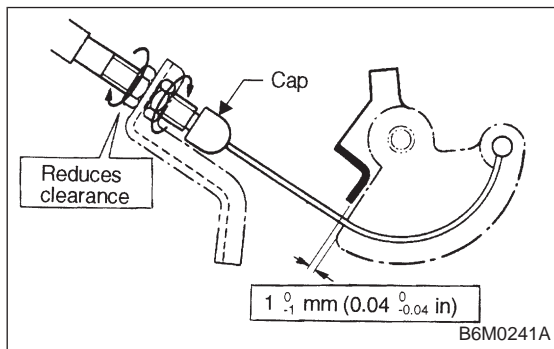
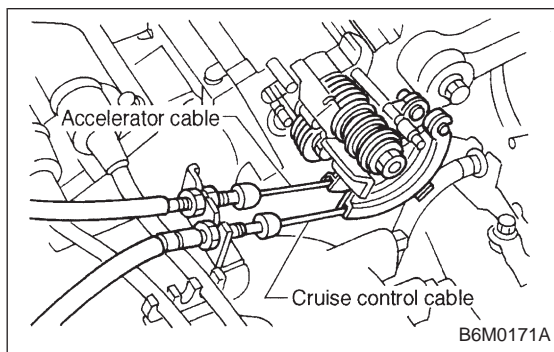
Airbag warning light comes "ON" for 8 seconds then goes out and stays out.

1. Supplemental Restraint System "Airbag"

Airbag system wiring harness is routed near the cruise control command switch.

CAUTION:

- All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuits.
- Be careful not to damage Airbag system wiring harness when servicing the cruise control command switch.



2. Pre-inspection

1. CRUISE CONTROL CABLE

- 1) Cable installation
 - (1) Ensure that cruise control cable is attached to the left of accelerator cable (on accelerator pedal side).
 - (2) Ensure that accelerator cable throttle cam does not move when cruise control throttle cam is moved by hand.
 - (3) Ensure that throttle cam moves smoothly.
- 2) Cable free play
 - (1) Ensure that throttle cam-to-lever clearance is within specifications.

Standard value: $1 \begin{smallmatrix} 0 \\ -1 \end{smallmatrix} \text{ mm } (0.04 \begin{smallmatrix} 0 \\ -0.04 \end{smallmatrix} \text{ in})$

NOTE:

If clearance is not within specifications, adjust cable at its outer end.

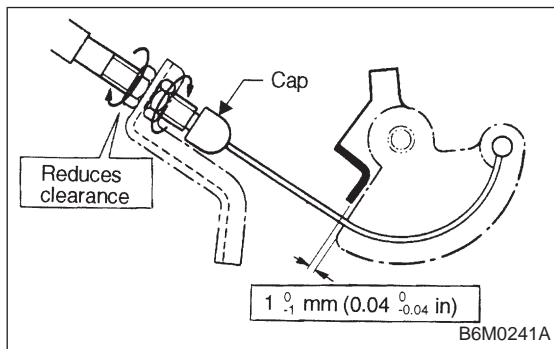
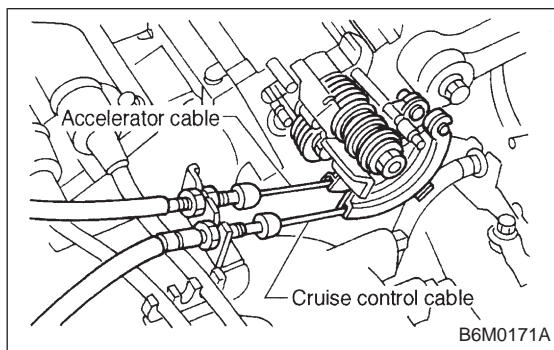
- (2) Ensure that cap is positioned in groove.

1. Supplemental Restraint System "Airbag"

Airbag system wiring harness is routed near the cruise control command switch.

CAUTION:

- All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuits.
- Be careful not to damage Airbag system wiring harness when servicing the cruise control command switch.



2. Pre-inspection

1. CRUISE CONTROL CABLE

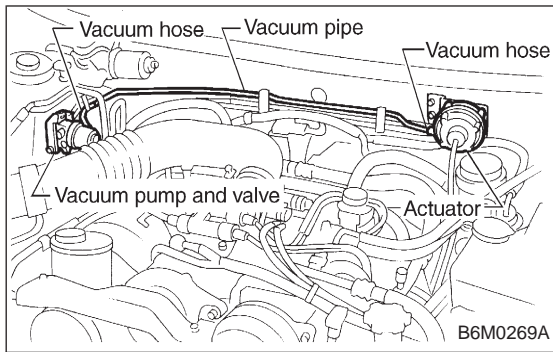
- 1) Cable installation
 - (1) Ensure that cruise control cable is attached to the left of accelerator cable (on accelerator pedal side).
 - (2) Ensure that accelerator cable throttle cam does not move when cruise control throttle cam is moved by hand.
 - (3) Ensure that throttle cam moves smoothly.
- 2) Cable free play
 - (1) Ensure that throttle cam-to-lever clearance is within specifications.

Standard value: $1 \begin{smallmatrix} 0 \\ -1 \end{smallmatrix} \text{ mm } (0.04 \begin{smallmatrix} 0 \\ -0.04 \end{smallmatrix} \text{ in})$

NOTE:

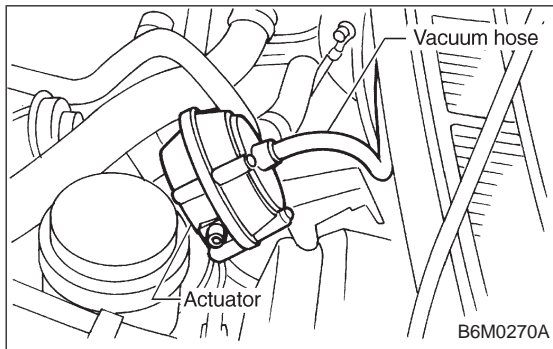
If clearance is not within specifications, adjust cable at its outer end.

- (2) Ensure that cap is positioned in groove.



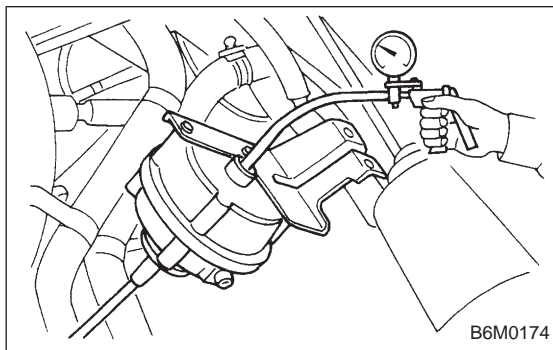
2. VACUUM HOSE AND PIPE

Check vacuum hose and pipe (which connects actuator and vacuum pump) for disconnection or cracks.



3. ACTUATOR

1) Disconnect vacuum hose from actuator.



2) Connect vacuum pump as shown in figure.

3) Make sure that cruise control cable moves smoothly and quickly when a vacuum pressure of 40.0 kPa (300 mmHg, 11.81 inHg) is applied to actuator.

Stroke: 35 mm (1.38 in)

4) When vacuum pressure is released from condition 3) above, make sure the cable returns to its original position smoothly and quickly.

5) After inspection, disconnect vacuum pump and connect vacuum hose.

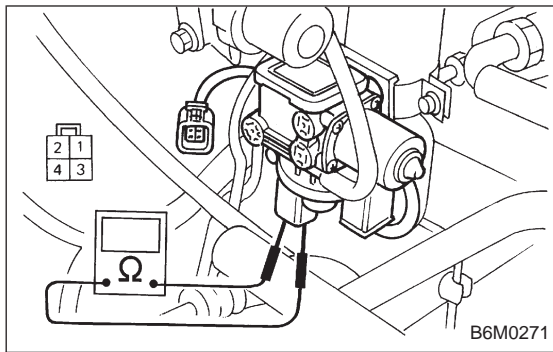
4. POWER SUPPLY

1) Measure battery voltage and specific gravity of electrolyte.

Standard voltage: 12 V

Specific gravity: Above 1.260

2) Check the condition of the main and other fuses, and harnesses and connectors. Also check for proper grounding.

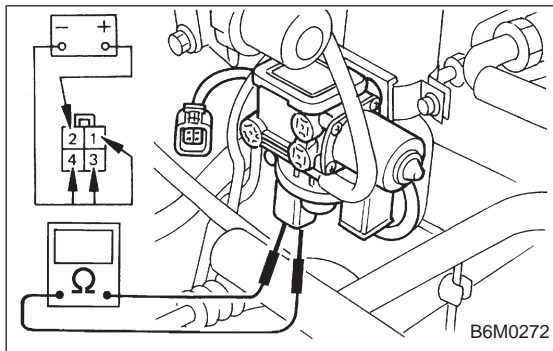


5. VACUUM PUMP AND VALVE

- 1) Measure resistance of vacuum pump and valve.
 - (1) Disconnect connector from vacuum pump and valve.
 - (2) Measure resistance between each terminal of vacuum pump and valve.

Terminals / Specified resistance:

- No. 2 — No. 3 / 100 Ω or less (Vacuum pump motor)**
- No. 2 — No. 1 / 69 Ω (Air valve)**
- No. 2 — No. 4 / 69 Ω (Release valve)**



- 2) Check for leakage and sticking of vacuum valve.
 - (1) Disconnect connector from vacuum pump and valve.
 - (2) Make sure that cruise control cable moves smoothly when connecting + (positive) battery cable to terminal No. 2 and – (negative) battery cable to terminals No. 1, 3 and 4 of vacuum pump and valve connector.

Stroke: 35 mm (1.38 in)

Movement time: Within 3 seconds

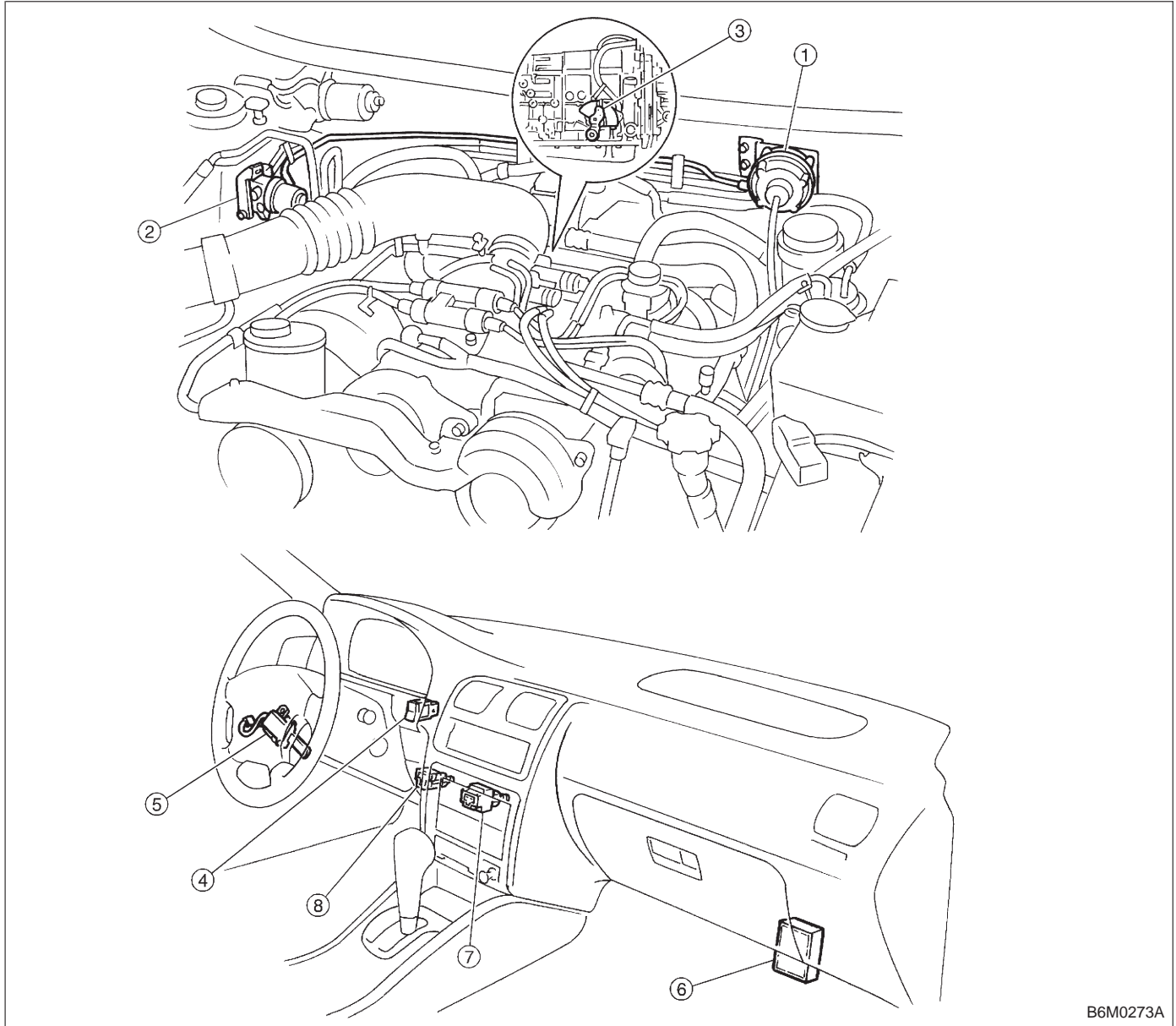
- (3) When the battery cable is disconnected from condition (2) above, make sure the cable returns to its original position smoothly.

Movement time: Within 1.5 seconds

- (4) Connect battery to each terminal and check cable movement.

Terminal No.				Battery		Cruise control cable operation
1	2	3	4	⊕	⊖	
—	—	—	—	—	—	—
	○			○		Pull
○		○			○	
			○		○	
	○			○		Hold
○			○		○	
	○			○		Release
			○		○	

3. Electrical Components Location

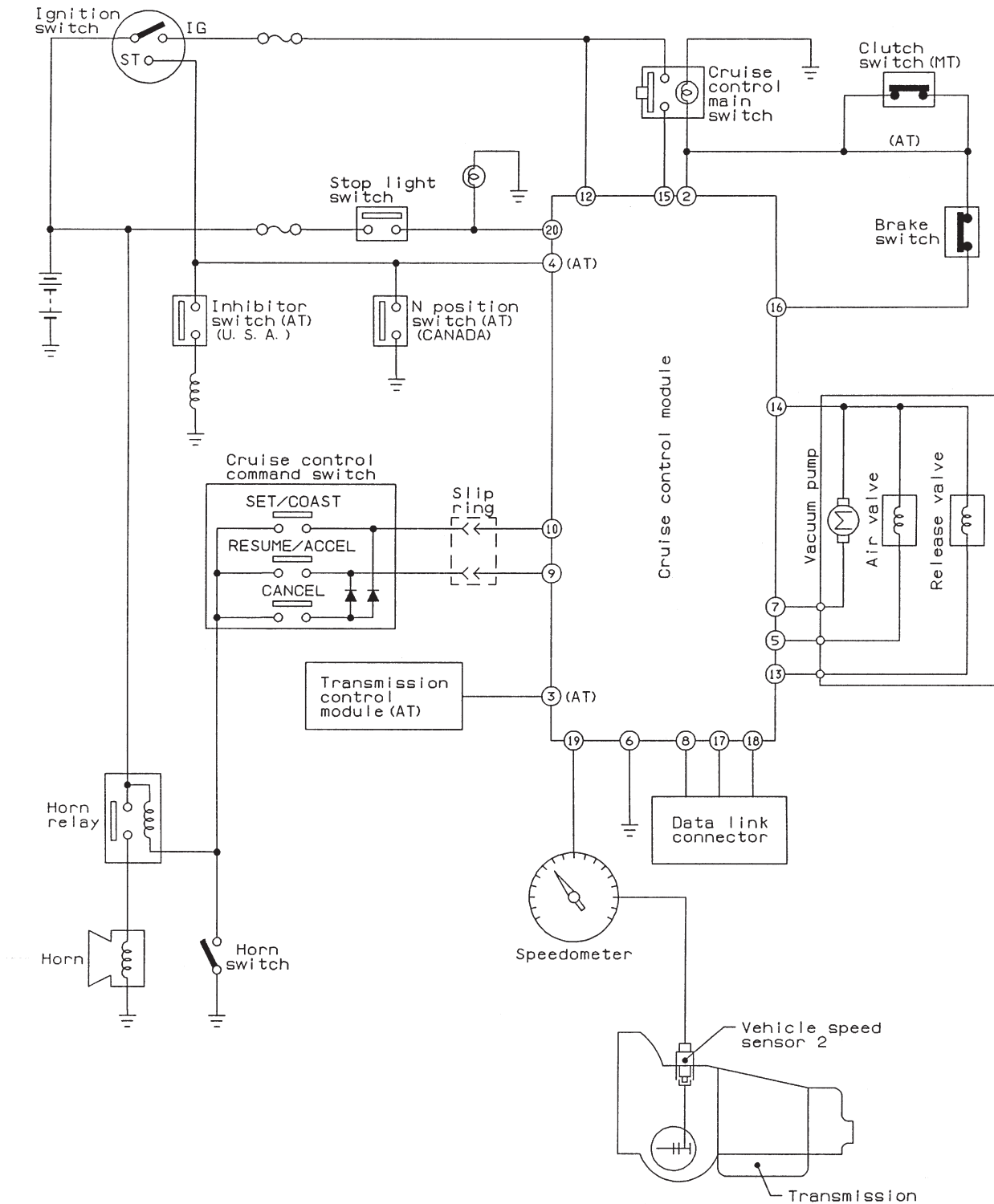


B6M0273A

- ① Actuator
- ② Vacuum pump and valve
- ③ Inhibitor switch (AT)
- ④ Cruise control main switch

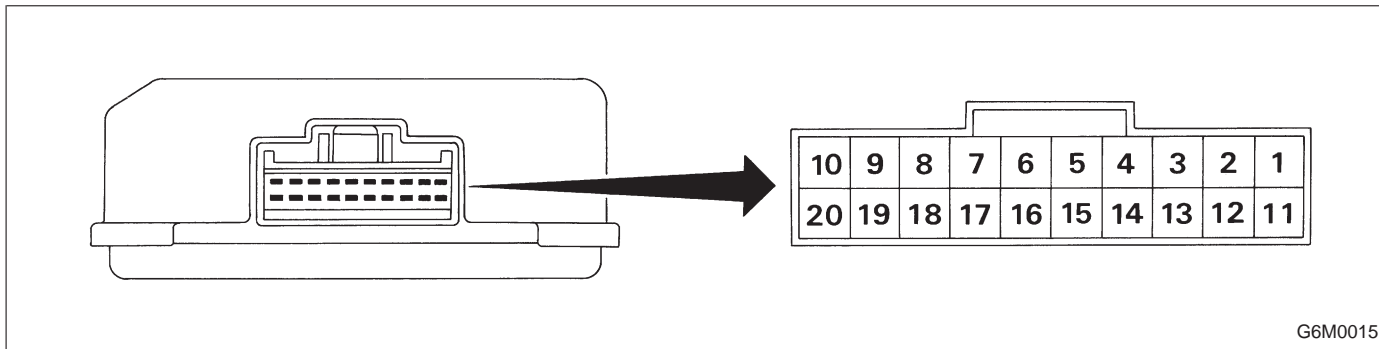
- ⑤ Cruise control command switch
- ⑥ Cruise control module
- ⑦ Stop and brake switch
- ⑧ Clutch switch (MT)

4. Schematic



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5. Control Module I/O Signal



G6M0015

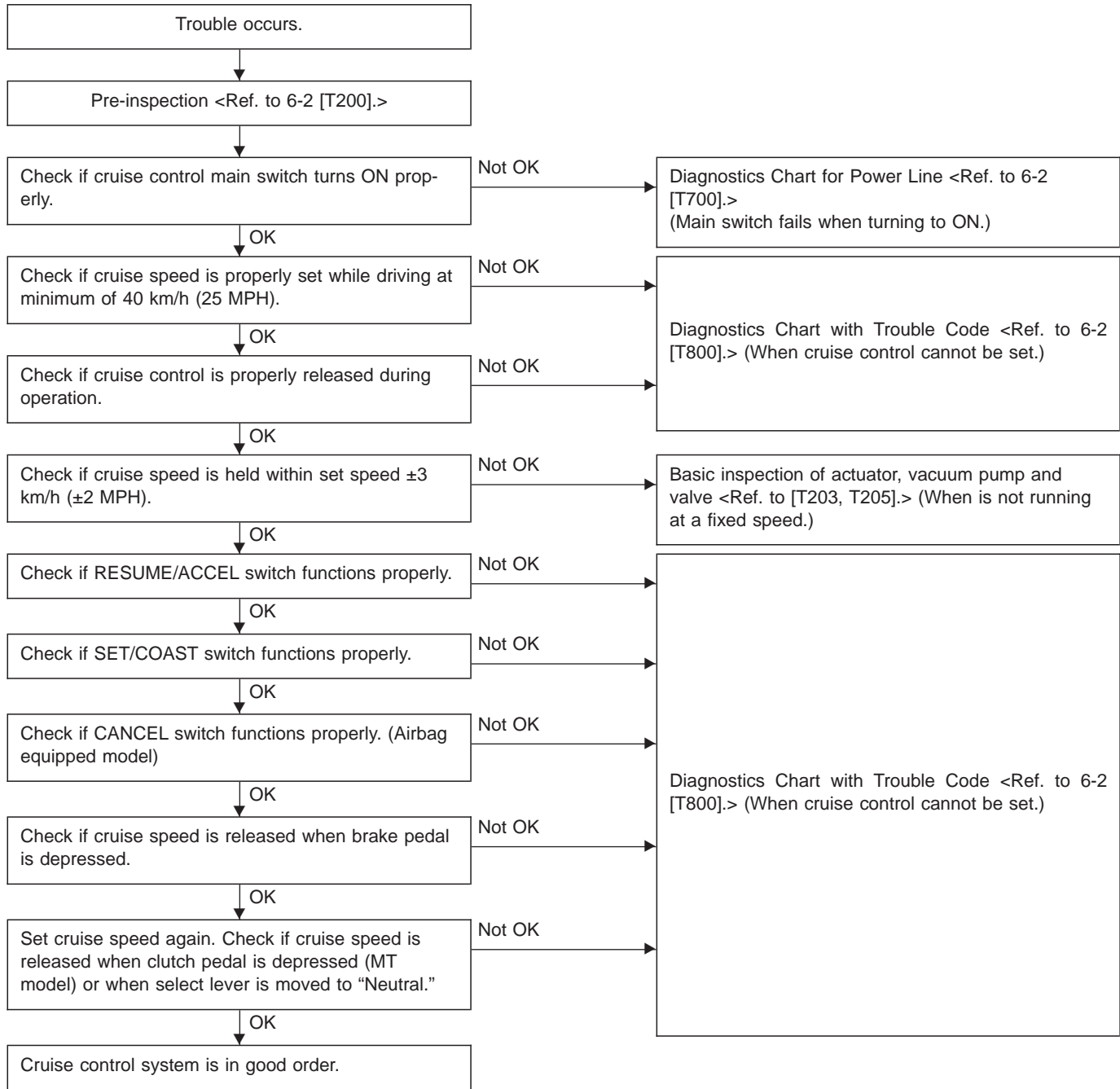
Content	Terminal No.	Measuring conditions and I/O signals (ignition switch ON and engine idling)
Main power supply	2	<ul style="list-style-type: none"> Battery voltage is present when main power is turned ON. "0" volt is present when main power is turned OFF.
Inhibitor switch (AT) (U.S.A.) N position switch (AT) (CANADA)	4	<ul style="list-style-type: none"> "0" volt is present when selector lever is set to P or N position (CANADA: N position only). Battery voltage is present when selector lever is other than P or N position (CANADA: N position only).
Air valve	5	<ul style="list-style-type: none"> "0" volt is present when vehicle is stopped. ON-and-OFF ("0"-and-battery voltage) operation is alternately repeated while cruise control is operating.
GND	6	—
Vacuum pump motor	7	<ul style="list-style-type: none"> "0" volt is present when vehicle is stopped. ON-and-OFF ("0"-and-battery voltage) operation is alternately repeated while cruise control is operating.
Data link connector	8	—
RESUME/ACCEL switch	9	<ul style="list-style-type: none"> Battery voltage is present when switch is turned ON. "0" volt is present when switch is turned OFF.
SET/COAST switch	10	<ul style="list-style-type: none"> Battery voltage is present when switch is turned ON. "0" volt is present when switch is turned OFF.
Ignition switch	12	<ul style="list-style-type: none"> Battery voltage is present when ignition switch is turned ON. "0" volt is present when ignition switch is turned OFF.
Release valve	13	<ul style="list-style-type: none"> "0" volt is present when vehicle is stopped. ON-and-OFF ("0"-and-battery voltage) operation is alternately repeated while cruise control is operating.
Power supply to vacuum pump motor, air valve, release valve	14	<ul style="list-style-type: none"> "0" volt is present when vehicle is stopped. Battery voltage is present while cruise control is operating.
Cruise main switch	15	<ul style="list-style-type: none"> Battery voltage is present during pressing the main switch, and then approx. 12 V is present while switch is turned ON. "0" volt is present when switch is turned OFF.
Brake switch	16	<p>Turn the cruise main switch to ON and leave clutch pedal released (MT). Then check that;</p> <ul style="list-style-type: none"> "0" volt is present when brake pedal is depressed. Battery voltage is present when brake pedal is released. <p>Additionally only in MT vehicle, keep the cruise main switch to ON and leave brake pedal released.</p> <p>Then check that;</p> <ul style="list-style-type: none"> "0" volt is present when clutch pedal is depressed. Battery voltage is present when clutch pedal is released.
Data link connector	17	—
Data link connector	18	—
Vehicle speed sensor 2	19	Lift-up the vehicle until all four wheels are raised off ground, and then rotate any wheel manually. Approx. 5 and 0 volt pulse signals are alternately input to cruise control module.
Stop light switch	20	<p>Turn ignition switch to OFF.</p> <p>Then check that;</p> <ul style="list-style-type: none"> Battery voltage is present when brake pedal is depressed. "0" volt is present when brake pedal is released.

NOTE:

Voltage at terminals 5, 7, 13 and 14 cannot be checked unless vehicle is driving by cruise control operation.

6. Diagnostics Chart for On-board Diagnosis System

A: BASIC DIAGNOSTICS PROCEDURE



B: ON-BOARD DIAGNOSIS WITH SELECT MONITOR

1. GENERAL

The on-board diagnosis function of the cruise control system uses an external select monitor.

The on-board diagnosis function operates in two categories, which are used depending on the type of problems;

- Cruise cancel conditions diagnosis
- Real-time diagnosis

Applicable cartridge No.: 498349601

- Cruise cancel conditions diagnosis

This category of diagnosis requires actual vehicle driving in order to determine the cause, (as when cruise speed is cancelled during driving although cruise cancel condition is not entered).



Cruise control module memory stores the cancel condition (Code No.) which occurred during driving. When there are plural cancel conditions (Code No.), they are shown in order, for 2 seconds per Code No., on the select monitor.

CAUTION:

- The cruise control memory stores not only the cruise “cancel” which occurred (although “cancel” operation is not entered by the driver), but also the “cancel” condition input by the driver.
- The content of memory is cleared when ignition switch or cruise main switch is turned OFF.

- Real-time diagnosis

The real-time diagnosis function is used to determine whether or not the input of output signal system is in good order, according to signal emitted from switches, sensors, etc.

Vehicle cannot be driven at cruise speed because problems occurs in the cruise control system or its associated circuits.



Monitor the signal conditions from switches and sensors.

2. CRUISE CANCEL CONDITIONS DIAGNOSIS

- 1) Connect select monitor.
- 2) Start the engine and turn cruise control main switch to ON.
- 3) Set select monitor in "FB0" mode.
- 4) Drive vehicle at least 40 km/h (25 MPH) with cruise speed set.
- 5) If cruise speed is canceled itself (without doing any cancel operations), a trouble code will appear on select monitor display.

CAUTION:

- A trouble code will also appear when cruise cancel is effected by driver. Do not confuse.
- Have a co-worker ride in vehicle to assist in diagnosis during driving.

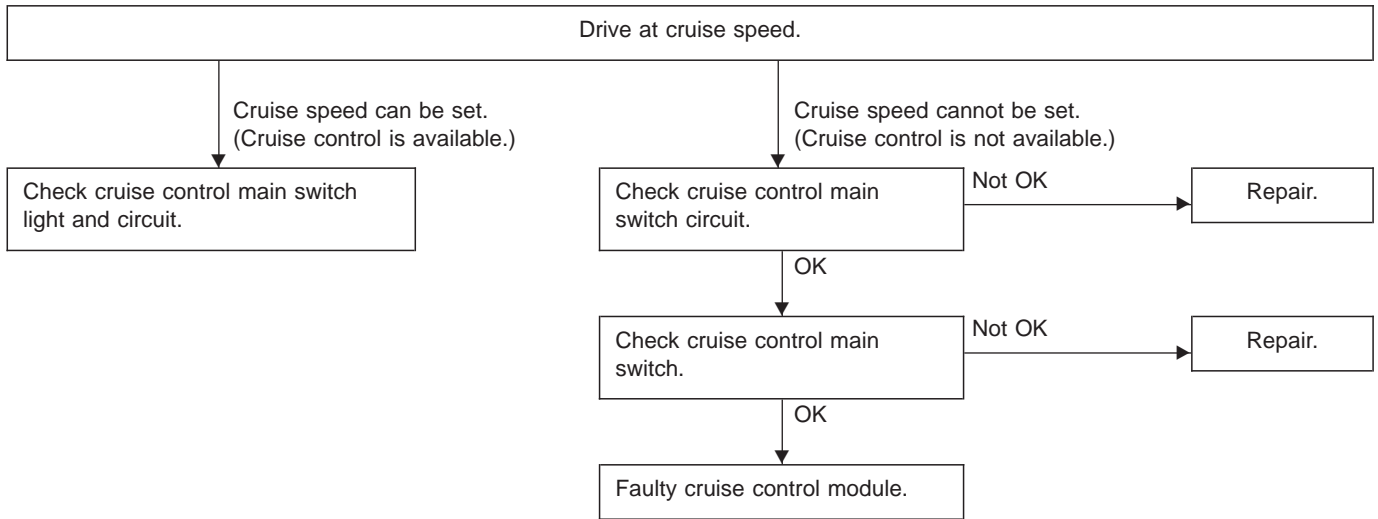
NOTE:

Trouble code will be cleared by turning ignition switch or cruise control main switch to OFF.

3. REAL-TIME DIAGNOSIS

- 1) Connect select monitor.
- 2) Turn ignition switch and cruise control main switch to ON.
- 3) Set select monitor in "FA0" mode.
- 4) Ensure that normal indication is displayed when controls are operated as indicated below:
 - When SET/COAST switch is pressed.
 - When RESUME/ACCEL switch is pressed.
 - When brake pedal is depressed. (Stop and brake switch turns ON.)
 - When clutch pedal is depressed. (MT model)
 - When select lever is set to N position. (AT model)

7. Diagnostics Chart for Power Line A: BASIC DIAGNOSTICS PROCEDURE



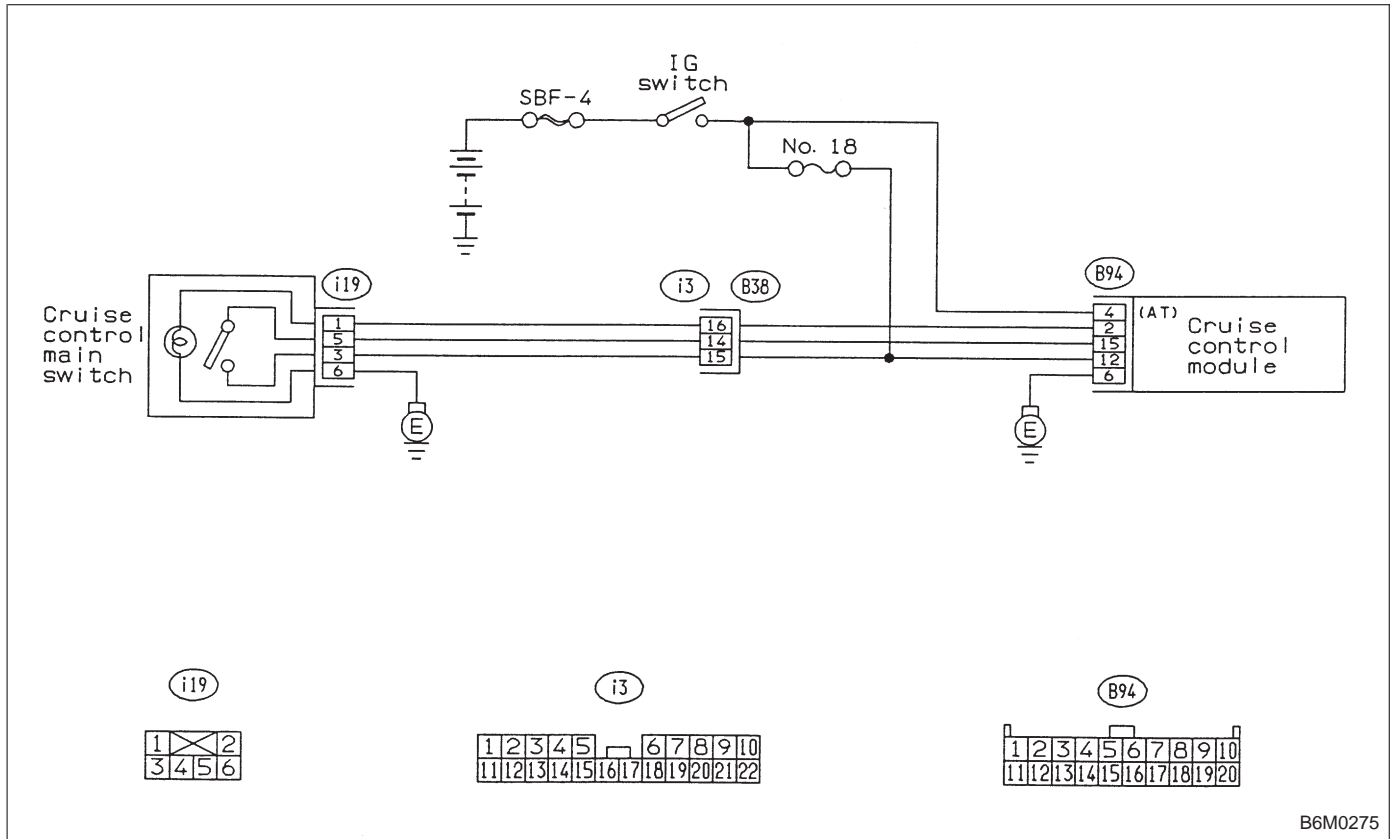
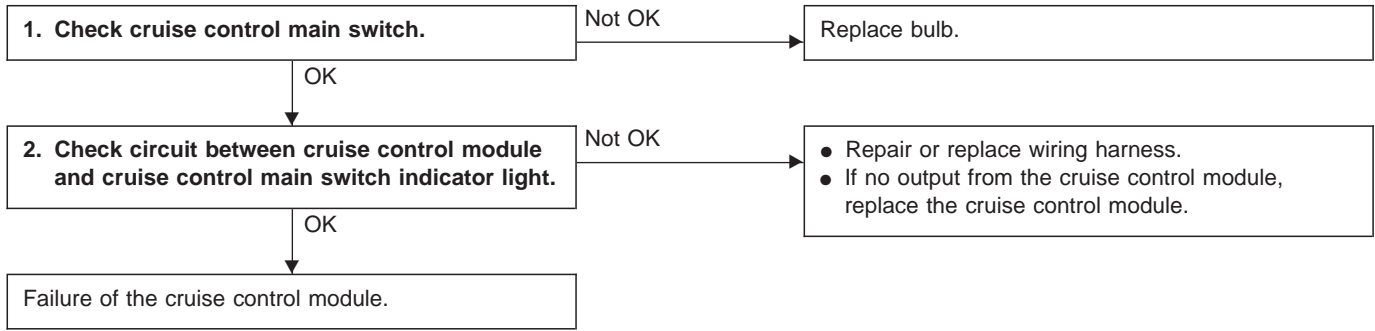
B: CHECK INDICATOR AND CIRCUIT IN CRUISE CONTROL MAIN SWITCH

DIAGNOSIS:

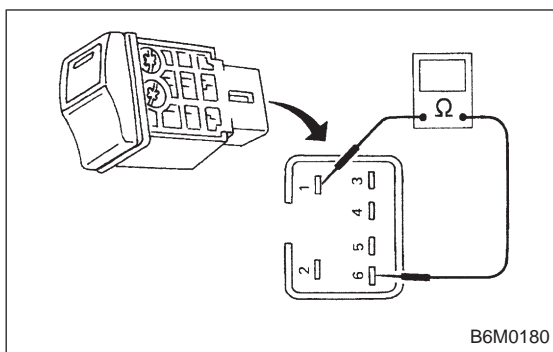
- Bulb failure or open harness of the indicator circuit in the cruise control main switch.

TROUBLE SYMPTOM:

- Cruise control can be set, normally indicator does not come on. (When main switch is pressed.)



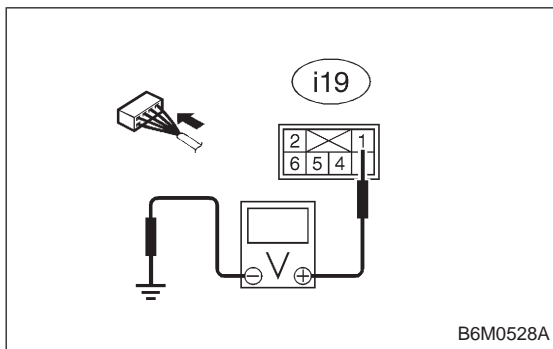
B6M0275



1. CHECK CRUISE CONTROL MAIN SWITCH.

- 1) Remove cruise control main switch.
- 2) Measure resistance between cruise control main switch terminals.

Terminals / Specified resistance:
No. 1 — No. 6 / Approx. 50 Ω

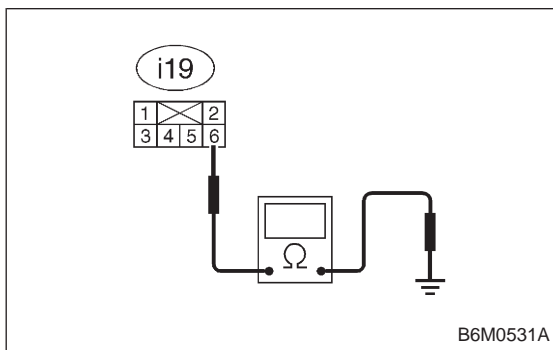


2. CHECK CIRCUIT BETWEEN CRUISE CONTROL MODULE AND CRUISE CONTROL MAIN SWITCH INDICATOR LIGHT.

- 1) Turn the ignition switch to ON.
- 2) Turn cruise control main switch to ON.
- 3) Measure voltage between cruise control main switch connector and the body.

Connector & terminal / Specified voltage:
(i19) No. 1 — Body / 10 V, or more

- 4) Turn the ignition switch and cruise control main switch to OFF.



- 5) Remove the connector from the cruise control main switch.

- 6) Measure resistance of ground circuit between the cruise control main switch connector and body.

Connector & terminal / Specified resistance:
(i19) No. 6 — Body / 10 Ω, max.

C: CHECK CRUISE CONTROL MAIN SWITCH DIAGNOSIS:

- Faulty cruise control main switch, or open harness.

TROUBLE SYMPTOM:

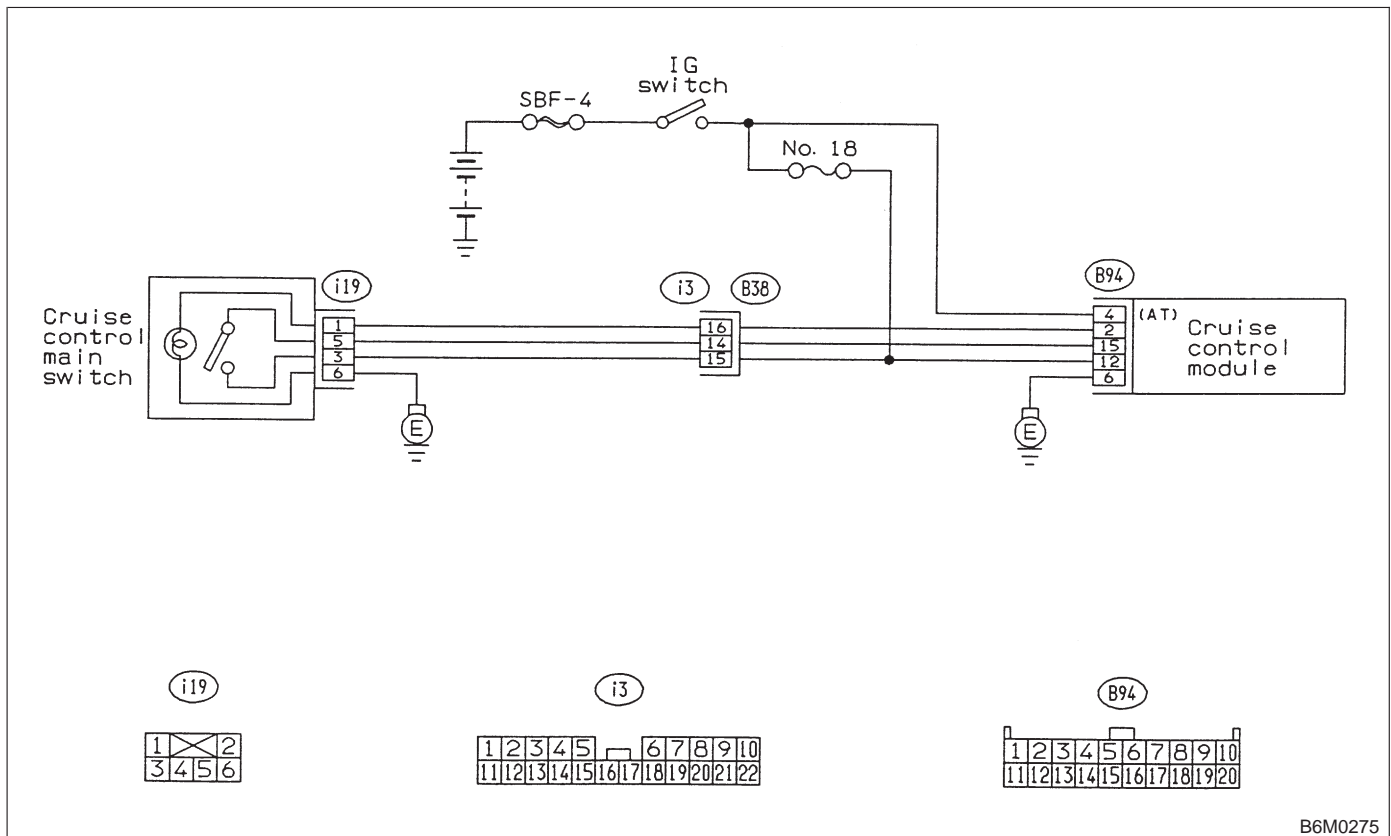
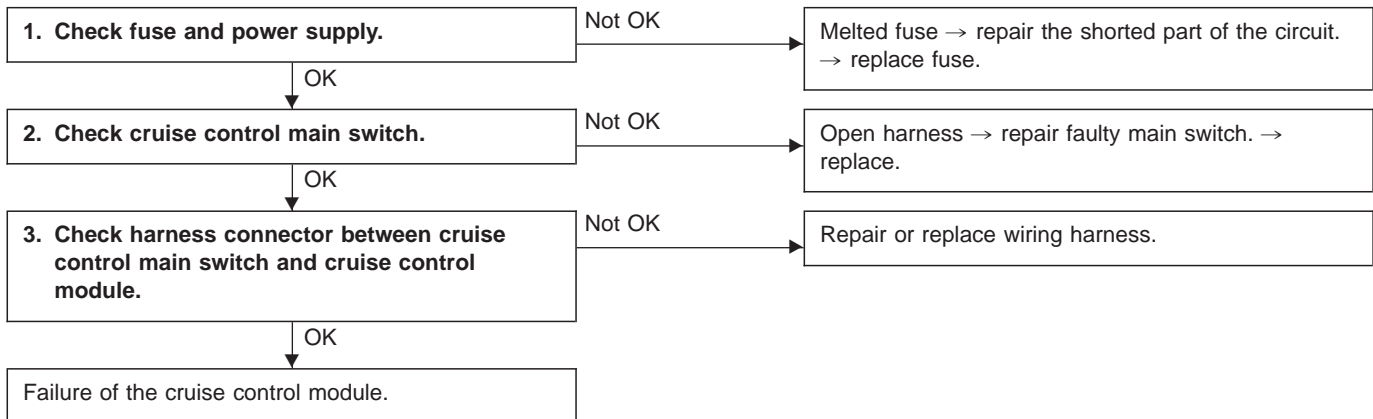
- Cruise control main switch is not turned ON and cruise control cannot be set.

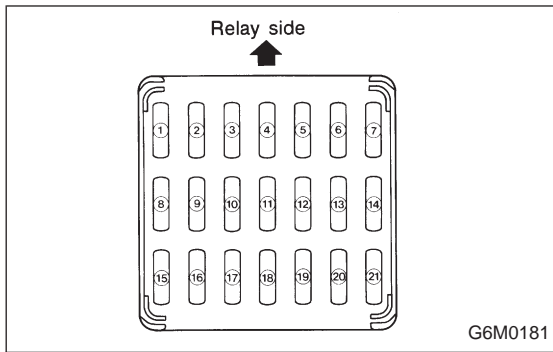
NOTE:

When the main relay (built-in cruise control module) operates, the main switch circuit is in normal condition.

The main relay operation can be checked by hearing the operation sounds.

This operation sounds will be heard when ignition switch and cruise control main switch is turned to ON.

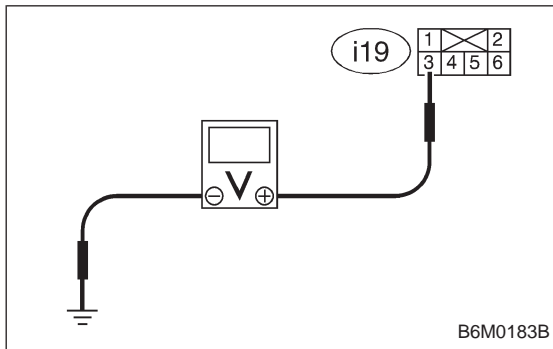




1. CHECK FUSE AND POWER SUPPLY.

- 1) Check fuse No. 18.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between fuse box connector and body.

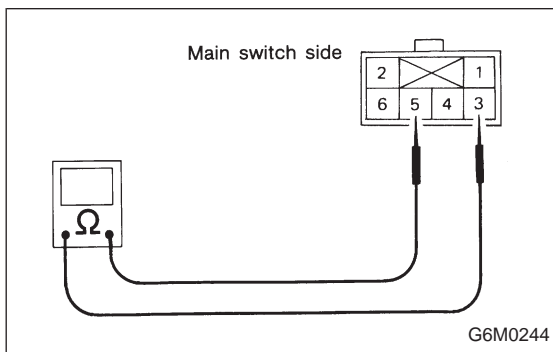
Connector & terminal / Specified voltage:
(B51) No. 4 — Body / 10 V, or more



2. CHECK CRUISE CONTROL MAIN SWITCH.

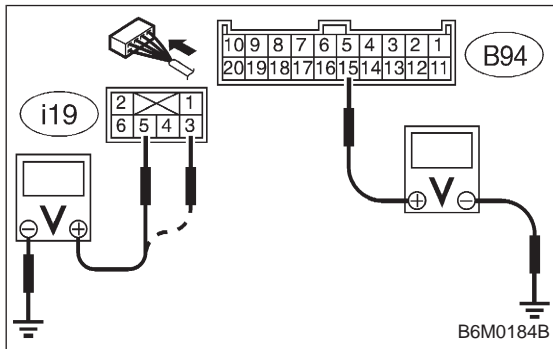
- 1) Turn ignition switch to OFF.
- 2) Remove cruise control main switch and disconnect connector.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between cruise control main switch connector and body.

Connector & terminal / Specified voltage:
(i19) No. 3 — Body / 10 V, or more



- 5) Measure resistance between cruise control main switch terminals.

Terminals / Specified resistance:
No. 3 — No. 5 / 10 Ω, max. (ON)
1 MΩ, min. (OFF)



3. CHECK HARNESS CONNECTOR BETWEEN CRUISE CONTROL MAIN SWITCH AND CRUISE CONTROL MODULE.

- 1) Connect connector.
- 2) Turn ignition switch to ON.
- 3) Turn cruise control main switch to ON.
- 4) Measure voltage between each terminal of cruise control main switch or cruise control module and body.

Connector & terminal / Specified voltage:
(i19) No. 3 — Body / 10 V, or more
(i19) No. 5 — Body / 10 V, or more
(B94) No. 15 — Body / 10 V, or more

NOTE:

Depress cruise control main switch with fingers while measuring (i19) No. 5 — Body.

8. Diagnostics Chart with Trouble Code

A: TROUBLE CODE

Trouble code	Item	Contents of diagnosis	Page
10	OK	Normal	18
11	BRAKE/ST/CL or N	<ul style="list-style-type: none"> ● Input signals from brake switch "OFF", stop light switch "ON" (Brake pedal is in depressed condition.) ● Input signals from clutch switch "OFF", or inhibitor switch is in "N" position. [Clutch pedal is depressed (MT), or select lever is set to N position (AT).] 	20
12	NOT SET SP	Out of cruise speed range	22
13	LOW SP LIM	Low-speed control limiter	22
14	CANCEL SW	Input signal from cancel switch	26
15	NO MEMORY	No memorized cruise speed	—
21	SP SENS NG	Faulty vehicle speed sensor 2	22
22	COM SW NG	Faulty SET/COAST switch or RESUME/ACCEL switch	26
23	RELAY NG	Faulty safety relay included in cruise control module	29
24	CPU RAM NG	Faulty CPU RAM included in cruise control module	29
31	MOTOR NG	Faulty vacuum motor or motor drive system	30
32	AIR VAL NG	Faulty air valve or valve drive system	30
33	REL VAL NG	Faulty release valve or valve drive system	30

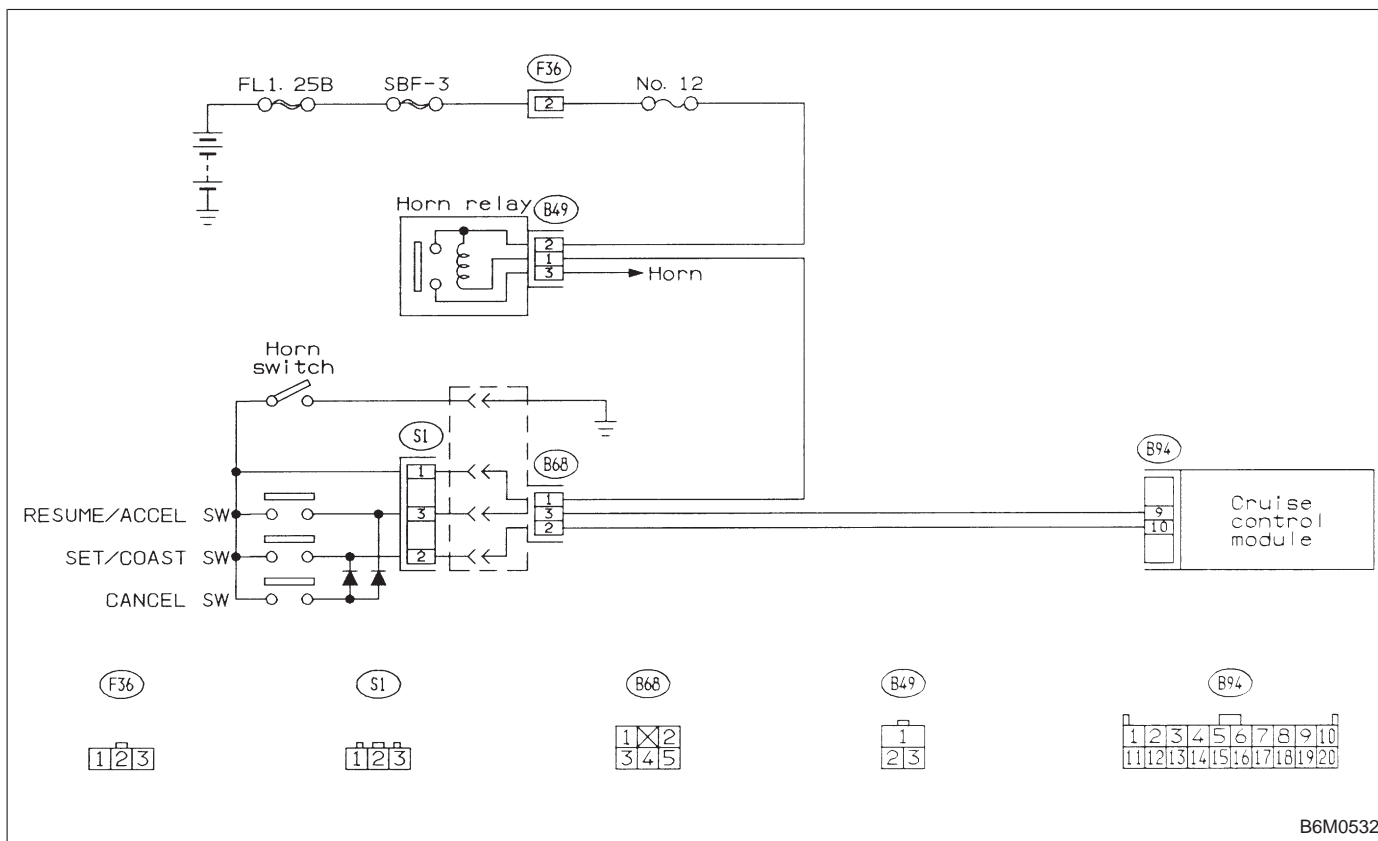
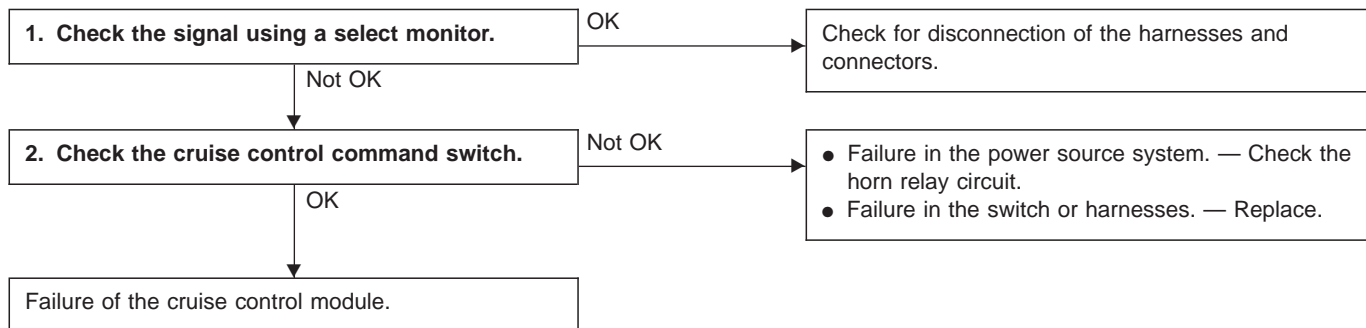
B: TROUBLE CODE 10
— NORMAL CONDITION —

DIAGNOSIS:

- SET/COAST switch or disconnection of the wiring or short circuit.
- RESUME/ACCEL switch or disconnection of the wiring or short circuit.

TROUBLE SYMPTOM:

- Cruise control cannot be set, or it is cancelled immediately.
- RESUME/ACCEL cannot be operated.



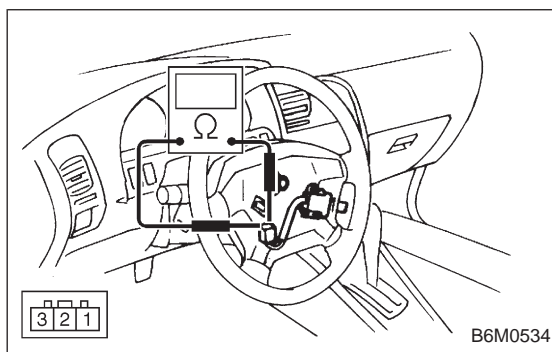
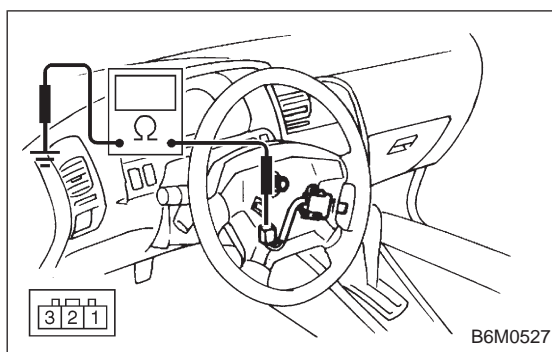
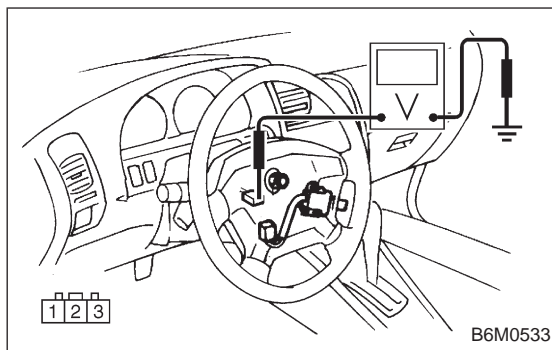
B6M0532

LED No.	Signal name	Display
1	SET/COAST switch	SE
2	RESUME/ACCEL switch	RE
3	Stop light switch	ST
4	● Brake switch ● Clutch switch (MT)	BR
5	Inhibitor switch (AT)	N
6	—	—
7	—	—
8	—	—
9	—	—
10	—	—

SE	RE	ST	BR	N
—	—	—	—	—

1	2	3	4	5
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6	7	8	9	10
---	---	---	---	----



1. CHECK THE SIGNAL USING A SELECT MONITOR.

- 1) Turn ignition switch to ON.
- 2) Turn cruise control main switch to ON.
- 3) Set select monitor in "FA0" mode.
- 4) Check signals for proper operation.
 - (1) When pushing the SET switch:
LED No. 1 goes out — lights.
 - (2) When pushing the RESUME switch:
LED No. 2 goes out — lights.

2. CHECK THE CRUISE CONTROL COMMAND SWITCH.

- 1) Disconnect connector from command switch.
- 2) Measure voltage between connector (S1) and body.

Connector & terminal / Specified voltage:
(S1) No. 1 — Body / 10 V, or more

- 3) Check for harness short circuit between command switch and body.

Terminals / Specified resistance:
No. 2 — Body / 1 M Ω , min.
No. 3 — Body / 1 M Ω , min.

- 4) Measure resistance between each terminal of switch side connector to check the switch operation.

Terminals:
No. 1 — No. 2 (SET/COAST SWITCH)
No. 1 — No. 3 (RESUME/ACCEL SWITCH)

Specified resistance:
10 Ω , max. (ON)
1 M Ω , min. (OFF)

CANCEL (FB0)

11 BRAKE/ST/CL or N

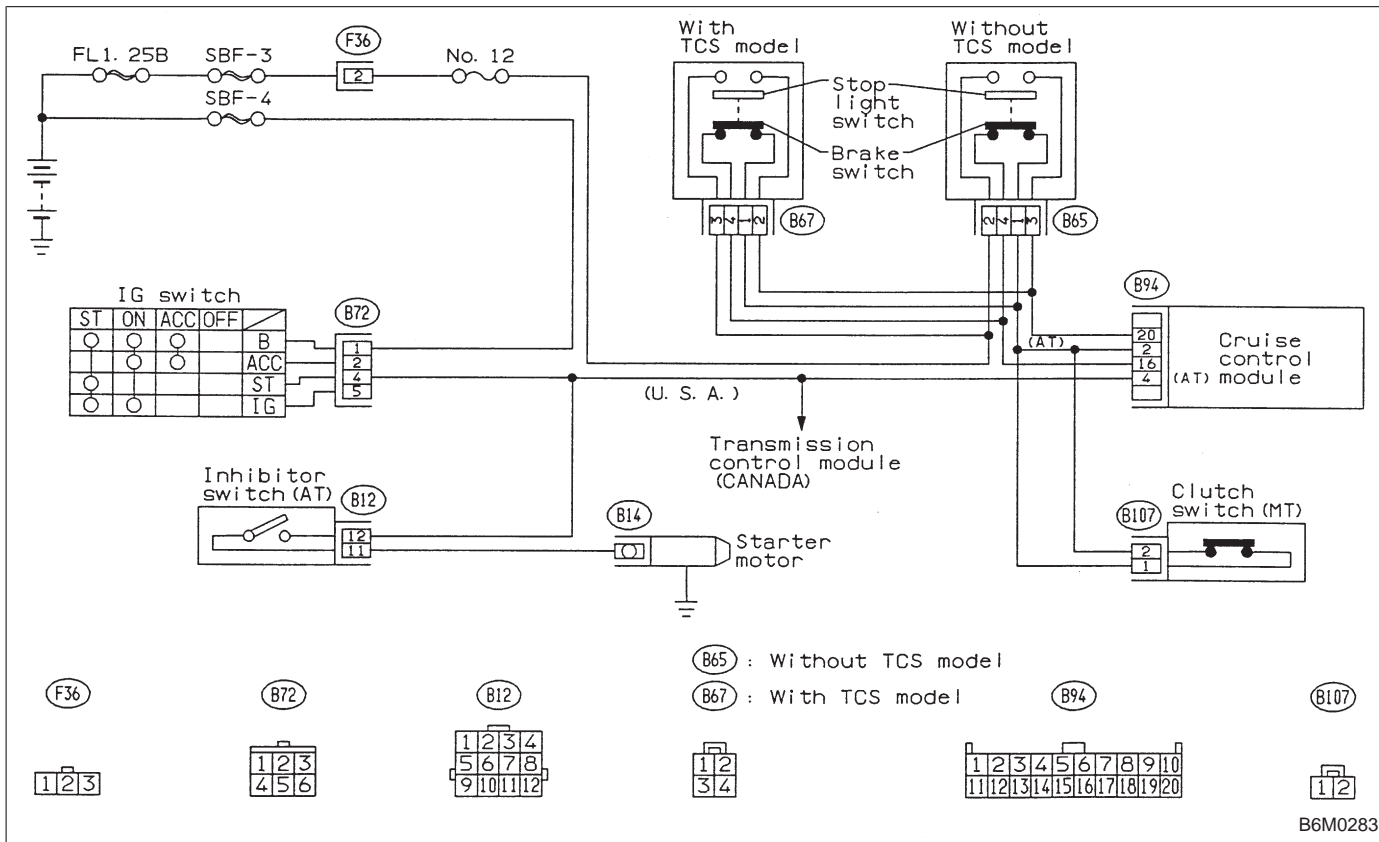
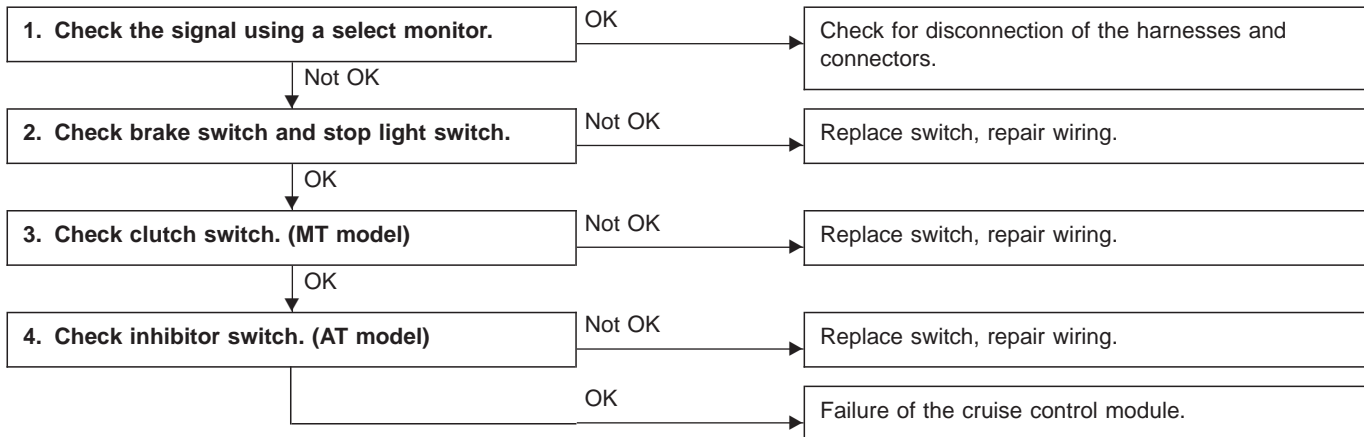
B6M0244

C: TROUBLE CODE 11
— BRAKE SWITCH, STOP LIGHT SWITCH, CLUTCH SWITCH, INHIBITOR SWITCH —
DIAGNOSIS:

- Failure or disconnection of the stop light switch and brake switch.
- Failure or disconnection of the inhibitor switch. (AT)
- Failure or disconnection of the clutch switch. (MT)

TROUBLE SYMPTOM:

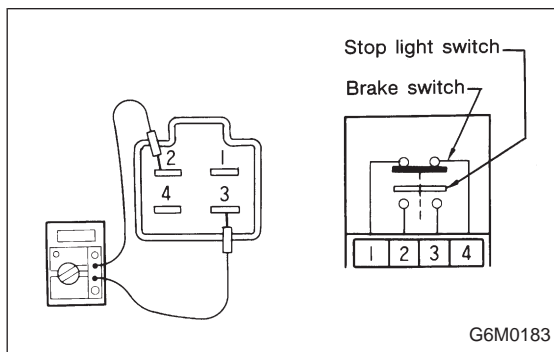
- Cruise control cannot be set.



LED No.	Signal name	Display
1	SET/COAST switch	SE
2	RESUME/ACCEL switch	RE
3	Stop light switch	ST
4	● Brake switch ● Clutch switch (MT)	BR
5	Inhibitor switch (AT)	N
6	—	—
7	—	—
8	—	—
9	—	—
10	—	—

SE	RE	ST	BR	N
—	—	—	—	—

1	2	3	4	5
6	7	8	9	10



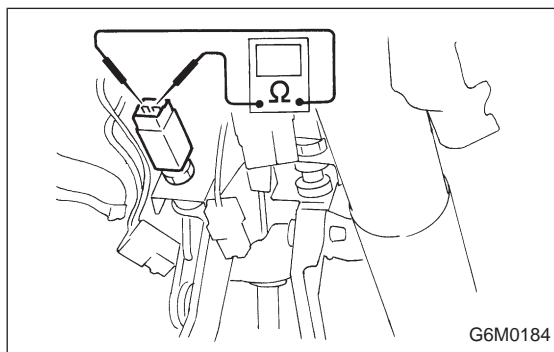
1. CHECK THE SIGNAL USING A SELECT MONITOR.

- 1) Turn ignition switch to ON.
- 2) Turn cruise control main switch to ON.
- 3) Apply parking brake securely.
- 4) Set select monitor in "FA0" mode.
- 5) Release the clutch pedal. (MT model)
- 6) Depress the brake pedal and check signals for proper operation.
Stop light switch: LED No. 3 goes out — lights.
Brake switch : LED No. 4 goes out — lights.
- 7) Release the brake pedal.
- 8) Depress the clutch pedal and check signal for proper operation. (MT model)
Clutch switch: LED No. 4 goes out — lights.
- 9) Set the selector lever from D to N position and check signal for proper operation. (AT model)
Inhibitor switch: LED No. 5 goes out — lights.

2. CHECK BRAKE SWITCH AND STOP LIGHT SWITCH.

- 1) Remove connector of stop and brake switch.
- 2) Check circuit between each terminal.

Pedal operation	Brake switch between No. 1 — No. 4	Stop light switch between No. 2 — No. 3
Depressing the brake pedal.	1 MΩ, or more	1 Ω, or less
Without depressing the brake pedal.	1 Ω, or less	1 MΩ, or more



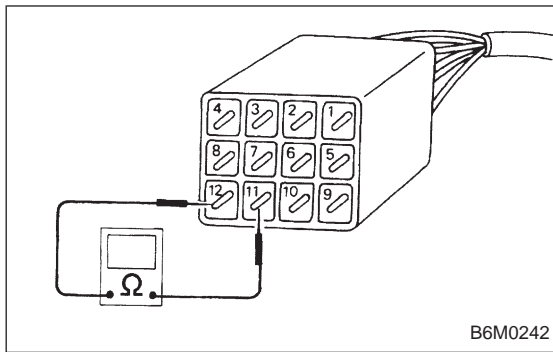
3. CHECK CLUTCH SWITCH. (MT MODEL)

- 1) Disconnect connector from clutch switch.
- 2) Check continuity of the clutch switch.

Terminals / Specified resistance:

No. 1 — No. 2 / 10 Ω, max. (Without pedal depressing.)

/ 1 MΩ, min. (Pedal depressing.)



4. CHECK INHIBITOR SWITCH. (AT MODEL)

- 1) Set the selector lever to N position.
- 2) Disconnect connector of inhibitor switch.
- 3) Check continuity of the inhibitor switch.

Terminals / Specified resistance:

No. 11 — No. 12 / 10 Ω, max.

(Selector lever is in P or N.)

/ 1 MΩ, min.

(Selector lever is not in P or N.)

CANCEL (FB0)

12 NOT SET SP

B6M0191

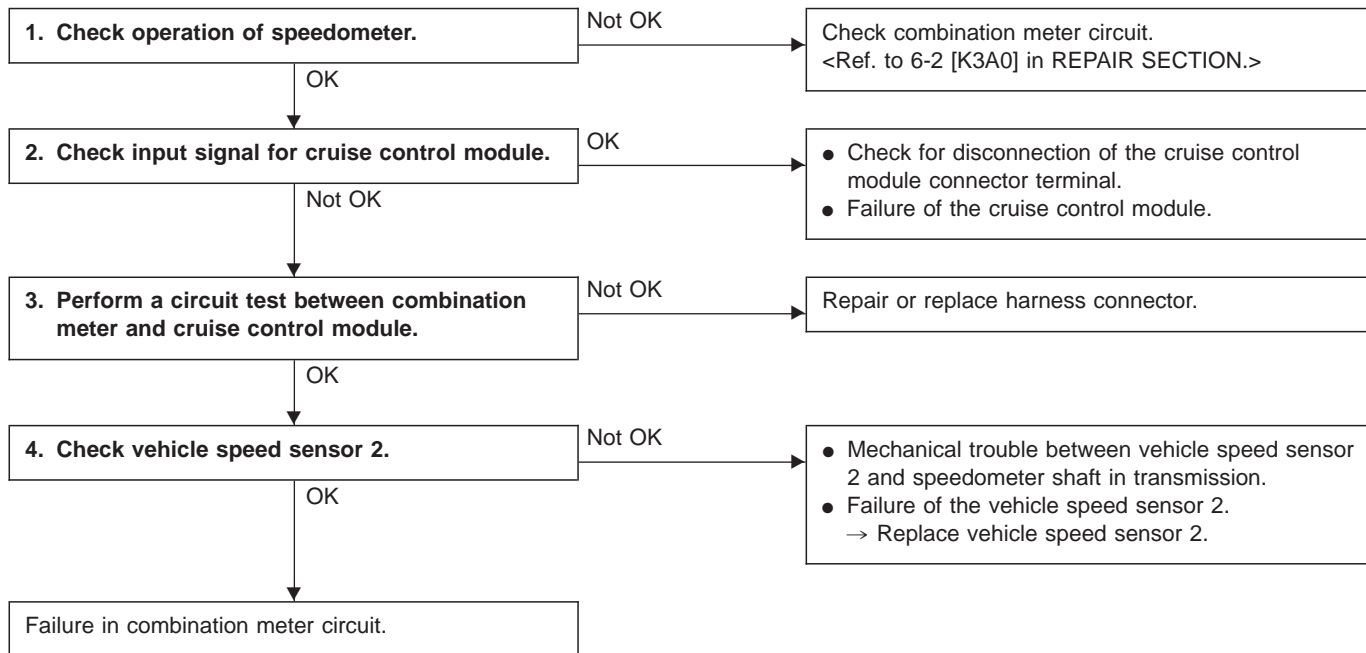
**D: TROUBLE CODE 12, 13 AND 21
— VEHICLE SPEED SENSOR 2 SYSTEM —**

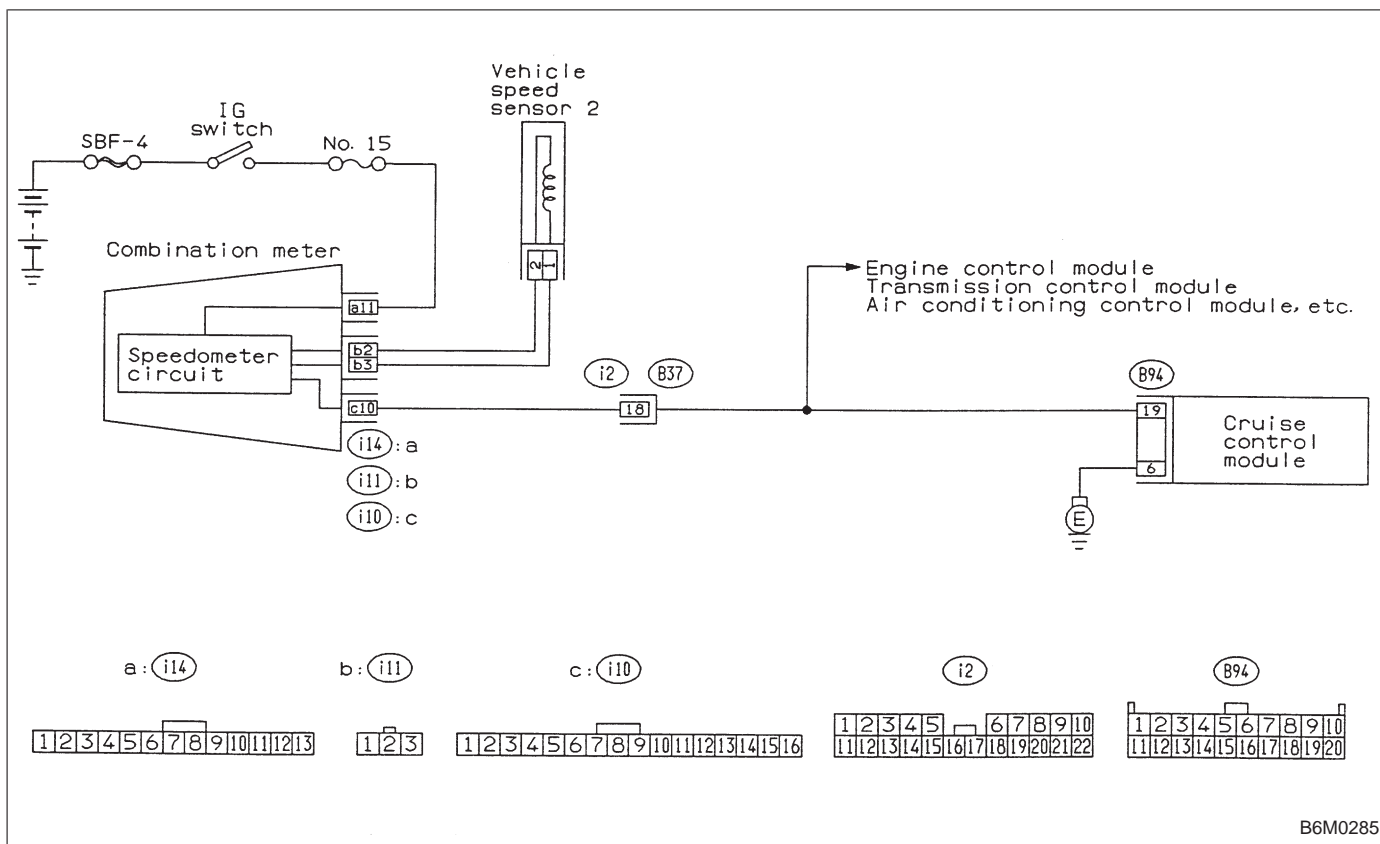
DIAGNOSIS:

- Disconnection or short circuit of vehicle speed sensor 2 system.

TROUBLE SYMPTOM:

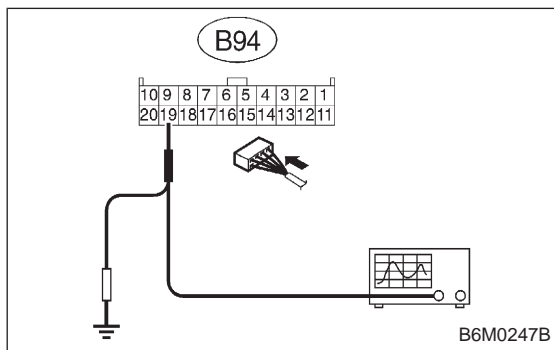
- Cruise control cannot be set. (Cancelled immediately.)





1. CHECK OPERATION OF SPEEDOMETER.

Make sure that speedometer indicates the vehicle speed by driving the vehicle.



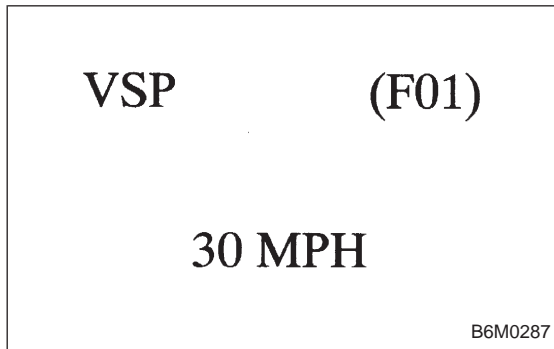
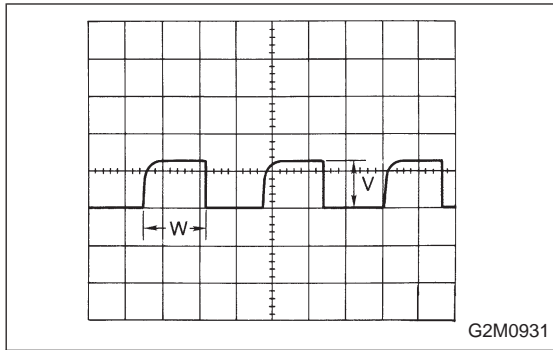
2. CHECK INPUT SIGNAL FOR CRUISE CONTROL MODULE.

WARNING:

Be careful not to be caught up by the running wheels.

- 1) Set the vehicle on free roller, or lift-up the vehicle and support with safety stands.
- 2) Set oscilloscope to cruise control module connector terminals.

Connector & terminal / (B94) No. 19 — Body



- 3) Start the engine.
- 4) Shift on the gear position, and keep the vehicle speed at constant.
- 5) Measure signal voltage.

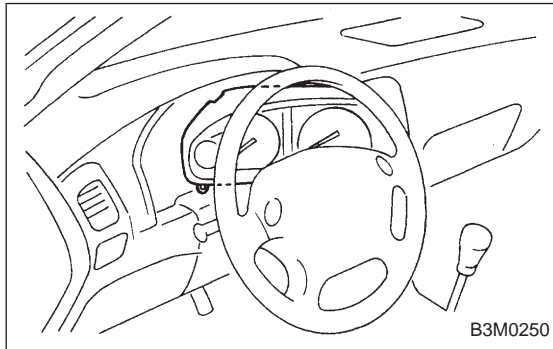
Specified voltage (V): 2 V, or more

NOTE:

- If the vehicle speed increases, the width of amplitude (W) decreases.
- If oscilloscope is not available, check input signal (vehicle speed signal) by using a select monitor. (Refer to the procedure as described below.)
- Using the select monitor:
 - (1) Set the vehicle on free roller, or lift-up the vehicle and support with safety stands.
 - (2) Turn ignition switch to OFF and set select monitor.
 - (3) Turn ignition switch to ON.
 - (4) Turn cruise control main switch to ON.
 - (5) Set select monitor in "F01" or "F02" mode.
 - (6) Drive the vehicle at speed greater than 40 km/h (25 MPH).
 - (7) Check that vehicle speed indication on select monitor and speedometer are equal.

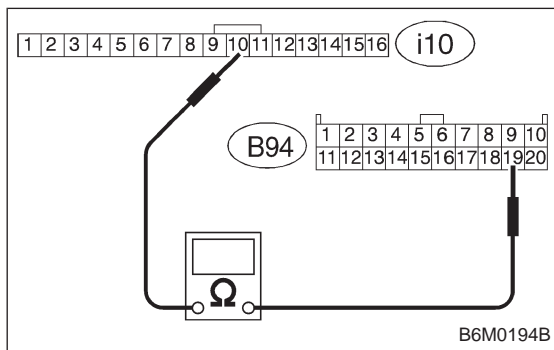
NOTE:

- When there is a disconnection or short circuit in the harness between the meter and the cruise control module, the indicated value will be 0 to 1.0 km/h (0 to 0.6 MPH).
- In "F01" mode, vehicle speed is indicated in mile per hour (MPH).
In "F02" mode, vehicle speed is indicated in kilometer per hour (km/h).



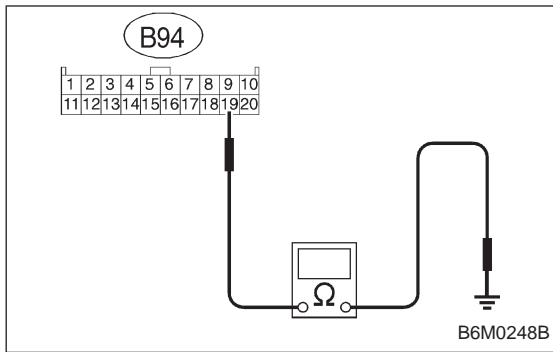
3. PERFORM A CIRCUIT TEST BETWEEN COMBINATION METER AND CRUISE CONTROL MODULE.

- 1) Turn ignition switch to OFF.
- 2) Remove combination meter.



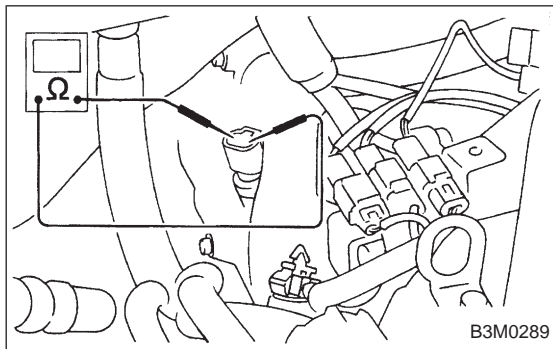
- 3) Disconnect connector from cruise control module.
- 4) Measure resistance of harness connector between combination meter and cruise control module.

Connector & terminal / Specified resistance:
(i10) No. 10 — (B94) No. 19 / 10 Ω, max.



5) Measure resistance of harness connector between cruise control module and body to make sure that circuit does not short.

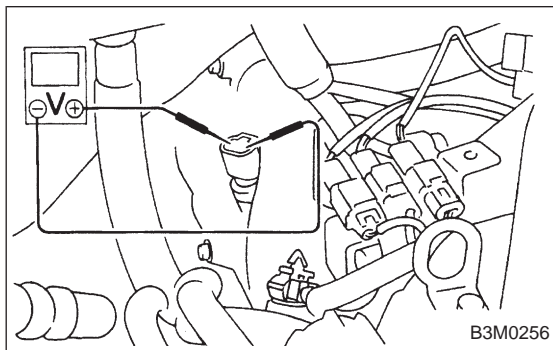
Connector & terminal / Specified resistance:
(B94) No. 19 — Body / 1 MΩ, min.



4. CHECK VEHICLE SPEED SENSOR 2.

- 1) Disconnect connector from vehicle speed sensor 2.
- 2) Measure resistance between terminals of vehicle speed sensor 2.

Terminals / Specified resistance:
No. 1 — No. 2 / 350 — 450 Ω

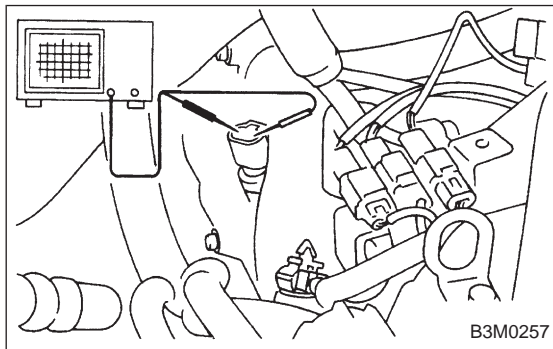


WARNING:

Be careful not to be caught up by the running wheels.

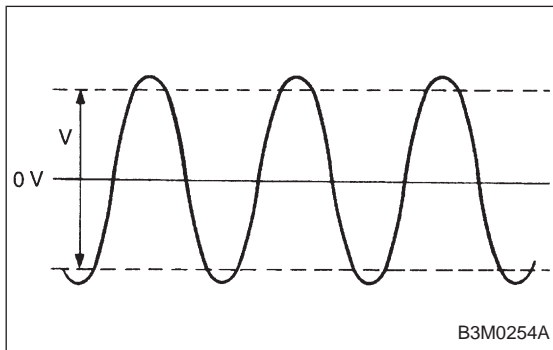
- 3) Set the vehicle on free roller, or lift-up the vehicle and support with safety stands.
- 4) Drive the vehicle at speed greater than 20 km/h (12 MPH).
- 5) Measure voltage between terminals of vehicle speed sensor 2.

Terminals / Specified voltage:
No. 1 — No. 2 / 2 V, or more (AC range)



- Using an oscilloscope:
 - (1) Turn ignition switch to OFF.
 - (2) Set oscilloscope to vehicle speed sensor 2.
 - (3) Drive the vehicle at speed greater than 20 km/h (12 MPH).
 - (4) Measure signal voltage.

Specified voltage (V): 5 V, min.



CANCEL (FB0)

14 CANCEL SW

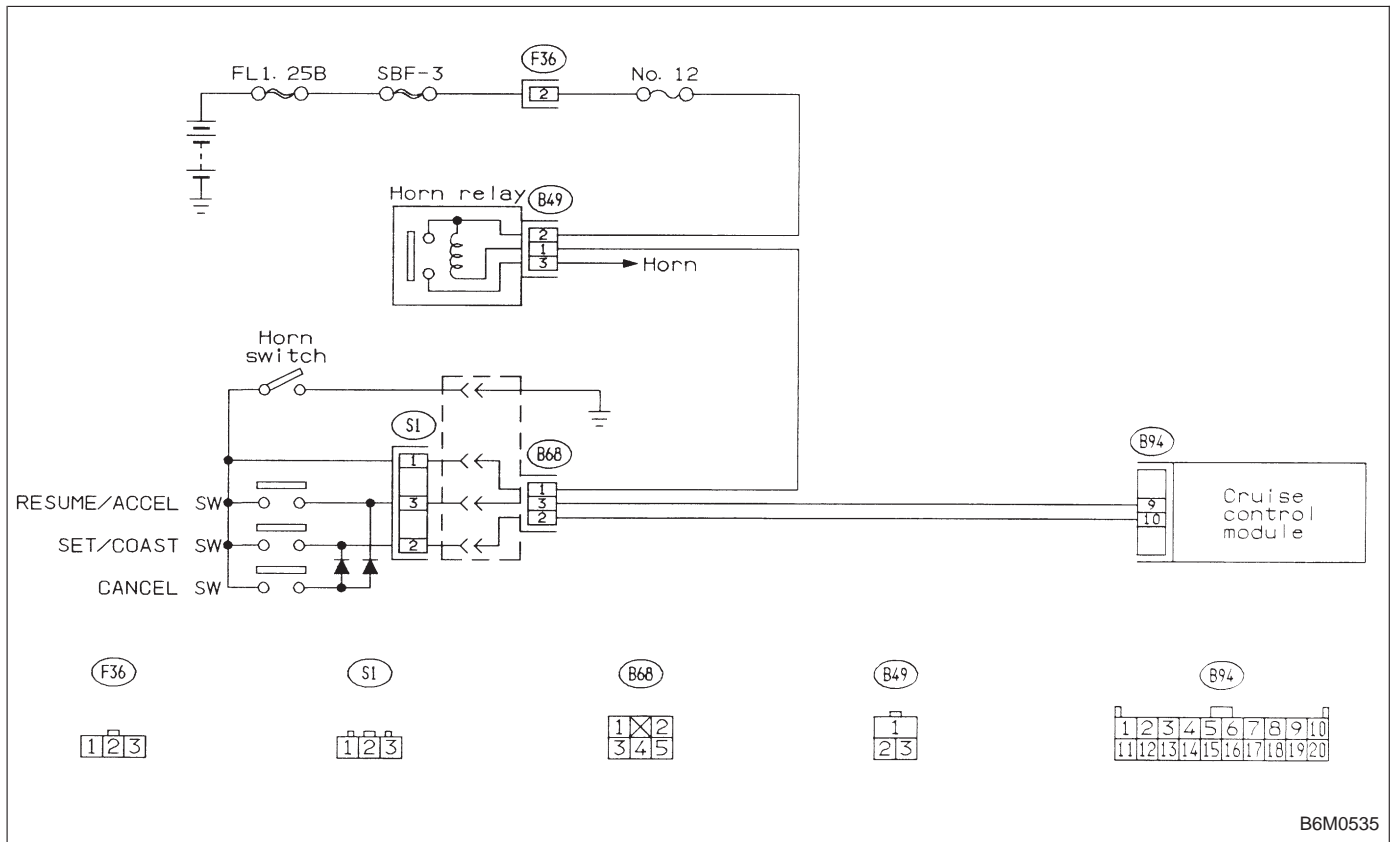
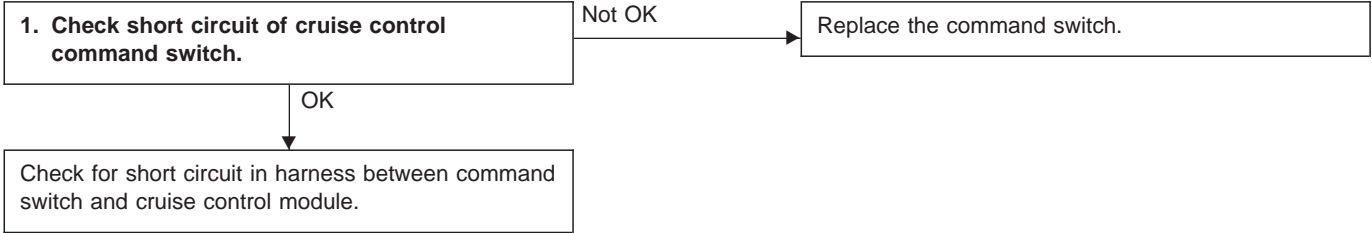
B6M0196

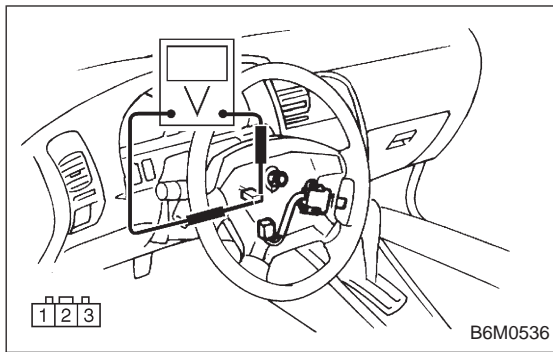
E: TROUBLE CODE 14 AND 22
— SET/COAST SWITCH, RESUME/ACCEL SWITCH, CANCEL SWITCH —
DIAGNOSIS:

- Short circuit inside the SET SW and RESUME SW.

TROUBLE SYMPTOM:

- Cruise control cannot be set. (Cancelled immediately.)





1. CHECK SHORT CIRCUIT OF CRUISE CONTROL COMMAND SWITCH.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between each terminal of connector (S1).

Terminals / Specified resistance:

SET switch ON

(S1) No. 1 — (S1) No. 2 / 10 — 13 V

RESUME switch ON

(S1) No. 1 — (S1) No. 3 / 10 — 13 V

CANCEL switch ON

(S1) No. 1 — (S1) No. 2 / 10 — 13 V

(S1) No. 1 — (S1) No. 3 / 10 — 13 V

CANCEL (FB0)

23 RELAY NG

B6M0198

**F: TROUBLE CODE 23 AND 24
— CRUISE CONTROL MODULE BUILT-IN
RELAY, CPU RAM —**

DIAGNOSIS:

- Welding of built-in relay of cruise control module.
- Failure of built-in CPU RAM of cruise control module.

TROUBLE SYMPTOM:

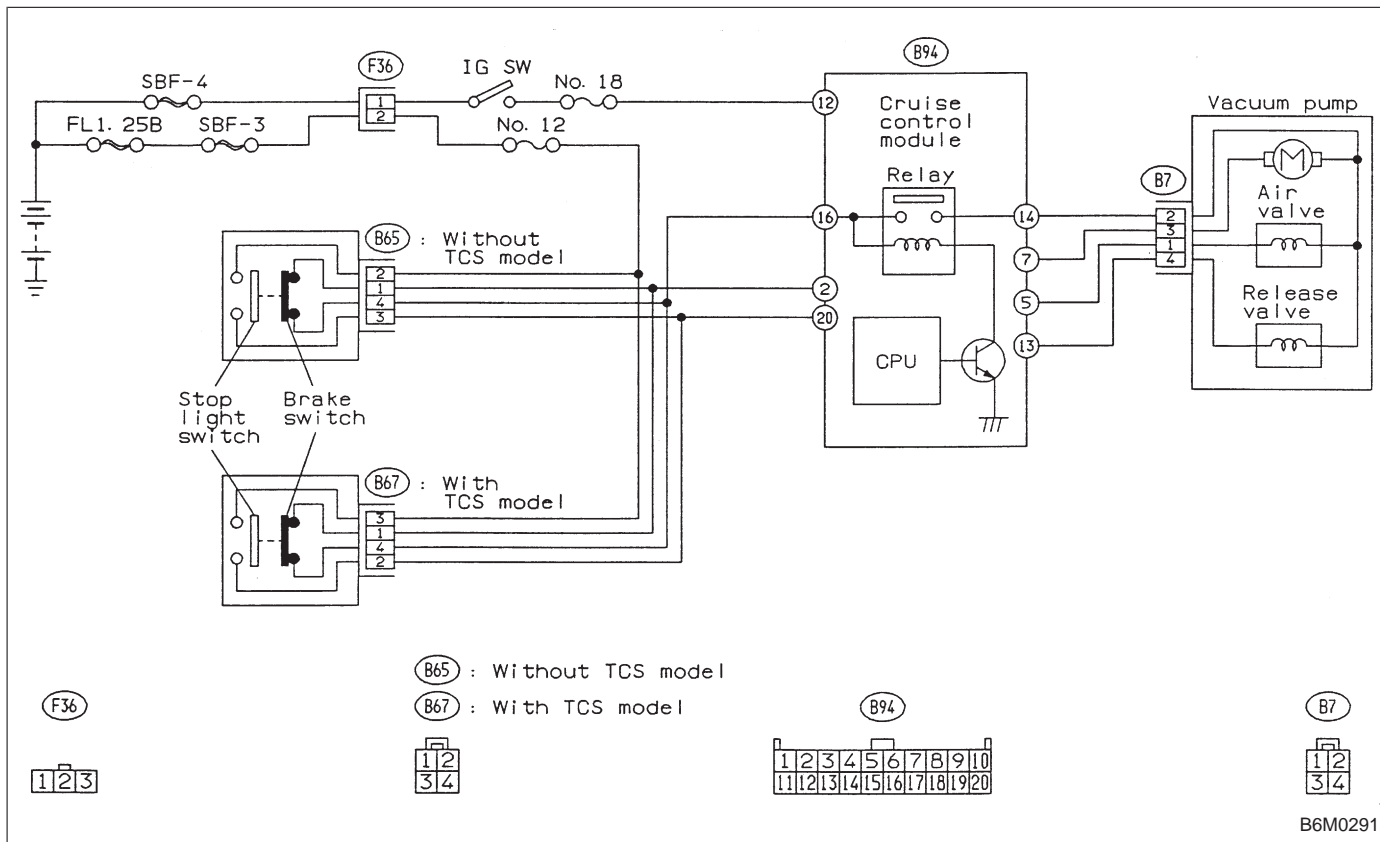
- Cruise control is cancelled and memorized cruise speed is also cancelled.
- Once cruise control is cancelled, cruise control cannot be set until the ignition switch and cruise main switch turns OFF, and then turns ON again.

NOTE:

Perform real-time diagnosis ("FA0" mode) and check vehicle speed signal with select monitor.

When input signals are in good condition, failure is in cruise control module.

(Check power supply and ground condition of cruise control module.)



CANCEL (FB0)

31 MOTOR NG

B6M0200

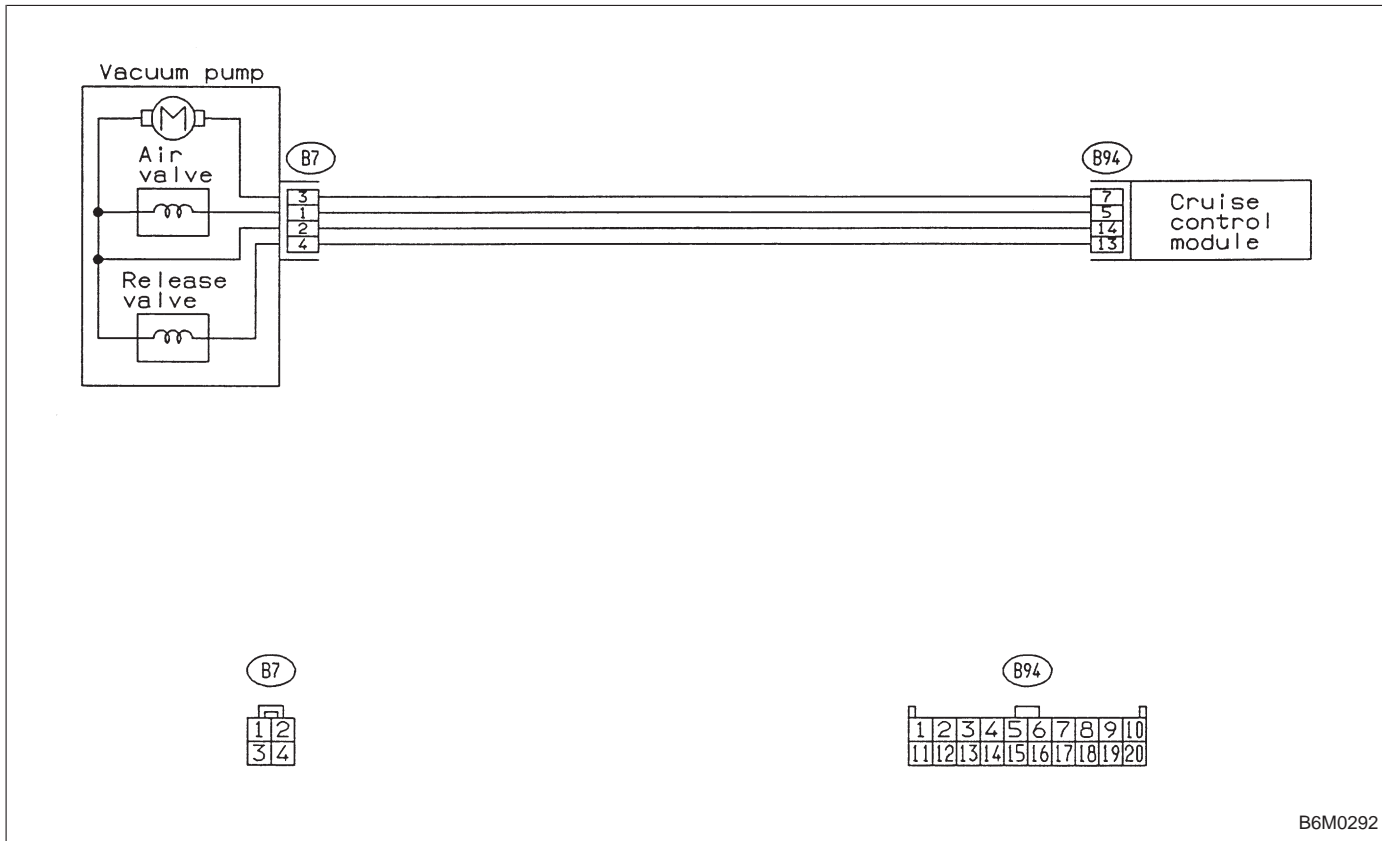
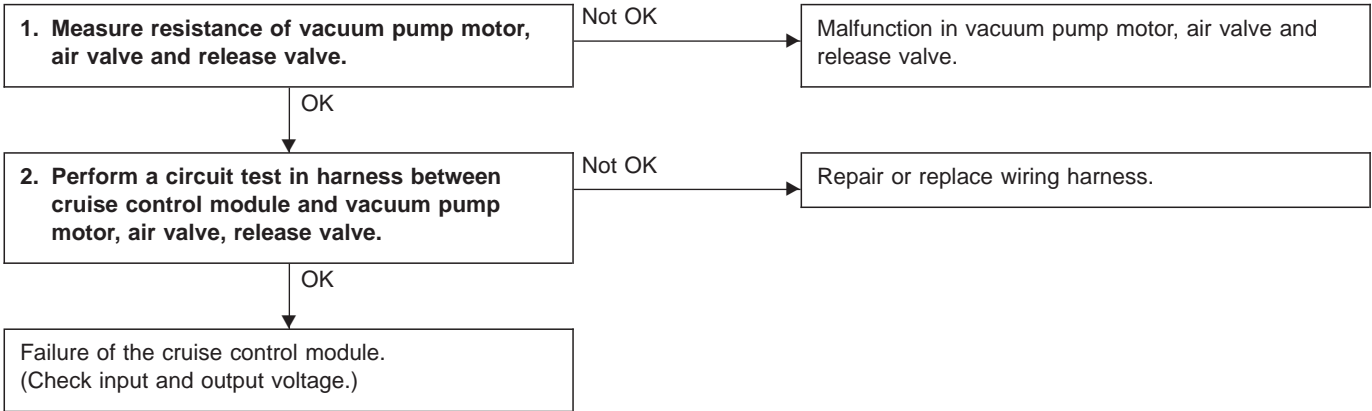
G: TROUBLE CODE 31, 32 AND 33
— VACUUM PUMP, AIR VALVE, RELEASE VALVE —

DIAGNOSIS:

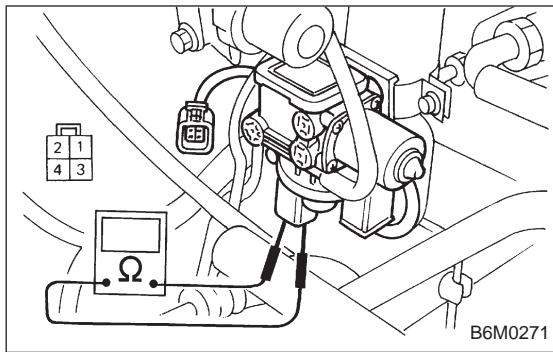
- Open or poor contact of vacuum pump motor, air valve and release valve.

TROUBLE SYMPTOM:

- Cruise control cannot be set. (Cancelled immediately.)



B6M0292



1. MEASURE RESISTANCE OF VACUUM PUMP MOTOR, AIR VALVE AND RELEASE VALVE.

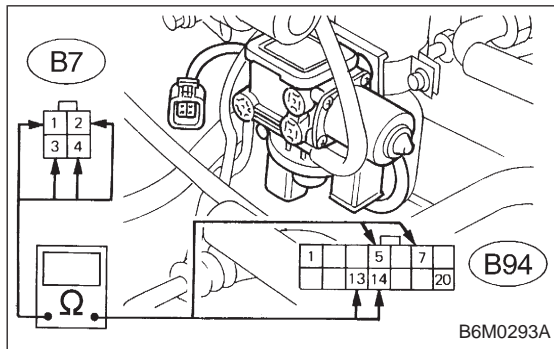
- 1) Disconnect connector of vacuum pump and valve.
- 2) Measure resistance of vacuum pump motor, air valve and release valve.

Terminals / Specified resistance:

No. 2 — No. 3 / 46 Ω (Vacuum pump motor)

No. 2 — No. 1 / 69 Ω (Air valve)

No. 2 — No. 4 / 69 Ω (Release valve)



2. PERFORM A CIRCUIT TEST IN HARNESS BETWEEN CRUISE CONTROL MODULE AND VACUUM PUMP MOTOR, AIR VALVE, RELEASE VALVE.

- 1) Disconnect connectors from cruise control module, vacuum pump and valve.
- 2) Measure resistance of harness connector between cruise control module, vacuum pump motor, air valve and release valve.

Connector & terminal / Specified resistance:

(B7) No. 1 — (B94) No. 5 / 10 Ω, max.

(B7) No. 2 — (B94) No. 14 / 10 Ω, max.

(B7) No. 3 — (B94) No. 7 / 10 Ω, max.

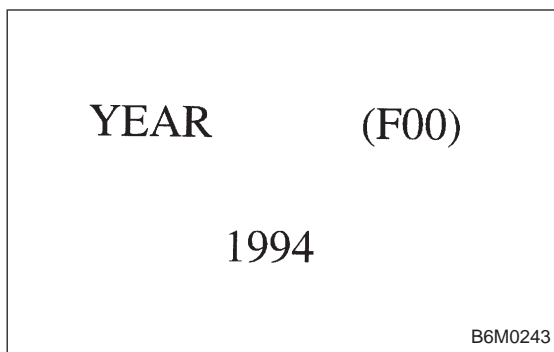
(B7) No. 4 — (B94) No. 13 / 10 Ω, max.

9. Diagnostics Chart with Select Monitor

A: FUNCTION MODE

Applicable cartridge of select monitor: No. 498349601

Function mode	Contents	Abbreviation	Unit of measure	Page
F00	ROM ID number	YEAR	—	33
F01	Vehicle speed signal	VSP	MPH	33
F02	Vehicle speed signal	VSP	km/h	33
F03	Memorized cruise set speed	MSP	MPH	34
F04	Memorized cruise set speed	MSP	km/h	34
FA0	ON ↔ OFF signal	—	—	35



B: MODE F00
— ROM ID NUMBER (YEAR) —

CONDITION:
 Ignition switch "ON"

SPECIFIED DATA:
 Presentation display

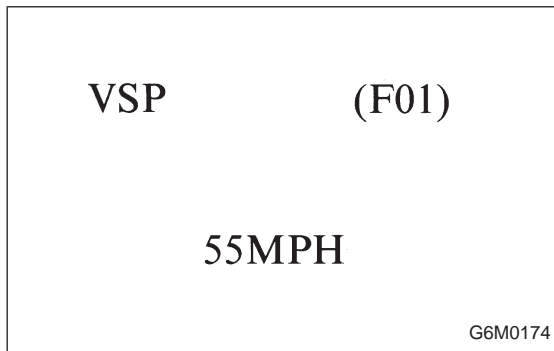
- Probable cause (Item outside "specified data")

1. Error 1

Check for loose or disconnected connector, and discontinued circuit, etc.

2. Error 2

Check for poor contact of cartridge, or different type cartridge.



C: MODE F01 AND F02
— VEHICLE SPEED SIGNAL (VSP) —

CONDITION:
 Driving at constant speed.

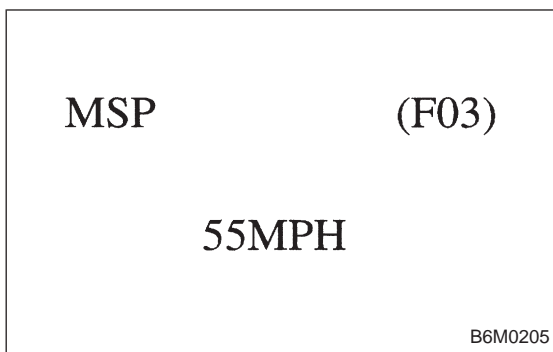
SPECIFIED DATA:
 Compare speedometer with monitor indications.

- F01: Vehicle speed is indicated in mile per hour (MPH).
- F02: Vehicle speed is indicated in kilometer per hour (km/h).

- Probable cause (Item outside "specified data")

1. Vehicle speed sensor 2

Check vehicle speed sensor line.
 <Ref. to 6-2 [T8D0].>



D: MODE F03 AND F04
— MEMORIZED CRUISE SET SPEED (MSP) —

CONDITION:

Driving at minimum of 40 km/h (25 MPH) and set cruise control.

SPECIFIED DATA:

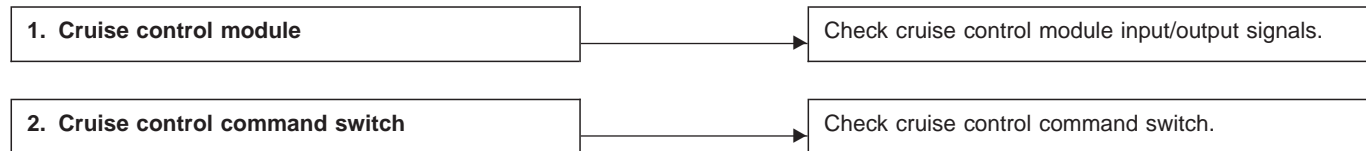
Compare displayed vehicle speed on select monitor in mode "F03" and "F04" with the speed in mode "F01" and "F02".

- F03: Memorized cruise set speed is indicated in mile per hour (MPH).
- F04: Memorized cruise set speed is indicated in kilometer per hour (km/h).

NOTE:

- F01: Actual vehicle speed is indicated in mile per hour (MPH).
- F02: Actual vehicle speed is indicated in kilometer per hour (km/h).

- Probable cause (Item outside "specified data")



LED No.	Signal name	Display
1	SET/COAST switch	SE
2	RESUME/ACCEL switch	RE
3	Stop light switch	ST
4	<ul style="list-style-type: none"> ● Brake switch ● Clutch switch (MT) 	BR
5	Inhibitor switch (AT)	N
6	—	—
7	—	—
8	—	—
9	—	—
10	—	—

E: MODE FA0

— ON ↔ OFF SIGNAL —

Requirement for LED “ON”.

LED No. 1 SET/COAST switch is turned to ON.

LED No. 2 RESUME/ACCEL switch is turned to ON.

LED No. 3 Stop light switch is turned to ON.
(Brake pedal is depressed.)

LED No. 4 ● Brake switch is turned to ON.
● Clutch switch is turned to ON. (MT model)
(Clutch pedal is depressed.)

LED No. 5 Select lever is set to “P” or “N” position. (AT model)

SE	RE	ST	BR	N
—	—	—	—	—

1	2	3	4	5
6	7	8	9	10