

ANTILOCK BRAKE SYSTEM

4-4

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1. Diagnostics Chart for On-board Diagnosis System

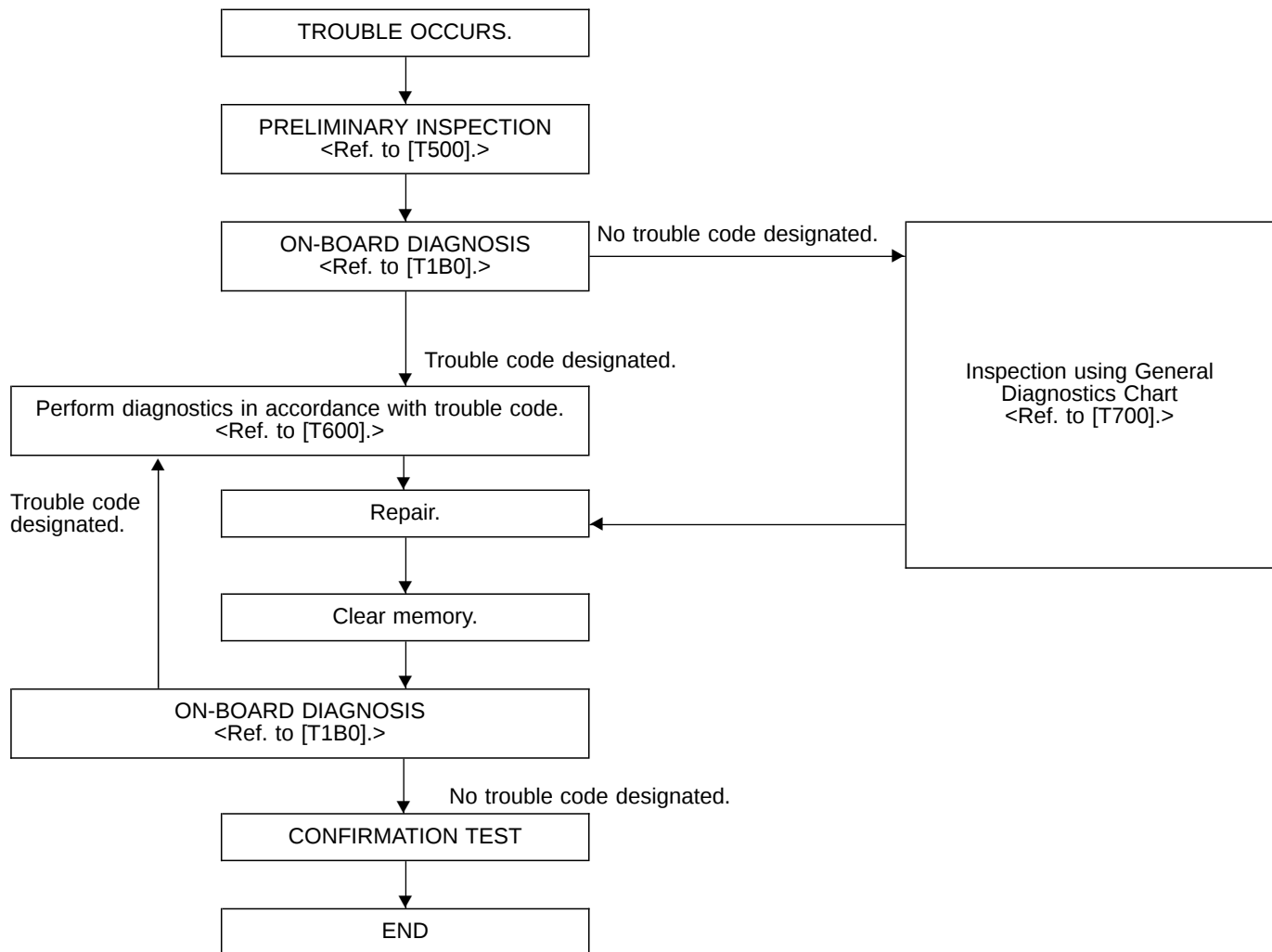
SUPPLEMENTAL RESTRAINT SYSTEM "AIRBAG"

Airbag system wiring harness is routed near the bulkhead harness.

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 bulkhead harness.

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: ON-BOARD DIAGNOSIS

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

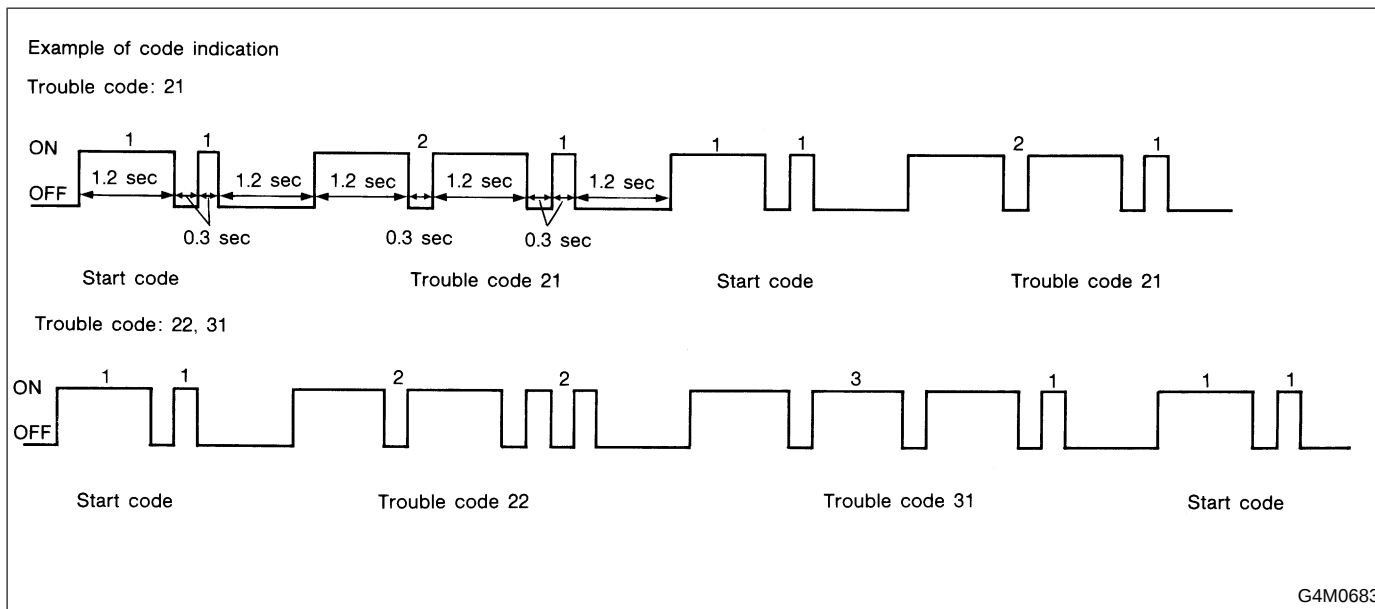
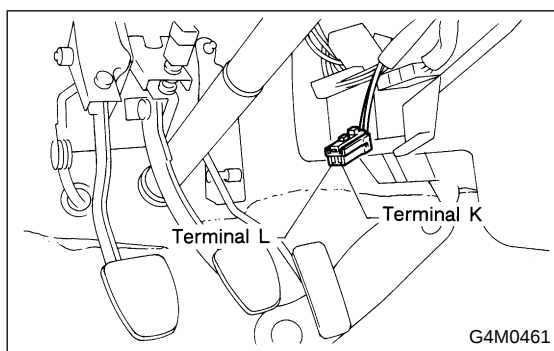
When on-board diagnosis of the A.B.S. control module detects a problem, the information (up to a maximum of three) will be stored in the EEPROM as a trouble code. When there are more than three, the most recent three will be stored. (Stored codes will stay in memory until they are cleared.)

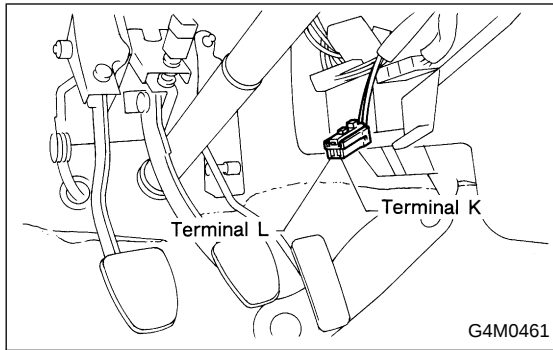
1. CALLING UP A TROUBLE CODE

- 1) Take out A.B.S. check connector from under side of steering column.
- 2) Turn ignition switch OFF.
- 3) Ground A.B.S. check connector terminal L.
- 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:

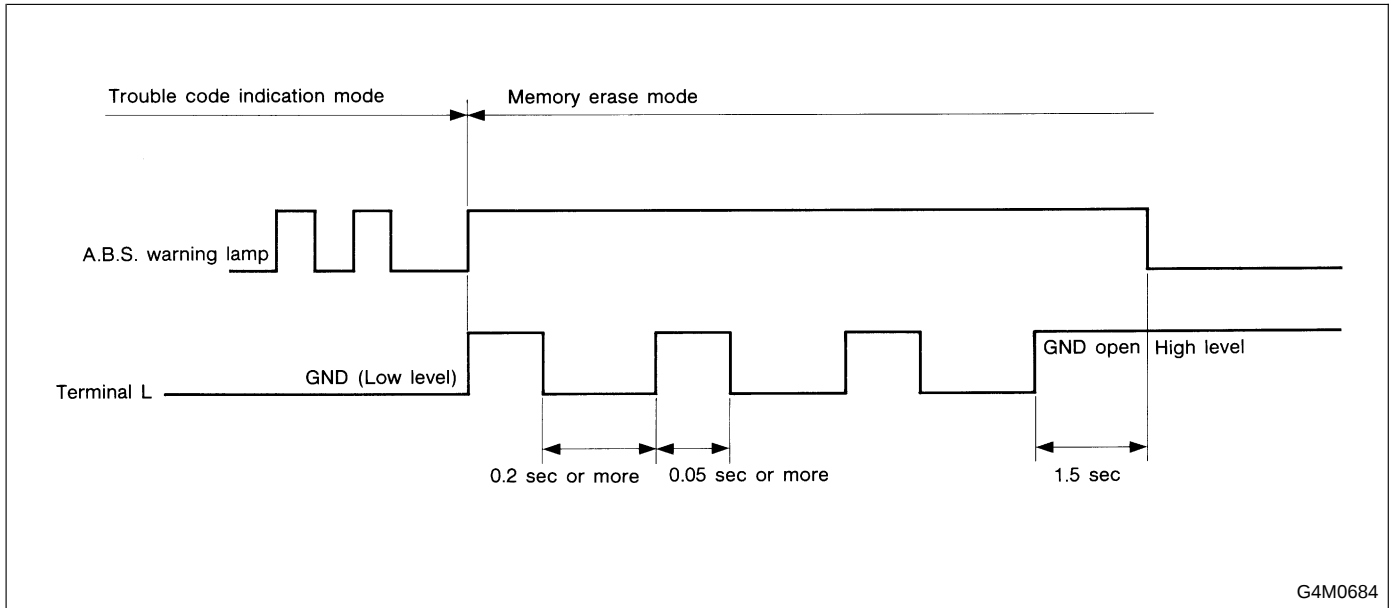
When there are no trouble codes in memory, only the start code (11) is shown.





2. CLEARING MEMORY

- 1) After calling up a trouble code, disconnect A.B.S. check connector terminal L from body ground.
- 2) Repeat 3 times within approx. 12 seconds; connecting and disconnecting terminal L and body ground for at least 0.05 seconds each time.

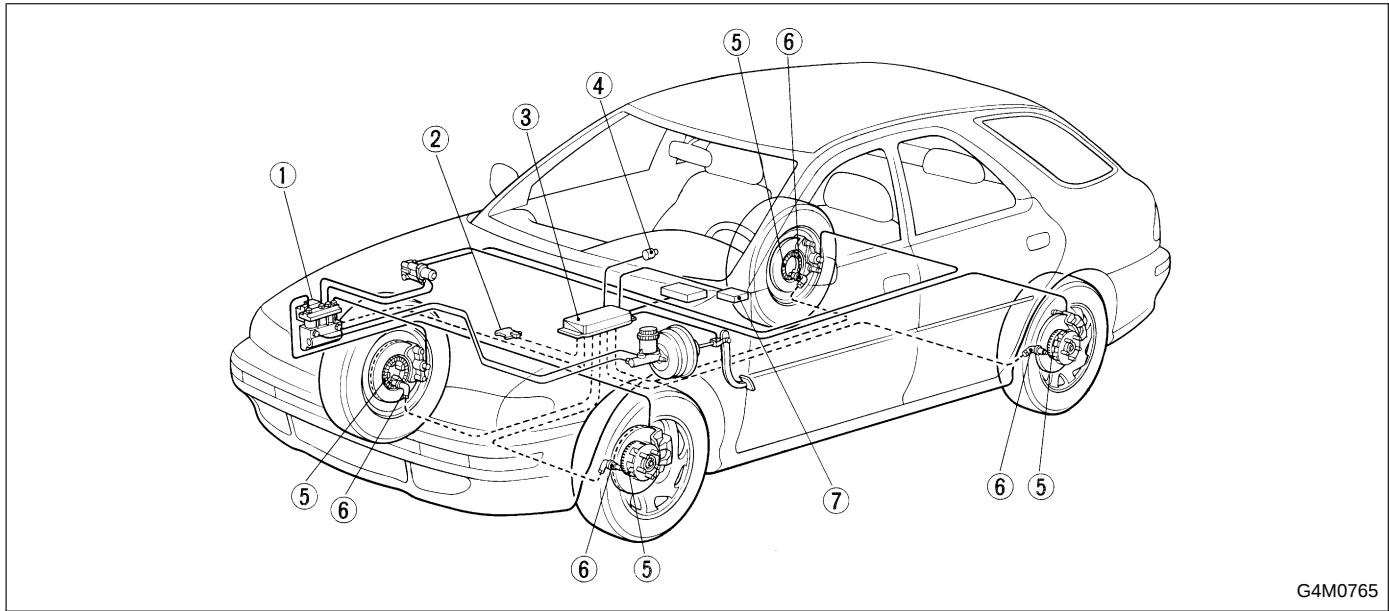


3. LIST OF TROUBLE CODES

Trouble code	Contents of diagnosis	
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.)	
NONE: B [Warning light ON] or [Abnormal trouble code output]	Trouble in warning light drive circuit	
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
23		Front left wheel sensor
25		Rear right wheel sensor
27		Rear left wheel sensor
22	Faulty A.B.S. sensor (When there is no open circuit or speed signal input.)	Front right wheel sensor
24		Front left wheel sensor
26		Rear right wheel sensor
28		Rear left wheel sensor
29	Faulty tone wheel, etc.	
31	Faulty solenoid valve circuit(s) in hydraulic unit	Front right wheel control
33		Front left wheel control
39		Rear wheels control
41	Faulty A.B.S. control module	
42	Source voltage is low.	
51	Faulty valve relay	
52	Faulty hydraulic motor and/or motor relay	
54	Faulty stop light circuit	
56	Use of improper A.B.S. control module specification, or faulty G sensor	

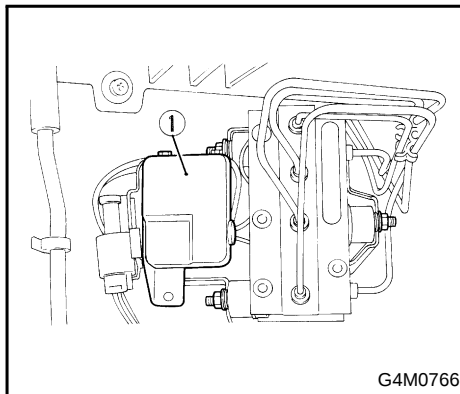
After diagnostics is completed, make sure to clear memory.
Make sure only start code (11) is shown after memory is
cleared.

2. Electrical Unit Location

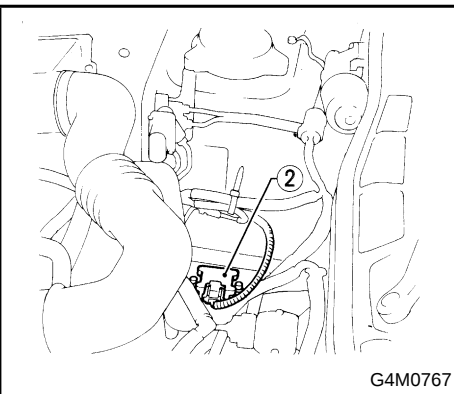


G4M0765

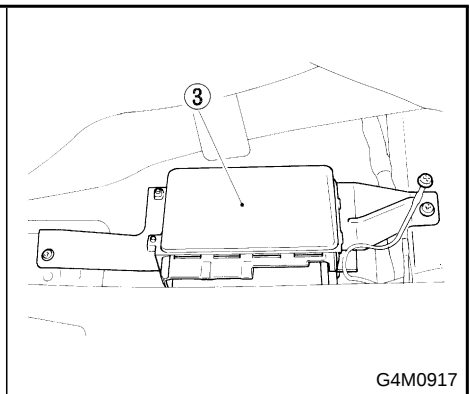
- | | |
|---------------------------|-------------------|
| ① Hydraulic control unit | ⑤ Tone wheel |
| ② G sensor (AWD MT model) | ⑥ A.B.S. sensor |
| ③ A.B.S. control module | ⑦ Check connector |
| ④ Warning light | |



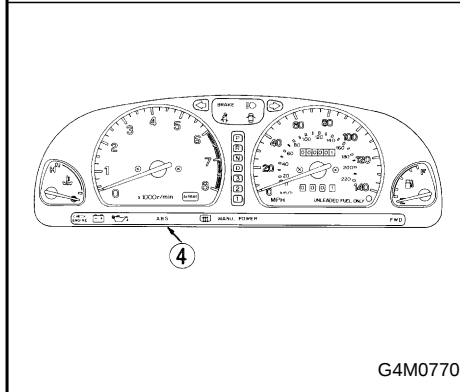
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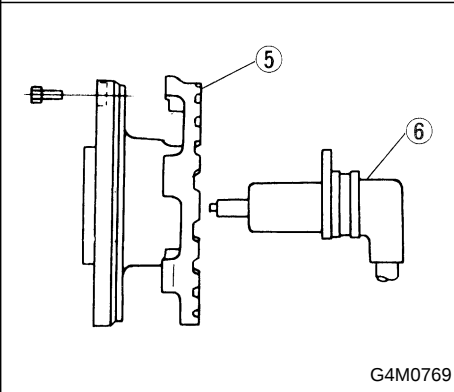
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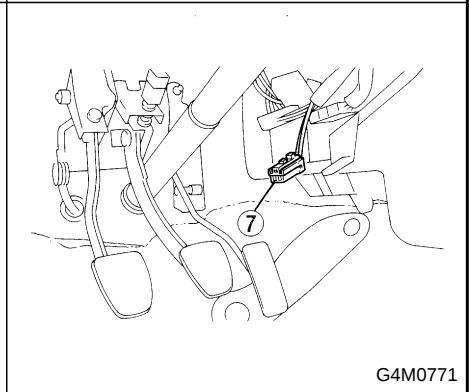
G4M0917



G4M0770

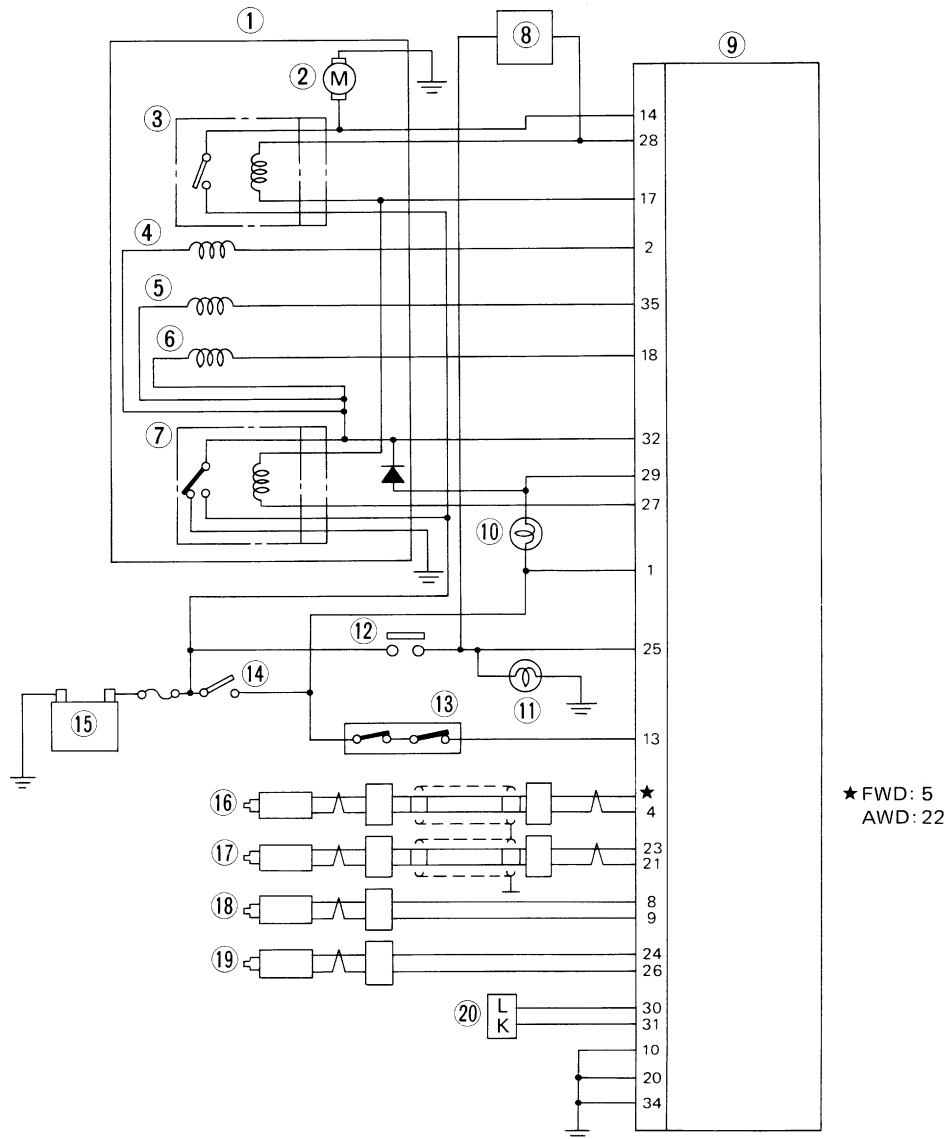


G4M0769



G4M0771

3. Schematic

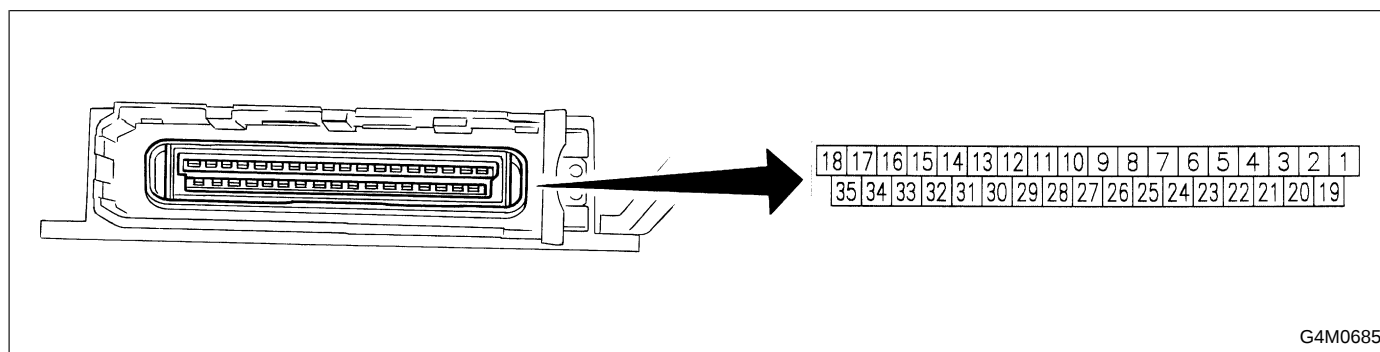


G4M0918

- | | |
|------------------------------|---------------------------|
| ① Hydraulic unit | ⑪ Stop light |
| ② Motor | ⑫ Stop light switch |
| ③ Motor relay | ⑬ G sensor (AWD MT model) |
| ④ Front left solenoid valve | ⑭ Ignition switch |
| ⑤ Front right solenoid valve | ⑮ Battery |
| ⑥ Rear solenoid valve | ⑯ Front left sensor |
| ⑦ Valve relay | ⑰ Front right sensor |
| ⑧ AT control module | ⑱ Rear left sensor |
| ⑨ A.B.S. control module | ⑲ Rear right sensor |
| ⑩ Warning light | ⑳ Check connector |

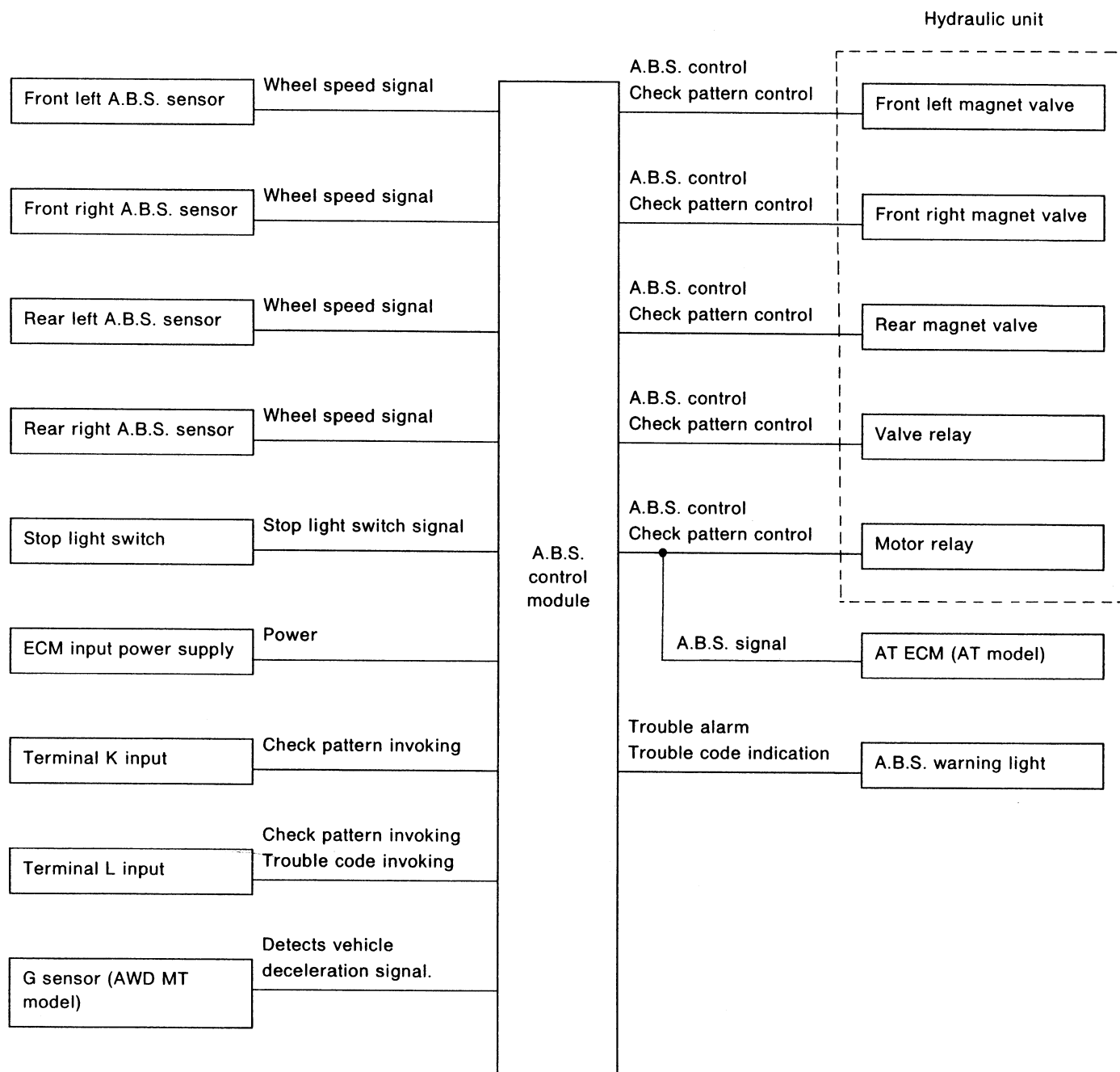
4. Control Module I/O Signal

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	FWD 5	0V	0.12 — 1V (When it is 10 Hz)	● No. 22 or No. 5 — No. 4	
		AWD 22				
	GND	4	0V	0.12 — 1V (When it is 10 Hz)	● No. 23 — No. 21	
	Front right wheel	23				
	GND	21	0V	0.12 — 1V (When it is 10 Hz)	● No. 8 — No. 9	
	Rear left wheel	8				
	GND	9	0V	0.12 — 1V (When it is 10 Hz)	● No. 24 — No. 26	
	Rear right wheel	24				
	GND	26				
G sensor (AWD MT model)		13	10 — 12V	0V	When slanting about 14° — 21.3° (θ)	
Check connector		30	—	—	—	
		31				
Stop light switch		25	0V	5 — 10V	When brake pedal is depressed.	
Motor monitoring		14	0V	10 — 12V	When motor operates.	
Valve power supply monitoring		32	10 — 12V	10 — 12V	—	
Hydraulic unit	Solenoid	Front left wheel	2	10 — 12V	0V	When solenoid is energized to produce output.
		Front right wheel	35	10 — 12V	0V	
		Rear wheel	18	10 — 12V	0V	
	Valve relay coil		27	0V	0V	—
	Motor relay coil		28	10 — 12V	0V	When motor operates to produce output.
Warning light		29	0V	10 — 12V	Ignition switch ON (Engine OFF)	
Power supply	Battery		1	10 — 12V	10 — 12V	—
	Relay coil (valve, motor, etc.)		17	10 — 12V	10 — 12V	—
Grounding line		10	0V	0V	—	
		20	0V	0V	—	
		34	0V	0V	—	

2. I/O SIGNAL DIAGRAM



5. Preliminary 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: 12V, 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) Brake fluid level

2) Brake fluid leakage

3. BRAKE DRAG

4. BRAKE PAD AND ROTOR

5. TIRE SPECIFICATIONS, TIRE WEAR AND AIR PRESSURE

6. Diagnostics Chart with Trouble Code

Trouble code	Contents of diagnosis		Page
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.)		12
NONE: B [Warning light ON] or [Abnormal trouble code output]	Trouble in warning light drive circuit		14
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	16
23		Front left wheel sensor	16
25		Rear right wheel sensor	16
27		Rear left wheel sensor	16
22	Faulty A.B.S. sensor (When there is no open circuit or speed signal input.)	Front right wheel sensor	20
24		Front left wheel sensor	20
26		Rear right wheel sensor	20
28		Rear left wheel sensor	20
29	Faulty tone wheel, etc.		24
31	Faulty solenoid valve circuit(s) in hydraulic unit	Front right wheel control	28
33		Front left wheel control	28
39		Rear wheels control	28
41	Faulty A.B.S. control module		30
42	Source voltage is low.		30
51	Faulty valve relay		32
52	Faulty hydraulic motor and/or motor relay		36
54	Faulty stop light circuit		39
56	Use of improper A.B.S. control module specification, or faulty G sensor		40

A: TROUBLE CODE (NONE: A) — TROUBLE IN WARNING LIGHT DRIVE CIRCUIT —

DIAGNOSIS:

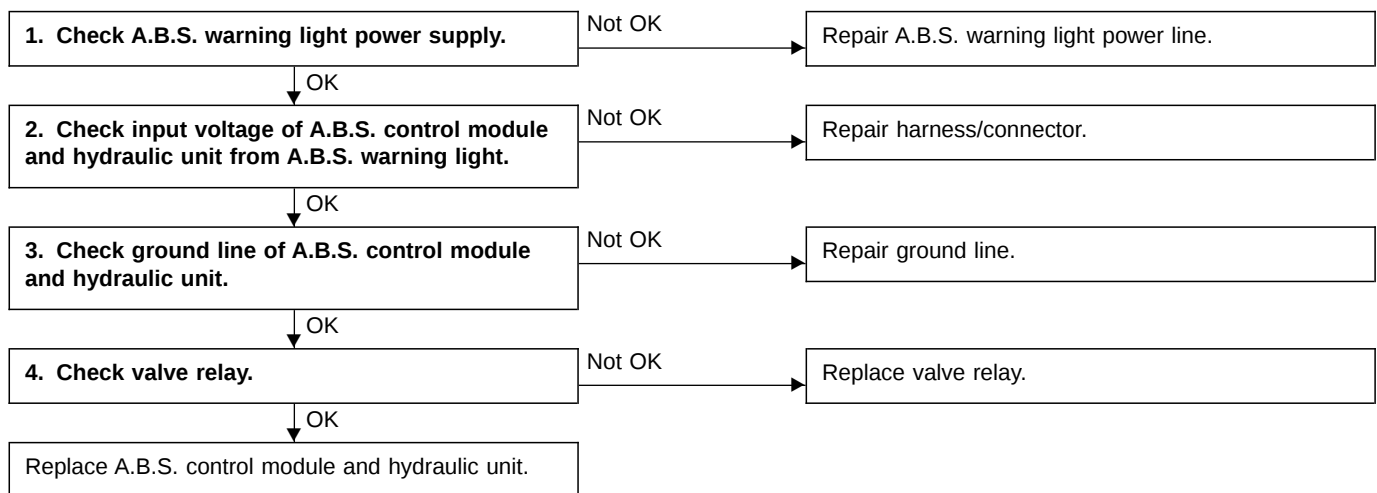
- Faulty A.B.S. warning light
- Faulty harness connector
- Faulty A.B.S. control module
- Faulty valve relay

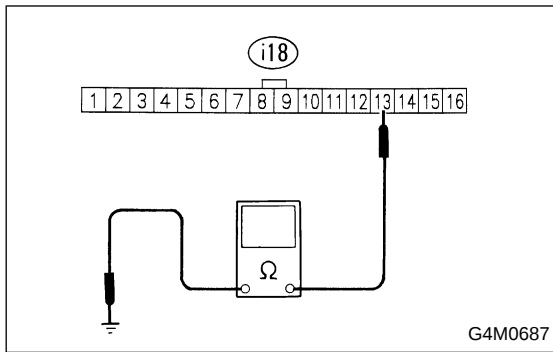
TROUBLE SYMPTOM:

- 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.



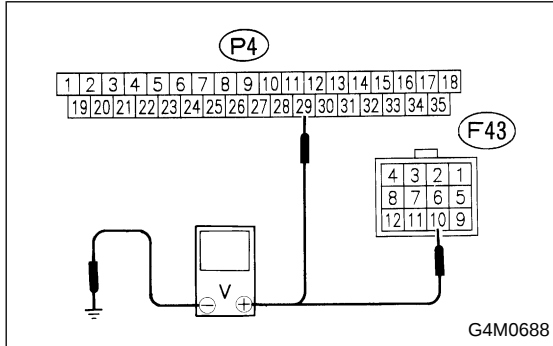


1. CHECK A.B.S. WARNING LIGHT POWER SUPPLY.

- 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:

(i18) No. 13 — Body / 10 — 12 V



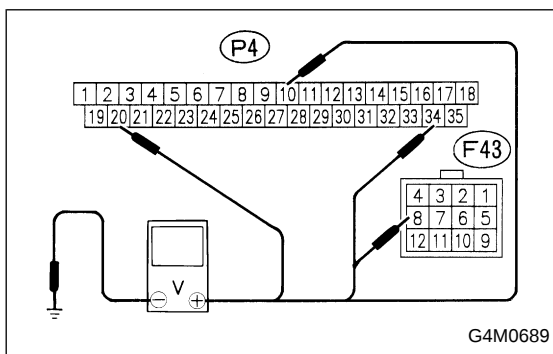
2. CHECK INPUT VOLTAGE OF A.B.S. CONTROL MODULE AND HYDRAULIC UNIT FROM A.B.S. WARNING LIGHT.

- 1) Turn ignition switch OFF and remove combination meter.
- 2) Disconnect connector from A.B.S. control module and hydraulic unit.
- 3) Turn ignition switch ON.
- 4) Measure voltage between A.B.S. control module and body, and between hydraulic unit and body.

Connector & terminal / Specified voltage:

(P4) No. 29 — body / 10 — 12 V

(F43) No. 10 — body / 10 — 12 V



3. CHECK GROUND LINE OF A.B.S. CONTROL MODULE AND HYDRAULIC UNIT.

- 1) Measure resistance between A.B.S. control module and body, and between hydraulic unit and body.

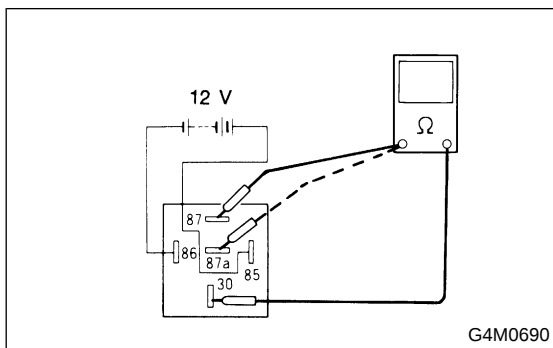
Connector & terminal / Specified resistance:

(P4) No. 10 — body / 0 Ω

(P4) No. 20 — body / 0 Ω

(P4) No. 34 — body / 0 Ω

(F43) 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 — 30 / 0 Ω (when 12 volts applied.)

No. 87 — 30 / 1 MΩ (when no voltage is applied.)

No. 87a — 30 / 1 MΩ (when 12 volts applied.)

No. 87a — 30 / 0 Ω (when no voltage is applied.)

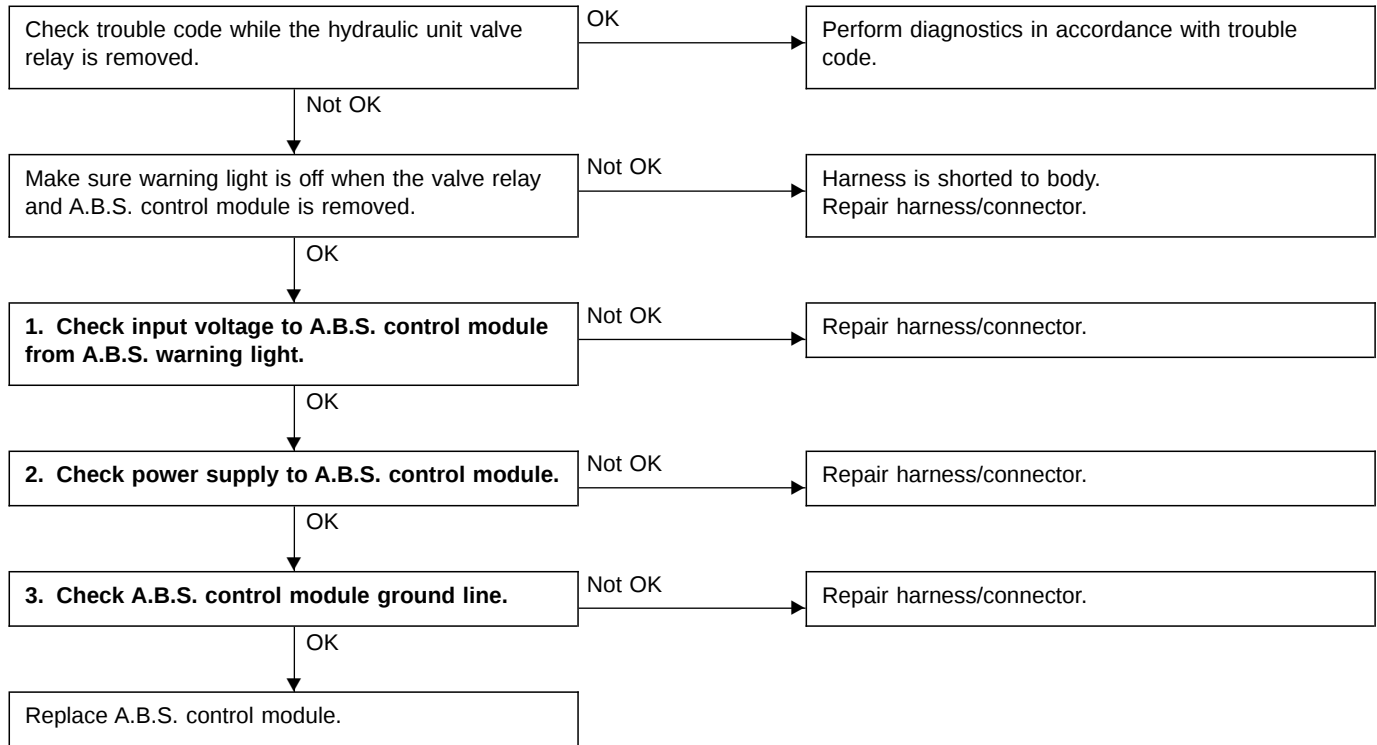
**B: TROUBLE CODE (NONE: B)
— TROUBLE IN WARNING LIGHT DRIVE
CIRCUIT —**

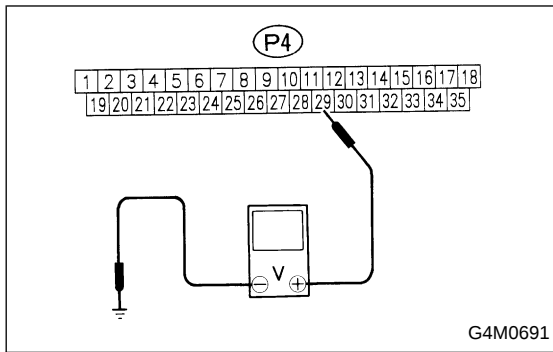
DIAGNOSIS:

- Faulty harness
- Faulty A.B.S. control module

TROUBLE SYMPTOM:

- Warning light remains on.
- Impossible to read trouble code.

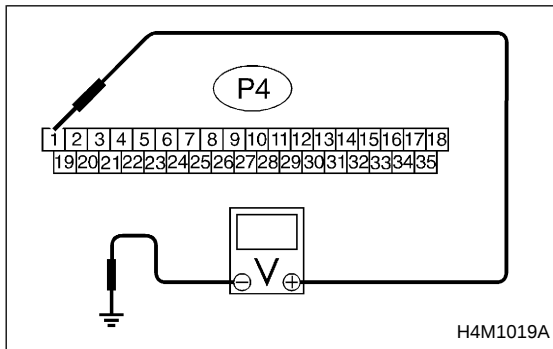




1. CHECK INPUT VOLTAGE TO A.B.S. CONTROL MODULE FROM A.B.S. WARNING LIGHT.

- 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.

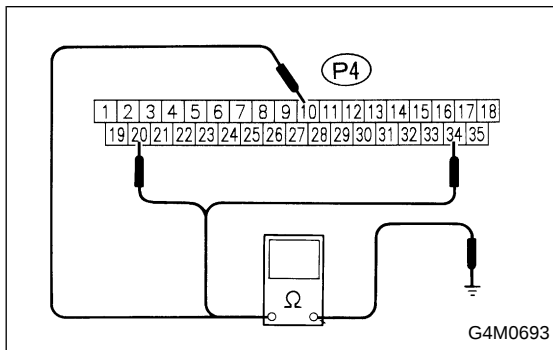
Connector & terminal / Specified voltage:
(P4) No. 29 — Body / 10 — 12 V



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:
(P4) No. 1 — Body / 10 — 12 V



3. CHECK A.B.S. CONTROL MODULE GROUND LINE.

- 1) Measure resistance between A.B.S. control module and body.

Connector & terminal / Specified resistance:
(P4) No. 10 — body / 0 Ω
(P4) No. 20 — body / 0 Ω
(P4) 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:

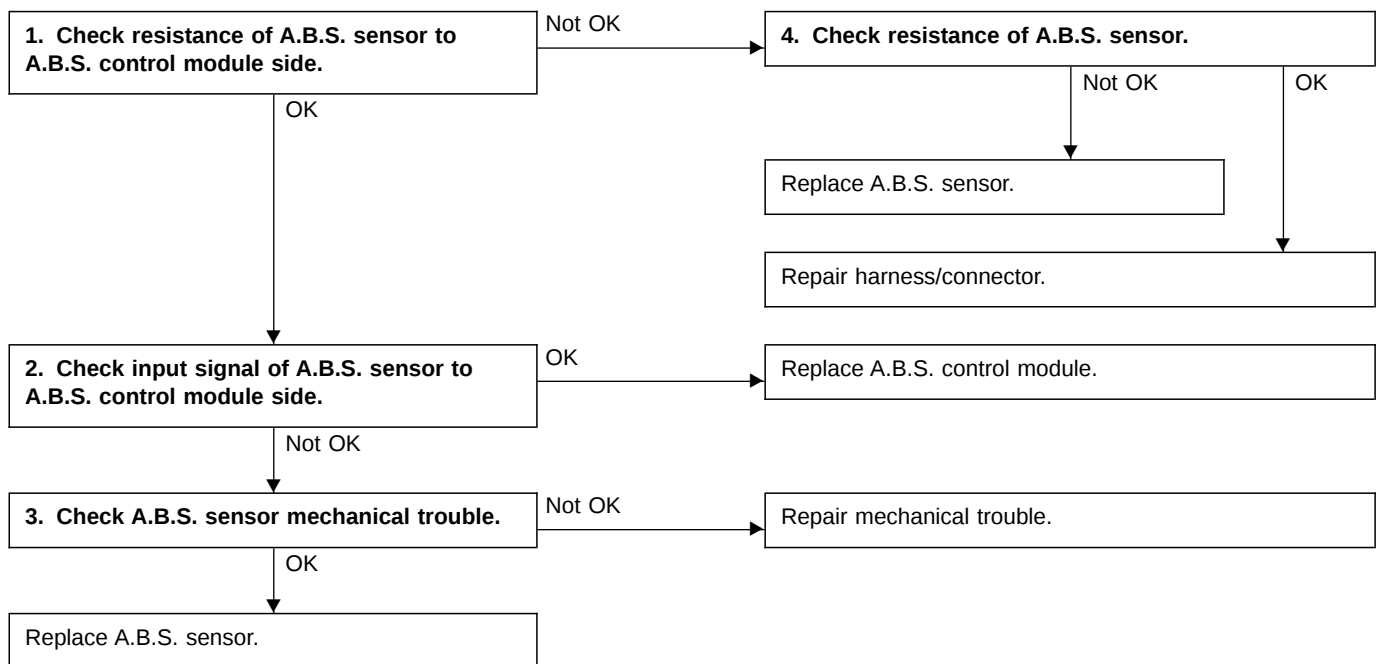
- Faulty A.B.S. sensor
- Faulty harness
- Faulty A.B.S. control module

TROUBLE SYMPTOM:

- A.B.S. does not operate.

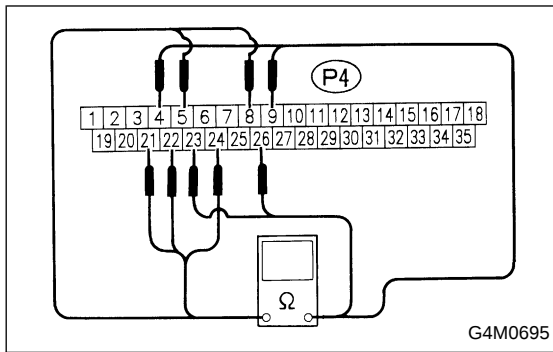
NOTE:

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.



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 / (P4) No. 23 — No. 21

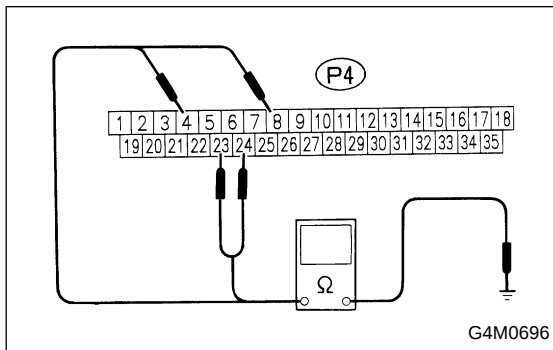
23 / (P4) No. 22 — No. 4: AWD

(P4) No. 5 — No. 4: FWD

25 / (P4) No. 24 — No. 26

27 / (P4) No. 8 — No. 9

Specified resistance: 0.8 — 1.3 kΩ



- 4) Measure resistance between A.B.S. control module connector and body.

TROUBLE CODE / Connector & terminal:

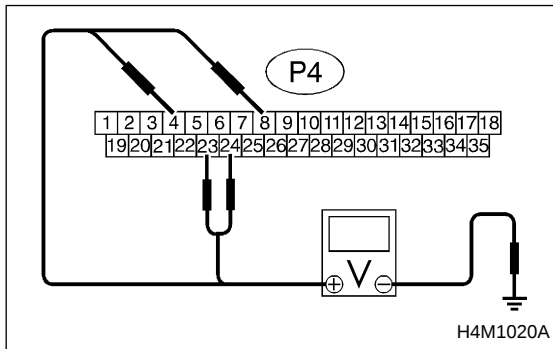
21 / (P4) No. 23 — body

23 / (P4) No. 4 — body

25 / (P4) No. 24 — body

27 / (P4) 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:

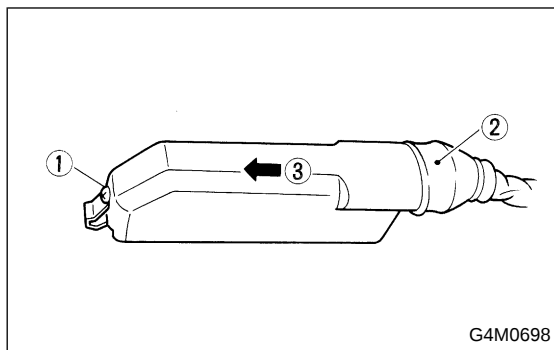
21 / (P4) No. 23 — body

23 / (P4) No. 4 — body

25 / (P4) No. 24 — body

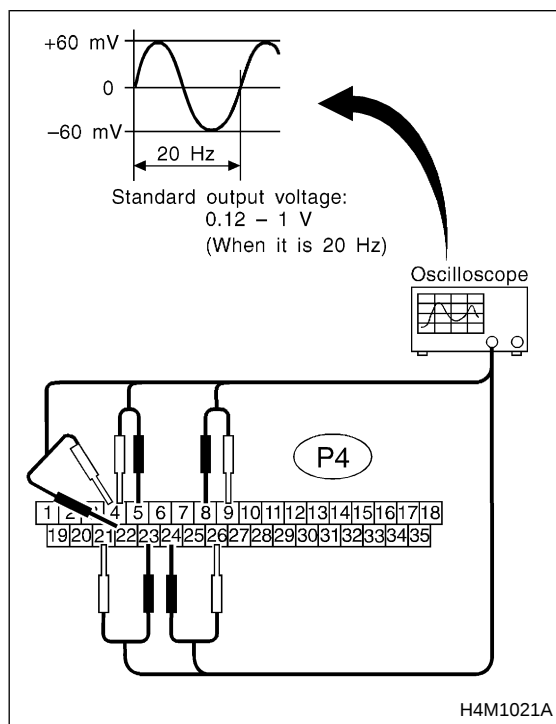
27 / (P4) No. 8 — body

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 / (P4) No. 23 — No. 21

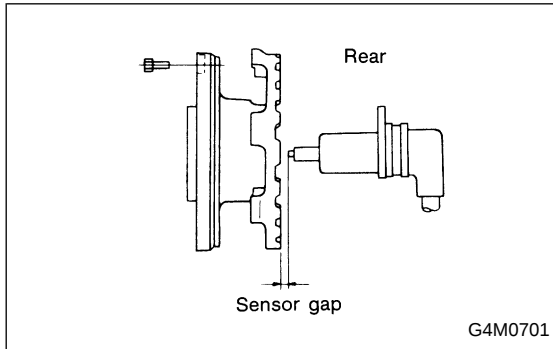
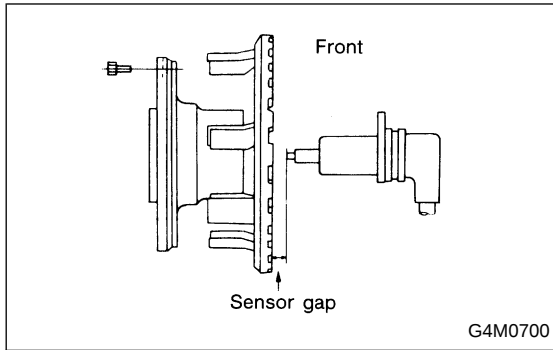
23 / (P4) No. 22 — No. 4: AWD

(P4) No. 5 — No. 4: FWD

25 / (P4) No. 24 — No. 26

27 / (P4) 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 — 1.6 kg-m, 7 — 12 ft-lb)

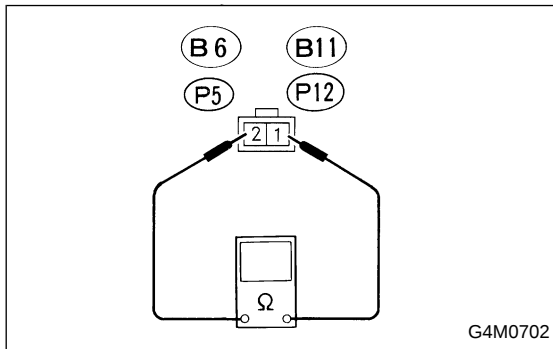
- 5) Measure tone wheel-to-pole piece gap over entire perimeter of the wheel.

	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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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 / (B11) No. 1 — No. 2

25 / (P5) No. 1 — No. 2

27 / (P12) No. 1 — No. 2

Specified resistance: 0.8 — 1.3 kΩ

D: TROUBLE CODE 22, 24, 26 AND 28
— FAULTY A.B.S. SENSOR
(WHEN THERE IS NO OPEN CIRCUIT OR
SPEED SIGNAL INPUT.) —

DIAGNOSIS:

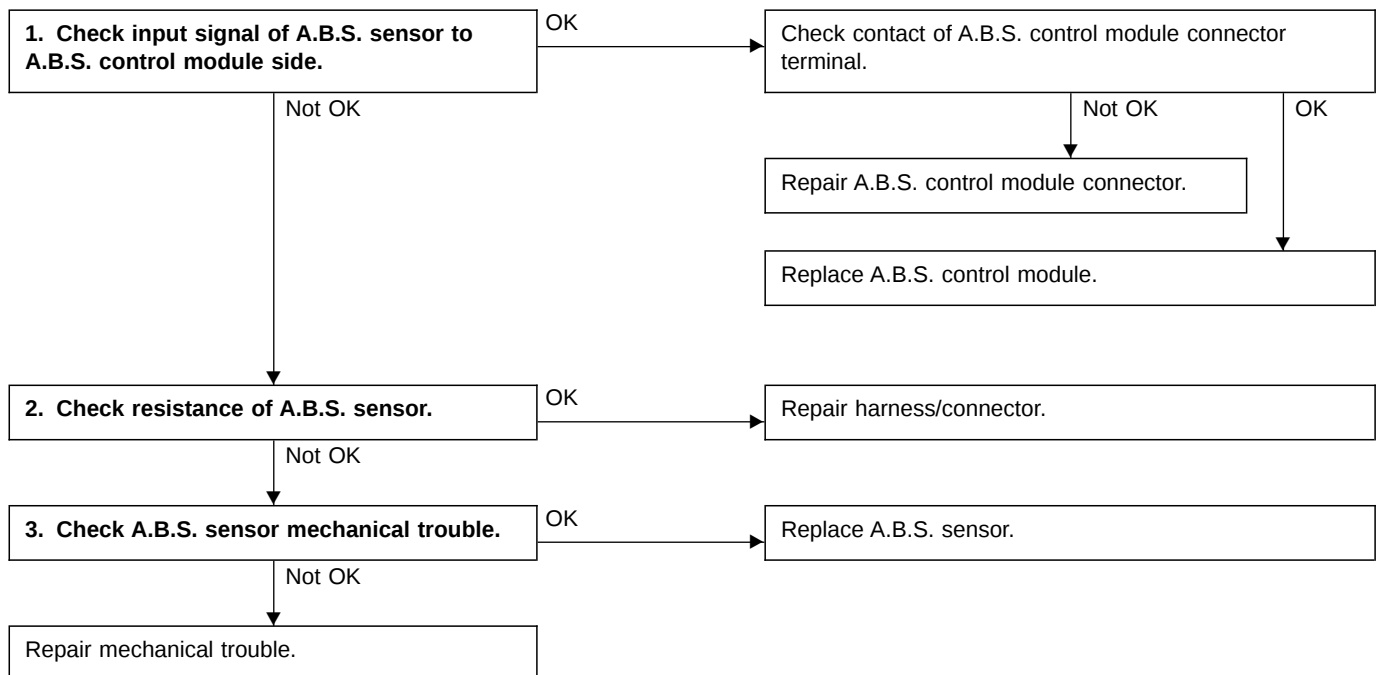
- Faulty A.B.S. sensor/harness
- Faulty tone wheel
- Faulty A.B.S. control module

TROUBLE SYMPTOM:

- A.B.S. does not operate.

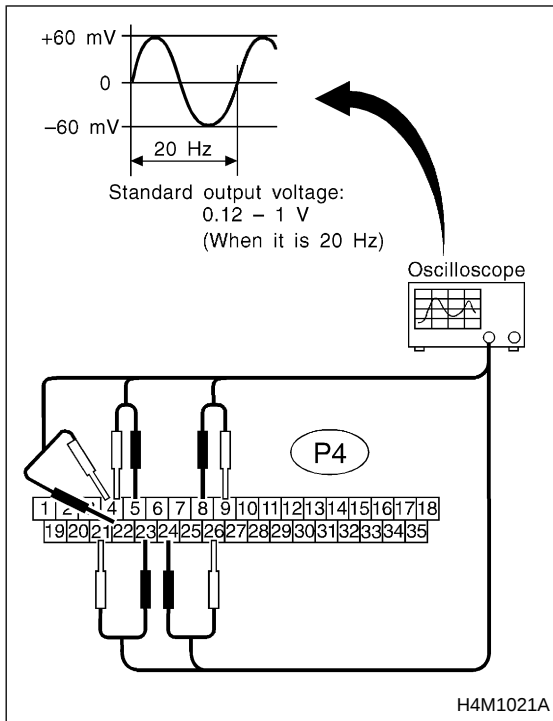
NOTE:

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.



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 4-4 [T6C2].>
- 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:

21 / (P4) No. 23 — No. 21

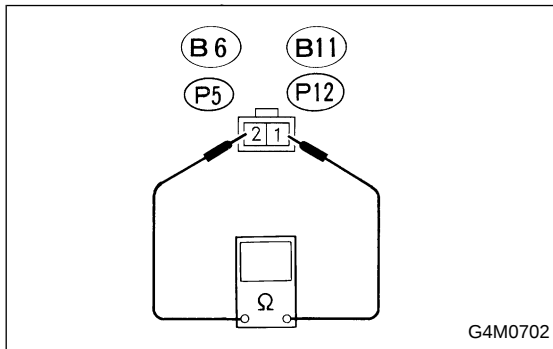
23 / (P4) No. 22 — No. 4: AWD

(P4) No. 5 — No. 4: FWD

25 / (P4) No. 24 — No. 26

27 / (P4) 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:

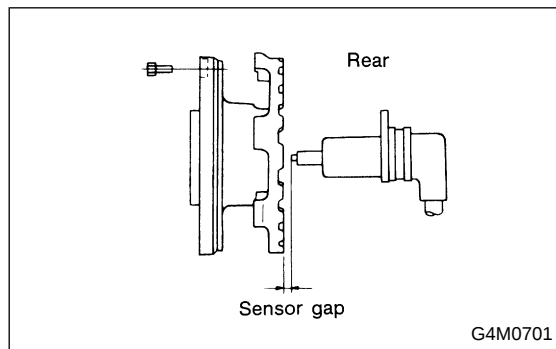
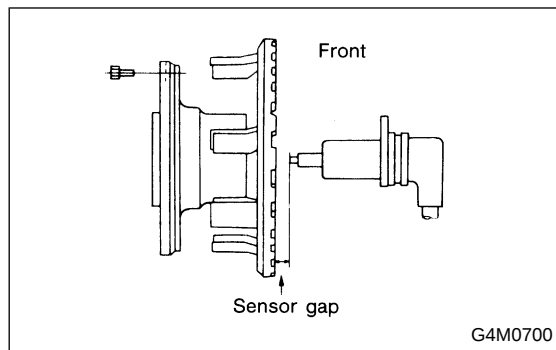
21 / (B6) No. 1 — No. 2

23 / (B11) No. 1 — No. 2

25 / (P5) No. 1 — No. 2

27 / (P12) No. 1 — No. 2

Specified resistance: 0.8 — 1.3 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 — 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:

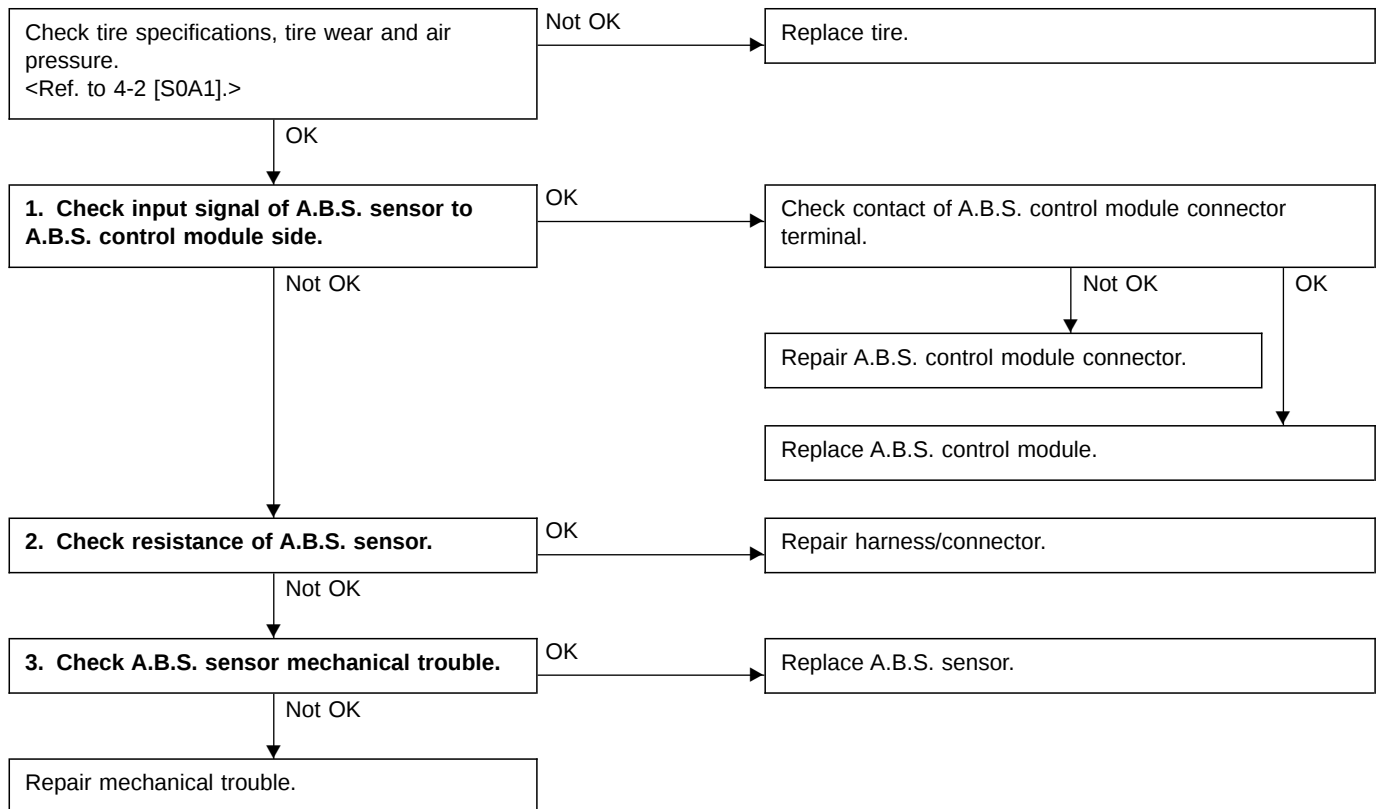
- Faulty tone wheel
- Faulty A.B.S. control module

TROUBLE SYMPTOM:

- A.B.S. does not operate.

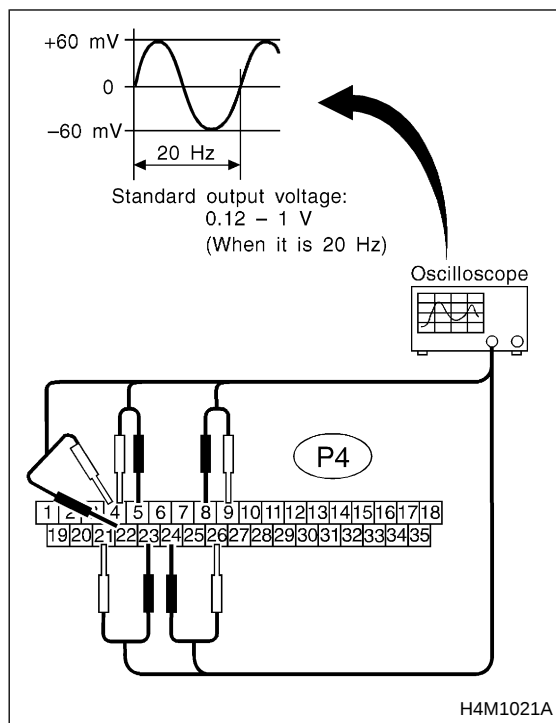
NOTE:

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.



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 4-4 [T6C2].>
- 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:

21 / (P4) No. 23 — No. 21

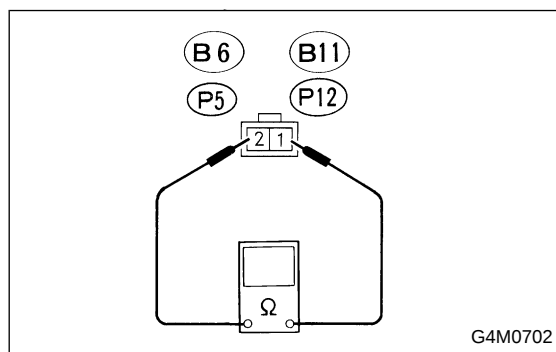
23 / (P4) No. 22 — No. 4: AWD

(P4) No. 5 — No. 4: FWD

25 / (P4) No. 24 — No. 26

27 / (P4) 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:

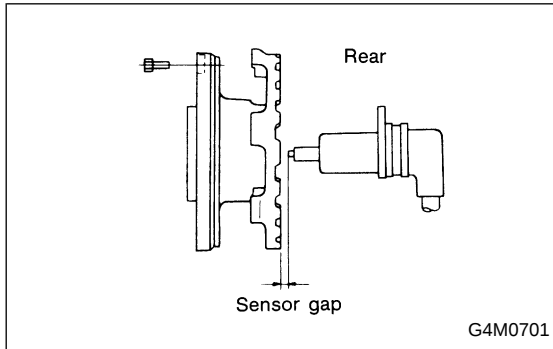
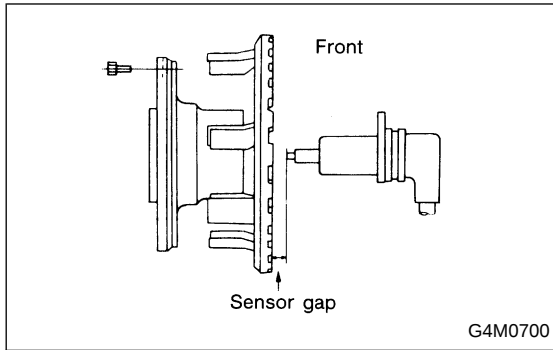
21 / (B6) No. 1 — No. 2

23 / (B11) No. 1 — No. 2

25 / (P5) No. 1 — No. 2

27 / (P12) No. 1 — No. 2

Specified resistance: 0.8 — 1.3 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 — 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)
----------------	---------------------

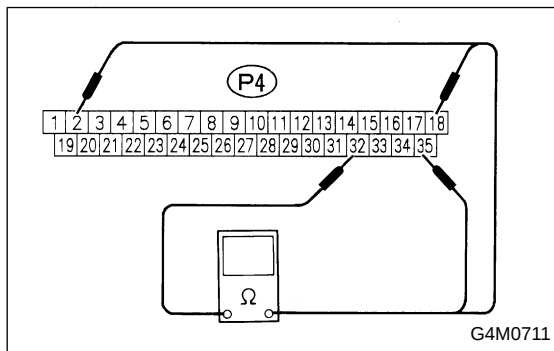
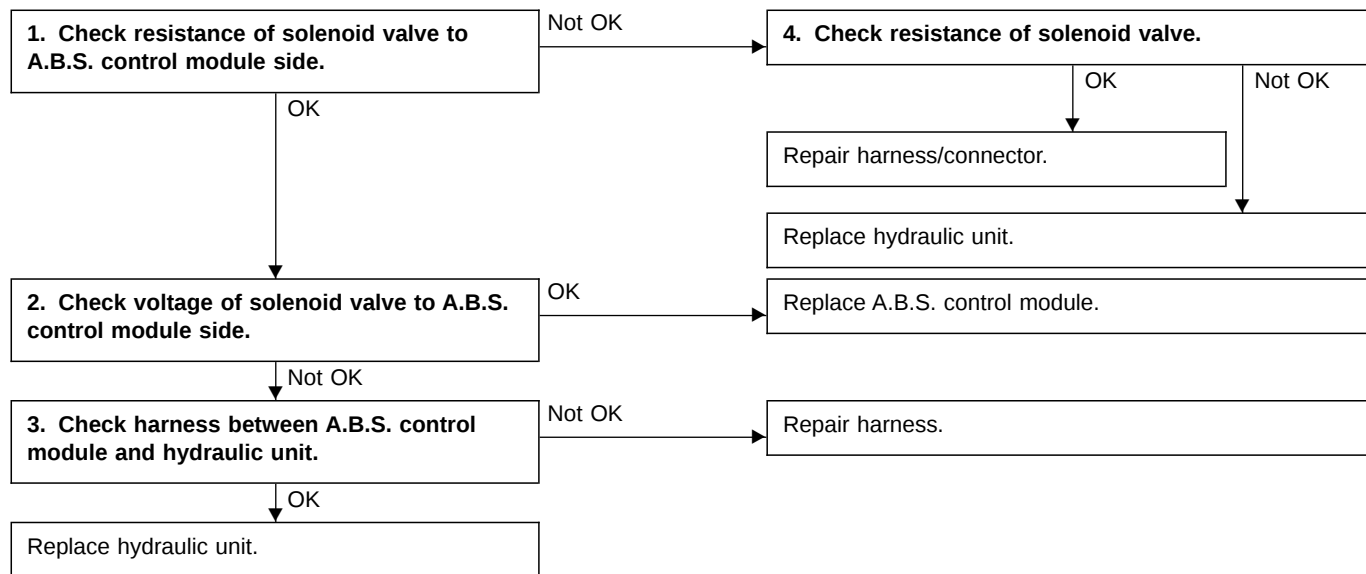
F: TROUBLE CODE 31, 33 AND 39 — FAULTY SOLENOID VALVE CIRCUIT(S) IN HYDRAULIC UNIT —

DIAGNOSIS:

- Faulty harness/connector
- Faulty solenoid valve in hydraulic unit
- Faulty A.B.S. control module

TROUBLE SYMPTOM:

- A.B.S. does not operate.



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.

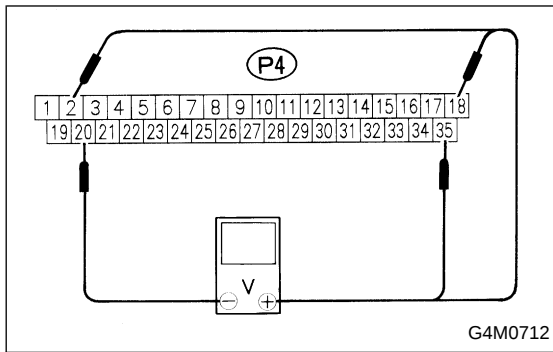
TROUBLE CODE / Connector & terminal:

31 / (P4) No. 35 — No. 32

33 / (P4) No. 2 — No. 32

39 / (P4) 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 unit.
- 3) Turn ignition switch ON.
- 4) Measure voltage between A.B.S. control module connector terminals.

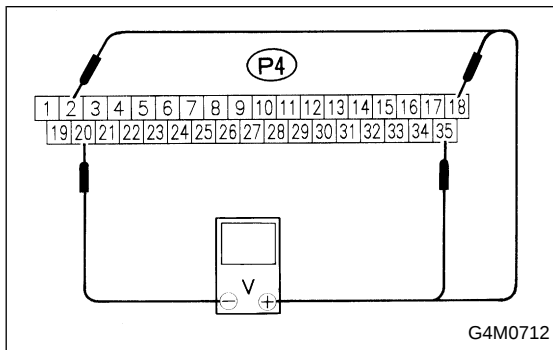
TROUBLE CODE / Connector & terminal:

31 / (P4) No. 35 — No. 20

33 / (P4) No. 2 — No. 20

39 / (P4) No. 18 — No. 20

Specified voltage: 0 V



3. CHECK HARNESS BETWEEN A.B.S. CONTROL MODULE AND HYDRAULIC UNIT.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic unit.
- 3) Turn ignition switch ON.
- 4) Measure voltage between A.B.S. control module connector terminals.

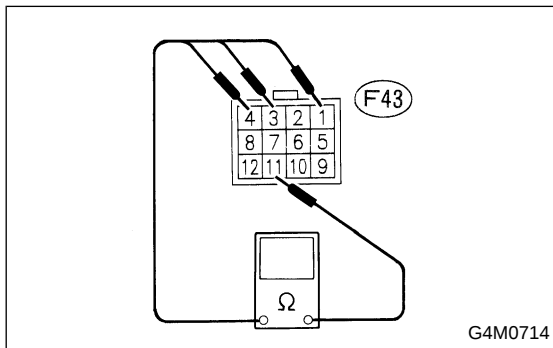
TROUBLE CODE / Connector & terminal:

31 / (P4) No. 35 — No. 20

33 / (P4) No. 2 — No. 20

39 / (P4) No. 18 — No. 20

Specified voltage: 0 V



4. 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 / to (F43) No. 4 — No. 11

33 / to (F43) No. 3 — No. 11

39 / to (F43) No. 1 — No. 11

Specified resistance: approx. 1 Ω

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.

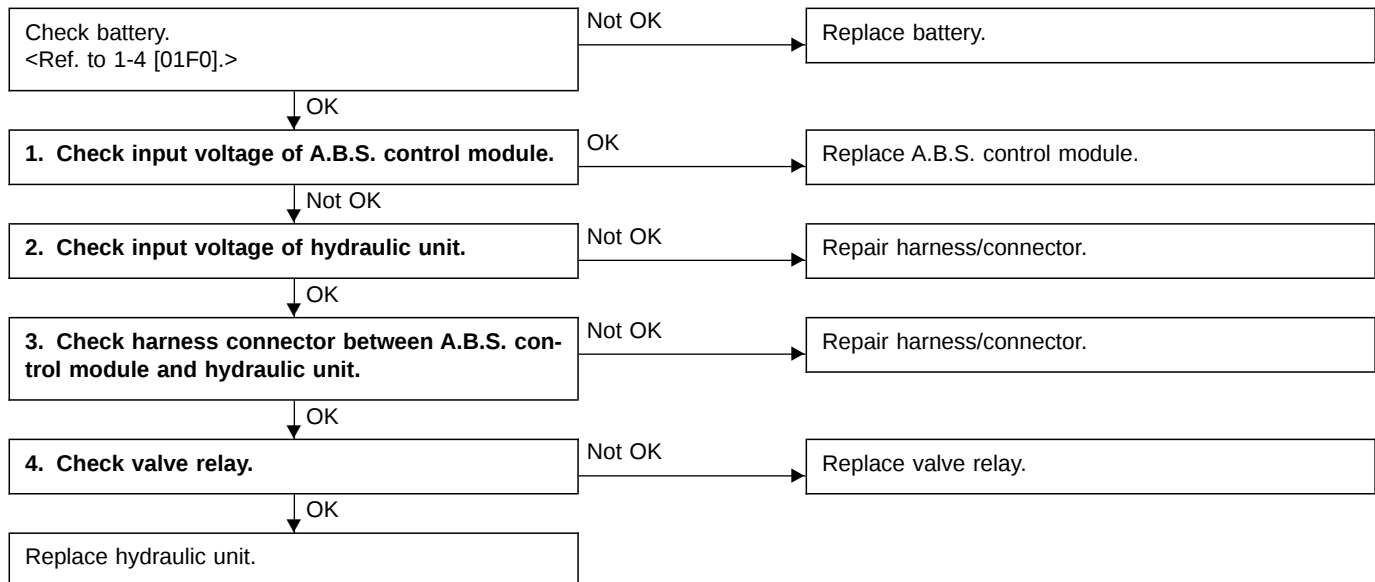
Replace A.B.S. control module.

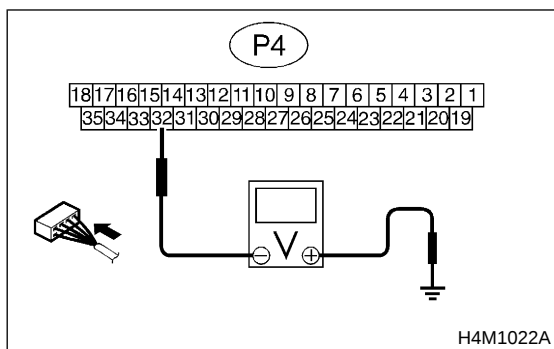
H: TROUBLE CODE 42
— SOURCE VOLTAGE IS LOW. —
DIAGNOSIS:

- Faulty battery
- Faulty A.B.S. control module
- Faulty harness
- Faulty valve relay

TROUBLE SYMPTOM:

- A.B.S. does not operate.



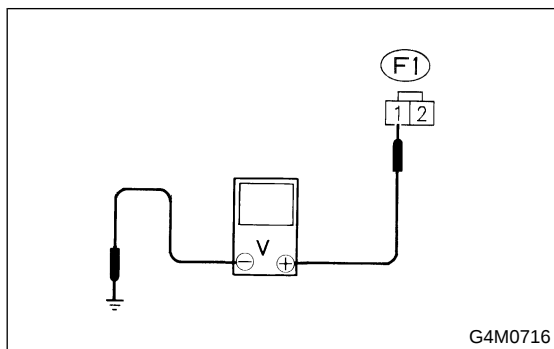


1. CHECK INPUT VOLTAGE OF A.B.S. CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module.
- 3) Disconnect connector cover from connector. <Ref. to 4-4 [T6C2].>
- 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:

(P4) No. 32 — Body / 9.2 — 12 V

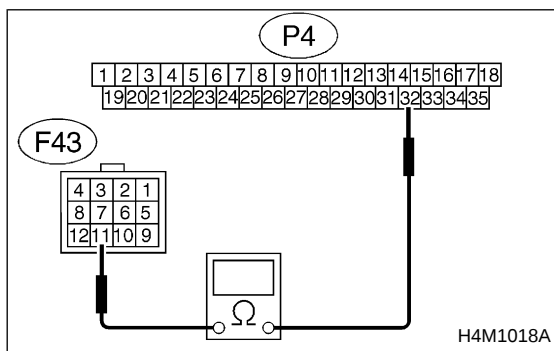


2. CHECK INPUT VOLTAGE OF HYDRAULIC UNIT.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic unit.
- 3) Turn ignition switch ON.
- 4) Measure input voltage between hydraulic unit connector and body.

Connector & terminal / Specified voltage:

(F1) No. 1 — Body / 10 — 12 V

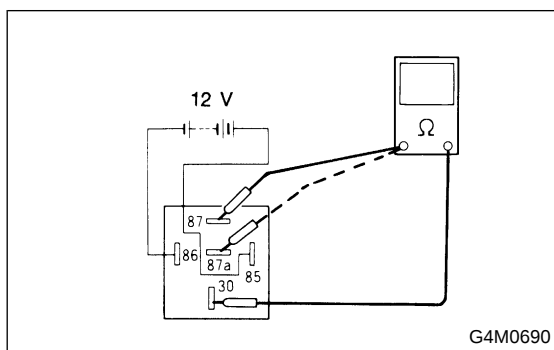


3. CHECK HARNESS CONNECTOR BETWEEN A.B.S. CONTROL MODULE AND HYDRAULIC UNIT.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module and hydraulic unit.
- 3) Measure resistance between A.B.S. control module and hydraulic unit.

Connector & terminal / Specified resistance:

(P4) No. 32 — (F43) 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 — 30 / 0 Ω (when 12 volts applied.)

No. 87 — 30 / 1 M Ω (when no voltage is applied.)

No. 87a — 30 / 1 M Ω (when 12 volts applied.)

No. 87a — 30 / 0 Ω (when no voltage is applied.)

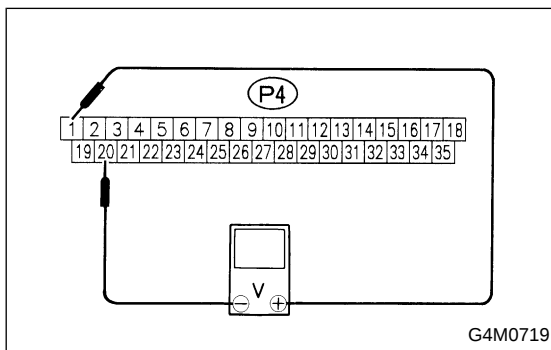
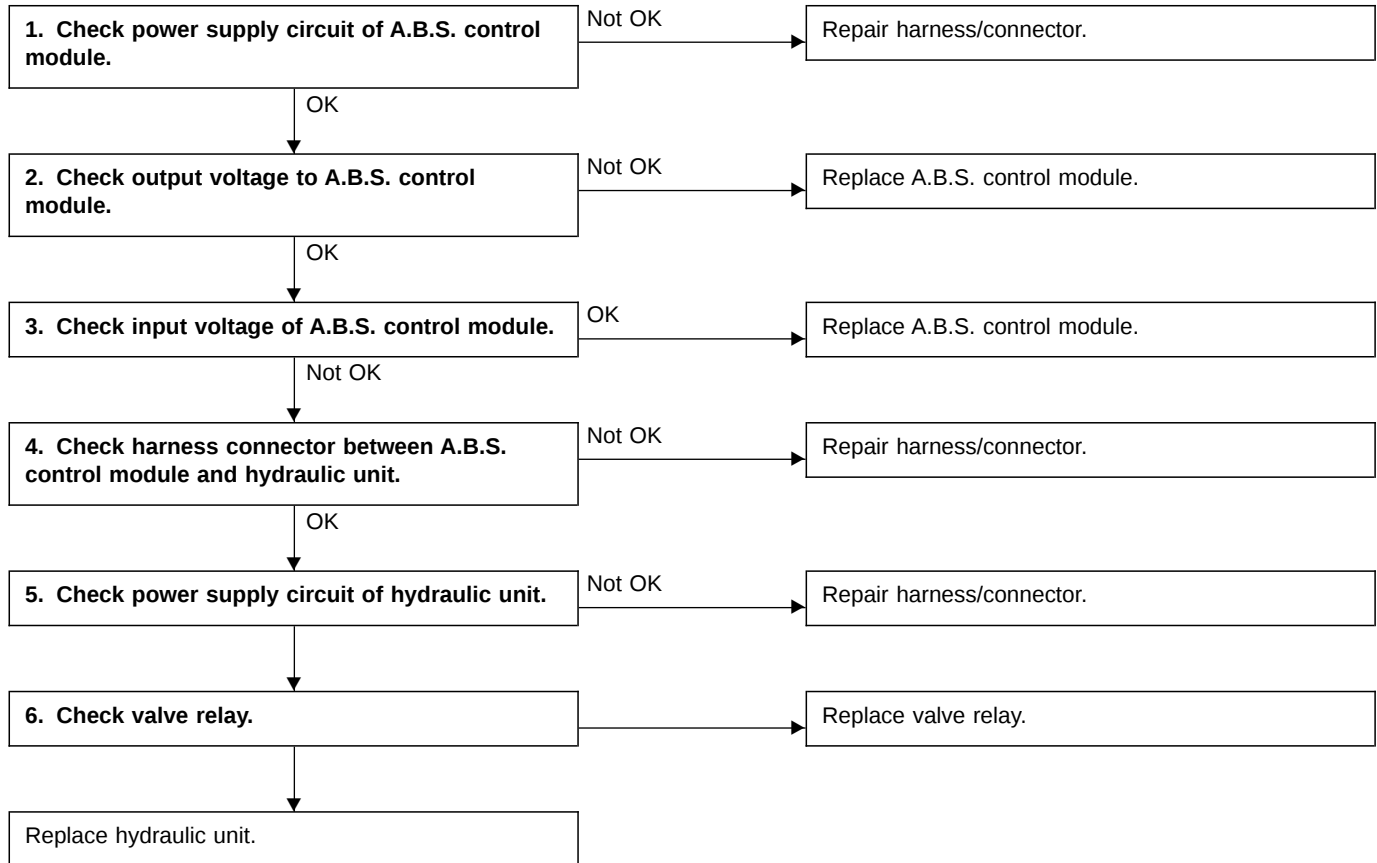
I: TROUBLE CODE 51 — FAULTY VALVE RELAY —

DIAGNOSIS:

- Faulty valve relay
- Faulty harness
- Faulty A.B.S. control module

TROUBLE SYMPTOM:

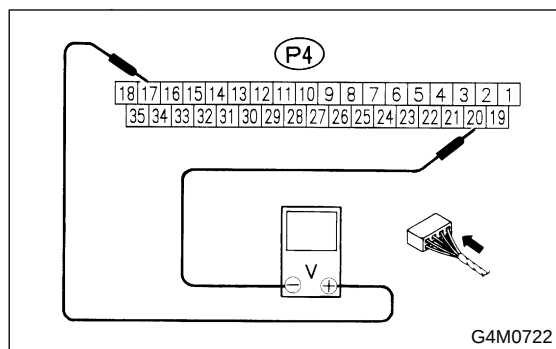
- A.B.S. does not operate.



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.

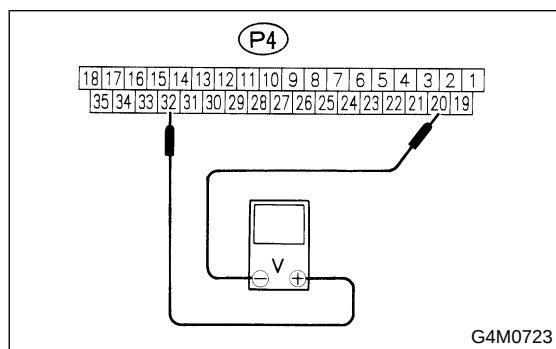
Connector & terminal / Specified voltage:
(P4) No. 1 — No. 20 / 10 — 12 V



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.
- 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.

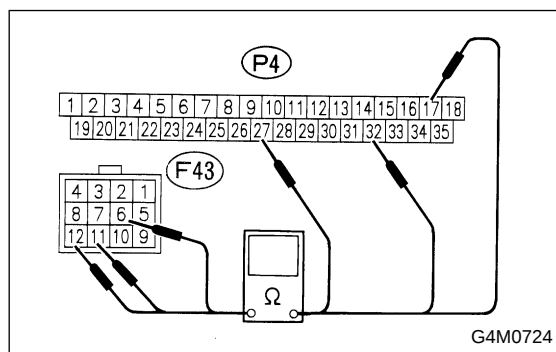
Connector & terminal / Specified voltage:
(P4) No. 17 — No. 20 / 10 — 12 V



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.

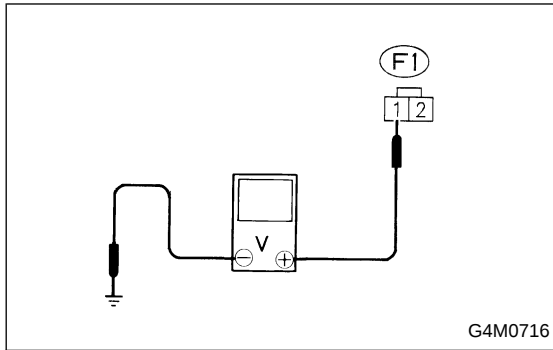
Connector & terminal / Specified voltage:
(P4) No. 32 — No. 20 / 10 — 12 V



4. CHECK HARNESS CONNECTOR BETWEEN A.B.S. CONTROL MODULE AND HYDRAULIC UNIT.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module and hydraulic unit.
- 3) Measure resistance between A.B.S. control module and hydraulic unit.

Connector & terminal / Specified resistance:
(P4) No. 17 — (F43) No. 6 / 0 Ω
(P4) No. 32 — (F43) No. 11 / 0 Ω
(P4) No. 27 — (F43) No. 12 / 0 Ω

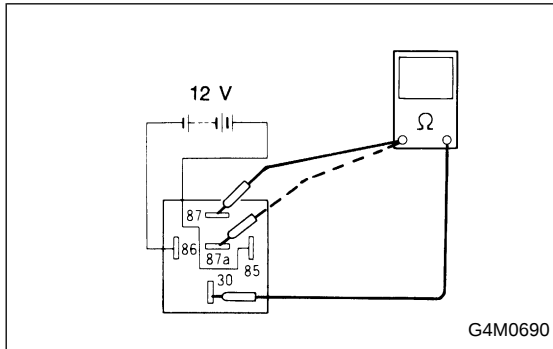


5. CHECK POWER SUPPLY CIRCUIT OF HYDRAULIC UNIT.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic unit.
- 3) Turn ignition switch ON.
- 4) Measure voltage between hydraulic unit and body.

Connector & terminal / Specified voltage:

(F1) 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 — 30 / 0 Ω (when 12 volts applied.)

No. 87 — 30 / 1 MΩ (when no voltage is applied.)

No. 87a — 30 / 1 MΩ (when 12 volts applied.)

No. 87a — 30 / 0 Ω (when no voltage is applied.)

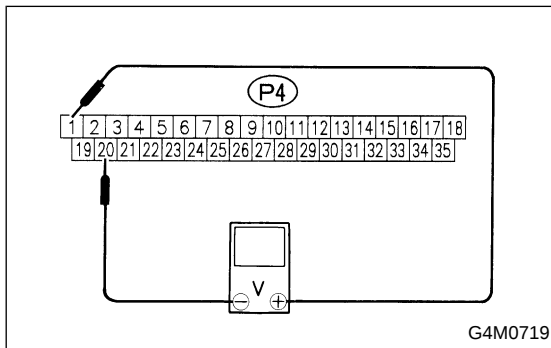
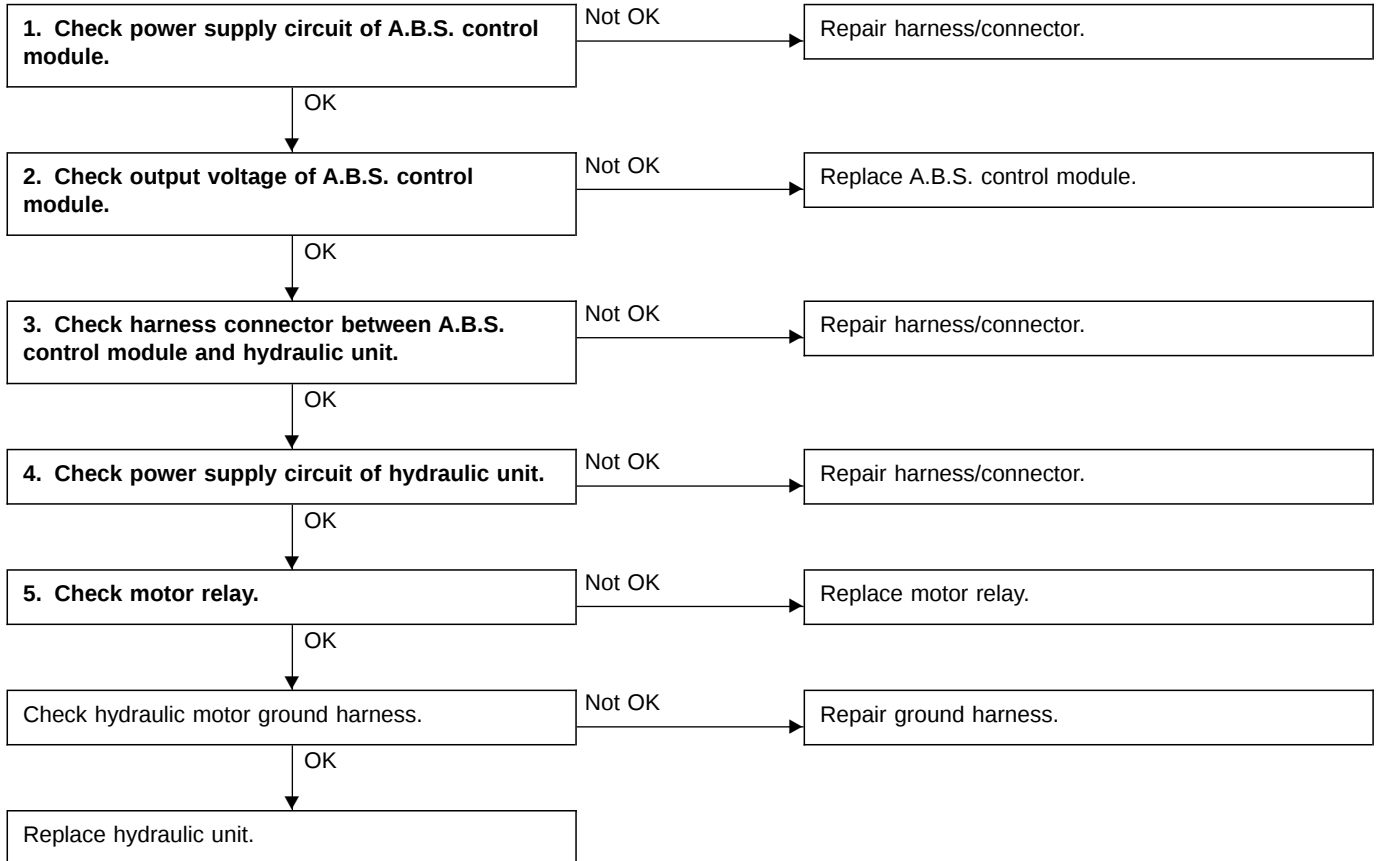
J: TROUBLE CODE 52
— FAULTY HYDRAULIC MOTOR AND/OR
MOTOR RELAY —

DIAGNOSIS:

- Faulty motor relay
- Faulty hydraulic unit
- Faulty harness
- Faulty A.B.S. control module

TROUBLE SYMPTOM:

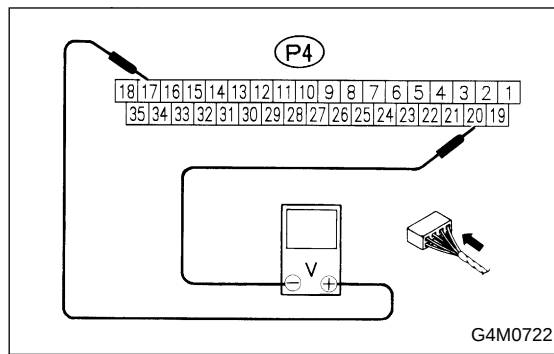
- A.B.S. does not operate.



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:
(P4) No. 1 — No. 20 / 10 — 12 V

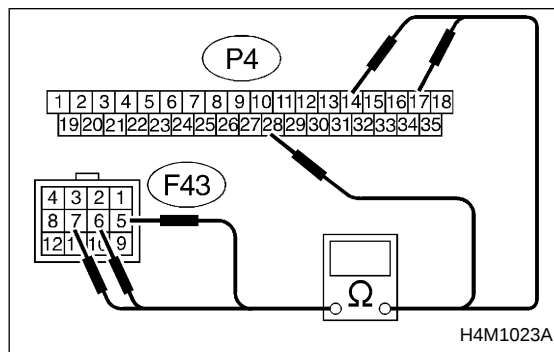


2. CHECK OUTPUT VOLTAGE OF A.B.S. CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module.
- 3) Disconnect connector cover from connector. <Ref. to 4-4 [T6C2].>
- 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:

(P4) No. 17 — No. 20 / 10 — 12 V



3. CHECK HARNESS CONNECTOR BETWEEN A.B.S. CONTROL MODULE AND HYDRAULIC UNIT.

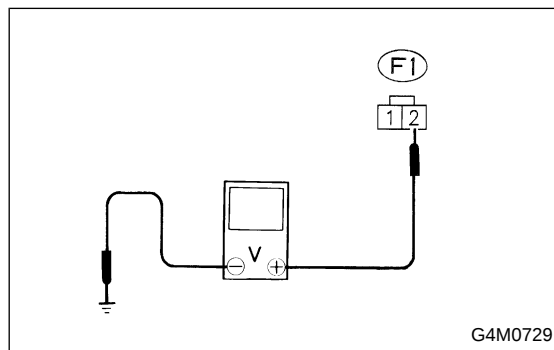
- 1) Turn ignition switch OFF.
- 2) Disconnect connector from A.B.S. control module.
- 3) Disconnect connector from hydraulic unit.
- 4) Measure resistance between A.B.S. control module connector and hydraulic unit connector.

Connector & terminal / Specified resistance:

(P4) No. 17 — (F43) No. 6 / 0 Ω

(P4) No. 28 — (F43) No. 5 / 0 Ω

(P4) No. 14 — (F43) No. 7 / 0 Ω

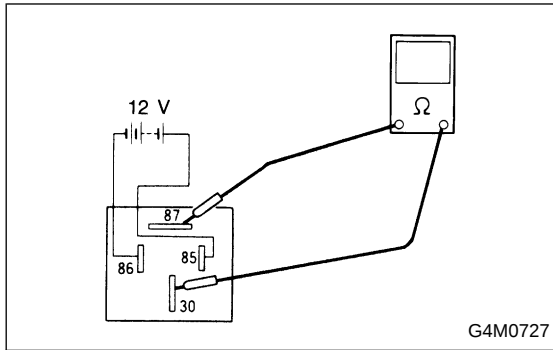


4. CHECK POWER SUPPLY CIRCUIT OF HYDRAULIC UNIT.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic unit.
- 3) Measure voltage between hydraulic unit connector and body.

Connector & terminal / Specified voltage:

(F1) 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 — 87 / 0 Ω (when 12 volts applied.)

No. 30 — 87 / 1 M Ω , min. (when no voltage is applied.)

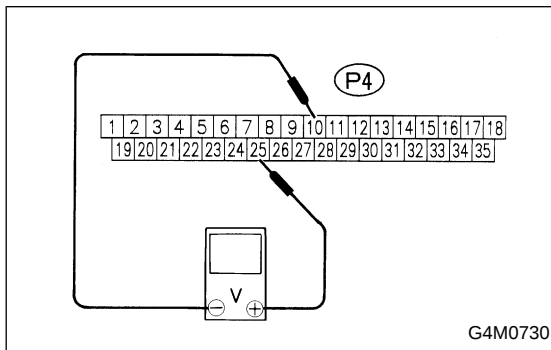
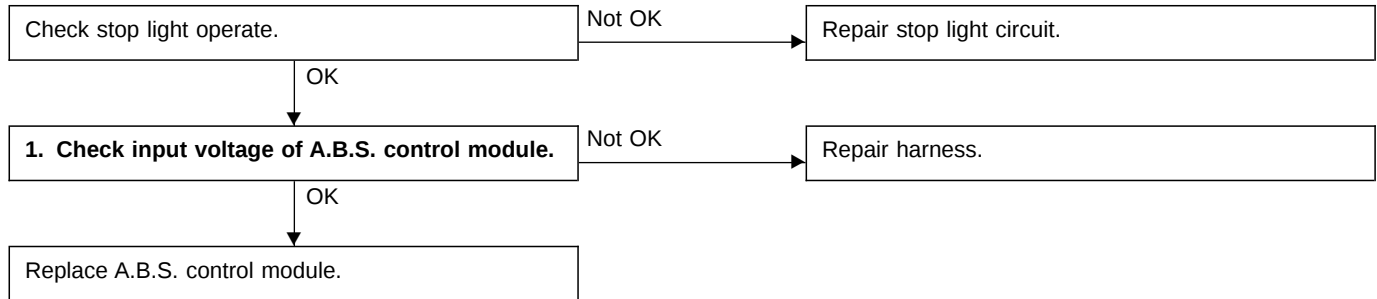
K: TROUBLE CODE 54 — FAULTY STOP LIGHT CIRCUIT —

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:

(P4) No. 25 — No. 10 / More than 4 V (when brake pedal is depressed.)

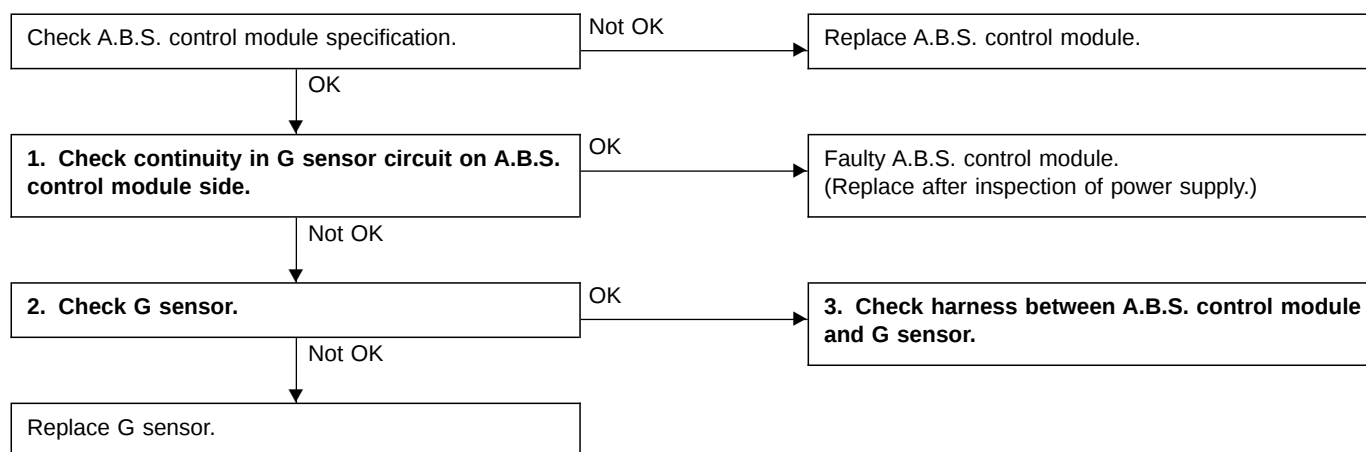
L: TROUBLE CODE 56
— USE OF IMPROPER A.B.S. CONTROL
MODULE SPECIFICATION, OR FAULTY G
SENSOR —

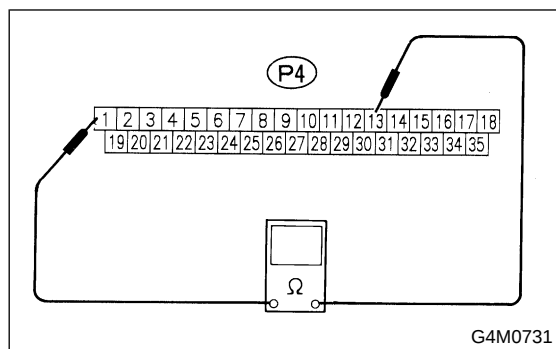
DIAGNOSIS:

- 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.



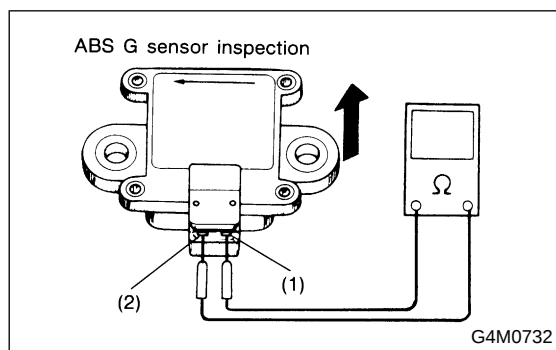


1. CHECK CONTINUITY IN G SENSOR CIRCUIT ON A.B.S. CONTROL MODULE SIDE.

- 1) Position vehicle on a flat surface.
- 2) Disconnect connector from A.B.S. control module.
- 3) Disassemble connector.
- 4) Measure resistance between A.B.S. control module connector terminals.

Connector & terminal / Specified Resistance:

(P4) No. 1 — No. 13 / 550 — 670 Ω

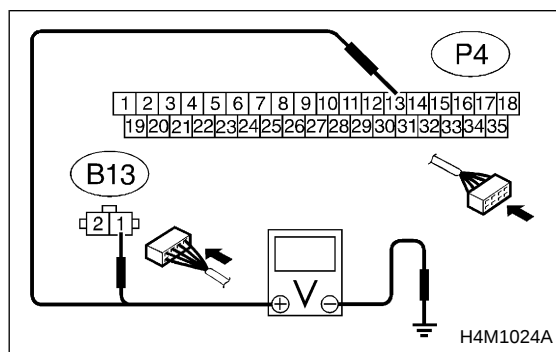


2. CHECK G SENSOR.

- 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:

(B13) No. 1 — Body / 10 — 12 V

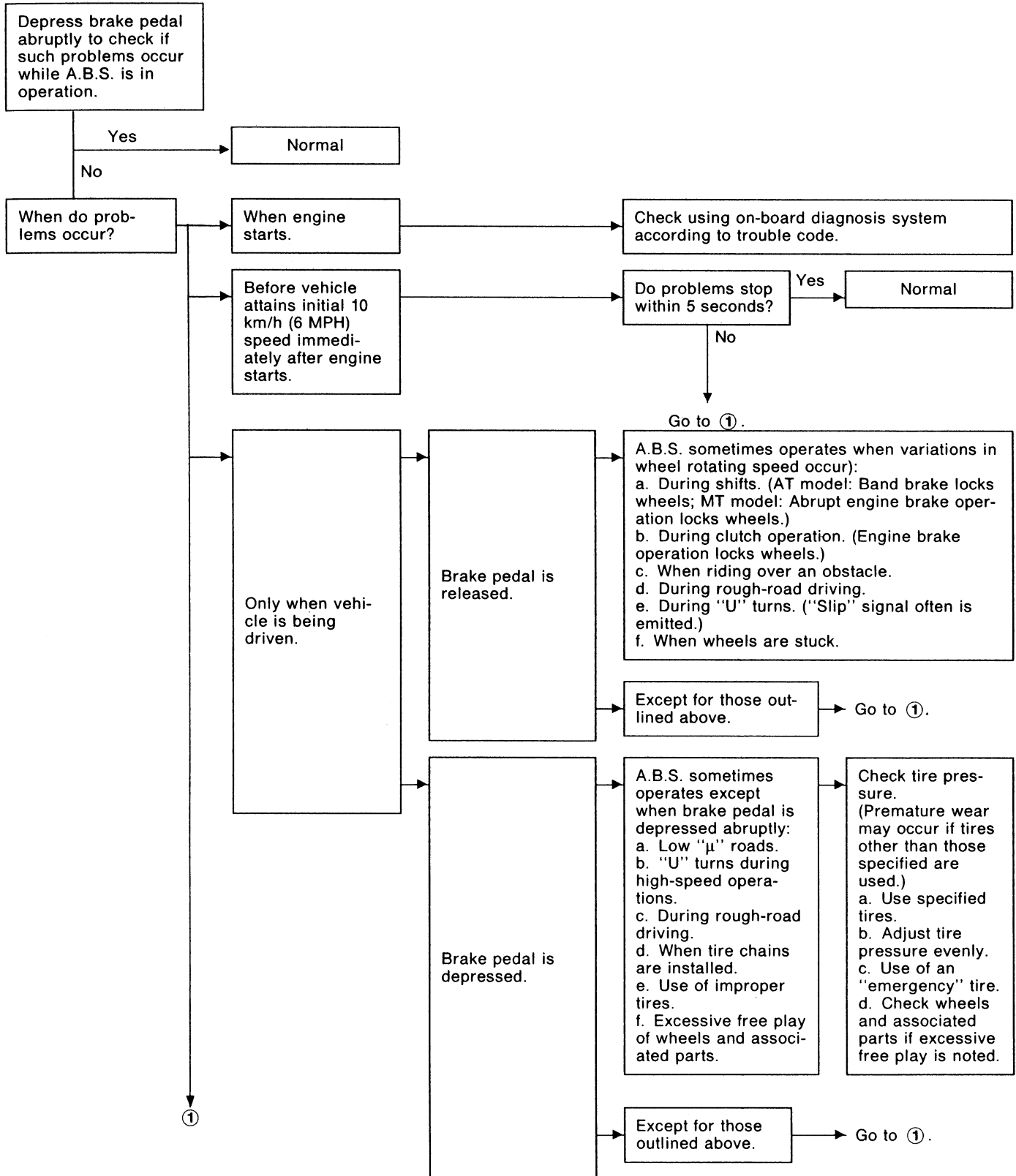
(P4) No. 13 — Body / 10 — 12 V

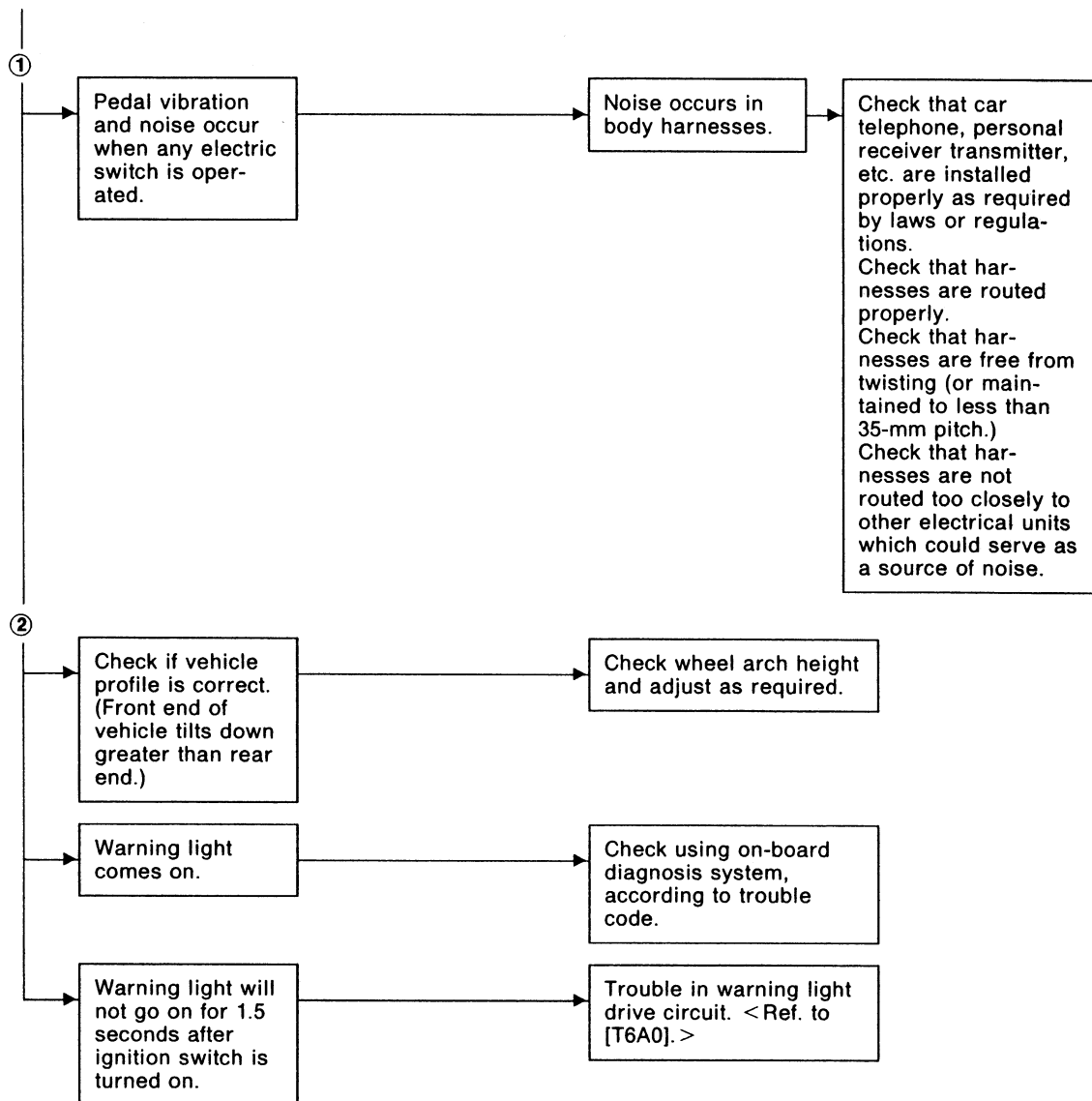
NOTE:

When voltage checks out "OK", replace A.B.S. control module.

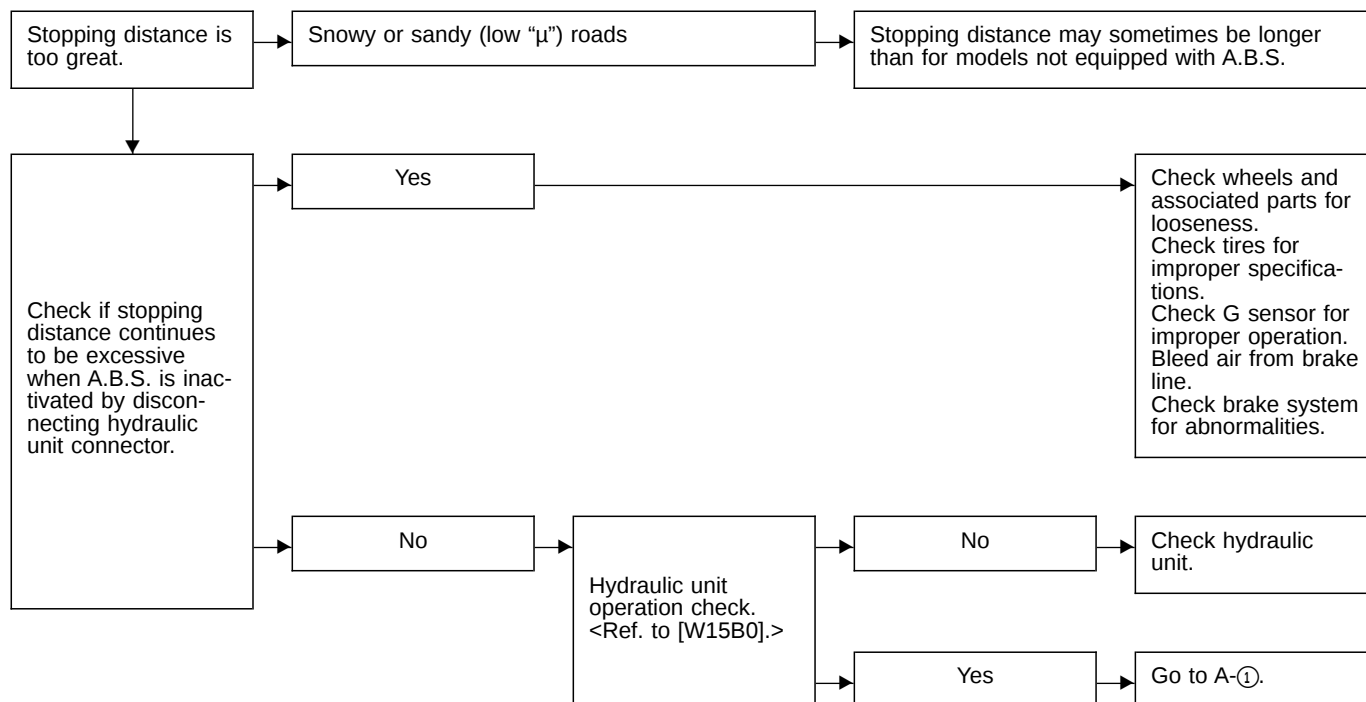
7. General Diagnostics Chart

A: VIBRATING PEDAL AND NOISE

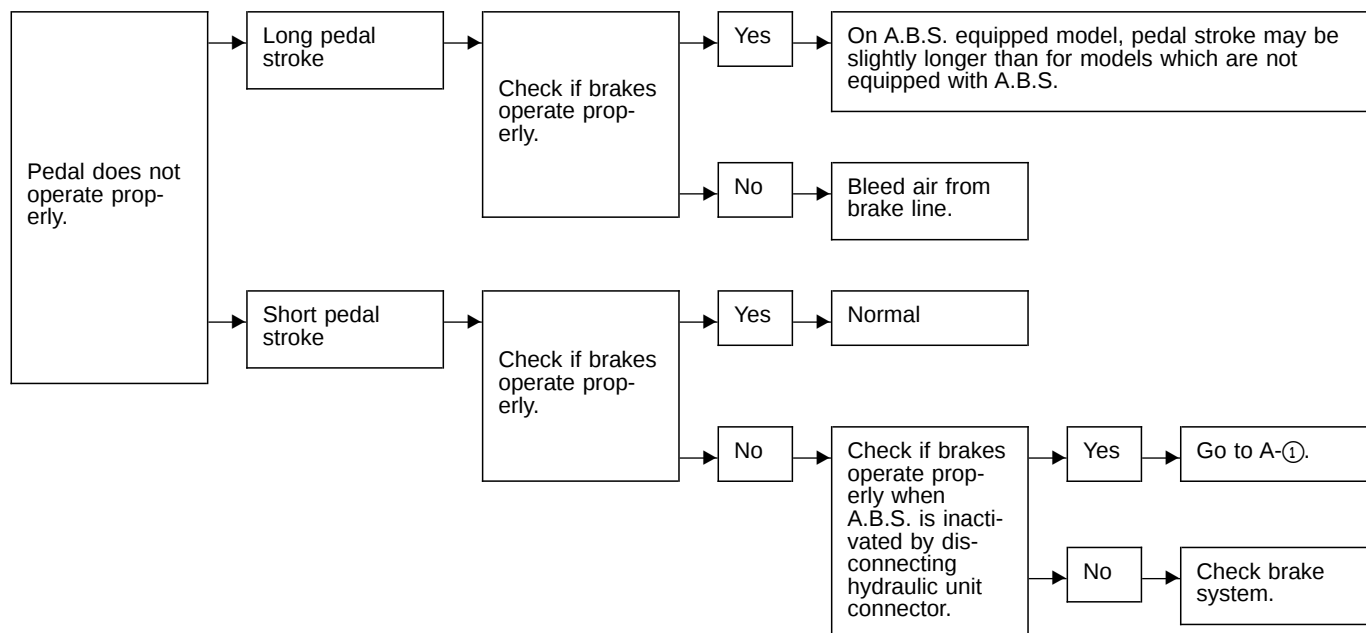




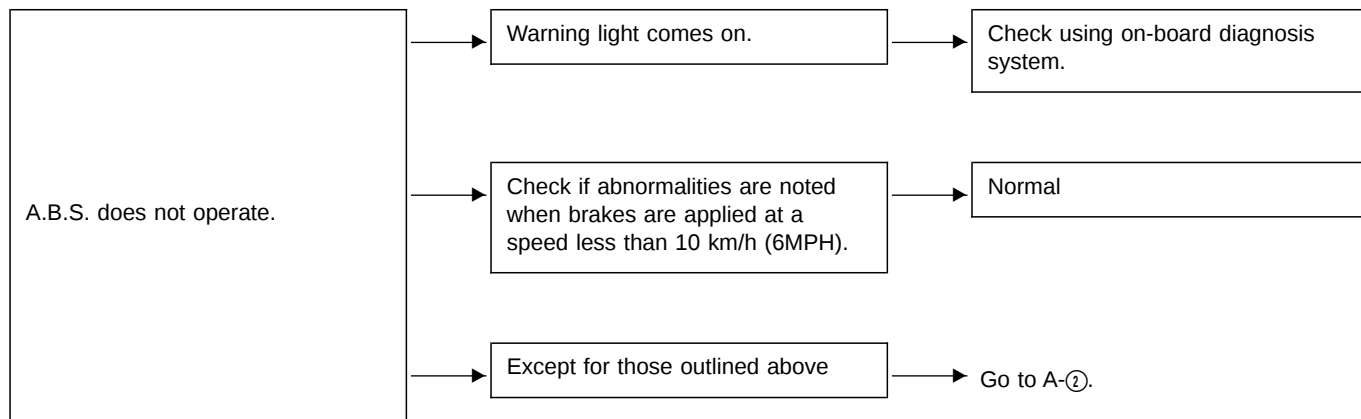
B: EXCESSIVE STOPPING DISTANCE



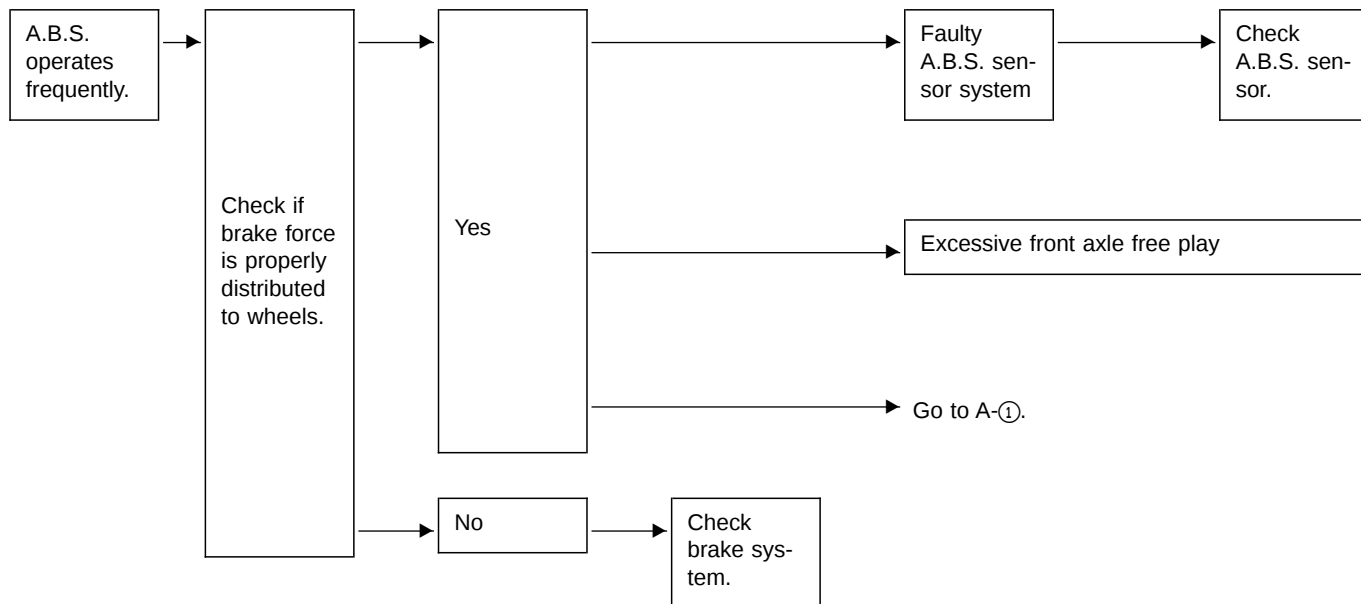
C: IMPROPER PEDAL OPERATION



D: A.B.S. INOPERATIVE



E: FREQUENT A.B.S. OPERATION



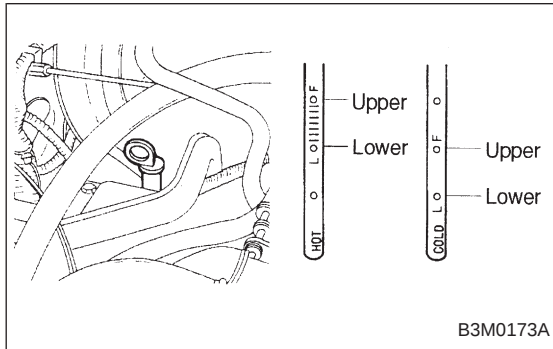
AUTOMATIC TRANSMISSION AND DIFFERENTIAL *3-2b* (2200 cc model)

	Page
T DIAGNOSTICS AIRBAG	2
1. Supplemental Restraint System "Airbag"	2
2. Pre-inspection	2
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1. Supplemental Restraint System "Airbag"

Airbag system wiring harness is routed near the transmission control module (TCM).

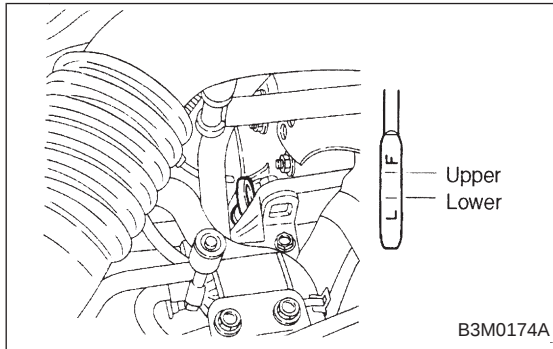
- All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuit.
- Be careful not to damage Airbag system wiring harness when performing diagnostics and servicing the TCM.



2. Pre-inspection

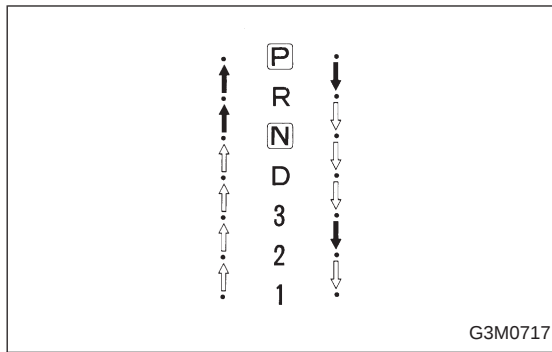
1. ATF LEVEL

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

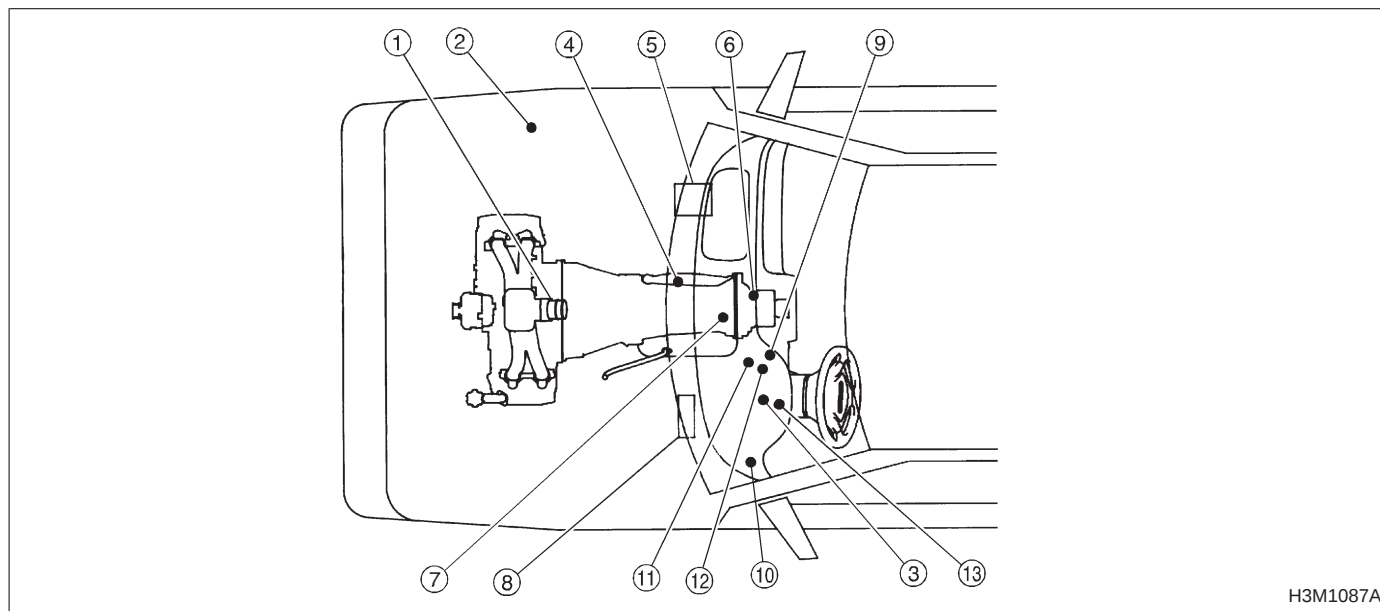
WARNING:

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

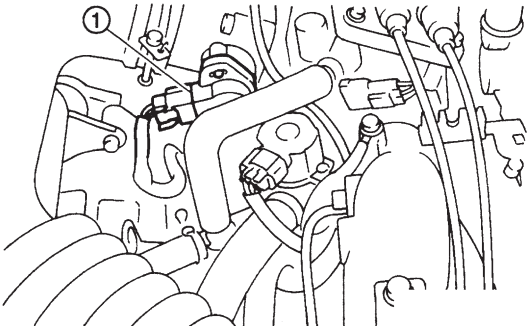
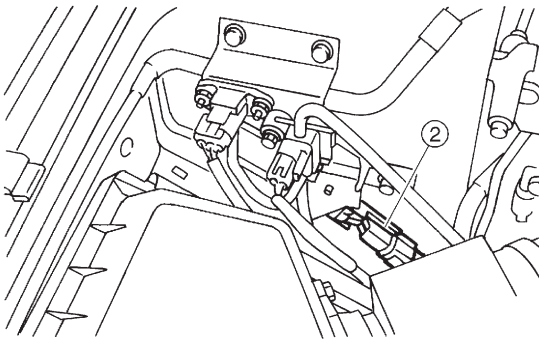
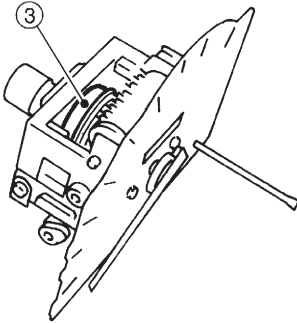
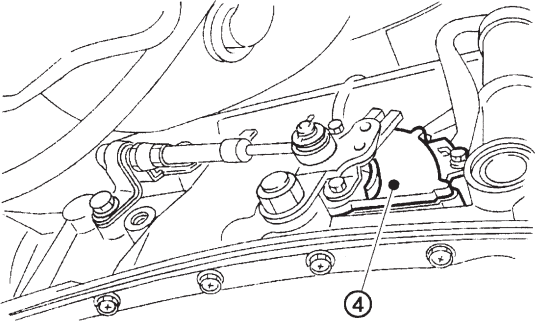
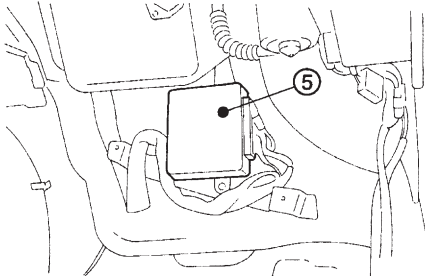
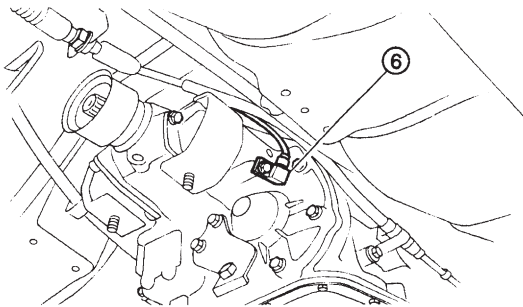
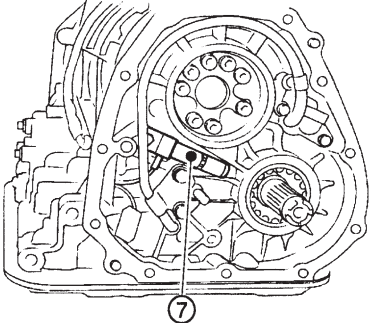
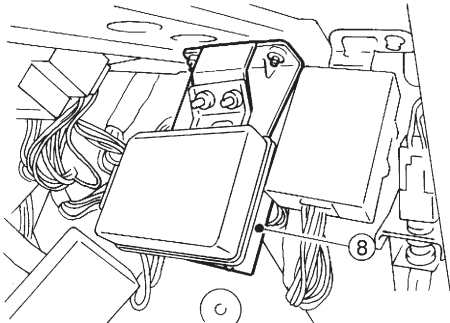
1. SENSOR AND CONTROL MODULE

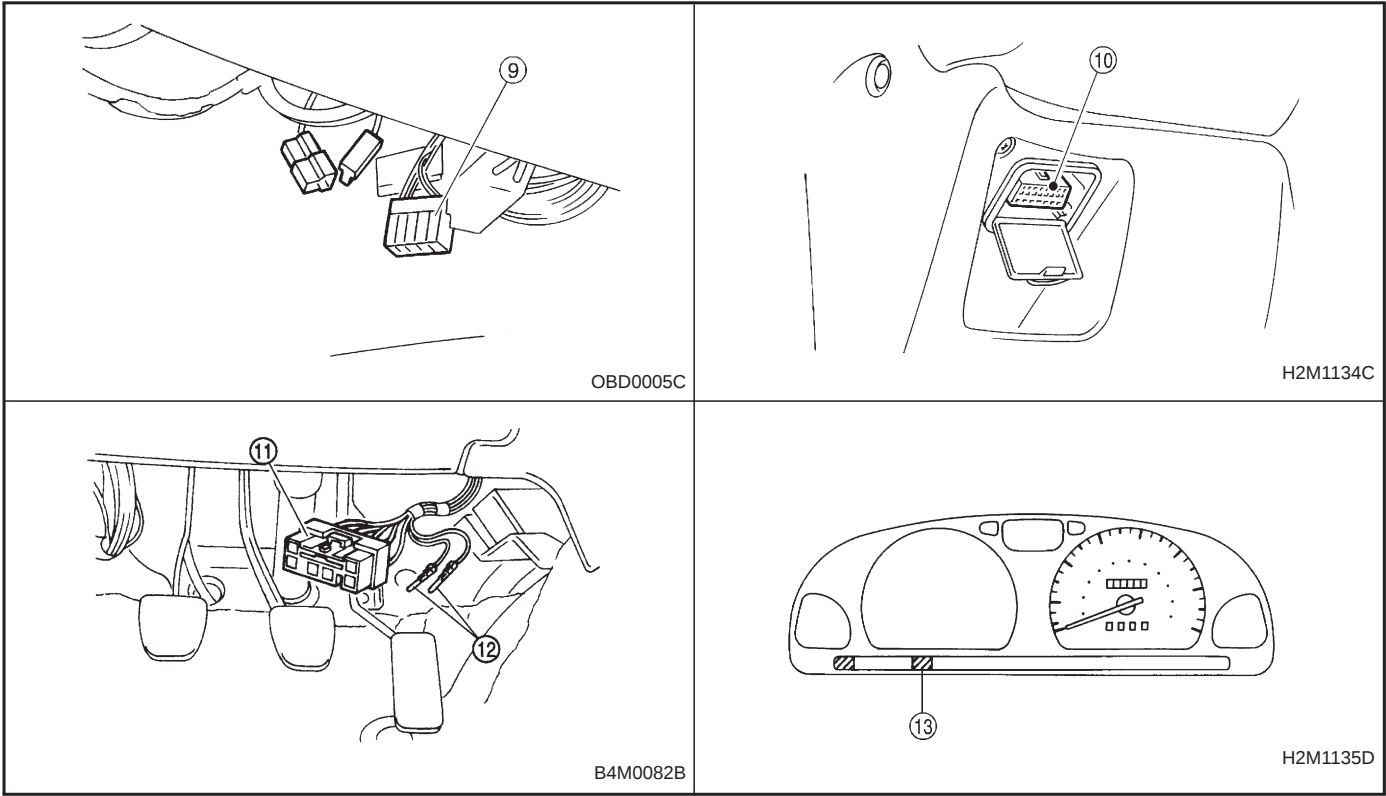


H3M1087A

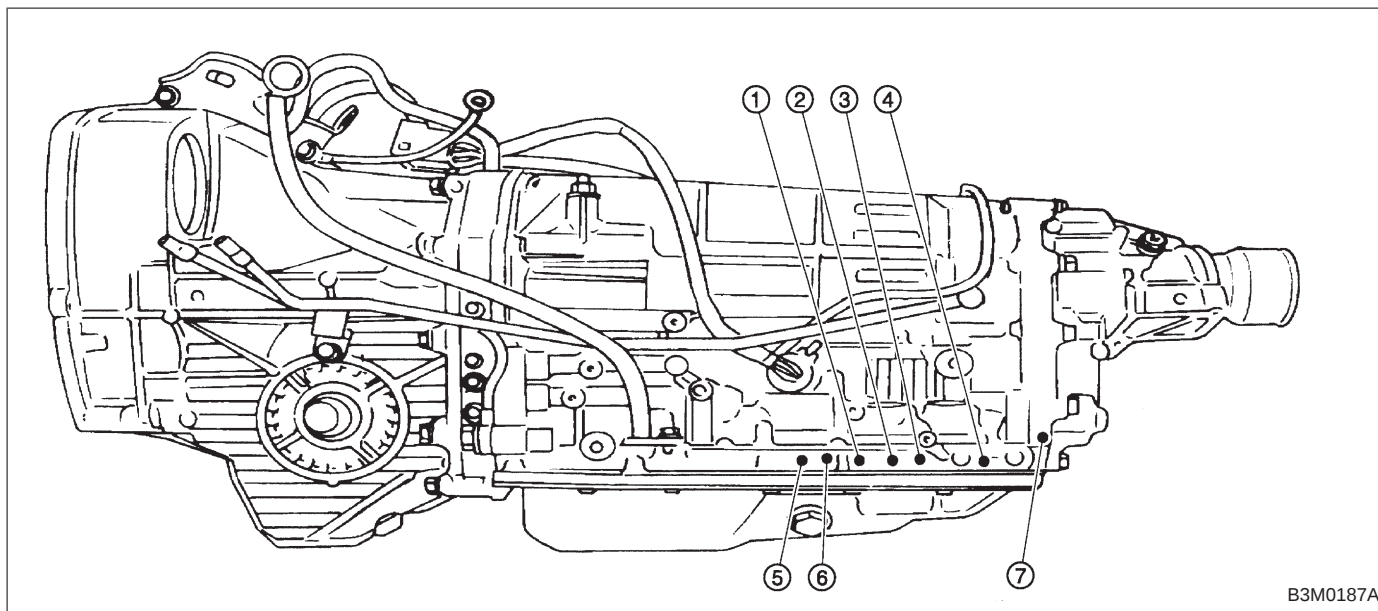
- ① Throttle position sensor
- ② Dropping resistor
- ③ Vehicle speed sensor 2
- ④ Inhibitor switch
- ⑤ ECM
- ⑥ Vehicle speed sensor 1 (AWD)
- ⑦ Vehicle speed sensor 1 (FWD)
- ⑧ TCM

- 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)

 Diagram showing the location of electrical components in the transmission area, labeled 1.	 Diagram showing the location of electrical components in the differential area, labeled 2.
B2M0155A	OBD0046A
 Diagram showing the location of electrical components in the transmission area, labeled 3.	 Diagram showing the location of electrical components in the differential area, labeled 4.
H2M1144B	B3M0182A
 Diagram showing the location of electrical components in the transmission area, labeled 5.	 Diagram showing the location of electrical components in the differential area, labeled 6.
B3M0183A	B3M0184A
 Diagram showing the location of electrical components in the transmission area, labeled 7.	 Diagram showing the location of electrical components in the differential area, labeled 8.
B3M0185A	H2M1143B

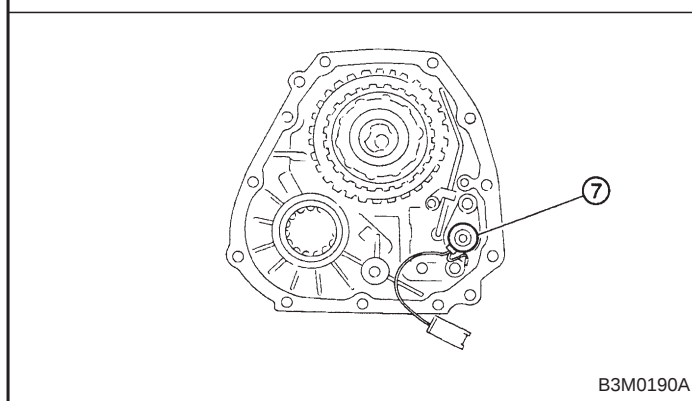
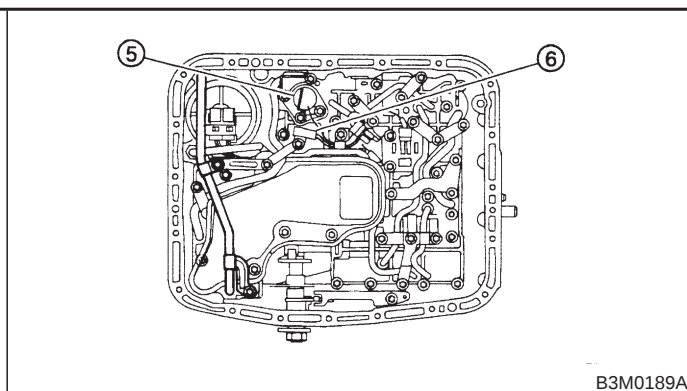
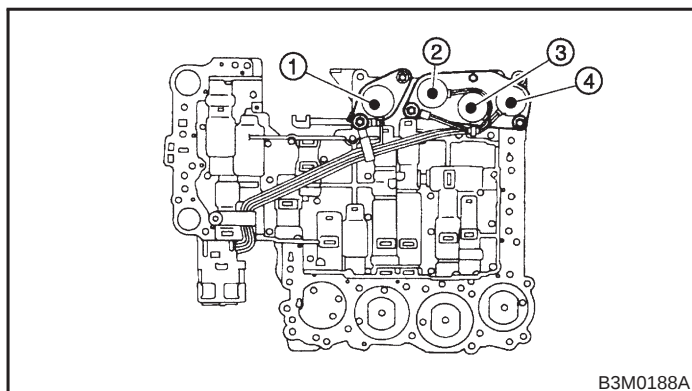


2. SOLENOID



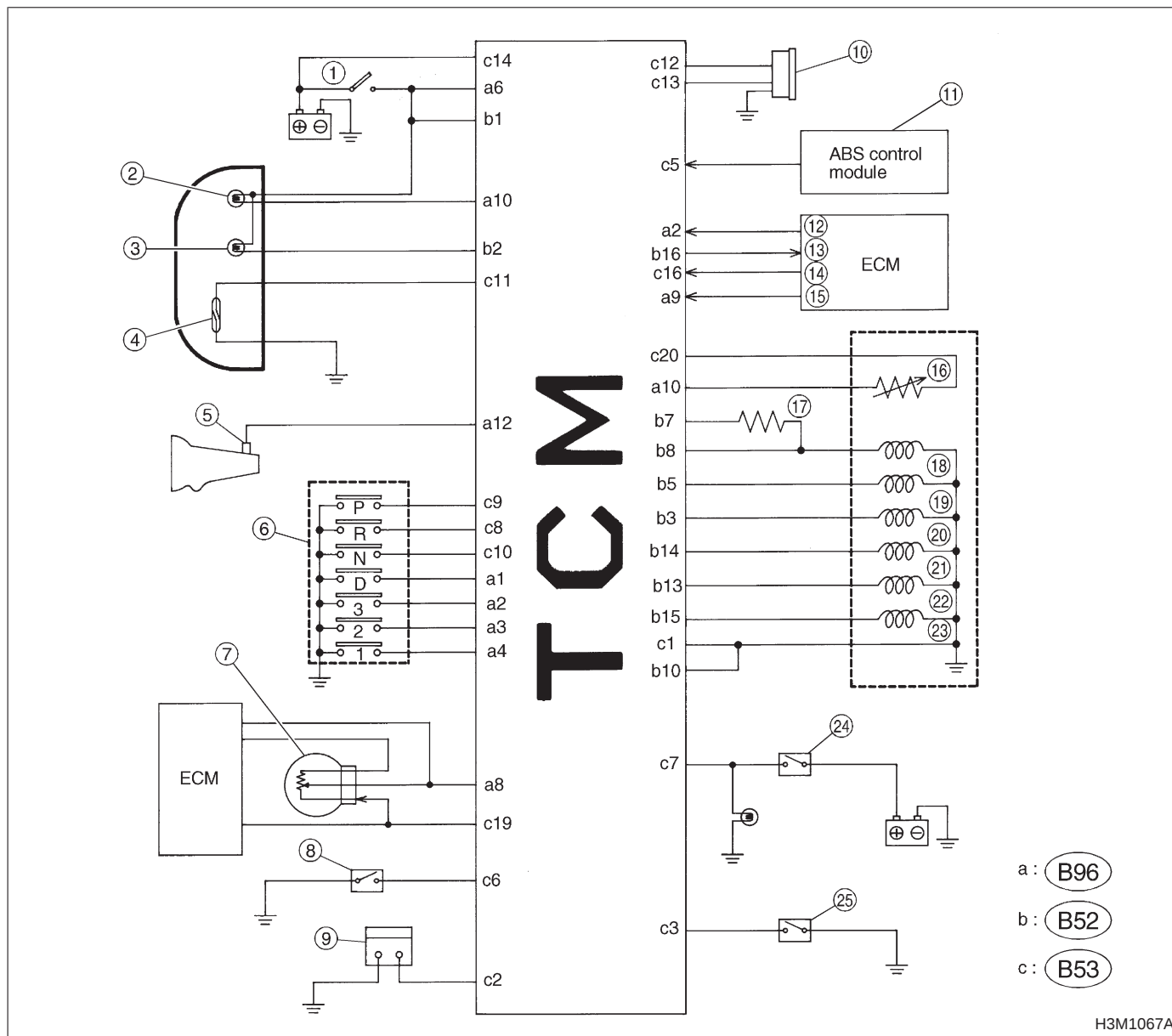
- ① Duty solenoid A
- ② Solenoid 2
- ③ Solenoid 1
- ④ Solenoid 3

- ⑤ Duty solenoid B
- ⑥ ATF temperature sensor
- ⑦ Duty solenoid C (AWD)



SUBARU.

4. Schematic

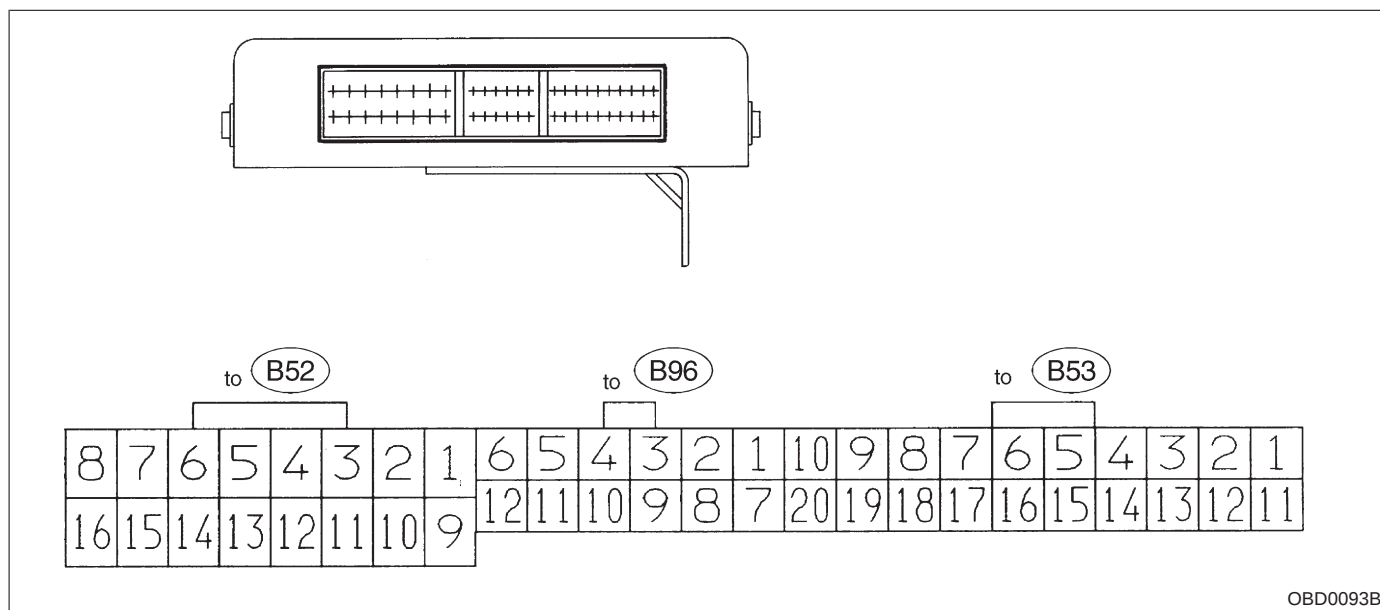


- ① Ignition switch
- ② FWD indicator light
- ③ AT OIL TEMP indicator light
- ④ Vehicle speed sensor 2
- ⑤ Vehicle speed sensor 1
- ⑥ Inhibitor switch
- ⑦ Throttle position sensor
- ⑧ Diagnosis switch
- ⑨ FWD switch (AWD)

- 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



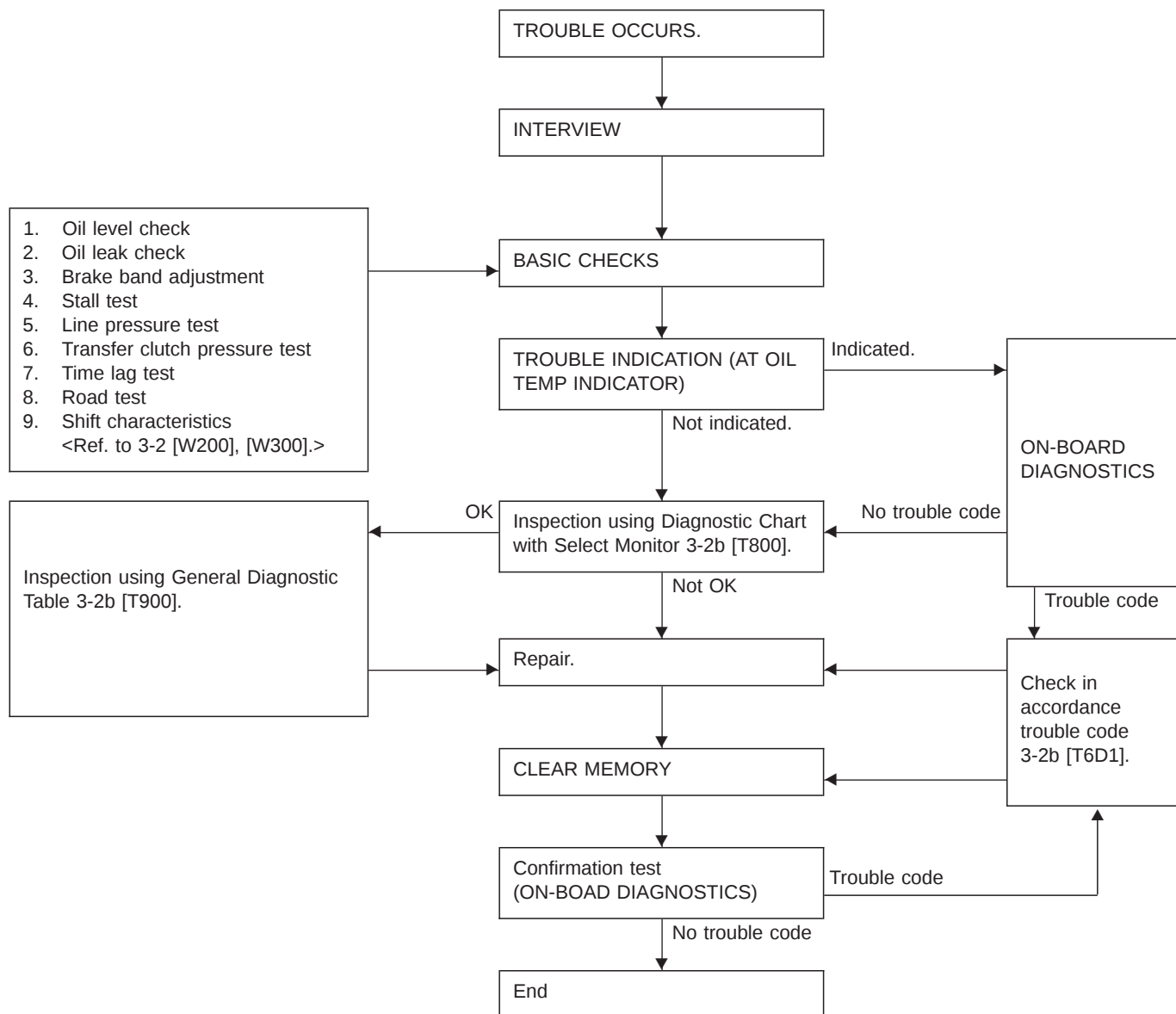
Check with ignition switch ON.

Content		Connector No.	Terminal No.	Measuring conditions	Voltage (V)
Back-up power supply		B53	14	Ignition switch OFF	10 — 16
Ignition power supply		B96	6	Ignition switch ON (with engine OFF)	10 — 16
		B52	1		
Inhibitor switch	“P” range switch	B53	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	B53	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	B53	10	Select lever in “R” range	Less than 1
				Select lever in any other than “R” range	More than 6
	“D” range switch	B96	1	Select lever in “D” range	Less than 1
				Select lever in any other than “D” range	More than 6
	“3” range switch	B96	2	Select lever in “3” range	Less than 1
				Select lever in any other than “3” range	More than 6
	“2” range switch	B96	3	Select lever in “2” range	Less than 1
				Select lever in any other than “2” range	More than 6
	“1” range switch	B96	4	Select lever in “1” range	Less than 1
				Select lever in any other than “1” range	More than 6
Diagnosis switch		B53	6	Diagnosis connector connected.	Less than 1
				Diagnosis connector disconnected.	More than 6
Brake switch		B53	7	Brake pedal depressed.	More than 10.5
				Brake pedal released.	Less than 1
ABS signal		B53	5	ABS switch ON	Less than 1
				ABS switch OFF	More than 6.5
AT diagnostic signal		B96	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	B96	8	Throttle fully closed.	0.5±0.2	—
			Throttle fully open.	4.6±0.3	
Throttle position sensor power supply	B53	19	Ignition switch ON (With engine OFF)	5.05±0.25	—
ATF temperature sensor	B96	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	B96	12	Vehicle stopped.	0	450 — 720
			Vehicle speed at least 20 km/h (12 MPH)	More than 1 (AC range)	
Vehicle speed sensor 2	B53	11	When vehicle is slowly moved at least 2 meters (7ft).	Less than 1↔More than 4	—
Engine speed signal	B96	5	Ignition switch ON (with engine OFF).	More than 10.5	—
			Ignition switch ON (with engine ON).	8 — 11	
Cruise set signal	B53	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	B52	16	Ignition switch ON	5±1	—
Torque control cut signal	B53	16	Ignition switch ON	6 — 9	—
Mass air flow signal	B96	9	Engine idling after warm-up	0.5 — 1.2	—
Shift solenoid 1	B52	14	1st or 4th gear	More than 9	20 — 32
			2nd or 3rd gear	Less than 1	
Shift solenoid 2	B52	13	1st or 2nd gear	More than 9	20 — 32
			3rd or 4th gear	Less than 1	
Shift solenoid 3	B52	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	B52	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	B52	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	B52	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)	B52	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	B96	7	—	0	Less than 1
Sensor ground line 2	B53	20	—	0	Less than 1
System ground line	B53	1	—	0	Less than 1
Power system ground line	B52	10	—	0	Less than 1
FWD switch (AWD model only)	B53	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.

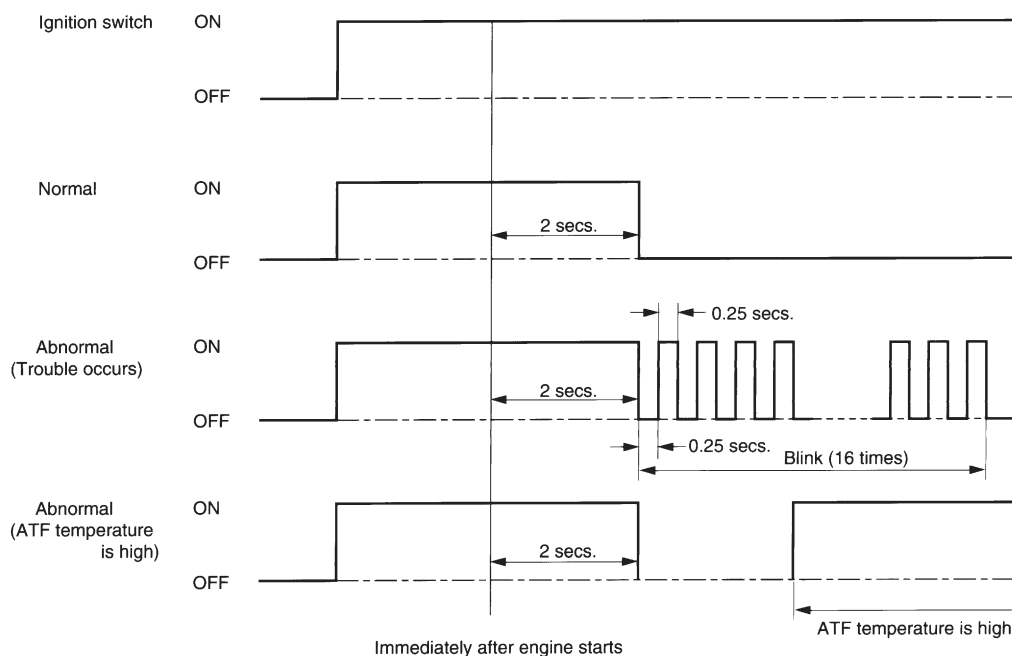
The malfunctioning part or unit can be determined by a trouble code during on-board diagnostic operation. Problems which occurred previously can also be identified through the memory function.

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.

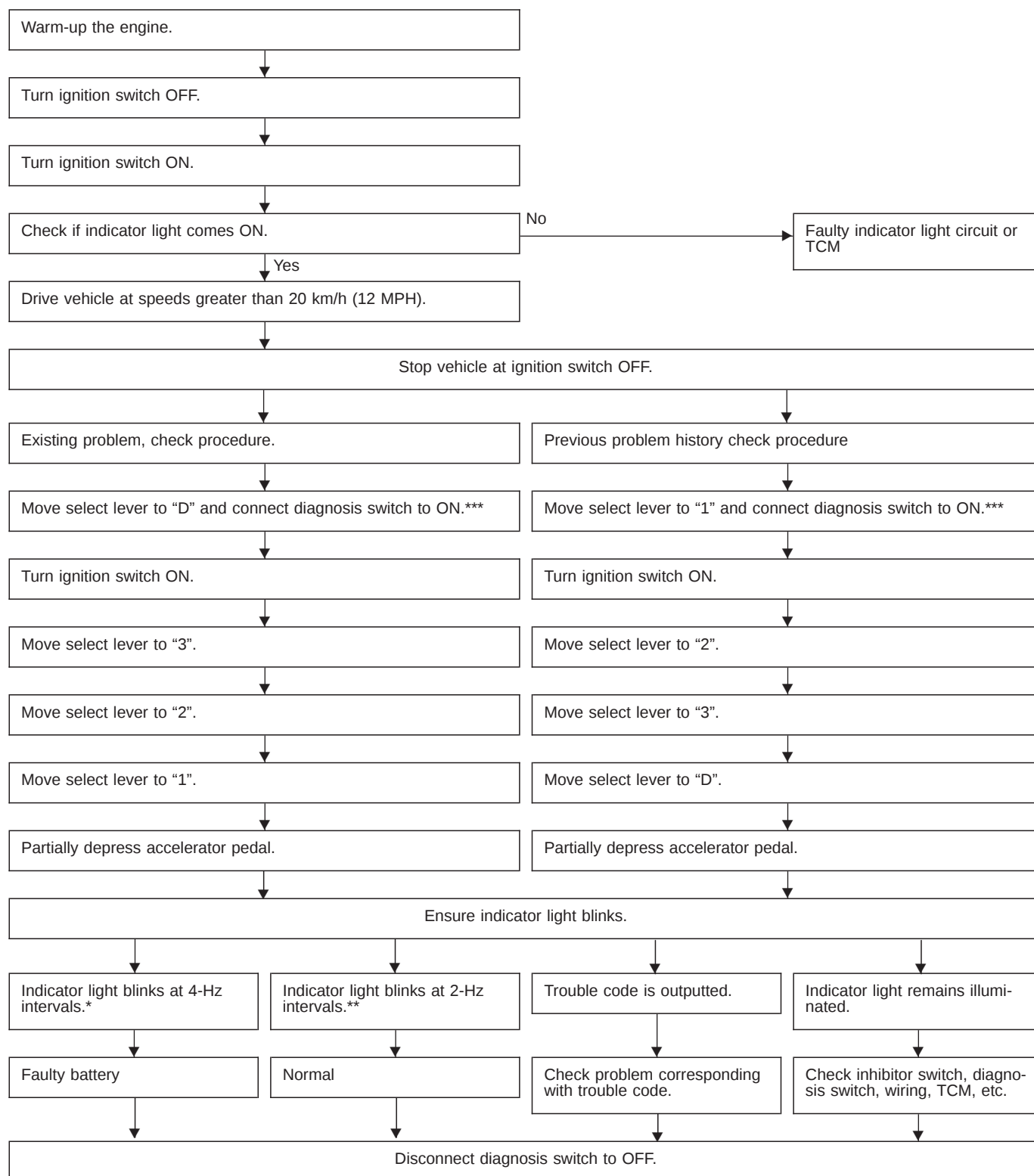
WARNING:

Warning can be noticed only when the engine is initially started.



H3H1066

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.

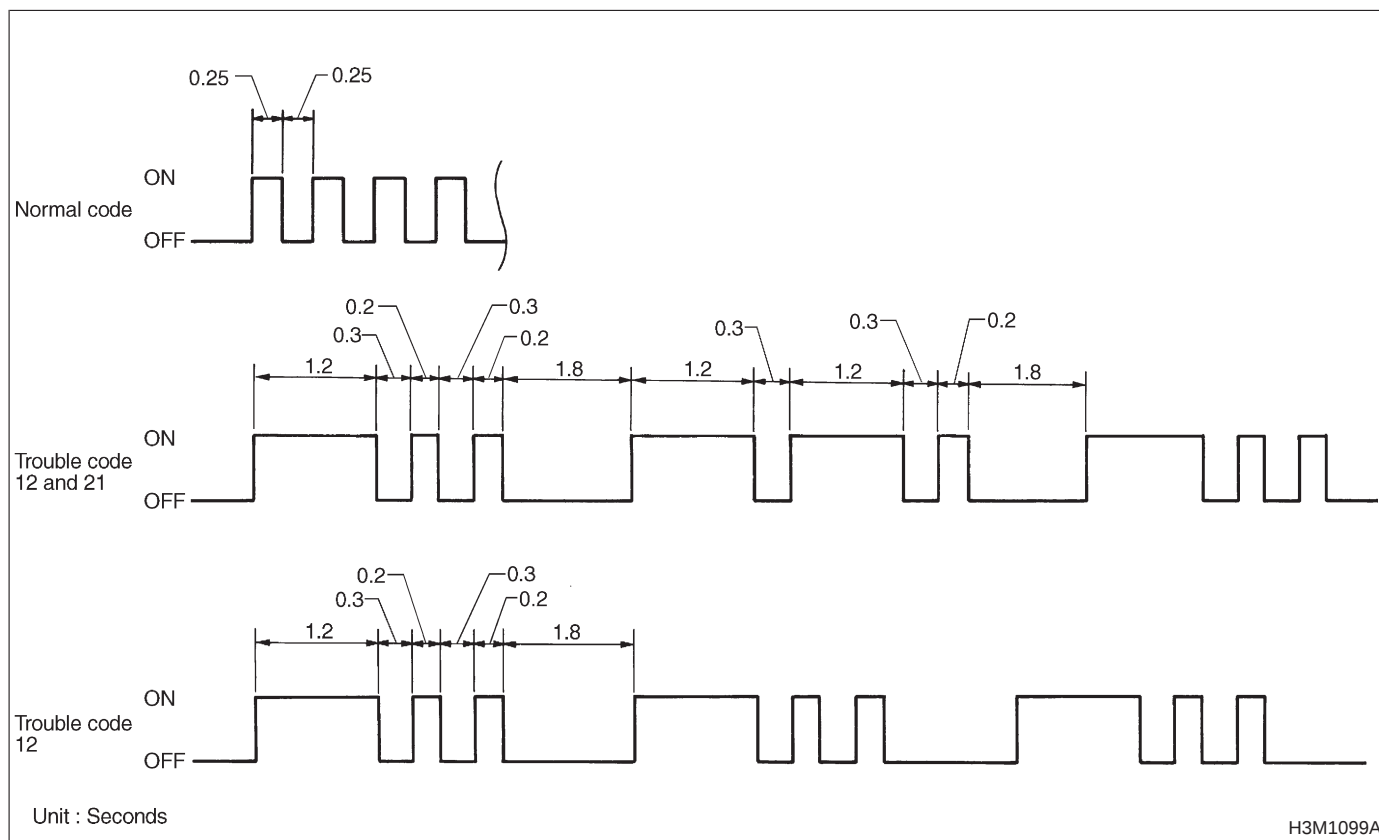
D: LIST OF TROUBLE CODE**1. TROUBLE CODE**

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.	PL	16
12	Duty solenoid B	Detects open or shorted drive circuit, as well as valve seizure.	L/U	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	35
23	Engine speed signal	Detects open or shorted input signal circuit.	EREV	37
24	Duty solenoid C	Detects open or shorted drive circuit, as well as valve seizure.	4WD	39
25	Torque control signal	Detects open or shorted input signal circuit.	TQ.CT	41
31	Throttle position sensor	Detects open or shorted input signal circuit.	THV	43
32	Vehicle speed sensor 1	Detects open or shorted input signal circuit.	VSP1	46
33	Vehicle speed sensor 2	Detects open or shorted input signal circuit.	VSP2	50

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 ECM (MFI). Removal of this fuse clears the previous trouble codes stored in the TCM and ECM (MFI) 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

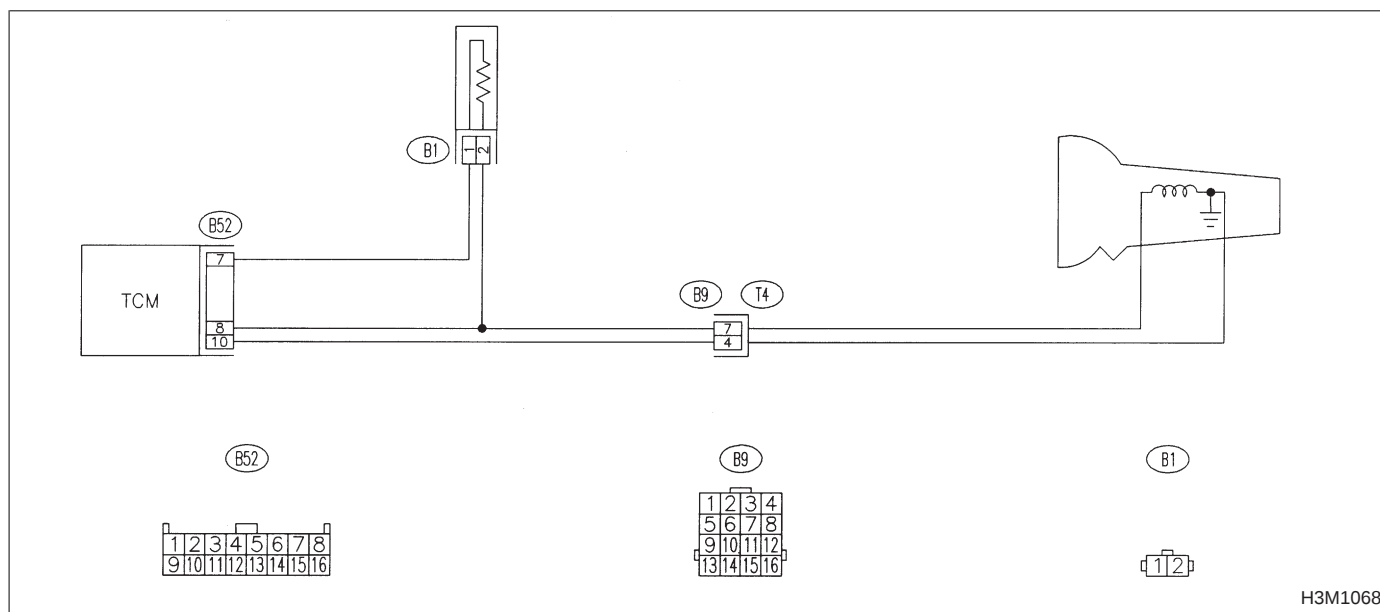
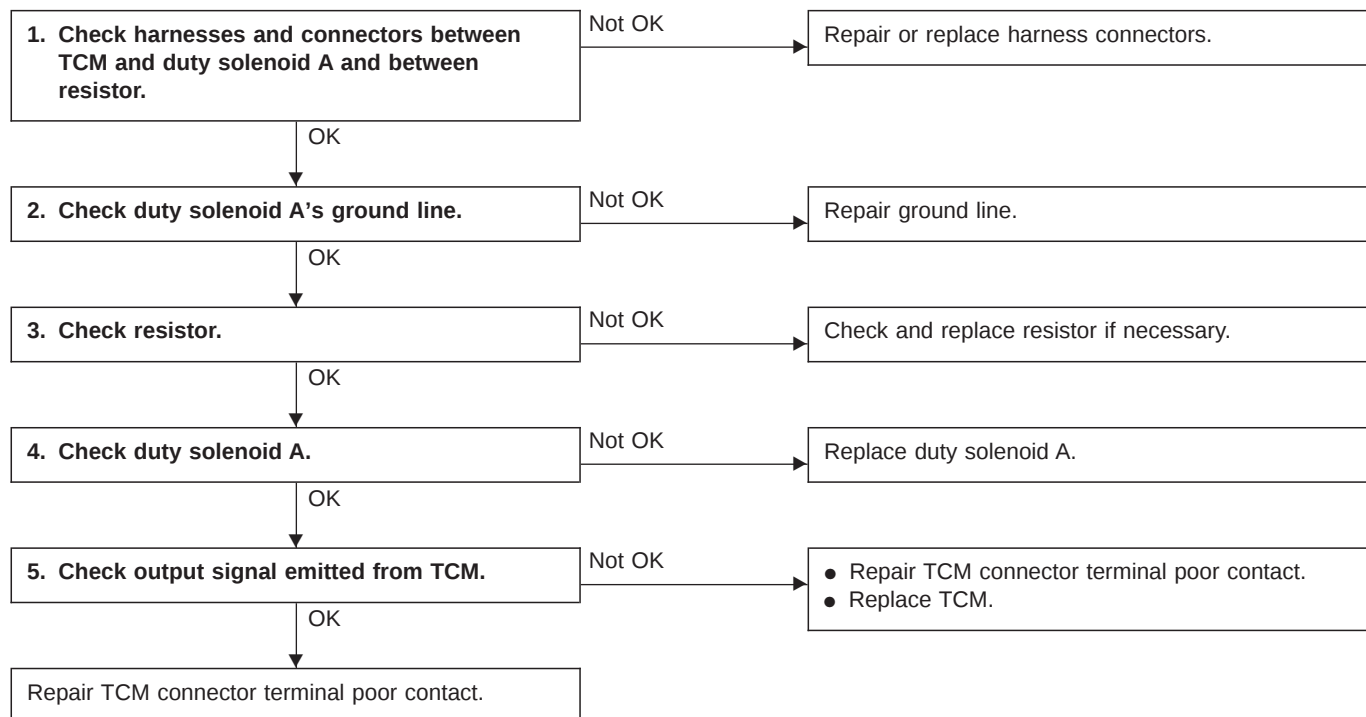
— DUTY SOLENOID A —

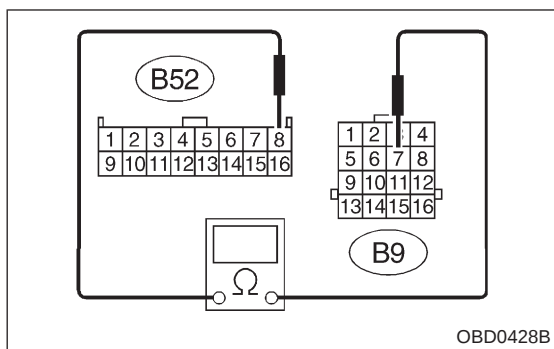
DIAGNOSIS:

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

TROUBLE SYMPTOM:

Excessive shift shock

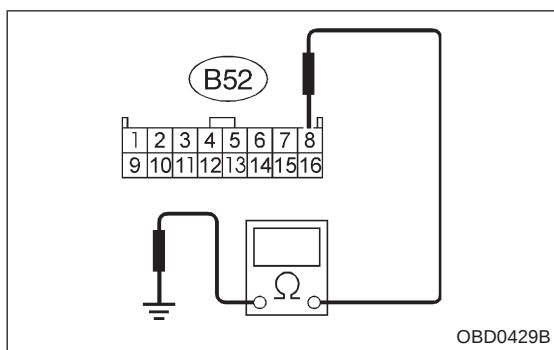




1. CHECK HARNESES AND CONNECTORS BETWEEN TCM AND DUTY SOLENOID A AND BETWEEN RESISTOR.

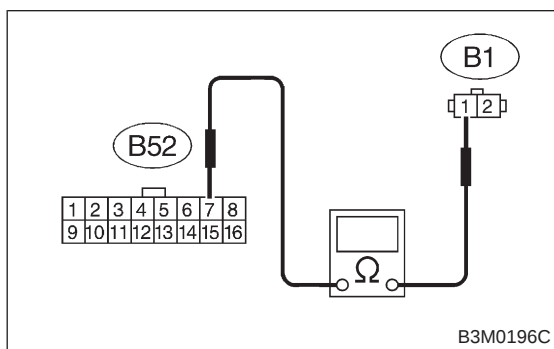
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM, transmission and resistor.
- 3) Measure resistance of harness connector between TCM and transmission.

Connector & terminal / Specified resistance:
(B52) No. 8 — (B9) No. 7 / 1 Ω, or less



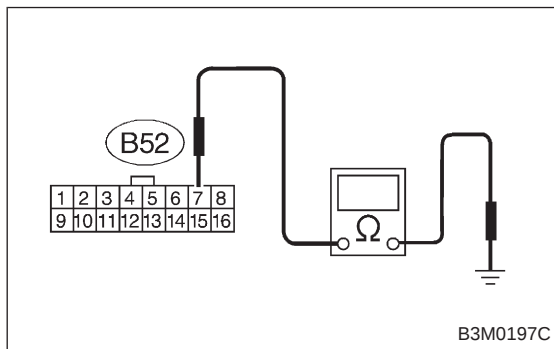
- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:
(B52) No. 8 — Body / 1 MΩ, or more



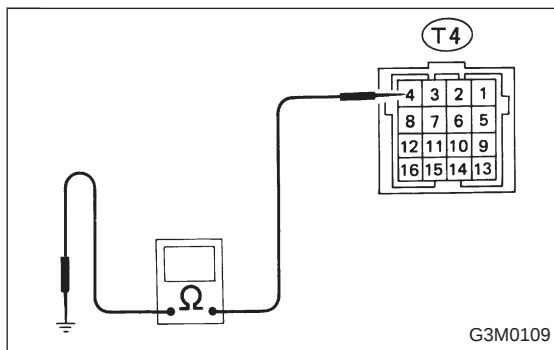
- 5) Measure resistance of harness connector between TCM and resistor connector.

Connector & terminal / Specified resistance:
(B52) No. 7 — (B1) No. 1 / 1 Ω, or less



- 6) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

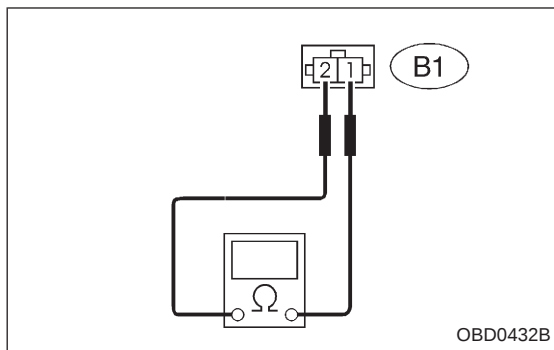
Connector & terminal / Specified resistance:
(B52) No. 7 — Body / 1 MΩ, or more



2. CHECK DUTY SOLENOID A's GROUND LINE.

Measure resistance between transmission connector receptacle (on transmission) and transmission case.

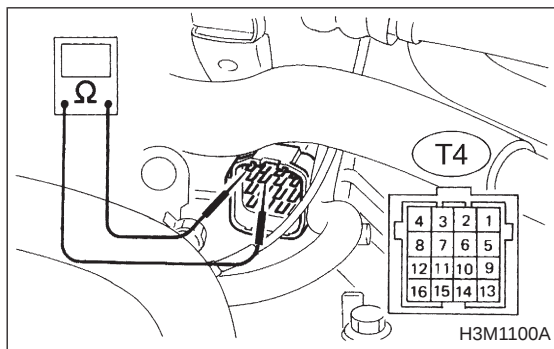
Connector & terminal / Specified resistance:
(T4) No. 4 — Transmission / 1 Ω, or less

**3. CHECK RESISTOR.**

Measure resistance between resistor terminals.

Specified resistance:

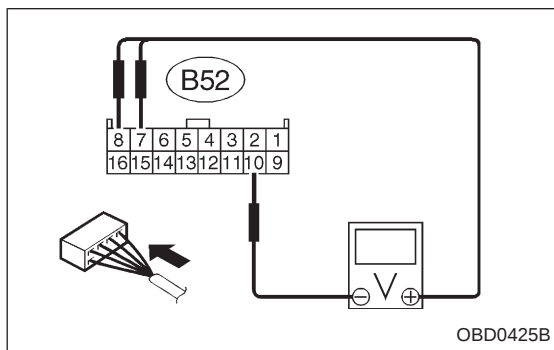
(B1) No. 1 — No. 2 / 9 — 15 Ω

**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.

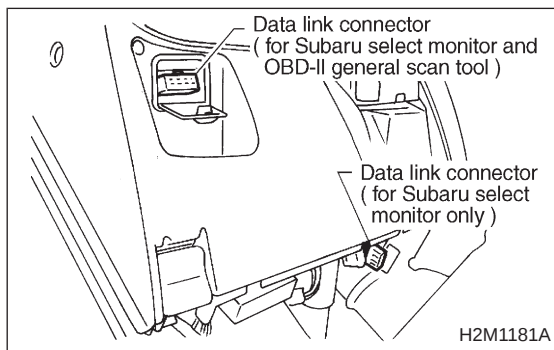
Connector & terminal / Specified resistance:

(B52) No. 8 — No. 10 / 1.5 — 4.0 V (Throttle is fully closed.)

(B52) No. 8 — No. 10 / 1 V, or less (Throttle is fully open.)

(B52) No. 7 — No. 10 / 5 — 14 V (Throttle is fully closed.)

(B52) 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.)**

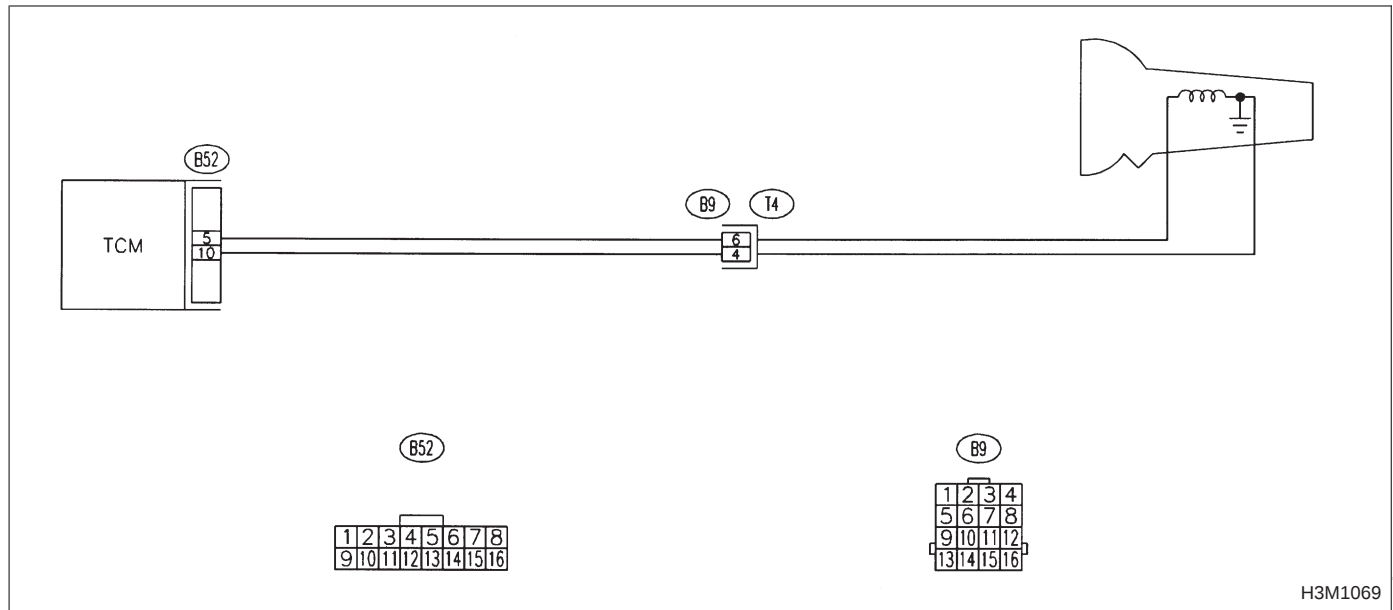
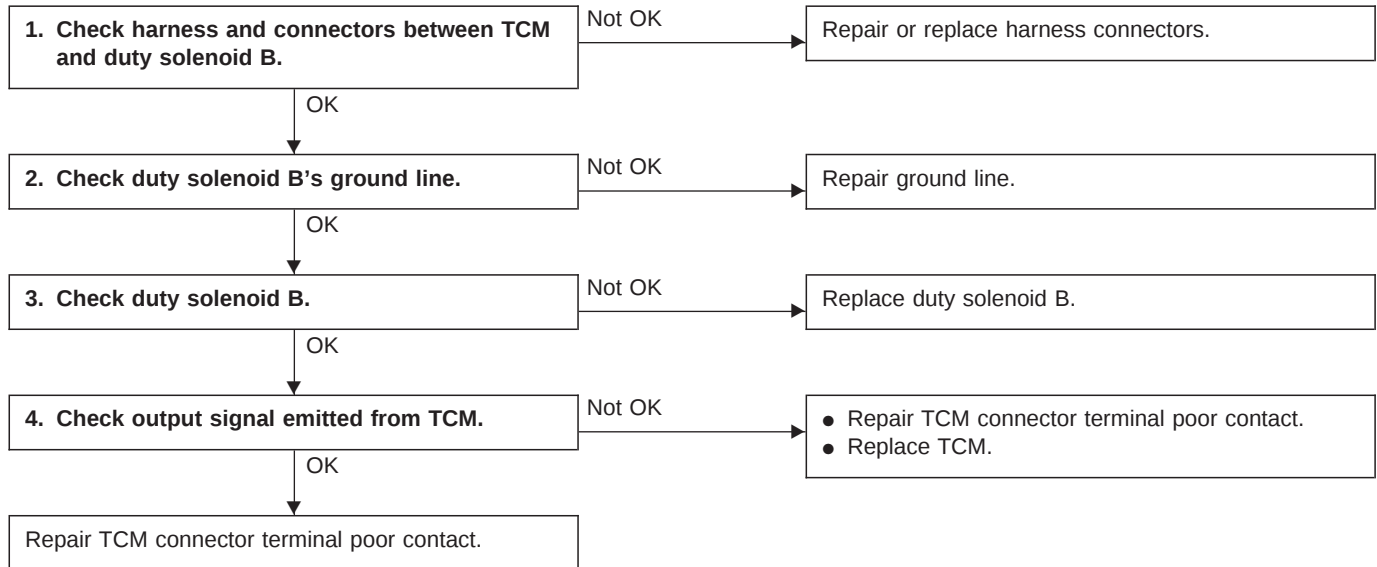
B: TROUBLE CODE 12
— DUTY SOLENOID B —

DIAGNOSIS:

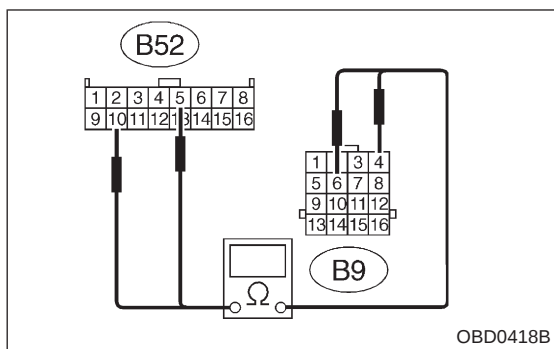
Output signal circuit of duty solenoid B is open or shorted.

TROUBLE SYMPTOM:

No lock-up (after engine warm-up)



H3M1069



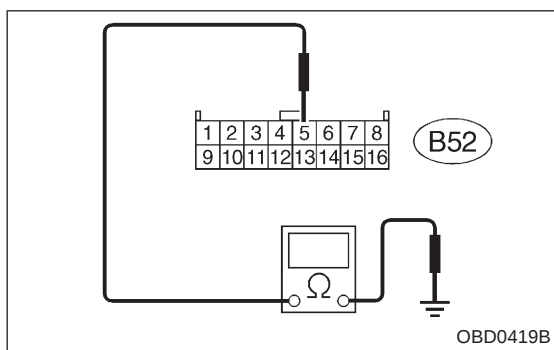
1. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND DUTY SOLENOID B.

- 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:

(B52) No. 5 — (B9) No. 6 / 1 Ω, or less

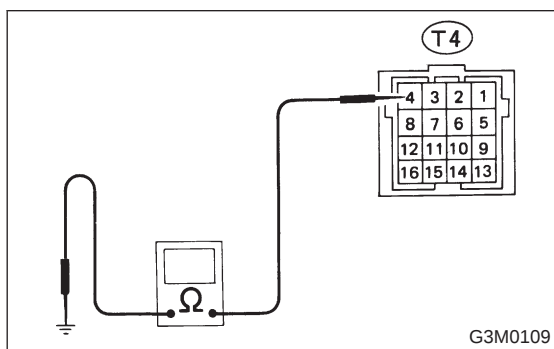
(B52) No. 10 — (B9) No. 4 / 1 Ω, or less



- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B52) No. 5 — Body / 1 MΩ, or more

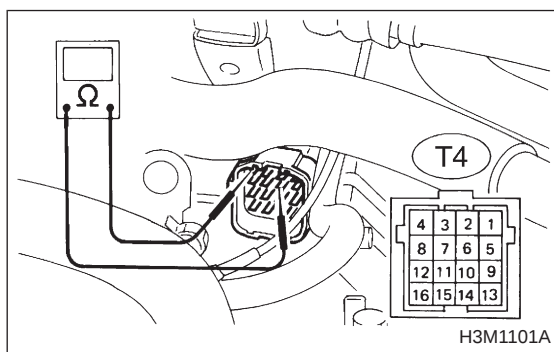


2. CHECK DUTY SOLENOID B's GROUND LINE.

Measure resistance between transmission connector receptacle and transmission case.

Connector & terminal / Specified resistance:

(T4) No. 4 — Transmission / 1 Ω, or less

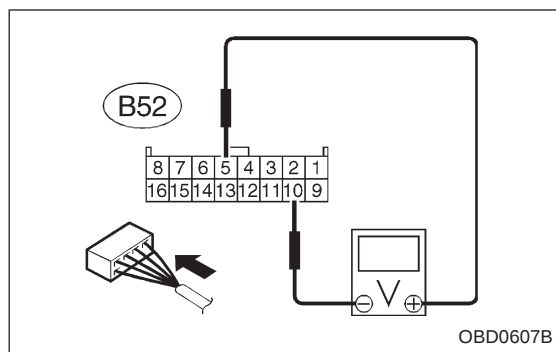


3. CHECK DUTY SOLENOID B.

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.

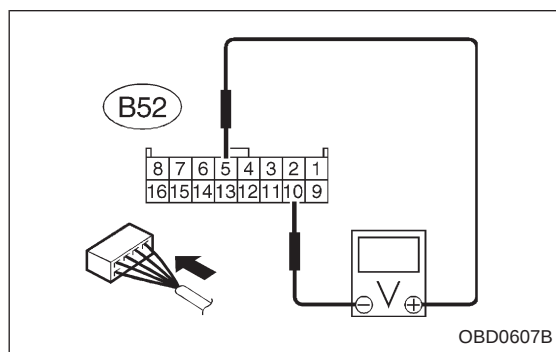
CAUTION:

On AWD models, raise all wheels off floor.

- 3) Start and warm-up the engine and transmission.
- 4) Move selector lever to "D" and slowly increase vehicle speed to 70 km/h or 44 MPH.
- 5) Measure voltage between TCM connector terminals.

Connector & terminal / Specified voltage:

(B52) No. 5 — No. 10 / 8.5 V, or more (when wheels are locked-up.)



- 6) Return the engine to idling speed and move selector lever to "N".
- 7) Measure voltage between TCM connector terminals.

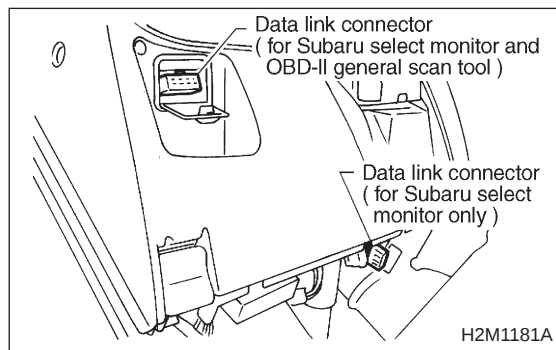
Connector & terminal / Specified voltage:

(B52) No. 5 — No. 10 / 0.5 V, or less

NOTE:

The speed difference between front and rear wheels may light either the ABS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4 [T1C2].>



- 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.

LUDTY (F12)

5 %

OBD0417

(6) Start and warm-up the engine and transmission.

(7) Designate mode using function key.

Function mode: F12

(8) Move selector lever to "D" and slowly increase vehicle speed to 70 km/h or 44 MPH.

(9) 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 warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4 [T1C2].>

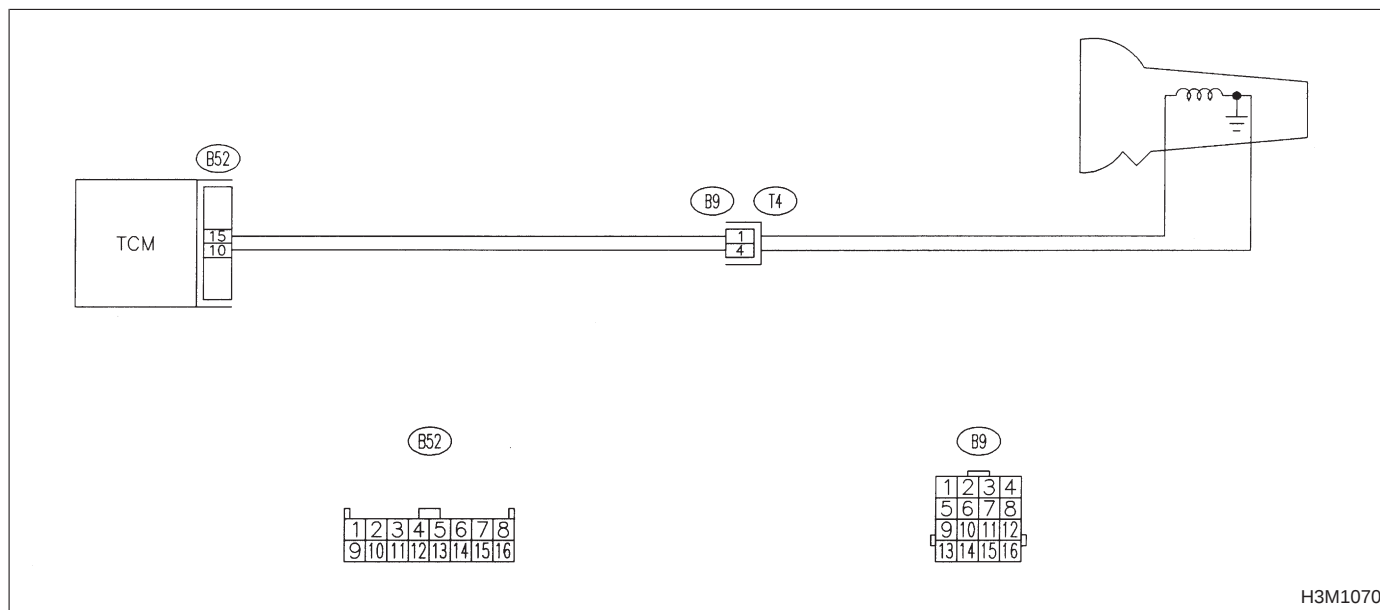
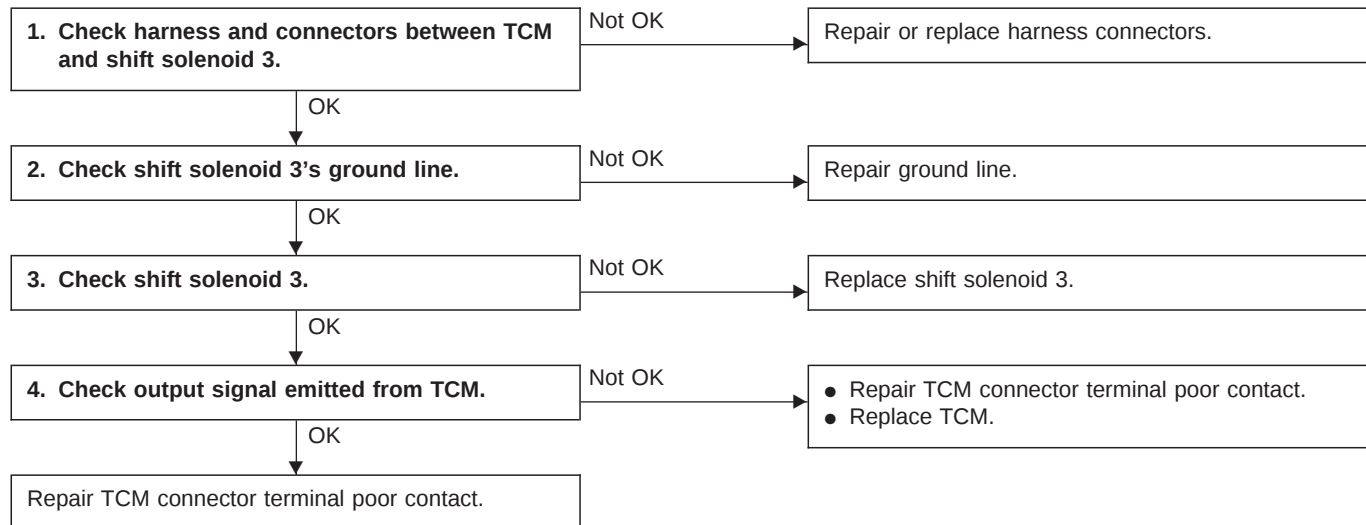
C: TROUBLE CODE 13 — SHIFT SOLENOID 3 —

DIAGNOSIS:

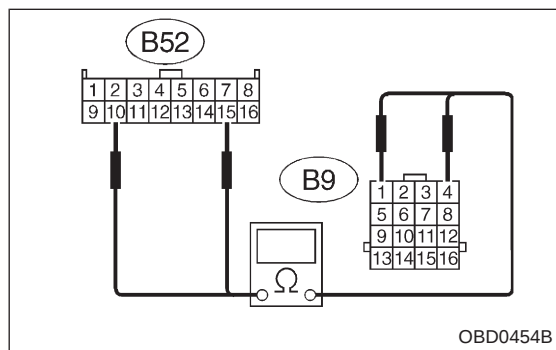
Output signal circuit of shift solenoid 3 is open or shorted.

TROUBLE SYMPTOM:

Ineffective engine brake with shift lever in "3"



H3M1070



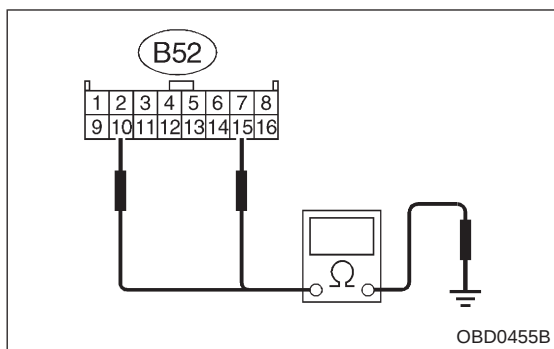
1. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND SHIFT SOLENOID 3.

- 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:

(B52) No. 15 — (B9) No. 1 / 1 Ω, or less

(B52) No. 10 — (B9) No. 4 / 1 Ω, or less

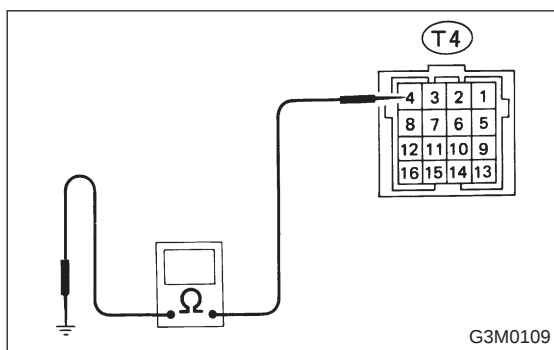


4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B52) No. 15 — Body / 1 MΩ, or more

(B52) No. 10 — Body / 1 MΩ, or more

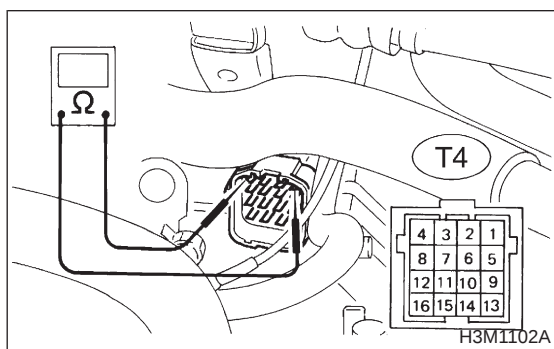


2. CHECK SHIFT SOLENOID 3's GROUND LINE.

Measure resistance between transmission connector receptacle and transmission case.

Connector & terminal / Specified resistance:

(T4) No. 4 — Transmission / 1 Ω, or less

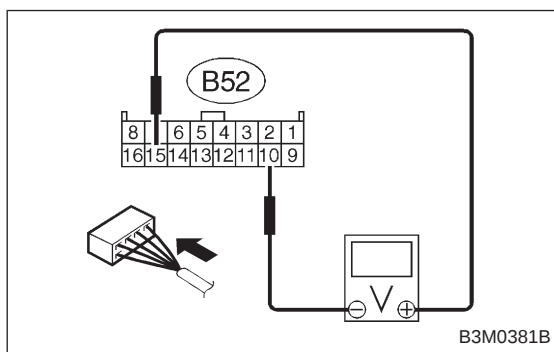


3. CHECK SHIFT SOLENOID 3.

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:

(B52) No. 15 — No. 10 / 9 V, or more

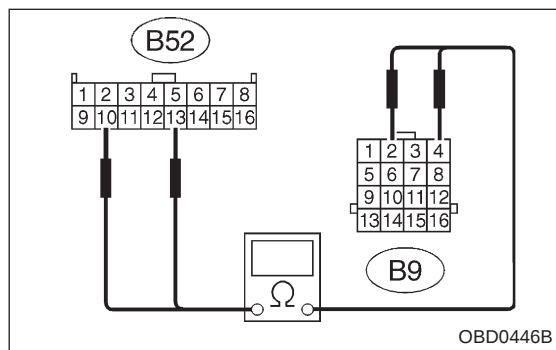
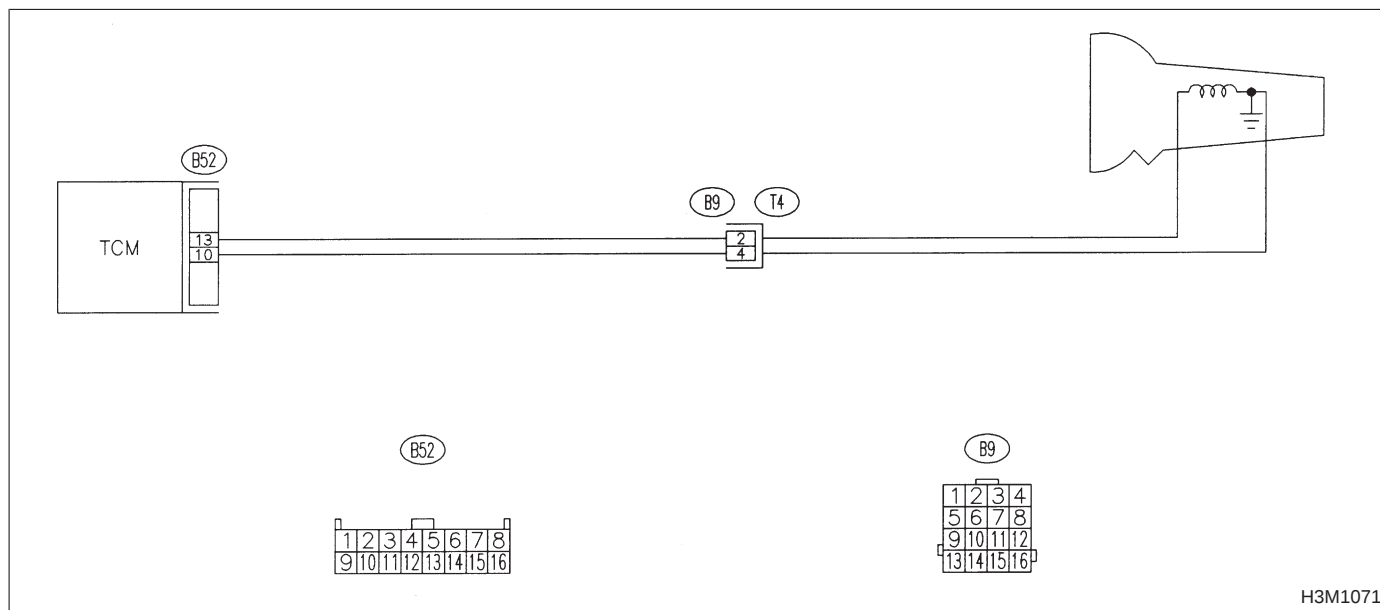
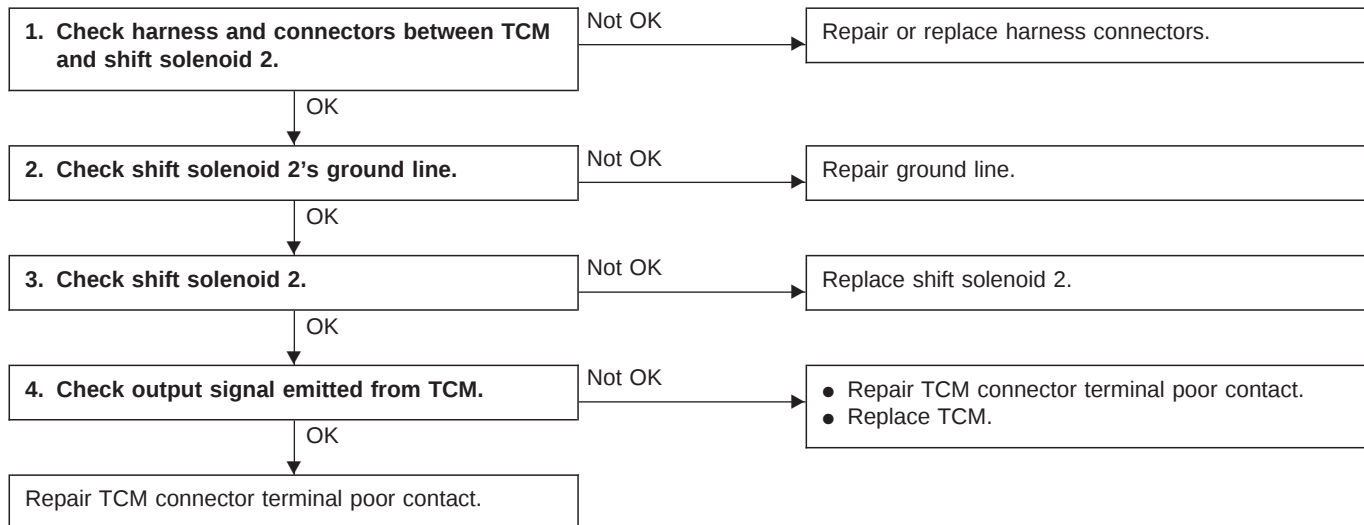
D: TROUBLE CODE 14
— SHIFT SOLENOID 2 —

DIAGNOSIS:

Output signal circuit of shift solenoid 2 is open or shorted.

TROUBLE SYMPTOM:

No shift

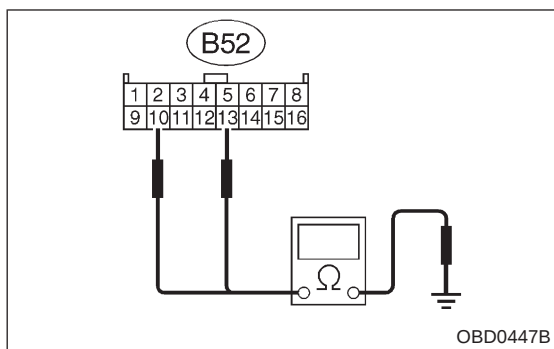


1. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND SHIFT SOLENOID 2.

- 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:

- (B52) No. 13 — (B9) No. 2 / 1 Ω, or less
(B52) No. 10 — (B9) No. 4 / 1 Ω, or less

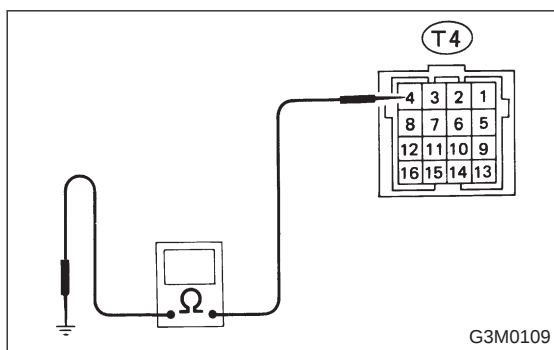


4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B52) No. 13 — Body / 1 MΩ, or more

(B52) No. 10 — Body / 1 MΩ, or more

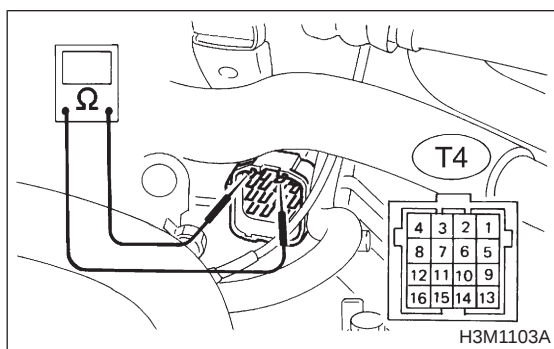


2. CHECK SHIFT SOLENOID 2's GROUND LINE.

Measure resistance between transmission connector receptacle and transmission case.

Connector & terminal / Specified resistance:

(T4) No. 4 — Transmission / 1 Ω, or less

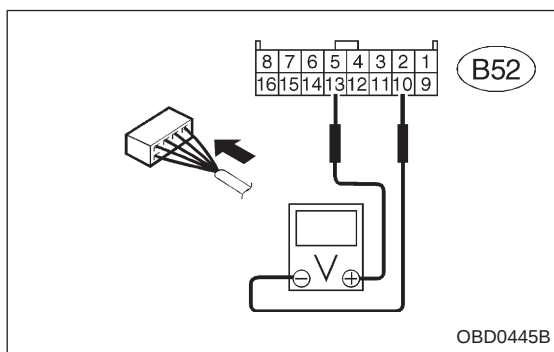


3. CHECK SHIFT SOLENOID 2.

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:

(B52) No. 13 — No. 10 / 9 V, or more

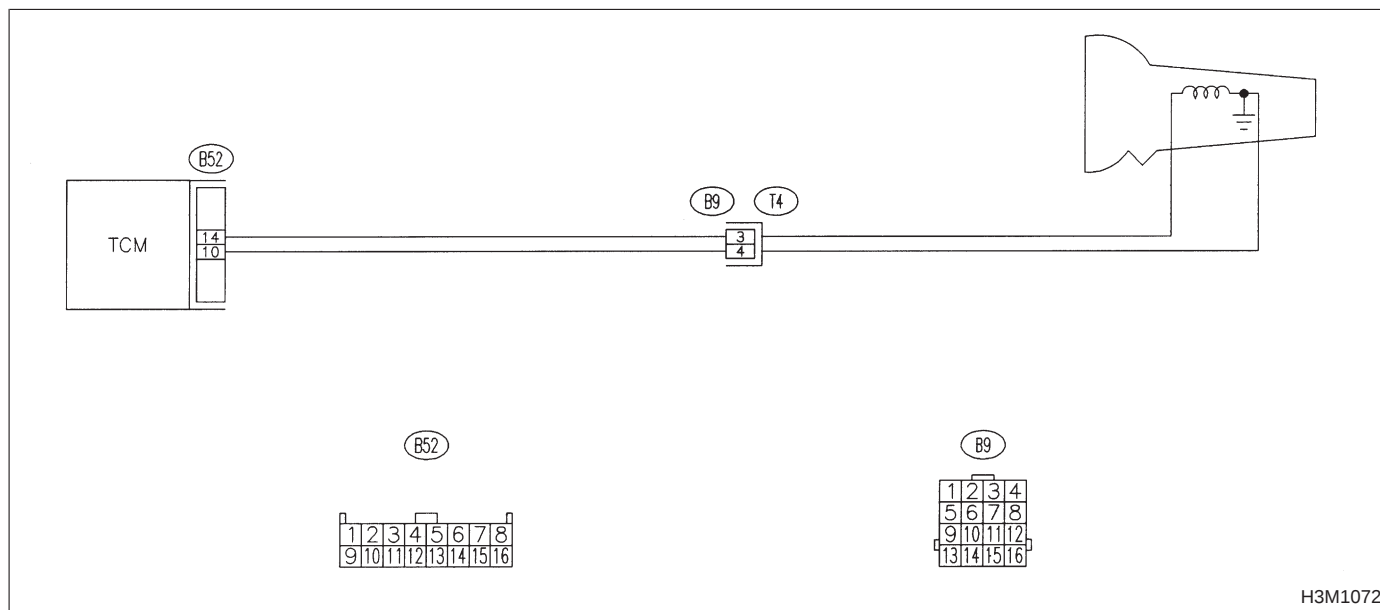
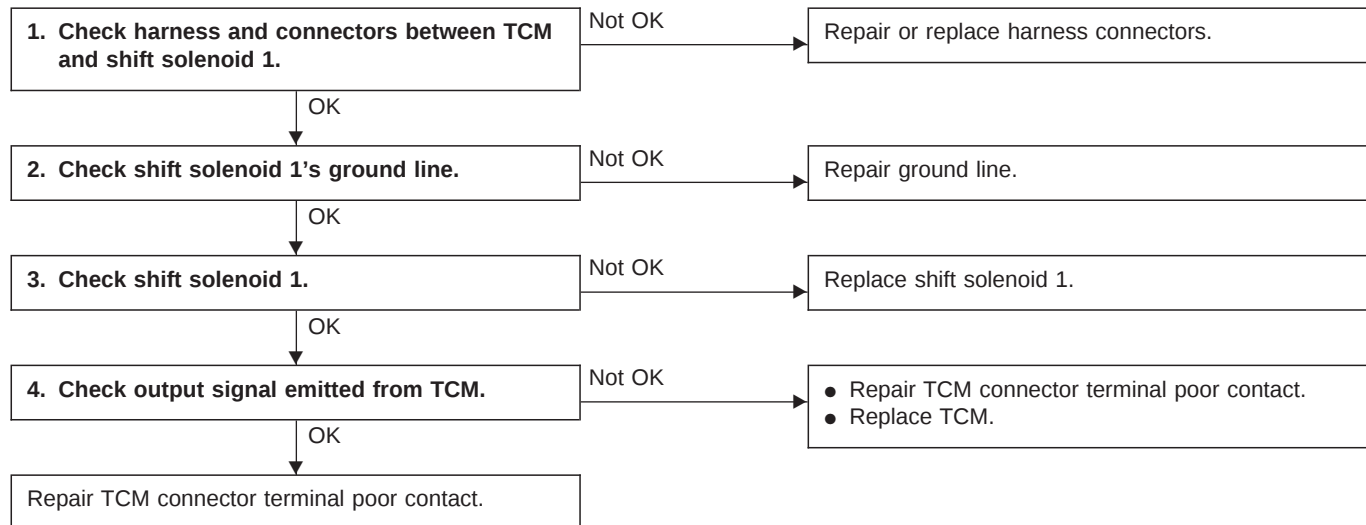
E: TROUBLE CODE 15 — SHIFT SOLENOID 1 —

DIAGNOSIS:

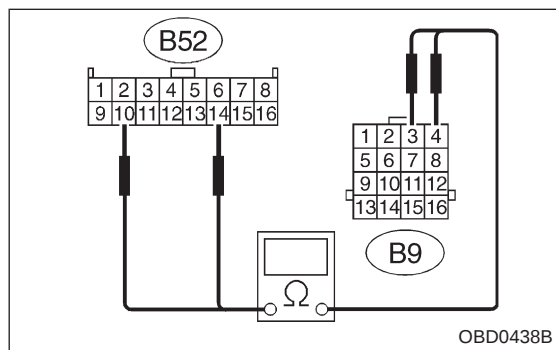
Output signal circuit of shift solenoid 1 is open or shorted.

TROUBLE SYMPTOM:

No shift



H3M1072



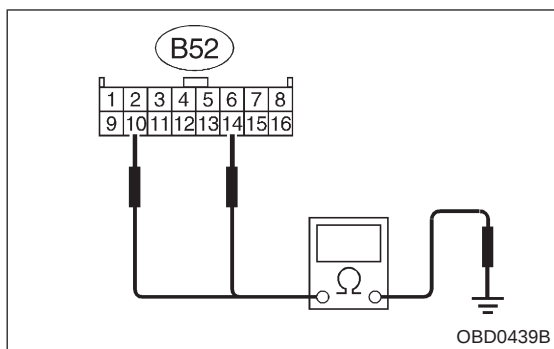
1. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND SHIFT SOLENOID 1.

- 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:

(B52) No. 14 — (B9) No. 3 / 1 Ω, or less

(B52) No. 10 — (B9) No. 4 / 1 Ω, or less

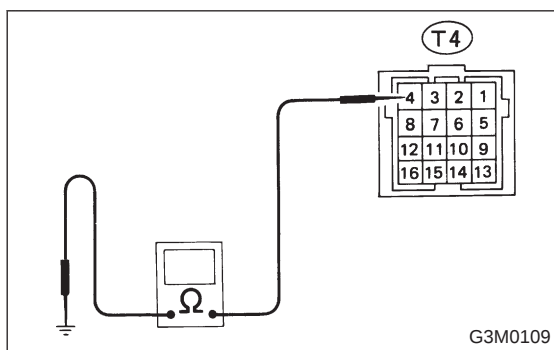


4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B52) No. 14 — Body / 1 MΩ, or more

(B52) No. 10 — Body / 1 MΩ, or more

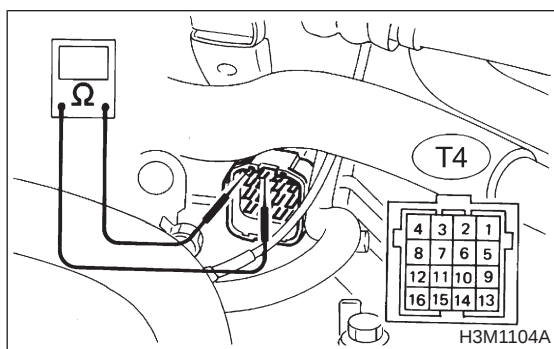


2. CHECK SHIFT SOLENOID 1's GROUND LINE.

Measure resistance between transmission connector receptacle and transmission case.

Connector & terminal / Specified resistance:

(T4) No. 4 — Transmission / 1 Ω, or less

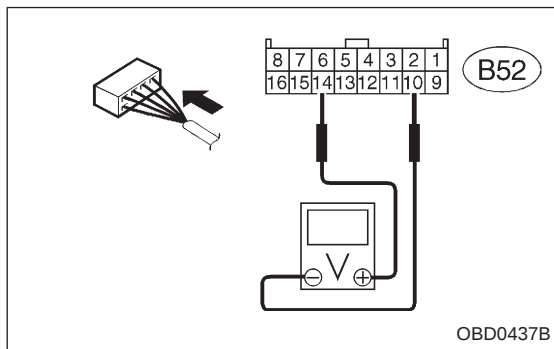


3. CHECK SHIFT SOLENOID 1.

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:

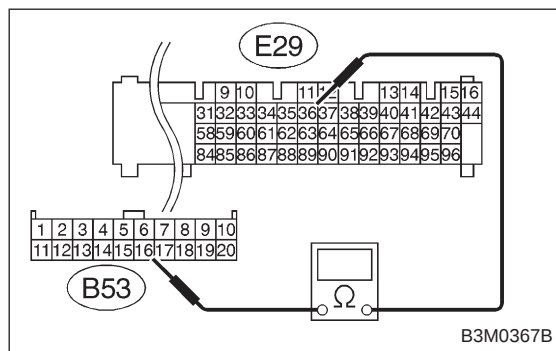
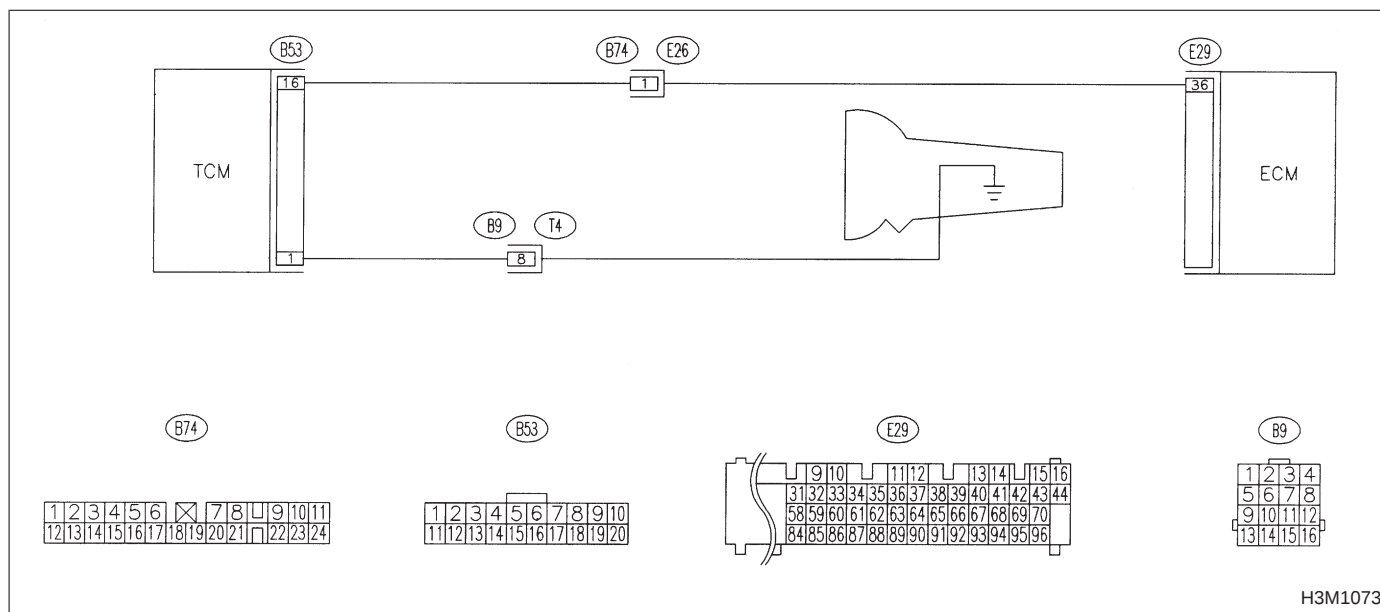
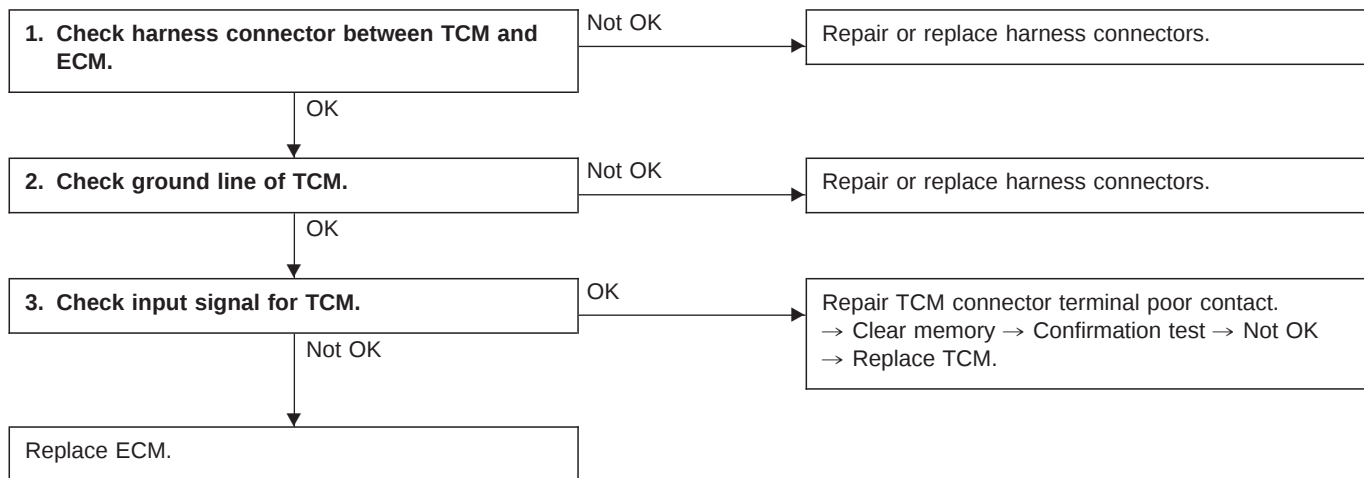
(B52) No. 14 — No. 10 / 9 V, or more

F: TROUBLE CODE 16

— TORQUE CONTROL CUT SIGNAL —

DIAGNOSIS:

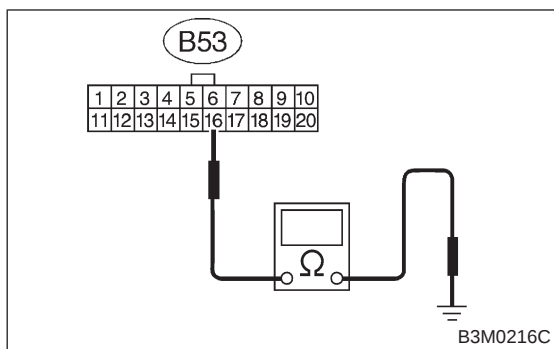
- Torque control cut signal is not emitted from ECM.
- The signal circuit is open or shorted.



1. CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.

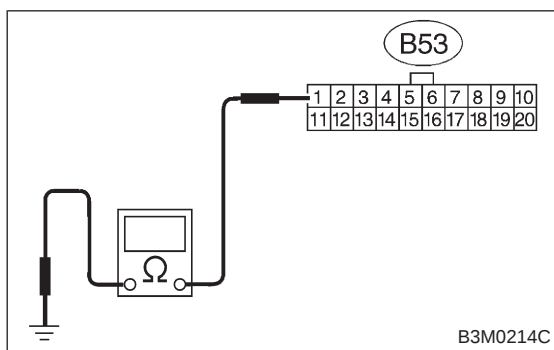
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from ECM and TCM.
- 3) Measure resistance of harness connector between TCM and ECM.

Connector & terminal / Specified resistance:
(B53) No. 16 — (E29) No. 36/ 1 Ω, or less



4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

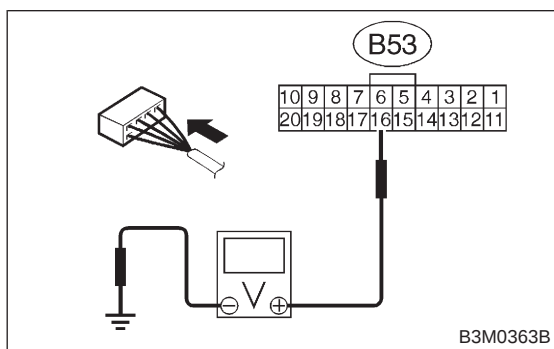
Connector & terminal / Specified resistance:
(B53) No. 16 — Body / 1 MΩ, or more



2. CHECK GROUND LINE OF TCM.

Measure resistance of harness connector between TCM and body.

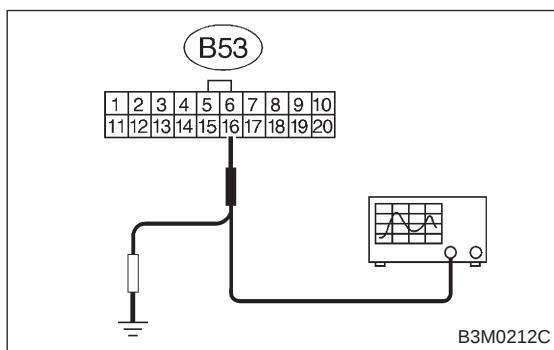
Connector & terminal / Specified resistance:
(B53) No. 1 — Body / 1 Ω, or less



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.

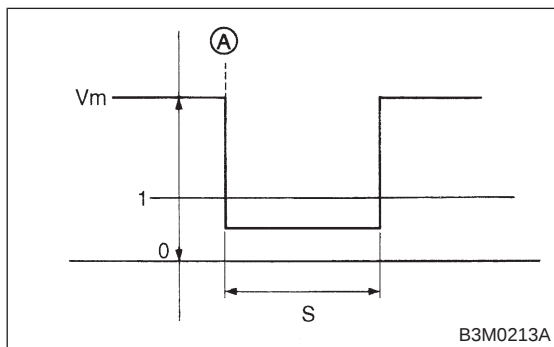
Connector & terminal / Specified voltage:
(B53) No. 16 — Body / 6 — 9 V



● Using oscilloscope:

- (1) Connect connectors to ECM and TCM.
- (2) Set oscilloscope to TCM connector terminals.

Connector & terminals:
Positive probe; (B53) 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)).

Vm: 6 — 9 V
S: 1 second

G: TROUBLE CODE 21

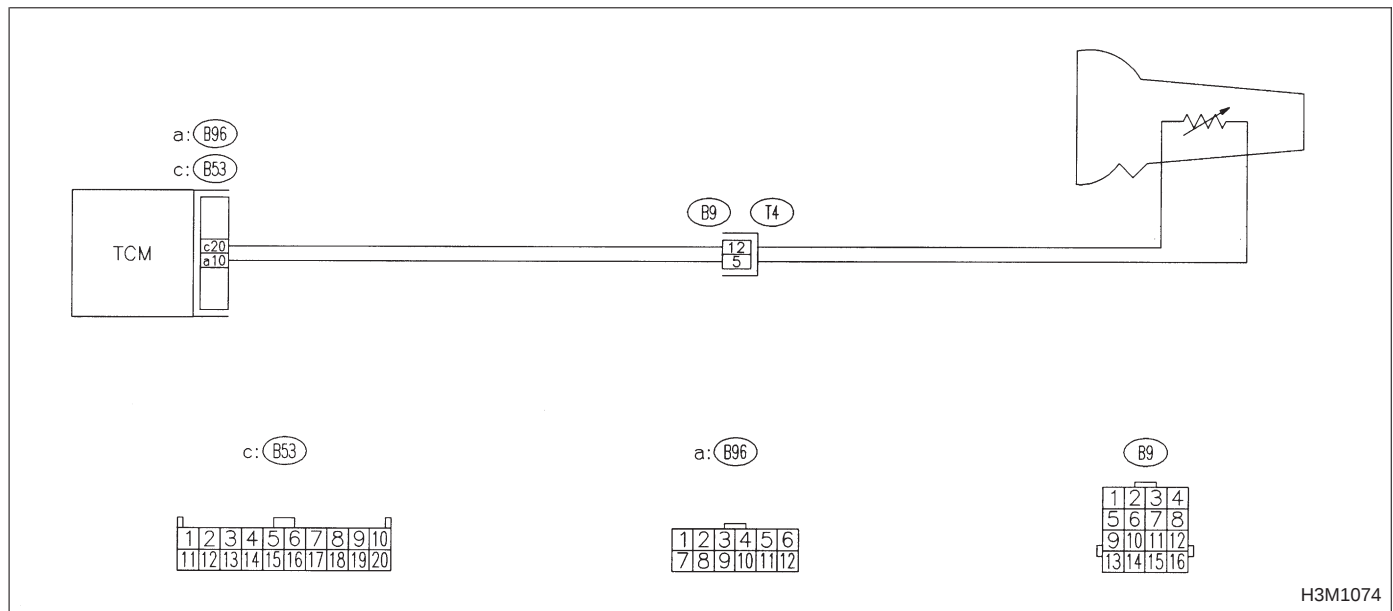
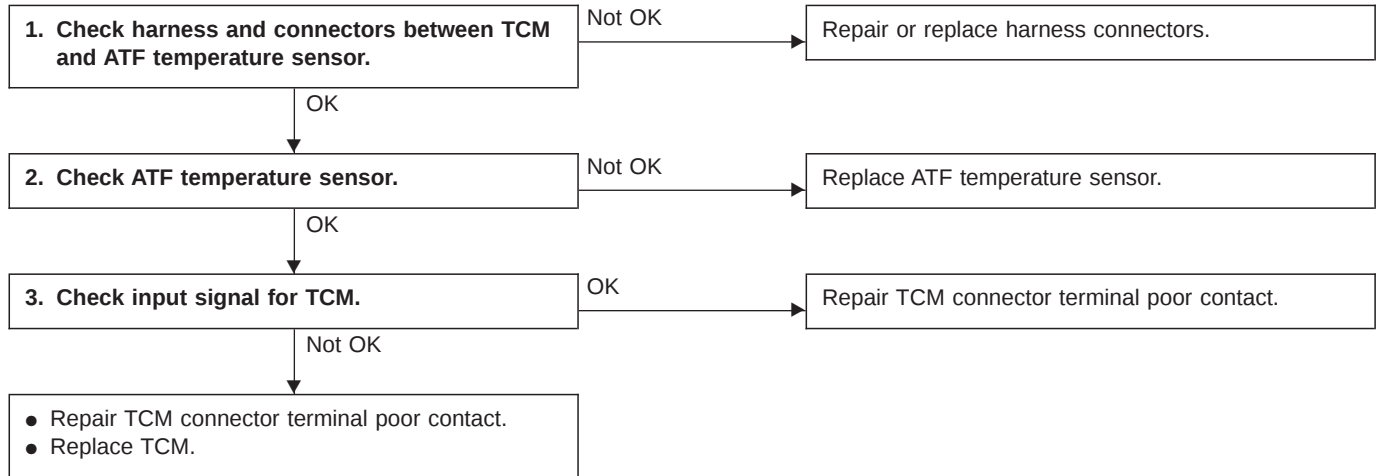
— ATF TEMPERATURE SENSOR —

DIAGNOSIS:

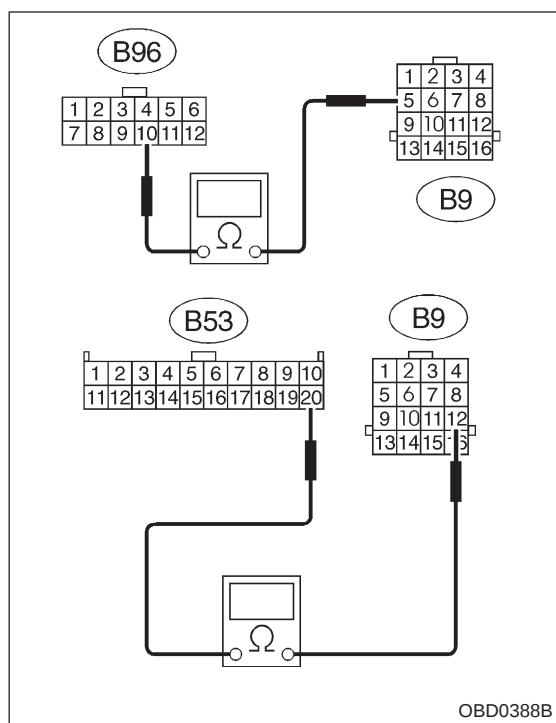
Input signal circuit of TCM to ATF temperature sensor is open or shorted.

TROUBLE SYMPTOM:

Excessive shift shock



H3M1074



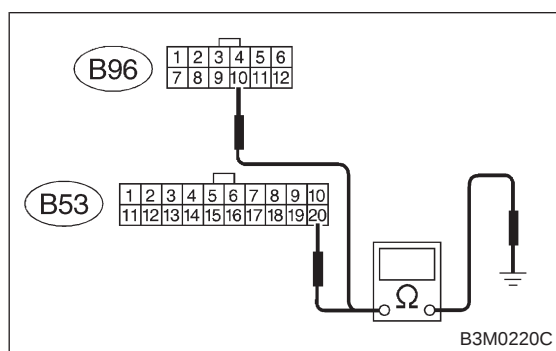
1. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND ATF TEMPERATURE SENSOR.

- 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:

(B96) No. 10 — (B9) No. 5 / 1 Ω , or less

(B53) No. 20 — (B9) No. 12 / 1 Ω , or less

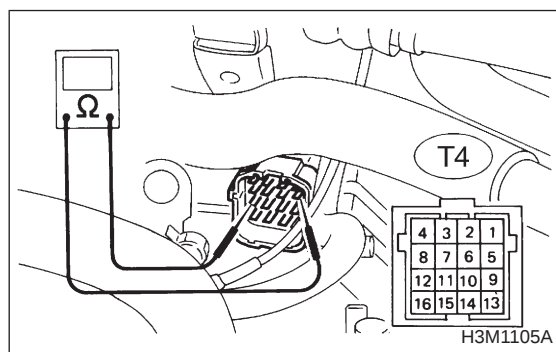


- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B96) No. 10 — Body / 1 M Ω , or more

(B53) 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 /

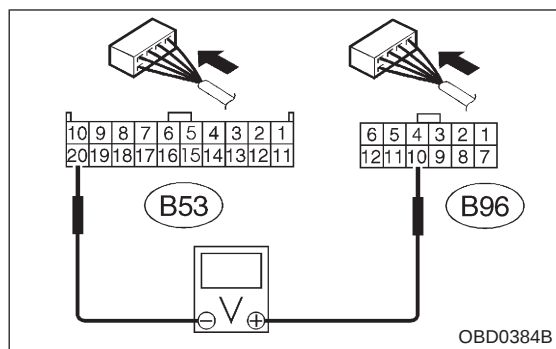
2.1 — 2.9 k Ω [ATF temperature: 20 deg C (68 deg F)]

- 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 deg C (176 deg F)]



3. CHECK INPUT SIGNAL FOR TCM.

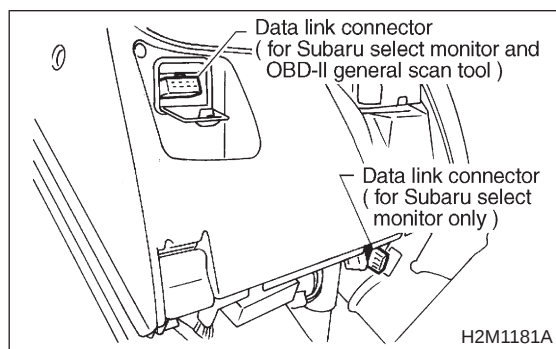
- 1) Turn ignition switch ON (with engine OFF) and measure signal voltage input of TCM.
- 2) Start and warm-up the engine. Measure signal voltage input of TCM.

Connector & terminal / Specified voltage:

(B96) No. 10 — (B53) No. 20 /

3.45±0.55 V [ATF temperature: 20 deg C (68 deg F)]

1.2±0.2 V [ATF temperature: 80 deg C (176 deg 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.

ATFT (F07)

176 deg F

OBD0386

ATFT (F08)

80 deg C

OBD0387

- (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

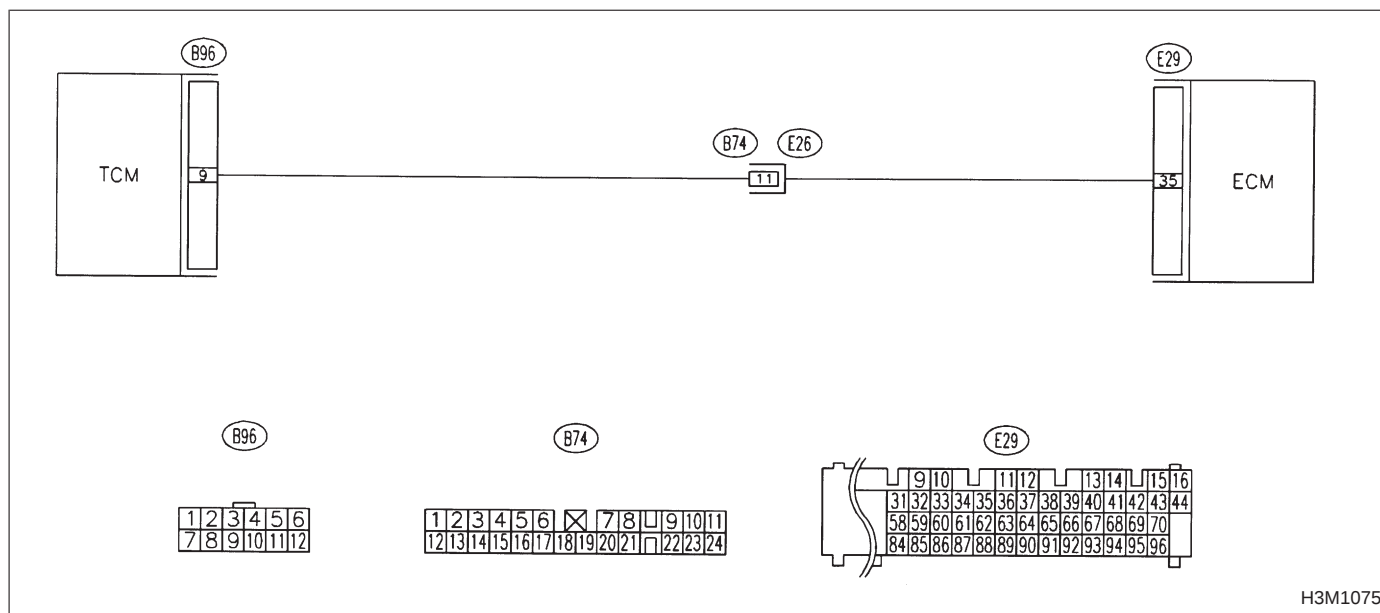
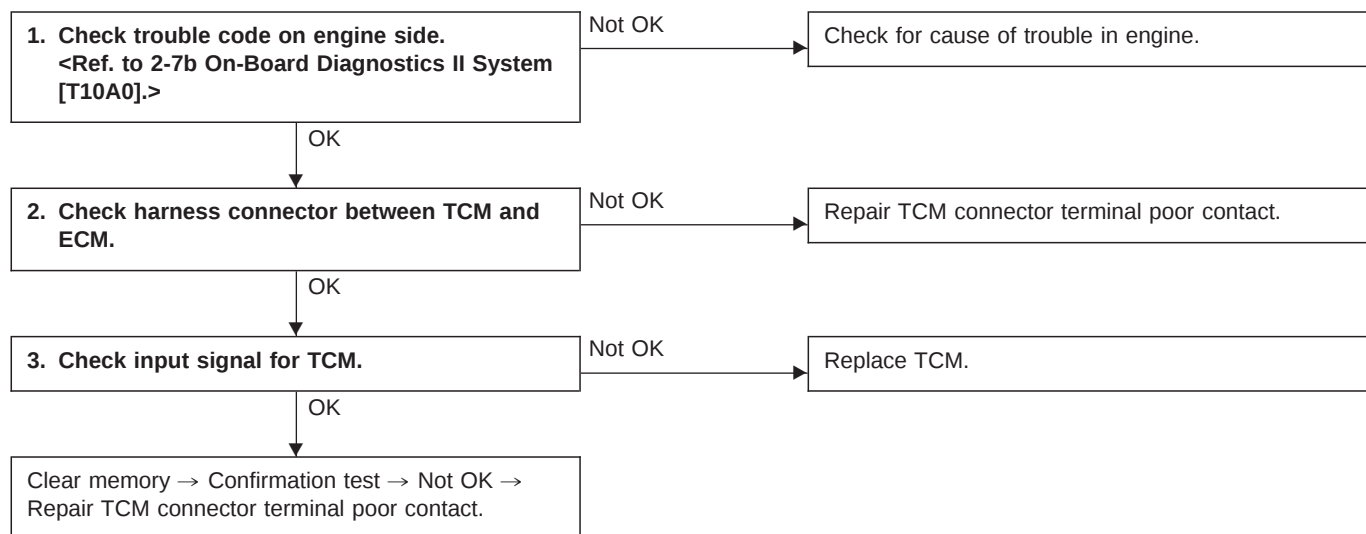
● Shorted harness: 160 deg C

- 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:**

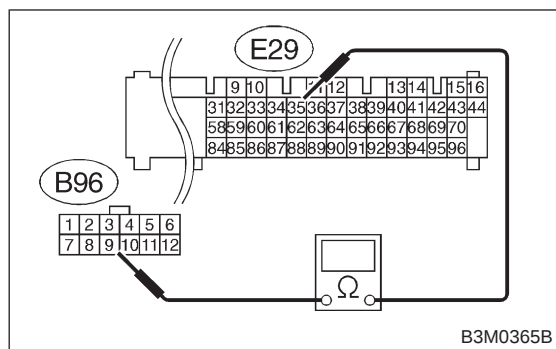
Input signal circuit of TCM from ECM is open or shorted.



H3M1075

1. CHECK TROUBLE CODE ON ENGINE SIDE.

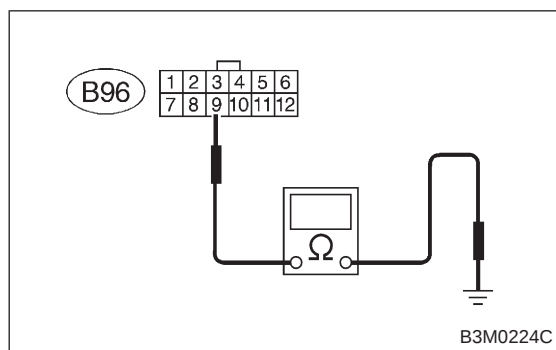
Using Subaru select monitor or OBD-II general scan tool, check trouble code of mass air flow sensor on engine side.



2. CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.

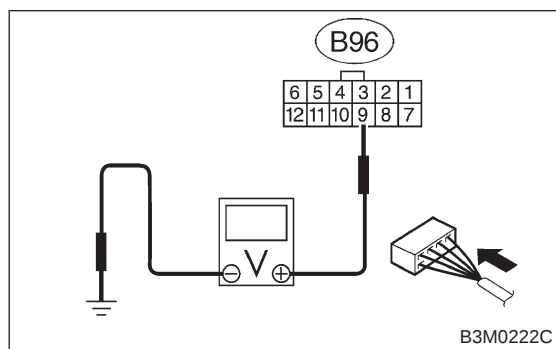
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and ECM.
- 3) Measure resistance of harness connector between TCM and ECM.

Connector & terminal / Specified resistance:
(B96) No. 9 — (E29) No. 35 / 1 Ω, or less



- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

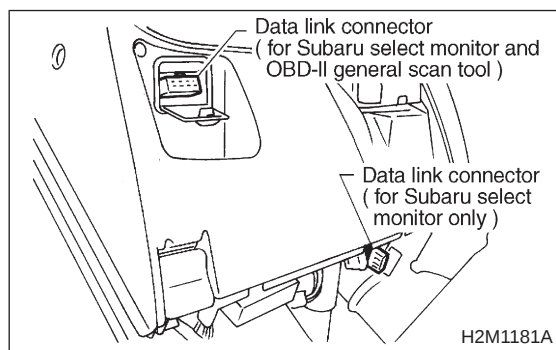
Connector & terminal / Specified resistance:
(B96) No. 9 — Body / 1 MΩ, or more



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;
(B96) 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)

AFM (F15)

0.6V

B3M0370

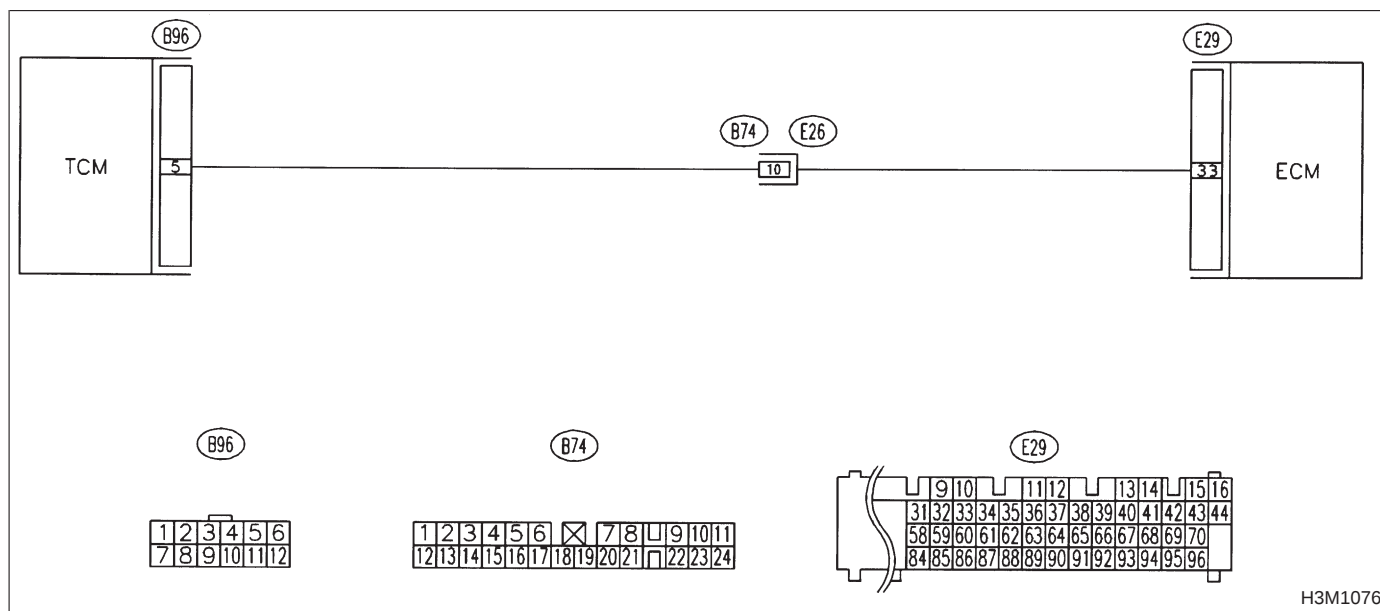
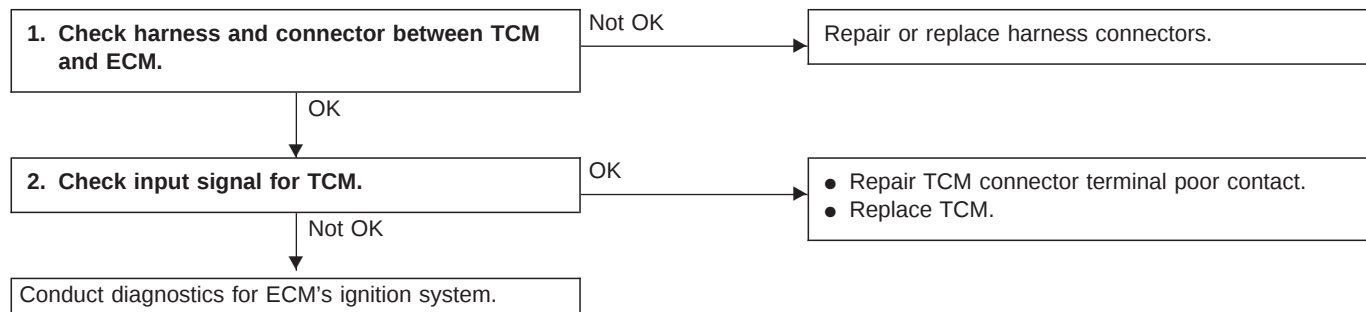
I: TROUBLE CODE 23 — ENGINE SPEED SIGNAL —

DIAGNOSIS:

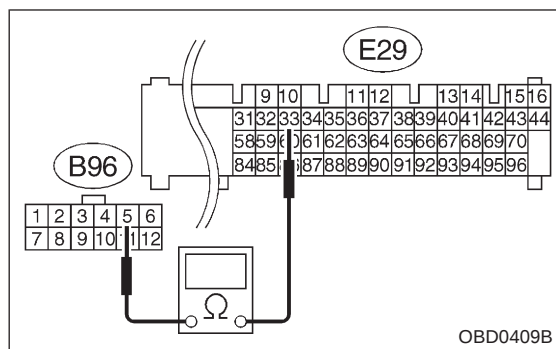
Engine speed input signal circuit is open or shorted.

TROUBLE SYMPTOM:

- No lock-up (after engine warm-up)
- AT OIL TEMP indicator remains on when vehicle speed is "0".



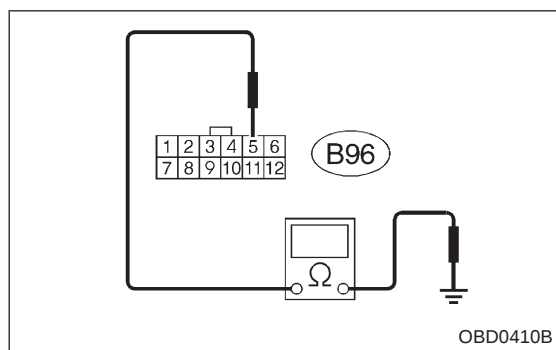
H3M1076



1. CHECK HARNESS AND CONNECTOR BETWEEN TCM AND ECM.

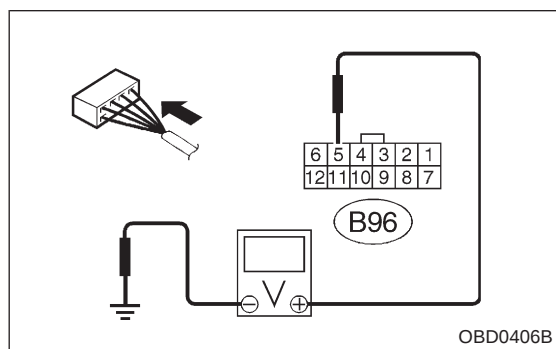
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and ECM.
- 3) Measure resistance of harness connector between TCM and ECM.

Connector & terminal / Specified resistance:
(B96) No. 5 — (E29) No. 33 / 1 Ω , or less



- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

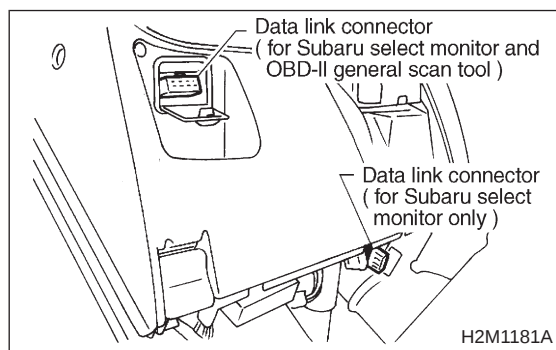
Connector & terminal / Specified resistance:
(B96) No. 5 — Body / 1 M Ω , or more



2. CHECK INPUT SIGNAL FOR TCM.

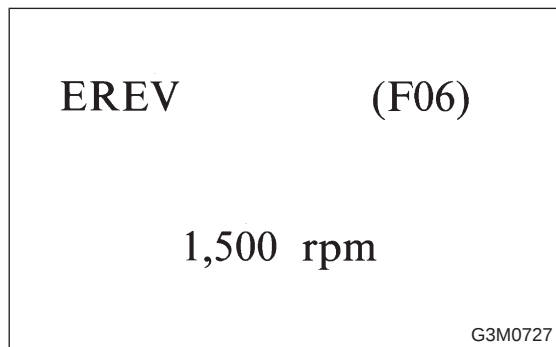
- 1) Connect connectors to ECM and TCM.
- 2) Turn ignition switch ON (with engine OFF).
- 3) Measure signal voltage for TCM.

Connector & terminal / Specified voltage:
(B96) 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.



- (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)

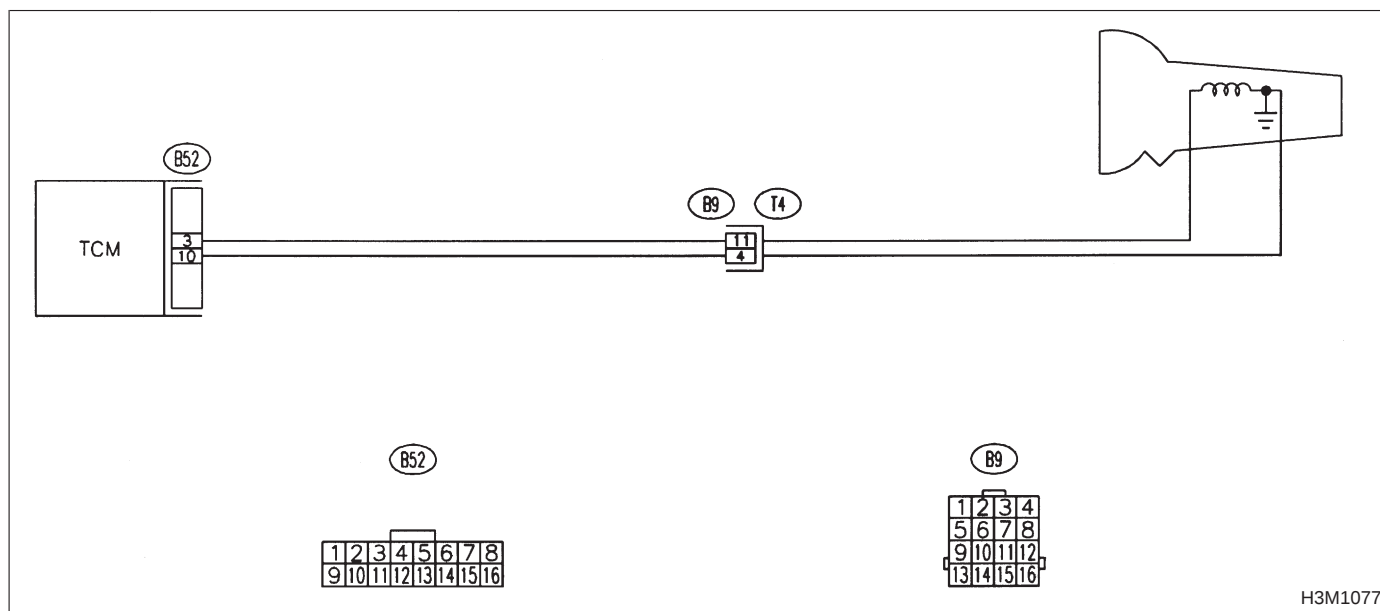
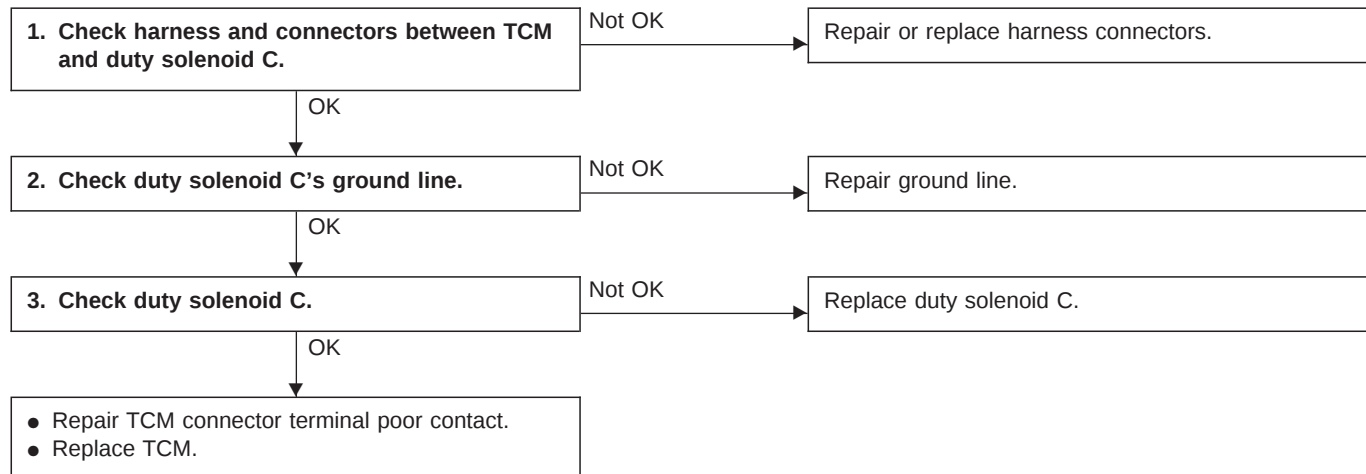
J: TROUBLE CODE 24 — DUTY SOLENOID C —

DIAGNOSIS:

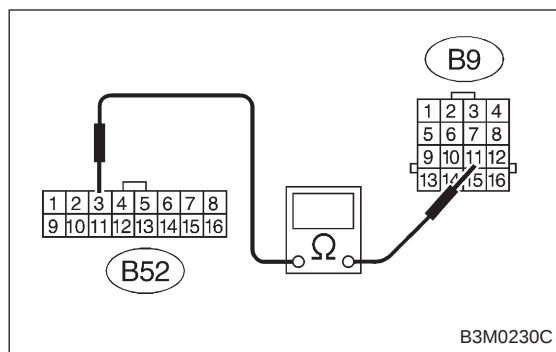
Output signal circuit of duty solenoid C is open or shorted.

TROUBLE SYMPTOM:

Excessive "braking" in tight corners



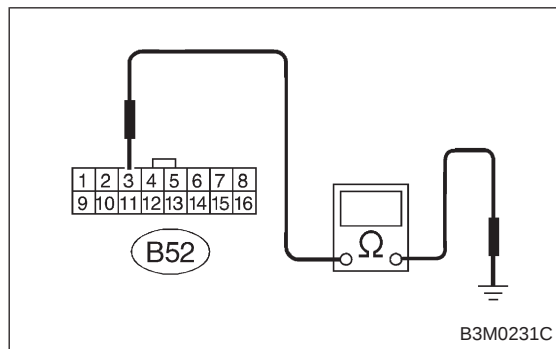
H3M1077



1. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND DUTY SOLENOID C.

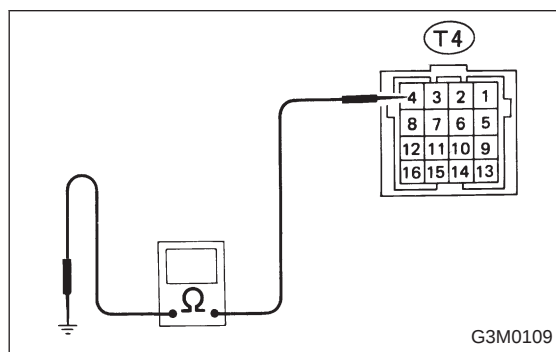
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and transmission.
- 3) Measure resistance of harness connector between TCM and transmission.

Connector & terminal / Specified resistance:
(B52) No. 3 — (B9) No. 11 / 1 Ω , or less



- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

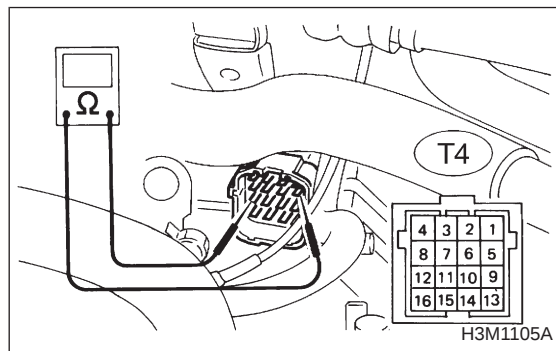
Connector & terminal / Specified resistance:
(B52) No. 3 — Body / 1 M Ω , or more



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.

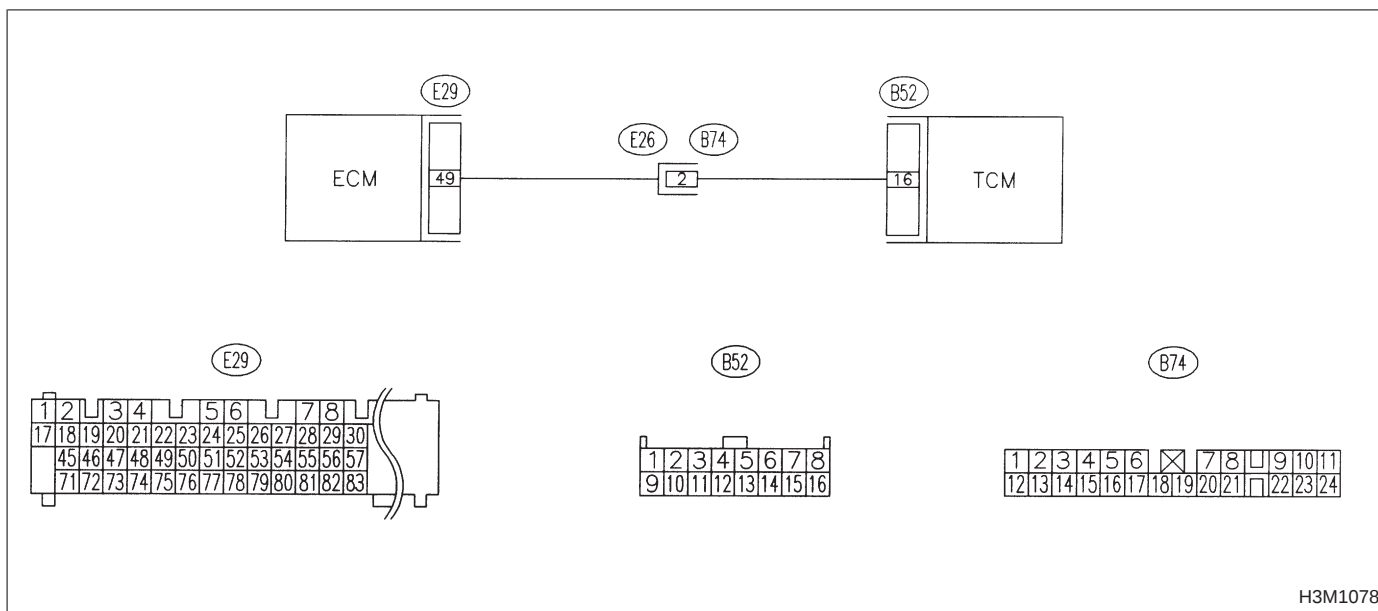
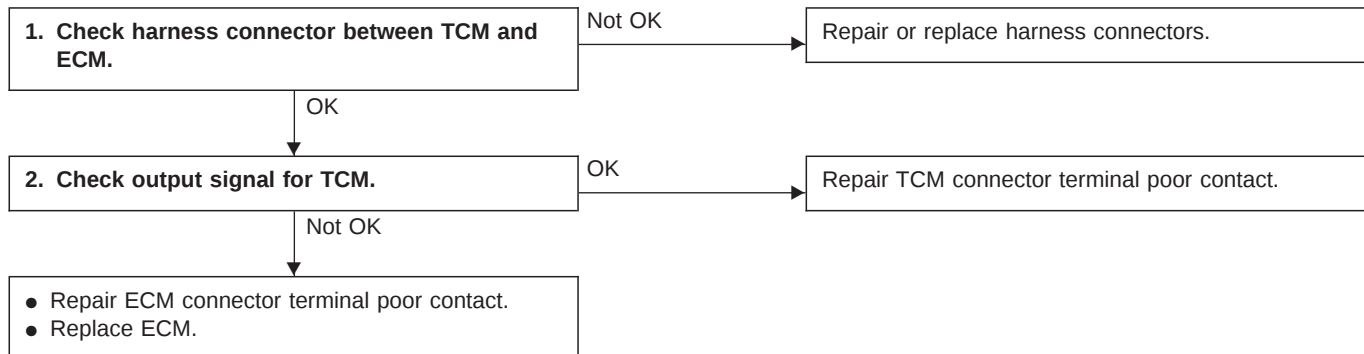
Connector & terminal / Specified resistance:
(T4) No. 11 — No. 4 / 9 — 17 Ω

K: TROUBLE CODE 25

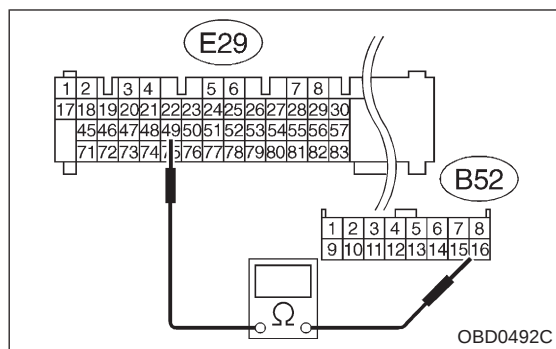
— TORQUE CONTROL SIGNAL —

DIAGNOSIS:

- Torque control signal is not emitted from TCM.
- The signal circuit is open or shorted.



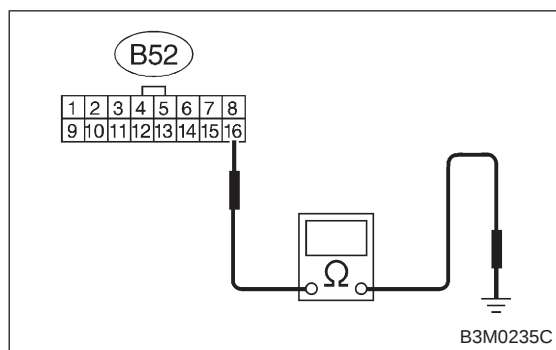
H3M1078



1. CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.

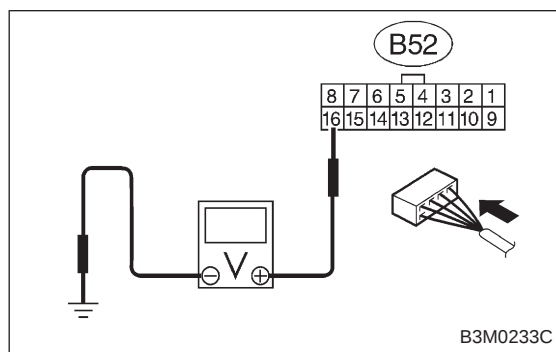
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and ECM.
- 3) Measure resistance of harness connector between TCM and ECM.

Connector & terminal / Specified resistance:
(B52) No. 16 — (E29) 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:
(B52) No. 16 — Body / 1 M Ω , or more



2. CHECK INPUT 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:
(B52) No. 16 — Body / 5 $\pm$ 1 V

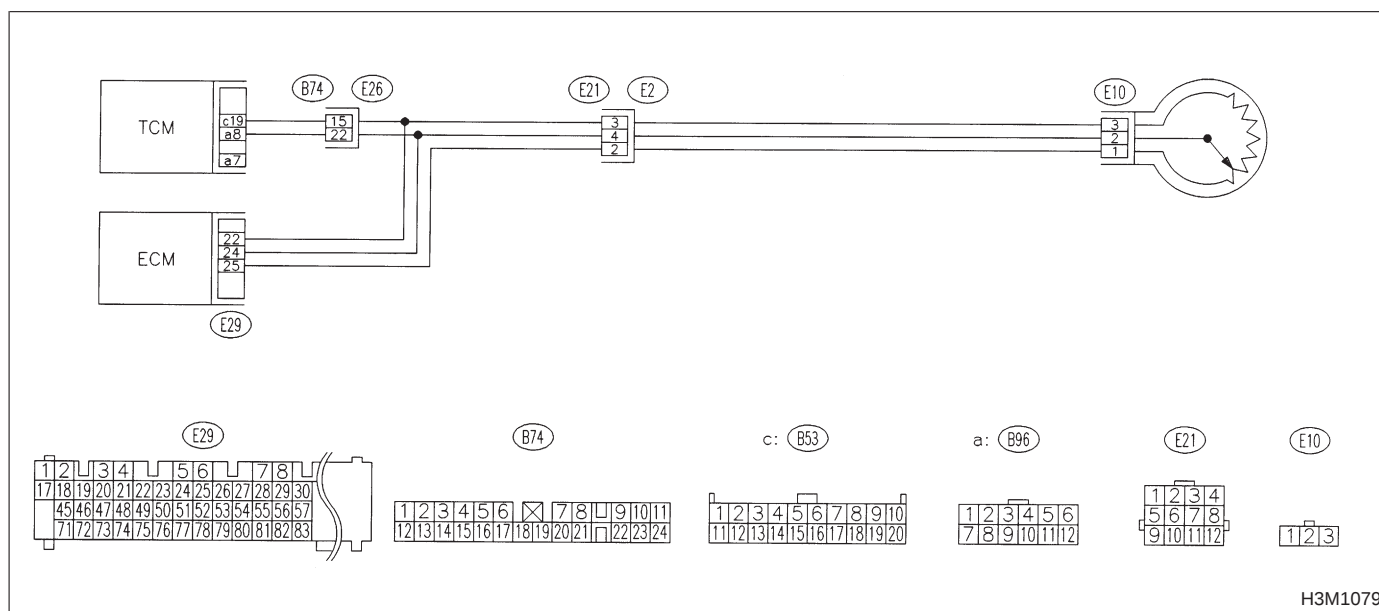
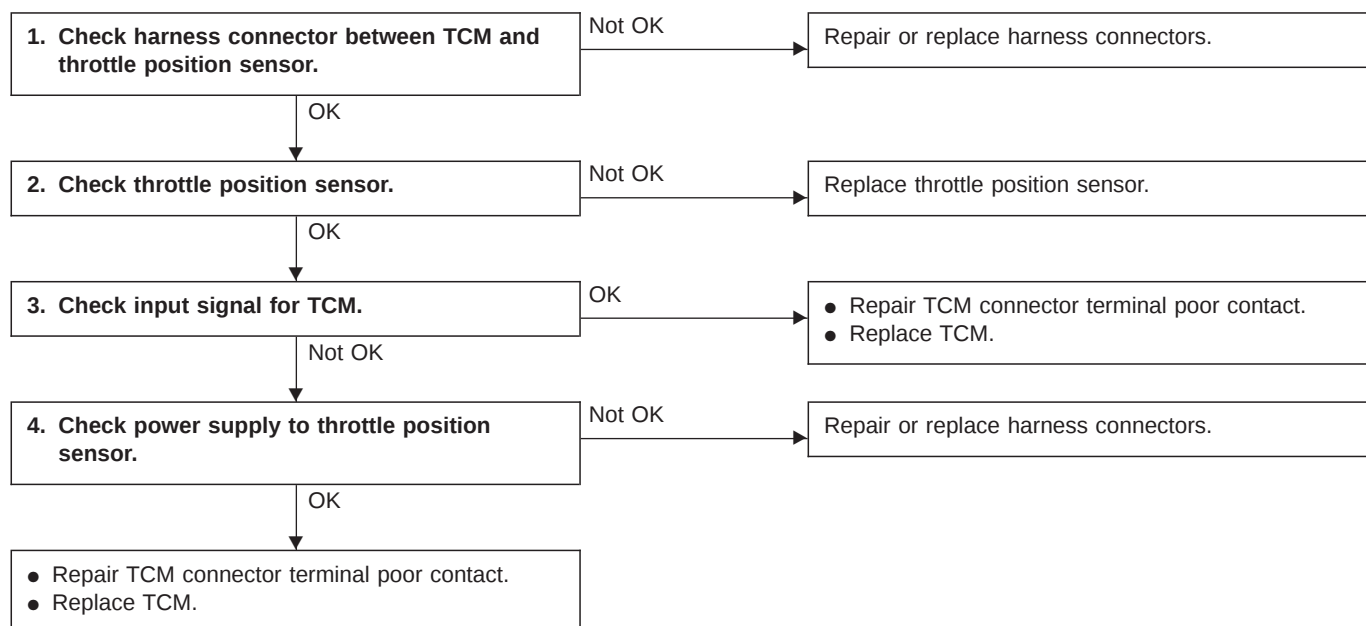
L: TROUBLE CODE 31 — THROTTLE POSITION SENSOR —

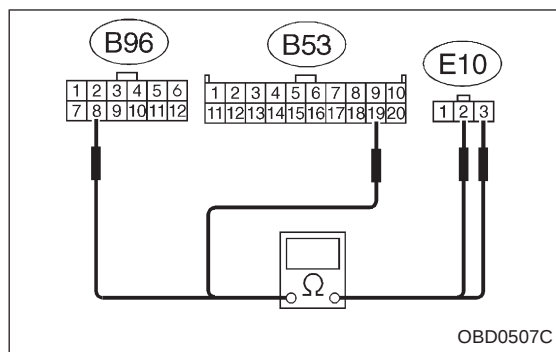
DIAGNOSIS:

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"





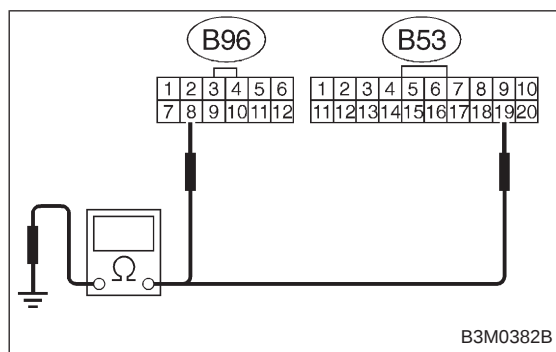
1. CHECK HARNESS CONNECTOR BETWEEN TCM AND THROTTLE POSITION SENSOR.

- 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:

(B96) No. 8 — (E10) No. 2 / 1 Ω , or less

(B53) No. 19 — (E10) No. 3 / 1 Ω , or less

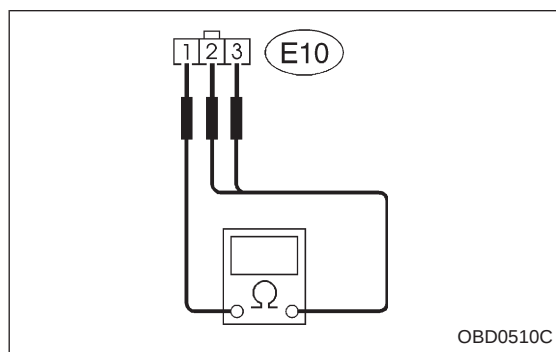


- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B96) No. 8 — Body / 1 M Ω , or more

(B53) No. 19 — Body / 1 M Ω , or more



2. CHECK THROTTLE POSITION SENSOR.

Measure resistance between throttle position sensor terminals.

Terminals / Specified resistance:

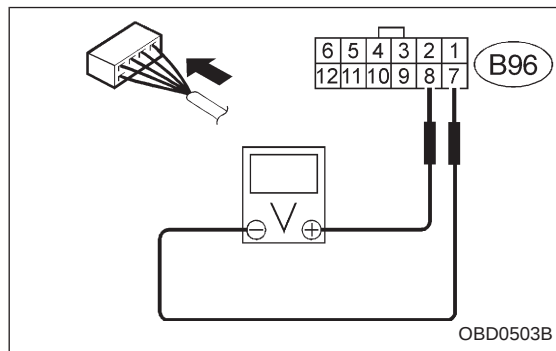
(E10) No. 1 — No. 2 / 0.3 — 0.7 k Ω

(Throttle fully closed.)

3 — 6 k Ω

(Throttle fully open.)

(E10) No. 1 — No. 3 / 3.5 — 6.5 k Ω



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:

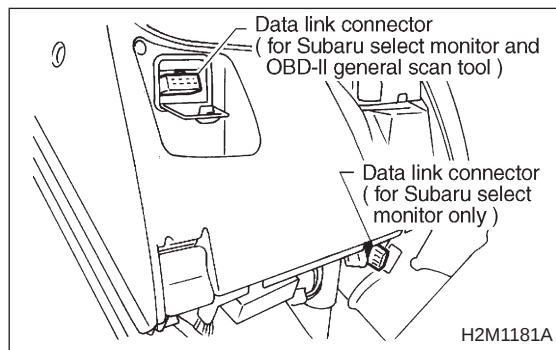
(B96) No. 8 — No. 7 /

0.5 $\pm$ 0.2 V (Throttle fully closed.)

4.6 $\pm$ 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.



THV (F09)

4 . 6V

B3M0383

- (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±0.2 V (Throttle fully open.)

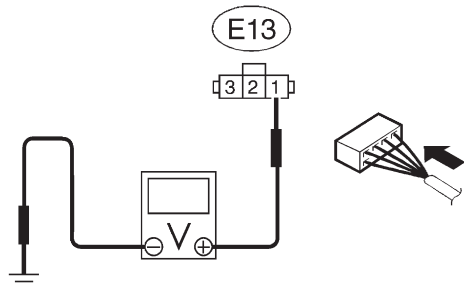
[Must be changed correspondingly with accelerator pedal operation (from "released" to "depressed" position).]

4. CHECK POWER SUPPLY TO THROTTLE POSITION SENSOR.

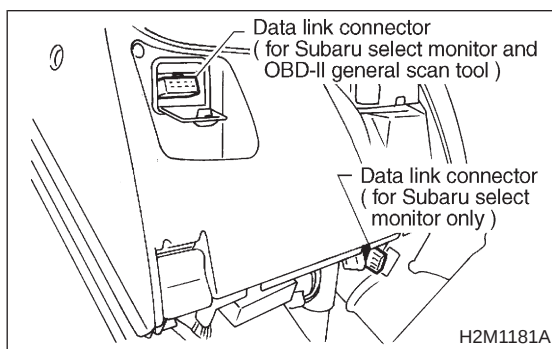
- 1) Turn ignition switch to ON (with engine OFF).
- 2) Measure power supply voltage to throttle position sensor.

Connector & terminal / Specified voltage:

(E13) No. 1 — Body / 5.12±0.1 V



B3M0238B



H2M1181A

- 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 (engine OFF) and Subaru select monitor switch to ON.

THVCC (F14)

5.2V

OBD0506

- (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

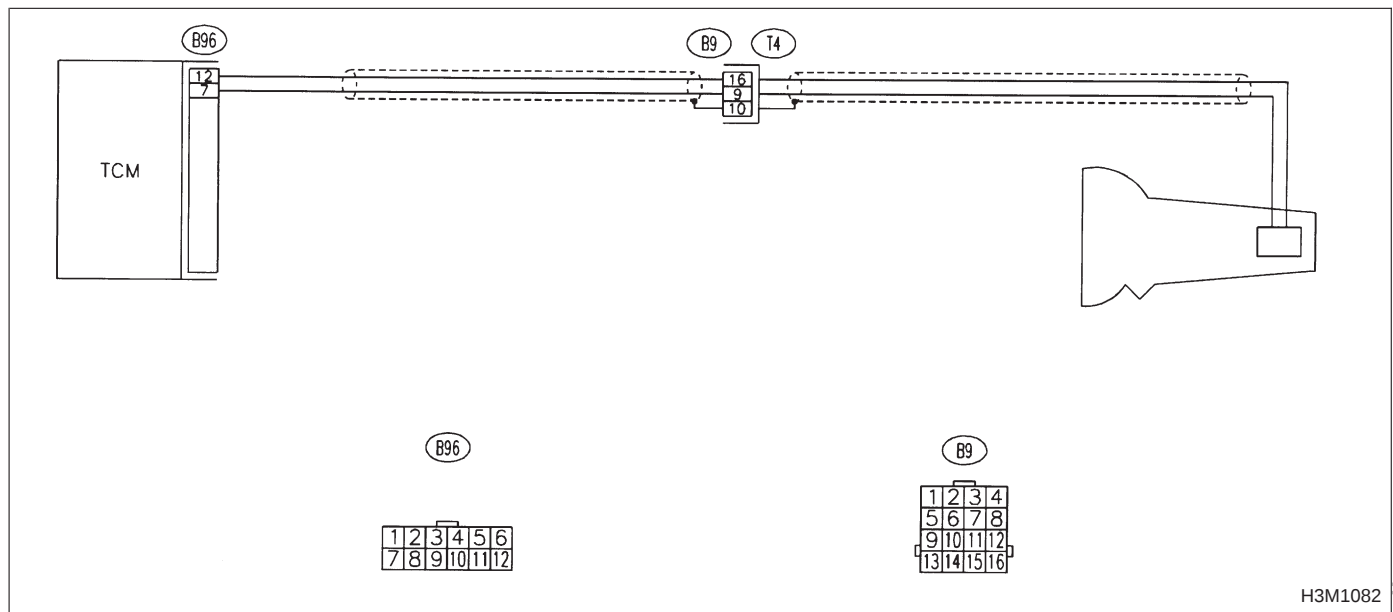
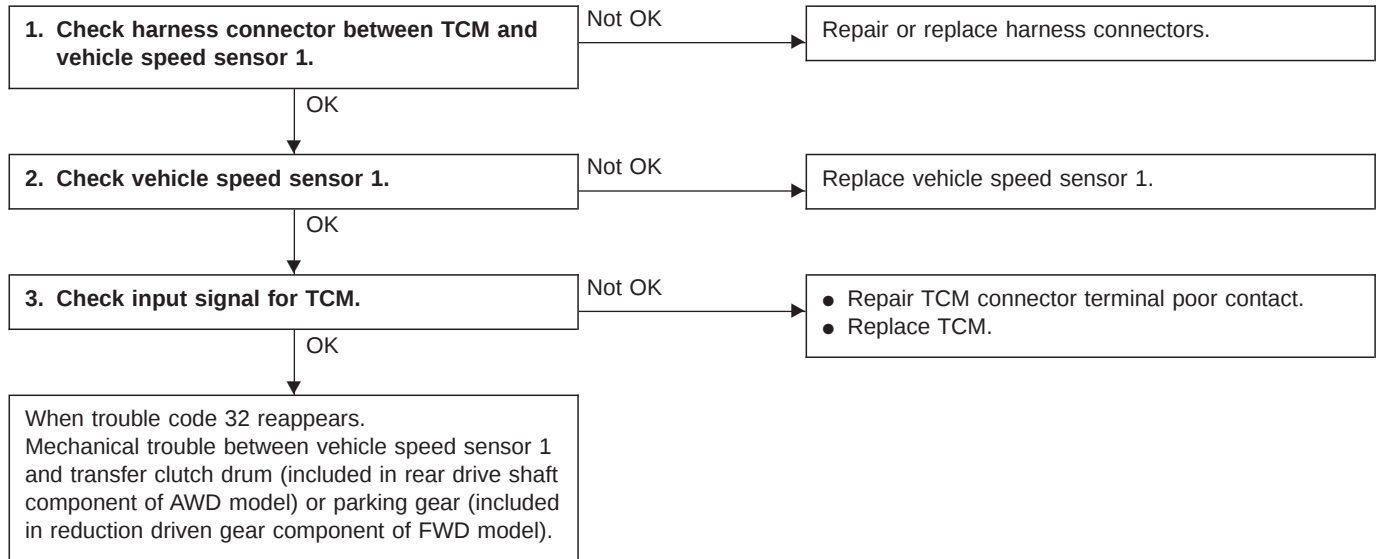
— VEHICLE SPEED SENSOR 1 —

DIAGNOSIS:

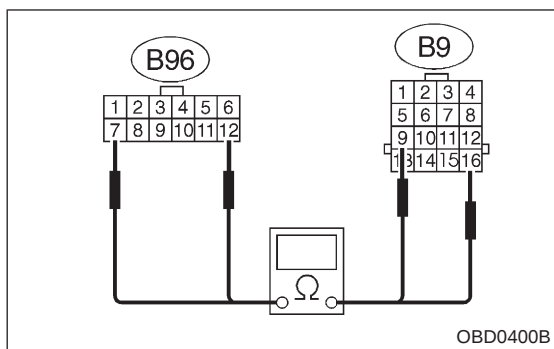
Input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

No lock-up or excessive tight corner “braking”



H3M1082



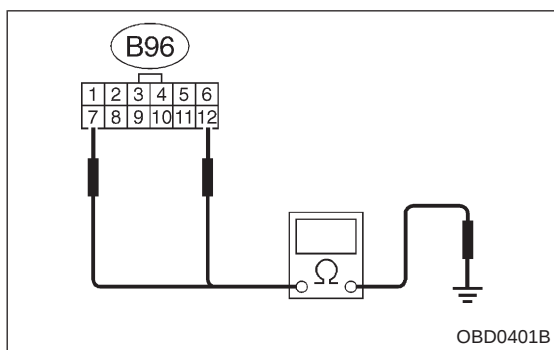
1. CHECK HARNESS CONNECTOR BETWEEN TCM AND VEHICLE SPEED SENSOR 1.

- 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:

(B96) No. 12 — (B9) No. 16 / 1 Ω, or less

(B96) No. 7 — (B9) No. 9 / 1 Ω, or less

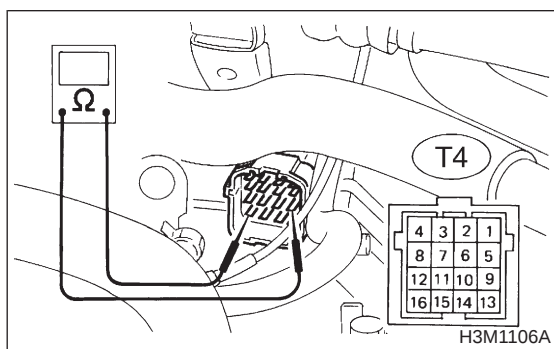


- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B96) No. 7 — Body / 1 MΩ, or more

(B96) No. 12 — Body / 1 MΩ, or more

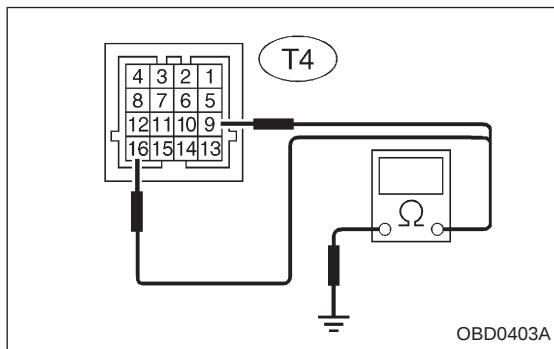


2. CHECK VEHICLE SPEED SENSOR 1.

- 1) Measure resistance between transmission connector receptacle's terminals.

Connector & terminal / Specified resistance:

(T4) No. 16 — No. 9 / 450 — 720 Ω

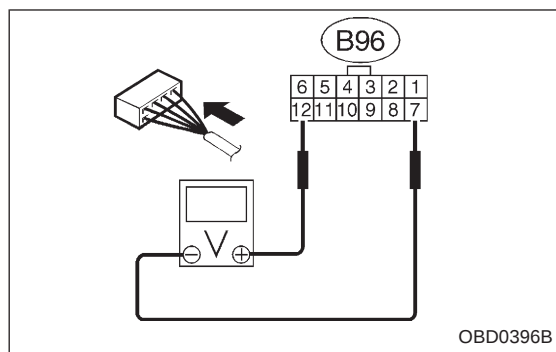


- 2) Measure resistance of harness connector between transmission connector and transmission case to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(T4) No. 16 — Transmission / 1 MΩ, or more

(T4) No. 9 — Transmission / 1 MΩ, 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) Start the engine and set vehicle in 20 km/h (12 MPH) condition.

- 4) Measure voltage between TCM connector terminals.

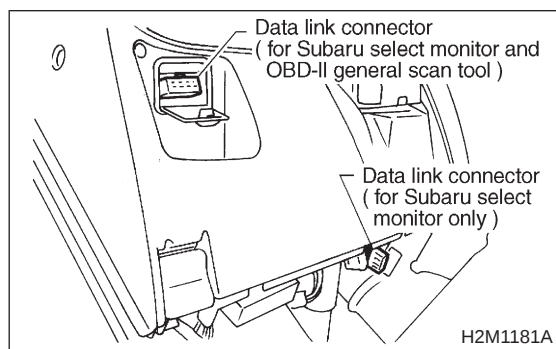
Connector & terminal / Specified voltage:

(B96) No. 12 — No. 7 / AC 1 V, or more

NOTE:

The speed difference between front and rear wheels may light either the ABS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4 [T1C2].>



- 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) Start the engine and operate at constant speed.
- (7) Read data on Subaru select monitor.
- (8) 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 warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4 [T1C2].>

VSP1 (F02)

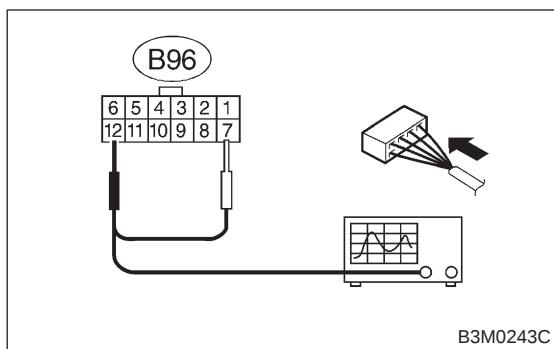
18 m/h

G3M0725

VSP1 (F03)

15 km/h

OBD0399



- Using oscilloscope:
 - (1) Connect connectors to TCM and transmission.
 - (2) Lift-up the vehicle and place safety stands.

WARNING:

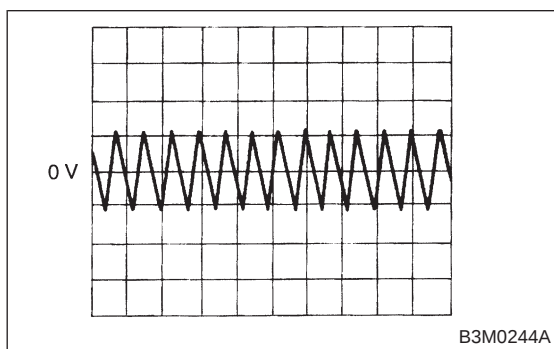
On AWD models, make sure that all wheels are raised off floor.

- (3) Set oscilloscope to TCM connector terminals.

Connector & terminals:

Positive probe; (B96) No. 12

Earth lead; (B96) No. 7



- (4) Start the engine, and set vehicle in 20 km/h (12 MPH) condition.
- (5) 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 warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4 [T1C2].>

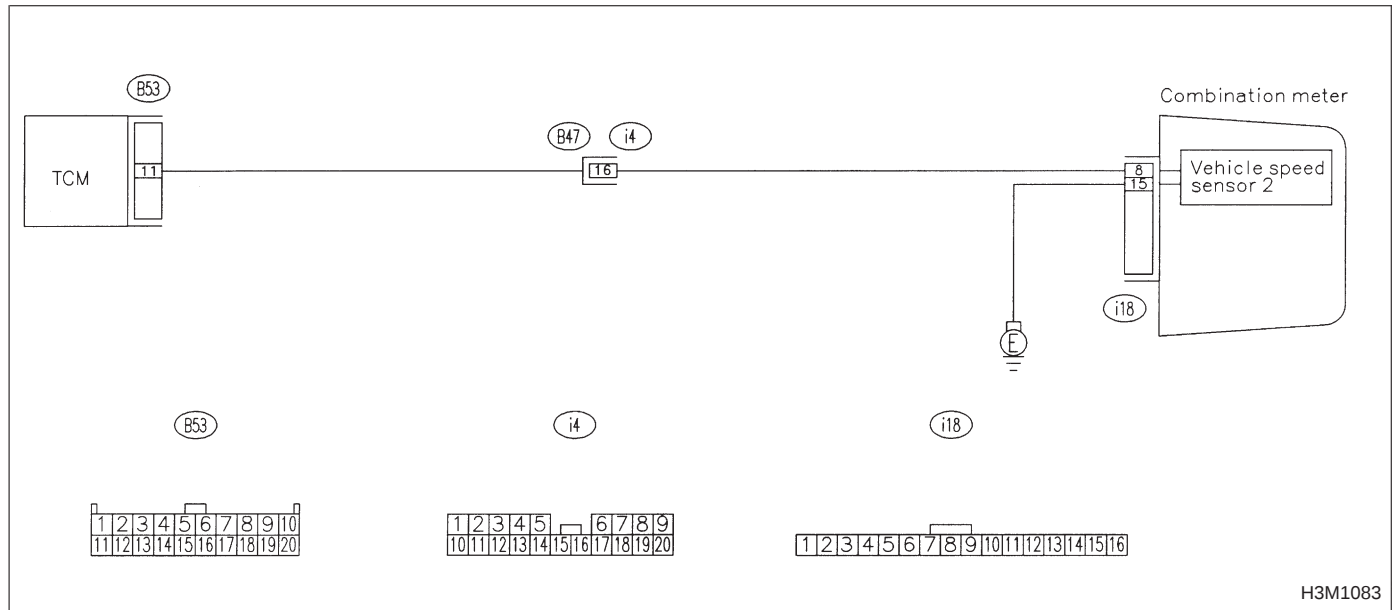
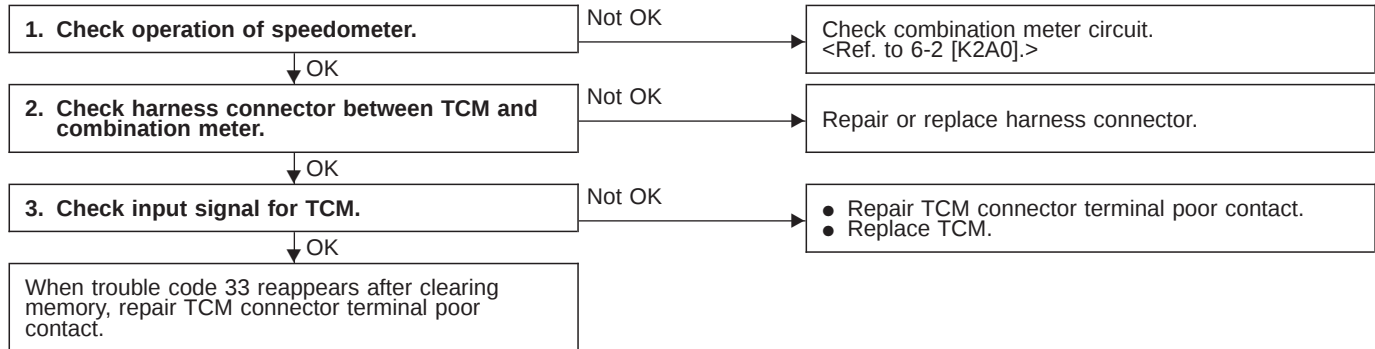
N: TROUBLE CODE 33 — VEHICLE SPEED SENSOR 2 —

DIAGNOSIS:

The harness connector between TCM and vehicle speed sensor is in short or open.

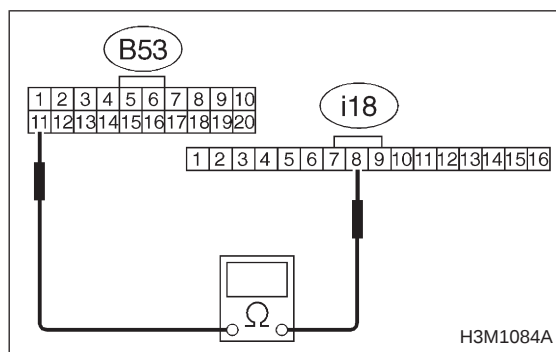
TROUBLE SYMPTOM:

Improper shift point



1. CHECK OPERATION OF SPEEDOMETER.

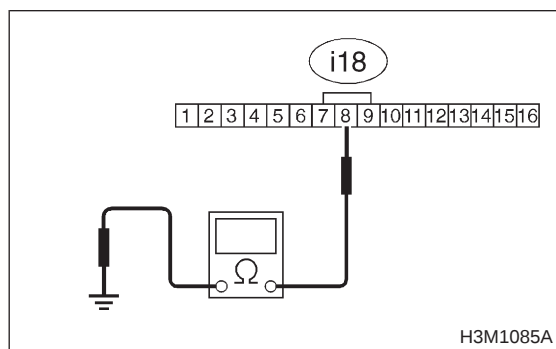
Make sure that speedometer indicates the vehicle speed by driving the vehicle.



2. CHECK HARNESS CONNECTOR BETWEEN TCM AND COMBINATION METER.

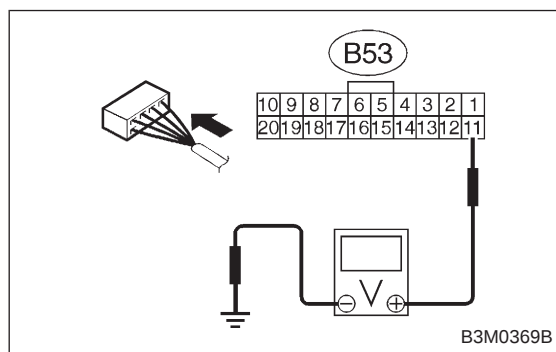
- 1) Turn ignition switch to OFF.
- 2) Remove combination meter.
- 3) Disconnect connectors from TCM and combination meter.
- 4) Measure resistance of harness connector between TCM and combination meter.

Connector & terminal / Specified resistance:
(B53) No. 11 — (i18) No. 8 / 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:
(i18) No. 8 — Body / 1 MΩ, or more



3. CHECK INPUT SIGNAL FOR TCM.

- 1) Connect connector to combination meter.
- 2) Install combination meter.
- 3) Lift-up the vehicle or set the vehicle on free roller.

CAUTION:

On AWD models, raise all wheels off floor.

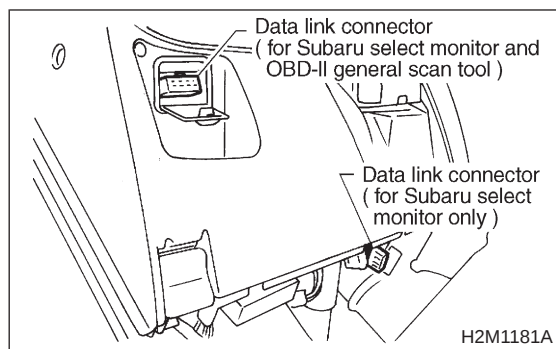
- 4) Start the engine, and drive the wheels slowly.
- 5) Measure voltage between TCM and body.

Connector & terminal / Specified voltage:
(B53) No. 11 — Body / Less than 1 V ↔ more than 4 V

NOTE:

The speed difference between front and rear wheels may light either the ABS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS memory clearance procedure of self-diagnosis system.

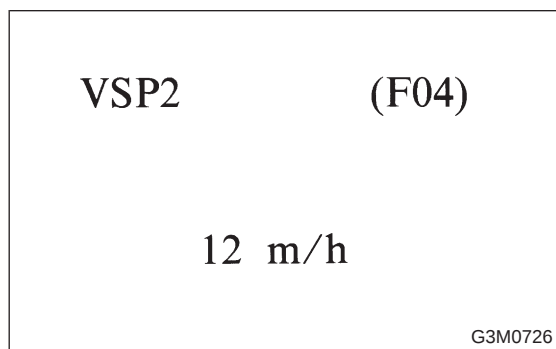
<Ref. to 4-4 [T1C2].>



- Using Subaru select monitor:
 - (1) Connect connector to combination meter.
 - (2) Install combination meter.
 - (3) Connect connectors to TCM.
 - (4) Lift-up the vehicle or set the vehicle on free roller.
 - (5) Turn ignition switch to OFF.
 - (6) Connect the Subaru select monitor to data link connector.
 - (7) Turn ignition switch to ON and Subaru select monitor switch to ON.

CAUTION:

On AWD models, raise all wheels off floor.



- (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:

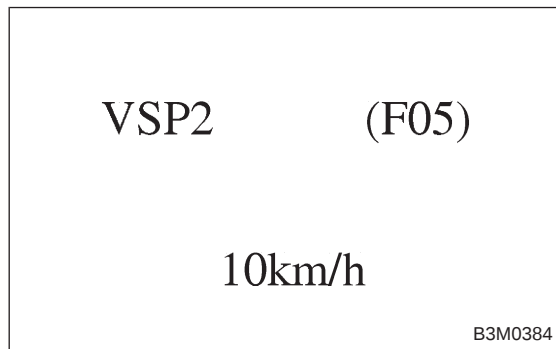
Compare speedometer with select monitor indications.

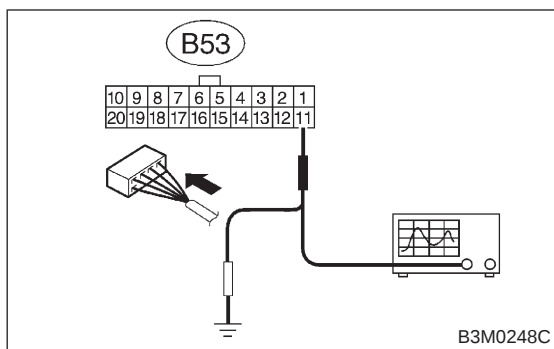
- F04: Vehicle speed is indicated in mile per hour (MPH).
- F05: Vehicle speed is indicated in kilometer per hour (km/h).

NOTE:

The speed difference between front and rear wheels may light either the ABS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4 [T1C2].>





- Using oscilloscope:
 - (1) Connect connector to combination meter.
 - (2) Install combination meter.
 - (3) Lift-up the vehicle or set the vehicle on free rollers.

CAUTION:

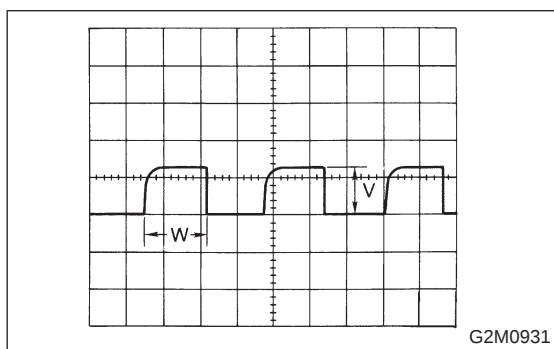
On AWD models, raise all wheels off floor.

- (4) Set oscilloscope to TCM connector terminals.

Connector & terminals:

Positive probe; (B53) No. 11

Earth lead; Body



- (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:

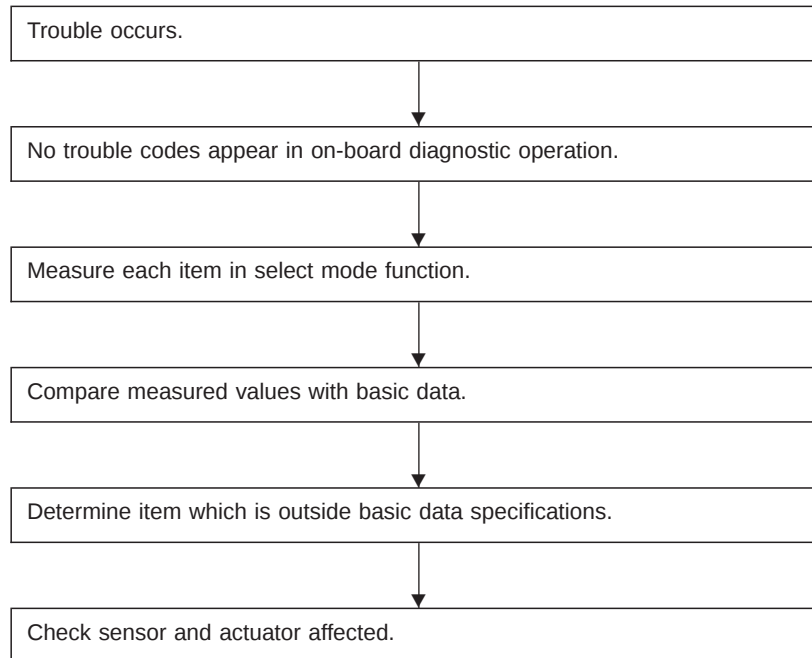
- If vehicle speed increases, the width of amplitude (W) decreases.
- The speed difference between front and rear wheels may light either the ABS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS memory clearance procedure of self-diagnosis system.

<Ref. to 4-4 [T1C2].>

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.)	57
F01	Battery voltage	VB	V	Battery voltage applied to control unit.	57
F02	Vehicle speed sensor 1	VSP1	m/h	Vehicle speed (miles/h) sent from vehicle speed sensor 1.	58
F03	Vehicle speed sensor 1	VSP1	km/h	Vehicle speed (km/h) sent from vehicle speed sensor 1.	58
F04	Vehicle speed sensor 2	VSP2	m/h	Vehicle speed (miles/h) sent from vehicle speed sensor 2.	58
F05	Vehicle speed sensor 2	VSP2	km/h	Vehicle speed (km/h) sent from vehicle speed sensor 2.	58
F06	Engine speed	EREV	rpm	Engine speed sent from ECM.	59
F07	ATF temperature sensor	ATFT	°F	ATF temperature (°F) sent from ATF temperature sensor.	59
F08	ATF temperature sensor	ATFT	°C	ATF temperature (°C) sent from ATF temperature sensor.	59
F09	Throttle position sensor	THV	V	Voltage sent from throttle position sensor.	60
F10	Gear position	GEAR	—	Transmission gear position	60
F11	Line pressure duty	PLDTY	%	Duty ratio flowing through duty solenoid A.	61
F12	Lock-up duty	LUPTY	%	Duty ratio flowing through duty solenoid B.	62
F13	AWD duty	4WDTY	%	Duty ratio flowing through duty solenoid C.	63
F14	Throttle position sensor power supply	THVCC	V	Power supply voltage to throttle position sensor	64
F15	Mass air flow signal	AFM	V	Output voltage from air flow sensor	64

2. ON $\longleftrightarrow$ 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.	66
	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.

E-4AT	(F00)
4WD	1993
G3M0723	

C: MODE F00 — MODE DISPLAY — SPECIFIED DATA:

Data at the left should be indicated.

Probable cause (if outside "specified data")

1. Communication failure
(No communication method can be confirmed with power ON.)

- Check loose or poor connectors, or shortcircuit.
- Check type of cartridge.

2. Vehicle types cannot be identified (due to communication failure).

- Check improper cartridge.
- Replace with proper one.

VB	(F01)
12 V	
G3M0724	

D: MODE F01 — BATTERY VOLTAGE (VB) — CONDITION:

- Ignition switch ON
- Engine idling after warm-up

SPECIFIED DATA:

VB: 10 — 16 V

1. Battery

Check battery voltage and specific gravity of electrolyte.

2. Charging system

- Measure regulating voltage under no loads.
- Check generator (as a single unit).

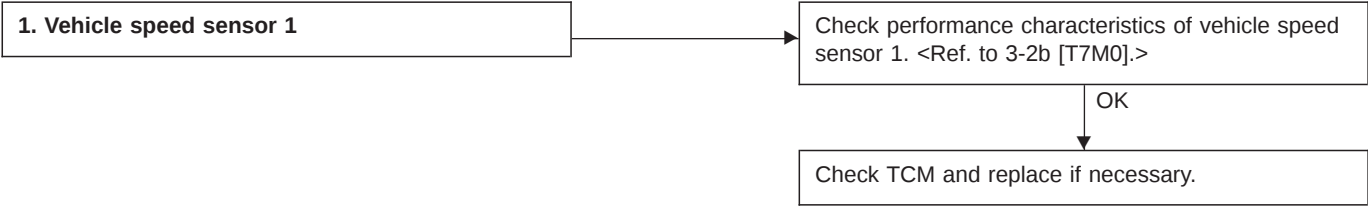
VSP1(F02)

18 m/h

G3M0725

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”)



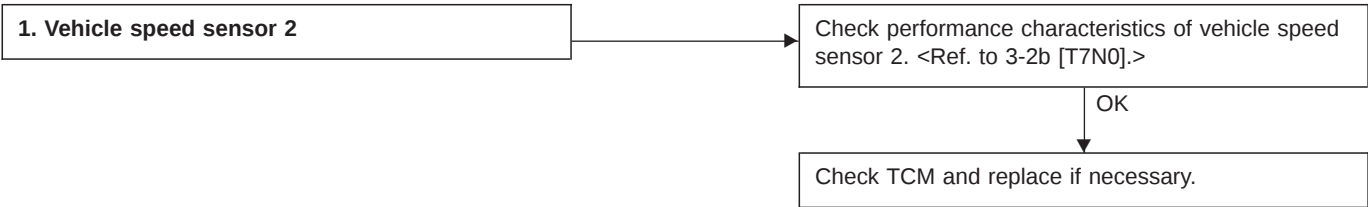
VSP2(F04)

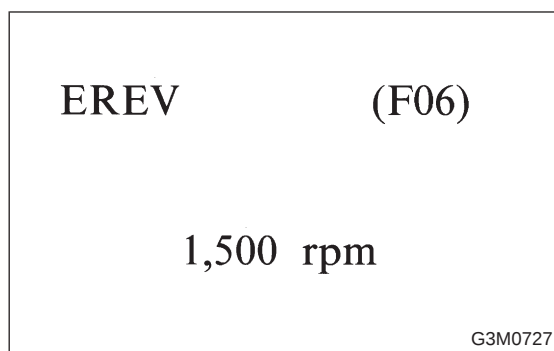
12 m/h

G3M0726

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”)



**G: MODE F06 — ENGINE SPEED (EREV) —
CONDITION:**

Measure with engine operating at constant speed.

SPECIFIED DATA:

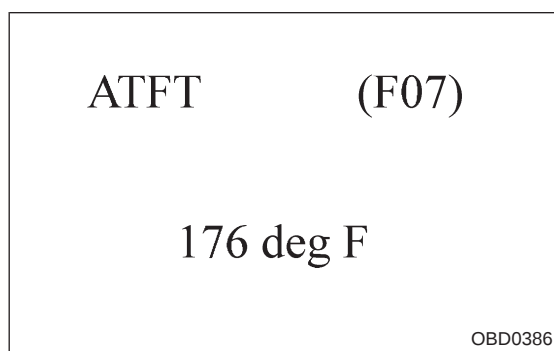
Same as tachometer reading (in combination meter)

Probable cause (if outside "specified data")

1. Conduct diagnostics in relation to MPFI system for engine speed.

OK

Check TCM and replace if necessary.

**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 deg F (± 10 deg C)
(Low ATF temperature)
- ATF temperature: 158 — 230 deg F (70 — 110 deg C)
(High ATF temperature)
- Open harness: 176 deg F (80 deg C)
- Shorted harness: 320 deg F (160 deg C)

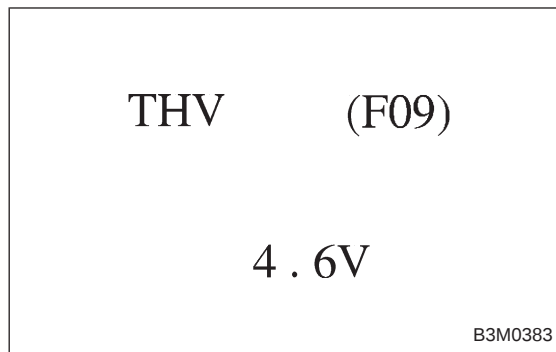
Probable cause (if outside "specified data")

1. ATF temperature sensor

Check performance characteristics of ATF temperature sensor. <Ref. to 3-2b [T7G0].>

OK

Check TCM and replace if necessary.



I: MODE F09

— THROTTLE POSITION SENSOR (THV) —

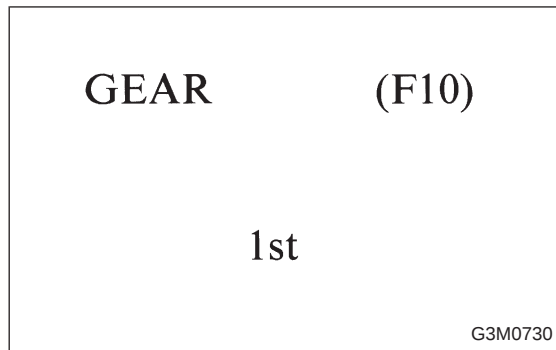
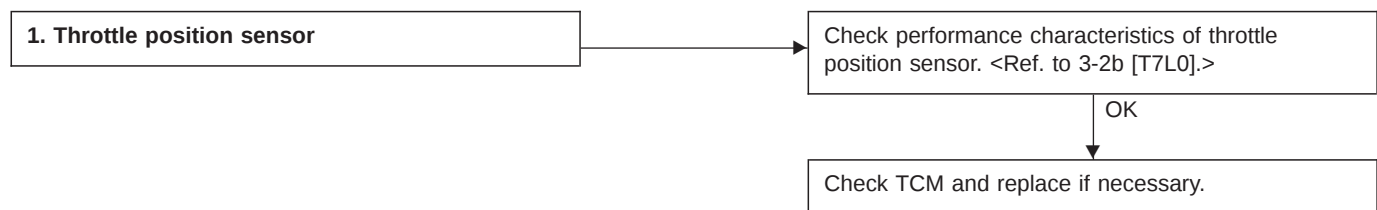
CONDITION:

- 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 ± 0.2 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) —

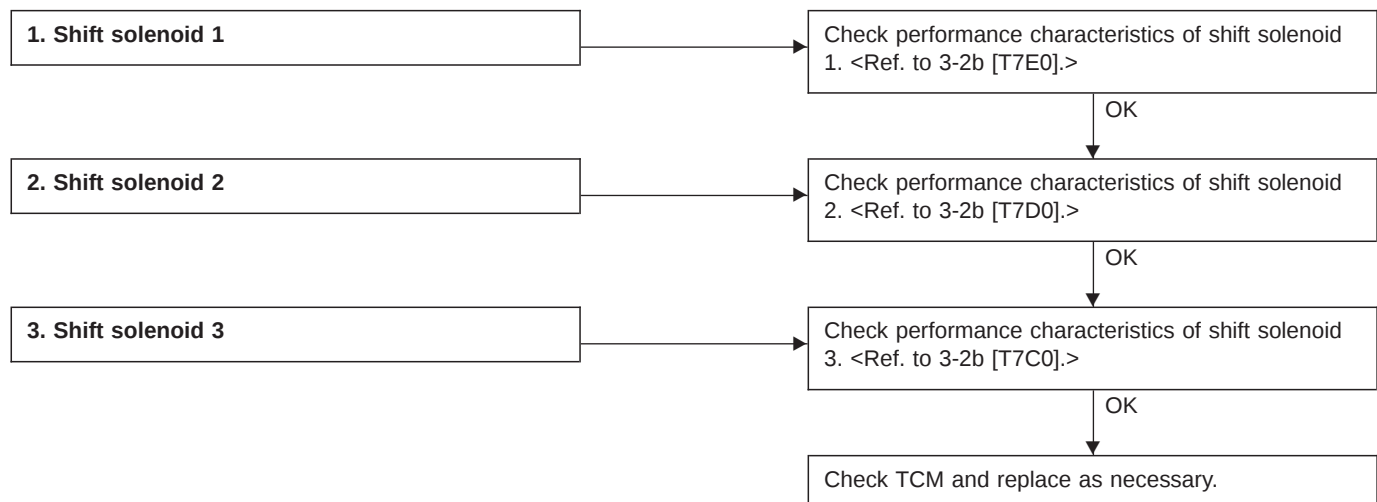
CONDITION:

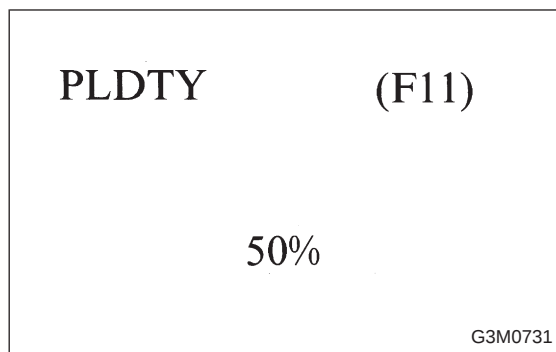
Check while driving vehicle (after warm-up).

SPECIFIED DATA:

Gear position (Refer to shift performance characteristics chart.)

Probable cause (item outside "specified data")





K: MODE F11

— LINE PRESSURE DUTY (PLDTY) —

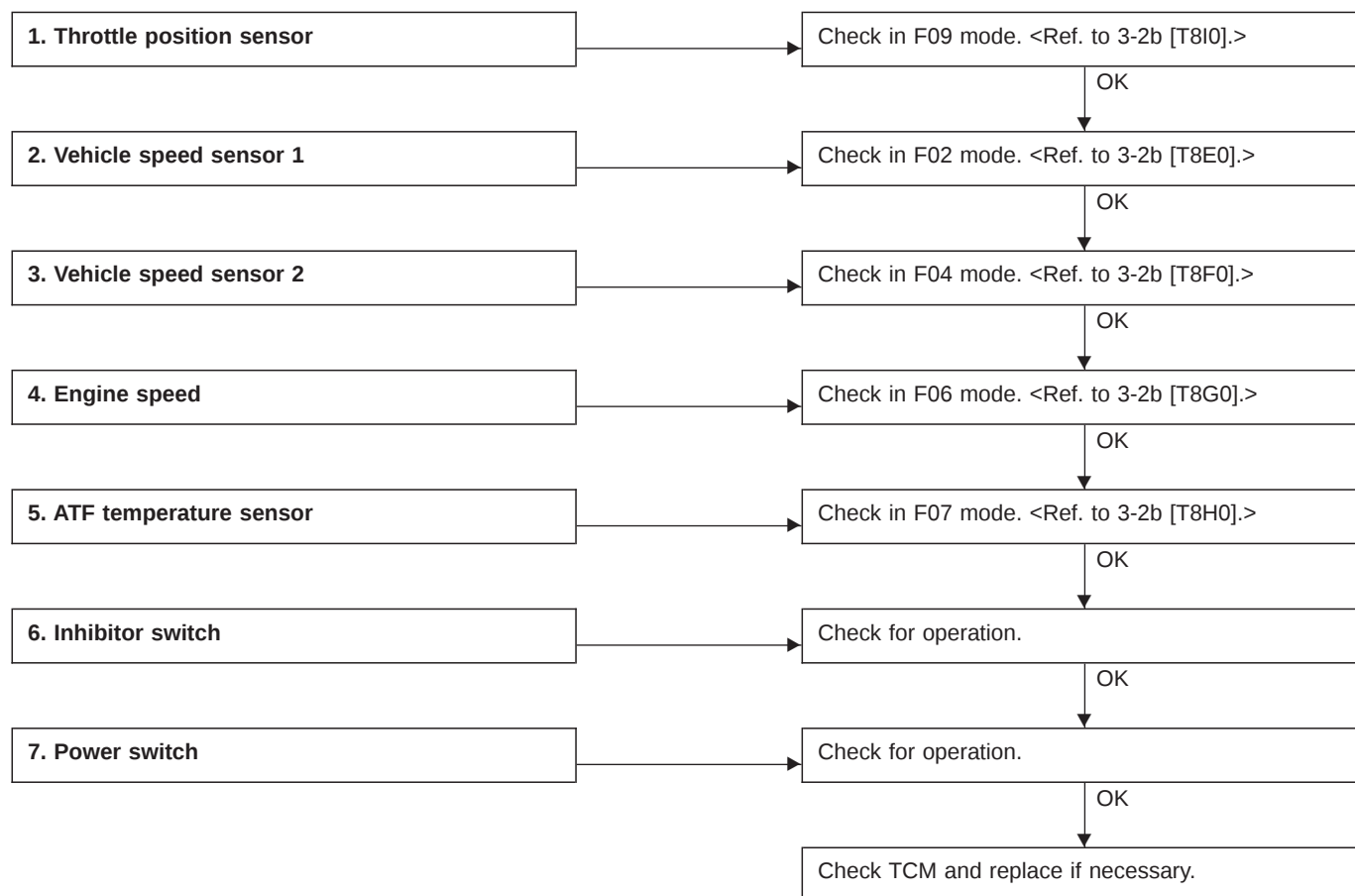
CONDITION:

- After sufficient warm-up
- Ignition ON (engine OFF)
- N range

SPECIFIED DATA:

- Throttle fully closed: 100%
- Throttle fully open : 15%

Probable cause (if outside "specified data")



LUPTY

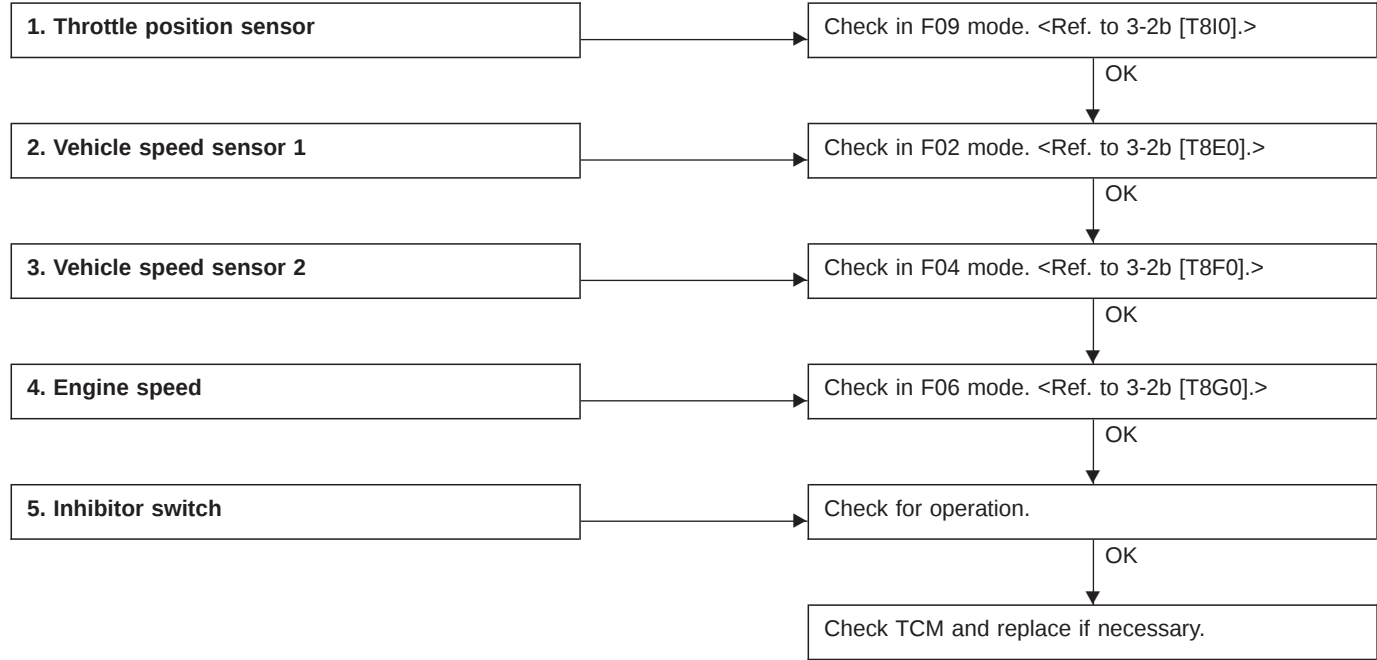
(F12)

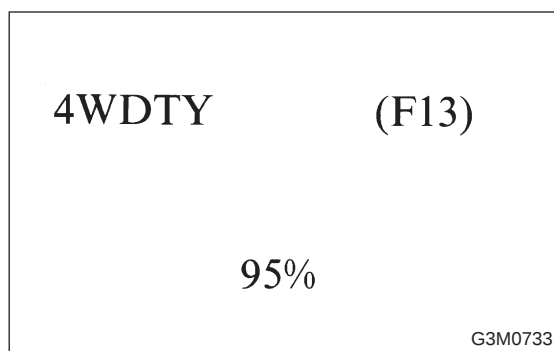
5%

G3M0732

- L: MODE F12 — LOCK-UP DUTY (LUPTY) —
CONDITION:
- Idling (after sufficient warm-up) with lock-up system released.
 - Driving at 70 km/h or 44 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”)



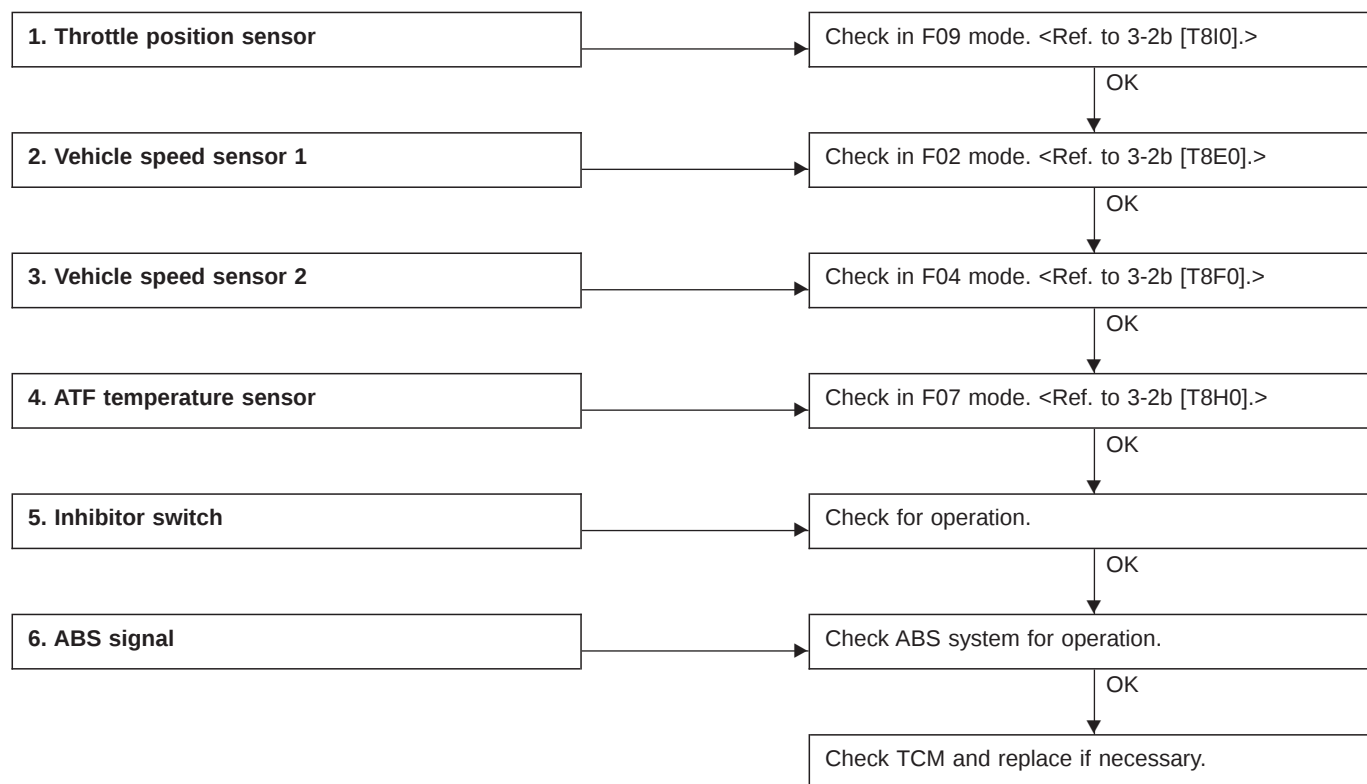
**M: MODE F13 — AWD DUTY (4WDTY) —****CONDITION:**

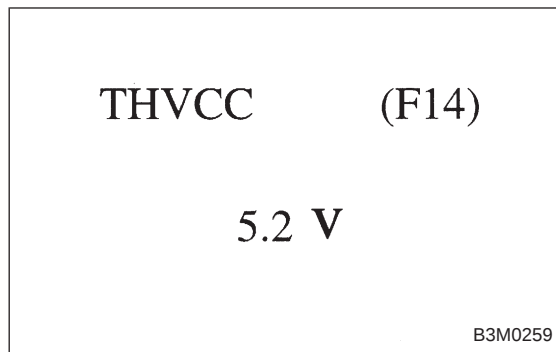
- FWD mode
 - (1) After sufficient warm-up
 - (2) Ignition switch ON (engine OFF)
- AWD mode
 - (1) After sufficient warm-up
 - (2) Ignition switch ON (engine OFF)
 - (3) D range and full throttle
 - (4) Vehicle speed 0 km/h or 0 MPH

SPECIFIED DATA:

- 95% (FWD mode)
- 25% or less (AWD mode)

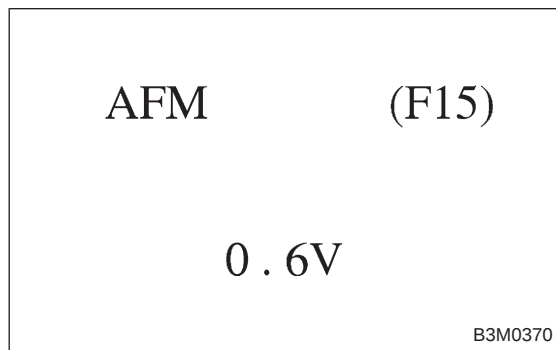
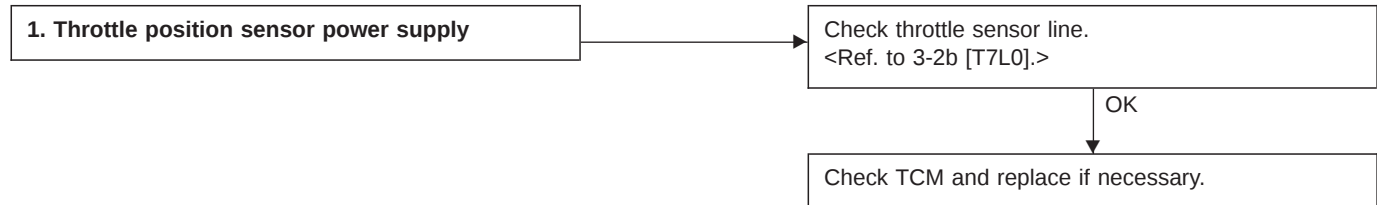
Probable cause (if outside "specified data")





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")



O: MODE F15
— MASS AIR FLOW SIGNAL (AFM) —
CONDITION:
 • Ignition switch ON (engine ON)
 • N range
 • Idling
SPECIFIED DATA:
 Engine warm-up: 0.55±0.25 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 2-7b [T10AN0].>

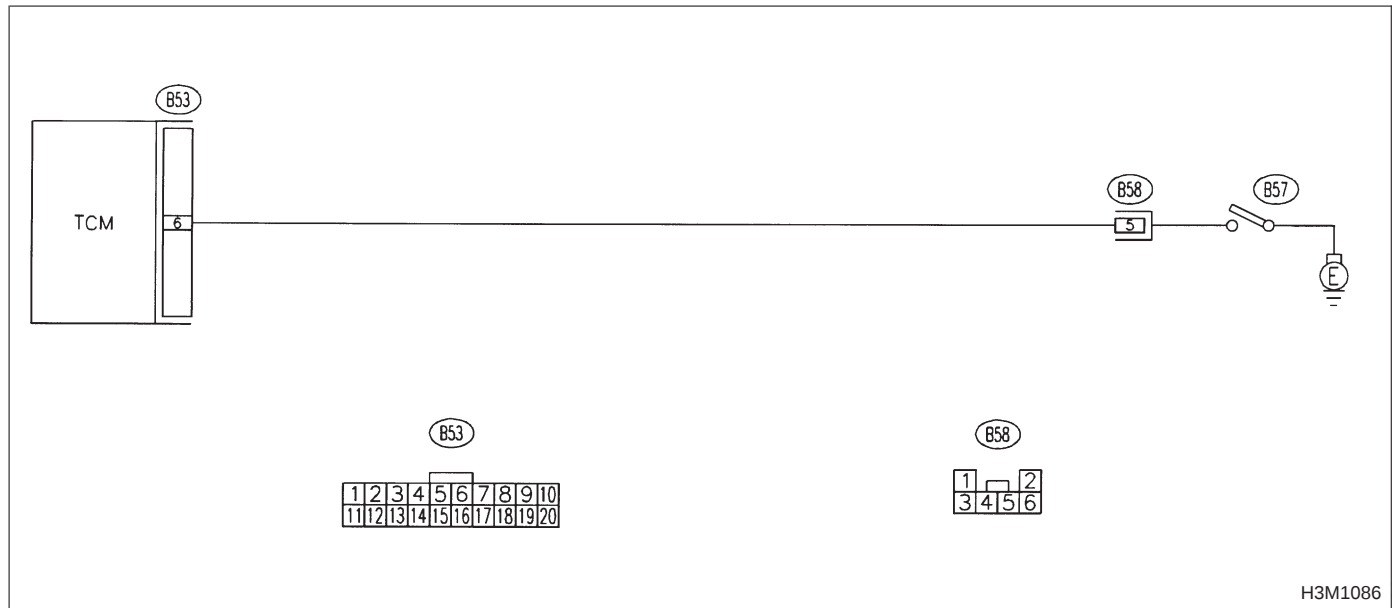
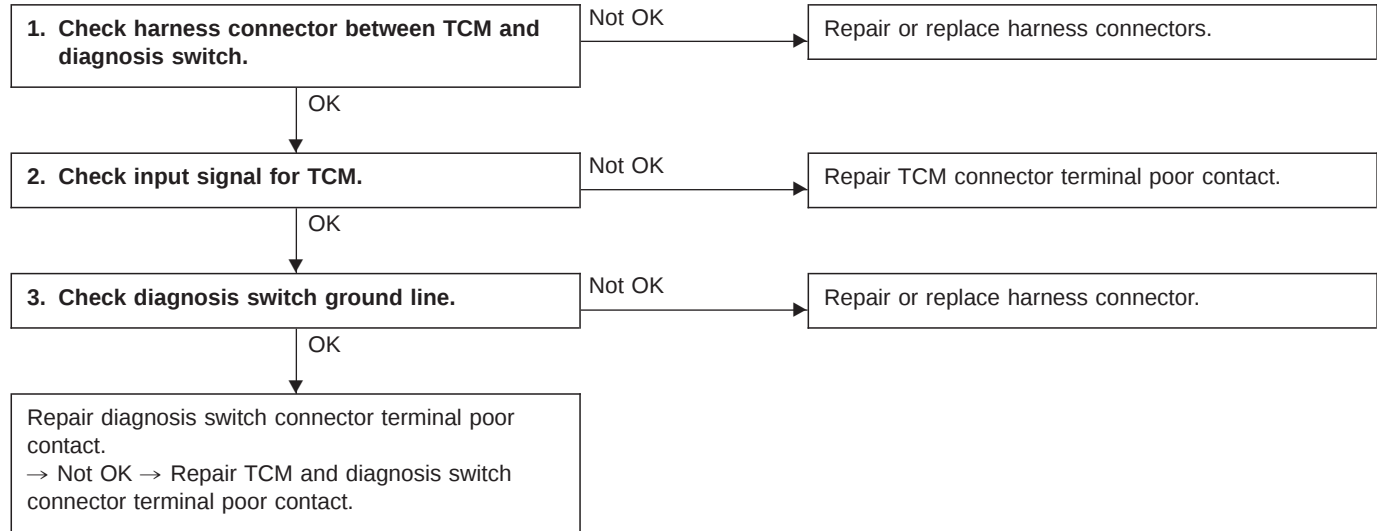
R: MODE FA1

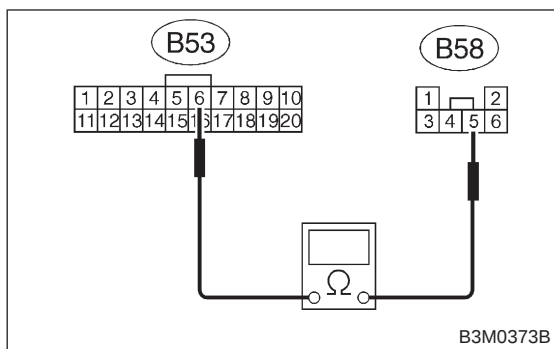
— LED No. 7, DIAGNOSIS SWITCH —

DIAGNOSIS:

- LED does not come on when diagnosis switch is ON.
- Diagnosis switch circuit is open or shorted.

Probable cause (if outside "specified data")

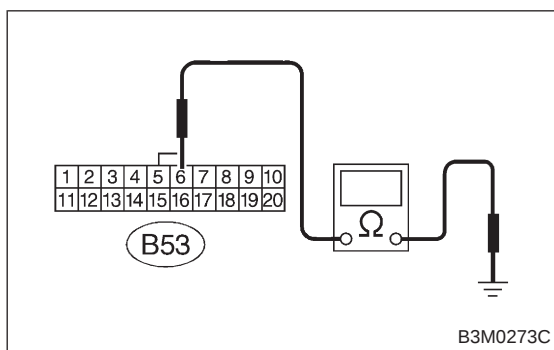




1. CHECK HARNESS CONNECTOR BETWEEN TCM AND DIAGNOSIS SWITCH.

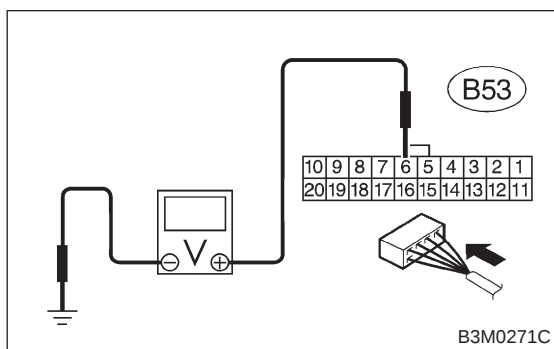
- 1) Turn ignition switch OFF.
- 2) Disconnect connector from TCM.
- 3) Measure resistance of harness connector between TCM and diagnosis switch.

Connector & terminal / Specified resistance:
(B53) No. 6 — (B58) No. 5 / 1 Ω , or less.



- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

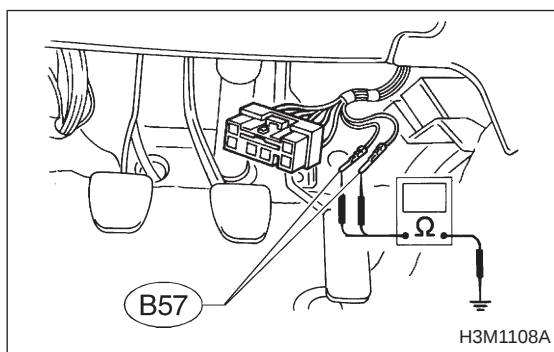
Connector & terminal / Specified resistance:
(B53) No. 6 — Body / 1 M Ω , or more



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:
(B53) 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:
(B57) — 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							
	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

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
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	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				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."
																													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).
																													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														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.
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	

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
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							
Slippage occurs when select lever is moved from "2" to "3" range.		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							
Slippage occurs when select lever is moved from "3" to "4" range.		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																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	
Front wheel slippage occurs during standing starts.		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

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
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	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			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.
																													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.
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	

AUTOMATIC TRANSMISSION AND DIFFERENTIAL

3-2

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1. Supplemental Restraint System "Airbag"

Airbag system wiring harness is routed near the transmission control module (TCM).

- 1. All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuit.**
- 2. Be careful not to damage Airbag system wiring harness when performing diagnostics and servicing the TCM.**

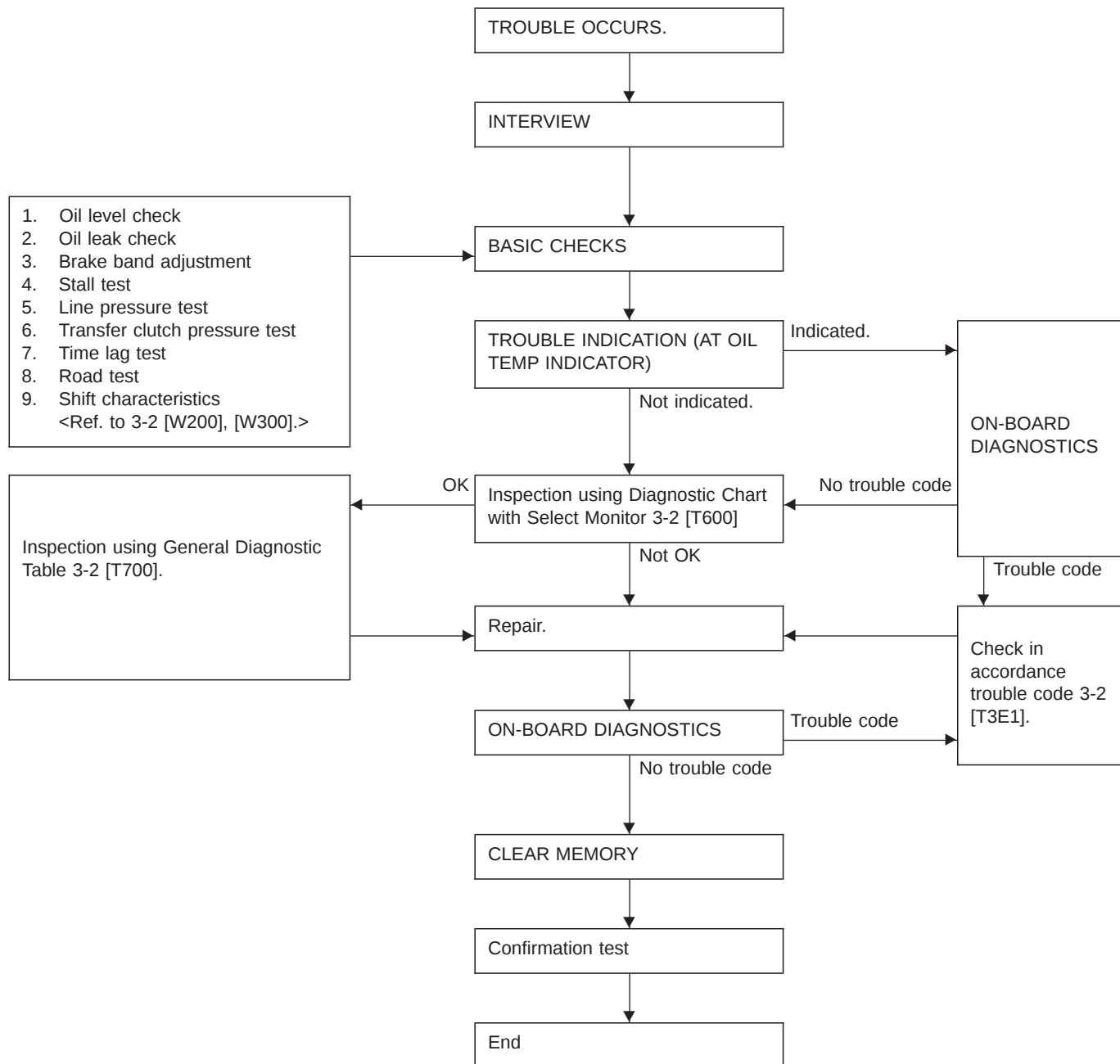
2. Precaution

1) 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.

2) 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.

3. 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.

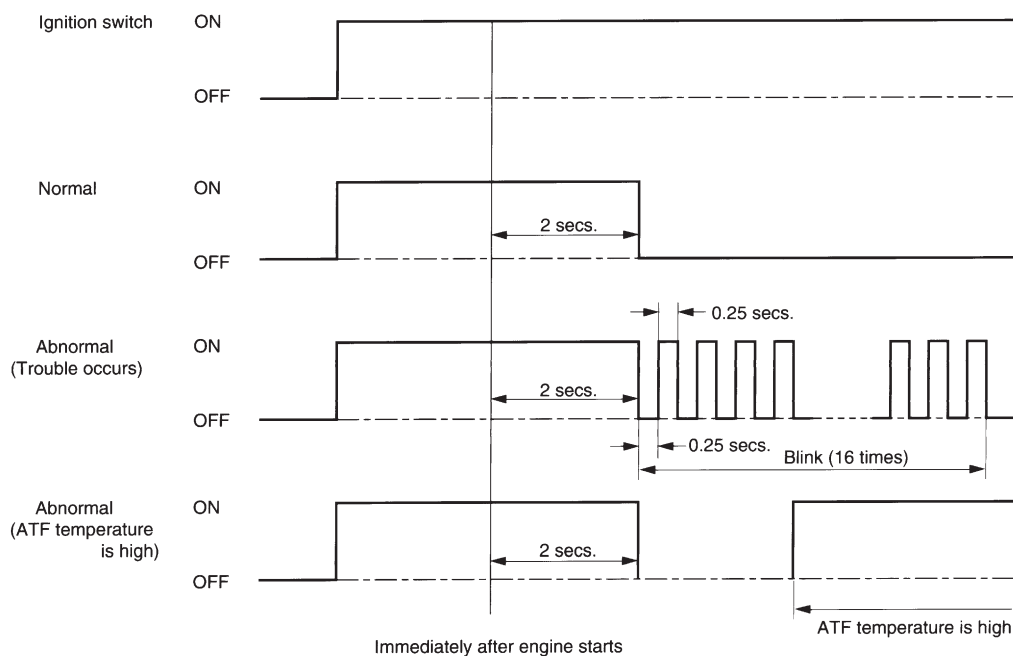
The malfunctioning part or unit can be determined by a trouble code during on-board diagnostic operation. Problems which occurred previously can also be identified through the memory function.

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.



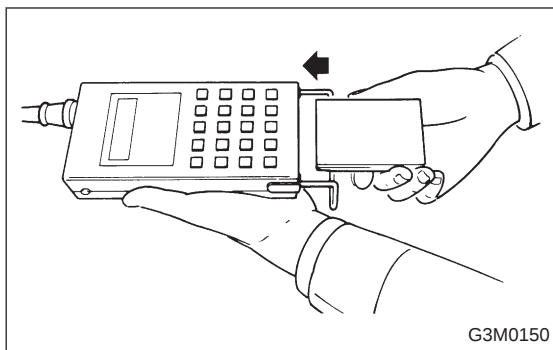
H3H1066

```

graph TD
    A[Warm-up the engine.] --> B[Turn ignition switch OFF.]
    B --> C[Turn ignition switch ON.]
    C --> D[Check if indicator light comes ON.]
    D -- No --> E[Faulty indicator light circuit or TCM]
    D -- Yes --> F[Drive vehicle at speeds greater than 20 km/h (12 MPH).]
    F --> G[Stop vehicle at ignition switch OFF.]
    G --> H[Existing problem, check procedure.]
    G --> I[Previous problem history check procedure]
    H --> J[Move select lever to "D" and connect diagnosis switch to ON.***]
    I --> K[Move select lever to "1" and connect diagnosis switch to ON.***]
    J --> L[Turn ignition switch ON.]
    K --> M[Turn ignition switch ON.]
    L --> N[Move select lever to "3".]
    M --> O[Move select lever to "2".]
    N --> P[Move select lever to "2".]
    O --> Q[Move select lever to "3".]
    P --> R[Move select lever to "1".]
    Q --> S[Move select lever to "D".]
    R --> T[Partially depress accelerator pedal.]
    S --> U[Partially depress accelerator pedal.]
    T --> V[Ensure indicator light blinks.]
    U --> V
    V --> W[Indicator light blinks at 4-Hz intervals.*]
    V --> X[Indicator light blinks at 2-Hz intervals.**]
    V --> Y[Trouble code is outputted.]
    V --> Z[Indicator light remains illuminated.]
    W --> AA[Faulty battery]
    X --> AB[Normal]
    Y --> AC[Check problem corresponding with trouble code.]
    Z --> AD[Check inhibitor switch, diagnosis switch, wiring, TCM, etc.]
    AA --> AE[Disconnect diagnosis switch to OFF.]
    AB --> AE
    AC --> AE
    AD --> AE
  
```

***: Plug in diagnosis terminal to diagnosis connector No. 5 located below

For every $\mathbf{y}$ and $\mathbf{g}$ there exists a $\mathbf{y}'$ and $\mathbf{g}'$ such that $\mathbf{y}' \leq \mathbf{y}$ and $\mathbf{g}' \leq \mathbf{g}$ and $\mathbf{y}' \leq \mathbf{g}'$.

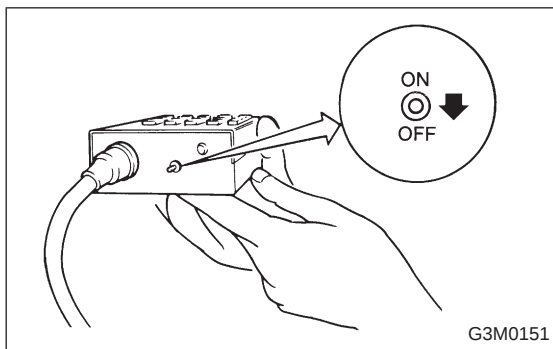


D: ON-BOARD DIAGNOSTICS WITH SELECT MONITOR

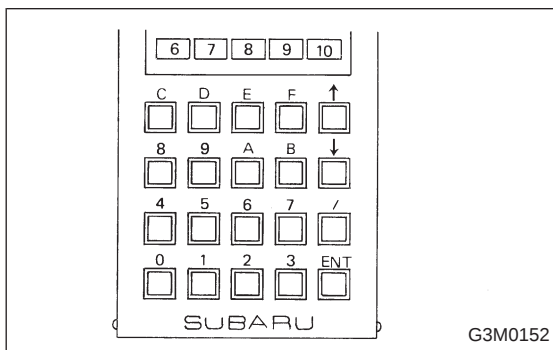
1. CONNECT SELECT MONITOR.

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

Applicable cartridge : No. 498349300

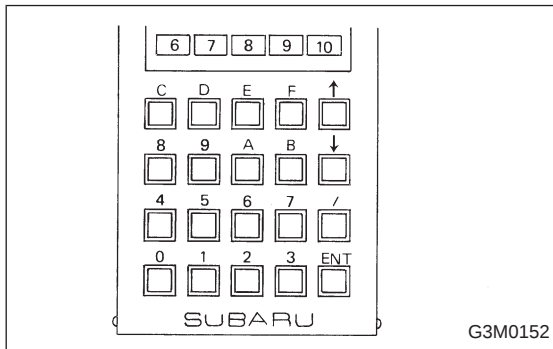


- 2) Turn ignition switch and select monitor switch ON.
- 3) After display is shown, press slash "/" key.
- 4) After AT mode is displayed, press function "[0]".
(Display returns to AT mode when slash "/" is pressed during on-board diagnostic operation.)



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.



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).

E: 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.	PL	11
12	Duty solenoid B	Detects open or shorted drive circuit, as well as valve seizure.	L/U	14
13	Shift solenoid 3	Detects open or shorted drive circuit, as well as valve seizure.	OVR	16
14	Shift solenoid 2	Detects open or shorted drive circuit, as well as valve seizure.	SFT2	18
15	Shift solenoid 1	Detects open or shorted drive circuit, as well as valve seizure.	SFT1	20
21	ATF temperature sensor	Detects open or shorted input signal circuit.	ATFT	22
23	Engine speed signal	Detects open or shorted input signal circuit.	EREV	24
24	Duty solenoid C	Detects open or shorted drive circuit, as well as valve seizure.	4WD	26
31	Throttle position sensor	Detects open or shorted input signal circuit.	THV	29
32	Vehicle speed sensor 1	Detects open or shorted input signal circuit.	VSP1	32
33	Vehicle speed sensor 2	Detects open or shorted input signal circuit.	VSP2	34

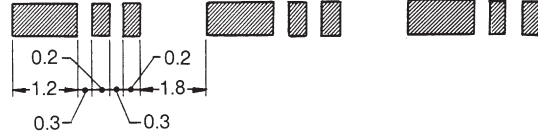
2. HOW TO READ TROUBLE CODE OF INDICATOR LIGHT

The power indicator light flashes the code corresponding to the faulty part.

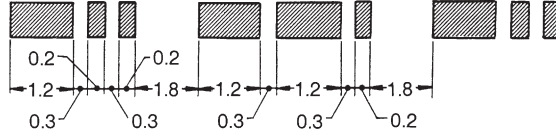
The long segment (1.2 sec on) indicates a "ten", and the short segment (0.2 sec on) signifies a "one".

Example:

When only one part has failed:
Flashing code 12
(unit: second)



When two or more parts have failed:
Flashing codes 12 and 21
(unit: second)



G3M0104

F: 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).

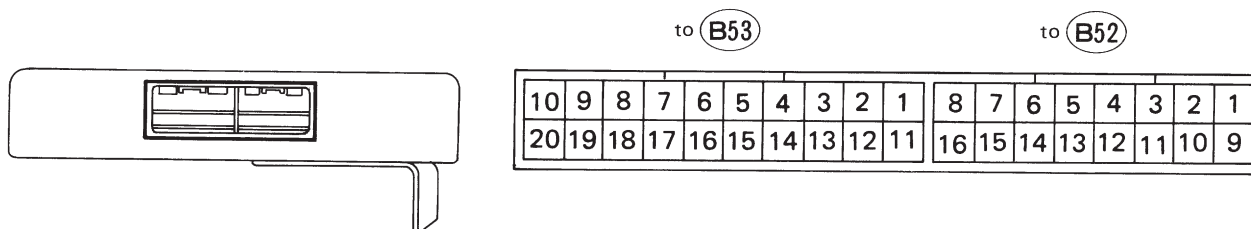
CLEAR MEMORY:

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 ECM (MFI). Removal of this fuse clears the previous trouble codes stored in the TCM and ECM (MFI) memory.
- Be sure to remove the No. 14 fuse for at least the specified length of time. Otherwise, trouble codes may not be cleared.

4. Transmission Control Module (TCM) I/O Signal

TCM terminals



G3M0105

Check with ignition switch ON.

Content		Connector No.	Terminal No.	Measuring conditions	Voltage (V)
Battery supply		B52	1	Ignition switch OFF	11 — 13
Ignition power supply		B52 B52	15 16	Ignition switch ON (with engine OFF)	11 — 13
Inhibitor switch	"P" and "N" range switch	B53	12	Select lever in "P" or "N" range	Less than 1
				Select lever in any other than "P" or "N" range	More than 8
	"R" range switch	B52	3	Select lever in "R" range	Less than 1
				Select lever in any other than "R" range	More than 9.5
	"D" range switch	B53	11	Select lever in "D" range	Less than 1
				Select lever in any other than "D" range	More than 9.5
	"3" range switch	B53	3	Select lever in "3" range	Less than 1
				Select lever in any other than "3" range	More than 9.5
Diagnosis switch		B53	13	Select lever in "2" range	Less than 1
				Select lever in any other than "2" range	More than 9.5
Brake switch		B53	8	Select lever in "1" range	Less than 1
				Select lever in any other than "1" range	More than 9.5
ABS signal		B53	7	Diagnosis connector connected	Less than 1
				Diagnosis connector disconnected	More than 6
AT diagnostic signal		B53	18	Brake pedal depressed	More than 10.5
				Brake pedal released	Less than 1
		B53	7	ABS switch ON	Less than 1
				ABS switch OFF	More than 6.5
		B53	18	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	B53	20	Throttle fully closed.	0.3 — 0.7	—
			Throttle fully open.	3.9 — 4.3	
Throttle position sensor power supply voltage	B53	1	Ignition switch ON (with engine OFF)	4.8 — 5.7	—
ATF temperature sensor	B53	19	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	B53	15	Vehicle stopped.	0	450 — 650
			Vehicle speed at least 20 km/h (12 MPH)	More than 1 (AC range)	
Vehicle speed sensor 2	B52	5	When vehicle is slowly moved at least 2 meters (7ft).	Less than 1↔More than 4	—
Engine speed signal	B52	4	Ignition switch ON (with engine OFF)	More than 10.5	—
			Ignition switch ON (with engine ON)	8 — 11	
Cruise set signal	B53	6	When cruise control is set (SET lamp ON).	Less than 1	—
			When cruise control is not set (SET lamp OFF).	6 — 10	
Shift solenoid 1	B52	10	Select lever in 1st or 4th gear	More than 10	20 — 30
			Select lever in 2nd or 3rd gear	Less than 1	
Shift solenoid 2	B52	9	Select lever in 1st or 2nd gear	More than 10	20 — 30
			Select lever in 3rd or 4th gear	Less than 1	
Shift solenoid 3	B52	8	Select lever in "N" range (with throttle fully closed.)	Less than 1	20 — 30
			Select lever in "D" range (with throttle fully closed.)	More than 10	
Duty solenoid A	B52	11	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	B52	12	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	B52	7	When lock up occurs.	More than 8.5	10 — 17
			When lock up is released.	Less than 0.5	
Duty solenoid C	B52	6	Fuse on FWD switch	More than 8.5	10 — 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	B53	16	—	0	Less than 1
Sensor ground line 2	B53	4	—	0	Less than 1
System ground line	B52	14	—	0	Less than 1
Power system ground line	B52	13	—	0	Less than 1
FWD switch	B52	2	Fuse removed.	More than 10	
			Fuse installed.	Less than 1	

5. Diagnostic Chart with Trouble Code

A: TROUBLE CODE 11

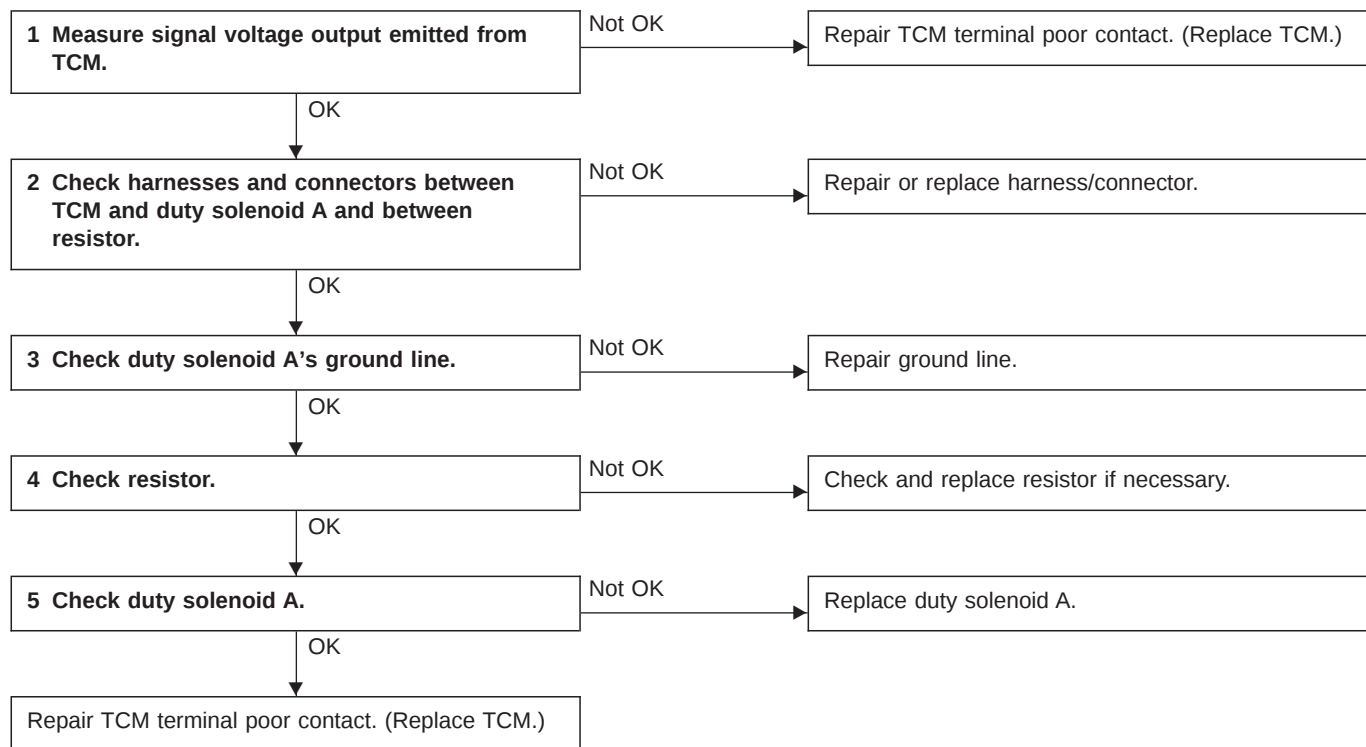
— DUTY SOLENOID A —

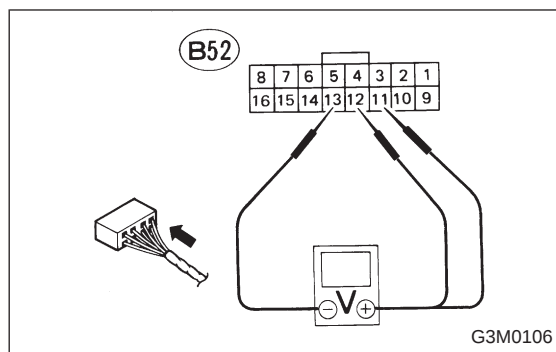
DIAGNOSIS:

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.

- 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.)

(B52) No. 12 — No.13 /

8.5 V, min. (Throttle is fully closed.)

0.5 V, max. (Throttle is fully open.)

● SELECT MONITOR FUNCTION MODE

Mode: F11

Condition:

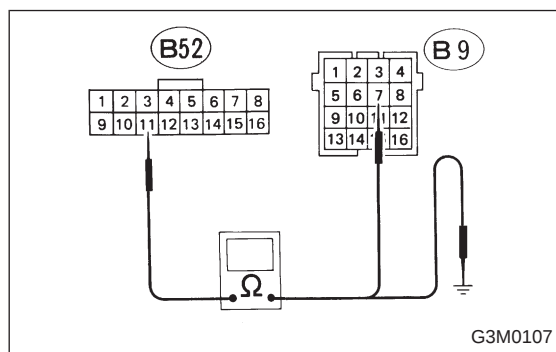
Ignition switch ON (Engine OFF) N range

Specified data:

PLDTY F11

Less than 25% (Throttle is fully open.)

100% (Throttle is fully closed.)



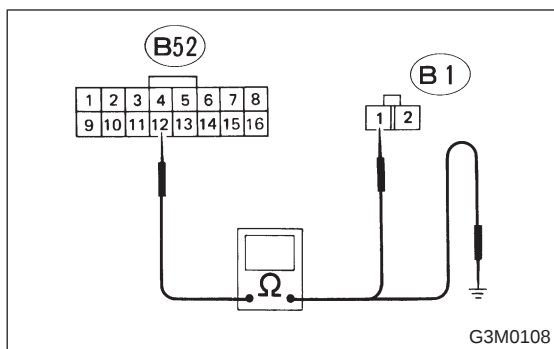
2. CHECK HARNESSES AND CONNECTORS BETWEEN TCM AND DUTY SOLENOID A AND BETWEEN RESISTOR.

- 1) Disconnect connector from TCM.
- 2) Disconnect connector from transmission.
- 3) Disconnect connector from resistor.
- 4) Measure resistance between TCM connector and transmission and between TCM connector and body.

Connector & terminal / Specified resistance:

(B52) No. 11 — (B9) No. 7 / 1 Ω, max.

(B52) No. 11 — Body / 1 MΩ, min.

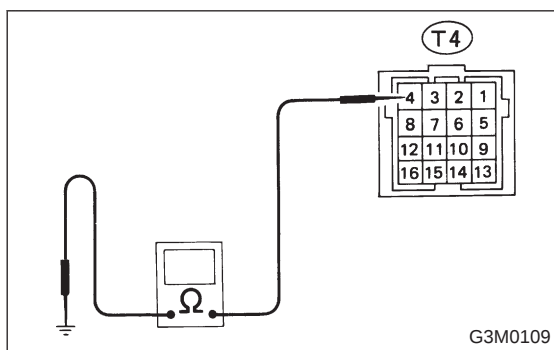


5) Measure resistance between TCM connector and resistor connector and between TCM connector and body.

Connector & terminal / Specified resistance:

(B52) No. 12 — (B1) No. 1 / 1 Ω, max.

(B52) No. 12 — Body / 1 MΩ, min.

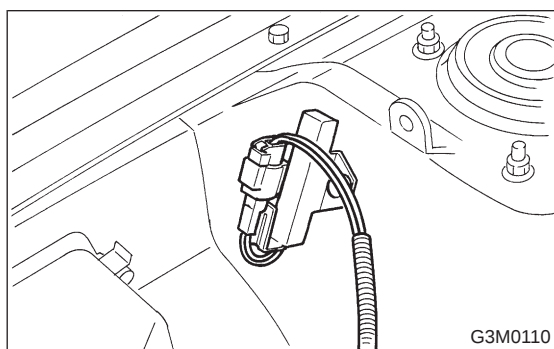


3. CHECK DUTY SOLENOID A'S GROUND LINE.

- 1) Disconnect connector from transmission.
- 2) Measure resistance between transmission connector receptacle (on transmission) and transmission case.

Connector & terminal / Specified resistance:

(T4) No. 4 — Transmission / 1 Ω, max.

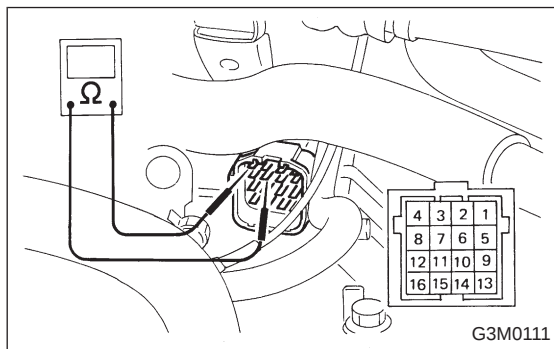


4. CHECK RESISTOR.

- 1) Disconnect connector from resistor.
- 2) Measure resistance between resistor terminals.

Specified resistance:

9 — 15 Ω



5. CHECK DUTY SOLENOID A.

- 1) Disconnect connector from transmission.
- 2) Measure resistance between transmission connector receptacle (on transmission) terminals.

Connector & terminal / Specified resistance:

(T4) No. 7 — No. 4 / 2.0 — 4.5 Ω

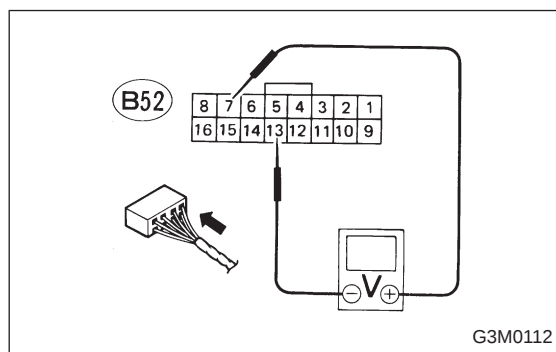
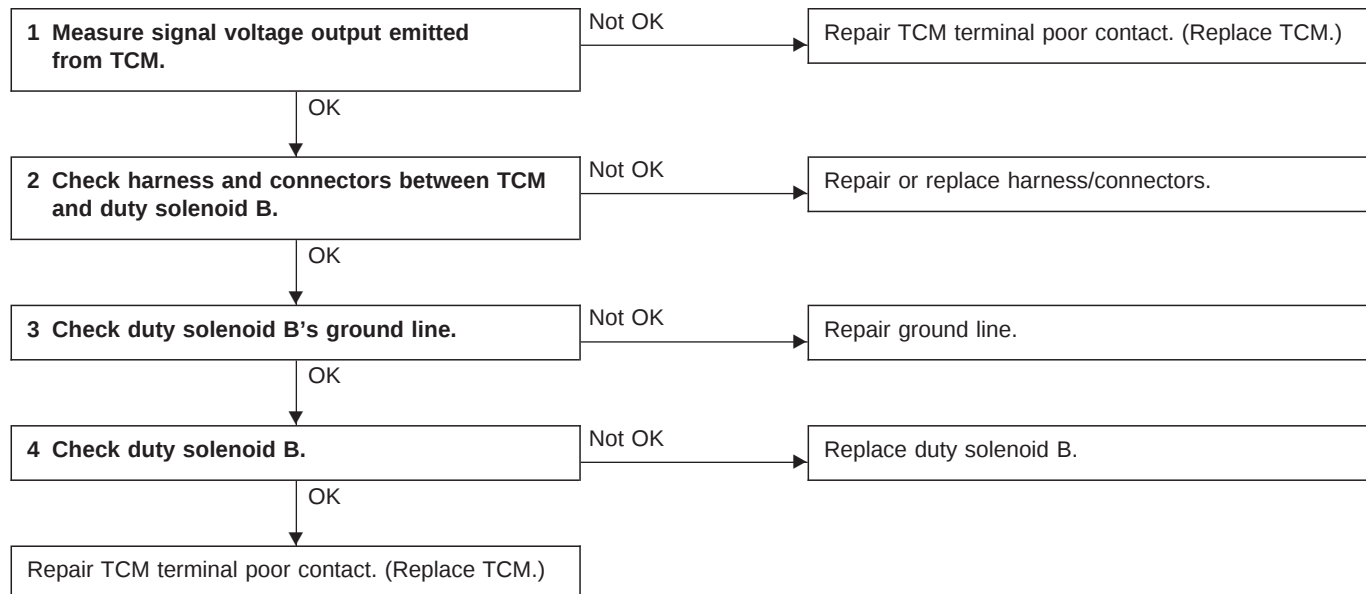
B: TROUBLE CODE 12 — DUTY SOLENOID B —

DIAGNOSIS:

Output signal circuit of duty solenoid B is open or shorted.

TROUBLE SYMPTOM:

No “locking-up” (after engine warm-up)



1. MEASURE SIGNAL VOLTAGE OUTPUT EMITTED FROM TCM.

1) Raise vehicle and support with safety stands.

CAUTION:

On AWD models, raise all wheels off ground.

2) Warm-up the engine and transmission.

3) Move shift lever to “D” and slowly increase vehicle speed to 75 km/h (47 MPH). Measure voltage output emitted from TCM.

Connector & terminal / Specified voltage:

(B52) No. 7 — No. 13 / 8.5 V, min. (when wheels are locked-up.)

- 4) Return the engine to idling speed. Move shift lever to "N" and measure voltage output emitted from TCM.

Connector & terminal / Specified voltage:

(B33) No. 7 — No. 13 / 0.5 V, max.

● **SELECT MONITOR FUNCTION MODE**

Mode: F12

Condition:

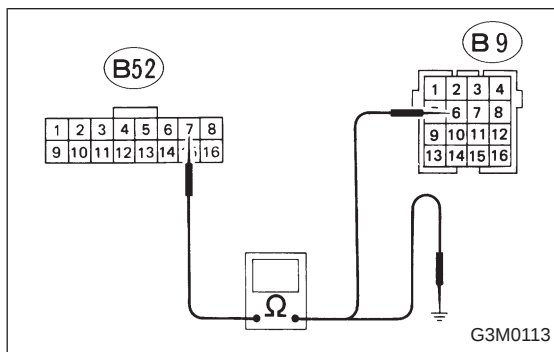
Start the engine and increase vehicle speed to 75 km/h (47 MPH). When wheels are locked-up:

Specified data:

LUPTY F12

95% (Wheel locked-up)

5% (Release)



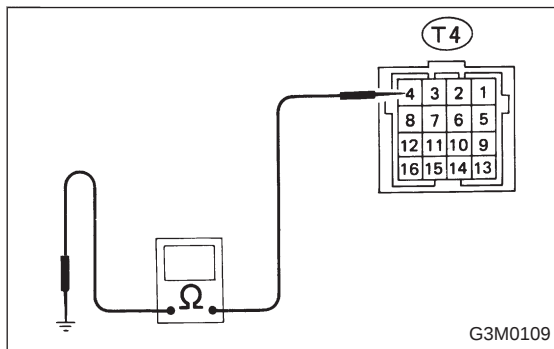
2. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND DUTY SOLENOID B.

- 1) Disconnect connector from TCM.
- 2) Disconnect connector from transmission.
- 3) Measure resistance between TCM connector and transmission connector, and between TCM connector and body.

Connector & terminal / Specified resistance:

(B52) No. 7 — (B9) No. 6 / 1 Ω, max.

(B52) No. 7 — Body / 1 MΩ, min.

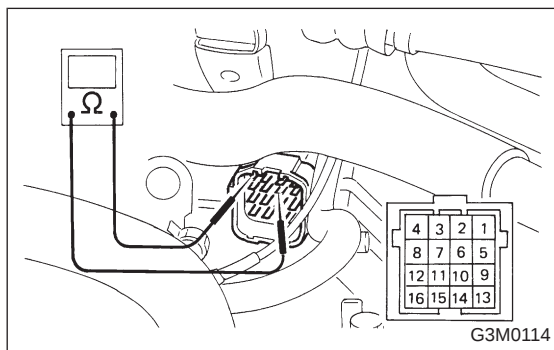


3. CHECK DUTY SOLENOID B'S GROUND LINE.

- 1) Disconnect connector from transmission.
- 2) Measure resistance between transmission connector receptacle and transmission case.

Connector & terminal / Specified resistance:

(T4) No. 4 — Transmission / 1 Ω, max.



4. CHECK DUTY SOLENOID B.

- 1) Disconnect connector from transmission.
- 2) Measure resistance between transmission connector receptacle's terminals.

Connector & terminal / Specified resistance:

(T4) No. 6 — No. 4 / 10 — 17 Ω

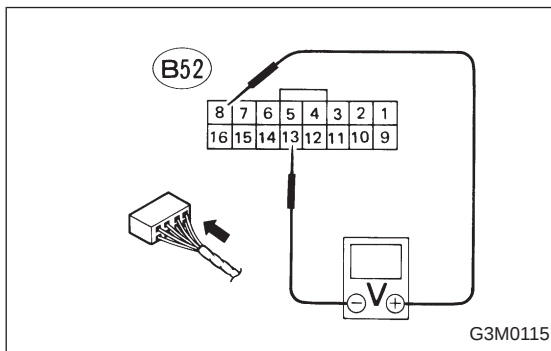
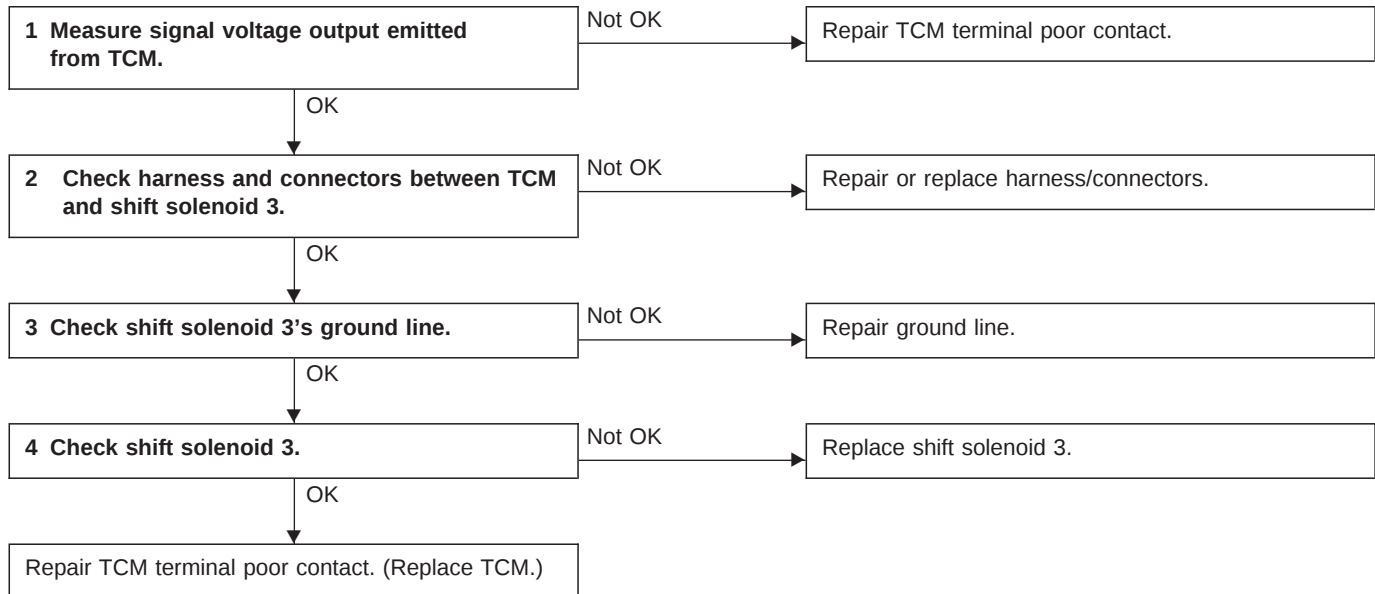
C: TROUBLE CODE 13 — SHIFT SOLENOID 3 —

DIAGNOSIS:

Output signal circuit of shift solenoid 3 is open or shorted.

TROUBLE SYMPTOM:

Ineffective engine brake with shift lever in "3"



1. MEASURE SIGNAL VOLTAGE OUTPUT EMITTED FROM TCM.

1) Raise vehicle and support with safety stands.

CAUTION:

On AWD models, raise all wheels off ground.

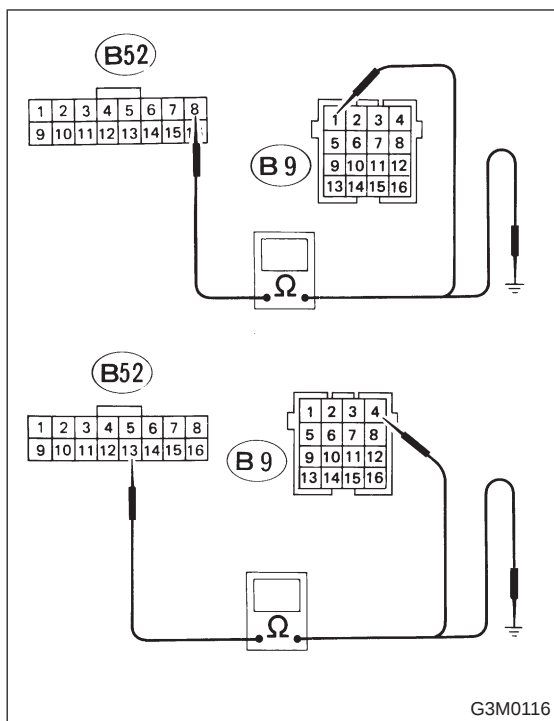
2) Warm-up the engine and transmission.

3) Move shift lever to "D".

4) Measure signal voltage output emitted from TCM while idling the engine.

Connector & terminal / Specified voltage:

(B52) No. 8 — No. 13 / 9 V, min.



2. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND SHIFT SOLENOID 3.

- 1) Disconnect connector from TCM.
- 2) Disconnect connector from transmission.
- 3) Measure resistance between TCM connector and transmission connector, and between TCM connector and body.

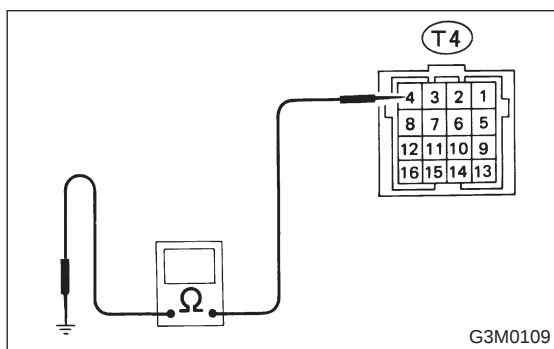
Connector & terminal / Specified resistance:

(B52) No. 8 — (B9) No. 1 / 1 Ω , max.

(B52) No. 8 — Body / 1 M Ω , min.

(B52) No. 13 — (B9) No. 4 / 1 Ω , max.

(B52) No. 13 — Body / 1 M Ω , min.

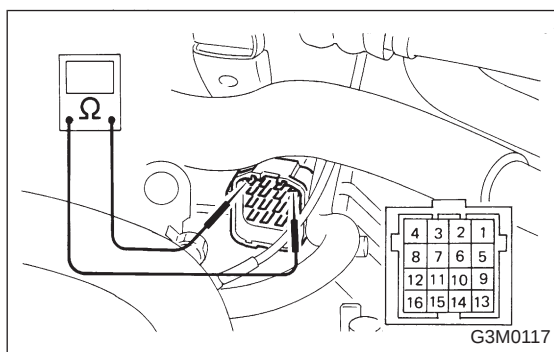


3. CHECK SHIFT SOLENOID 3'S GROUNDING LINE.

- 1) Disconnect connector from transmission.
- 2) Measure resistance between transmission connector receptacle and transmission case.

Connector & terminal / Specified resistance:

(T4) No. 4 — Transmission / 1 Ω , max.



4. CHECK SHIFT SOLENOID 3.

- 1) Disconnect connector from transmission.
- 2) Measure resistance between transmission connector receptacle's terminals.

Connector & terminal / Specified resistance:

(T4) No. 1 — No. 4 / 20 — 30 Ω

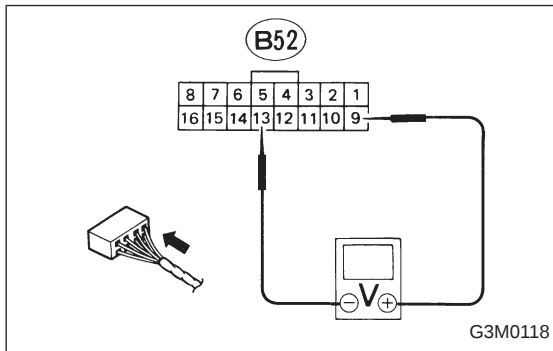
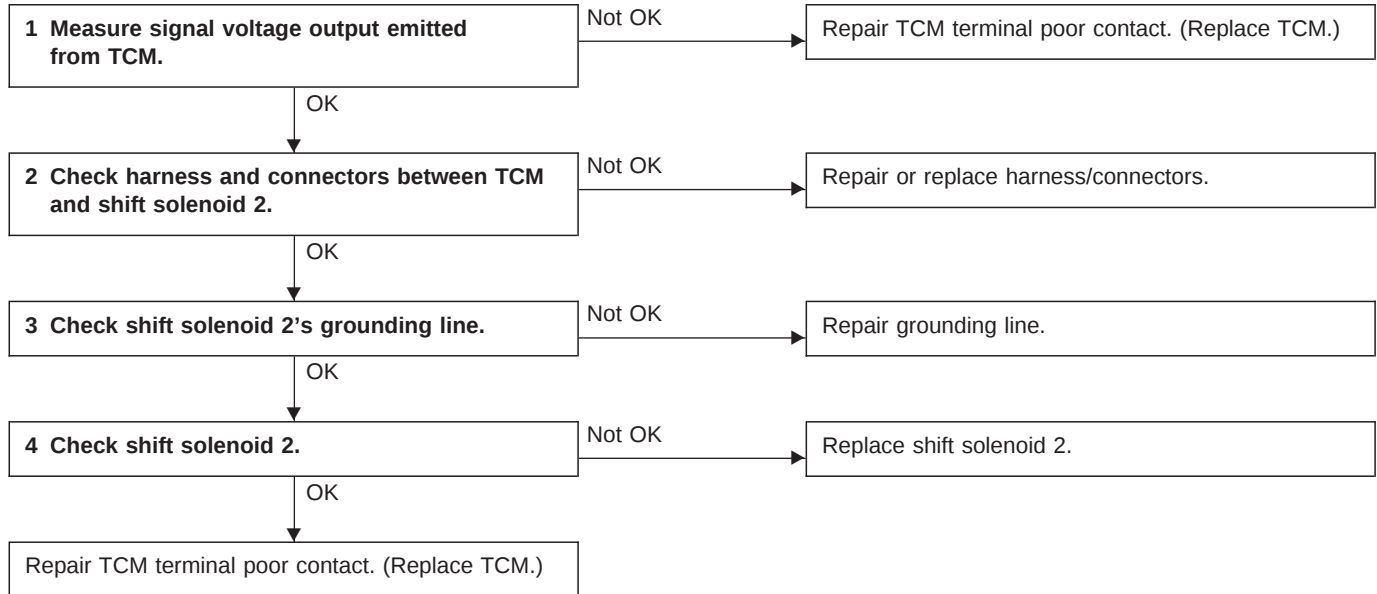
D: TROUBLE CODE 14
— SHIFT SOLENOID 2 —

DIAGNOSIS:

Output signal circuit of shift solenoid 2 is open or shorted.

TROUBLE SYMPTOM:

No shift



1. MEASURE SIGNAL VOLTAGE OUTPUT EMITTED FROM TCM.

1) Raise vehicle and support with safety stands.

CAUTION:

On AWD models, raise all wheels off ground.

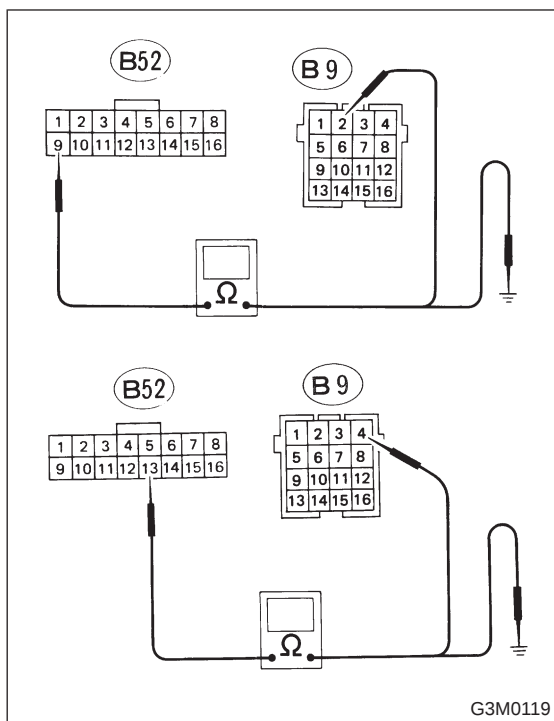
2) Warm-up the engine and transmission.

3) Move shift lever to "D".

4) Measure signal voltage output emitted from TCM while idling the engine.

Connector & terminal / Specified voltage:

(B52) No. 9 — No. 13 / 9 V, min.



2. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND SHIFT SOLENOID 2.

- 1) Disconnect connector from TCM.
- 2) Disconnect connector from transmission.
- 3) Measure resistance between TCM connector and transmission connector, and between TCM connector and body.

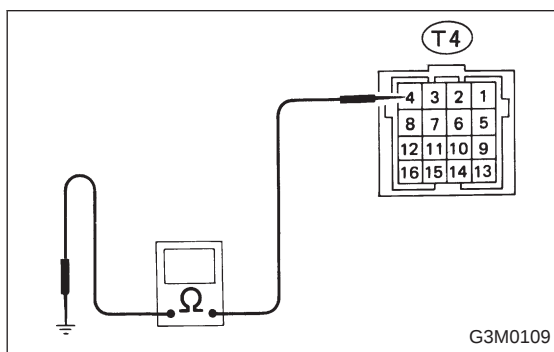
Connector & terminal / Specified resistance:

(B52) No. 9 — (B9) No. 2 / 1 Ω , max.

(B52) No. 9 — Body / 1 M Ω , min.

(B52) No. 13 — (B9) No. 4 / 1 Ω , max.

(B52) No. 13 — Body / 1 M Ω , min.

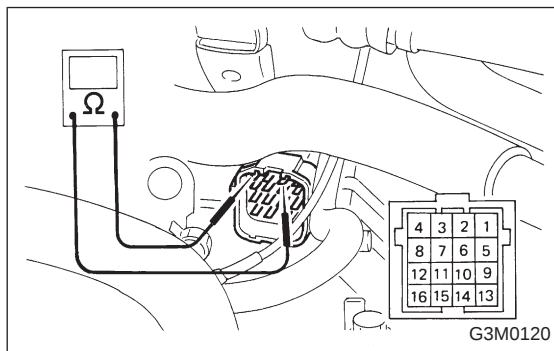


3. CHECK SHIFT SOLENOID 2'S GROUNDING LINE.

- 1) Disconnect connector from transmission.
- 2) Measure resistance between transmission connector receptacle and transmission case.

Connector & terminal / Specified resistance:

(T4) No. 4 — Transmission / 1 Ω , max.



4. CHECK SHIFT SOLENOID 2.

- 1) Disconnect connector from transmission.
- 2) Measure resistance between transmission connector receptacle's terminals.

Connector & terminal / Specified resistance:

(T4) No. 2 — No. 4 / 20 — 30 Ω

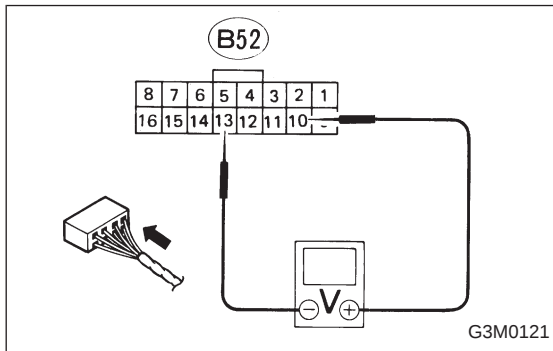
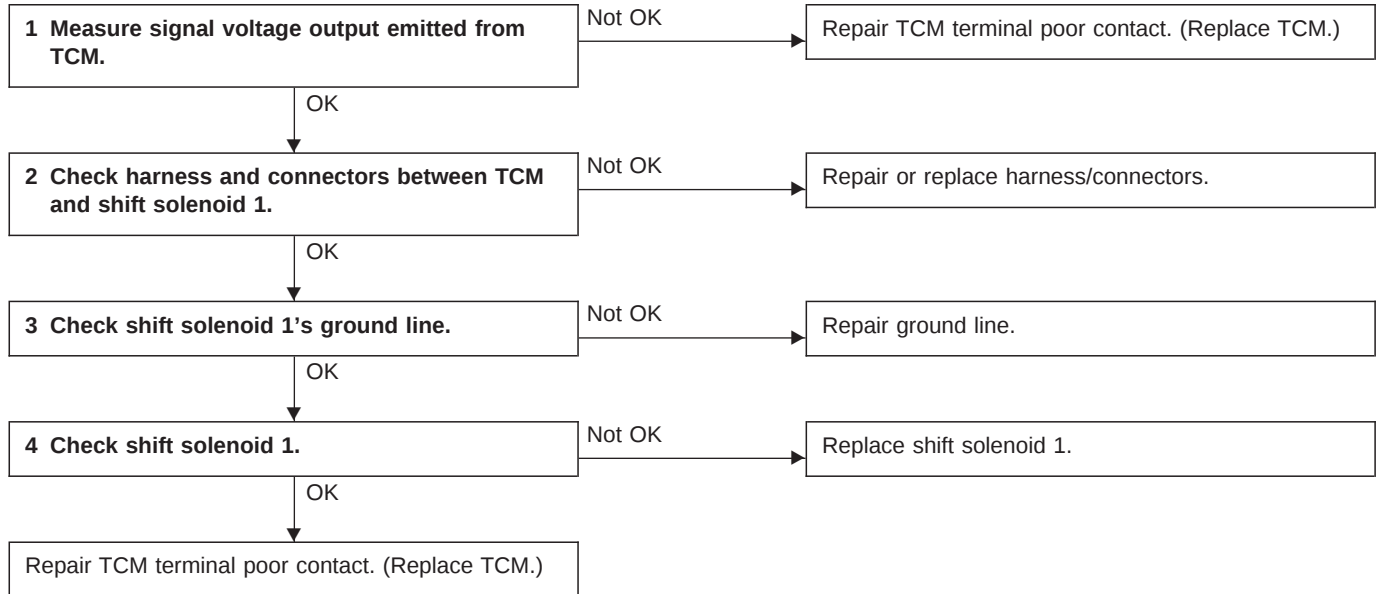
E: TROUBLE CODE 15
— SHIFT SOLENOID 1 —

DIAGNOSIS:

Output signal circuit of shift solenoid 1 is open or shorted.

TROUBLE SYMPTOM:

No shift



1. MEASURE SIGNAL VOLTAGE OUTPUT EMITTED FROM TCM.

1) Raise vehicle and support with safety stands.

CAUTION:

On AWD models, raise all wheels off ground.

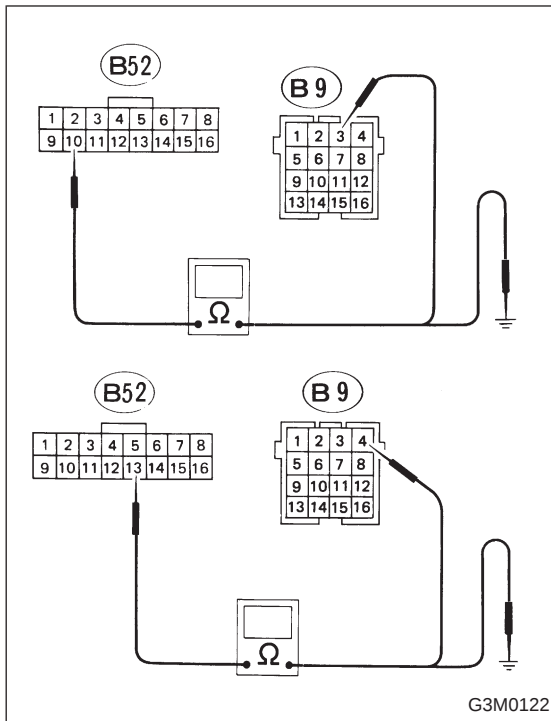
2) Warm-up the engine and transmission.

3) Move shift lever to "D".

4) Measure signal voltage output emitted from TCM while idling the engine.

Connector & terminal / Specified voltage:

(B52) No. 10 — No. 13 / 9 V, min.

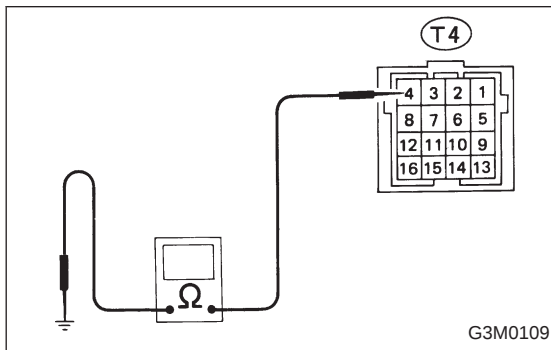


2. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND SHIFT SOLENOID 1.

- 1) Disconnect connector from TCM.
- 2) Disconnect connector from transmission.
- 3) Measure resistance between TCM connector and transmission connector, and between TCM connector and body.

Connector & terminal / Specified resistance:

- (B52) No. 10 — (B9) No. 3 / 1 Ω , max.
- (B52) No. 10 — Body / 1 M Ω , min.
- (B52) No. 13 — (B9) No. 4 / 1 Ω , max.
- (B52) No. 13 — Body / 1 M Ω , min.

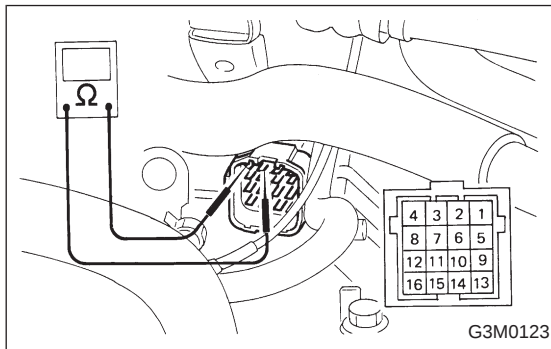


3. CHECK SHIFT SOLENOID 1'S GROUND LINE.

- 1) Disconnect connector from transmission.
- 2) Measure resistance between transmission connector receptacle and transmission case.

Connector & terminal / Specified resistance:

- (T4) No. 4 — Transmission / 1 Ω , max.



4. CHECK SHIFT SOLENOID 1.

- 1) Disconnect connector from transmission.
- 2) Measure resistance between transmission connector receptacle's terminals.

Connector & terminal / Specified resistance:

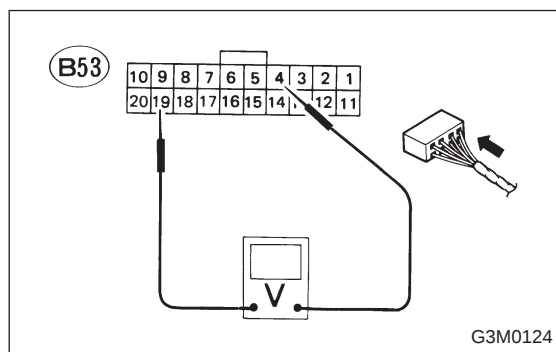
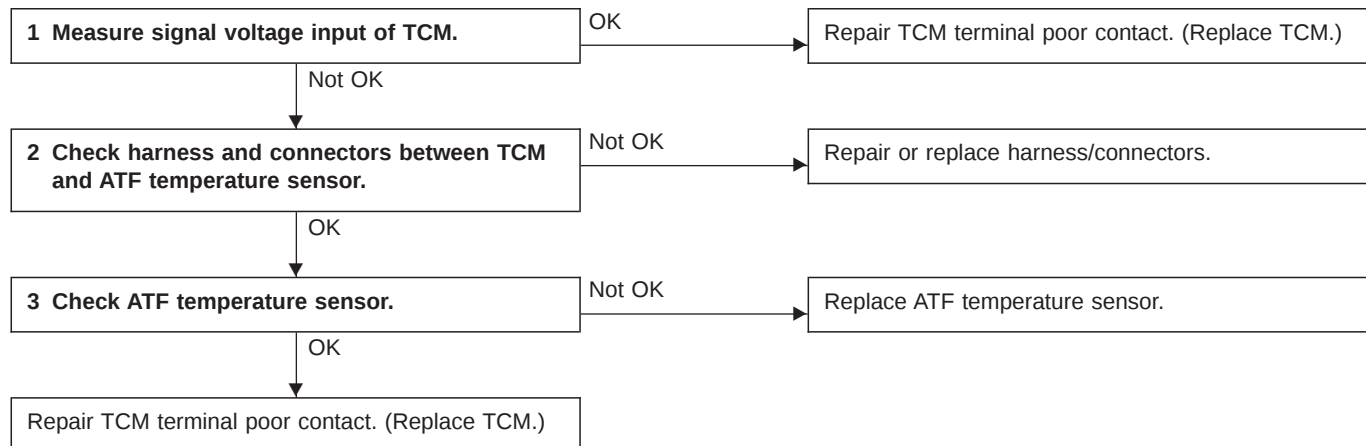
- (T4) No. 3 — No. 4 / 20 — 30 Ω

F: 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

**1. MEASURE SIGNAL VOLTAGE INPUT OF 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:

(B53) No. 19 — No. 4 /

2.9 — 4.0 V [ATF temperature: 20°C (68°F)]

1.0 — 1.4 V [ATF temperature: 80°C (176°F)]

● SELECT MONITOR FUNCTION MODE

Mode: F08 or F07

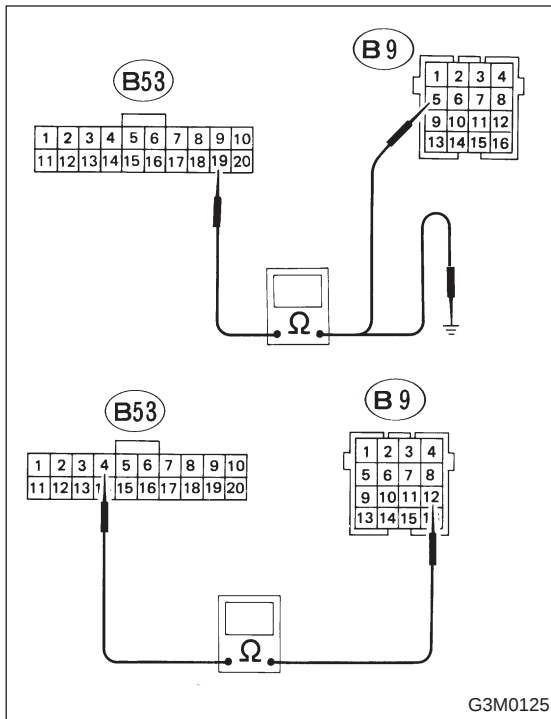
Condition:

Warm-up the engine to increase ATF temperature.

Specified data:

ATFT F08 or F07

(Temperature shown on display increases.)

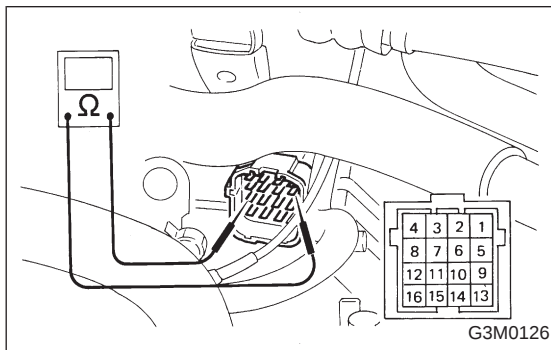


2. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND ATF TEMPERATURE SENSOR.

- 1) Disconnect connector from TCM.
- 2) Disconnect connector from transmission.
- 3) Measure resistance between TCM connector and transmission connector, and between TCM connector and body.

Connector & terminal / Specified resistance:

- (B53) No. 19 — (B9) No. 5 / 1 Ω , max.
- (B53) No. 19 — Body / 1 M Ω , min.
- (B53) No. 4 — (B9) No. 12 / 1 Ω , max.



3. CHECK ATF TEMPERATURE SENSOR.

- 1) Disconnect connector from transmission.
- 2) 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)]

- 3) Connect connector to transmission, and warm-up the engine to increase ATF temperature.

- 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)]

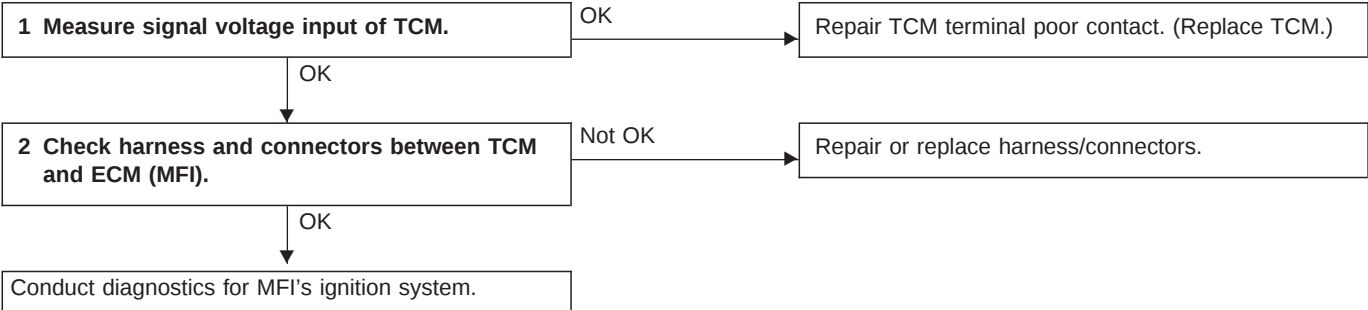
G: TROUBLE CODE 23
— ENGINE SPEED SIGNAL —

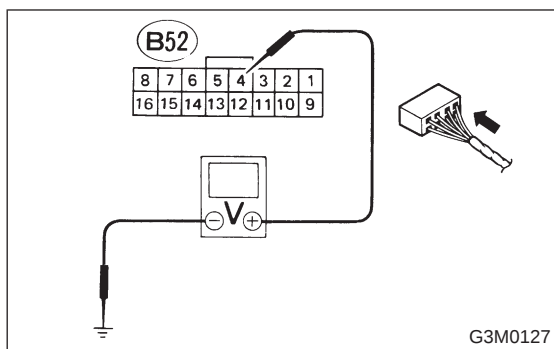
DIAGNOSIS:

Engine speed input signal circuit is open or shorted.

TROUBLE SYMPTOM:

- No lock-up occurs (after engine warm-up)
- Power indicator remains on when vehicle speed is “0”.





1. MEASURE SIGNAL VOLTAGE INPUT OF TCM.

- 1) Turn ignition switch ON (with engine OFF).
- 2) Measure signal voltage input of TCM.

Connector & terminal / Specified voltage:

(B52) No. 4 — Body / 10.5 V, min.

● SELECT MONITOR FUNCTION MODE

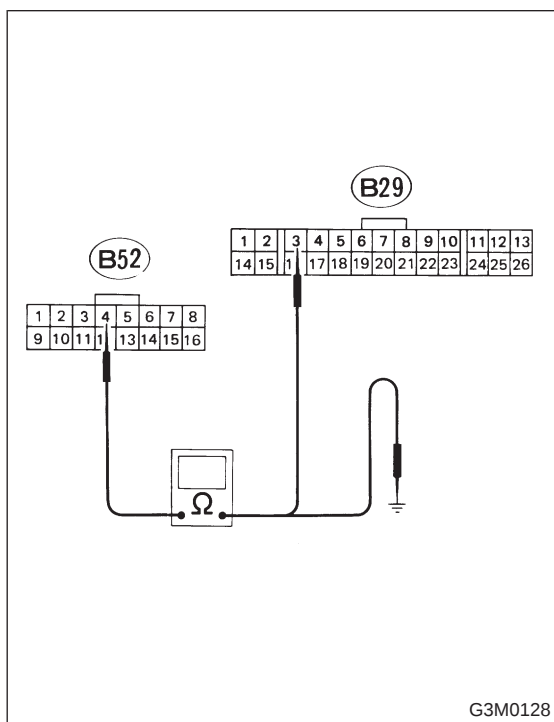
Mode: F06

Condition:

After warming-up the engine

Specified data: EREV F06

(Engine speed is shown in rpm.)



2. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND ECM (MFI).

- 1) Disconnect connector from TCM.
- 2) Disconnect connector from ECM (MFI).
- 3) Measure resistance between TCM connector and ECM (MFI) connector.

Connector & terminal / Specified resistance:

(B52) No. 4 — (B29) No. 3 / 1 Ω , max.

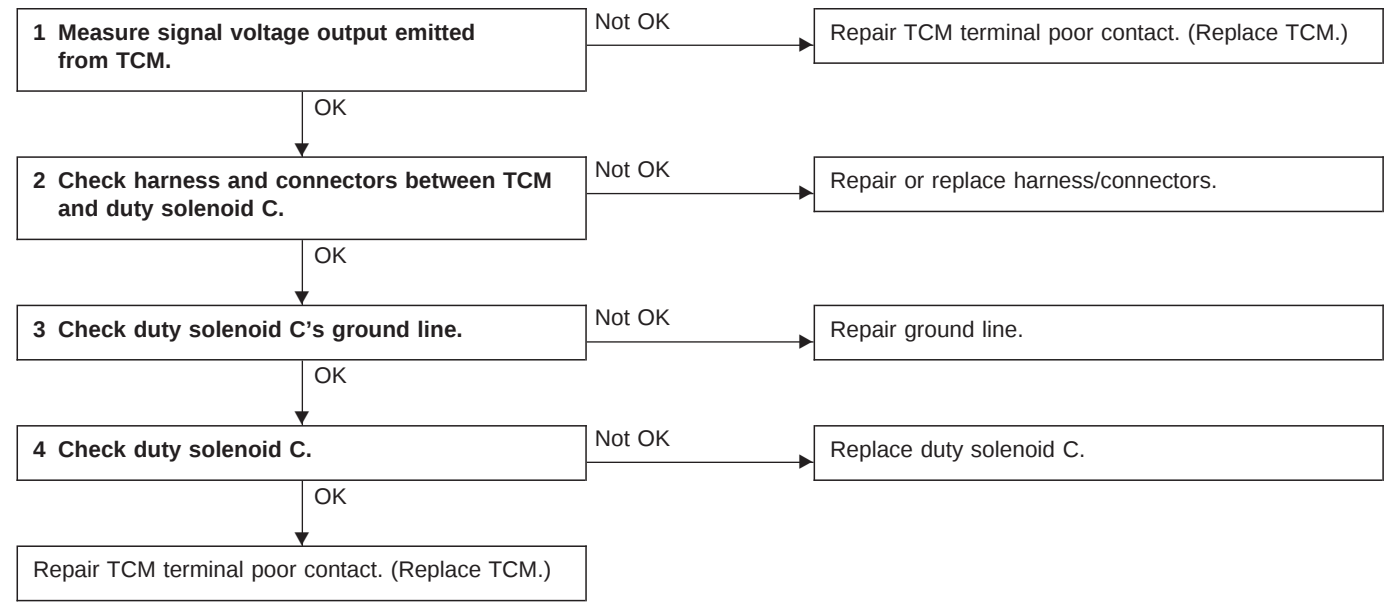
(B52) No. 4 — Body / 1 M Ω , min.

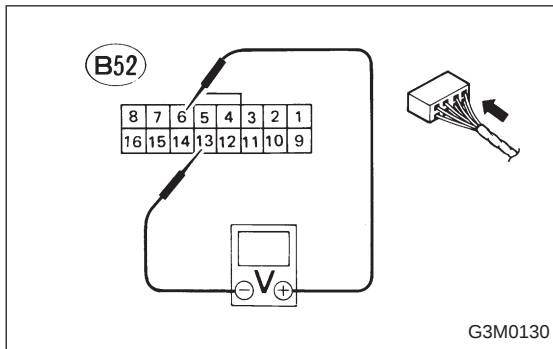
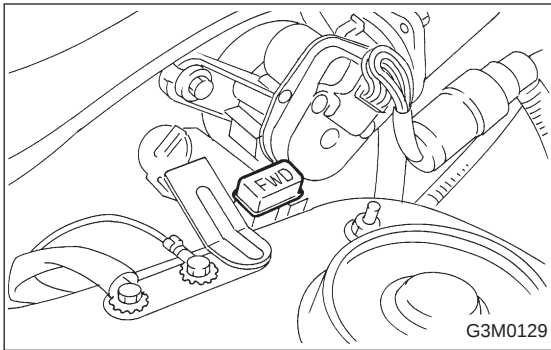
H: TROUBLE CODE 24

— DUTY SOLENOID C —

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

TROUBLE SYMPTOM:
Excessive “braking” in tight corners





1. MEASURE SIGNAL VOLTAGE OUTPUT EMITTED FROM TCM.

1) Install spare fuse on FWD switch and set in FWD mode.

2) Turn ignition switch ON (with engine OFF).

3) Move select lever to "D".

4) Measure voltage output emitted from TCM (with accelerator pedal released).

Connector & terminal / Specified voltage:

(B52) No. 6 — No. 13 / 8.5 V, min.

5) Turn ignition switch OFF.

6) Remove spare fuse from FWD switch.

7) Turn ignition switch ON (with engine OFF).

8) Move select lever to "D".

9) Measure voltage output emitted from TCM (with accelerator pedal fully depressed).

Connector & terminal / Specified voltage:

(B52) No. 6 — No. 13 / 0.5 V, max.

● SELECT MONITOR FUNCTION MODE

Mode: F13

Condition:

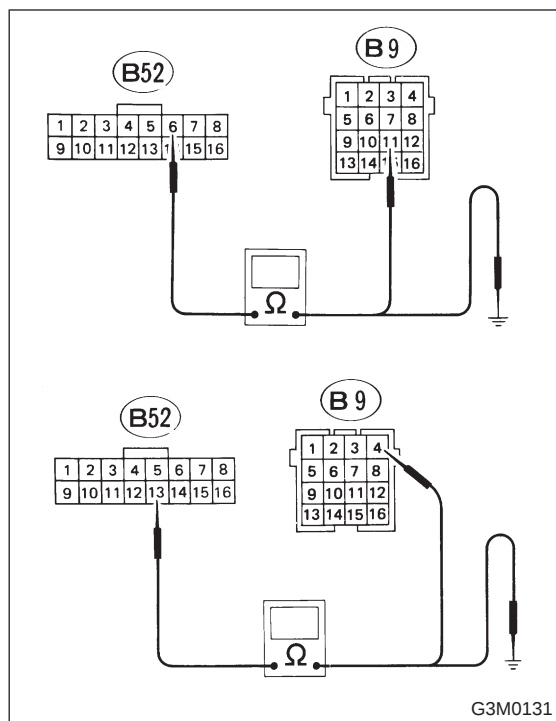
Ignition switch ON (Engine OFF)

Specified data:

4WDTY F13

95% (FWD mode)

25%, max. (AWD mode, D-range, full throttle)



2. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND DUTY SOLENOID C.

- 1) Disconnect connector from TCM.
- 2) Disconnect connector from transmission.
- 3) Measure resistance between TCM connector and transmission connector.

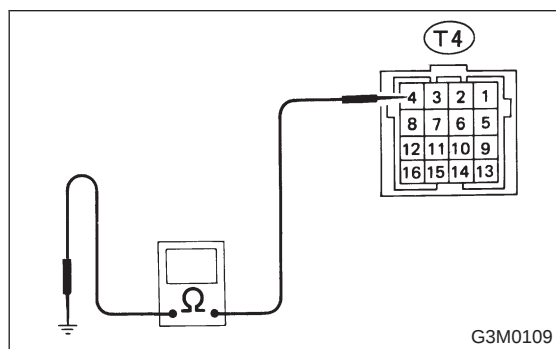
Connector & terminal / Specified resistance:

(B52) No. 6 — (B9) No. 11 / 1 Ω , max.

(B52) No. 6 — Body / 1 M Ω , min.

(B52) No. 13 — (B9) No. 4 / 1 Ω , max

(B52) No. 13 — Body / 1 M Ω , min.

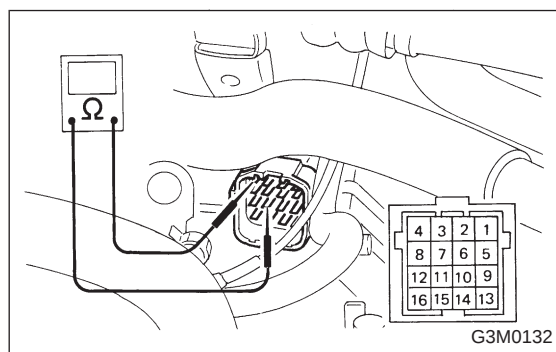


3. CHECK DUTY SOLENOID C'S GROUND LINE.

- 1) Disconnect connector from transmission.
- 2) Measure resistance between transmission connector receptacle and transmission case.

Connector & terminal / Specified resistance:

(T4) No. 4 — Transmission / 1 Ω , max.



4. CHECK DUTY SOLENOID C.

- 1) Disconnect connector from transmission.
- 2) Measure resistance between transmission connector receptacle's terminals.

Connector & terminal / Specified resistance:

(T4) No. 11 — No. 4 / 10 — 17 Ω

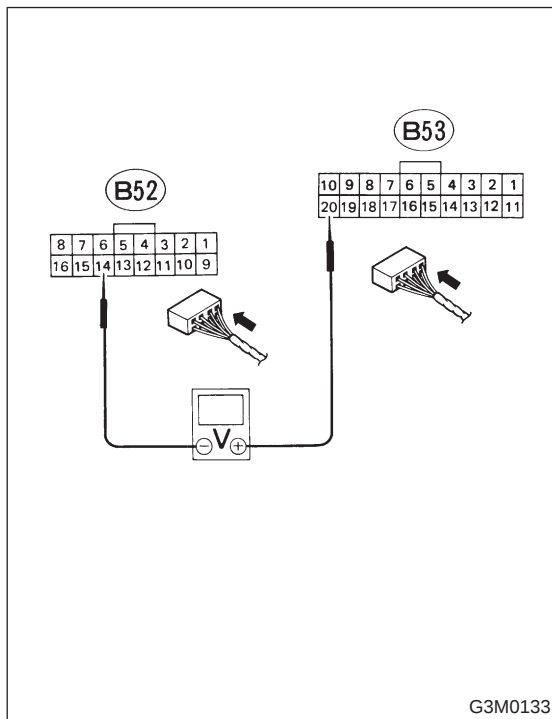
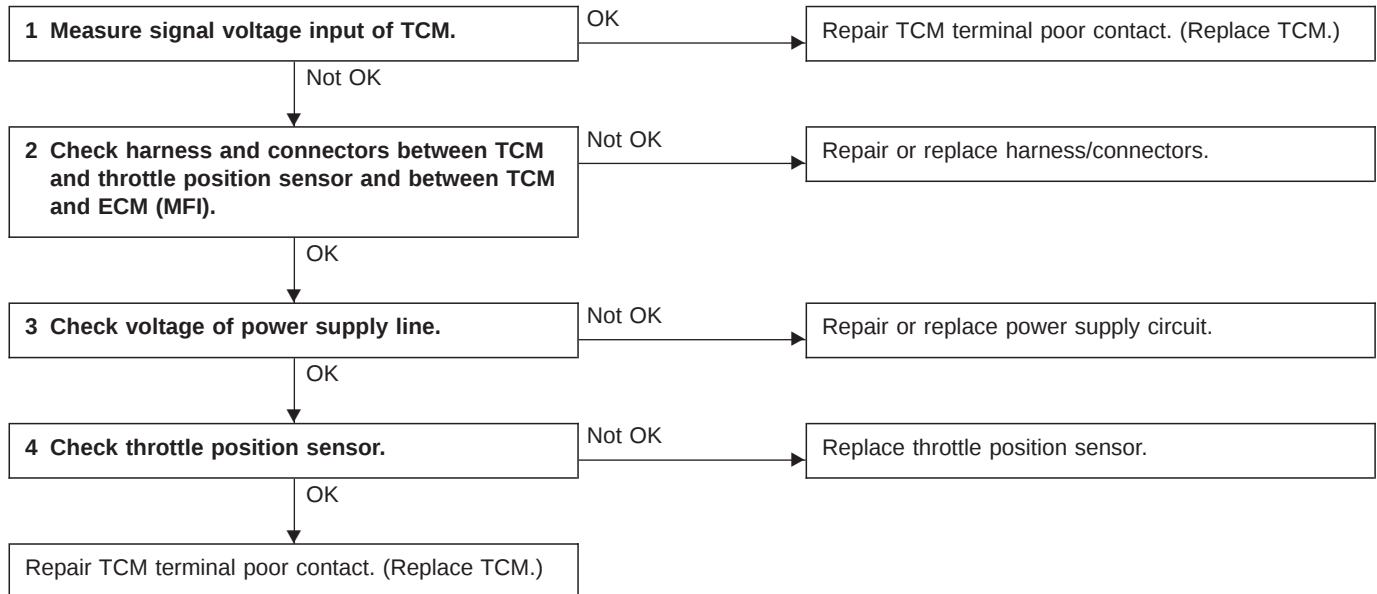
I: TROUBLE CODE 31 — THROTTLE POSITION SENSOR —

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. MEASURE SIGNAL VOLTAGE INPUT OF TCM.

- 1) Turn ignition switch ON (with engine OFF).
- 2) Measure signal voltage input emitted from throttle position sensor with accelerator pedal fully depressed.

Connector & terminal / Specified voltage:

(B53) No. 20 — (B52) No. 14 /

0.3 — 0.7 V (Throttle fully closed.)

3.9 — 4.3 V (Throttle fully open.)

● SELECT MONITOR FUNCTION MODE

Mode: F09

Condition:

Ignition switch ON (Engine OFF)

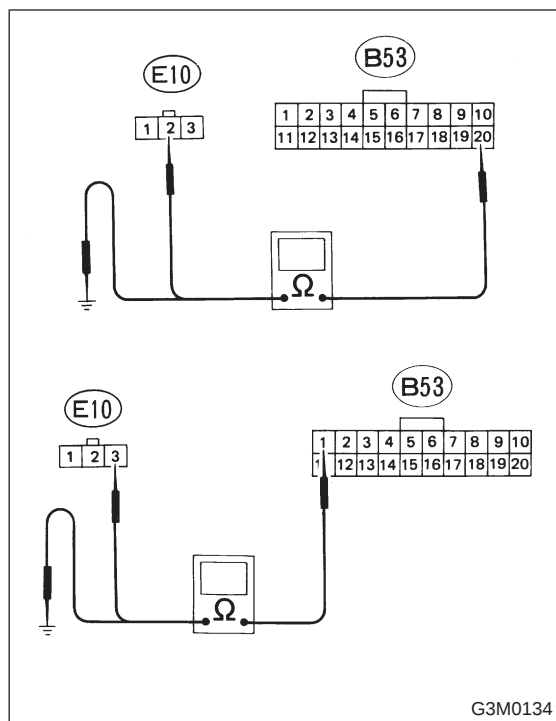
Specified data:

THV F09

0.3 — 0.7 V (Throttle fully closed.)

3.9 — 4.3 V (Throttle fully open.)

[Must be changed correspondingly with accelerator pedal operation (from "released" to "depressed" position).]



G3M0134

2. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND THROTTLE POSITION SENSOR AND BETWEEN TCM AND ECM (MFI).

- 1) Disconnect connector from TCM.
- 2) Disconnect connector from ECM (MFI).
- 3) Disconnect connector from throttle position sensor.
- 4) Measure resistance between TCM and throttle position sensor connectors.

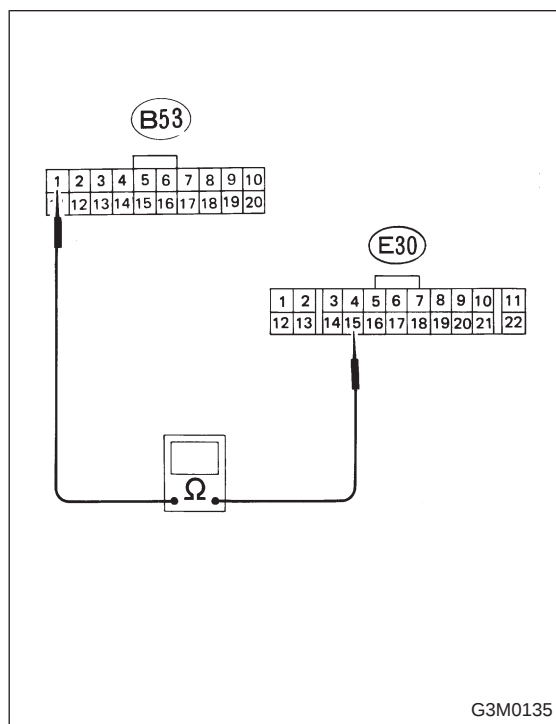
Connector & terminal / Specified resistance:

(B53) No. 20 — (E10) No. 2 / 1 Ω , max.

(B53) No. 20 — Body / 1 M Ω , min.

(B53) No. 1 — (E10) No. 3 / 1 Ω , max.

(B53) No. 1 — Body / 1 M Ω , min.

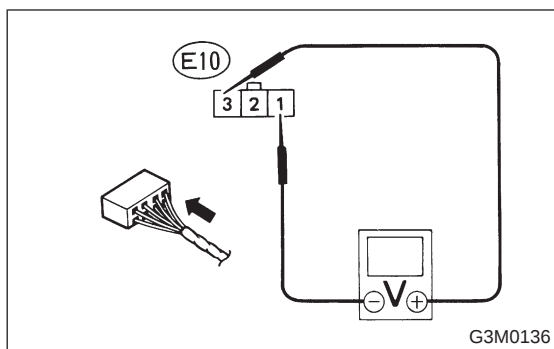


G3M0135

- 5) Measure resistance between TCM and ECM (MFI) connectors.

Connector & terminal / Specified resistance:

(B53) No. 1 — (E30) No. 15 / 1 Ω , max.

**3. CHECK VOLTAGE OF POWER SUPPLY LINE.**

- 1) Turn ignition switch ON (with engine OFF).
- 2) Measure voltage of throttle position sensor connector.

Connector & terminal / Specified voltage:

(E10) No. 3 — No. 1 / 4.8 — 5.3 V

● **SELECT MONITOR FUNCTION MODE**

Mode: F14

Condition:

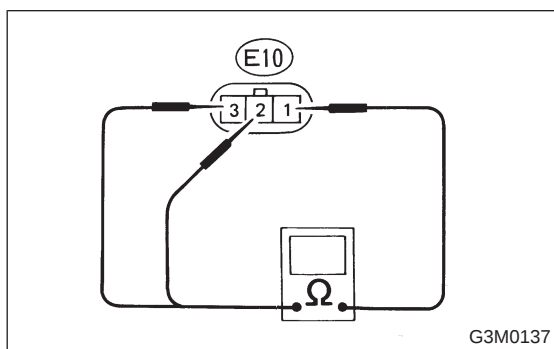
Ignition switch ON (Engine OFF)

Specified data:

THVCC F14

4.8 — 5.3 V

(Throttle position sensor power supply voltage is indicated.)

**4. CHECK THROTTLE POSITION SENSOR.**

- 1) Disconnect connector from throttle position sensor.
- 2) Measure resistance between throttle position sensor terminals.

Terminal / Specified resistance:

(E10) No. 1 — No. 2 /

500 Ω (Throttle fully closed.)

4 — 4.5 kΩ (Throttle fully open.)

(E10) No. 1 — No. 3 / 5 kΩ

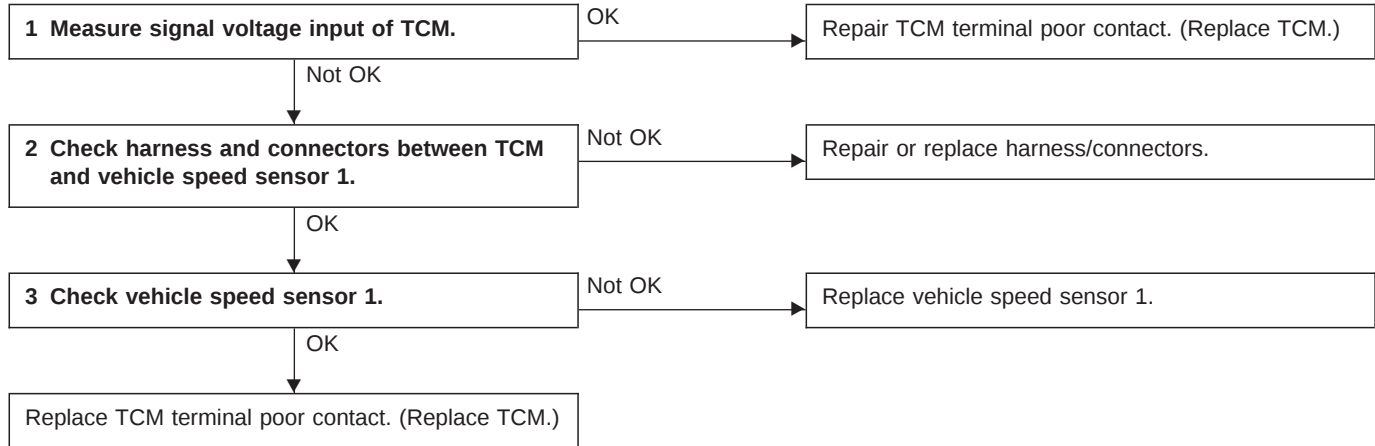
J: TROUBLE CODE 32
— VEHICLE SPEED SENSOR 1 —

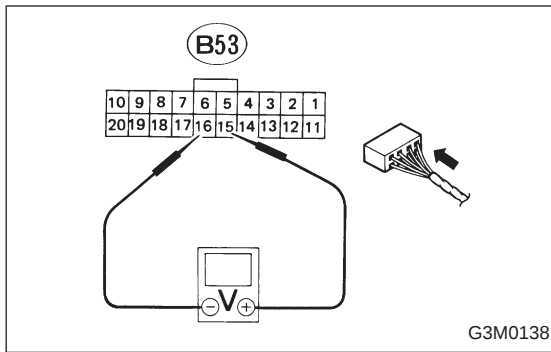
DIAGNOSIS:

Input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

No shift or excessive tight corner “braking”





1. MEASURE SIGNAL VOLTAGE INPUT OF TCM.

- 1) Raise vehicle and place safety stands.

CAUTION:

On AWD models, raise all wheels off floor.

- 2) Start the engine. Set vehicle in 12 miles/h condition.
- 3) Measure signal voltage input of TCM.

Connector & terminal / Specified voltage:

(B53) No. 15 — No. 16 / AC 1 V, min.

● SELECT MONITOR FUNCTION MODE

Mode: F02

Condition:

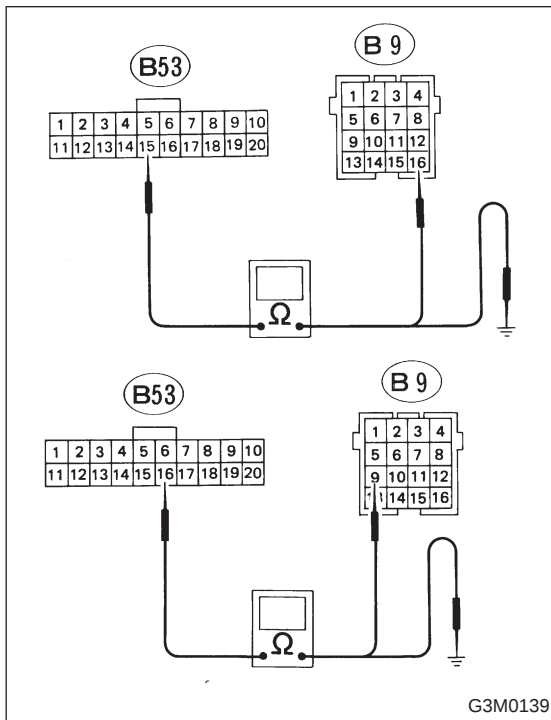
Simulated driving

Specified data:

VSP1 F02

(Vehicle speed) miles/h

Mode F03: "km/h" indication



2. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND VEHICLE SPEED SENSOR 1.

- 1) Disconnect connector from TCM.
- 2) Disconnect connector from transmission.
- 3) Measure resistance between TCM connector and transmission connector.

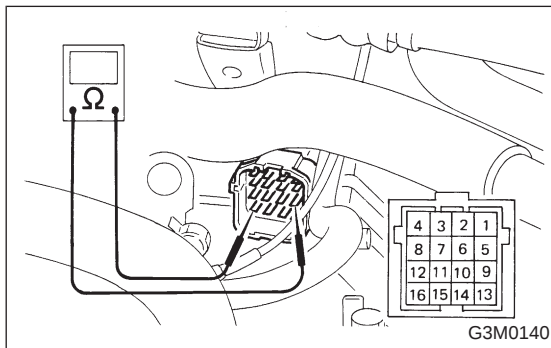
Connector & terminal / Specified resistance:

(B53) No. 15 — (B9) No. 16 / 1 Ω , max.

(B53) No. 15 — Body / 1 M Ω , min.

(B53) No. 16 — (B9) No. 9 / 1 Ω , max.

(B53) No. 16 — Body / 1 M Ω , min.



3. CHECK VEHICLE SPEED SENSOR 1.

- 1) Disconnect connector from transmission.
- 2) Measure resistance between transmission connector receptacle's terminals.

Connector & terminal / Specified resistance:

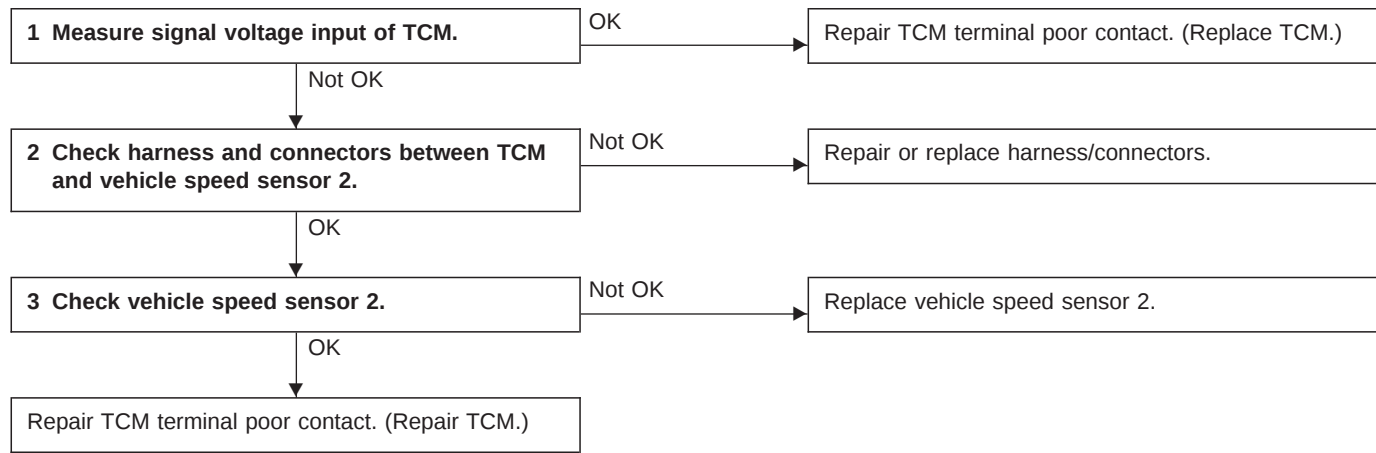
(T4) No. 16 — No. 9 / 450 — 650 Ω

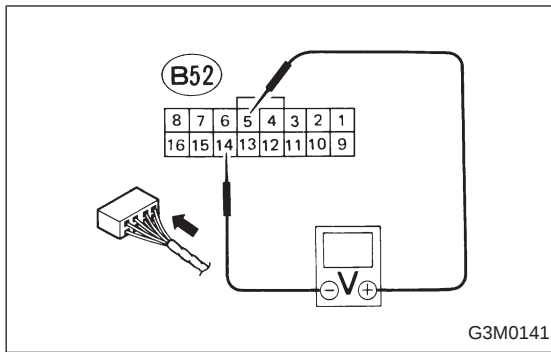
K: TROUBLE CODE 33

— VEHICLE SPEED SENSOR 2 —

DIAGNOSIS:
Input signal circuit of vehicle speed sensor 2 is open or shorted.

TROUBLE SYMPTOM:
Improper shift points





1. MEASURE SIGNAL VOLTAGE INPUT OF TCM.

- 1) Turn ignition switch ON (with engine OFF).
- 2) Move select lever to "N" and slowly move vehicle by pushing it.
- 3) While vehicle is slowly moving, measure signal voltage input of TCM.

Connector & terminal / Specified voltage:

(B52) No. 5 — No. 14 / repetition of 1 volt (max.)
— 4 volts (min.)

● SELECT MONITOR FUNCTION MODE

Mode: F04

Condition:

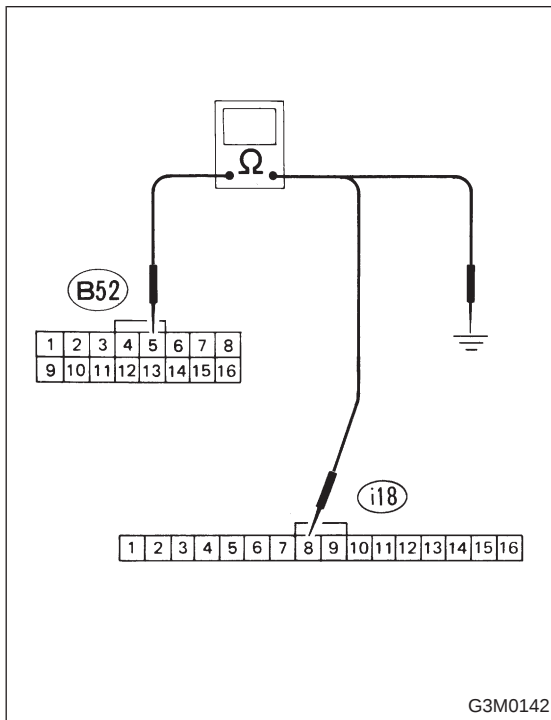
Simulated driving

Specified data:

VSP2 04

(vehicle speed) miles/h

Mode F05: "km/h" indication



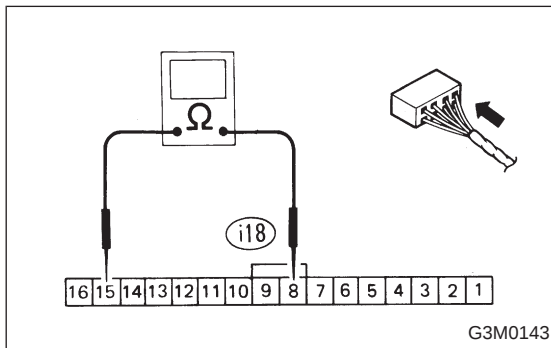
2. CHECK HARNESS AND CONNECTORS BETWEEN TCM AND VEHICLE SPEED SENSOR 2.

- 1) Disconnect connector from TCM.
- 2) Disconnect connector from rear of combination meter.
- 3) Measure resistance between TCM connector and combination meter cable connector.

Connector & terminal / Specified resistance:

(B52) No. 5 — (i18) No. 8 / 1 Ω, max.

(B52) No. 5 — Body / 1 MΩ, min.



3. CHECK VEHICLE SPEED SENSOR 2.

- 1) Remove combination meter from instrument panel.
- 2) Rotate combination meter with a screwdriver inserted into rear of combination meter at cable location.
- 3) Check that resistance across combination meter cable connector terminals changes (from 0 to more than 1 MΩ) four times per rotation.

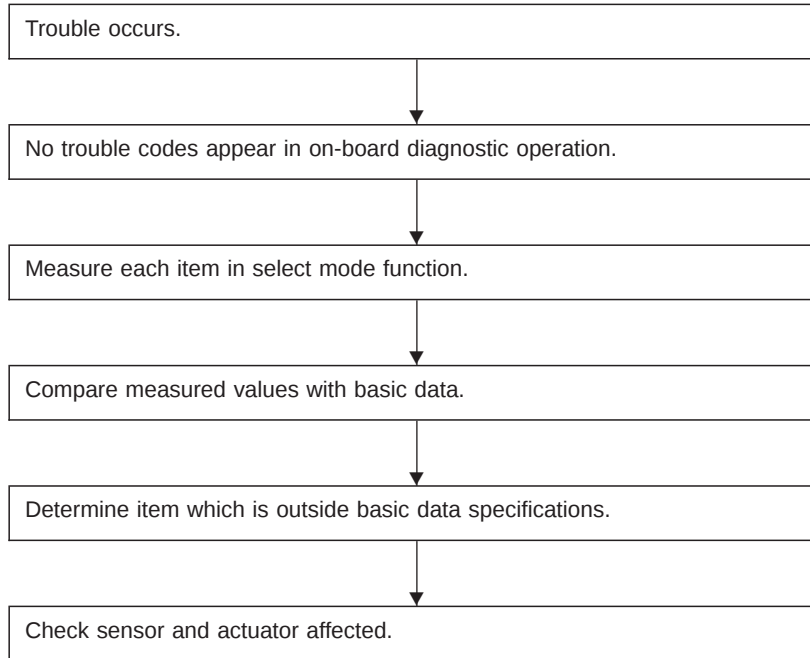
Connector & terminal / Specified resistance:

(i18) No. 8 — (i18) No. 15 / 0 ↔ More than 1 MΩ

6. 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)	39
F01	Battery voltage	VB	V	Battery voltage applied to control unit.	39
F02	Vehicle speed sensor 1	VSP1	m/h	Vehicle speed (miles/h) sent from vehicle speed sensor 1.	40
F03	Vehicle speed sensor 1	VSP1	km/h	Vehicle speed (km/h) sent from vehicle speed sensor 1.	—
F04	Vehicle speed sensor 2	VSP2	m/h	Vehicle speed (miles/h) sent from vehicle speed sensor 2.	40
F05	Vehicle speed sensor 2	VSP2	km/h	Vehicle speed (km/h) sent from vehicle speed sensor 2.	—
F06	Engine speed	EREV	rpm	Engine speed sent from EGI unit.	41
F07	ATF temperature sensor	ATFT	°F	ATF temperature (°F) sent from ATF temperature sensor.	41
F08	ATF temperature sensor	ATFT	°C	ATF temperature (°C) sent from ATF temperature sensor.	—
F09	Throttle position sensor	THV	V	Voltage sent from throttle position sensor.	42
F10	Gear position	GEAR	—	Transmission gear position.	43
F11	Line pressure duty	PLDTY	%	Duty ratio flowing through duty solenoid A.	44
F12	Lock-up duty	LUPTY	%	Duty ratio flowing through duty solenoid B.	45
F13	AWD duty	4WDTY	%	Duty ratio flowing through duty solenoid C.	46
F14	Throttle position sensor power supply voltage	THVCC	V	Battery voltage applied to throttle position sensor.	47

2. ON $\longleftrightarrow$ 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.	50
	8	—	—		—
	9	—	—		—
	10	—	—		—

NOTE: LED Nos. 2 and 8 cannot be turned on.

3. DIAGNOSIS MODE

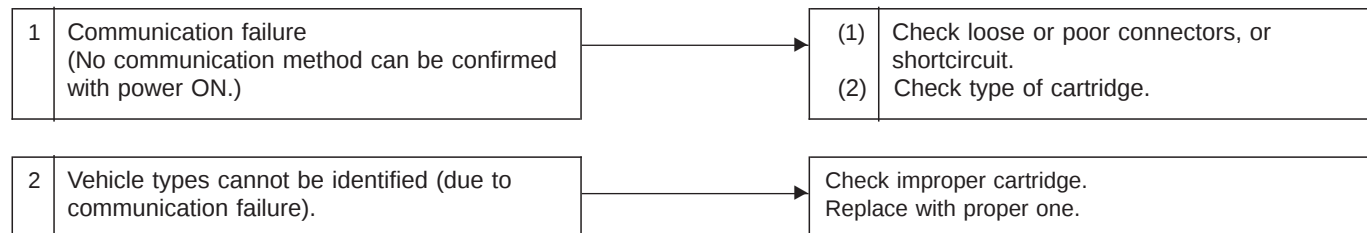
Mode	Contents	Abbr.	Contents of display	Page
FB0	On-board diagnostics	DIAG.U	Current trouble code determined by on-board diagnostics.	52
FB1	On-board diagnostics	DIAG.M	Previous trouble code stored in memory by on-board diagnostics.	53
FC0	Back-up clear	—	Function of clearing trouble code stored in memory.	54

E-4AT	(F00)
4WD	1993
G3M0723	

C: MODE F00 — MODE DISPLAY — SPECIFIED DATA:

Following data should be indicated.

Probable cause (if outside "specified data")



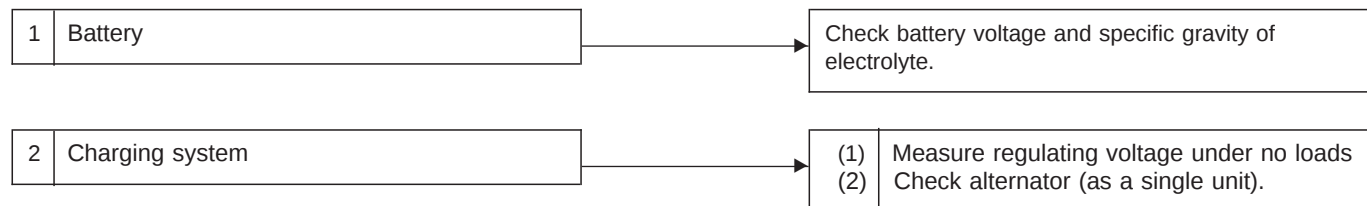
VB	(F01)
12 V	
G3M0724	

D: MODE F01 — BATTERY VOLTAGE (VB) — CONDITION:

- Ignition switch ON
- Engine idling after warm-up

SPECIFIED DATA:

VB: 10 — 15 V



VSP1

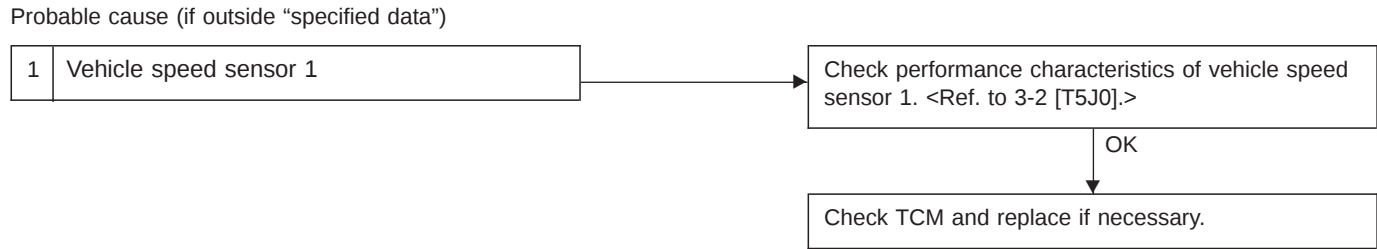
(F02)

18 m/h

G3M0725

E: MODE F02
— VEHICLE SPEED SENSOR 1 (VSP1) —
CONDITION:
Raise vehicle off ground and operate at constant speed.
SPECIFIED DATA:

- Compare speedometer with monitor indications.
- Probable cause (if indications are different)



VSP2

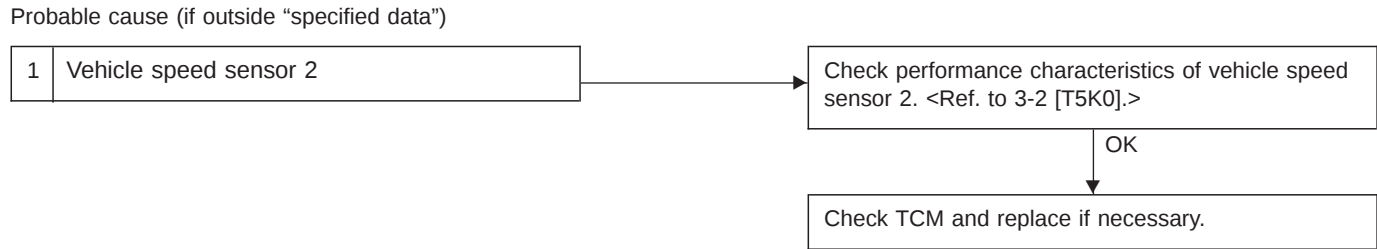
(F04)

12 m/h

G3M0726

F: MODE F04
— VEHICLE SPEED SENSOR 2 (VSP2) —
CONDITION:
Raise vehicle off ground and operate at constant speed.
SPECIFIED DATA:

- Compare speedometer with monitor indications.
- Probable cause (if indications are different)



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	

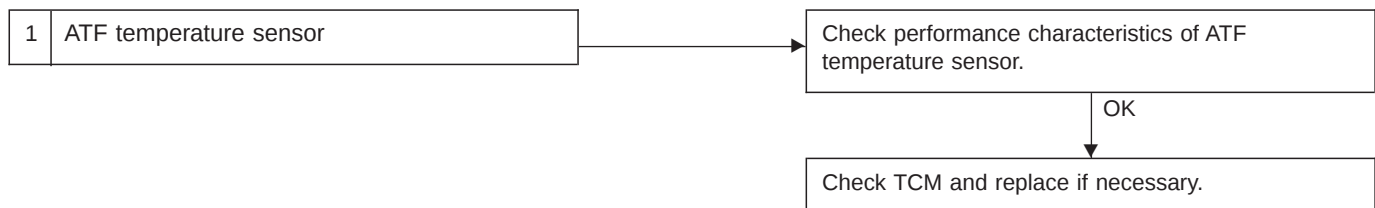
H: MODE F07 — ATF TEMPERATURE SENSOR (ATFT) — CONDITION:

- Low ATF temperature (before engine/vehicle starts)
- High ATF temperature (after driving vehicle for warm-up)

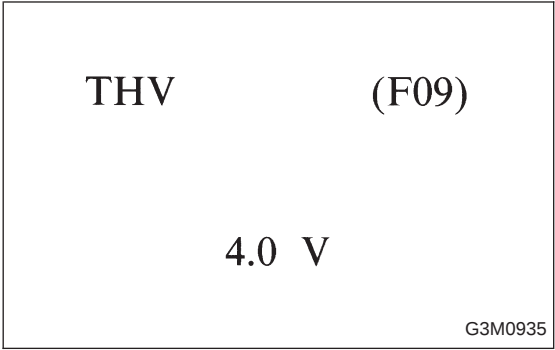
SPECIFIED DATA:

- Ambient temperature: $\pm 50^{\circ}\text{F}$ ($\pm 10^{\circ}\text{C}$)
- ATF temperature: 158 — 230°F (70 — 110°C)
- Open harness: 176 deg F (80 deg C)
- Shorted harness: 320 deg F (160 deg C)

Probable cause (if outside "specified data")



**F08 = ATF temperature (ATFT):
to be indicated in "deg C".**



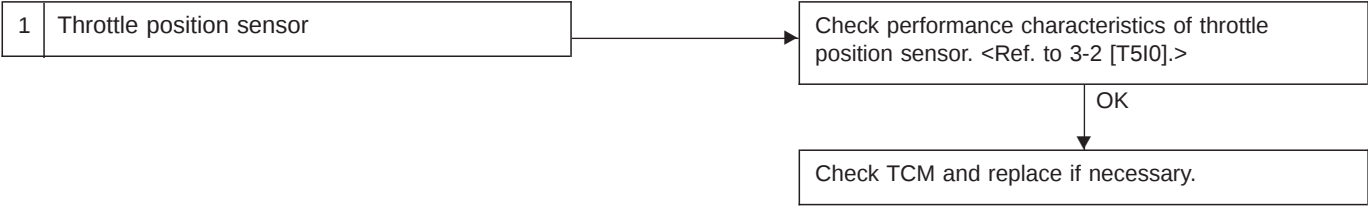
I: MODE F09
— THROTTLE POSITION SENSOR (THV) —
CONDITION:

- 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: 0.3 — 0.7 V
- Fully open position: 3.9 — 4.3 V
- From fully closed to fully open position: Voltage must smoothly decrease.
- Open harness: 4.7 — 5.3 V
- Shorted harness: 0.00 V

Probable cause (if outside “specified data”)



GEAR

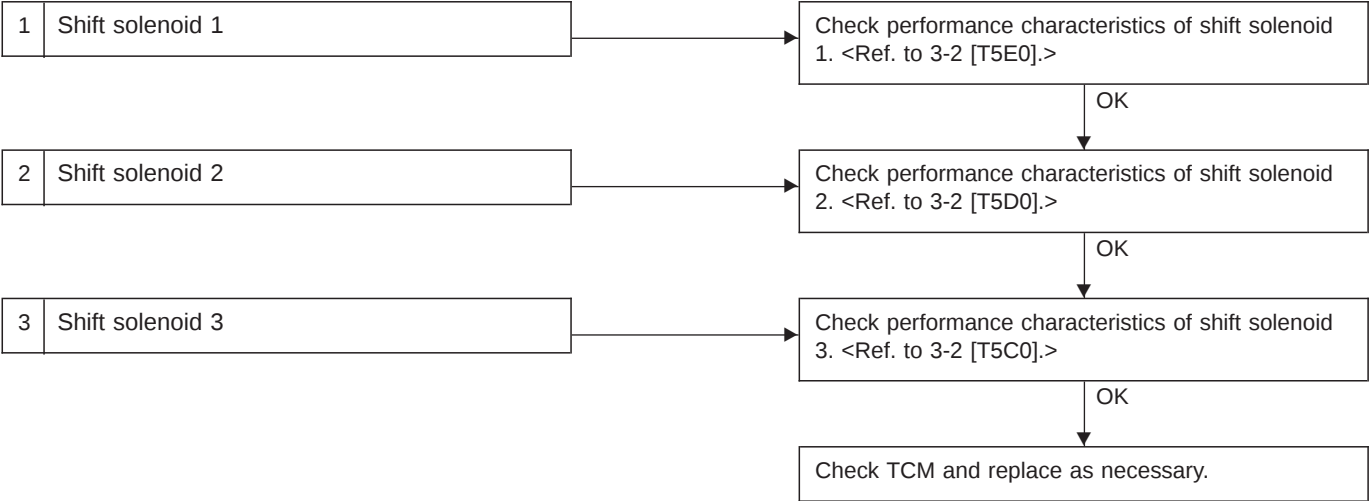
(F10)

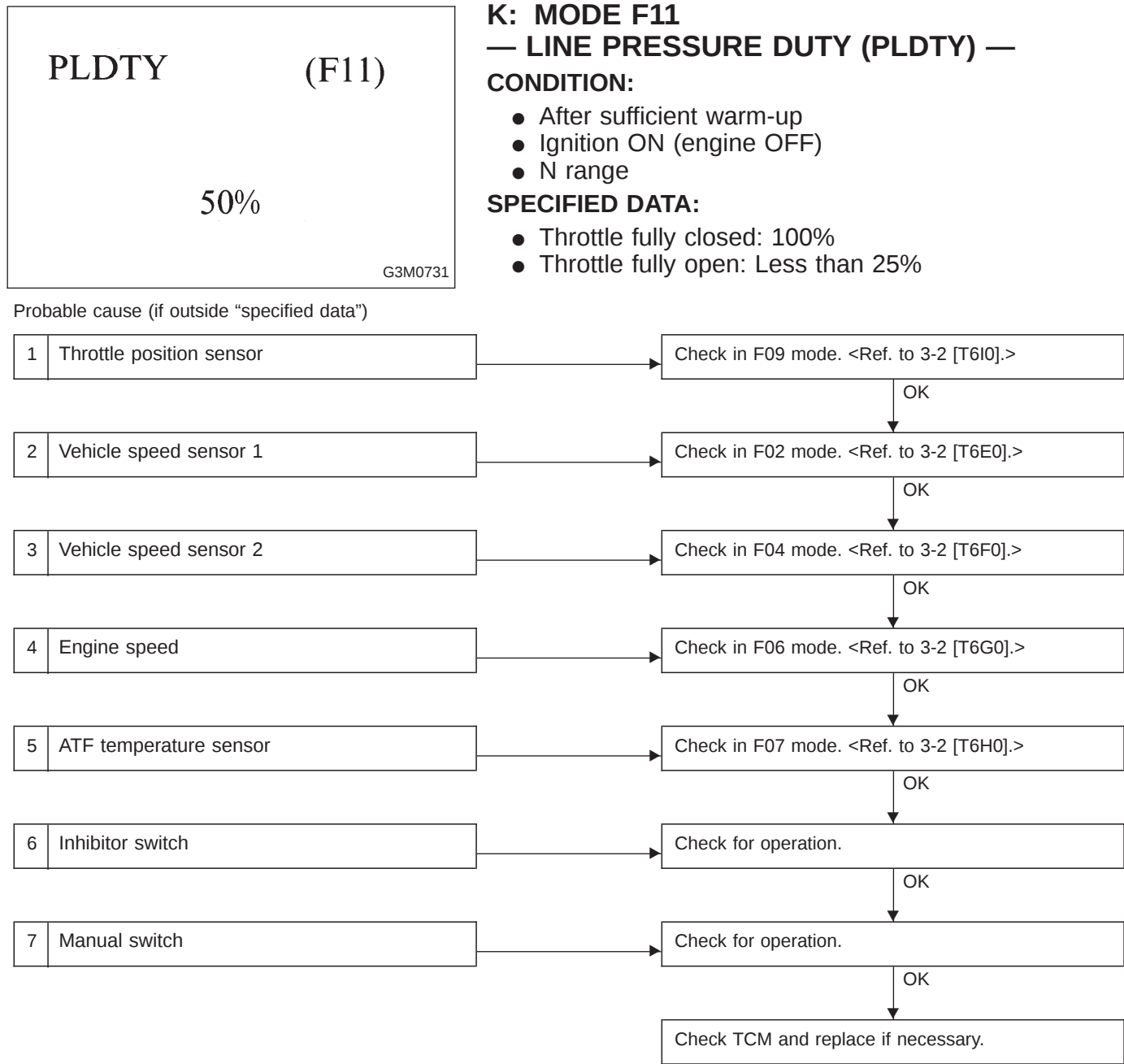
1st

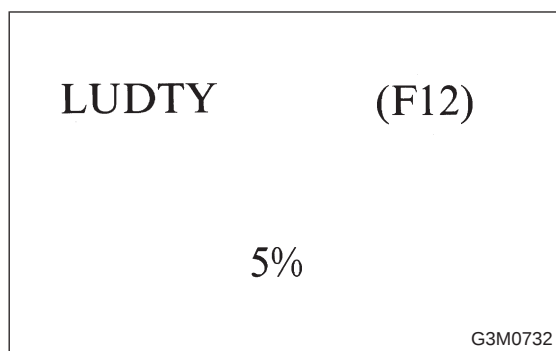
G3M0730

J: MODE F10 — GEAR POSITION (GEAR) —
CONDITION:
Check while driving vehicle (after warm-up).
SPECIFIED DATA:
Gear position (Ref. to shift performance characteristics chart <Ref. to 3-2 [W200], [W300].>.)

Probable cause (item outside “specified data”)







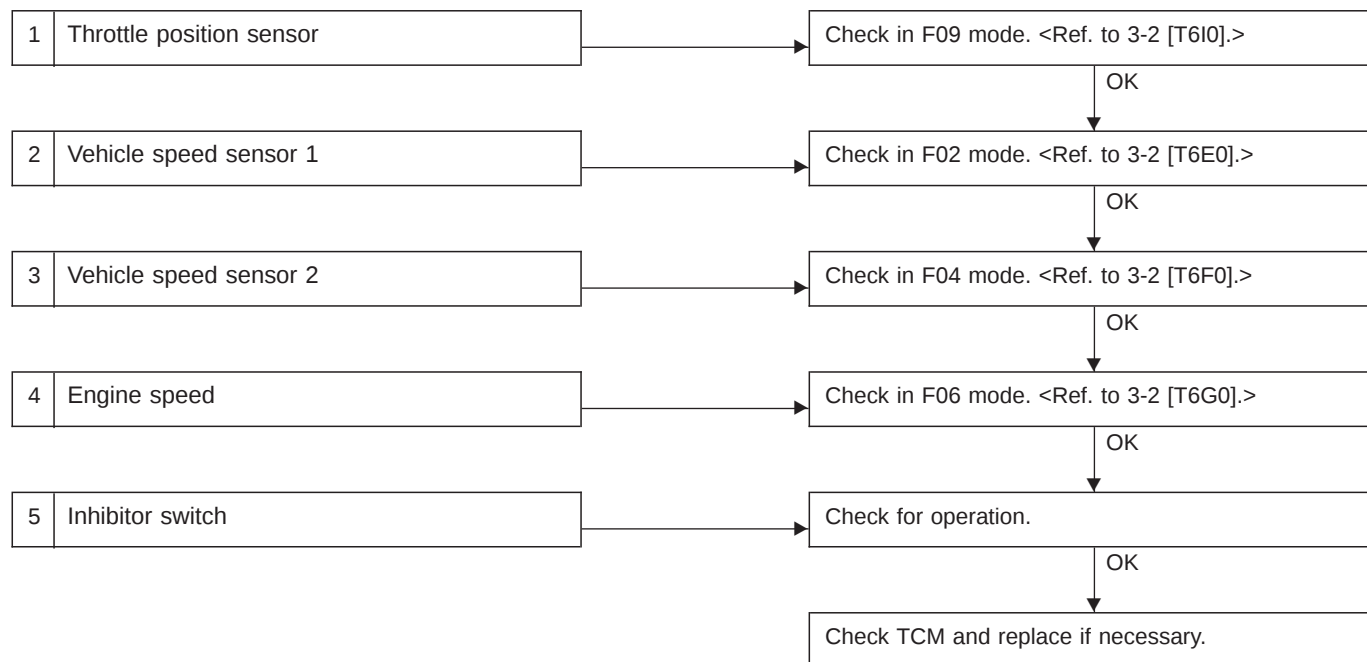
L: MODE F12 — LOCK-UP DUTY (LUPTY) — CONDITION:

- 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

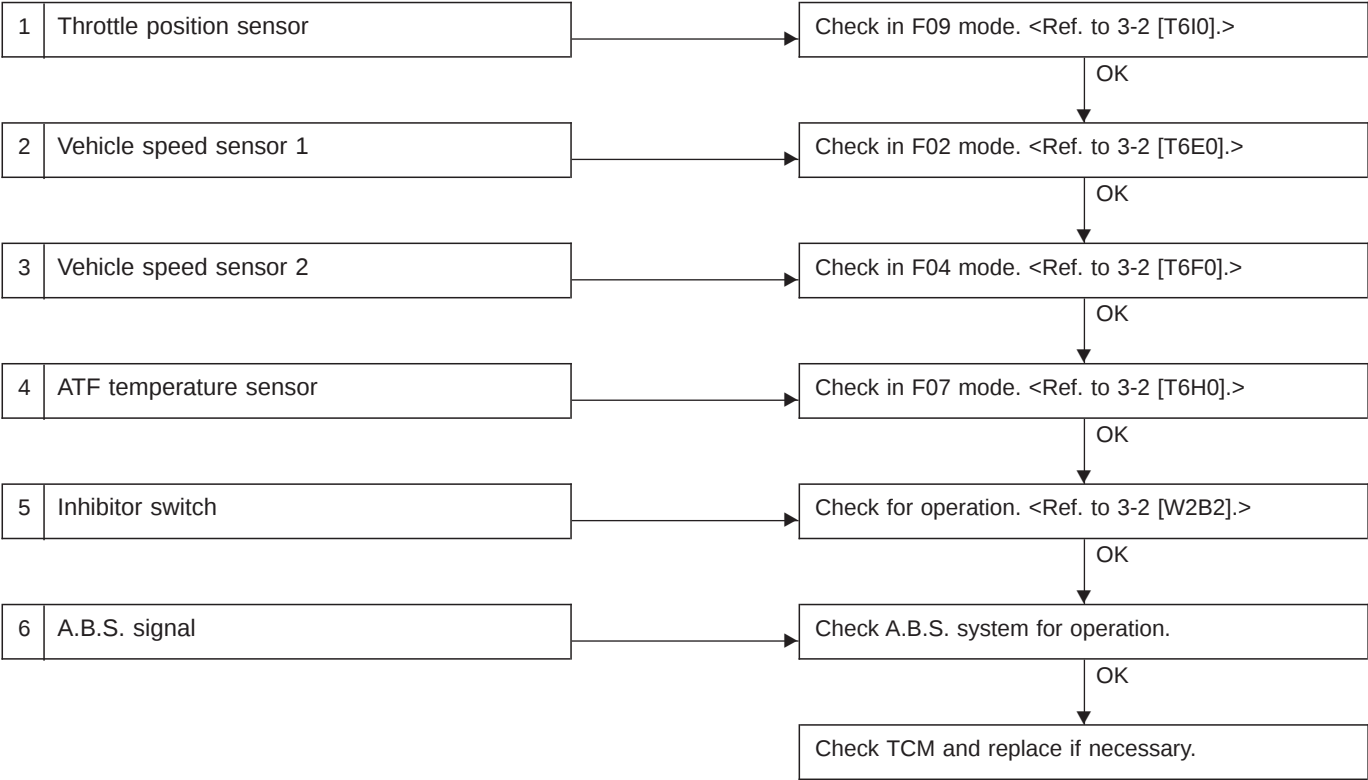
M: MODE F13 — AWD DUTY (4WDTY) —
CONDITION:

- After sufficient warm-up
- Ignition switch ON (engine OFF)
- FWD mode
- AWD mode, D range, full throttle

SPECIFIED DATA:

- 95% (FWD model)
- 25%, max. (vehicle speed 0 m/h)

Probable cause (if outside “specified data”)



THVCC

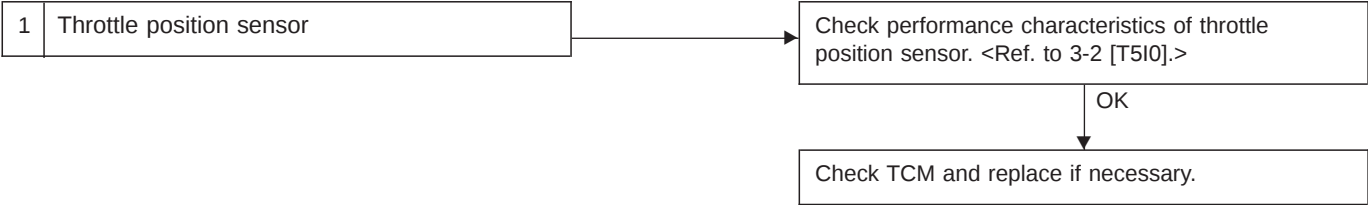
(F14)

5.2 V

G3M0734

N: MODE F14
— THROTTLE POSITION SENSOR POWER SUPPLY VOLTAGE (THVCC) —
CONDITION:
Ignition switch ON (engine OFF)
SPECIFIED DATA:
4.8 — 5.3 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 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

O: MODE FA0 — SWITCH 1 (SW1) —

Reference values

- Lights up when the fuse is installed in FWD switch (No. 1).
- Lights up when the brake switch is turned ON (No. 5).
- Lights up when the A.B.S. signal is entered (No. 6).
- Lights up when the cruise control is set (No. 7).

P: MODE FA1 — SWITCH 2 (SW2) —

DISPLAY

LED No.	Signal name	Symbol
1	P/N 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

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).

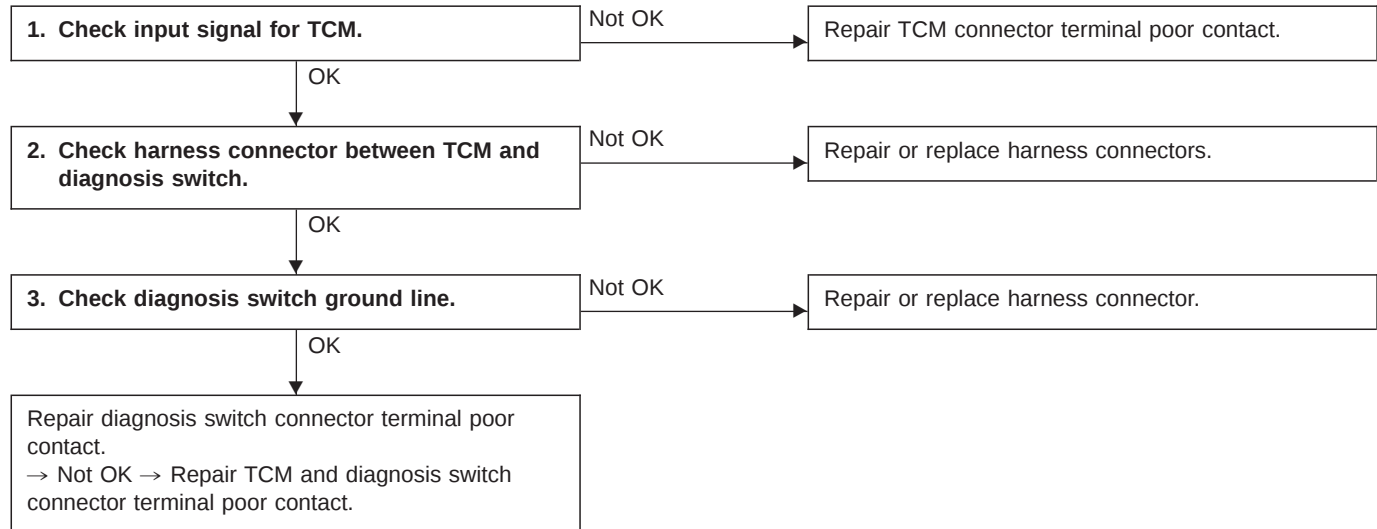
Q: MODE FA1

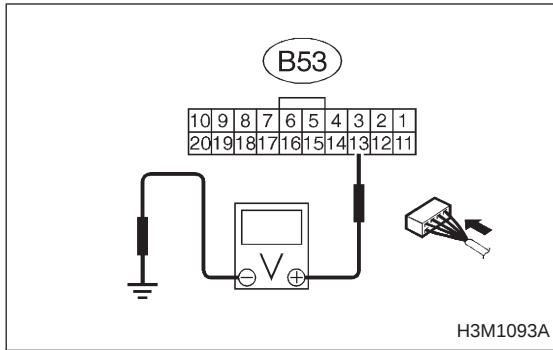
— LED No. 7, DIAGNOSIS SWITCH —

DIAGNOSIS:

- LED does not come on when diagnosis switch is ON.
- Diagnosis switch circuit is open or shorted.

Probable cause (if outside "specified data")



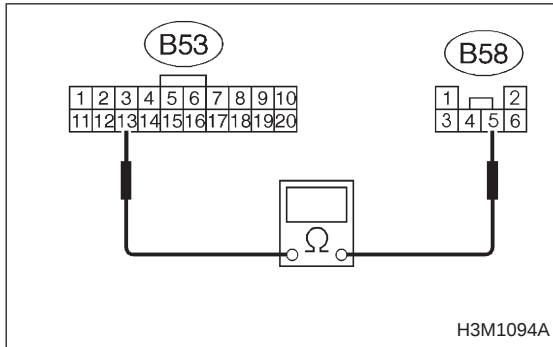


1. CHECK INPUT SIGNAL FOR TCM.

- 1) Turn ignition switch ON (with engine OFF).
- 2) Measure signal voltage for TCM while connecting and disconnecting the diagnosis terminal to diagnosis connector.

Connector & terminal / Specified voltage:

**(B53) No. 13 — Body / Less than 1 V (Connected)
More than 6 V (Disconnected)**

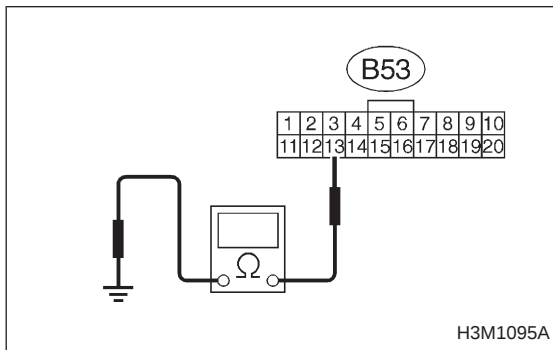


2. CHECK HARNESS CONNECTOR BETWEEN TCM AND DIAGNOSIS SWITCH.

- 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:

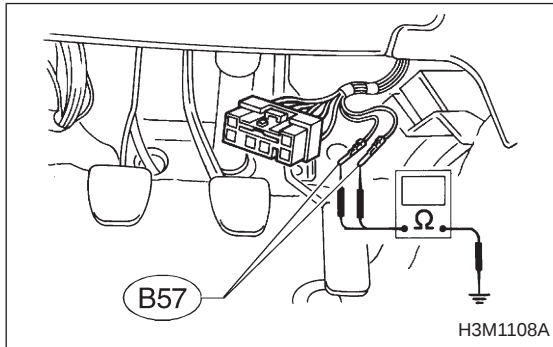
(B53) No. 13 — (B58) No. 5 / 1 Ω , or less.



- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B53) No. 13 — Body / 1 M Ω , or more

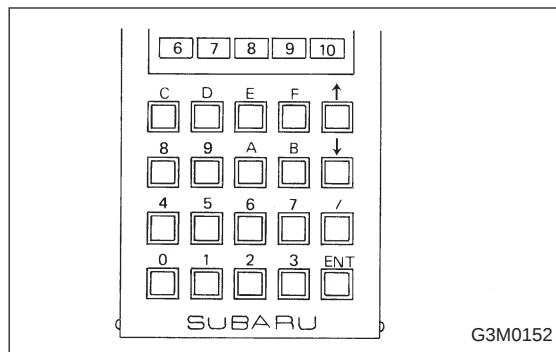


3. CHECK DIAGNOSIS SWITCH GROUND LINE.

Measure resistance of harness terminal between diagnosis terminal and body.

Connector & terminal / Specified resistance:

(B57) — Body / 1 Ω , or less



R: MODE FB0

— ON-BOARD DIAGNOSTICS (DIAG. U) —

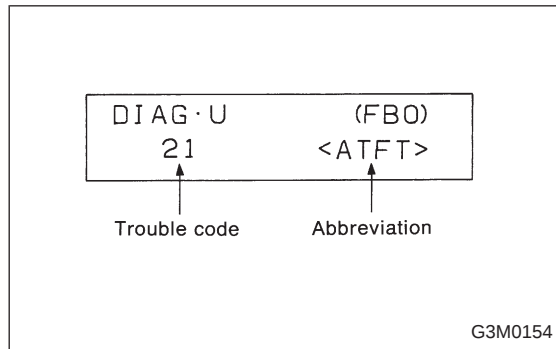
DISPLAY:

Current trouble code determined by on-board diagnostics.

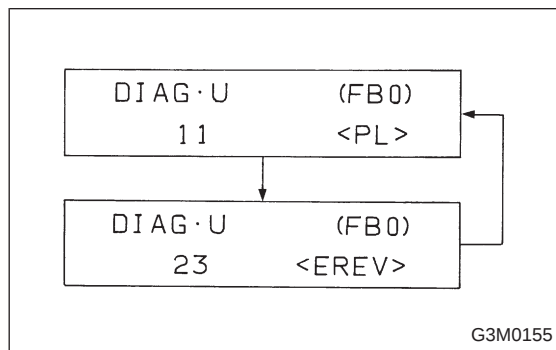
- 1) Connect select monitor.
- 2) Designate mode using function key.
Press [F] [B] [0] [ENT] in that order.

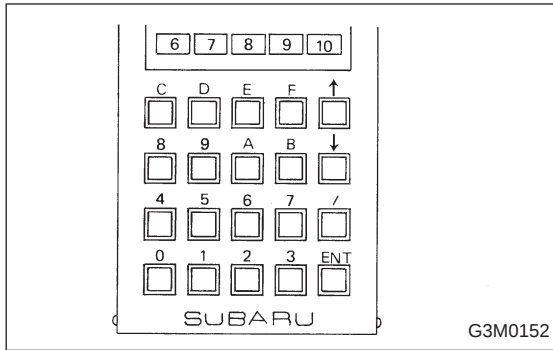
- 3) Ensure displayed trouble code(s).

- When there is only one trouble code



- When there are multiple trouble codes





G3M0152

S: MODE FB1

— ON-BOARD DIAGNOSTICS (DIAG. M) —

DISPLAY:

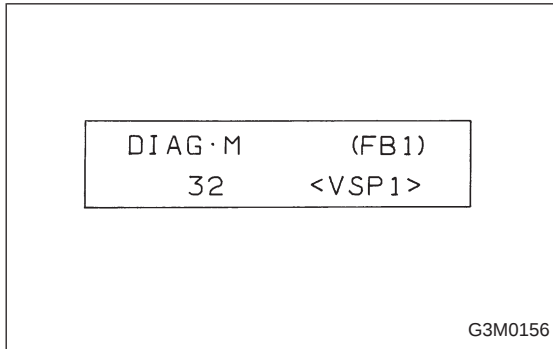
Previous trouble code stored in by on-board diagnostics.

- 1) Connect select monitor.
- 2) Designate mode using function key.

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

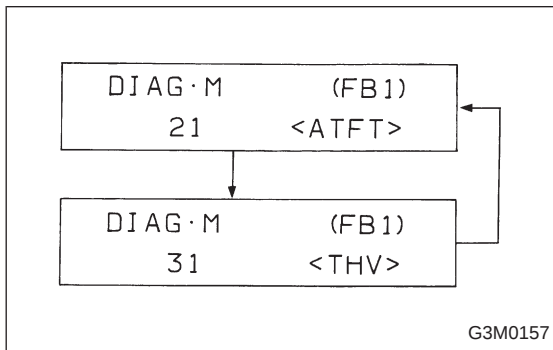
- 3) Ensure displayed trouble code(s).

- When there is only one trouble code



G3M0156

- When there are multiple trouble codes



G3M0157

T: MODE FC0 — BACK-UP CLEAR —**DISPLAY:**

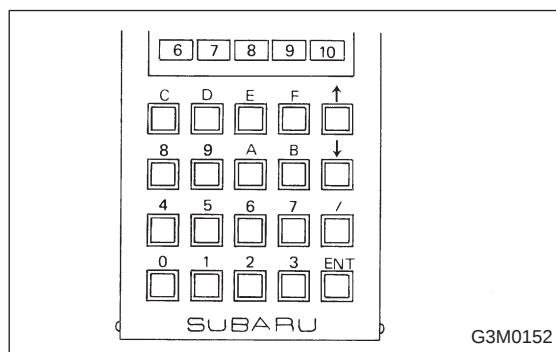
Function of clearing trouble code stored in memory.

The current trouble history code is deleted from the monitor when the ignition switch is turned OFF after performing on-board diagnostics. However, past trouble history code are stored in TCM. They remain in memory even when the ignition switch is turned OFF, because there is a memory back-up battery. The current trouble history code can be displayed again when on-board diagnostics is performed after driving, provided that no inspection or repair has been made.

To delete past trouble history codes, first perform on-board diagnostics after inspection and repair using the current trouble history code, then confirm that no trouble code is displayed. Next, select and execute a particular mode on the select monitor.

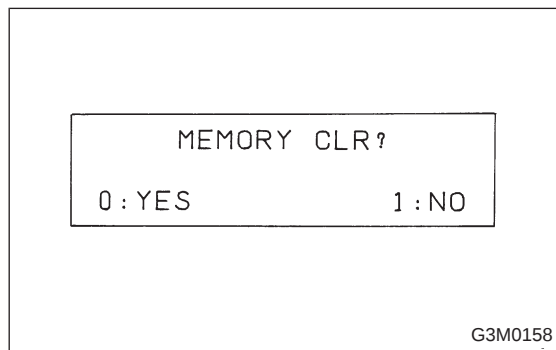
NOTE:

- Since the past trouble history is deleted, it is necessary when erasing the trouble code to inspect and make repairs according to the trouble code, and ensure that no trouble code is indicated in on-board diagnostics.
- The past trouble history will not be lost, provided inspection and repairs are performed according to the current trouble history code, and that no trouble remains.



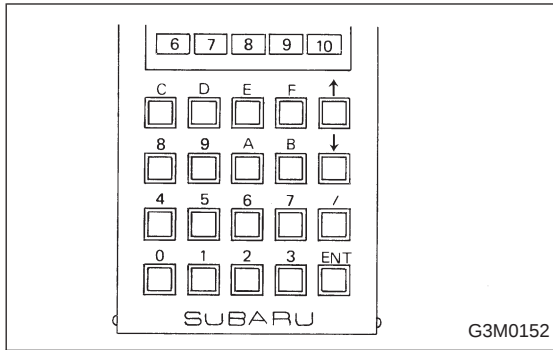
G3M0152

- 1) Connect select monitor.
- 2) Designate mode using function key.
Press [F] [C] [0] [ENT] in that order.

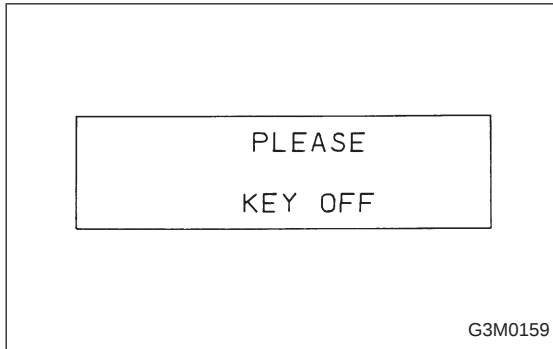


G3M0158

- 3) Ensure displayed message.



- 4) Press [ENT] 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 ignition switch to OFF.

7. 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 in "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							
	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

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
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	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				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."
																													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).
																													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														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.
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	

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
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																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	
Front wheel slippage occurs during standing starts.		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

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
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	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			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.
																													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.
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	

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- **SUPPLEMENTAL RESTRAINT SYSTEM “AIRBAG”**

Airbag system wiring harness is routed near the cruise control sub switch.

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 cruise control sub switch.

1. On-board Diagnosis System

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 — the cruise cancel conditions diagnosis and real-time diagnosis, which are used depending on the type of problems.

Applicable cartridge No.: 498349300

- 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 no 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.

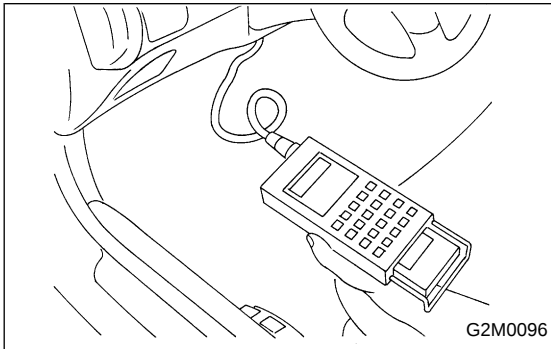
- Real-time diagnosis

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.



Dummy signals are manually entered from sub switch, etc.



2. ON-BOARD DIAGNOSIS PROCEDURES USING SELECT MONITOR

- 1) Connect select monitor to data link connector.
- 2) Turn ignition switch ON, then turn cruise main switch ON.
- 3) Turn select monitor's power ON. All LED's will come on. Select monitor display will read, after several seconds.

NOTE:

If cruise main switch is OFF, error 1 will appear. Turn cruise main switch ON and repeat steps 2.

- 4) Press "F", "B", "0", and "ENT" in that order, and enter the desired designated code ("FB0", for example), or press scroll key to select the code.

3. DIAGNOSIS OF CRUISE CANCEL CONDITIONS

- 1) Connect select monitor.
- 2) Turn ignition and cruise main switch ON, and set select monitor in "FB0" mode.
- 3) Start engine and drive vehicle at least 40 km/h (25 MPH) with cruise speed set.
- 4) 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.

Function code indication		Item to measure		Contents of diagnosis
Code No.	Abbreviation	Trouble code	Abbreviation	
FB0	CANCEL	10	OK	Normal
		11	BRAKE/STOP	Input signals from brake switch "OFF", stop light switch "ON" (Brake pedal is depressed.)
		12	CLU or N	Input signals from clutch switch "OFF", inhibitor switch "N" (Clutch pedal is depressed, or select lever is set to "N".)
		13	SPEED LIM	Low-speed control limiter
		14	SET+RESUME	Input signal from cancel switch "ON"
		21	VAC VALVE	Faulty vacuum valve or valve drive system
		22	VENT2 VALVE	Faulty vent 2 valve or valve drive system
		23	VENT1 VALVE	Faulty vent 1 valve or valve drive system
		24	SP SENSOR	Faulty vehicle speed sensor
		25	CONTROL UNIT	Faulty control module

- 5) Trouble code will be cleared by turning ignition or cruise main switch OFF.

4. REAL-TIME DIAGNOSIS

- 1) Connect select monitor.
- 2) Turn ignition switch and cruise main switch 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" (AT model).

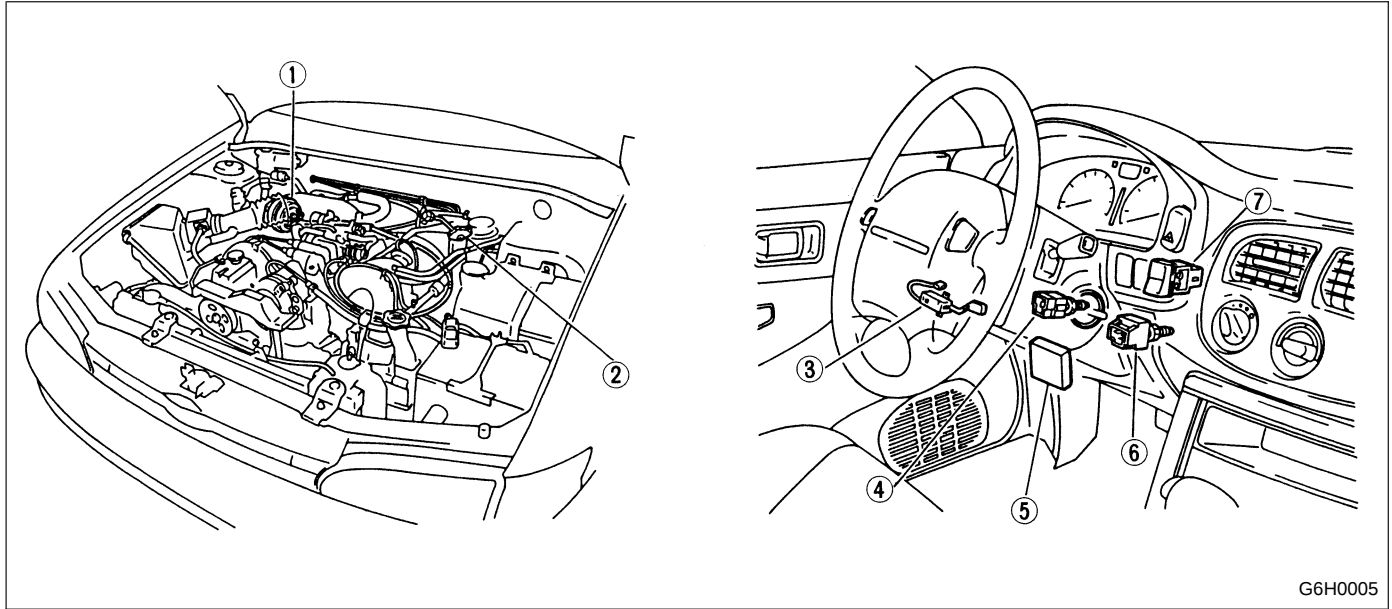
Function code indication		Item to measure	Content of items to be monitored
Code No.	Abbreviation		
FA0	ST	Stop light switch	LED No.1 comes on when switch is turned ON. (Brake pedal is depressed.)
	BR	Brake switch	LED No. 2 comes on when brake pedal is depressed.
	SE	SET/COAST switch	LED No. 3 comes on when switch is turned ON.
	RE	RESUME/ACCEL switch	LED No. 4 comes on when switch is turned ON.
	IH	Clutch switch/inhibitor switch	● LED No. 5 comes on when clutch pedal is depressed (MT model). ● LED No. 5 comes on when select lever is set to "N" (AT model).

NOTE:
LED's come on shortly after switches are pressed.

5. DATA SHOWN ON SELECT MONITOR DISPLAY DISPLAY

Indication of function code		Item to measure	Contents of items to be monitored
Code No.	Abbreviation		
F 00	CRUISE CONTROL	Cruise control module identification	Reads ROM ID number of cruise control module to display a possible communication state.
F 01	VSP (MPH)	Vehicle speed (MPH)	Displays vehicle speed data (in miles/h) determined by cruise control module in relation to signal emitted from vehicle speed sensor 2 in combination meter.
F 02	VSP (km/h)	Vehicle speed (km/h)	Displays vehicle speed in km/h.

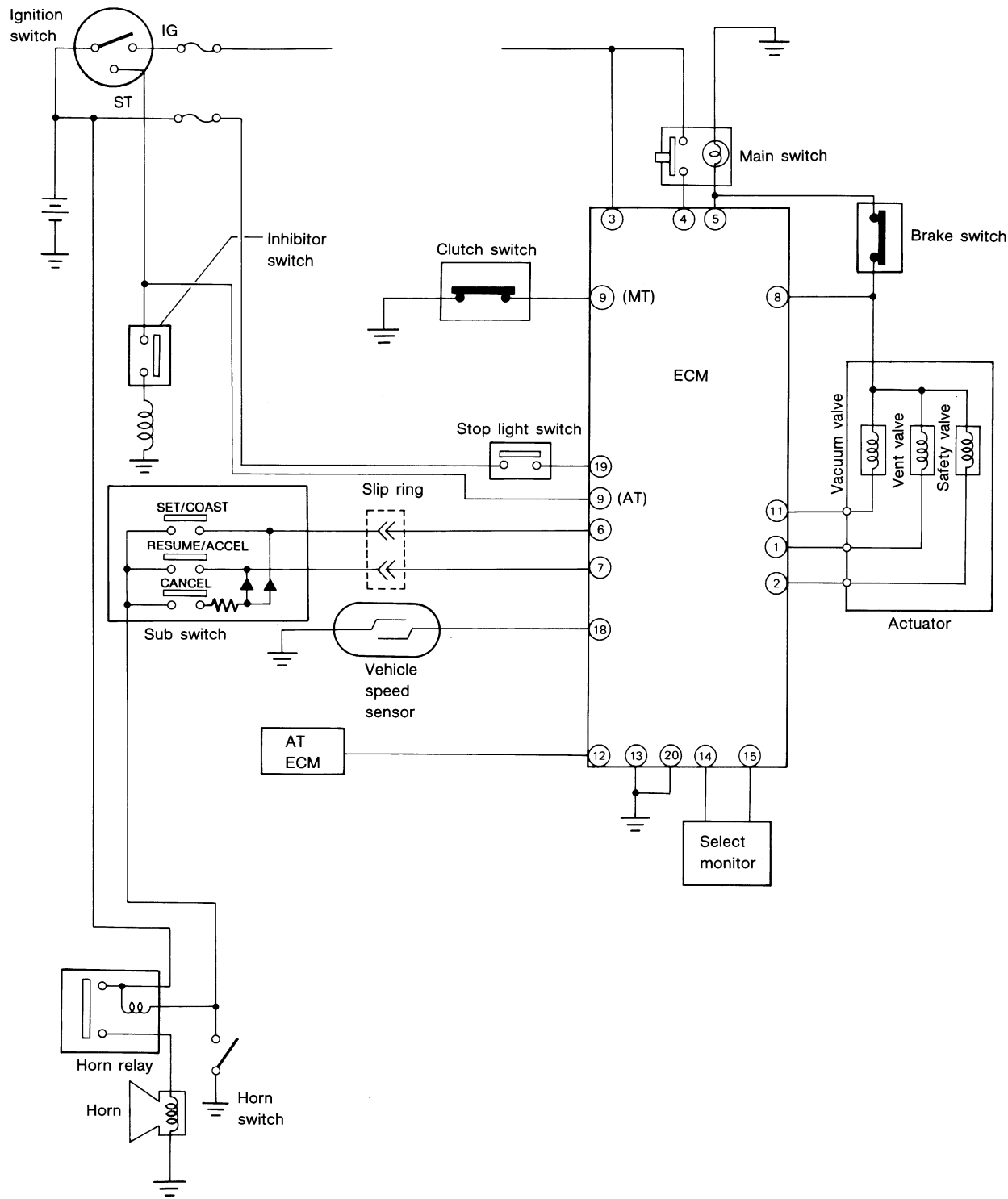
2. Electrical Unit Location



- ① Actuator
- ② Inhibitor switch
- ③ Sub switch
- ④ Clutch switch

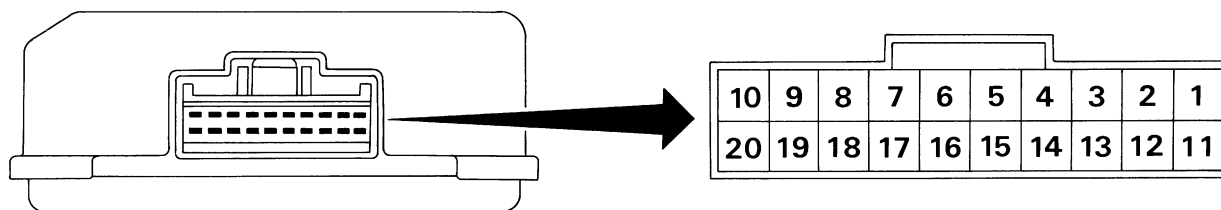
- ⑤ Control module
- ⑥ Stop and brake switch
- ⑦ Main switch

3. Schematic



G6M0177

4. Control Module I/O Signal



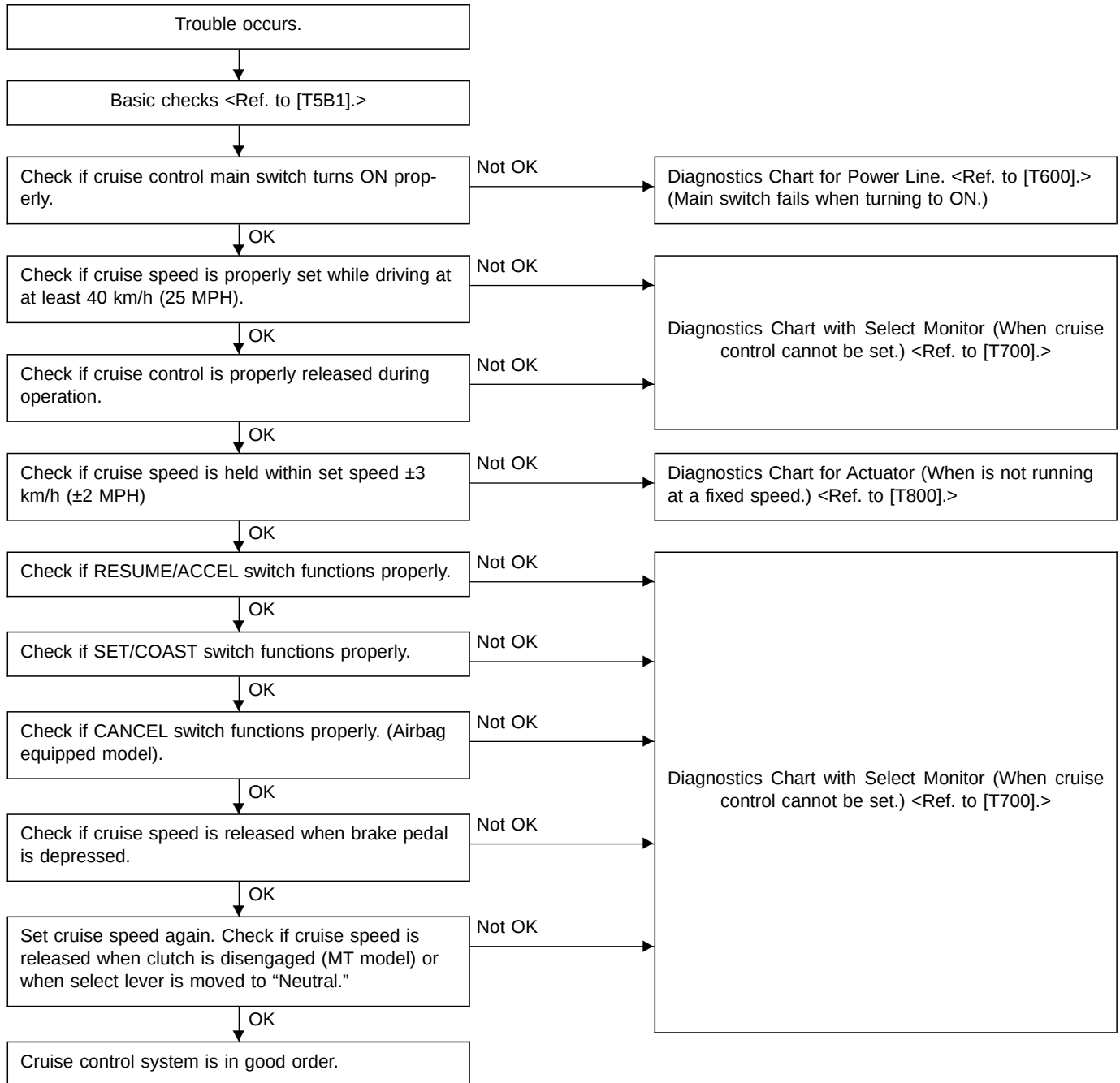
G6M0015

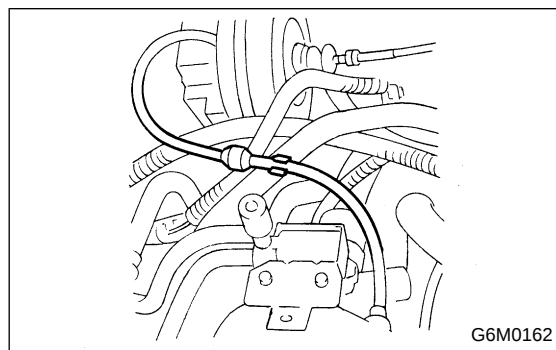
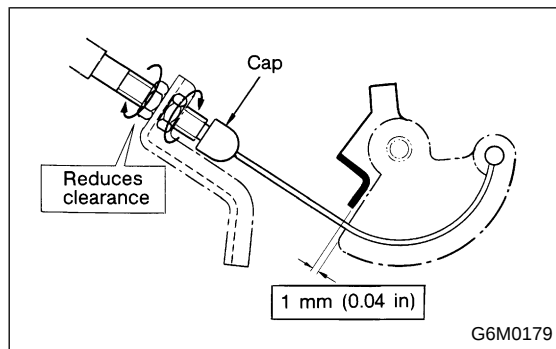
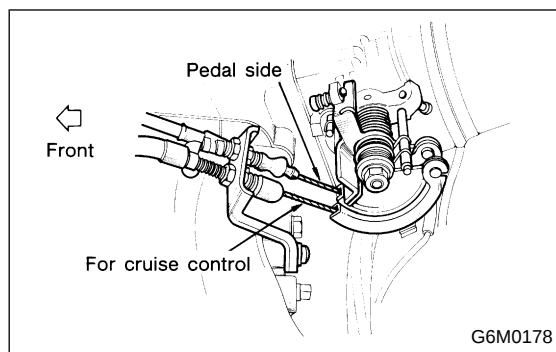
Content	Terminal No.	Measuring conditions and I/O signals (ignition switch ON and engine idling)
Vent valve	1	- Power supply is ON when vehicle is stopped. - ON-and-OFF (0 and 12 volts) operation is alternately repeated while cruise control is operating.
Safety valve	2	- Power supply is ON when vehicle is stopped. - ON-and-OFF (0 and 12 volts) operation is alternately repeated while cruise control is operating.
Ignition switch	3	Battery voltage is present when switch is turned on.
Main switch	4	- When main switch is pressed, battery voltage is present. - When main switch is OFF, "0" volt is present.
Power Supply to vacuum valve, vent valve, safety valve and set indicator	5	When main switch is pressed, battery voltage is present.
SET/COAST switch	6	- When switch is turned ON, battery voltage is present. - When switch is turned OFF, "0" volt is present.
RESUME/ACCEL switch	7	- When switch is turned ON, battery voltage is present. - When switch is turned OFF, "0" volt is present.
Brake switch	8	Set select lever to any position other than "P" or "N" (AT model)/leave clutch released (MT model), with main switch ON. Then check that: 0 volt is present when brake pedal is depressed. - Battery voltage is present when brake pedal is released, or 0 volt is present when clutch pedal is depressed (MT model). - Battery voltage is present when clutch pedal is released (MT model). 0 volt is present when select lever is set to "P" or "N" (AT model). - Battery voltage is present when select lever is in any position other than "P" or "N" (AT model).
Inhibitor switch Clutch switch	9	When switch is turned ON, "0" volt is present.
Vacuum valve	11	- Power supply is ON when vehicle is stopped. - ON-and-OFF (0 and 12 volts) operation is alternately repeated while cruise control is operating.
AT control (Set signal)	12	ECM emits a ground-level signal while driving vehicle at least 40 km/h (25 MPH) with SET switch ON.
GND	13	—
Select monitor (Output)	14	—
Select monitor (Input)	15	—
Vehicle speed sensor	18	When all four wheels are raised off ground and any wheel is rotated manually, approximately 5 and 0 volt pulse signals are alternately sent to cruise control module.
Stop light switch	19	With ignition switch ON or OFF: - Depress brake pedal to check that battery voltage is present. "0" volt is present with brake pedal released.
GND	20	—

Voltage at terminals (1, 2, 11 and 12) cannot be checked unless vehicle is driving at cruising speed.

5. Diagnostics Chart for On-board Diagnosis System

A: BASIC DIAGNOSTICS PROCEDURE





B: BASIC CHECKS

1. CHECK 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 mm (0.04 in)

NOTE:

If clearance is not within specifications, adjust cable at its outer end.

- (2) Ensure that cap is positioned in groove.
- (3) Ensure that cable deflects within specifications.

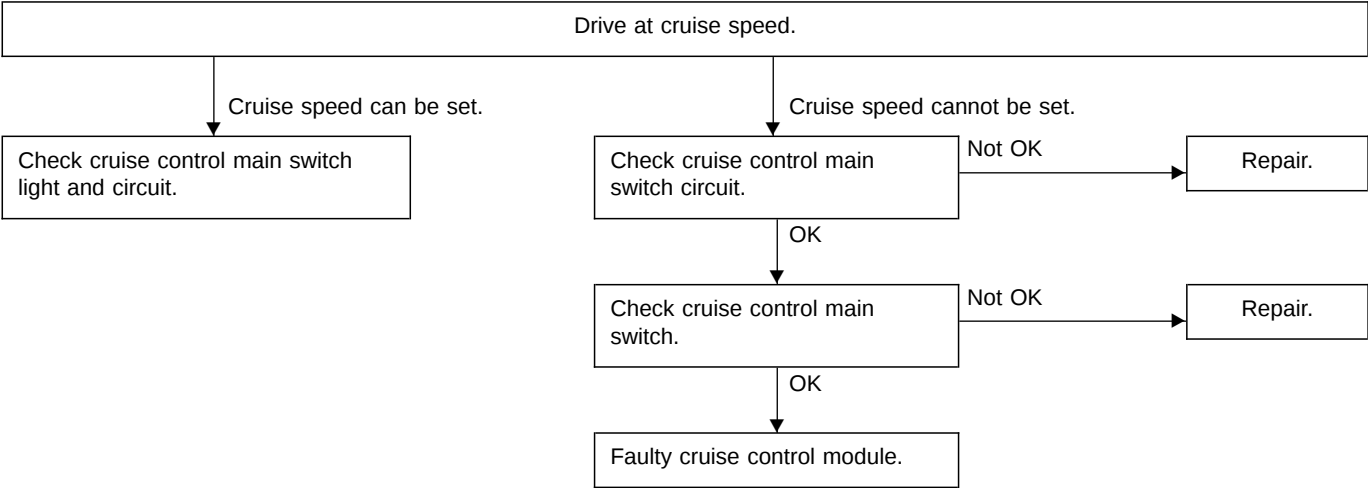
Standard value:

1 — 8 mm (0.04 — 0.31 in)

2. CHECK VACUUM HOSE

- 1) Check vacuum hose (which connects actuator and intake manifold) for disconnection or cracks.

6. Diagnostics Chart for Power Line



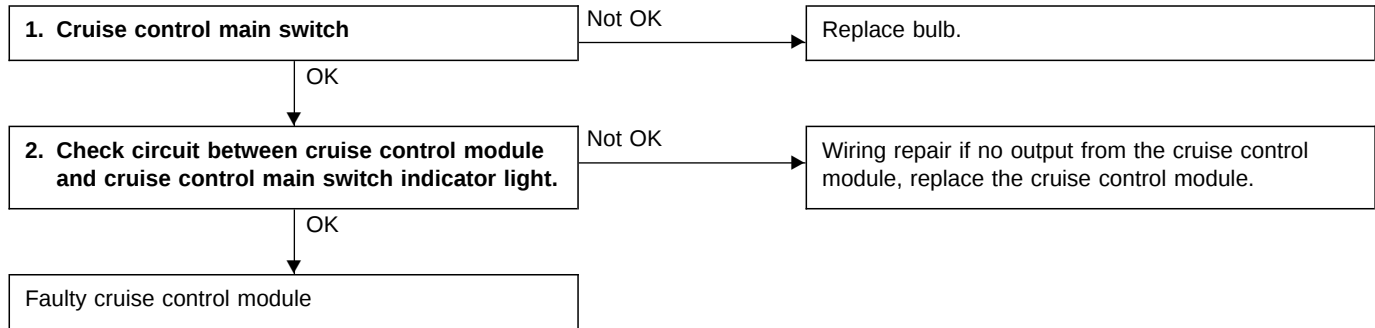
A: CHECK INDICATOR AND CIRCUIT IN CRUISE CONTROL MAIN SWITCH

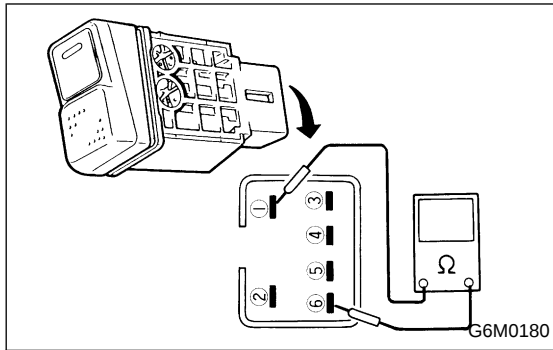
DIAGNOSIS:

- 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.)





1. CRUISE CONTROL MAIN SWITCH

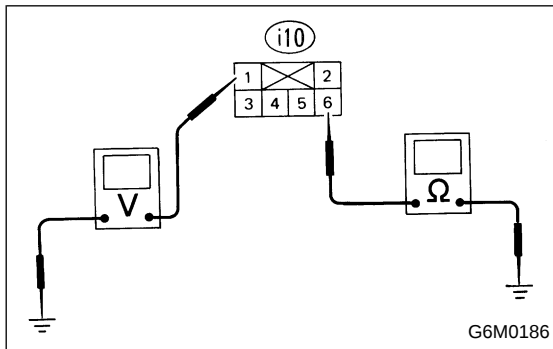
1) Remove cruise main switch.

Turn lower part of the housing upward to remove. If this cannot be done, insert a small screwdriver on the right hand side of the housing to remove the lock.

2) Measure resistance value between cruise control main switch terminals.

Terminal/Specified resistance:

No. 1 — No. 6/Approx. 120 Ω



2. CHECK CIRCUIT BETWEEN CRUISE CONTROL MODULE AND CRUISE CONTROL MAIN SWITCH INDICATOR LIGHT

1) Measure voltage between cruise control main switch and body. (Perform this measurement by turning ON the ignition switch and the cruise control main switch.)

Connector & terminal/Specified voltage:

(i10) No. 1 — Body/10 — 13 V

2) Remove the connector from the cruise control main switch.

3) Measure the resistance value between the cruise control main switch connector and the body.

Connector & terminal/Specified resistance:

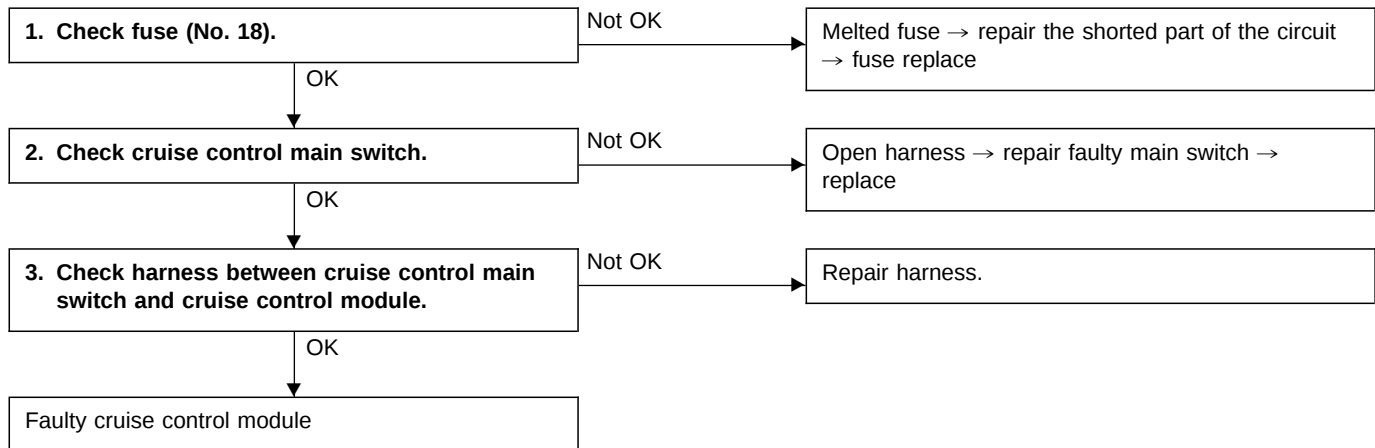
(i10) No. 6 — Body/10 Ω , max.

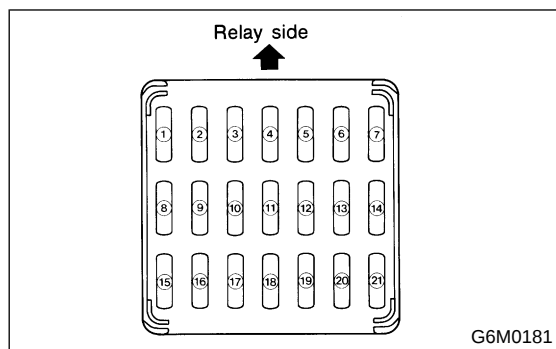
B: CHECK CRUISE CONTROL MAIN SWITCH**DIAGNOSIS:**

- Faulty cruise control main switch, or open harness.

TROUBLE SYMPTOM:

- Cruise control main switch is not turned ON and cruise control cannot be set.





1. CHECK FUSE (NO. 18)

1) Check fuse.

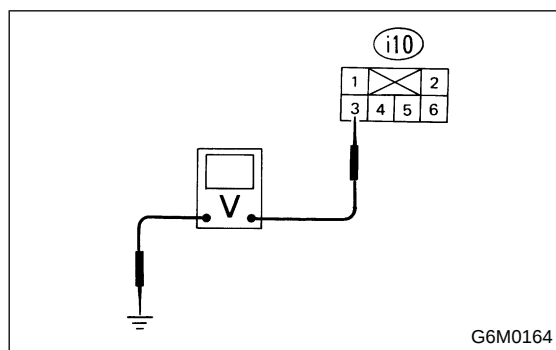
Test circuit with a tester.

2) Checking voltage of the ignition power source

Turn ignition switch ON and measure the voltage between the fuse box connector and the body.

Connector & terminal/Specified voltage:

(B34) No. 4 — Body/10 — 13 V



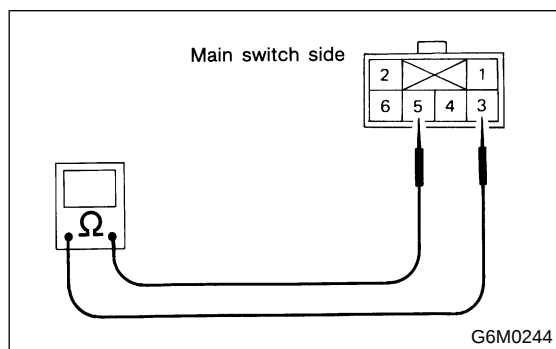
2. CHECK CRUISE CONTROL MAIN SWITCH

1) Remove cruise control main switch and disconnect connector.

Turn ignition switch ON and measure the voltage between cruise control main switch connector and body.

Connector & terminal/Specified voltage:

(i10) No. 3 — Body/10 — 13 V



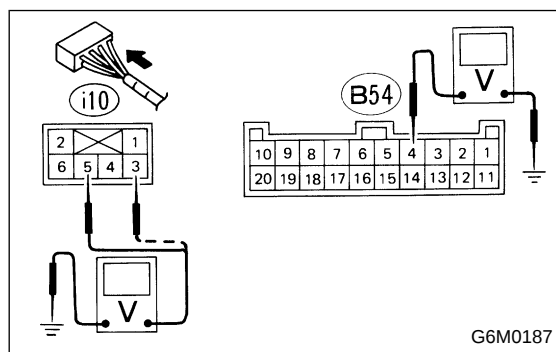
2) Check ON/OFF function of main switch

Measure resistance between main switch and terminal.

Terminal/Specified resistance:

No. 3 — No. 5/10 Ω, max. (Switch ON)

1 MΩ, min. (Switch OFF)



3. CHECK HARNESS BETWEEN CRUISE CONTROL MAIN SWITCH AND CRUISE CONTROL MODULE

1) Connect connector.

2) Turn ignition switch ON.

3) Turn cruise main switch ON.

4) Measure voltage between each of terminals and body.

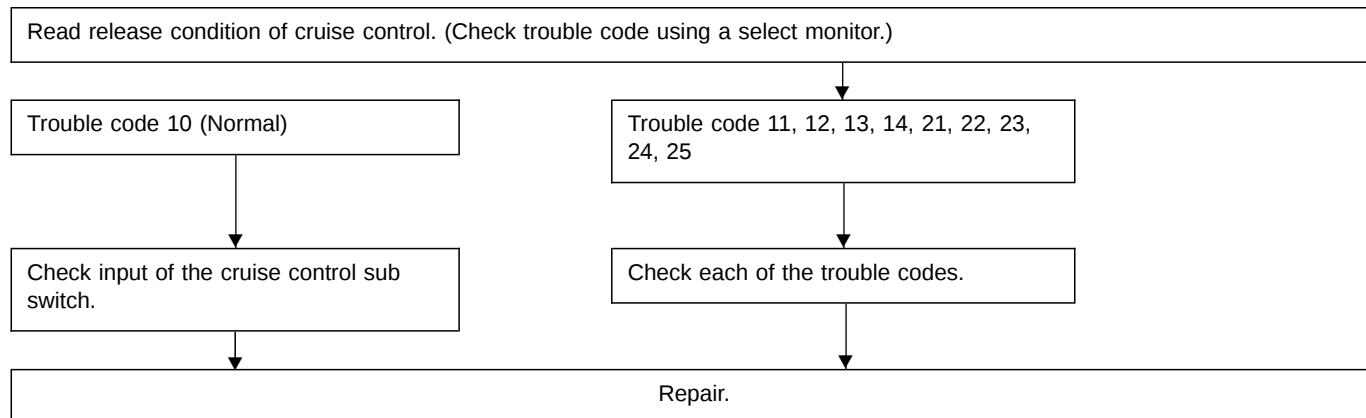
Connector & terminal/Specified voltage:

(i10) No. 3 — Body/10 — 13 V

(i10) No. 5 — Body/10 — 13 V

(B54) No. 4 — Body/10 — 13 V

7. Diagnostics Chart with Select Monitor — When cruise control cannot be set —



Trouble code	Item	Contents of diagnosis	Page
10	OK	Normal	—
11	Brake/switch, Stop light switch	Input signals from brake switch "OFF", stop light switch "ON" (Brake pedal is depressed.)	20
12	Clutch switch, N position	Input signals from clutch switch "OFF", inhibitor switch "N" (Clutch pedal is depressed, or select lever is set to "N".)	22
13	Speed limiter	Low-speed control limiter	24
14	Set switch and resume switch	Input signal from cancel switch "ON"	26
21	Vacuum valve	Faulty vacuum valve or valve drive system	27
22	Vent 2 valve	Faulty vent 2 valve or valve drive system	27
23	Vent 1 valve	Faulty vent 1 valve or valve drive system	27
24	Speed sensor	Faulty vehicle speed sensor	24
25	Control module	Faulty control module	28

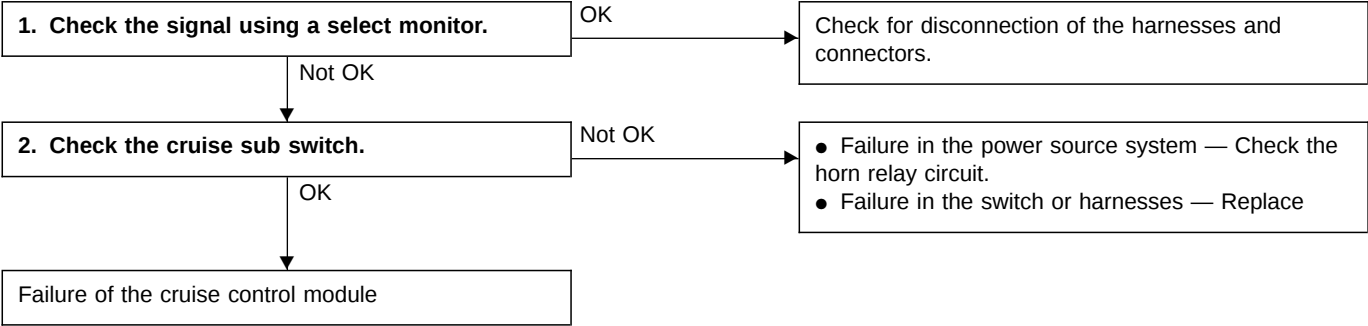
A: CHECKING INPUT OF CRUISE CONTROL SUB SWITCH

DIAGNOSIS:

- SET/COAST SW or disconnection of the wiring or short circuit.
- RESUME/ACCEL SW or disconnection of the wiring or short circuit.

TROUBLE SYMPTOM:

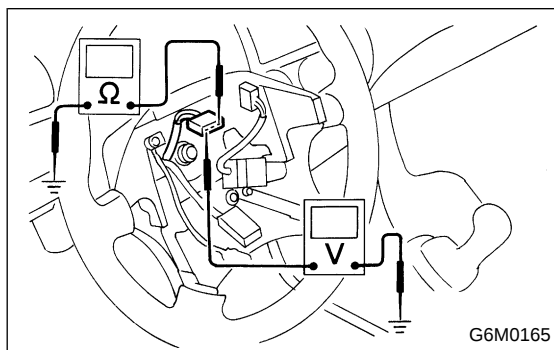
- Cruise control cannot be set, or it is cancelled immediately.
- RESUME/ACCEL cannot be operated.



LED No.	Signal name	Display
1	—	—
2	—	—
3	SET/COAST switch	SE
4	RESUME/ACCEL switch	RE
5	—	—
6	—	—
7	—	—
8	—	—
9	—	—
10	—	—

ST	BR	SE	RE	IH
—	—	—	—	—

1	2	3	4	5
6	7	8	9	10



1. CHECK THE SIGNAL USING A SELECT MONITOR

- Measuring condition: Turn ON the ignition switch and cruise main switch.
- Operation of the function keys: FA0 ENT
When pushing the SET SW: LED No. 3 goes out — lights
When pushing the RESUME SW: LED No. 4 goes out — lights

2. CHECK THE CRUISE SUB SWITCH

- 1) Separate connector from sub switch. (Use together with horn power supply.)
- 2) Check voltage between sub switch connector and body.

Terminals/Specified voltage:

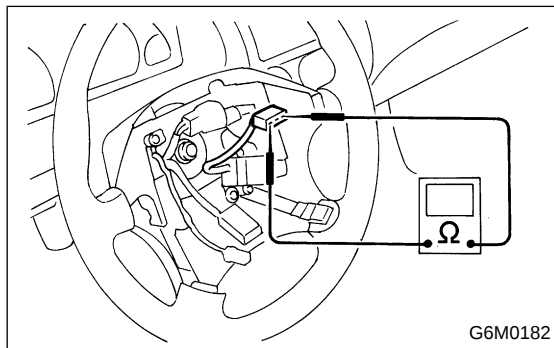
No. 1 — Body/10 — 13 V

- 3) Check for harness short circuit between sub switch and cruise control module.

Terminals/Specified resistance:

No. 2 — Body/1 MΩ, min.

No. 3 — Body/1 MΩ, min.



- 4) Check inner switch of the cruise control sub switch and check continuity at switch side connector.

Terminals:

No. 1 — 2 (SET/COAST SWITCH)

No. 1 — 3 (RESUME/ACCEL SWITCH)

Specified resistance:

10 Ω, max. (Switch ON)

1 MΩ, min. (Switch OFF)

CANCEL

(FB0)

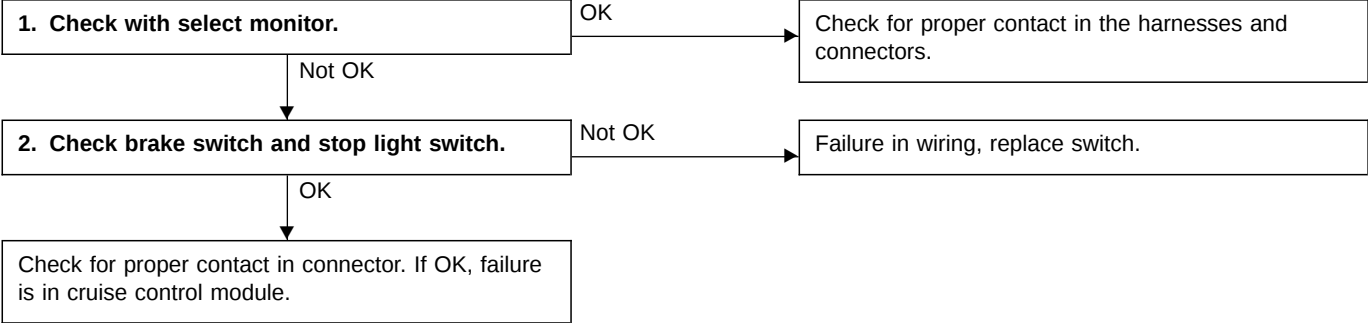
11

BRAKE/STOP

G6M0169

B: TROUBLE CODE 11
— BRAKE SW, STOP LIGHT SW —

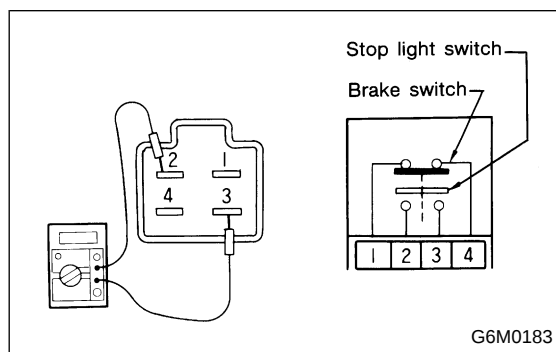
- DIAGNOSIS:**
- Failure or disconnection of the stop light switch and brake switch.
- TROUBLE SYMPTOM:**
- Cruise control cannot be set.



LED No.	Signal name	Display
1	Stop light switch	ST
2	Brake switch	BR
3	—	—
4	—	—
5	—	—
6	—	—
7	—	—
8	—	—
9	—	—
10	—	—

ST	BR	SE	RE	IH
—	—	—	—	—

1	2	3	4	5
6	7	8	9	10



1. CHECK WITH SELECT MONITOR

- Measurement condition: Turn ignition switch ON.
Turn cruise main switch ON.

- Operation of the function keys: FA0 ENT

1) When depressing brake pedal (Set in the D range for AT, without depressing clutch pedal for MT)

Stop light switch: LED No. 1 goes out — lights.

Brake switch : LED No. 2 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 — 4	Stop light switch between No. 2 — 3
Depressing the brake pedal.	Circuit failure	Circuit normal
Without depressing the brake pedal.	Circuit normal	Circuit failure

CANCEL

(FB0)

12

CLU or N

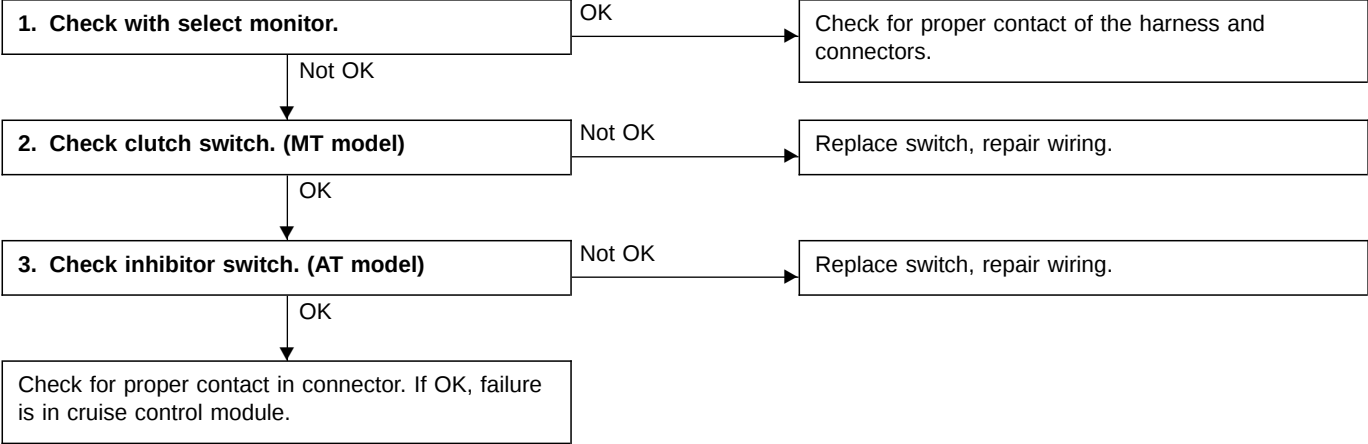
G6M0171

C: TROUBLE CODE 12
— CLUTCH SWITCH, N POSITION —
DIAGNOSIS:

- Failure or disconnection of inhibitor switch
- Failure or disconnection of clutch switch

TROUBLE SYMPTOM:

- Cruise control cannot be set.



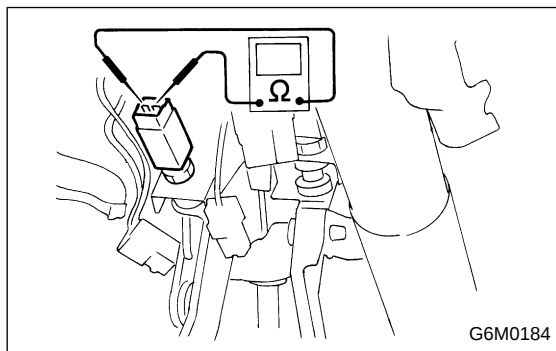
LED No.	Signal name	Display
1	—	—
2	—	—
3	—	—
4	—	—
5	Clutch switch/inhibitor switch	IH
6	—	—
7	—	—
8	—	—
9	—	—
10	—	—

ST	BR	SE	RE	IH
—	—	—	—	—

1	2	3	4	5
6	7	8	9	10

1. CHECK WITH SELECT MONITOR

- Measurement condition: Turn ignition switch ON.
Turn cruise main switch ON.
- Operation of function keys: FA0 ENT
 - 1) When depressing clutch pedal;
LED No. 5 goes out — lights.
 - 2) When setting shift lever in N position;
LED No. 5 goes out — lights.



G6M0184

2. CHECK CLUTCH SWITCH (MT MODEL)

- 1) Check items for the clutch switch. (Circuit test between terminals)

Terminals/Specified resistance:

No. 1 — No. 2/10 Ω , max. (Without pedal depressing).

/1 M Ω , min. (Pedal depressing).

3. CHECK INHIBITOR SWITCH (AT MODEL)

- 1) When engine starts in the N position (the starter rotates), N position contact point of the inhibitor is normal.
- 2) Check the wiring harness.

CANCEL

(FB0)

13

SPEED LIM

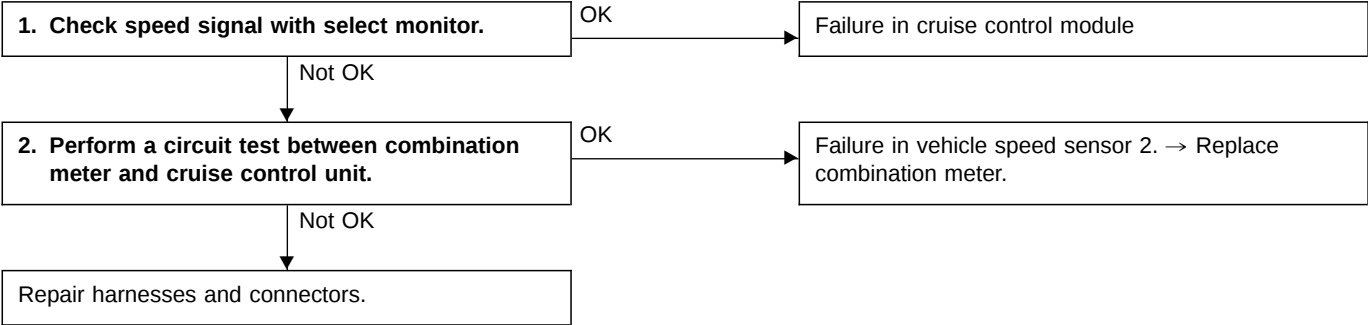
G6M0173

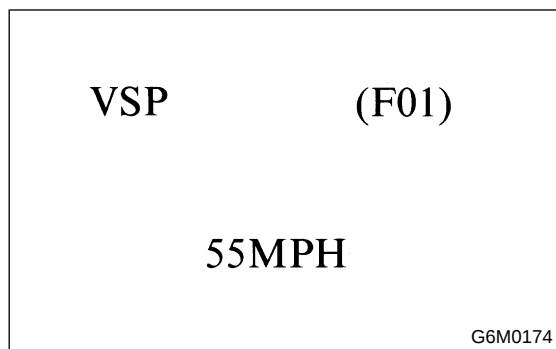
D: TROUBLE CODE 13 AND 24
— SPEED LIMITER, SPEED SENSOR —
DIAGNOSIS:

- Disconnection or short circuit of speed sensor.

TROUBLE SYMPTOM:

- Cruise control cannot be set. (Cancelled immediately.)





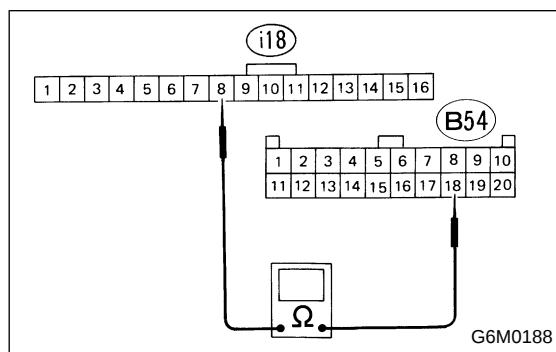
1. CHECK SPEED SIGNAL WITH SELECT MONITOR

- Driving condition: Running at speed greater than 40 km/h (25 MPH)

- Operation of the function keys: F02 ENT

NOTE:

- When there is a failure in the meter cable or the vehicle speed sensor 2, the indicated value of the meter will be incorrect.
- 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 — 1 km/h.



2. PERFORM A CIRCUIT TEST BETWEEN COMBINATION METER AND CRUISE CONTROL UNIT

- 1) Separate connectors from combination meter and cruise control module.
- 2) Perform a circuit test in the harnesses.

Connector & terminal/Specified resistance:

(i18) No. 8 — (B54) No. 18/10 Ω , max.

CANCEL (FB0)

14 SET + RESUME

G6M0175

E: TROUBLE CODE 14 — SET SWITCH AND RESUME SWITCH (CANCEL SW-ON) —

DIAGNOSIS:

- Short circuit inside the SET SW and RESUME SW.

TROUBLE SYMPTOM:

- Cruise control cannot be set. (Cancelled immediately.)

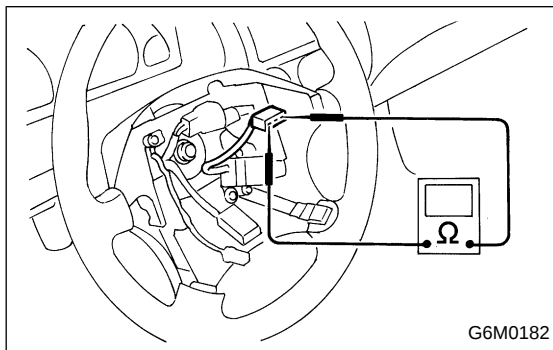
1. Check short circuit of cruise control sub switch.

Not OK

Replace the sub switch.

OK

Check for short circuit in harness between sub switch and cruise control module.



G6M0182

1. CHECK SHORT CIRCUIT OF CRUISE CONTROL SUB SWITCH

- 1) Separate connector of cruise control sub switch.
- 2) Measure resistance between each terminal of cruise control sub switch.

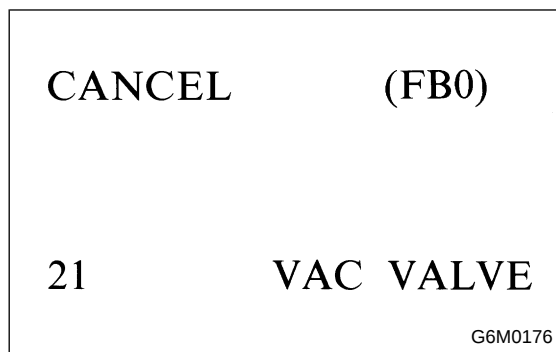
Terminal/Specified resistance:

SET switch ON No. 1 — No. 2/10 Ω , max.

RESUME switch ON No. 1 — No. 3/10 Ω , max.

CANCEL switch ON No. 1 — No. 2/10 Ω , max.

No. 1 — No. 3/10 Ω , max.



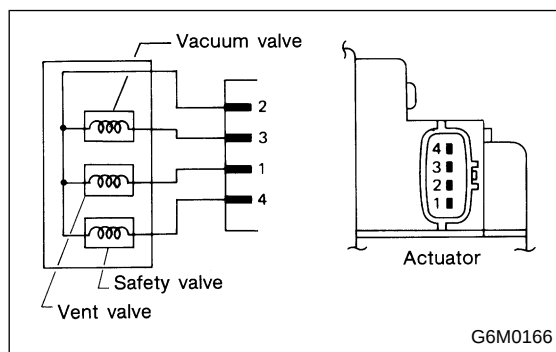
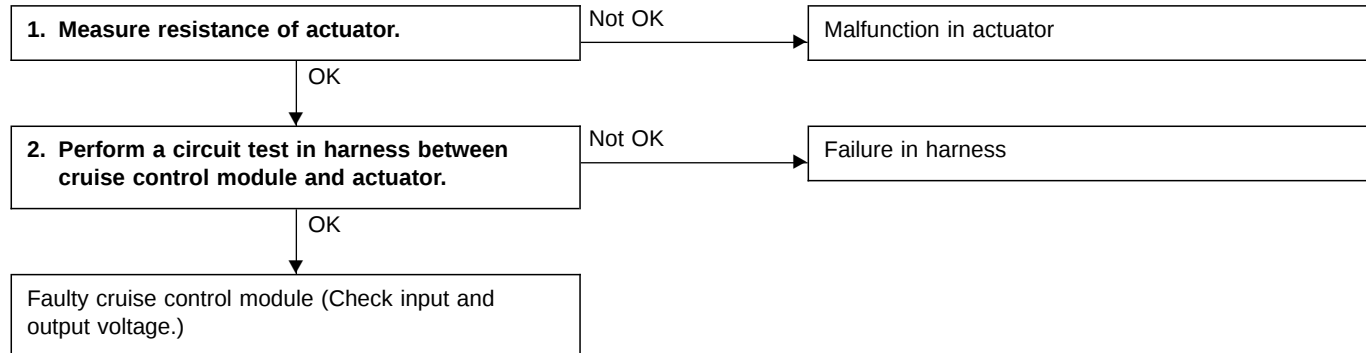
F: TROUBLE CODE 21, 22 AND 23 — VACUUM VALVE, VENT 1 VALVE, VENT 2 VALVE —

DIAGNOSIS:

- Open or poor contact of vacuum valve, vent 1 valve and vent 2 valve.

TROUBLE SYMPTOM:

- Cruise control cannot be set, or cancelled immediately.



1. MEASURE RESISTANCE OF ACTUATOR

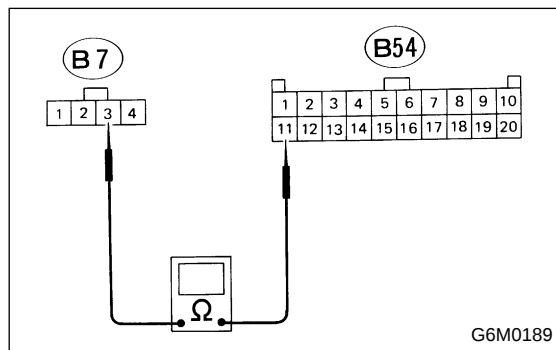
- 1) Separate the connector.
- 2) Measure the resistance value of the actuator.

Terminals/Specified resistance:

No. 2 — No. 1/55 Ω

No. 2 — No. 3/22 Ω

No. 2 — No. 4/55 Ω



2. PERFORM A CIRCUIT TEST IN HARNESS BETWEEN CRUISE CONTROL MODULE AND ACTUATOR

- 1) Separate both sides of connectors.
- 2) Perform a circuit test between each of the harnesses.

Connector & terminal/Specified resistance:

(B7) No. 1 — (B54) No. 1/10 Ω , max.

(B7) No. 2 — (B54) No. 8/10 Ω , max.

(B7) No. 3 — (B54) No. 11/10 Ω , max.

(B7) No. 4 — (B54) No. 2/10 Ω , max.

CANCEL

(FB0)

25

CONTROL UNIT

G6M0190

G: TROUBLE CODE 25
— CONTROL MODULE —

DIAGNOSIS:

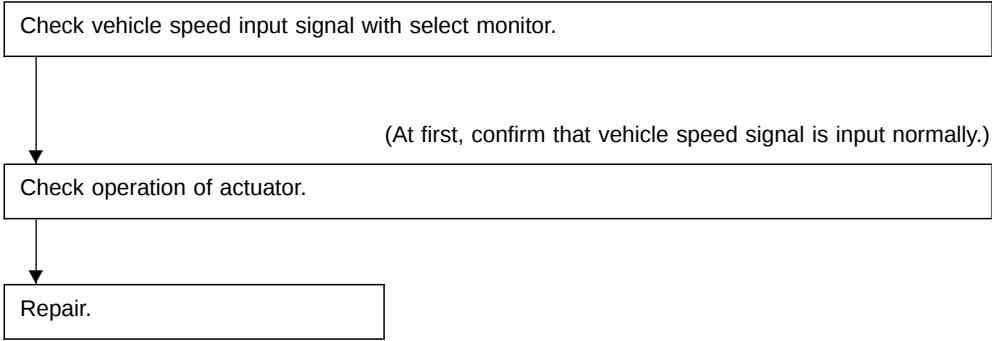
- Faulty cruise control module.

TROUBLE SYMPTOM:

- Cruise control cannot be set.

Replace cruise control module.

8. Diagnostics Chart for Actuator

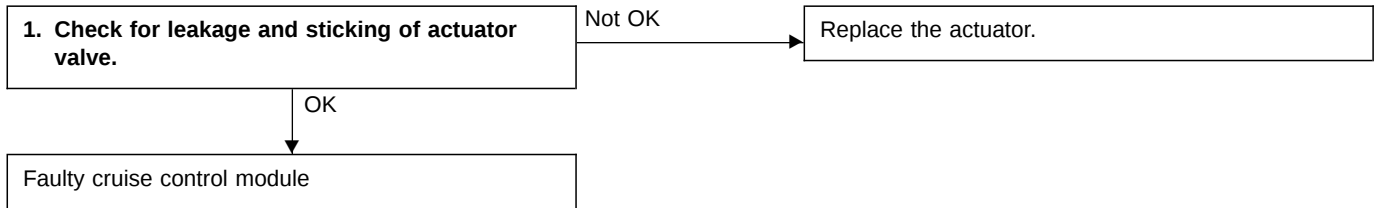


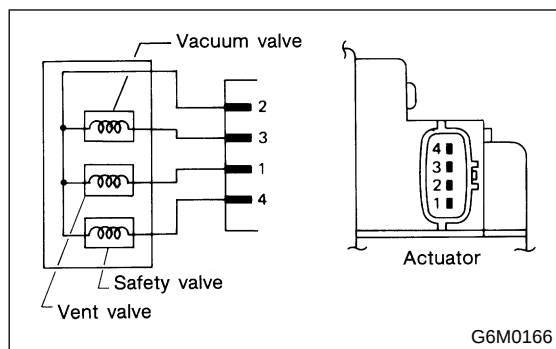
A: CHECK OPERATION OF ACTUATOR**DIAGNOSIS:**

- Sticking of air leaves of actuator, or sticking of valve and actuator diaphragm.

TROUBLE SYMPTOM:

- Cannot run at set speed ± 3 km/h (± 2 MPH).





1. CHECK FOR LEAKAGE AND STICKING OF ACTUATOR VALVE

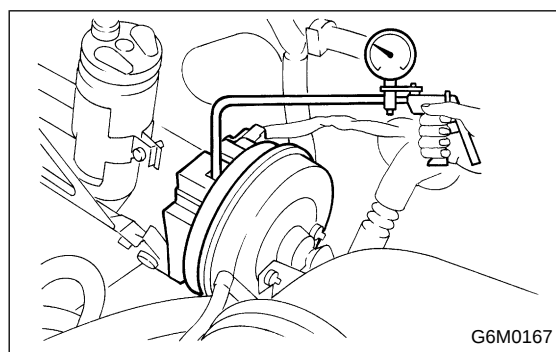
1) Measure resistance of actuator.

Terminals/Specified resistance:

No. 2 — No. 1/55 Ω (Vent valve)

No. 2 — No. 3/22 Ω (Vacuum valve)

No. 2 — No. 4/55 Ω (Safety valve)



2) Check operation of actuator.

(1) Connect $\oplus$ battery cable to terminal 2 and $\ominus$ battery cable to terminal 1, 3 and 4.

(2) Make sure cable moves smoothly when a vacuum pressure of 40.0 kPa (300 mmHg, 11.81 inHg) is applied to actuator using vacuum pump.

Stroke: 35 mm (1.38 in)

Movement time: Within 3 seconds

(3) When the battery is removed 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 when vacuum pressure is applied by vacuum pump.

Vacuum pressure	Terminal No.				Battery		Operation mode
	1	2	3	4	$\oplus$	$\ominus$	
OFF	—	—	—	—	—	—	—
ON (Vacuum pressure applied.)		○			○		Pull
			○			○	
	○					○	
				○		○	
		○			○		Hold
	○					○	
				○		○	
		○			○		Release
				○		○	

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T DIAGNOSTICS AIRBAG	2
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3. Pre-inspection	4
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1. 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), main relay and fuel pump relay.

2. 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 items a. thru c. above.
- 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.

3. 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.

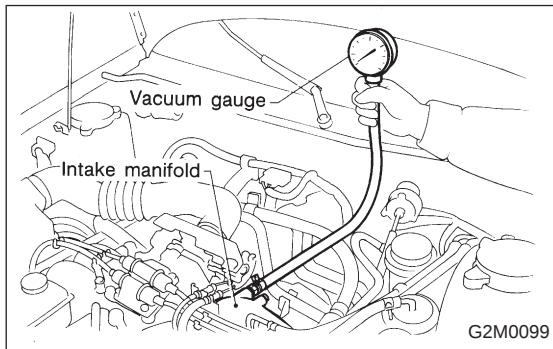
Standard voltage: 12 V

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. CAPS AND PLUGS

- 1) Check that the fuel cap is properly closed.
- 2) Check that the oil filler cap is properly closed.
- 3) Check that the oil level gauge is properly inserted.



3. INTAKE MANIFOLD VACUUM PRESSURE

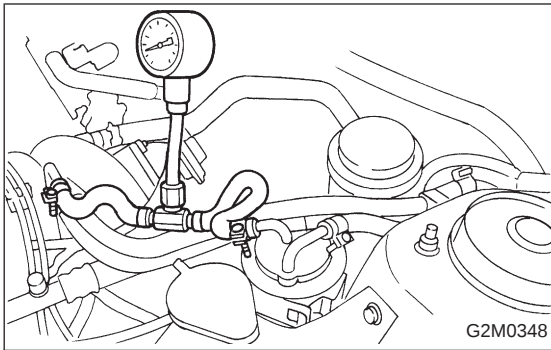
- 1) After warming-up the engine, measure intake manifold vacuum pressure while at idle.

Standard vacuum pressure:

More than -66.7 kPa (-500 mmHg , -19.69 inHg)

<Ref. to 2-2 [05A0].>

- 2) Unusual vacuum pressure occurs because of air leaks, fuel or engine problems. In such a case, engine idles roughly.



4. FUEL PRESSURE

- 1) Release fuel pressure

<Ref. to 2-8 [W1A0].>

- 2) Connect fuel pressure gauge between fuel filter and hose, and measure fuel pressure at idling.

<Ref. to 2-8 [W2A0].>

Fuel pressure:

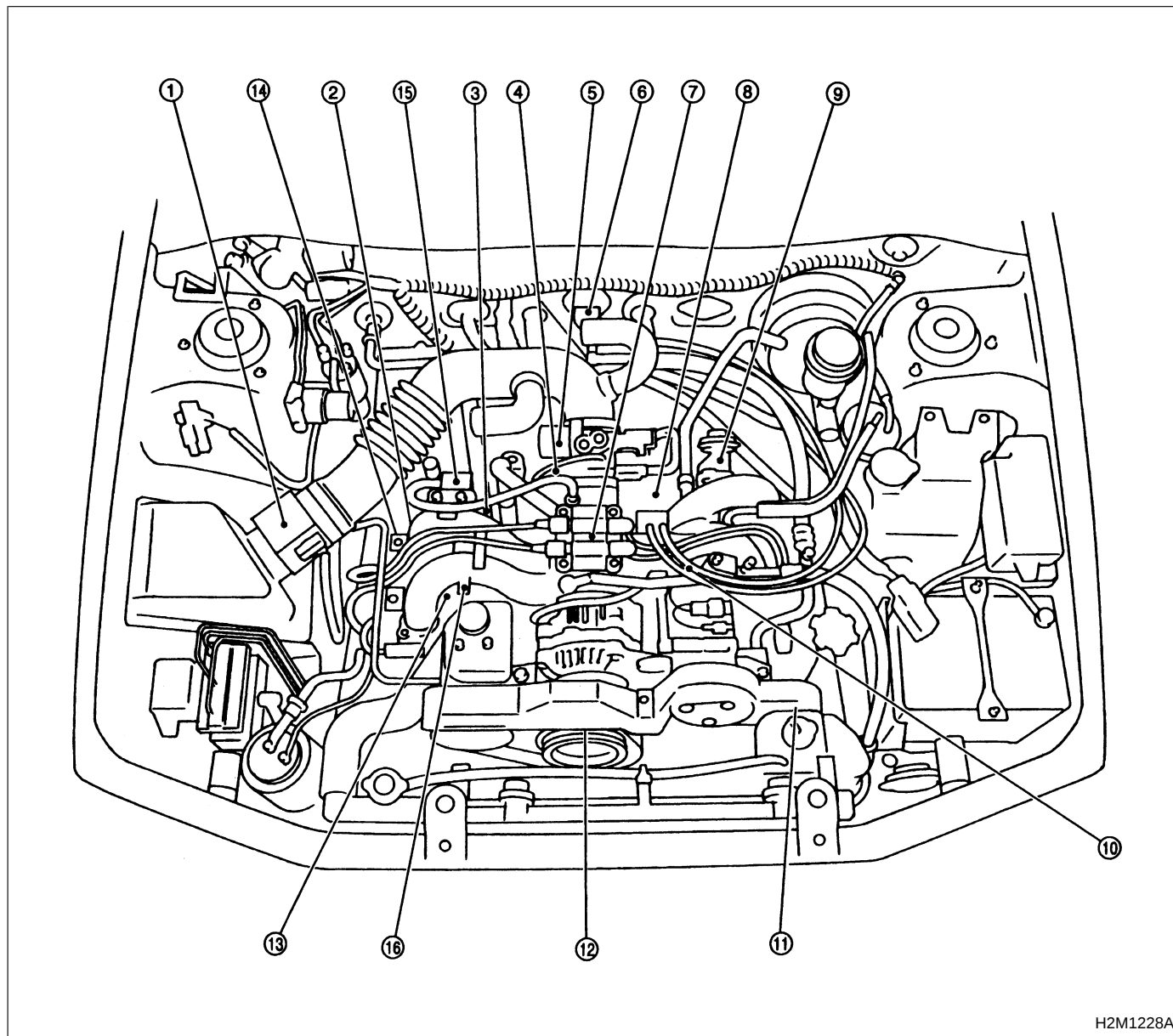
177 — 206 kPa (1.8 — 2.1 kg/cm², 26 — 30 psi)

5. ENGINE GROUNDING

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

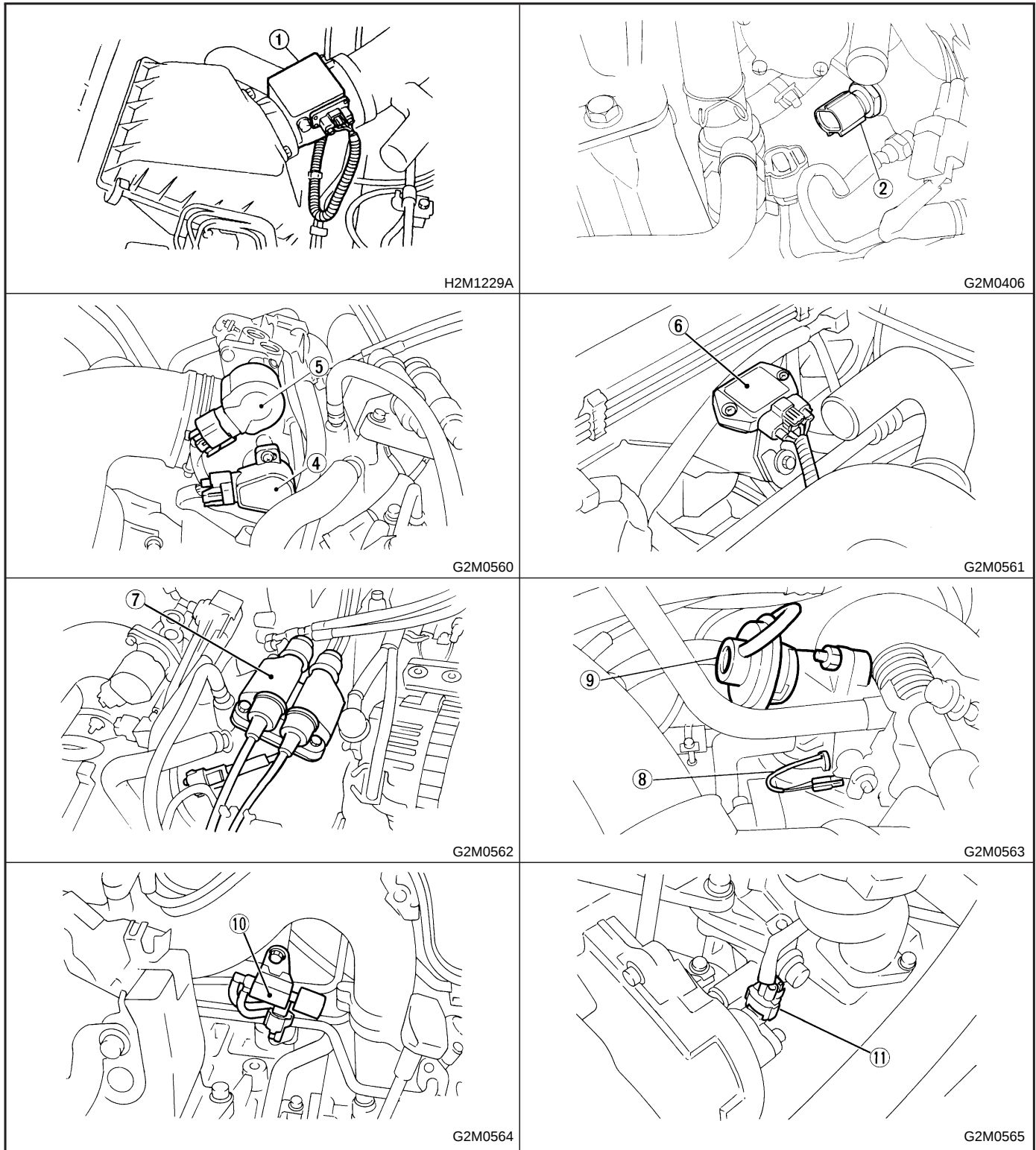
4. Electrical Unit Location

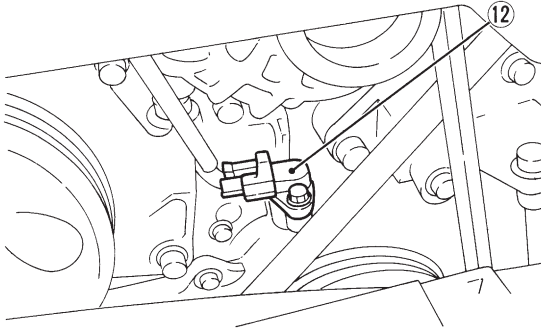
1. SENSOR AND SOLENOID VALVE



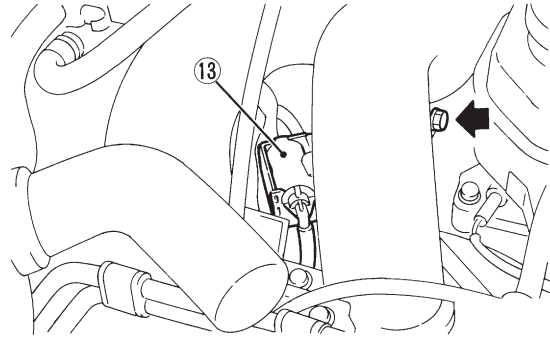
H2M1228A

- | | |
|--|---|
| ① Mass air flow sensor | ⑨ EGR valve |
| ② Engine coolant temperature sensor | ⑩ EGR solenoid valve |
| ③ Air suction solenoid valve | ⑪ Camshaft position sensor |
| ④ Throttle position sensor | ⑫ Crankshaft position sensor |
| ⑤ Idle air control solenoid valve | ⑬ Purge control solenoid valve |
| ⑥ Ignitor | ⑭ Air suction valve |
| ⑦ Ignition coil | ⑮ FICD solenoid valve (With A/C model) |
| ⑧ Recirculation gas temperature sensor | ⑯ Purge control solenoid valve (California FWD model) |

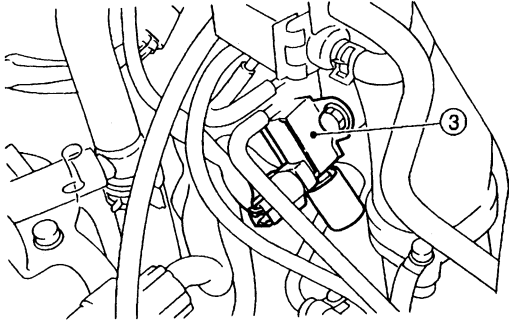




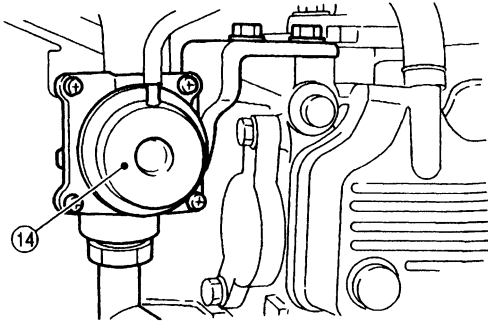
G2M0566



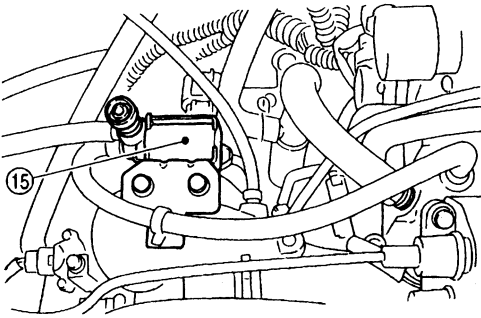
G2M0567



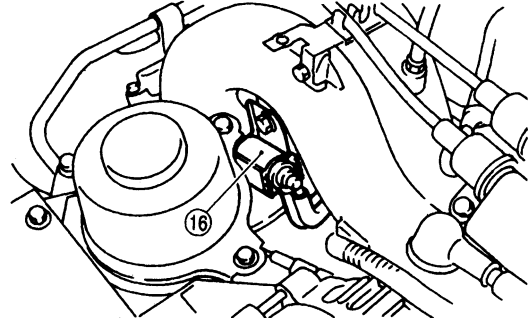
H2M1230A



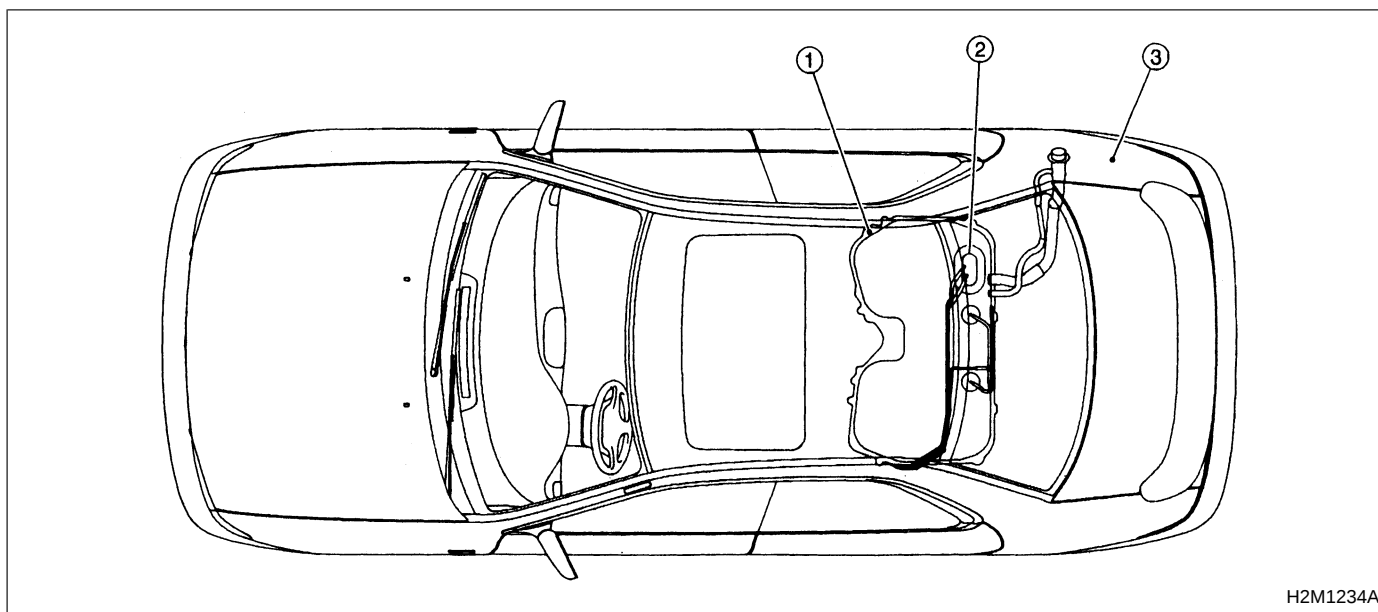
H2M1231A



H2M1232A

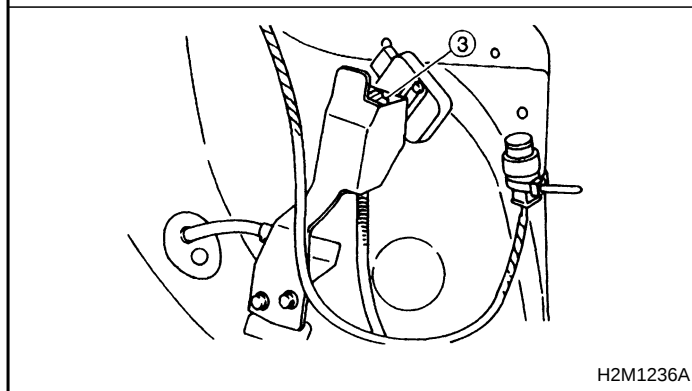
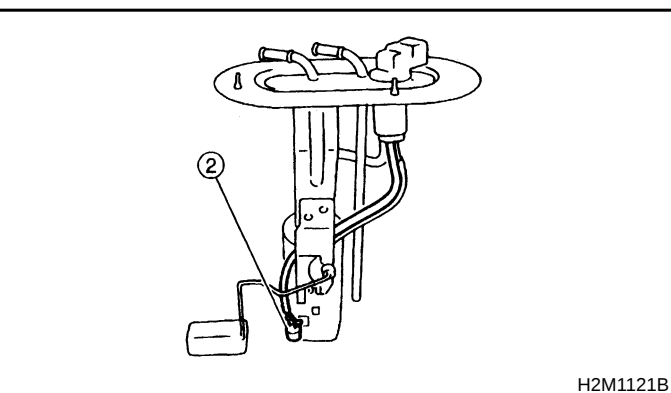
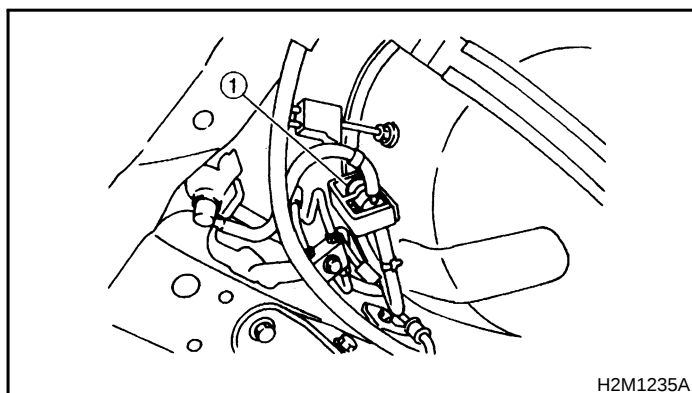


H2M1233A



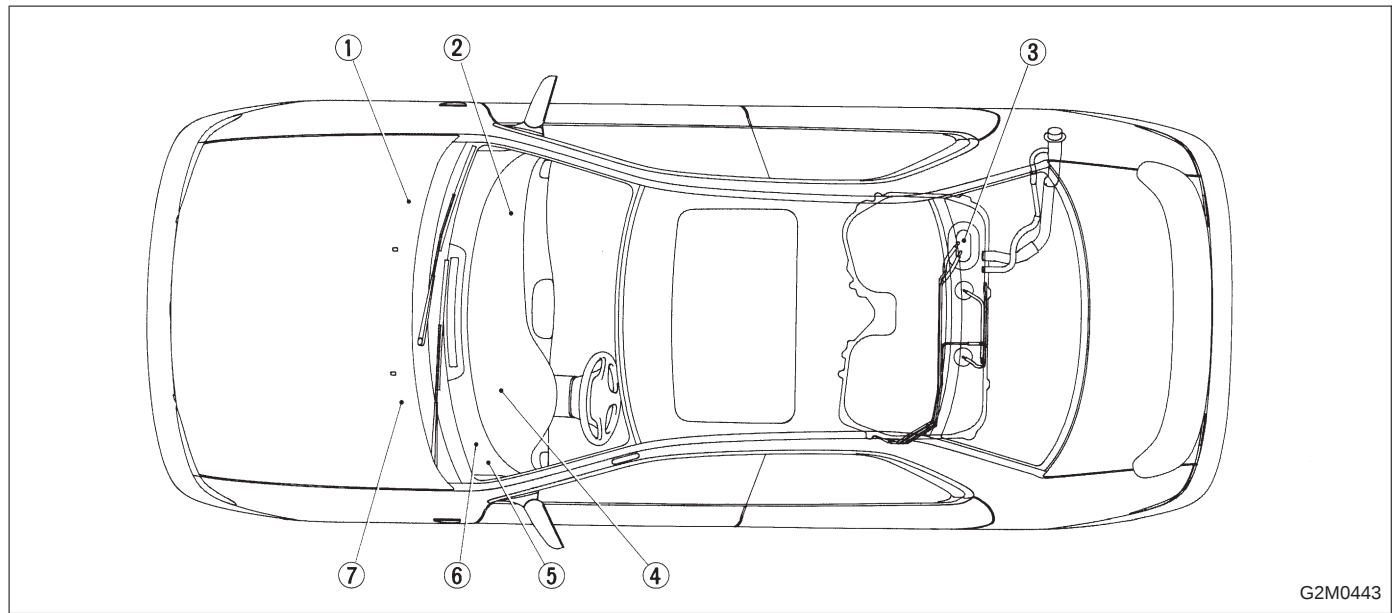
- ① Fuel tank pressure control solenoid valve
- ② Fuel temperature sensor

- ③ Fuel tank pressure sensor



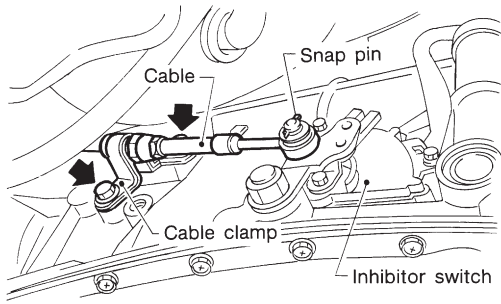
SUBARU.

2. MODULE AND RELAY

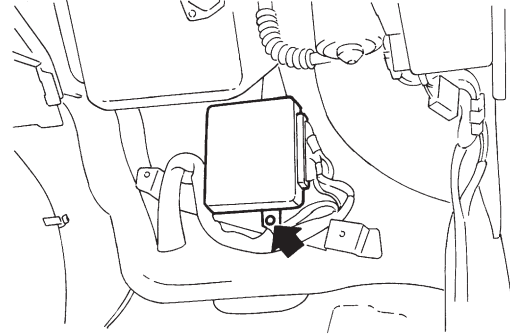


- ① Inhibitor switch
- ② ECM
- ③ Fuel pump
- ④ TCM
- ⑤ Main relay

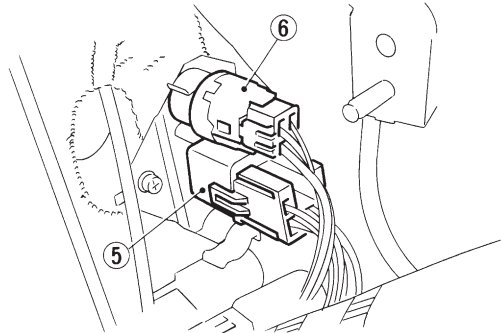
- ⑥ Fuel pump relay
- ⑦ Starter
- ⑧ Read memory connector
- ⑨ Test mode connector
- ⑩ Data link connector



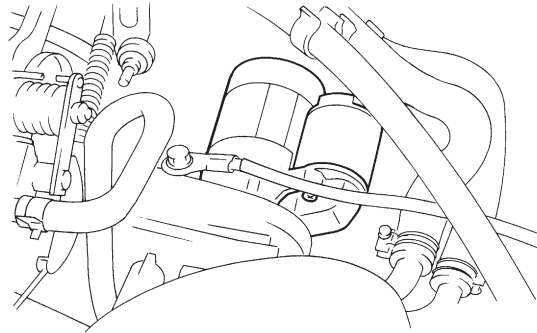
G3M0699



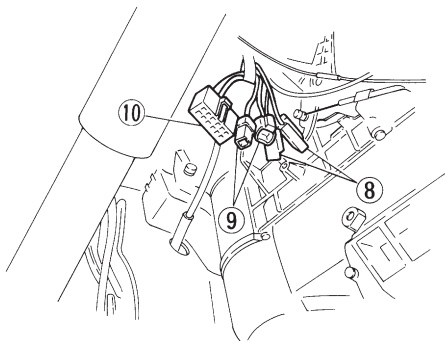
G2M0435



G2M0568



G2M0569

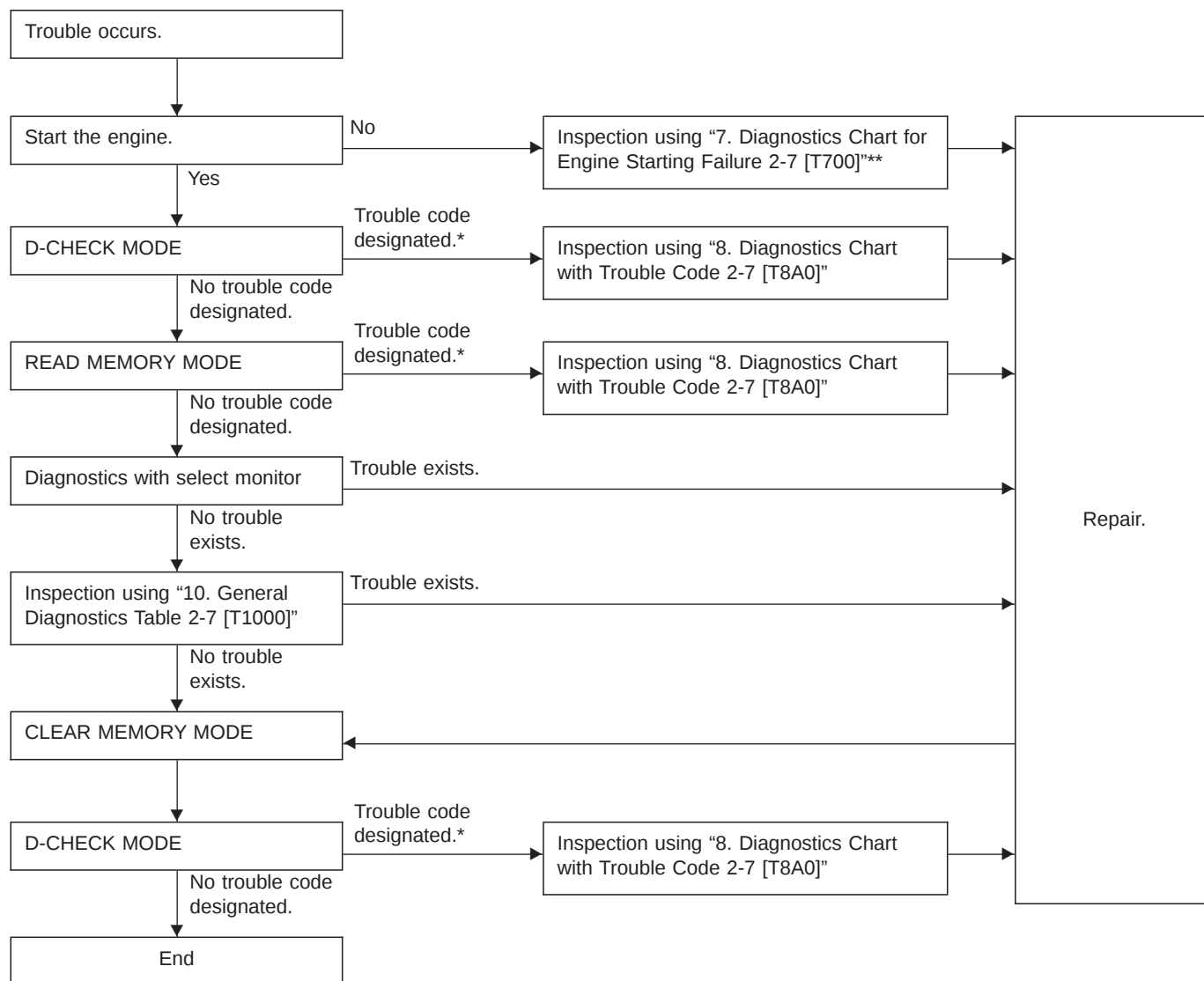


G2M0449

SUBARU.

5. Diagnostics Chart for On-board Diagnosis System

A: BASIC DIAGNOSTICS PROCEDURE



*: When more than one trouble code is out-putted, begin diagnostics with the smallest trouble code number and proceed to the next higher code.

After correcting each problem, conduct the D-CHECK and ensure that the corresponding trouble code no longer appears.

***: When a trouble code is displayed in the READ MEMORY MODE, conduct diagnostics measures which correspond with the code.

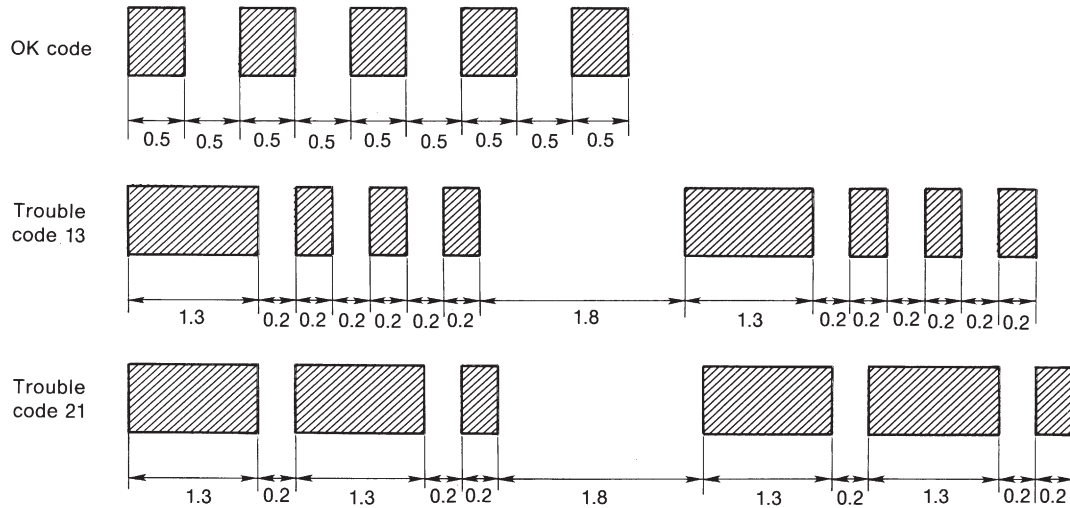
CAUTION:

- Check the connector while it is connected unless specified otherwise.
- Be sure to check again from the beginning in order to prevent secondary trouble caused by repair work.

B: TROUBLE CODE**1. HOW TO READ TROUBLE CODE**

The malfunction indicator lamp flashes the code corresponding to the faulty parts. The long segment (1.3 seconds ON) indicates a "ten", and the short segment (0.2 seconds ON) signifies "one". And middle segment (0.5 seconds ON) means OK code.

Example:

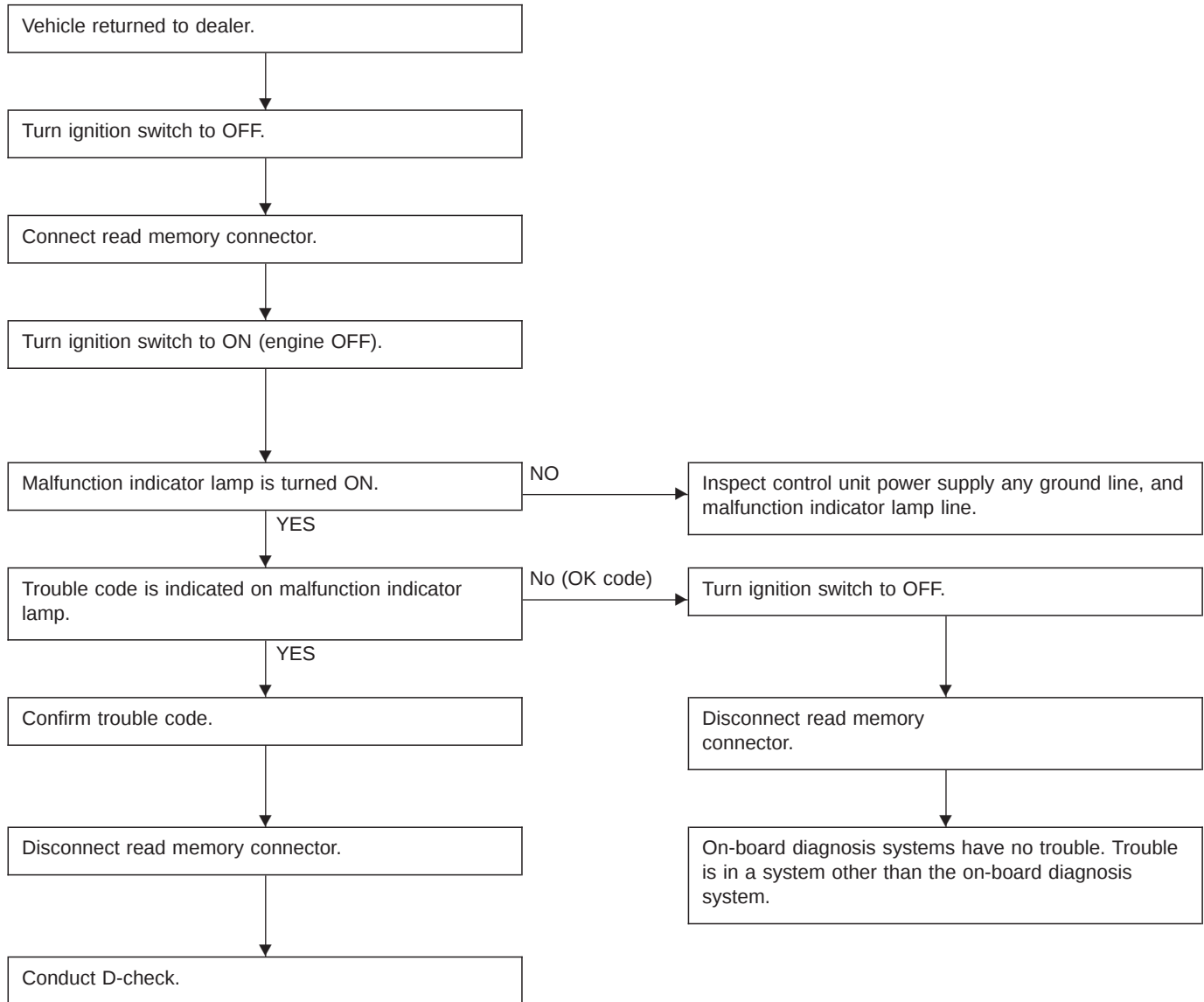


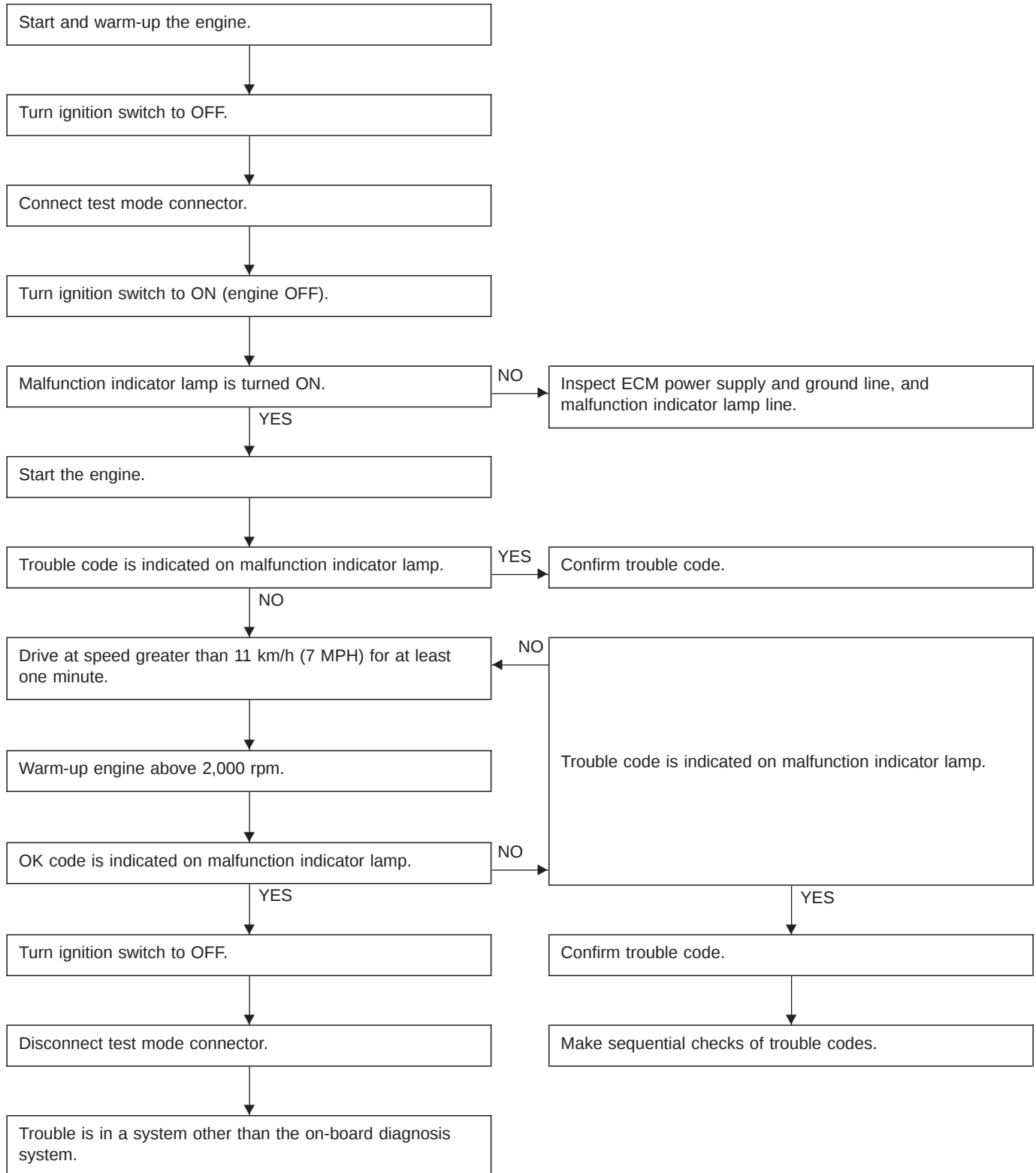
G2M0445

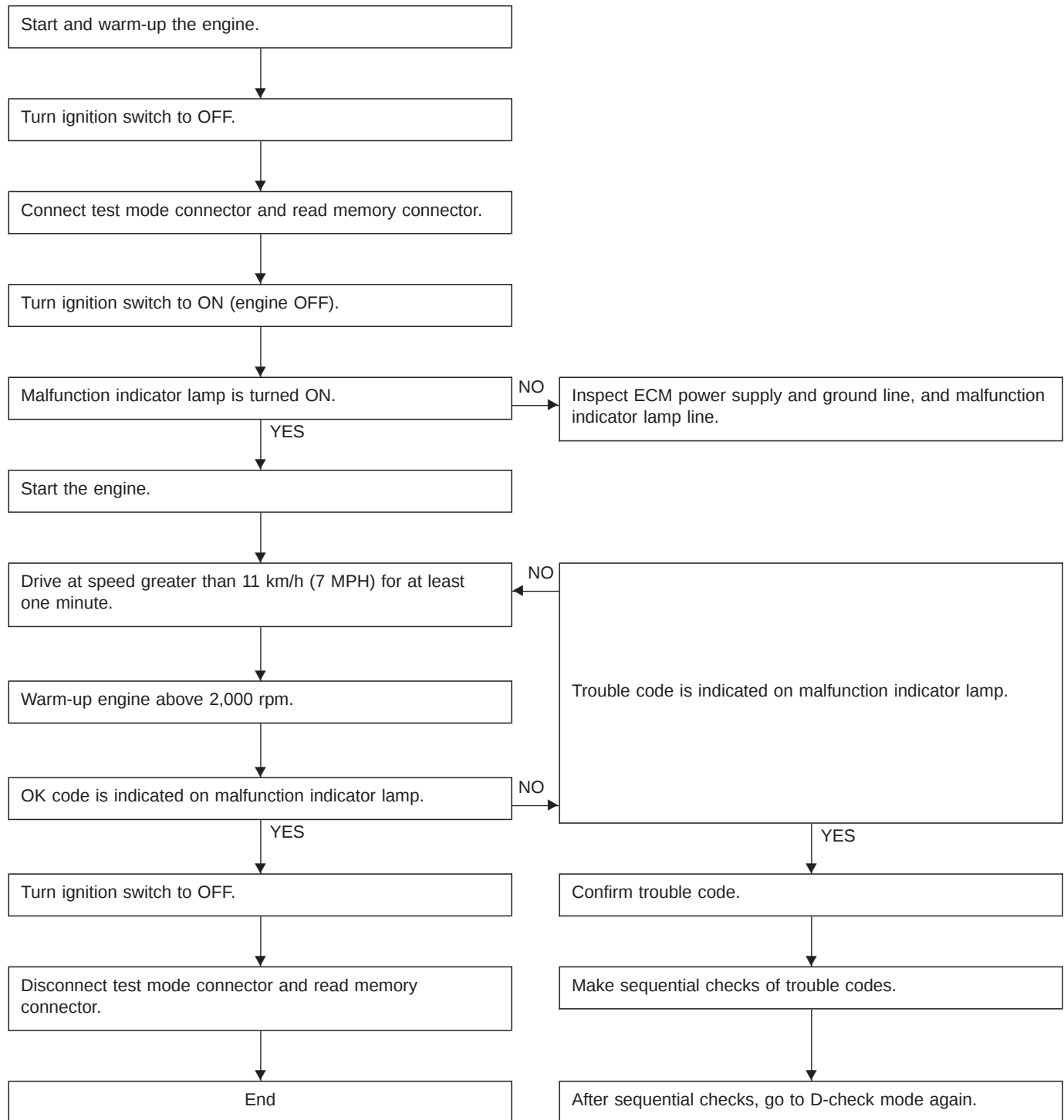
2. LIST OF TROUBLE CODE

Trouble code	Item	Contents of diagnosis
11	Crankshaft position sensor	No signal entered from crankshaft position sensor, but signal entered from camshaft position sensor.
12	Starter switch	● The starter switch signal is abnormal. ● The harness connector between ECM and starter switch is in short or open.
13	Camshaft position sensor	No signal entered from camshaft position sensor, but signal entered from crankshaft position sensor.
14	Fuel injector # 1	Fuel injection is not in function. (Abnormal signal emitted from monitor circuit.)
15	Fuel injector # 2	
16	Fuel injector # 3	
17	Fuel injector # 4	
21	Engine coolant temperature sensor	● The engine coolant temperature sensor signal is abnormal. ● The harness connector between ECM and engine coolant temperature sensor is in short or open.
23	Mass air flow sensor	● The mass air flow sensor signal is abnormal. ● The harness connector between ECM and mass air flow sensor is in short or open.
24	Idle air control solenoid valve	● The idle air control solenoid valve is not in function. ● The harness connector between ECM and idle air control solenoid valve is in short or open.
31	Throttle position sensor	● The throttle position sensor signal is abnormal. ● The harness connector between ECM and throttle position sensor is in short or open.
32	Oxygen sensor	● The oxygen sensor is not in function. ● The harness connector between ECM and oxygen sensor is in short or open.
33	Vehicle speed sensor 2	● The vehicle speed sensor 2 is not in function. ● The harness connector between ECM and vehicle speed sensor 2 is in short or open.
34	EGR solenoid valve	● The EGR solenoid valve is not in function. ● The harness connector between ECM and EGR solenoid valve is in short or open.
35	Purge control solenoid valve	● The purge control solenoid valve is not in function. ● The harness connector between ECM and purge control solenoid valve is in short or open.
36	Air suction solenoid valve	● The air suction solenoid valve is not in function. ● The harness connector between ECM and air suction solenoid valve is in short or open.
41	A/F (air/fuel) learning control	Faulty leaning control function
51	Neutral position switch (MT)	● The neutral position switch signal is abnormal. ● The harness connector between ECM and neutral position switch is in short or open.
	Inhibitor switch (AT)	● The inhibitor switch signal is abnormal. ● The harness connector between ECM and inhibitor switch is in short or open.
55	Recirculation gas temperature sensor	● Recirculation gas temperature sensor is not in function. ● The harness connector between ECM and recirculation gas temperature sensor is in short or open.
56	EGR system	Faulty EGR system function

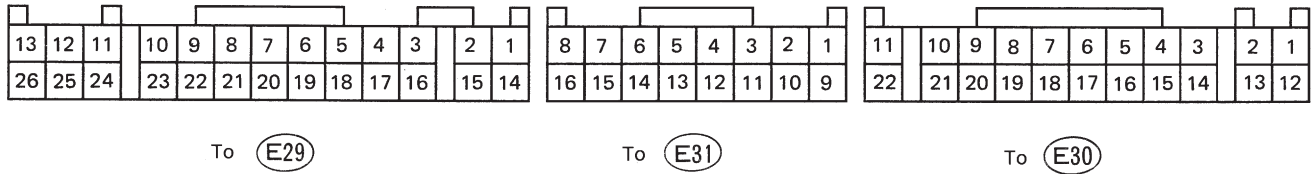
Trouble code	Item	Contents of diagnosis
61	Fuel tank pressure control solenoid valve (California FWD model only)	● The fuel tank pressure control solenoid valve is not in function. ● The harness connector between ECM and fuel tank pressure control solenoid valve is in short or open.
62	Fuel temperature sensor (California FWD model only)	● The fuel temperature sensor signal is abnormal. ● The harness connector between ECM and fuel temperature sensor is in short or open.
63	Fuel tank pressure sensor (California FWD model only)	● The fuel tank pressure sensor signal is abnormal. ● The harness connector between ECM and fuel tank pressure sensor is in short or open.

C: READ MEMORY MODE

D: D-CHECK MODE

E: CLEAR MEMORY MODE

6. Control Module I/O Signal



G2M0446

Content		Connector No.	Terminal No.	Signal (V)		Note
				Ig SW ON (Engine OFF)	Engine ON (Idling)	
Crankshaft position sensor	Signal (+)	E30	6	0	±6	Sensor output waveform
	Signal (-)	E30	7	0	0	—
	Shield	E30	11	0	0	—
Camshaft position sensor	Signal (+)	E30	8	0	±2.7	Sensor output waveform
	Signal (-)	E30	9	0	0	—
	Shield	E30	11	0	0	—
Mass air flow sensor	Signal	E30	5	0 — 0.3	0.8 — 1.2	—
	GND	E31	1	0	0	—
	Shield	E30	11	0	0	—
Throttle position sensor	Signal	E30	4	Fully closed: 0.2 — 1.0 Fully opened: 4.2 — 4.5		—
	Power supply	E30	15	5	5	—
	GND	E30	11	0	0	—
Oxygen sensor	Signal	E30	10	0	Rich mixture: 0.7 Lean mixture: 0	—
	Shield	E30	11	0	0	—
Engine coolant temperature sensor		E30	3	0.7 — 1.0	0.7 — 1.0	After warm-up
Vehicle speed sensor 2		E29	4	0 or 5	0 or 5	"5" and "0" are repeatedly displayed when vehicle is driven.
Starter switch		E29	12	0	0	Cranking: 10 — 14
A/C switch		E29	11	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
Ignition switch		E29	10	10 — 13	13 — 14	—
Neutral position switch (MT)		E29	16	ON: 0 OFF: 10 — 13		- On MT model; switch is ON when gear is in neutral position. - On AT model; switch is ON when shift is in "P" or "N" position.
Park/Neutral position switch (AT)						
Test mode connector		E29	20	5	5	When connected: 0
Read memory connector		E29	19	5	5	When connected: 0
AT/MT identification		E29	17	(AT) 5 (MT) 0	(AT) 5 (MT) 0	When measuring voltage between ECM and body.
Back-up power supply		E29	26	10 — 13	13 — 14	—
Control unit power supply		E29	13	10 — 13	13 — 14	—

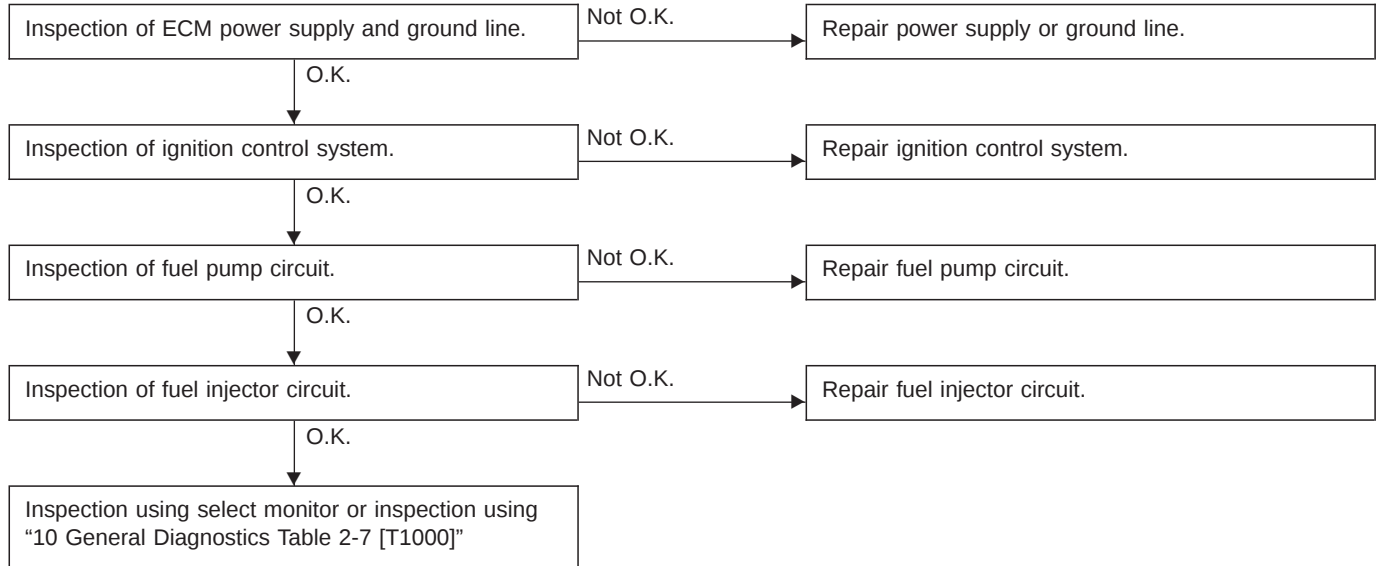
Content		Connector No.	Terminal No.	Signal (V)		Note
				Ig SW ON (Engine OFF)	Engine ON (Idling)	
Ignition control	# 1, # 2	E30	21	0	3.4, max.	—
	# 3, # 4	E30	20	0	3.4, max.	—
Fuel injector	# 1	E30	2	10 — 13	13 — 14	Waveform
	# 2	E30	1	10 — 13	13 — 14	Waveform
	# 3	E30	13	10 — 13	13 — 14	Waveform
	# 4	E30	12	10 — 13	13 — 14	Waveform
Idle air control solenoid valve	OPEN end	E29	2	—	1, max. — 13, min.	Waveform
	CLOSE end	E29	1	—	13, min. — 1, max.	Waveform
Fuel pump relay control		E29	8	ON: 0 OFF: 10 — 13	0	—
A/C relay control		E29	9	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Radiator fan relay 1 control		E29	23	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Radiator fan relay 2 control		E29	7	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Self-shutoff control		E29	18	10 — 13	13 — 14	—
Malfunction indicator lamp		E29	22	—	—	● Light "ON": 1, or less ● Light "OFF": 10 — 14
Engine speed output		E29	3	—	0 — 13, min.	Waveform
EGR solenoid valve		E30	18	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Air suction solenoid valve		E31	3	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
FICD solenoid valve		E29	24	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	A/C equipped model
Purge control solenoid valve		E30	19	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Power steering pressure		E30	14	5	5	● Steering wheel turned to extreme end of travel: 0 ● When driving straight forward: 5
Recirculation gas temperature sensor		E31	4	—	—	—
Fuel temperature sensor (California FWD model only)		E31	8	2.5 — 3.8	2.5 — 3.8	Ambient temperature: 25°C (77°F)
Tank pressure control solenoid valve (California FWD model only)		E29	21	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Fuel tank pressure sensor (California FWD model only)	Signal	E31	5	2.3 — 2.7	2.3 — 2.7	The value obtained after the fuel filler cap was removed once and recapped.
	Power supply	E30	15	5	5	—
	GND	E30	11	0	0	—
GND (sensors)		E30	11	0	0	—
GND (injectors)		E29	15	0	0	—
GND (ignition system)		E29	14	0	0	—

Content	Connector No.	Terminal No.	Signal (V)		Note
			Ig SW ON (Engine OFF)	Engine ON (Idling)	
GND (power supply)	E29	25	0	0	—
GND (control systems)	E30	22	0	0	—
Select Monitor Signal	E29	6	—	—	—
	E29	5	—	—	—

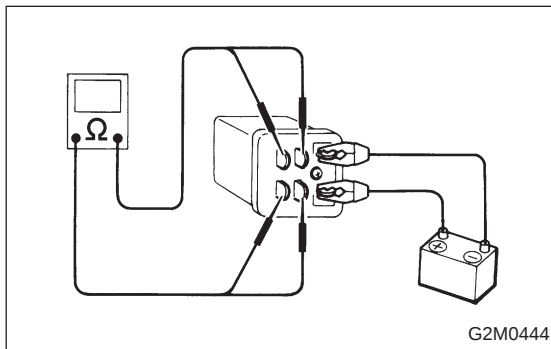
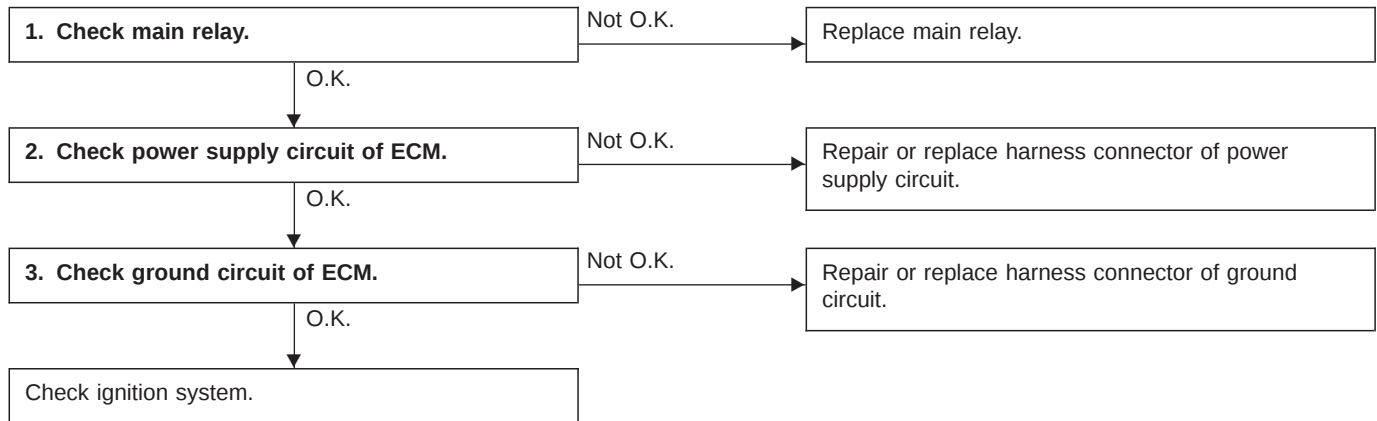
7. Diagnostics Chart for Engine Starting Failure

A: BASIC DIAGNOSTICS CHART

When engine cranks but does not start, perform diagnostics in accordance with the following chart.



B: CONTROL UNIT POWER SUPPLY AND GROUND LINE



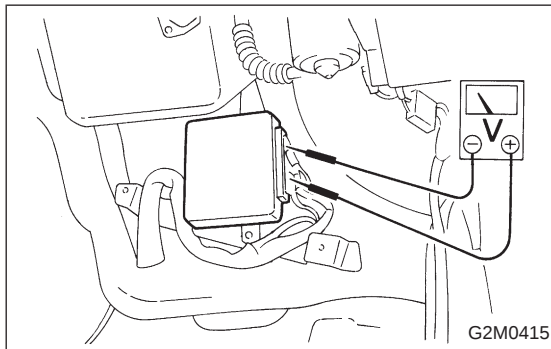
1. CHECK MAIN RELAY.

- 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.

Terminals /Specified resistance:

No. 3 — No. 5/10 Ω , max.

No. 4 — No. 6/10 Ω , max.



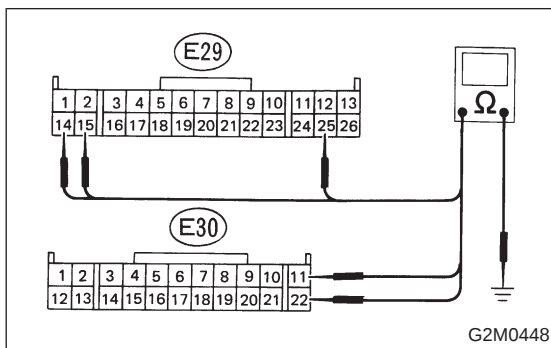
2. CHECK POWER SUPPLY CIRCUIT OF ECM.

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

Connector & terminal /Specified voltage:

(E29) No. 13 — Body/10 V, min.

(E29) No. 26 — Body/10 V, min.



3. CHECK GROUND CIRCUIT OF ECM.

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

Connector & terminal /Specified resistance:

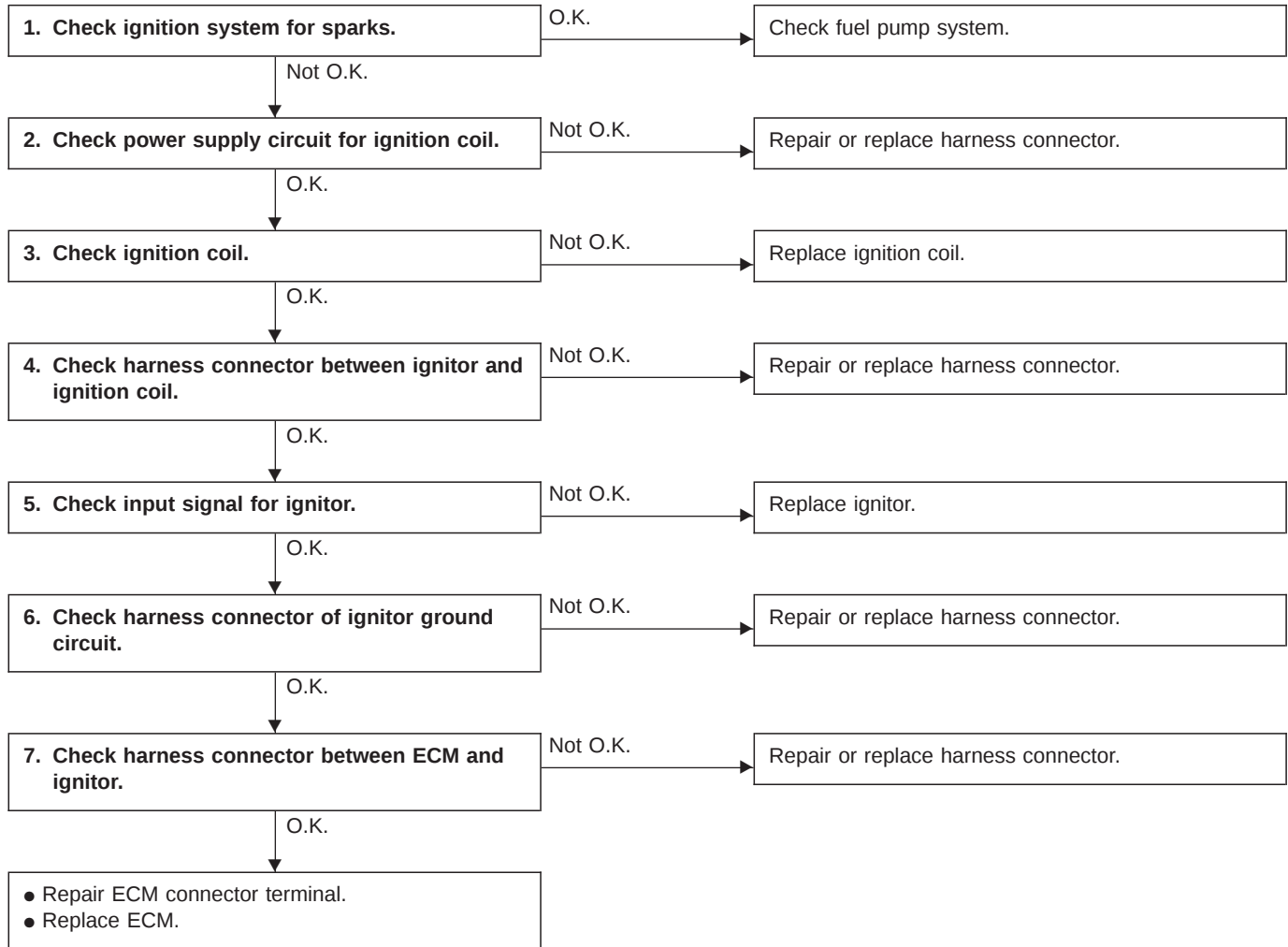
(E29) No. 25 — Body/10 Ω , max.

(E29) No. 14 — Body/10 Ω , max.

(E29) No. 15 — Body/10 Ω , max.

(E30) No. 11 — Body/10 Ω , max.

(E30) No. 22 — Body/10 Ω , max.

C: IGNITION CONTROL SYSTEM

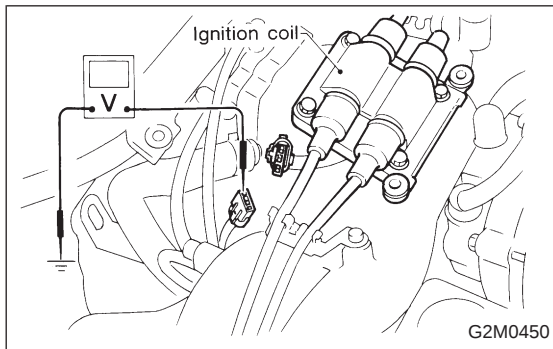
1. CHECK IGNITION SYSTEM FOR SPARKS.

- 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.

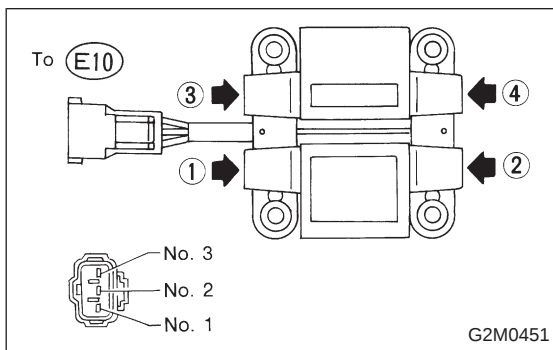


2. CHECK POWER SUPPLY CIRCUIT FOR IGNITION COIL.

- 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.

Connector & terminal /Specified voltage:

(E9) No. 2 — Body/10 V, min.



3. CHECK IGNITION COIL.

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

Terminals /Specified resistance:

No. 2 — No. 1/0.7 Ω

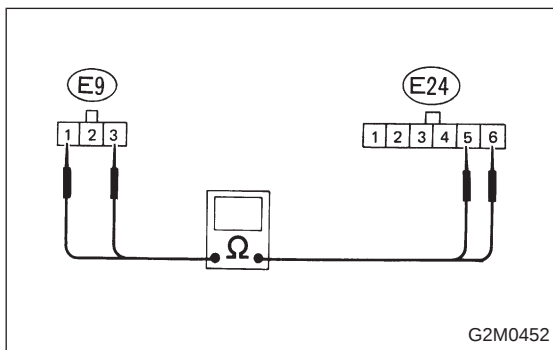
No. 2 — No. 3/0.7 Ω

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

Connector & terminal/Specified resistance:

#1 — #2 /13.8 k Ω

#3 — #4 /13.8 k Ω



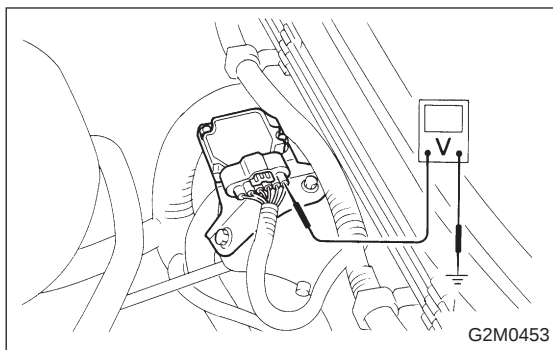
4. CHECK HARNESS CONNECTOR BETWEEN IGNITOR AND IGNITION COIL.

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

Connector & terminal /Specified resistance:

(E24) No. 5 — (E9) No. 1/10 Ω , max.

(E24) No. 6 — (E9) No. 3/10 Ω , max.

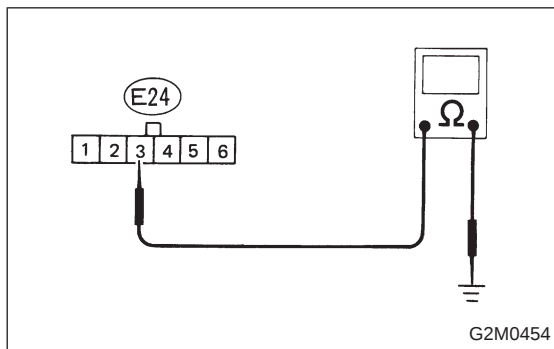
**5. CHECK INPUT SIGNAL FOR IGNITOR.**

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

Connector & terminal /Specified voltage:

(E24) No. 1 — Body/0.1 V, min. — 3.4 V, max.

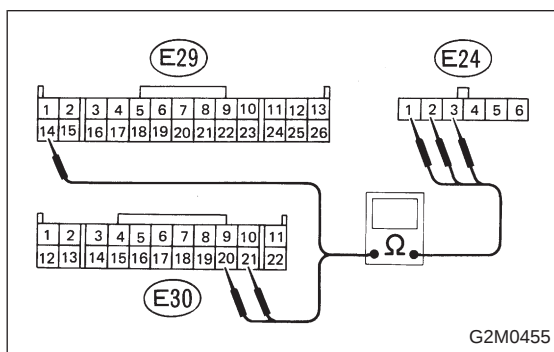
(E24) No. 2 — Body/0.1 V, min. — 3.4 V, max.

**6. CHECK HARNESS CONNECTOR OF IGNITOR GROUND CIRCUIT.**

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

Connector & terminal /Specified resistance:

(E24) No. 3 — Body/10 Ω , max.

**7. CHECK HARNESS CONNECTOR BETWEEN ECM AND IGNITOR.**

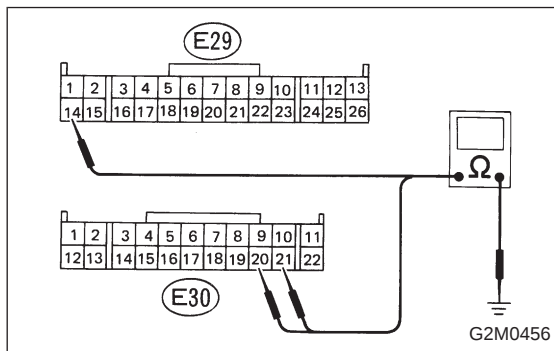
- 1) Disconnect connector from ECM.
- 2) Measure resistance of harness connector between ECM and ignitor.

Connector & terminal /Specified resistance:

(E30) No. 20 — (E24) No. 1/10 Ω , max.

(E30) No. 21 — (E24) No. 2/10 Ω , max.

(E29) No. 14 — (E24) No. 3/10 Ω , max.



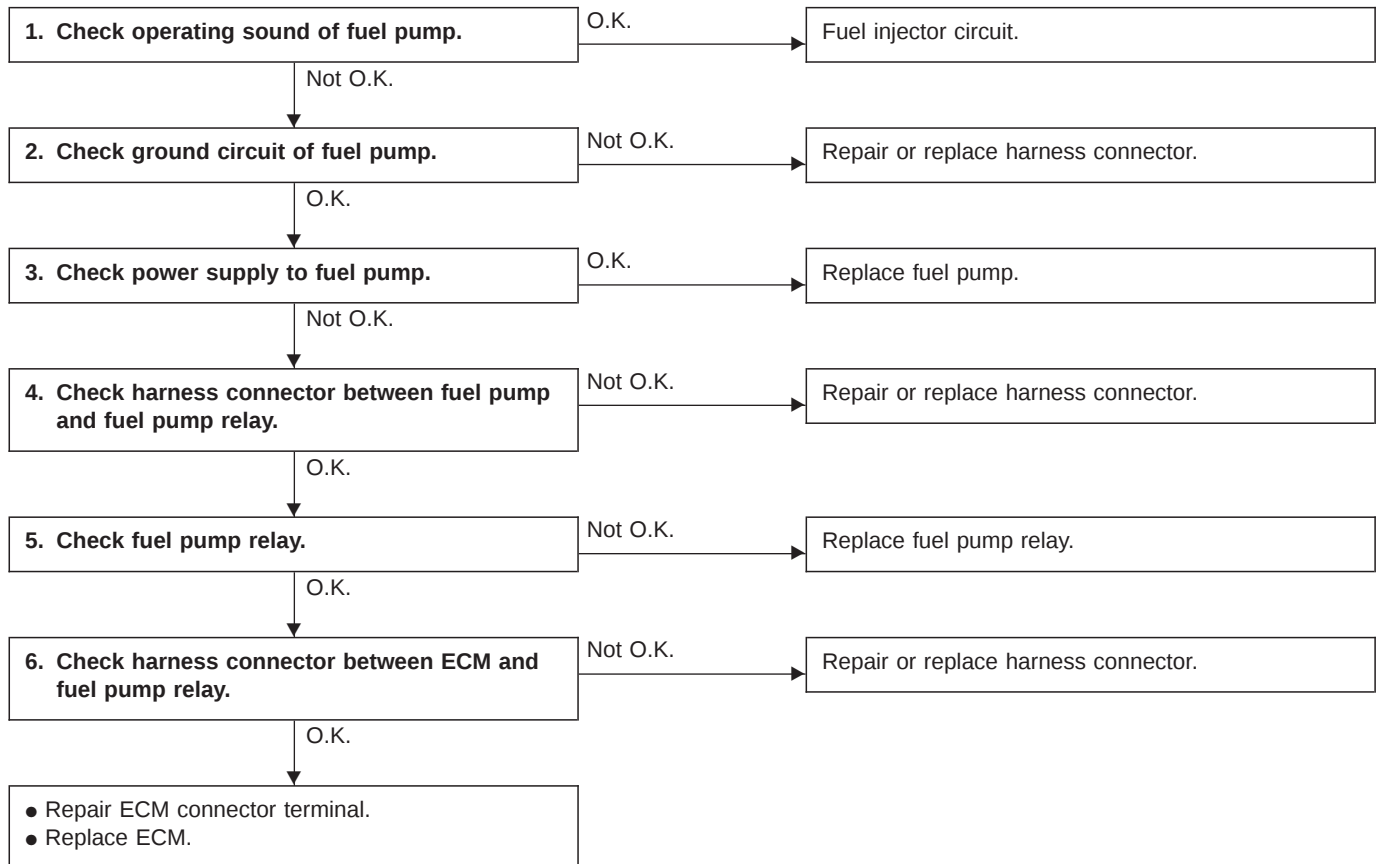
- 3) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal /Specified resistance:

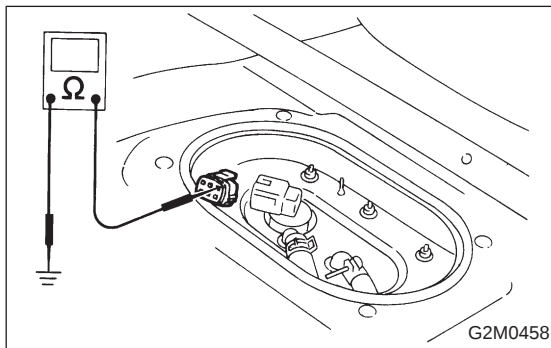
(E30) No. 20 — Body/1 M Ω , min.

(E30) No. 4 — Body/1 M Ω , min.

(E29) No. 14 — Body/1 M Ω , min.

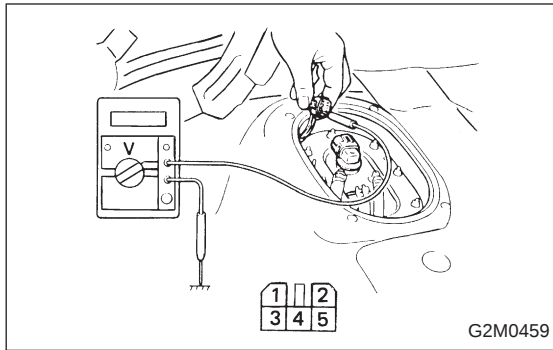
D: FUEL PUMP CIRCUIT**1. CHECK OPERATING SOUND OF FUEL PUMP.**

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

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

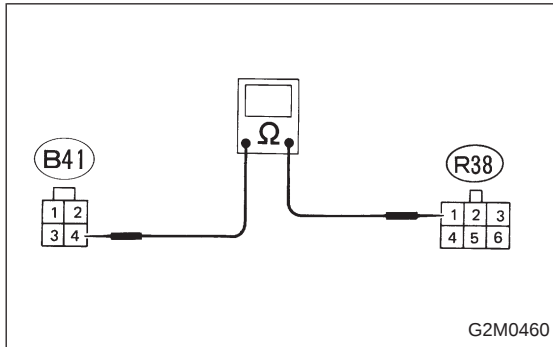
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from fuel pump.
- 3) Measure resistance of harness connector between fuel pump and body.

Connector & terminal /Specified resistance:
(R38) No. 3 — Body/10 Ω , max.

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

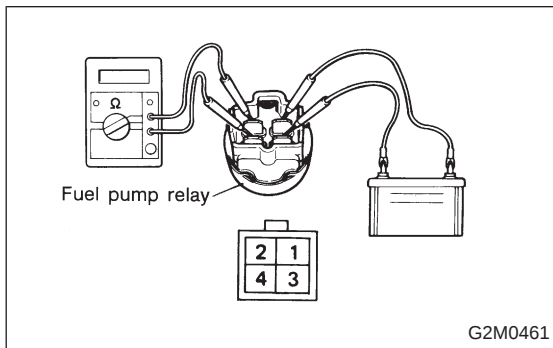
- 1) Turn ignition switch to ON.
- 2) Measure voltage of power supply circuit between fuel pump connector and body.

Connector & terminal /Specified voltage:
(R38) No. 1 — Body/10 V, min.

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

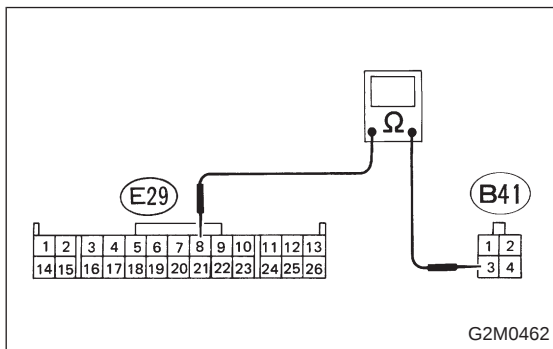
- 1) Turn ignition switch to OFF.
- 2) Measure resistance of harness connector between fuel pump and fuel pump relay.

Connector & terminal /Specified resistance:
(R38) No. 1 — (B41) No. 4/10 Ω, max.

**5. CHECK FUEL PUMP RELAY.**

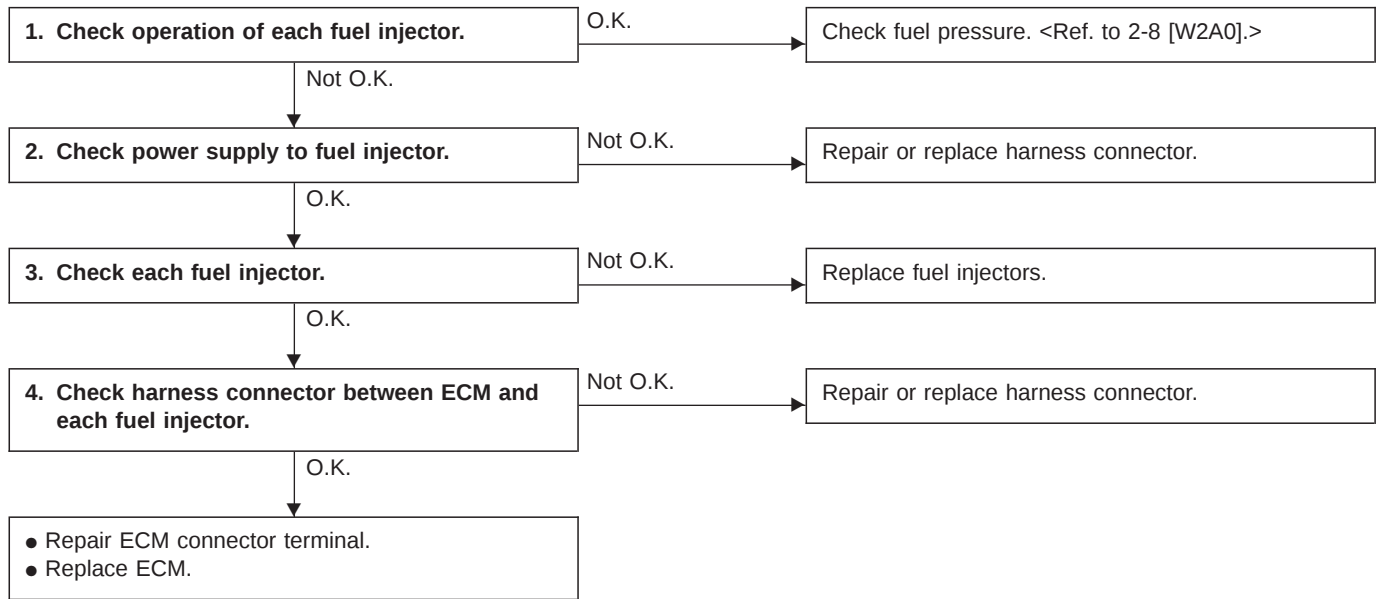
- 1) Disconnect connectors from fuel pump relay and main relay.
- 2) Remove fuel pump relay and main relay with bracket.
- 3) Connect battery to fuel pump relay connector terminals No. 1 and No. 3.
- 4) Measure resistance between connector terminals of fuel pump relay.

Terminals /Specified resistance:
No. 2 — No. 4/10 Ω, max.

**6. CHECK HARNESS CONNECTOR BETWEEN ECM AND FUEL PUMP RELAY.**

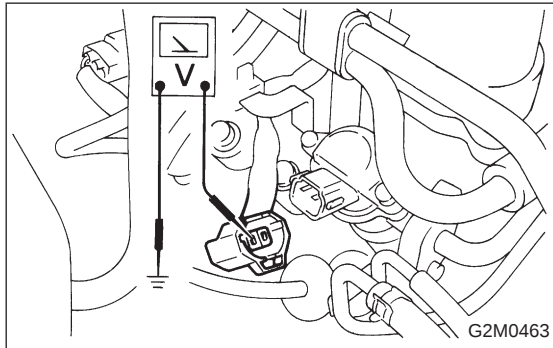
- 1) Disconnect connectors from ECM.
- 2) Measure resistance of harness connector between ECM and fuel pump relay.

Connector & terminal /Specified resistance:
(E29) No. 8 — (B41) No. 3/10 Ω, max.

E: FUEL INJECTOR CIRCUIT

1. CHECK OPERATION OF EACH FUEL INJECTOR.

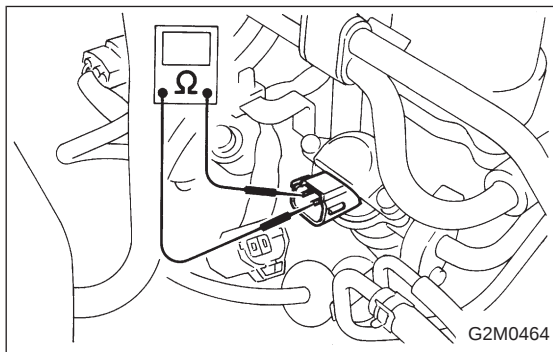
While cranking the engine, check that each fuel injector emits “operating” sound. Use a sound scope or attach a screwdriver to injector for this check.

**2. CHECK POWER SUPPLY TO FUEL INJECTOR.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from each injector.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between each fuel injector connector terminal and body.

Connector & terminal /Specified voltage:

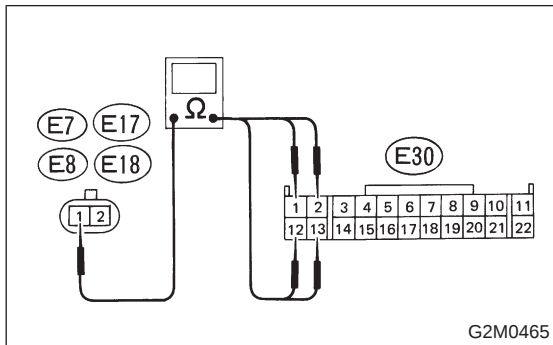
- #1 (E7) No. 2 — Body /10 V, min.
- #2 (E17) No. 2 — Body/10 V, min.
- #3 (E8) No. 2 — Body /10 V, min.
- #4 (E18) No. 2 — Body/10 V, min.

**3. CHECK EACH FUEL INJECTOR.**

Measure resistance between fuel injector terminals.

Terminals /Specified resistance:

- No. 1 — No. 2/11 — 12 Ω

**4. CHECK HARNESS CONNECTOR BETWEEN ECM AND EACH FUEL INJECTOR.**

- 1) Disconnect connector from ECM.
- 2) Measure resistance of harness connector between ECM and each fuel injector.

Connector & terminal /Specified resistance:

- (E30) No. 2 — (E7) No. 1 /10 Ω, max.
- (E30) No. 1 — (E17) No. 1 /10 Ω, max.
- (E30) No. 13 — (E8) No. 1 /10 Ω, max.
- (E30) No. 12 — (E18) No. 1 /10 Ω, max.

8. Diagnostics Chart with Trouble Code

A: TROUBLE CODE

Trouble code	Item	Contents of diagnosis	Page
11	Crankshaft position sensor	- No signal entered from crankshaft position sensor, but signal entered from camshaft position sensor. - The harness connector between ECM and crankshaft position sensor is in short or open.	33
12	Starter switch	- The starter switch signal is abnormal. - The harness connector between ECM and starter switch is in short or open.	35
13	Camshaft position sensor	- No signal entered from camshaft position sensor, but signal entered from crankshaft position sensor. - The harness connector between ECM and camshaft position sensor is in short or open.	37
14	Fuel injector #1	- The fuel injector is not in function. - The harness connector between ECM and each fuel injector is in short or open.	39
15	Fuel injector #2		
16	Fuel injector #3		
17	Fuel injector #4		
21	Engine coolant temperature sensor	- The engine coolant temperature sensor signal is abnormal. - The harness connector between ECM and engine coolant temperature sensor is in short or open.	41
23	Mass air flow sensor	- The mass air flow sensor signal is abnormal. - The harness connector between ECM and mass air flow sensor is in short or open.	43
24	Idle air control solenoid valve	- The idle air control solenoid valve is not in function. - The harness connector between ECM and idle air control solenoid valve is in short or open.	45
31	Throttle position sensor	- The throttle position sensor signal is abnormal. - The throttle position sensor is installed abnormally. - The harness connector between ECM and throttle position sensor is in short or open.	47
32	Oxygen sensor	- The oxygen sensor is not in function. - The harness connector between ECM and oxygen sensor is in short or open.	50
33	Vehicle speed sensor 2	- The vehicle speed sensor 2 is not in function. - The harness connector between ECM and vehicle speed sensor 2 is in short or open.	52
34	EGR solenoid valve	- The EGR solenoid valve is not in function. - The harness connector between ECM and EGR solenoid valve is in short or open.	54
35	Purge control solenoid valve	- The purge control solenoid valve is not in function. - The harness connector between ECM and purge control solenoid valve is in short or open.	56
36	Air suction solenoid valve	- The air suction solenoid valve is not in function. - The harness connector between ECM and air suction solenoid valve is in short or open.	58
41	A/F (air/fuel) learning control	Faulty leaning control function	60
51	Neutral position switch (MT)	- The neutral position switch signal is abnormal. - The harness connector between ECM and neutral position switch is in short or open.	61
	Inhibitor switch (AT)	- The park/neutral position signal is abnormal. - The shift cable is connected abnormally. - The harness connector between ECM and inhibitor switch is in short or open.	63
55	Recirculation gas temperature sensor	- The recirculation gas temperature sensor is not in function. - The harness connector between ECM and recirculation gas temperature sensor is in short or open.	65
56	EGR system	Faulty EGR system function	66
61	Fuel tank pressure control solenoid valve (California FWD model only)	- The fuel tank pressure control solenoid valve is not in function. - The harness connector between ECM and fuel tank pressure control solenoid valve is in short or open.	67

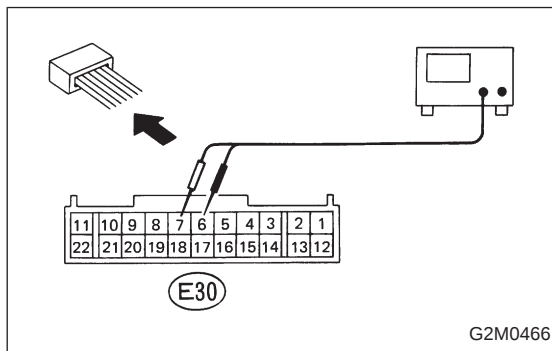
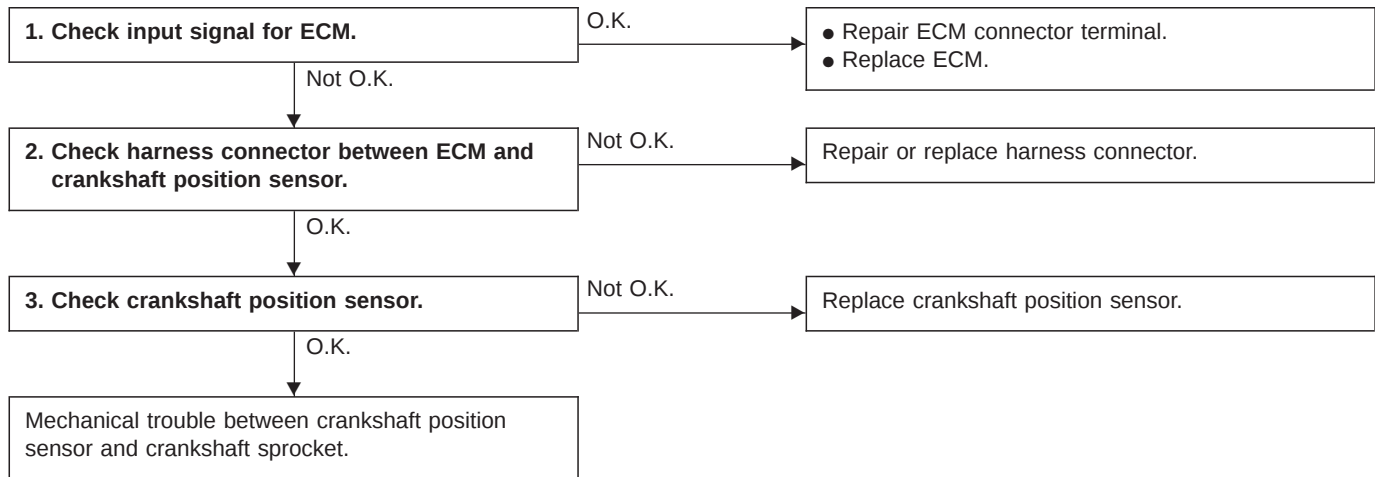
Trouble code	Item	Contents of diagnosis	Page
62	Fuel temperature sensor (California FWD model only)	• The fuel temperature sensor signal is abnormal. • The harness connector between ECM and fuel temperature sensor is in short or open.	71
63	Fuel tank pressure sensor (California FWD model only)	• The fuel tank pressure sensor signal is abnormal. • The harness connector between ECM and fuel tank pressure sensor is in short or open.	75

B: TROUBLE CODE (11)**— CRANKSHAFT POSITION SENSOR —****DIAGNOSIS:**

- No signal entered from crankshaft position sensor, but signal entered from camshaft position sensor.
- The harness connector between ECM and crankshaft position sensor is in short or open.

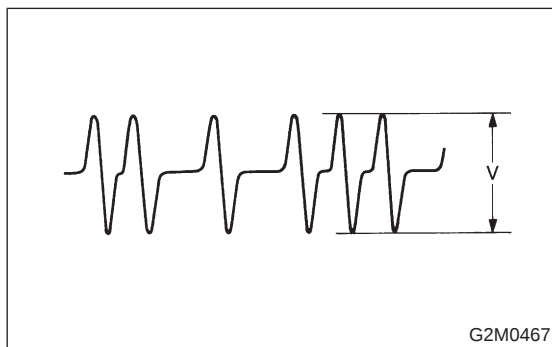
TROUBLE SYMPTOM:

- Engine stalls.
- Restarting impossible

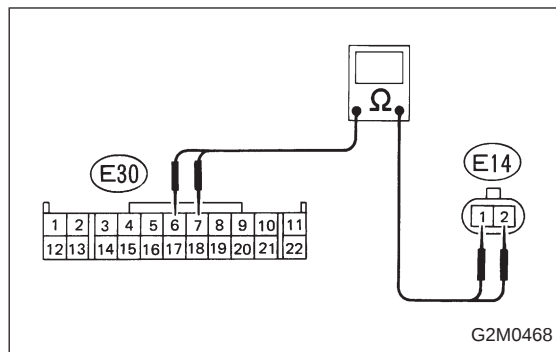
**1. CHECK INPUT SIGNAL FOR ECM.**

1) Set the positive (+) probe and earth lead of oscilloscope at ECM connector terminals.

Connector & terminal / (E30) No. 6 — (E30) No. 7



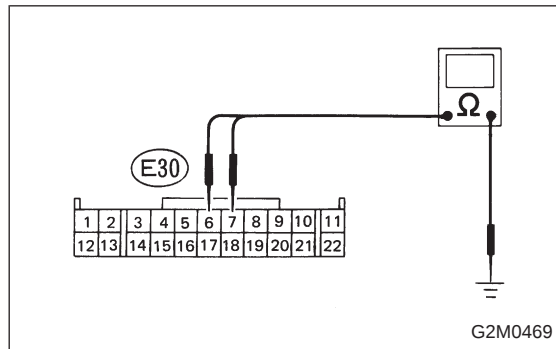
2) Measure signal voltage indicated on oscilloscope while cranking the engine.



2. CHECK HARNESS CONNECTOR BETWEEN ECM AND CRANKSHAFT POSITION SENSOR.

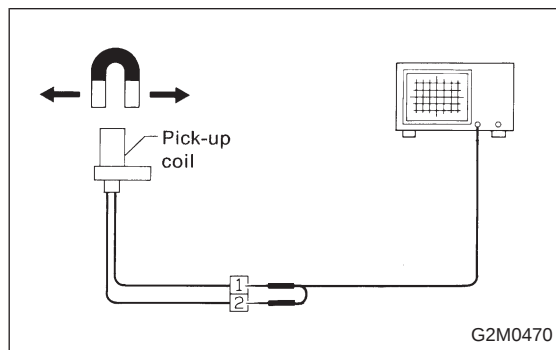
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from ECM and crankshaft position sensor.
- 3) Measure resistance of harness connector between ECM and crankshaft position sensor.

Connector & terminal /Specified resistance:
 (E30) No. 6 — (E14) No. 1 /10 Ω, max.
 (E30) No. 7 — (E14) No. 2 /10 Ω, max.



- 4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal /Specified resistance:
 (E30) No. 6 — Body /1 MΩ, min.
 (E30) No. 7 — Body /1 MΩ, min.
 (E30) No. 11 — Body /1 MΩ, min.



3. CHECK CRANKSHAFT POSITION SENSOR.

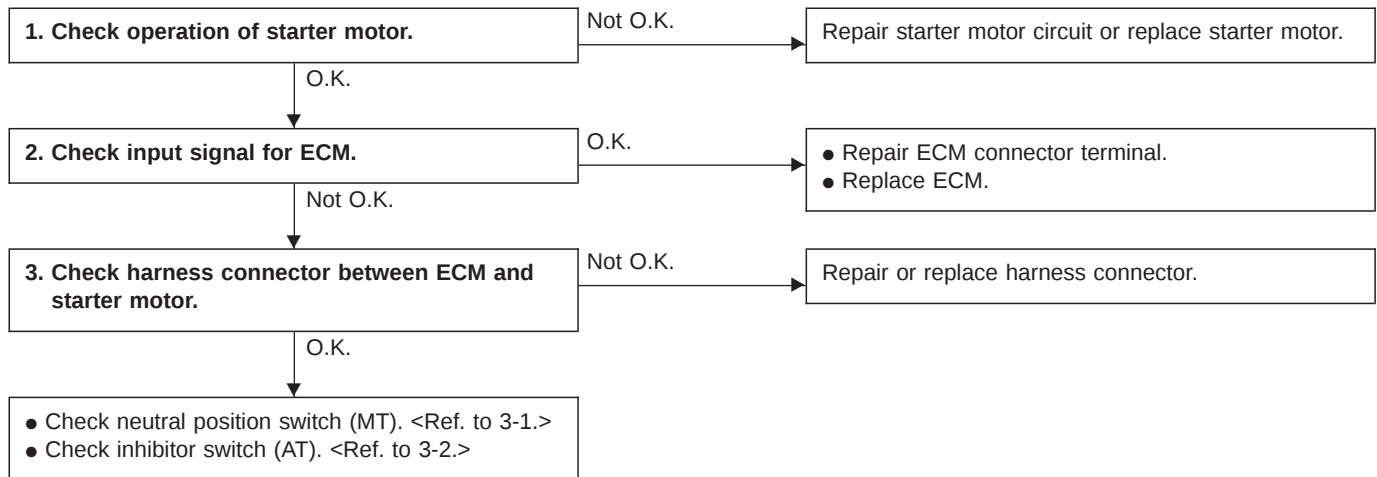
- 1) Remove crankshaft position sensor.
- 2) Set the position (+) probe at sensor connector terminal No. 1, and set earth lead at terminal No. 2.
- 3) Check that a wave profile appears crossing a magnet near the pick-up coil of crankshaft position sensor.

C: TROUBLE CODE (12)**— STARTER SWITCH —****DIAGNOSIS:**

- The starter switch signal is abnormal.
- The harness connector between ECM and starter switch is in short or open.

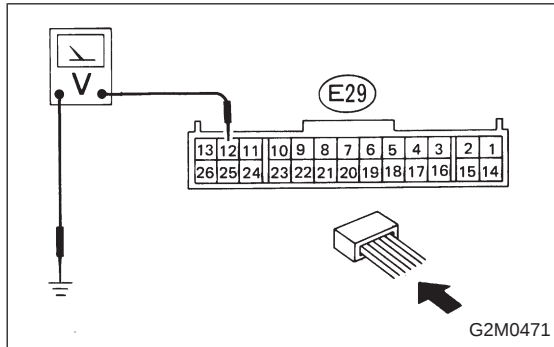
TROUBLE SYMPTOM:

- Failure of engine to start



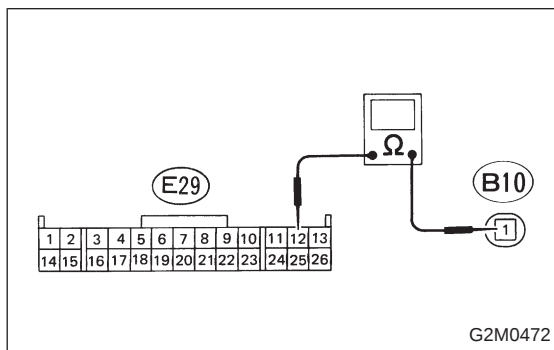
1. CHECK OPERATION OF STARTER MOTOR.

Turn ignition switch to "ST" to ensure that starter motor functions.

**2. CHECK INPUT SIGNAL FOR ECM.**

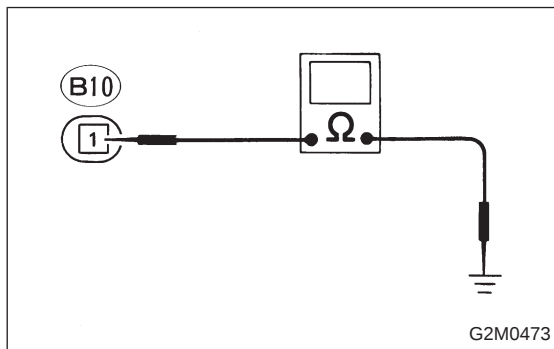
Measure voltage between ECM and body while cranking the engine.

Connector & terminal /Specified voltage:
(E29) No. 12 — Body/13 — 14 V

**3. CHECK HARNESS CONNECTOR BETWEEN ECM AND STARTER MOTOR.**

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

Connector & terminal /Specified resistance:
(E29) No. 12 — (B10) No. 1/0 Ω



- 4) Measure resistance of harness connector between starter motor and body to make sure that circuit does not short.

Connector & terminal /Specified resistance:
(B10) No. 1 — Body/1 M Ω , min.

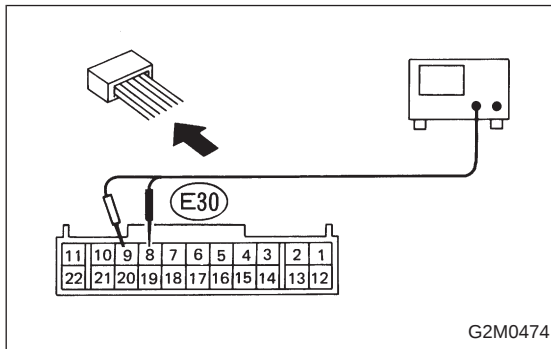
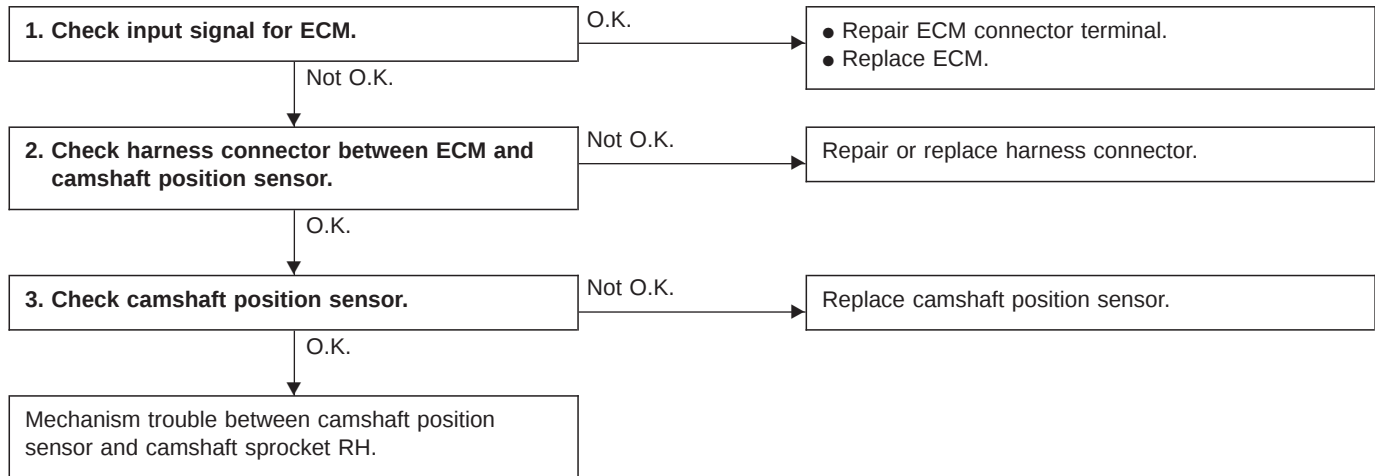
D: TROUBLE CODE (13) — CAMSHAFT POSITION SENSOR —

DIAGNOSIS:

- No signal entered from camshaft position sensor, but signal entered from crankshaft position sensor.
- The harness connector between ECM and camshaft position sensor is short or open.

TROUBLE SYMPTOM:

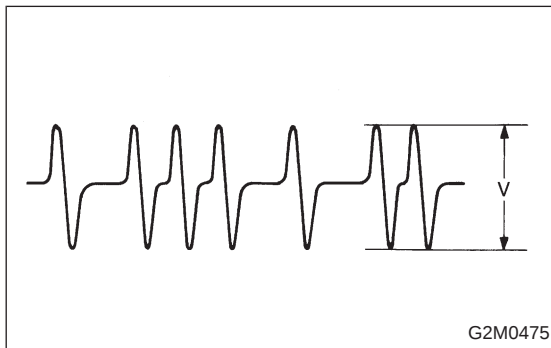
- Engine stalls
- Failure of engine to start



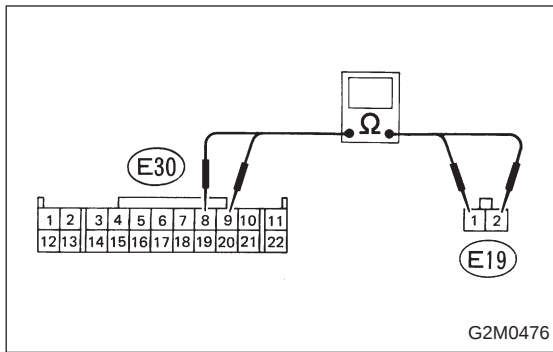
1. CHECK INPUT SIGNAL FOR ECM.

1) Set the positive (+) probe and earth lead of oscilloscope at ECM connector terminals.

Connector & terminal / (E30) No. 8 — (E30) No. 9



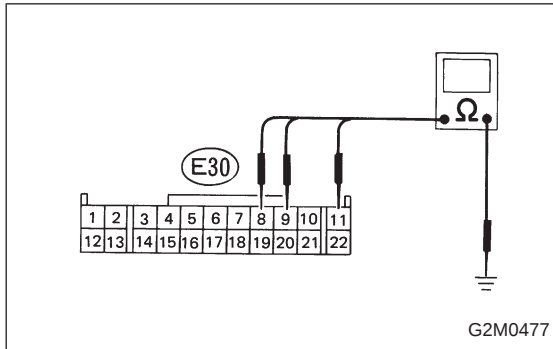
2) Measure signal voltage indicated on oscilloscope, while cranking the engine.



2. CHECK HARNESS CONNECTOR BETWEEN ECM AND CAMSHAFT POSITION SENSOR.

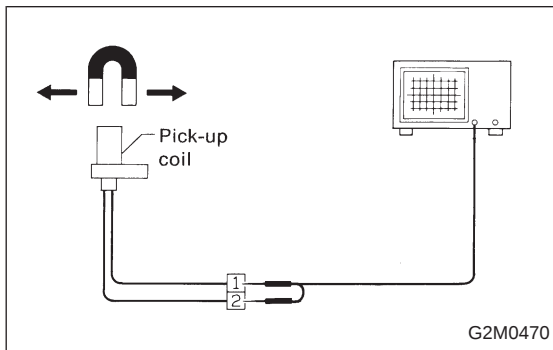
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from ECM and camshaft position sensor.
- 3) Measure resistance of harness connector between ECM and camshaft position sensor.

Connector & terminal /Specified resistance:
(E30) No. 8 — (E19) No. 1 /10 Ω, max.
(E30) No. 9 — (E19) No. 2 /10 Ω, max.



- 4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal /Specified resistance:
(E30) No. 8 — Body /1 MΩ, min.
(E30) No. 9 — Body /1 MΩ, min.
(E30) No. 11 — Body/1 MΩ, min.



3. CHECK CAMSHAFT POSITION SENSOR.

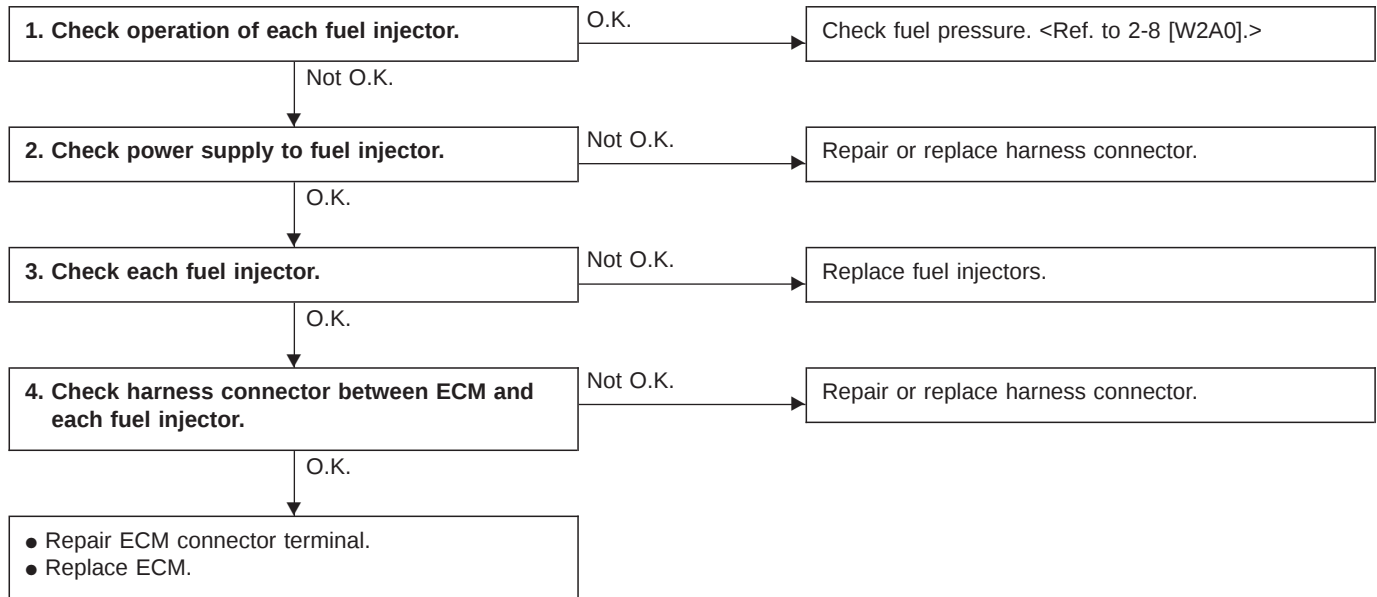
- 1) Remove camshaft position sensor.
- 2) Set the position (+) probe at sensor connector terminal No. 1, and set earth lead at terminal No. 2.
- 3) Check that a wave profile appears crossing a magnet near the pick-up coil of crankshaft position sensor.

E: TROUBLE CODE 14, 15, 16, 17**— FUEL INJECTOR —****DIAGNOSIS:**

- The fuel injector is not in function.
- The harness connector between ECM and each fuel injection is in short or open.

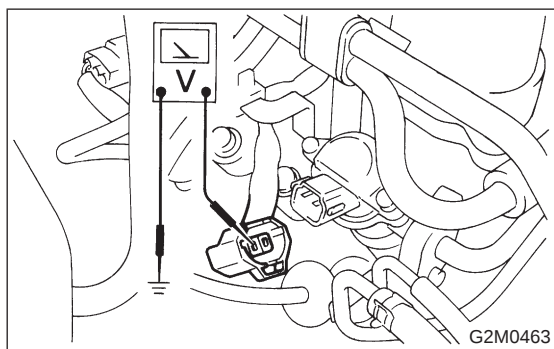
TROUBLE SYMPTOM:

- Engine stalls.
- Erroneous idling
- Rough driving



1. CHECK OPERATION OF EACH FUEL INJECTOR.

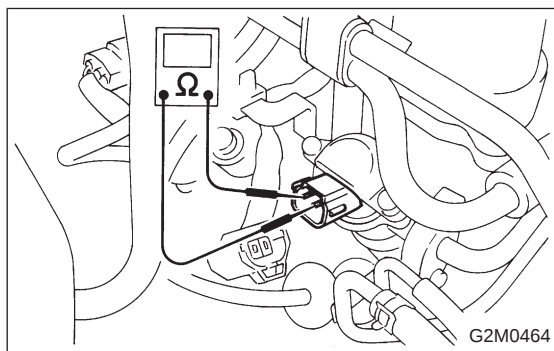
While cranking the engine, check that each fuel injector emits "operating" sound. Use a sound scope or attach a screwdriver to injector for this check.

**2. CHECK POWER SUPPLY TO FUEL INJECTOR.**

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

Connector & terminal / **Specified voltage:**

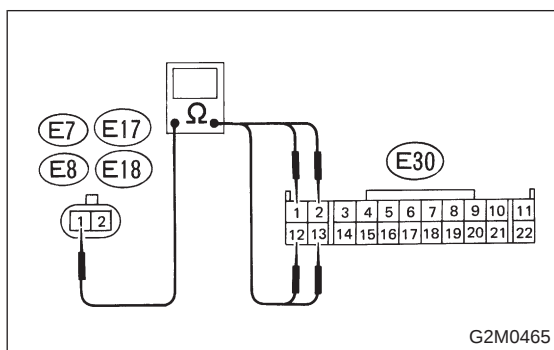
- #1 (E7) No. 2 — Body /10 V, min.
- #2 (E17) No. 2 — Body/10 V, min.
- #3 (E8) No. 2 — Body /10 V, min.
- #4 (E18) No. 2 — Body/10 V, min.

**3. CHECK EACH FUEL INJECTOR.**

Measure resistance between fuel injector terminals.

Terminals / **Specified resistance:**

- No. 1 — No. 2/11 — 12 Ω

**4. CHECK HARNESS CONNECTOR BETWEEN ECM AND EACH FUEL INJECTOR.**

- 1) Disconnect connector from ECM.
- 2) Measure resistance of harness connector between ECM connector and each fuel injector.

Connector & terminal / **Specified resistance:**

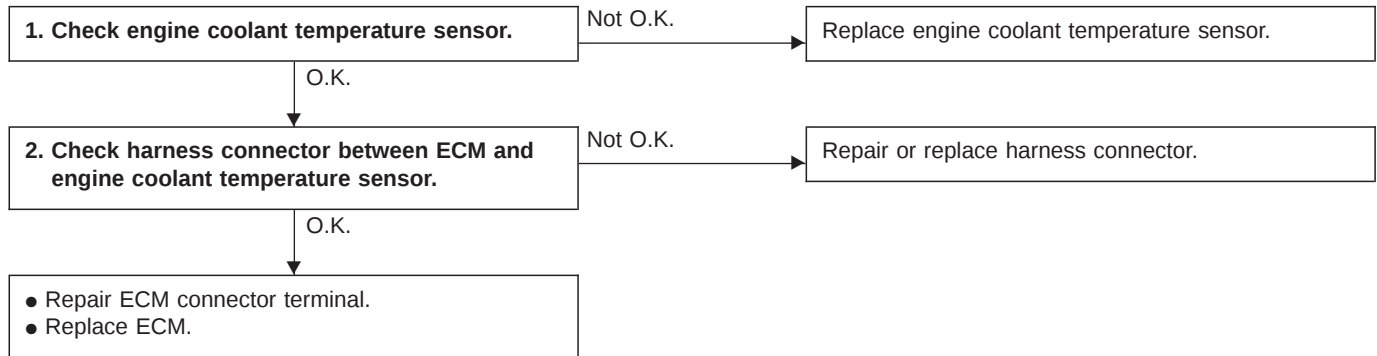
- (E30) No. 2 — (E7) No. 1 /10 Ω, max.
- (E30) No. 1 — (E17) No. 1 /10 Ω, max.
- (E30) No. 13 — (E8) No. 1 /10 Ω, max.
- (E30) No. 12 — (E18) No. 1/10 Ω, max.

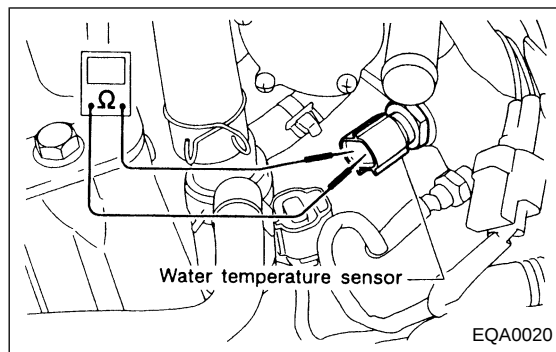
**F: TROUBLE CODE (21)
— ENGINE COOLANT TEMPERATURE
SENSOR —****DIAGNOSIS:**

- The engine coolant temperature sensor signal is abnormal.
- The harness connector between ECM and engine coolant temperature sensor is in short or open.

TROUBLE SYMPTOM:

- Hard to start
- Erroneous idling
- Poor driving performance





1. CHECK ENGINE COOLANT TEMPERATURE SENSOR.

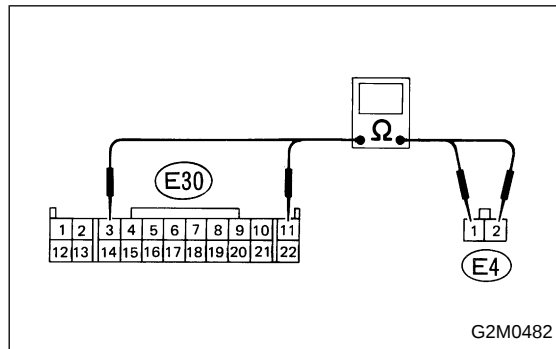
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from engine coolant temperature sensor.
- 3) Measure resistance between engine coolant temperature sensor terminals.

Terminals

/Specified resistance:

No. 1 — No. 2/2.0 — 3.0 k Ω at 20°C (68°F)

No. 1 — No. 2/270 — 370 Ω at 80°C (176°F)



2. CHECK HARNESS CONNECTOR BETWEEN ECM AND ENGINE COOLANT TEMPERATURE SENSOR.

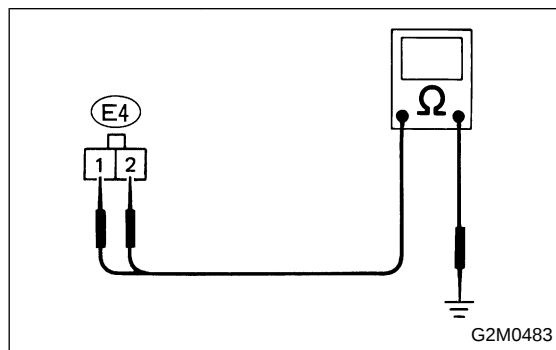
- 1) Disconnect connector from ECM.
- 2) Measure resistance of harness connector between ECM and engine coolant temperature connector.

Connector & terminal

/Specified resistance:

(E30) No. 3 — (E4) No. 1 /10 Ω , max.

(E30) No. 11 — (E4) No. 2/10 Ω , max.



- 3) Measure resistance of harness connector between engine coolant temperature sensor and body to make sure that circuit does not short.

Connector & terminal /Specified resistance:

(E4) No. 1 — Body/1 M Ω , min.

(E4) No. 2 — Body/1 M Ω , min.

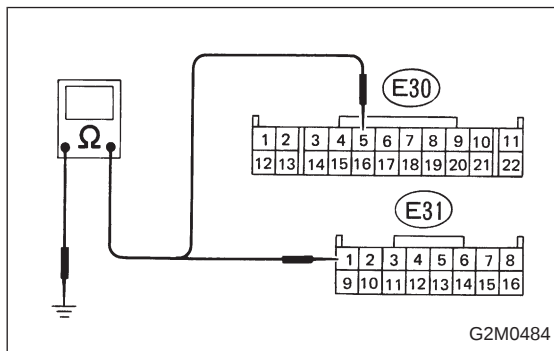
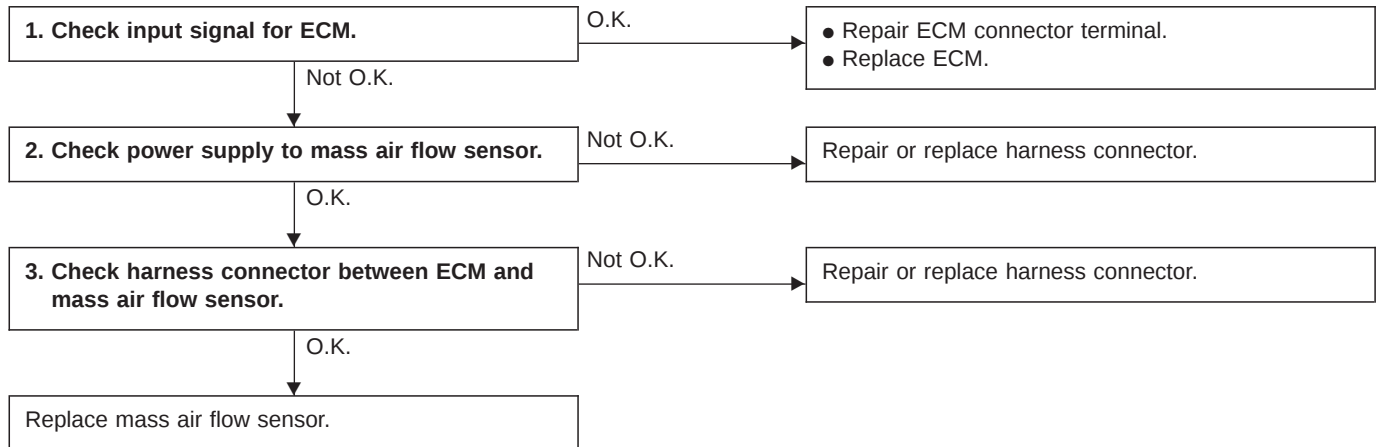
G: TROUBLE CODE (23) — MASS AIR FLOW SENSOR —

DIAGNOSIS:

- The mass air flow sensor signal is abnormal.
- The harness connector between ECM and mass air flow sensor is in short or open.

TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance



1. CHECK INPUT SIGNAL FOR ECM.

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

Connector & terminal /Specified voltage:

(E30) No. 5 — Body/0 — 0.3 V

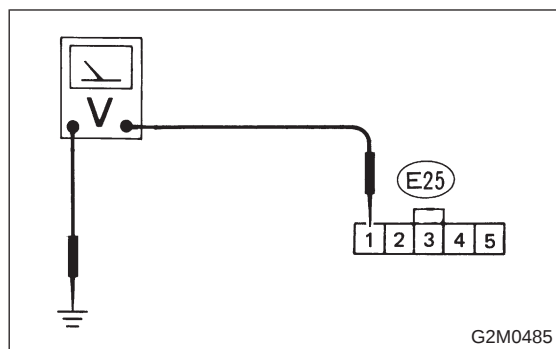
(E31) No. 1 — Body/0 V

- 3) Start engine, and idle it.
- 4) Measure voltage between ECM and body while engine is idling.

Connector & terminal /Specified voltage:

(E30) No. 5 — Body/0.8 — 1.2 V

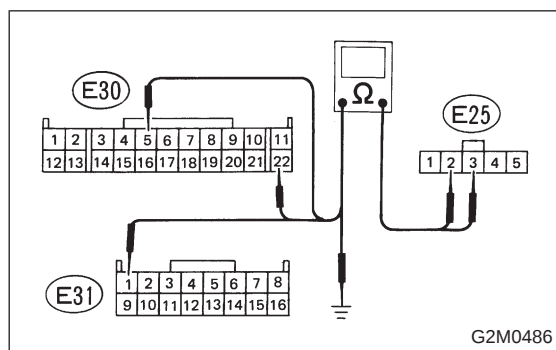
(E31) No. 1 — Body/0 V



2. 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.

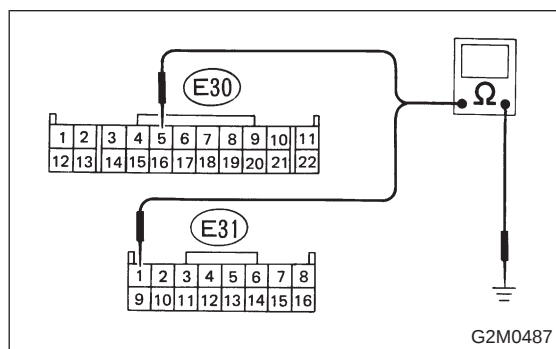
Connector & terminal /Specified voltage:
(E25) No. 1 — Body/10 — 13 V



3. 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.

Connector & terminal /Specified resistance:
(E30) No. 5 — (E25) No. 2 /10 Ω, max.
(E30) No. 22 — (E25) No. 3 /10 Ω, max.
(E25) No. 3 — Body /10 Ω, max.



- 4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

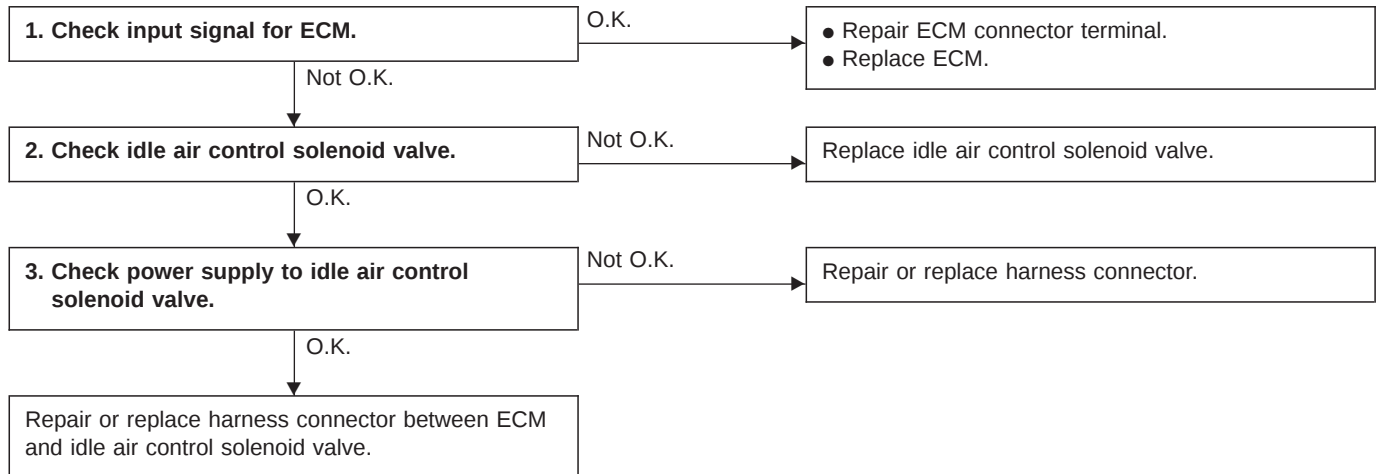
Connector & terminal /Specified resistance:
(E30) No. 5 — Body/1 MΩ, min.
(E31) No. 1 — Body/1 MΩ, min.

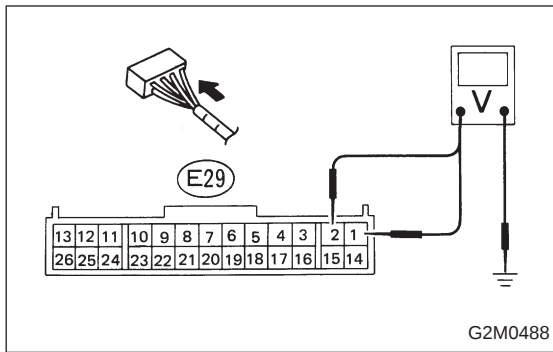
H: TROUBLE CODE (24)**— IDLE AIR CONTROL SOLENOID VALVE —****DIAGNOSIS:**

- The idle air control solenoid valve is not in function.
- The harness connector between ECM and idle air control solenoid valve is in short or open.

TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Engine breathing



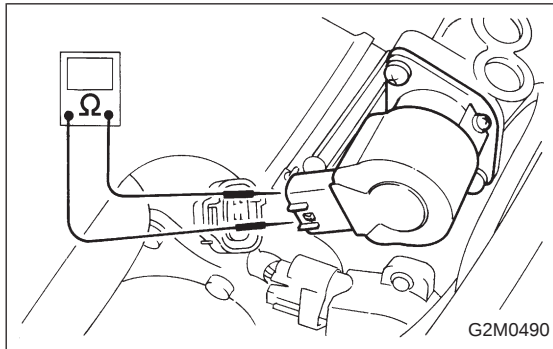
**1. CHECK INPUT SIGNAL FOR ECM.**

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

Connector & terminal /Specified voltage:

(E29) No. 2 — Body/0 V → 13 V

(E29) No. 1 — Body/13 V → 0 V

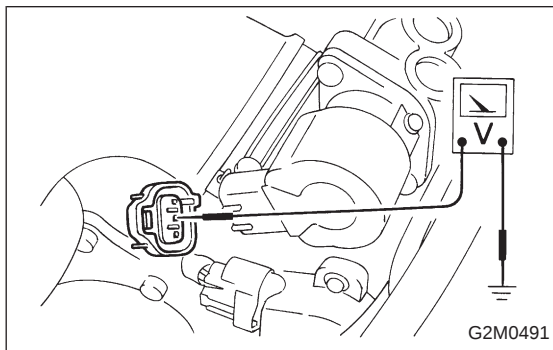
**2. CHECK IDLE AIR CONTROL SOLENOID VALVE.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from idle air control solenoid valve.
- 3) Measure resistance between solenoid valve terminals.

Terminals /Specified resistance:

No. 1 — No. 2/32 Ω

No. 2 — No. 3/32 Ω

**3. CHECK POWER SUPPLY TO IDLE AIR CONTROL SOLENOID VALVE.**

- 1) Turn ignition switch to ON.
- 2) Measure voltage between idle air control solenoid valve and body.

Connector & terminal /Specified voltage:

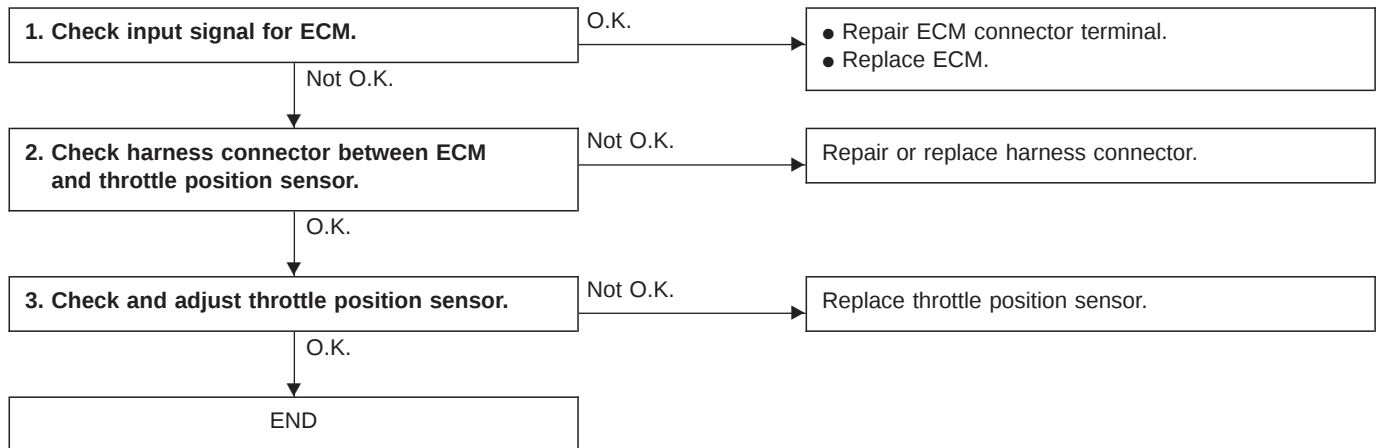
(E11) No. 2 — Body/10 V, min.

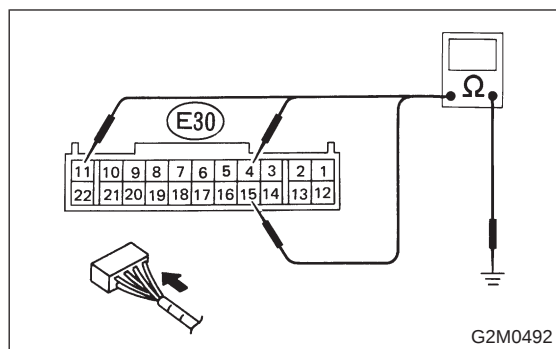
I: TROUBLE CODE (31)
— THROTTLE POSITION SENSOR —**DIAGNOSIS:**

- The throttle position sensor signal is abnormal.
- The throttle position sensor is installed abnormally.
- The harness connector between ECM and throttle position sensor is in short or open.

TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

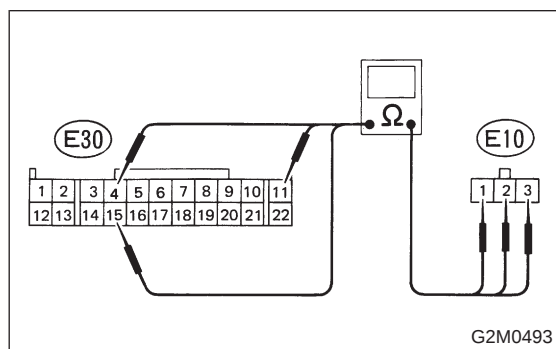


**1. CHECK INPUT SIGNAL FOR ECM.**

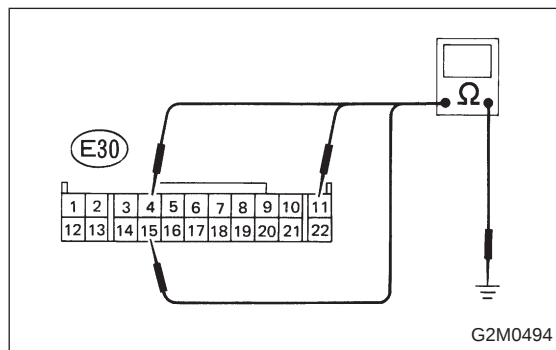
- 1) Turn ignition switch to ON.
- 2) Measure signal voltage between ECM and body while throttle valve is fully closed.

Connector & terminal /Specified voltage:**(E30) No. 15 — Body/4.4 — 5.5 V****(E30) No. 4 — Body /0.4 — 0.5 V****(E30) No. 11 — Body/0 V**

- 3) Measure signal voltage between ECM and body while throttle valve is fully opened.

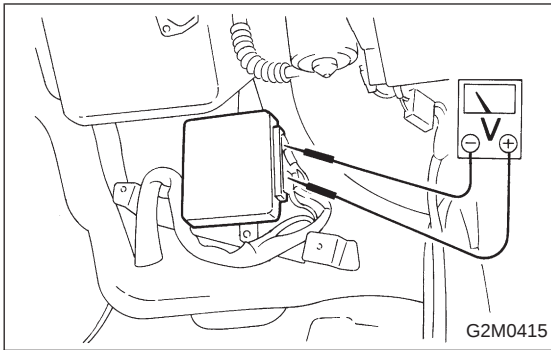
Connector & terminal /Specified voltage:**(E30) No. 15 — Body/4.4 — 5.5 V****(E30) No. 4 — Body /3.5 — 4.3 V****(E30) No. 11 — Body/0 V****2. CHECK HARNESS CONNECTOR BETWEEN ECM AND THROTTLE POSITION SENSOR.**

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

Connector & terminal /Specified resistance:**(E30) No. 15 — (E10) No. 1/10 Ω, max.****(E30) No. 4 — (E10) No. 2 /10 Ω, max.****(E30) No. 11 — (E10) No. 3/10 Ω, max.**

- 4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal /Specified resistance:**(E30) No. 15 — Body/1 MΩ, min.****(E30) No. 4 — Body /1 MΩ, min.****(E30) No. 11 — Body/1 MΩ, min.**



3. CHECK AND ADJUST THROTTLE POSITION SENSOR.

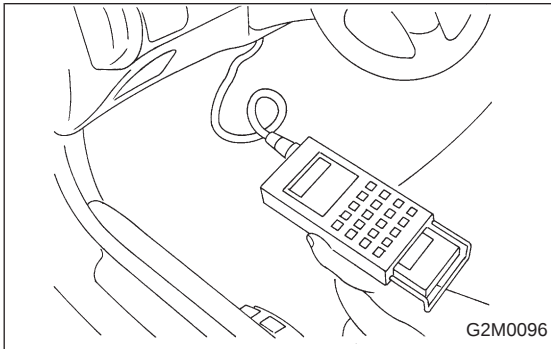
- 1) Connect all connectors.
- 2) Loosen throttle position sensor installing screws.
- 3) Adjust throttle position sensor while throttle valve is fully closed.

- Using voltage meter:

- (1) Turn ignition switch to ON.
- (2) Adjust throttle position sensor to specified voltage between ECM connector terminals.

Connector & terminal / **Specified voltage:**
(E30) No. 15 — (E30) No. 4/0.45 — 0.55 V

- (3) Tighten throttle position sensor installing screws.



- Using select monitor:

- (1) Attach select monitor.
- (2) Turn ignition switch to ON.
- (3) Select mode "F10".
- (4) Adjust throttle position sensor to specified data.

Conditions / **Specified data:**
Throttle valve fully closed/0.50 V

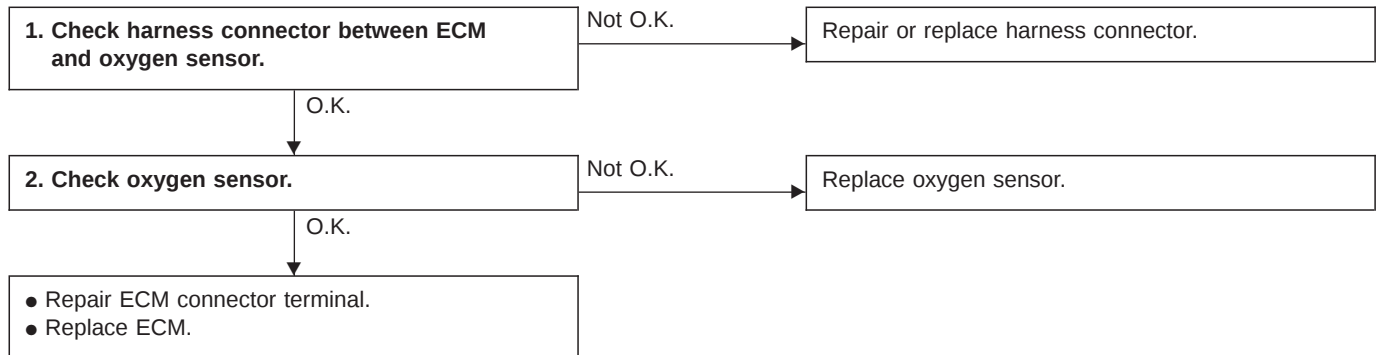
- (5) Tighten throttle position sensor installing screws.

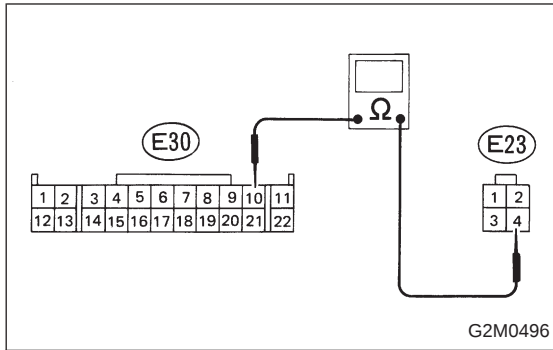
J: TROUBLE CODE (32)**— OXYGEN SENSOR —****DIAGNOSIS:**

- The oxygen sensor is not in function.
- The harness connector between ECM and oxygen sensor is in short or open.

TROUBLE SYMPTOM:

- Failure of engine to start
- Erroneous idling
- Poor driving performance
- Engine stalls.
- Idle mixture is out of specifications.

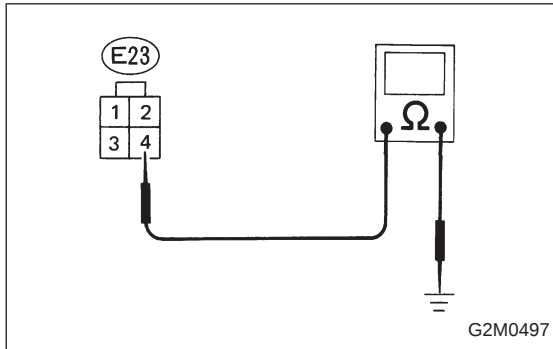




1. CHECK HARNESS CONNECTOR BETWEEN ECM AND OXYGEN SENSOR.

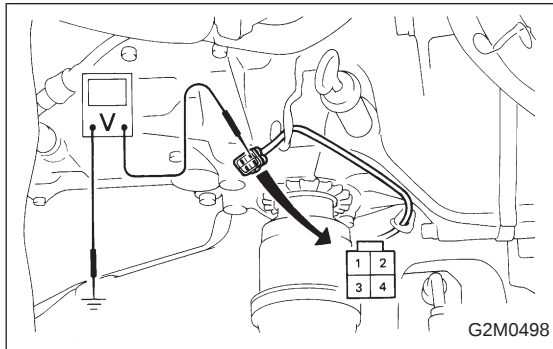
- 1) Disconnect connectors from ECM and oxygen sensor.
- 2) Measure resistance of harness connector between ECM and oxygen sensor.

Connector & terminal /Specified resistance:
(E30) No. 10 — (E23) No. 4/0 Ω



- 3) Measure resistance of harness connector between oxygen sensor and body to make sure that circuit does not short.

Connector & terminal /Specified resistance:
(E23) No. 4 — Body /1 M Ω , min.



2. CHECK OXYGEN SENSOR.

- 1) Idle engine.
- 2) Disconnect oxygen sensor connector.
- 3) Measure voltage between oxygen sensor terminal and body.

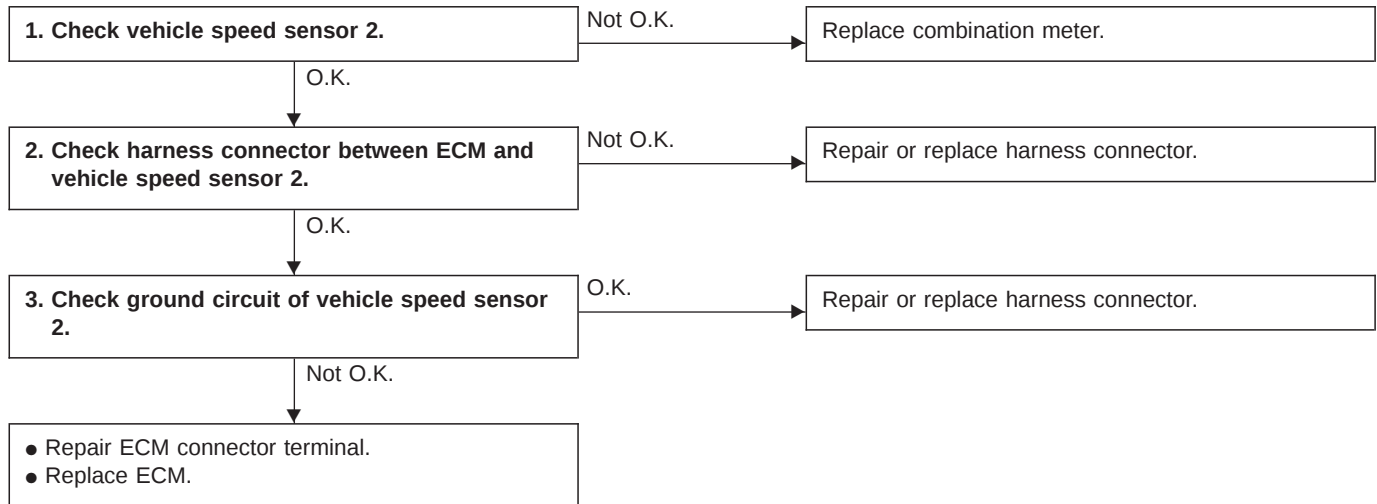
Connector & terminal/Specified voltage:
No. 4 — Body /0.1 — 1.0 V

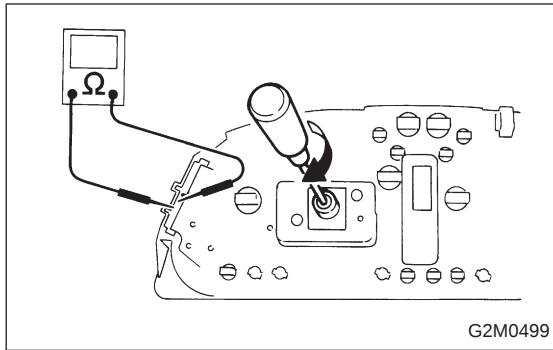
K: TROUBLE CODE (33)
— VEHICLE SPEED SENSOR 2 —**DIAGNOSIS:**

- The vehicle speed sensor 2 is not in function.
- The harness connector between ECM and vehicle speed sensor 2 is in short or open.

TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

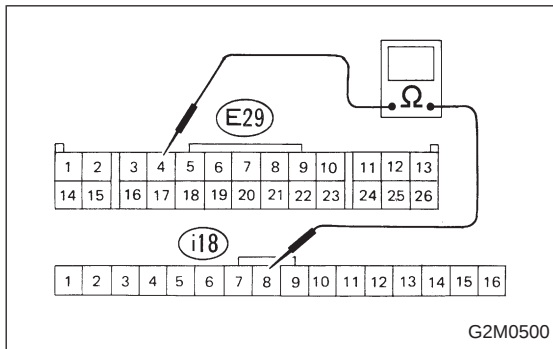




1. CHECK VEHICLE SPEED SENSOR 2.

- 1) Remove combination meter.
- 2) Measure resistance between connector terminals of combination meter by rotating rotor of speedometer cable hole with screwdriver.

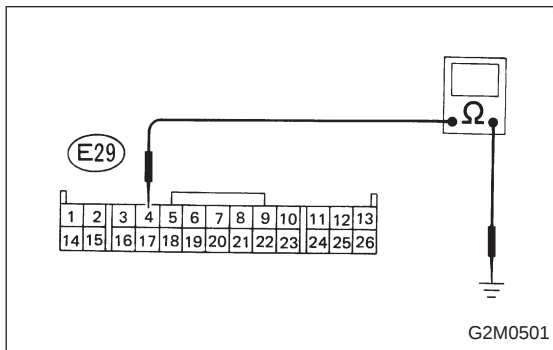
Terminals **/Specified resistance:**
No. 11 — No. 8/10 Ω, max. ↔ 1 MΩ, min.
(Four times per rotation)



2. CHECK HARNESS CONNECTOR BETWEEN ECM AND VEHICLE SPEED SENSOR 2.

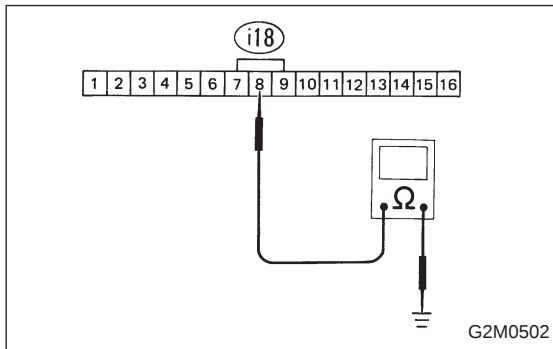
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ECM.
- 3) Measure resistance of harness connector between ECM and combination meter.

Connector & terminal **/Specified resistance:**
(E29) No. 4 — (i18) No. 8/10 Ω, max.



- 4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal **/Specified resistance:**
(E29) No. 4 — Body /1 MΩ, min.



3. CHECK GROUND CIRCUIT OF VEHICLE SPEED SENSOR 2.

Measure resistance between combination meter and body.

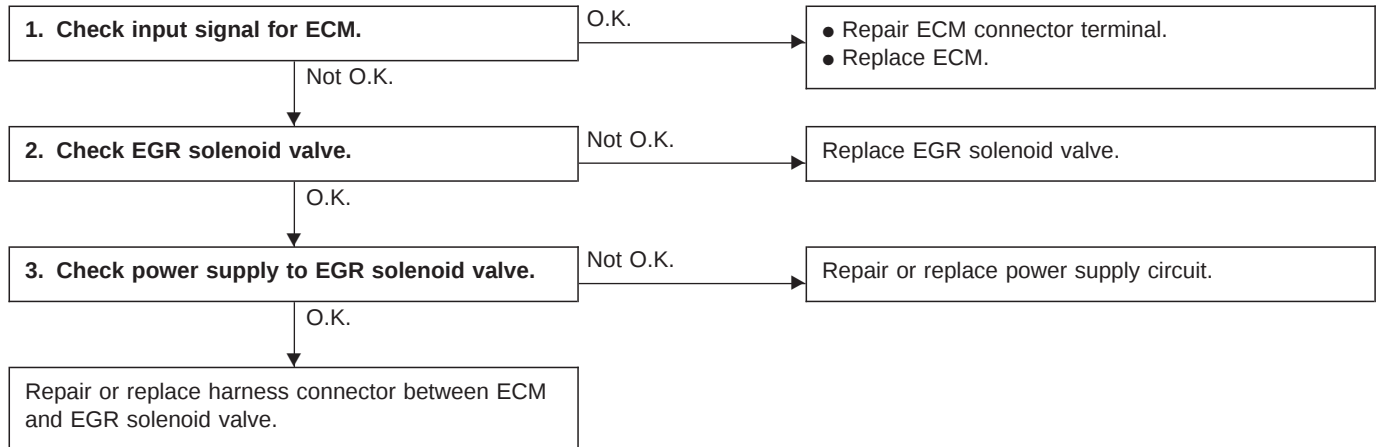
Connector & terminal **/Specified resistance:**
(i18) No. 8 — Body / 1 MΩ, min.

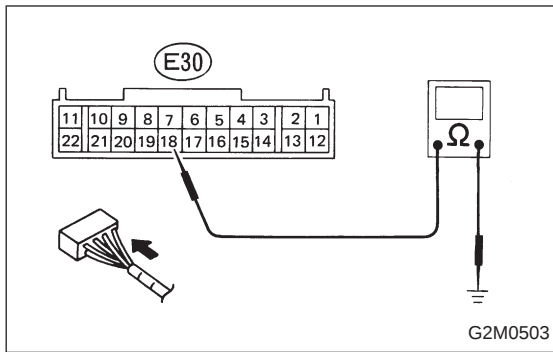
L: TROUBLE CODE (34)
— EGR SOLENOID VALVE —**DIAGNOSIS:**

- The EGR solenoid valve is not in function.
- The harness connector between ECM and EGR solenoid valve is in short or open.

TROUBLE SYMPTOM:

- Poor driving performance on low engine speed



**1. CHECK INPUT SIGNAL FOR ECM.**

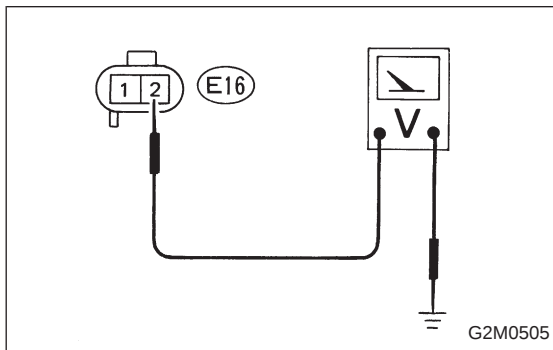
- 1) Turn ignition switch to ON.
- 2) Measure signal voltage between ECM and body.

Connector & terminal /Specified voltage:
(E30) No. 18 — Body/10 V, max.

2. CHECK EGR SOLENOID VALVE.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from EGR solenoid valve.
- 3) Measure resistance between connector terminals of EGR solenoid valve.

Terminals /Specified resistance:
No. 1 — No. 2/36 Ω at 20°C (68°F)

**3. CHECK POWER SUPPLY TO EGR SOLENOID VALVE.**

- 1) Turn ignition switch to ON.
- 2) Measure voltage between EGR solenoid valve connector and body.

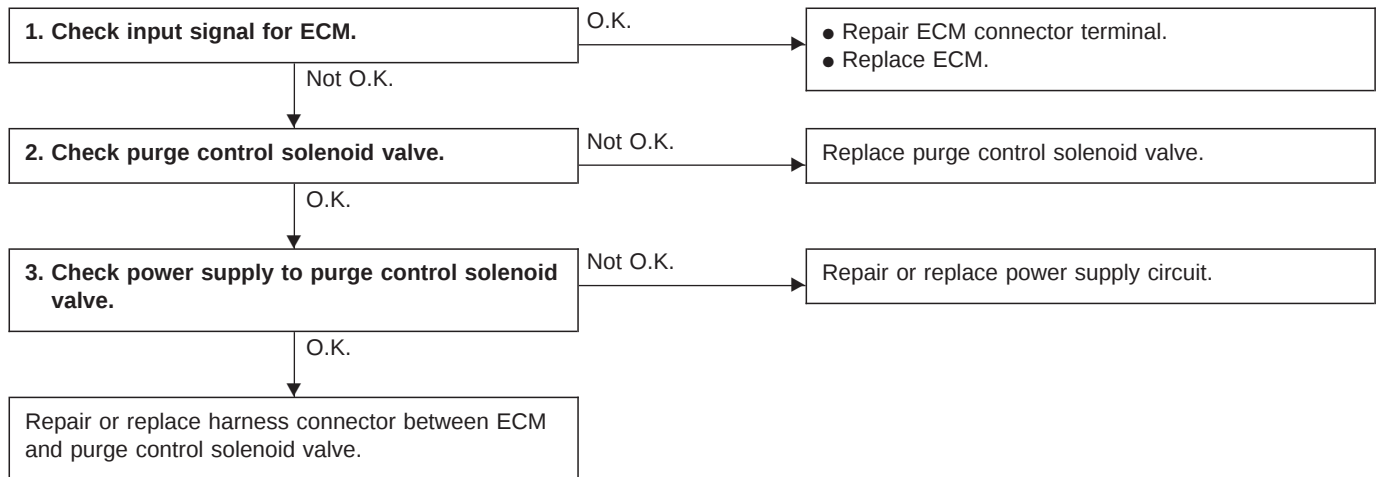
Connector & terminal /Specified voltage:
(E16) No. 2 — Body/10 V, max.

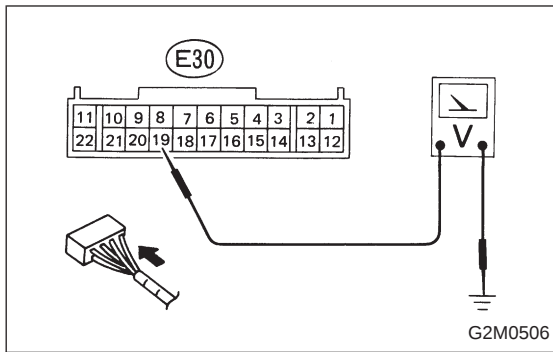
M: TROUBLE CODE (35)**— PURGE CONTROL SOLENOID VALVE —****DIAGNOSIS:**

- The purge control solenoid valve is not in function.
- The harness connector between ECM and purge control solenoid valve is in short or open.

TROUBLE SYMPTOM:

- Erroneous idling



**1. CHECK INPUT SIGNAL FOR ECM.**

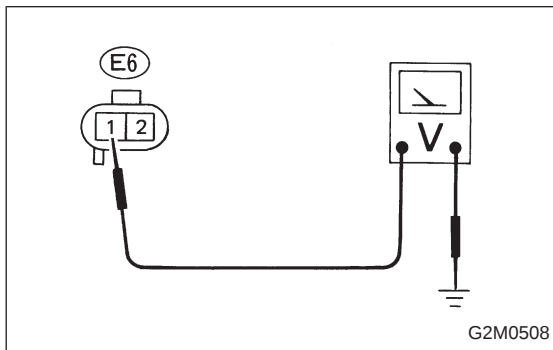
- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM connector terminal and body.

Connector & terminal /Specified voltage:
(E30) No. 19 — Body/10 — 13 V

2. CHECK PURGE CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to OFF.
- 2) Remove purge control solenoid valve.
- 3) Measure resistance between solenoid valve terminals.

Terminals/Specified resistance:
No. 1 — No. 2/36 Ω [at 20°C (68°F)]

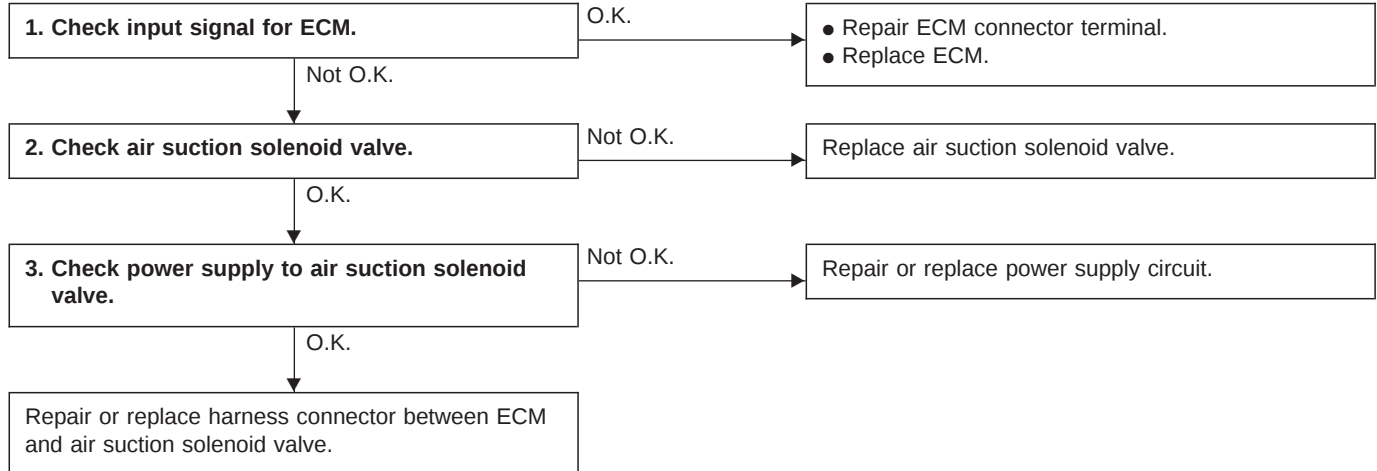
**3. CHECK POWER SUPPLY TO PURGE CONTROL SOLENOID VALVE.**

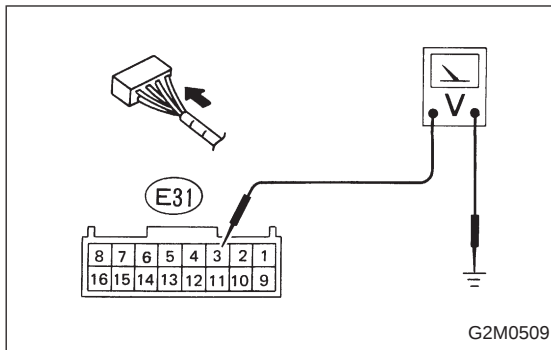
- 1) Turn ignition switch to ON.
- 2) Measure voltage between purge control solenoid valve connector and body.

Connector & terminal /Specified voltage:
(E6) No. 1 — Body/10 V, min.

N: TROUBLE CODE (36)
— AIR SUCTION SOLENOID VALVE —
DIAGNOSIS:

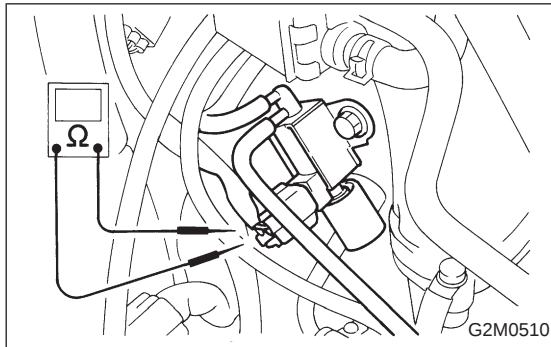
- The air suction solenoid valve is not in function.
- The harness connector between ECM and air suction solenoid valve is in short or open.



**1. CHECK INPUT SIGNAL FOR ECM.**

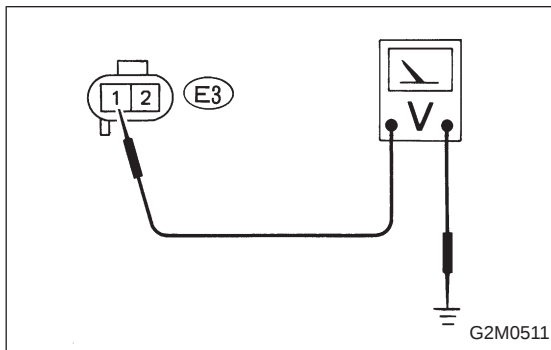
- 1) Turn ignition switch to ON.
- 2) Measure signal voltage between ECM and body.

Connector & terminal /Specified voltage:
(E31) No. 3 — Body/10 V, max.

**2. CHECK AIR SUCTION SOLENOID VALVE.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from air suction solenoid valve.
- 3) Measure resistance between connector terminals of air suction solenoid valve.

Terminals /Specified resistance:
No. 1 — No. 2/36 Ω at 20°C (68°F)

**3. CHECK POWER SUPPLY TO AIR SUCTION SOLENOID VALVE.**

- 1) Turn ignition switch to ON.
- 2) Measure voltage between air suction solenoid valve connector and body.

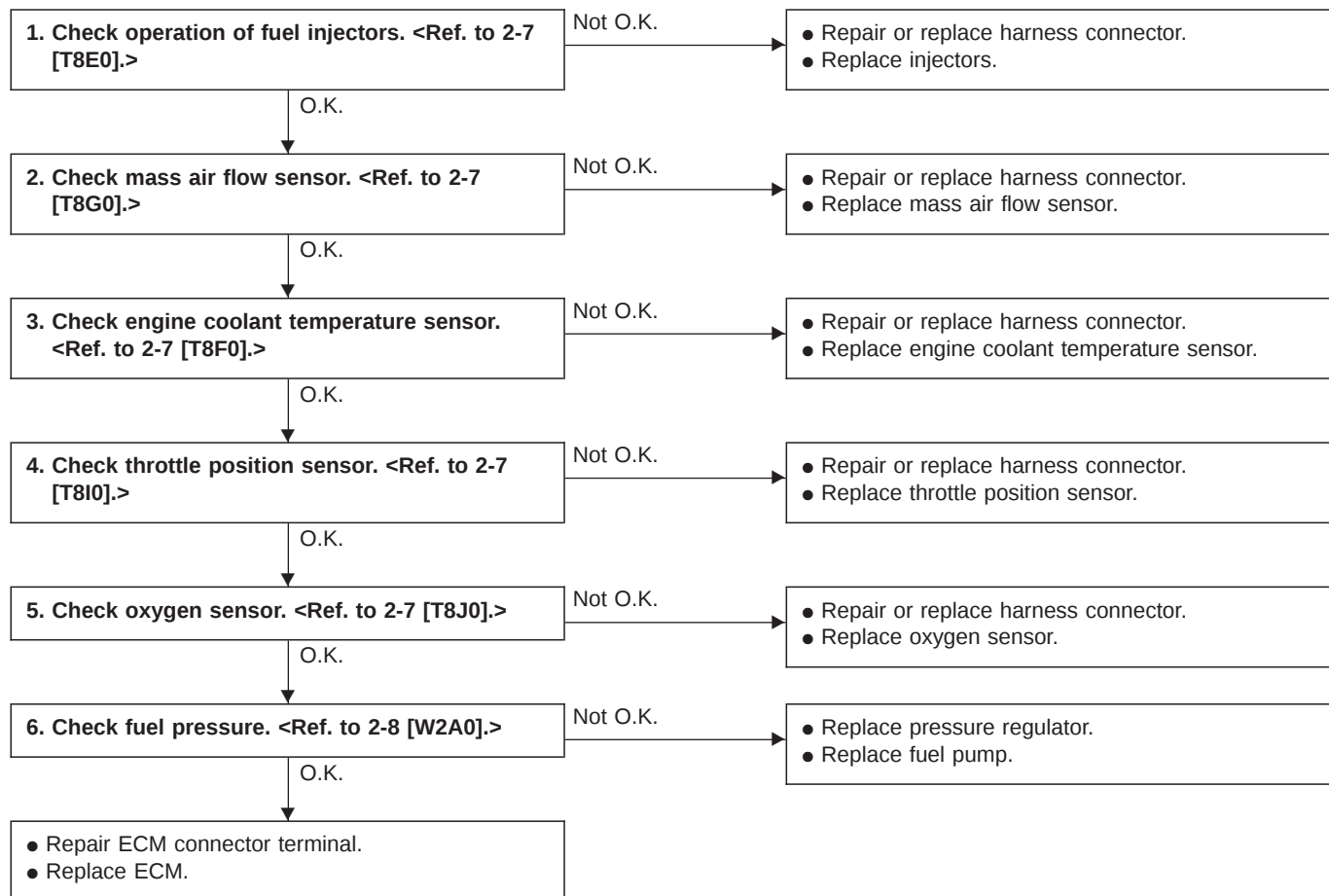
Connector & terminal /Specified voltage:
(E3) No. 1 — Body/10 V, max.

O: TROUBLE CODE (41)**— A/F (AIR/FUEL) LEARNING CONTROL —****DIAGNOSIS:**

- Faulty learning control function

TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.

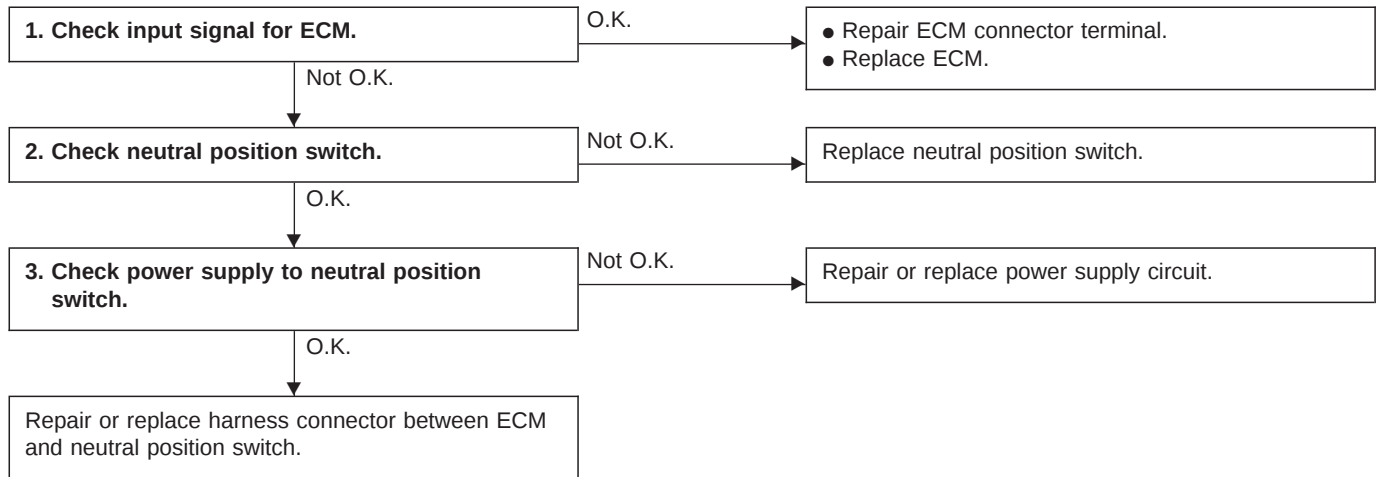


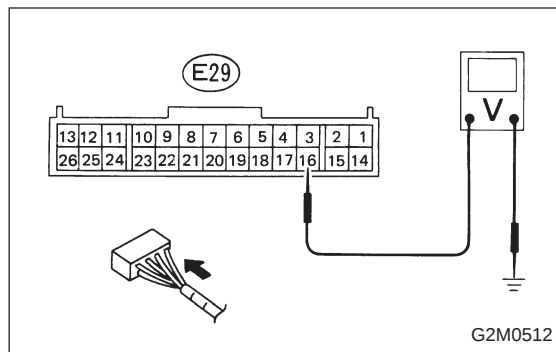
P: TROUBLE CODE (51)**— NEUTRAL POSITION SWITCH (MT) —****DIAGNOSIS:**

- The neutral position switch signal is abnormal.
- The harness connector between ECM and neutral position switch is in short or open.

TROUBLE SYMPTOM:

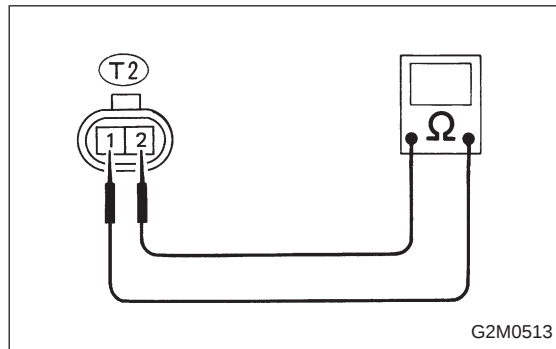
- Erroneous idling



**1. CHECK INPUT SIGNAL FOR ECM.**

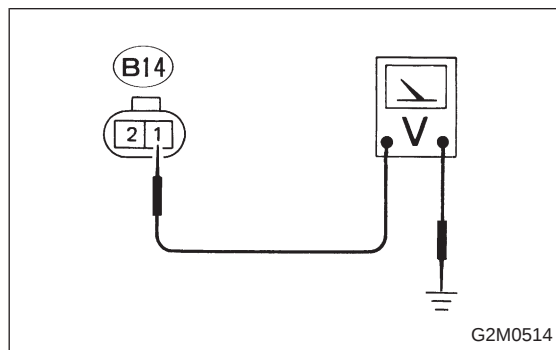
- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM and body.

Connector & terminal /Specified voltage:
(E29) No. 16 — Body/10 — 14 V (Neutral position)
0 V (Other positions)

**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.

Connector & terminal /Specified resistance:
(T2) No. 1 — (T2) No. 2 /1 MΩ, min.
(Neutral position)
10 Ω, max.
(Other positions)

**3. CHECK POWER SUPPLY TO NEUTRAL POSITION SWITCH.**

- 1) Turn ignition switch to ON.
- 2) Measure voltage between neutral position switch connector and body.

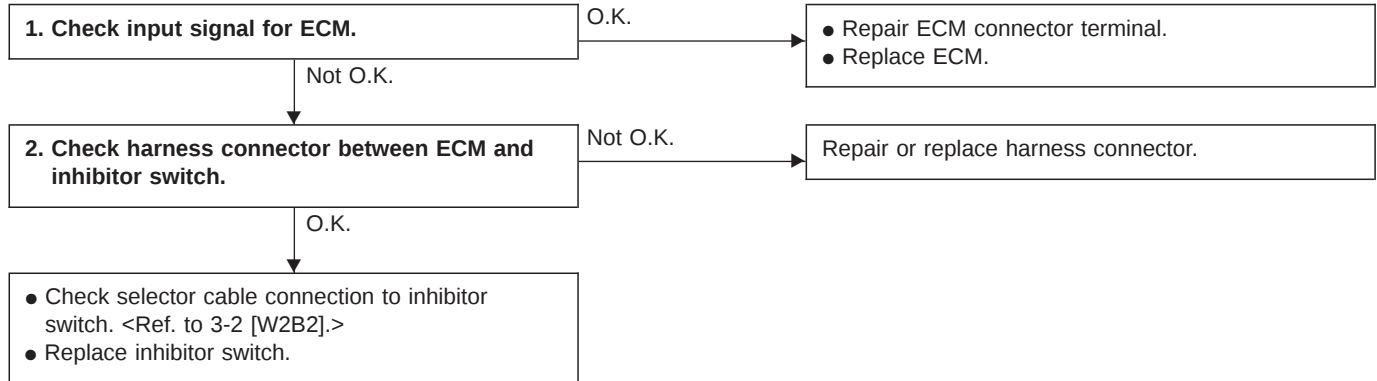
Connector & terminal /Specified voltage:
(B14) No. 1 — Body/10 V, min.

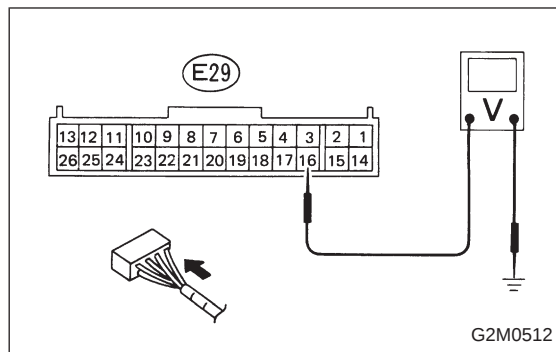
Q: TROUBLE CODE (51)
— INHIBITOR SWITCH (AT) —**DIAGNOSIS:**

- The park/neutral position switch signal is abnormal.
- The shift cable is connected abnormally.
- The harness connector between ECM and inhibitor switch is in short or open.

TROUBLE SYMPTOM:

- Erroneous idling



**1. CHECK INPUT SIGNAL FOR ECM.**

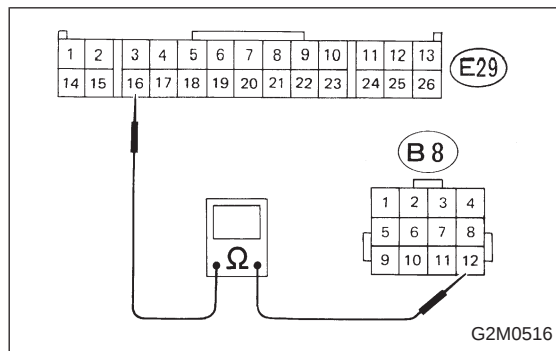
- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM and body.

Connector & terminal /Specified voltage:

(E29) No. 16 — Body/10 — 14 V

("P" or "N" position)

0 V (Other positions)

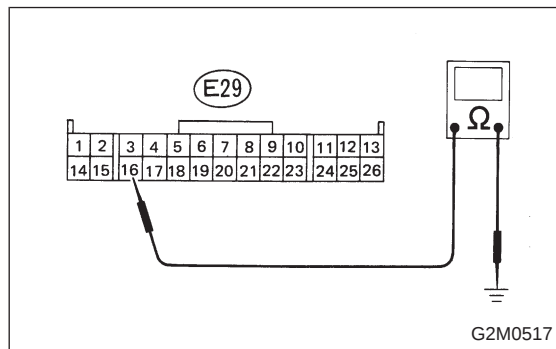
**2. CHECK HARNESS CONNECTOR BETWEEN ECM AND INHIBITOR SWITCH.**

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

Connector & terminal /Specified resistance:

(E29) No. 16 — (B8) No. 1/10 Ω , max.

(E29) No. 16 — (B8) No. 3/10 Ω , max.



- 4) Measure resistance harness connector between ECM and body to make sure that circuit does not short.

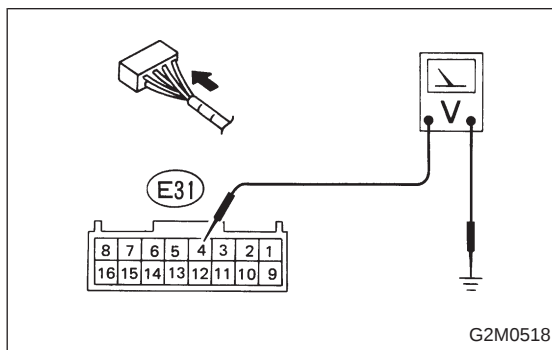
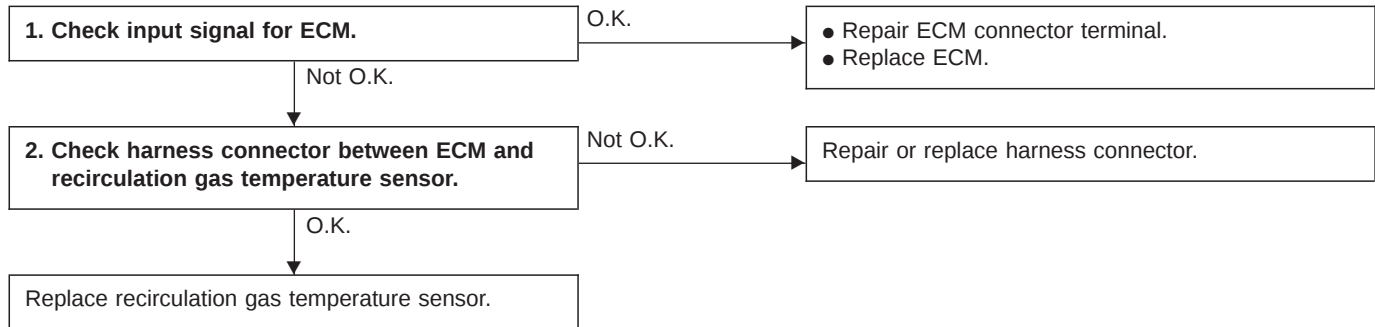
Connector & terminal /Specified resistance:

(E29) No. 16 — Body/1 M Ω , min.

R: TROUBLE CODE (55) — RECIRCULATION GAS TEMPERATURE SENSOR —

DIAGNOSIS:

- The recirculation gas temperature sensor is not in function.
- The harness connector between ECM and recirculation gas temperature sensor is in short or open.



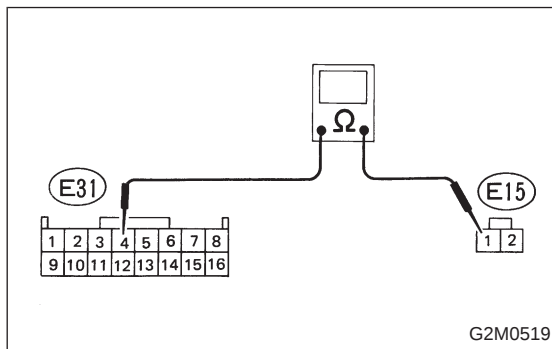
1. CHECK INPUT SIGNAL FOR ECM.

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

Connector & terminal /Specified voltage:

(E31) No. 4 — Body/4 — 4.8 V at 20°C (68°F)

(E31) No. 4 — Body/0.4 — 1.2 V at 100°C (212°F)

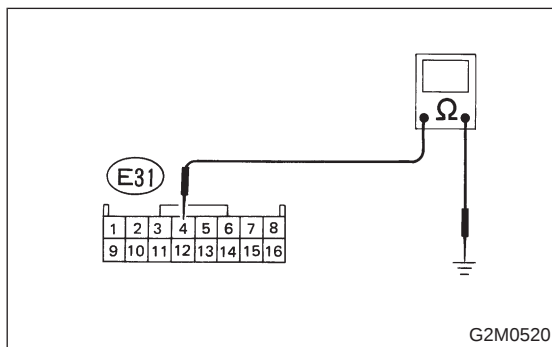


2. CHECK HARNESS CONNECTOR BETWEEN ECM AND RECIRCULATION GAS TEMPERATURE SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from recirculation gas temperature sensor.
- 3) Measure resistance of harness connector between ECM and recirculation gas temperature sensor.

Connector & terminal /Specified resistance:

(E31) No. 4 — (E15) No. 1/10 Ω, max.



- 4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal /Specified resistance:

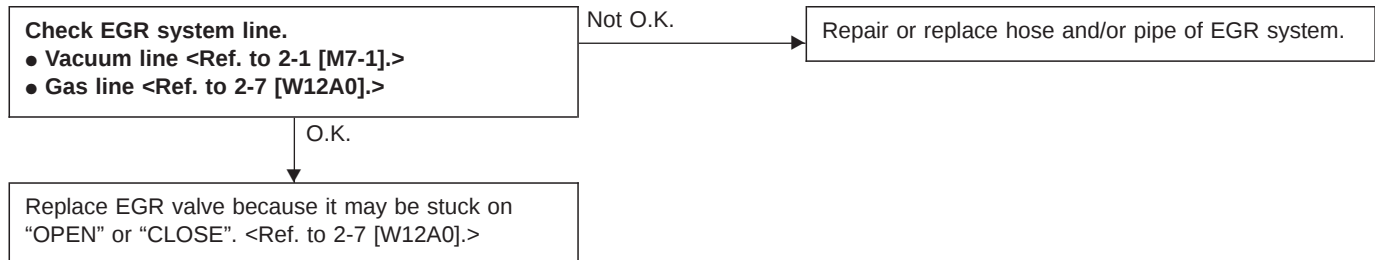
(E31) No. 4 — Body/1 MΩ, max.

S: TROUBLE CODE (56)**— EGR SYSTEM —****DIAGNOSIS:**

- Faulty EGR system function

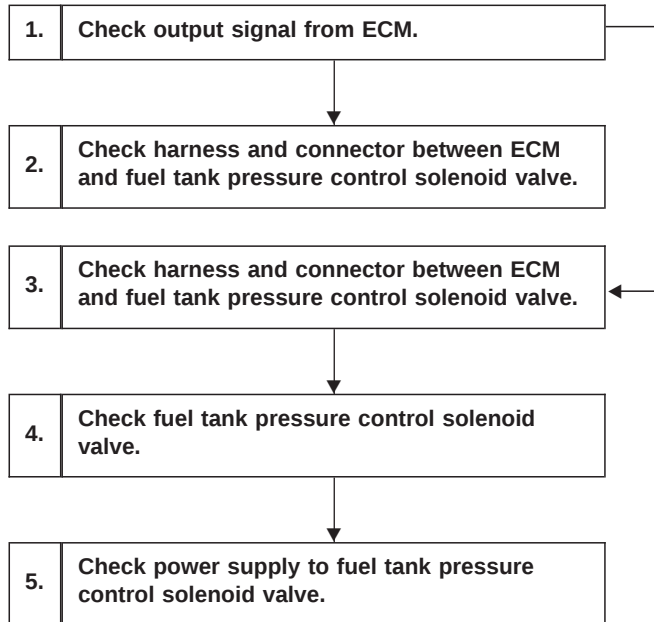
TROUBLE SYMPTOM:

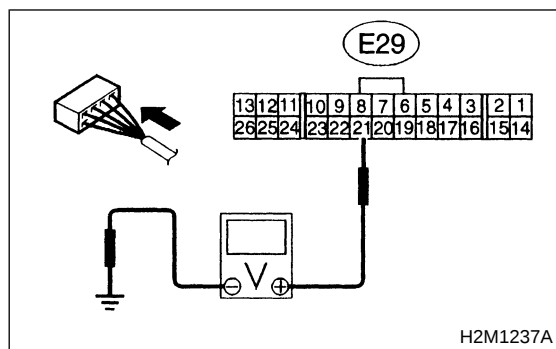
- Poor driving performance on low engine speed



T: TROUBLE CODE (61)**— FUEL TANK PRESSURE CONTROL SOLENOID VALVE —****DIAGNOSIS:**

- The fuel tank pressure control solenoid valve is not in function.
- The harness connector between ECM and fuel tank pressure control solenoid valve is in short or open.



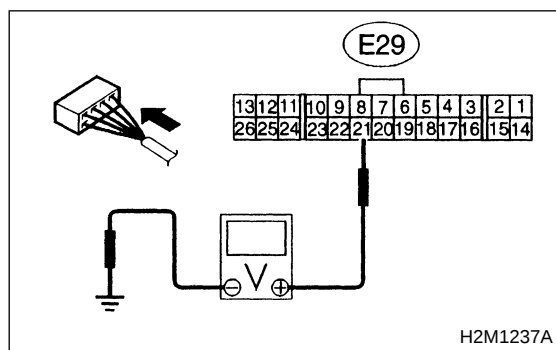
**1. CHECK OUTPUT SIGNAL FROM ECM.**

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

CHECK : **Connector & terminal**
(E29) No. 21 — Body/10 V, or more

YES : Go to step 2.

NO : Go to step 3.

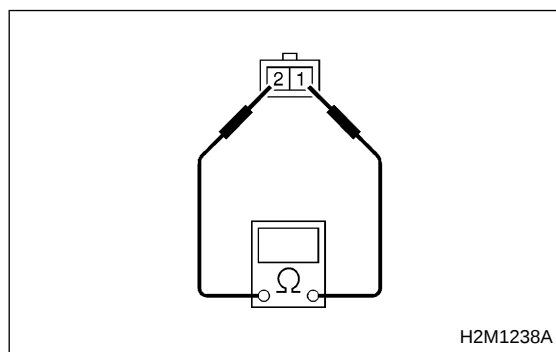
**2. CHECK HARNESS AND CONNECTOR BETWEEN ECM AND FUEL TANK PRESSURE CONTROL SOLENOID VALVE.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from fuel tank pressure control solenoid valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM and body.

CHECK : **Connector & terminal**
(E29) No. 21 — Body/10 V, or more

YES : Repair short circuit of harness between ECM and fuel tank pressure control solenoid valve connector. After repair, replace ECM with a new one.

NO : Go to next step.



- 5) Turn ignition switch to OFF.
- 6) Measure resistance between fuel tank pressure control solenoid valve terminals.

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

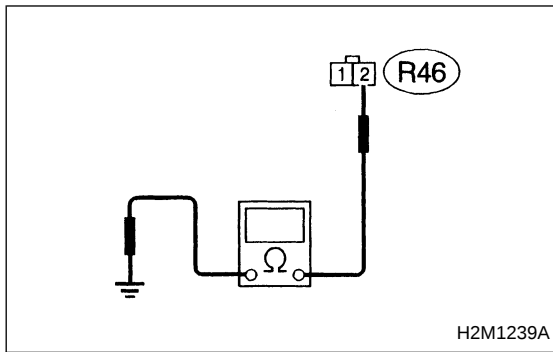
YES : Replace fuel tank pressure control solenoid valve and ECM.

NO : Go to next **CHECK** .

CHECK : **Is there poor contact in ECM connector?**

YES : Repair poor contact in ECM connector.

NO : Replace ECM with a new one.



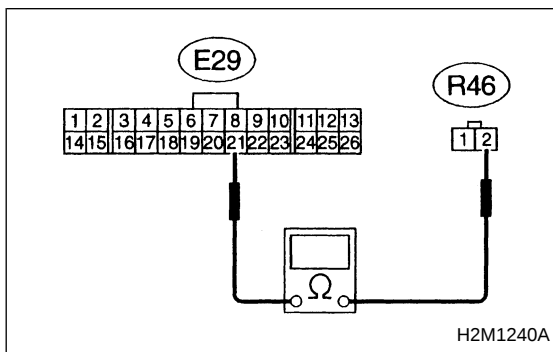
3. CHECK HARNESS AND CONNECTOR BETWEEN ECM AND FUEL TANK PRESSURE CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from fuel tank pressure control solenoid valve and ECM.
- 3) Measure resistance between fuel tank pressure control solenoid valve connector and body.

CHECK : **Connector & terminal**
(R46) No. 2 — Body/10 Ω, or less

YES : Repair short circuit of harness between ECM and fuel tank pressure control solenoid valve connector.

NO : Go to next step.



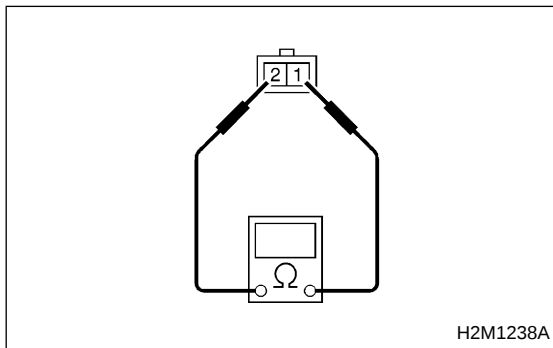
- 4) Measure resistance of harness between ECM and fuel tank pressure control solenoid valve connector.

CHECK : **Connector & terminal**
(E29) No. 21 — (R46) No. 2/1 Ω, or less

YES : Go to step 4.

NO : In this case, repair the following items.

- Open circuit of harness between ECM and fuel tank pressure control solenoid valve connector
- Poor contact in ECM connector
- Poor contact in fuel tank pressure control solenoid valve connector
- Poor contact in coupling connectors (B74, B85 and R45)



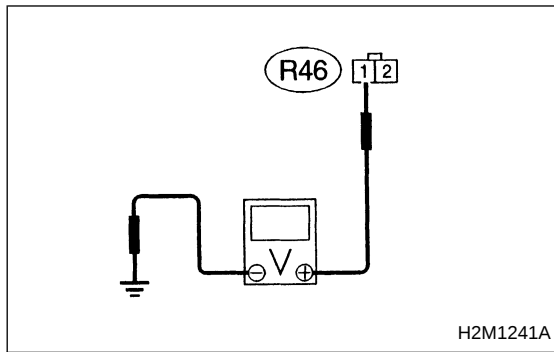
4. CHECK FUEL TANK PRESSURE CONTROL SOLENOID VALVE.

Measure resistance between fuel tank pressure control solenoid valve terminals.

CHECK : **Terminals**
No. 1 — No. 2/10 — 100 Ω

YES : Go to step 5.

NO : Replace fuel tank pressure control solenoid valve with a new one.



5. CHECK POWER SUPPLY TO FUEL TANK PRESSURE CONTROL SOLENOID VALVE.

- 1) Connect connector to ECM.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between fuel tank pressure control solenoid valve connector and body.

CHECK : **Connector & terminal (R46) No. 1 — Body/10 V, or more**

YES : Go to next **CHECK** .

NO : In this case, repair the following items.

- Open circuit of harness between main relay and fuel tank pressure control solenoid valve connector
- Poor contact in main relay connector
- Poor contact in coupling connectors (B85 and R39)

CHECK : **Is there poor contact in fuel tank pressure control solenoid valve connector?**

YES : Repair poor contact in fuel tank pressure control solenoid valve connector.

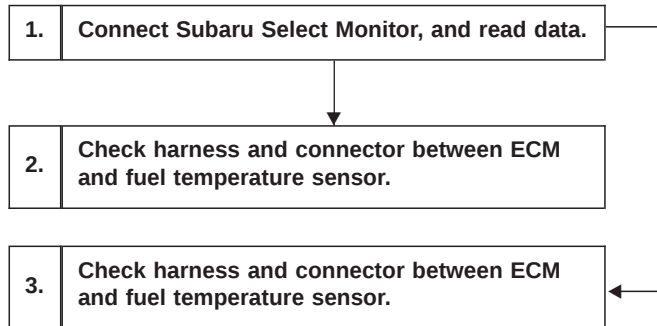
NO : Contact with SOA service.

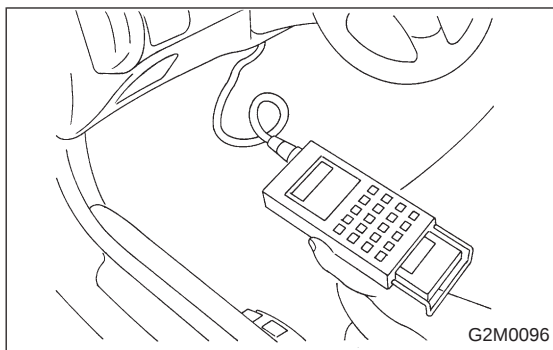
NOTE:

Inspection by DTM is required.

U: TROUBLE CODE (62)
— FUEL TEMPERATURE SENSOR —**DIAGNOSIS:**

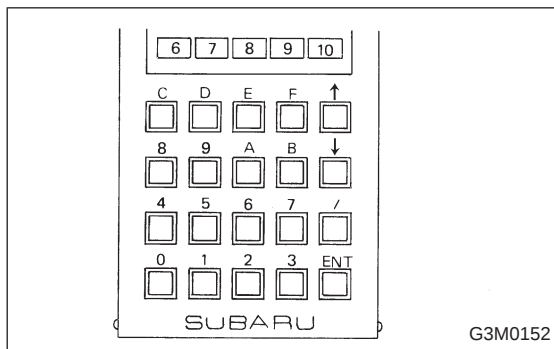
- The fuel temperature sensor signal is abnormal.
- The harness connector between ECM and fuel temperature sensor is in short or open.





1. CONNECT SUBARU SELECT MONITOR, AND READ DATA.

- 1) Turn ignition switch to OFF.
- 2) Connect Subaru Select Monitor to data link connector.



- 3) Turn ignition switch to ON and Subaru Select Monitor switch to ON.
- 4) Start engine.
- 5) Read data on Subaru Select Monitor.

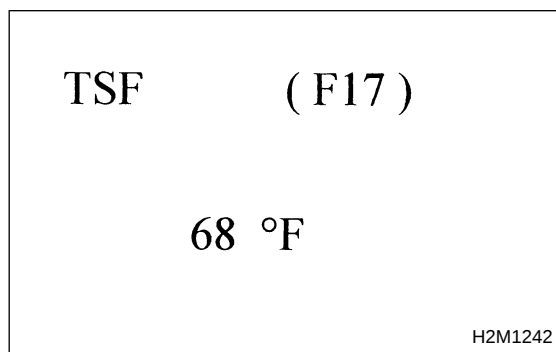
- 5) Read data on Subaru Select Monitor.

● Subaru Select Monitor

Designate mode using function key.

Function mode: F17

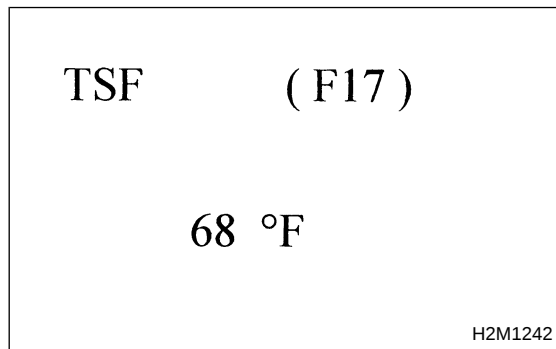
- F17: Fuel temperature is indicated in "°F".



CHECK : Is the value greater than 300°F with function mode F17?

YES : Go to step 2.

NO : Go to next **CHECK** .

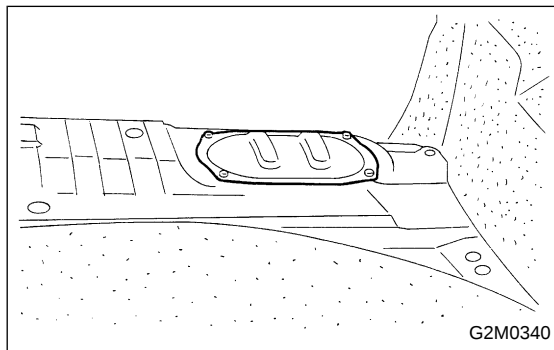


CHECK : Is the value less than -40°F with function mode F17?

YES : Go to step 3.

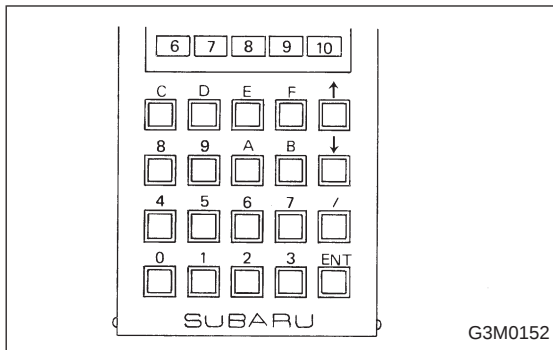
NO : In this case, repair the following items.

- Poor contact in ECM connector
- Poor contact in fuel pump connector
- Poor contact in coupling connectors (B74, B84, B85 and R45)



2. CHECK HARNESS AND CONNECTOR BETWEEN ECM AND FUEL TEMPERATURE SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Remove access hole lid.

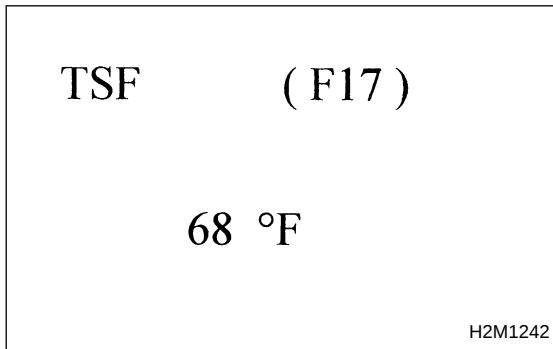


G3M0152

- 3) Disconnect connector from fuel pump.
 - 4) Turn ignition switch to ON and Subaru Select Monitor switch to ON.
 - 5) Read data on Subaru Select Monitor.
- Subaru Select Monitor
- Designate mode using function key.

Function mode: F17

- F17: Fuel temperature is indicated in "°F".

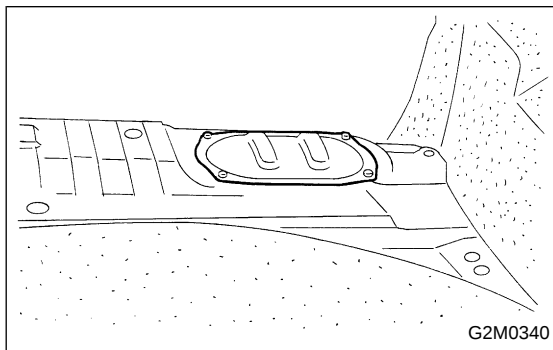


H2M1242

CHECK : Is the value less than -40°F with function mode F17?

YES : Replace fuel temperature sensor.

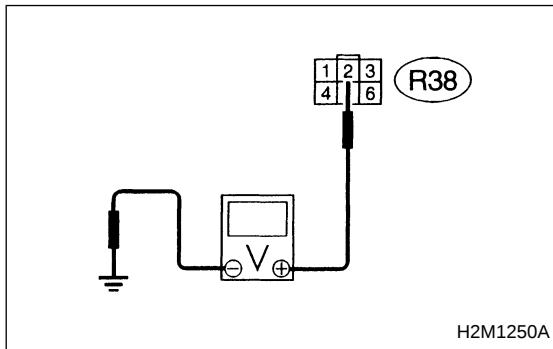
NO : Repair short circuit of harness between ECM and fuel pump connector.



G2M0340

3. CHECK HARNESS AND CONNECTOR BETWEEN ECM AND FUEL TEMPERATURE SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Remove access hole lid.



H2M1250A

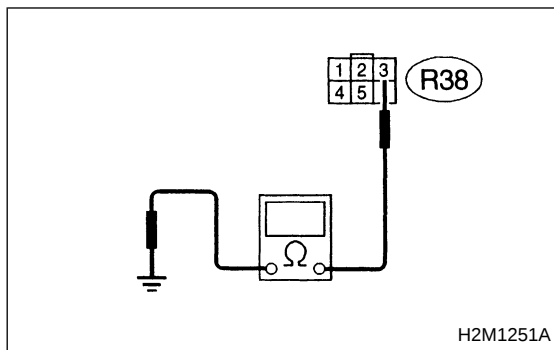
- 3) Disconnect connector from fuel pump.
- 4) Turn ignition switch to ON.
- 5) Measure voltage between fuel pump connector and body.

CHECK : Connector & terminal (R38) No. 2 — Body/4 V, or more

YES : Go to next step.

NO : In this case, repair the following items.

- Repair open circuit of harness between ECM and fuel pump connector.
- Poor contact in ECM connector
- Poor contact in fuel pump connector
- Poor contact in coupling connectors (B74, B85 and R45)



6) Turn ignition switch to OFF.

7) Measure resistance of harness between fuel pump connector and body.

CHECK : **Connector & terminal**
(R38) No. 3 — Body/5 Ω , or less

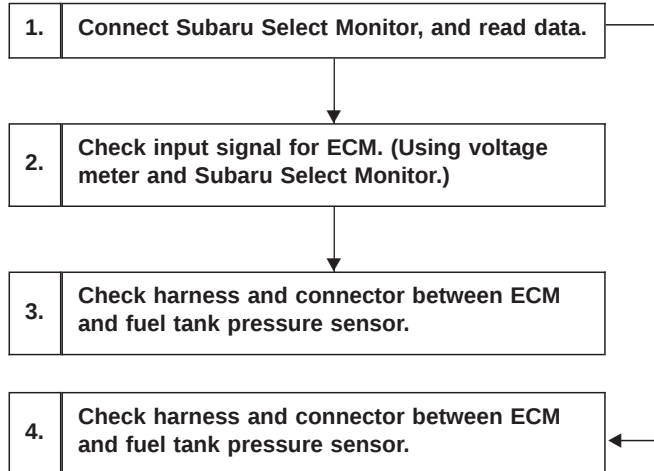
YES : Replace fuel temperature sensor.

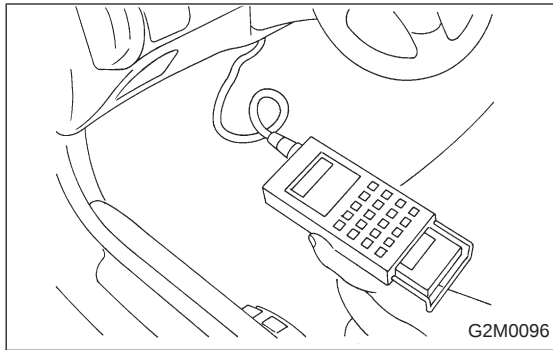
NO : In this case, repair the following items.

- Repair open circuit of harness between ECM and fuel pump connector.
- Poor contact in ECM connector
- Poor contact in fuel pump connector
- Poor contact in coupling connectors (B74, B84 and R45)

V: TROUBLE CODE (63)**— FUEL TANK PRESSURE SENSOR —****DIAGNOSIS:**

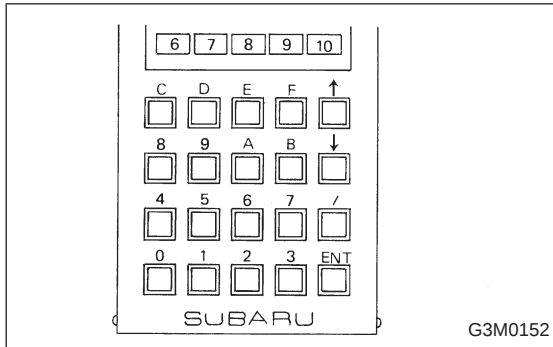
- The fuel tank pressure sensor signal is abnormal.
- The harness connector between ECM and fuel tank pressure sensor is in short or open.





1. CONNECT SUBARU SELECT MONITOR, AND READ DATA.

- 1) Turn ignition switch to OFF.
- 2) Remove fuel filler cap.
- 3) Install fuel filler cap.
- 4) Connect Subaru Select Monitor to data link connector.

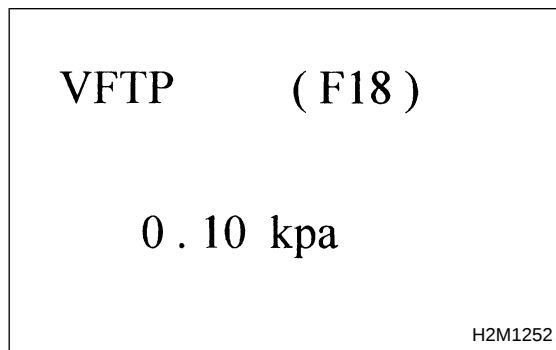


- 5) Turn ignition switch to ON and Subaru Select Monitor switch to ON.
- 6) Read data on Subaru Select Monitor.

● Subaru Select Monitor
Designate mode using function key.

Function mode: F18

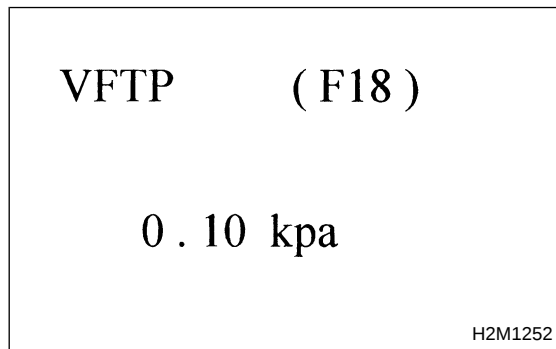
- F18: Fuel tank pressure sensor output signal is indicated.



CHECK : *Is the value less than -7.2 kPa?*

YES : Go to step 2.

NO : Go to next **CHECK** .

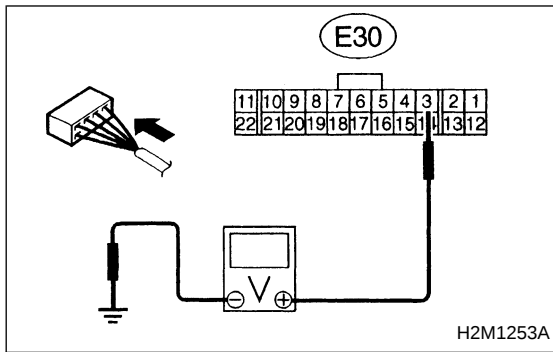


CHECK : *Is the value more than 7.2 kPa?*

YES : Go to step 4.

NO : In this case, repair the following items.

- Open circuit of harness between ECM and fuel tank pressure sensor connector
- Poor contact in ECM connector
- Poor contact in fuel tank pressure sensor connector
- Poor contact in coupling connectors (B74, B84 and B85)



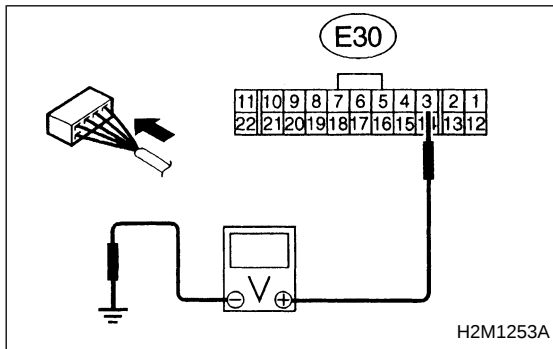
2. CHECK INPUT SIGNAL FOR ECM. (USING VOLTAGE METER AND SUBARU SELECT MONITOR.)

1) Measure voltage between ECM connector and body.

CHECK : **Connector & terminal (E30) No. 3 — Body/4.5 V, or more**

YES : Go to next step.

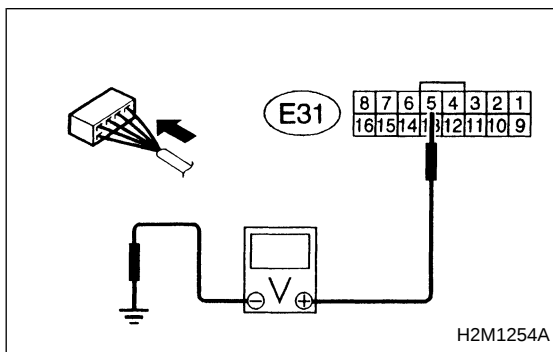
NO : Go to next **CHECK** .



CHECK : **Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?**

YES : Repair poor contact in ECM connector.

NO : Replace ECM with a new one.

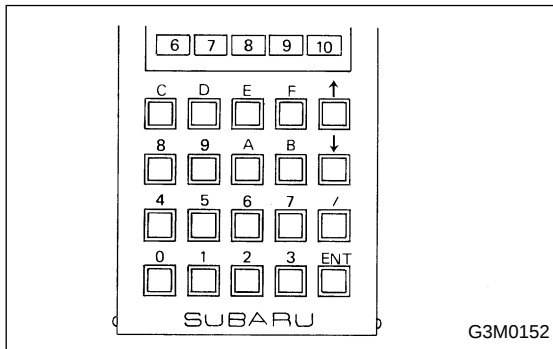


2) Measure voltage between ECM connector and body.

CHECK : **Connector & terminal (E31) No. 5 — Body/0.2 V, or less**

YES : Go to step 3.

NO : Go to next step.



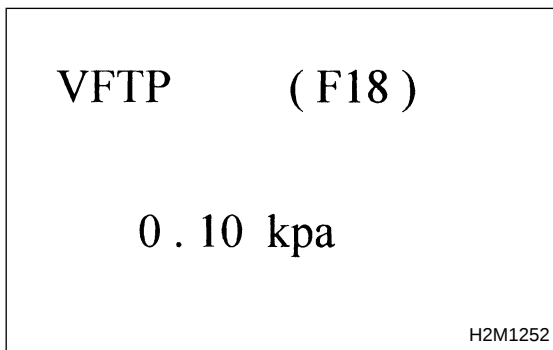
3) Read data on Subaru Select Monitor.

● Subaru Select Monitor

Designate mode using function key.

Function mode: F18

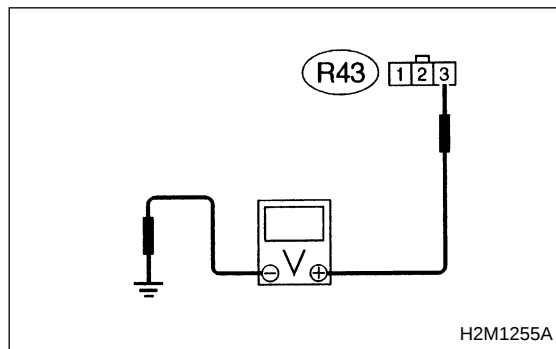
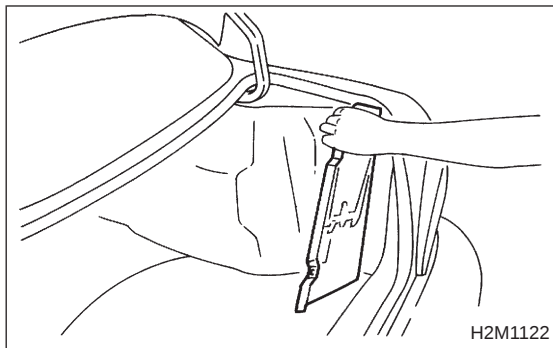
● F18: Fuel tank pressure sensor output signal is indicated.



CHECK : **Does the value change more than -7.2 kPa by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?**

YES : Repair poor contact in ECM connector.

NO : Go to step 3.



3. CHECK HARNESS AND CONNECTOR BETWEEN ECM AND FUEL TANK PRESSURE SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Remove right side rear quarter trim.

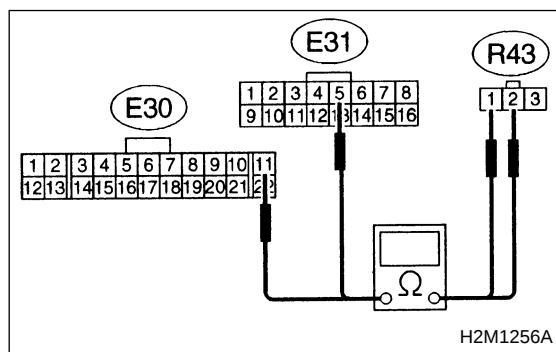
- 3) Disconnect connector from fuel tank pressure sensor.
- 4) Turn ignition switch to ON.
- 5) Measure voltage between fuel tank pressure sensor connector and body.

CHECK : **Connector & terminal**
(R43) No. 3 — Body/4.5 V, or more

YES : Go to next **CHECK** .

NO : In this case, repair the following items.

- Open circuit of harness between ECM and fuel tank pressure sensor connector
- Poor contact in ECM connector
- Poor contact in fuel tank pressure sensor connector
- Poor contact in coupling connectors (B74 and B85)



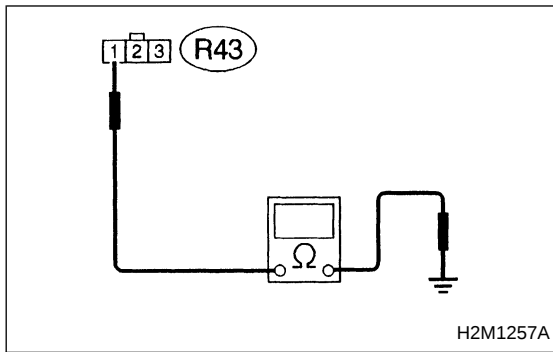
- 6) Turn ignition switch to OFF.
- 7) Disconnect connector from ECM.
- 8) Measure resistance of harness between ECM and fuel tank pressure sensor connector.

CHECK : **Connector & terminal**
(E31) No.5 — (R43) No. 1/1 Ω, or less
(E30) No. 11 — (R43) No. 2/1 Ω, or less

YES : Go to next step.

NO : In this case, repair the following items.

- Open circuit of harness between ECM and fuel tank pressure sensor connector
- Poor contact in ECM connector
- Poor contact in fuel tank pressure sensor connector
- Poor contact in coupling connectors (B74 and B84)



9) Measure resistance between fuel tank pressure sensor connector and body.

CHECK : **Connector & terminal (R43) No. 1 — Body/500 kΩ, or more**

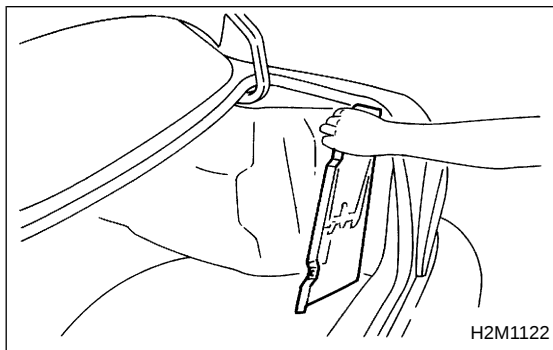
YES : Go to next **CHECK** .

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

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

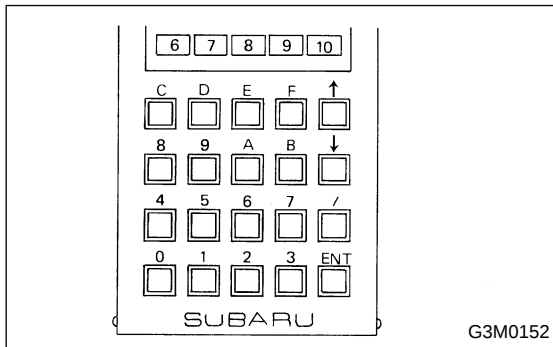
YES : Repair poor contact in fuel tank pressure sensor connector.

NO : Replace fuel tank pressure sensor with a new one.



4. CHECK HARNESS AND CONNECTOR BETWEEN ECM AND FUEL TANK PRESSURE SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Remove right side rear quarter trim.



3) Disconnect connector from fuel tank pressure sensor.

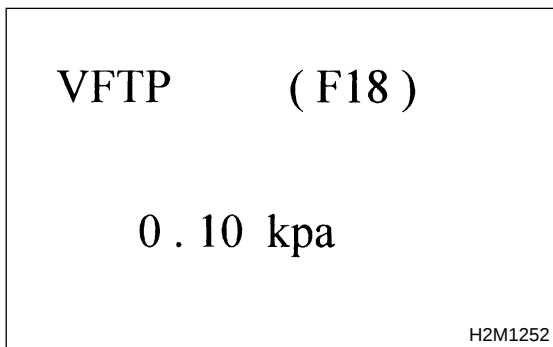
4) Turn ignition switch to ON.

5) Read data on Subaru Select Monitor.

● Subaru Select Monitor
Designate mode using function key.

Function mode: F18

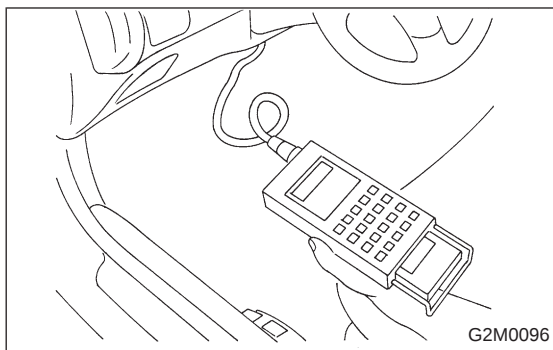
● F18: Fuel tank pressure sensor output signal is indicated.



CHECK : **Is the value more than 7.2 kPa with function mode F18?**

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

NO : Replace fuel tank pressure sensor with a new one.



9. Diagnostics Chart with Select Monitor

A: FUNCTION MODE

Applicable cartridge of select monitor: No. 498345500

Function mode	Contents	Abbreviation	Unit of measure	Page
F00	ROM ID number	YEAR	—	81
F01	Battery voltage	VB	V	81
F02	Vehicle speed signal	VSP	MPH	82
F03	Vehicle speed signal	VSP	km/h	82
F04	Engine speed signal	EREV	rpm	83
F05	Engine coolant temperature signal	TW	deg F	84
F06	Engine coolant temperature signal	TW	deg C	84
F07	Ignition signal	ADVS	deg	84
F08	Mass air flow signal	QA	V	85
F09	Load data	LDATA	—	85
F10	Throttle position signal	THV	V	86
F11	Injector pulse width	TIM	mS	87
F12	Idle air control signal	ISC	%	88
F13	Oxygen sensor output signal	O ₂	V	88
F14	Oxygen sensor MAX. output signal	O ₂ MAX.	V	89
F15	Oxygen sensor MIN. output signal	O ₂ MIN.	V	89
F16	A/F correction coefficient	ALPHA	%	90
F17	Fuel temperature signal	TSF	°F	90
F18	Fuel tank pressure signal	VFTP	kpa	90
F19	Purge control signal	CPCD	%	91
F22	Recirculation gas temperature	EGRT	deg C	91
FA0	ON ↔ OFF signal	—	—	92
FA1	ON ↔ OFF signal	—	—	92
FA2	ON ↔ OFF signal	—	—	93

YEAR	(F00)
1995	
H2M1258	

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.

VB	(F01)
12 V	
G2M0522	

C: MODE F01
— BATTERY VOLTAGE (VB) —

CONDITION:

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

SPECIFIED DATA:

- (1) 10 — 12 V
- (2) 12 — 14 V

- Probable cause (Item outside "specified data")

1. Battery

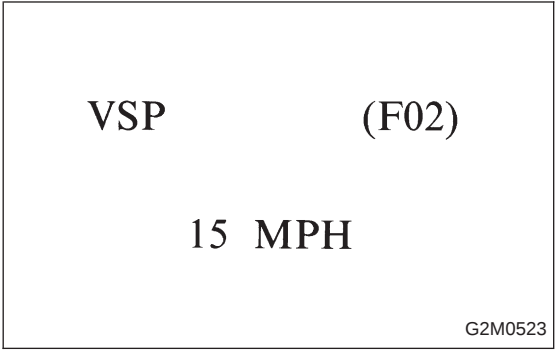
Check battery voltage and electrolyte's specific gravity.

2. Charging system

- Check regulating voltage. (On no-load)
- Check alternator.

3. Power supply line

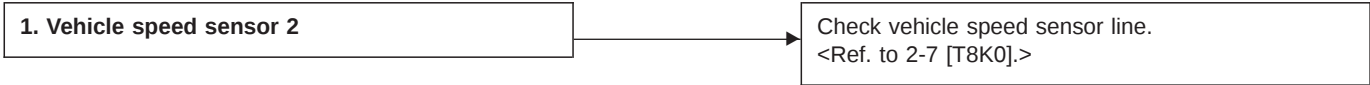
- Check main relay. <Ref. to 2-7 [T7B1].>
- Check harness connector of ECM power supply line. <Ref. to 2-7 [T7B2], [T7B3].>



D: MODE F02 AND F03
— VEHICLE SPEED SIGNAL (VSP) —
CONDITION:
Driving at constant speed.

SPECIFIED DATA:
Compare speedometer with monitor indications.
● F02: Vehicle speed is indicated in mile per hour (MPH).
● F03: Vehicle speed is indicated in kilometer per hour (km/h).

- Probable cause (Item outside “specified data”)



EREV (F04)

1500 rpm

G2M0524

E: MODE F04**— ENGINE SPEED SIGNAL (EREV) —****CONDITION:**

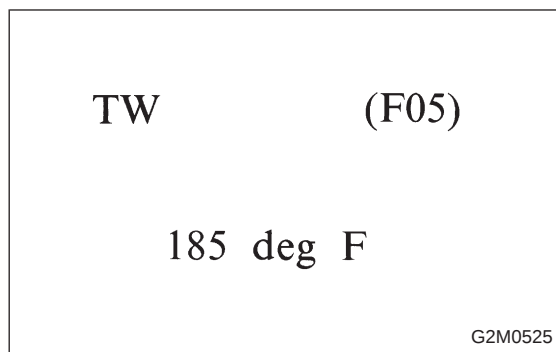
Operate engine at constant speed.

SPECIFIED DATA:

Compare engine speed indicated at tachometer.

- Probable cause (Item outside “specified data”)

1. Camshaft position sensorCheck camshaft position sensor line.
<Ref. to 2-7 [T8D0].>**2. Crankshaft position sensor**Check crankshaft position sensor line.
<Ref. to 2-7 [T8B0].>**3. Engine coolant temperature sensor**Check “MODE F05” or “MODE F06”.
<Ref. to 2-7 [T9F0].>**4. Power steering pressure switch**Check “MODE FA0”.
<Ref. to 2-7 [T9U0].>**5. Throttle position sensor**Check “MODE F10”.
<Ref. to 2-7 [T9J0].>**6. Idle air control solenoid valve**Check “MODE F12”.
<Ref. to 2-7 [T9L0].>**7. FICD solenoid valve (with A/C model)**Check “MODE FA1”.
<Ref. to 2-7 [T9V0].>



F: MODE F05 AND F06 — ENGINE COOLANT TEMPERATURE SIGNAL (TW) —

CONDITION:

Idling after warm-up.

SPECIFIED DATA:

F05: 158 — 194 deg F

F06: 70 — 90 deg C

- F05: Water temperature is indicated in “deg F”.
- F06: Water temperature is indicated in “deg C”.

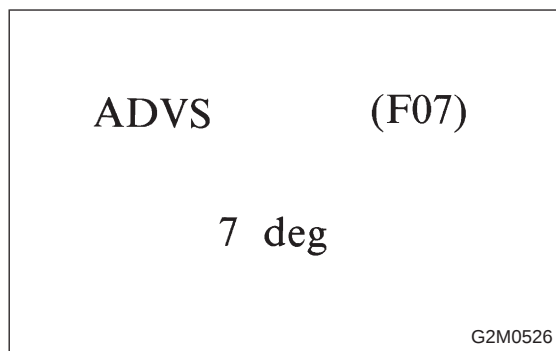
- Probable cause (Item outside “specified data”)

1. Cooling system

- Check coolant level. <Ref. to 1-5 [05A2].>
- Check thermostat. <Ref. to 2-5 [W2B0].>
- Check operation of radiator fan.

2. Engine coolant temperature sensor

- Check engine coolant temperature sensor. <Ref. to 2-7 [T8F0].>



G: MODE F07

— IGNITION SIGNAL (ADVS) —

CONDITION:

- Idling after warm-up.
- Shift lever is in Neutral position on MT model.
- Selector lever is in Neutral or Parking position on AT model.

SPECIFIED DATA:

12 — 28 deg

- Probable cause (Item outside “specified data”)

1. Engine under load

Check “MODE F09”.
<Ref. to 2-7 [T9I0].>

2. Mass air flow sensor

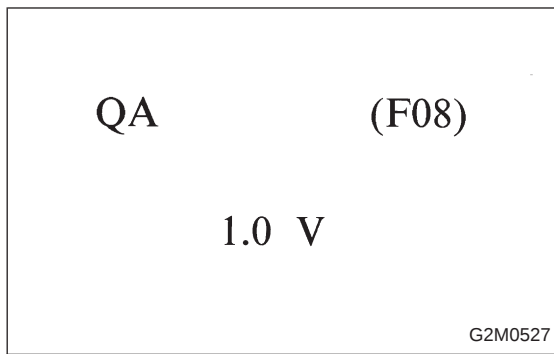
Check “MODE F08”.
<Ref. to 2-7 [T9H0].>

3. Throttle position sensor

Check “MODE F10”.
<Ref. to 2-7 [T9J0].>

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.



H: MODE F08 — MASS AIR FLOW SIGNAL (QA) —

CONDITION:

Idling after warm-up.

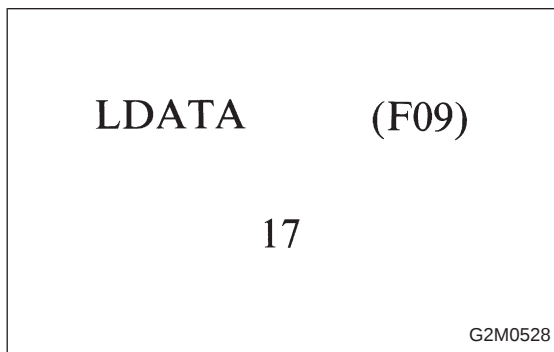
SPECIFIED DATA:

0.8 — 1.2 V

- Probable cause (Item outside “specified data”)

1. Mass air flow sensor

Check mass air flow sensor line.
<Ref. to 2-7 [T8G0].>



I: MODE F09 — LOAD DATA (LDATA) —

CONDITION:

Idling after warm-up.

SPECIFIED DATA:

15 — 20

- Probable cause (Item outside “specified data”)

1. Mass air flow sensor

Check “MODE F08”.
<Ref. to 2-7 [T9H0].>

2. Engine speed

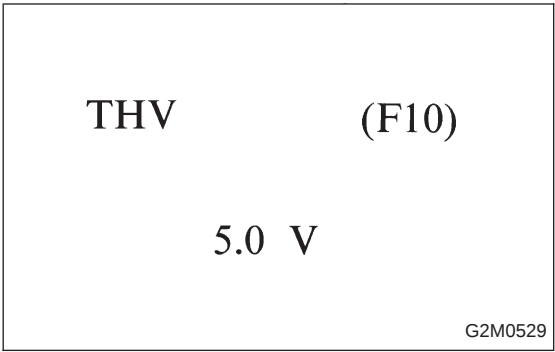
Check “MODE F04”.
<Ref. to 2-7 [T9E0].>

3. Camshaft position sensor

Check camshaft position sensor line.
<Ref. to 2-7 [T8D0].>

4. Crankshaft position sensor

Check crankshaft position sensor line.
<Ref. to 2-7 [T8B0].>



J: MODE F10
— THROTTLE POSITION SIGNAL (THV) —
CONDITION:
Check voltage while throttle valve is changing from “fully closed” to “fully opened”.
SPECIFIED DATA:
5.0 — 1.5 V

- Probable cause (Item outside “specified data”)



TIM (F11)

2.8 mS

G2M0530

K: MODE F11
— INJECTOR PULSE WIDTH (TIM) —**CONDITION:**

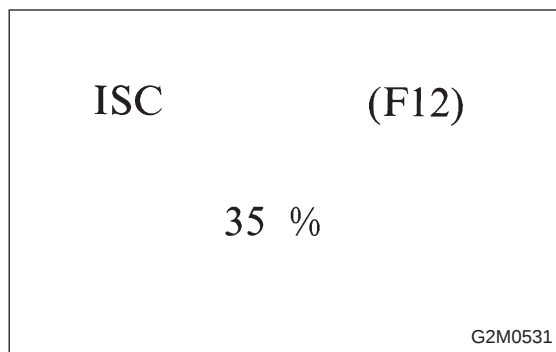
- Idling after warm-up.
- Electric load item and blower fan is turned OFF.
- Radiator fan is not in operation.

SPECIFIED DATA:

2.0 — 3.5 mS

- Probable cause (Item outside “specified data”)

1. Engine under loadCheck “MODE F09”.
<Ref. to 2-7 [T9I0].>**2. A/F correction coefficient**Check “MODE F16”.
<Ref. to 2-7 [T9P0].>**3. Engine coolant temperature sensor**Check “MODE F05” or “MODE F06”.
<Ref. to 2-7 [T9F0].>**4. Oxygen sensor**Check “MODE F13”.
<Ref. to 2-7 [T9M0].>**5. Vehicle speed sensor 2**Check “MODE F02” or “MODE F03”.
<Ref. to 2-7 [T9D0].>**6. Mass air flow sensor**Check “MODE F08”.
<Ref. to 2-7 [T9H0].>**7. Idle air control solenoid valve**Check “MODE F12”.
<Ref. to 2-7 [T9L0].>**8. Battery voltage**Check “MODE F01”.
<Ref. to 2-7 [T9C0].>

**L: MODE F12****— IDLE AIR CONTROL SIGNAL (ISC) —
CONDITION:**

- Idling after warm-up.
- A/C is turned OFF.
- Radiator fan is not in operation.
- Battery voltage is above 13 volts.
- Vehicle is at sea level. (Not high altitudes)

SPECIFIED DATA:

25 — 40 %

- Probable cause (Item outside "specified data")

1. Engine coolant temperature sensor

Check "MODE F05" or "MODE F06".
<Ref. to 2-7 [T9F0].>

2. Throttle position sensor

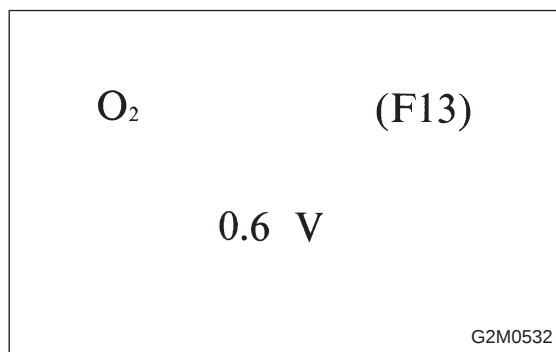
Check "MODE F10"
<Ref. to 2-7 [T9J0].>

3. Neutral position switch (MT model)

Check neutral position switch line.
<Ref. to 2-7 [T8P0].>

4. Park/Neutral position switch (AT model)

Check Park/Neutral position switch line.
<Ref. to 2-7 [T8Q0].>

**M: MODE F13****— OXYGEN SENSOR OUTPUT SIGNAL (O₂) —****CONDITION:**

- Idling after warm-up.
- A/C is turned OFF.

SPECIFIED DATA:

0 — 1.0 V

- Probable cause (Item outside "specified data")

1. Injection plus width

Check "MODE F11".
<Ref. to 2-7 [T9K0].>

2. Oxygen sensor

Check oxygen sensor line.
<Ref. to 2-7 [T8J0].>

O₂ MAX. (F14)

0.8 V

G2M0533

N: MODE F14

— OXYGEN SENSOR MAX. OUTPUT SIGNAL (O₂ MAX.) —

CONDITION:

- Idling after warm-up.
- A/C is turned OFF.

SPECIFIED DATA:

0.7 — 1.0 V

- Probable cause (Item outside “specified data”)

1. Injection plus width

Check “MODE F11”.
<Ref. to 2-7 [T9K0].>

2. Oxygen sensor

Check oxygen sensor line.
<Ref. to 2-7 [T8J0].>

O₂ MIN. (F15)

0.1 V

G2M0534

O: MODE F15

— OXYGEN SENSOR MIN. OUTPUT SIGNAL (O₂ MIN.) —

CONDITION:

- Idling after warm-up.
- A/C is turned OFF.

SPECIFIED DATA:

0 — 0.2 V

- Probable cause (Item outside “specified data”)

1. Injection plus width

Check “MODE F11”.
<Ref. to 2-7 [T9K0].>

2. Oxygen sensor

Check oxygen sensor line.
<Ref. to 2-7 [T8J0].>

ALPHA (F16)

+ 5 %

G2M0535

P: MODE F16**— A/F CORRECTION COEFFICIENT (ALPHA) —****CONDITION:**

Idling after warm-up.

SPECIFIED DATA:

-10 to +10 %

- Probable cause (Item outside “specified data”)

1. Injection plus widthCheck “MODE F11”.
<Ref. to 2-7 [T9K0].>**2. Oxygen sensor**Check oxygen sensor line.
<Ref. to 2-7 [T8J0].>**3. Throttle position sensor**Check throttle position sensor line.
<Ref. to 2-7 [T8I0].>

TSF (F17)

68 °F

H2M1242

Q: MODE F17**— FUEL TEMPERATURE SIGNAL (TSF) —**

VFTP (F18)

0 . 10 kpa

H2M1252

R: MODE F18**— FUEL TANK PRESSURE SIGNAL (VFTP) —**

CPCD (F19)

0 %

H2M1282

S: MODE F19**— PURGE CONTROL SIGNAL (CPCD) —**

EGRT (F22)

25 °C



65 °C

G2M0536

T: MODE F22**— RECIRCULATION GAS TEMPERATURE (EGRT) —****CONDITION:**

Idling after warm-up.

SPECIFIED DATA:

- (1) Make sure to recirculate gas temperature when engine is idling.
- (2) Open EGR valve by force.
- (3) Make sure that indicated temperature rises.

- Probable cause (Item outside "specified data")

1. Recirculation gas temperature sensorCheck recirculation gas temperature sensor line.
<Ref. to 2-7 [T8R0].>

LED No.	Signal name	Display
1	Ignition switch	IG
2	Identification of AT model	AT
3	Test mode connector	UD
4	Read memory connector	RM
5	Fuel tank pressure control solenoid valve	PC
6	—	—
7	Park/Neutral position switch	NT
8	Power steering pressure	SS
9	—	—
10	Oxygen sensor signal	O2

IG	AT	UD	RM	PC
—	NT	SS	—	O2

1	2	3	4	5
6	7	8	9	10

LED No.	Signal name	Display
1	FICD solenoid valve	AF
2	A/C switch	AC
3	A/C relay	AR
4	Radiator fan relay 1	R1
5	Radiator fan relay 2	R2
6	—	—
7	—	—
8	—	—
9	—	—
10	Oxygen sensor signal	O2

AF	AC	AR	R1	R2
—	—	—	—	O2

1	2	3	4	5
6	7	8	9	10

U: 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. 4 Read memory connector is connected.

LED No. 5 Fuel tank pressure control solenoid valve is in function.

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

LED No. 8 Steering is turned.

LED No. 10 Mixture ratio is rich.

NOTE:

● When LED Nos. 3 and 4 blink with the test mode connector connected and the ignition switch turned to ON, the corresponding parts are functioning properly.

V: MODE FA1**— ON ↔ OFF SIGNAL —**

Requirement for LED “ON”.

LED No. 1 FICD solenoid valve is in function.

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. 10 Mixture ratio is rich.

NOTE:

When LED No. 1 blinks with the test mode connector connected and the ignition switch turned to ON, the corresponding part is functioning properly.

LED No.	Signal name	Display
1	Fuel pump relay	FP
2	Purge control solenoid valve	CN
3	Air suction solenoid valve	SV
4	—	—
5	—	—
6	—	—
7	—	—
8	—	—
9	—	—
10	Oxygen sensor signal	O2

FP	CN	SV	—	—
—	—	—	—	O2

1	2	3	4	5
6	7	8	9	10

W: MODE FA2**— ON ↔ OFF SIGNAL —**

Requirement for LED “ON”.

LED No. 1 Fuel pump relay is turned ON.

LED No. 2 Purge control solenoid valve is in function.

LED No. 3 Air suction solenoid valve is in function.

LED No. 10 Mixture ratio is rich.

NOTE:

- When LED Nos. 2 and 3 blink with the test mode connector connected and the ignition switch turned to ON, the corresponding parts are functioning properly.

10. General Diagnostics Table

		ECM power supply	Mass air flow sensor	Engine coolant temperature sensor	Throttle position sensor	Crankshaft position sensor	Camshaft position sensor	Vehicle speed sensor 2	Oxygen sensor	Ignition coil	Ignitor	Spark plug	Fuel pump	Pressure regulator	Fuel injector	Idle air control solenoid valve	FICD solenoid valve (models with A/C)	Engine ground terminal	Test mode or read memory connectors are connected.	Accelerator cable is out of adjustment.	Transmission Control Module (TCM)	Air leak in air intake system
Failure of engine to start	Internal combustion does not occur.	1		3		2	2			3	3	3	2	2	3	3		1				
	Internal combustion occurs.	1	3	2								1	3	2	3	3	3					
	Engine stalls after internal combustion.	1		2						3		2	3	3	3	3	3					
Engine stalls.		3	3		3	3		3		3		2	3			3				2	2	
Rough idling		3	2	2	3				3			1	3	2	3	2	2		3			2
Hard to drive at constant speed.			3	3	3								3	1	2							
Poor acceleration /deceleration			3	3	2					2		1	2	2	2	3						
Poor return to idling			3	3	2											2	3			1		
Back fire										3	3	1	3	3	2							
Knocking			3	3									2	2								
Excessive fuel consumption			1	1										2								
Shocks while driving.		2			2									1								
Poor engine revving			2	2	2								2	1								
Remarks		*1												*2		*2	*2					*2

*1: Include ECM grounding circuit.

*2: Check hoses.

ON-BOARD DIAGNOSTICS II SYSTEM *2-7b*

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T DIAGNOSTICS AIRBAG	2
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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.

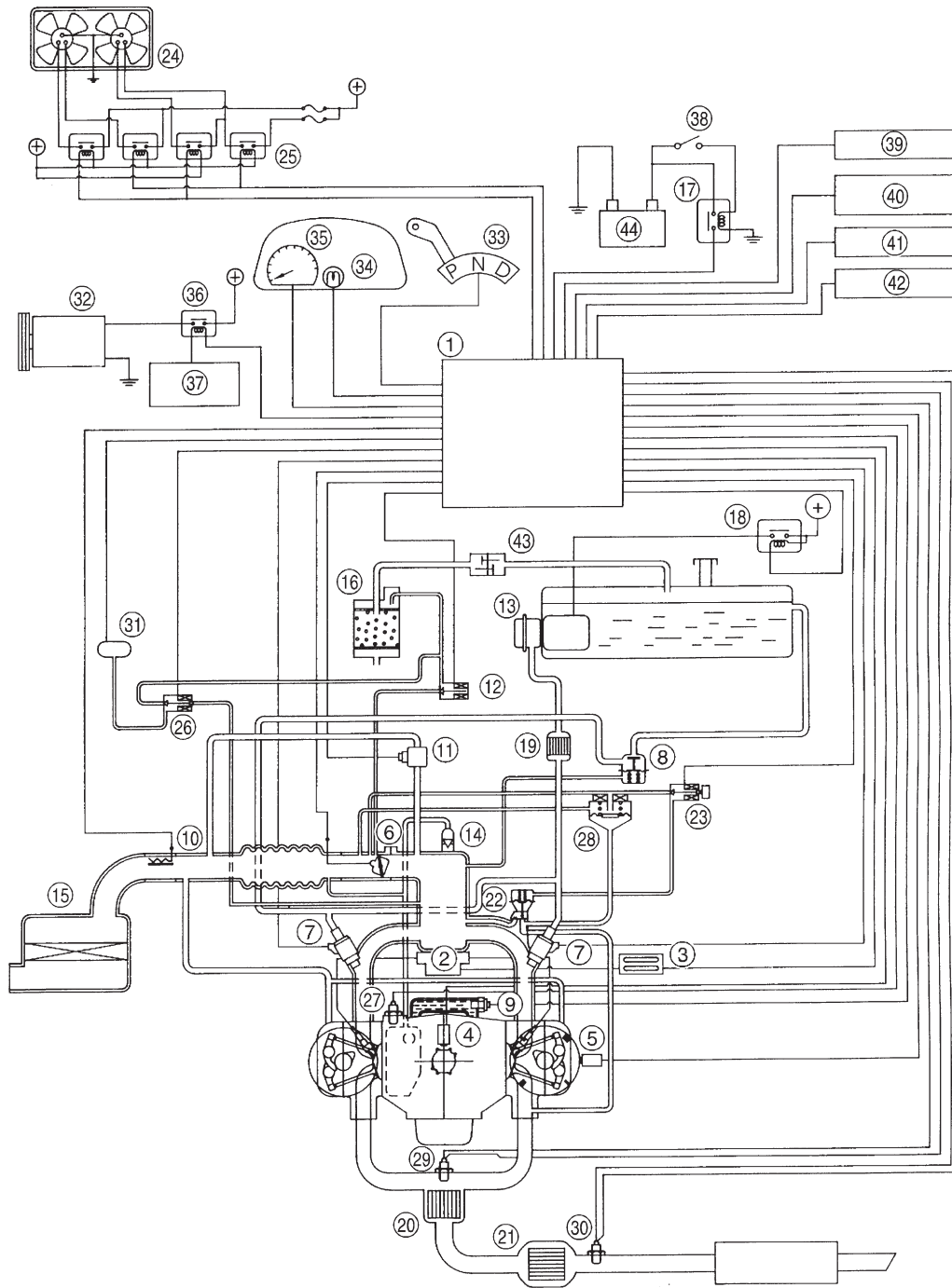
With this system fuel, which is pressurized at a constant pressure, is injected into the intake air passage of the cylinder head. The injection quantity of fuel is controlled by an intermittent injection system where the electro-magnetic injection valve (fuel injector) opens only for a short period of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



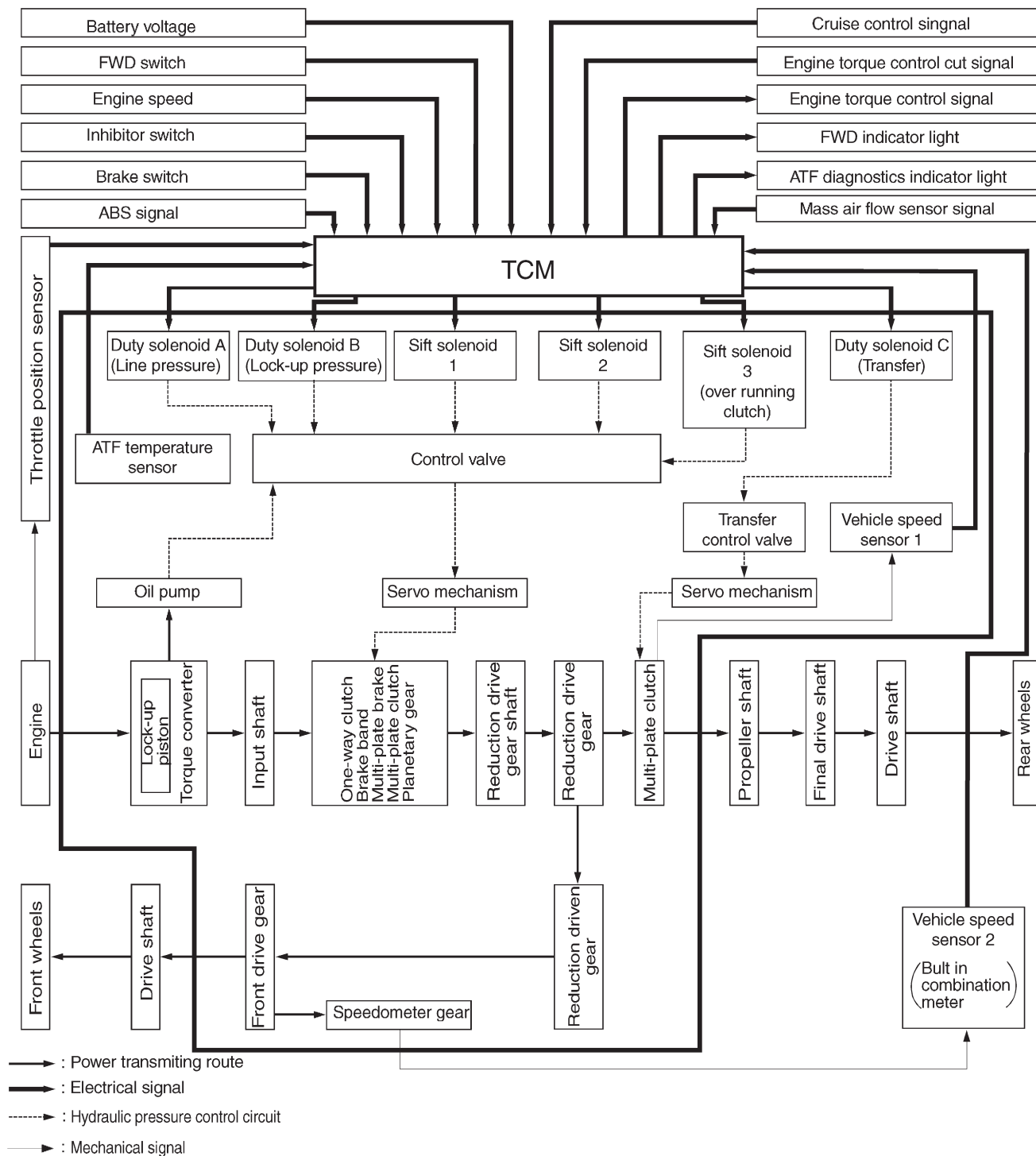
H2M1130A

- | | |
|-------------------------------------|---|
| ① Engine control module (ECM) | ②③ EGR control solenoid valve |
| ② Ignition coil | ②④ Radiator fan |
| ③ Ignitor | ②⑤ Radiator fan relay |
| ④ Crankshaft position sensor | ②⑥ Pressure sources switching solenoid valve |
| ⑤ Camshaft position sensor | ②⑦ Knock sensor |
| ⑥ Throttle position sensor | ②⑧ Back-pressure transducer |
| ⑦ Fuel injectors | ②⑨ Front oxygen sensor |
| ⑧ Pressure regulator | ③⑩ Rear oxygen sensor |
| ⑨ Engine coolant temperature sensor | ③⑪ Pressure sensor |
| ⑩ Mass air flow sensor | ③⑫ A/C compressor |
| ⑪ Idle air control solenoid valve | ③⑬ Inhibitor switch |
| ⑫ Purge control solenoid valve | ③⑭ CHECK ENGINE malfunction indicator lamp (MIL) |
| ⑬ Fuel pump | ③⑮ Tachometer |
| ⑭ PCV valve | ③⑯ A/C relay |
| ⑮ Air cleaner | ③⑰ A/C control module |
| ⑯ Canister | ③⑱ Ignition switch |
| ⑰ Main relay | ③⑲ Transmission control module (TCM) |
| ⑱ Fuel pump relay | ④⑰ Vehicle speed sensor |
| ⑲ Fuel filter | ④⑱ Data link connector (Subaru select monitor) |
| ⑳ Front catalytic converter | ④⑲ Data link connector (OBD-II general scan tool) |
| ㉑ Rear catalytic converter | ④⑳ Two way valve |
| ㉒ EGR valve | ④㉑ Battery |

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

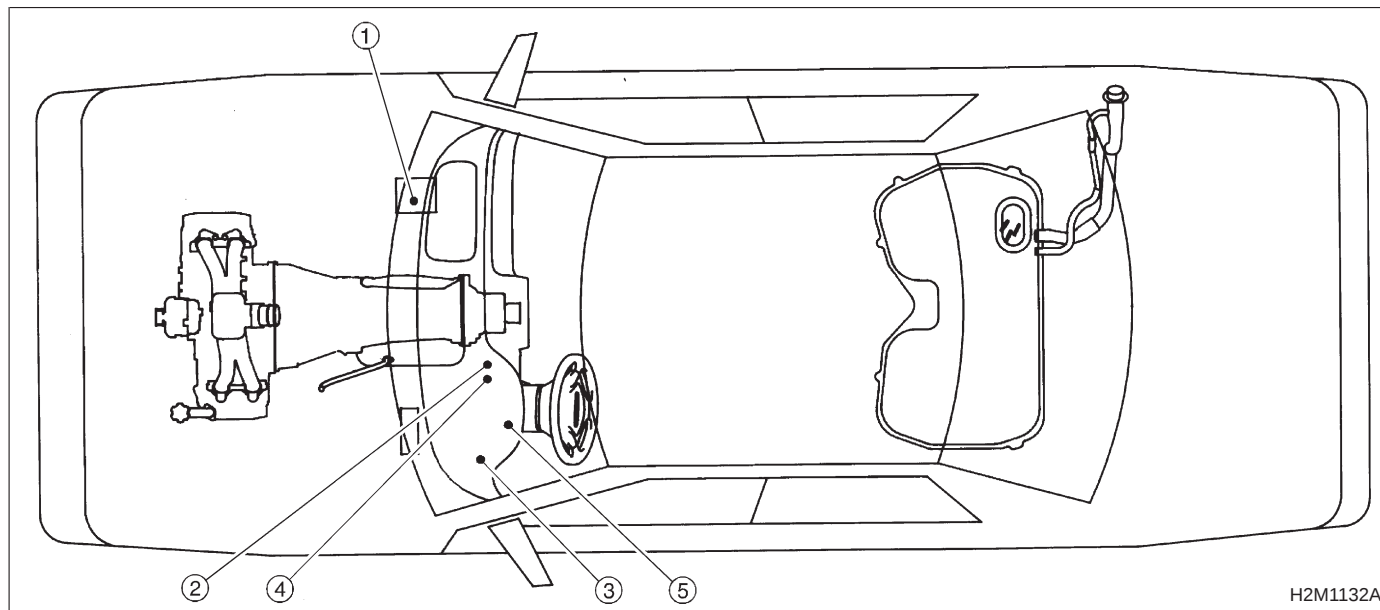


H2M1131A

2. Electrical Components Location

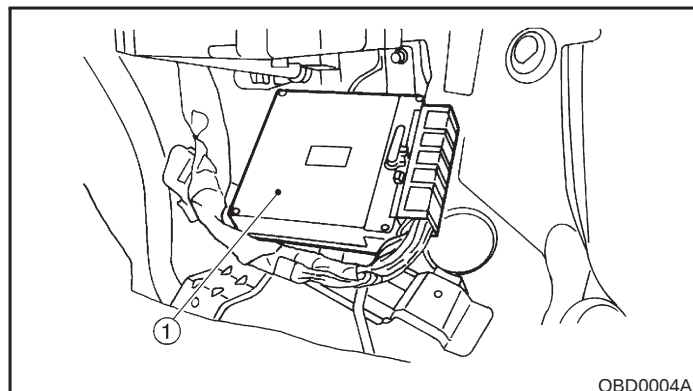
A: ENGINE

1. MODULE

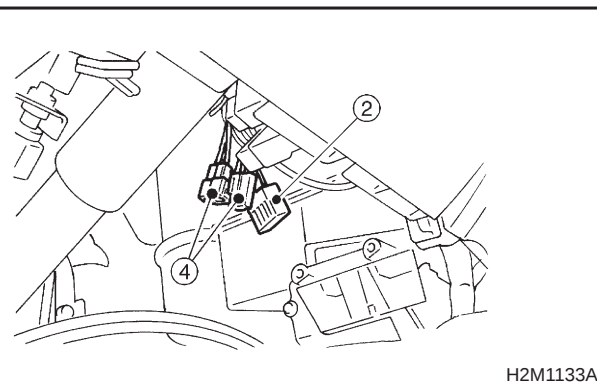


H2M1132A

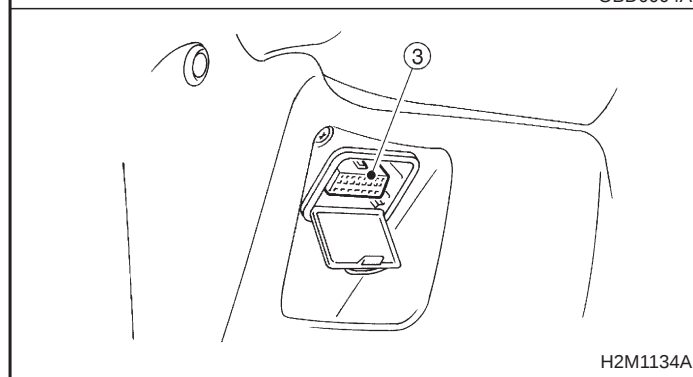
- ① Engine control module (ECM)
- ② Data link connector (for Subaru select monitor only)
- ③ Data link connector (for Subaru select monitor and OBD-II general scan tool)
- ④ Test mode connector
- ⑤ CHECK ENGINE malfunction indicator lamp (MIL)



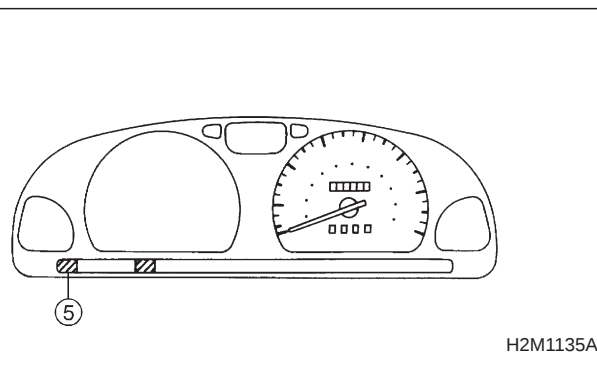
OBD0004A



H2M1133A

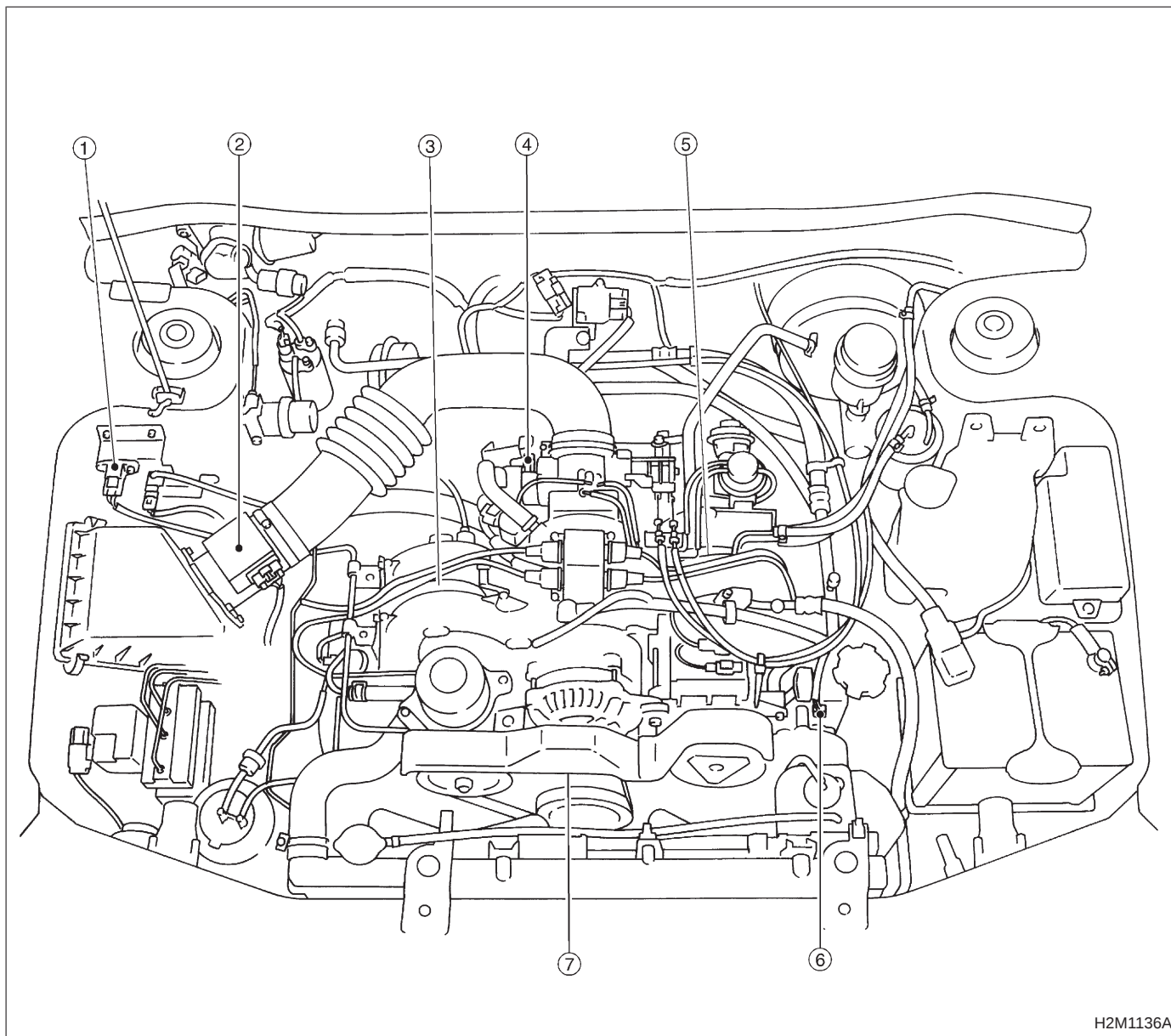


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H2M1135A

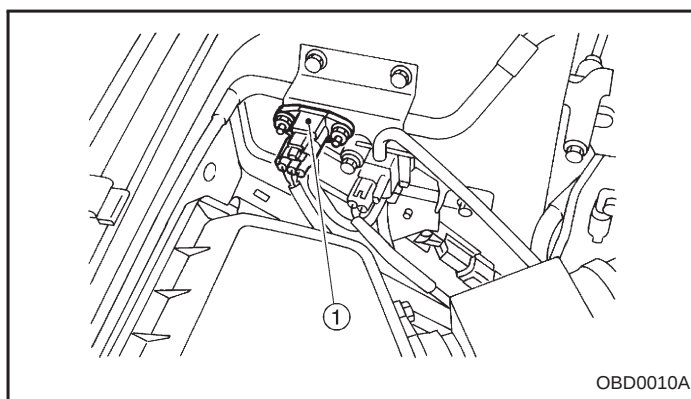
2. SENSOR



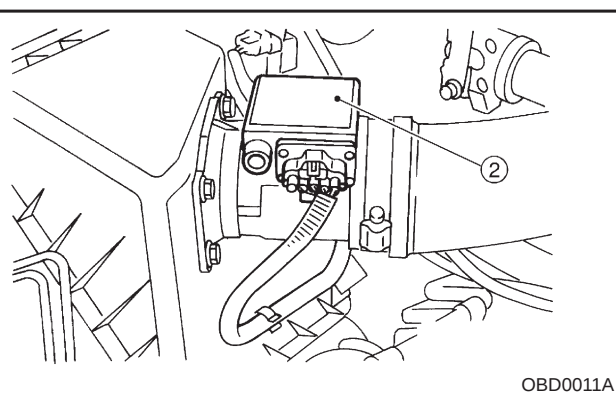
H2M1136A

- ① Pressure sensor
- ② Mass air flow sensor
- ③ Engine coolant temperature sensor
- ④ Throttle position sensor

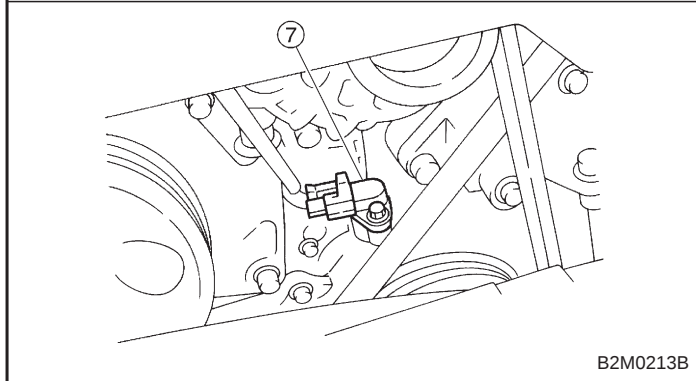
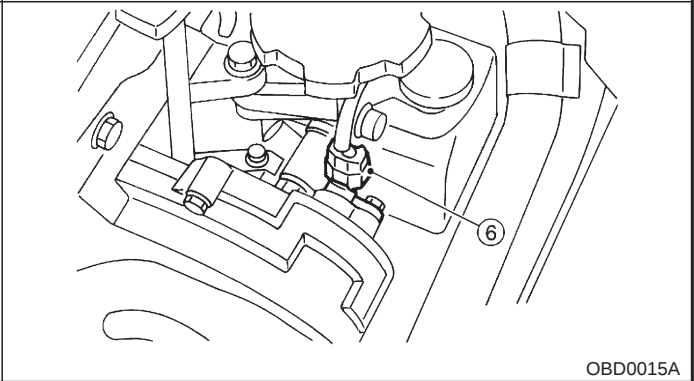
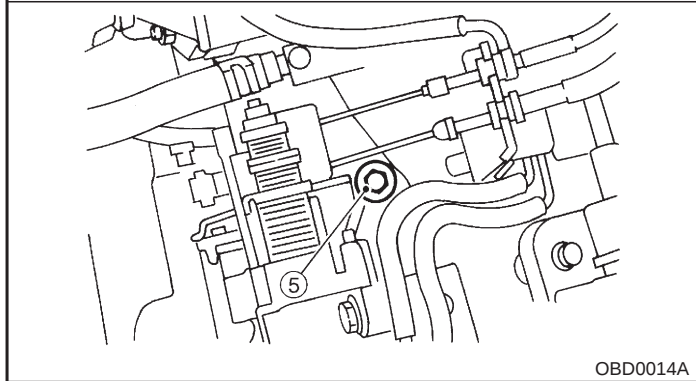
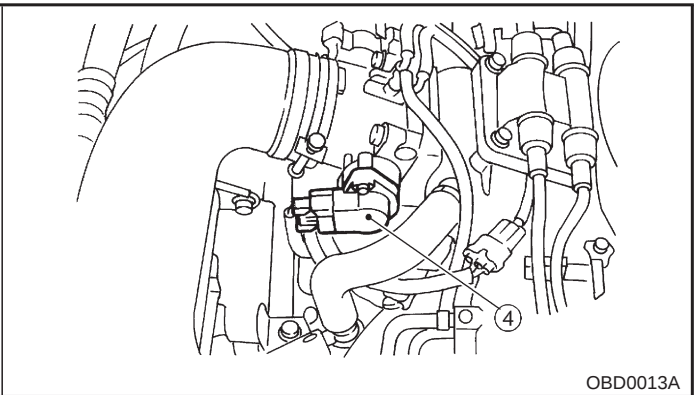
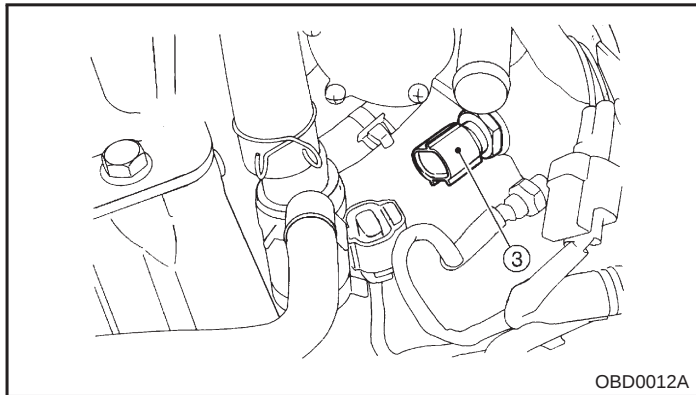
- ⑤ Knock sensor
- ⑥ Camshaft position sensor
- ⑦ Crankshaft position sensor

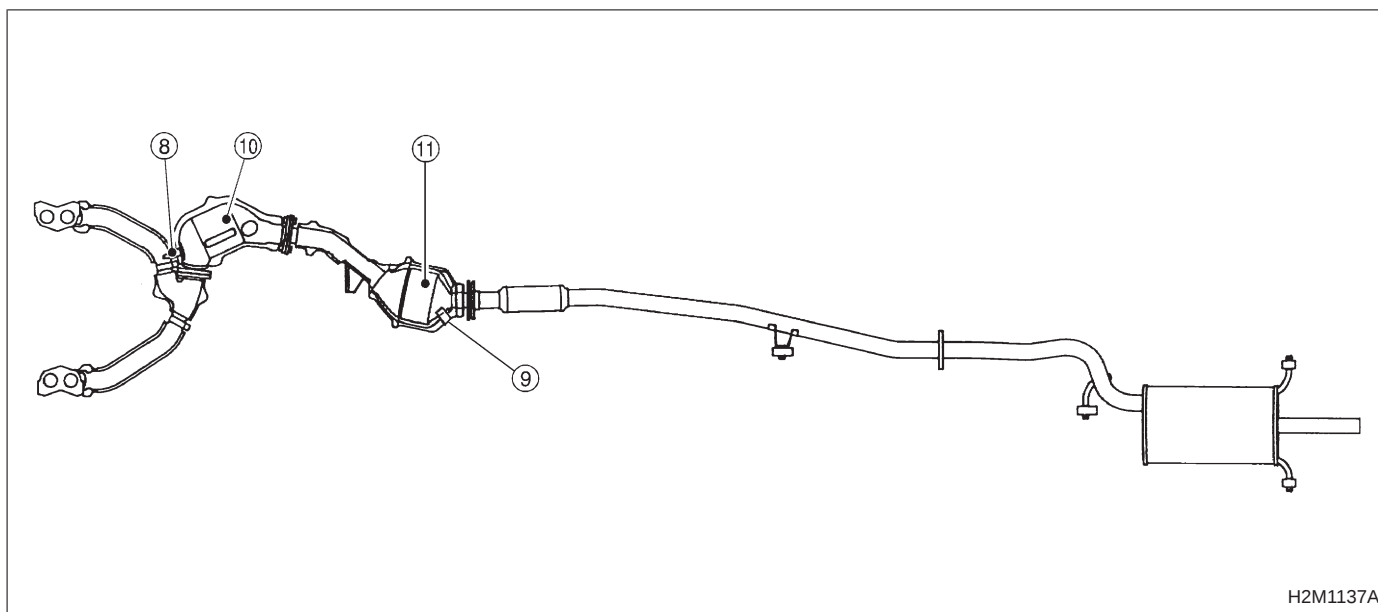


OBD0010A



OBD0011A

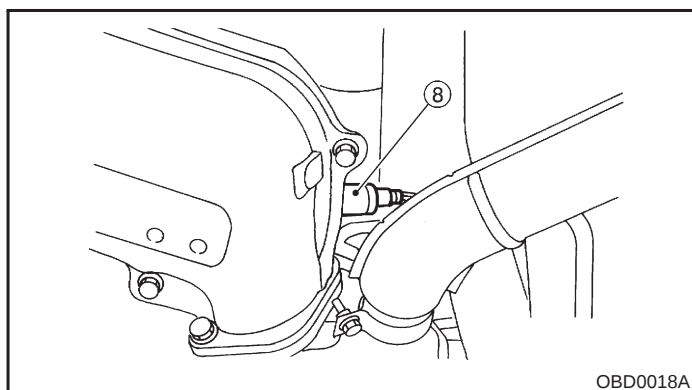




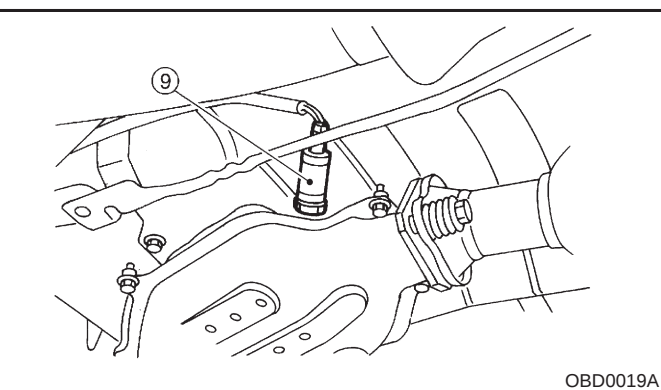
H2M1137A

- ⑧ Front oxygen sensor
- ⑨ Rear oxygen sensor

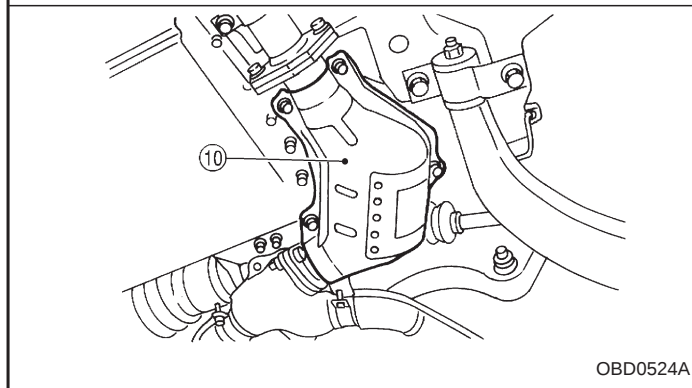
- ⑩ Front catalytic converter
- ⑪ Rear catalytic converter



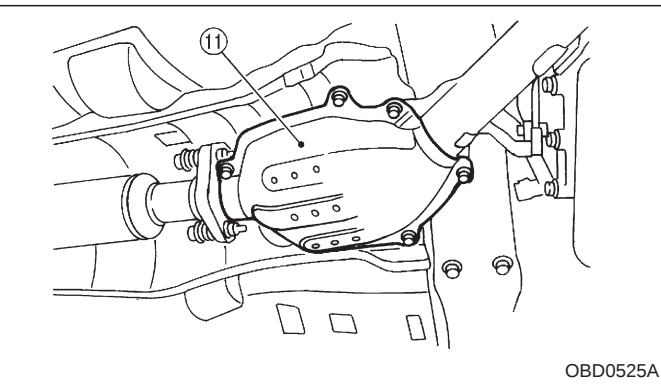
OBD0018A



OBD0019A

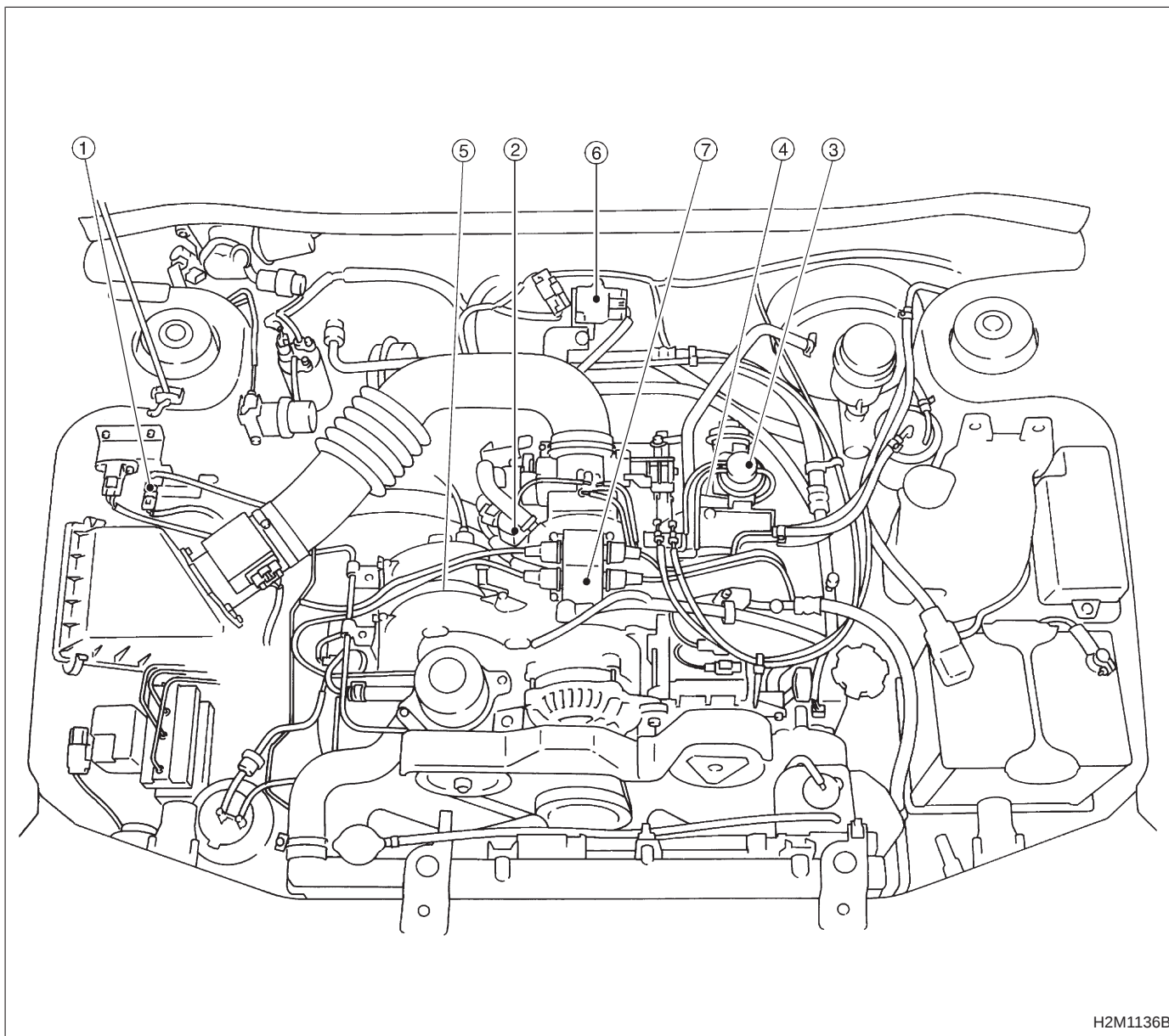


OBD0524A



OBD0525A

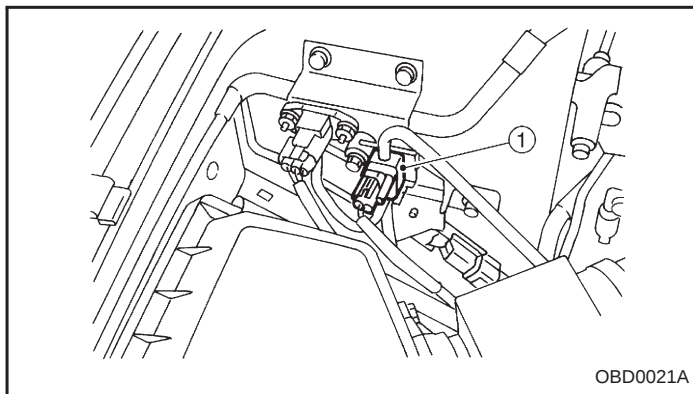
3. SOLENOID VALVE, EMISSION CONTROL SYSTEM PARTS AND IGNITION SYSTEM PARTS



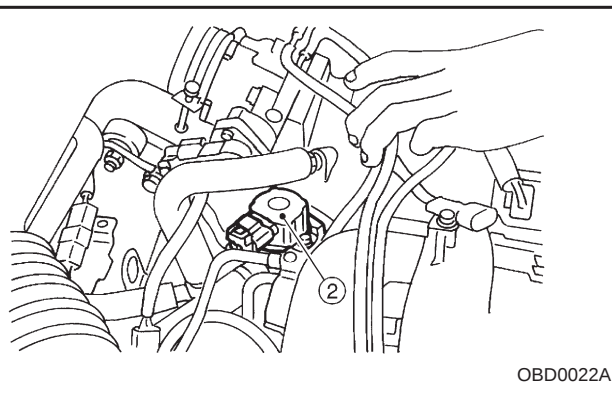
H2M1136B

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

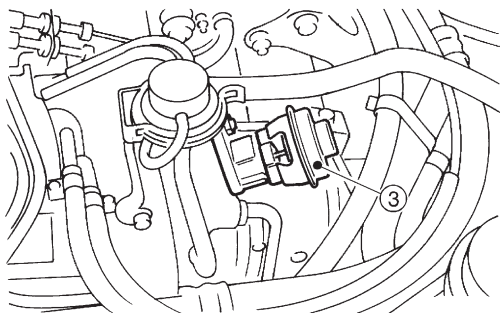
- ⑤ Purge control solenoid valve
- ⑥ Ignitor
- ⑦ Ignition coil



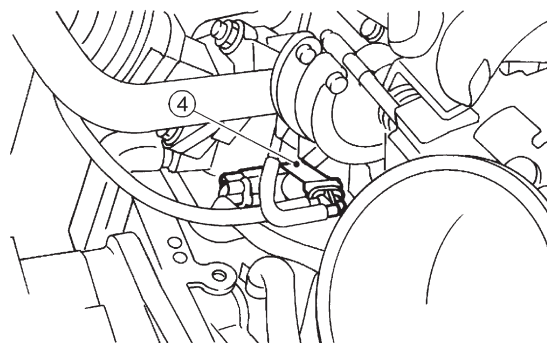
OBD0021A



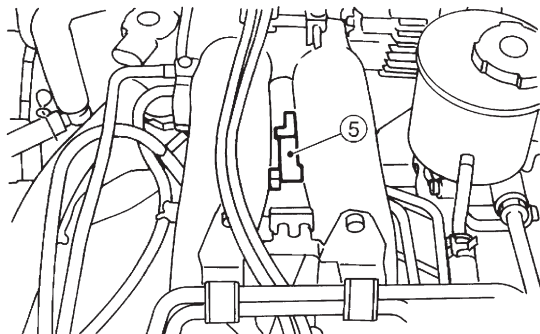
OBD0022A



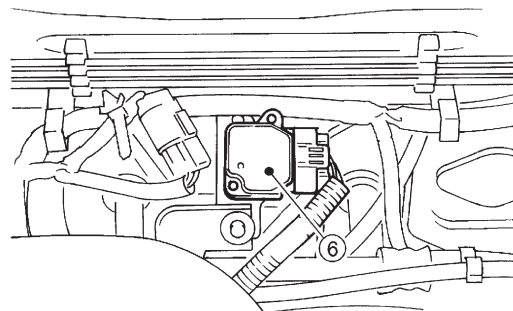
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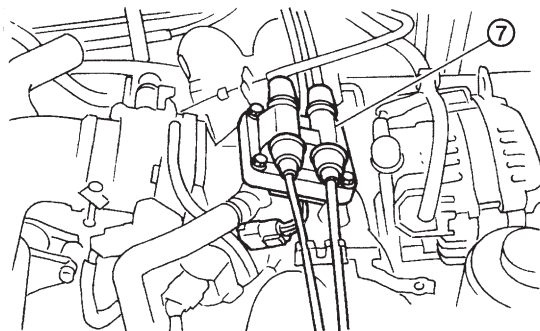
OBD0024A



OBD0025A



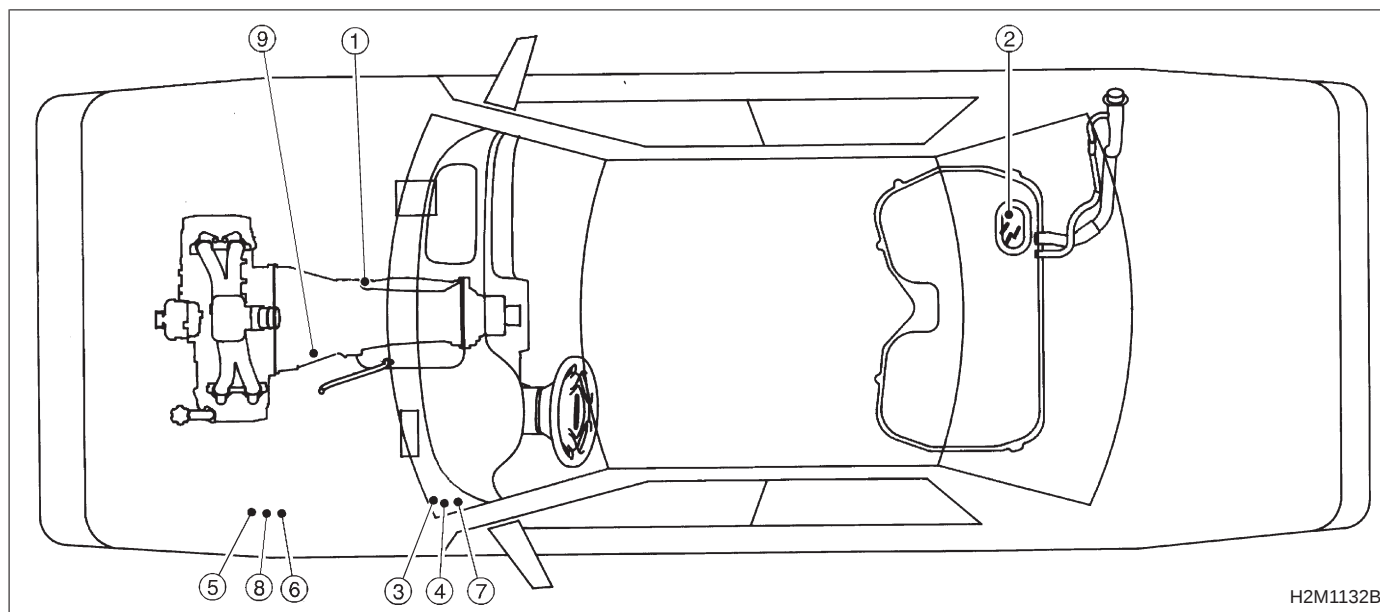
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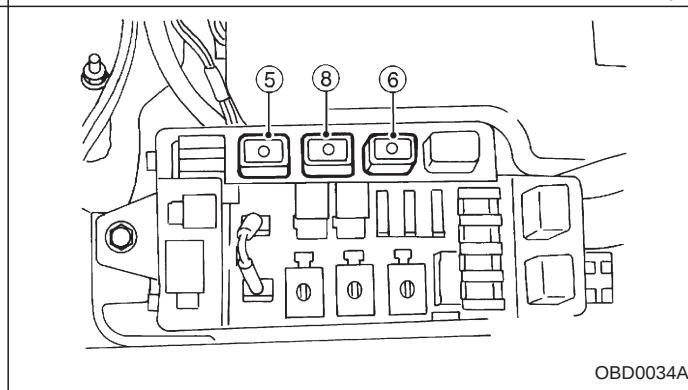
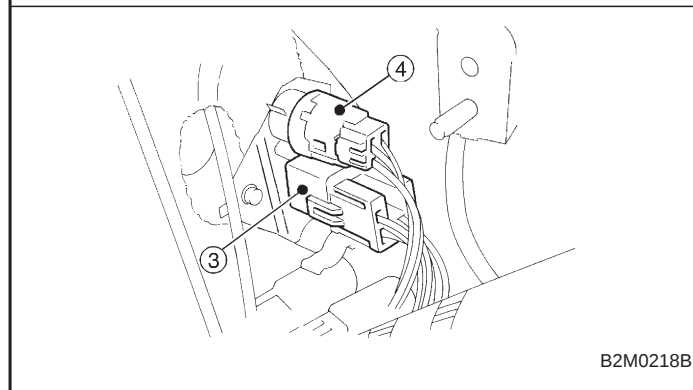
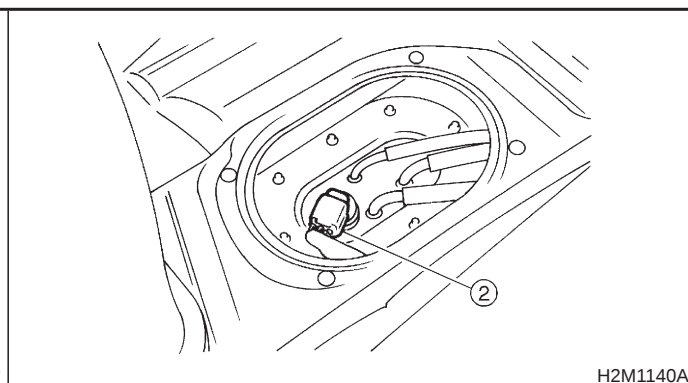
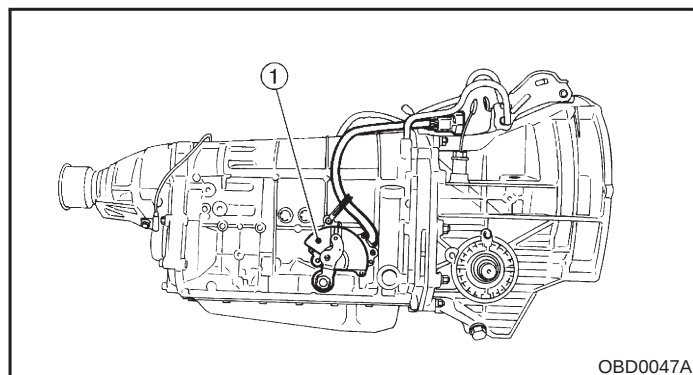
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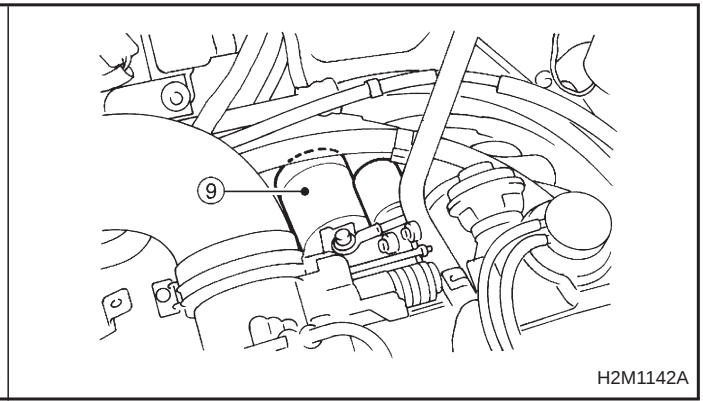
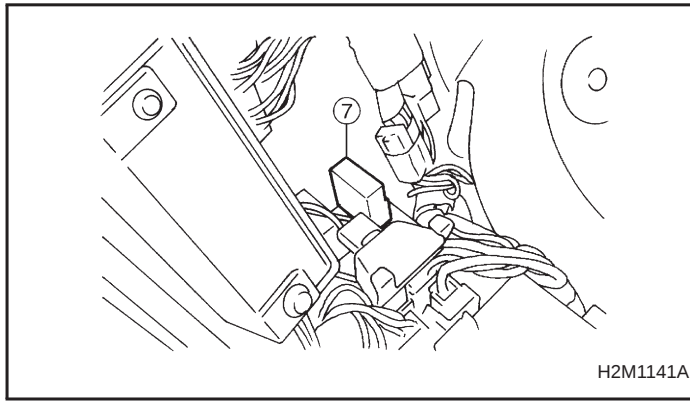
SUBARU.

2. Electrical Components Location



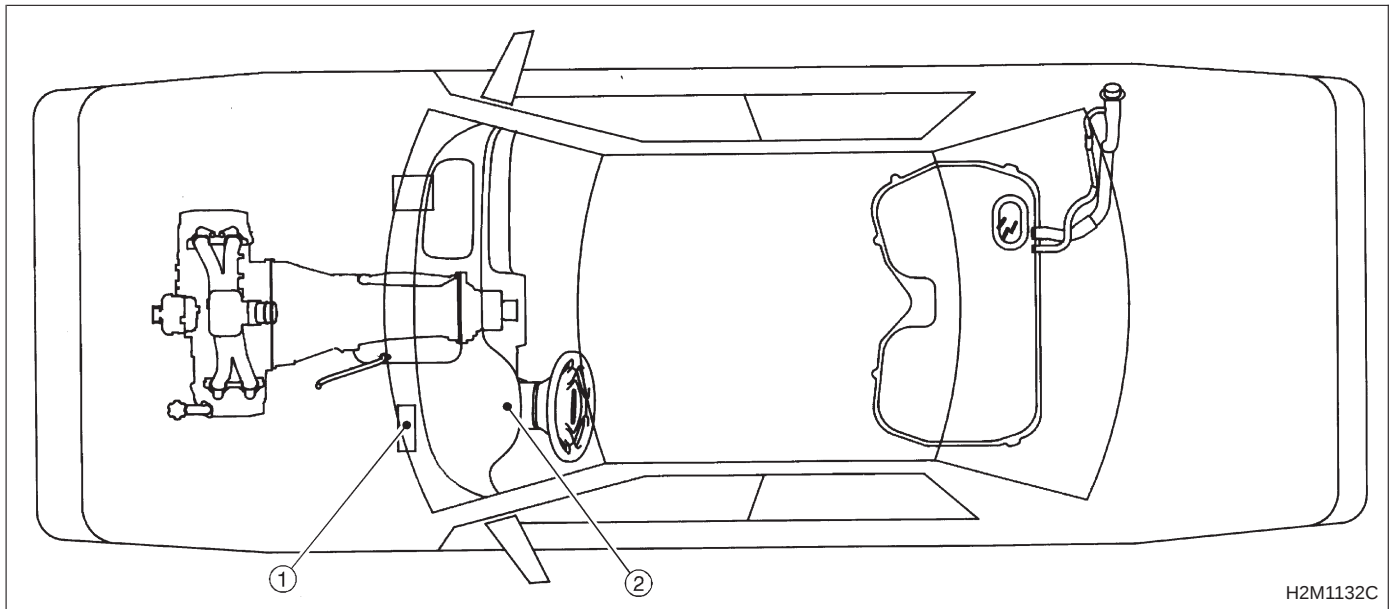
- | | |
|---|--|
| ① Inhibitor switch | ⑥ Radiator sub fan relay 1 (With A/C models only) |
| ② Fuel pump | ⑦ Main fan relay |
| ③ Main relay | ⑧ Radiator main fan relay 2 (With A/C models only) |
| ④ Fuel pump relay | ⑨ Starter |
| ⑤ Radiator sub fan relay 2 (With A/C models only) | |





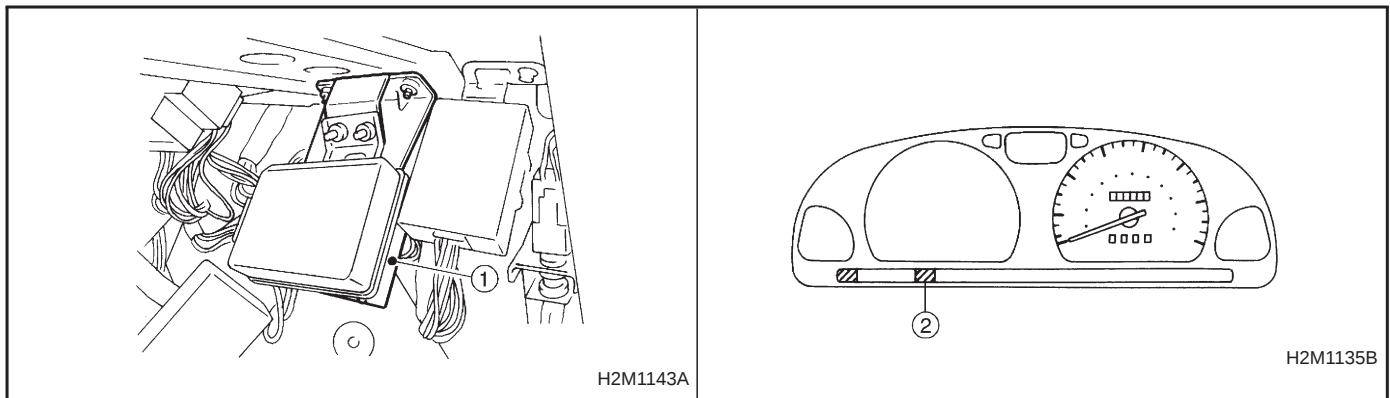
B: TRANSMISSION

1. MODULE

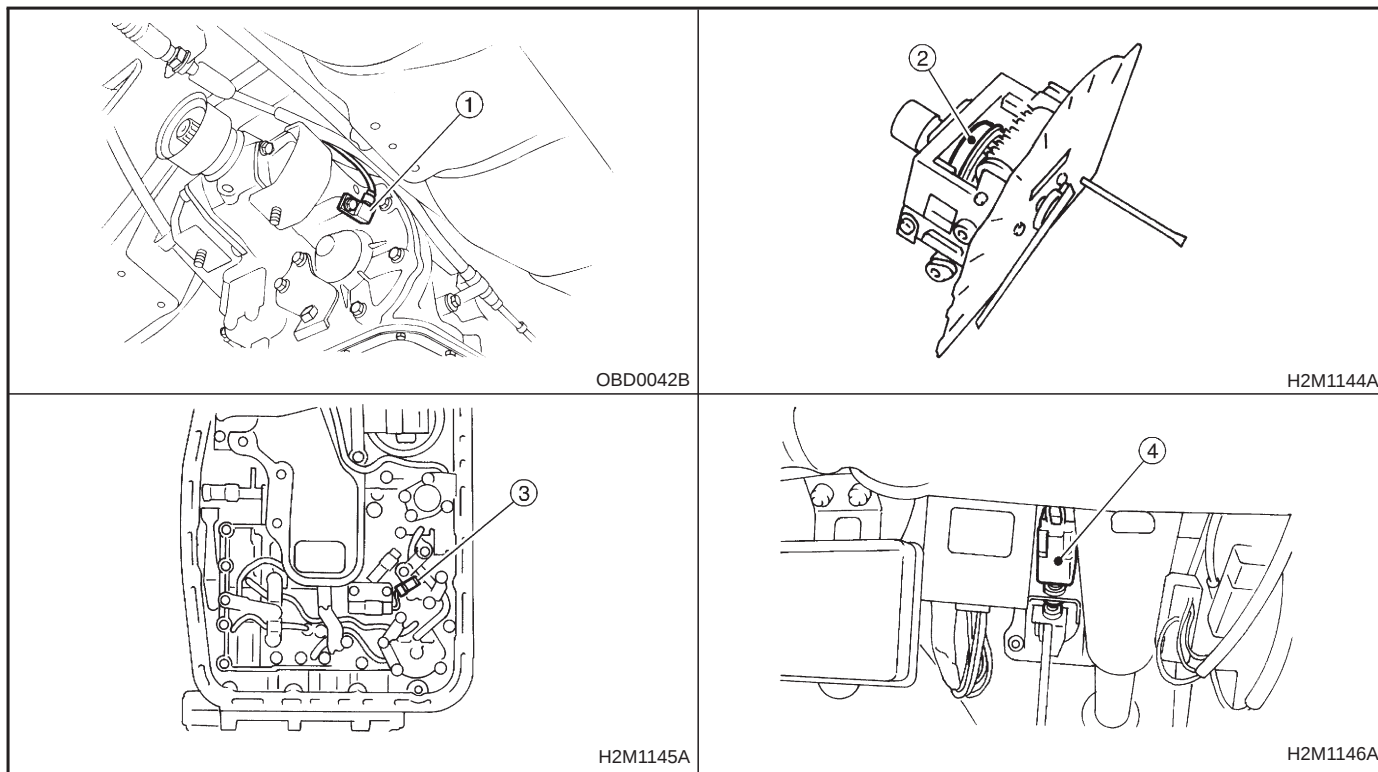


① Transmission Control Module (TCM)

② AT diagnostic indicator light



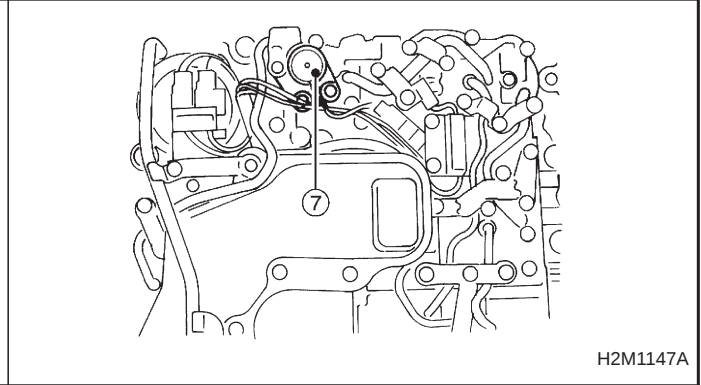
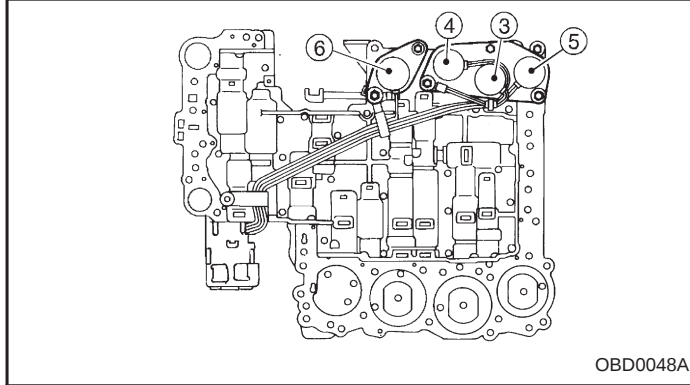
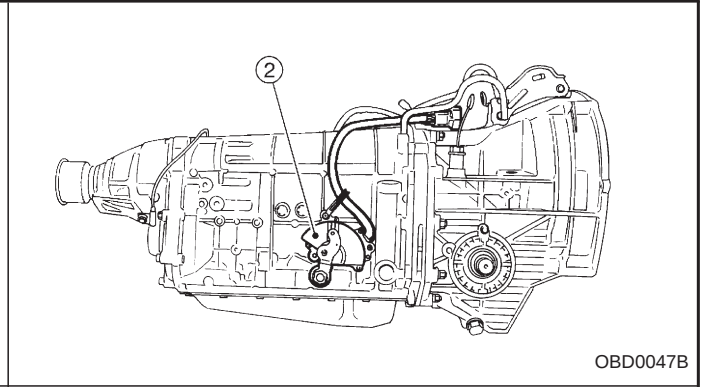
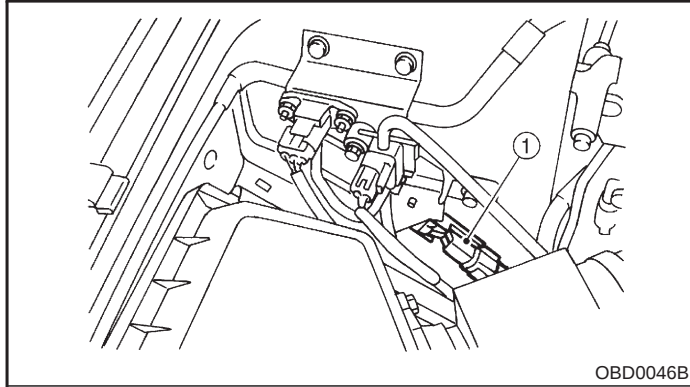
2. SENSOR



- ① Vehicle speed sensor 1
- ③ ATF temperature sensor

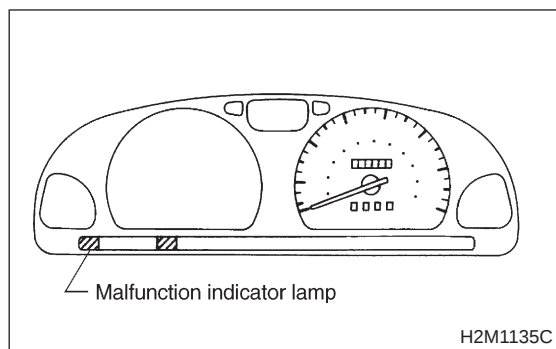
- ② Vehicle speed sensor 2
- ④ Brake light switch

3. SOLENOID VALVE AND RELAY



- 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



3. Diagnosis System

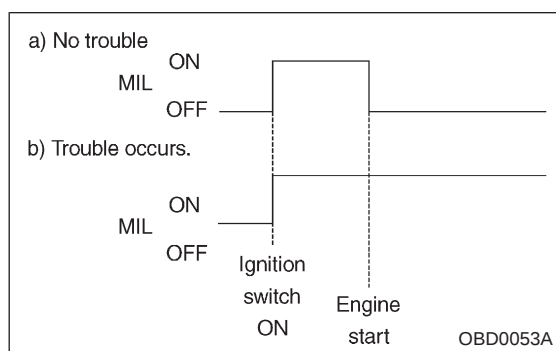
A: MALFUNCTION INDICATOR LAMP (MIL)

1. ACTIVATION OF MALFUNCTION INDICATOR LAMP (MIL)

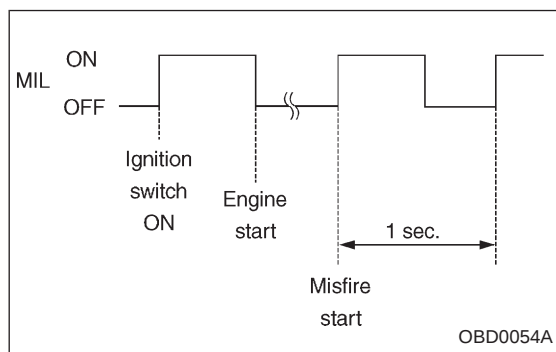
1) When ignition switch is turned to ON (engine off), the CHECK ENGINE malfunction indicator lamp (MIL) in the combination meter illuminates.

NOTE:

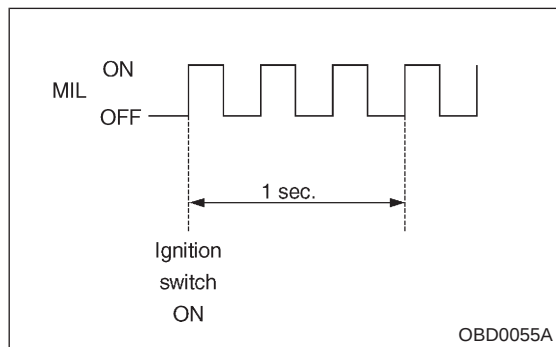
If the MIL does not illuminate, perform diagnostics of the CHECK ENGINE light circuit or the combination meter circuit. <Refer to "7. Diagnostics for CHECK ENGINE Malfunction Indicator Lamp (MIL), 2-7b [T700]".>



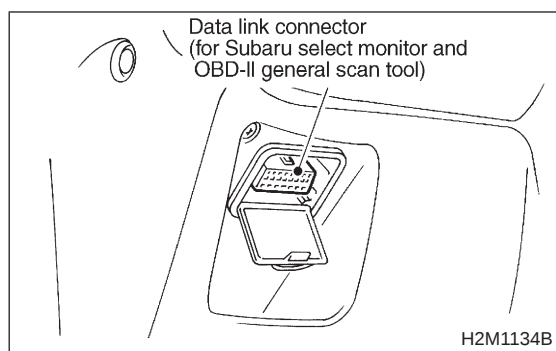
2) After starting the engine, the MIL goes out. If it does not, either the engine or the emission control system is malfunctioning.



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:

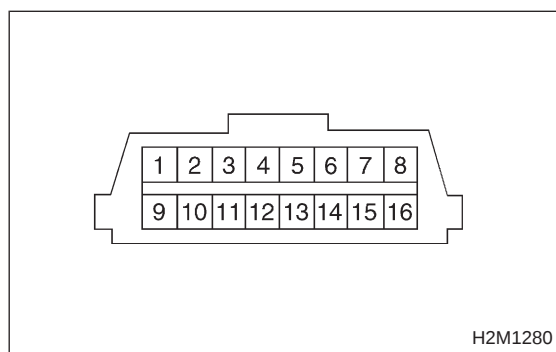
- (1) MODE \$01: Current powertrain diagnostic data
- (2) MODE \$02: Powertrain freeze frame data
- (3) MODE \$03: Emission-related powertrain diagnostic trouble codes
- (4) MODE \$04: Clear/Reset emission-related diagnostic information
- (5) MODE \$05: Oxygen sensor monitoring test results

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", 2-7b [T10A0].



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 the Subaru Select Monitor.
- 2) Terminal No. 4 to No. 6 of the data link connector is used for the Subaru Select Monitor signal.

CAUTION:

Do not connect any scan tools other than the OBD-II general scan tools and the Subaru Select Monitor, because the circuit for the 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", 2-7b [T10A0].

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

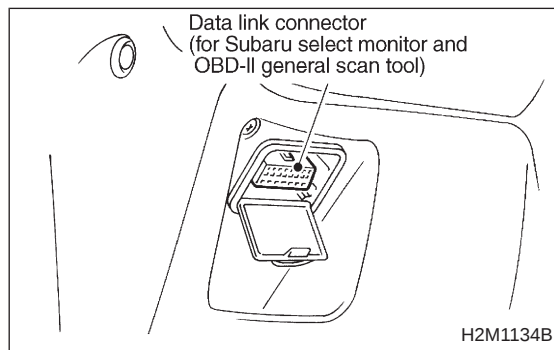
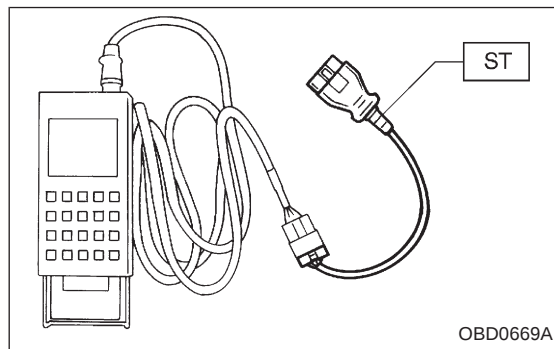
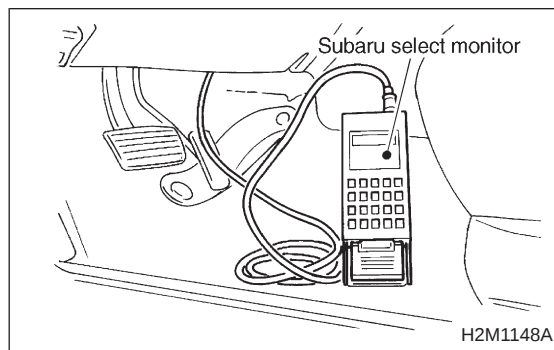
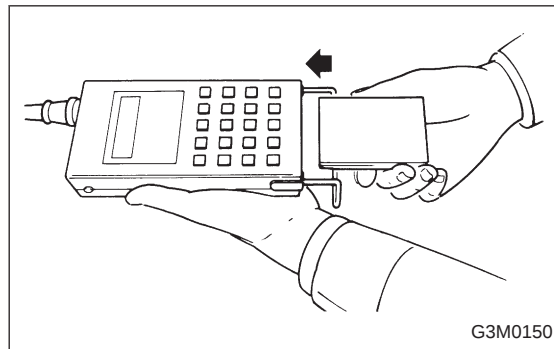
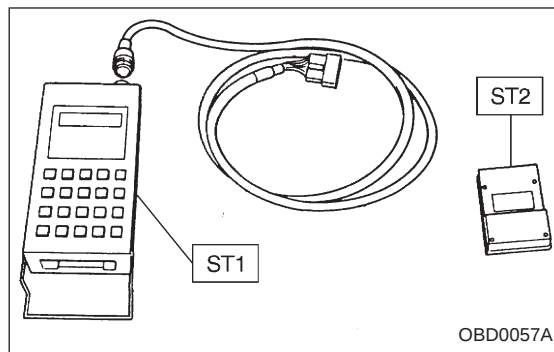
— Oxygen sensor monitoring test results —
Refers to the mode using oxygen sensor output data while the on-board diagnosis system is performing diagnosis on the oxygen sensor.

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 498345500 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;

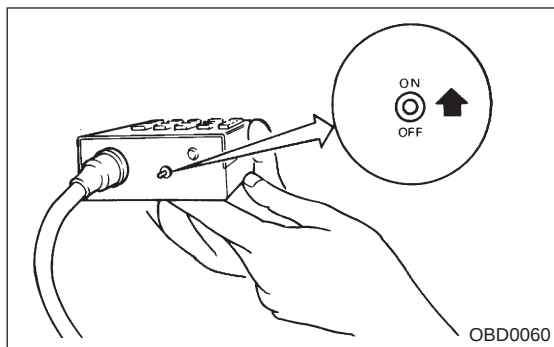
(1) Connect ST to Subaru select monitor cable.

ST 498357200 ADAPTER CABLE

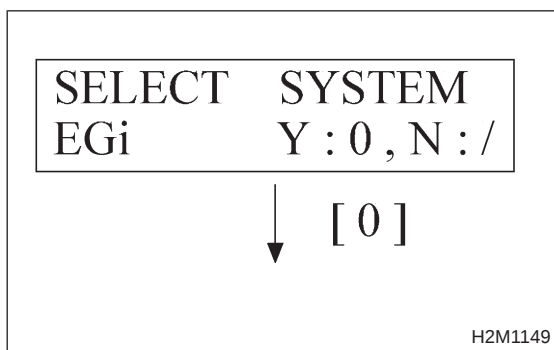
(2) Open the cover and connect Subaru select monitor to data link connector located in the lower portion of the instrument panel (on the driver's side), to the lower cover.

CAUTION:

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



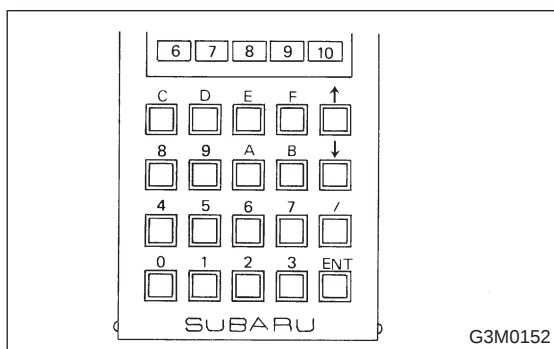
5) Turn ignition switch ON (engine OFF) and Subaru select monitor switch ON.



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

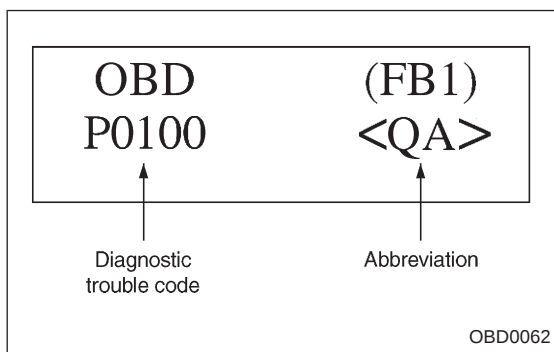
● READ DIAGNOSTIC TROUBLE CODE (DTC) SHOWN ON DISPLAY. (MODE FB1)

(1) Press the function key [0].



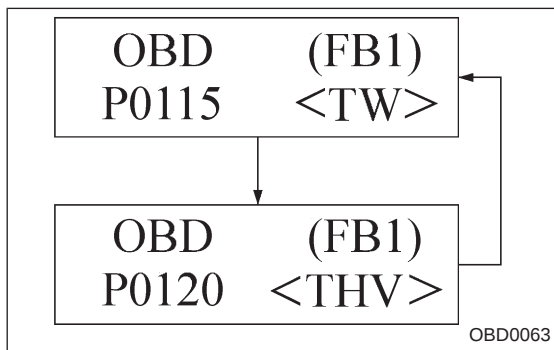
(2) Designate mode using function key.

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



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

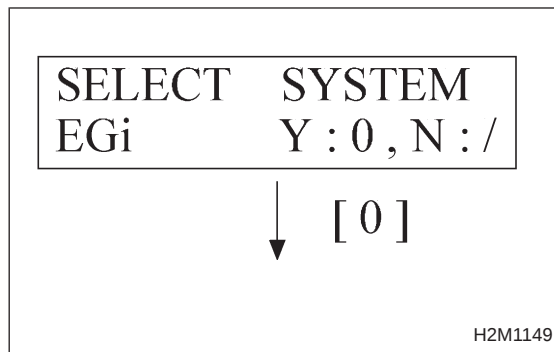
● When there is only one diagnostic trouble code.



● When there are multiple diagnostic trouble codes.

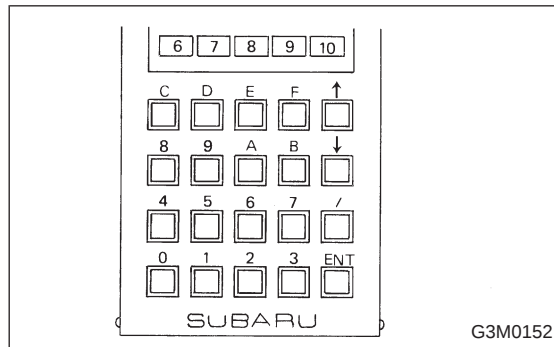
NOTE:

For details concerning diagnostic trouble codes, refer to the "DIAGNOSTIC TROUBLE CODE (DTC) LIST", 2-7b [T10A0].



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

(1) Press the function key [0].

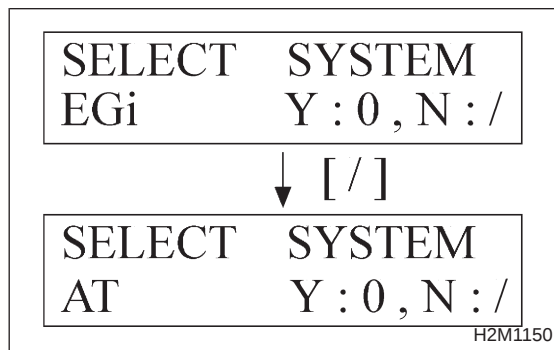


(2) Designate mode using function key.

Refer to "READ DATA FUNCTION KEY LIST FOR ENGINE", 2-7b [T3C2].

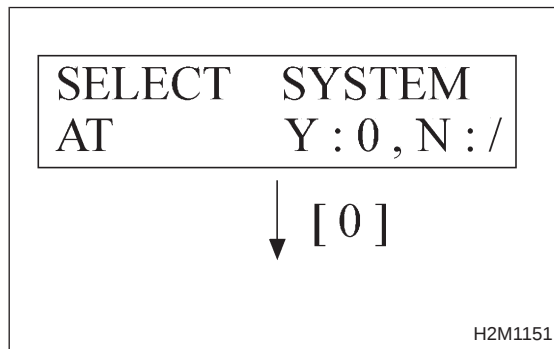
(Example: Press [F] [0] [1] [ENT] in that order.)

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

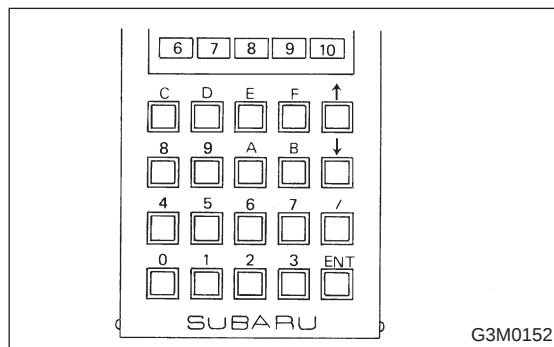


● **READ CURRENT DATA SHOWN ON DISPLAY FOR AT. (FUNCTION MODE)**

(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", 2-7b [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	BARO. P	V
F24	Intake manifold absolute pressure signal	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
F38	Minimum EGR system pressure value	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
F50	Load data (Freeze frame data)	LOAD-F	%
F51	Engine coolant temperature signal (Freeze frame data)	TW-F	°C
F52	Throttle position signal (Freeze frame data)	ALPH-F	%
F53	Long term fuel trim (Freeze frame data)	KBLR-F	%
F54	Intake manifold absolute pressure signal (Freeze frame data)	MANI-F	kPa
F55	Engine speed signal (Freeze frame data)	EREV-F	rpm
F56	Vehicle speed signal (Freeze frame data)	VSP-F	km/h

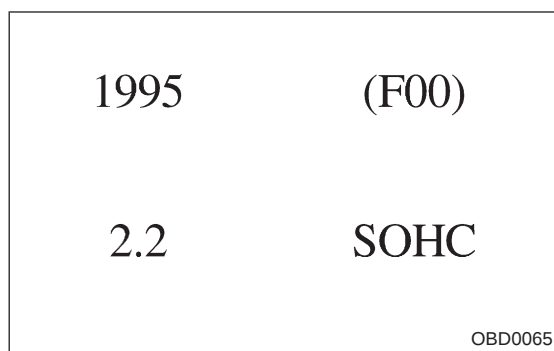
Function mode	Contents	Abbreviation	Unit of measure
FA0	ON ↔ OFF signal	—	—
FA1	ON ↔ OFF signal	—	—
FA2	ON ↔ OFF signal	—	—
FA3	ON ↔ OFF signal	—	—
FA4	ON ↔ OFF signal	—	—
FB0	Diagnostic trouble code (DTC)	INSPECT	—
FB1	Diagnostic trouble code (DTC)	OBD	—
FC0	Clear memory	—	—

NOTE:

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

2) F38 (Minimum EGR system pressure value) will not read accurately until the EGR flow diagnosis terminates.

EGR flow diagnosis terminates when LED No.5 illuminates at function mode FA4.



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

CONDITION:
 Ignition switch "ON"

SPECIFIED DATA:
 Presentation display

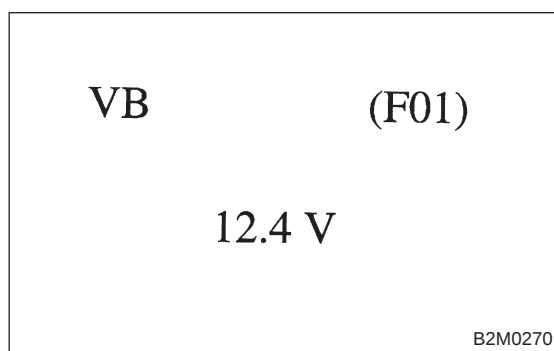
- Probable cause (Item outside "specified data")

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.



● **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")

1. Battery

Check battery voltage and electrolyte's specific gravity.

2. Charging system

- Check regulating voltage. (On no-load)
- Check alternator.

3. Power supply line

- Check main relay. <Ref. to 2-7b [T8C1].>
- Check harness connector of ECM power supply line. <Ref. to 2-7b [T8C2], [T8C3].>

VSP (F02)

15 m/h

H2M1152

- **FUNCTION MODE: F02 AND F03**
— **VEHICLE SPEED SIGNAL (VSP) —**

- F02: Vehicle speed is indicated in mile per hour (m/h).
- 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 (BARO. P) —

MANI.P (F24)

2.30 V

OBD0620

- FUNCTION MODE: F24
— INTAKE MANIFOLD ABSOLUTE PRESSURE SIGNAL (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) —

EGRmin (F38)

30 mmHg

H2M1219

- **FUNCTION MODE: F38**
— MINIMUM EGR SYSTEM PRESSURE VALUE (EGRMIN) —

NOTE:

Minimum EGR system pressure value will not read accurately until the EGR flow diagnosis terminates.

EGR flow diagnosis terminates when LED No.5 illuminates at function mode FA4.

LOAD (F45)

10.0 %

OBD0639

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

THV (F46)

15.0 %

OBD0640

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

QA (F47)

2.35 g/s

OBD0616

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

BARO.P (F48)

100 kpa

OBD0159

- FUNCTION MODE: F48
- ATMOSPHERIC ABSOLUTE PRESSURE SIGNAL (BARO. P) —

MANI.P (F49)

29 kpa

OBD0641

- FUNCTION MODE: F49
- INTAKE MANIFOLD ABSOLUTE PRESSURE SIGNAL (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 [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.
	8	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	—	—
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. 7 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.

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.	49
FB1	OBD	On-board diagnostics (Read data)	Current trouble code indicated by on-board diagnostics.	24

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.	48

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")

1. Communication failure
(No communication method can be confirmed with power ON.)

- | | |
|-----|--|
| (1) | Check loose or poor connectors, or shortcircuit. |
| (2) | Check type of cartridge. |

2. Vehicle types cannot be identified (due to communication failure).

Check improper cartridge.
Replace with proper one.

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

1. Battery

Check battery voltage and specific gravity of electrolyte.

2. Charging system

- | | |
|-----|--|
| (1) | Measure regulating voltage under no loads. |
| (2) | Check generator (as a single unit). |

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 deg F (F07)

176 deg F

G3M0728

● **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)** —

GEAR (F10)

1st

G3M0730

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

PLDTY (F11)

50%

G3M0731

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

LUPTY (F12)

5%

G3M0732

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

4WDTY (F13)

95%

G3M0733

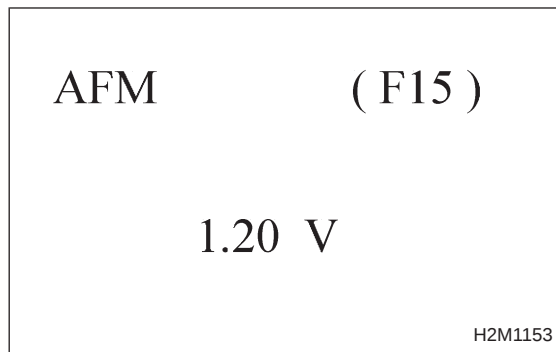
- FUNCTION MODE: F13
— AWD DUTY (4WDTY) —

THVCC (F14)

5.2 V

B3M0259

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



- FUNCTION MODE: F15
- MASS AIR FLOW SENSOR (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.

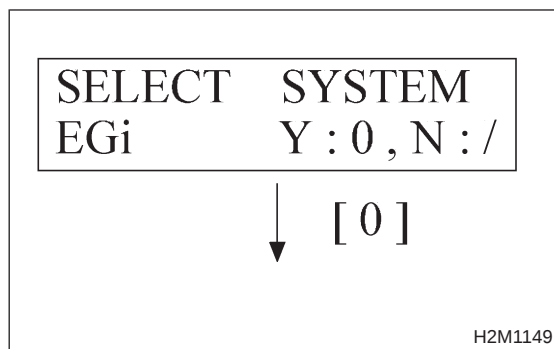
LED No. 3 “D” range is selected.

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**

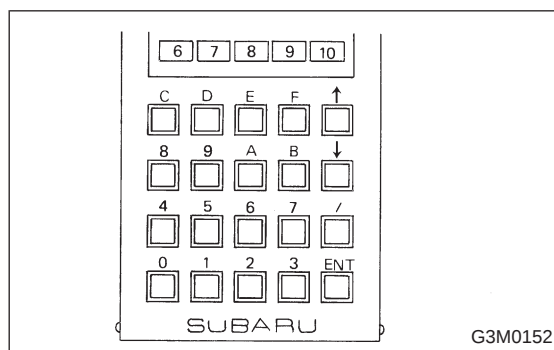
1) Select engine mode or AT mode using function key.

- Engine mode:

Press the function key [0].

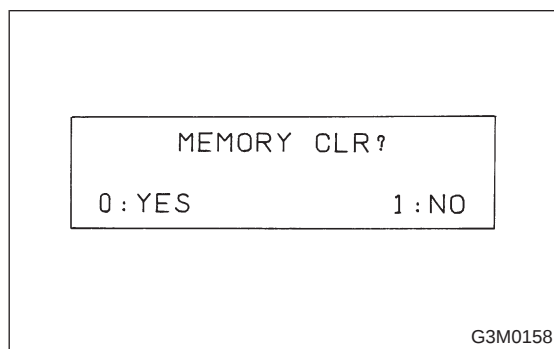
- AT mode:

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

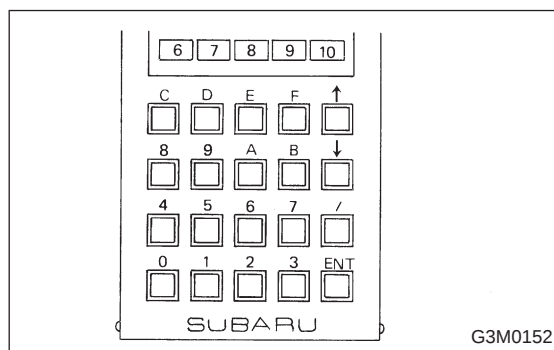


2) Designate mode using function key.

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



3) Ensure displayed message.



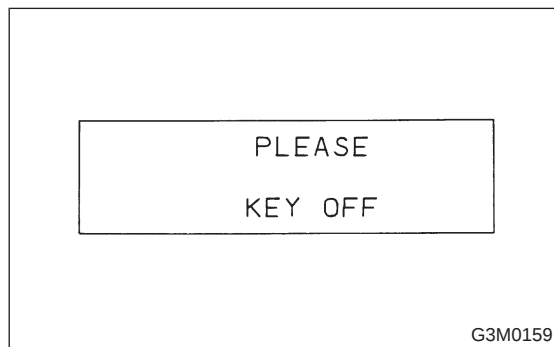
4) Press function key.

- When executing, (YES)

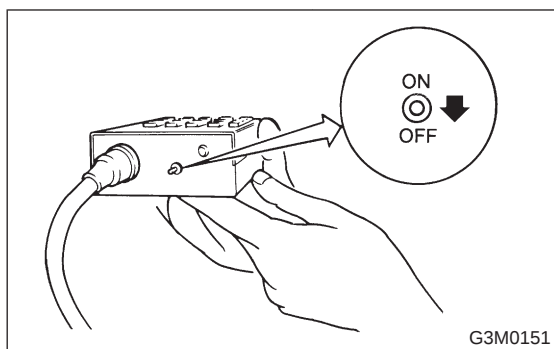
Press [0] [ENT] in that order.

- 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.



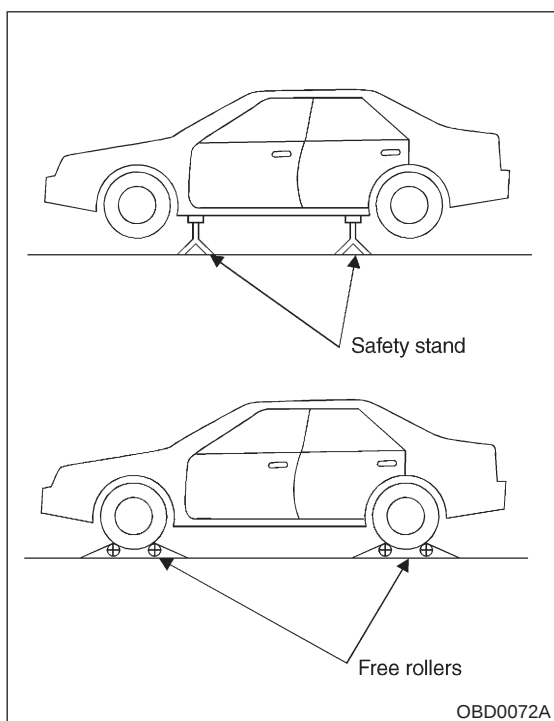
6) After the display is gone, turn Subaru select monitor switch and ignition switch to OFF.

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

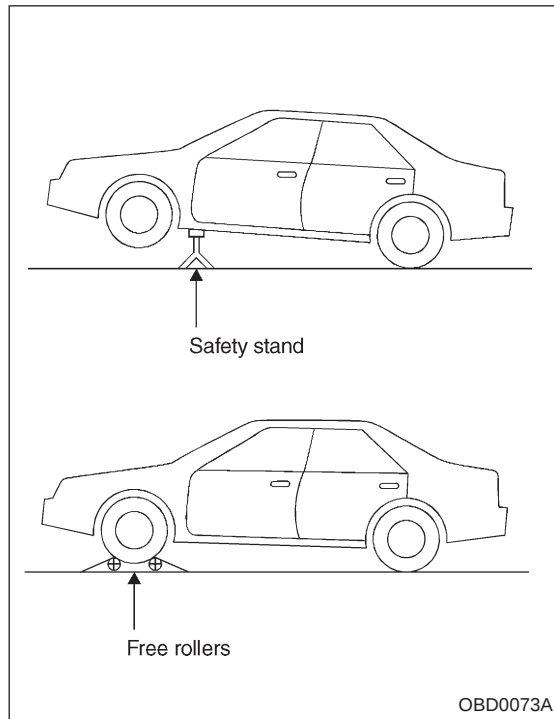
Raise the vehicle using a garage jack and place on safety stands or drive the vehicle onto free rollers.

● 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.

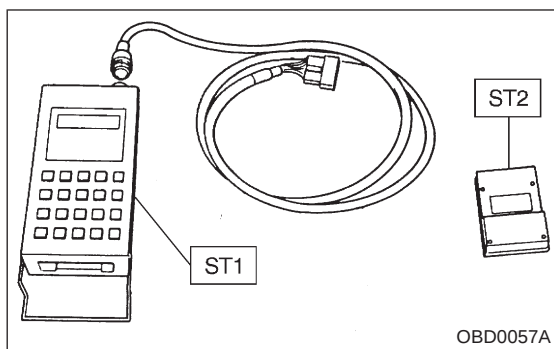
- Since the rear wheels will also rotating, do not place anything near them. Also, make sure that nobody goes in front of the vehicle.



- **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.



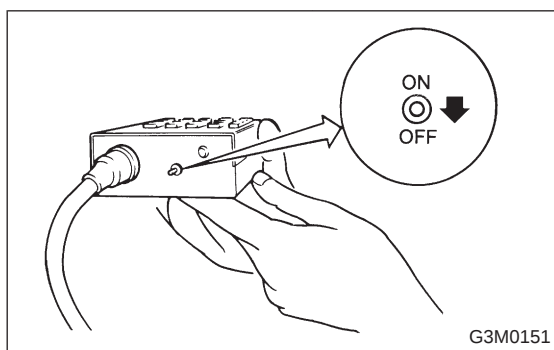
2. SUBARU SELECT MONITOR

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

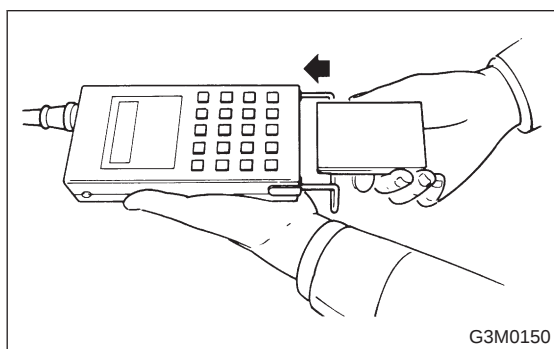
1) Prepare Subaru select monitor and cartridge.

ST1 498307500 SELECT MONITOR KIT

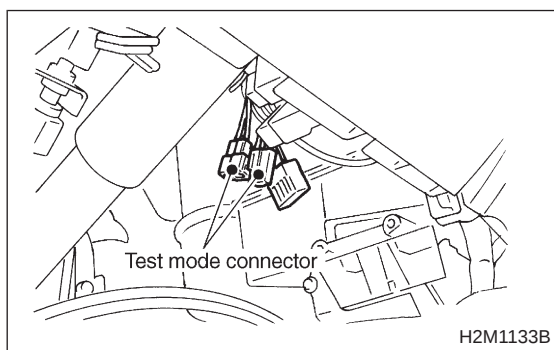
ST2 498345500 CARTRIDGE



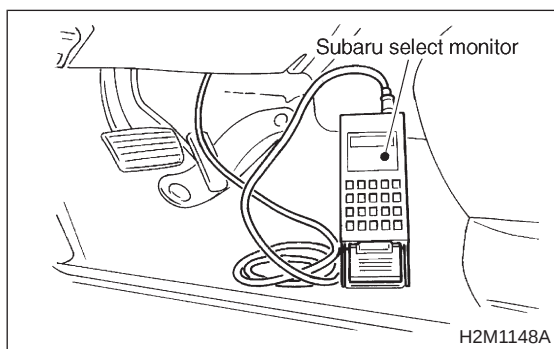
2) Turn ignition switch and monitor switch to OFF.



3) Insert cartridge into Subaru select monitor.

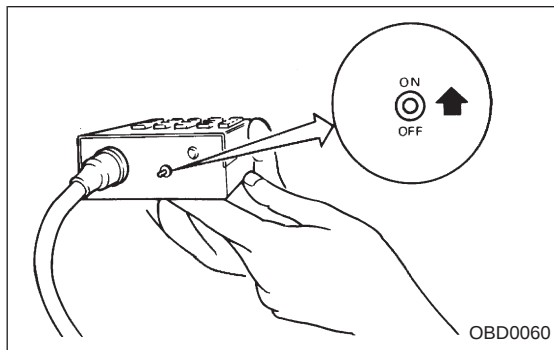
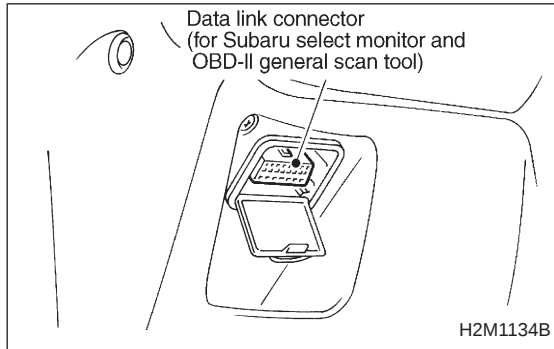
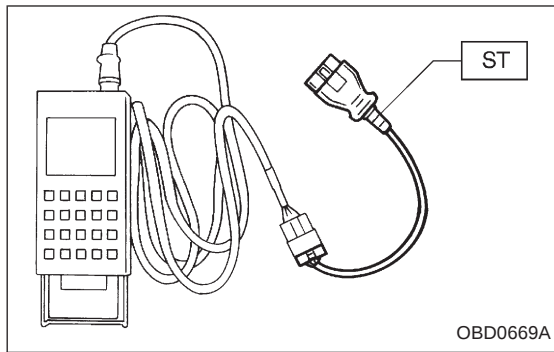


4) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



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.

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.

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

NOTE:

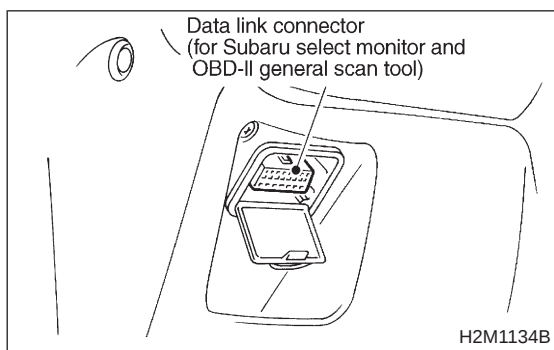
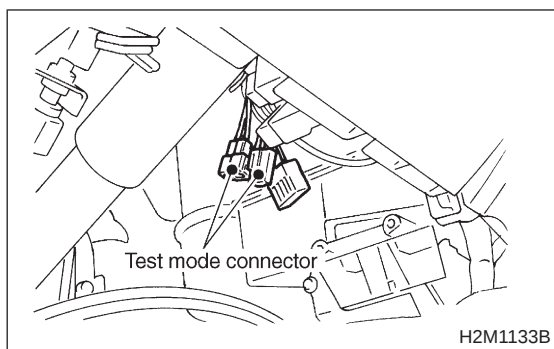
On models without tachometer, use the Subaru select monitor or tachometer (Secondary pickup type).

11) Place the selector lever or shift lever in the "D" position 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 warning light, but this indicates no malfunctions. When engine control diagnosis is finished, perform the ABS memory clearance procedure of self-diagnosis system. <Ref. to 4-4 [T1C2].>



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.

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.

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 and drive the vehicle at 5 to 10 km/h (3 to 6 MPH).

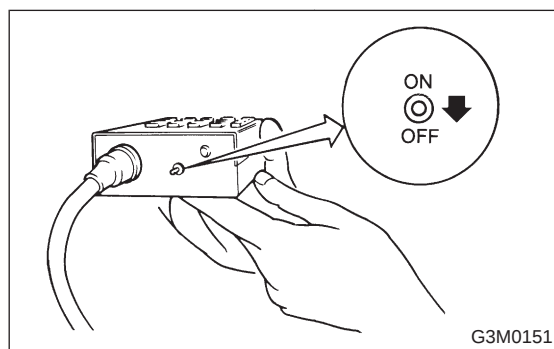
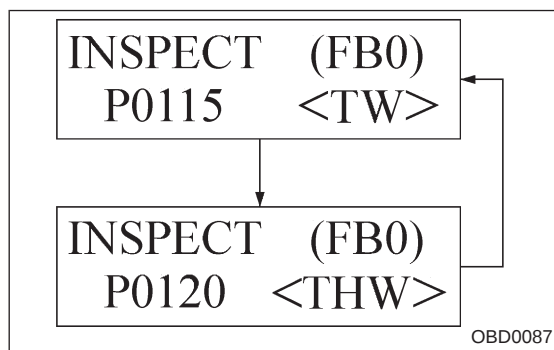
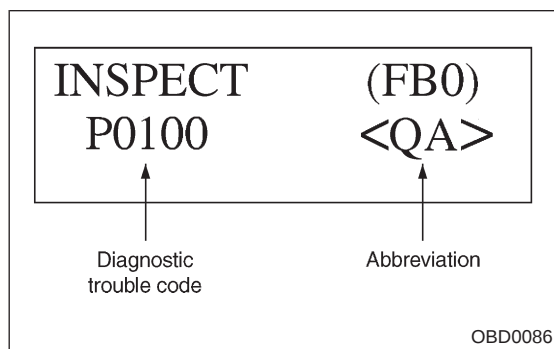
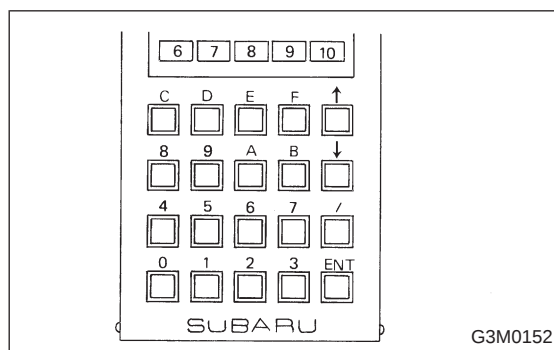
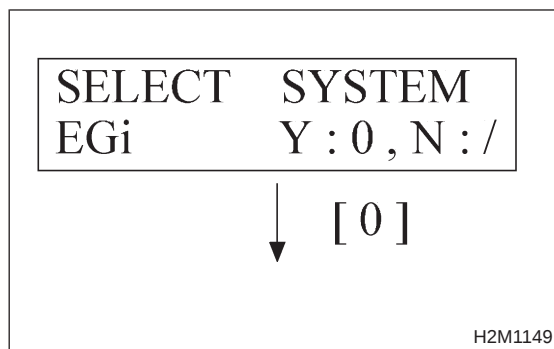
NOTE:

- On AWD vehicles, release the parking brake.
- The speed difference between front and rear wheels may light either the ABS warning light, but this indicates no malfunctions. When engine control diagnosis is finished, perform the ABS memory clearance procedure of self-diagnosis system. <Ref. to 4-4 [T1C2].>

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", 2-7b [T10A0].



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", 2-7b [T10A0].

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”

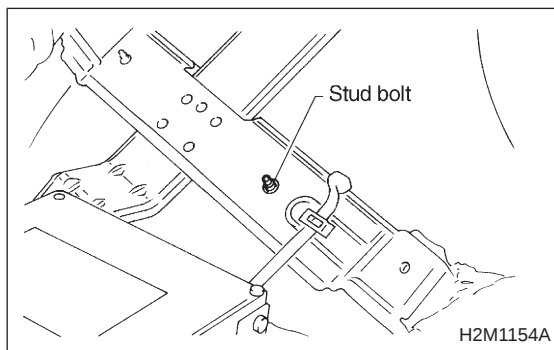
Airbag system wiring harness is routed near the engine control module (ECM), main relay and fuel pump relay.

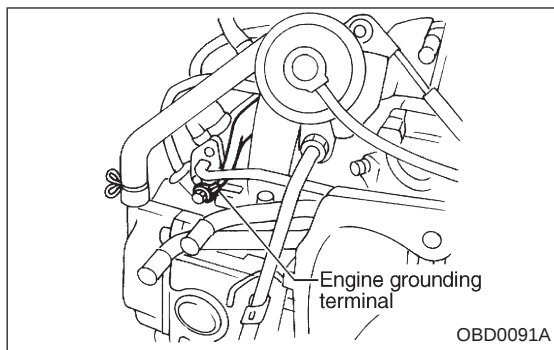
CAUTION:

- 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) Use ECM mounting stud bolts at the body head grounding point when measuring voltage and resistance inside the passenger compartment.





7) Use engine grounding terminal or engine proper as the grounding point to the body when measuring voltage and resistance in the engine compartment.

8) Every MFI-related part is a precision part. Do not drop them.

9) 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.

10) 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.

11) 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.

12) 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.

13) 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).

14) On ABS 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 memory clearance procedure of self-diagnosis system. <Ref. to 4-4 [T1C2].>

C: PRE-INSPECTION

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

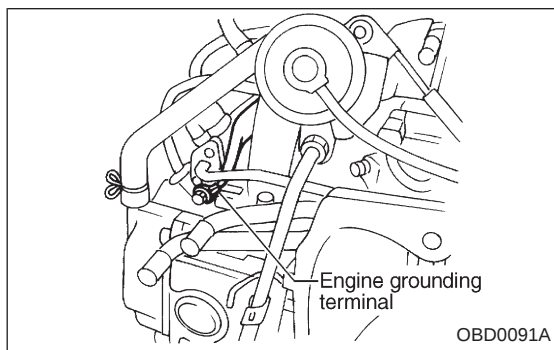
1. POWER SUPPLY

1) Measure battery voltage and specific gravity of electrolyte.

Standard voltage: 12 V

Specific gravity: Above 1.260

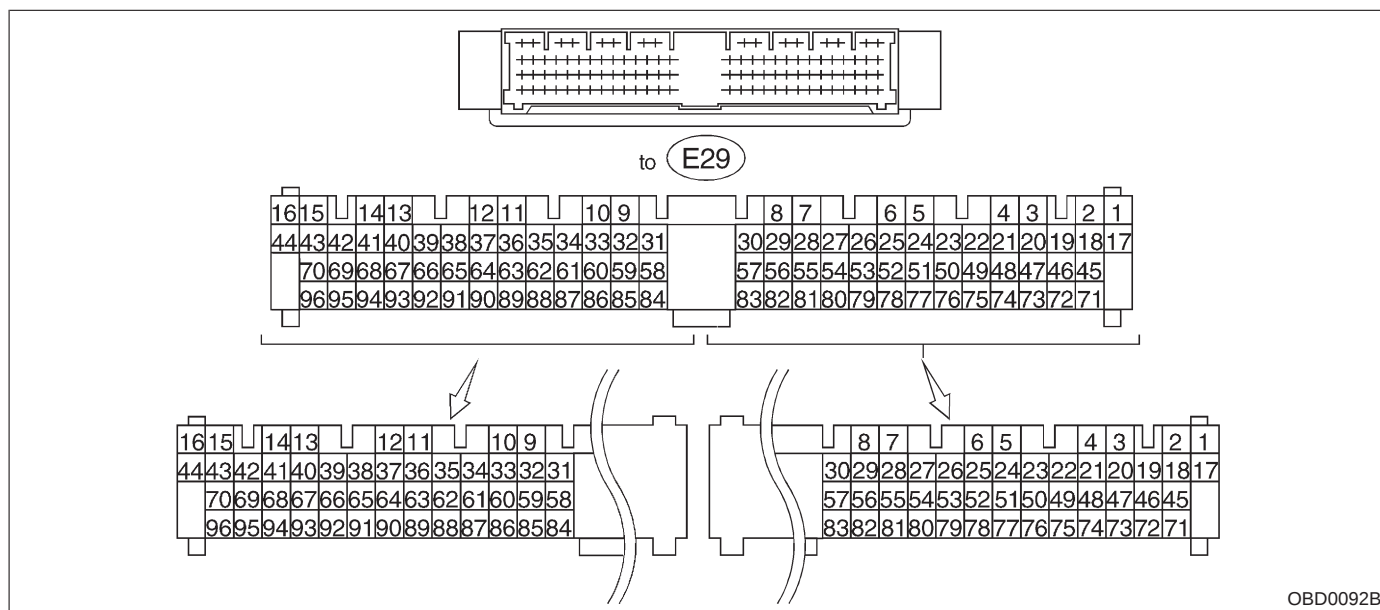
2) Check the condition of the main and other fuses, and harnesses and connectors. Also check for proper grounding.

**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



Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Crankshaft position sensor	Signal (+)	E29	8	0	-7 — +7	Sensor output waveform
	Signal (-)	E29	7	0	0	—
	Shield	E29	52	0	0	—
Camshaft position sensor	Signal (+)	E29	6	0	-7 — +7	Sensor output waveform
	Signal (-)	E29	5	0	0	—
	Shield	E29	52	0	0	—
Mass air flow sensor	Signal	E29	26	0 — 0.3	0.8 — 1.2	—
	Shield	E29	54	0	0	—
	GND	E29	25	0	0	—
Throttle position sensor	Signal	E29	24	Fully closed: 0.2 — 1.0 Fully opened: 4.2 — 4.7		—
	Power supply	E29	22	5	5	—
	GND	E29	25	0	0	—
Front oxygen sensor	Signal	E29	28	0	0 — 0.9	—
	Shield	E29	56	0	0	—
Rear oxygen sensor	Signal	E29	27	0	0 — 0.9	—
	Shield	E29	56	0	0	—
Engine coolant temperature sensor		E29	29	1.0 — 1.4	1.0 — 1.4	After warm-up
Vehicle speed sensor 2		E29	57	0 or 5	0 or 5	"5" and "0" are repeatedly displayed when vehicle is driven.
Starter switch		E29	81	0	0	Cranking: 8 to 14
A/C switch		E29	80	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
Ignition switch		E29	79	10 — 13	13 — 14	—

Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW	Engine ON (Idling)	
				ON (Engine OFF)		
Neutral position switch		E29	78	ON: 0 OFF: 5.0±0.5		Switch is ON when shift is in “N” or “P” position.
Test mode connector		E29	75	5	5	When connected: 0
Knock sensor	Signal	E29	30	2.8	2.8	—
	Shield	E29	56	0	0	—
Back-up power supply		E29	42	10 — 13	13 — 14	Ignition switch “OFF”: 10 — 13
Control unit power supply		E29	15	10 — 13	13 — 14	—
			16			
Ignition control	# 1, # 2	E29	14	0	1 — 3.4	—
	# 3, # 4	E29	13	0	1 — 3.4	—
Fuel injector	# 1	E29	2	10 — 13	1 — 14	Waveform
	# 2	E29	1	10 — 13	1 — 14	Waveform
	# 3	E29	18	10 — 13	1 — 14	Waveform
	# 4	E29	17	10 — 13	1 — 14	Waveform
Idle air control solenoid valve	OPEN end	E29	12	—	1 — 13	Waveform
	CLOSE end	E29	11	—	13 — 1	Waveform
Fuel pump relay control		E29	84	ON: 0.5, or less OFF: 10 — 13	0.5, or less	—
A/C relay control		E29	85	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—
Radiator fan relay 1 control		E29	77	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—
			88			
Radiator fan relay 2 control		E29	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		E29	86	10 — 13	13 — 14	—
Malfunction indicator lamp		E29	31	—	—	Light “ON”: 1, or less Light “OFF”: 10 — 14
Engine speed output		E29	33	—	0 — 13, or more	Waveform
Torque control signal		E29	49	5	5	—
Torque control cut signal		E29	36	8	8	—
Mass air flow signal for AT		E29	35	0 — 0.3	0.8 — 1.2	—
Purge control solenoid valve		E29	59	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—
Atmospheric pressure sensor		E29	23	3.9 — 4.1	2.0 — 2.3	—
Pressure sources switching solenoid valve		E29	58	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—
EGR solenoid valve		E29	60	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—
Front oxygen sensor heater signal		E29	44	0 — 1.0	0 — 1.0	—
Rear oxygen sensor heater signal		E29	43	0 — 1.0	0 — 1.0	—
AT diagnosis input signal		E29	48	Less than 1 ↔ More than 4	Less than 1 ↔ More than 4	Waveform
GND (sensors)		E29	25	0	0	—
GND (injectors)		E29	71	0	0	—
			72			
GND (ignition system)		E29	69	0	0	—

Content	Connector No.	Terminal No.	Signal (V)		Note
			Ignition SW	Engine ON (Idling)	
			ON (Engine OFF)		
GND (power supply)	E29	95	0	0	—
		96			
GND (control systems)	E29	45	0	0	—
		46			
GND (oxygen sensor heater)	E29	70	0	0	—

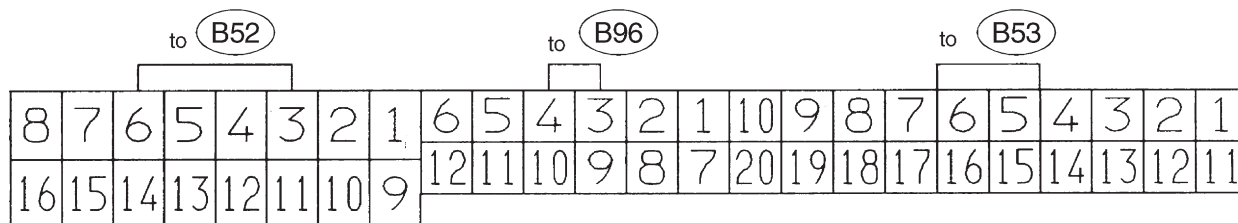
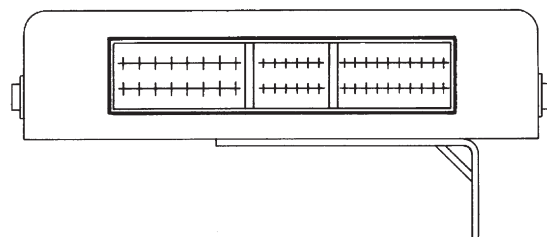
2. ENGINE CONDITION DATA

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:

- 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



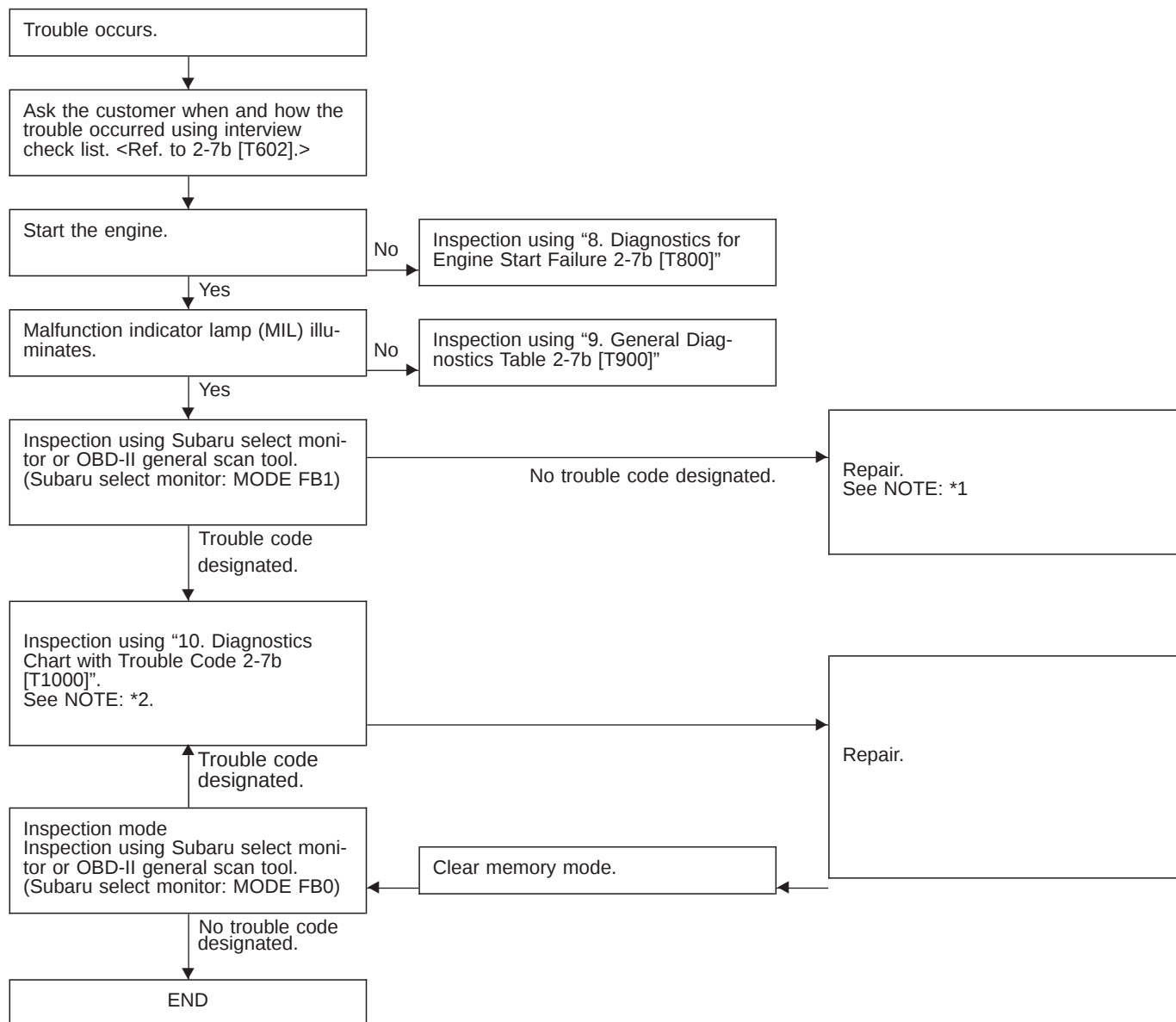
OBD0093B

Check with ignition switch ON.

Content		Connector No.	Terminal No.	Measuring conditions	Voltage (V)
Back-up power supply		B53	14	Ignition switch OFF	10 — 16
Ignition power supply		B96	6	Ignition switch ON (with engine OFF)	10 — 16
		B52	1		
Inhibitor switch	“P” range switch	B53	9	Selector lever in “P” range	Less than 1
				Selector lever in any other than “P” range	More than 8
	“N” range switch	B53	8	Selector lever in “N” range	Less than 1
				Selector lever in any other than “N” range	More than 8
	“R” range switch	B53	10	Selector lever in “R” range	Less than 1
				Selector lever in any other than “R” range	More than 6
	“D” range switch	B96	1	Selector lever in “D” range	Less than 1
				Selector lever in any other than “D” range	More than 6
	“3” range switch	B96	2	Selector lever in “3” range	Less than 1
				Selector lever in any other than “3” range	More than 6
	“2” range switch	B96	3	Selector lever in “2” range	Less than 1
				Selector lever in any other than “2” range	More than 6
	“1” range switch	B96	4	Selector lever in “1” range	Less than 1
				Selector lever in any other than “1” range	More than 6
Brake switch		B53	7	Brake pedal depressed	More than 10.5
				Brake pedal released	Less than 1
ABS signal		B53	5	ABS switch ON	Less than 1
				ABS switch OFF	More than 6.5
AT diagnostics signal		B52	12	Ignition switch ON (with engine OFF)	Less than 1
				Ignition switch ON (with engine ON)	More than 10
Diagnosis switch		B53	6	Diagnosis connector connected.	Less than 1
				Diagnosis connector disconnected.	More than 6

Content	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
Throttle position sensor	B96	8	Throttle fully closed.	0.3 — 0.7	—
			Throttle fully open.	4.3 — 4.9	
Throttle position sensor power supply	B53	19	Ignition switch ON (with engine OFF)	4.8 — 5.3	—
ATF temperature sensor	B96	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	B96	12	Vehicle stopped.	0	450 — 720
			Vehicle speed at least 20 km/h (12 MPH)	More than 1 (AC range)	
Vehicle speed sensor 2	B53	11	When vehicle is slowly moved at least 2 meters (7ft).	Less than 1 ↔ More than 4	—
Engine speed signal	B96	5	Ignition switch ON (with engine OFF).	More than 10.5	—
			Ignition switch ON (with engine ON).	8 — 11	
Cruise set signal	B53	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	B52	16	Ignition switch ON	4 — 6	—
Torque control cut signal	B53	16	Ignition switch ON	6 — 9	—
Mass air flow signal	B96	9	Engine idling after warm-up	0.5 — 1.2	—
Shift solenoid 1	B52	14	1st or 4th gear	More than 9	20 — 32
			2nd or 3rd gear	Less than 1	
Shift solenoid 2	B52	13	1st or 2nd gear	More than 9	20 — 32
			3rd or 4th gear	Less than 1	
Shift solenoid 3	B52	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	B52	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 1	
Dropping resistor	B52	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	B52	5	When lock up occurs.	More than 8.5	9 — 17
			When lock up is released.	Less than 0.5	
Duty solenoid C	B52	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	B96	7	—	0	Less than 1
Sensor ground line 2	B53	20	—	0	Less than 1
System ground line	B53	1	—	0	Less than 1
Power system ground line	B52	10	—	0	Less than 1
FWD switch	B53	2	Fuse removed.	6 — 9.1	—
			Fuse installed.	Less than 1	
Data link signal (Subaru select monitor)	B53	12	—	—	—
		13	—	—	
AT diagnosis signal	B53	11	Ignition switch ON	Less than 1 ↔ More than 4	—

6. 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. <Ref. to "7. Diagnostics for CHECK ENGINE Malfunction Indicator Lamp (MIL), 2-7b [T700]".>

*2: Carry out the basic check, only when trouble code about automatic transmission is shown on display. <Ref. to 2-7b [T601].>

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 [W200], [W300].

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	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Other___		
Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (approx. ___ °F/ ___ °C)		
Place	☐ Highway ☐ Suburbs ☐ Inner City ☐ Uphill ☐ Downhill ☐ Rough road ☐ Other_____		
Engine Temp.	☐ Cold ☐ Warming-up ☐ After warming-up ☐ Any temp. ☐ Other		
Engine speed			
Driving conditions	☐ Not affected ☐ At starting ☐ While idling ☐ At racing ☐ While accelerating ☐ While cruising ☐ While decelerating ☐ While turning (RH/LH) Vehicle speed		
Headlight	☐ ON / ☐ OFF		
Blower	☐ ON / ☐ OFF		
A/C compressor	☐ ON / ☐ OFF		
Cooling fan	☐ ON / ☐ OFF		
Front wiper	☐ ON / ☐ OFF		
Rear wiper	☐ ON / ☐ OFF		
Rear defogger	☐ ON / ☐ OFF		
Radio	☐ ON / ☐ OFF		
CD/Cassette	☐ ON / ☐ OFF		
Car phone	☐ ON / ☐ 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. ☐ Yes / ☐ No
☐ ① Low fuel warning light
☐ ② Charge indicator light
☐ ③ AT diagnostics indicator light
☐ ④ ABS warning light
☐ ⑤ Engine oil pressure warning light
b) Fuel level
● Lack of gasoline: ☐ Yes / ☐ No
● Indicator position of fuel gauge:
c) Intentional connecting or disconnecting of harness connectors or spark plug cords: ☐ Yes / ☐ No
● What:
d) Intentional connecting or disconnecting of hoses: ☐ Yes / ☐ No
● What:
e) Installing of parts other than genuine parts ☐ Yes / ☐ No
● What:
● Where:
f) Occurrence of noise ☐ Yes / ☐ No
● From where:
● What kind:
g) Occurrence of smell ☐ Yes / ☐ No
● From where:
● What kind:
h) Intrusion of water into engine compartment or passenger compartment ☐ Yes / ☐ No
i) Troubles occurred
☐ ① Engine does not start.
☐ ② Engine stalls during idling.
☐ ③ Engine stalls while driving.
☐ ④ Engine speed decreases.
☐ ⑤ Engine speed does not decrease.
☐ ⑥ Rough idling
☐ ⑦ Poor acceleration
☐ ⑧ Back fire
☐ ⑨ After fire
☐ ⑩ No shift
☐ ⑪ Excessive shift shock

NOTE: Use copies of this page for interviewing customers.

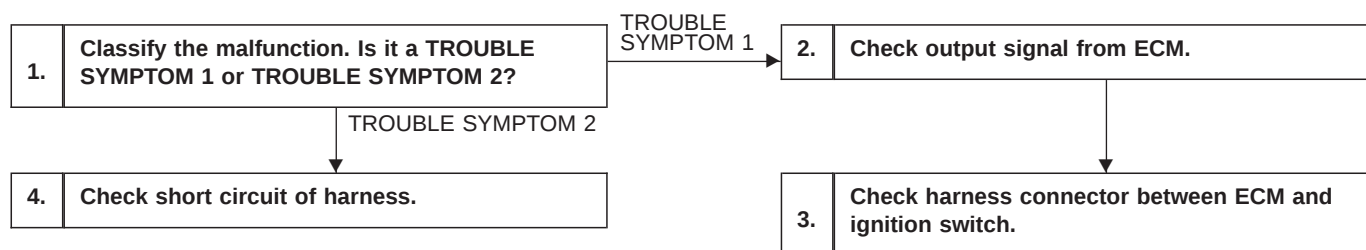
7. Diagnostics for CHECK ENGINE Malfunction Indicator Lamp (MIL)

DIAGNOSIS:

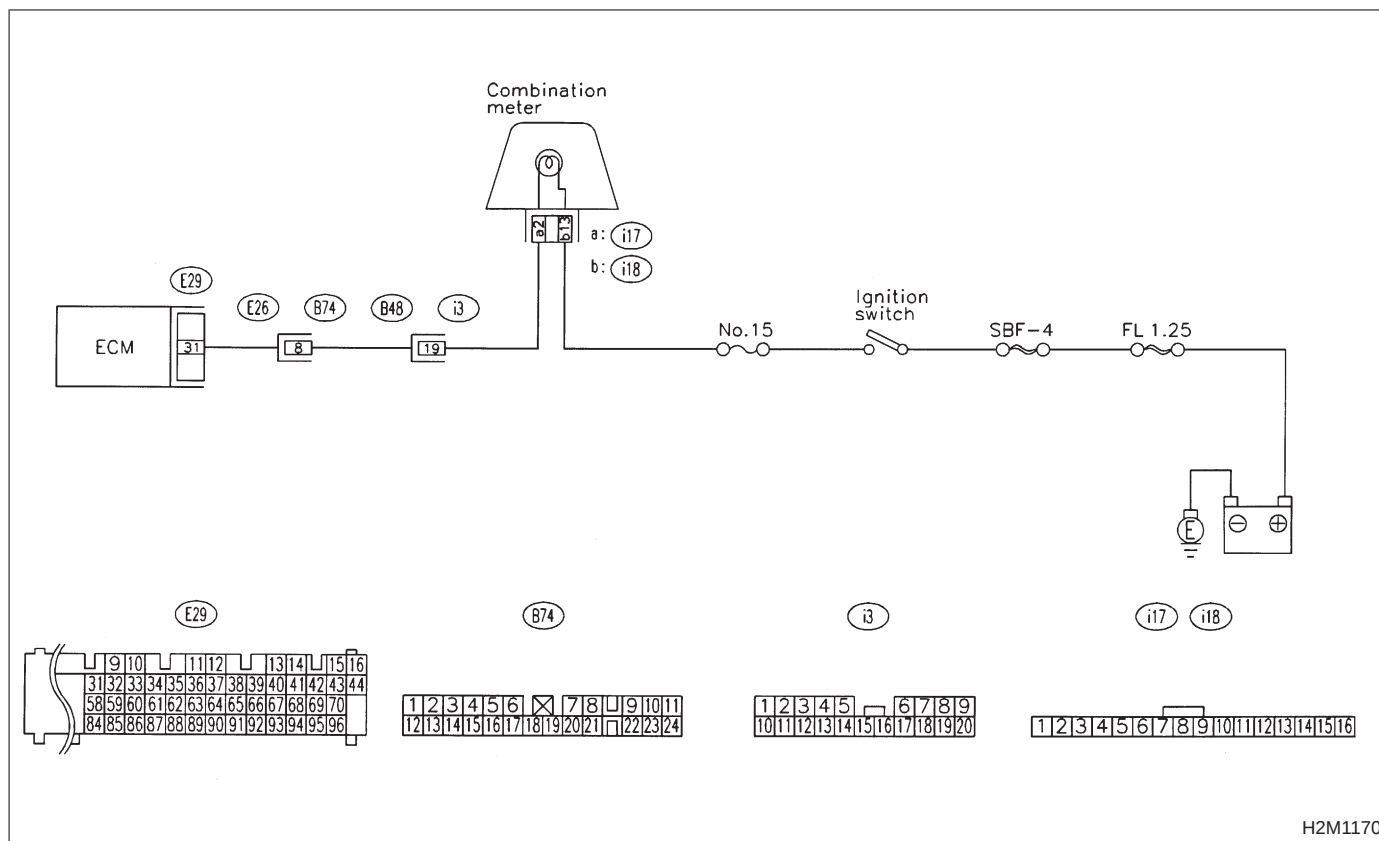
- The CHECK ENGINE malfunction indicator lamp (MIL) circuit is in short or open.

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:



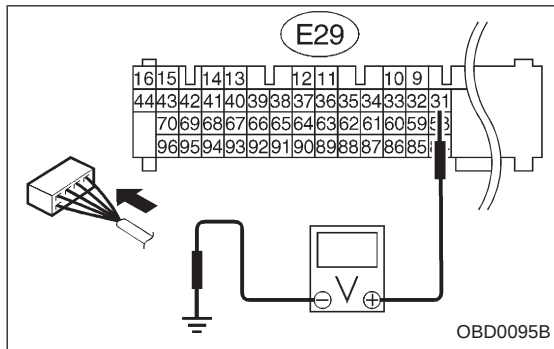
H2M1170

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.

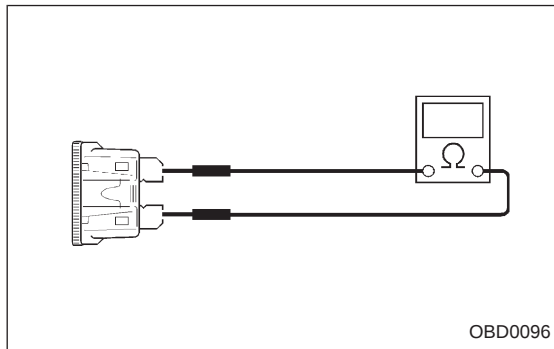
1) Turn ignition switch to ON.

2) Measure voltage between ECM and body.

CHECK : **Connector & terminal (E29) 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 connectors (B48) and (B74) are correctly connected as the wiring diagram shows.

4**CHECK SHORT CIRCUIT OF HARNESS.**

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

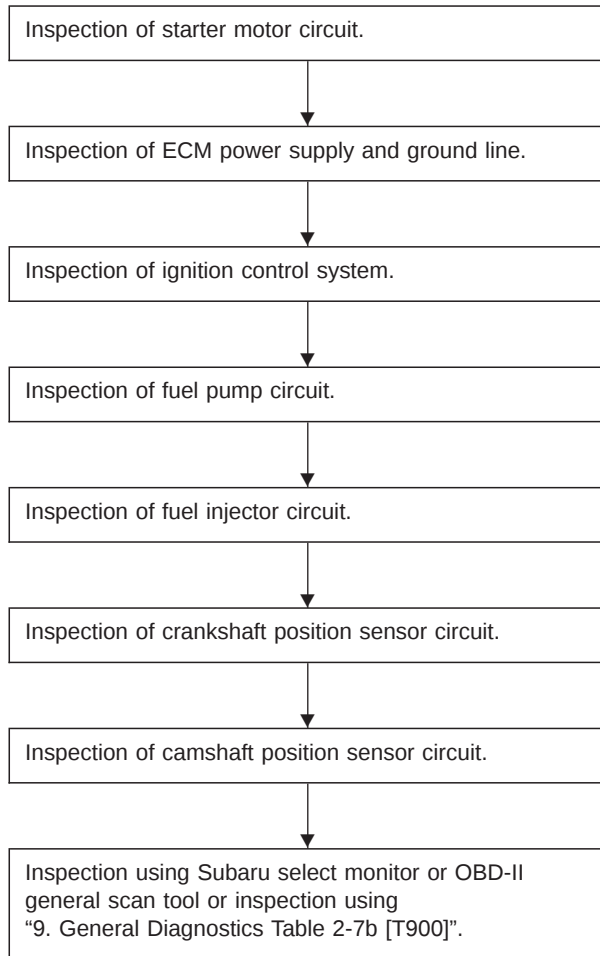
CHECK : ***Does the MIL comes on?***

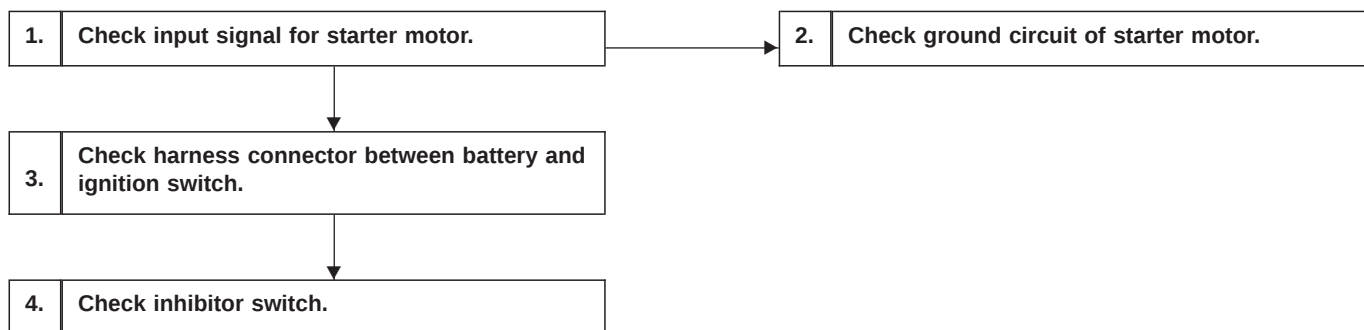
YES : Repair short circuit of harness between ECM and combination meter.

NO : Replace ECM.

8. Diagnostics for Engine Starting Failure

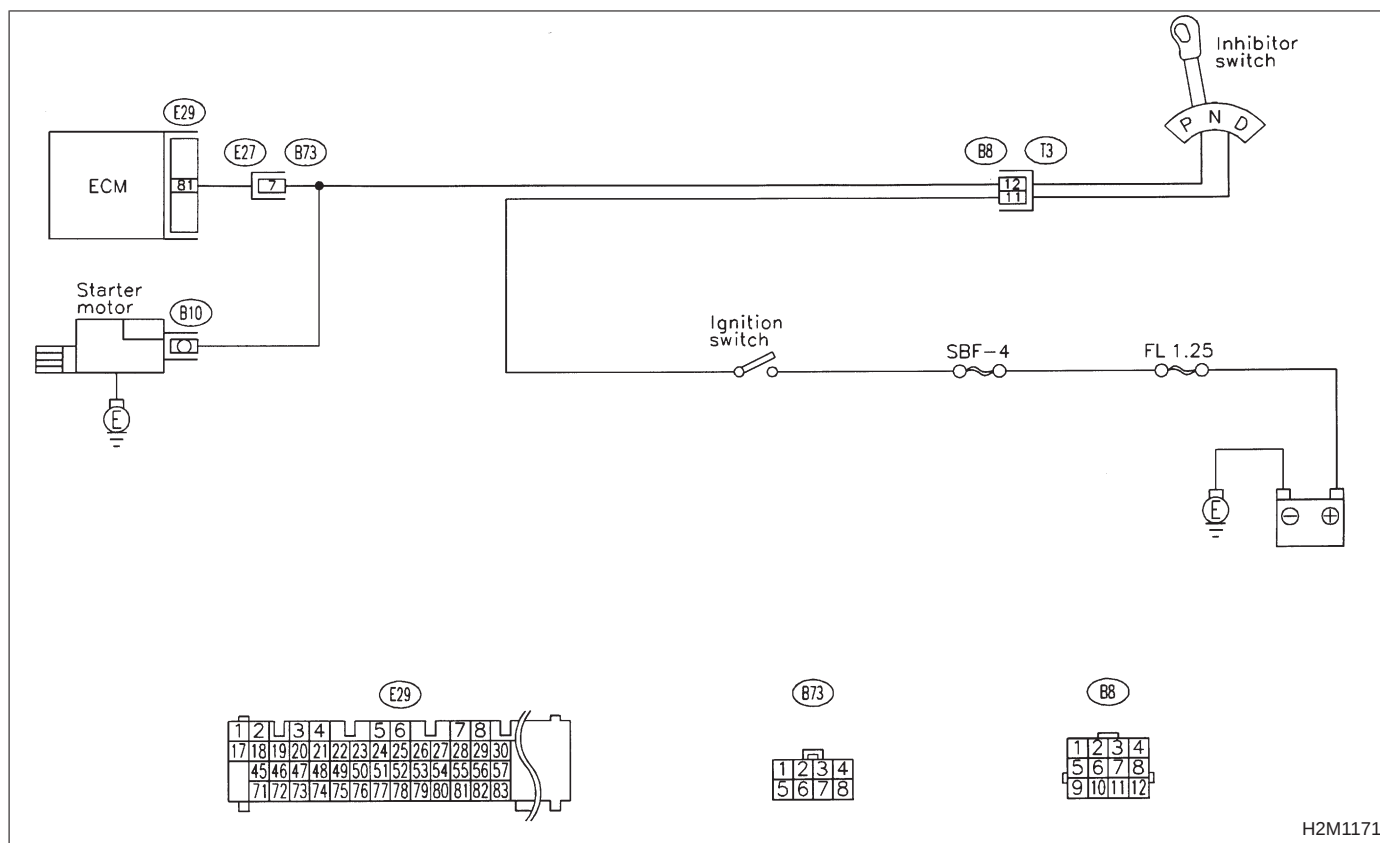
A: BASIC DIAGNOSTICS CHART

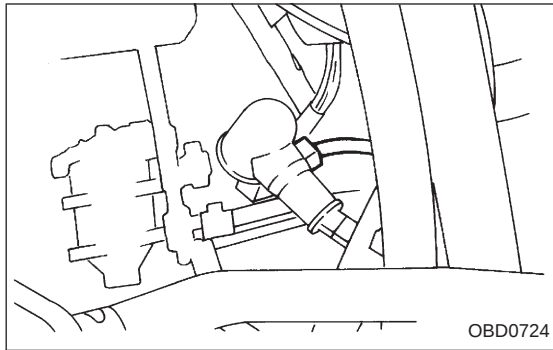


B: STARTER MOTOR CIRCUIT**CAUTION:**

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

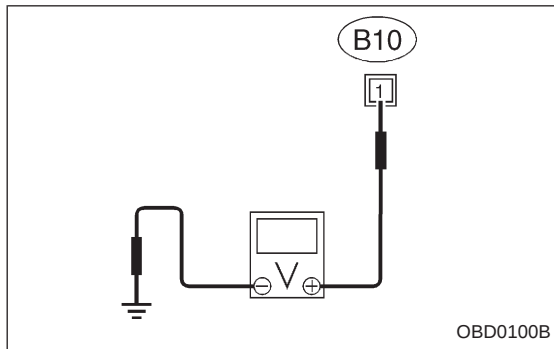
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



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.

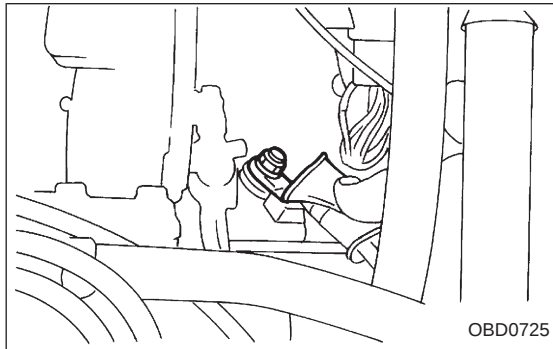
CHECK : **Connector & terminal (B10) No. 1 — Body/10 V, or more**

NOTE:

Place the selector lever in the "P" or "N" position.

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 5 Ω?**

YES : Check starter motor. <Ref. to 6-1 [T100].>

NO : Repair open circuit of ground cable.

3 CHECK HARNESS CONNECTOR BETWEEN BATTERY AND IGNITION SWITCH.

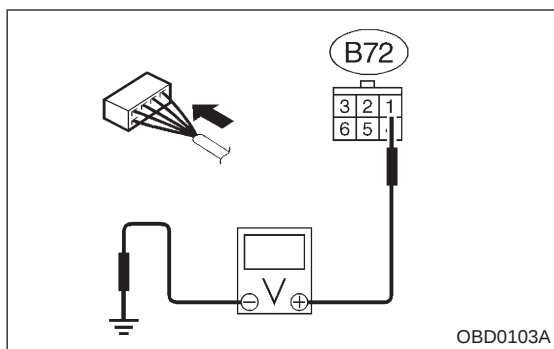
- 1) Turn ignition switch to OFF.
- 2) Remove SBF No. 4 from main fuse box.
- 3) Measure resistance of fuse.

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.

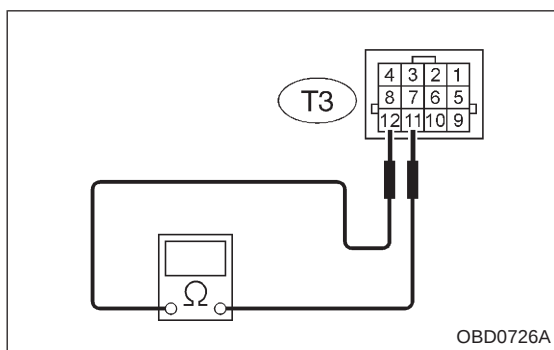


6) Measure power supply voltage between ignition switch connector and body.

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.

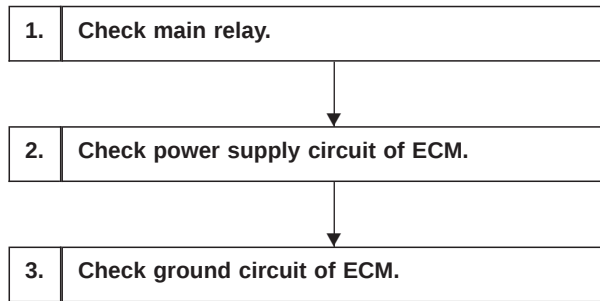
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from transmission.
- 3) Measure resistance between transmission harness connector receptacle's terminals.

CHECK : **Connector & terminal**
(T3) No. 11 — No. 12/1 Ω, or less

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

NO : Repair or replace inhibitor switch.

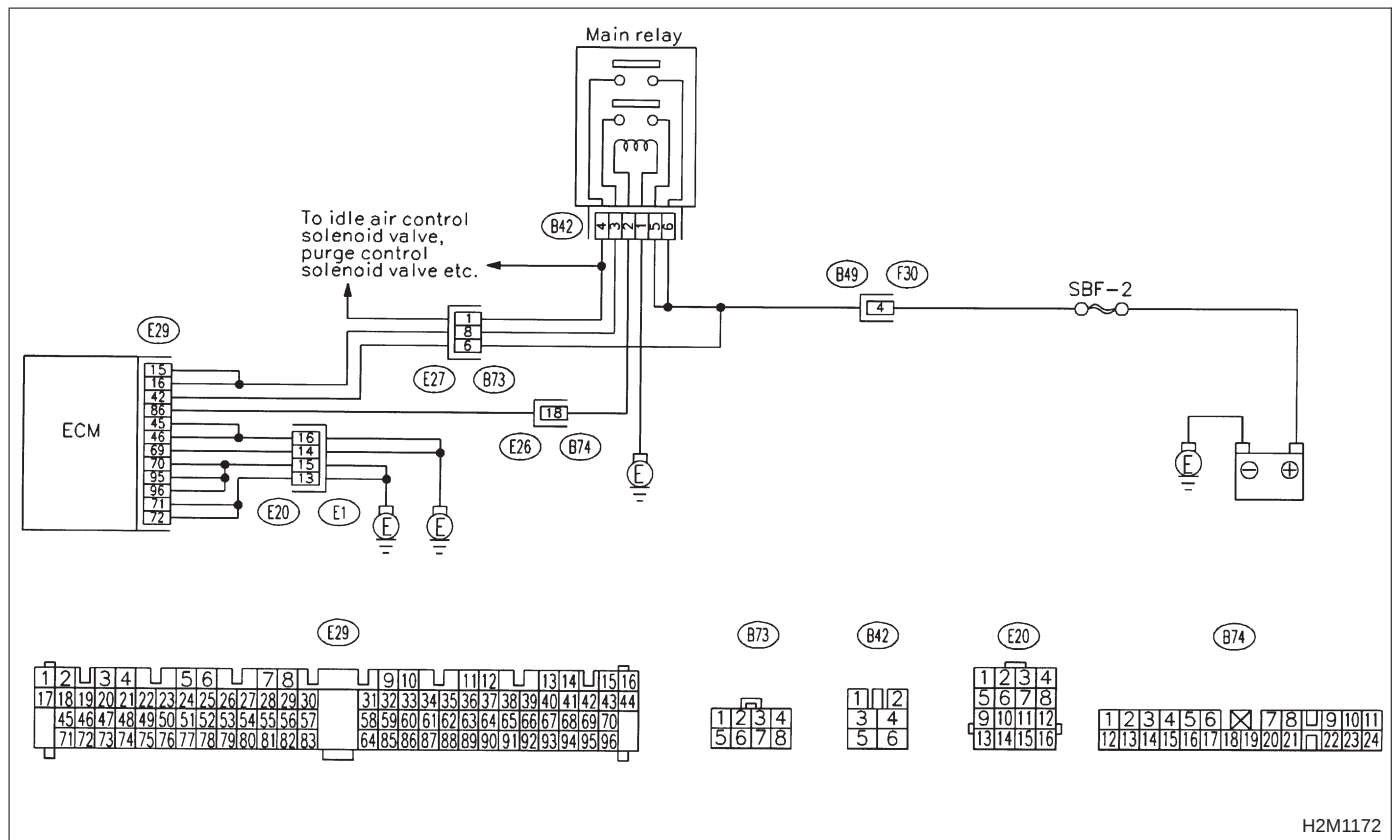
C: CONTROL MODULE POWER SUPPLY AND GROUND LINE

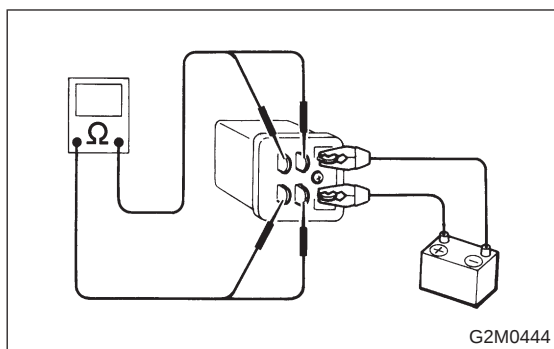


CAUTION:

After repair or replacement of faulty parts, conduct
CLEAR MEMORY and **INSPECTION MODES**.
 <Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:





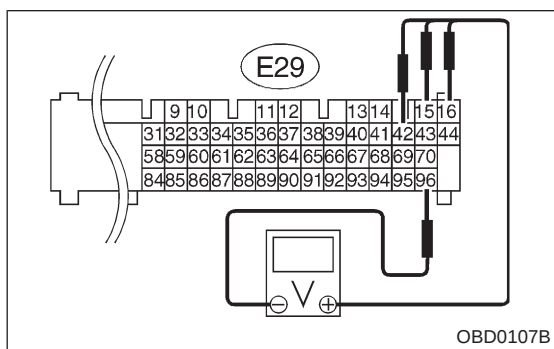
1 CHECK MAIN RELAY.

- 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.



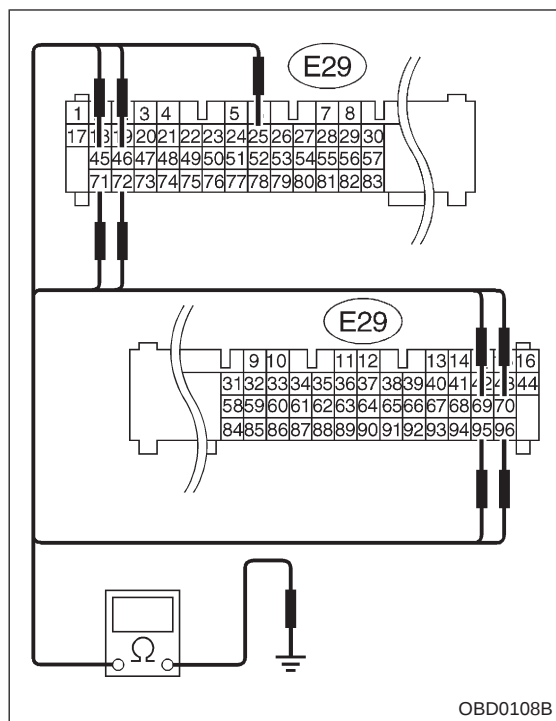
2 CHECK POWER SUPPLY CIRCUIT OF ECM.

- 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**
(E29) No. 15 — No. 96/10 V, or more
(E29) No. 16 — No. 96/10 V, or more
(E29) No. 42 — No. 96/10 V, or more

YES : Go to step 3.

NO : Repair harness of power supply circuit.



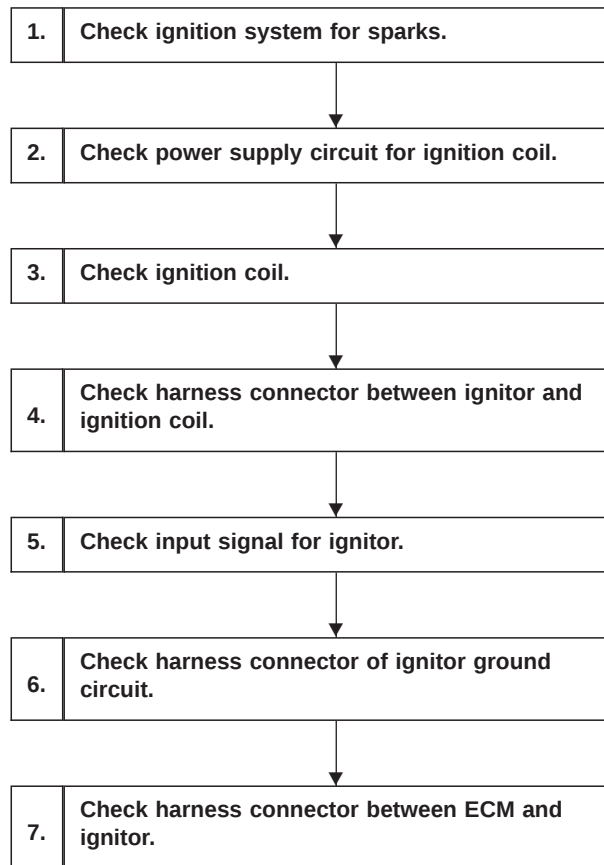
3 CHECK GROUND CIRCUIT OF ECM.

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

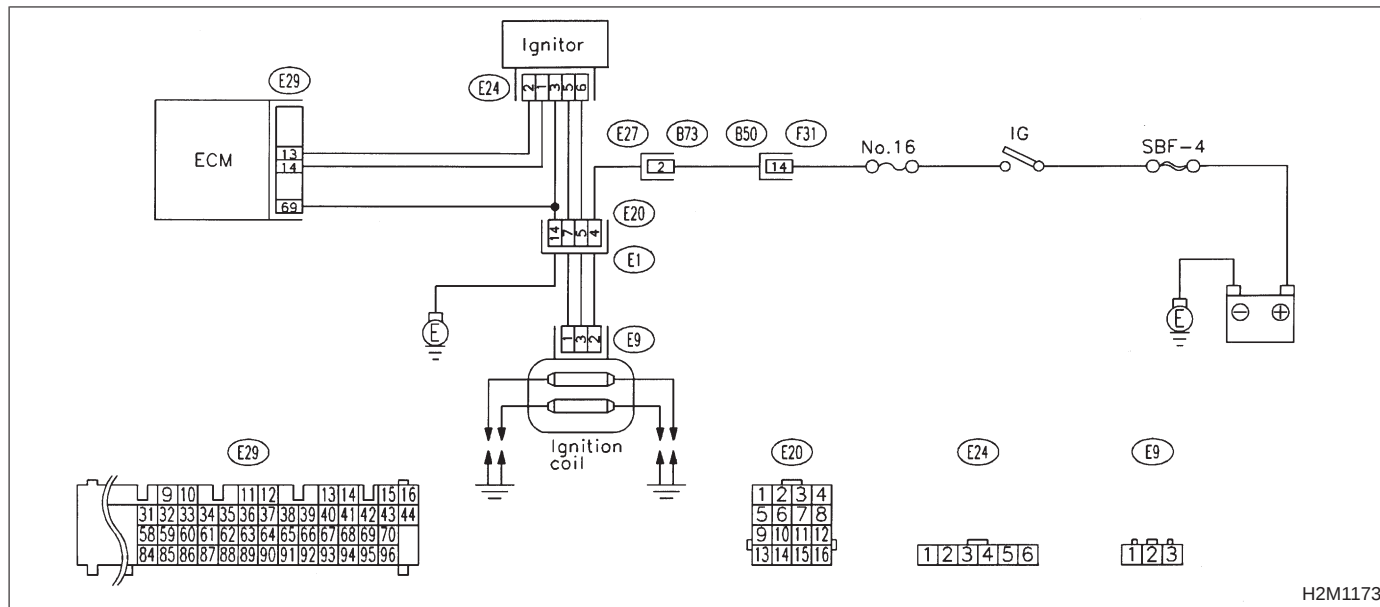
CHECK : **Connector & terminal**
(E29) No. 25 — Body/5 Ω, or less
(E29) No. 45 — Body/5 Ω, or less
(E29) No. 46 — Body/5 Ω, or less
(E29) No. 69 — Body/5 Ω, or less
(E29) No. 70 — Body/5 Ω, or less
(E29) No. 71 — Body/5 Ω, or less
(E29) No. 72 — Body/5 Ω, or less
(E29) No. 95 — Body/5 Ω, or less
(E29) No. 96 — Body/5 Ω, or less

YES : Check ignition control system. <Ref. to 2-7b [T8D0].>

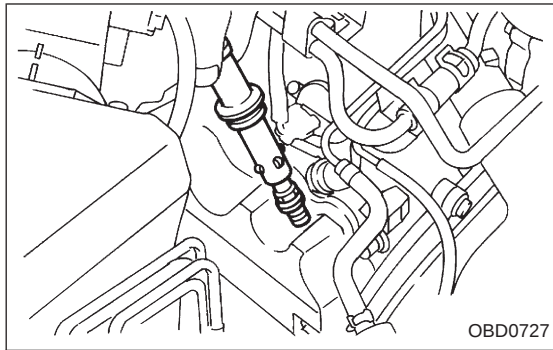
NO : Repair harness between ECM connector and body.

D: IGNITION CONTROL SYSTEM**CAUTION:**

After repair or replacement of faulty parts, conduct
CLEAR MEMORY and **INSPECTION MODES**.
 <Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:

H2M1173



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:

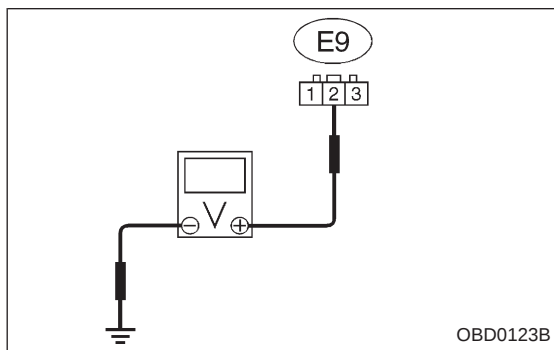
Do not remove spark plug from engine.

- 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 2-7b [T8E0].>

NO : Go to step 2.



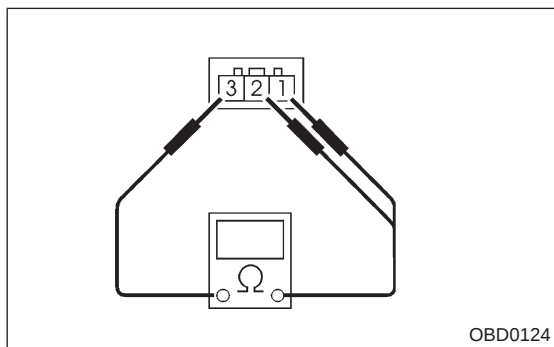
2 CHECK POWER SUPPLY CIRCUIT FOR IGNITION COIL.

- 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 (E9) 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.

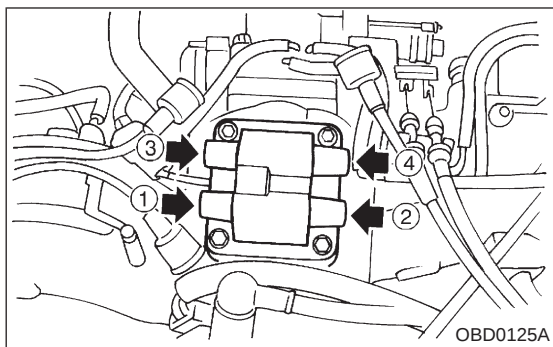
CHECK : **Terminals**

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.

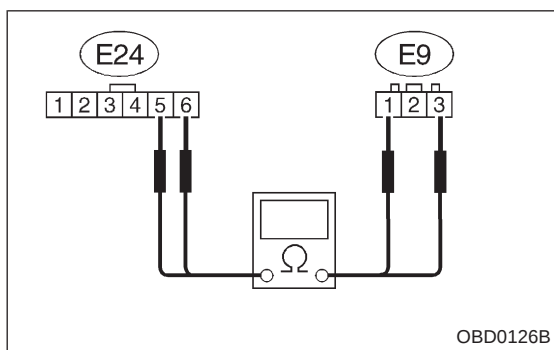


2) Measure resistance between spark plug cord contact portions to check secondary coil.

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**
 (E24) No. 5 — (E9) No. 1/1 Ω, or less
 (E24) No. 6 — (E9) No. 3/1 Ω, or less

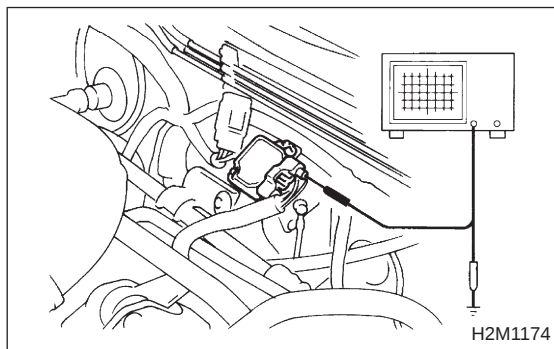
YES : Go to step 5.

NO : Go to next **CHECK** .

CHECK : **Is there poor contact in coupling connector (B20)?**

YES : Repair poor contact in coupling connector.

NO : Repair harness between ignition coil and ignitor connector.



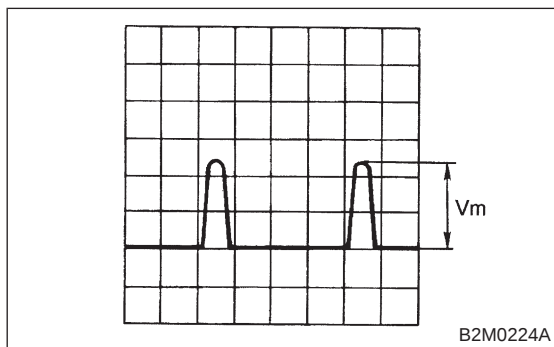
5 CHECK INPUT SIGNAL FOR IGNITOR.

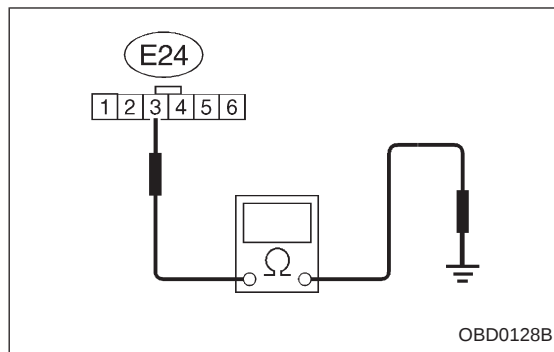
Check if voltage varies synchronously with engine speed when cranking, while monitoring voltage between ignitor connector and body.

CHECK : **Connector & terminal:**
 (E24) No. 1 — Body/10 V, or more
 (E24) No. 2 — Body/10 V, or more

YES : Go to step 6.

NO : Replace ignitor.



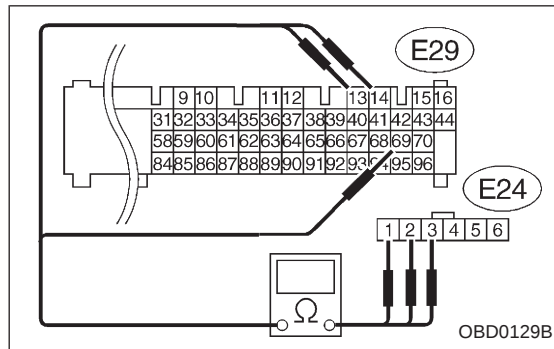
**6****CHECK HARNESS CONNECTOR OF IGNITOR GROUND CIRCUIT.**

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

CHECK : **Connector & terminal**
(E24) No. 3 — Body/5 Ω, or less

YES : Go to step 7.

NO : Repair harness between ignitor connector and body.

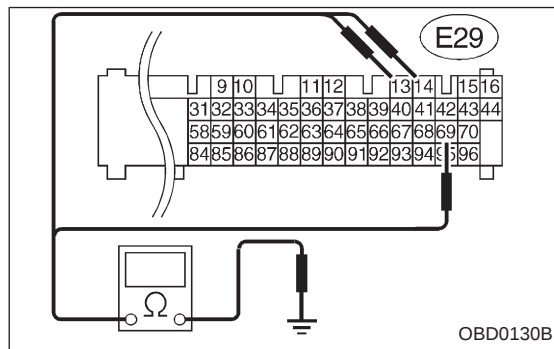
**7****CHECK HARNESS CONNECTOR BETWEEN ECM AND IGNITOR.**

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

CHECK : **Connector & terminal**
(E29) No. 14 — (E24) No. 1/1 Ω, or less
(E29) No. 13 — (E24) No. 2/1 Ω, or less
(E29) No. 69 — (E24) No. 3/1 Ω, or less

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

YES : Go to next step.



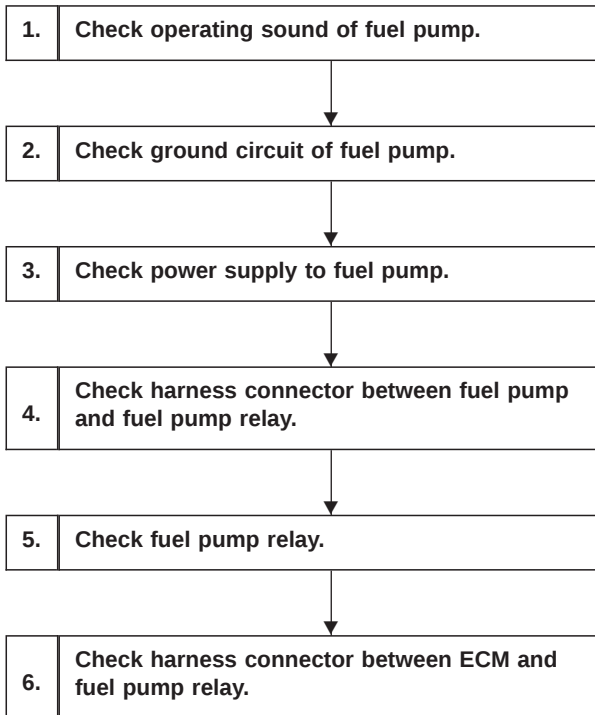
- 3) Measure resistance of harness connector between ECM and body.

CHECK : **Connector & terminal**
(E29) No. 13 — Body/1 MΩ, or more
(E29) No. 14 — Body/1 MΩ, or more

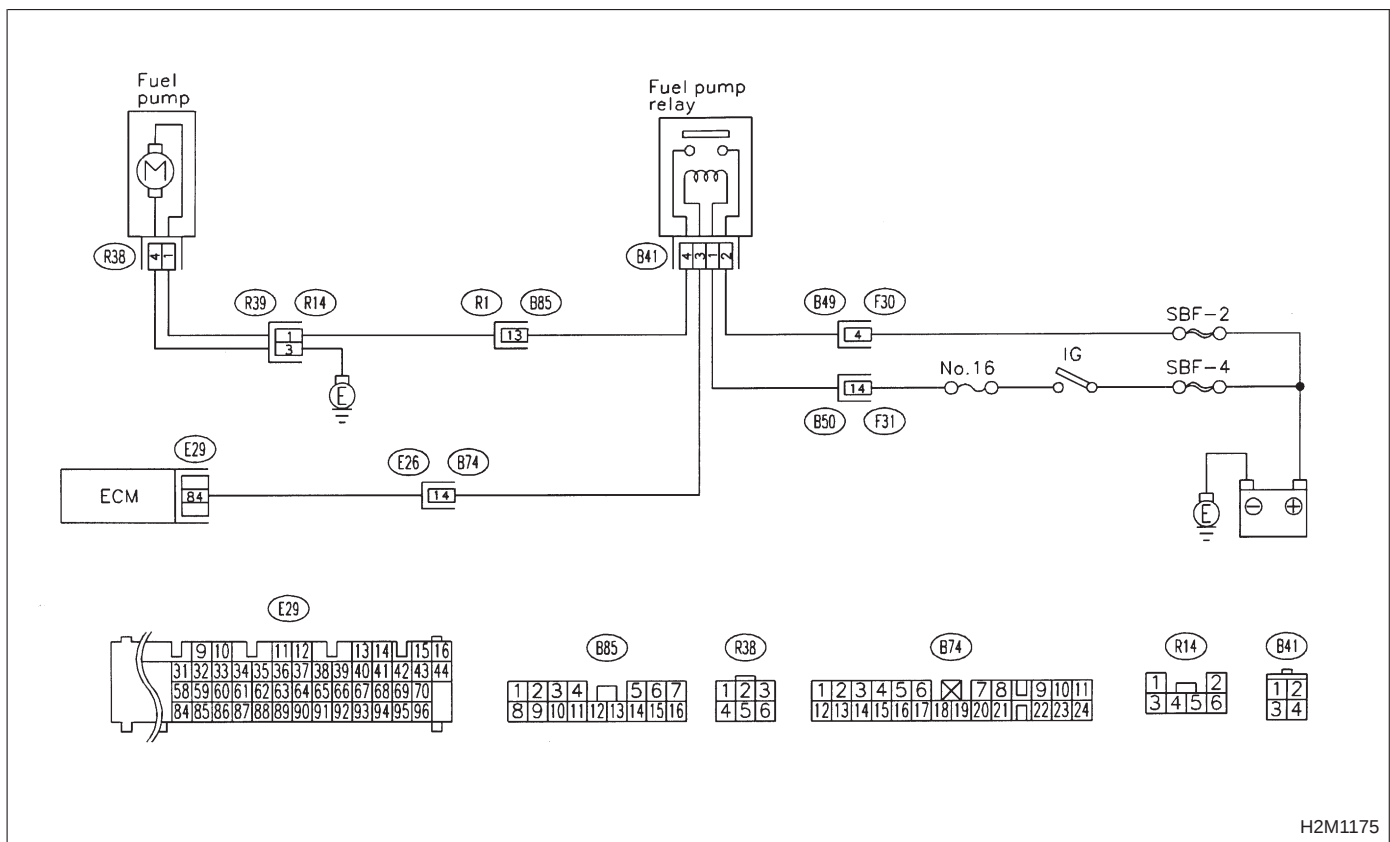
NO : Repair short circuit of harness between ECM and ignitor.

YES : Confirm good connection in ECM connector.

E: FUEL PUMP CIRCUIT



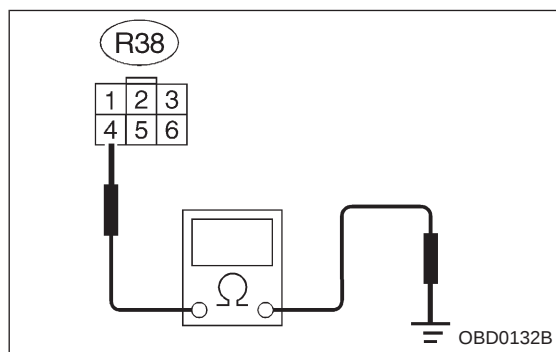
WIRING DIAGRAM:



1 CHECK OPERATING SOUND OF FUEL PUMP.

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

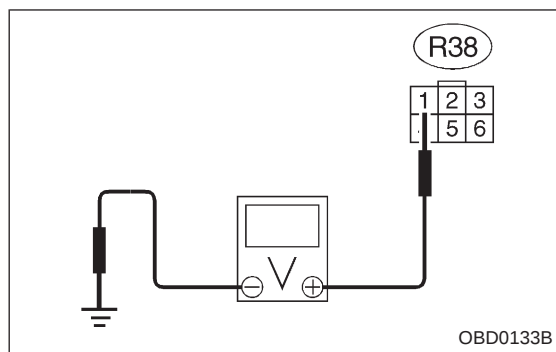
- CHECK** : **Does fuel pump produce operating sound?**
YES : Check fuel injector circuit. <Ref. to 2-7b [T10Q0].>
NO : Go to step 2.



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.

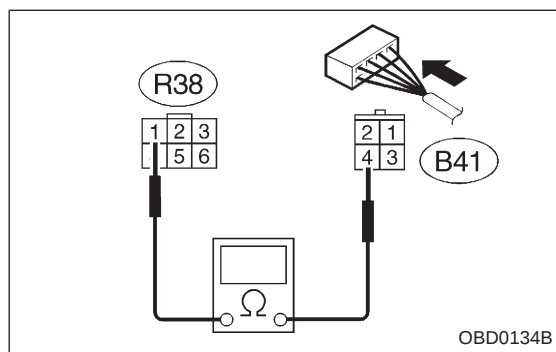
- CHECK** : **Connector & terminal (R38) No. 4 — Body/5 Ω, or less**
YES : Go to step 3.
NO : Repair open circuit of fuel pump ground circuit.



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 (R38) No. 1 — Body/10 V, or more**
YES : Go to next **CHECK** .
NO : Go to step 4.
CHECK : **Is there poor contact in fuel pump connector?**
YES : Repair poor contact in fuel pump connector.
NO : Replace fuel pump.

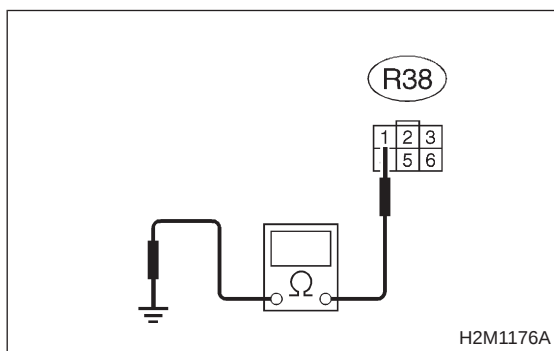


4 CHECK HARNESS CONNECTOR BETWEEN FUEL PUMP AND FUEL PUMP RELAY.

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

- CHECK** : **Connector & terminal (R38) No. 1 — (B41) No. 4/1 Ω, or less**
YES : Go to next **CHECK** .

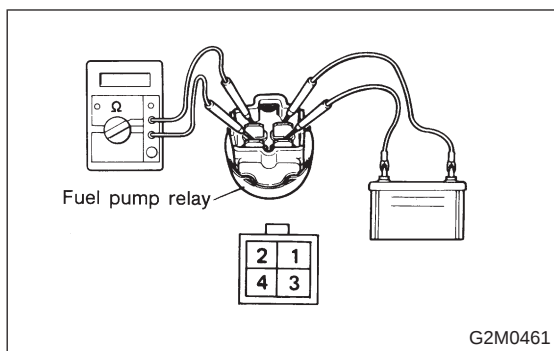
- (NO)** : Repair open circuit of harness between fuel pump and fuel pump relay connector.



- (CHECK)** : **Connector & terminal**
(R38) 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.



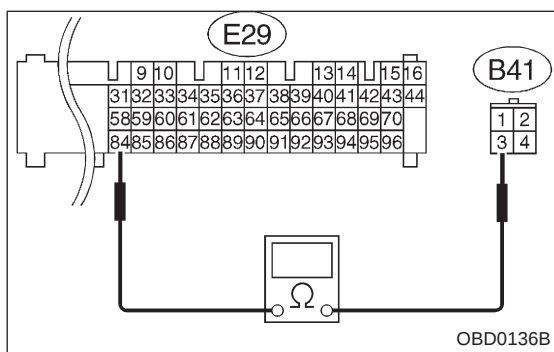
5 CHECK FUEL PUMP RELAY.

- 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.

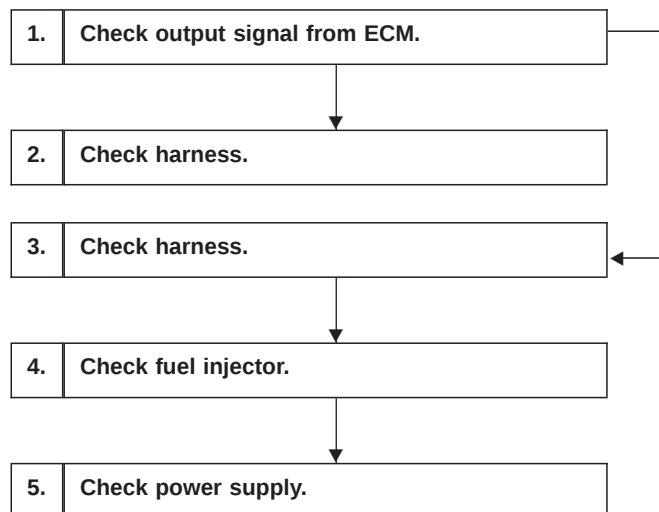
- 1) Disconnect connectors from ECM.
- 2) Measure resistance of harness connector between ECM and fuel pump relay.

- (CHECK)** : **Connector & terminal**
(E29) No. 84 — (B41) No. 3/1 Ω, or less

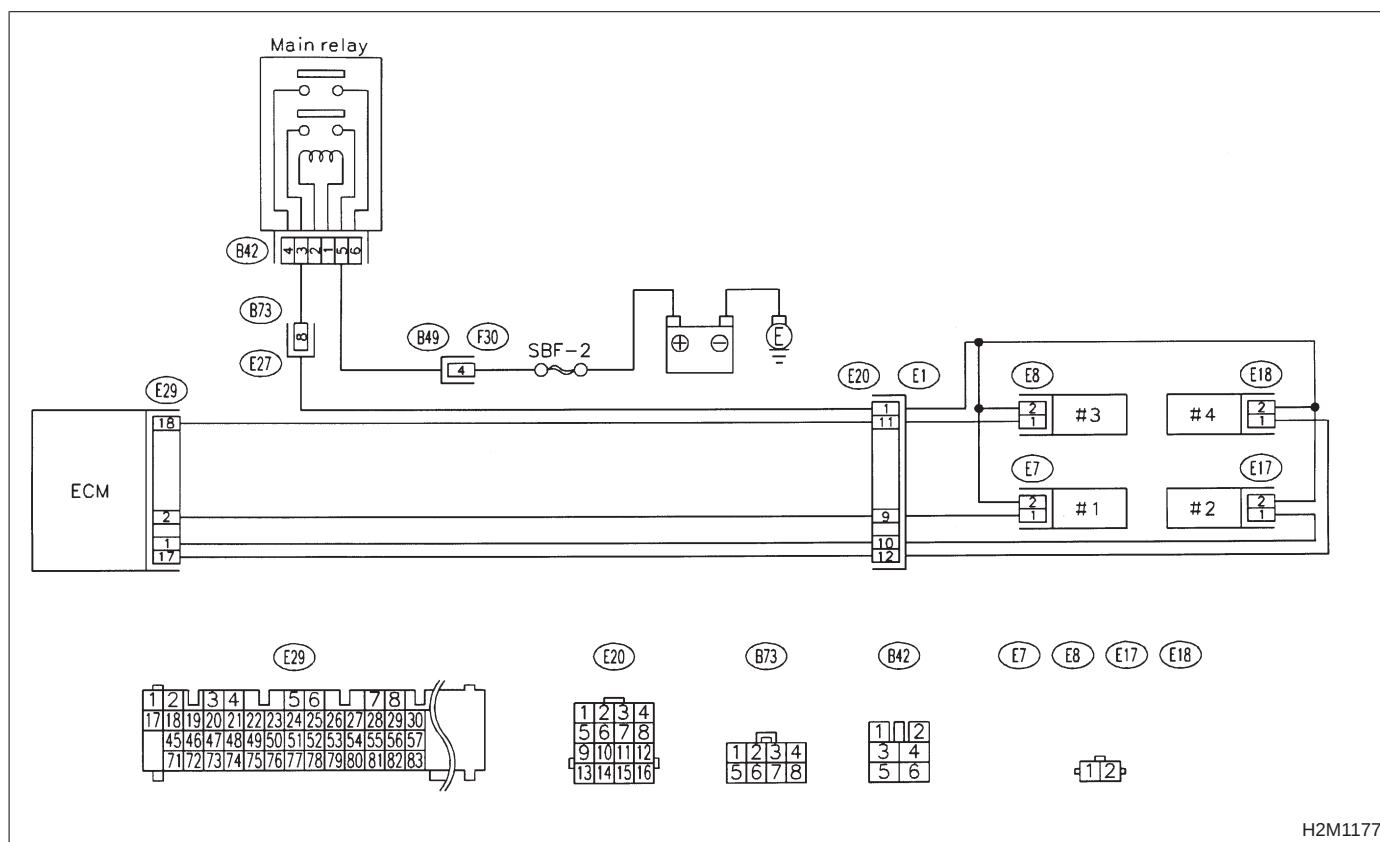
- (NO)** : Confirm good connection in ECM connector.



: Repair open circuit of harness between ECM and fuel pump relay 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 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:

H2M1177

NOTE:

For the diagnostic procedure on fuel injector circuit, refer to 2-7b [T10Q0].

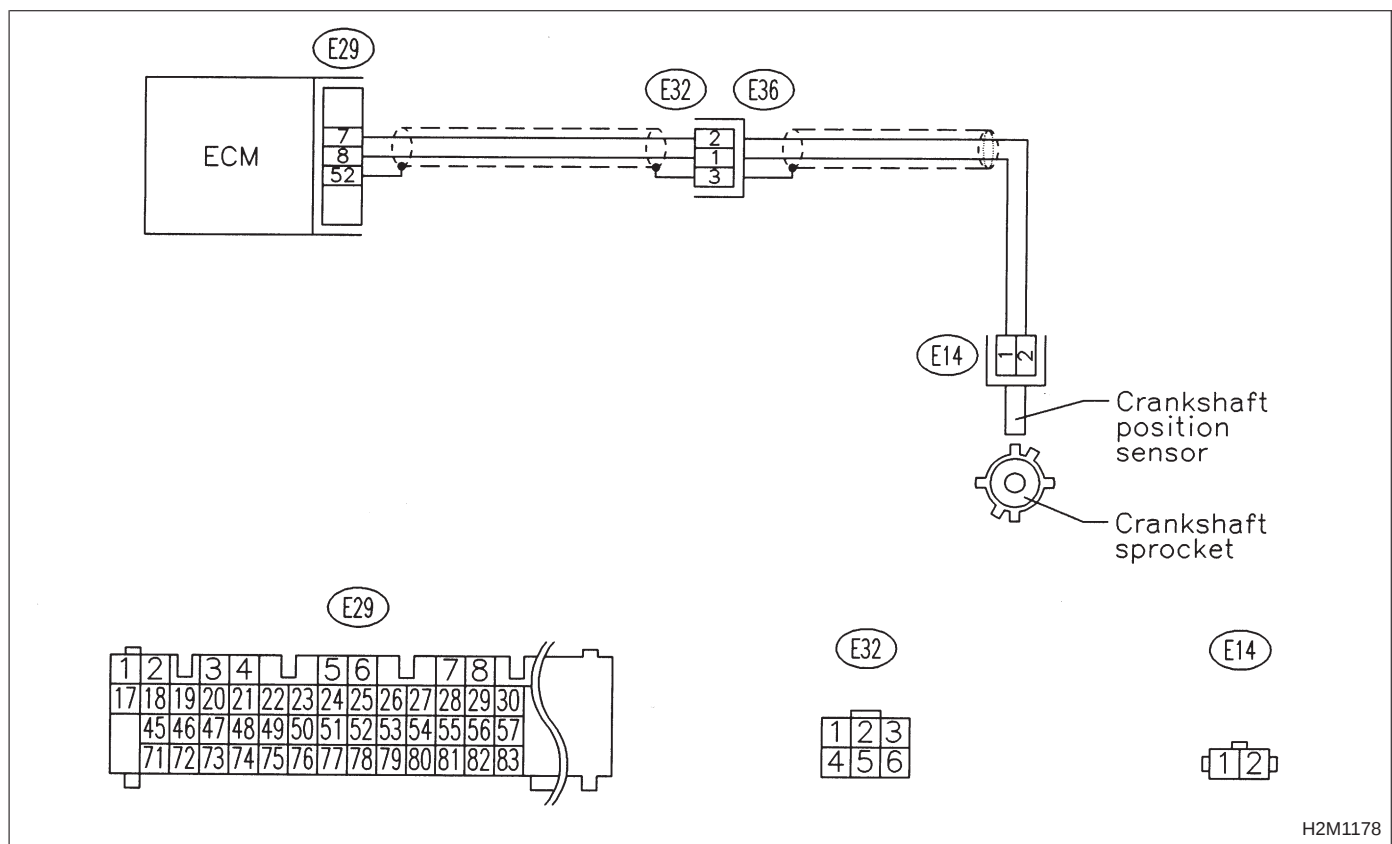
G: CRANKSHAFT POSITION SENSOR CIRCUIT

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

CAUTION:

After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



NOTE:

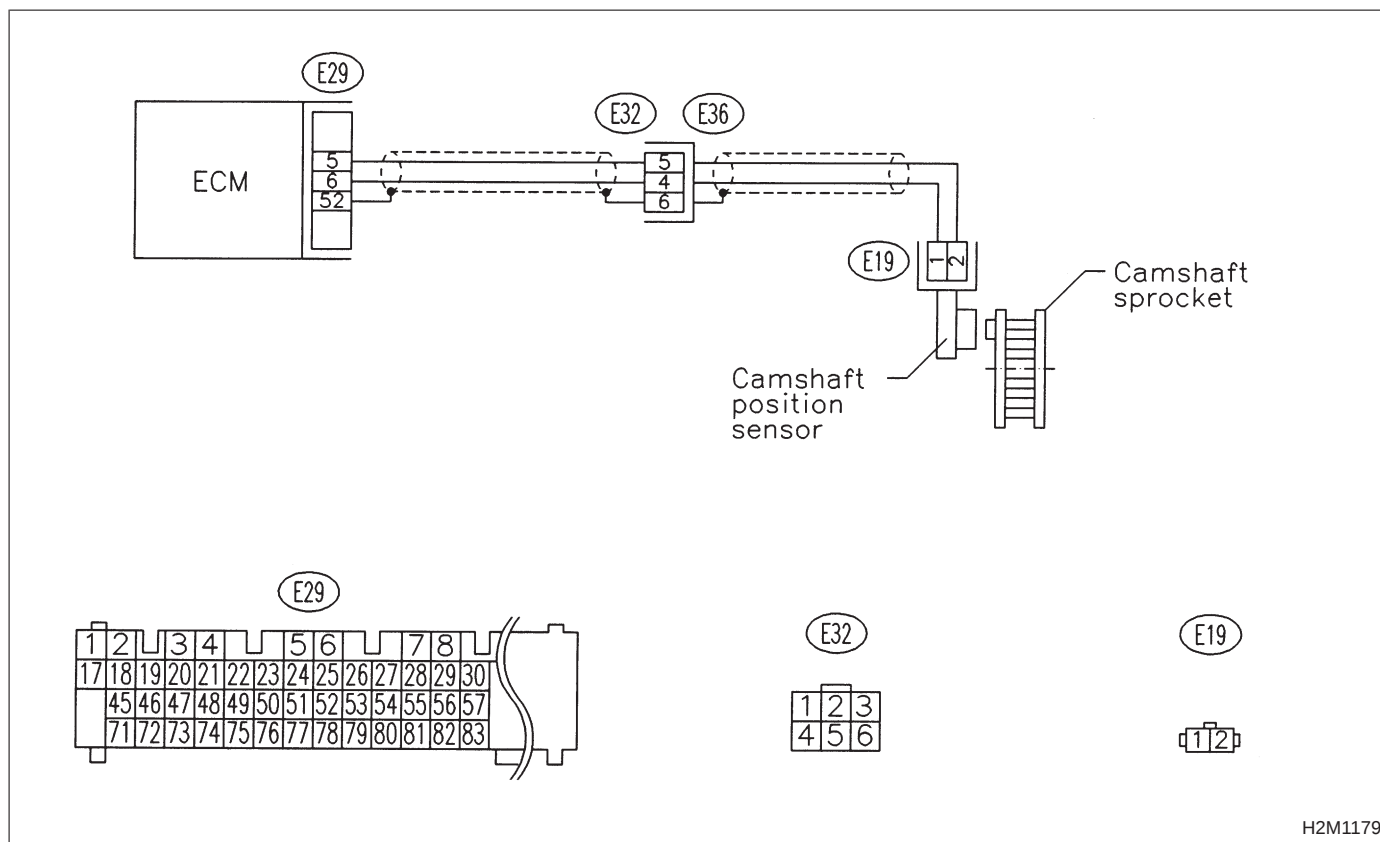
For the diagnostic procedure on crankshaft position sensor circuit, refer to 2-7b [T10Z0].

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 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:**NOTE:**

For the diagnostic procedure on camshaft position sensor circuit, refer to 2-7b [T10A0].

H2M1179

9. 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 [T100] in Repair Section 2-3 of the Service Manual.

2. FOR AT

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
Symptom	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."	○				○	○		○																					
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.	○	○							○													○							
	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

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
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	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.
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																													
	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
Symptom	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.		○					○																		○	○		○	
	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

9. General Diagnostics Table

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.
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	

10. 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	95
P0101	QA — R	Mass air flow sensor circuit range/performance problem	100
P0105	P — S	Pressure sensor circuit malfunction	101
P0106	P — R	Pressure sensor circuit range/performance problem	107
P0115	TW	Engine coolant temperature sensor circuit malfunction	111
P0120	THV	Throttle position sensor circuit malfunction	115
P0121	TH — R	Throttle position sensor circuit range/performance problem	121
P0125	TW — CL	Insufficient coolant temperature for closed loop fuel control	122
P0130	FO2 — V	Front oxygen sensor circuit malfunction	123
P0133	FO2 — R	Front oxygen sensor circuit slow response	127
P0135	FO2H	Front oxygen sensor heater circuit malfunction	129
P0136	RO2 — V	Rear oxygen sensor circuit malfunction	134
P0139	RO2 — R	Rear oxygen sensor circuit slow response	138
P0141	RO2H	Rear oxygen sensor heater circuit malfunction	140
P0170	FUEL	Fuel trim malfunction	145
P0201	INJ1	Fuel injector circuit malfunction - #1	150
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	155
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	161
P0335	CRANK	Crankshaft position sensor circuit malfunction	165
P0340	CAM	Camshaft position sensor circuit malfunction	168
P0400	EGR	Exhaust gas recirculation flow malfunction	171
P0403	EGRSOL	Exhaust gas recirculation circuit malfunction	176
P0420	CAT	Catalyst system efficiency below threshold	181
P0441	CPC — F	Evaporative emission control system incorrect purge flow	183
P0443	CPC	Evaporative emission control system purge control valve circuit malfunction	185
P0500	VSP	Vehicle speed sensor malfunction	189
P0505	ISC	Idle control system malfunction	191
P0506	ISC — L	Idle control system RPM lower than expected	196
P0507	ISC — H	Idle control system RPM higher than expected	198
P0600	—	Serial communication link malfunction	200
P0601	RAM	Internal control module memory check sum error	202
P0703	BRK	Brake switch input malfunction	204

DTC No.	Abbreviation (Subaru select monitor)	Item	Page
P0705	RNG	Transmission range sensor circuit malfunction	207
P0710	ATF	Transmission fluid temperature sensor circuit malfunction	212
P0720	ATVSP	Output speed sensor (vehicle speed sensor 1) circuit malfunction	214
P0725	ATNE	Engine speed input circuit malfunction	216
P0731	GR — 1	Gear 1 incorrect ratio	218
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	222
P0743	LU	Torque converter clutch system electrical	226
P0748	PL	Pressure control solenoid electrical	228
P0753	SFT1	Shift solenoid A electrical	230
P0758	SFT2	Shift solenoid B electrical	232
P0760	OVR — F	Shift solenoid C malfunction	234
P0763	OVR	Shift solenoid C electrical	238
P1100	ST — SW	Starter switch circuit malfunction	240
P1101	N — SW	Neutral position switch circuit malfunction	242
P1102	BR	Pressure sources switching solenoid valve circuit malfunction	246
P1103	TRQ	Engine torque control signal circuit malfunction	250
P1500	FAN — 1	Radiator fan relay 1 circuit malfunction	252
P1502	FAN — F	Radiator fan function problem	258
P1700	ATTH	Throttle position sensor circuit malfunction for automatic transmission	260
P1701	CRS	Cruise control set signal circuit malfunction for automatic transmission	262
P1702	ATDIAG	Automatic transmission diagnosis input signal circuit malfunction	265

OBD	(FB1)
P0100	<QA>
OBD0142	

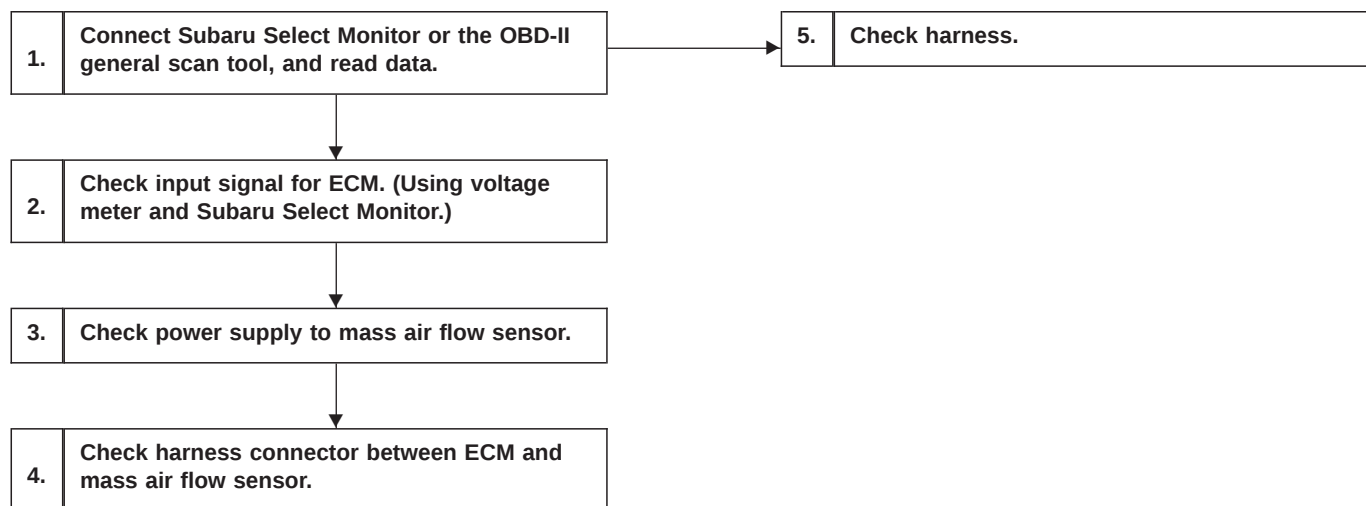
B: DTC P0100
— MASS AIR FLOW SENSOR CIRCUIT
MALFUNCTION (QA) —

DTC DETECTING CONDITION:

- Immediately at fault recognition

TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

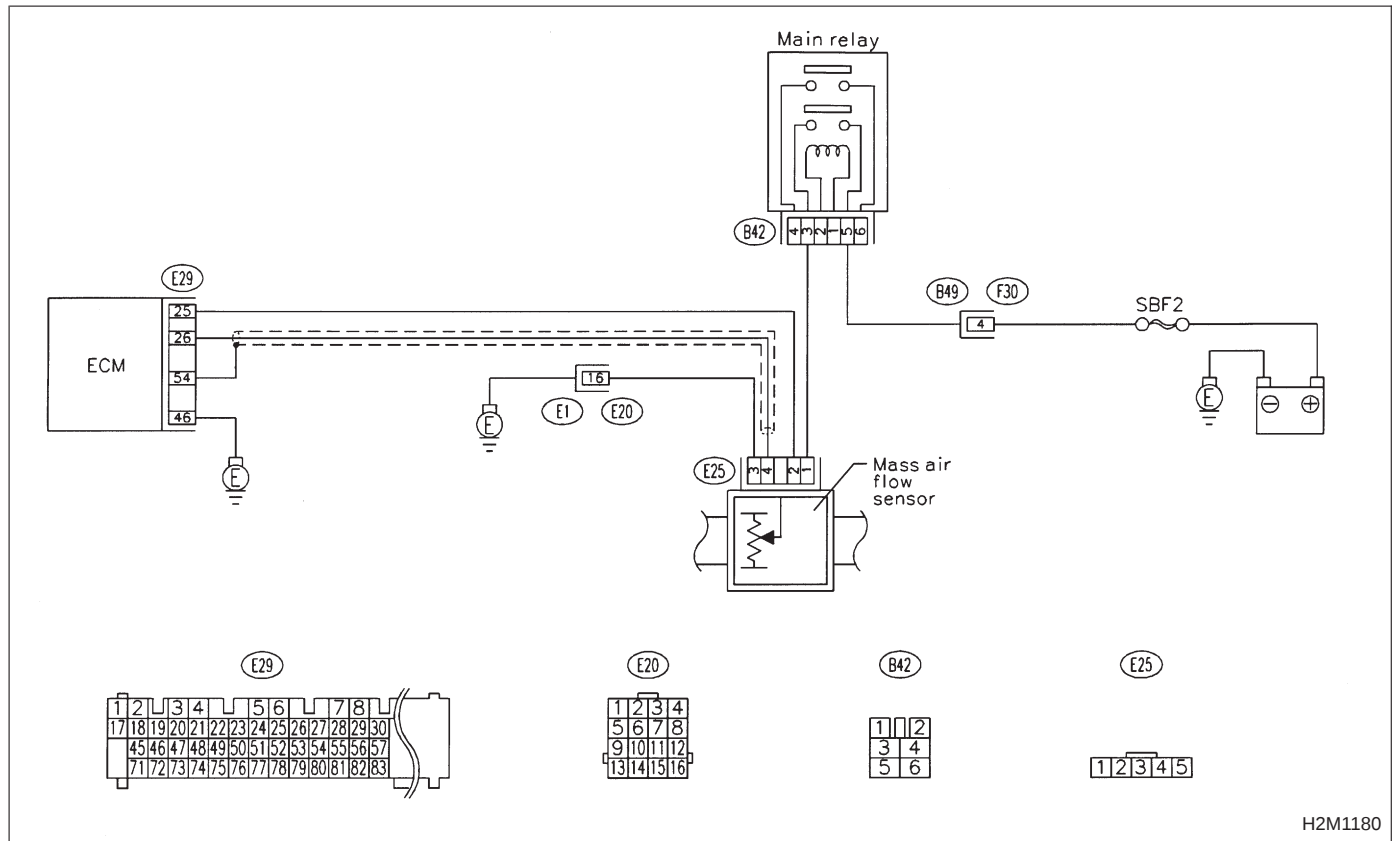


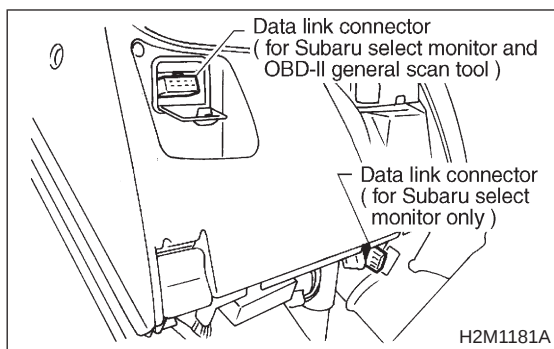
CAUTION:

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

<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:





QA (F08)

0.98 V

B2M0271

QA (F47)

2.35 g/s

OBD0616

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

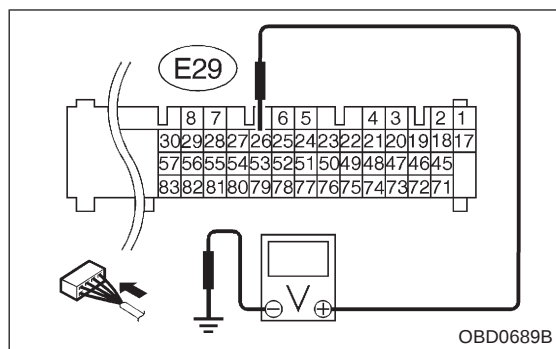
: Go to step 2.

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 (E29) No. 26 — Body/0.3 V, or less**

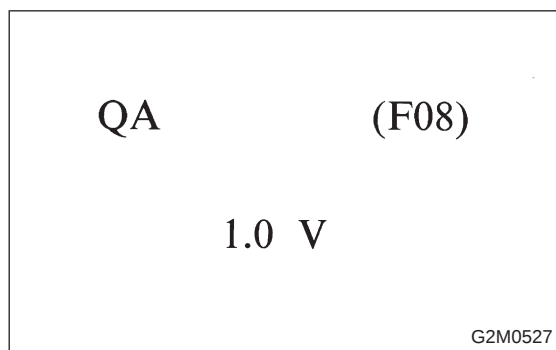
YES : Go to step 3.

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

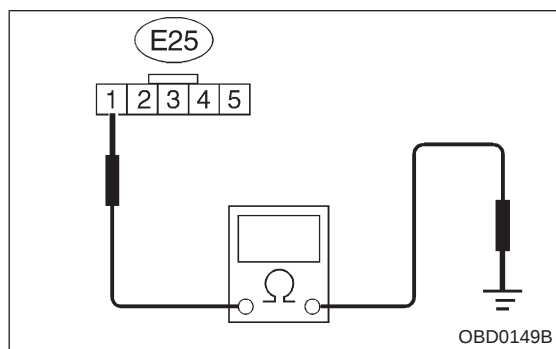
CHECK POWER SUPPLY TO MASS AIR FLOW SENSOR.

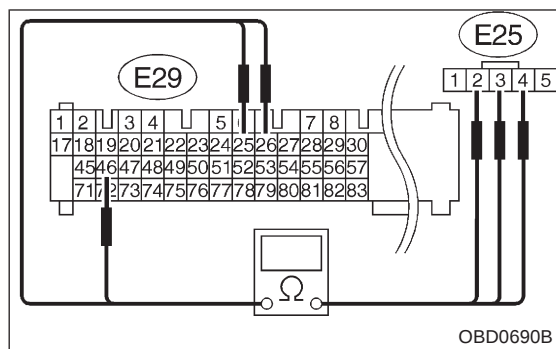
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from mass air flow sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between mass air flow sensor connector and body.

CHECK : **Connector & terminal (E25) 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.





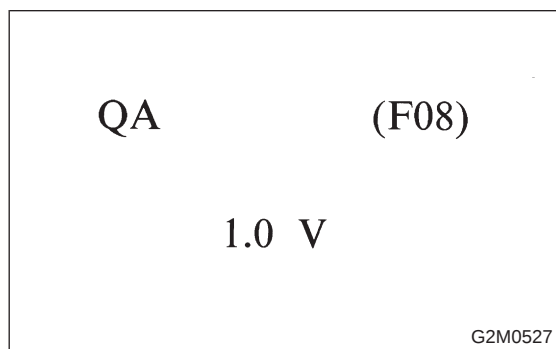
4

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 (E29) No. 26 — (E25) No. 4/1 Ω , or less
- ② (E29) No. 46 — (E25) No. 3/1 Ω , or less
- ③ (E29) No. 25 — (E25) No. 2/1 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.

5

CHECK HARNESS.

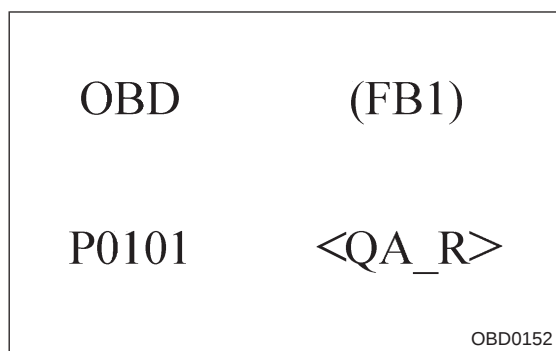
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from mass air flow sensor.
- 3) Connect Subaru Select Monitor or OBD-II General Scan Tool to data link connector.
- 4) Turn ignition switch to ON.
- 5) Read data on Subaru select monitor or OBD-II general scan tool.

● 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.



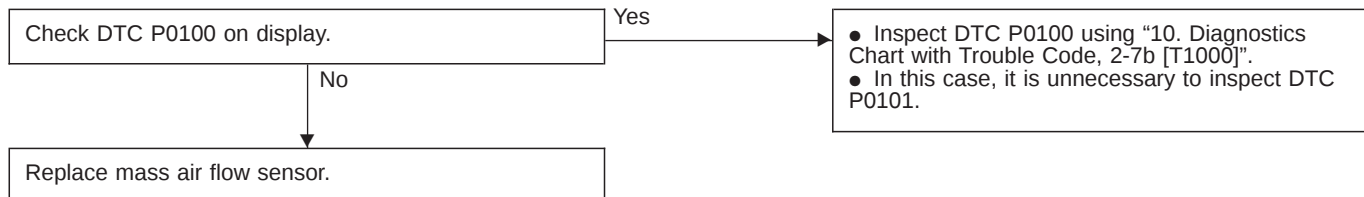
C: DTC P0101
— MASS AIR FLOW SENSOR CIRCUIT
RANGE/PERFORMANCE PROBLEM
(QA — R) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

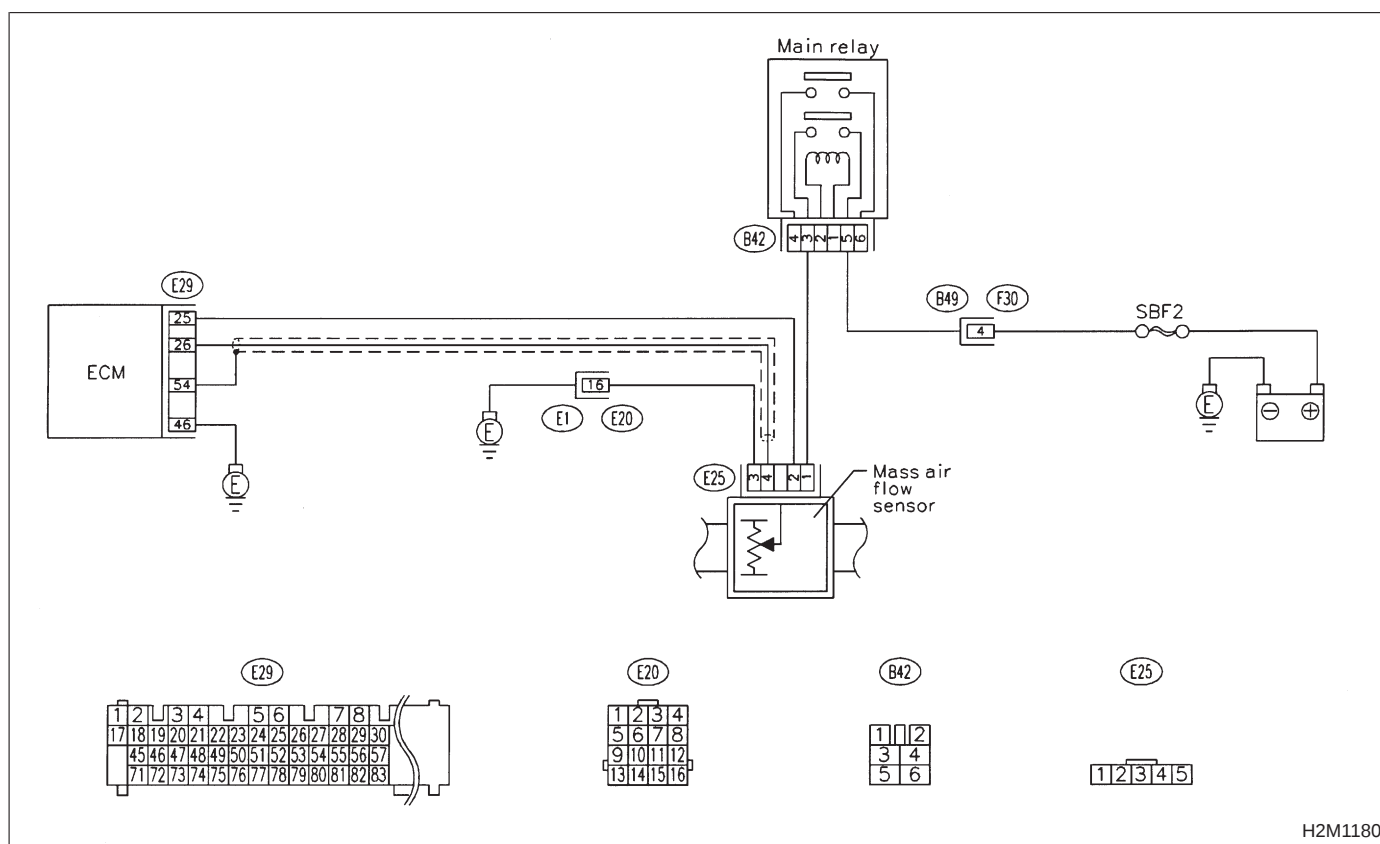
- Erroneous idling
- Engine stalls.
- Poor driving performance



CAUTION:

After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**.
 <Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



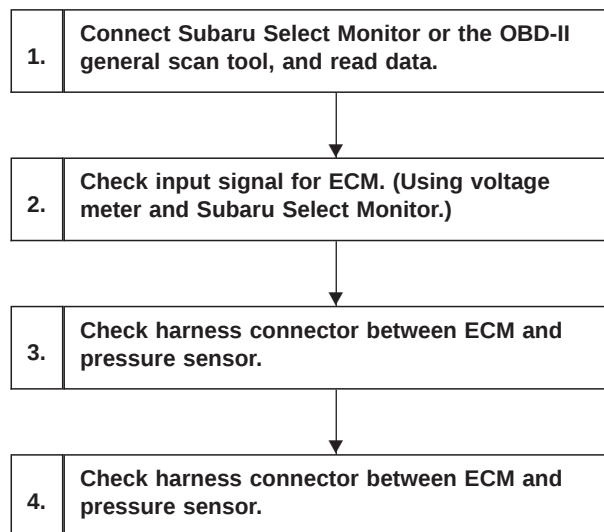
H2M1180



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

DTC DETECTING CONDITION:

- Immediately at fault recognition

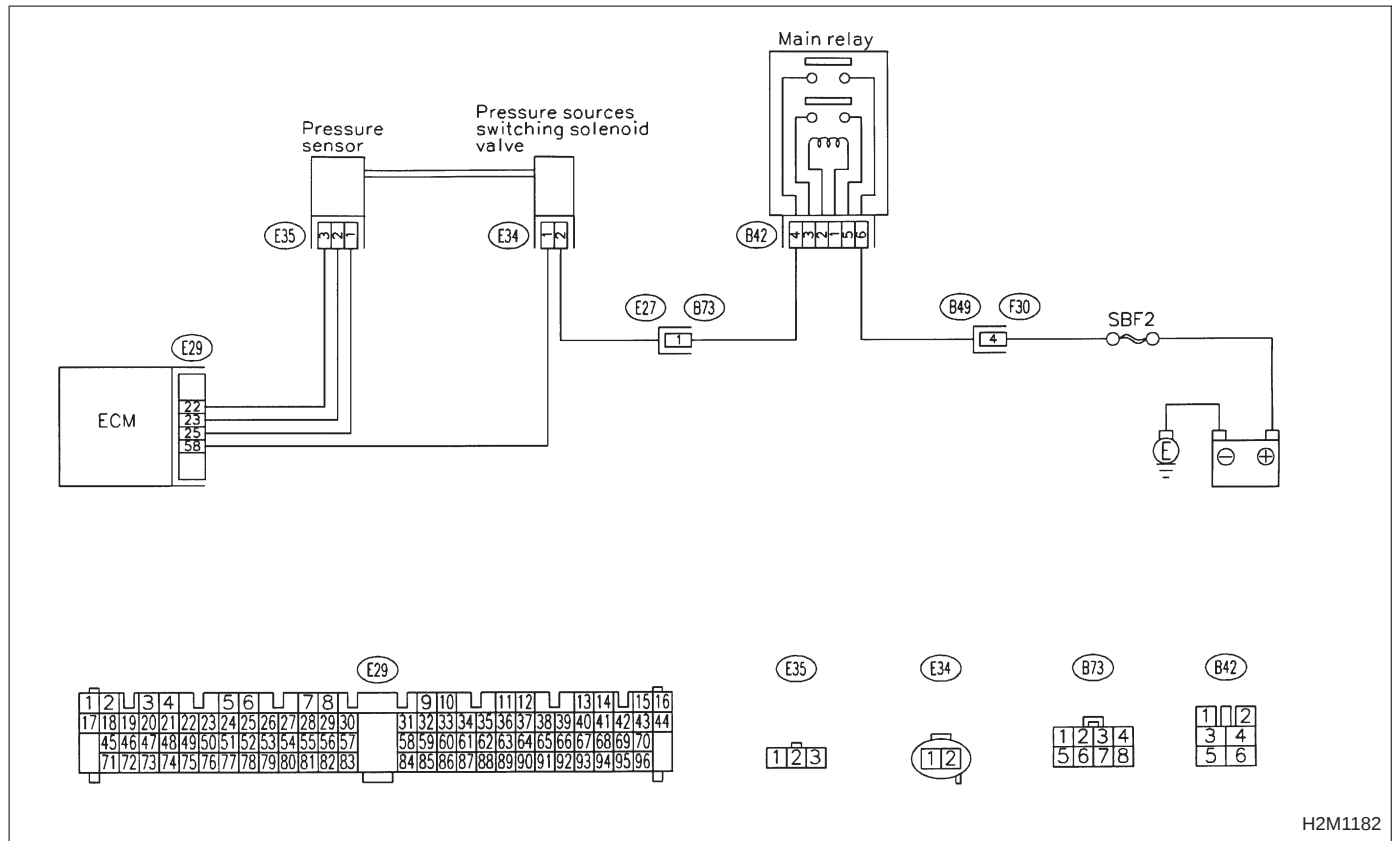


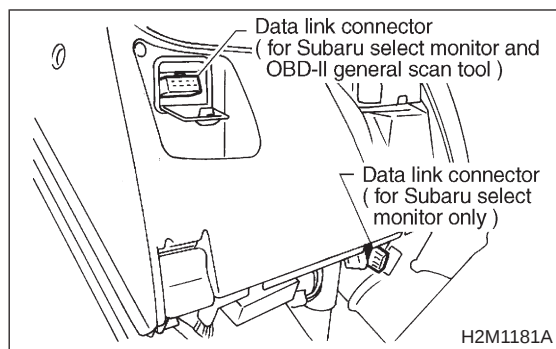
CAUTION:

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

<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:





MANI.P (F24)

2.30 V

OBD0620

MANI.P (F49)

29 kPa

OBD0641

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 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

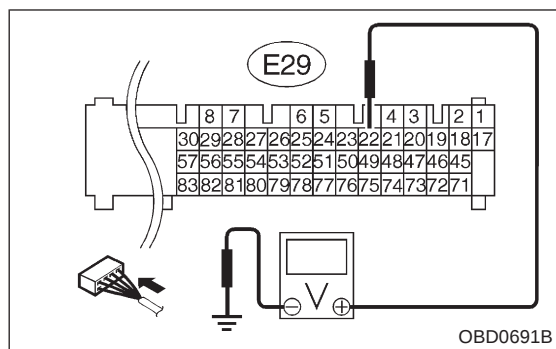
- F24: Display shows voltage signal value sent from pressure sensor.
- F49: Display shows pressure signal value sent from pressure sensor.

CHECK : Less than 0.2 V or 0 kPa**YES** : Go to step 2.**NO** : Go to next **CHECK** .**CHECK : More than 4.9 V or 140 kPa****YES** : Go to step 4.**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.



2

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

1) Measure voltage between ECM and body.

CHECK : **Connector & terminal**
(E29) 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**
(E29) No. 23 — Body/0.2 V, or less

YES : Go to step 3.

NO : Go to next **CHECK** .

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

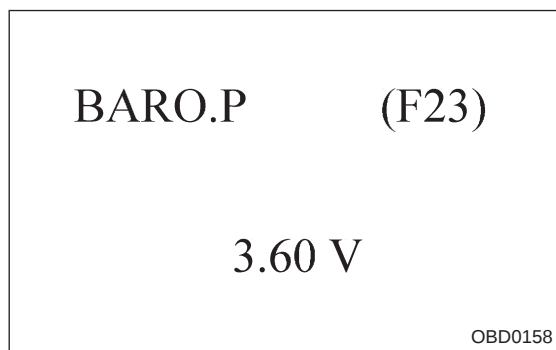
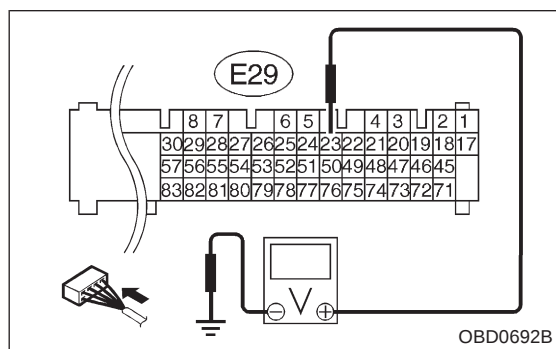
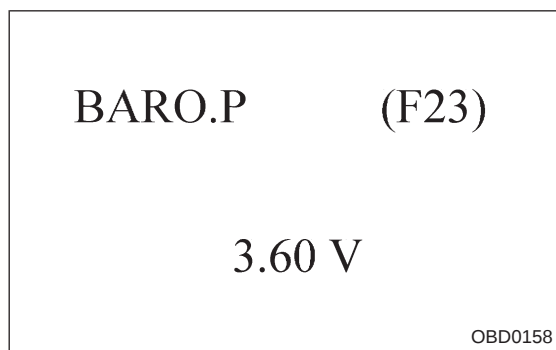
- Subaru Select Monitor
Designate mode using function key.

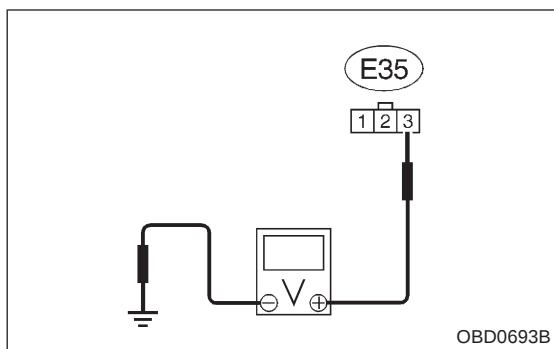
Function mode: F23

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

YES : Repair poor contact in ECM connector.

NO : Go to step 3.



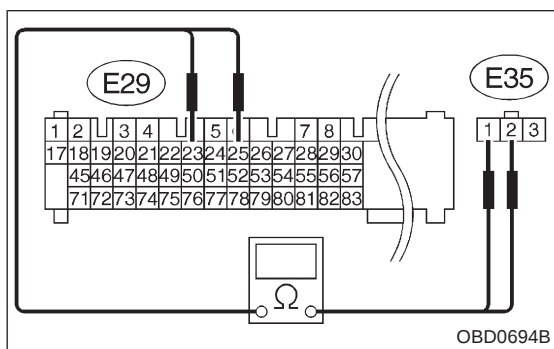
**3****CHECK HARNESS CONNECTOR BETWEEN ECM AND PRESSURE SENSOR.**

- 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**
(E35) No. 3 — Body/4.5 V, or more

YES : Go to the next step.

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

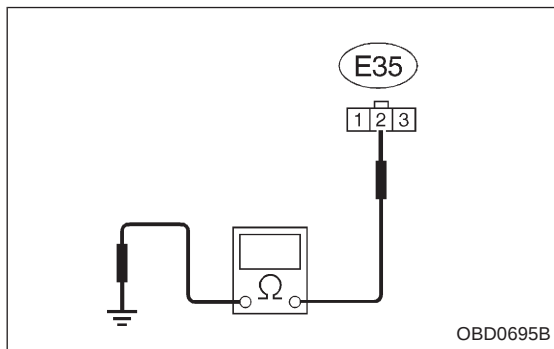


- 5) Turn ignition switch to OFF.
- 6) Disconnect connector from ECM.
- 7) Measure resistance of harness connector between ECM and pressure sensor.

CHECK : **Connector & terminal**
(E29) No. 23 — (E35) No. 2/1 Ω , or less
(E29) No. 25 — (E35) No. 1/1 Ω , or less

YES : Go to the next step.

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



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

CHECK : **Connector & terminal**
(E35) No. 2 — Body/500 k Ω , or more

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

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

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.

MANI.P (F24)
2.30 V
OBD0620

4

CHECK HARNESS CONNECTOR BETWEEN ECM AND PRESSURE SENSOR.

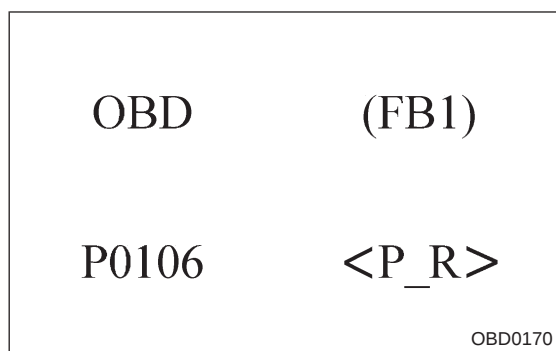
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from pressure sensor.
- 3) Turn ignition switch to ON.
- 4) Read data on Subaru select monitor or the OBD-II general scan tool.

- Subaru Select Monitor
Designate mode using function key.

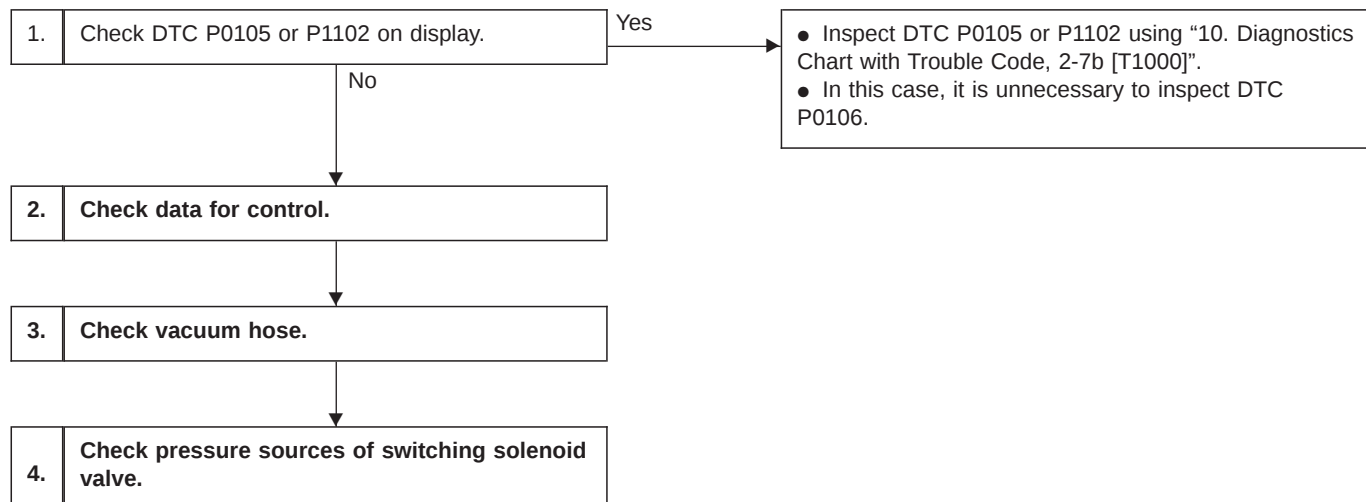
Function mode: F24**CHECK** : *Is the value more than 4.9 V?***YES** : Repair short circuit of harness between ECM and pressure sensor connector.**NO** : Replace pressure sensor with a new one.

- OBD-II general scan tool

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

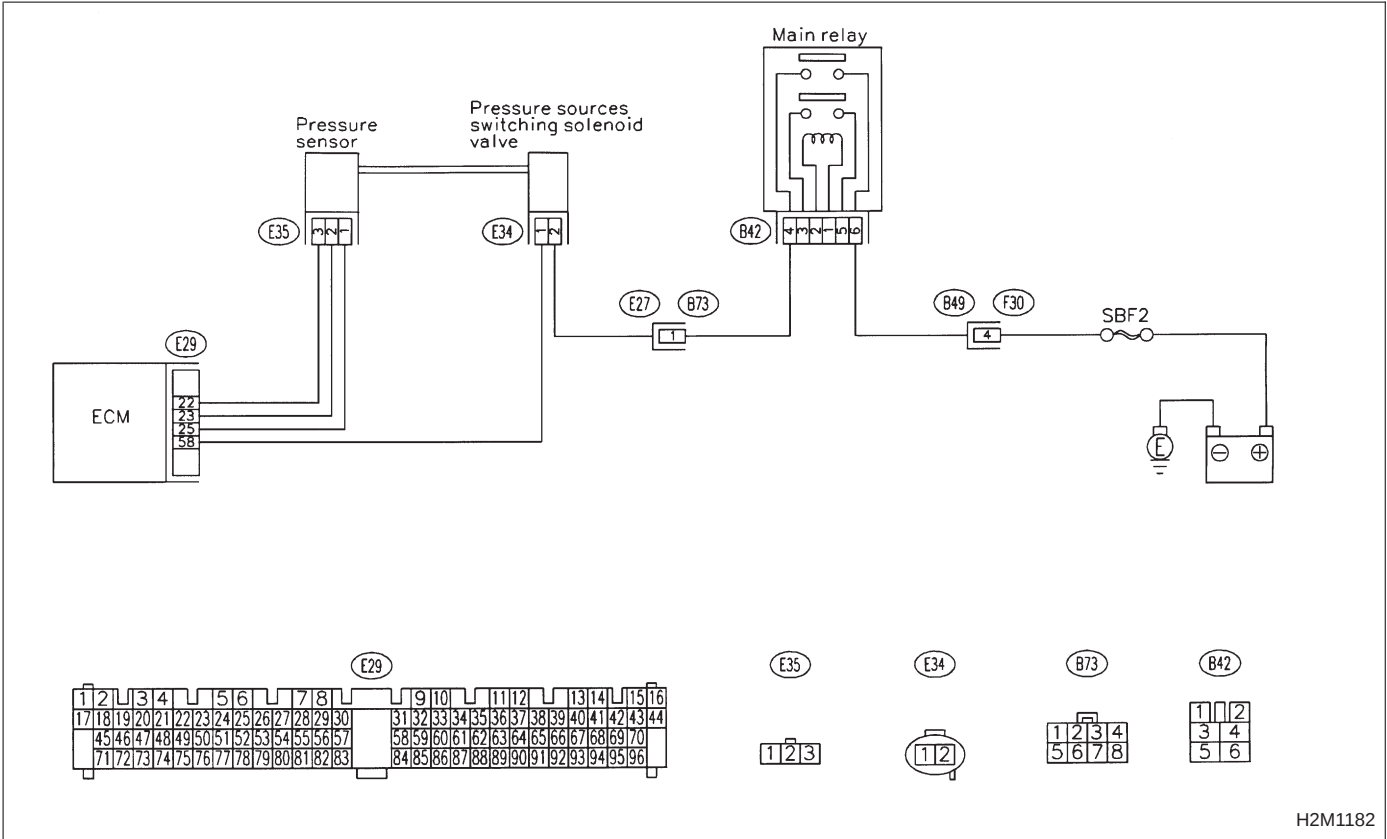
**E: DTC P0106****— PRESSURE SENSOR CIRCUIT****RANGE/PERFORMANCE PROBLEM (P — R) —****DTC DETECTING CONDITION:**

- Two consecutive trips with fault

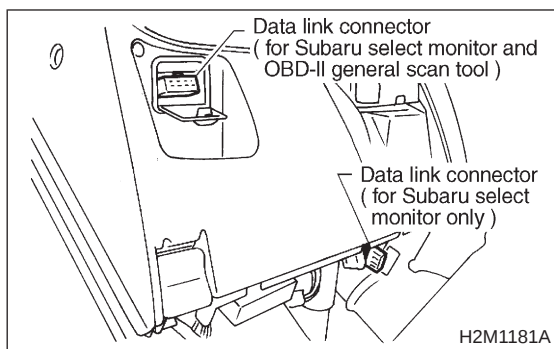
**CAUTION:**

After repair or replacement of faulty parts, conduct
CLEAR MEMORY and **INSPECTION MODES**.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



H2M1182



2 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.

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 3.

NO : Go to next **CHECK** .

MANI.P (F24)

2.30 V

OBD0620

BARO.P (F23)

3.60 V

OBD0158

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

YES : Go to step 4.

NO : Go to next **CHECK** .

BARO.P (F23)

3.60 V

OBD0158

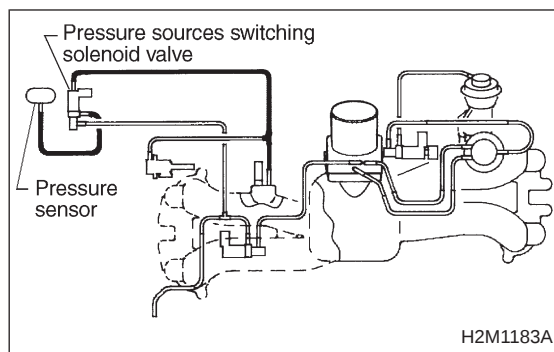
CHECK : *Is the voltage more than 4.7 V with function mode F23?*

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.



3 CHECK VACUUM HOSE.

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

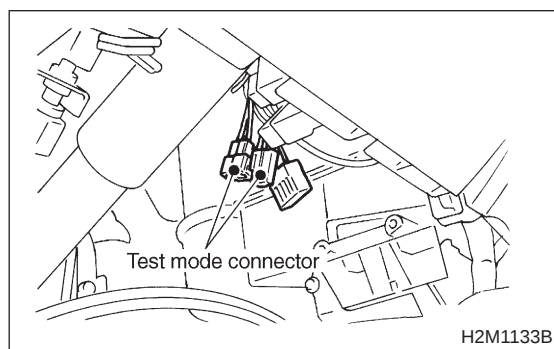
NOTE:

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 4.



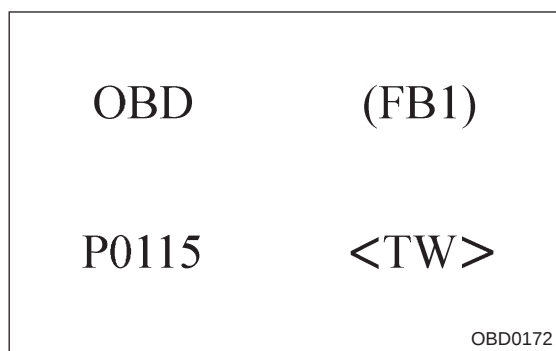
4 CHECK PRESSURE SOURCES OF SWITCHING SOLENOID VALVE.

- 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.

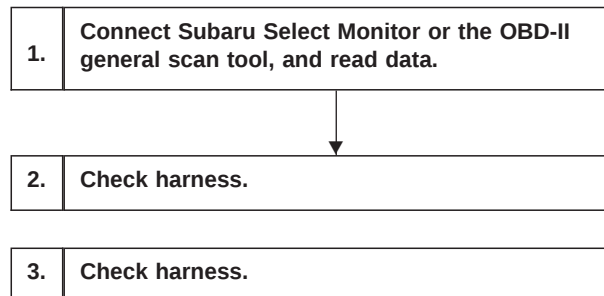
NO : Replace pressure sources switching solenoid valve.

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

- Immediately at fault recognition

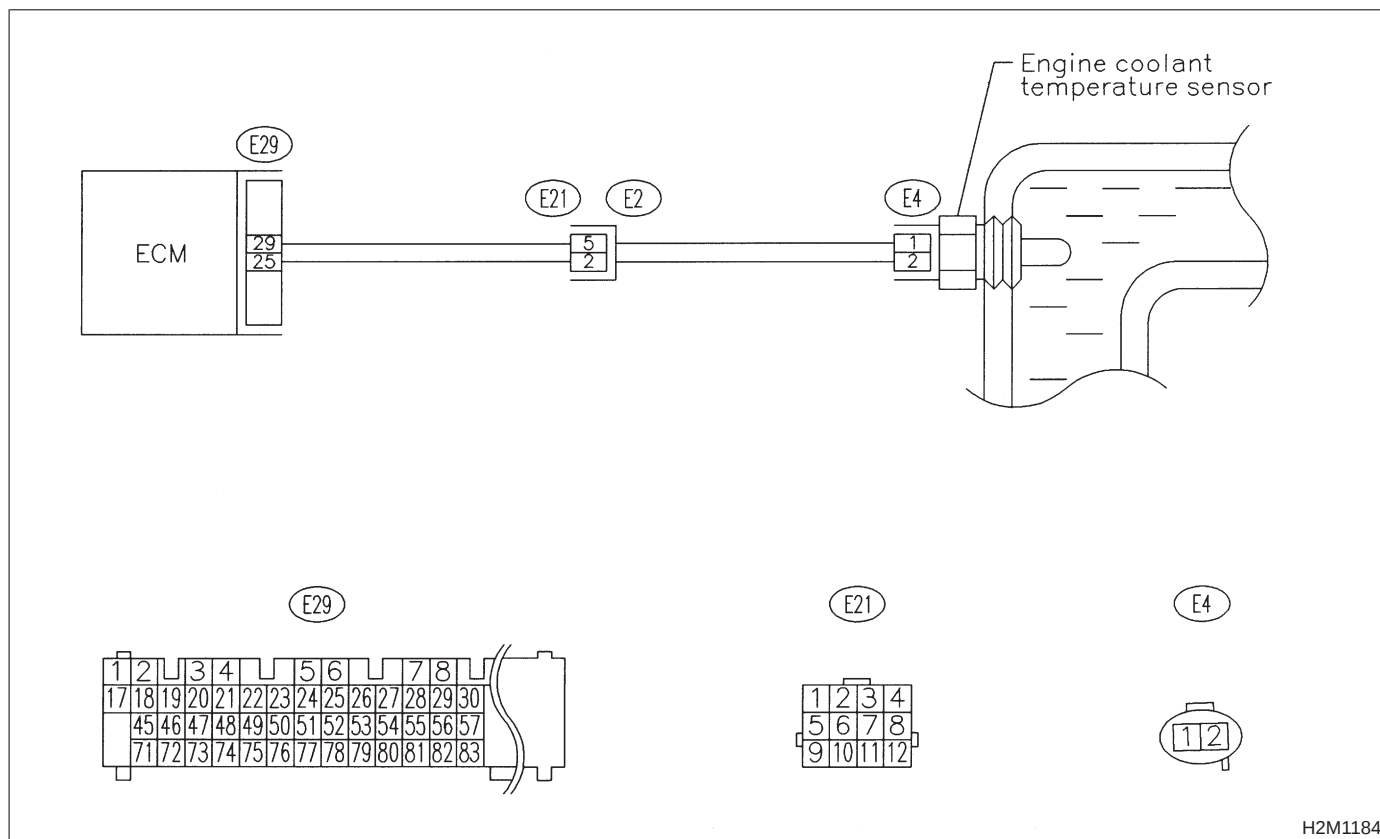
TROUBLE SYMPTOM:

- Hard to start
- Erroneous idling
- Poor driving performance

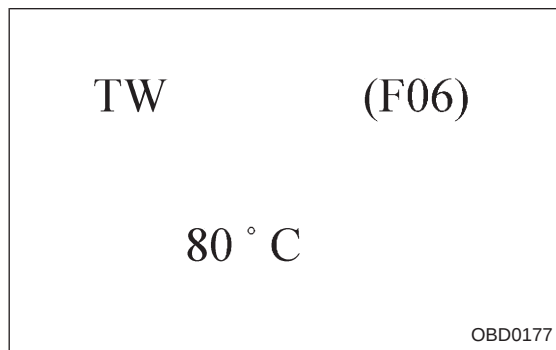
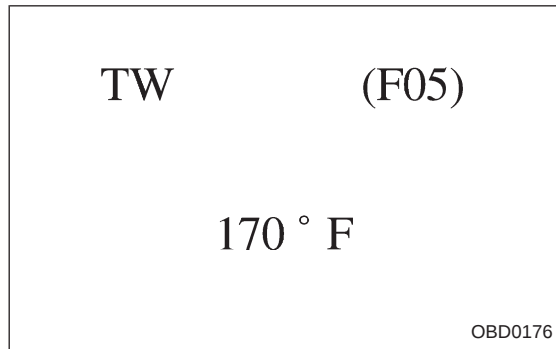
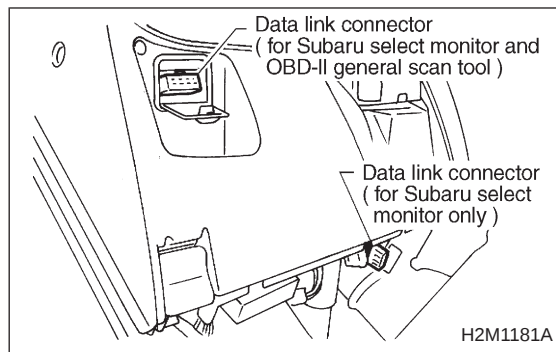
**CAUTION:**

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

<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:

H2M1184



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** .

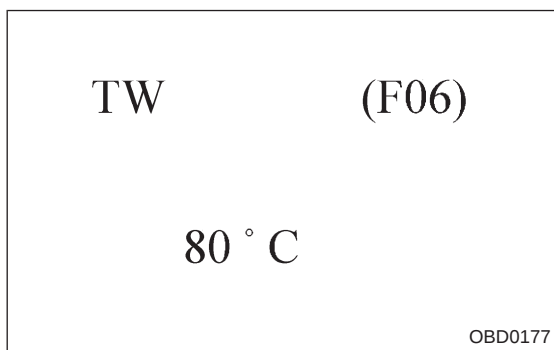
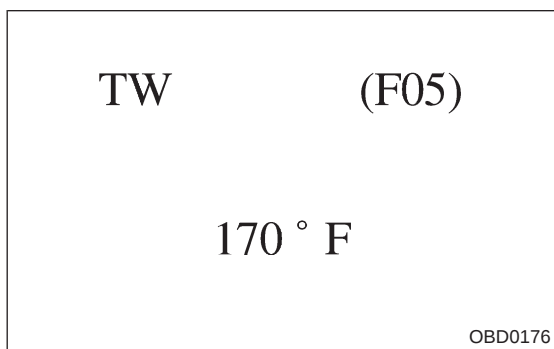
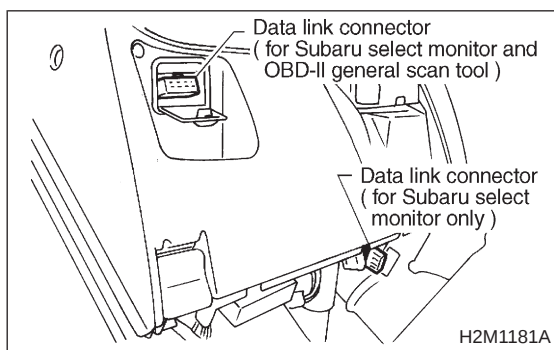
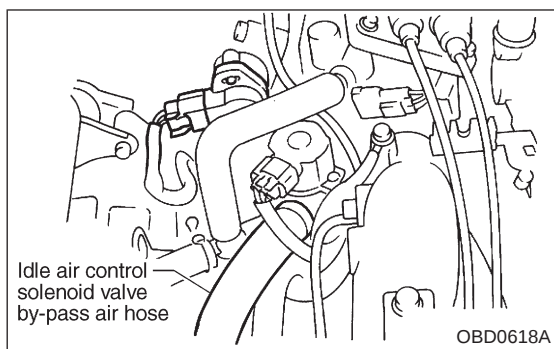
CHECK : ● *Is the value less than -40°F with function mode F05?*
 ● *Is the value less than -40°C with function mode F06?*

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

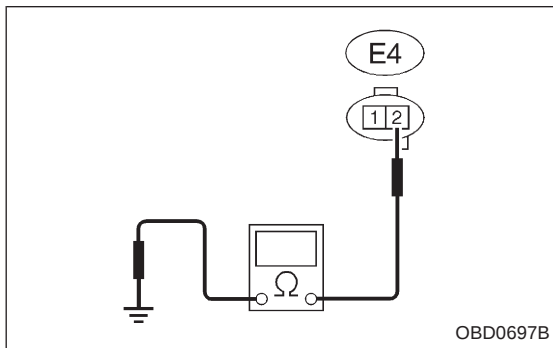
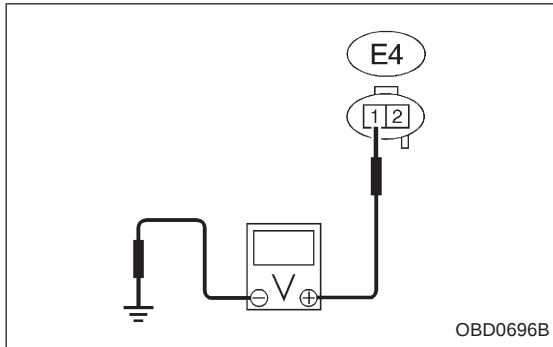
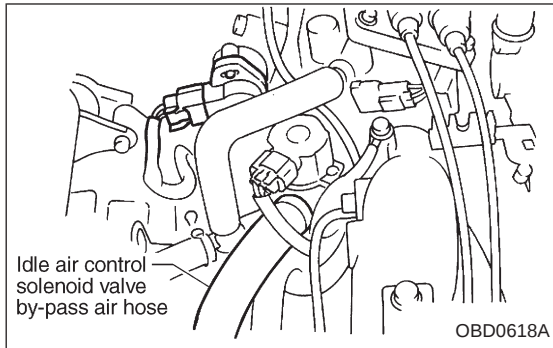
- F05: Water temperature is indicated in "°F".
- F06: Water temperature is indicated in "°C".

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 (E4) No. 1 — Body/4 V, or more**

YES : Go to the next step.

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

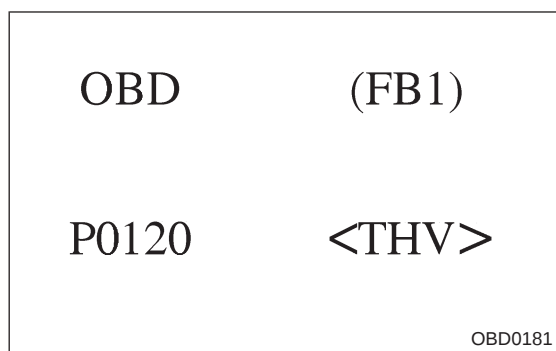
- 6) Turn ignition switch to OFF.

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

CHECK : **Connector & terminal (E4) No. 2 — Body/5 Ω, or less**

YES : Replace engine coolant temperature sensor.

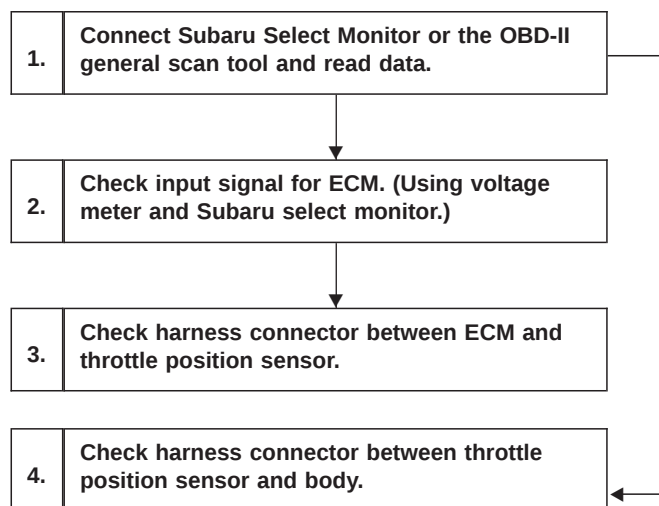
NO : Repair open circuit of harness or poor contact in ECM and engine coolant temperature sensor connector.

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

- Immediately at fault recognition

TROUBLE SYMPTOM:

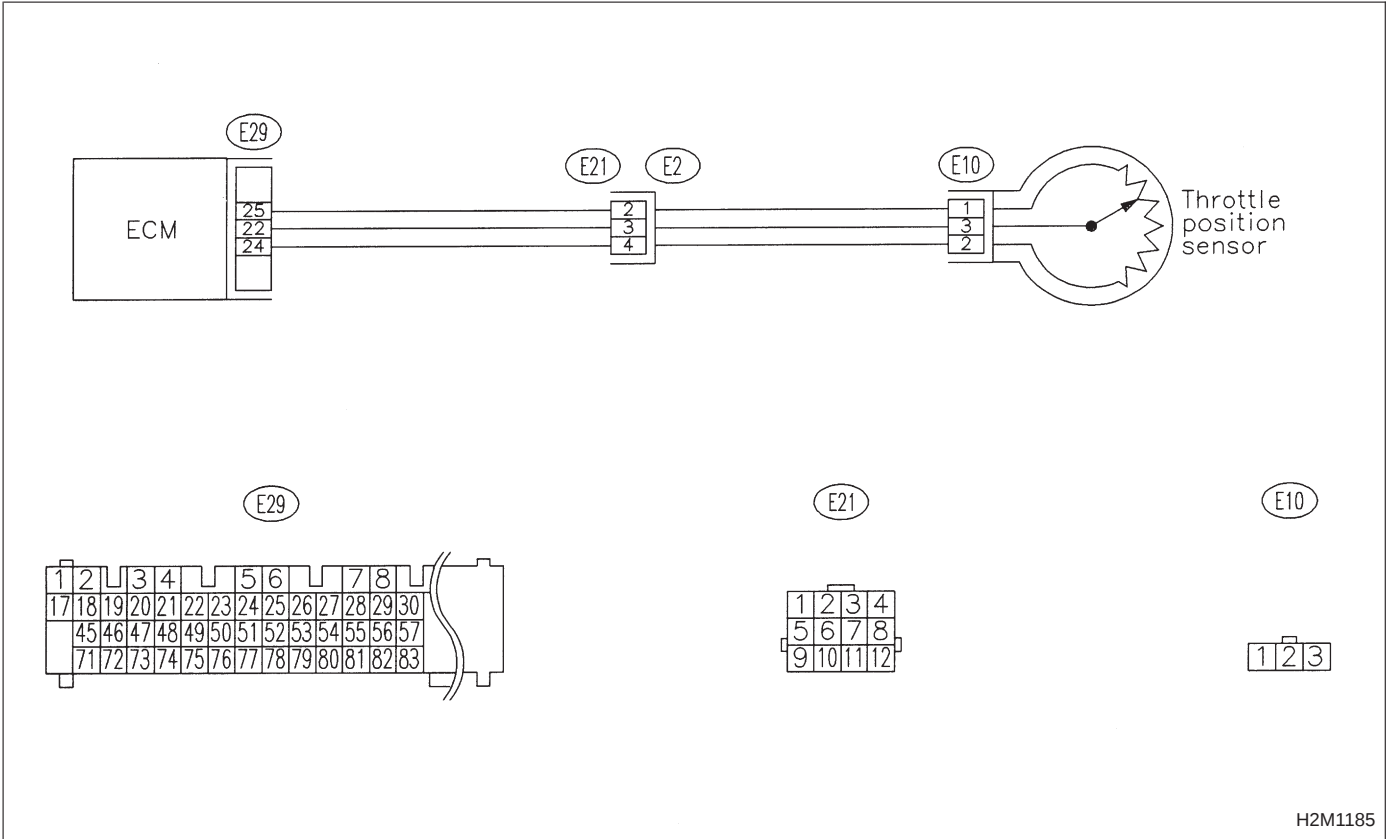
- Erroneous idling
- Engine stalls.
- Poor driving performance

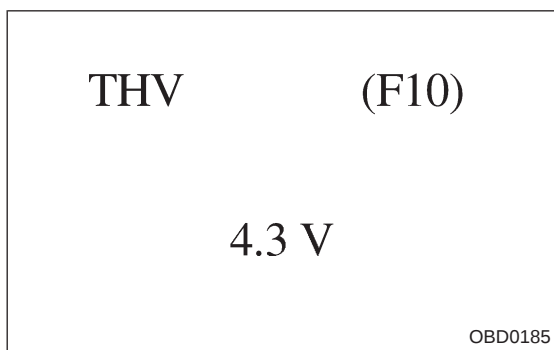
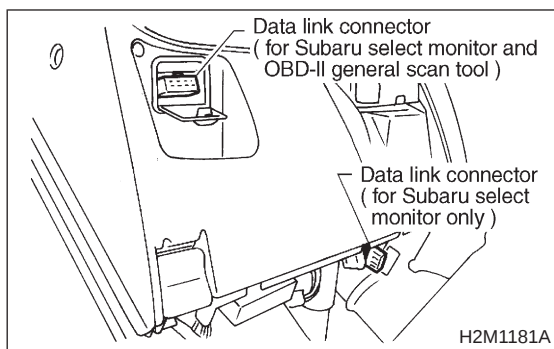
**CAUTION:**

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

<Ref. to 2-7b [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: 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?*

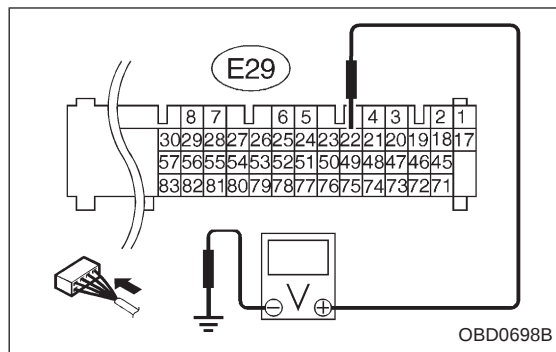
YES : Go to step 4.

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 (E21)

- 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**
(E29) No. 22 — Body/4.5 V, or more

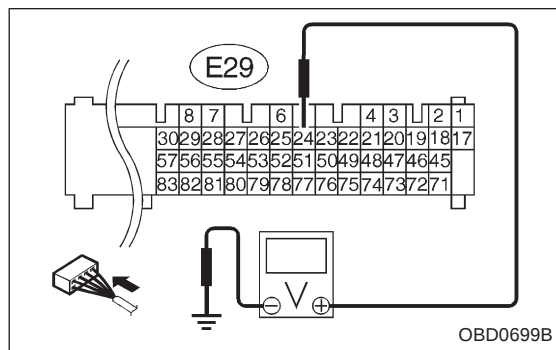
YES : Go to next step.

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**
(E29) No. 24 — Body/0.1 V, or less

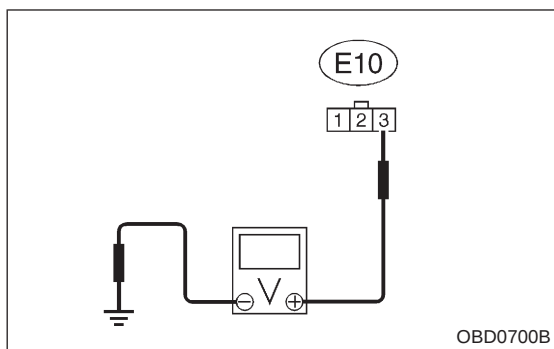
YES : Go to step 3.

NO : Go to next **CHECK** .

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**
(E10) No. 3 — Body/4.5 V, or more

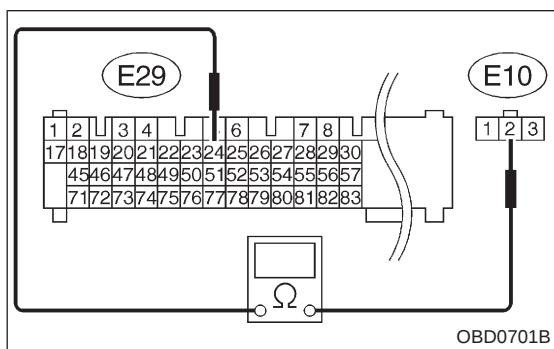
YES : Go to the next step.

NO : Repair harness and connector.

NOTE:

In this case, the possible causes are:

- ① Open circuit of the harness between connector (E10) terminal No. 3 and connector (E29) 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 (E21)



- 5) Turn ignition switch to OFF.

- 6) Measure resistance of harness between ECM connector and throttle position sensor connector.

CHECK : **Connector & terminal**
(E29) No. 24 — (E10) No. 2/1 Ω , or less

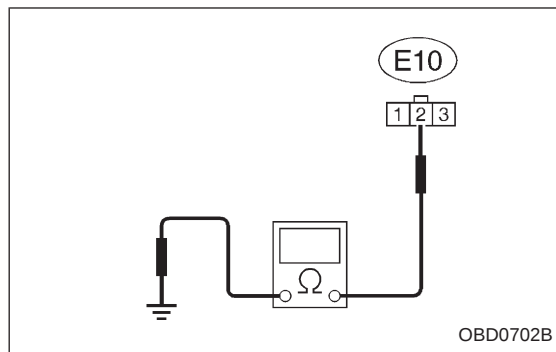
YES : Go to next step.

NO : Repair harness and connector.

NOTE:

In this case, the following are the possible causes.

- ① Open circuit between connector (E29) terminal No. 24 and connector (E10) terminal No. 2.
- ② Poor contact in ECM connector.
- ③ Poor contact in throttle position sensor connector
- ④ Poor contact in coupling connector (E21)



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

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

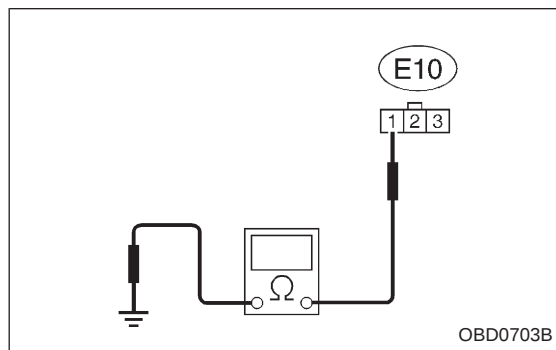
YES : Repair short circuit of harness between throttle position sensor and ECM connector.

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.

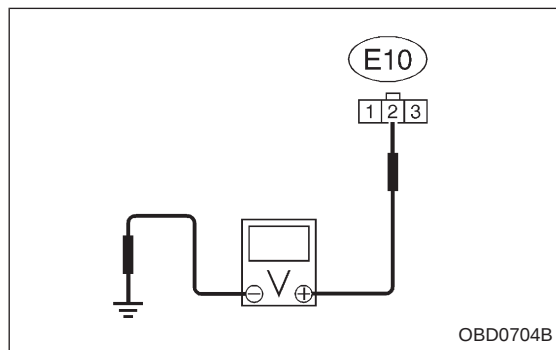
2) Disconnect connector from throttle position sensor.

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

CHECK : **Connector & terminal (E10) No. 1 — Body/5 Ω, or less**

YES : Go to the next step.

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



4) Turn ignition switch to ON.

5) Measure voltage between throttle position sensor connector and body.

CHECK : **Connector & terminal (E10) No. 2 — Body/4.9 V, or more**

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

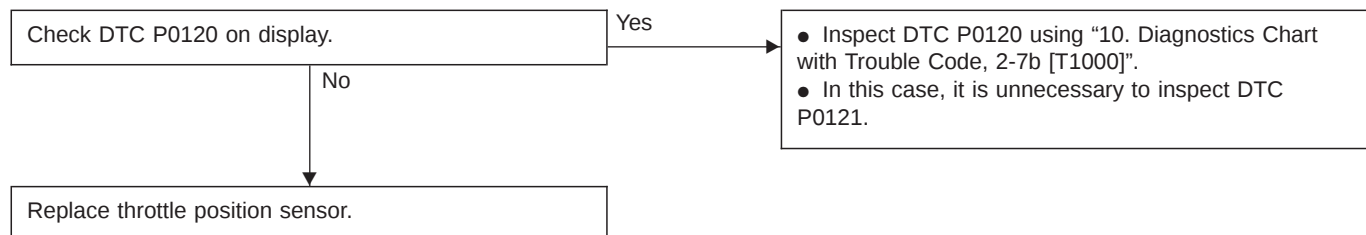
NO : Replace throttle position sensor.

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

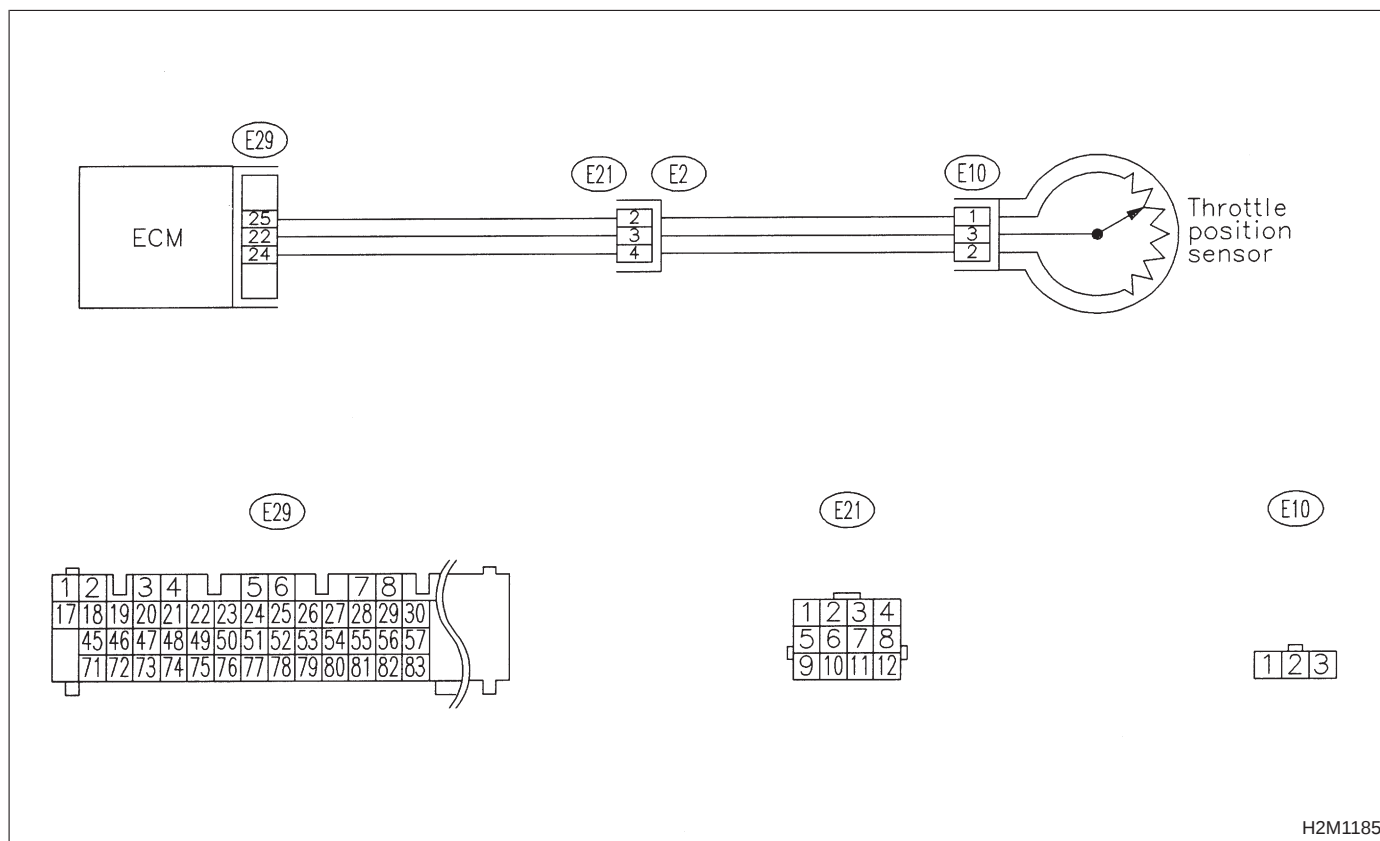
- Two consecutive trips with fault

TROUBLE SYMPTOM:

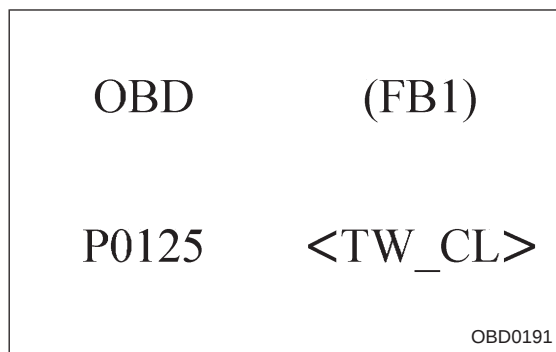
- Erroneous idling
- Engine stalls.
- Poor driving performance

**CAUTION:**

After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:

H2M1185



I: DTC P0125

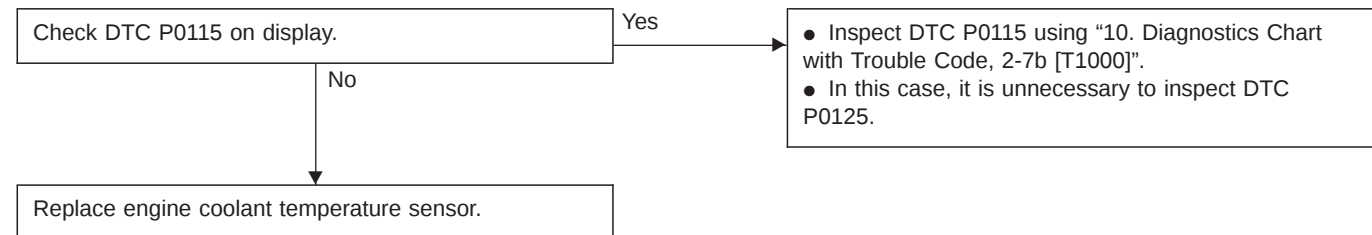
— INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL (TW — CL) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

- Engine would not return to idling.

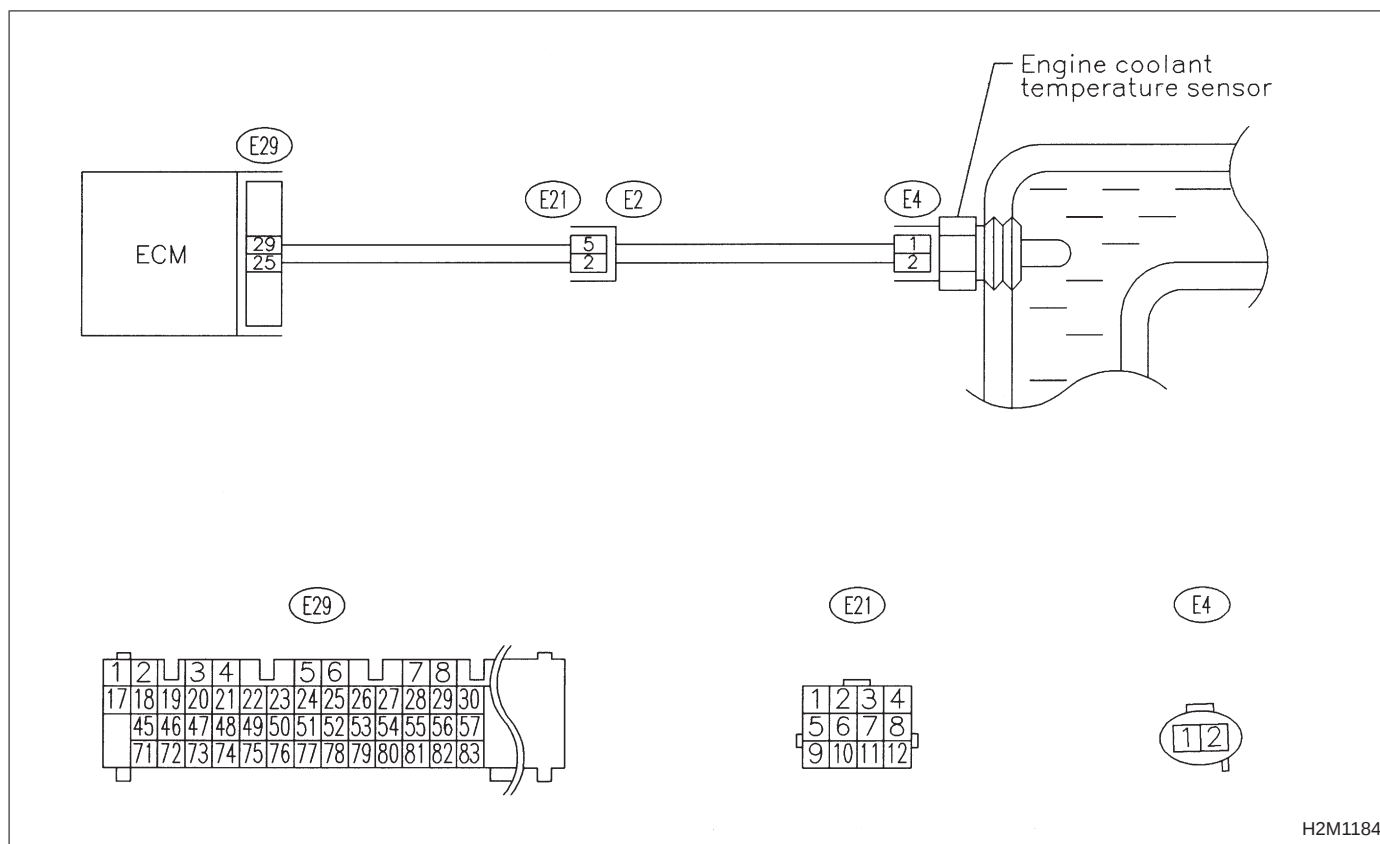


CAUTION:

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

<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



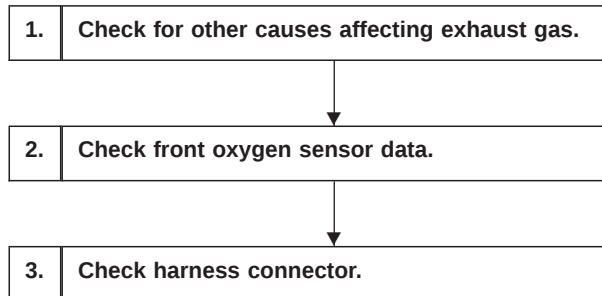
H2M1184



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

DTC DETECTING CONDITION:

- Two consecutive trips with fault

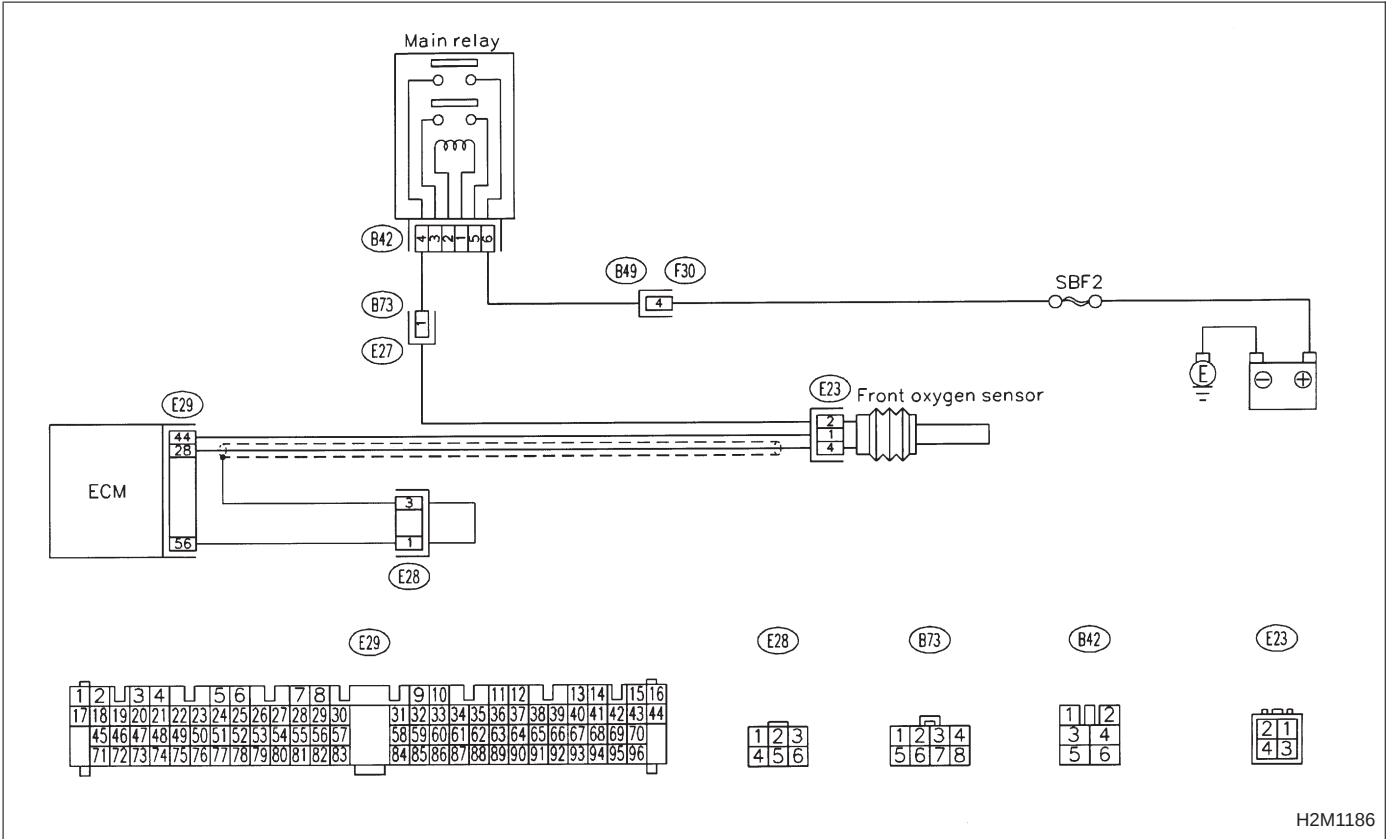


CAUTION:

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

<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



H2M1186

1**CHECK FOR OTHER CAUSES AFFECTING EXHAUST GAS.****CHECK****: Is CO % more than 2 % after engine warm-up?****YES**

: Check fuel system.

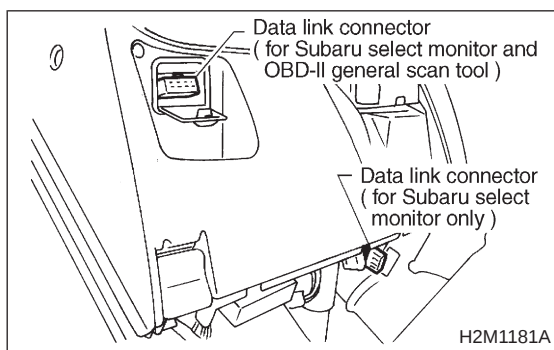
NOTE:

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.

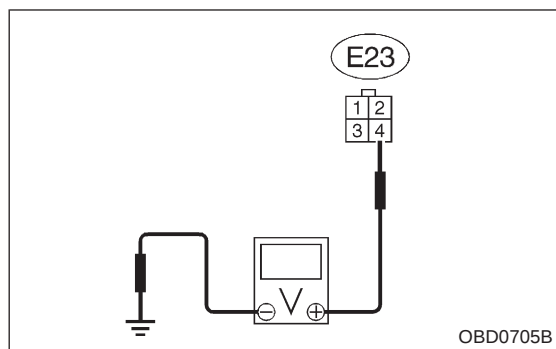
CHECK**: Is the difference of voltage between F14 and F15 0.1 V, or less?****YES**

: 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 (E23) No. 4 — Body/0.2 V, or more**

YES : Go to next **CHECK** .

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.

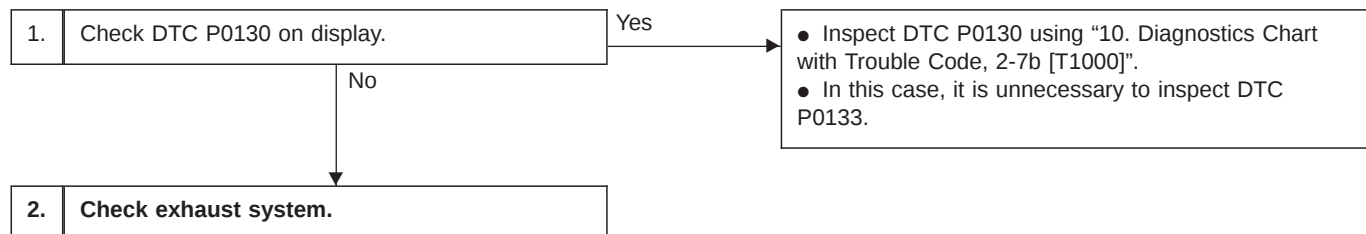
CHECK : **Is there poor contact in front oxygen sensor connector?**

YES : Repair poor contact in front oxygen sensor connector.

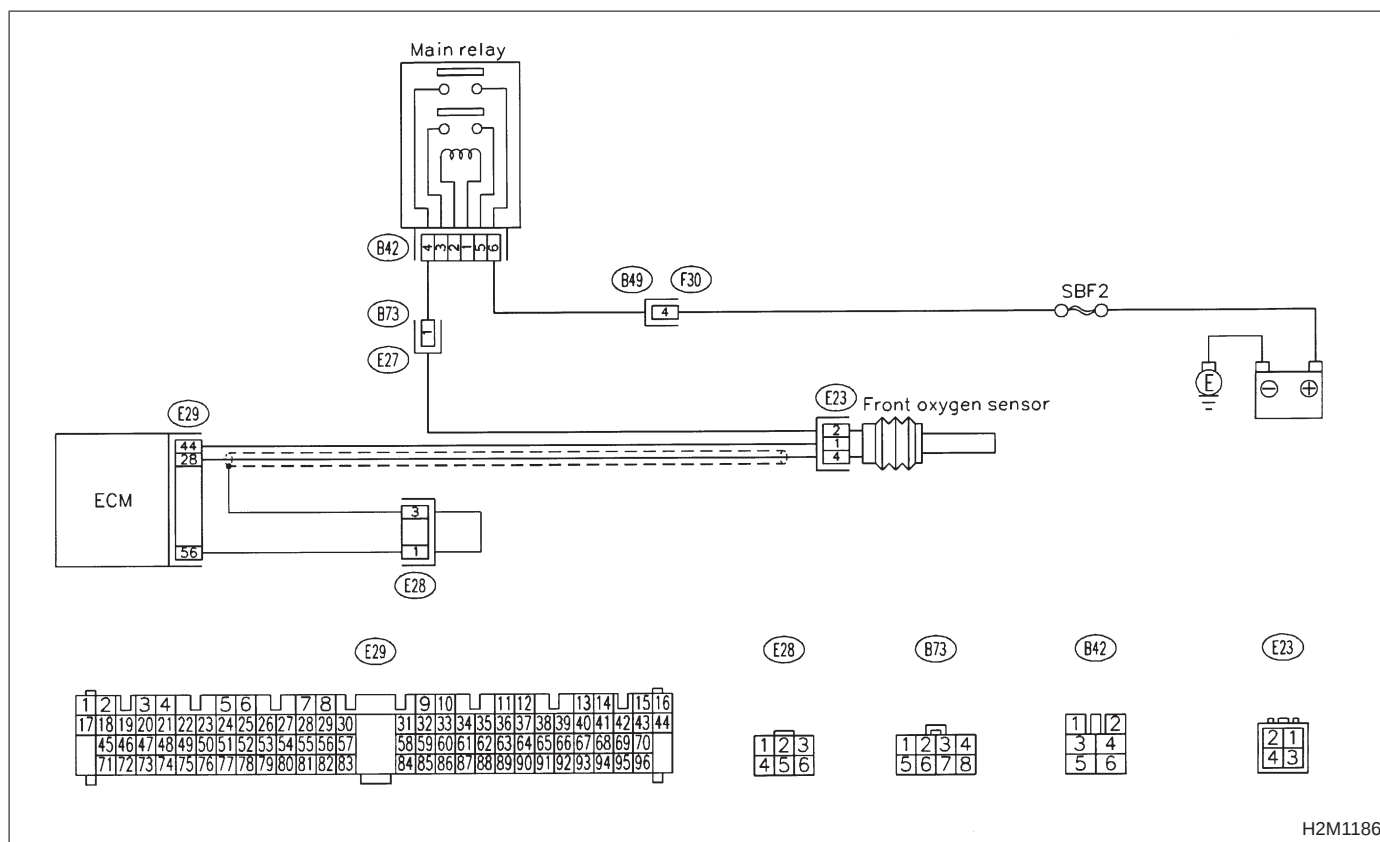
NO : Replace front oxygen sensor.

**K: DTC P0133****— FRONT OXYGEN SENSOR CIRCUIT SLOW
RESPONSE (FO2 — R) —****DTC DETECTING CONDITION:**

- Two consecutive trips with fault

**CAUTION:****After repair or replacement of faulty parts, conduct
CLEAR MEMORY and INSPECTION MODES.****<Ref. to 2-7b [T3D0] and [T3E0].>**

WIRING DIAGRAM:



H2M1186

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

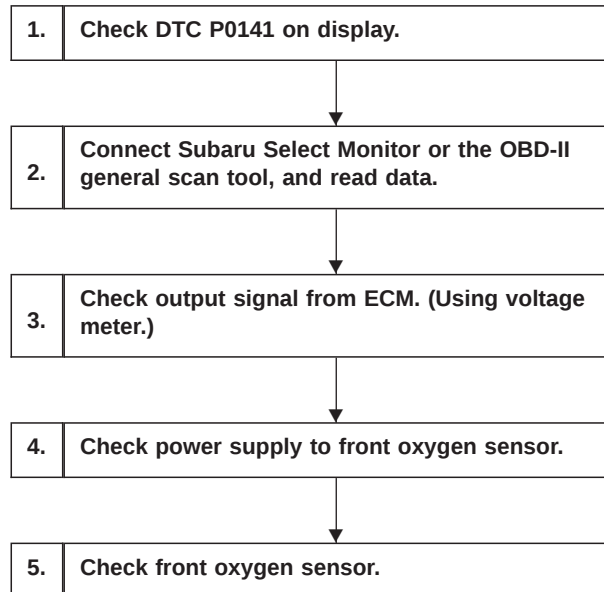
: Replace front oxygen sensor.



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

DTC DETECTING CONDITION:

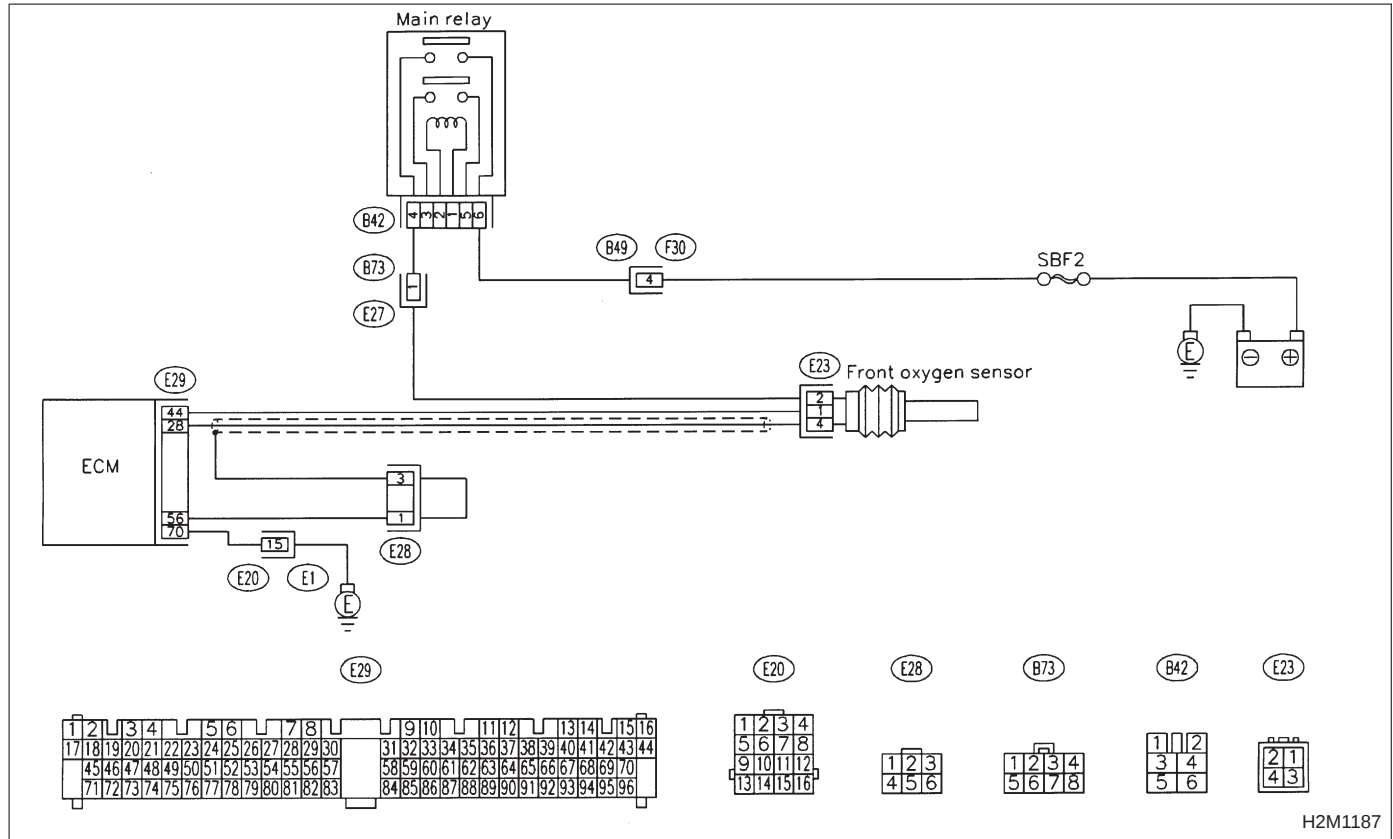
- Two consecutive trips with fault



CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:

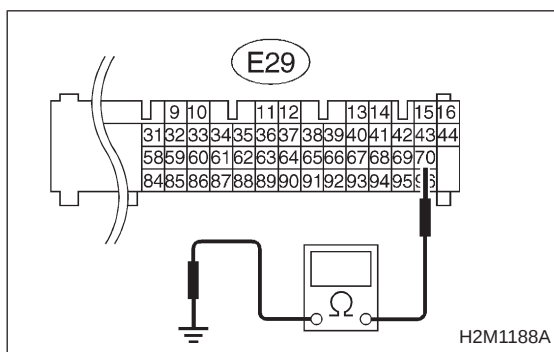


1 CHECK DTC P0141 ON DISPLAY.

CHECK : Does the Subaru select monitor or OBD-II general scan tool indicate DTC P0135 and P0141 at the same time?

YES : Go to next step.

NO : Go to step 2.



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

CHECK : **Connector & terminal (E29) No. 70 — Body/5 Ω, or less**

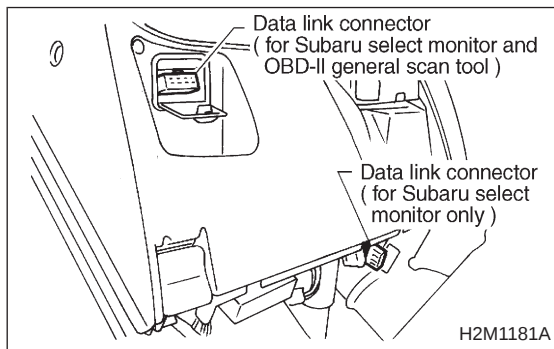
YES : Repair poor contact in ECM connector.

NO : Repair harness and connector.

NOTE:

In this case, repair the following items.

- Open circuit of harness between ECM and coupling connector (E20).
- Open circuit of harness between coupling connector (E20) and engine grounding terminal.
- Poor contact in front oxygen sensor connector.
- Poor contact in coupling connector (E20).



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 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.

FO2H (F29)

1.00A

OBD0215

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

YES : Repair connector.

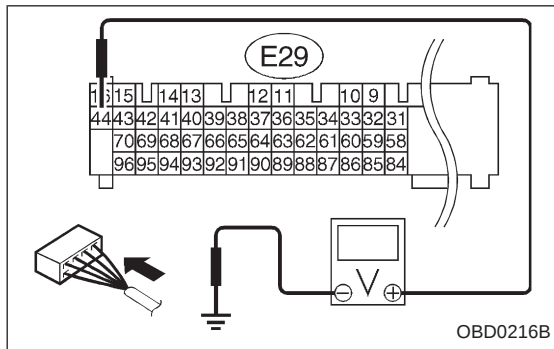
NOTE:

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

NO : Go to step 3.

● OBD-II scan tool

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



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

1) Start and idle the engine.

2) Measure voltage between ECM and body.

CHECK : **Connector & terminal**
(E29) No. 44 — Body/1.0 V, or less

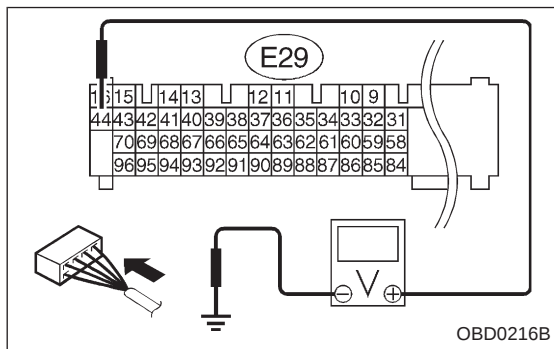
YES : Go to step 4.

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.



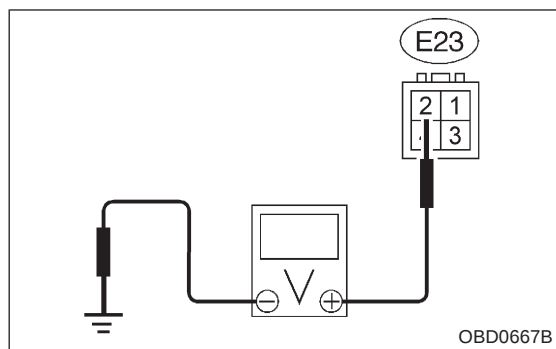
3) Disconnect connector from front oxygen sensor.

4) Measure voltage between ECM and body.

CHECK : **Connector & terminal**
(E29) 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.

**4****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.

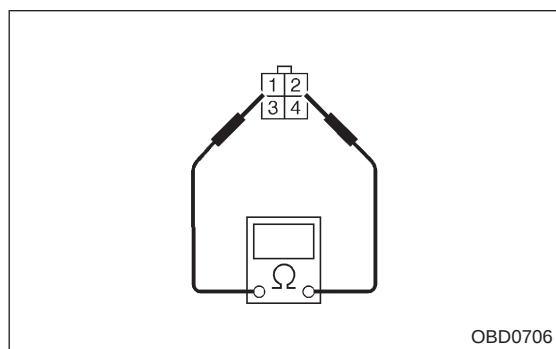
CHECK : **Connector & terminal**
(E23) No. 2 — Body/10 V, or more

YES : Go to step 5.

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.

**5****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:

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

NO : Replace front oxygen sensor.

OBD

(FB1)

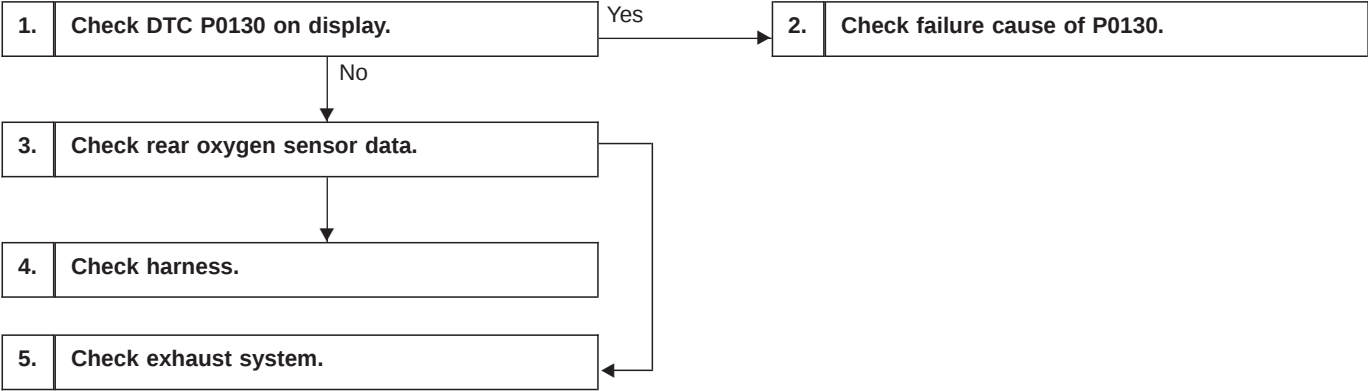
P0136

<RO2_V>

OBD0220

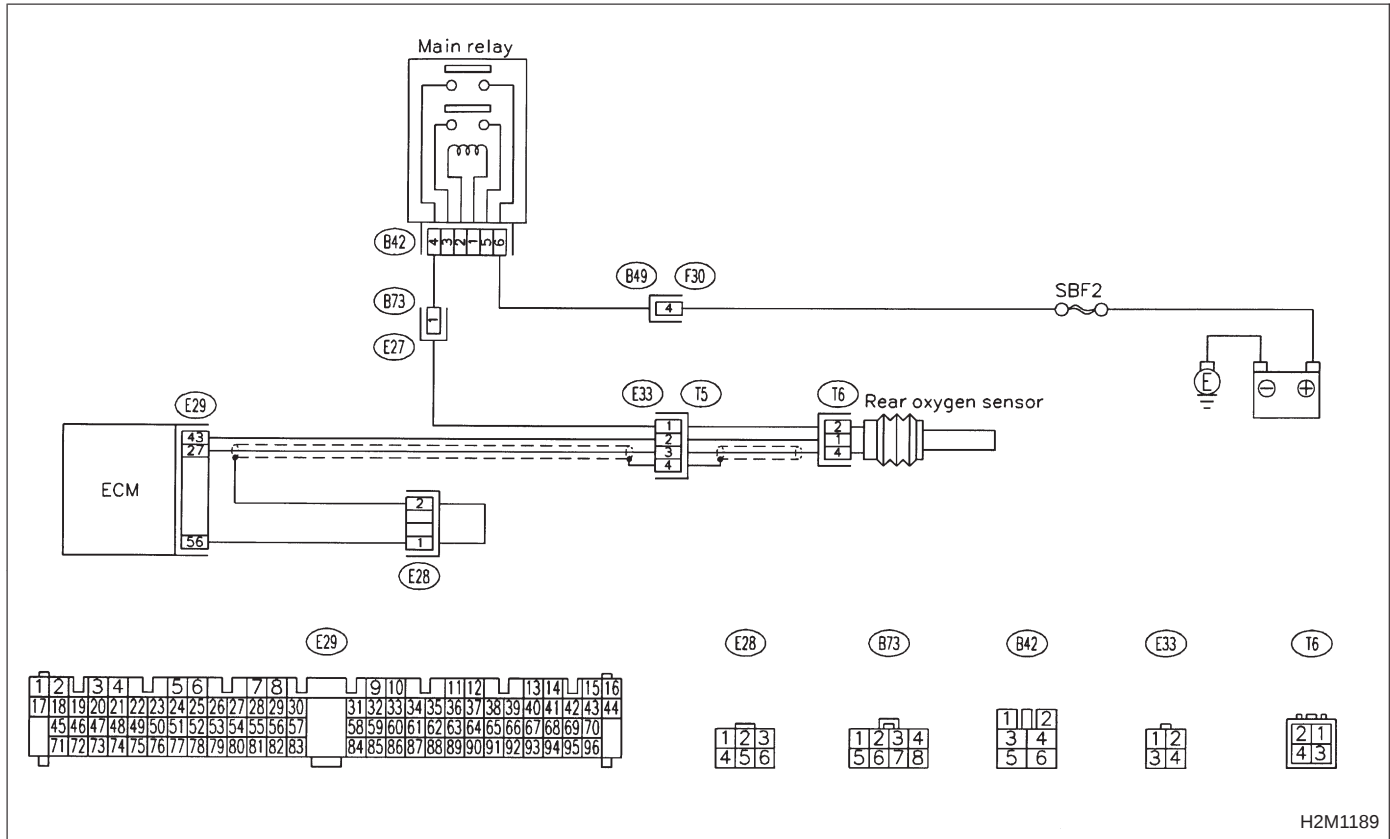
M: DTC P0136
— REAR OXYGEN SENSOR CIRCUIT
MALFUNCTION (RO2 — V) —

- DTC DETECTING CONDITION:
- Two consecutive trips with fault



CAUTION:
After repair or replacement of faulty parts, conduct
CLEAR MEMORY and INSPECTION MODES.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



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.

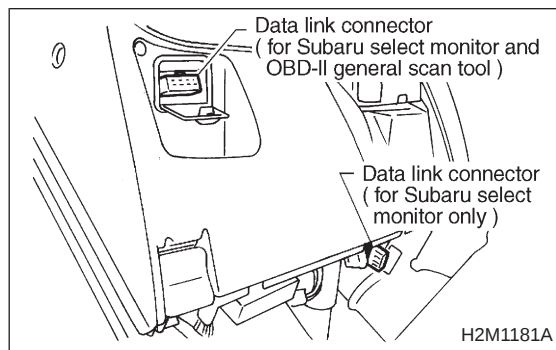
2 CHECK FAILURE CAUSE OF P0130.

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** .

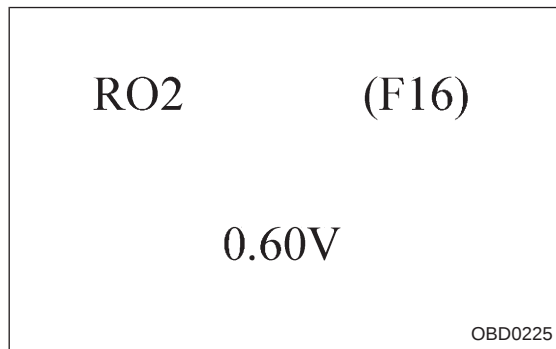
CHECK : Is the indicated data fixed at 0.3±0.1 V?

YES : Go to step 4.

NO : Replace rear oxygen sensor.

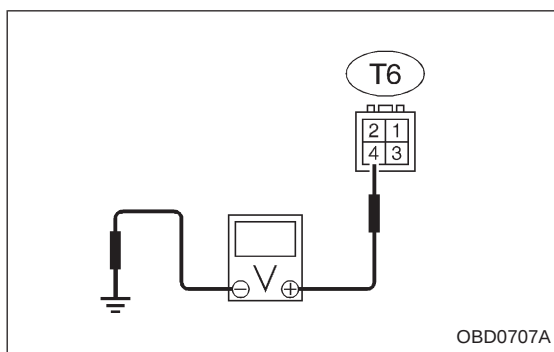
- OBD-II general scan tool

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

YES : Replace rear oxygen sensor.

NO : Repair harness and connector.

NOTE:

In this case, the following are the possible causes.

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

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)

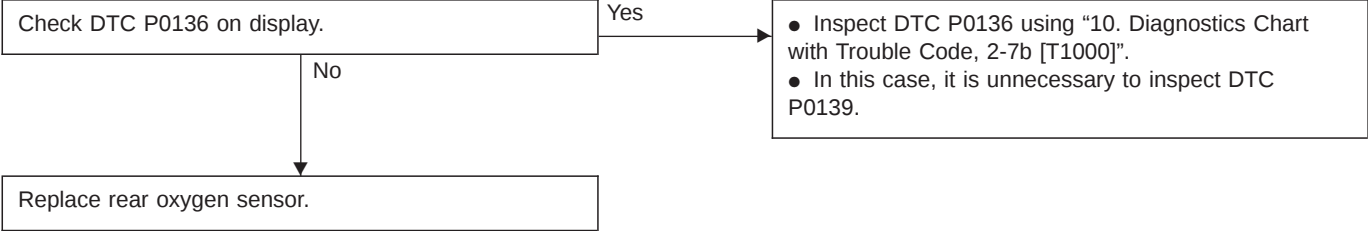
P0139

<RO2_R>

OBD0229

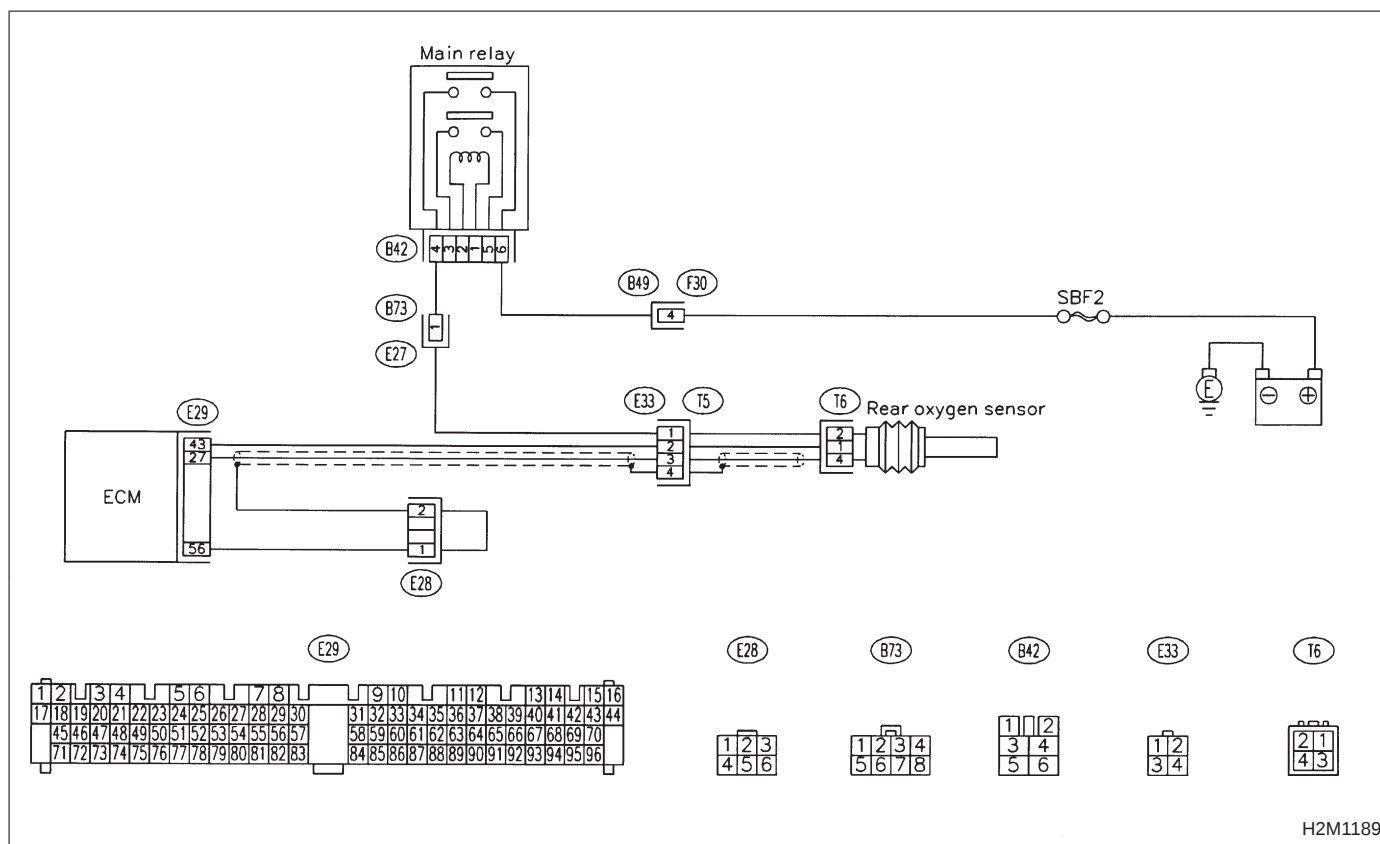
N: DTC P0139
— REAR OXYGEN SENSOR CIRCUIT SLOW
RESPONSE (RO2 — R) —

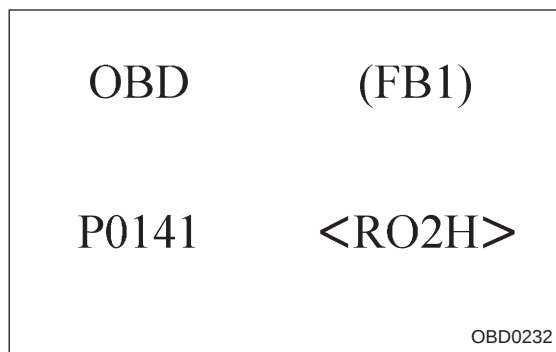
- DTC DETECTING CONDITION:
- Two consecutive trips with fault



CAUTION:
After repair or replacement of faulty parts, conduct
CLEAR MEMORY and **INSPECTION MODES**.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:

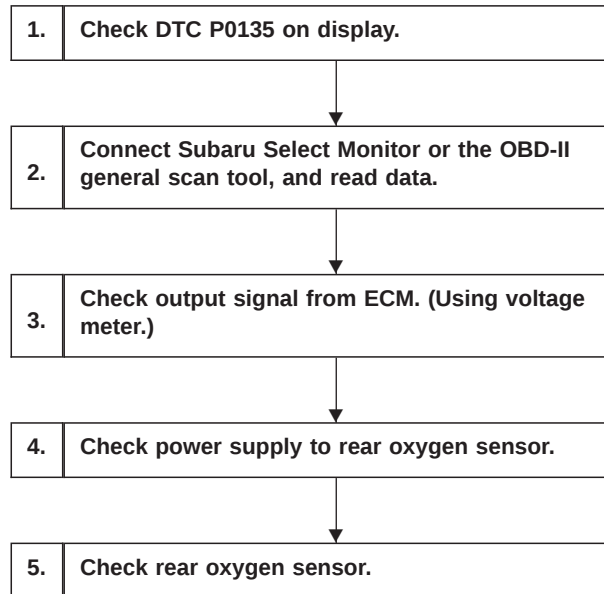




O: DTC P0141
— REAR OXYGEN SENSOR HEATER
CIRCUIT MALFUNCTION (RO2H) —

DTC DETECTING CONDITION:

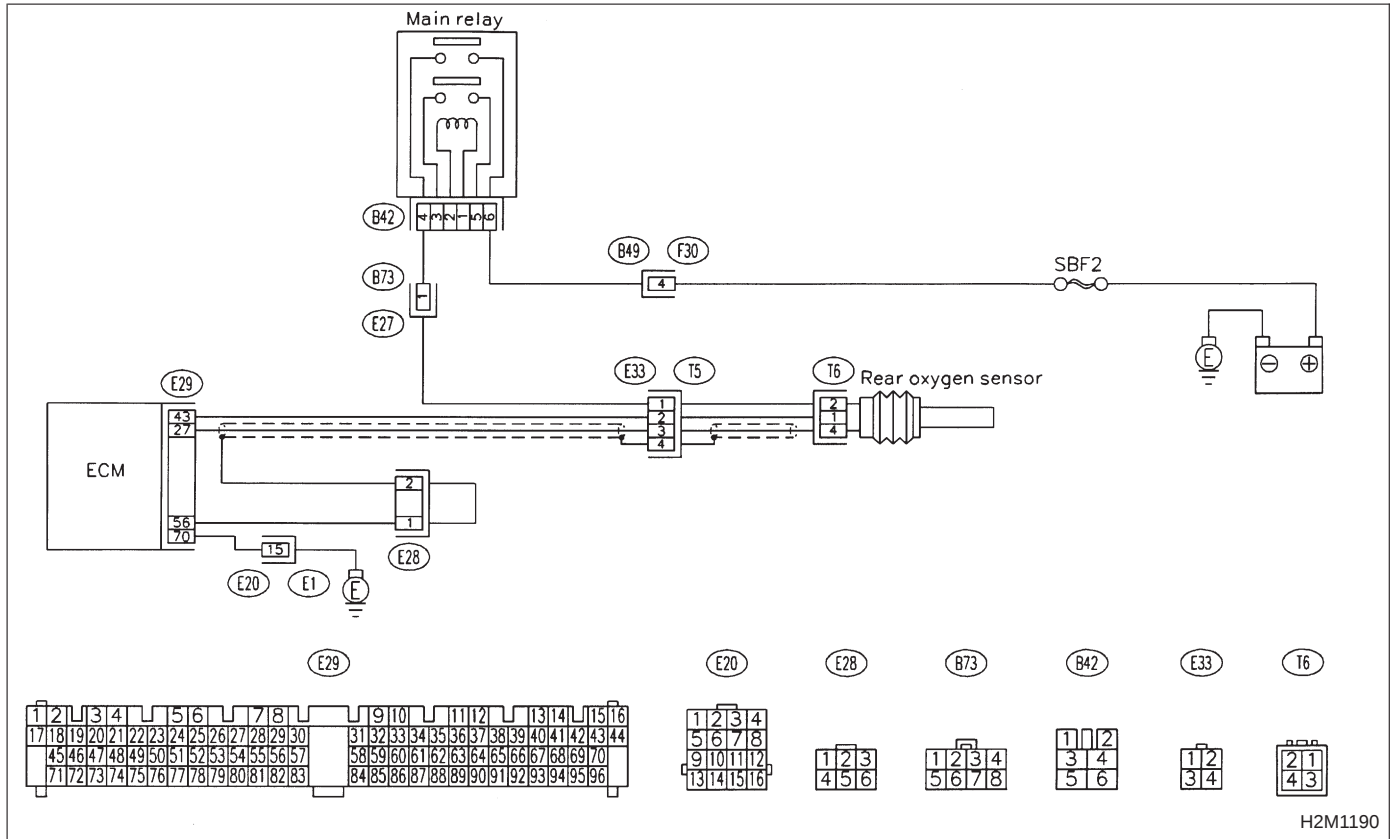
- Two consecutive trips with fault



CAUTION:

After repair or replacement of faulty parts, conduct
CLEAR MEMORY and **INSPECTION MODES**.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:

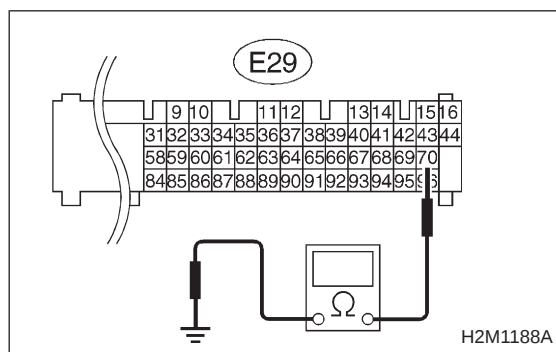


1 CHECK DTC P0135 ON DISPLAY.

CHECK : Does the Subaru select monitor or OBD-II general scan tool indicate DTC P0141 and P0135 at the same time?

YES : Go to next step.

NO : Go to step 2.



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

CHECK : **Connector & terminal (E29) No. 70 — Body/5 Ω, or less**

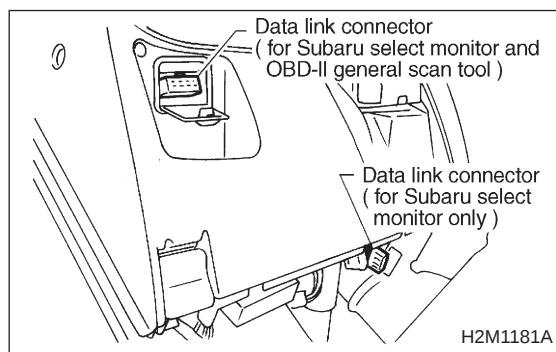
YES : Repair poor contact in ECM connector.

NO : Repair harness and connector.

NOTE:

In this case, repair the following items.

- Open circuit of harness between ECM and coupling connector (E20).
- Open circuit of harness between coupling connector (E20) and engine grounding terminal.
- Poor contact in rear oxygen sensor connector.
- Poor contact in rear oxygen sensor connecting harness connector (E33).
- Poor contact in coupling connector (E20).



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 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.

RO2H <F30>

1.00 A

OBD0708

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

YES : Repair connector.

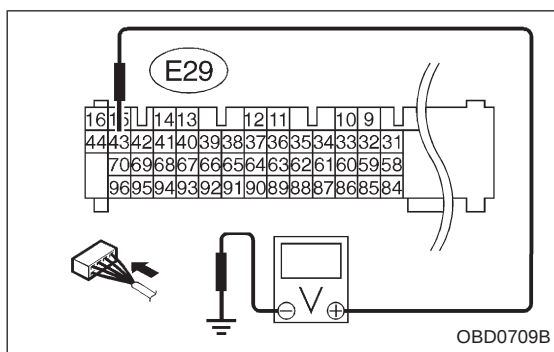
NOTE:

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

NO : Go to step 3.

● OBD-II scan tool

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



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

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

CHECK : **Connector & terminal**
(E29) No. 43 — Body/1.0 V, or less

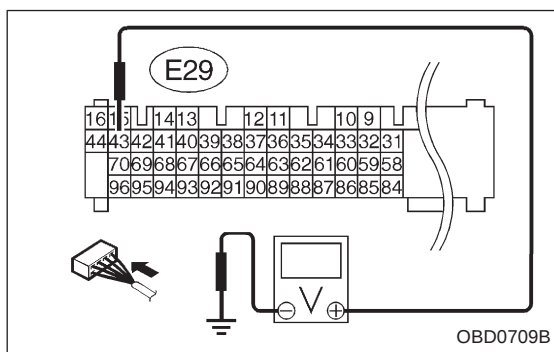
YES : Go to step 4.

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.

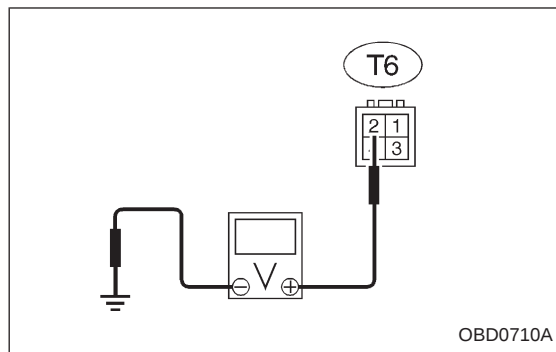


- 3) Disconnect connector from rear oxygen sensor.
- 4) Measure voltage between ECM and body.

CHECK : **Connector & terminal**
(E29) 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.



4

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.

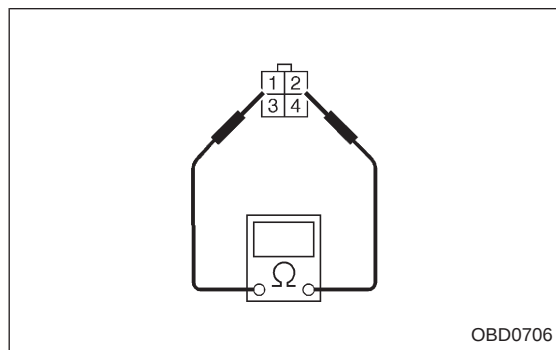
CHECK : **Connector & terminal (T6) No. 2 — Body/10 V, or more**

YES : Go to step 5.

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.



5

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**

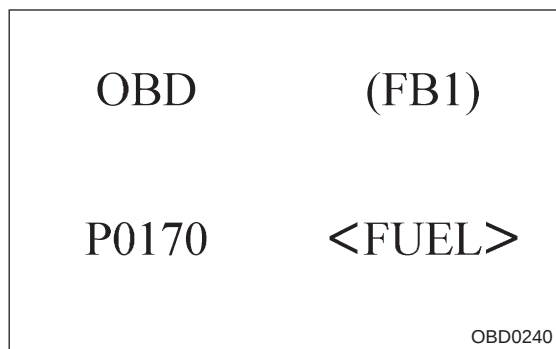
YES : Repair harness and connector.

NOTE:

In this case, repair the following.

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

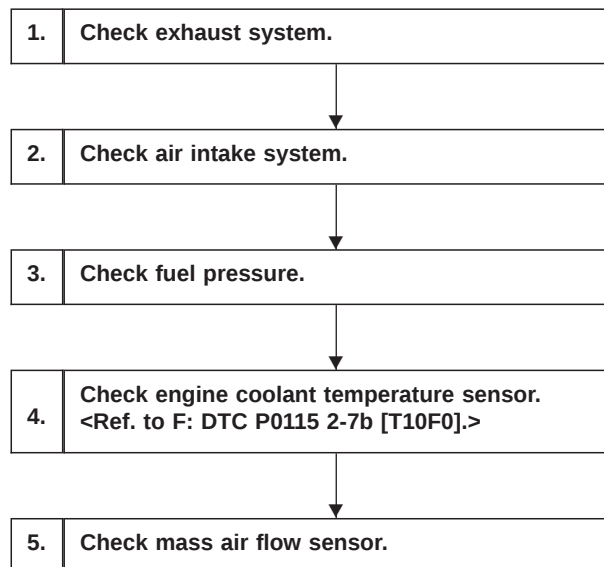
NO : Replace rear oxygen sensor.

**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 2-7b [T3D0] and [T3E0].>

1 CHECK EXHAUST SYSTEM.

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

YES : Repair exhaust system.

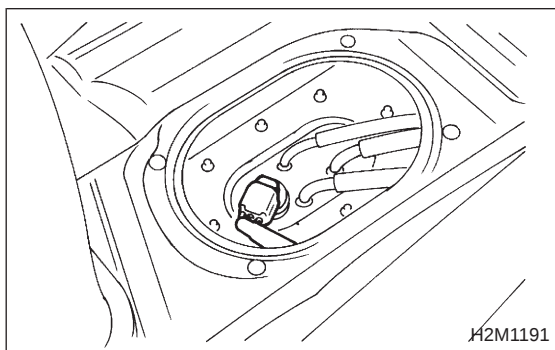
NO : Go to step 2.

2 CHECK AIR INTAKE SYSTEM.

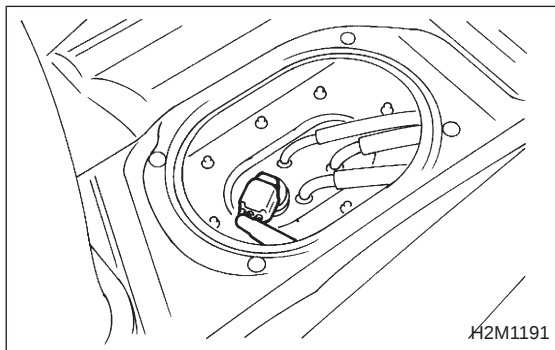
CHECK : *Are there holes, loose bolts or disconnection of hose on air intake system?*

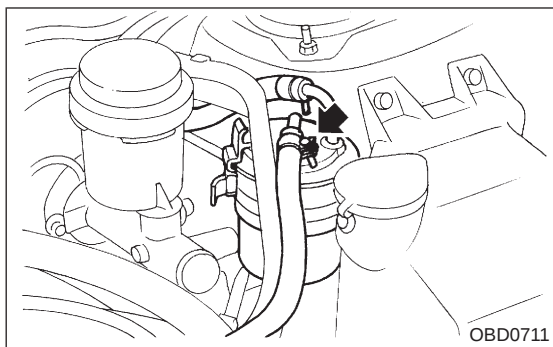
YES : Repair air intake system.

NO : Go to step 3.

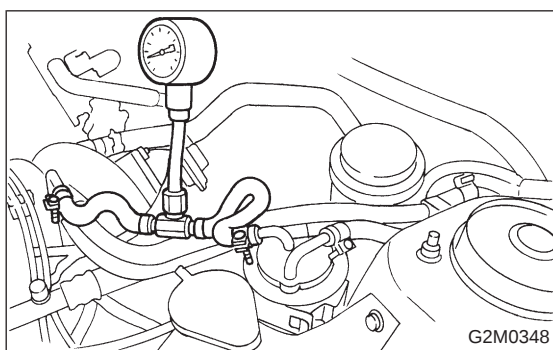
**3 CHECK FUEL PRESSURE.****1) Release fuel pressure.**

- (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	● Clogged fuel return line or bent hose
Fuel pressure too low	● 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	● Faulty pressure regulator ● Clogged fuel return line or bent hose
Fuel pressure too low	● Faulty pressure regulator ● Improper fuel pump discharge ● Clogged fuel supply line

WARNING:

Before removing fuel pressure gauge, release fuel pressure.

NOTE:

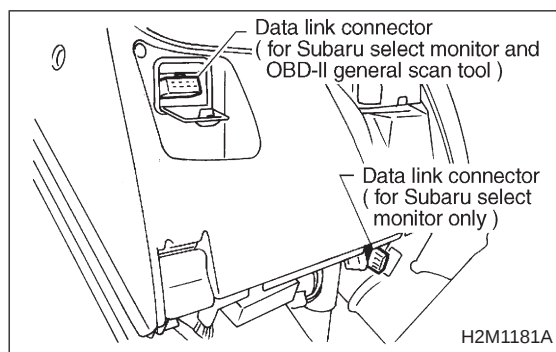
- If fuel pressure does not increase, squeeze fuel return hose 2 to 3 times, then measure fuel pressure again.
- If out of specification as measured at step 6), check or replace pressure regulator and pressure regulator vacuum hose.

4

CHECK ENGINE COOLANT TEMPERATURE SENSOR.

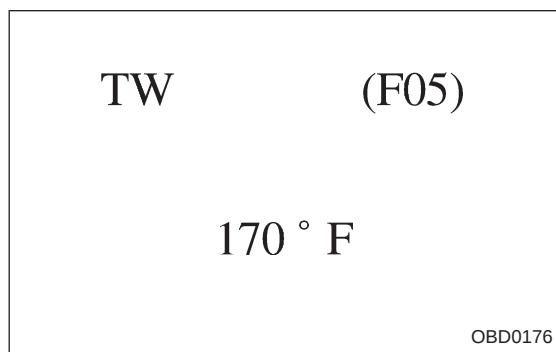
< REF. TO F: DTC P0115, 2-7b [T10F0].>

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".

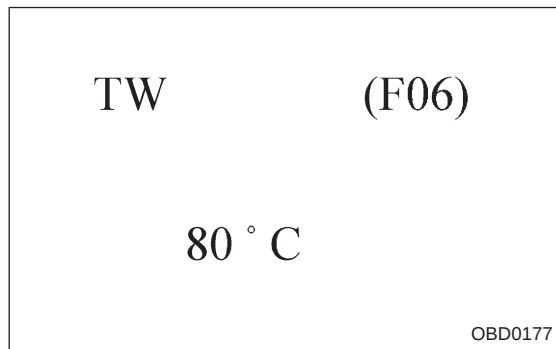
● F06: Water temperature is indicated in "°C".

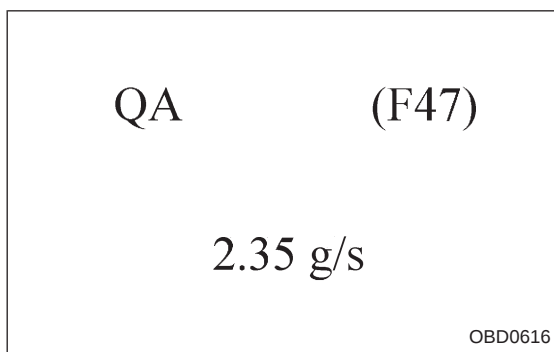
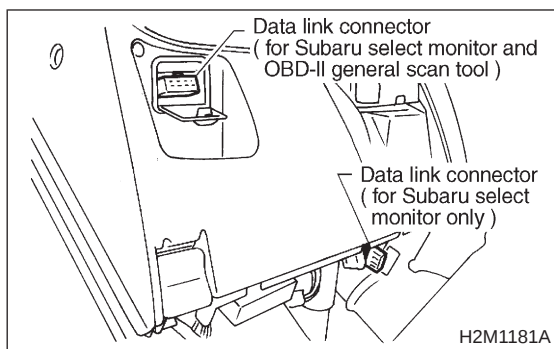
CHECK : *Is temperature indicated on Subaru Select Monitor (F05) greater than 140°F?*
Is temperature indicated on Subaru Select Monitor (F06) greater than 60°C?

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) Place the selector lever in "N" or "P" position.
- 5) Turn A/C switch to OFF.
- 6) Turn all accessory switches to OFF.
- 7) 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)

YES : Contact with SOA service.

Note: Inspection by DTM is required.

Probable cause: Deterioration of plural parts

NO : Replace mass air flow sensor.

- 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

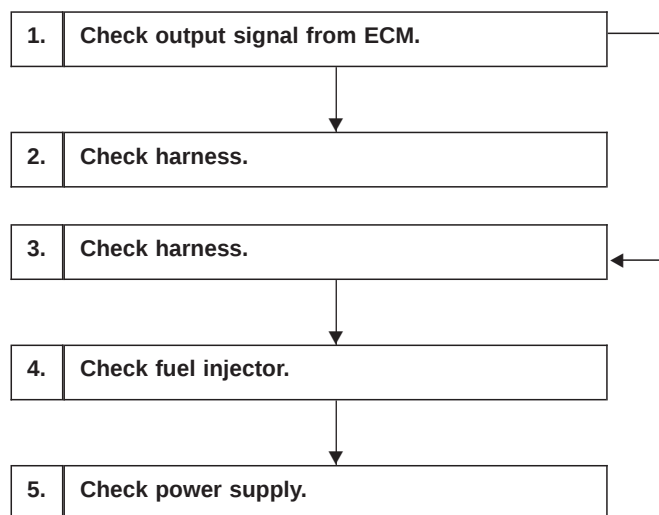
T: DTC P0204
— FUEL INJECTOR CIRCUIT MALFUNCTION - #4 (INJ4) —

DTC DETECTING CONDITION:

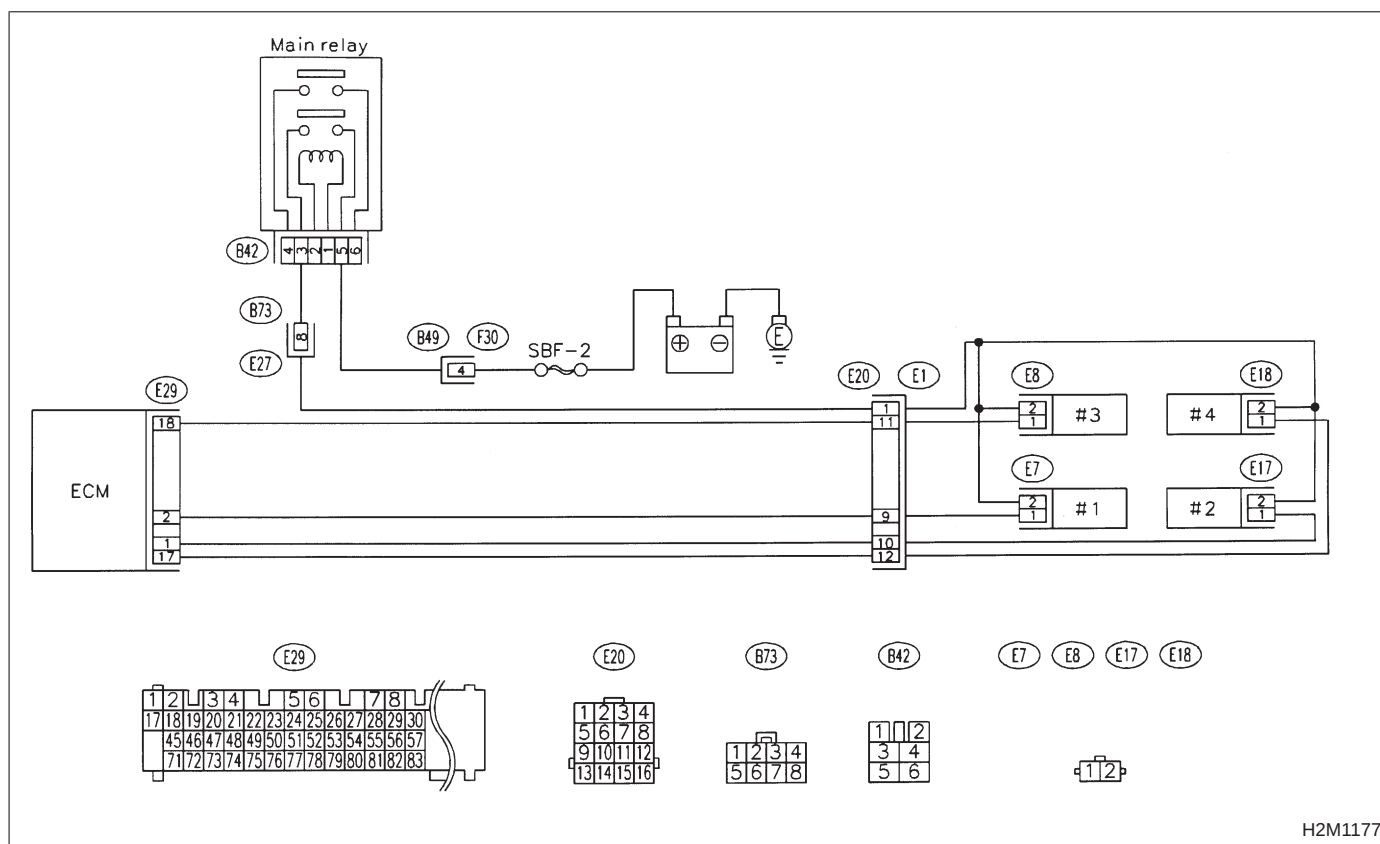
- Immediately at fault recognition

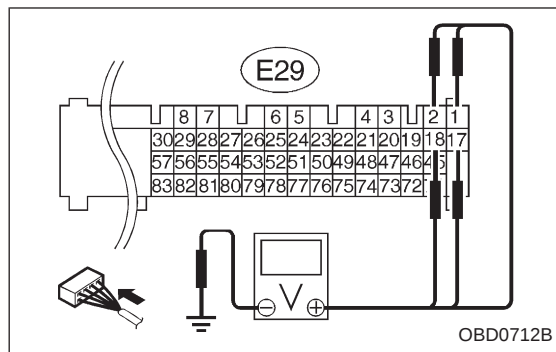
TROUBLE SYMPTOM:

- 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 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



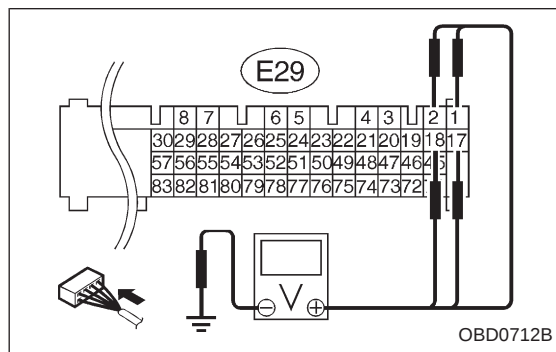
1 CHECK OUTPUT SIGNAL FROM ECM.

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

CHECK : **Connector & terminal**
#1 (E29) No. 2 — Body/10 V, or more
#2 (E29) No. 1 — Body/10 V, or more
#3 (E29) No. 18 — Body/10 V, or more
#4 (E29) No. 17 — Body/10 V, or more

YES : Go to step 2.

NO : Go to step 3.



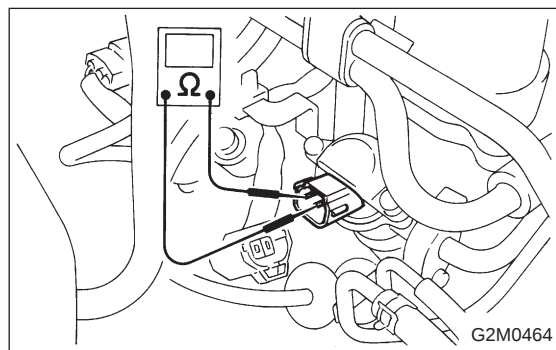
2 CHECK HARNESS.

- 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 (E29) No. 2 — Body/10 V, or more
#2 (E29) No. 1 — Body/10 V, or more
#3 (E29) No. 18 — Body/10 V, or more
#4 (E29) 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.



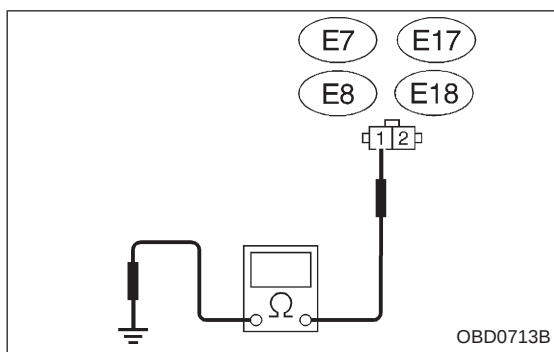
- 5) Turn ignition switch to OFF.
- 6) Measure resistance between fuel injector terminals on faulty cylinder.

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

YES : Replace faulty fuel injector and ECM.

NO : Go to next **CHECK** .

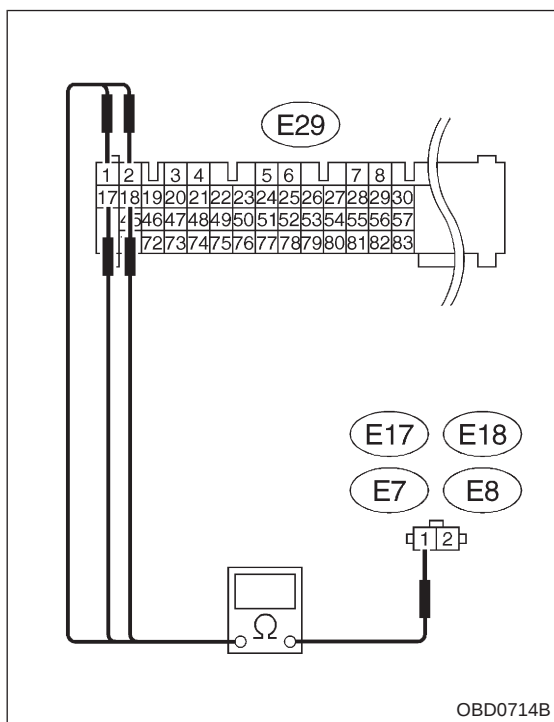
- CHECK** : *Is there poor contact in ECM connector?*
YES : Repair poor contact in ECM connector.
NO : Replace ECM.



3 CHECK HARNESS.

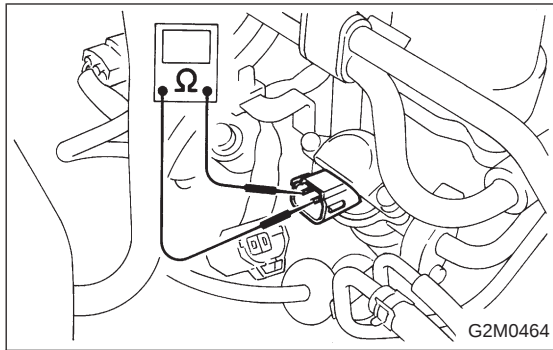
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from fuel injector on faulty cylinders.
- 3) Measure voltage between ECM connector and body on faulty cylinders.

- CHECK** : **Connector & terminal**
#1 (E7) No. 1 — Body/10 Ω, or less
#2 (E17) No. 1 — Body/10 Ω, or less
#3 (E8) No. 1 — Body/10 Ω, or less
#4 (E18) 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.

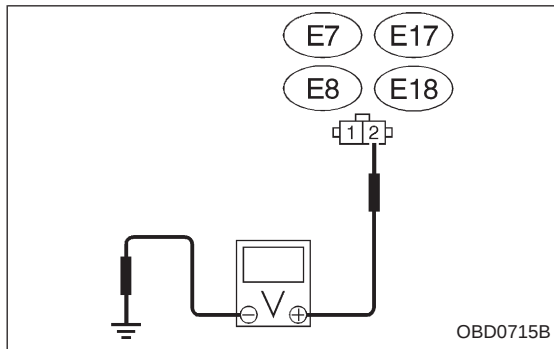
- CHECK** : **Connector & terminal**
#1 (E29) No. 2 — (E7) No. 1/1 Ω, or less
#2 (E29) No. 1 — (E17) No. 1/1 Ω, or less
#3 (E29) No. 18 — (E8) No. 1/1 Ω, or less
#4 (E29) No. 17 — (E18) No. 1/1 Ω, or less
- YES** : Go to step 4.
NO : Repair open circuit of harness between ECM and fuel injector.



4 CHECK FUEL INJECTOR.

Measure resistance between fuel injector terminals on faulty cylinder.

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



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 (E7) No. 2 — Body/10 V, or more
#2 (E17) No. 2 — Body/10 V, or more
#3 (E8) No. 2 — Body/10 V, or more
#4 (E18) No. 2 — Body/10 V, or more
- YES** : Check for poor contact of all connectors in WIRING DIAGRAM on page 151.
- 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

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

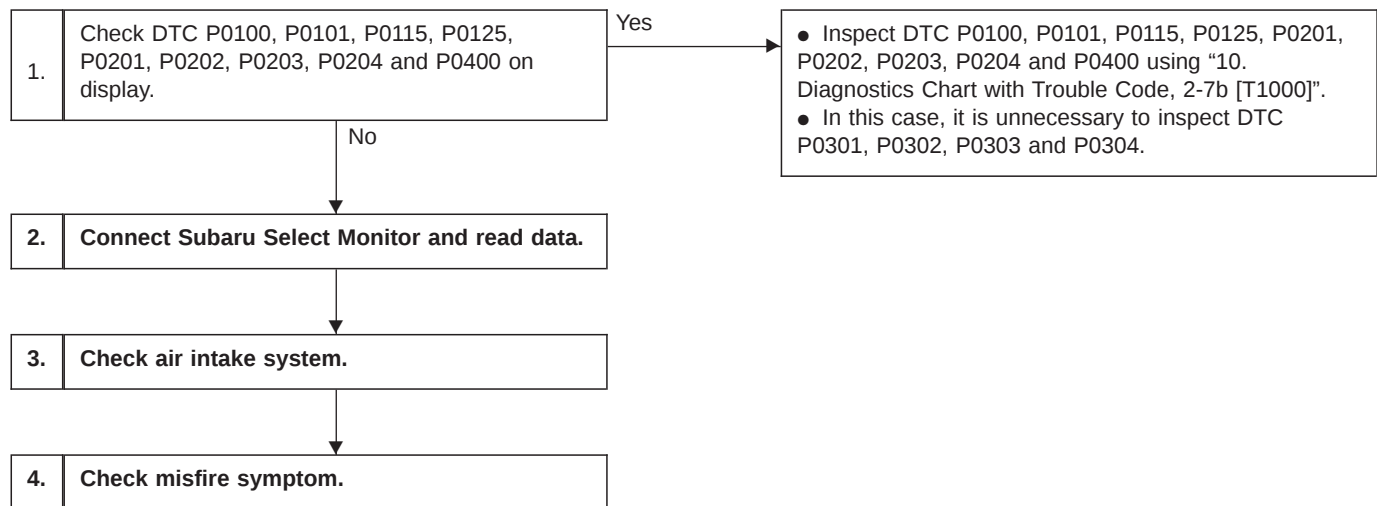
X: DTC P0304
— CYLINDER 4 MISFIRE DETECTED
(MIS — 4) —

DTC DETECTING CONDITION:

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

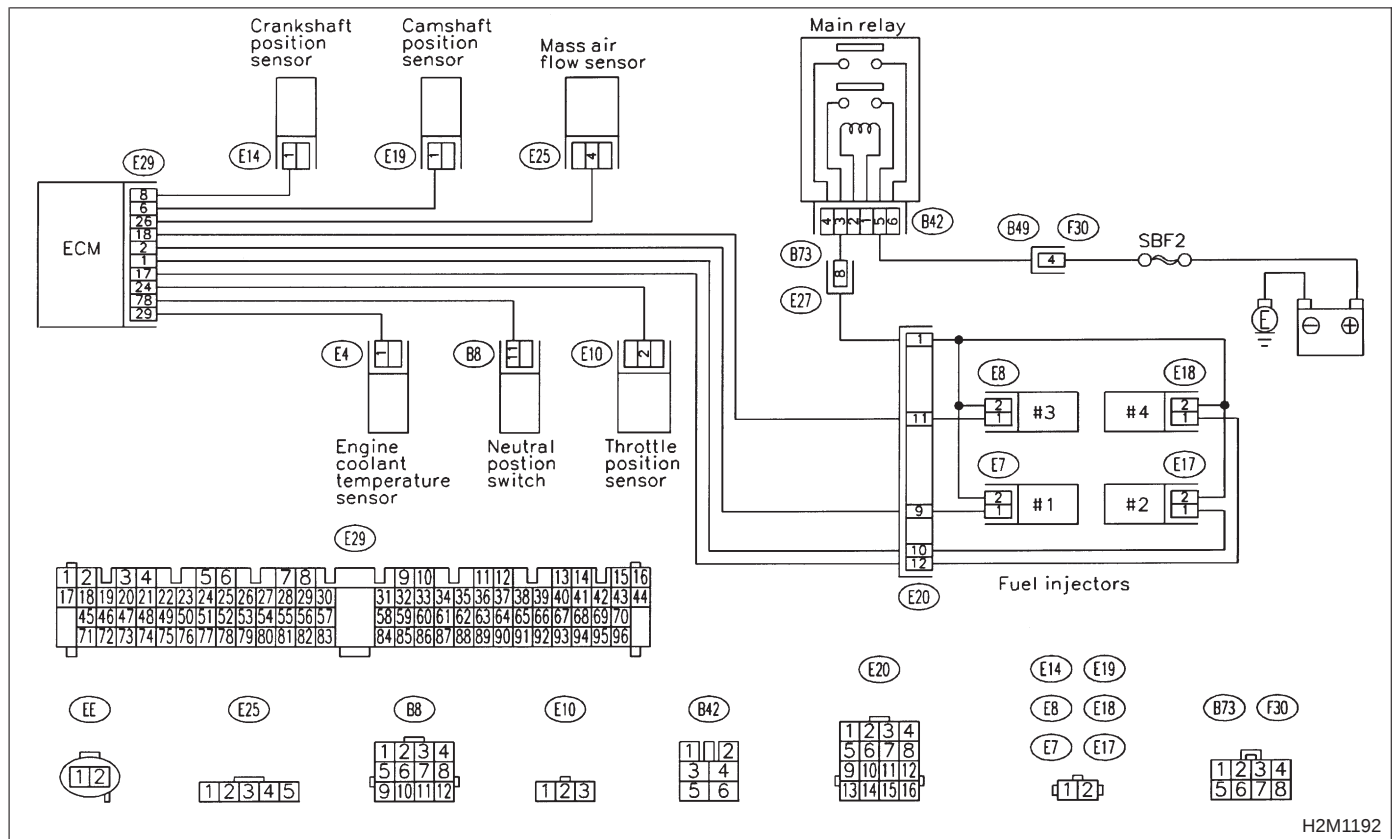
TROUBLE SYMPTOM:

- Engine stalls.
- Erroneous idling
- Rough driving

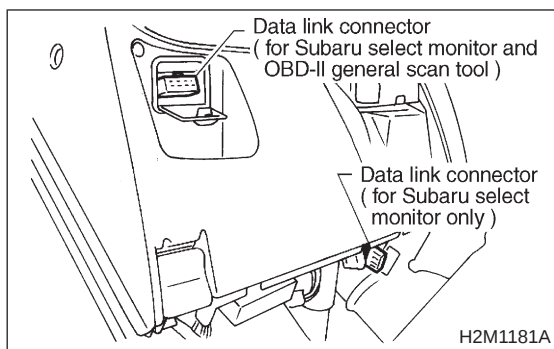
**CAUTION:**

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

<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:

H2M1192



2 CONNECT SUBARU SELECT MONITOR AND READ DATA.

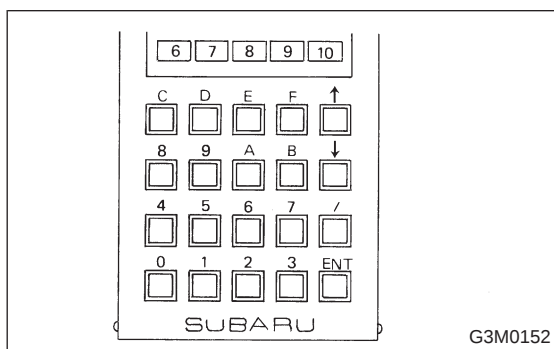
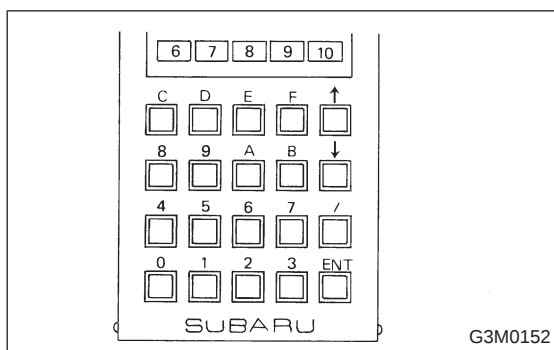
- 1) Turn ignition switch to OFF.
- 2) Connect Subaru Select Monitor to the data link connector.
- 3) Turn ignition switch to ON, and turn Subaru Select Monitor switch to ON.

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

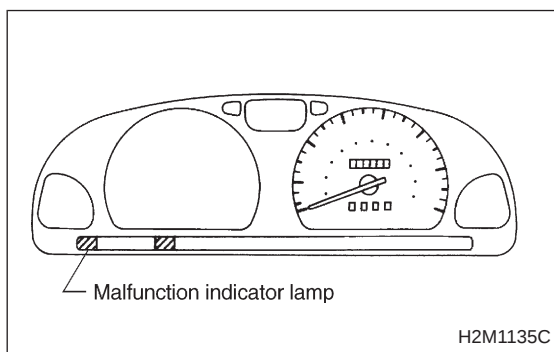
Function mode: F38

NOTE:

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.

CHECK : Is the MIL coming on or blinking?

YES : Go to step 3.

NO : Go to next **CHECK** .

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.

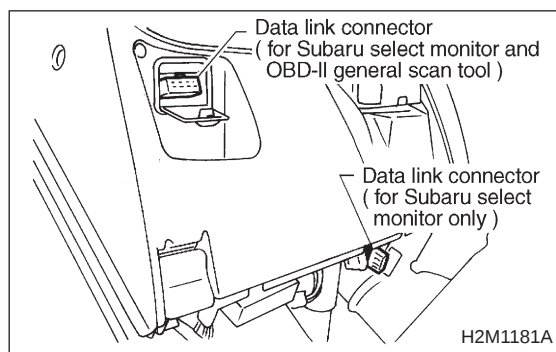
- ① Are there air leaks or air suction caused by loose or dislocated nuts and bolts?
- ② Are there cracks or any disconnection of hoses?

YES

: Repair air intake system.

NO

: Go to step 4.



4 CHECK MISFIRE SYMPTOM.

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

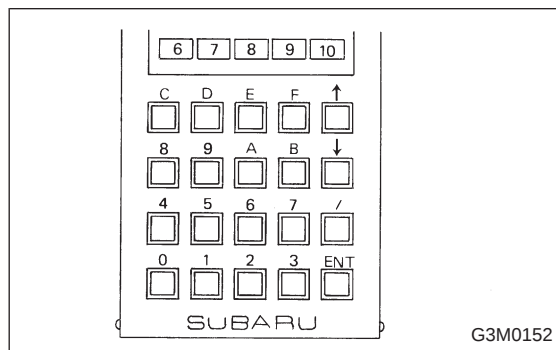
- 3) Turn ignition switch to ON, and turn Subaru Select Monitor or OBD-II general scan tool switch to ON.

- 4) Read diagnostic trouble code (DTC).

● Subaru Select Monitor

Designate mode use function key.

Function mode: FB1



● OBD-II general scan tool

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

NOTE:

Perform diagnosis according to the items listed below.

DTC	Next CHECK
Only one cylinder	Go to step ①.
P0301 and P0302	Go to step ②.
P0303 and P0304	Go to step ③.
P0301 and P0303	Go to step ④.
P0302 and P0304	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
- Ignition coil

NOTE:

If no abnormal is discovered, check for "8. 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
- Ignition coil

NOTE:

If no abnormal is discovered, check for "8. 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** .

NO : Go to DTC P0170, 2-7b [T10P3], [T10P4] and [T10P5].

EGRmin (F38)

30 mmHg

H2M1219

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

NOTE:

Use the value read in step 2 for function mode F38.

YES : Clean EGR valve.

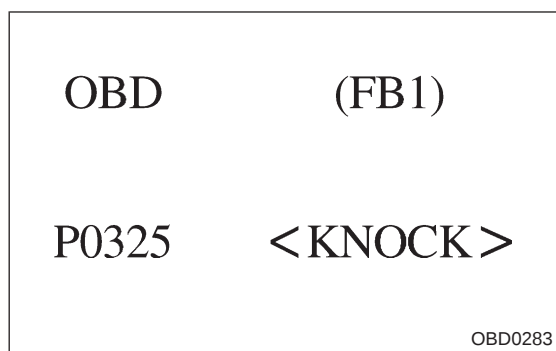
CAUTION:

Do not use solvent when cleaning EGR valve assembly, as it can damage diaphragm.

NOTE:

- Remove and blow away the exhaust deposits. Make sure the valve operates smoothly and the valve seat area is completely cleaned.
- Replace EGR valve as required.

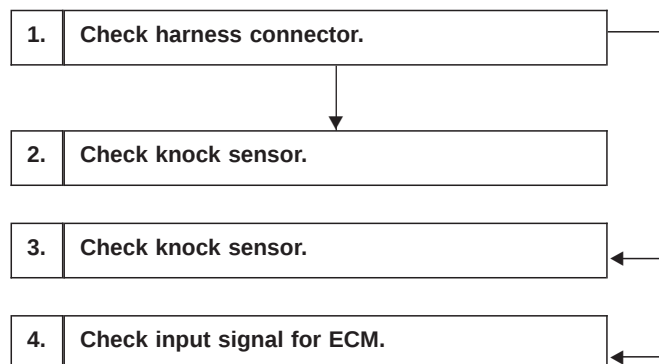
NO : Go to DTC P0170, 2-7b [T10P3], [T10P4] and [T10P5].

**Y: DTC P0325****— KNOCK SENSOR CIRCUIT MALFUNCTION (KNOCK) —****DTC DETECTING CONDITION:**

- Immediately at fault recognition

TROUBLE SYMPTOM:

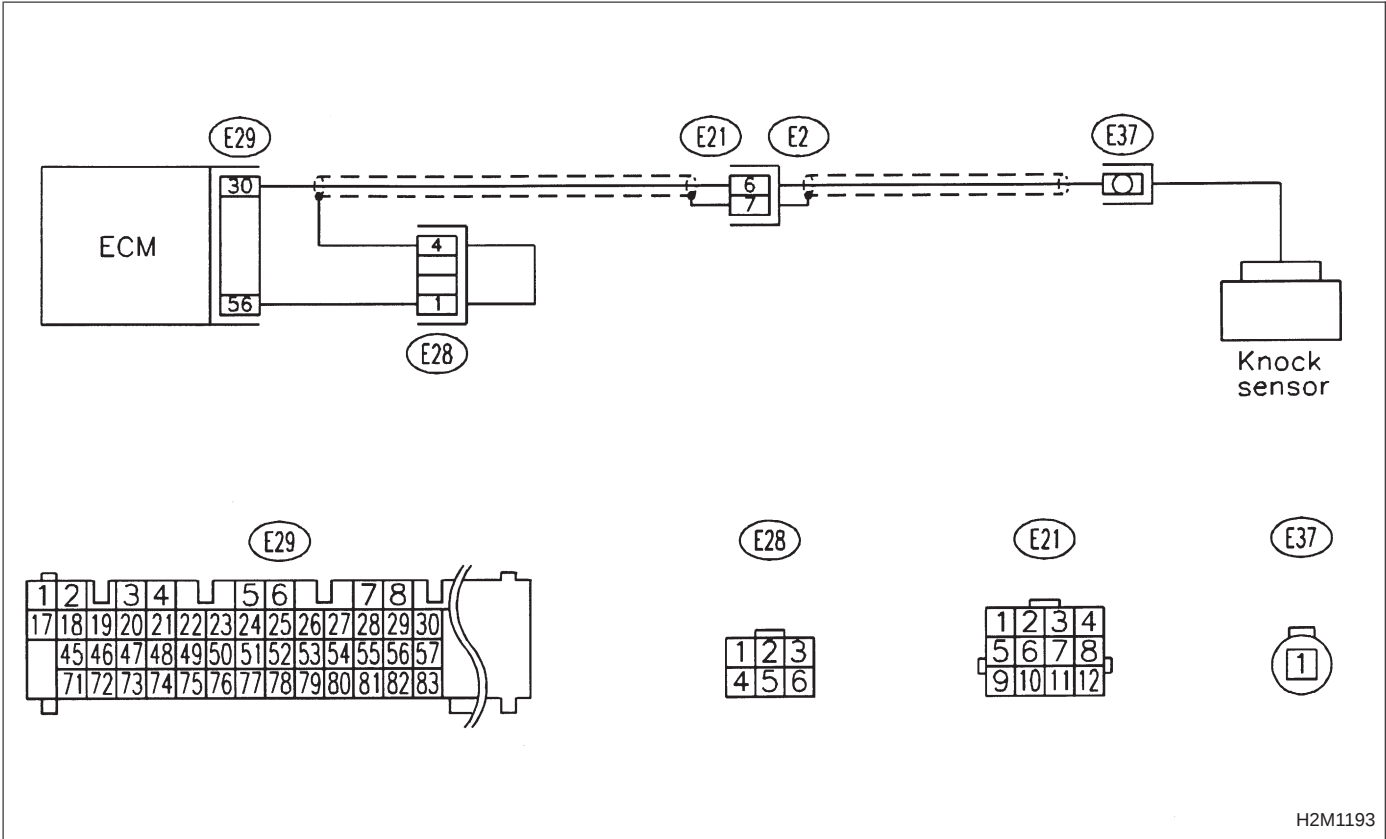
- Poor driving performance
- Knocking occurs.

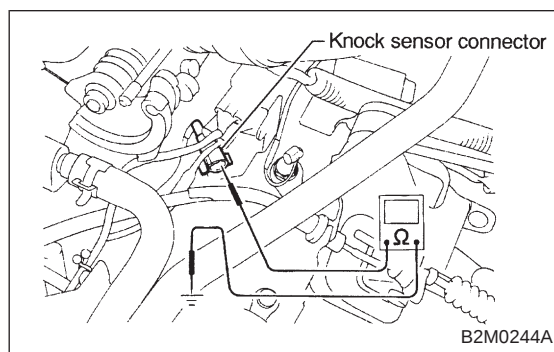
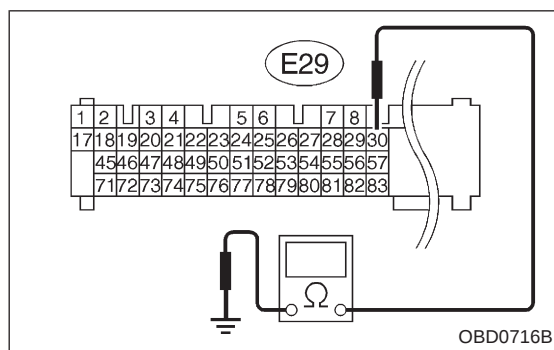
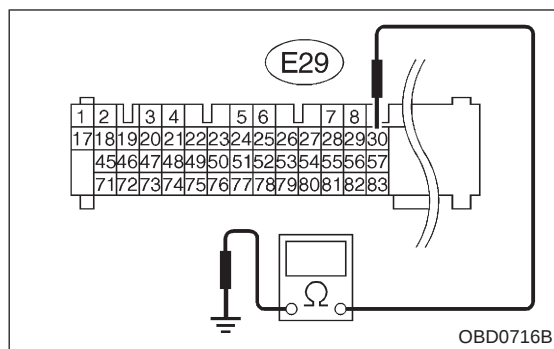
**CAUTION:**

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

<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:





1 CHECK HARNESS CONNECTOR.

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

CHECK : **Connector & terminal (E29) No. 30 — Body/700 kΩ, or more**

YES : Go to step 2.

NO : Go to next **CHECK** .

CHECK : **Connector & terminal (E29) 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 (E37) No. 1 — Body/700 kΩ, or more**

YES : Go to next **CHECK** .

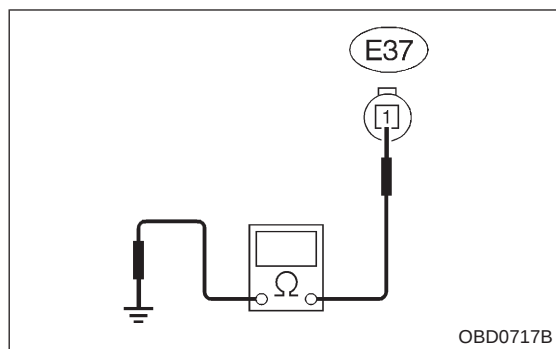
NO : Check and repair the following items.

- Open circuit of the harness between knock sensor connector and ECM connector
- Poor contact of the knock sensor connector
- Poor contact of coupling connector (E21)

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

YES : Replace knock sensor.

NO : Tighten knock sensor installation bolt securely.



3 CHECK KNOCK SENSOR.

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

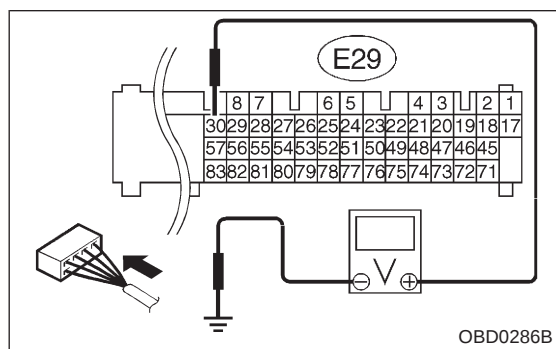
CHECK : **Connector & terminal**
(E37) No. 1 — Body/400 kΩ, or less

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.

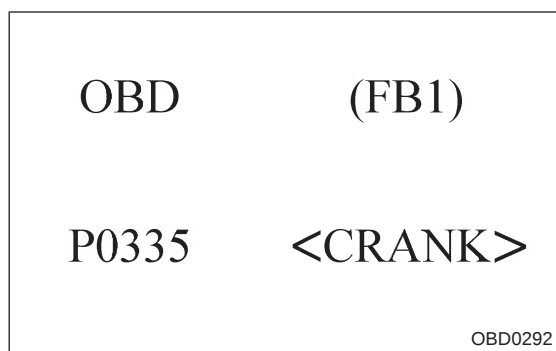
CHECK : **Connector & terminal**
(E29) No. 30 — Body/2 V, or more

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 (E21)

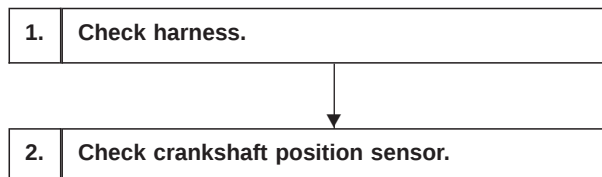
NO : Repair poor contact in ECM connector.

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

- Immediately at fault recognition

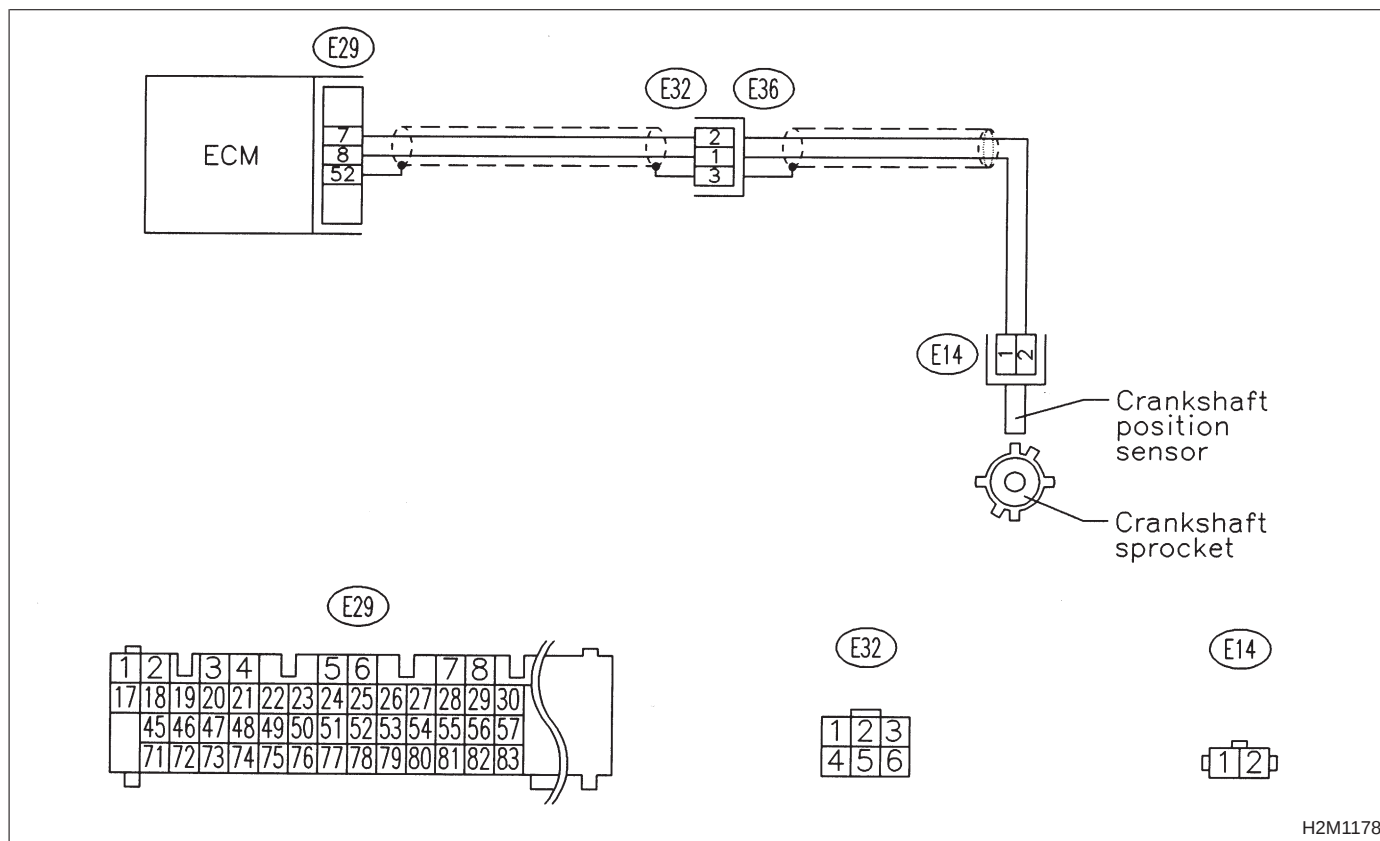
TROUBLE SYMPTOM:

- Engine stalls.
- Failure of engine to start

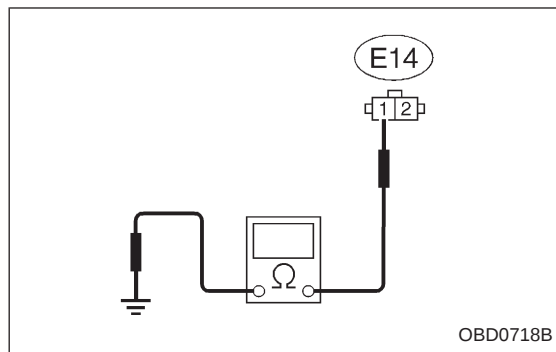
**CAUTION:**

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

<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:

H2M1178



1 CHECK HARNESS.

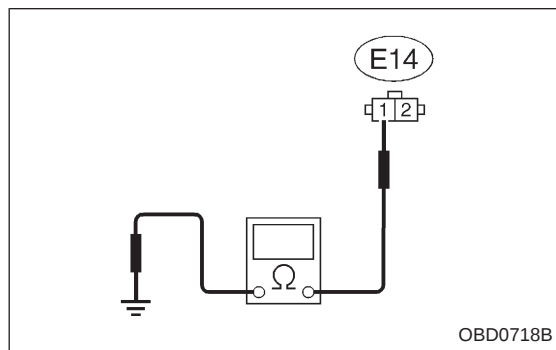
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from crankshaft position sensor.
- 3) Measure resistance of harness between crankshaft position sensor connector and body.

CHECK : **Connector & terminal**
(E14) 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 (E32)

NO : Go to next **CHECK** .



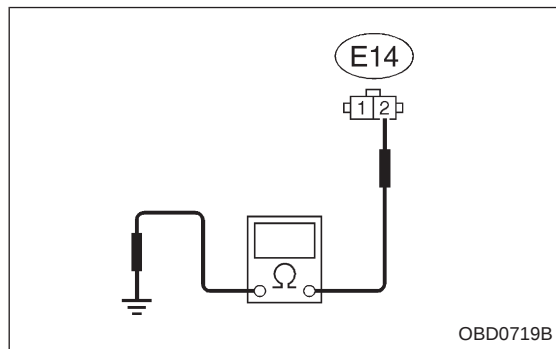
CHECK : **Connector & terminal**
(E14) No. 1 — Body/10 Ω, or less

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**
(E14) No. 2 — Body/5 Ω, or less

YES : Go to step 2.

NO : Check and repair the following items.

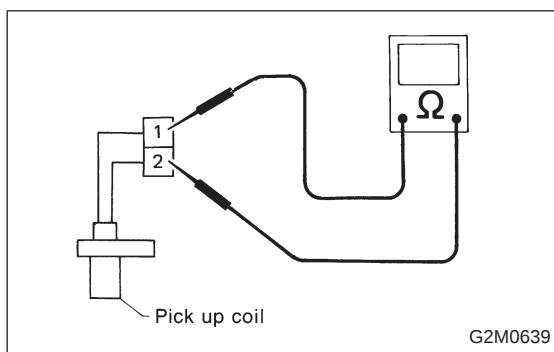
- Open circuit of harness between crankshaft position sensor connector and ECM connector
- Poor contact in ECM connector
- Poor contact in the coupling connector (E32)

2 CHECK CRANKSHAFT POSITION SENSOR.

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

YES : Go to the next step.

NO : Tighten securely.



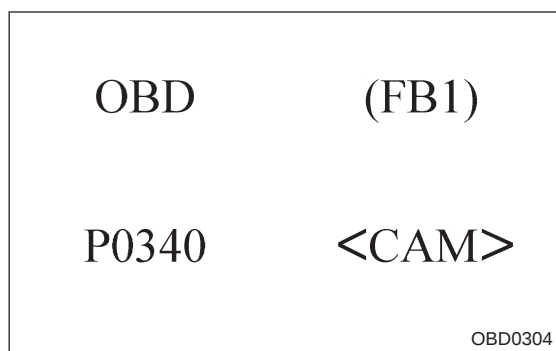
1) Remove crankshaft position sensor.

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

CHECK : **Terminals**
No. 1 — No. 2/1 — 4 k Ω

YES : Repair poor contact in crankshaft position sensor connector.

NO : Replace crankshaft position sensor.



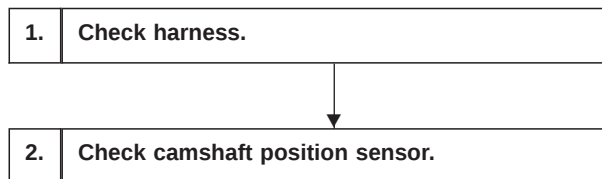
AA: DTC P0340 — CAMSHAFT POSITION SENSOR CIRCUIT MALFUNCTION (CAM) —

DTC DETECTING CONDITION:

- Immediately at fault recognition

TROUBLE SYMPTOM:

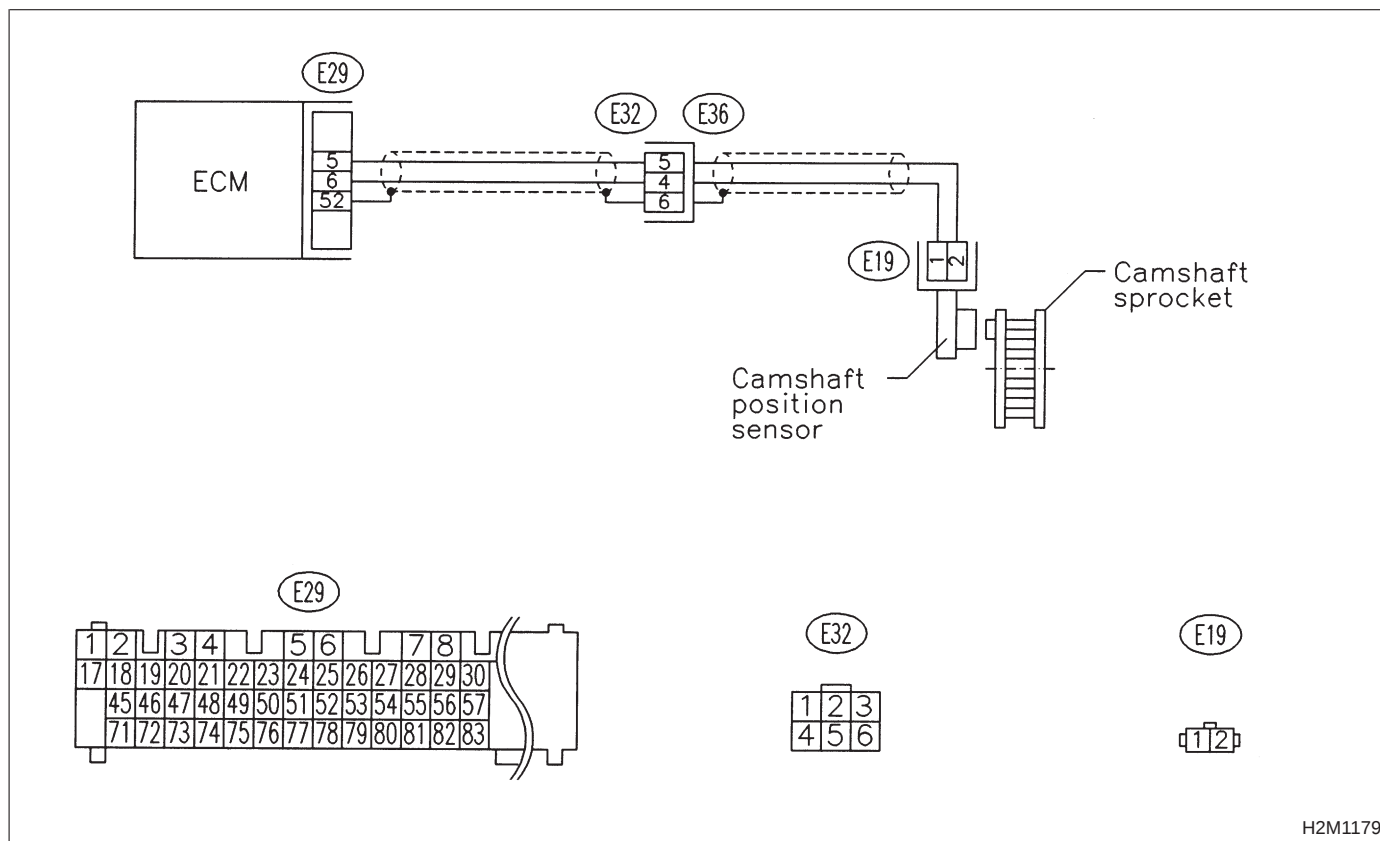
- Engine stalls.
- Failure of engine to start



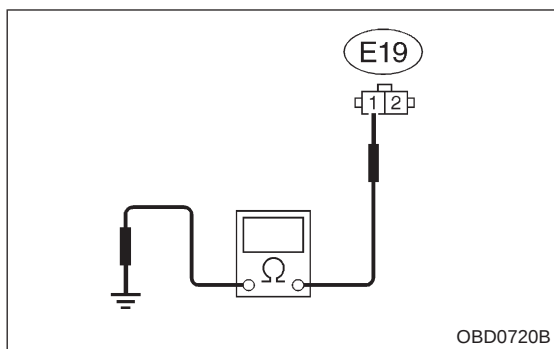
CAUTION:

After repair or replacement of faulty parts, conduct
CLEAR MEMORY and **INSPECTION MODES**.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



H2M1179



1 CHECK HARNESS.

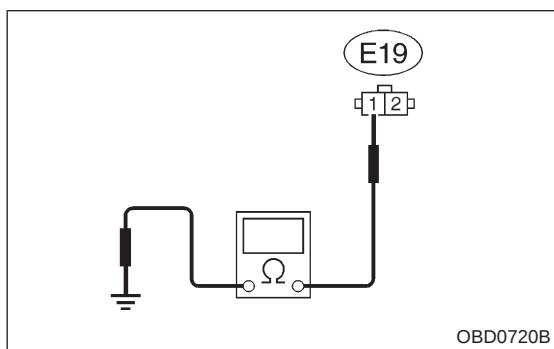
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from camshaft position sensor.
- 3) Measure resistance of harness between camshaft position sensor connector and body.

CHECK : **Connector & terminal**
(E19) 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 (E32)

NO : Go to next **CHECK** .



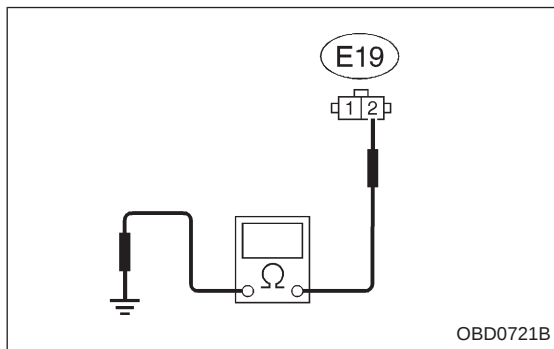
CHECK : **Connector & terminal**
(E19) No. 1 — Body/10 Ω, or less

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** .

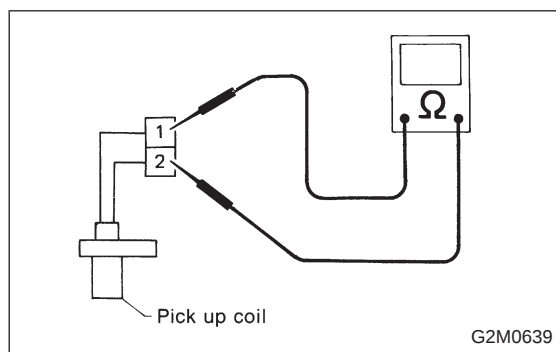


CHECK : **Connector & terminal**
(E19) No. 2 — Body/5 Ω, or less

YES : Go to step 2.

NO : Check and repair the following items.

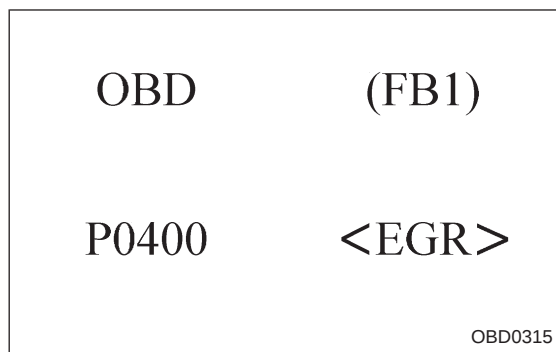
- Open circuit of harness between camshaft position sensor connector and ECM connector
- Poor contact in ECM connector
- Poor contact in the coupling connector (E32)

2**CHECK CAMSHAFT POSITION SENSOR.****CHECK****: Check for secure tightening of the installation bolts of the camshaft position sensor.****YES****: Go to the next step.****NO****: Tighten securely.**

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.**



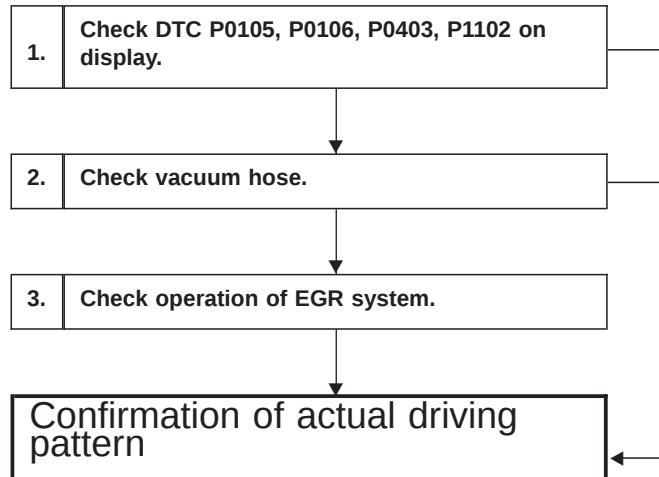
AB: DTC P0400
— EXHAUST GAS RECIRCULATION FLOW
MALFUNCTION (EGR) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

- Poor driving performance on low engine speed

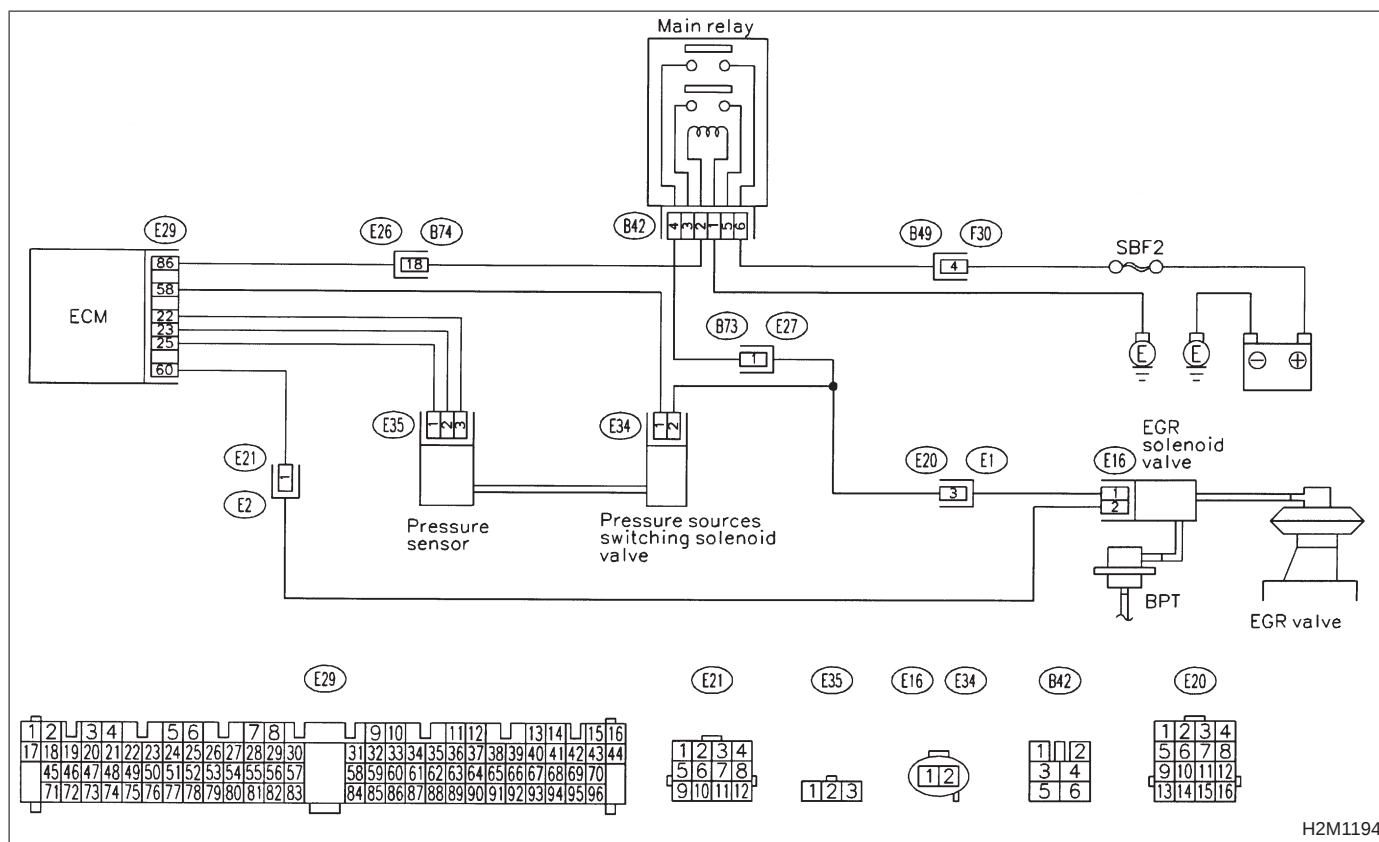


CAUTION:

Before confirmation of actual driving pattern, conduct CLEAR MEMORY and INSPECTION MODES.

<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



H2M1194

1

CHECK DTC P0105, P0106, P0403, P1102 ON DISPLAY.



: Check that Subaru Select Monitor or OBD-II general scan tool shows P0105, P0106, P0403 and P1102.



- Inspect the relevant DTC using "10. Diagnostics Chart with Trouble Code, 2-7b [T1000]".
- Manually check that EGR valve diaphragm is not stuck.
- In this case, inspection of DTC P0400 is not necessary after the above items.

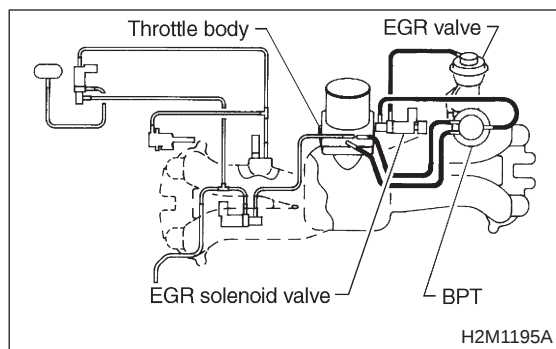
WARNING:

Be careful when checking EGR valve, since it may be extremely hot.

After checking the above item, go to **CONFIRMATION OF ACTUAL DRIVING PATTERN.**



: Go to step 2.



2 CHECK VACUUM HOSE.

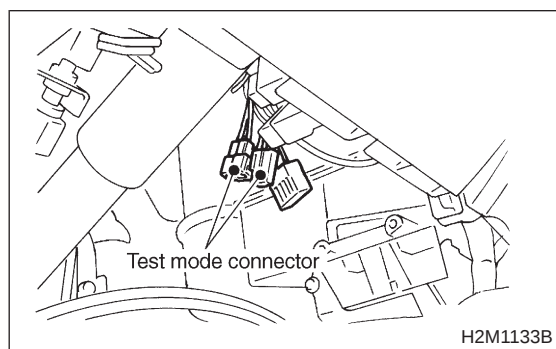
CHECK : Check vacuum hoses for disconnection, leakage and clogging.

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

And after the checking and repairing, go to **CONFIRMATION OF ACTUAL DRIVING PATTERN.**

NO : Go to step 3.



3 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**.

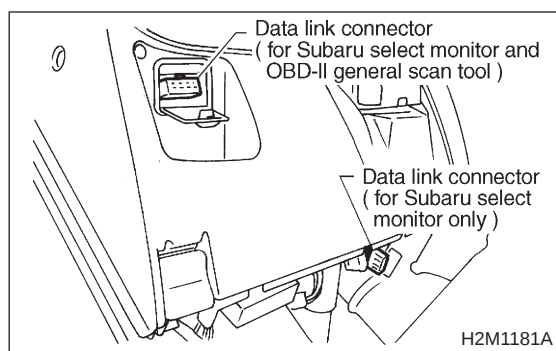
NO : Clean EGR valve. And go to **CONFIRMATION OF ACTUAL DRIVING PATTERN**.

CAUTION:

Do not use solvent when cleaning EGR valve assembly, as it can damage diaphragm.

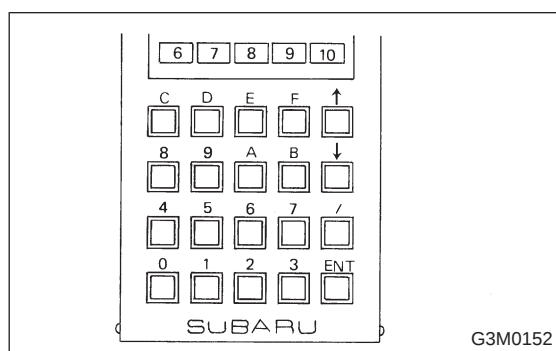
NOTE:

- Remove and blow away the exhaust deposits. Make sure the valve operates smoothly and the valve seat area is completely cleaned.
- Replace EGR valve as required.



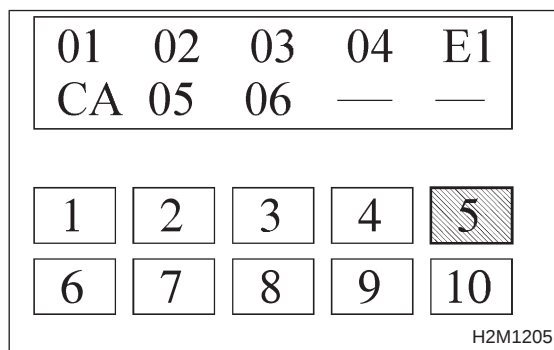
CONFIRMATION OF ACTUAL DRIVING PATTERN.

- 1) Conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to 2-7b [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



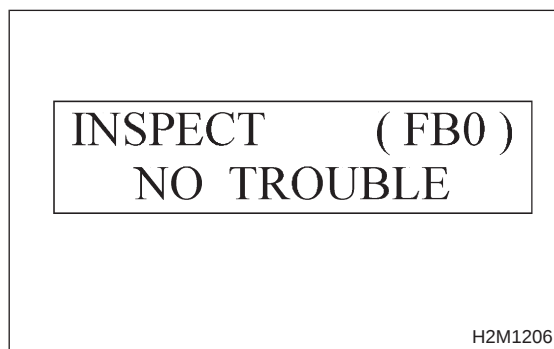
- 6) Drive at 88 ± 5 km/h (55 ± 3 MPH) until the LED No. 5 comes on.

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.

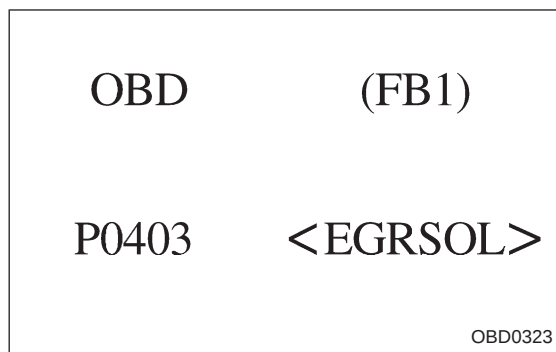
Put the gear to "D" range for the diagnosis.



- 7) Designate mode using function key.

Function mode: FB0

- 8) Confirm the "No trouble" indication on Subaru select monitor.



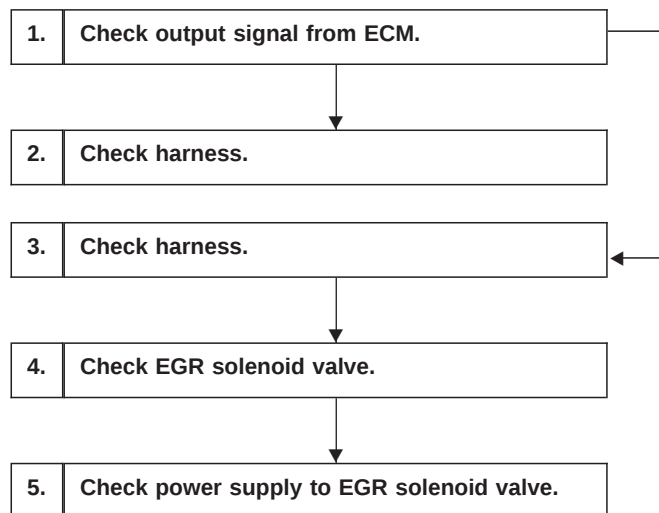
AC: DTC P0403
— EXHAUST GAS RECIRCULATION CIRCUIT MALFUNCTION (EGRSOL) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

- Poor driving performance on low engine speed

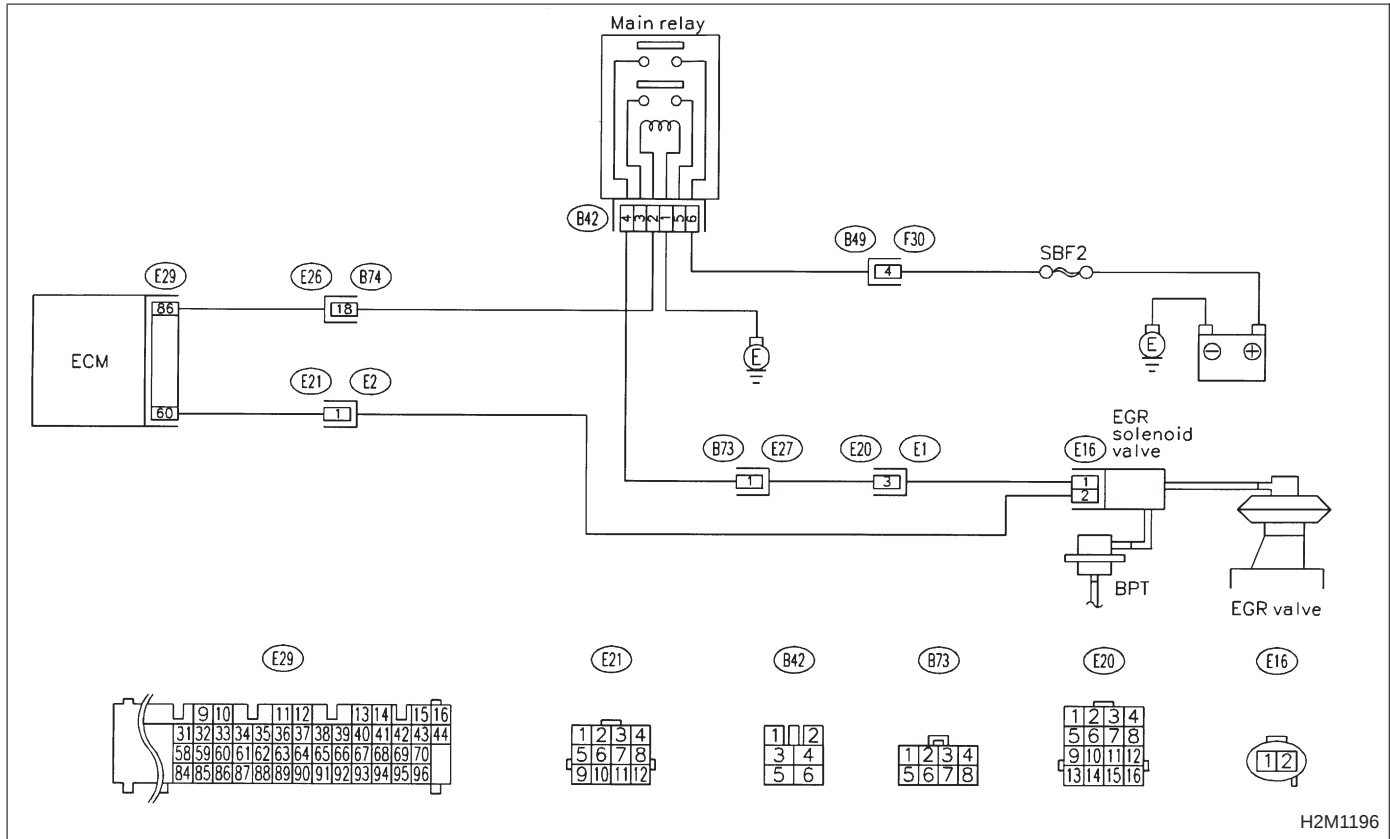


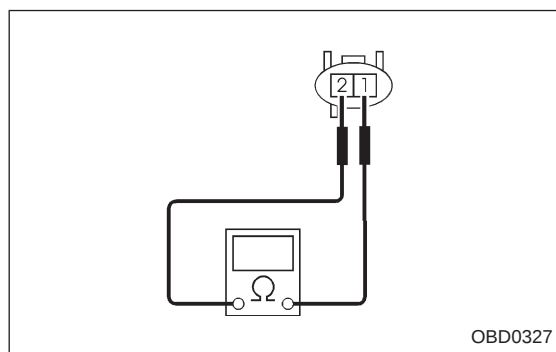
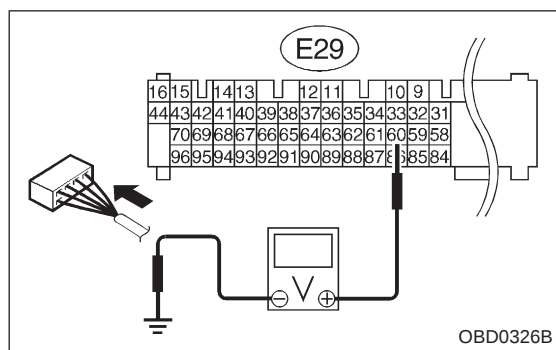
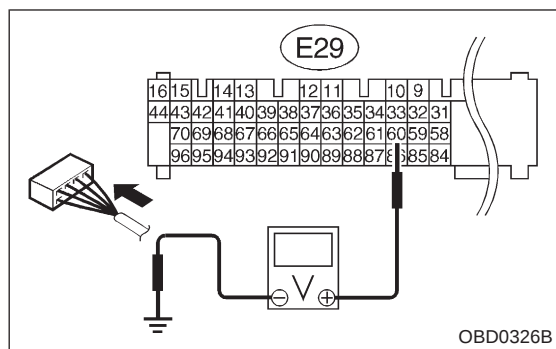
CAUTION:

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

<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:





1	CHECK OUTPUT SIGNAL FROM ECM.
---	-------------------------------

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

CHECK : Connector & terminal
(E29) No. 60 — 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 EGR solenoid valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM and body.

CHECK : Connector & terminal
(E29) 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

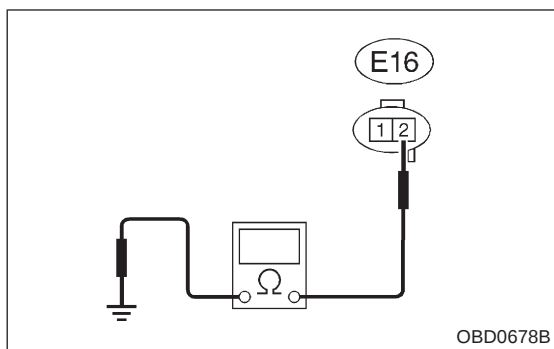
YES : Replace EGR solenoid valve and ECM.

NO : Go to next **CHECK** .

CHECK : Is there poor contact in ECM connector?

YES : Repair poor contact in ECM connector.

NO : Replace ECM.



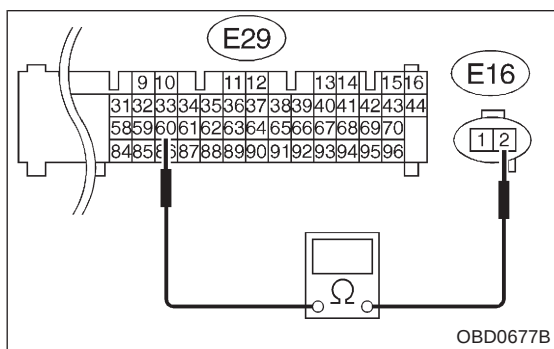
3 CHECK HARNESS.

- 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**
(E16) 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.

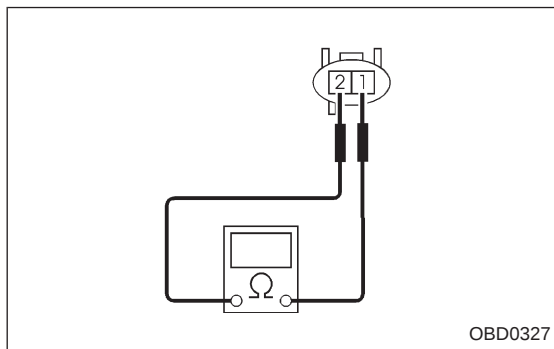


- 4) Measure resistance of harness connector between ECM and EGR solenoid valve.

CHECK : **Connector & terminal**
(E29) No. 60 — (E16) No. 2 / 1 Ω, or less

YES : Go to step 4.

NO : Repair open circuit of harness between ECM connector and EGR solenoid valve connector.



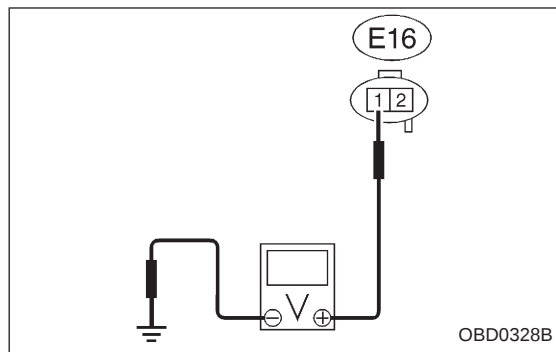
4 CHECK EGR SOLENOID VALVE.

Measure resistance between connector terminals of EGR solenoid valve.

CHECK : **Terminals**
No. 1 — No. 2 / 10 — 100 Ω

YES : Go to step 5.

NO : Replace EGR solenoid valve.



5

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

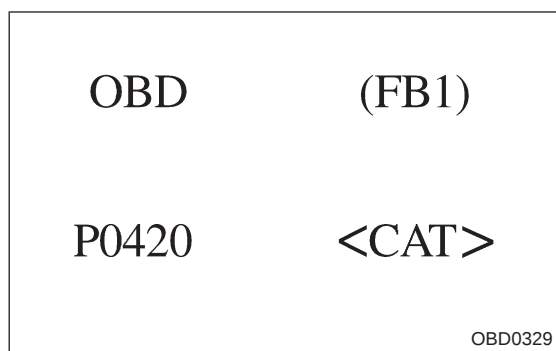
: **Connector & terminal
(E16) No. 1 — Body / 10 V, or more**

YES

: Confirm good connection at EGR solenoid valve connector.

NO

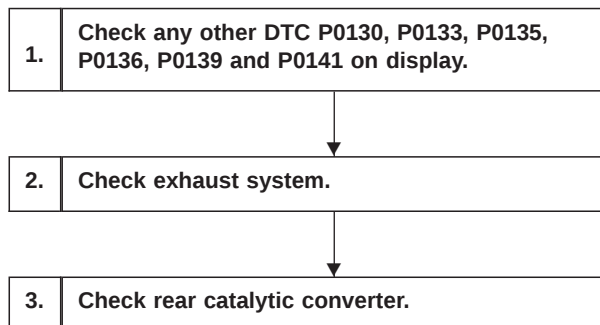
: Repair open circuit of harness between main relay connector and EGR solenoid valve connector.

**AD: DTC P0420****— CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (CAT) —****DTC DETECTING CONDITION:**

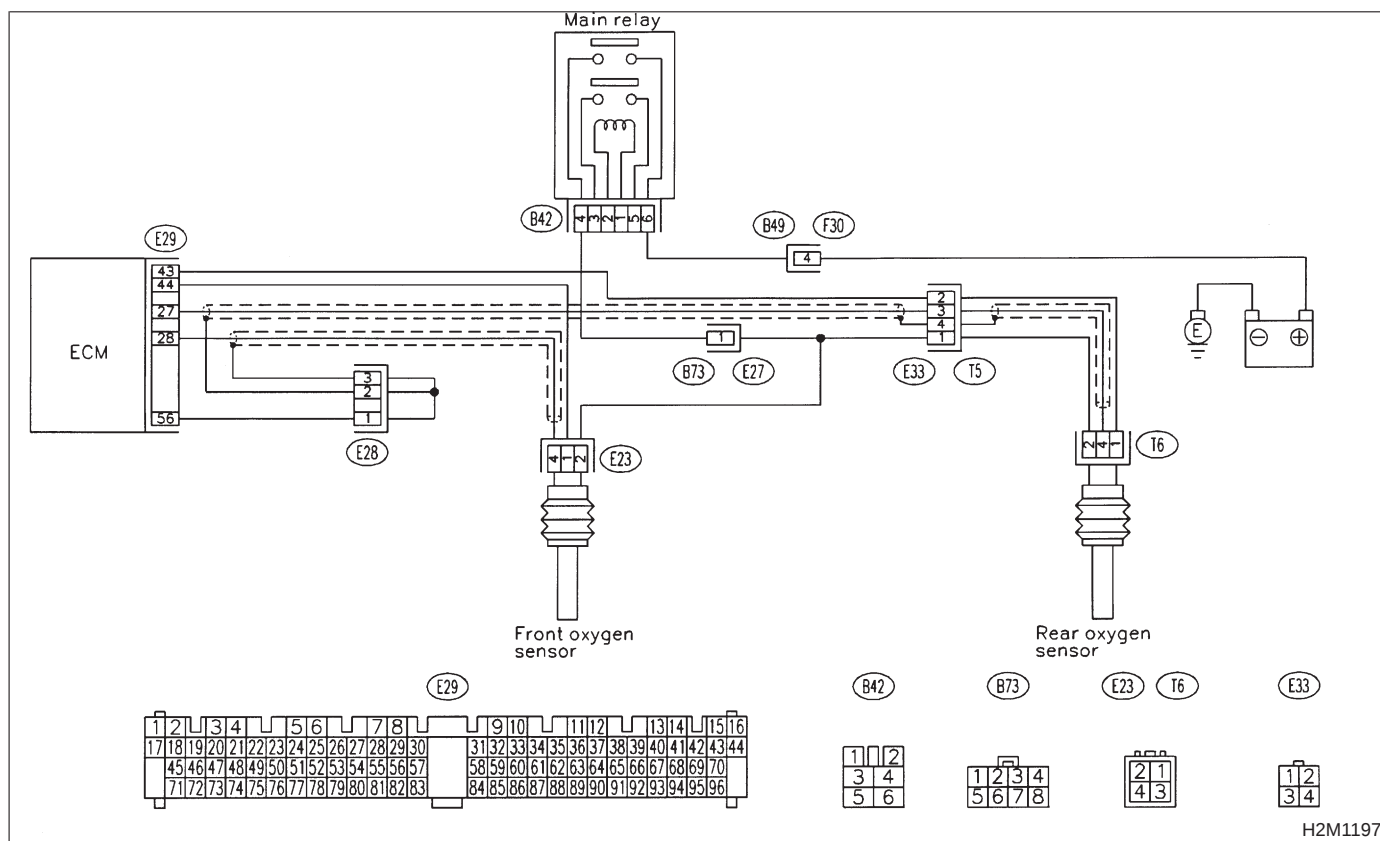
- Immediately at fault recognition

TROUBLE SYMPTOM:

- Engine stalls.
- Idle mixture is out of specifications.

**CAUTION:**

After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:

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 "10. Diagnostics Chart with Trouble Code, 2-7b [T1000]".
Inspection of P0420 is not necessary after above.

NO : Go to step 2.

2	CHECK EXHAUST SYSTEM.
----------	------------------------------

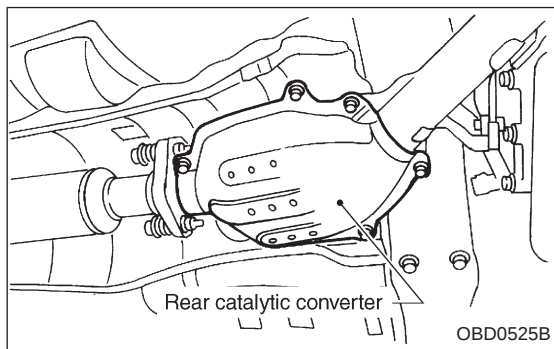
Check for gas leaks or air suction caused by loose or dislocated nuts and bolts, and open hole at exhaust pipes.

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.



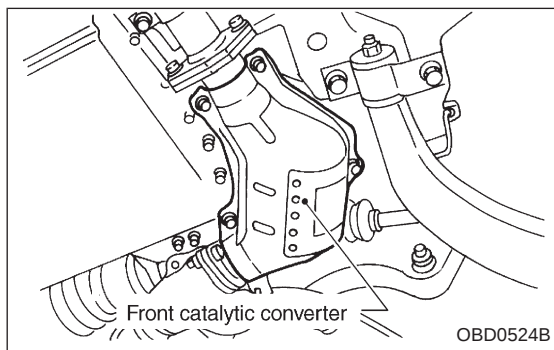
3	CHECK REAR CATALYTIC CONVERTER.
----------	--

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?

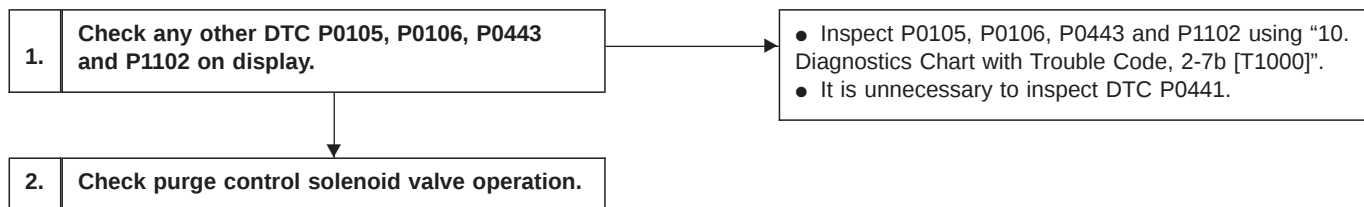
If there is damage in front catalyst, replace front catalytic converter.

**AE: DTC P0441**

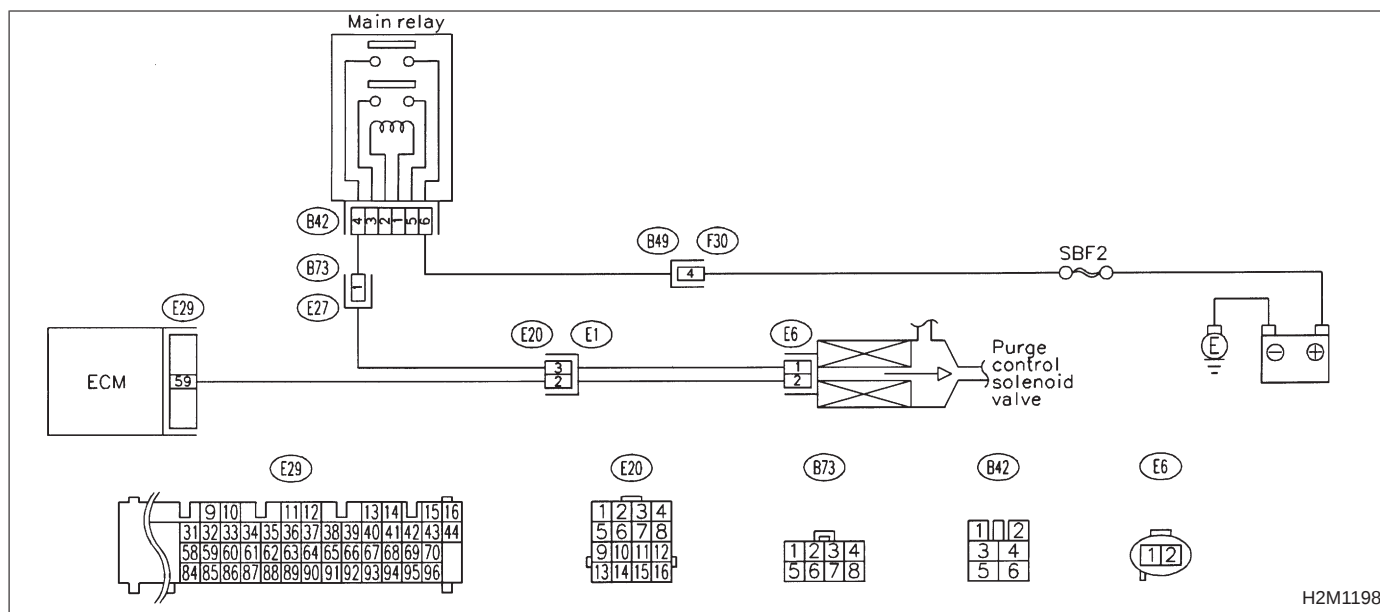
— EVAPORATIVE EMISSION CONTROL
SYSTEM INCORRECT PURGE FLOW
(CPC — F) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

**CAUTION:**

After repair or replacement of faulty parts, conduct
CLEAR MEMORY and **INSPECTION MODES**.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:

H2M1198

1**CHECK ANY OTHER DTC P0105, P0106, P0443 AND P1102 ON DISPLAY.****CHECK**

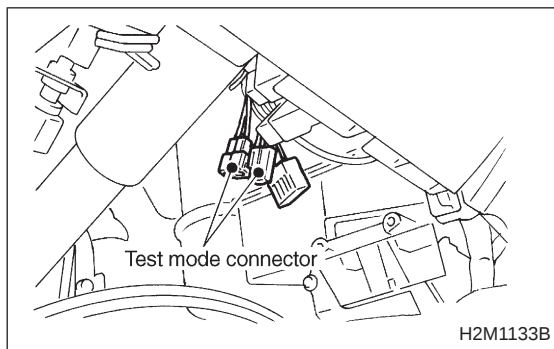
: Check that Subaru select monitor or the OBD-II general scan tool shows P0105, P0106, P0443 and P1102.

YES

: Inspect the relevant DTC using "10. Diagnostics Chart with Trouble Code, 2-7b [T1000]".

NO

: Go to step 2.

**2****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.

YES

: Go to next step.

NO

: Replace purge control solenoid valve.

- 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

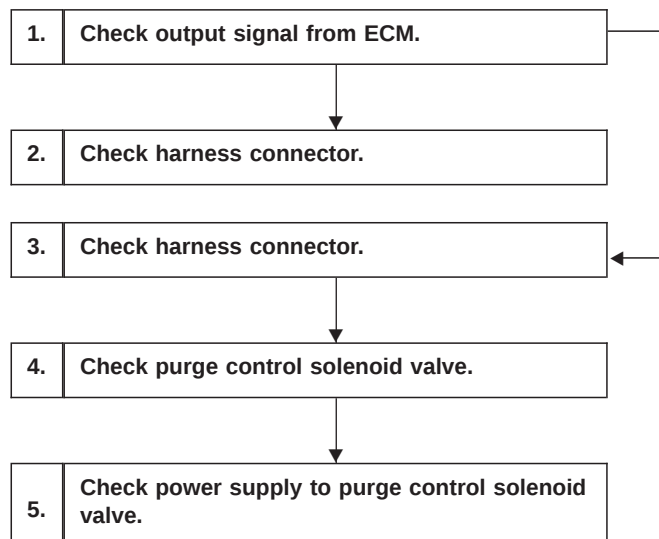
: Replace purge control solenoid valve.

**AF: DTC P0443****— EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT MALFUNCTION (CPC) —****DTC DETECTING CONDITION:**

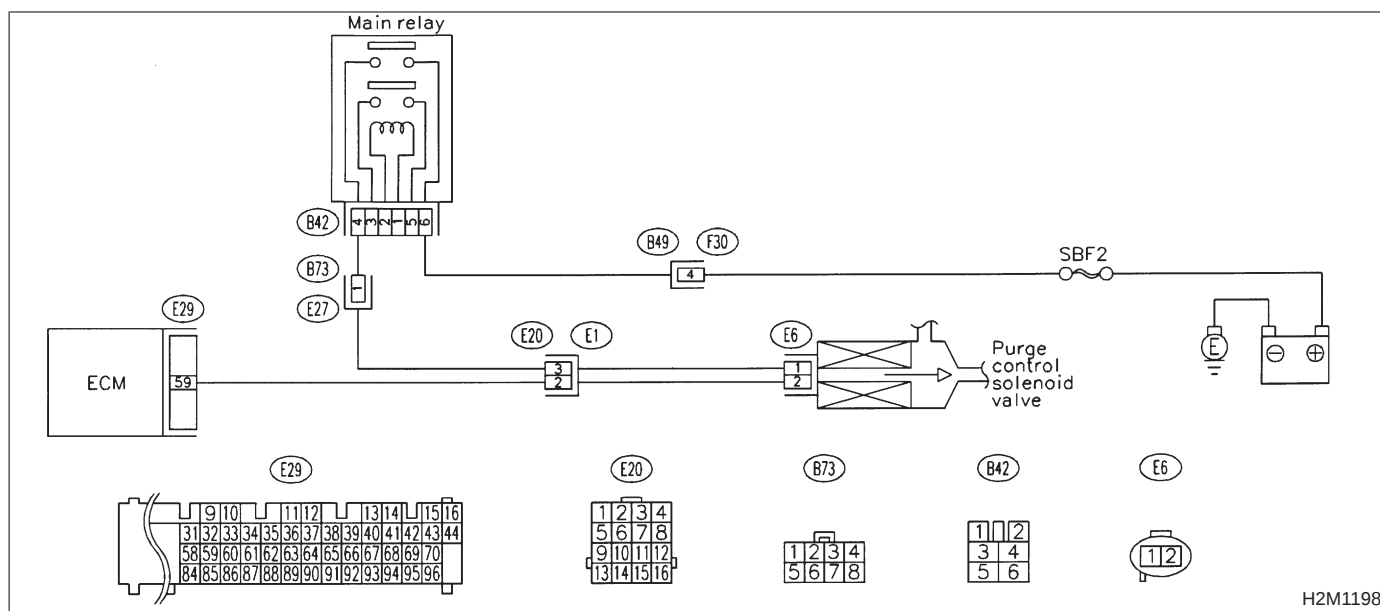
- Two consecutive trips with fault

TROUBLE SYMPTOM:

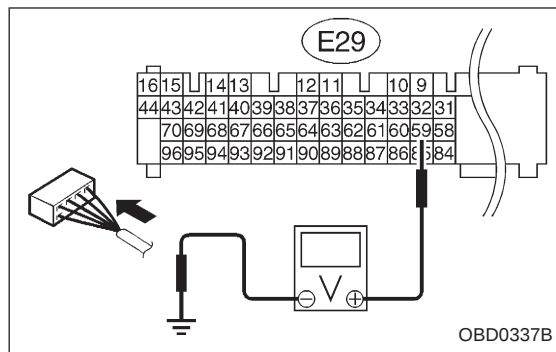
- Erroneous idling

**CAUTION:**

After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**.
 <Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:

H2M1198



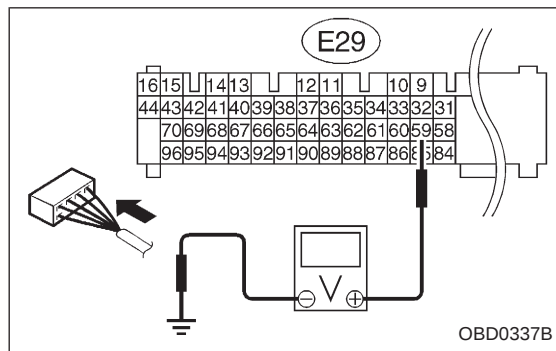
1 CHECK OUTPUT SIGNAL FROM ECM.

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

CHECK : **Connector & terminal**
(E29) No. 59 — Body / 10 V, or more

YES : Go to step 2.

NO : Go to step 3.



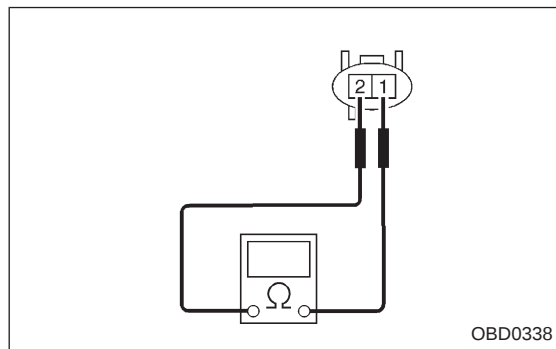
2 CHECK HARNESS CONNECTOR.

- 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**
(E29) 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

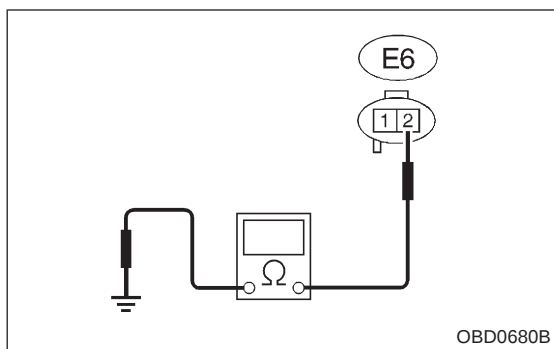
YES : Replace purge control solenoid valve and ECM.

NO : Go to next **CHECK** .

CHECK : **Is there poor contact in ECM connector?**

YES : Repair poor contact in ECM connector.

NO : Replace ECM.



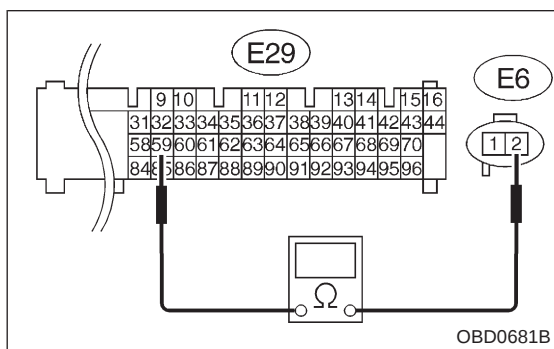
3 CHECK HARNESS CONNECTOR.

- 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**
(E6) 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 next step.

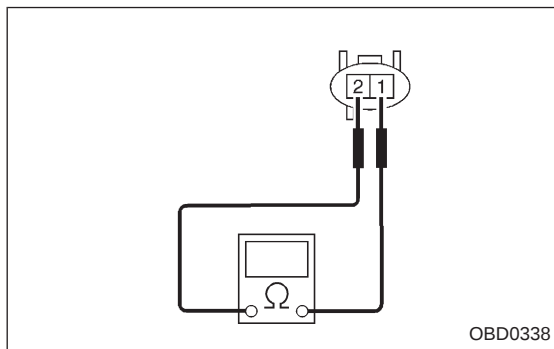


- 4) Measure resistance between ECM and purge control solenoid valve of harness connector.

CHECK : **Connector & terminal**
(E29) No. 59 — (E6) No. 2 / 1 Ω , or less

YES : Go to step 4.

NO : Repair open circuit of harness between ECM connector and purge control solenoid valve connector.



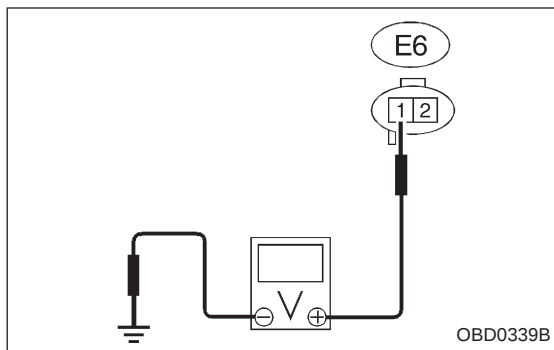
4 CHECK PURGE CONTROL SOLENOID VALVE.

- 1) Remove purge control solenoid valve.
- 2) Measure resistance between purge control solenoid valve terminals.

CHECK : **Terminals**
No. 1 — No. 2 / 10 — 100 Ω

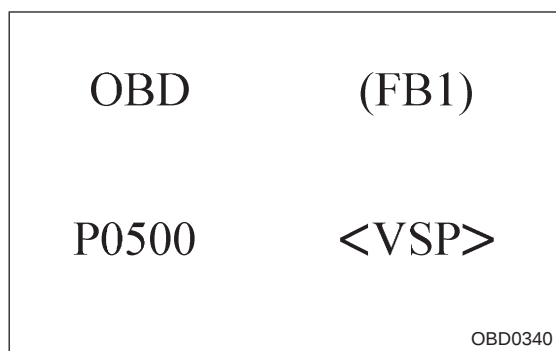
YES : Go to step 5.

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.

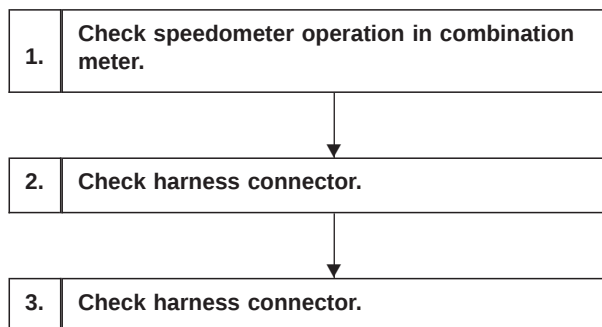
- CHECK** : **Connector & terminal (E6) No. 1 — Body / 10 V, or more**
- YES** : Confirm good connection at purge control solenoid valve connector.
- NO** : Repair open circuit of harness between main relay connector and purge control solenoid valve connector.



AG: DTC P0500 — VEHICLE SPEED SENSOR MALFUNCTION (VSP) —

DTC DETECTING CONDITION:

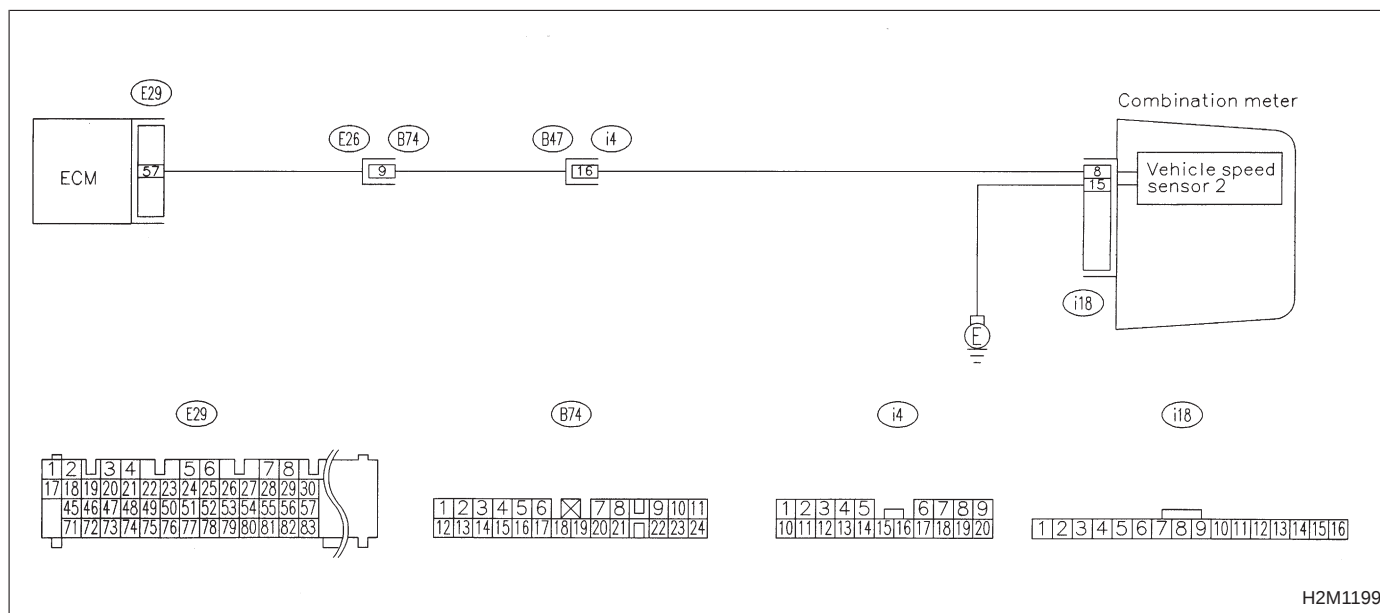
- Immediately at fault recognition



CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES.
 <Ref. to 2-7b [T3D0] and [T3E0].>

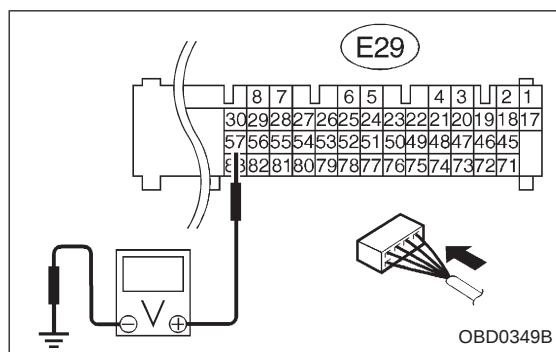
WIRING DIAGRAM:



H2M1199

1**CHECK SPEEDOMETER OPERATION IN COMBINATION METER.****CHECK**: **Check normal operation of speedometer.****YES**

: Go to step 2.

NO: Check speedometer and vehicle speed sensor
<Ref. to 6-2 [K2A0].>.**2****CHECK HARNESS CONNECTOR.**

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

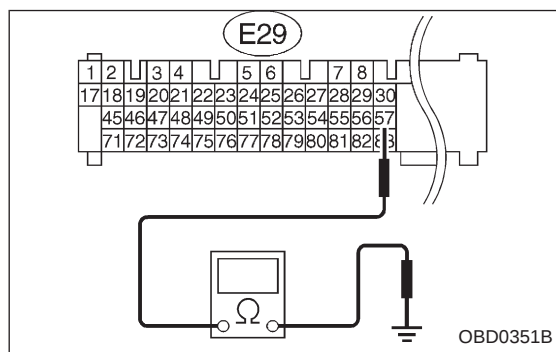
CHECK: **Connector & terminal
(E29) No. 57 — Body / 2 V, or more****YES**

: 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 connectors (B74) and (i4)

NO

: Go to step 3.

**3****CHECK HARNESS CONNECTOR.**

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

CHECK: **Connector & terminal
(E29) 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.



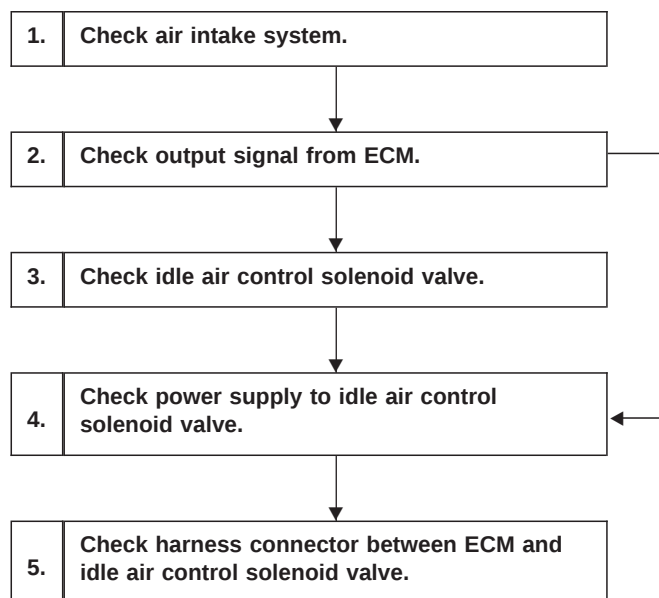
AH: DTC P0505
— IDLE CONTROL SYSTEM MALFUNCTION (ISC) —

DTC DETECTING CONDITION:

- Immediately at fault recognition

TROUBLE SYMPTOM:

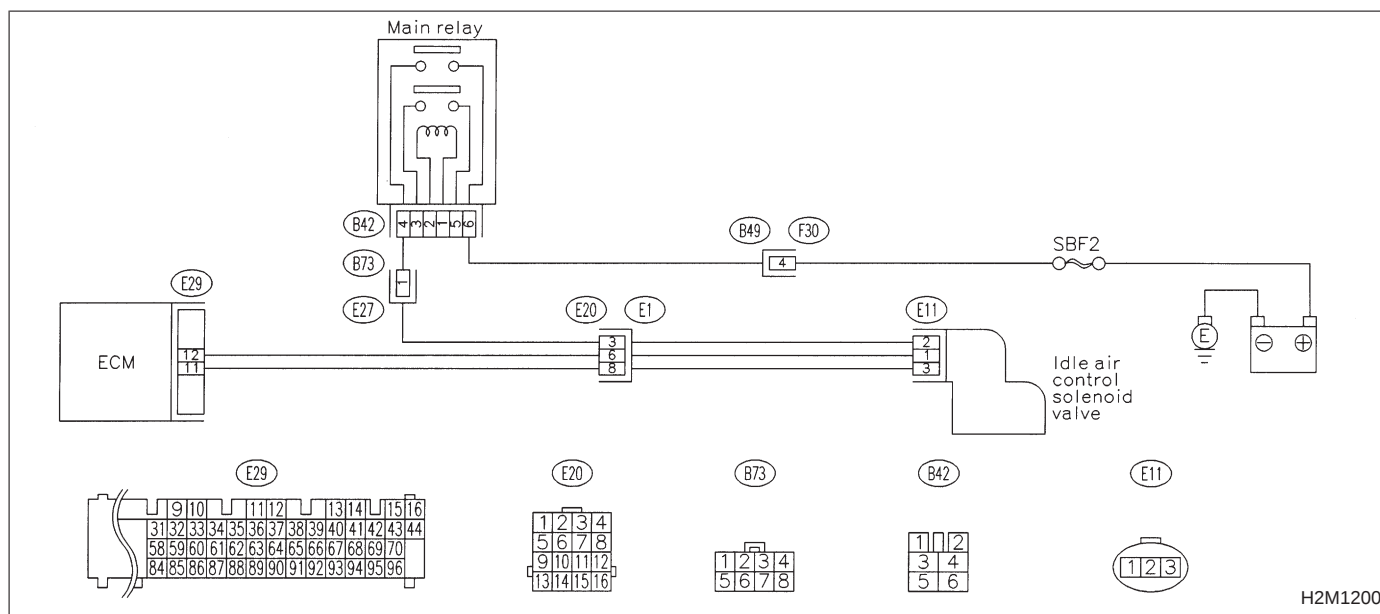
- Erroneous idling
- Engine stalls.
- Engine breathing



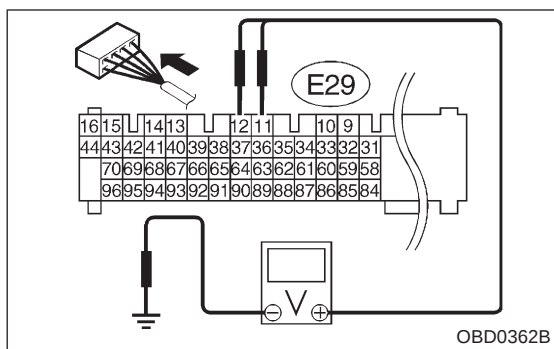
CAUTION:

After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:

**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.



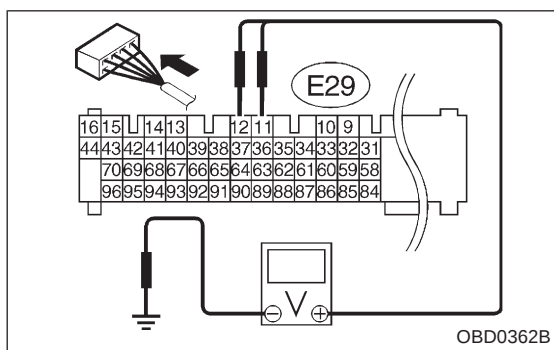
2 CHECK OUTPUT SIGNAL FROM ECM.

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

CHECK : **Connector & terminal**
(E29) No. 11 — Body / 3 V, or more
(E29) No. 12 — Body / 3 V, or more

YES : Go to the next step.

NO : Go to step 4.



- 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**
(E29) No. 11 — Body / 10 V, or more
(E29) No. 12 — Body / 10 V, or more

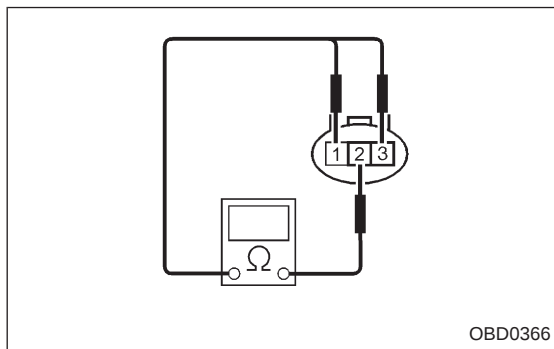
YES : Repair short circuit of harness and replace ECM.

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

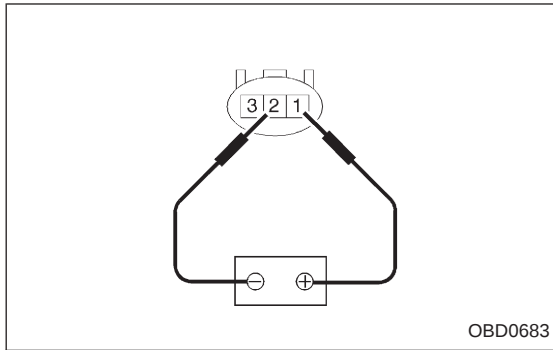
YES : Replace idle air control solenoid valve.

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.



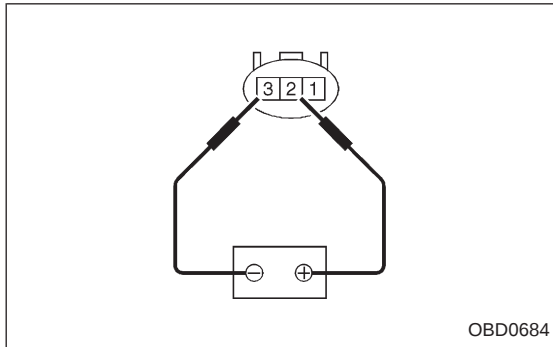
3) Remove idle air control solenoid valve. <Ref. to 2-7b [W12A0].>

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** .

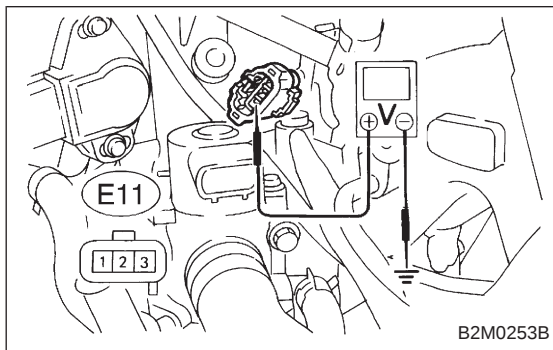
NO : Clean idle air control solenoid valve. <Ref. to 2-7b [W12B0].>



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 2-7b [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.

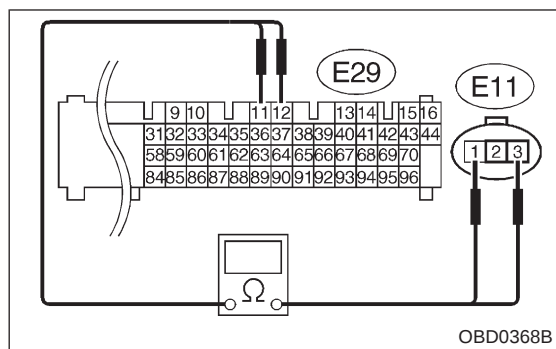
3) Turn ignition switch to ON.

4) Measure voltage between idle air control solenoid valve and body.

CHECK : *Connector & terminal (E11) 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

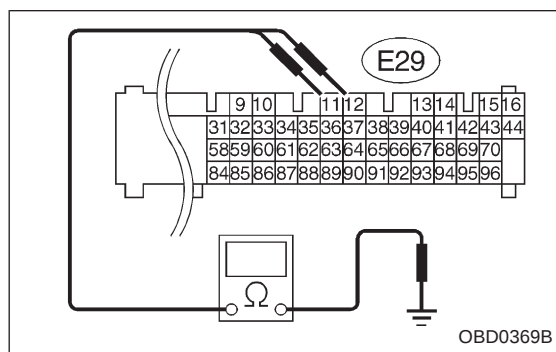
CHECK HARNESS CONNECTOR BETWEEN ECM AND IDLE AIR CONTROL SOLENOID VALVE.

- 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**
(E29) No. 11 — (E11) No. 3 / 1 Ω , or less
(E29) No. 12 — (E11) No. 1 / 1 Ω , or less

YES : Go to the next step.

NO : Repair open circuit of harness between ECM connector and idle air control solenoid valve connector.



- 4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

CHECK : **Connector & terminal**
(E29) No. 11 — Body / 1 $M\Omega$, or more
(E29) No. 12 — Body / 1 $M\Omega$, 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

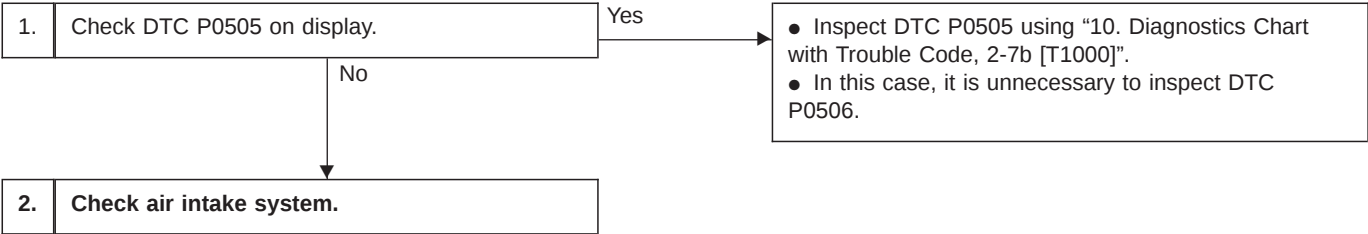
<ISC_L>

OBD0370

AI: DTC P0506
— IDLE CONTROL SYSTEM RPM LOWER THAN EXPECTED (ISC — L) —

- 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 2-7b [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

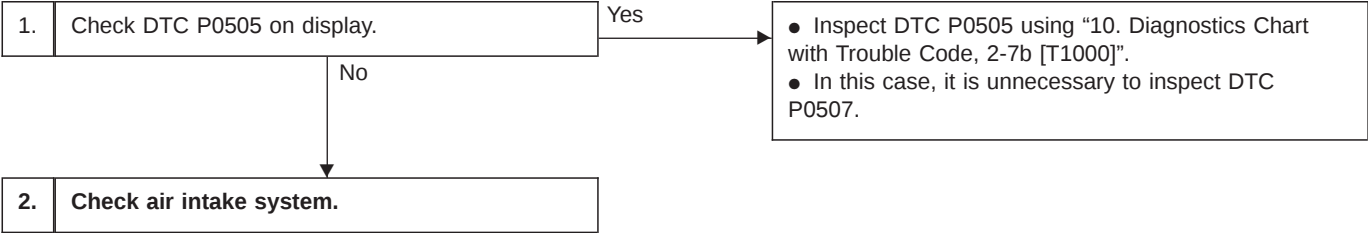
AJ: DTC P0507
— IDLE CONTROL SYSTEM RPM HIGHER THAN EXPECTED (ISC — H) —

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 2-7b [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 —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

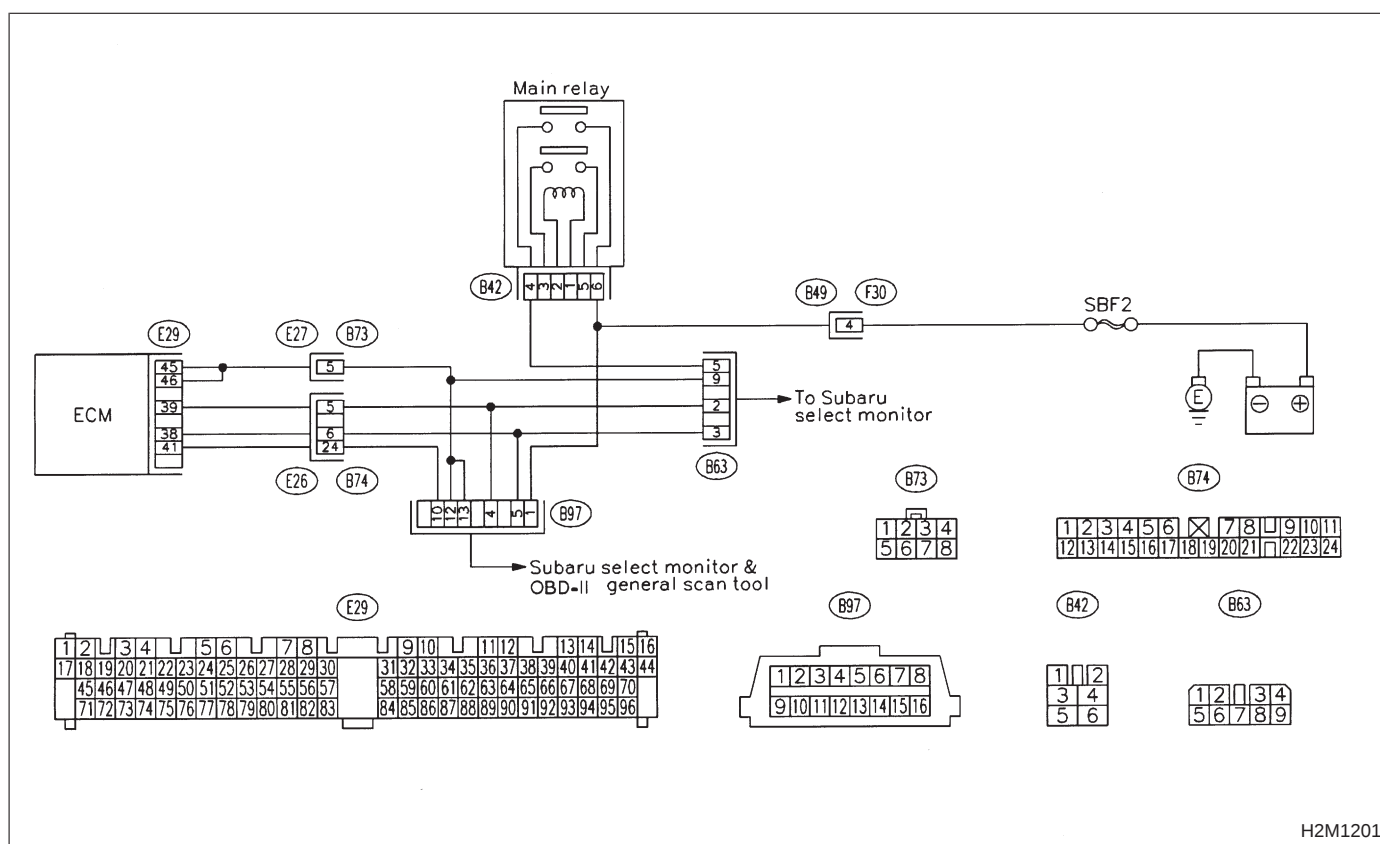
1. Check harness connector.

CAUTION:

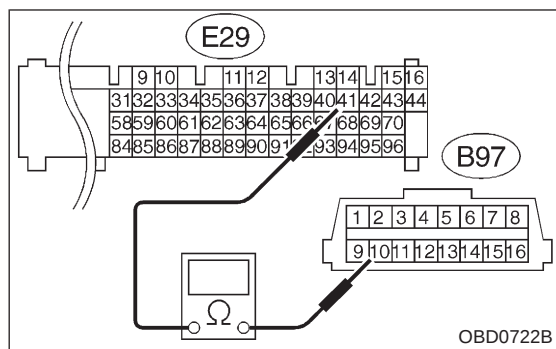
After repair or replacement of faulty parts, conduct
CLEAR MEMORY and INSPECTION MODES.

<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



H2M1201



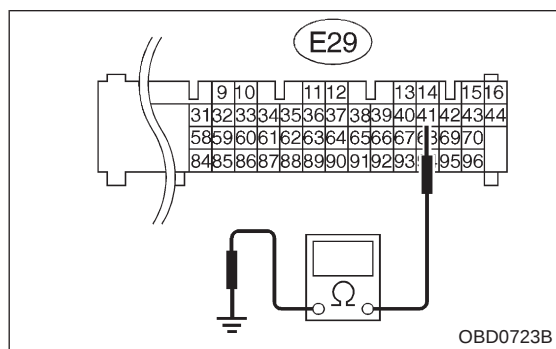
1 CHECK HARNESS CONNECTOR.

- 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**
(E29) No. 41 — (B97) No. 10 / 1 Ω , or less

YES : Go to the next step.

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



- 4) Measure resistance between ECM harness connector and body.

CHECK : **Connector & terminal**
(E29) 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.

OBD

(FB1)

P0601

<RAM>

OBD0376

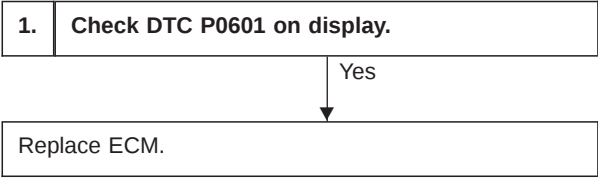
AL: DTC P0601
— INTERNAL CONTROL MODULE MEMORY
CHECK SUM ERROR (RAM) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

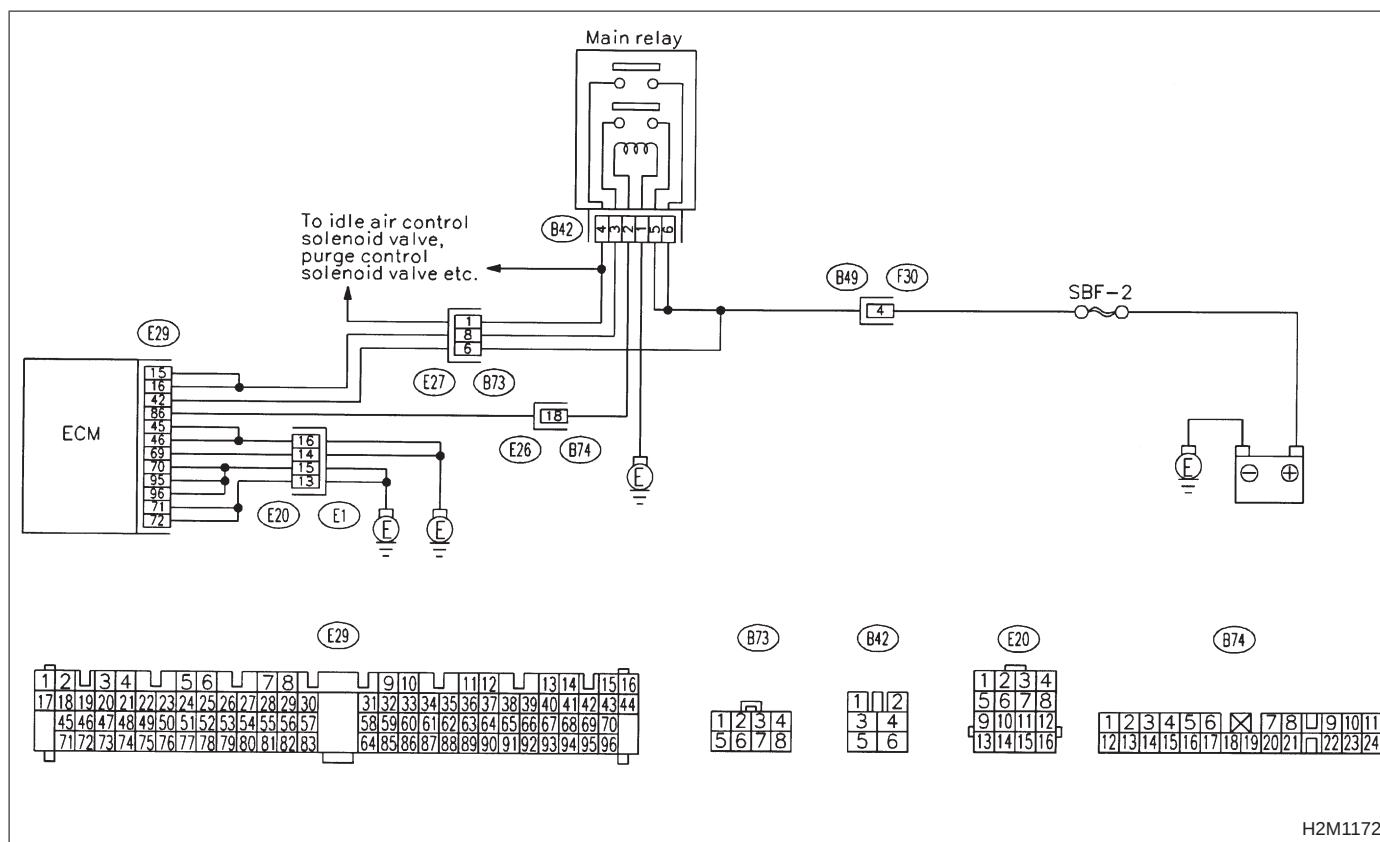
TROUBLE SYMPTOM:

- Engine does not start.
- Engine stalls.



CAUTION:
After repair or replacement of faulty parts, conduct
CLEAR MEMORY and **INSPECTION MODES**.
<Ref. to 2-7b [T3D0] and [T3E0].>

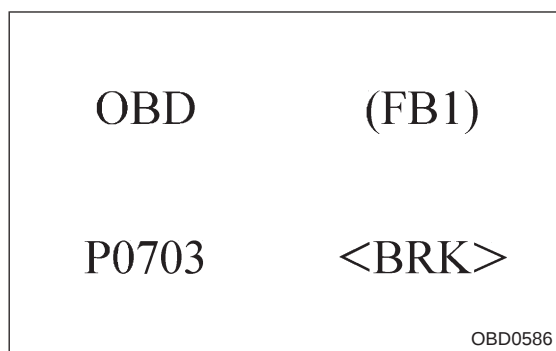
WIRING DIAGRAM:



1 CHECK DTC P0601 ON DISPLAY.

CHECK : Check that DTC P0601 is indicated on Subaru Select Monitor or OBD-II general scan tool.

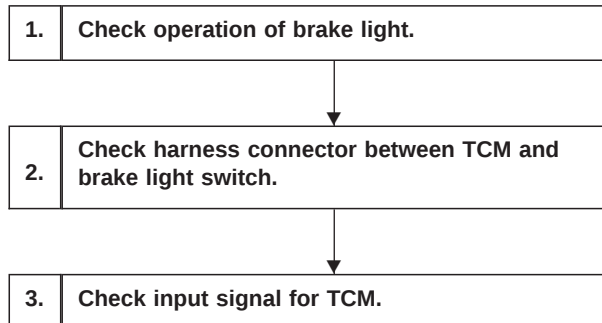
YES : Replace ECM.



AM: DTC P0703 — BRAKE SWITCH INPUT MALFUNCTION (BRK) —

DTC DETECTING CONDITION:

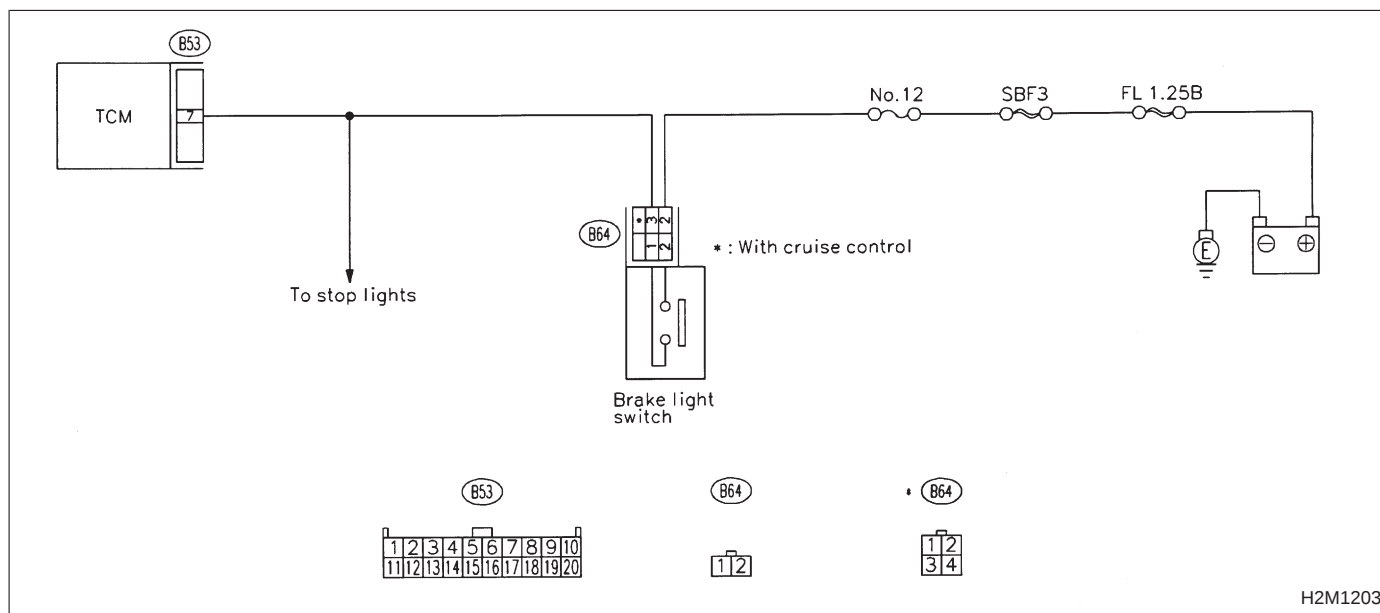
- Two consecutive trips with fault



CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:

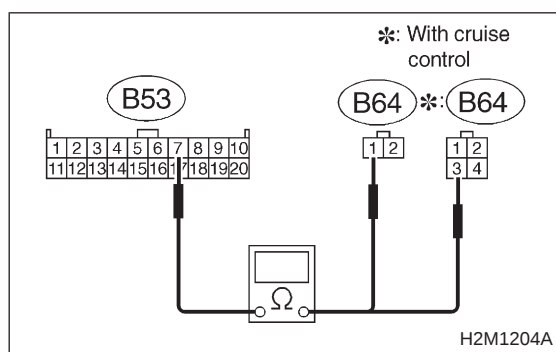


1 CHECK OPERATION OF BRAKE LIGHT.

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.

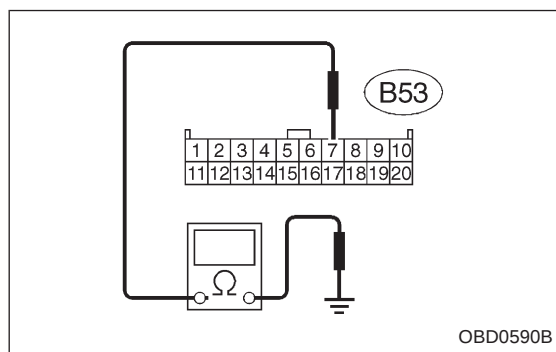
CHECK : **Connector & terminal**
(B53) No. 7 — (B64) No. 1 / 1 Ω, or less
(B53) No. 7 — (B64) No. 3 / 1 Ω, or less
(With cruise control)

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.

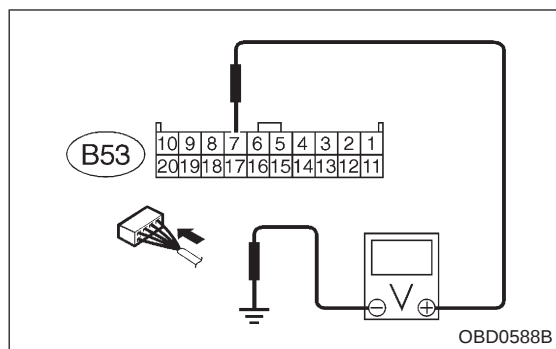


3) Measure resistance of harness connector between TCM and body.

CHECK : **Connector & terminal**
(B53) 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****(B53) No. 7 — Body / 1 V, or less [When release the brake pedal.]****(B53) 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.**

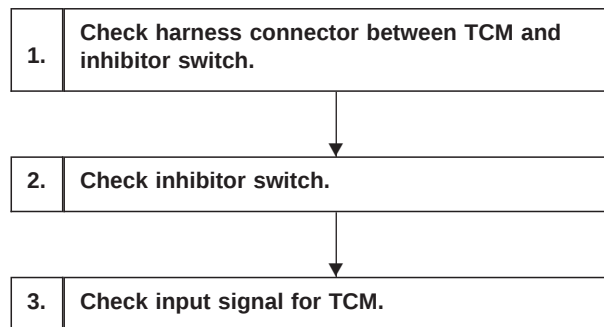
OBD	(FB1)
P0705	<RNG>
OBD0591	

AN: DTC P0705**— TRANSMISSION RANGE SENSOR CIRCUIT MALFUNCTION (RNG) —****DTC DETECTING CONDITION:**

- Two consecutive trips with fault

TROUBLE SYMPTOM:

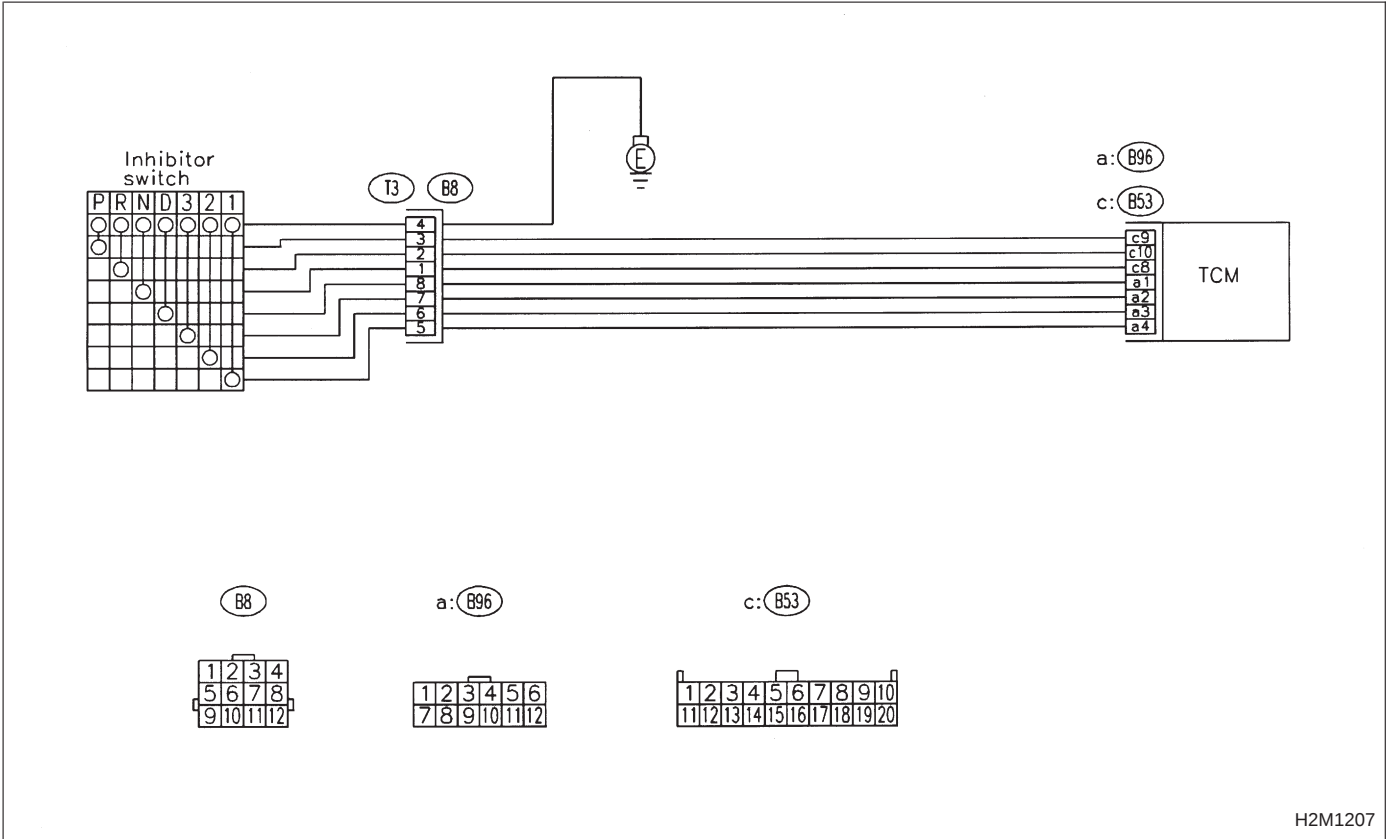
- Starter does not rotate when selector lever is in “P” or “N” range.
- Starter rotates when selector lever is in “R”, “D”, “3”, “2” or “1” range.
- Engine brake is not effected when selector lever is in “3” range.
- Shift characteristics are erroneous.

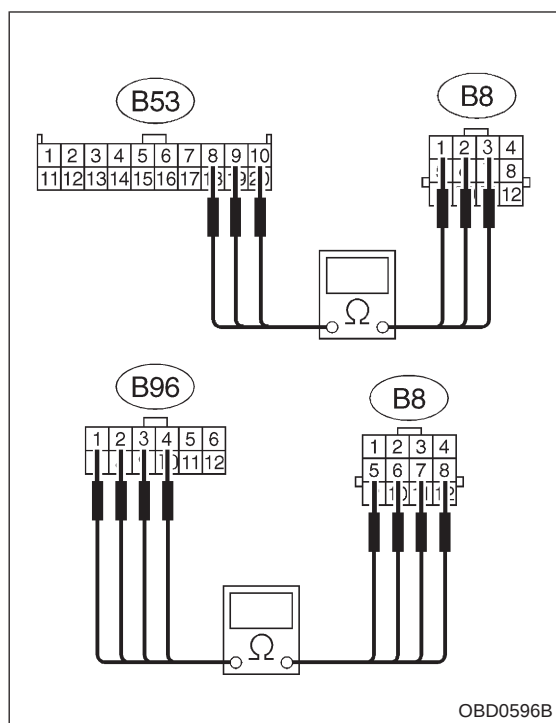
**CAUTION:**

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

<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



**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**

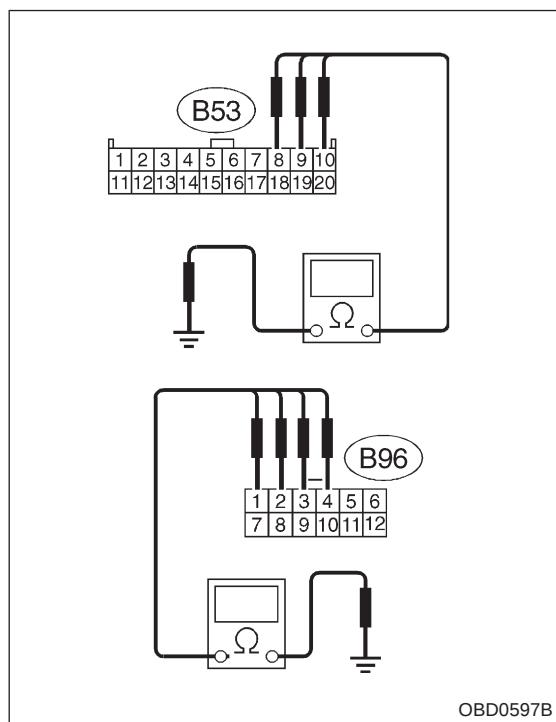
- (B53) No. 9 — (B8) No. 3 / 1 Ω, or less**
(B53) No. 10 — (B8) No. 2 / 1 Ω, or less
(B53) No. 8 — (B8) No. 1 / 1 Ω, or less
(B96) No. 1 — (B8) No. 8 / 1 Ω, or less
(B96) No. 2 — (B8) No. 7 / 1 Ω, or less
(B96) No. 3 — (B8) No. 6 / 1 Ω, or less
(B96) No. 4 — (B8) No. 5 / 1 Ω, or less

YES

: Go to next step.

NO

: Repair open circuit of harness between TCM and transmission.



- 4) Measure resistance of harness connector between TCM and body.

CHECK**: Connector & terminal**

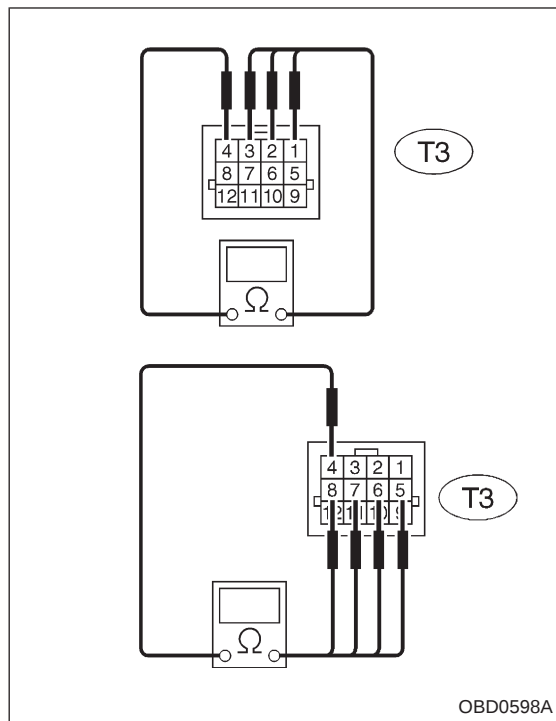
- (B53) No. 9 — Body / 1 MΩ, or more**
(B53) No. 10 — Body / 1 MΩ, or more
(B53) No. 8 — Body / 1 MΩ, or more
(B96) No. 1 — Body / 1 MΩ, or more
(B96) No. 2 — Body / 1 MΩ, or more
(B96) No. 3 — Body / 1 MΩ, or more
(B96) No. 4 — Body / 1 MΩ, or more

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 M Ω , or more (Other positions)

(T3) No. 2 — No. 4 / 1 Ω , or less ("R" position)

(T3) No. 2 — No. 4 / 1 M Ω , or more (Other positions)

(T3) No. 1 — No. 4 / 1 Ω , or less ("N" position)

(T3) No. 1 — No. 4 / 1 M Ω , or more (Other positions)

(T3) No. 8 — No. 4 / 1 Ω , or less ("D" position)

(T3) No. 8 — No. 4 / 1 M Ω , or more (Other positions)

(T3) No. 7 — No. 4 / 1 Ω , or less ("3" position)

(T3) No. 7 — No. 4 / 1 M Ω , or more (Other positions)

(T3) No. 6 — No. 4 / 1 Ω , or less ("2" position)

(T3) No. 6 — No. 4 / 1 M Ω , or more (Other positions)

(T3) No. 5 — No. 4 / 1 Ω , or less ("1" position)

(T3) No. 5 — No. 4 / 1 M Ω , or more (Other positions)

YES

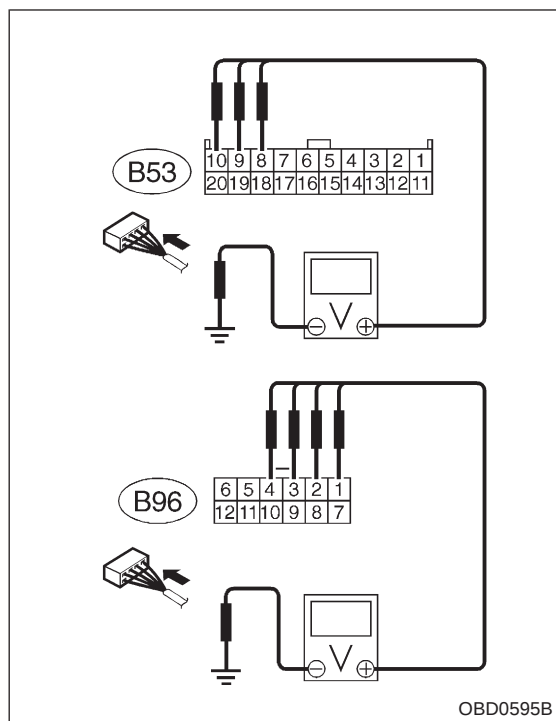
: Go to step 3.

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) Connect connector to TCM and transmission.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between TCM and body.

CHECK : Connector & terminal

(B53) No. 9 — Body / 1 V, or less ("P" and "N" positions)

(B53) No. 9 — Body / 8 V, or more (Other positions)

(B53) No. 10 — Body / 1 V, or less ("R" position)

(B53) No. 10 — Body / 6 V, or more (Other positions)

(B53) No. 8 — Body / 1 V, or less ("N" and "P" positions)

(B53) No. 8 — Body / 8 V, or more (Other positions)

(B96) No. 1 — Body / 1 V, or less ("D" position)

(B96) No. 1 — Body / 6 V, or more (Other positions)

(B96) No. 2 — Body / 1 V, or less ("3" position)

(B96) No. 2 — Body / 6 V, or more (Other positions)

(B96) No. 3 — Body / 1 V, or less ("2" position)

(B96) No. 3 — Body / 6 V, or more (Other positions)

(B96) No. 4 — Body / 1 V, or less ("1" position)

(B96) No. 4 — Body / 6 V, or more (Other positions)

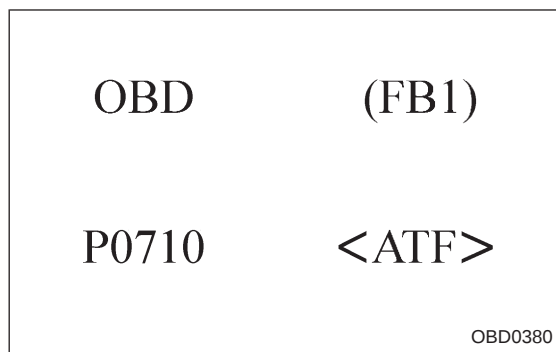
YES : Repair poor contact in TCM connector.

NO : Go to next **CHECK** .

CHECK : **Is there poor contact in TCM connector?**

YES : Repair poor contact in TCM connector.

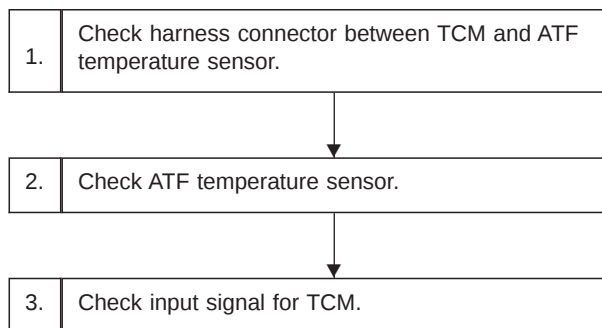
NO : Replace TCM with a new one.

**AO: DTC P0710****— TRANSMISSION FLUID TEMPERATURE
SENSOR CIRCUIT MALFUNCTION (ATF) —****DTC DETECTING CONDITION:**

- Two consecutive trips with fault

TROUBLE SYMPTOM:

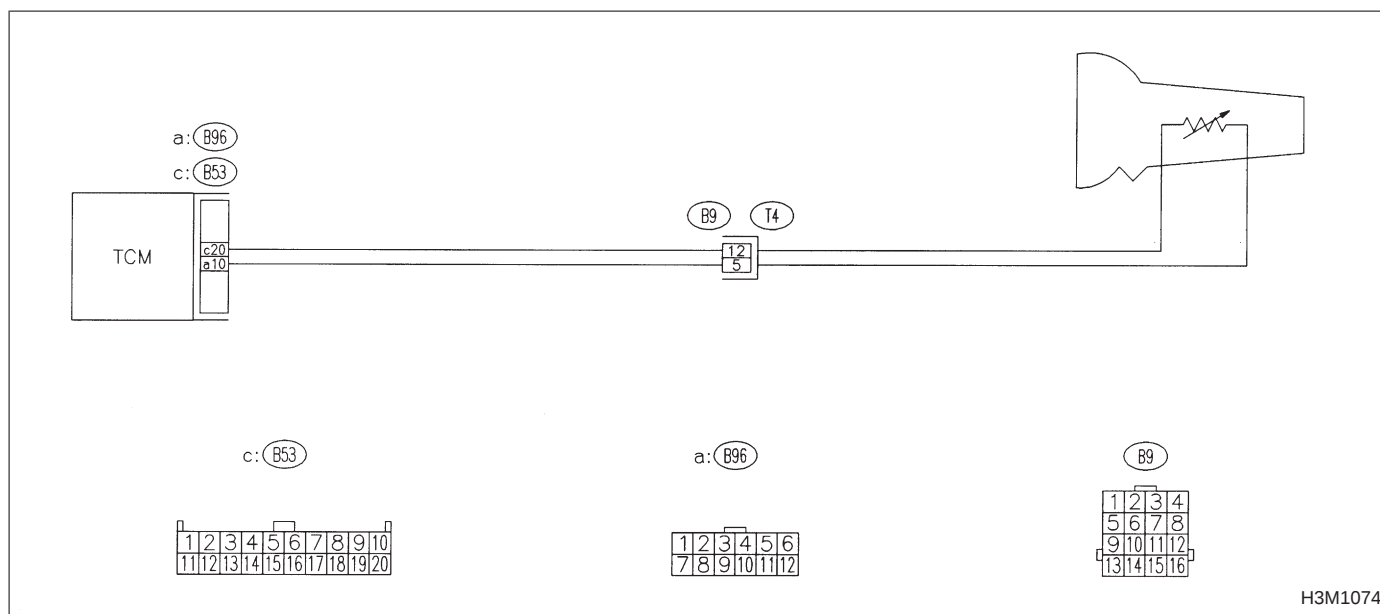
- No shift up to 4th speed (after engine warm-up)
- No lock-up (after engine warm-up)
- Excessive shift shock

**CAUTION:**

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

<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



NOTE:

For the diagnostic procedure on transmission fluid temperature sensor circuit, refer to 3-2b [T7G0].

OBD

(FB1)

P0720

<ATVSP>

OBD0392

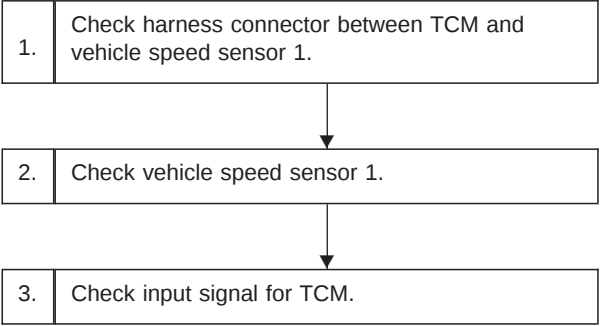
AP: DTC P0720
— OUTPUT SPEED SENSOR (VEHICLE SPEED SENSOR 1) CIRCUIT MALFUNCTION (ATVSP) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

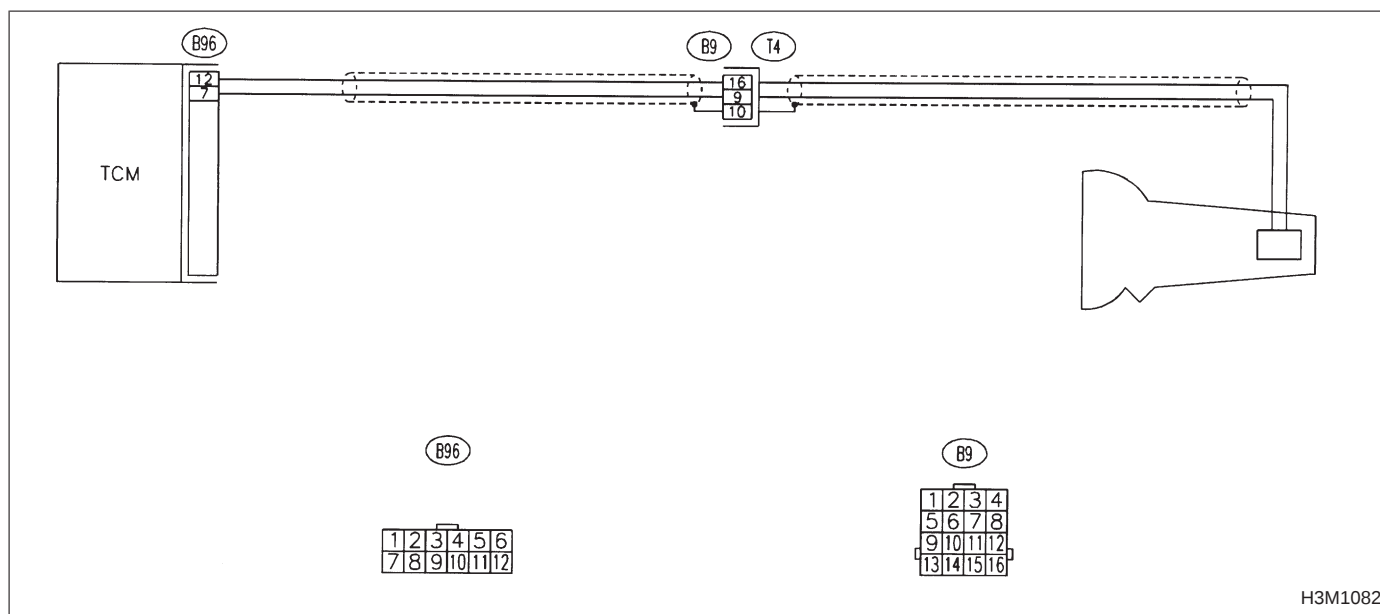
TROUBLE SYMPTOM:

- No shift or excessive tight corner “braking”



CAUTION:
After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



NOTE:

For the diagnostic procedure on vehicle speed sensor 1 circuit, refer to 3-2b [T7M0].

OBD

(FB1)

P0725

<ATNE>

OBD0404

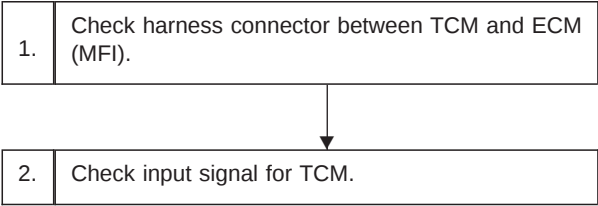
AQ: DTC P0725
— ENGINE SPEED INPUT CIRCUIT MALFUNCTION (ATNE) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

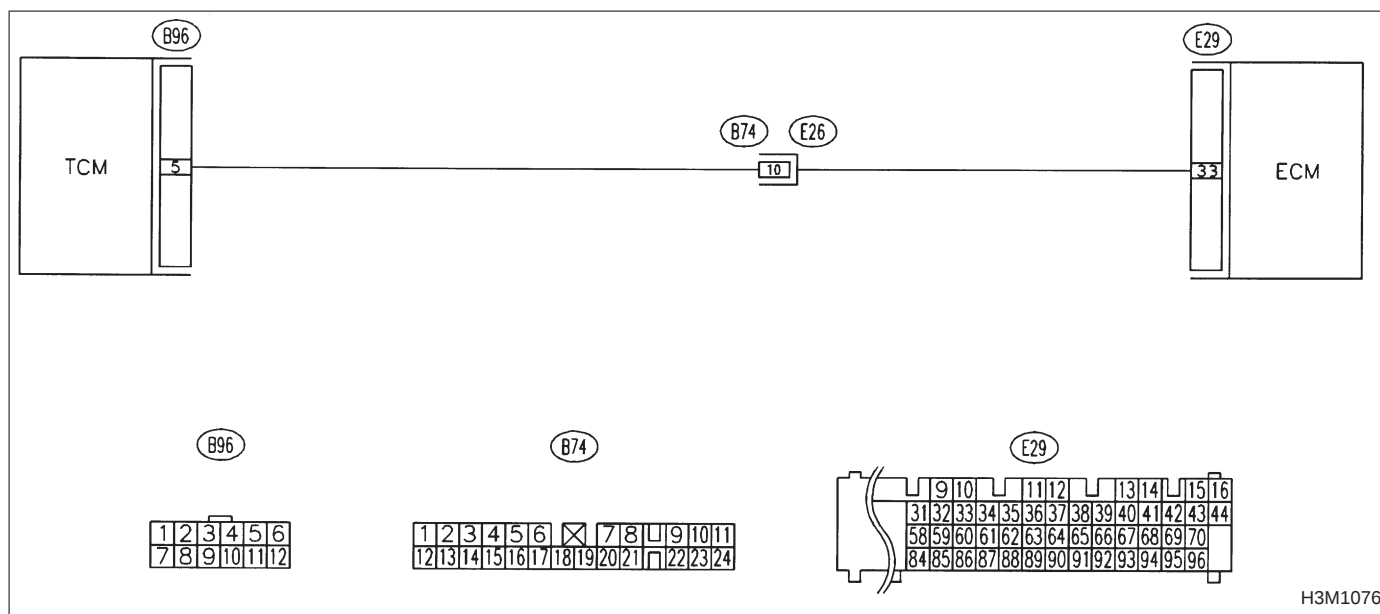
TROUBLE SYMPTOM:

- No lock-up (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 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



NOTE:

For the diagnostic procedure on engine speed input circuit, refer to 3-2b [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>

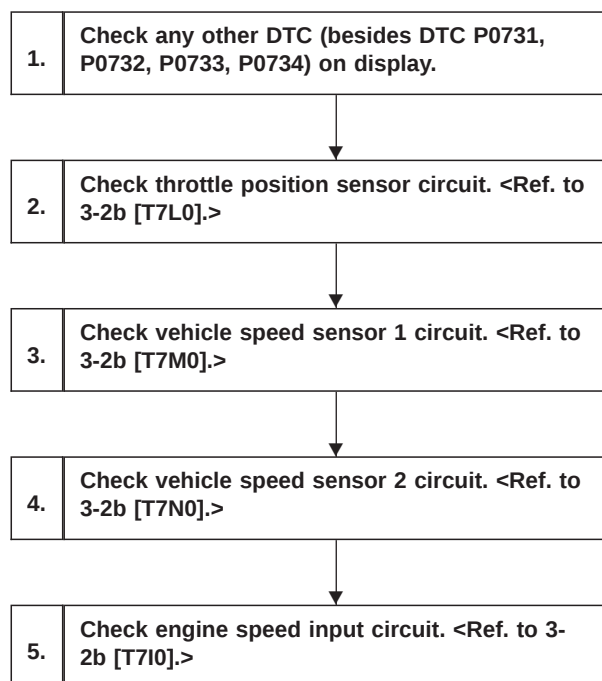
OBD0602

AU: DTC P0734**— GEAR 4 INCORRECT RATIO (GR — 4) —****DTC DETECTING CONDITION:**

- Two consecutive trips with fault

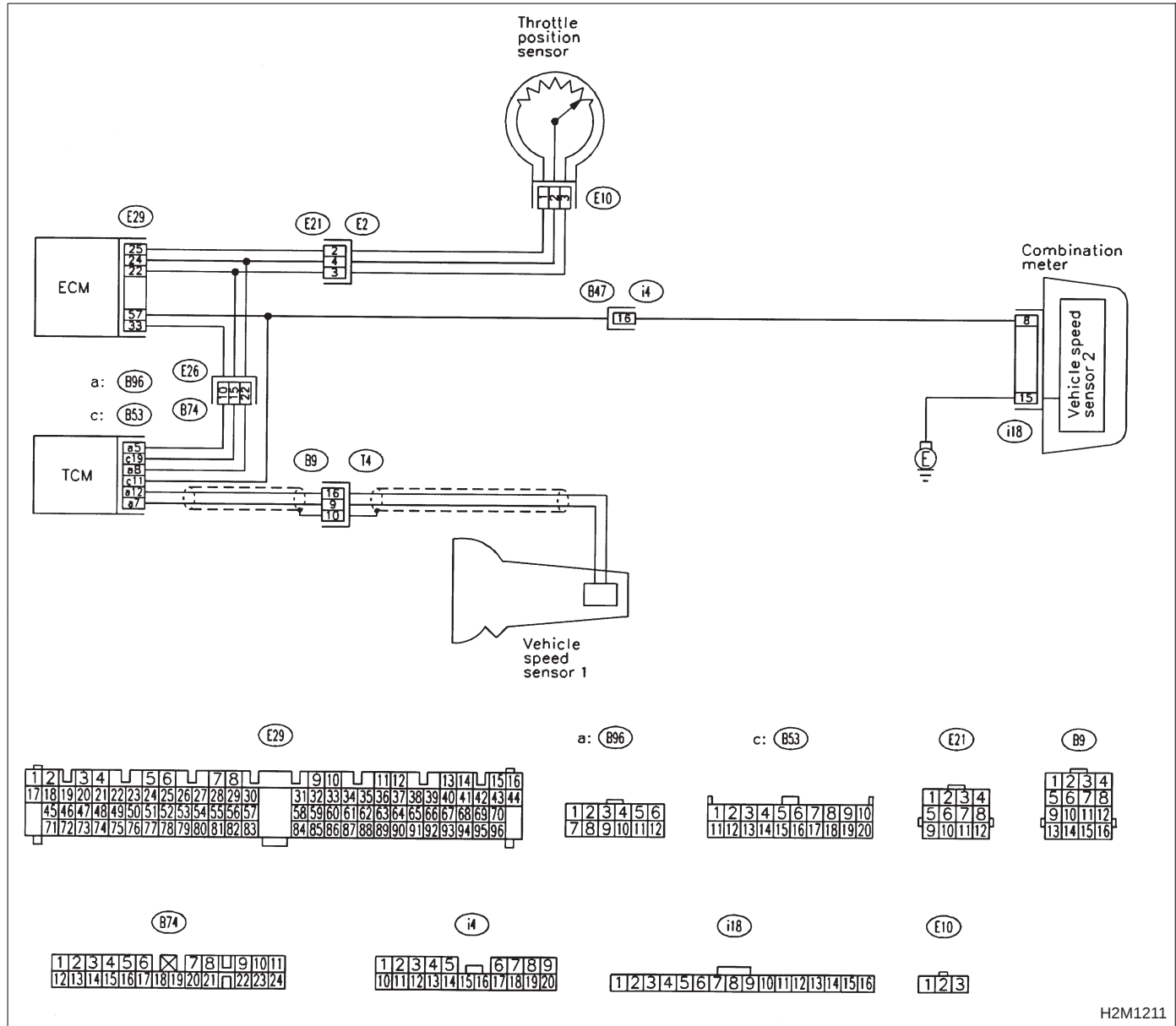
TROUBLE SYMPTOM:

- 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 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



- | | |
|--------------|---|
| 1 | CHECK ANY OTHER DTC (BESIDES DTC P0731, P0732, P0733, P0734) ON DISPLAY. |
| CHECK | : <i>Is there any other DTC on display?</i> |
| YES | : Inspect relevant DTC using “10. Diagnostics Chart with Trouble Code, 2-7b [T1000]”. |
| NO | : Go to step 2. |

2	CHECK THROTTLE POSITION SENSOR CIRCUIT. <REF. TO 3-2b [T7L0].>
----------	---

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. <REF. TO 3-2b [T7M0].>
----------	---

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. <REF. TO 3-2b [T7N0].>
----------	---

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. <REF. TO 3-2b [T7I0].>
----------	---

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?*

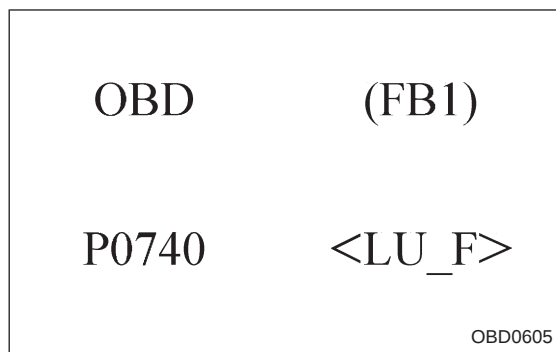
YES : Repair poor contact in TCM connector.

NO : Go to next **CHECK** .

CHECK : *Is there any mechanical trouble in automatic transmission?*

YES : Repair or replace automatic transmission.

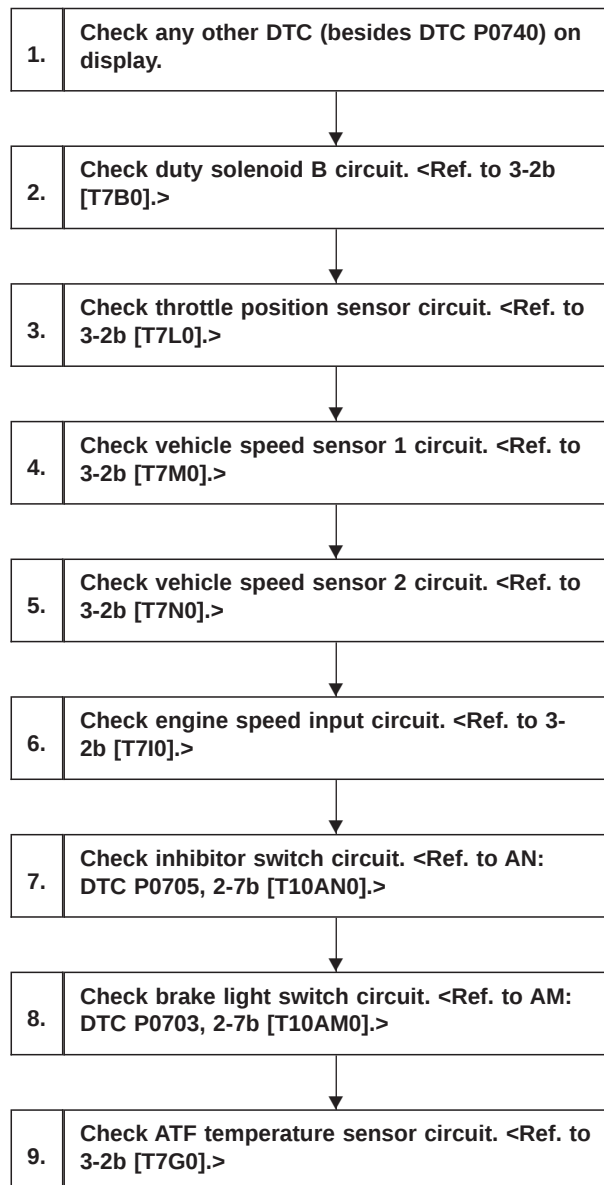
NO : Replace TCM with a new one.

**AV: DTC P0740****— TORQUE CONVERTER CLUTCH SYSTEM
MALFUNCTION (LU — F) —****DTC DETECTING CONDITION:**

- Two consecutive trips with fault

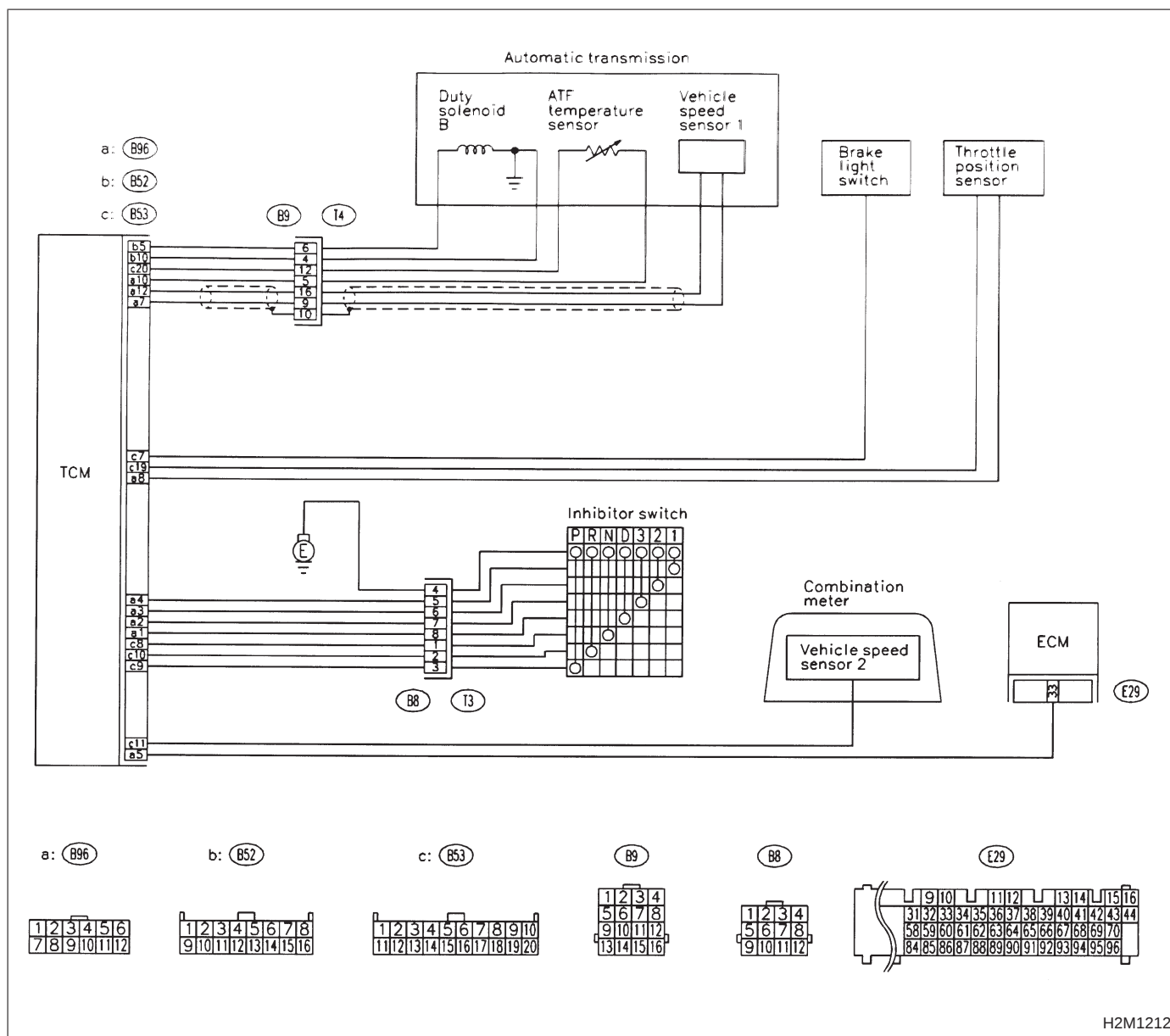
TROUBLE SYMPTOM:

- No lock-up (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 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



1 CHECK ANY OTHER DTC (BESIDES DTC P0740) ON DISPLAY.

CHECK : Is there any other DTC on display?

YES : Inspect the relevant DTC using "10. Diagnostics Chart with Trouble Code, 2-7b [T1000]".

NO : Go to step 2.

2	CHECK DUTY SOLENOID B CIRCUIT. <REF. TO 3-2b [T7B0].>
----------	--

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. <REF. TO 3-2b [T7L0].>
----------	---

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. <REF. TO 3-2b [T7M0].>
----------	---

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. <REF. TO 3-2b [T7N0].>
----------	---

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. <REF. TO 3-2b [T7I0].>
----------	---

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. <REF. TO “AN: DTC P0705, 2-7b [T10AN0]”.>
----------	--

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. <REF. TO “AM: DTC P0703, 2-7b [T10AM0]”.>
----------	--

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. <REF. TO 3-2b [T7G0].>
----------	--

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

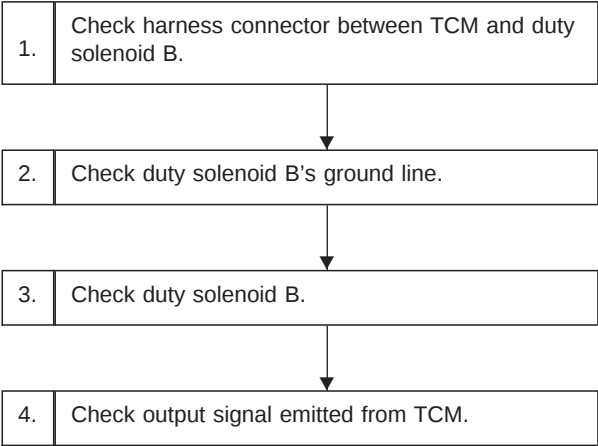
AW: DTC P0743
— TORQUE CONVERTER CLUTCH SYSTEM
(DUTY SOLENOID B) ELECTRICAL (LU) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

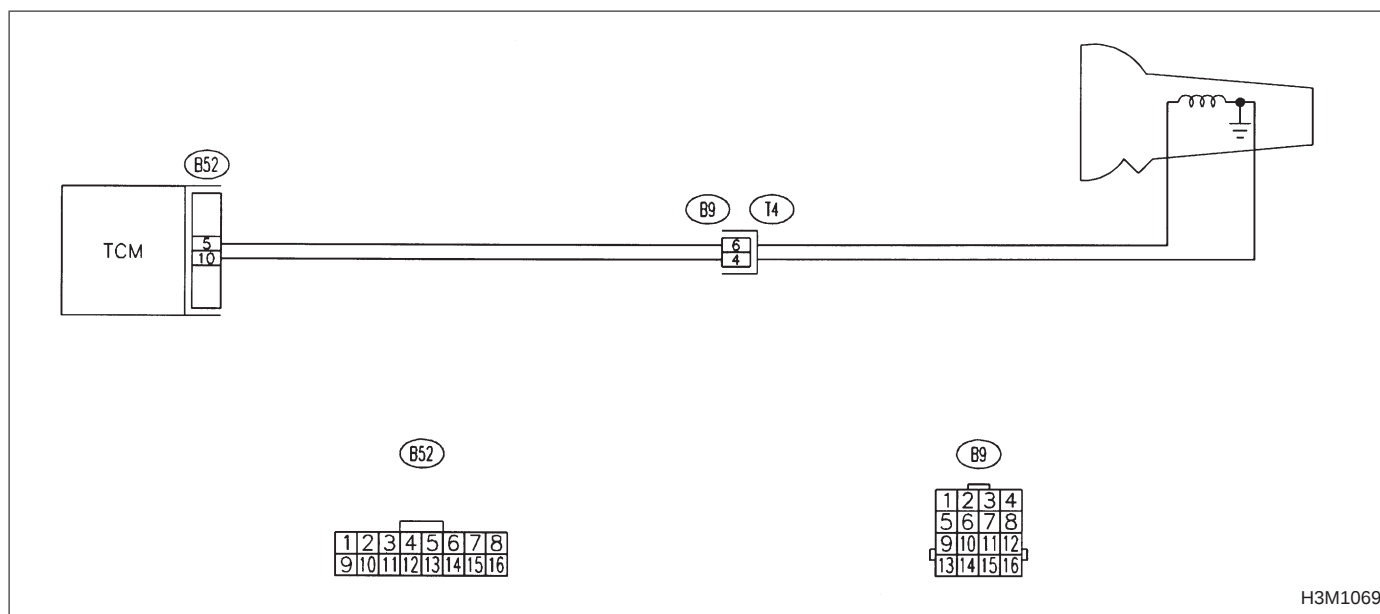
TROUBLE SYMPTOM:

- No lock-up (after engine warm-up)



CAUTION:
After repair or replacement of faulty parts, conduct
CLEAR MEMORY and **INSPECTION MODES**.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



NOTE:

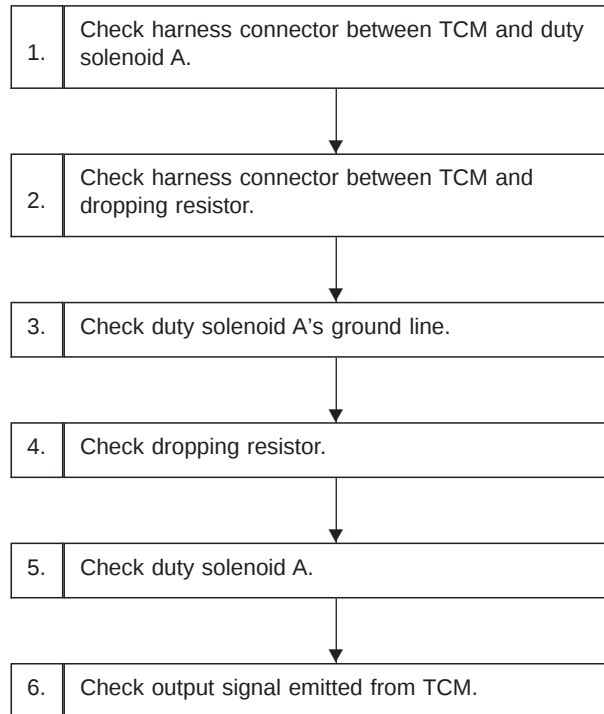
For the diagnostic procedure on duty solenoid B circuit, refer to 3-2b [T7B0].

**AX: DTC P0748****— PRESSURE CONTROL SOLENOID (DUTY SOLENOID A) ELECTRICAL (PL) —****DTC DETECTING CONDITION:**

- Two consecutive trips with fault

TROUBLE SYMPTOM:

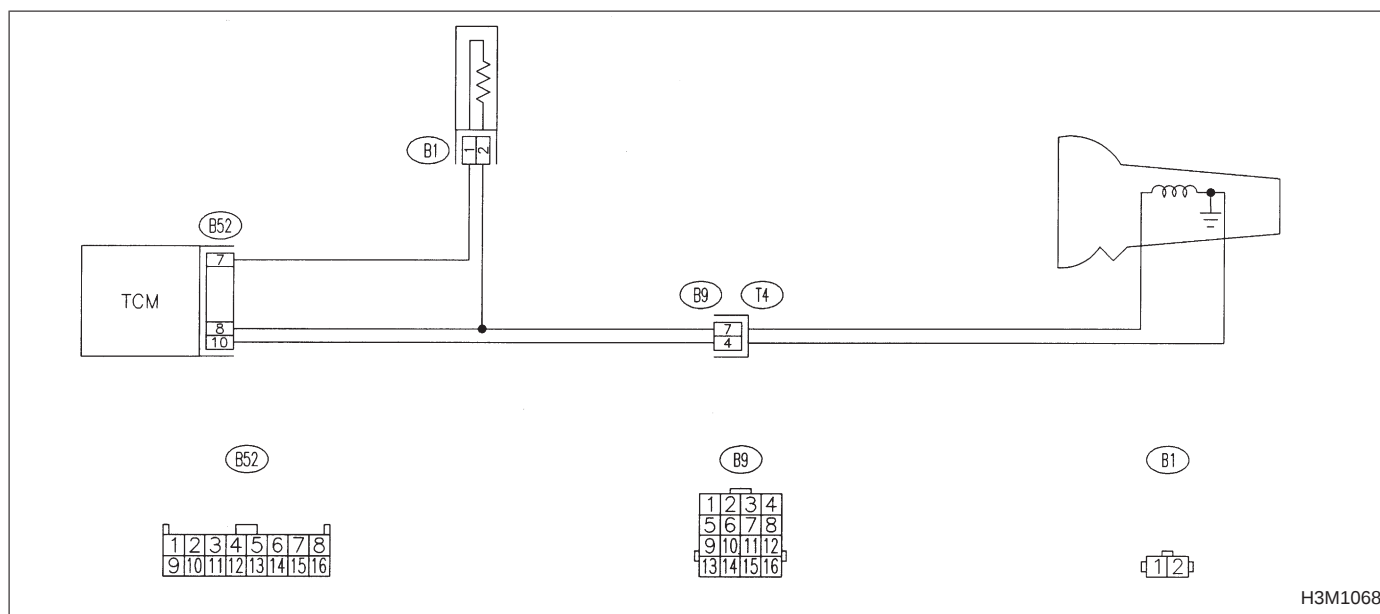
- Excessive shift shock

**CAUTION:**

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

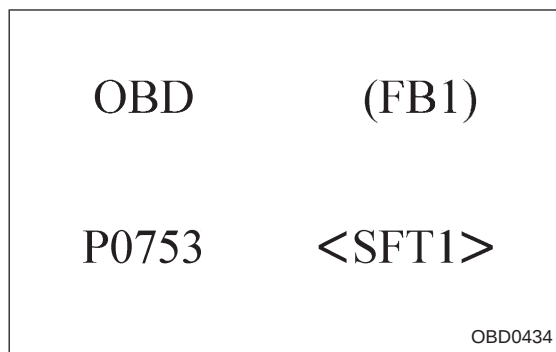
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



NOTE:

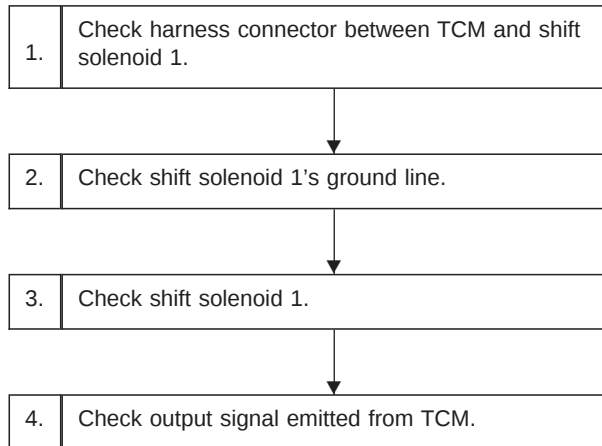
For the diagnostic procedure on duty solenoid A circuit, refer to 3-2b [T7A0].

**AY: DTC P0753****— SHIFT SOLENOID A (SHIFT SOLENOID 1)
ELECTRICAL (SFT1) —****DTC DETECTING CONDITION:**

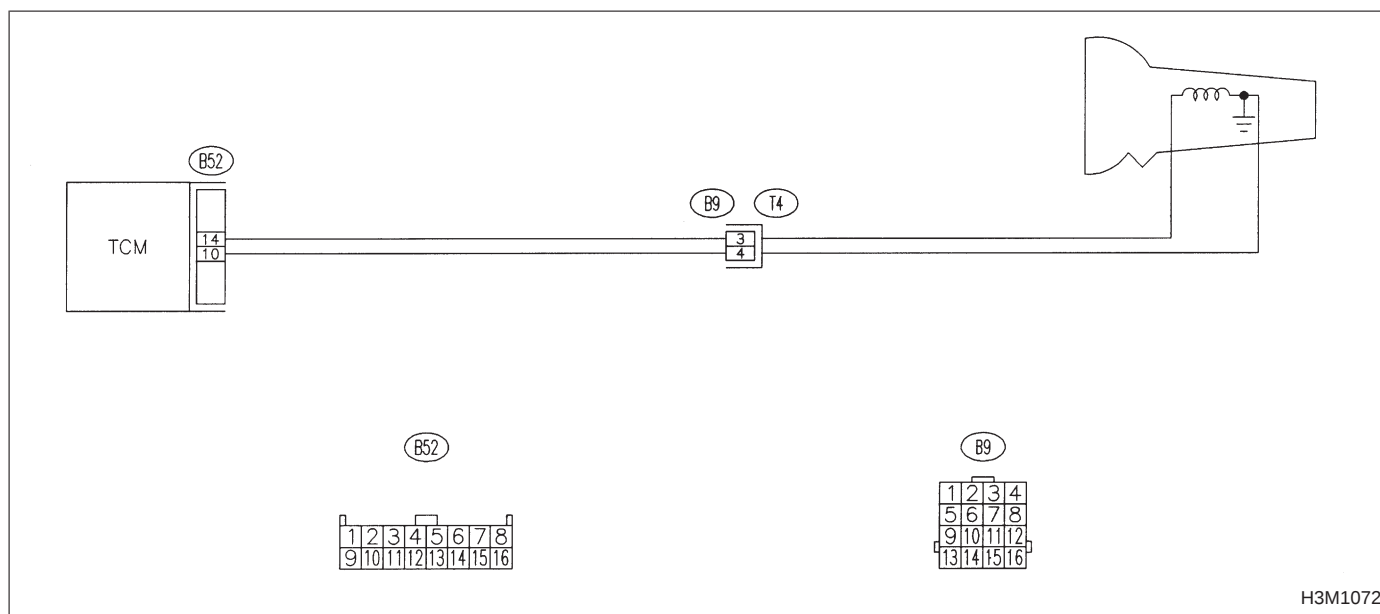
- Two consecutive trips with fault

TROUBLE SYMPTOM:

- No shift

**CAUTION:****After repair or replacement of faulty parts, conduct
CLEAR MEMORY and INSPECTION MODES.****<Ref. to 2-7b [T3D0] and [T3E0].>**

WIRING DIAGRAM:



NOTE:

For the diagnostic procedure on shift solenoid 1 circuit, refer to 3-2b [T7E0].

OBD

(FB1)

P0758

<SFT2>

OBD0442

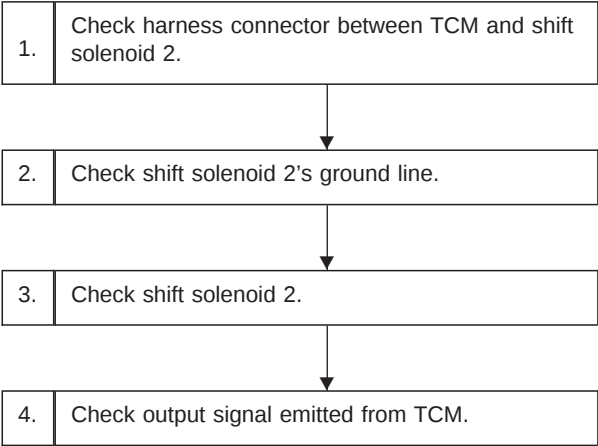
AZ: DTC P0758
— SHIFT SOLENOID B (SHIFT SOLENOID 2)
ELECTRICAL (SFT2) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

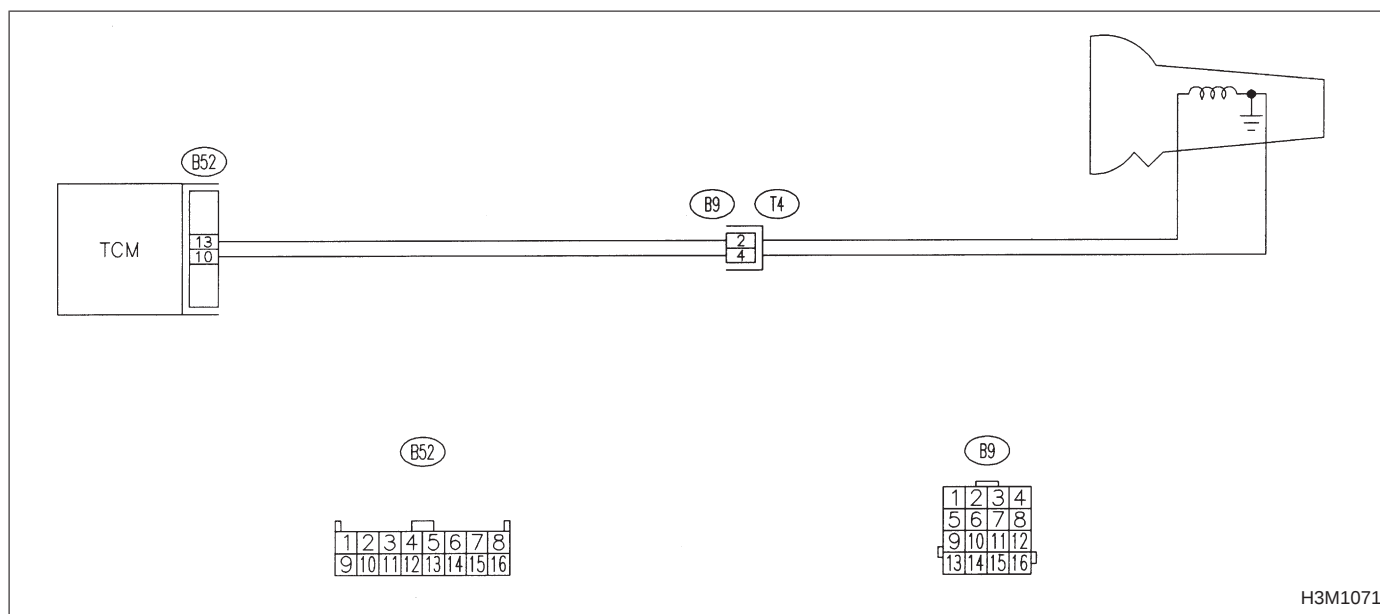
TROUBLE SYMPTOM:

- No shift



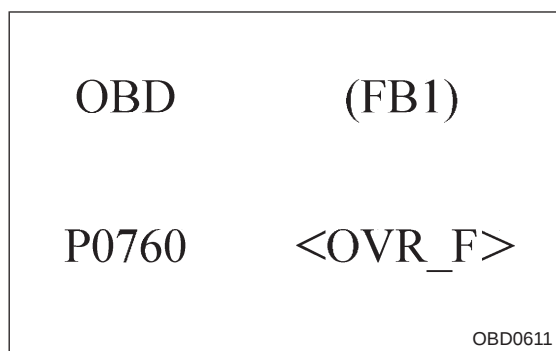
CAUTION:
After repair or replacement of faulty parts, conduct
CLEAR MEMORY and **INSPECTION MODES**.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



NOTE:

For the diagnostic procedure on shift solenoid 2 circuit, refer to 3-2b [T7D0].

**BA: DTC P0760**

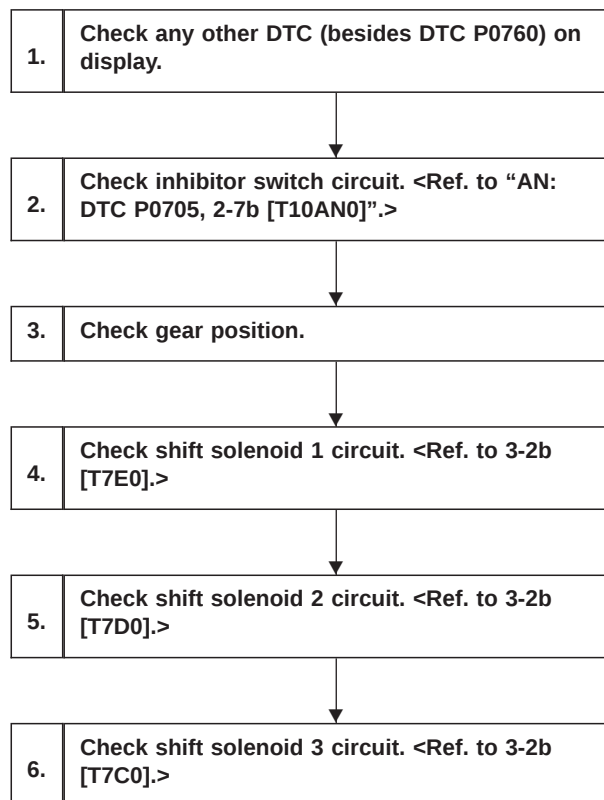
— SHIFT SOLENOID C (SHIFT SOLENOID 3) MALFUNCTION (OVR — F) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

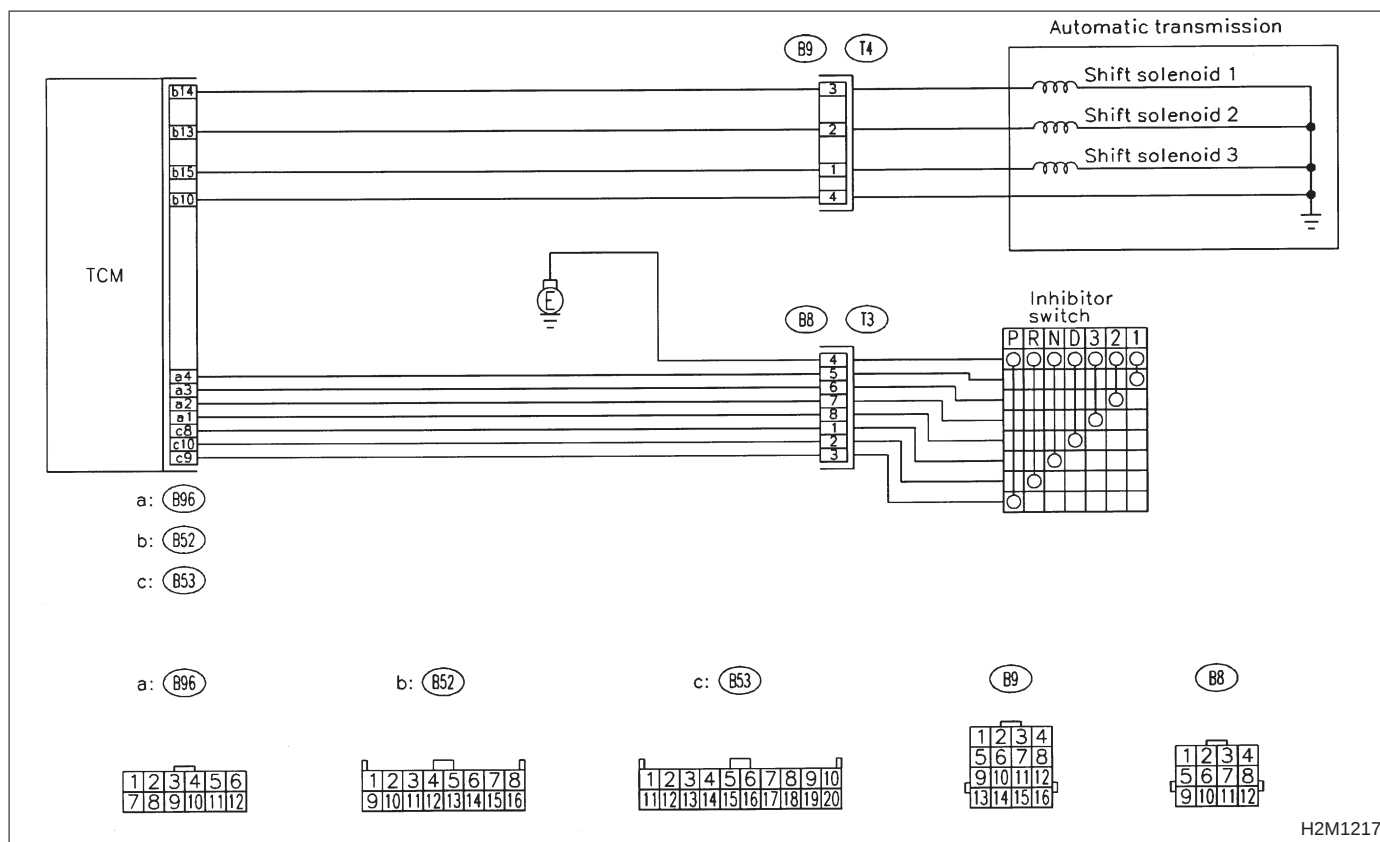
TROUBLE SYMPTOM:

- Ineffective engine brake with selector lever in “3”

**CAUTION:**

After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**.
 <Ref. to 2-7b [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 "10. Diagnostics Chart with Trouble Code, 2-7b [T1000]".

NO

: Go to step 2.

2

CHECK INHIBITOR SWITCH CIRCUIT.
<REF. TO "AN: DTC P0705, 2-7b [T10AN0]".>

CHECK

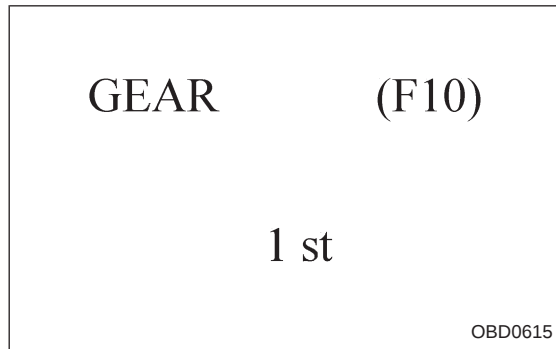
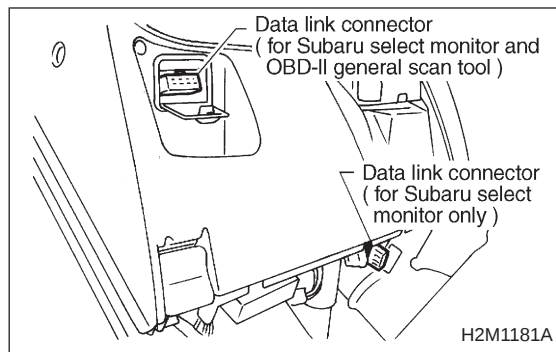
: *Is there any trouble in inhibitor switch circuit?*

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.

- 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. <REF. TO 3-2b [T7E0].>

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. <REF. TO 3-2b [T7D0].>
----------	---

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. <REF. TO 3-2b [T7C0].>
----------	---

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

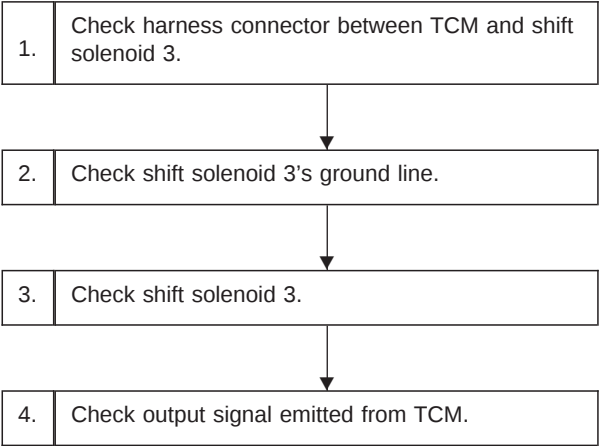
BB: DTC P0763
— SHIFT SOLENOID C (SHIFT SOLENOID 3)
ELECTRICAL (OVR) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

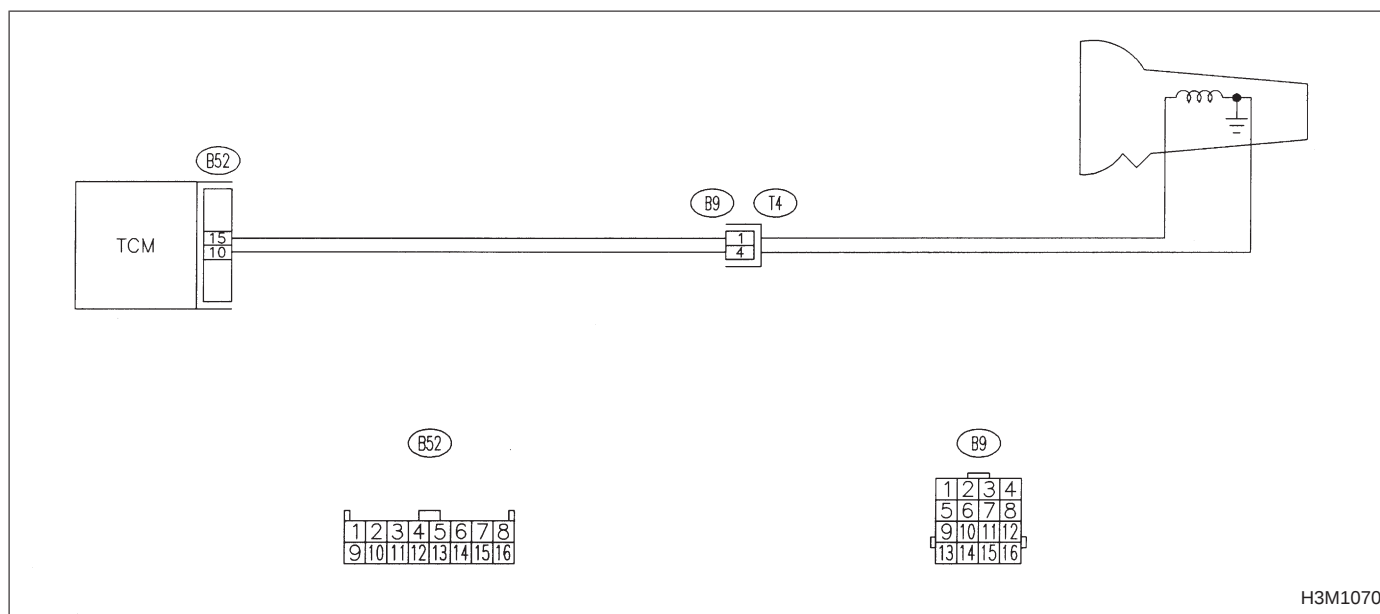
TROUBLE SYMPTOM:

- Ineffective engine brake with selector lever in “3”



CAUTION:
After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



NOTE:

For the diagnostic procedure on shift solenoid 3 circuit, refer to 3-2b [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:

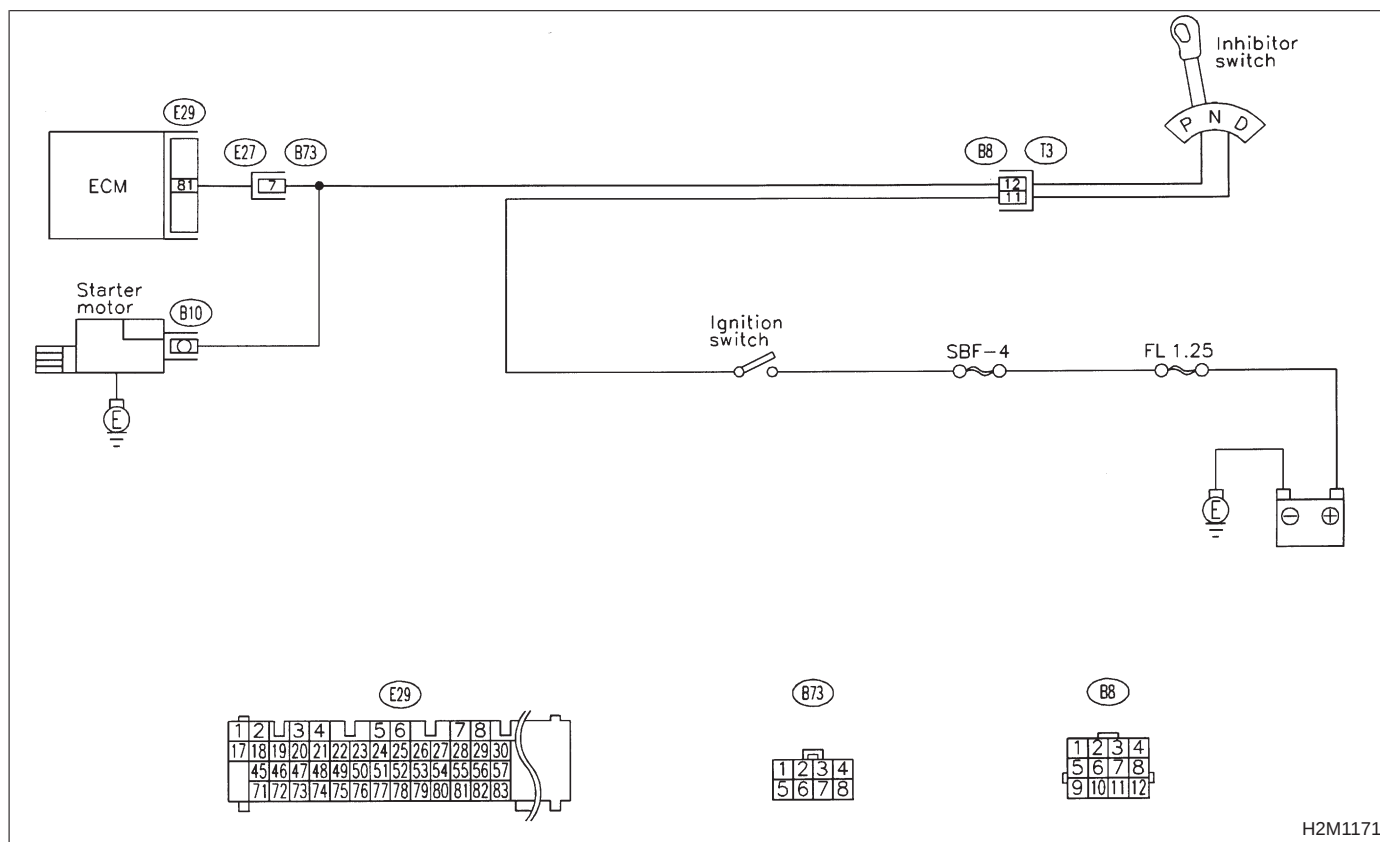
- Failure of engine to start

1. Check operation of starter motor.

CAUTION:

After repair or replacement of faulty parts, conduct
CLEAR MEMORY and INSPECTION MODES.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



H2M1171

1	CHECK OPERATION OF STARTER MOTOR.
----------	--

CHECK : *Turn ignition switch to “ST” to ensure that starter motor operates.*

NOTE:

Place the selector lever in the “P” or “N” position.

YES : Repair open circuit or poor contact in ECM connector.

NO : Diagnose starter motor circuit <Ref. to 2-7b [T8B0].>

OBD

(FB1)

P1101

<N_SW>

OBD0473

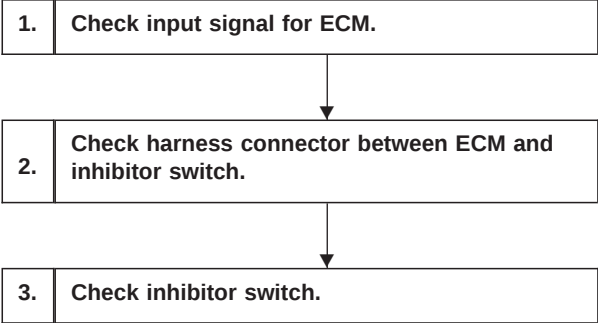
BD: DTC P1101
— NEUTRAL POSITION SWITCH CIRCUIT
MALFUNCTION (N — SW) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

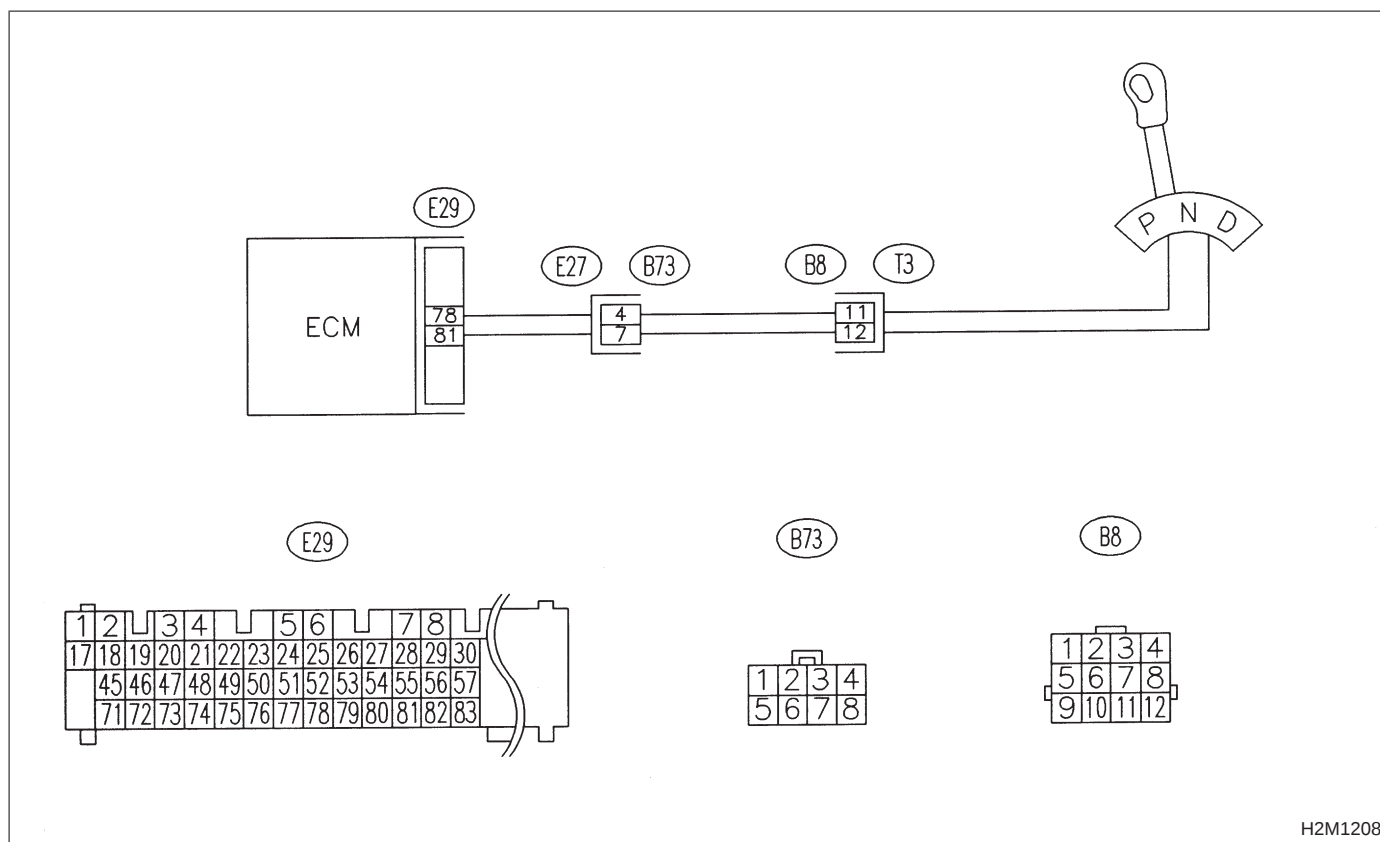
TROUBLE SYMPTOM:

- Erroneous idling

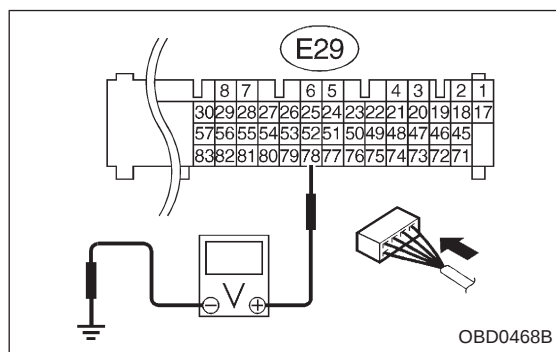


CAUTION:
After repair or replacement of faulty parts, conduct
CLEAR MEMORY and **INSPECTION MODES**.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



H2M1208



OBD0468B

1 CHECK INPUT SIGNAL FOR ECM.

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

CHECK : **Connector & terminal**
(E29) No. 78 — Body / 0 V ("N" and "P" positions)
(E29) No. 78 — Body / 5.0±0.5 V (Other positions)

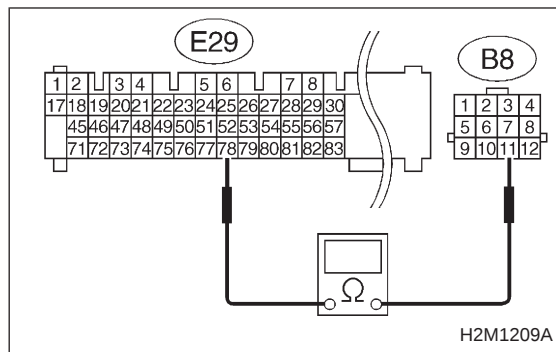
YES : Go to next **CHECK** .

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

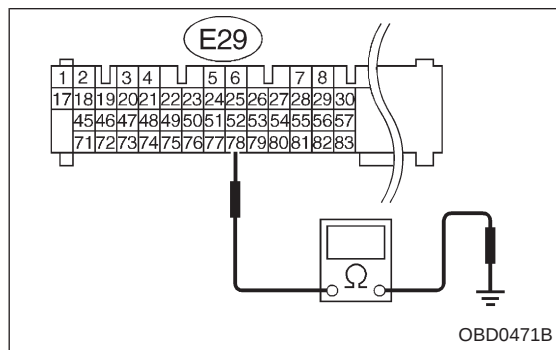
CHECK HARNESS CONNECTOR BETWEEN ECM AND INHIBITOR SWITCH.

- 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**
(E29) No. 78 — (B8) No. 11 / 1 Ω, or less

YES : Go to next step.

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

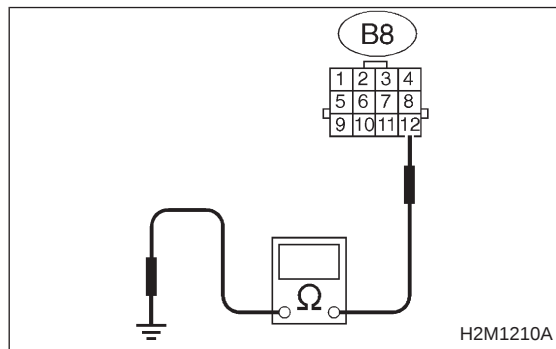


- 4) Measure resistance of harness connector between ECM and body.

CHECK : **Connector & terminal**
(E29) No. 78 — Body / 1 MΩ, or more

YES : Go to next step.

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

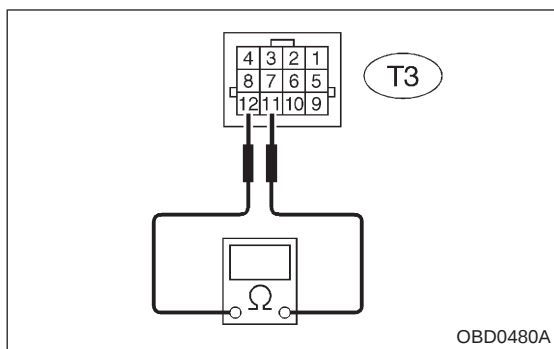


- 5) Measure resistance of harness connector between inhibitor switch and body.

CHECK : **Connector & terminal**
(B8) No. 12 — Body / 5 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	

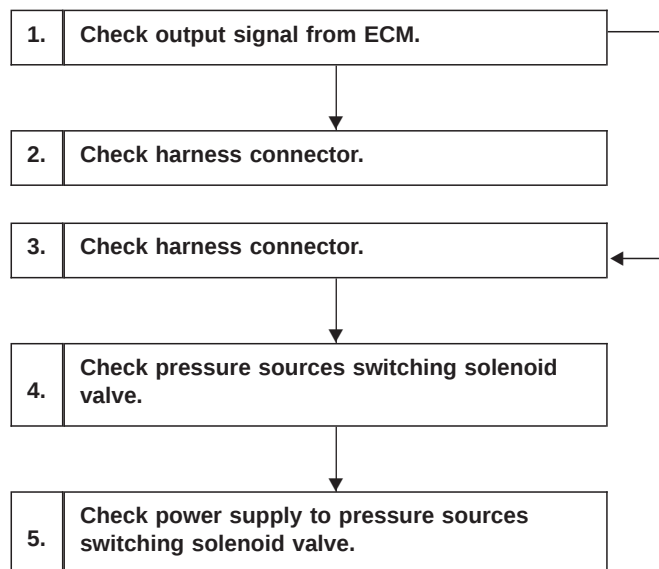
BE: DTC P1102
— PRESSURE SOURCES SWITCHING
SOLENOID VALVE CIRCUIT MALFUNCTION
(BR) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

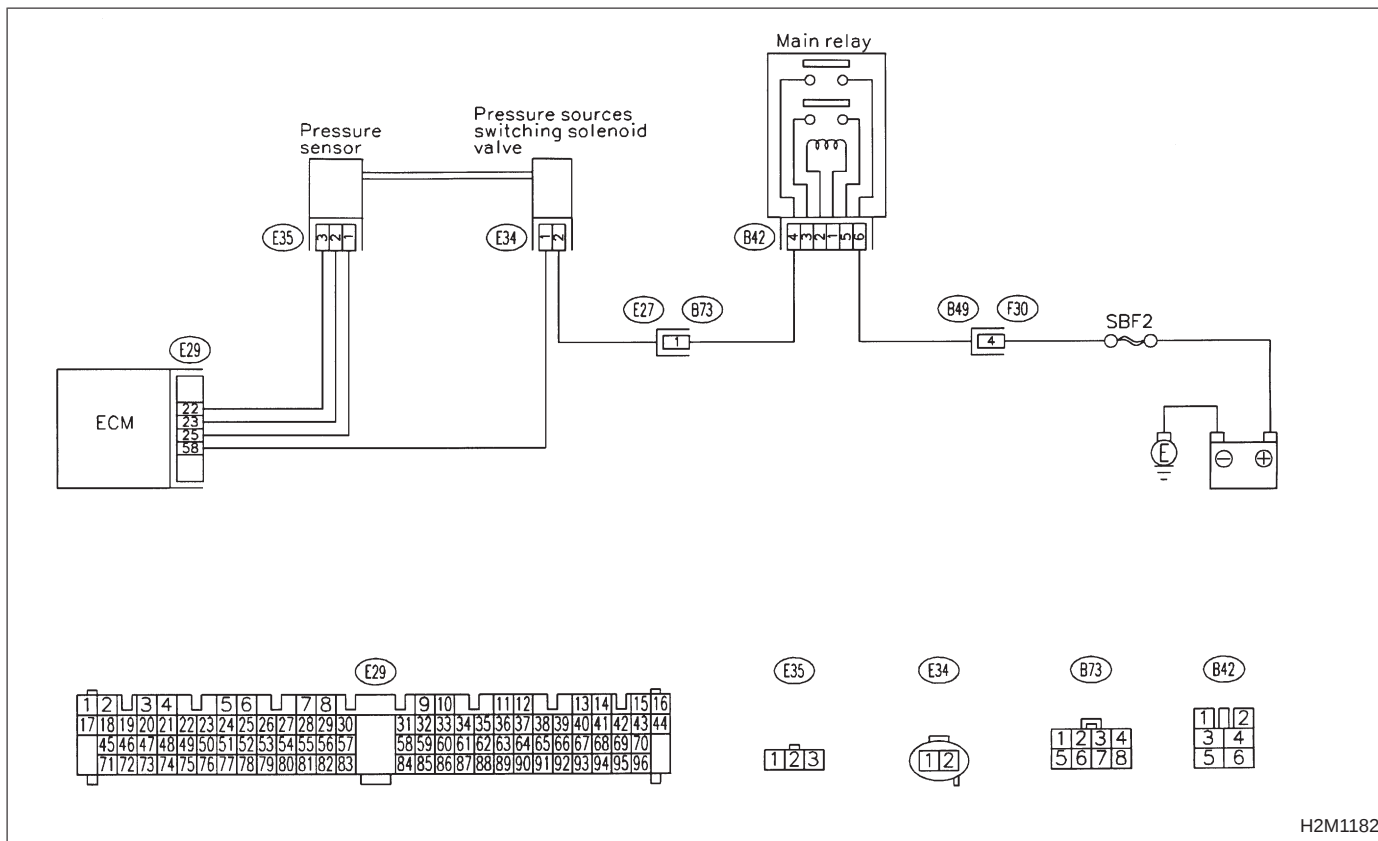
- Erroneous idling
- Failure of engine to start



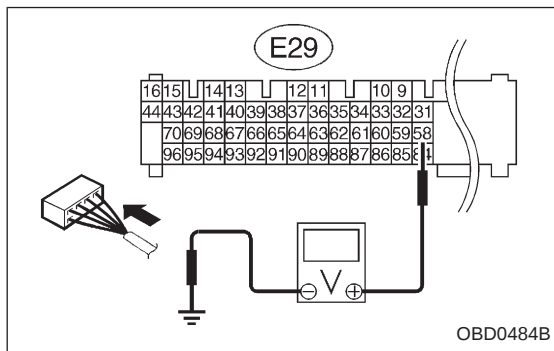
CAUTION:

After repair or replacement of faulty parts, conduct
CLEAR MEMORY and **INSPECTION MODE**.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



H2M1182



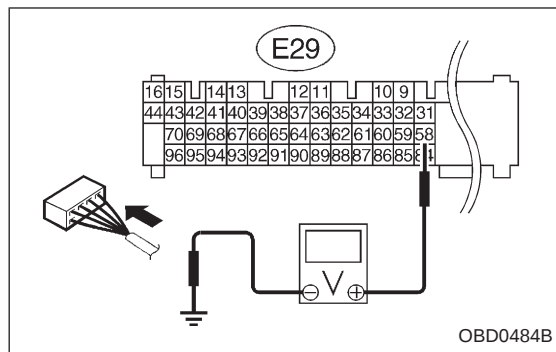
1 CHECK OUTPUT SIGNAL FROM ECM.

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

CHECK : **Connector & terminal**
(E29) No. 58 — Body / 10 V, or more

YES : Go to step 2.

NO : Go to step 3.



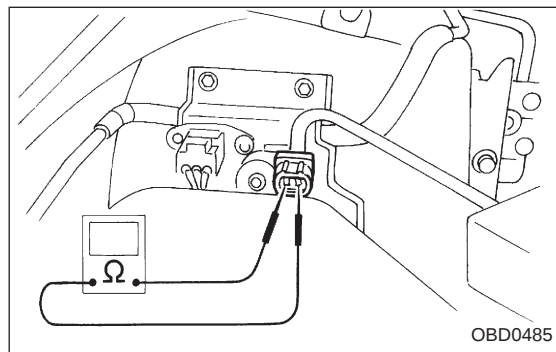
2 CHECK HARNESS CONNECTOR.

- 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**
(E29) 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

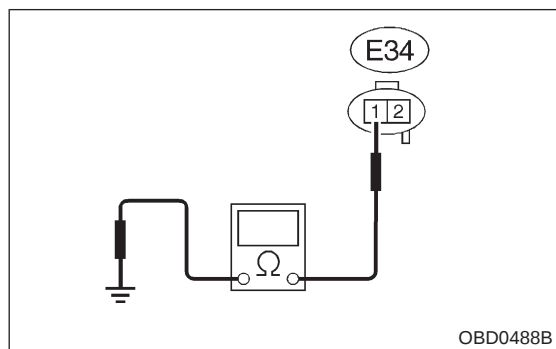
YES : Replace pressure sources switching solenoid valve and ECM.

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.

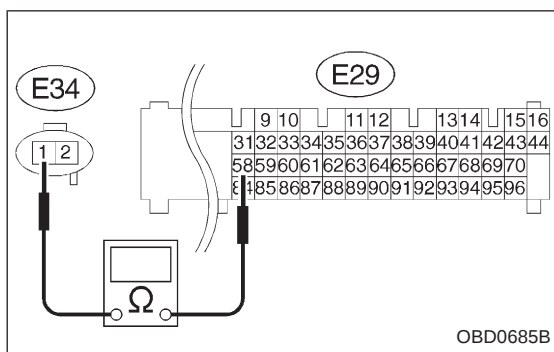


3 CHECK HARNESS CONNECTOR.

- 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**
(E34) No. 1 — Body / 10 Ω , or less

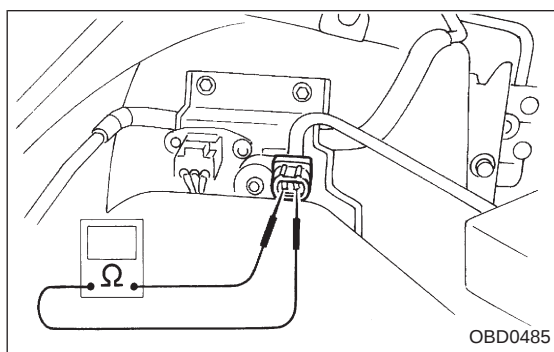
- YES** : Repair short circuit of harness between ECM connector and pressure sources switching solenoid valve connector.
- NO** : Go to next step.



4) Measure resistance of harness connector between ECM and pressure sources switching solenoid valve.

CHECK : **Connector & terminal**
(E29) No. 58 — (E34) No. 1 / 1 Ω, or less

- YES** : Go to step 4.
- NO** : Repair open circuit of harness between ECM connector and pressure sources switching solenoid valve connector.

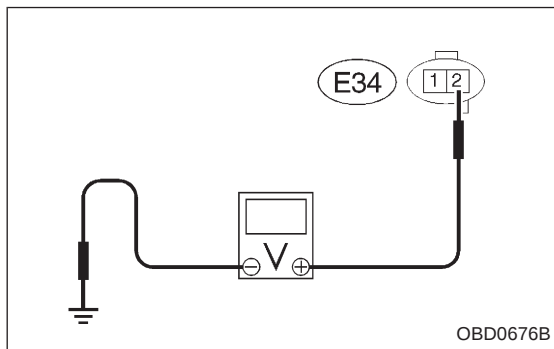


4 CHECK PRESSURE SOURCES SWITCHING SOLENOID VALVE.

Measure resistance between pressure sources switching solenoid valve connector terminals.

CHECK : **Terminals**
No. 1 — No. 2 / 10 — 100 Ω

- YES** : Go to step 5.
- NO** : Replace pressure sources switching solenoid valve.



5 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**
(E34) 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.

OBD

(FB1)

P1103

<TRQ>

OBD0489

BF: DTC P1103
— ENGINE TORQUE CONTROL SIGNAL
CIRCUIT MALFUNCTION (TRQ) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

- Excessive shift shock

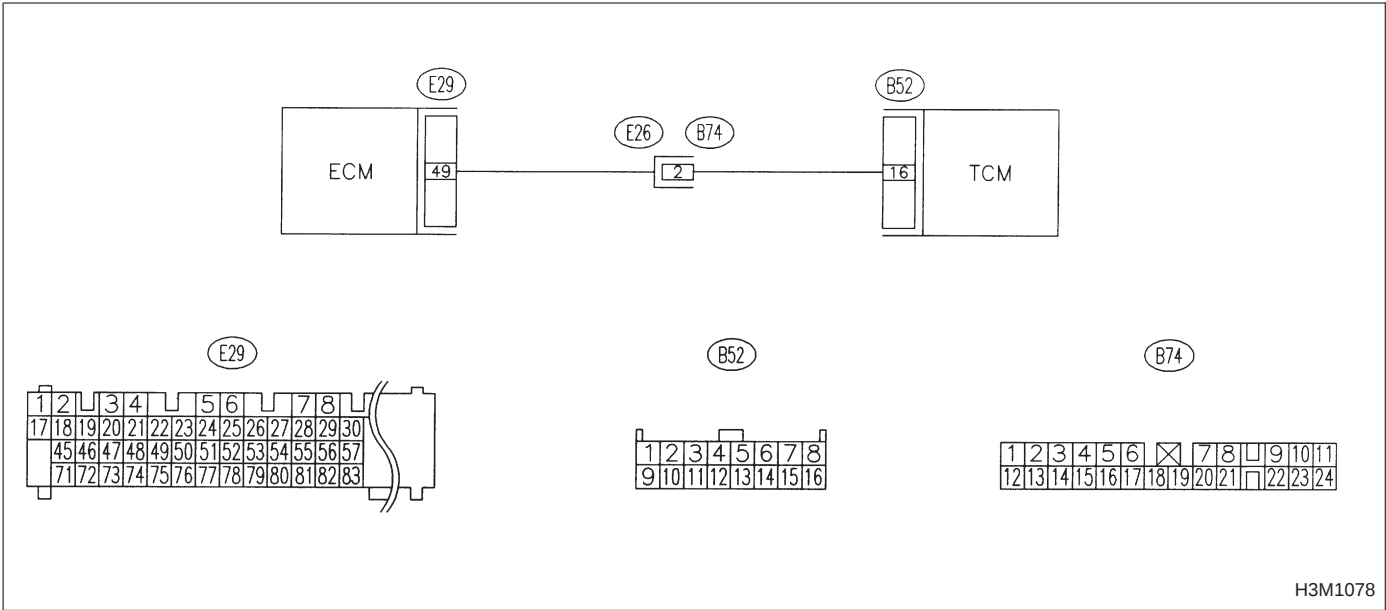
1.

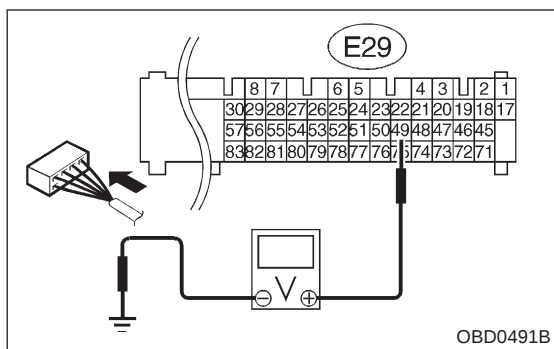
Check input signal for ECM.
2.

Check harness connector between ECM and TCM.

CAUTION:
After repair or replacement of faulty parts, conduct **CLEAR MEMORY** and **INSPECTION MODES**.
<Ref. to 2-7b [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**
(E29) No. 49 — Body / 4.5V, or more

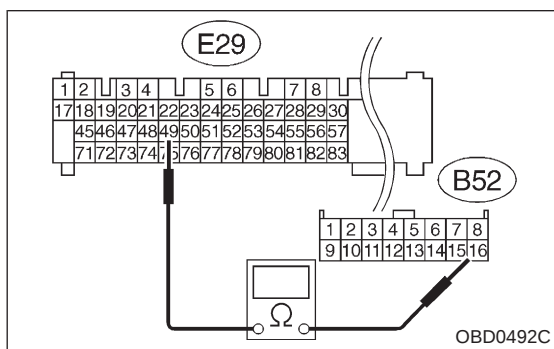
YES : Go to next **CHECK** .

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.



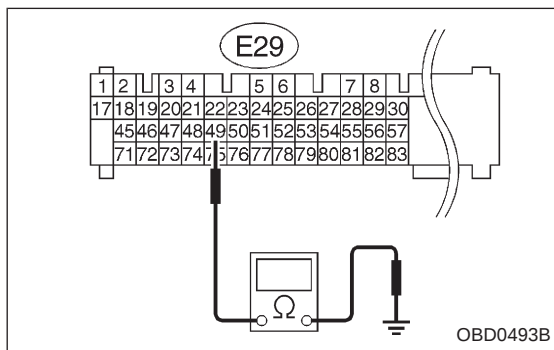
2 CHECK HARNESS CONNECTOR BETWEEN ECM AND TCM.

- 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**
(E29) No. 49 — (B52) No. 16 / 1 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**
(E29) No. 49 — Body / 1 $M\Omega$, or more

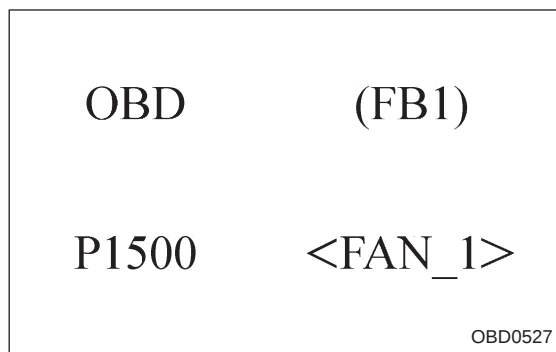
YES : Go to next **CHECK** .

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.



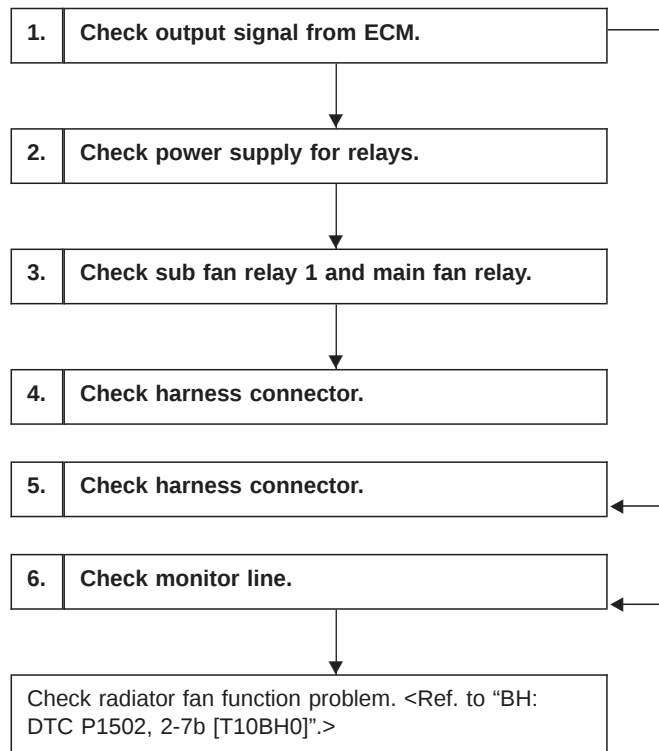
BG: DTC P1500
— RADIATOR FAN RELAY 1 CIRCUIT
MALFUNCTION (FAN — 1) —

DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

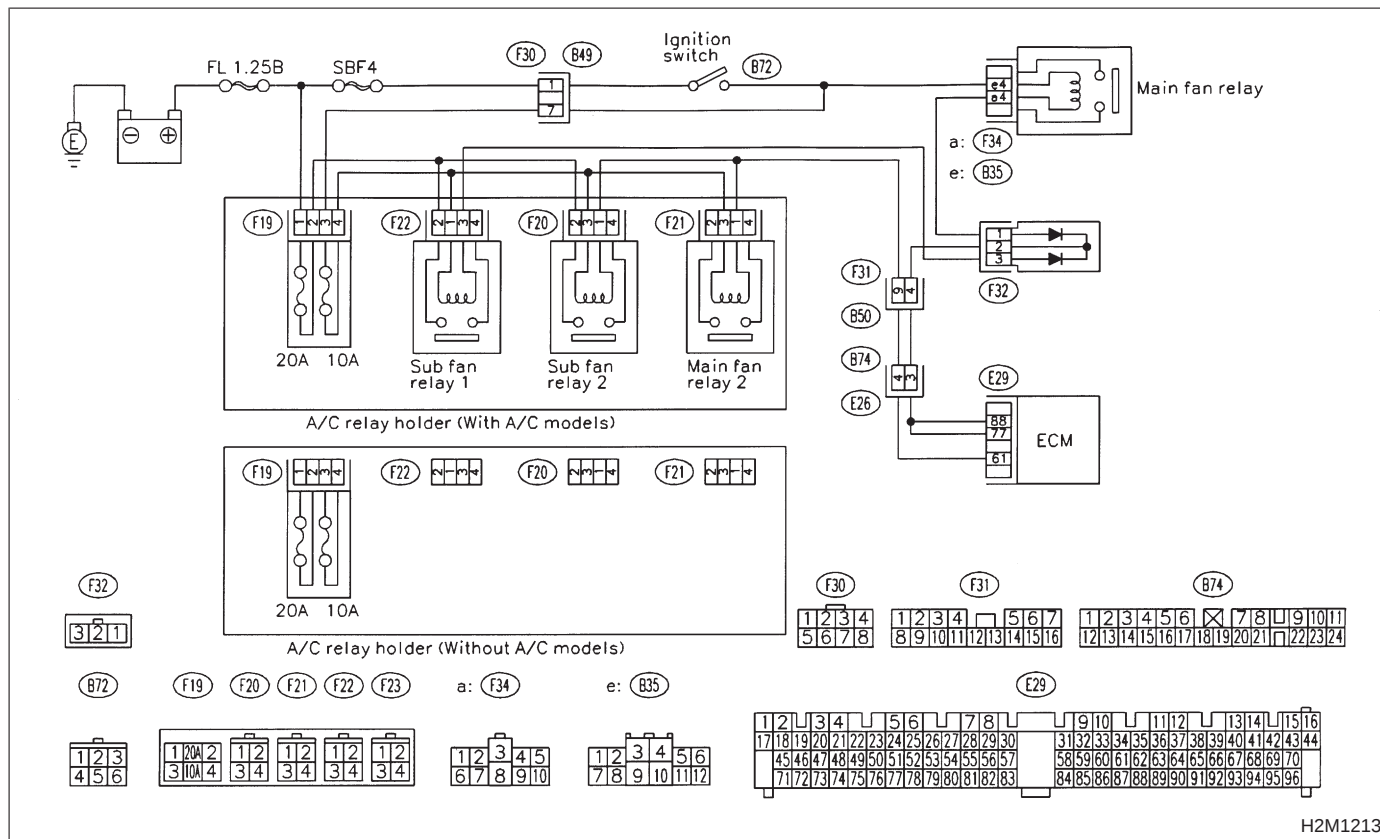
- Radiator fan does not operate properly.
- Overheating



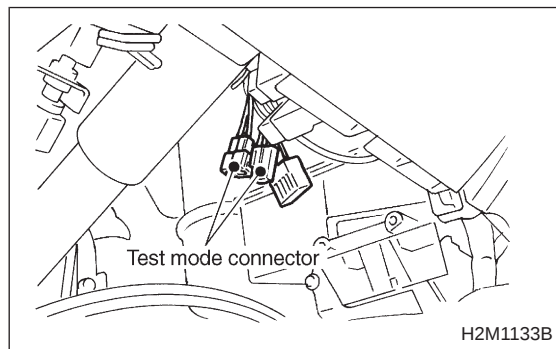
CAUTION:

After repair or replacement of faulty parts, conduct
CLEAR MEMORY and **INSPECTION MODE**.
 <Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



H2M1213



H2M1133B

1 CHECK OUTPUT SIGNAL FROM ECM.

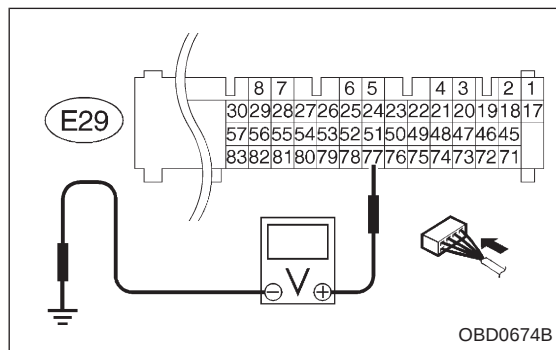
- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.
- 3) Turn ignition switch to ON.

- 4) Measure voltage between ECM and body.

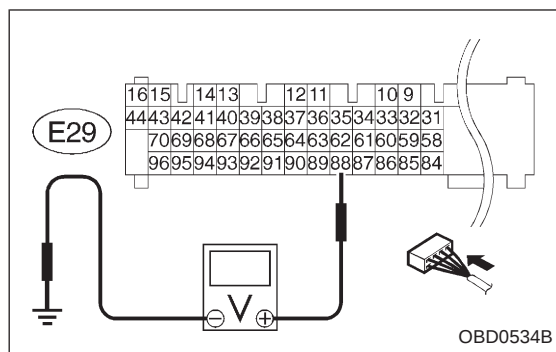
CHECK : **Connector & terminal (E29) No. 77 — Body/10 V, or more and 1 V or less at every 2 seconds**

YES : Go to step 6.

NO : Go to next **CHECK** .



OBD0674B

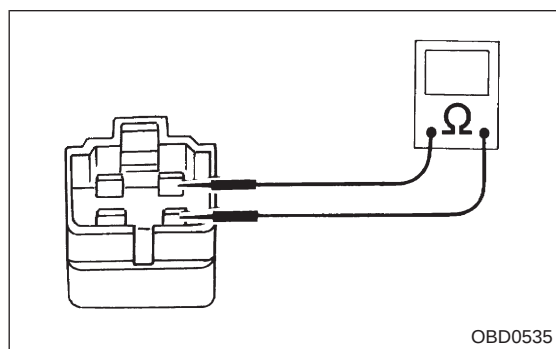


- CHECK** : **Connector & terminal**
(E29) No. 88 — Body/10 V, or more
- YES** : Go to step 5.
- NO** : Go to step 2.

2 CHECK POWER SUPPLY FOR RELAYS.

Turn ignition switch to OFF.

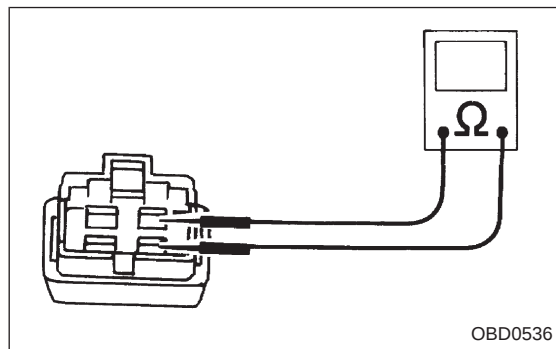
- CHECK** : **Is the fuse in power supply circuit broken?**
- YES** : Replace the fuse.
- NO** : Go to step 3.



3 CHECK SUB FAN RELAY 1 AND MAIN FAN RELAY.

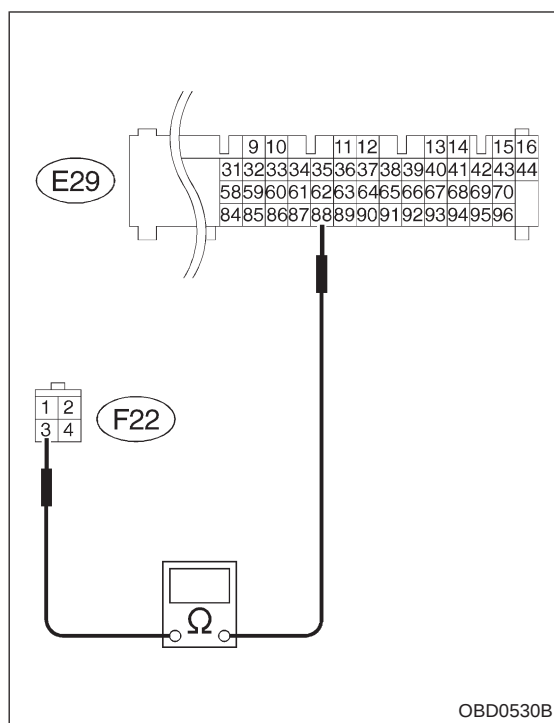
- 1) Remove sub fan relay 1. (With A/C models only)
- 2) Measure resistance between sub fan relay 1 terminals.

- CHECK** : **Terminal**
No. 1 — No. 3/97±10 Ω
- YES** : Go to next step.
- NO** : Replace sub fan relay 1.



- 3) Remove main fan relay.
- 4) Measure resistance between main fan relay terminals.

- CHECK** : **Terminal**
No. 1 — No. 3/100±17 Ω
- YES** : Go to step 4.
- NO** : Replace main fan relay.



4 CHECK HARNESS CONNECTOR.

- 1) Disconnect connector from ECM.
- 2) Check if the harness connector is open circuit or has poor contact with the following circuits.

CHECK : **Connector & terminal**
(E29) No. 88 — (F22) No. 3 / 1 Ω, or less

NOTE:

With A/C models only.

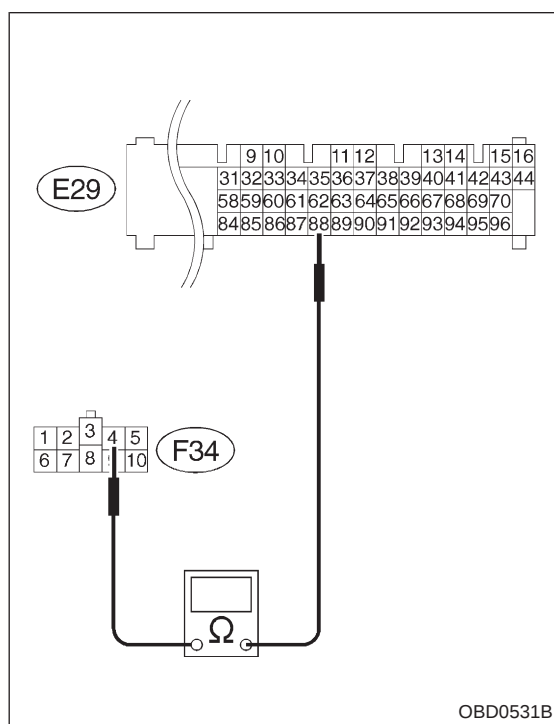
YES : Go to next **CHECK** .

NO : Repair open circuit of harness between ECM connector and sub fan relay 1 connector.

CHECK : **Is there poor contact in ECM or sub fan relay 1 connector?**

YES : Repair ECM or sub fan relay 1 connector.

NO : Go to next **CHECK** .



CHECK : **Connector & terminal**
(E29) No. 88 — (F34) No. 4 / 1 Ω, or less

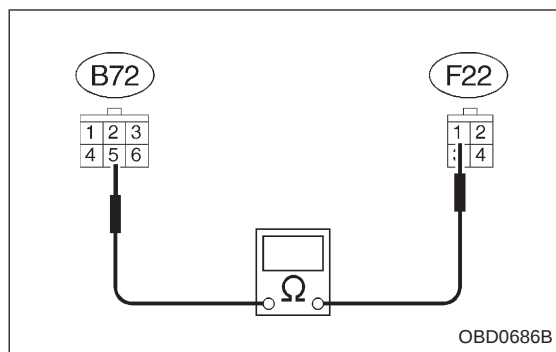
YES : Go to next **CHECK** .

NO : Repair open circuit of harness between ECM connector and main fan relay connector.

CHECK : **Is there poor contact in ECM or main fan relay connector?**

YES : Repair ECM or main fan relay connector.

NO : Go to next **CHECK** .



CHECK : **Connector & terminal**
(F22) No. 1 — (B72) No. 5 / 1 Ω , or less

YES : Go to next **CHECK** .

NO : Repair open circuit of harness between sub fan relay 1 connector and ignition switch connector.

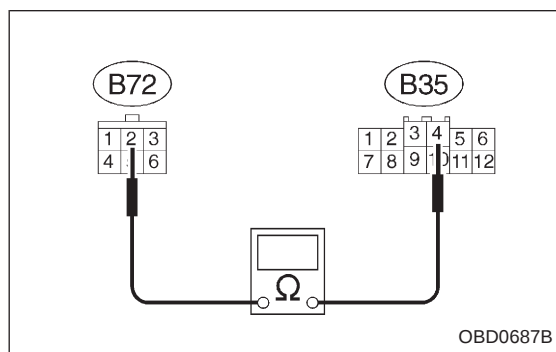
CHECK : **Is there poor contact in sub fan relay 1 or ignition switch connector?**

YES : Repair poor contact in sub fan relay 1 or ignition switch connector.

NO : Go to next **CHECK** .

NOTE:

With A/C models only.



CHECK : **Connector & terminal**
(B35) No. 4 — (B72) No. 2 / 1 Ω , or less

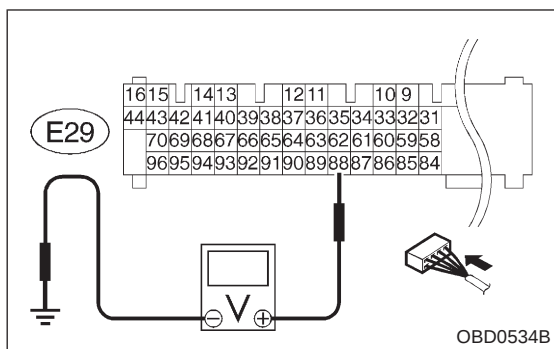
YES : Go to next **CHECK** .

NO : Repair open circuit of harness between main fan relay connector and ignition switch connector.

CHECK : **Is there poor contact in main fan relay or ignition switch connector?**

YES : Repair poor contact in main fan relay 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 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**
(E29) No. 88 — Body / 10 V, or more

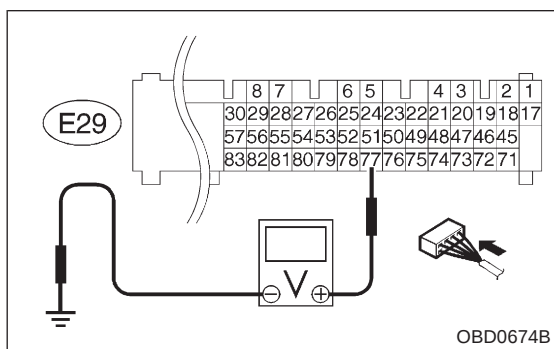
YES : Repair short circuit of harness and replace ECM.

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**
(E29) 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 and main fan relay connector.

OBD

(FB1)

P1502

<FAN F>

OBD0538

BH: DTC P1502

— RADIATOR FAN FUNCTION PROBLEM
(FAN — F) —

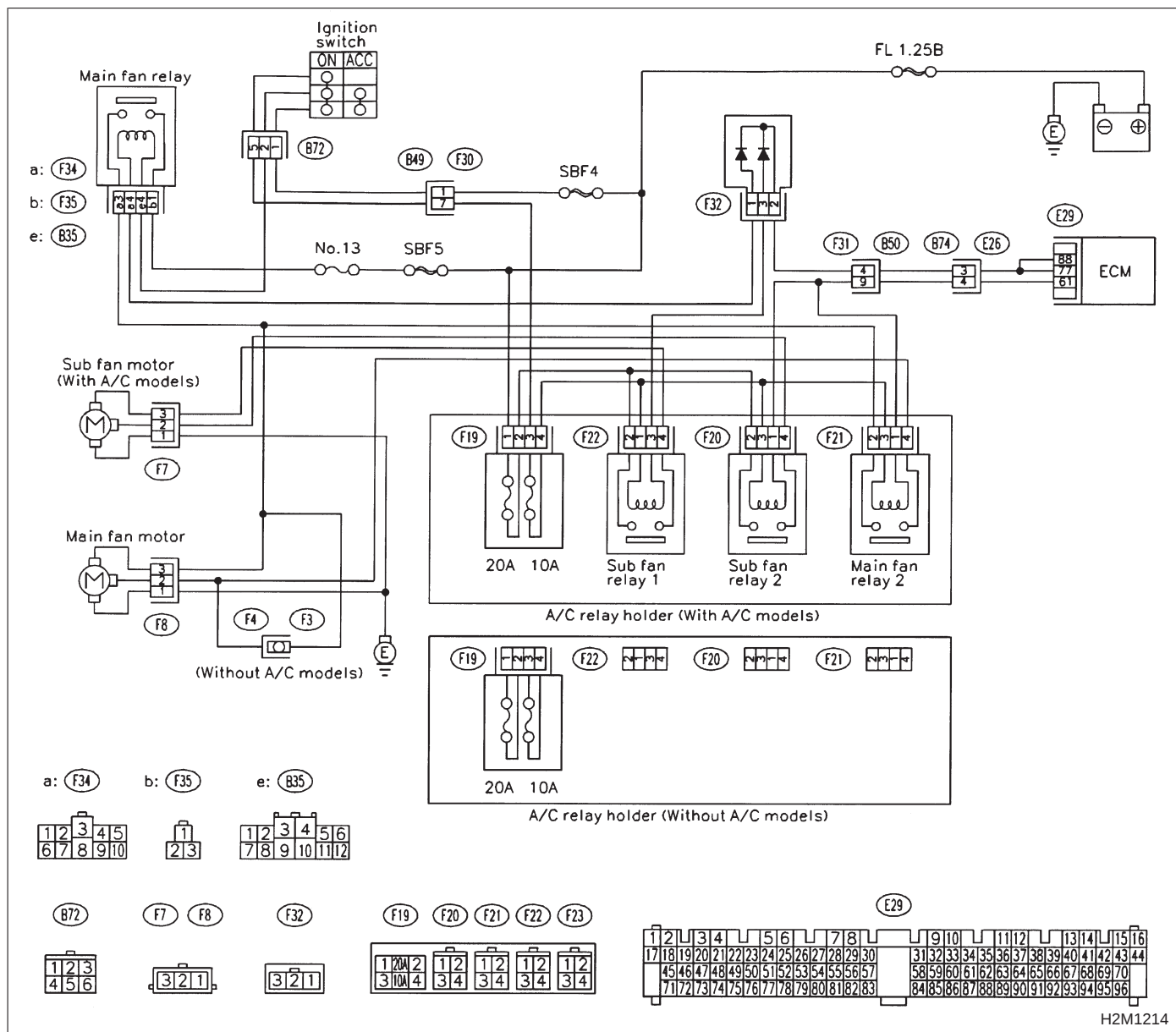
DTC DETECTING CONDITION:

- Two consecutive trips with fault

TROUBLE SYMPTOM:

- Occurrence of noise
- Overheating

WIRING DIAGRAM:



When DTC P1104 is on display, check engine cooling system. <Ref. to 2-5 [T100].>

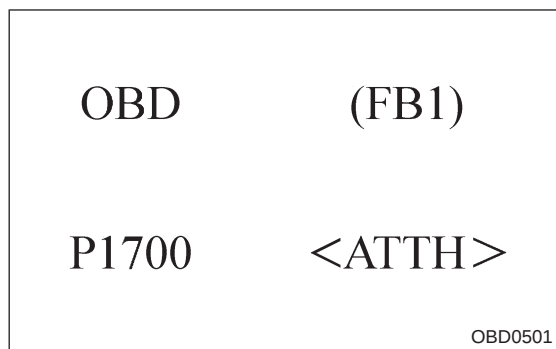
CAUTION:

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

<Ref. to 2-7b [T3D0] and [T3E0].>

NOTE:

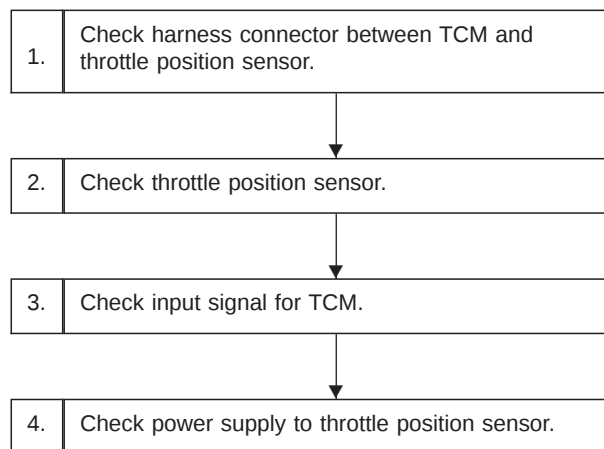
If the vehicle, with the engine idling, is placed very close to a wall or another vehicle, preventing normal cooling function, the OBD system may detect malfunction.

**BI: DTC P1700****— THROTTLE POSITION SENSOR CIRCUIT
MALFUNCTION FOR AUTOMATIC
TRANSMISSION (ATTH) —****DTC DETECTING CONDITION:**

- Two consecutive trips with fault

TROUBLE SYMPTOM:

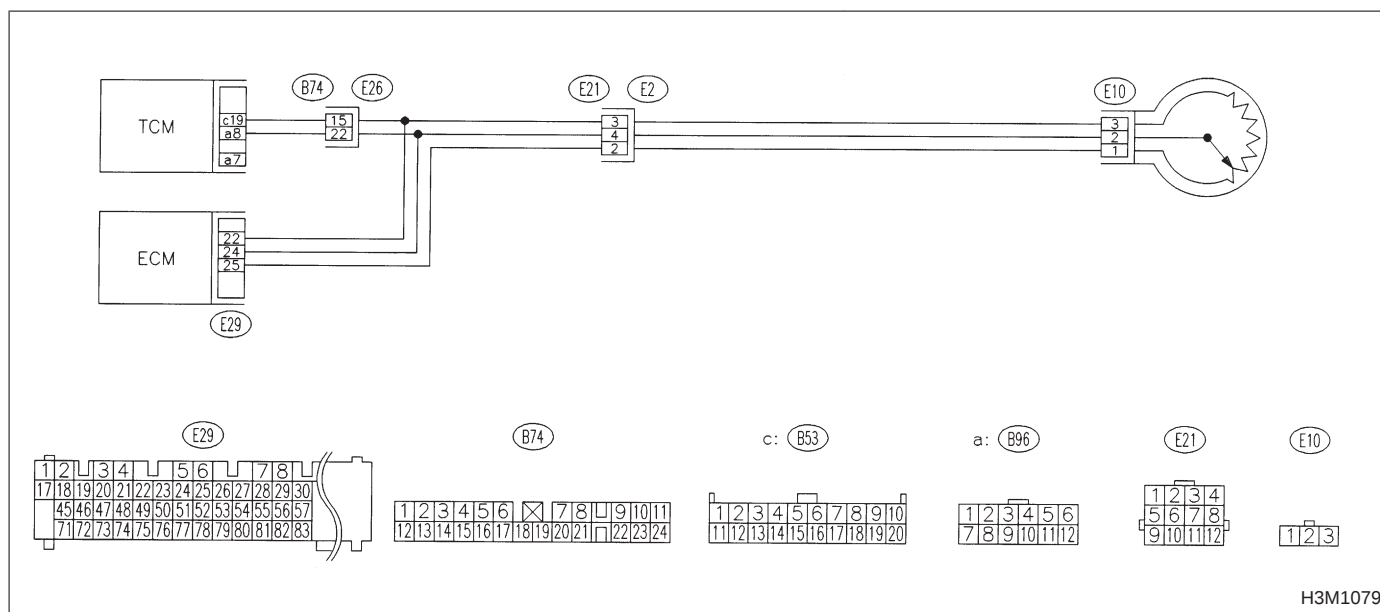
- Shift point too high or too low; engine brake not effected in “3” range; excessive shift shock; excessive tight corner “braking”

**CAUTION:**

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

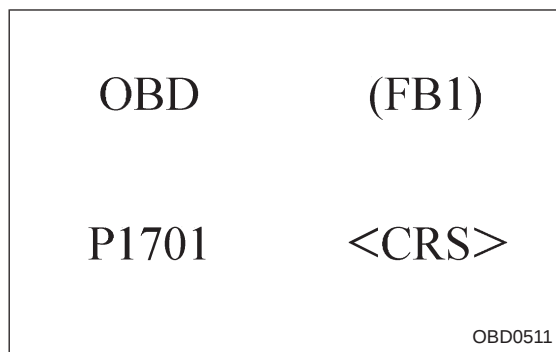
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:



NOTE:

For the diagnostic procedure on throttle position sensor circuit, refer to 3-2b [T7L0].

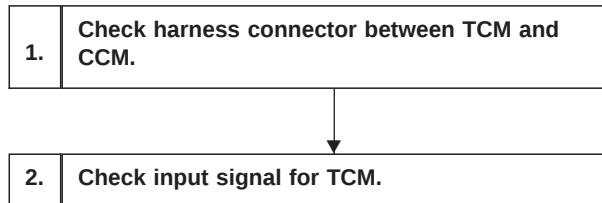


BJ: DTC P1701

**— CRUISE CONTROL SET SIGNAL CIRCUIT
MALFUNCTION FOR AUTOMATIC
TRANSMISSION (CRS) —**

DTC DETECTING CONDITION:

- Two consecutive trips with fault

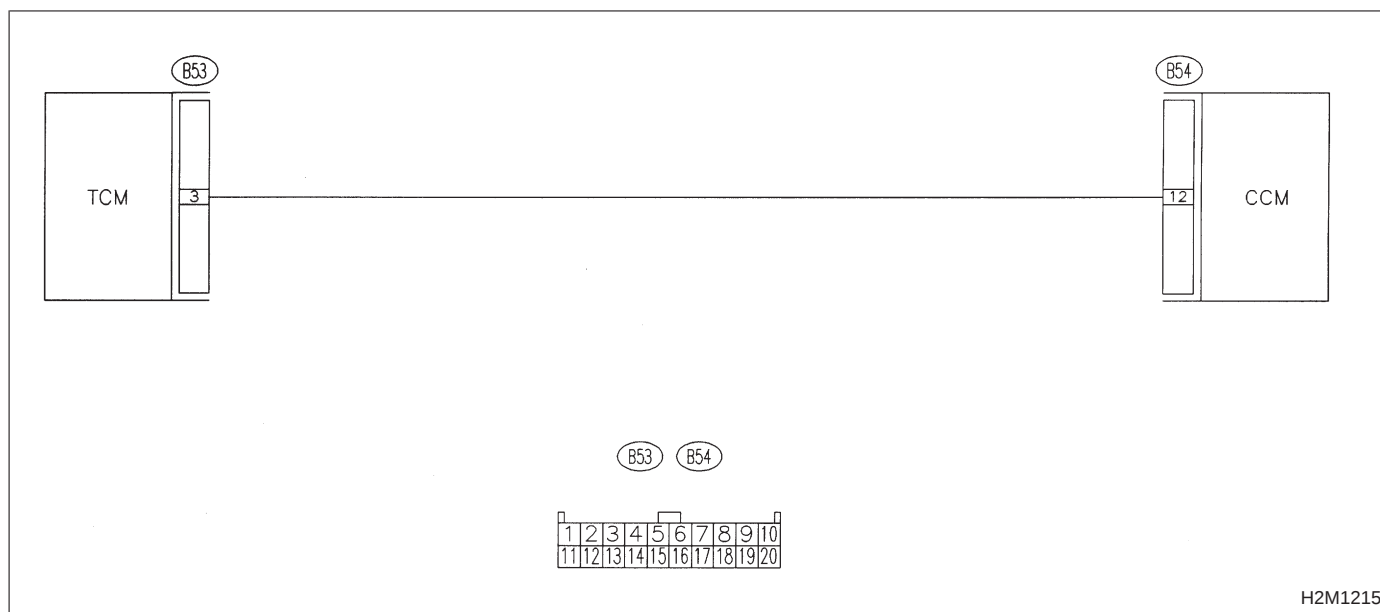


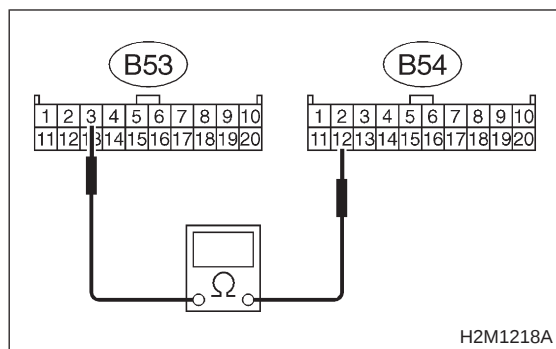
CAUTION:

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

<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:





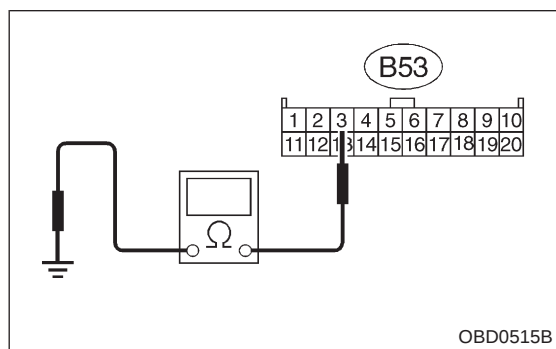
1. CHECK HARNESS CONNECTOR BETWEEN TCM AND CCM.

- 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**
(B53) No. 3 — (B54) No. 12 / 1 Ω , or less

YES : Go to next step.

NO : Repair open circuit of harness between TCM connector and CCM connector.

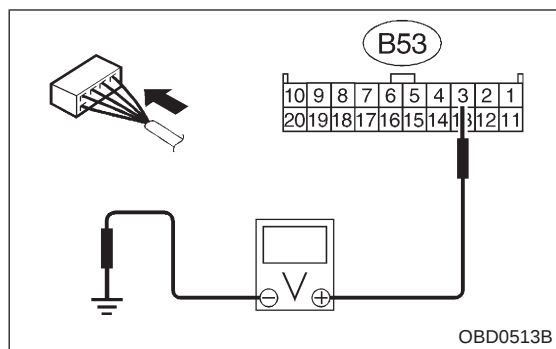


- 4) Measure resistance of harness connector between TCM and body.

CHECK : **Connector & terminal**
(B53) No. 3 — Body / 1 $M\Omega$, or more

YES : Go to step 2.

NO : Repair short circuit of harness between TCM connector and CCM connector.

**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) Move selector lever to "D" and slowly increase vehicle speed to 50 km/h (31 MPH).
- 6) Cruise control set switch to ON.
- 7) Measure voltage between TCM and body.

CHECK : **Connector & terminal**
(B53) No. 3 — Body / 1 V, or less

YES : Go to next **CHECK** .

NO : Check cruise control set circuit. <Ref. to 6-2 [T600].>

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

BK: DTC P1702**— AUTOMATIC TRANSMISSION DIAGNOSIS
INPUT SIGNAL CIRCUIT MALFUNCTION
(ATDIAG) —****DTC DETECTING CONDITION:**

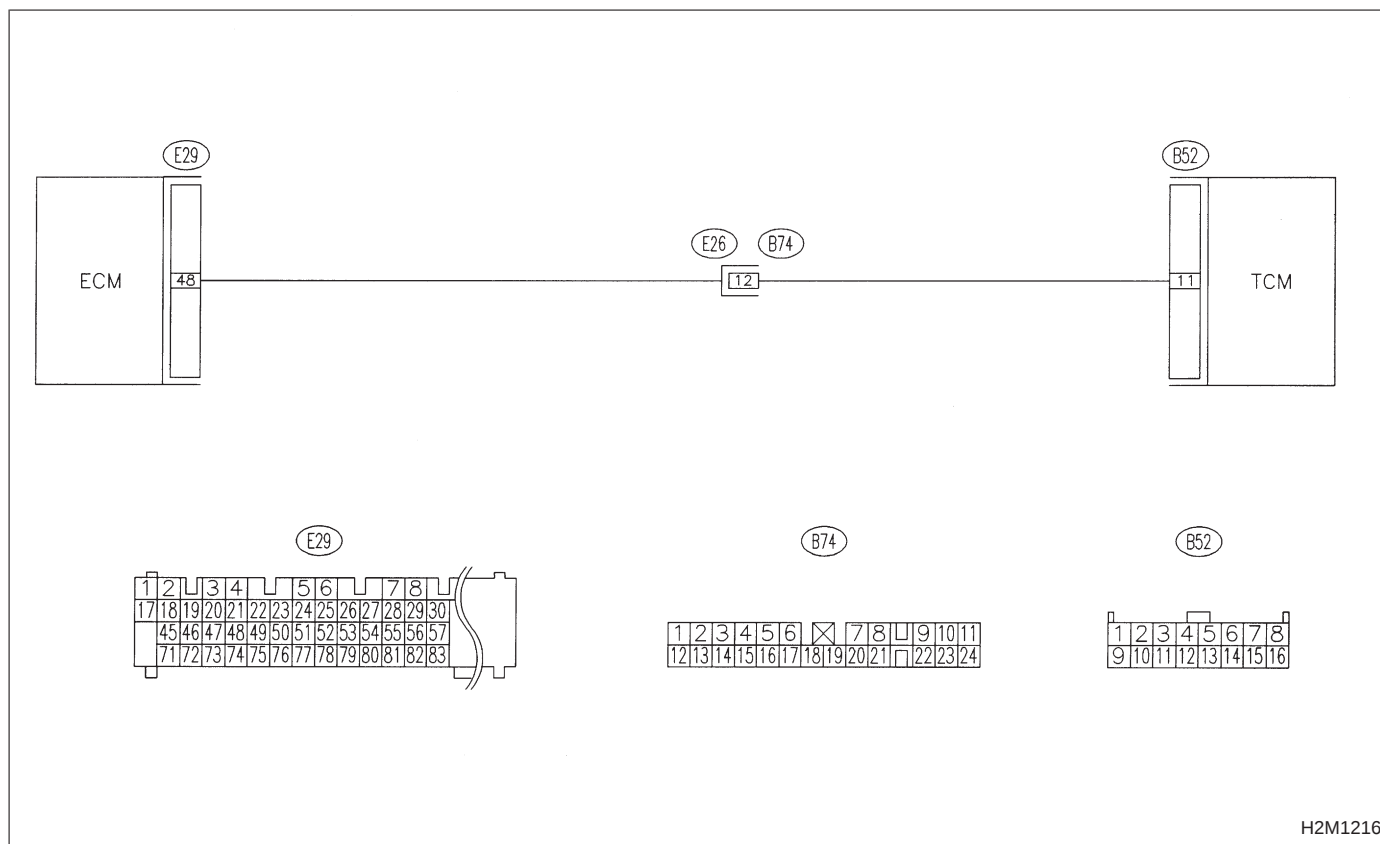
- Two consecutive trips with fault

1. Check harness connector.

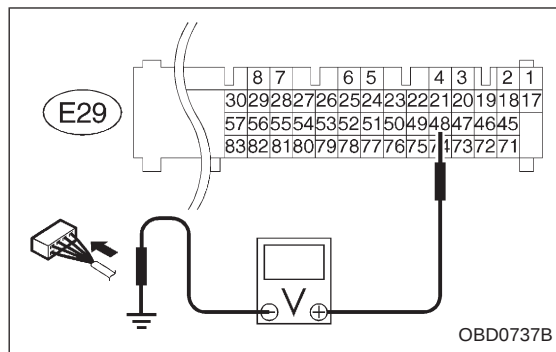
2. Check harness connector.

CAUTION:

After repair or replacement of faulty parts, conduct
CLEAR MEMORY and **INSPECTION MODES**.
<Ref. to 2-7b [T3D0] and [T3E0].>

WIRING DIAGRAM:

H2M1216



1 CHECK HARNESS CONNECTOR

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

CHECK : **Connector & terminal**
(E29) No. 48 — Body / 4 V, or more

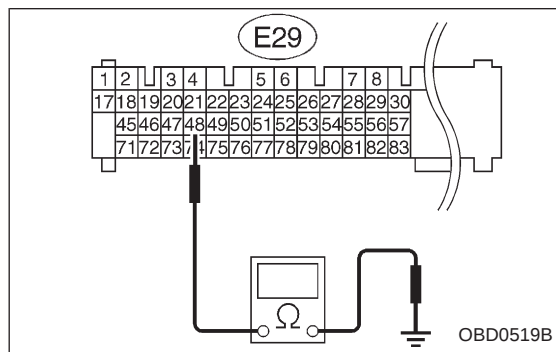
YES : ● Open circuit of harness between ECM connector and TCM connector
● Poor contact in ECM connector
● Poor contact in TCM connector
● Poor contact in coupling connector (B74)
Check the above and repair if necessary.

NO : Go to next **CHECK** .

CHECK : **Connector & terminal**
(B84) No. 48 — Body / 1 V, or less

YES : Go to step 2.

NO : Although MIL illuminates, circuit is now normal.
Check all connectors for possible poor contact between ECM connector and TCM connector.



2 CHECK HARNESS CONNECTOR.

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

CHECK : **Connector & terminal**
(E29) 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.

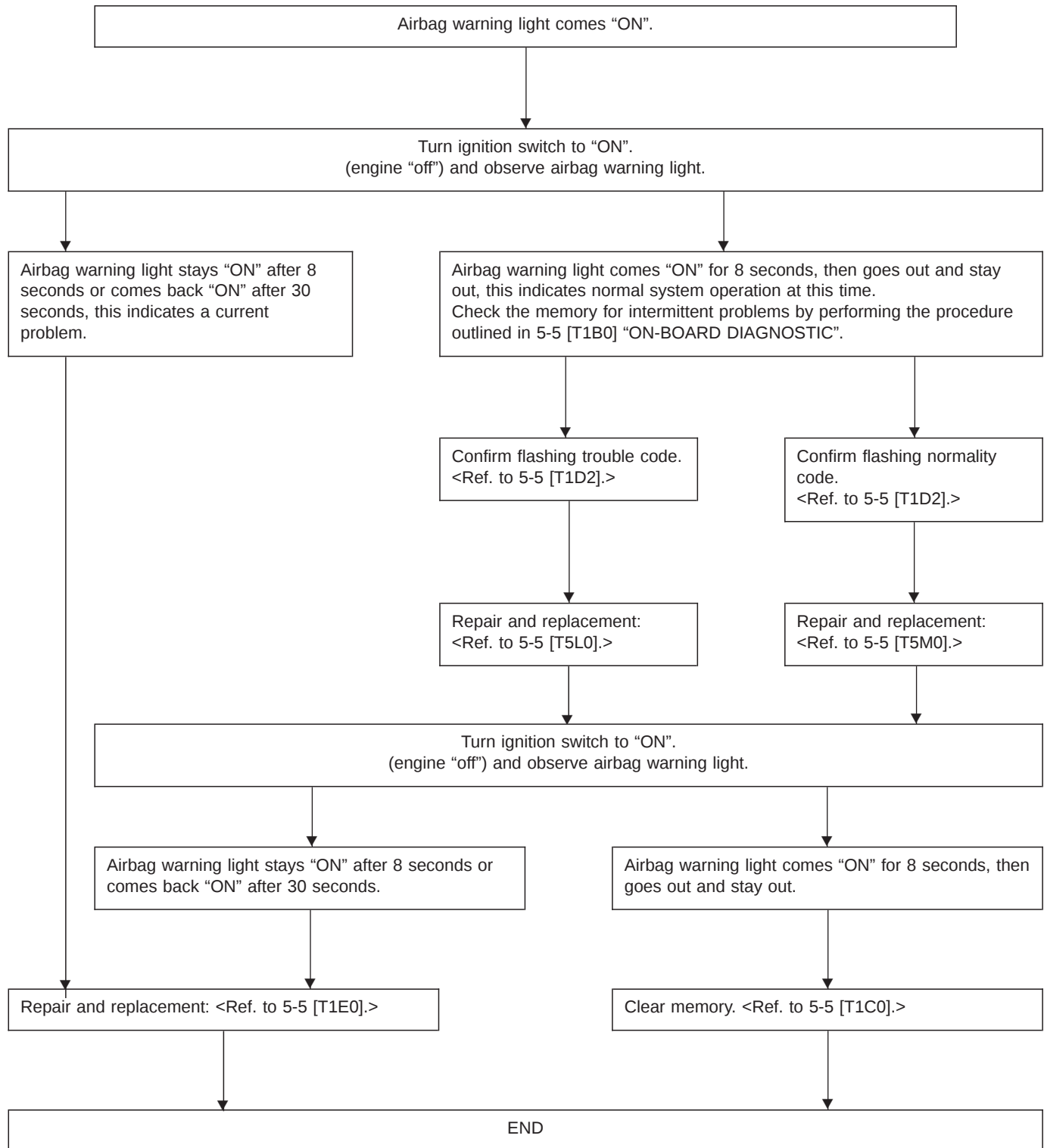
SUPPLEMENTAL RESTRAINT SYSTEM

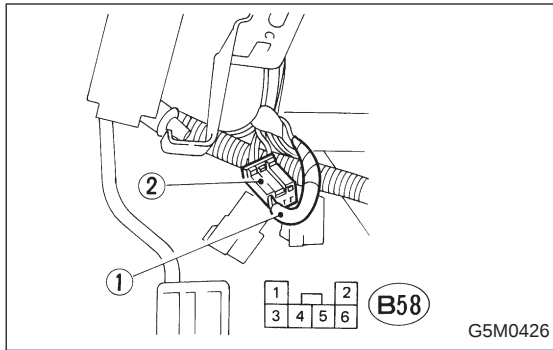
5-5

	Page
T DIAGNOSTICS	2
1. Diagnostics Chart for On-board Diagnostic System.....	2
2. Diagram of SRS Airbag	9
3. Wiring Location	10
4. Test Harnesses and Airbag Resistor	11
5. Diagnostics Chart with Trouble Code	15

1. Diagnostics Chart for On-board Diagnostic System

A: BASIC DIAGNOSTICS PROCEDURE



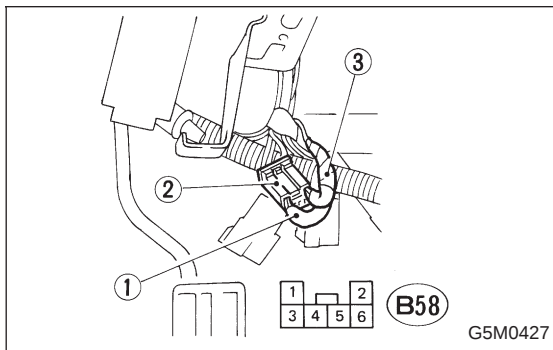


B: ON-BOARD DIAGNOSTIC

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, contact 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.

D: LIST OF TROUBLE CODES**1. TROUBLE CODES**

Trouble code/Contents of troubles	Memory function	Contents of diagnosis	Page
04	Provided.	1) Airbag main harness circuit is shorted. 2) Airbag module harness (Ps) circuit is shorted. 3) Airbag control module is faulty.	16
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.	17
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.	19
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.	20
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) (AB6) is not connected properly to airbag control module.	21
21	Provided.	Airbag control module is faulty.	23
22	Provided.	1) Airbag main harness circuit is open. 2) Airbag module harness (Ps) circuit is open. 3) Airbag control module is faulty.	24
34	Provided.	1) Airbag main harness circuit (Ps) is shorted to power supply. 2) Airbag module harness (Ps) is shorted to power supply. 3) Airbag control module is faulty.	25
41	Provided.	1) Airbag main harness circuit (Dr) is shorted to ground. 2) Airbag module harness circuit (Dr) is shorted to ground. 3) Roll connector circuit is shorted to ground. 4) Airbag control module is faulty.	26
42	Provided.	1) Airbag main harness circuit (Ps) is shorted to ground. 2) Airbag module harness circuit (Ps) is shorted to ground. 3) Airbag control module is faulty.	27
43	Provided.	1) Airbag main harness circuit (Dr) is shorted to power supply. 2) Airbag module harness (Dr) is shorted to power supply. 3) Roll connector is shorted to power supply. 4) Airbag control module is faulty.	28
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 (B39) are not connected properly.	29
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.	32
Warning light indicates trouble code, then normality code.	Flashing trouble code.	Provided.	Airbag system component parts are faulty.	34
	Flashing normality 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.	37

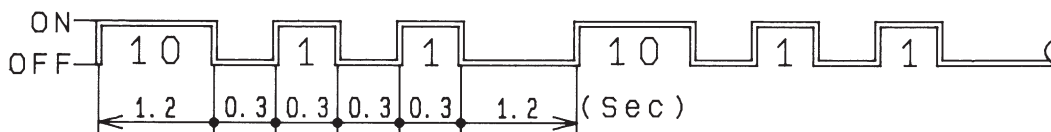
2. HOW TO READ TROUBLE CODES

The AIRBAG warning light flashes a code corresponding to the faulty parts.

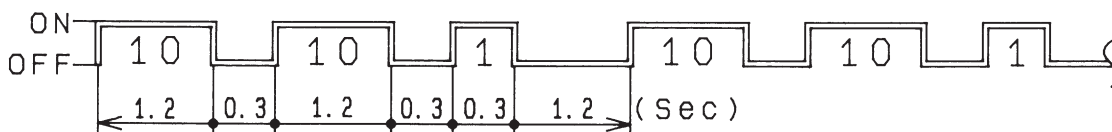
The long segment (1.2 sec on) indicates a "ten", and the short segment (0.3 sec on) indicates a "one".

Example :

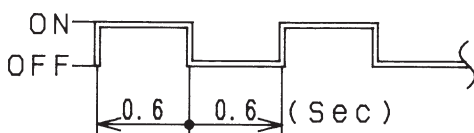
Flashing
code 12:



Flashing
code 21:



Flashing
normality
code:



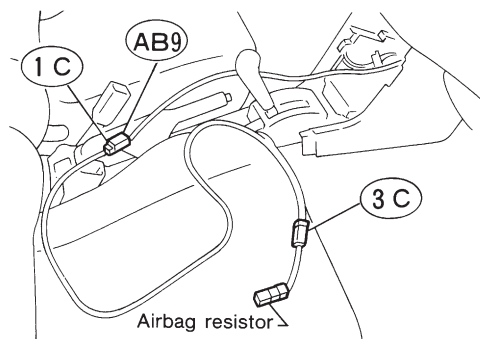
G5M0428

E: DIAGNOSTICS PROCEDURE

Airbag warning light stays on after 8 seconds.

- 1) Perform on-board diagnostic. <Ref. to 5-5 [T1B0].>
- 2) Are trouble codes 4, 12, 13, 22, 34, 41, 42 or 43 indicated? <Ref. to 5-5 [T1D1].> <Ref. to 5-5 [T1D2].>
Record trouble codes. If "YES" proceed to step 4). If "NO" proceed to step 3).
- 3) Proceed with diagnostics and repair according to trouble code indicated then perform step 15).
- 4) If codes 4, 22, 34, 42 are indicated, proceed to step 5). If codes 4, 22, 34, 42 are not indicated, proceed to step 10).
- 5) If codes 12, 13, 41, 43 are indicated, proceed to step 6). If codes 12, 13, 41, 43 are not indicated, proceed to step 11).

- 6) Turn ignition switch "OFF", disconnect battery ground cable, and wait 20 seconds. Disconnect passenger side airbag module connector (AB9) to (AB10). Connect test harness C connector (1C) to (AB9).
Connect airbag resistor to test harness C connector (3C).



G5M0589

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).

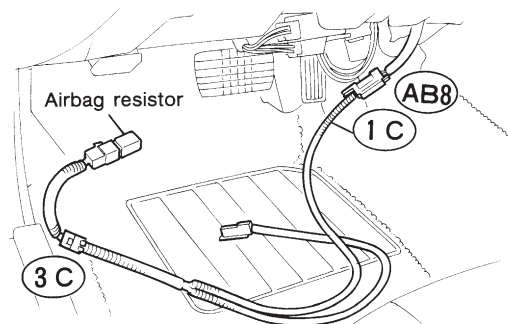
Connect battery ground cable and turn ignition switch "ON".

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.)

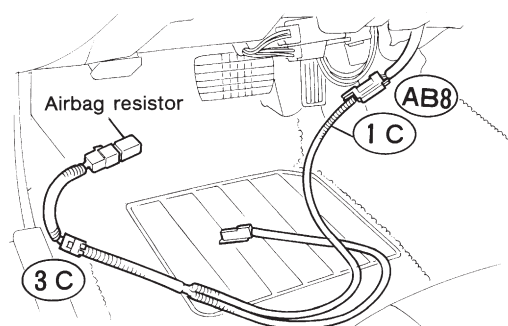
If "YES" proceed to step 7).

If "NO" proceed to step 3).



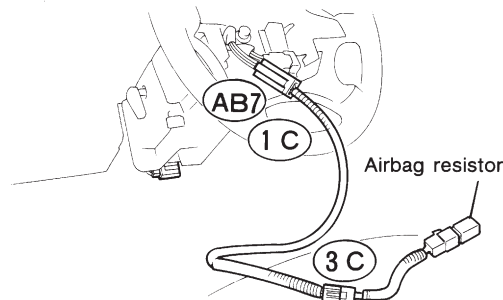
G5M0429

- 7) Turn ignition switch "OFF", disconnect battery ground cable, and wait 20 seconds. Connect passenger side airbag module connector (AB9) to (AB10). Connect 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 8).
If "NO" proceed to step 13).



G5M0429

- 8) Turn ignition switch "OFF", disconnect battery ground cable, and wait 20 seconds. Connect connector (AB8) to (AB3). Remove driver side airbag module and connect test harness C connector (1C) to (AB7). <Ref. to 5-5 [W2A1].>
Connect airbag resistor to test harness C connector (3C). Connect 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 note 1) and 2). (Refer to end of chart.)
If "YES" proceed to step 9).
If "NO" proceed to step 14).



G5M0430

1. Diagnostics Chart for On-board Diagnostic System

9) Turn ignition switch "OFF", disconnect battery ground cable, and wait 20 seconds. Replace with a new driver side airbag module. <Ref. to 5-5 [W2A1].> Proceed to step 15).

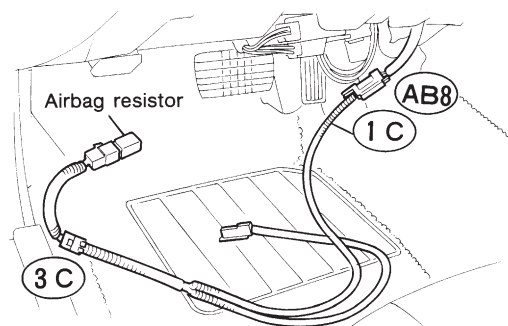
10) Turn ignition switch "OFF", disconnect battery ground cable, and wait 20 seconds. Remove lower cover panel and connect test harness C connector (1C) to (AB8) <Ref. to 5-4 [W1A0].> with airbag resistor attached to test harness C connector (3C).

Connect 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 8).

If "NO" proceed to step 3).



G5M0429

11) Turn ignition switch "OFF", disconnect battery ground cable, and wait 20 seconds. Disconnect passenger side airbag module connector (AB9) to (AB10).

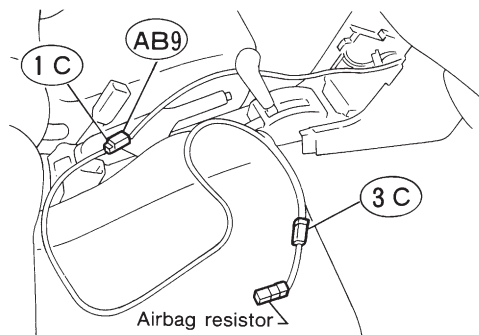
Connect test harness C connector (1C) to (AB9). Connect airbag resistor to test harness C connector (3C).

Connect 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 12).

If "NO" proceed to step 3).



G5M0589

12) Turn ignition switch "OFF", disconnect battery ground cable, and wait 20 seconds. Replace with a new passenger side airbag module <Ref. to 5-5 [W2A2].> then proceed to step 15).

13) Turn ignition switch "OFF", disconnect battery ground cable and wait 20 seconds. Replace with a new passenger side airbag module <Ref. to 5-5 [W2A2].> then proceed to step 7).

14) Turn ignition switch "OFF", disconnect battery ground cable, and wait 20 seconds. Replace with a new combination switch, <Ref. to 5-5 [W5A0].> and install driver side airbag module <Ref. to 5-5 [W2A1].>.

Connect 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 16).

If "NO" proceed to step 9).

15) Connect 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 16).

If "NO" proceed to step 1).

16) Perform clear memory procedure. <Ref. to 5-5 [T1C0].>

If memory cannot be cleared, another trouble code exists. Return to step 1).

If memory can be cleared, proceed to step 17).

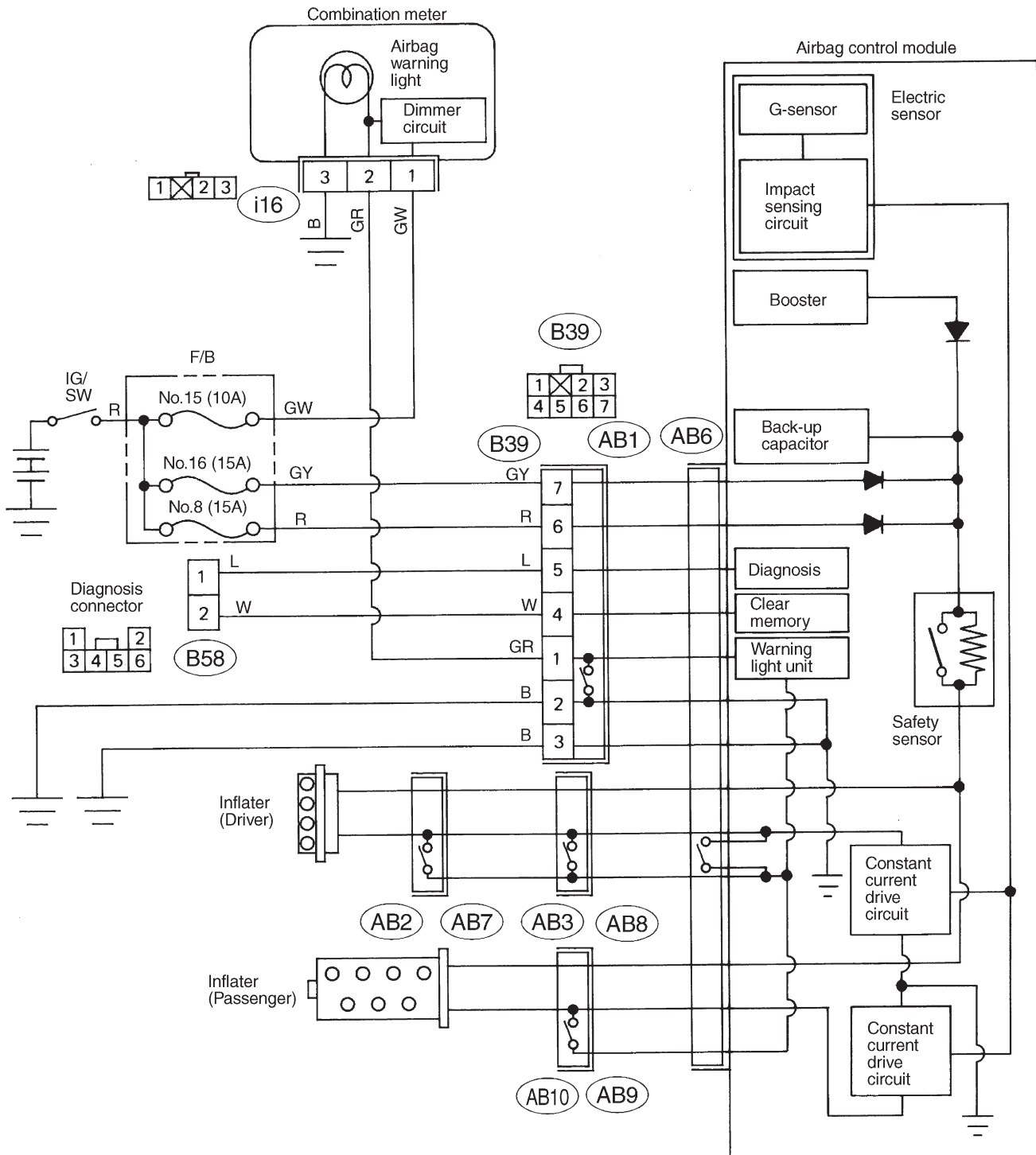
17) END

NOTES:

1) Always remember to secure the green double locks before turning the ignition switch "ON".

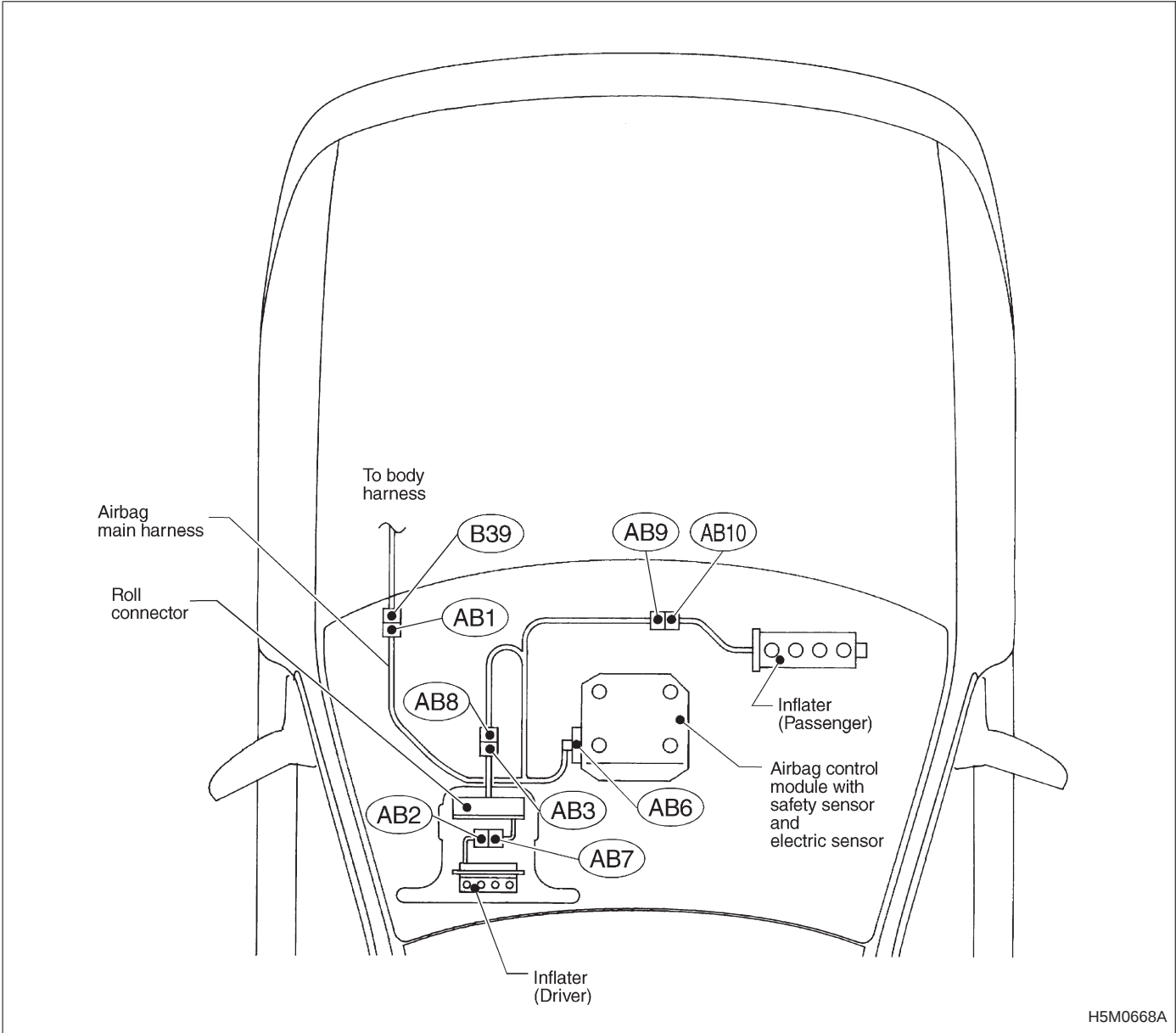
2) In some cases the airbag warning light will go "OFF" after 8 seconds but will turn "ON" again within 30 seconds. In this case continue diagnostics with the basic diagnostics procedures or trouble code procedures.

2. Diagram of SRS Airbag



H5M0667A

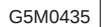
3. Wiring Location



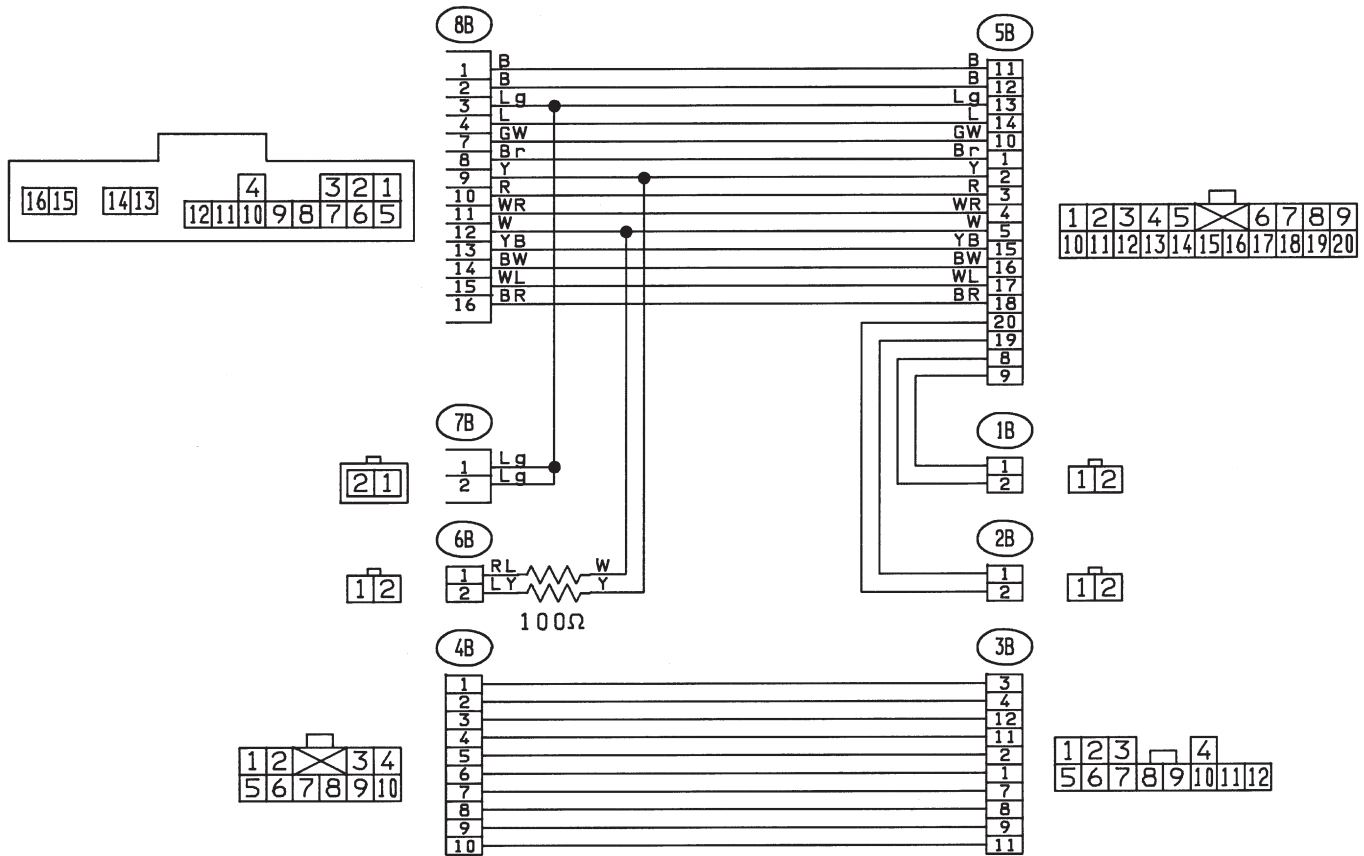
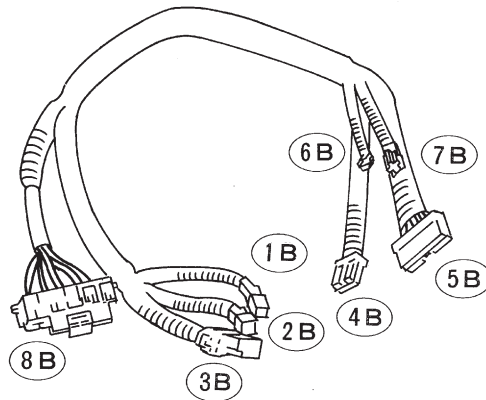
H5M0668A

Connector No.	(AB1)	(AB2)	(AB3)	(AB6)	(AB7)	(AB8)	(AB9)	(AB10)
Pole	7	3	3	12	3	3	3	3
Color	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Male/Female	Male	Female	Female	Female	Male	Male	Male	Female

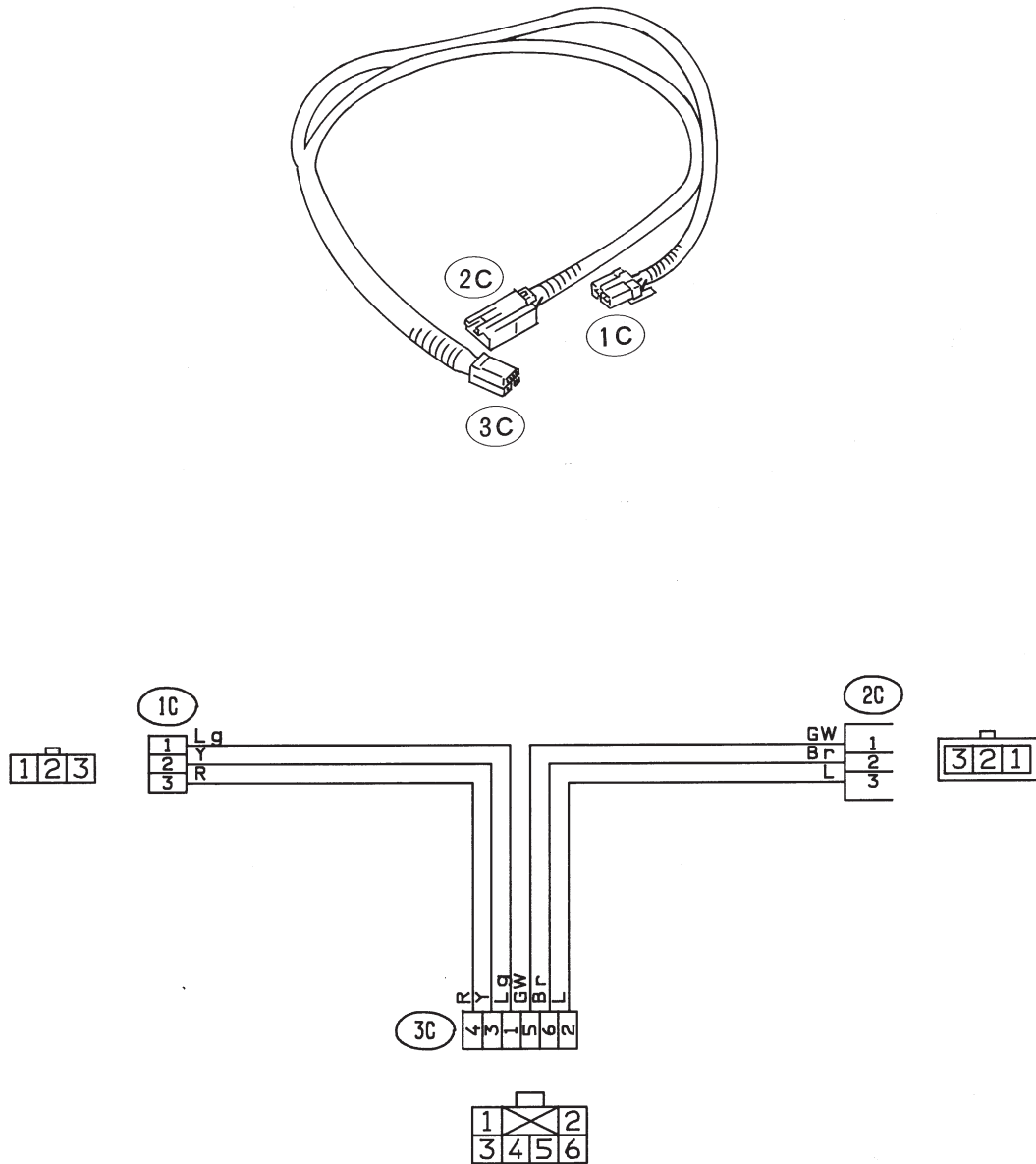
A: TEST HARNESS A (PN98299PA000)



B: TEST HARNESS B (PN98299PA010)



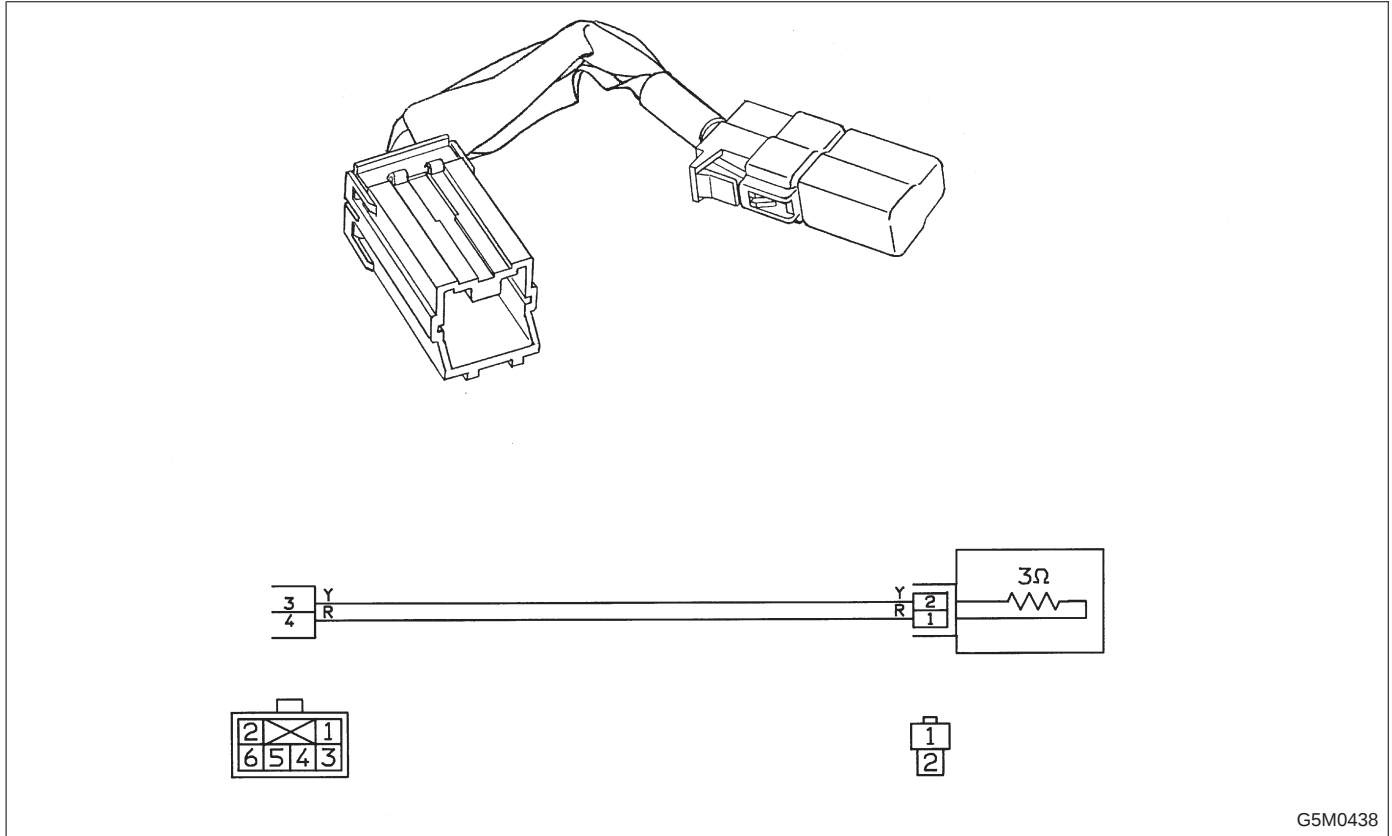
C: TEST HARNESS C (PN98299PA020)



G5M0437

D: AIRBAG RESISTOR (PN98299PA040)

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.



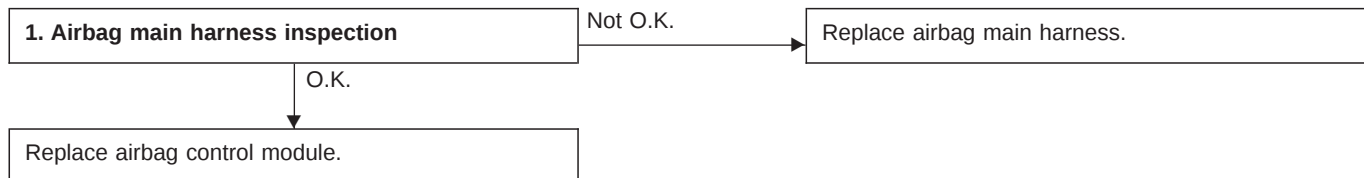
5. Diagnostics Chart with Trouble Code

Trouble code/Contents of troubles		Memory function	Contents of diagnosis	Page
04		Provided.	1) Airbag main harness circuit is shorted. 2) Airbag module harness (Ps) circuit is shorted. 3) Airbag control module is faulty.	16
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.	17
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.	19
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.	20
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) (AB6) is not connected properly to airbag control module.	21
21		Provided.	Airbag control module is faulty.	23
22		Provided.	1) Airbag main harness circuit is open. 2) Airbag module harness (Ps) circuit is open. 3) Airbag control module is faulty.	24
34		Provided.	1) Airbag main harness circuit (Ps) is shorted to power supply. 2) Airbag module harness (Ps) is shorted to power supply. 3) Airbag control module is faulty.	25
41		Provided.	1) Airbag main harness circuit (Dr) is shorted to ground. 2) Airbag module harness circuit (Dr) is shorted to ground. 3) Roll connector circuit is shorted to ground. 4) Airbag control module is faulty.	26
42		Provided.	1) Airbag main harness circuit (Ps) is shorted to ground. 2) Airbag module harness circuit (Ps) is shorted to ground. 3) Airbag control module is faulty.	27
43		Provided.	1) Airbag main harness circuit (Dr) is shorted to power supply. 2) Airbag module harness (Dr) is shorted to power supply. 3) Roll connector is shorted to power supply. 4) Airbag control module is faulty.	28
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 (B39) are not connected properly.	29
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.	32
Warning light indicates trouble code, then normality code.	Flashing trouble code.	Provided.	Airbag system component parts are faulty.	34
	Flashing normality 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.	37

NOTE: Dr: Driver side Ps: Passenger side

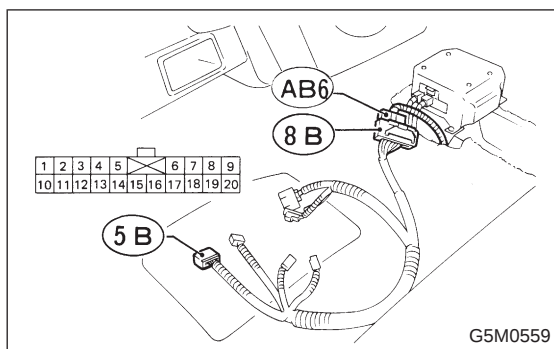
A: TROUBLE CODE 04**DIAGNOSIS:**

- 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 (AB6) to test harness-B connector (8B).

2) Measure resistance between test harness-B connector (5B) terminals.

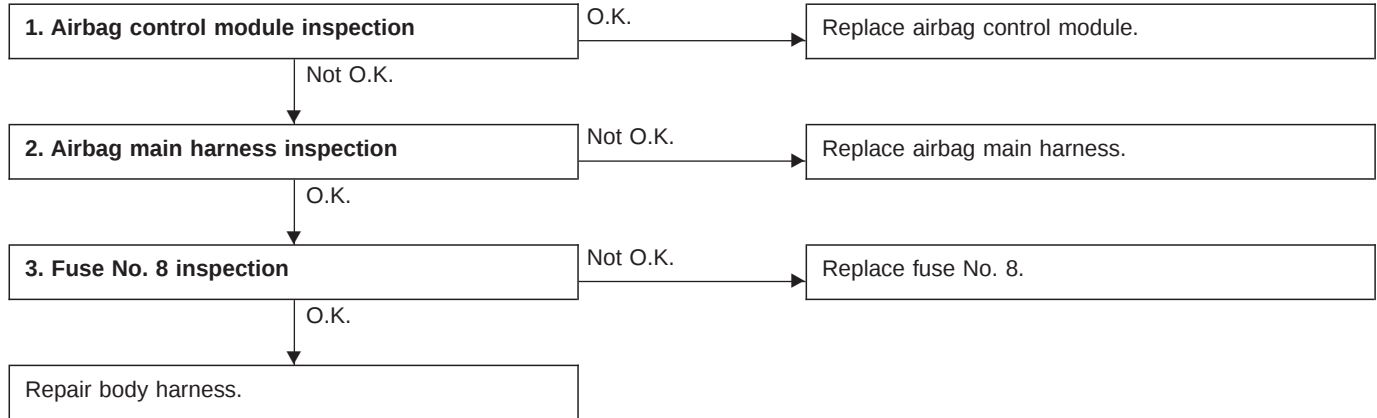
(5B) Terminal / Specified resistance:

No. 6 — No. 7 / 10 kΩ, or more

B: TROUBLE CODE 11

DIAGNOSIS:

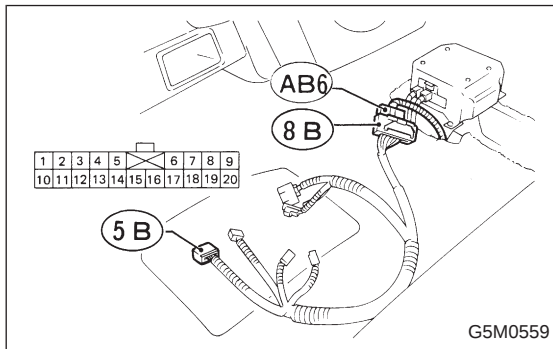
- Airbag control module is faulty.
- Airbag main harness circuit is open.
- Fuse No. 8 is blown.
- Body harness circuit is open.



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).



Test harness B-PN98299PA010

1. AIRBAG CONTROL MODULE INSPECTION

1) Disconnect connector (AB6) from airbag control module <Ref. to 5-5 [W5A0].> and connect it to test harness-B connector (8B).

2) Connect battery ground cable and turn ignition switch “ON”. (engine off)

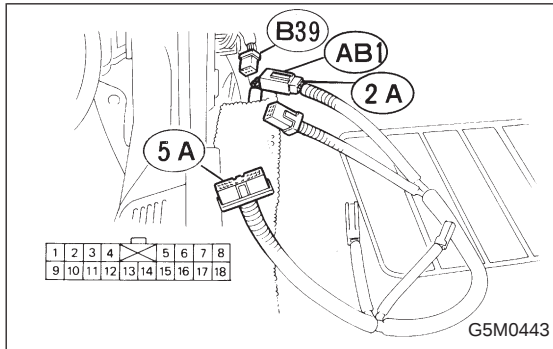
3) Measure voltage across connector (5B) terminal and body.

(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.



Test harness A-PN98299PA000

- 3) Disconnect bulk harness connector (B39) 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-B connector (5B) terminal.

Connector & terminal / Specified resistance:

(5A) No. 1 — (5B) No. 2 / 10 Ω , or less

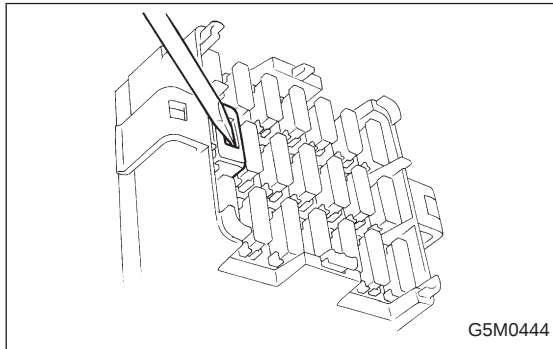
- 5) Measure resistance between terminals of connectors (5A) and (5B).

(5A) Terminal / Specified resistance:

No. 1 — Body / 10 k Ω , or more

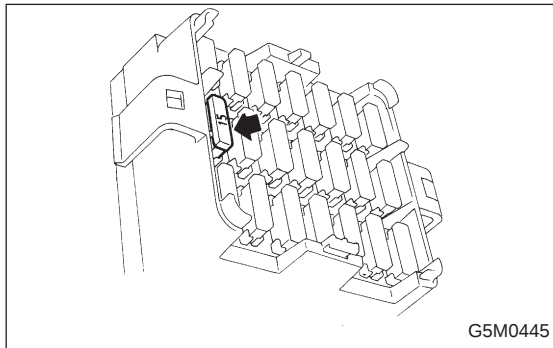
(5B) Terminal / Specified resistance:

No. 2 — Body / 10 k Ω , or more



3. FUSE NO. 8 INSPECTION

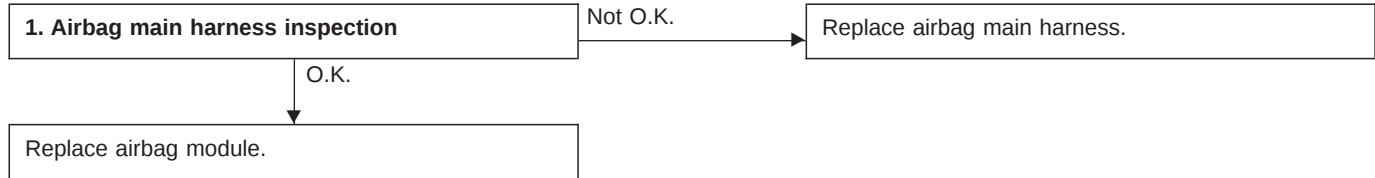
- 1) Turn ignition switch "OFF", and remove airbag fuse protector.



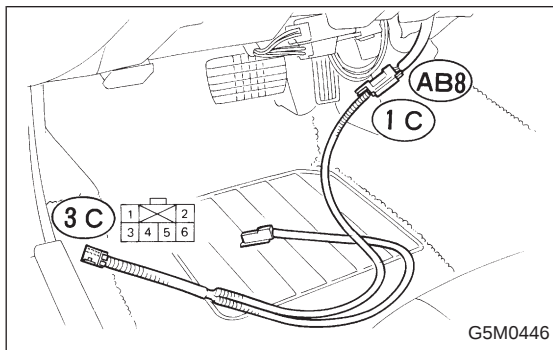
- 2) Remove and visually check fuse No. 8.

C: TROUBLE CODE 12**DIAGNOSIS:**

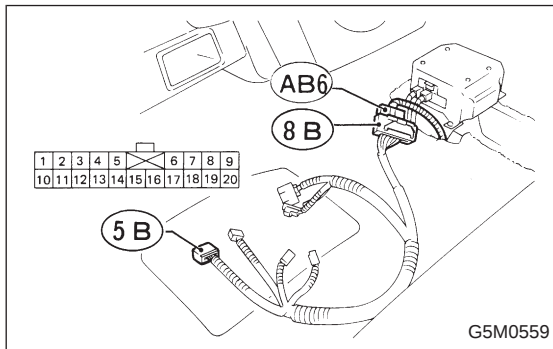
- Airbag main harness circuit is open.
- Airbag module harness circuit is open.
- Roll connector circuit is open.
- Airbag control module is faulty.

**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 [W5A0].> from airbag control module, and connect it to test harness-B connector (8B) terminal.

3) Measure resistance between test harness-B connector (5B) and test harness-C connector (3C) terminals.

Connector & terminal / Specified resistance:

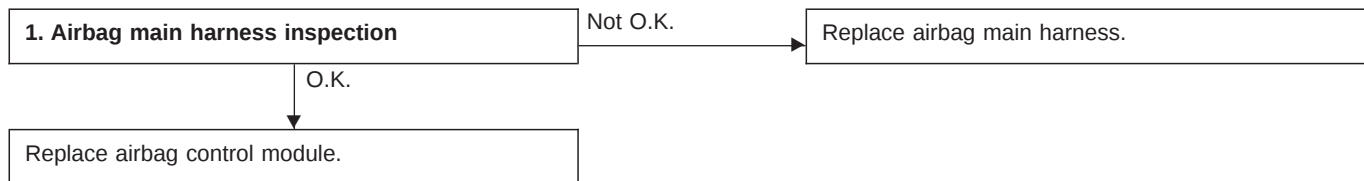
(5B) No. 14 — (3C) No. 2 / 10 Ω, or less

(5B) No. 1 — (3C) No. 3 / 10 Ω, or less

Test harness B-PN98299PA010
Test harness C-PN98299PA020

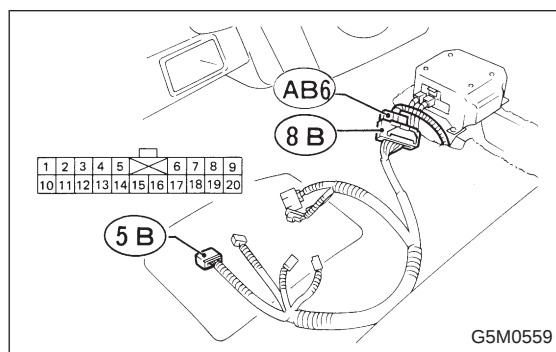
D: TROUBLE CODE 13**DIAGNOSIS:**

- Airbag main harness circuit is shorted.
- Airbag module harness 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).

**1. AIRBAG MAIN HARNESS INSPECTION**

1) Disconnect connector (AB6) from airbag control module <Ref. to 5-5 [W5A0].>, and connect it to test harness-B connector (8B).

2) Measure resistance between test harness-B connector (5B) terminals.

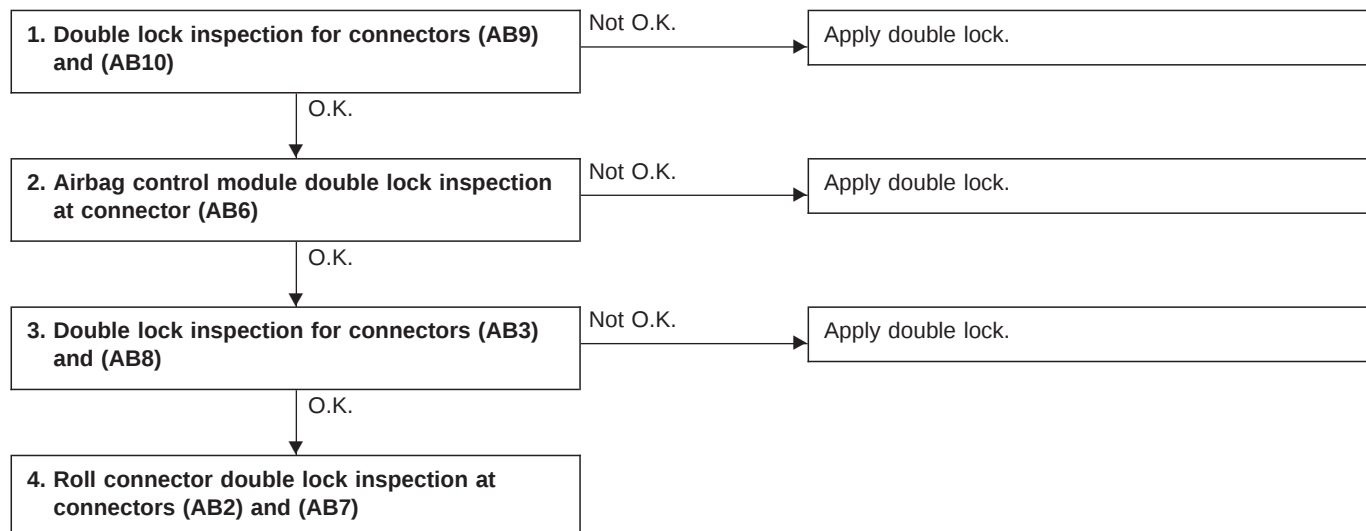
(5B) Terminal / Specified resistance:

No. 1 — No. 14 / 10 kΩ, or more

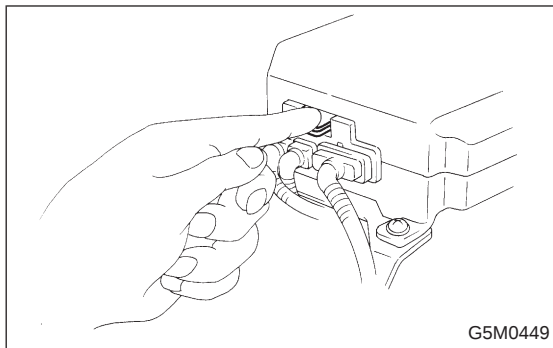
Test harness B-PN98299PA010

E: TROUBLE CODE 14**DIAGNOSIS:**

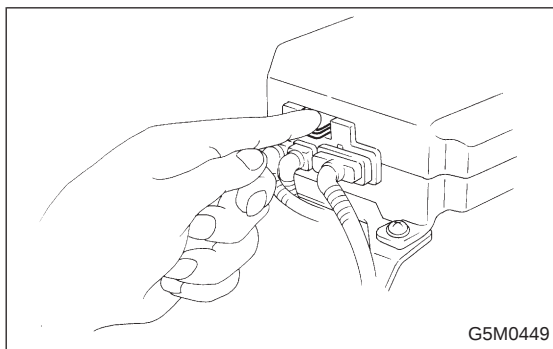
- (AB9) and (AB10) are not connected properly.
- (AB2) and (AB7) are not connected properly.
- (AB3) and (AB8) are not connected properly.
- (AB6) is not connected properly to airbag control module.

**CAUTION:**

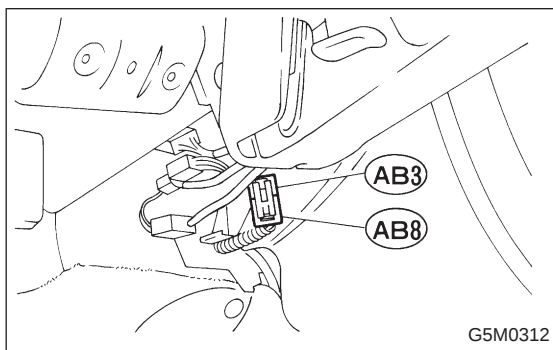
Before performing diagnostics on airbag system, turn ignition switch "OFF", disconnect battery ground cable and then wait at least 20 seconds.

**1. AIRBAG CONTROL MODULE DOUBLE LOCK INSPECTION AT CONNECTORS (AB4) (AB5) (AB6)**

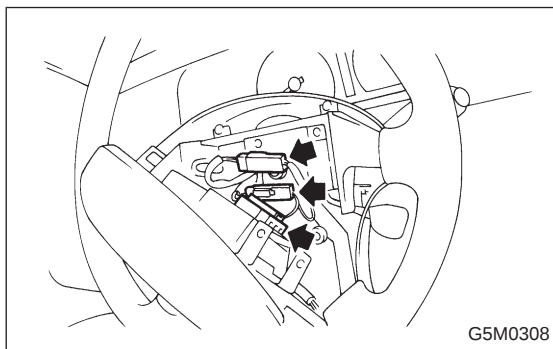
1) Check double lock of connectors (AB4) (AB5) (AB6) connected to airbag control module. <Ref. to 5-5 [W5A0].>

**2. AIRBAG CONTROL MODULE DOUBLE LOCK INSPECTION AT CONNECTOR (AB6)**

1) Check double lock of connector (AB6) connected to airbag control module. <Ref. to 5-5 [W5A0].>

**3. DOUBLE LOCK INSPECTION FOR CONNECTORS (AB3) AND (AB8) BELOW STEERING COLUMN**

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)**

1) Remove airbag module <Ref. to 5-5 [W2A0].>, and check double lock of connectors (AB2) and (AB7) at roll connector.

F: TROUBLE CODE 21**DIAGNOSIS:**

- Airbag control module is faulty.

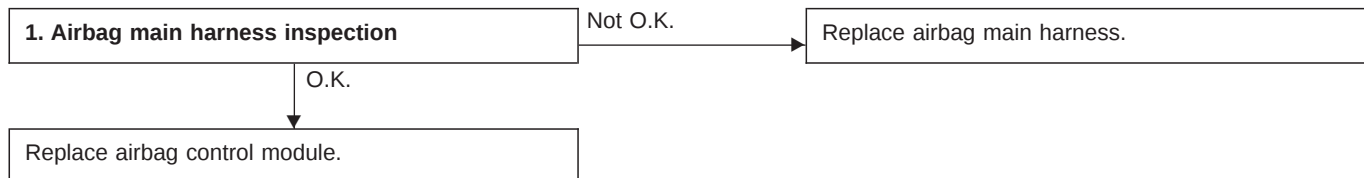
Replace airbag control module.

CAUTION:

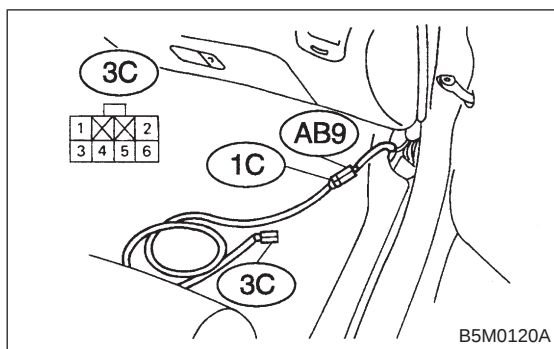
Before performing diagnostics on airbag system, turn ignition switch “OFF”, disconnect battery ground terminal, and then wait at least 20 seconds.

G: TROUBLE CODE 22**DIAGNOSIS:**

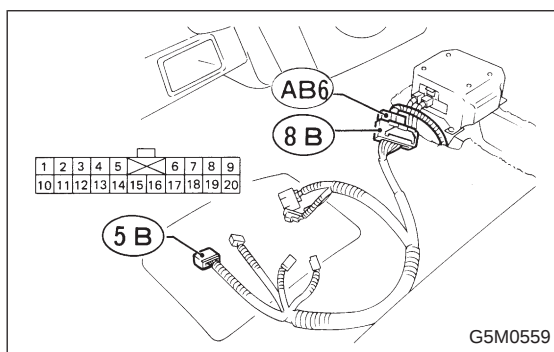
- Airbag main harness circuit is open.
- Airbag module harness (Passenger) circuit is open.
- Airbag control module is faulty.

**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 [C700].>, 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 (AB6) to test harness-B connector (8B) terminal.

3) Measure resistance between test harness-B connector (5B) and test harness C connector (3C) terminals.

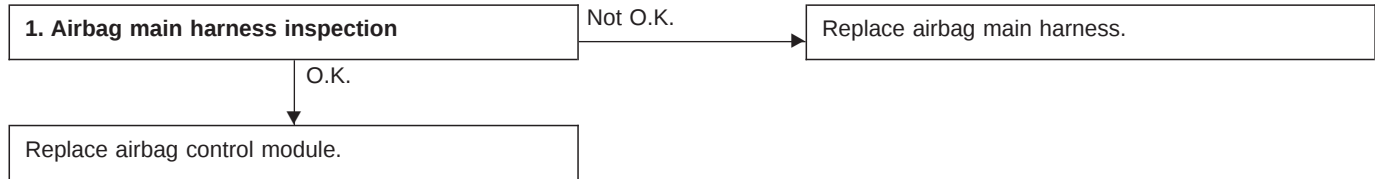
Connector & terminal / Specified resistance:

(5B) No. 6 — (3C) No. 4 / 10 Ω, or less

(5B) No. 7 — (3C) No. 3 / 10 Ω, or less

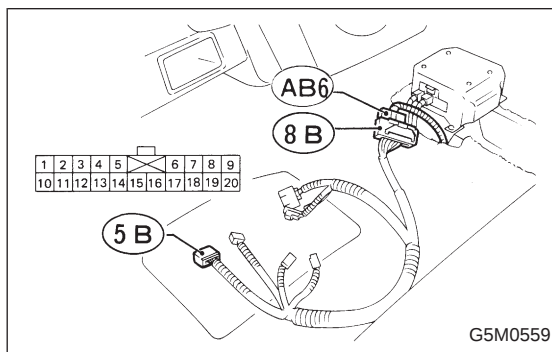
H: TROUBLE CODE 34**DIAGNOSIS:**

- Airbag main harness circuit (Passenger) is shorted to power supply.
- Airbag module harness (Passenger) 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. AIRBAG MAIN HARNESS INSPECTION**

1) Disconnect connector (AB6) from airbag control module <Ref. to 5-5 [W5A0].>, and connect it to test harness-B connector (8B).

2) Connect battery ground cable and turn ignition switch "ON" (engine off).

3) Measure voltage across each test harness-B connector (5B) terminal and body.

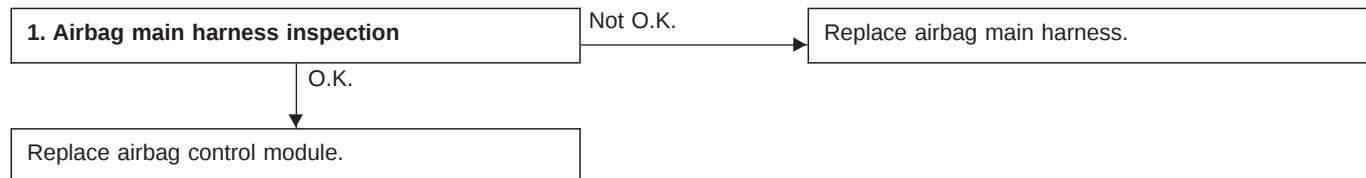
(5B) Terminals / Specified voltage:

No. 6 — Body / 1 V, or less

No. 7 — Body / 1 V, or less

I: TROUBLE CODE 41**DIAGNOSIS:**

- Airbag main harness circuit (Driver) is shorted to ground.
- Airbag module harness circuit (Driver) is shorted to ground.
- Roll connector circuit is shorted to ground.
- 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

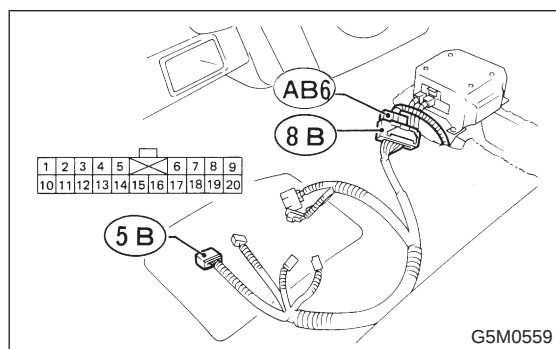
1) Disconnect connector (AB6) from airbag control module <Ref. to 5-5 [W5A0].>, and connect it to test harness-B connector (8B).

2) Measure resistance between test harness-B connector (5B) terminals and body.

(5B) Terminal / Specified resistance:

No. 1 — Body / 200 Ω, or more

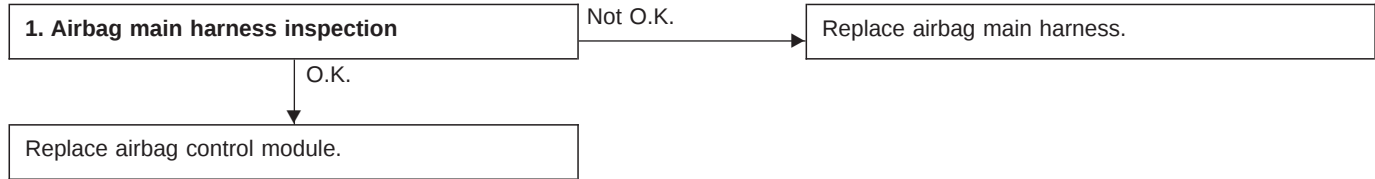
No. 14 — Body / 200 Ω, or more



J: TROUBLE CODE 42

DIAGNOSIS:

- Airbag main harness circuit (Passenger) is shorted to ground.
- Airbag module harness circuit (Passenger) is shorted to ground.
- 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

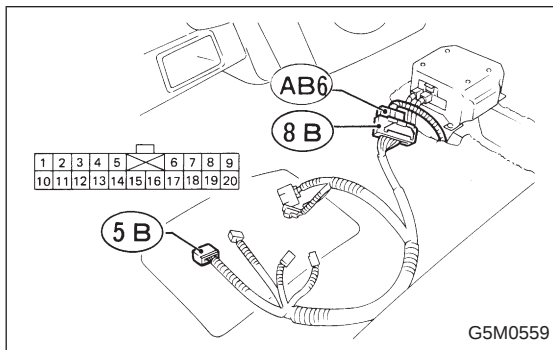
1) Disconnect connector (AB6) from airbag control module <Ref. to 5-5 [W5A0].>, and connect it to test harness-B connector (8B).

2) Measure resistance between test harness-B connector (5B) terminals and body.

(5B) Terminal / Specified resistance:

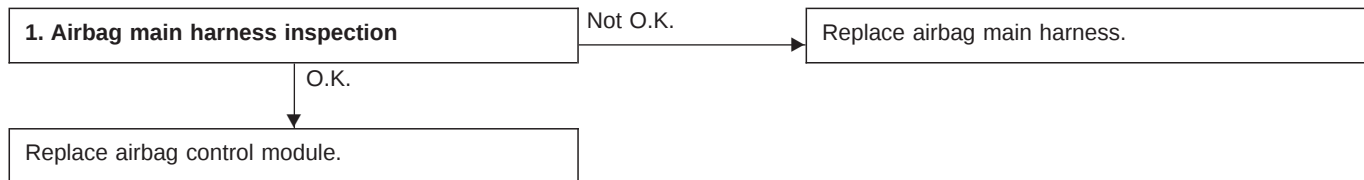
No. 6 — Body / 200 Ω, or more

No. 7 — Body / 200 Ω, or more



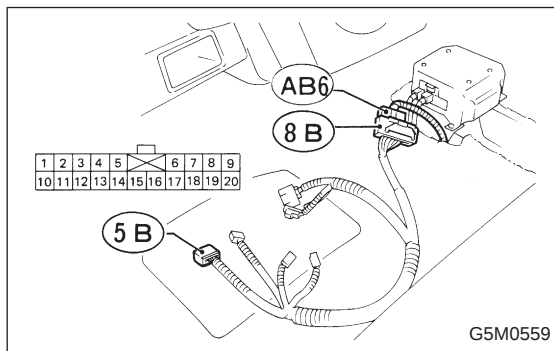
K: TROUBLE CODE 43**DIAGNOSIS:**

- Airbag main harness circuit (Driver) is shorted to power supply.
- Airbag module harness (Driver) is shorted to power supply.
- 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. AIRBAG MAIN HARNESS INSPECTION**

1) Disconnect connector (AB6) from airbag control module <Ref. to 5-5 [W5A0].>, and connect it to test harness-B connector (8B).

2) Connect battery ground cable and turn ignition switch "ON" (engine off).

3) Measure voltage across each test harness-B connector (5B) terminal and body.

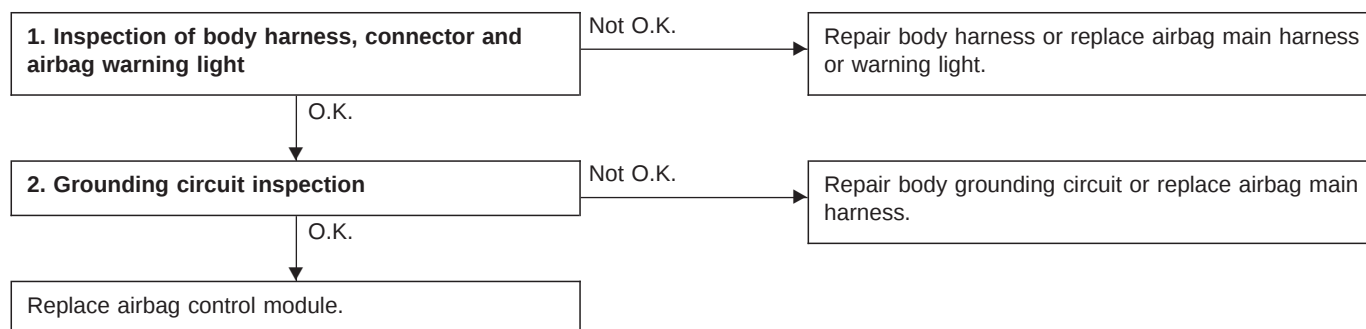
(5B) Terminals / Specified voltage:

No. 1 — Body / 1 V, or less

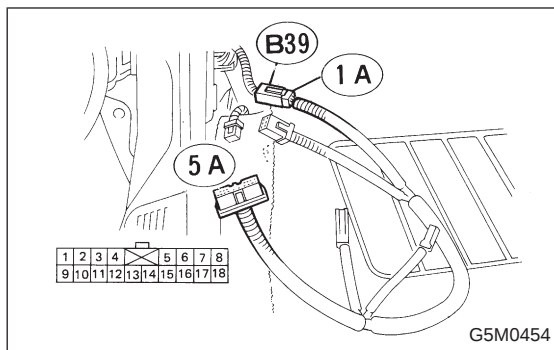
No. 14 — Body / 1 V, or less

L: 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 (B39) are not connected properly.

**CAUTION:**

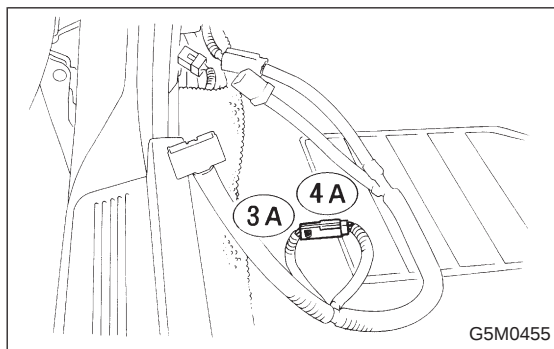
Before performing diagnostics on airbag system, turn ignition switch "OFF", disconnect battery ground cable and then wait at least 20 seconds.



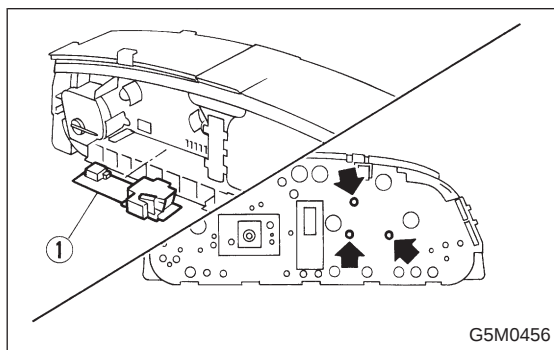
1. INSPECTION OF BODY HARNESS, CONNECTOR AND AIRBAG WARNING LIGHT

1) Turn ignition switch "OFF" and connect connector (B39) to test connector-A connector (1A).

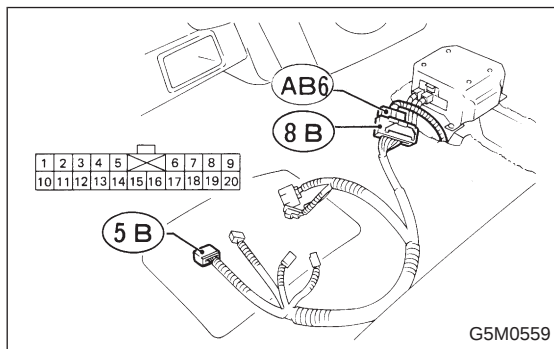
Test harness A-PN98299PA000



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.



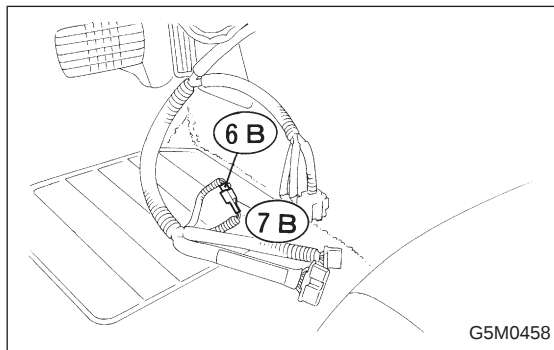
3) If body harness is satisfactory, replace airbag warning light unit ①. After problem has been eliminated, disconnect connectors (3A) and (4A).



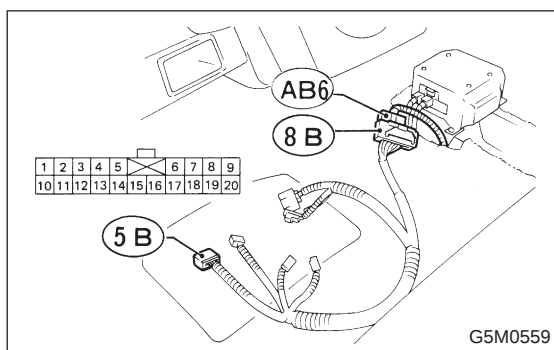
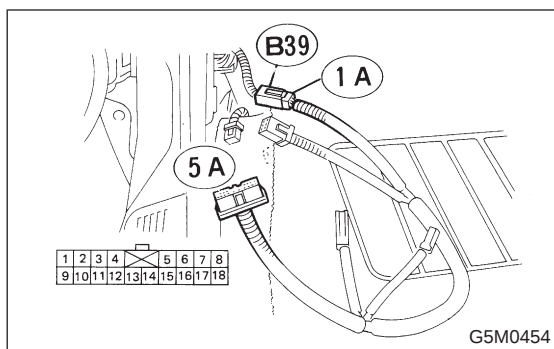
4) Turn ignition switch "OFF", disconnect battery ground cable and then wait at least 20 seconds, and re-connect connectors (AB1) and (B39).

5) Remove instrument panel lower cover and disconnect (AB3) with (AB8), then disconnect connector (AB6) from airbag control module <Ref. to 5-5 [W5A0].>, and connect it to test harness-B connector (8B).

Test harness B-PN98299PA010



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 "2. Grounding Circuit Inspection" below. If it remains on, replace airbag main harness. After problem has been eliminated, disconnect connectors (6B) and (7B).



Test harness A-PN98299PA000
Test harness B-PN98299PA010

2. GROUNDING CIRCUIT INSPECTION

1) Turn ignition switch "OFF", disconnect battery ground cable and then wait at least 20 seconds. Disconnect connector (AB1) from bulk harness connector (B39), and connect connector (B39) 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 (B39). Disconnect connector (AB6) from airbag control module <Ref. to 5-5 [W5A0].>, and connect it to test harness-B connector (8B).

3) Measure resistance between each test harness-B connector (5B) terminal and body.

(5B) Terminal / Specified resistance:

No. 11 — Body / 10 Ω, or less

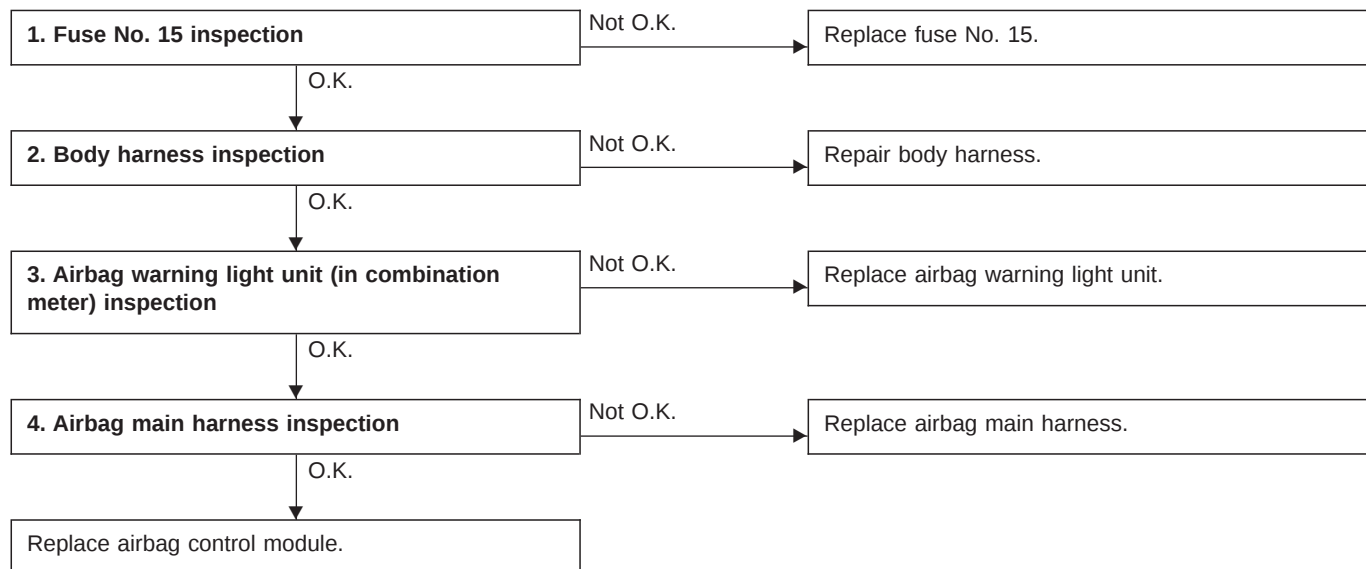
No. 12 — Body / 10 Ω, or less

If resistance is greater than 10 ohms, replace airbag main harness.

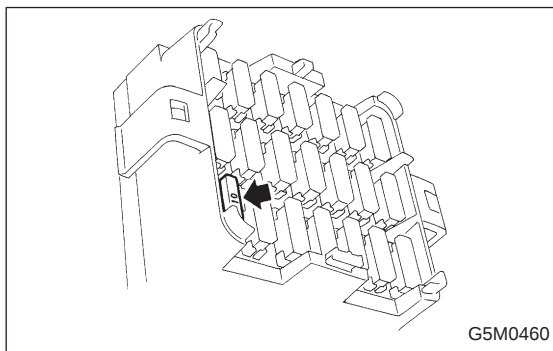
If resistance is less than 10 ohms, replace airbag control module.

M: 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:**

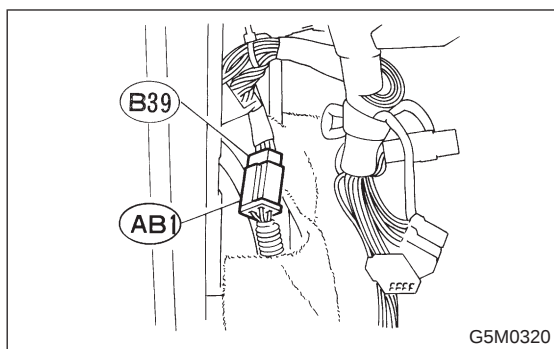
Before performing diagnostics on airbag system, turn ignition switch "OFF", disconnect battery ground terminal, and then wait at least 20 seconds.

**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".

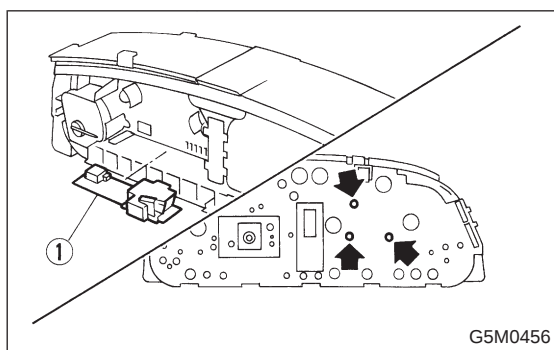
2. BODY HARNESS INSPECTION

- 1) Turn ignition switch "ON" (engine off) to make sure other warning lights (in combination meter) illuminate. If they do not, check body harness.



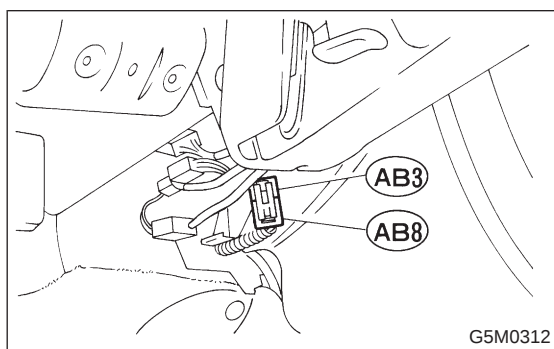
3. AIRBAG WARNING LIGHT UNIT (IN COMBINATION METER) INSPECTION

- 1) Turn ignition switch "OFF", disconnect battery ground cable and then wait at least 20 seconds.
- 2) Disconnect bulk harness connector (B39) from connector (AB1).



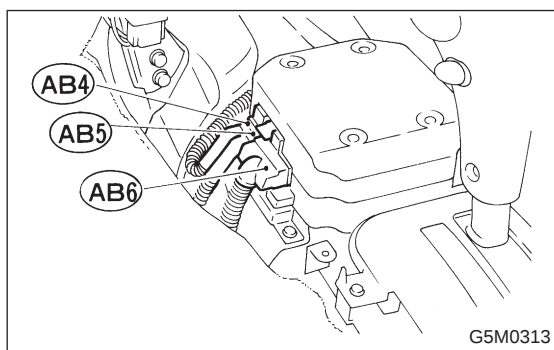
- 3) Connect battery ground cable and turn ignition switch "ON" (engine off) to make sure airbag warning light illuminates.

If it does not, replace airbag warning light unit ①.



4. AIRBAG MAIN HARNESS INSPECTION

- 1) Turn ignition switch "OFF", disconnect battery ground cable and then wait at least 20 seconds.
- 2) Connect bulk harness connector (B39) 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 [W5A0].>

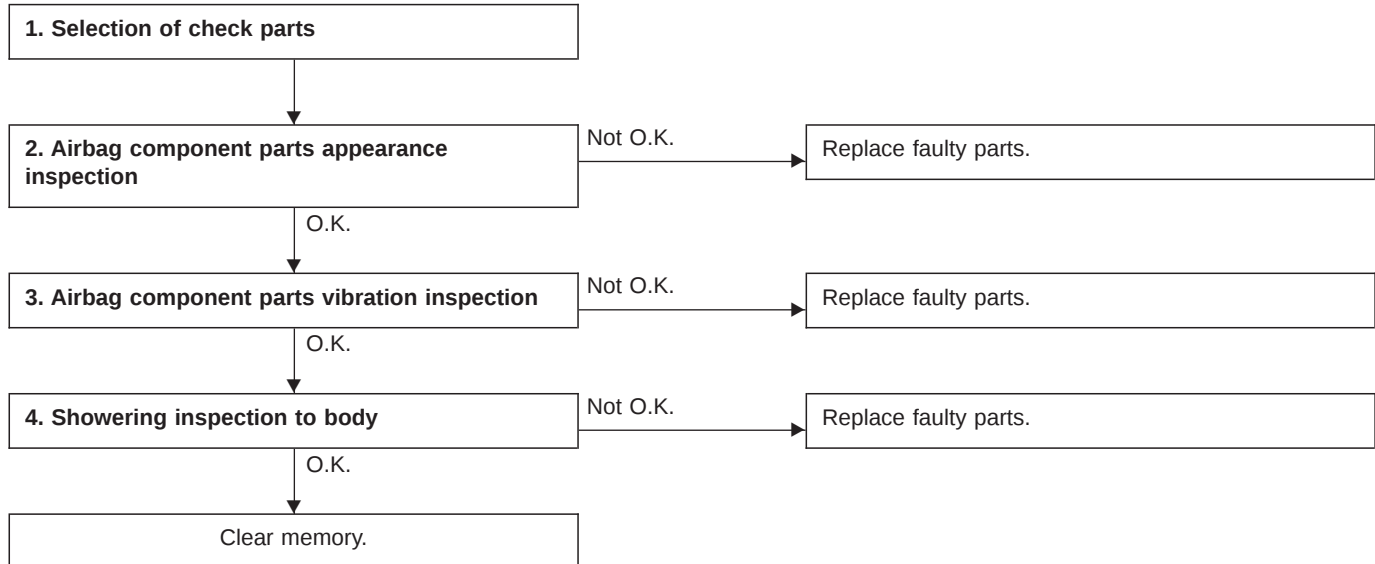
- 5) Connect battery ground cable and turn ignition switch "ON" to make sure airbag warning light illuminates.

N: WARNING LIGHT INDICATES TROUBLE CODE, THEN NORMALITY 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 [T1B0].>

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:
04	● Airbag module (Passenger) ● Airbag main harness ● Airbag control module	W2A2 W4A0 W5A0
11	● Fuse No. 8 ● Airbag main harness ● Airbag control module ● Body harness	T5A3 W4A0 W5A0 —
12	● Roll connector ● Airbag module (Driver) ● Airbag main harness ● Airbag control module	W6A0 W2A1 W4A0 W5A0
13	● Airbag module (Driver) ● Roll connector ● Airbag main harness ● Airbag control module	W2A1 W6A0 W4A0 W5A0
21	● Airbag control module	W5A0
22	● Airbag module (Passenger) ● Airbag main harness ● Airbag control module	W2A2 W4A0 W5A0
34	● Airbag main harness ● Airbag module (Passenger) ● Airbag control module	W4A0 W2A2 W5A0
41	● Airbag module (Driver) ● Roll connector ● Airbag main harness ● Airbag control module	W2A1 W6A0 W4A0 W5A0
42	● Airbag module (Passenger) ● Airbag main harness ● Airbag control module	W2A2 W4A0 W5A0
43	● Airbag module (Driver) ● Roll connector ● Airbag main harness ● Airbag control module	W2A1 W6A0 W4A0 W5A0

2. AIRBAG COMPONENT PARTS APPEARANCE INSPECTION

1) Conduct appearance inspection on parts selected.

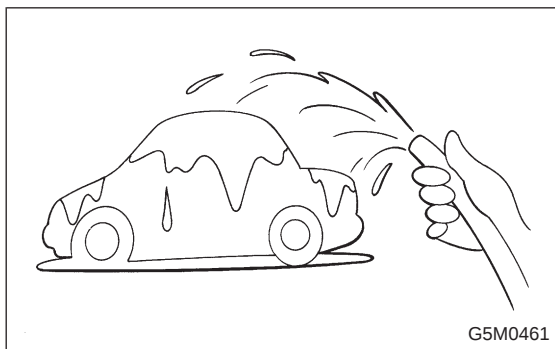
NOTE:

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.



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.

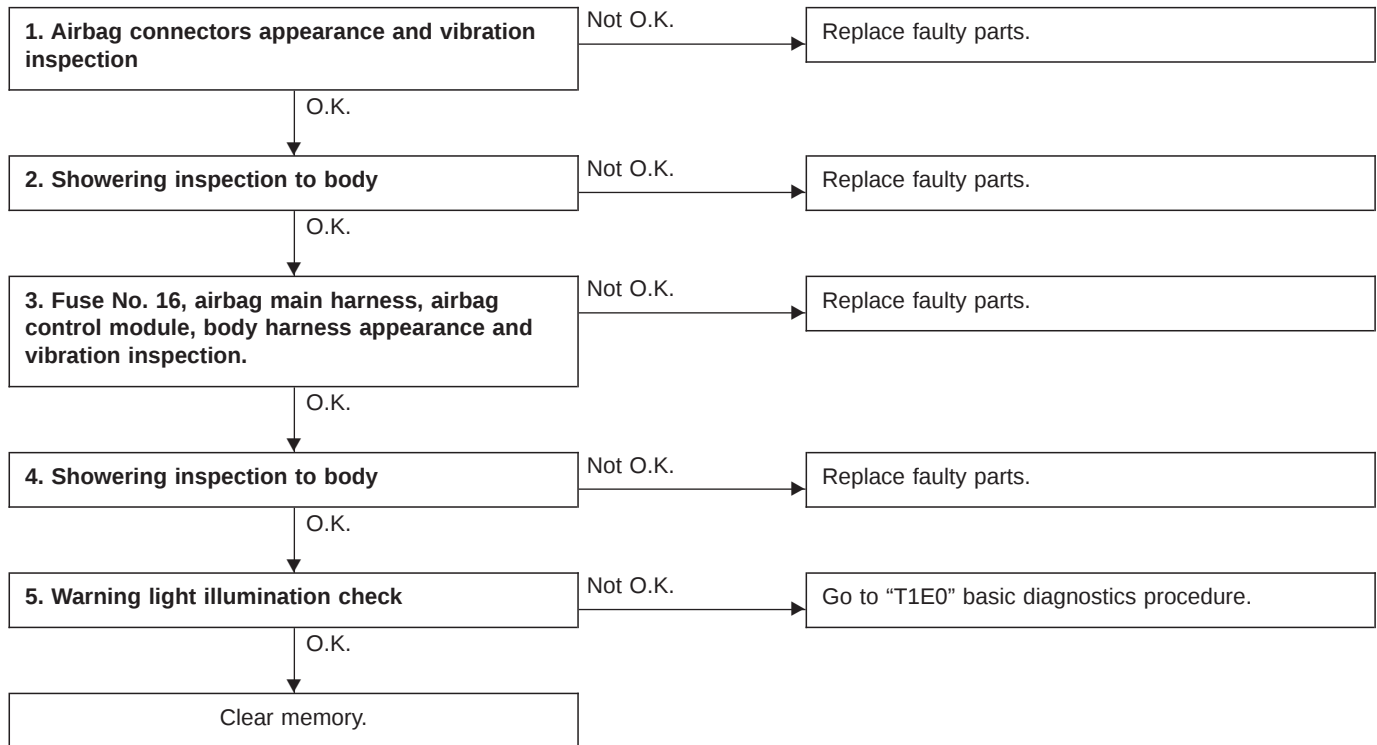
NOTE:

Also check wiring harnesses as water may leak along them and get airbag component parts wet.

**O: WARNING LIGHT INDICATES TROUBLE CODE, THEN NORMALITY CODE.
— FLASHING NORMALITY 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 [T300].>

NOTE:

Check terminals, case and wiring harnesses for damage.

2) Conduct vibration inspection on airbag connectors (AB2 through AB8). <Ref. to 5-5 [T300].>

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 connectors.

- 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, airbag main harness <Ref. to 5-5 [W3A0].>, airbag control module <Ref. to 5-5 [W4A0].> and body harness.

NOTE:

Also check connectors, terminals, wiring harnesses 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

- 1) 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.