

8. Diagnostics Chart with Trouble Code

A: LIST OF TROUBLE CODE

Trouble code	Contents of diagnosis		Ref. to 4-4b
11	Start code ● Trouble code is shown after start code. ● Only start code is shown in normal condition.		—
21	Faulty ABS sensor (Open circuit or short circuit)	Front right wheel speed sensor	[T8B0]
23		Front left wheel speed sensor	
25		Rear right wheel speed sensor	
27		Rear left wheel speed sensor	
22	Faulty ABS sensor (Faulty ABS sensor signal)	Front right wheel speed sensor	[T8C0]
24		Front left wheel speed sensor	
26		Rear right wheel speed sensor	
28		Rear left wheel speed sensor	
31	Faulty solenoid valve circuit(s) in hydraulic unit	Front right inlet valve	[T8D0]
32		Front right outlet valve	[T8E0]
33		Front left inlet valve	[T8D0]
34		Front left outlet valve	[T8E0]
35		Rear right inlet valve	[T8D0]
36		Rear right outlet valve	[T8E0]
37		Rear left inlet valve	[T8D0]
38		Rear left outlet valve	[T8E0]
41	Faulty ABS/TCS control module		[T8F0]
42	Source voltage is high.		[T8G0]
43	Faulty engine control module communication cables		[T8H0]
51	Faulty valve relay		[T8I0]
52	Faulty motor, motor sensor and/or motor relay		[T8J0]
54	Faulty stroke sensor and/or stop light switch		[T8K0]
57	Faulty fluid level sensor		[T8L0]
58	Faulty pressure switch		[T8M0]
61	Faulty solenoid valve circuit(s) in hydraulic unit	TCS 1 valve	[T8D0]
62		TCS 2 valve	[T8D0]

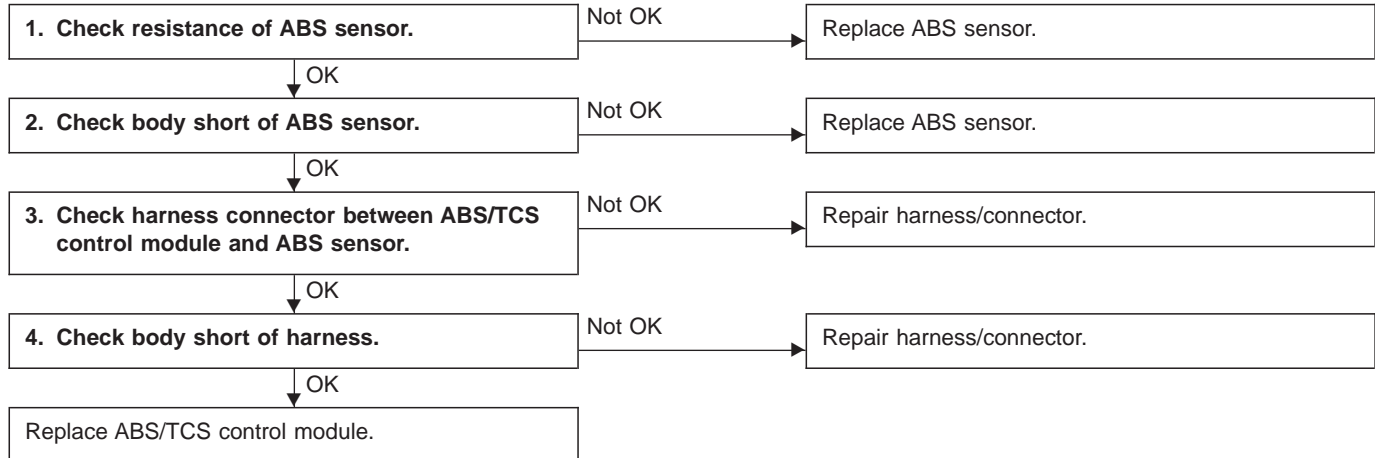
**B: TROUBLE CODE 21, 23, 25 AND 27
— FAULTY ABS SENSOR (OPEN CIRCUIT OR
SHORT CIRCUIT) —**

DIAGNOSIS:

- Faulty ABS sensor
- Faulty harness/connector
- Faulty ABS/TCS control module

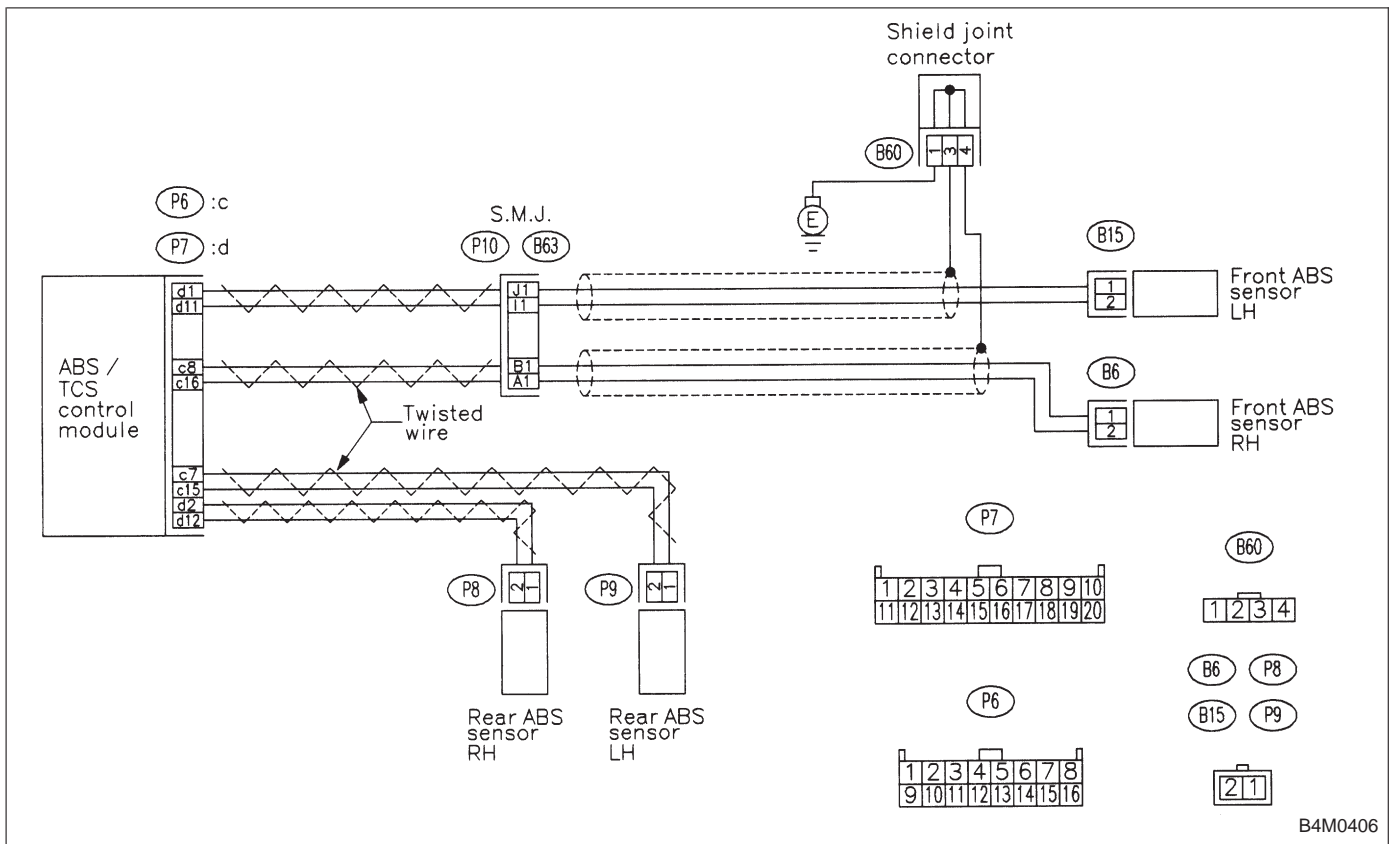
TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.

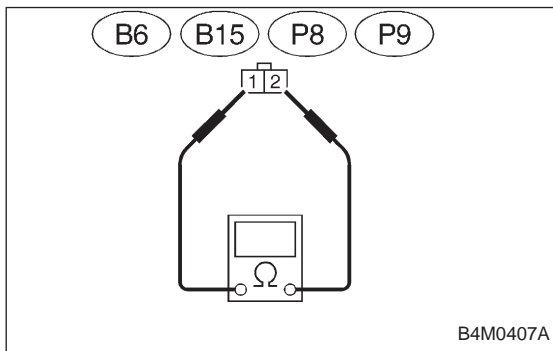


NOTE:

When checking ABS sensor, carefully bend or swing connector and harness to check for improper contacts or open circuits.



B4M0406



B4M0407A

1. CHECK RESISTANCE OF ABS SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS sensor.
- 3) Measure resistance between ABS sensor connector terminals.

TRUBLE CODE / Connector & terminal:

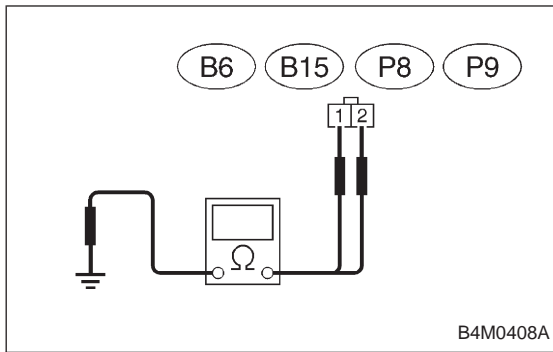
21 / (B6) No. 1 — No. 2

23 / (B15) No. 1 — No. 2

25 / (P8) No. 1 — No. 2

27 / (P9) No. 1 — No. 2

Specified resistance: 0.8 — 1.2 kΩ

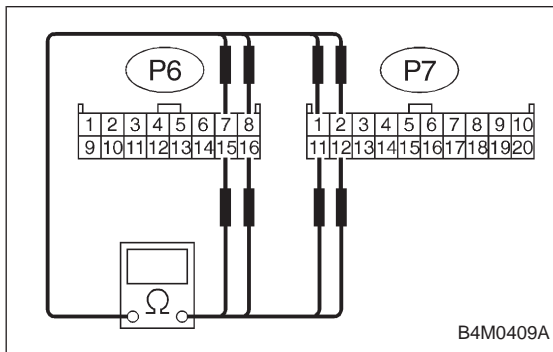


2. CHECK BODY SHORT OF ABS SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS sensor.
- 3) Measure resistance between ABS sensor connector terminal and body.

TROUBLE CODE / Connector & terminal:

- 21 / (B6) No. 1 — body
 - / (B6) No. 2 — body
 - 23 / (B15) No. 1 — body
 - / (B15) No. 2 — body
 - 25 / (P8) No. 1 — body
 - / (P8) No. 2 — body
 - 27 / (P9) No. 1 — body
 - / (P9) No. 2 — body
- Specified resistance: 1 MΩ or more**

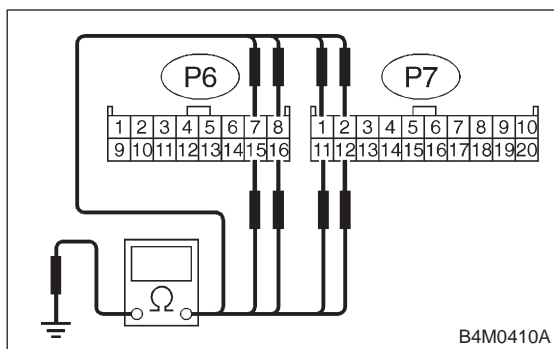


3. CHECK HARNESS CONNECTOR BETWEEN ABS/ TCS CONTROL MODULE AND ABS SENSOR.

- 1) Turn ignition switch OFF.
- 2) Connect connector to ABS sensor.
- 3) Disconnect all connectors from ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

TROUBLE CODE / Connector & terminal:

- 21 / (P6) No. 8 — No. 16
 - 23 / (P7) No. 1 — No. 11
 - 25 / (P7) No. 2 — No. 12
 - 27 / (P6) No. 7 — No. 15
- Specified resistance: 0.8 — 1.2 kΩ**



4. CHECK BODY SHORT OF HARNESS.

- 1) Turn ignition switch OFF.
- 2) Connect connector to ABS sensor.
- 3) Disconnect all connectors from ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

TROUBLE CODE / Connector & terminal:

- 21 / (P6) No. 8 — body**
- / (P6) No. 16 — body**
- 23 / (P7) No. 1 — body**
- / (P7) No. 11 — body**
- 25 / (P7) No. 2 — body**
- / (P7) No. 12 — body**
- 27 / (P6) No. 7 — body**
- / (P6) No. 15 — body**

Specified resistance: 1 MΩ or more

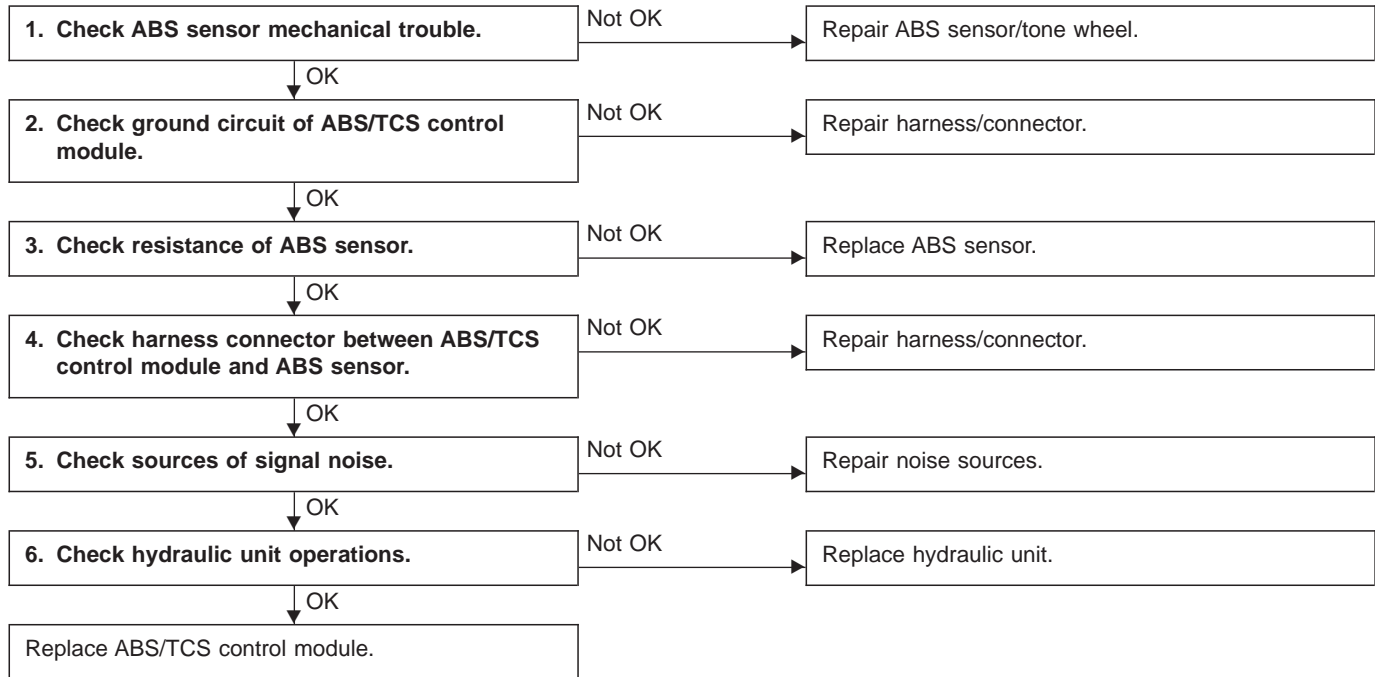
**C: TROUBLE CODE 22, 24, 26 AND 28
— FAULTY ABS SENSOR (FAULTY ABS
SENSOR SIGNAL) —**

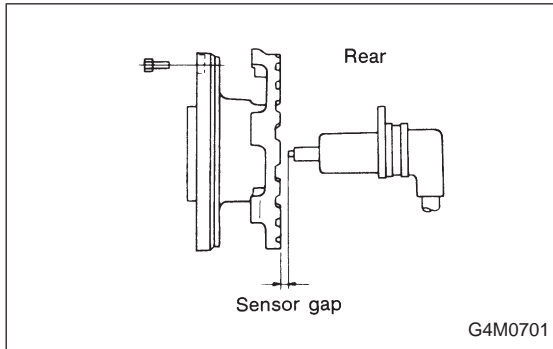
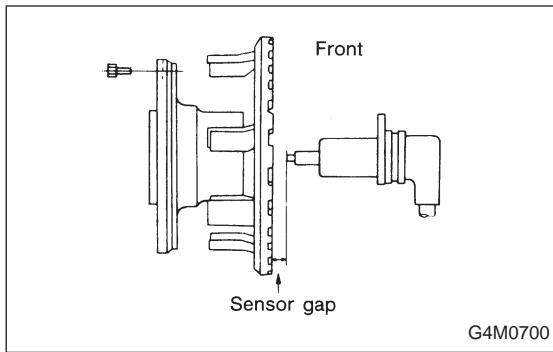
DIAGNOSIS:

- Faulty ABS sensor signal (noise, irregular signal, etc.)
- Faulty hydraulic unit
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.
- TCS operates when should not.





1. CHECK ABS SENSOR MECHANICAL TROUBLE.

- 1) Dismount brake as outlined in manual to gain access to ABS sensor and tone wheel for inspection.
- 2) Check pole piece and tone wheel for accumulation of foreign particles. If necessary, remove foreign particles and clean.
- 3) Check tone wheel teeth for cracks for deformities. If necessary, replace tone wheel (No. of teeth: 44) with a new one.
- 4) Check tone wheel for looseness.

Tightening torque:

10 — 16 N·m (1 — 1.6 kg-m, 7 — 12 ft-lb)

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

Specifications	Front wheel	Rear wheel
	0.9 — 1.4 mm (0.035 — 0.055 in)	0.7 — 1.2 mm (0.028 — 0.047 in)

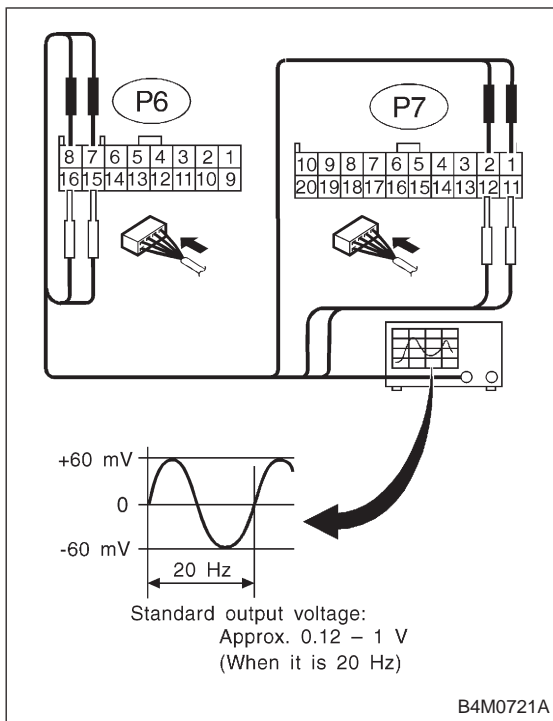
If measurements check out “Not OK”, adjust the gap using spacers (Part No. 26755AA000). If spacers cannot correct the gap, replace worn sensor or worn tone wheel.

- 6) Check hub runout.

Specifications	0.05 mm (0.0020 in)
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- 7) The following checks can be made if an oscilloscope is available.

- (1) Raise all four wheels of ground.
- (2) Turn ignition switch OFF.
- (3) Connect all connectors to ABS control module.
- (4) Connect the oscilloscope to the ABS control module connector in accordance with trouble code.
- (5) Turn ignition switch ON.



(6) Rotate wheels and measure voltage at specified frequency.

NOTE:

When this inspection is completed, the ABS/TCS control module sometimes stores the trouble code.

TROUBLE CODE / Connector & terminal:

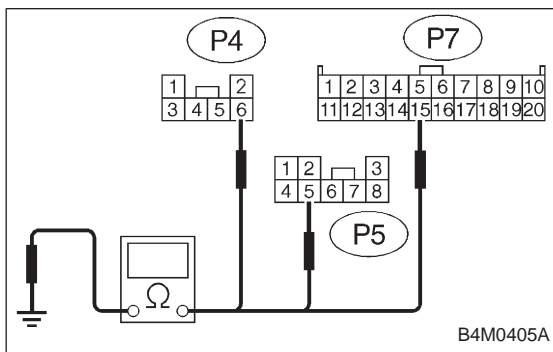
22 / (P6) No. 8 — No.16 (Connect terminal to oscilloscope earth head.)

24 / (P7) No. 1 — No.11 (Connect terminal to oscilloscope earth head.)

26 / (P7) No. 2 — No.12 (Connect terminal to oscilloscope earth head.)

28 / (P6) No. 7 — No.15 (Connect terminal to oscilloscope earth head.)

Specified voltage: 0.12 — 1 V (When it is 20 Hz.)



2. CHECK GROUND CIRCUIT OF ABS/TCS CONTROL MODULE.

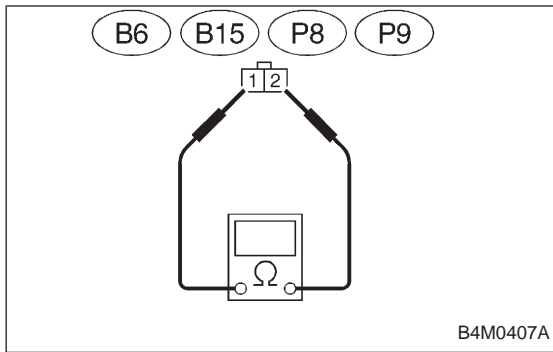
- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS/TCS control module.
- 3) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:

(P4) No. 6 — body / 1 Ω or less

(P5) No. 5 — body / 1 Ω or less

(P7) No. 15 — body / 1 Ω or less



3. CHECK RESISTANCE OF ABS SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS sensor.
- 3) Measure resistance between ABS sensor connector terminals.

TROUBLE CODE / Connector & terminal:

22 / (B6) No. 1 — No. 2

24 / (B15) No. 1 — No. 2

26 / (P8) No. 1 — No. 2

28 / (P9) No. 1 — No. 2

Specified resistance: 0.8 — 1.2 kΩ

4. CHECK HARNESS CONNECTOR BETWEEN ABS/ TCS CONTROL MODULE AND ABS SENSOR.

Check for poor contacts in plug-in connectors. Refer to "Basic checks" in "FOREWORD".

5. CHECK SOURCES OF SIGNAL NOISE.

- 1) Check that the mobile phone, personal radio and other wireless apparatus are correctly installed.
- 2) Check that the antenna and other possible noise sources are distant enough from the sensor harness.
- 3) Check that the sealed wires of the front harness sensor (in the engine room) are securely grounded.
- 4) Check that between ABS/TCS control module and the rear sensor harness has the correct twist pitch.

Twist pitch:

25 mm (0.98 in) or less

6. CHECK HYDRAULIC UNIT OPERATIONS.

- 1) Operate the ABS sequence control and check that the brake fluid pressure at the malfunctioning brake line increases and decreases properly. <Ref. to 4-4 [W20C0].>

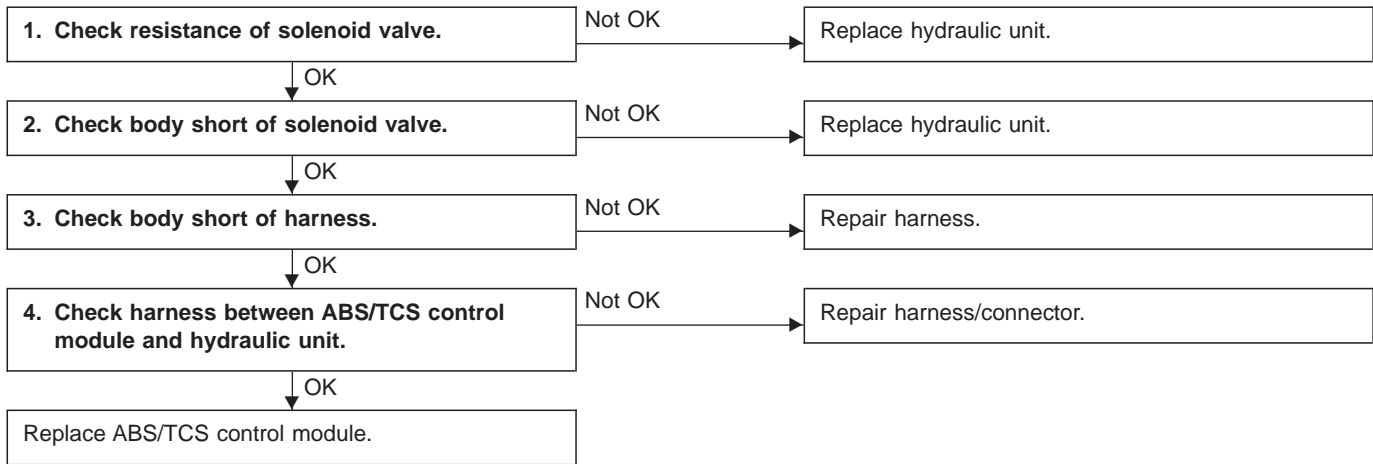
**D: TROUBLE CODE 31, 33, 35, 37, 61 AND 62
— FAULTY INLET SOLENOID VALVE
CIRCUIT(S) AND TCS SOLENOID VALVE
CIRCUIT(S) IN HYDRAULIC UNIT —**

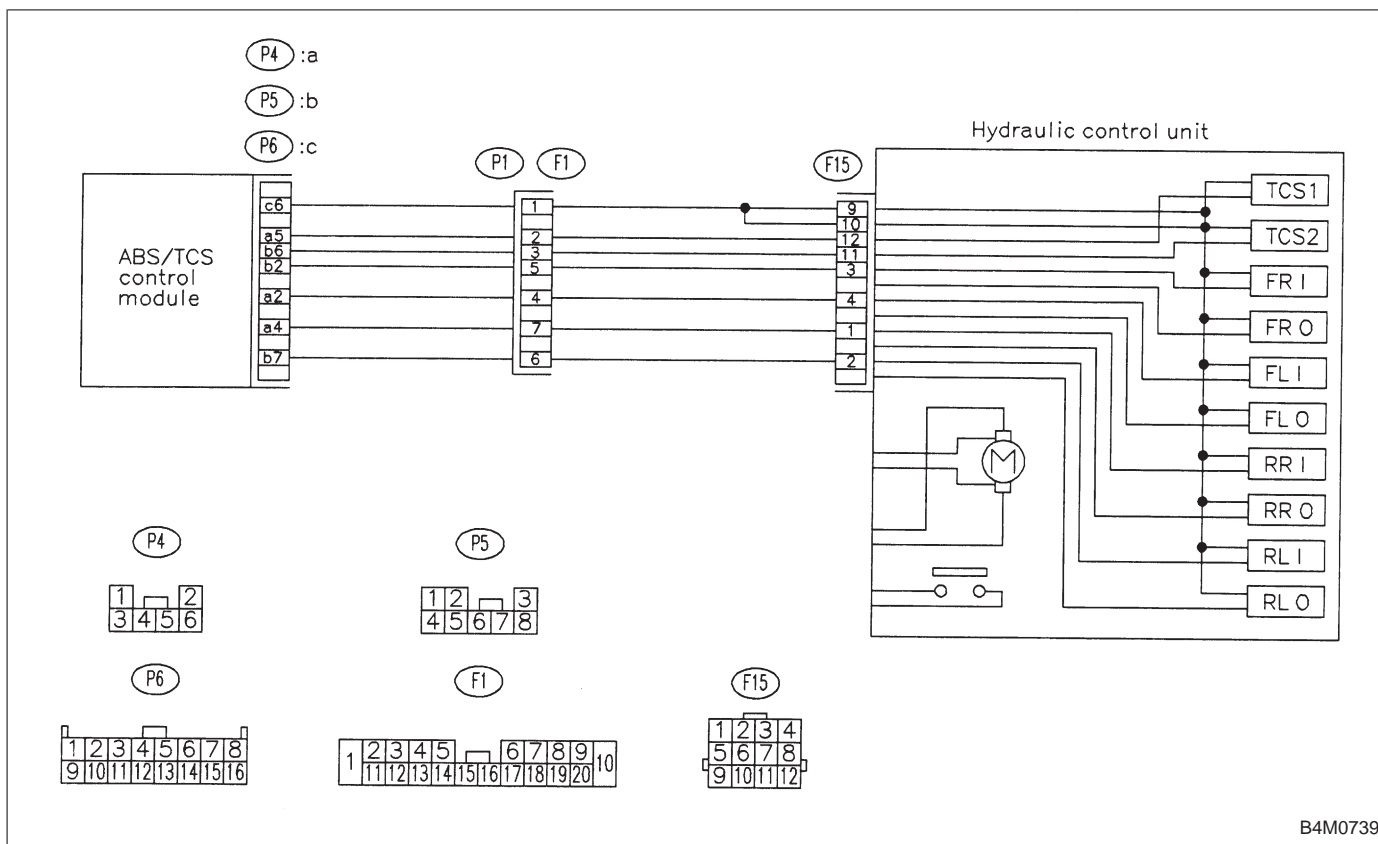
DIAGNOSIS:

- Faulty harness/connector
- Faulty solenoid valve in hydraulic unit
- Faulty ABS/TCS control module

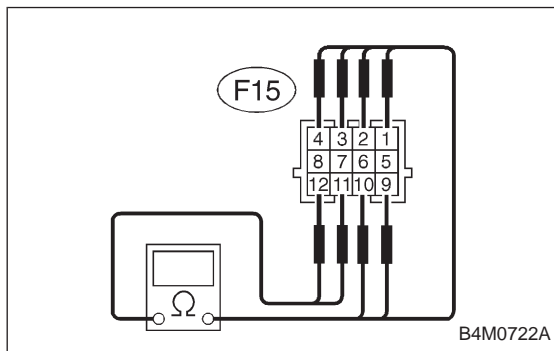
TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.
- ABS sequence control does not operate.
- TCS sequence control does not operate.
- Air bleeding mode does not operate.





B4M0739



B4M0722A

1. CHECK RESISTANCE OF SOLENOID VALVE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic unit.
- 3) Measure resistance between hydraulic unit terminals.

TROUBLE CODE / Connector & terminal:

31 / (F15) No. 3 — No. 9

33 / (F15) No. 4 — No. 10

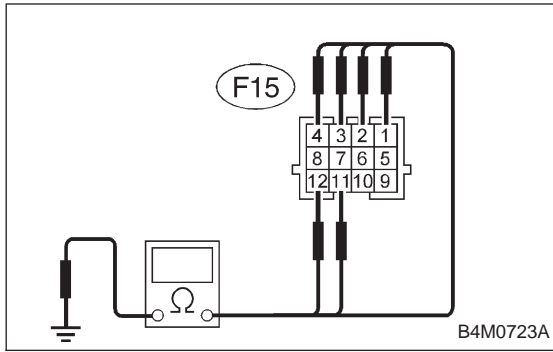
35 / (F15) No. 1 — No. 10

37 / (F15) No. 2 — No. 9

61 / (F15) No. 12 — No. 9

62 / (F15) No. 11 — No. 10

Specified resistance: approx. 6±1 Ω

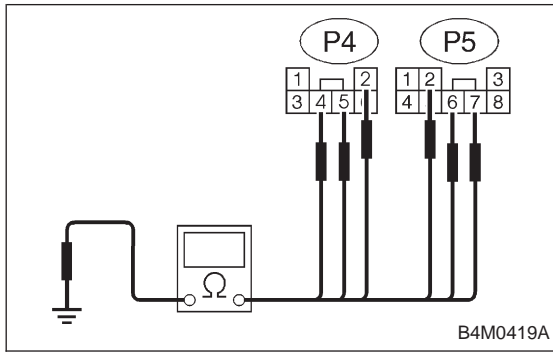


2. CHECK BODY SHORT OF SOLENOID VALVE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic unit.
- 3) Measure resistance between hydraulic unit terminals.

TROUBLE CODE / Connector & terminal:

- 31 / (F15) No. 3 — body
 - 33 / (F15) No. 4 — body
 - 35 / (F15) No. 1 — body
 - 37 / (F15) No. 2 — body
 - 61 / (F15) No. 12 — body
 - 62 / (F15) No. 11 — body
- Specified resistance: 1 MΩ or more**

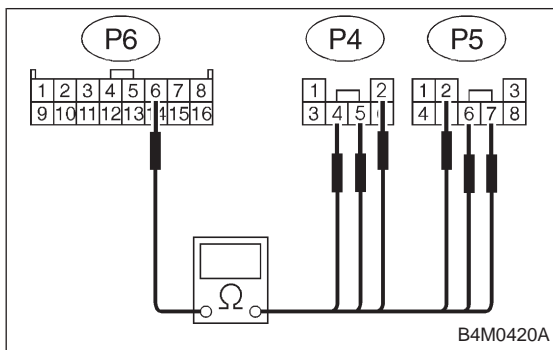


3. CHECK BODY SHORT OF HARNESS.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic unit.
- 3) Disconnect connector from ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

TROUBLE CODE / Connector & terminal:

- 31 / (P5) No. 2 — body
 - 33 / (P4) No. 2 — body
 - 35 / (P4) No. 4 — body
 - 37 / (P5) No. 7 — body
 - 61 / (P4) No. 5 — body
 - 62 / (P5) No. 6 — body
- Specified resistance: 1 MΩ or more**



4. CHECK HARNESS BETWEEN ABS/TCS CONTROL MODULE AND HYDRAULIC UNIT.

- 1) Turn ignition switch OFF.
- 2) Connect connector to hydraulic unit.
- 3) Disconnect connector from ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

TROUBLE CODE / Connector & terminal:

- 31 / (P5) No. 2 — (P6) No. 6
- 33 / (P4) No. 2 — (P6) No. 6

35 / (P4) No. 4 — (P6) No. 6

37 / (P5) No. 7 — (P6) No. 6

61 / (P4) No. 5 — (P6) No. 6

62 / (P5) No. 6 — (P6) No. 6

Specified resistance: $6.2 \pm 1.0 \Omega$

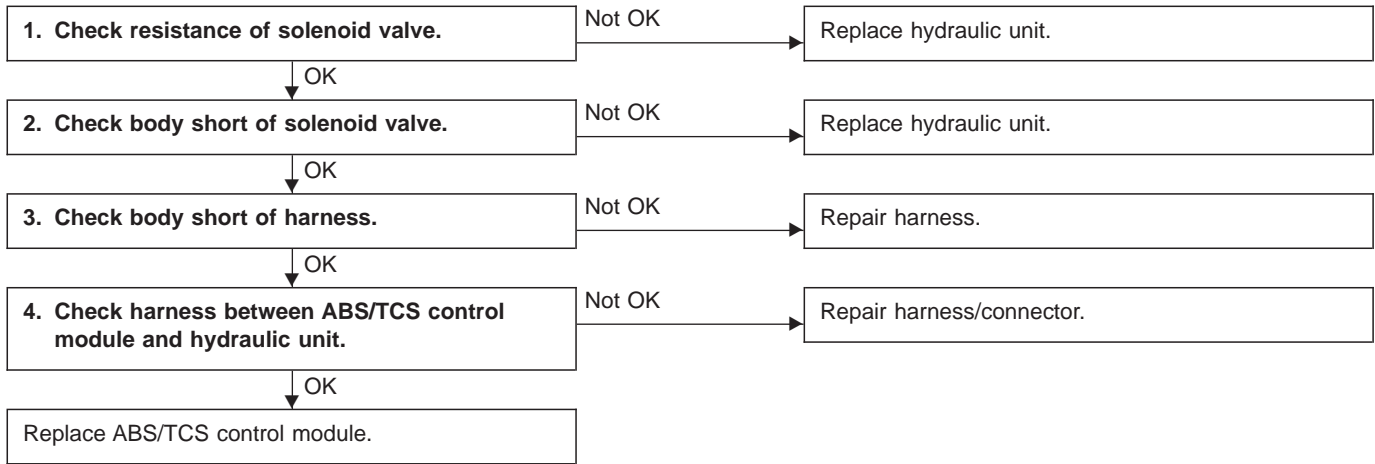
**E: TROUBLE CODE 32, 34, 36 AND 38
— FAULTY OUTLET SOLENOID VALVE
CIRCUIT(S) IN HYDRAULIC UNIT —**

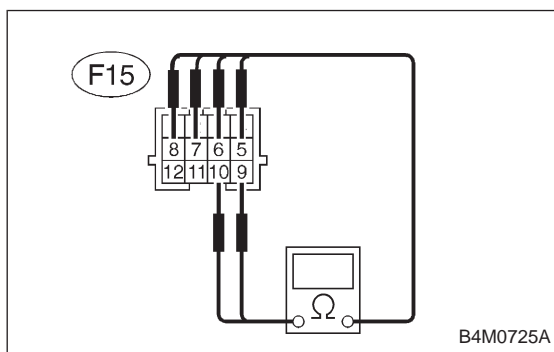
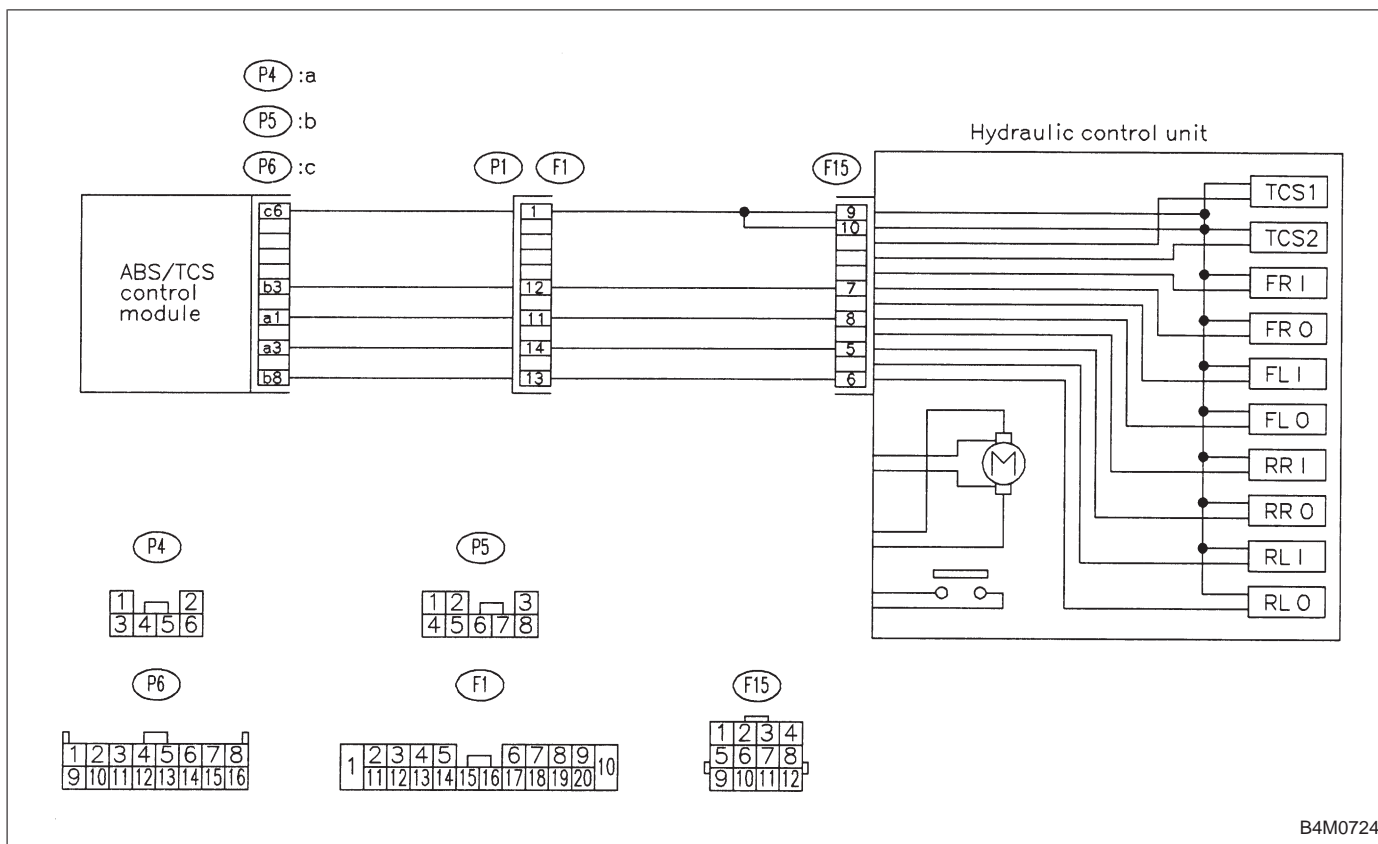
DIAGNOSIS:

- Faulty harness/connector
- Faulty solenoid valve in hydraulic unit
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.
- ABS sequence control does not operate.
- TCS sequence control does not operate.
- Air bleeding mode does not operate.



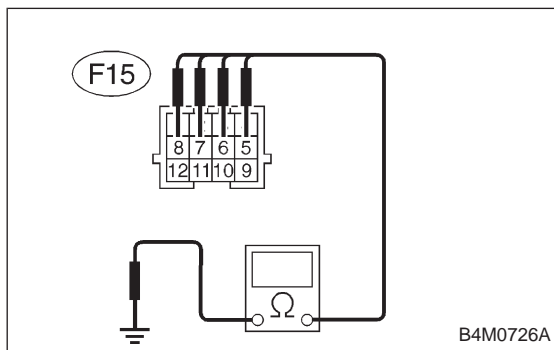


1. CHECK RESISTANCE OF SOLENOID VALVE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic unit.
- 3) Measure resistance between hydraulic unit terminals.

TROUBLE CODE / Connector & terminal:

- 32 / (F15) No. 7 — No. 9
 - 34 / (F15) No. 8 — No. 10
 - 36 / (F15) No. 5 — No. 10
 - 38 / (F15) No. 6 — No. 9
- Specified resistance: 3.5±1.0 Ω**

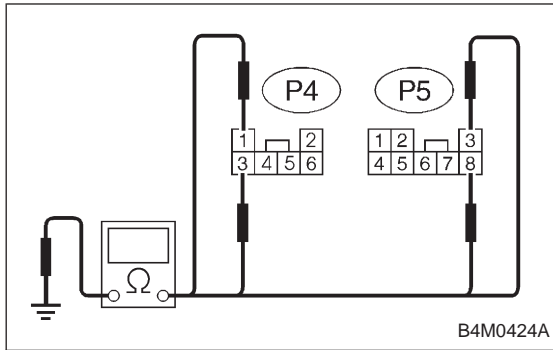


2. CHECK BODY SHORT OF SOLENOID VALVE.

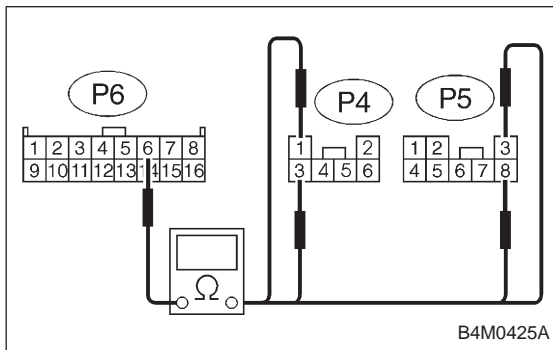
- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic unit.
- 3) Measure resistance between hydraulic unit terminals.

TROUBLE CODE / Connector & terminal:

- 32 / (F15) No. 7 — body
 - 34 / (F15) No. 8 — body
 - 36 / (F15) No. 5 — body
 - 38 / (F15) No. 6 — body
- Specified resistance: 1 MΩ or more**

**3. CHECK BODY SHORT OF HARNESS.**

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from hydraulic unit.
- 3) Disconnect connector from ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

TROUBLE CODE / Connector & terminal:**32 / (P5) No. 3 — body****34 / (P4) No. 1 — body****36 / (P4) No. 3 — body****38 / (P5) No. 8 — body****Specified resistance: 1 MΩ or more****4. CHECK HARNESS BETWEEN ABS/TCS CONTROL MODULE AND HYDRAULIC UNIT.**

- 1) Turn ignition switch OFF.
- 2) Connect connector to hydraulic unit.
- 3) Disconnect connector from ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

TROUBLE CODE / Connector & terminal:**32 / (P5) No. 3 — (P6) No. 6****34 / (P4) No. 1 — (P6) No. 6****36 / (P4) No. 3 — (P6) No. 6****38 / (P5) No. 8 — (P6) No. 6****Specified resistance: 3.7±1.0 Ω**

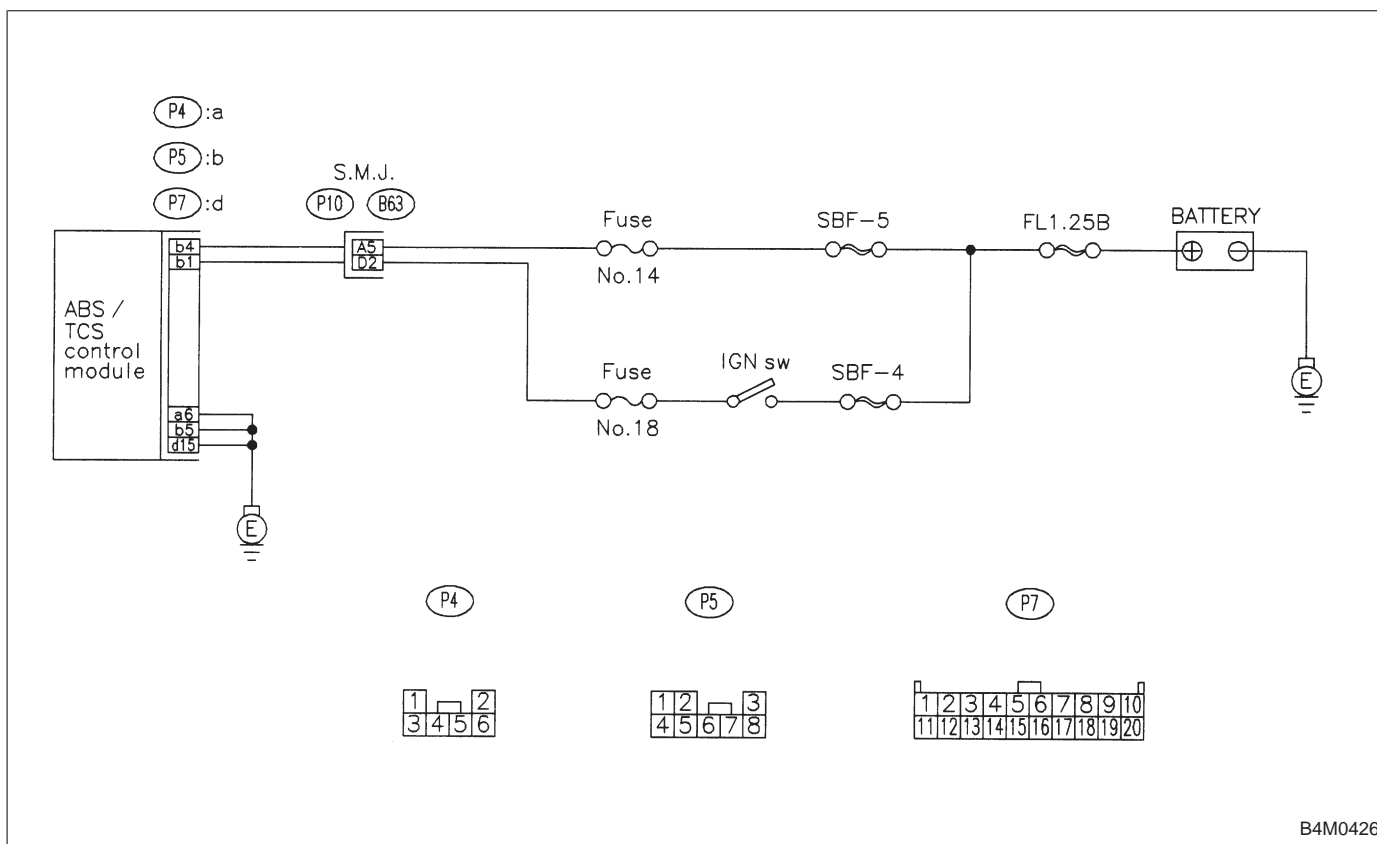
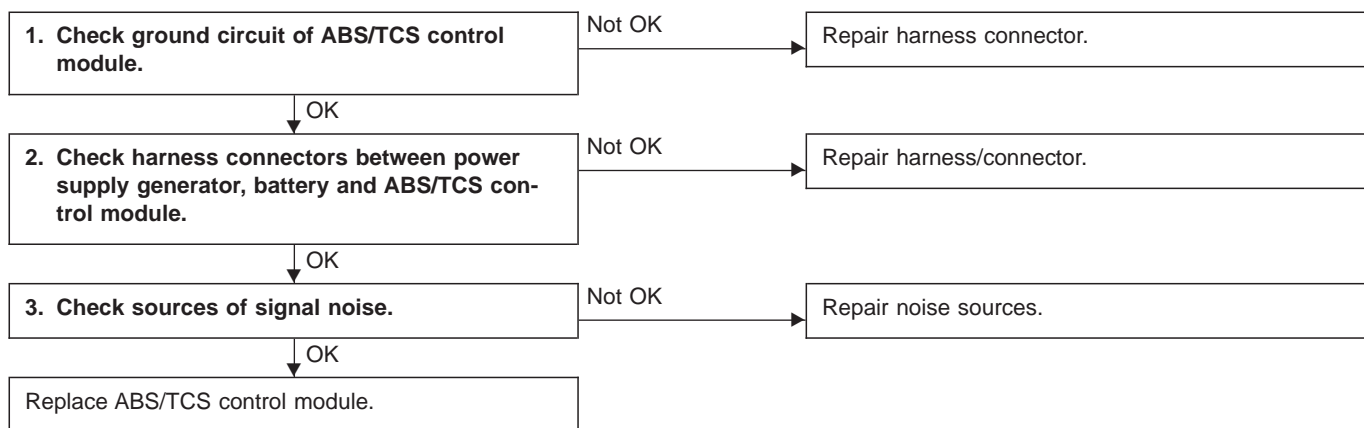
**F: TROUBLE CODE 41
— FAULTY ABS/TCS CONTROL
MODULE —**

DIAGNOSIS:

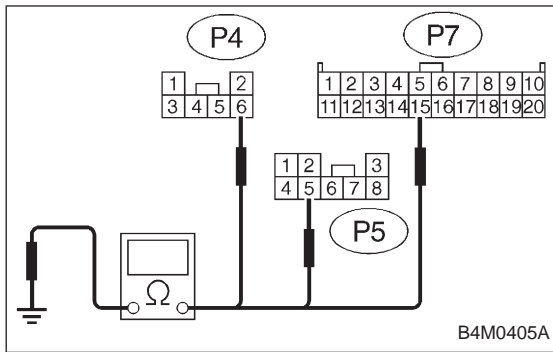
- Faulty ABS/TCS control module
- Faulty harness/connector

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.



B4M0426



1. CHECK GROUND CIRCUIT OF ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS/TCS control module.
- 3) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:

- (P4) No. 6 — body / 1 Ω or less
- (P5) No. 5 — body / 1 Ω or less
- (P7) No. 15 — body / 1 Ω or less

2. CHECK HARNESS CONNECTORS BETWEEN POWER SUPPLY GENERATOR, BATTERY AND ABS/TCS CONTROL MODULE.

Check for poor contacts in plug-in connectors. Refer to "Basic checks" in "FOREWORD".

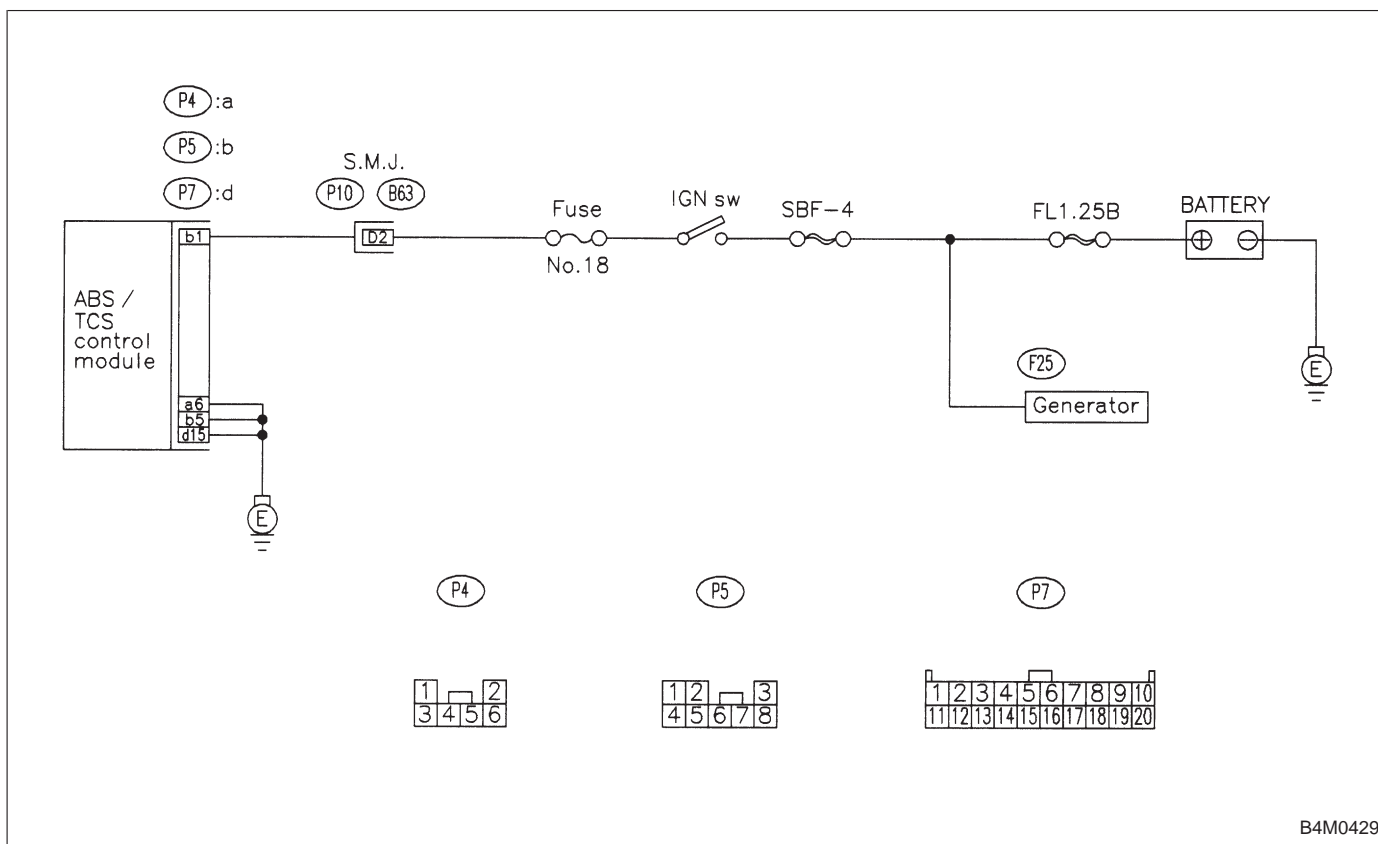
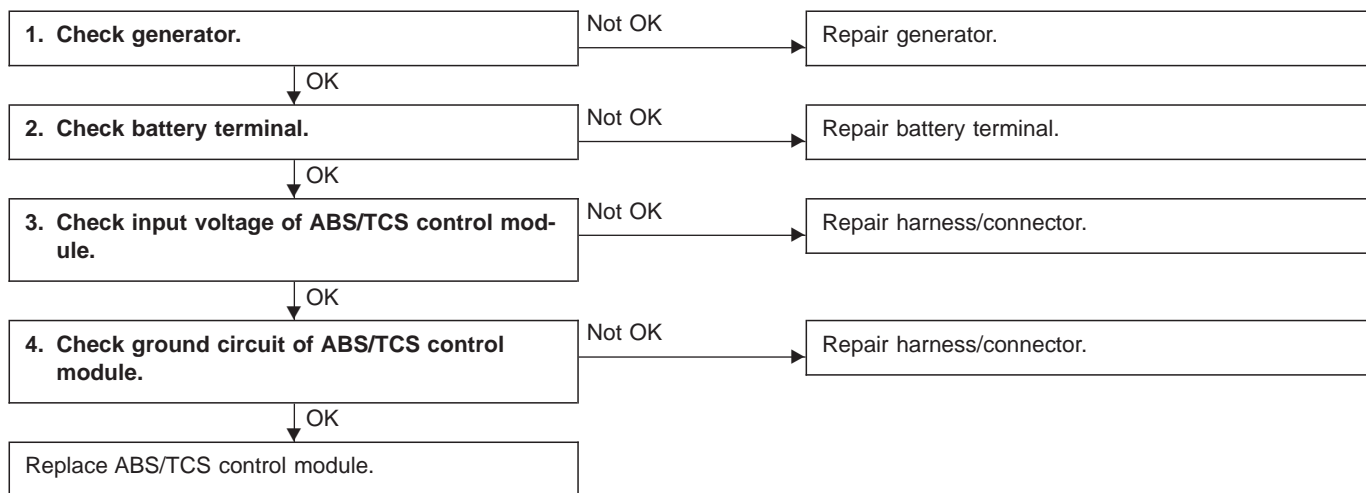
G: TROUBLE CODE 42
— SOURCE VOLTAGE IS HIGH. —

DIAGNOSIS:

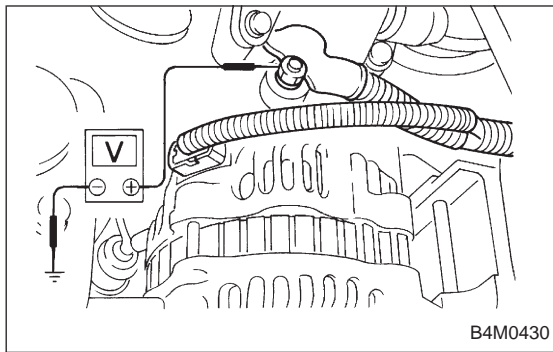
- Power source voltage of the ABS/TCS control module is more than 18 V.
- Faulty ABS/TCS control module
- Faulty harness/connector

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.



B4M0429



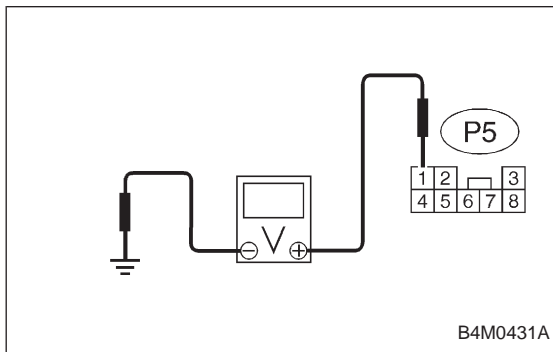
1. CHECK GENERATOR.

- 1) Idling after warm-up.
- 2) Measure voltage between generator B terminal and body.

Connector / Specified voltage:
(F25) — body / 10 — 15 V

2. CHECK BATTERY TERMINAL.

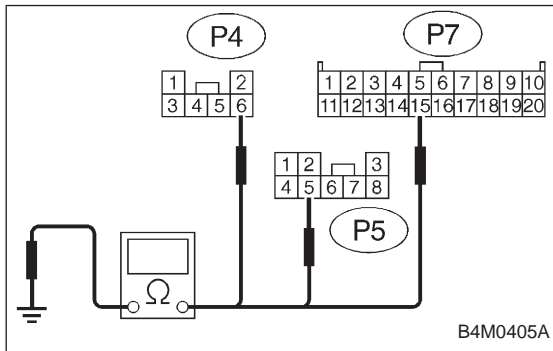
Check that the positive and negative battery terminals are firmly fixed.



3. CHECK INPUT VOLTAGE OF ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS/TCS control module.
- 3) Run the engine at idle.
- 4) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:
(P5) No. 1 — body / 10 — 15 V



4. CHECK GROUND CIRCUIT OF ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS/TCS control module.
- 3) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:
(P4) No. 6 — body / 1 Ω or less
(P5) No. 5 — body / 1 Ω or less
(P7) No. 15 — body / 1 Ω or less

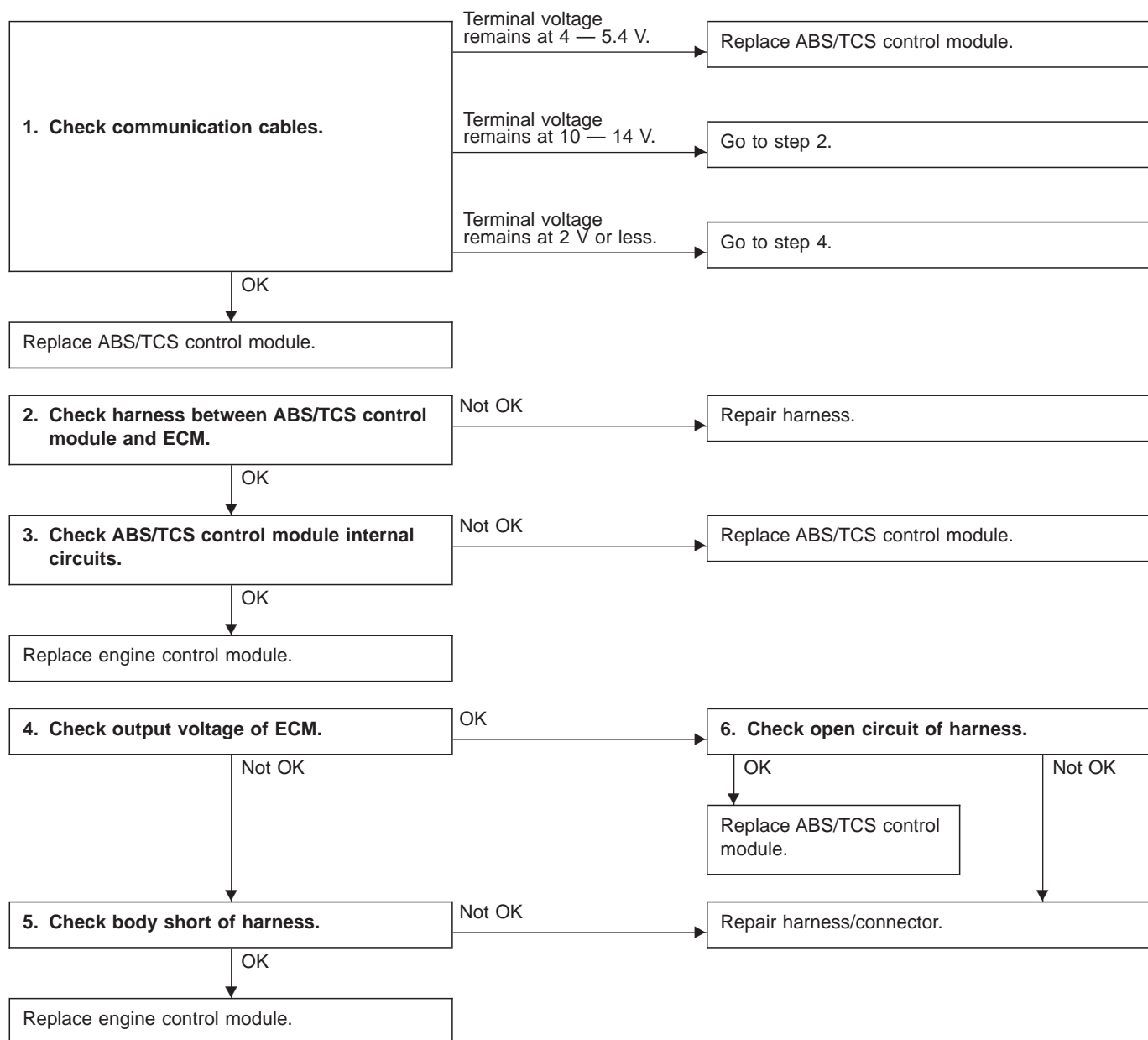
**H: TROUBLE CODE 43
— FAULTY ENGINE CONTROL MODULE
COMMUNICATION CABLES —**

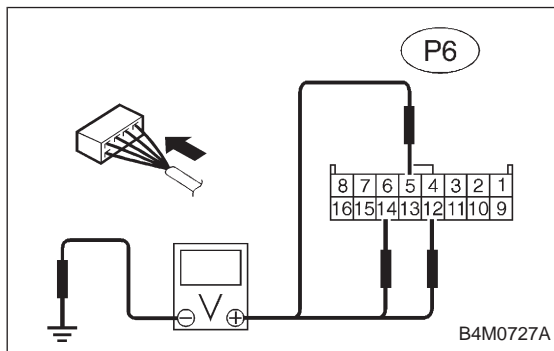
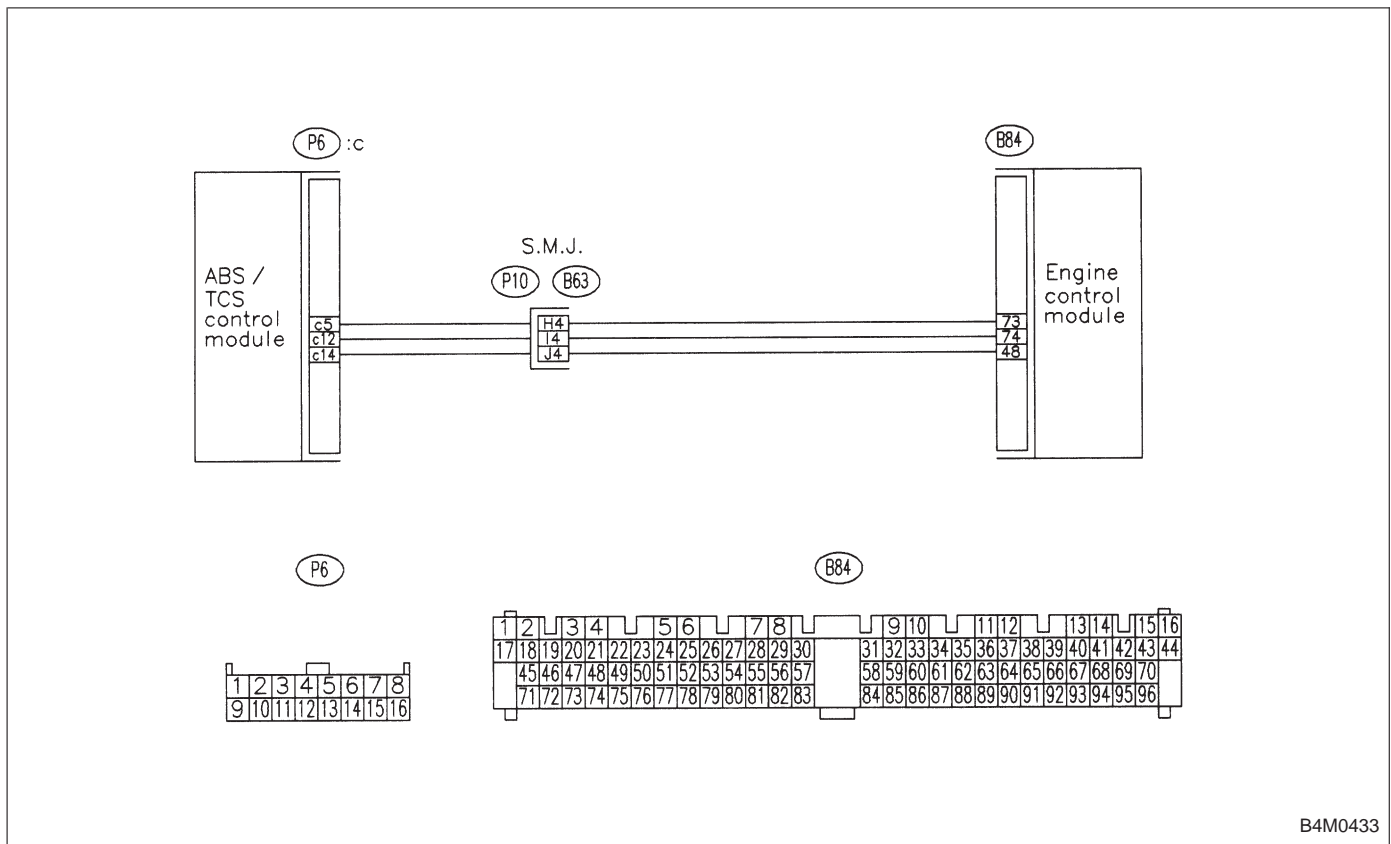
DIAGNOSIS:

- AET communication cable is broken or short circuited.
- AEB communication cable is broken or short circuited.
- AEC communication cable is broken or short circuited.
- Faulty ABS/TCS control module
- Faulty engine control module

TROUBLE SYMPTOM:

- TCS does not operate.





1. CHECK COMMUNICATION CABLES.

- 1) Operate the TCS sequence control.
<Ref. to 4-4 [W20F0].>
- 2) Measure the voltage between ABS/TCS control module and the body during the TCS check sequence operation.

Connector & terminal:

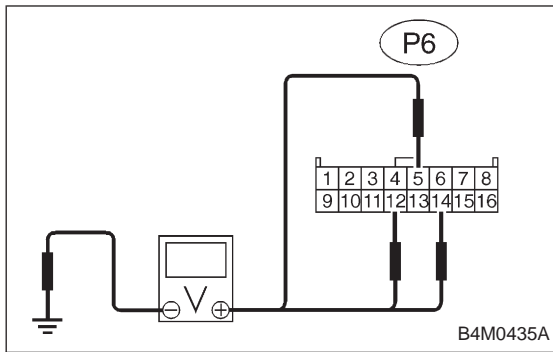
- (P6) No. 12 — body (AET communication cable)
- (P6) No. 5 — body (AEB communication cable)
- (P6) No. 14 — body (AEC communication cable)

Specified voltage:

High voltage: 4 — 5.4 V

Low voltage: 2 V or less

Check that each of the above voltage reading are displayed.



2. CHECK HARNESS BETWEEN ABS/TCS CONTROL MODULE AND ENGINE CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect engine control module.
- 3) Disconnect ABS/TCS control module.
- 4) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:

(P6) No. 12 — body / 0 V (AET communication cable)

(P6) No. 5 — body / 0 V (AEB communication cable)

(P6) No. 14 — body / 0 V (AEC communication cable)

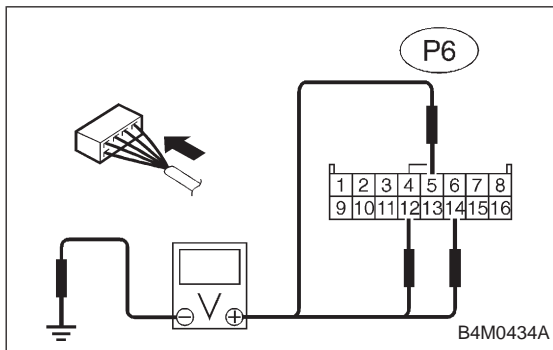
- 5) Turn ignition switch ON.
- 6) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:

(P6) No. 12 — body / 0 V (AET communication cable)

(P6) No. 5 — body / 0 V (AEB communication cable)

(P6) No. 14 — body / 0 V (AEC communication cable)



3. CHECK ABS/TCS CONTROL MODULE INTERNAL CIRCUITS.

- 1) Turn ignition switch OFF.
- 2) Disconnect engine control module.
- 3) Connect ABS/TCS control module.
- 4) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:

(P6) No. 12 — body / 2 V or less (AET communication cable)

(P6) No. 5 — body / 2 V or less (AEB communication cable)

(P6) No. 14 — body / 2 V or less (AEC communication cable)

- 5) Turn ignition switch ON.
- 6) Measure voltage between ABS/TCS control module connector and body.

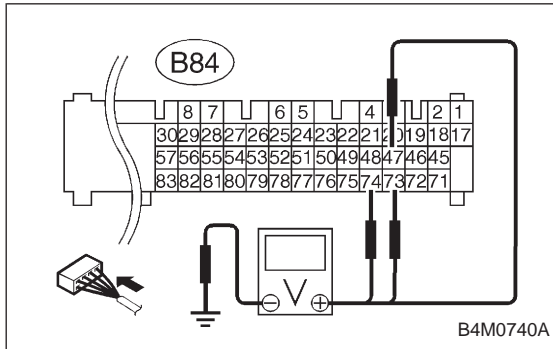
Connector & terminal / Specified voltage:

(P6) No. 12 — body / 2 V or less (AET communication cable)

(P6) No. 5 — body / 2 V or less (AEB communication cable)

tion cable)

(P6) No. 14 — body / 2 V or less (AEC communication cable)

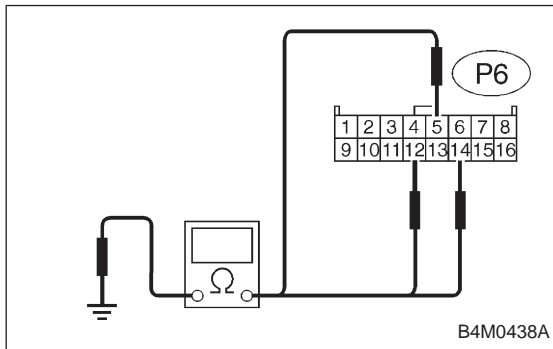


4. CHECK OUTPUT VOLTAGE OF ENGINE CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Connect engine control module.
- 3) Connect ABS/TCS control module.
- 4) Turn ignition switch ON.
- 5) Measure voltage between engine control module connector and body.

Connector & terminal / Specified voltage:

- (B84) No. 74 — body / 4 — 5.4 V (AET communication cable)*
- (B84) No. 73 — body / 4 — 5.4 V (AEB communication cable)*
- (B84) No. 47 — body / 4 — 5.4 V (AEC communication cable)*

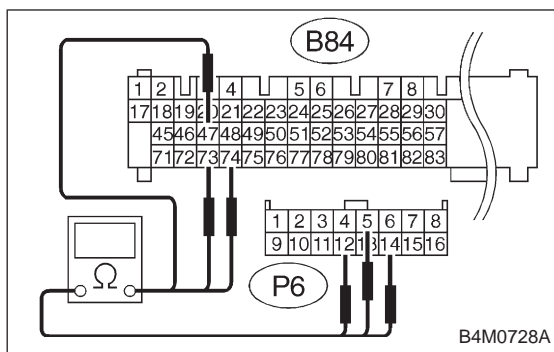


5. CHECK BODY SHORT OF HARNESS.

- 1) Turn ignition switch OFF.
- 2) Disconnect engine control module.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:

- (P6) No. 12 — body / 1 MΩ or more (AET communication cable)*
- (P6) No. 5 — body / 1 MΩ or more (AEB communication cable)*
- (P6) No. 14 — body / 1 MΩ or more (AEC communication cable)*

**6. CHECK OPEN CIRCUIT OF HARNESS.**

- 1) Turn ignition switch OFF.
- 2) Disconnect engine control module.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector and engine control module connector.

(P6) No. 12 — (B84) No. 74 / 1 Ω or less (AET communication cable)

(P6) No. 5 — (B84) No. 73 / 1 Ω or less (AEB communication cable)

(P6) No. 14 — (B84) No. 47 / 1 Ω or less (AEC communication cable)

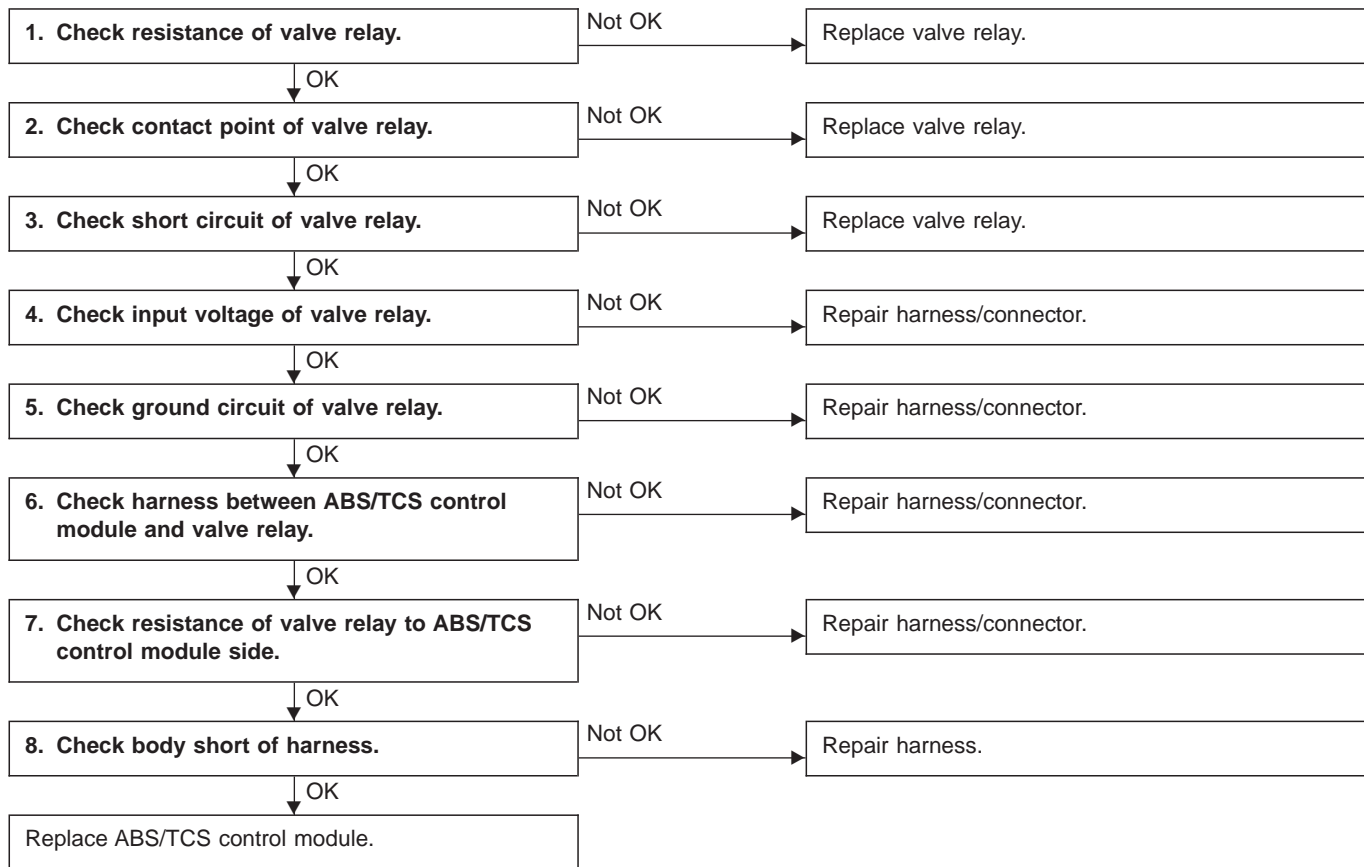
**I: TROUBLE CODE 51
— FAULTY VALVE RELAY —**

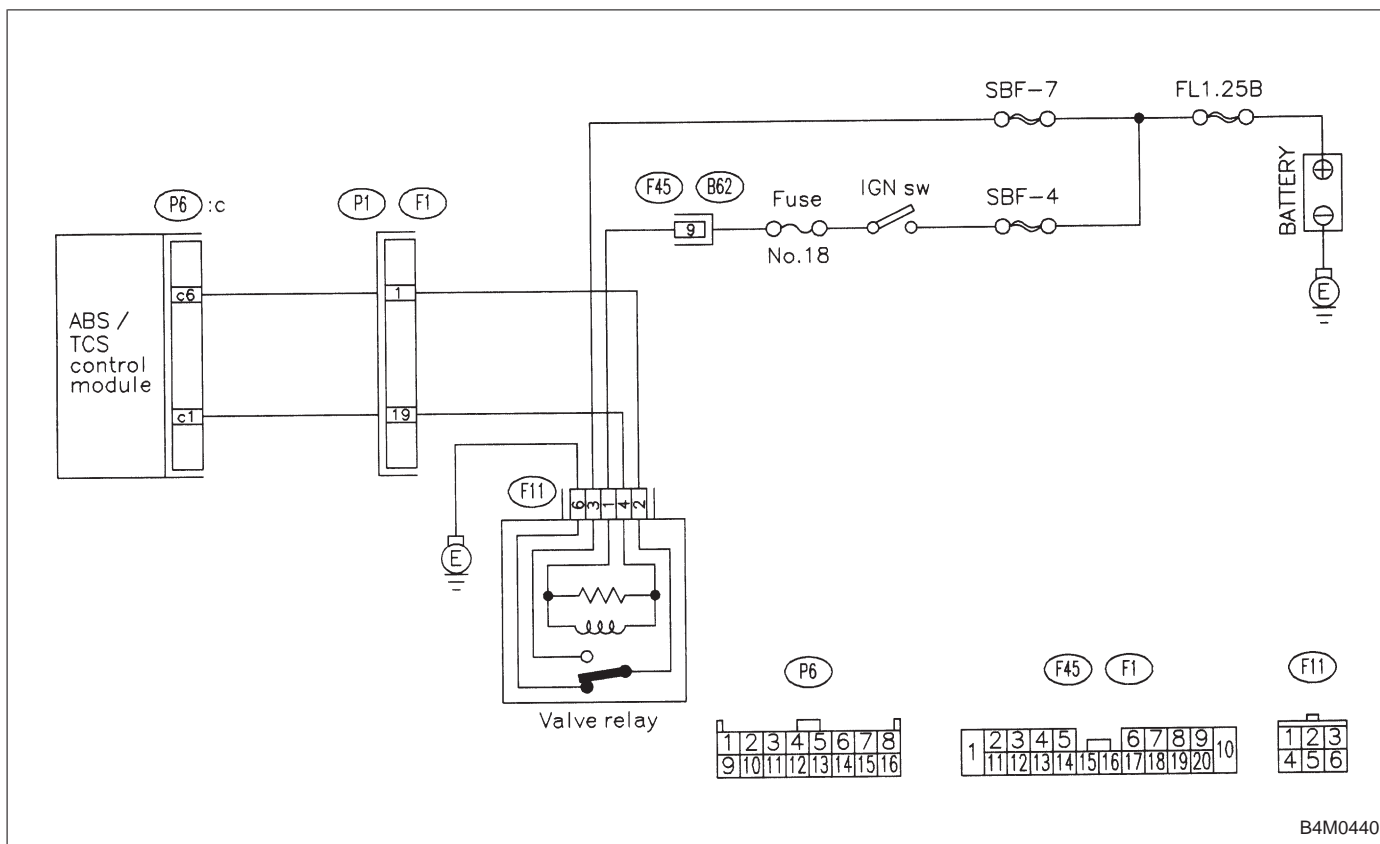
DIAGNOSIS:

- Faulty valve relay
- Faulty harness/connector
- Faulty ABS/TCS control module

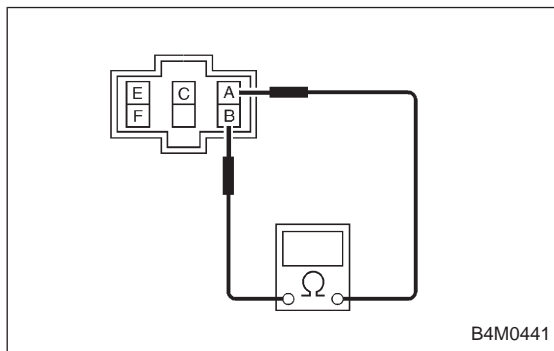
TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.





B4M0440



B4M0441

1. CHECK RESISTANCE OF VALVE RELAY.

- 1) Turn ignition switch OFF.
- 2) Remove valve relay.
- 3) Measure resistance between valve relay terminals.

Terminal / Specified resistance:

No. A — B / $90 \pm 10 \Omega$

2. CHECK CONTACT POINT OF VALVE RELAY.

- 1) Turn ignition switch OFF.
- 2) Remove valve relay.
- 3) Attach circuit tester probes to terminals as shown in figure.
- 4) Measure resistance between respective terminals.

Terminal / Specified resistance:

No. C — E / 1Ω or less (When 12 volts applied.)

No. C — E / $1 M\Omega$ or more

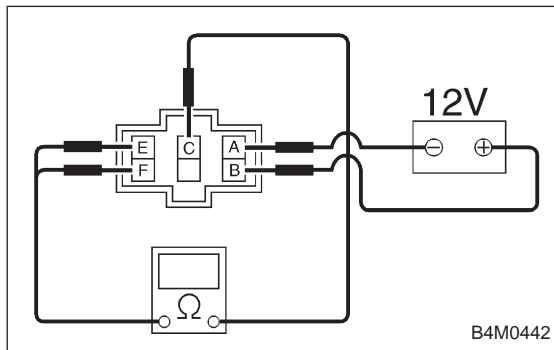
(When no voltage is applied.)

No. C — F / $1 M\Omega$ or more

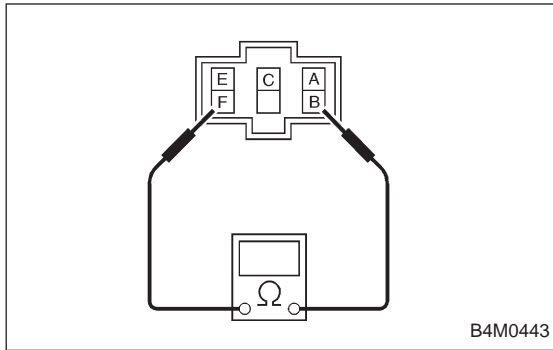
(When 12 volts applied.)

No. C — F / 1Ω or less

(When no voltage is applied.)



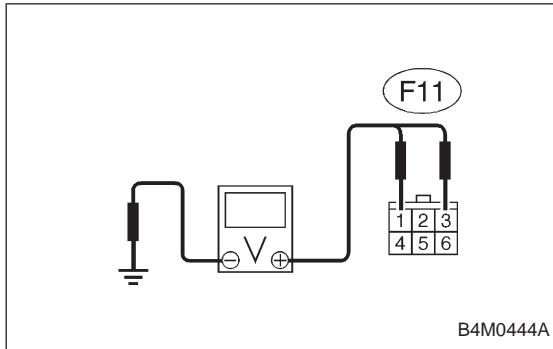
B4M0442

**3. CHECK SHORT CIRCUIT OF VALVE RELAY.**

- 1) Turn ignition switch OFF.
- 2) Remove valve relay.
- 3) Measure resistance between valve relay terminals.

Terminal / Specified resistance:

No. B — F / 1 MΩ or more

**4. CHECK INPUT VOLTAGE OF VALVE RELAY.**

- 1) Turn ignition switch OFF.
- 2) Disconnect valve relay.
- 3) Measure voltage between valve relay connector and body.

Connector & terminal / Specified voltage:

(F11) No. 1 — body / 0 V

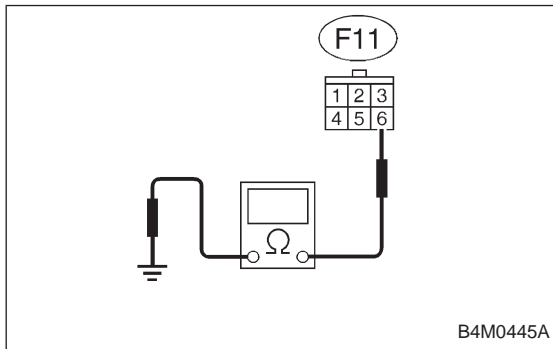
(F11) No. 3 — body / 10 — 13 V

- 4) Turn ignition switch ON.
- 5) Measure voltage between valve relay connector and body.

Connector & terminal / Specified voltage:

(F11) No. 1 — body / 10 — 13 V

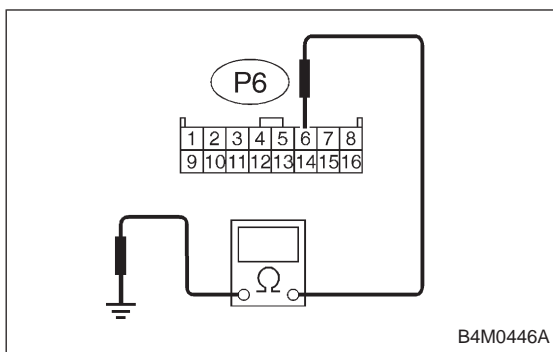
(F11) No. 3 — body / 10 — 13 V

**5. CHECK GROUND CIRCUIT OF VALVE RELAY.**

- 1) Turn ignition switch OFF.
- 2) Disconnect valve relay.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between valve relay connector and body.

Connector & terminal / Specified resistance:

(F11) No. 6 — body / 1 Ω or less



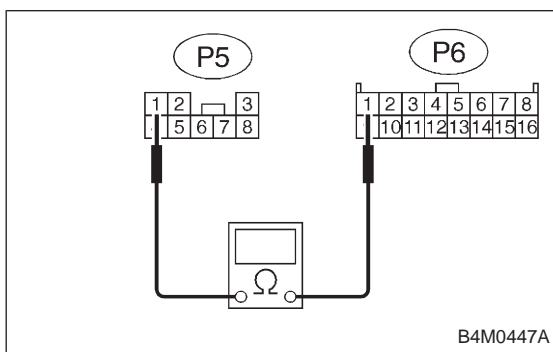
6. CHECK HARNESS BETWEEN ABS/TCS CONTROL MODULE AND VALVE RELAY.

- 1) Turn ignition switch OFF.
- 2) Disconnect valve relay.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:
(P6) No. 6 — body / 1 MΩ or more

- 5) Connect valve relay.
- 6) Measure resistance between ABS/TCS control module connector and body.

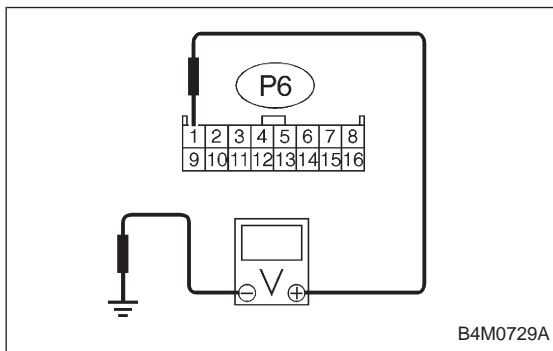
Connector & terminal / Specified resistance:
(P6) No. 6 — body / 1 Ω or less



7. CHECK RESISTANCE OF VALVE RELAY TO ABS/ TCS CONTROL MODULE SIDE.

- 1) Turn ignition switch OFF.
- 2) Connect valve relay.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

Connector & terminal / Specified resistance:
(P5) No. 1 — (P6) No. 1 / 90±10 Ω



8. CHECK BODY SHORT OF HARNESS.

- 1) Turn ignition switch OFF.
- 2) Connect valve relay.
- 3) Disconnect ABS/TCS control module.
- 4) Turn ignition switch ON.
- 5) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:
(P6) No. 1 — body / 10 — 13 V

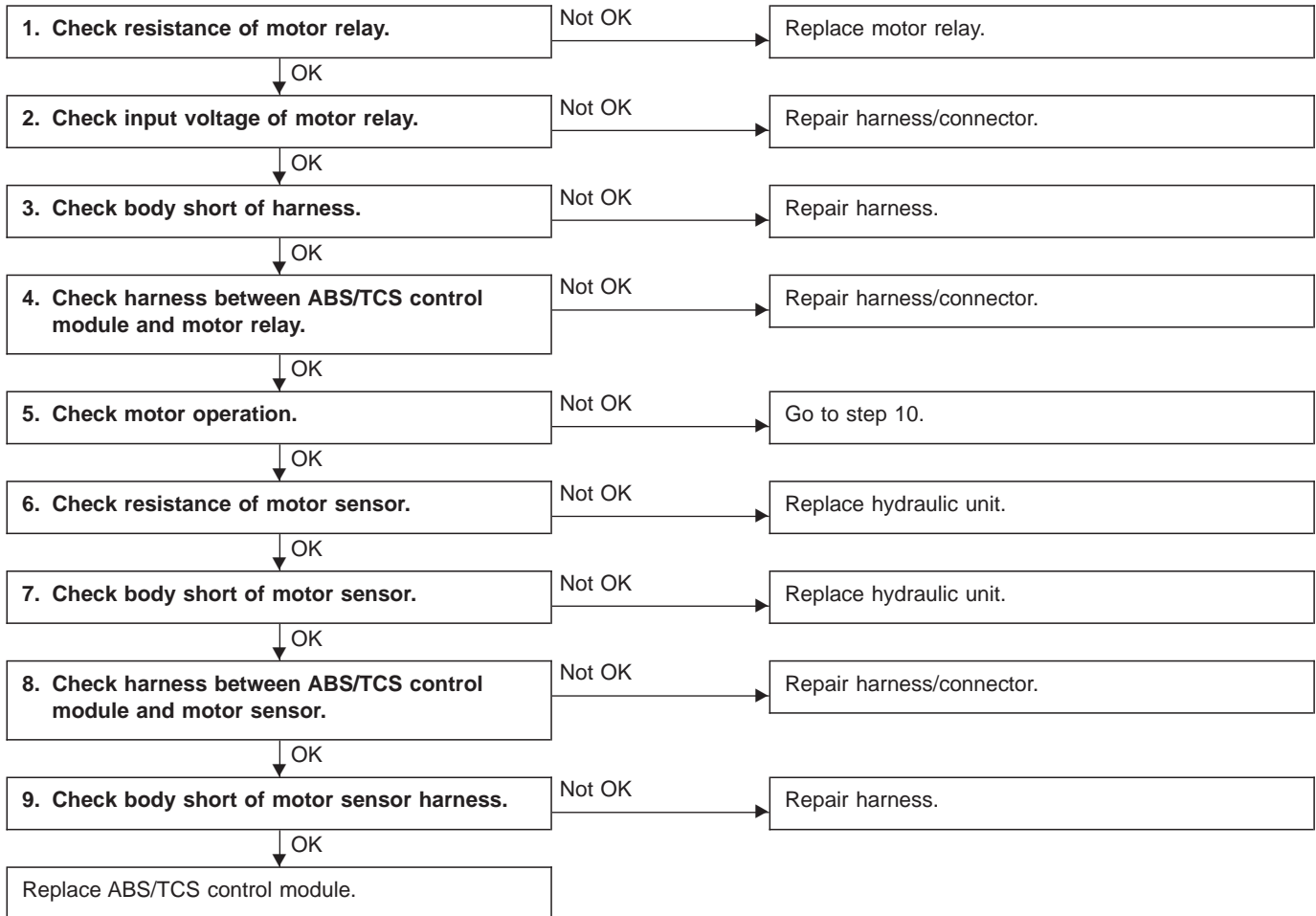
**J: TROUBLE CODE 52
— FAULTY MOTOR, MOTOR SENSOR AND/
OR MOTOR RELAY —**

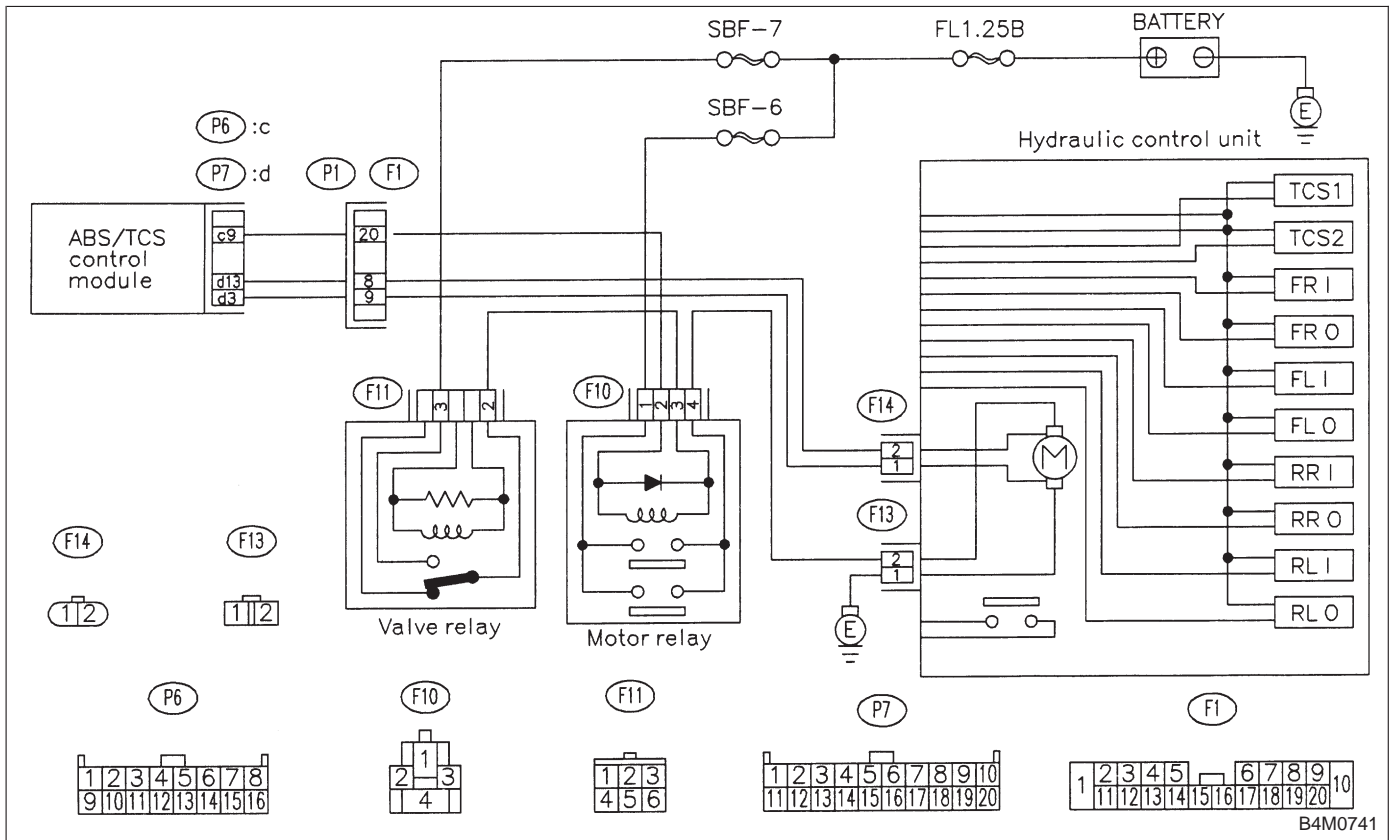
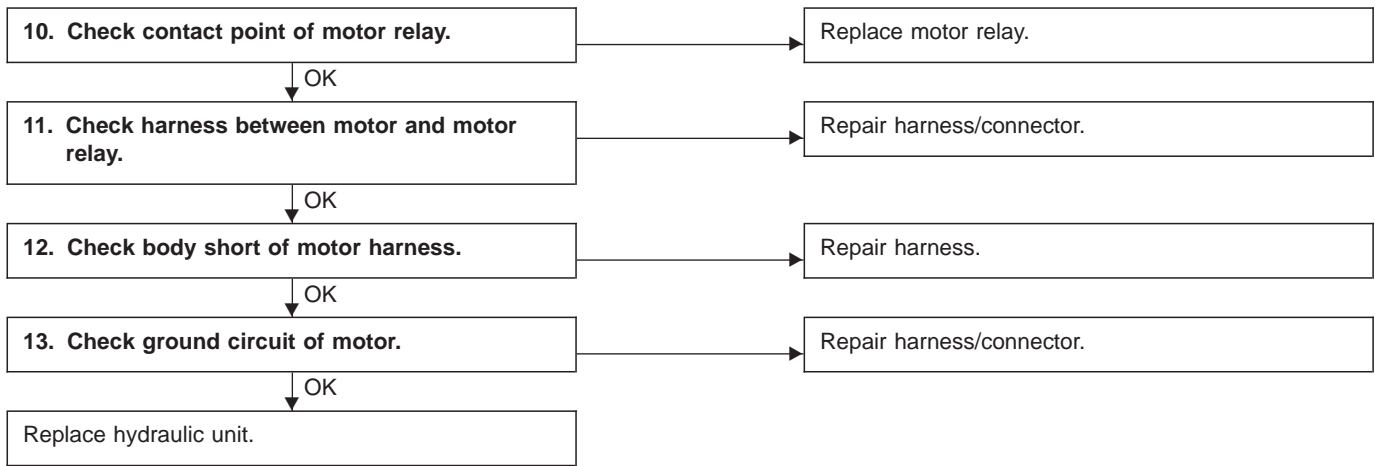
DIAGNOSIS:

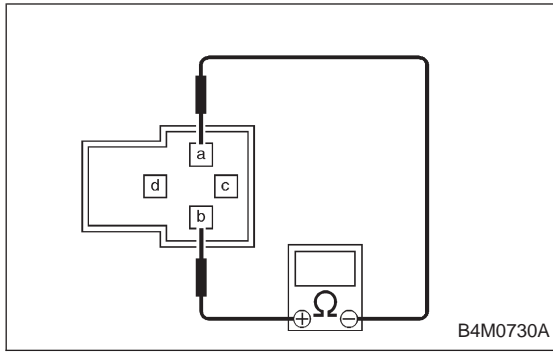
- Faulty motor relay
- Faulty motor
- Faulty motor sensor
- Faulty harness/connector
- Faulty ABS/TCS control module

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.





**1. CHECK RESISTANCE OF MOTOR RELAY.**

- 1) Turn ignition switch OFF.
- 2) Remove motor relay.
- 3) Measure resistance between motor relay terminals.

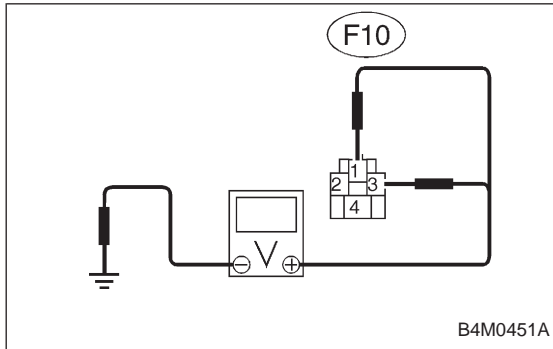
Terminal / Specified resistance:

No. a — b / 57 Ω

NOTE:

Apply + to b terminal.

Apply - to a terminal.

**2. CHECK INPUT VOLTAGE OF MOTOR RELAY.**

- 1) Turn ignition switch OFF.
- 2) Disconnect motor relay.
- 3) Measure voltage between motor relay connector and body.

Connector & terminal / Specified voltage:

(F10) No. 1 — body / 10 — 13 V

(F10) No. 3 — body / 0 V

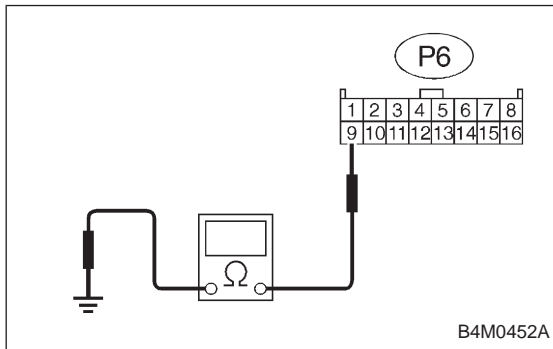
- 4) Turn ignition switch ON.

- 5) Measure voltage between motor relay connector and body.

Connector & terminal / Specified voltage:

(F10) No. 1 — body / 10 — 13 V

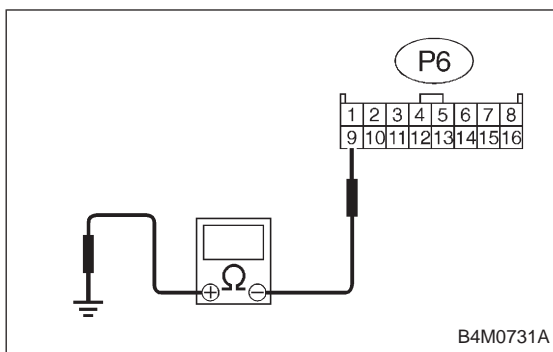
(F10) No. 3 — body / 10 — 13 V (In 1 second after turning ignition key ON.)

**3. CHECK BODY SHORT OF HARNESS.**

- 1) Turn ignition switch OFF.
- 2) Disconnect motor relay.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:

(P6) No. 9 — body / 1 M Ω or more



4. CHECK HARNESS BETWEEN ABS/TCS CONTROL MODULE AND MOTOR RELAY.

- 1) Turn ignition switch OFF.
- 2) Connect motor relay.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector and body.

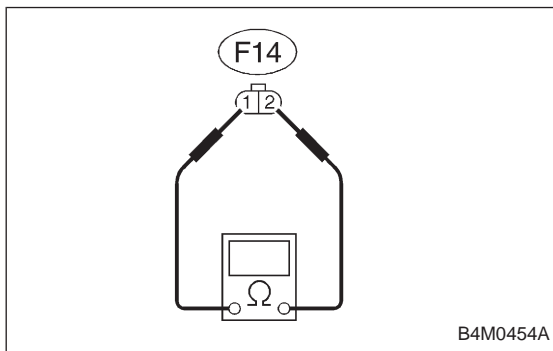
NOTE:

Apply + to GND.
Apply – to (P6) No. 9.

Connector & terminal / Specified resistance:
(P6) No. 9 — body / $57 \pm 6 \Omega$

5. CHECK MOTOR OPERATION.

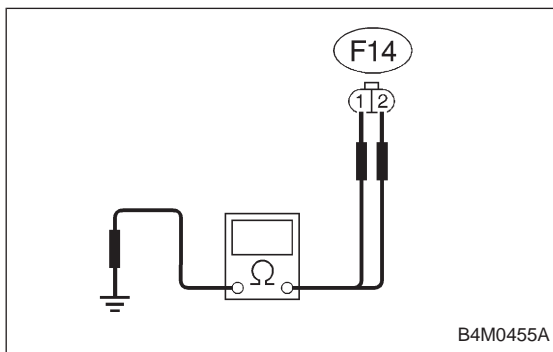
- 1) Connect motor relay.
- 2) Connect ABS/TCS control module.
- 3) Operate the TCS sequence check.
<Ref. to 4-4 [W20F0]. >
- 4) By the whirring sound check that the motor rotates.



6. CHECK RESISTANCE OF MOTOR SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect motor sensor connector.
- 3) Measure resistance between motor sensor connector terminals.

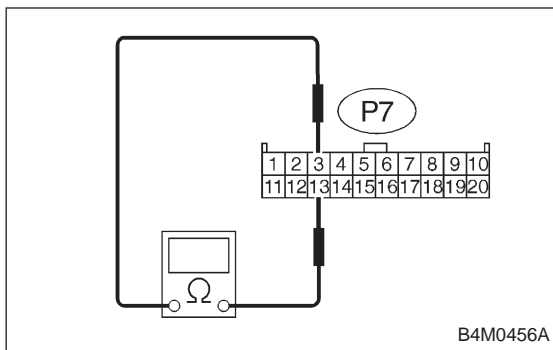
Connector & terminal / Specified resistance:
(F14) No. 1 — No. 2 / $72 - 98 \Omega$



7. CHECK BODY SHORT OF MOTOR SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect motor sensor connector.
- 3) Measure resistance between motor sensor connector and body.

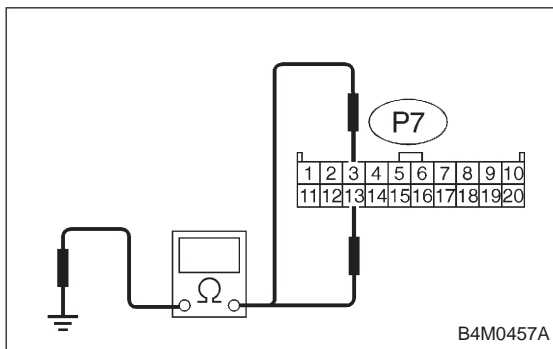
Connector & terminal / Specified resistance:
(F14) No. 1 — body / $1 M\Omega$ or more
(F14) No. 2 — body / $1 M\Omega$ or more



8. CHECK HARNESS BETWEEN ABS/TCS CONTROL MODULE AND MOTOR SENSOR.

- 1) Turn ignition switch OFF.
- 2) Connect motor sensor connector.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module connector terminals.

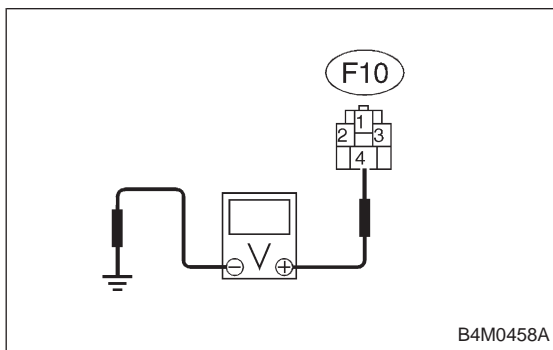
Connector & terminal / Specified resistance:
(P7) No. 3 — No. 13 / 72 — 98 Ω



9. CHECK BODY SHORT OF MOTOR SENSOR HARNESS.

- 1) Turn ignition switch OFF.
- 2) Connect motor sensor connector.
- 3) Disconnect ABS/TCS control module.
- 4) Measure resistance between ABS/TCS control module and body.

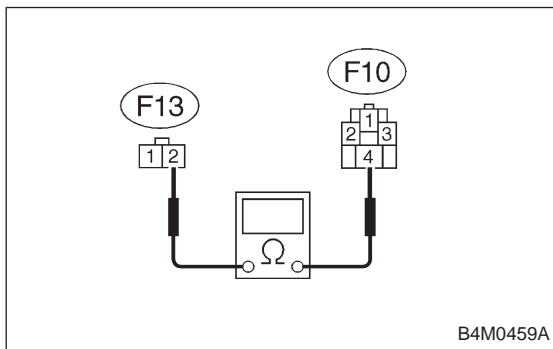
Connector & terminal / Specified resistance:
(P7) No. 3 — body / 1 MΩ or more
(P7) No. 13 — body / 1 MΩ or more



10. CHECK CONTACT POINT OF MOTOR RELAY.

- 1) Connect motor relay.
- 2) Connect ABS/TCS control module.
- 3) Operate the TCS sequence check. <Ref. to 4-4 [W20F0].>
- 4) Measure voltage between motor relay connector and body.

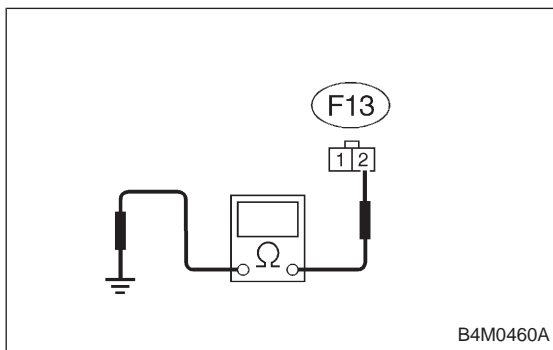
Connector & terminal / Specified voltage:
(F10) No. 4 — body / 10 — 14 V (While TCS operating indicator light is ON.)



11. CHECK HARNESS BETWEEN MOTOR AND MOTOR RELAY.

- 1) Turn ignition switch OFF.
- 2) Disconnect motor relay.
- 3) Disconnect motor connector.
- 4) Measure resistance between motor relay connector and motor connector.

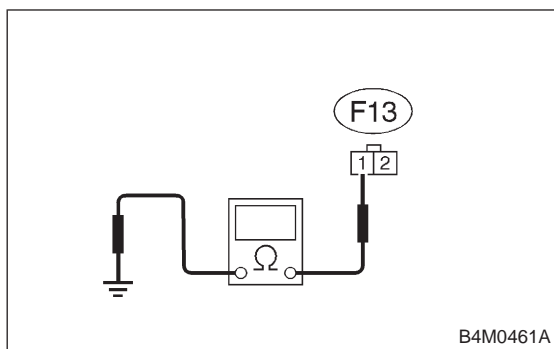
Connector & terminal / Specified resistance:
(F13) No. 2 — (F10) No. 4 / 1 Ω or less



12. CHECK BODY SHORT OF MOTOR HARNESS.

- 1) Turn ignition switch OFF.
- 2) Disconnect motor relay.
- 3) Disconnect motor connector.
- 4) Measure resistance between motor connector and body.

Connector & terminal / Specified resistance:
(F13) No. 2 — body / 1 MΩ or more

**13. CHECK GROUND CIRCUIT OF MOTOR.**

- 1) Turn ignition switch OFF.
- 2) Disconnect motor connector.
- 3) Measure resistance between motor connector and body.

Connector & terminal / Specified resistance:
(F13) No. 1 — body / 1 Ω or less

NOTE:

The check can also be made by analyzing the waves of the motor sensor output signal with oscilloscope during the TCS sequence control operation. If the ECM female connector end gives correct value, skip steps 6 through 9 above.

If not, operate the TCS sequence control again and measure the value at motor sensor male connector end with the motor sensor connector removed. If the value is OK, proceed with steps 8 and 9 above.

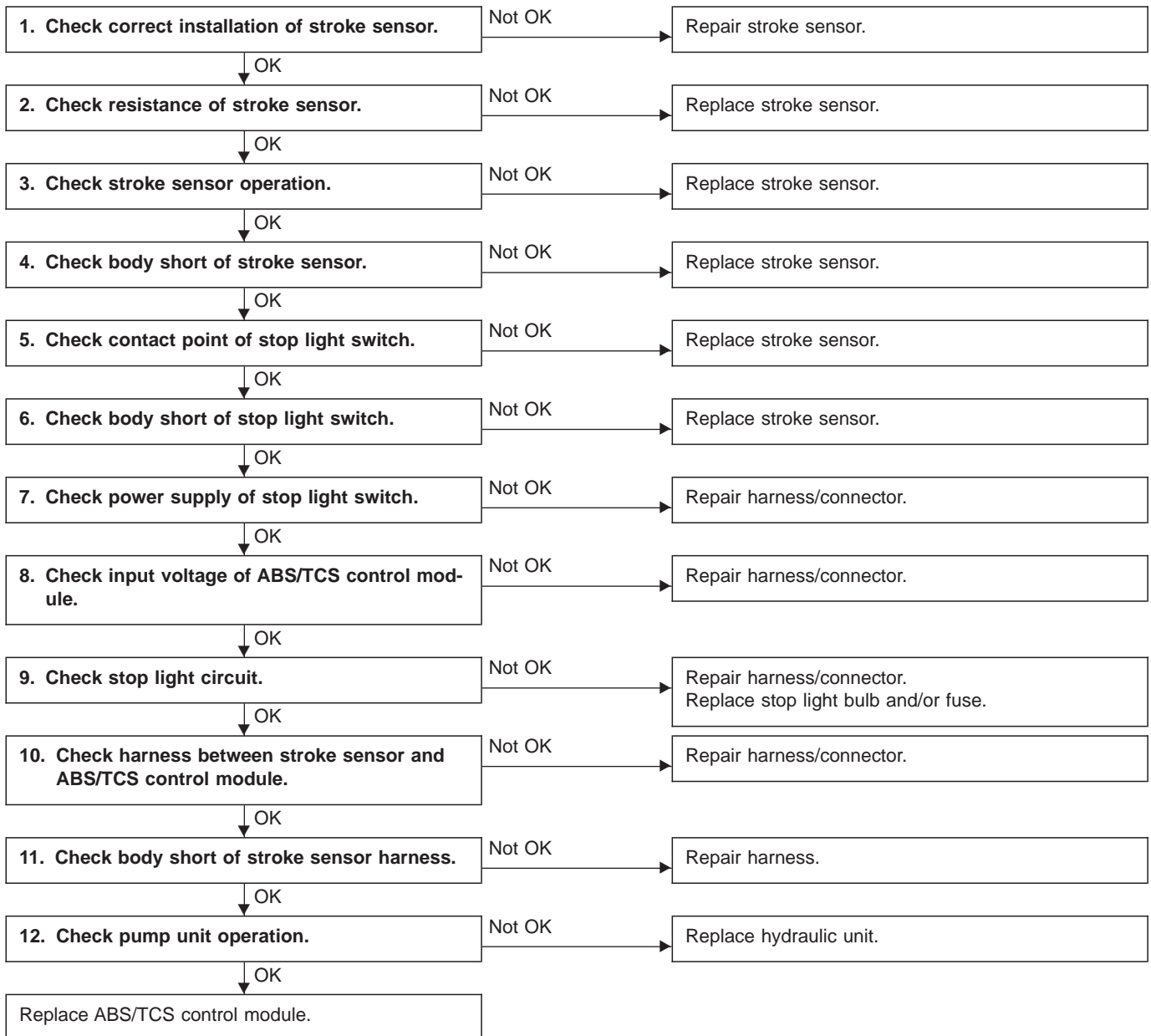
**K: TROUBLE CODE 54
— FAULTY STROKE SENSOR AND/OR STOP
LIGHT SWITCH —**

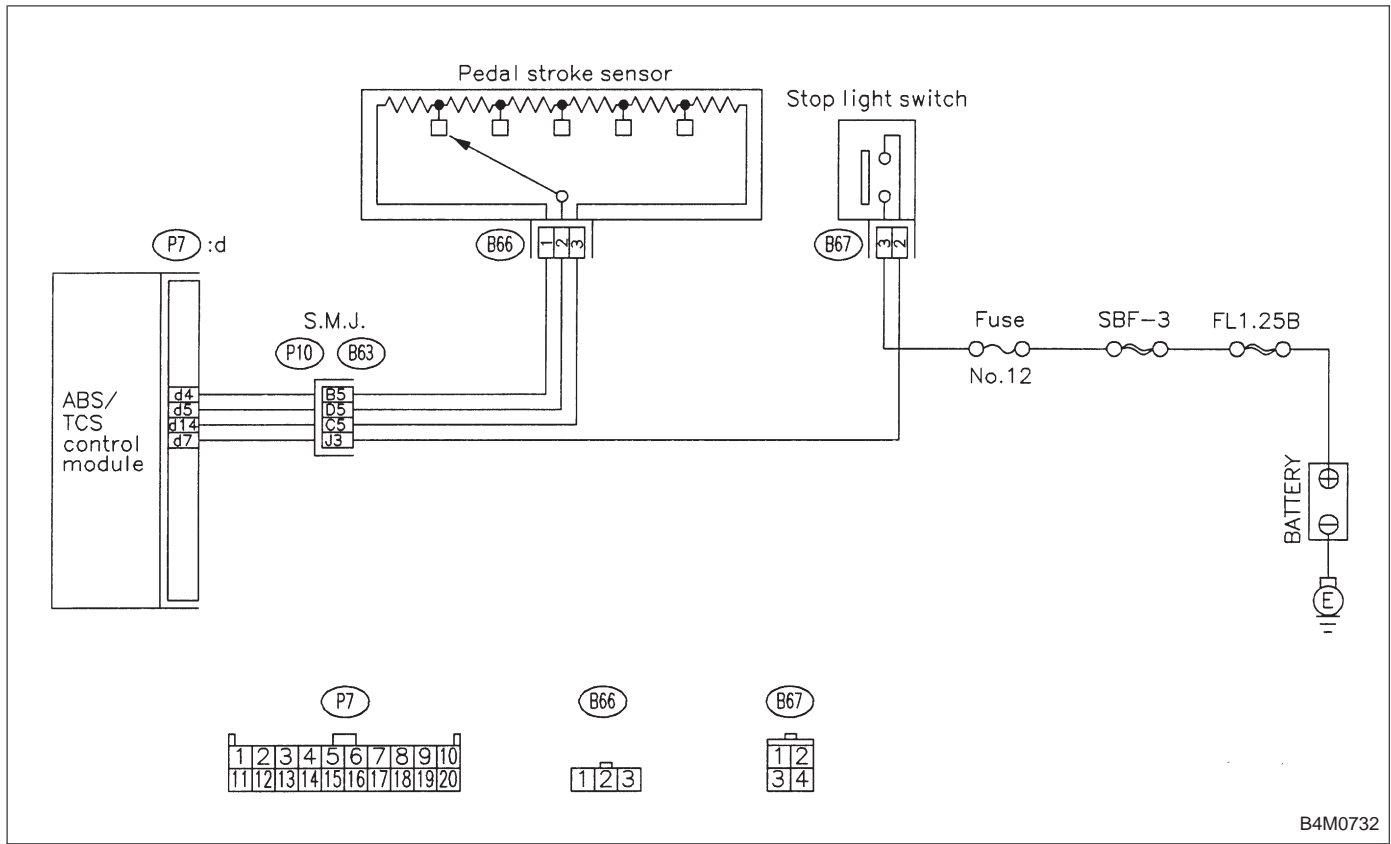
DIAGNOSIS:

- Faulty stroke sensor
- Faulty stop light switch
- Faulty pump unit in hydraulic unit
- Faulty ABS/TCS control module
- Faulty harness/connector

TROUBLE SYMPTOM:

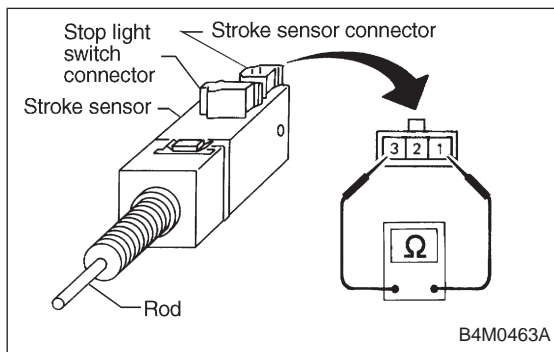
- ABS and TCS do not operate.
- No kick-back occurs while ABS is functioning.
- Only when the stop light switch circuit is broken, the ABS functions while TCS does not. (TCS warning light only illuminates.)





1. CHECK CORRECT INSTALLATION OF STROKE SENSOR.

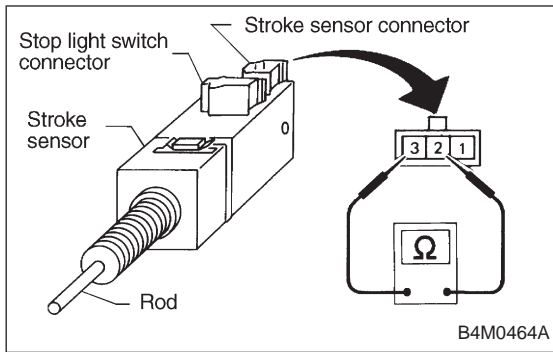
- 1) Check that the stroke sensor is firmly installed without play.
- 2) Check that the stop lamp does not remain illuminated.



2. CHECK RESISTANCE OF STROKE SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect stroke sensor connectors.
- 3) Remove stroke sensor.
- 4) Measure resistance between stroke sensor terminals.

Terminal / Specified resistance:
No. 1 — No. 3 / 570 — 630 Ω



3. CHECK STROKE SENSOR OPERATION.

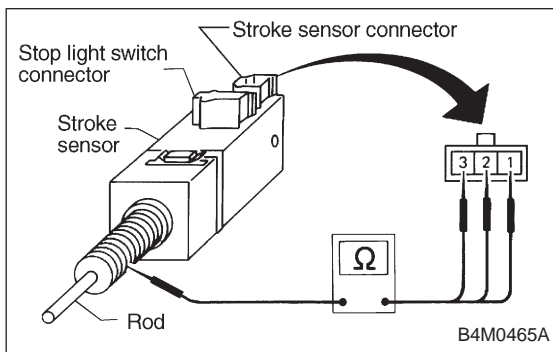
- 1) Turn ignition switch OFF.
- 2) Disconnect stroke sensor connectors.
- 3) Remove stroke sensor.
- 4) Measure the stroke sensor resistance against the rod stroke.

Terminal:
No. 3 — No. 2

Stroke	Unit: mm (in)	Specified resistance
0 — 3.1±0.5 (0 — 0.122±0.020)		95 — 105 Ω
3.1 — 5.5±0.5 (0.122 — 0.217±0.020)		190 — 210 Ω
5.5 — 7.9±0.5 (0.217 — 0.311±0.020)		285 — 315 Ω
7.9 — 10.3±0.5 (0.311 — 0.406±0.020)		380 — 420 Ω
10.3 — 18±0.5 (0.406 — 0.709±0.020)		475 — 525 Ω

NOTE:

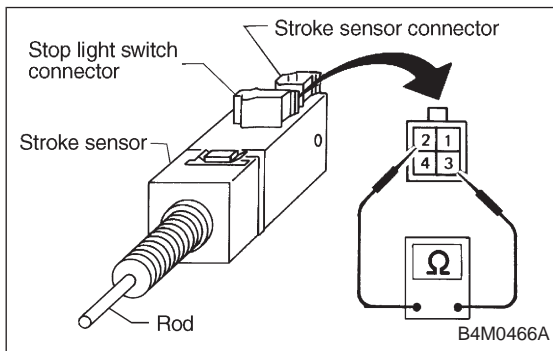
Stroke = 0 when the stroke sensor rod is completely drawn into the sensor unit.



4. CHECK BODY SHORT OF STROKE SENSOR.

- 1) Turn ignition switch OFF.
- 2) Disconnect stroke sensor connectors.
- 3) Remove stroke sensor.
- 4) Measure resistance between stroke sensor terminal and stroke sensor threads.

Terminal / Specified resistance:
No. 1 — stroke sensor threads/ 1 MΩ or more
No. 2 — stroke sensor threads/ 1 MΩ or more
No. 3 — stroke sensor threads/ 1 MΩ or more



5. CHECK CONTACT POINT OF STOP LIGHT SWITCH.

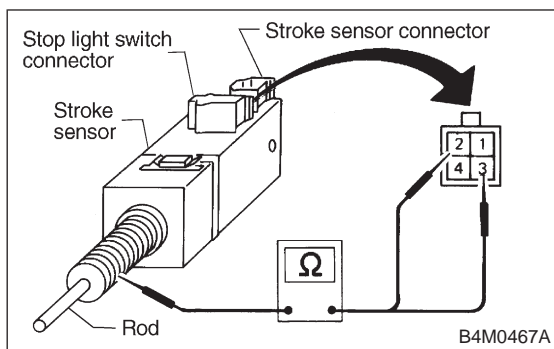
- 1) Turn ignition switch OFF.
- 2) Disconnect stroke sensor connectors.
- 3) Remove stroke sensor.
- 4) Measure resistance between stroke sensor terminals.

Terminal:
No. 2 — No. 3

Stroke	Unit mm (in)	Specified resistance
0 — 2.2±1.0 (0 — 0.087±0.039)		1 MΩ or more
2.2±1.0 — 18.0±0.5 (0.087±0.039 — 0.709±0.020)		1 Ω or less

NOTE:

Stroke = 0 when the rod is completely drawn in.

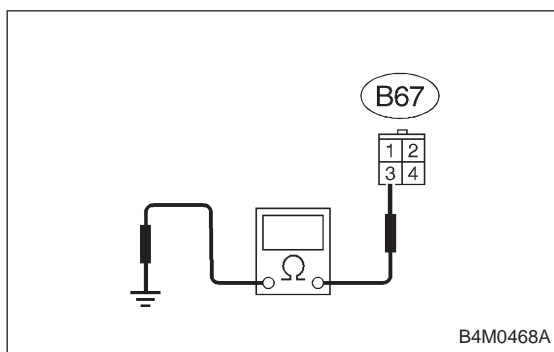
**6. CHECK BODY SHORT OF STOP LIGHT SWITCH.**

- 1) Turn ignition switch OFF.
- 2) Disconnect stroke sensor connectors.
- 3) Remove stroke sensor.
- 4) Measure resistance between stroke sensor terminal and stroke sensor threads.

Terminal / Specified resistance:

No. 2 — stroke sensor threads / 1 MΩ or more

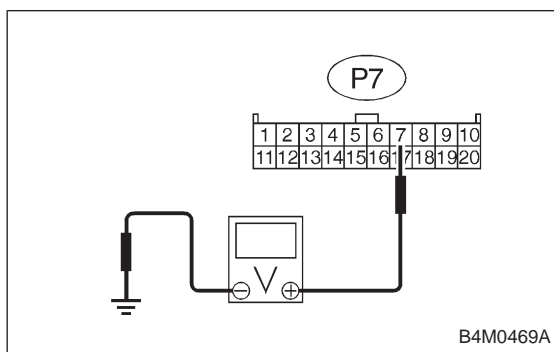
No. 3 — stroke sensor threads / 1 MΩ or more

**7. CHECK POWER SUPPLY OF STOP LIGHT SWITCH.**

- 1) Turn ignition switch OFF.
- 2) Disconnect stroke sensor connector.
- 3) Measure voltage between stroke sensor connector and body.

Connector & terminal / Specified voltage:

(B67) No. 3 — body / 10 — 13 V

**8. CHECK INPUT VOLTAGE OF ABS/TCS CONTROL MODULE.**

- 1) Turn ignition switch OFF.
- 2) Install stroke sensor.
- 3) Connect stop light switch connector.
- 4) Disconnect ABS/TCS control module connector.
- 5) Measure voltage between ABS/TCS control module connector and body.

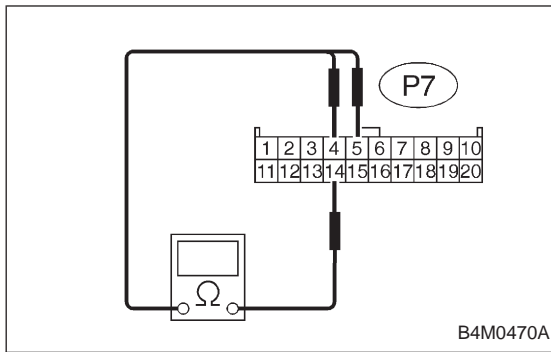
Connector & terminal / Specified voltage:

(P7) No. 7 — body / 10 — 13 V (With brake pedal depressed)

(P7) No. 7 — body / 0 V (Without brake pedal depressed)

9. CHECK STOP LIGHT CIRCUIT.

- 1) Turn ignition switch OFF.
- 2) Install stroke sensor.
- 3) Connect stroke sensor connector.
- 4) Connect ABS/TCS control module connector.
- 5) Depress brake pedal and check that the stop light comes on.



10. CHECK HARNESS BETWEEN STROKE SENSOR AND ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Install stroke sensor.
- 3) Connect stroke sensor connector.
- 4) Disconnect ABS/TCS control module connector.
- 5) Measure resistance between ABS/TCS control module connector terminals.

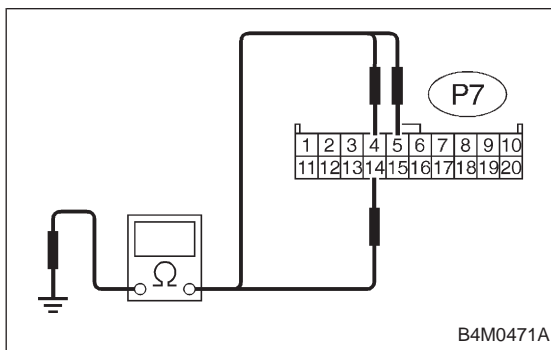
Connector & terminal / Specified resistance:

(P7) No. 4 — No. 14 / 570 — 630 Ω

(P7) No. 5 — No. 14 / 95 — 105 Ω

NOTE:

Do not depress brake pedal.



11. CHECK BODY SHORT OF STROKE SENSOR HARNESS.

- 1) Turn ignition switch OFF.
- 2) Connect stroke sensor connector.
- 3) Disconnect ABS/TCS control module connector.
- 4) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:

(P7) No. 4 — body / 1 M Ω or more

(P7) No. 5 — body / 1 M Ω or more

(P7) No. 14 — body / 1 M Ω or more

12. CHECK PUMP UNIT OPERATION.

- 1) Turn ignition switch OFF.
- 2) Connect stroke sensor connector.
- 3) Connect stop light switch connector.
- 4) Connect ABS/TCS control module connector.
- 5) Operate the TCS sequence control and check that the front brake fluid pressure increases and decreases correctly. <Ref. to 4-4 [W20F0].>

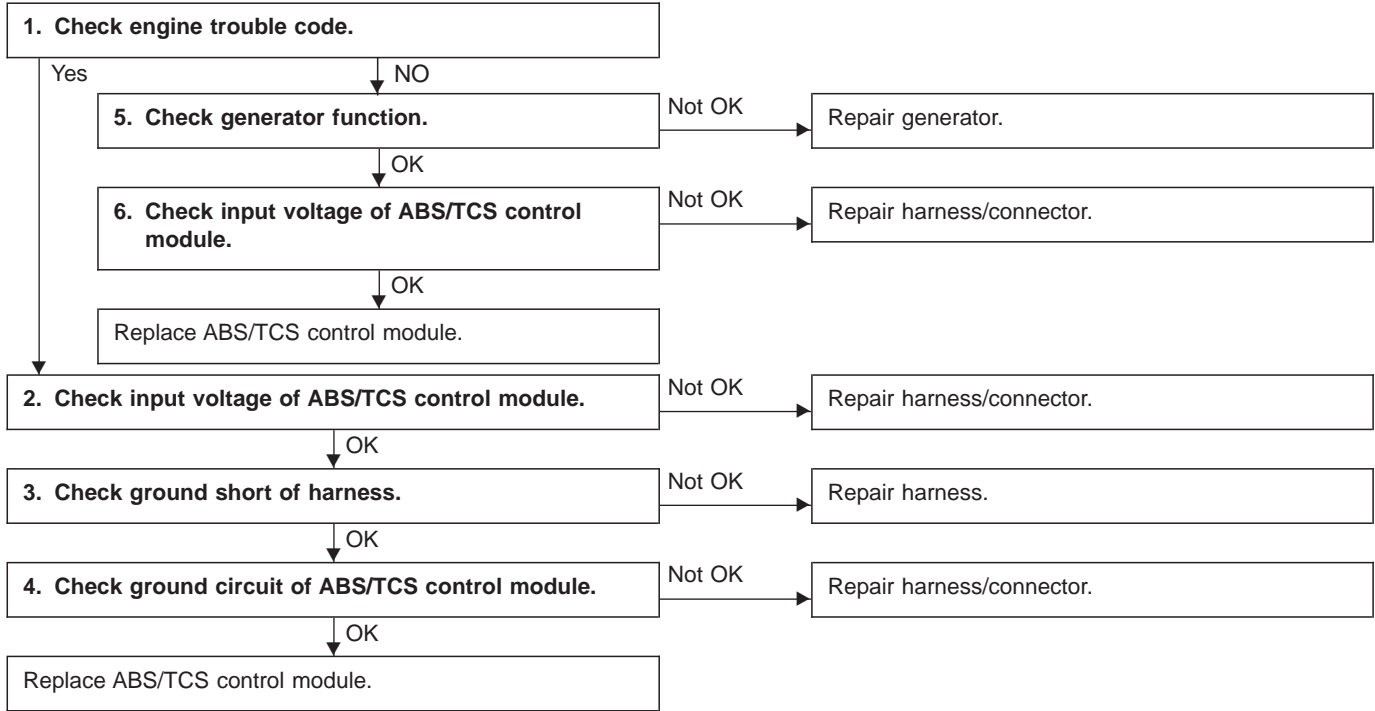
**L: TROUBLE CODE 57
— FAULTY FLUID LEVEL SENSOR —**

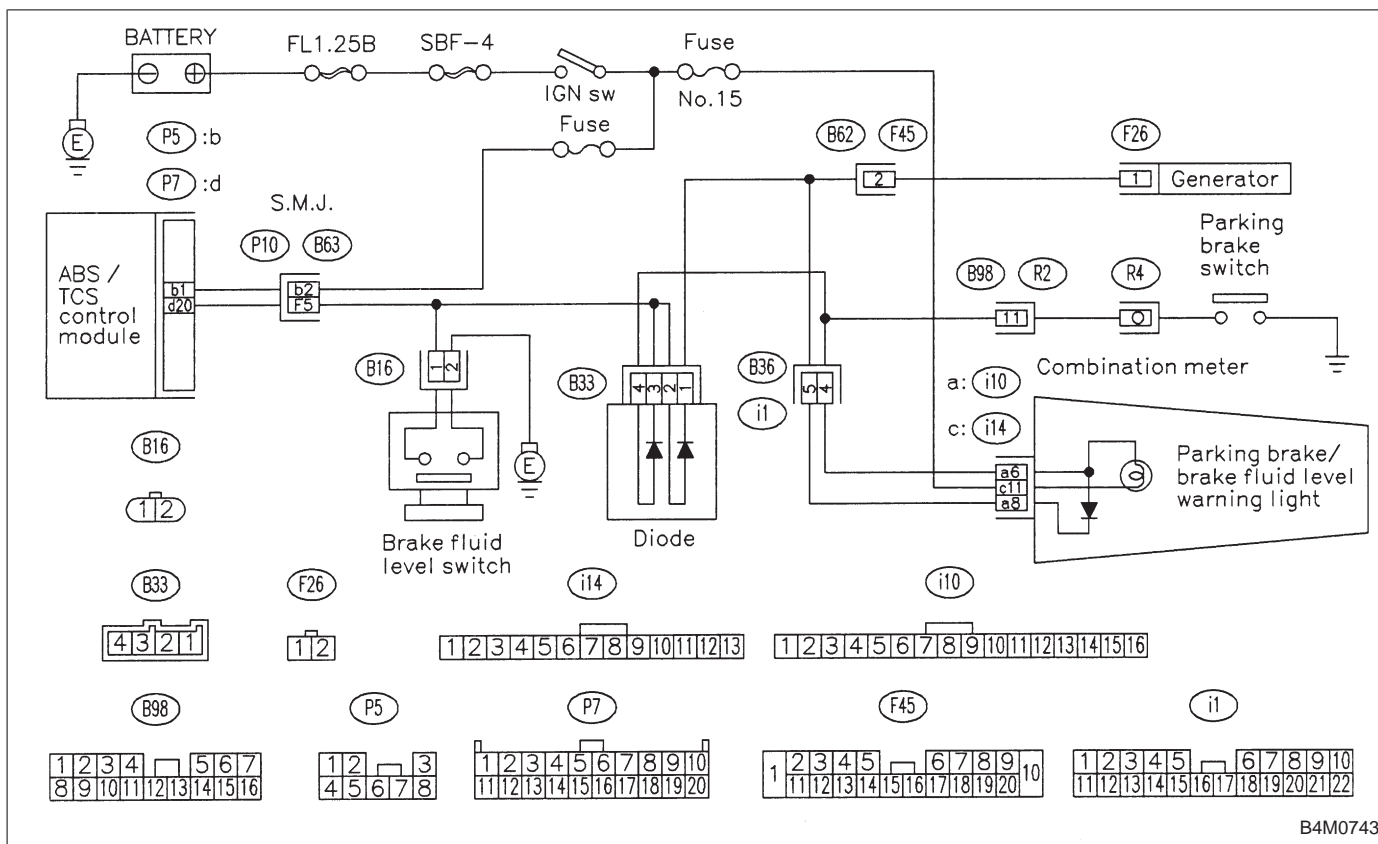
DIAGNOSIS:

- Faulty fluid level sensor circuit
- Faulty harness/connector
- Faulty ABS/TCS control module
- Faulty generator

TROUBLE SYMPTOM:

- ABS does not operate.
- TCS does not operate.

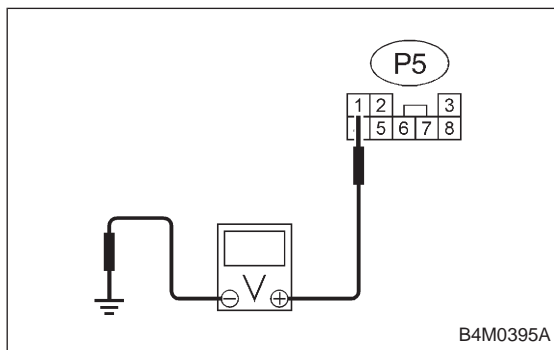




B4M0743

1. CHECK ENGINE TROUBLE CODE.

- 1) Read out engine trouble code.
- 2) Is trouble code 39 in memory?

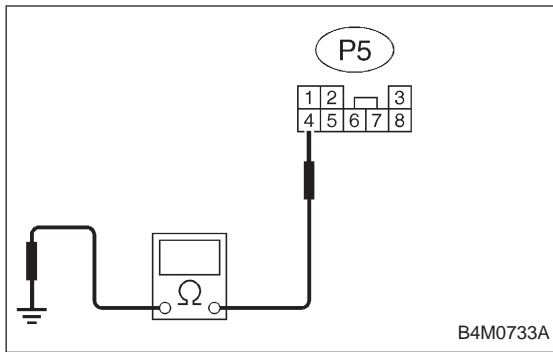


B4M0395A

2. CHECK INPUT VOLTAGE OF ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect ABS/TCS control module connectors.
- 3) Turn ignition switch ON, while engine is idling.
- 4) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:
(P5) No. 1 — body / 14.5±0.3 V

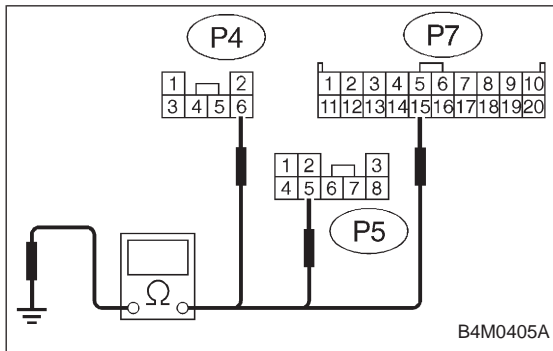


3. CHECK GROUND SHORT OF HARNESS.

- 1) Turn ignition switch OFF.
- 2) Remove No. 18 fuse from fuse and joint box.
- 3) Disconnect ABS/TCS control module connectors.
- 4) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:

(P5) No. 1 — body / 1 MΩ or more



4. CHECK GROUND CIRCUIT OF ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Disconnect connector from ABS/TCS control module.
- 3) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:

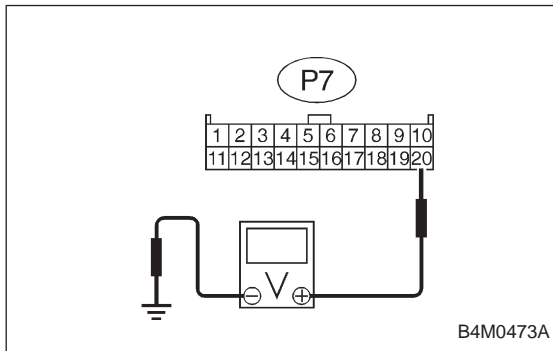
(P4) No. 6 — body / 1 Ω or less

(P5) No. 5 — body / 1 Ω or less

(P7) No. 15 — body / 1 Ω or less

5. CHECK GENERATOR FUNCTION.

- 1) When the ignition key is at OFF, check the charge warning light is off.
- 2) Turn the key ON and ensure the light comes on.
- 3) Keep the engine running at idle and ensure the light goes off.



6. CHECK INPUT VOLTAGE OF ABS/TCS CONTROL MODULE.

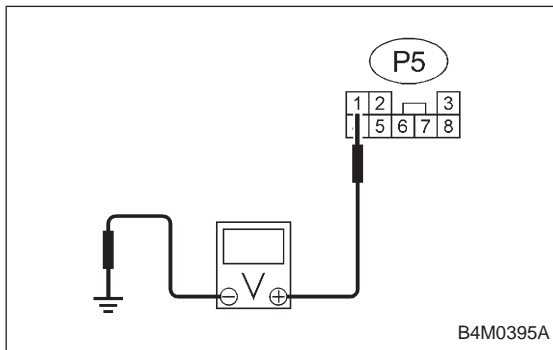
- 1) Turn ignition switch OFF.
- 2) Disconnect ABS/TCS control module connectors.
- 3) Turn ignition switch ON.
- 4) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:

(P7) No. 20 — body / 2 V or less (Engine OFF)

(P7) No. 20 — body / 10 — 14 V (Engine idling)

(P5) No. 1 — body / 10 — 13 V (Engine OFF)



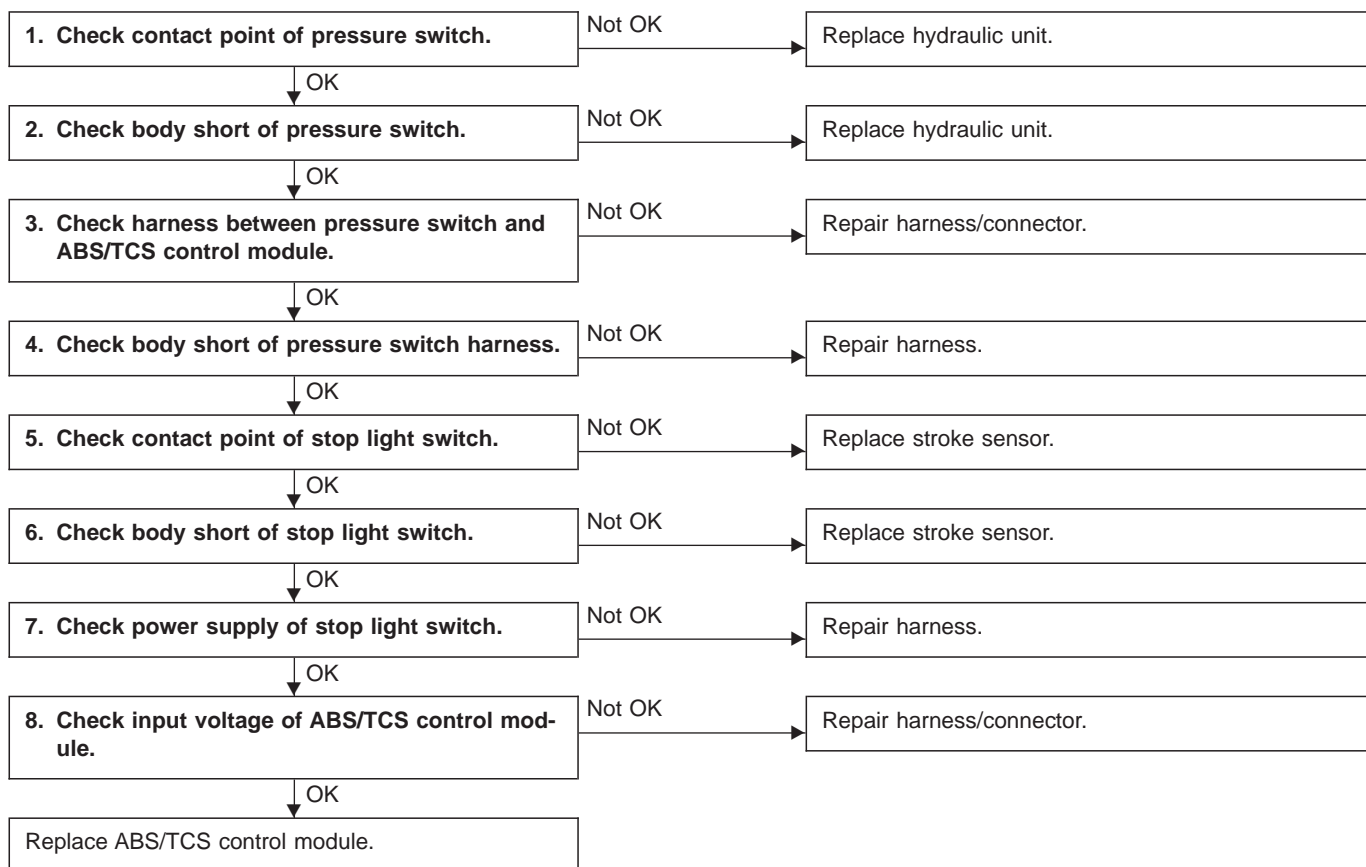
**M: TROUBLE CODE 58
— FAULTY PRESSURE SWITCH —**

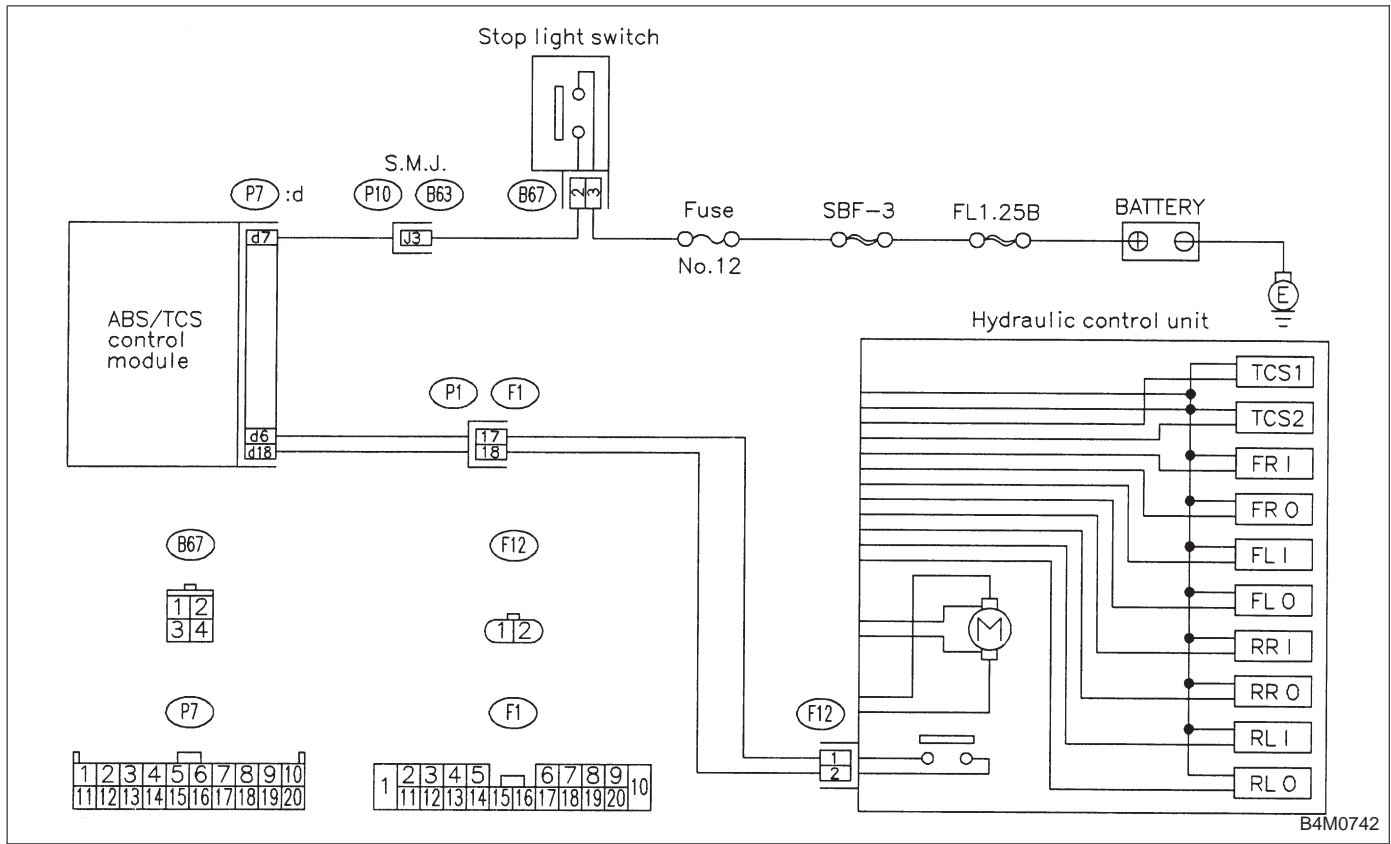
DIAGNOSIS:

- Faulty pressure switch
- Faulty stop light switch
- Faulty harness/connector
- Faulty ABS/TCS control module

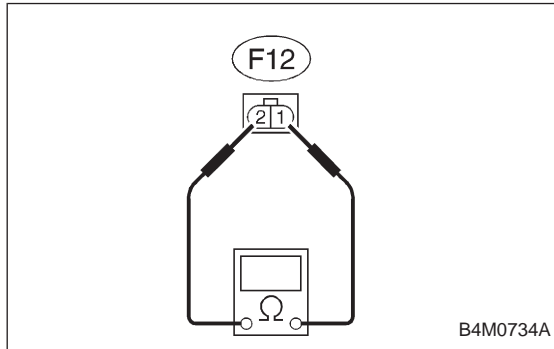
TROUBLE SYMPTOM:

- TCS does not operate.





B4M0742



B4M0734A

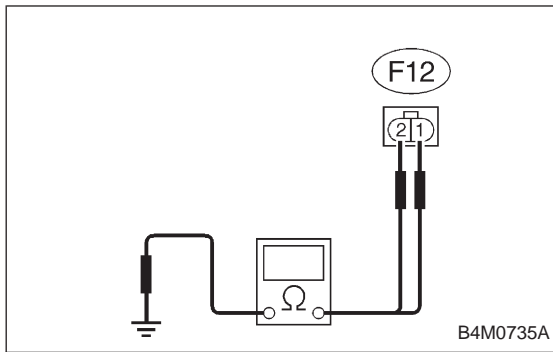
1. CHECK CONTACT POINT OF PRESSURE SWITCH.

- 1) Turn ignition switch OFF.
- 2) Disconnect hydraulic unit connector.
- 3) Measure resistance between hydraulic unit connector terminals.

Connector & terminal / Specified resistance:

(F12) No. 1 — No. 2 / 1 MΩ or more (With brake pedal depressed)

(F12) No. 1 — No. 2 / 1 Ω or less (Without brake pedal depressed)



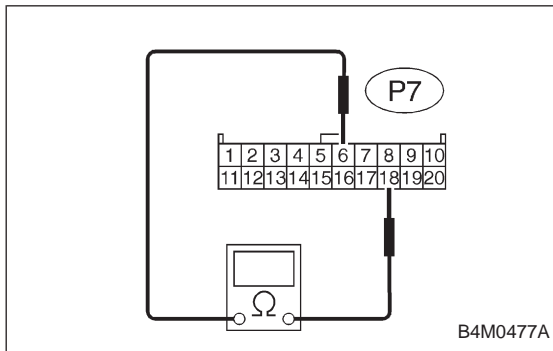
2. CHECK BODY SHORT OF PRESSURE SWITCH.

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

Connector & terminal / Specified resistance:

(F12) No. 1 — body / 1 MΩ or more

(F12) No. 2 — body / 1 MΩ or more



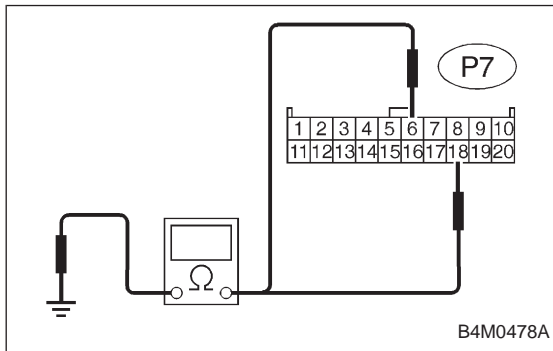
3. CHECK HARNESS BETWEEN PRESSURE SWITCH AND ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Connect hydraulic unit connector.
- 3) Disconnect ABS/TCS control module connector.
- 4) Measure resistance between ABS/TCS control module connector terminals.

Connector & terminal / Specified resistance:

(P7) No. 6 — No. 18 / 1 MΩ or more (With brake pedal depressed)

(P7) No. 6 — No. 18 / 1 Ω or less (Without brake pedal depressed)



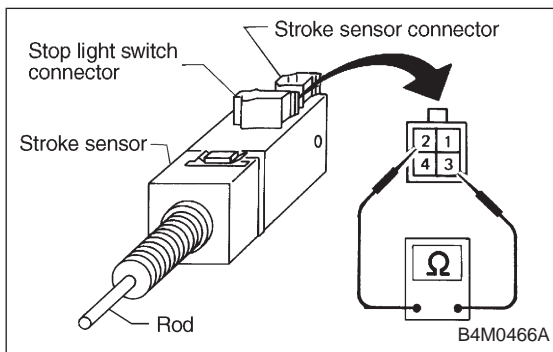
4. CHECK BODY SHORT OF PRESSURE SWITCH HARNESS.

- 1) Turn ignition switch OFF.
- 2) Disconnect ABS/TCS control module connector.
- 3) Measure resistance between ABS/TCS control module connector and body.

Connector & terminal / Specified resistance:

(P7) No. 6 — body / 1 MΩ or more

(P7) No. 18 — body / 1 MΩ or more



5. CHECK CONTACT POINT OF STOP LIGHT SWITCH.

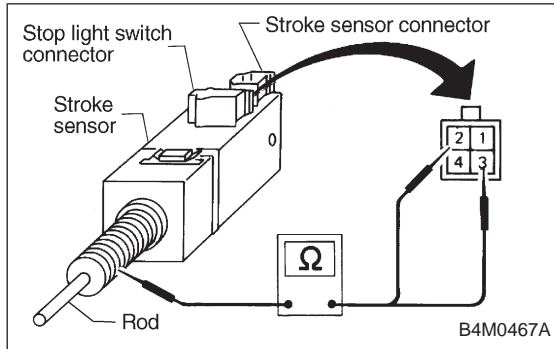
- 1) Turn ignition switch OFF.
- 2) Disconnect stop light switch connectors.
- 3) Remove stroke sensor.
- 4) Measure resistance between stroke sensor terminals.

Terminal:
No. 2 — No. 3

Stroke	Unit: mm (in)	Specified resistance
0 — 2.2±1.0 (0 — 0.087±0.039)		1 MΩ or more
2.2±1.0 — 18.0±0.5 (0.087±0.039 — 0.709±0.020)		1 Ω or less

NOTE:

Stroke = 0 when the rod is completely drawn in.



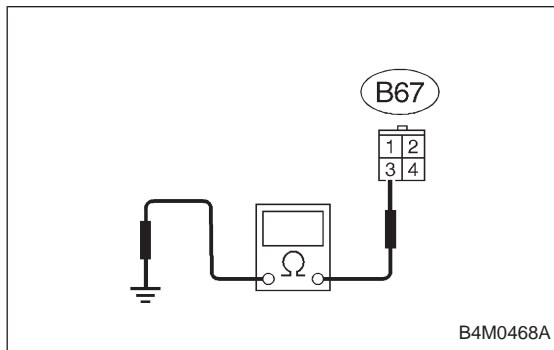
6. CHECK BODY SHORT OF STOP LIGHT SWITCH.

- 1) Turn ignition switch OFF.
- 2) Disconnect stroke sensor connectors.
- 3) Remove stroke sensor.
- 4) Measure resistance between stroke sensor terminal and stroke sensor threads.

Terminal / Specified resistance:

No. 2 — stroke sensor threads / 1 MΩ or more

No. 3 — stroke sensor threads / 1 MΩ or more

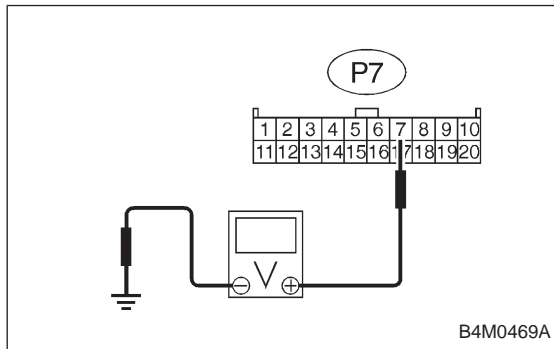


7. CHECK POWER SUPPLY OF STOP LIGHT SWITCH.

- 1) Turn ignition switch OFF.
- 2) Disconnect stroke sensor connector.
- 3) Measure voltage between stroke sensor connector and body.

Connector & terminal / Specified voltage:

(B67) No. 3 — body / 10 — 13 V



8. CHECK INPUT VOLTAGE OF ABS/TCS CONTROL MODULE.

- 1) Turn ignition switch OFF.
- 2) Install stroke sensor.
- 3) Connect stroke sensor connector.
- 4) Disconnect ABS/TCS control module connector.
- 5) Measure voltage between ABS/TCS control module connector and body.

Connector & terminal / Specified voltage:

(P7) No. 7 — body / 10 — 13 V (With brake pedal depressed)

(P7) No. 7 — body / 0 V (Without brake pedal depressed)