

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).

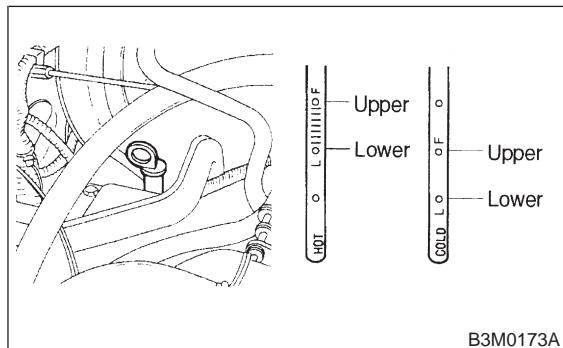
CAUTION:

- 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 performing diagnostics and servicing the TCM.

2. Pre-inspection

A: ATF LEVEL

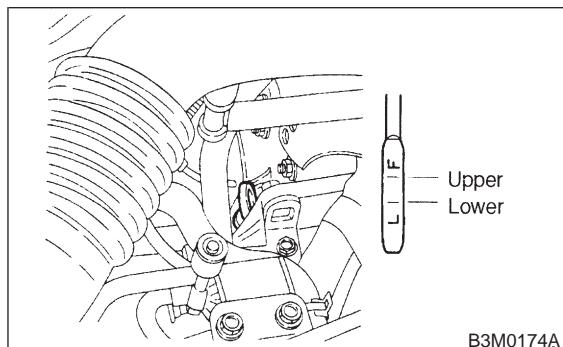
Make sure that ATF level is in the specification.



B3M0173A

B: FRONT DIFFERENTIAL OIL LEVEL

Make sure that front differential oil level is in the specification.



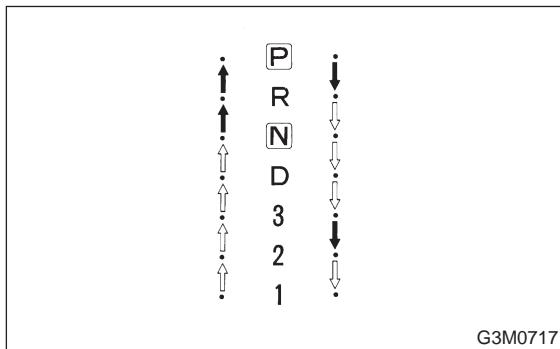
B3M0174A

C: OPERATION OF SHIFT SELECTOR LEVER

WARNING:

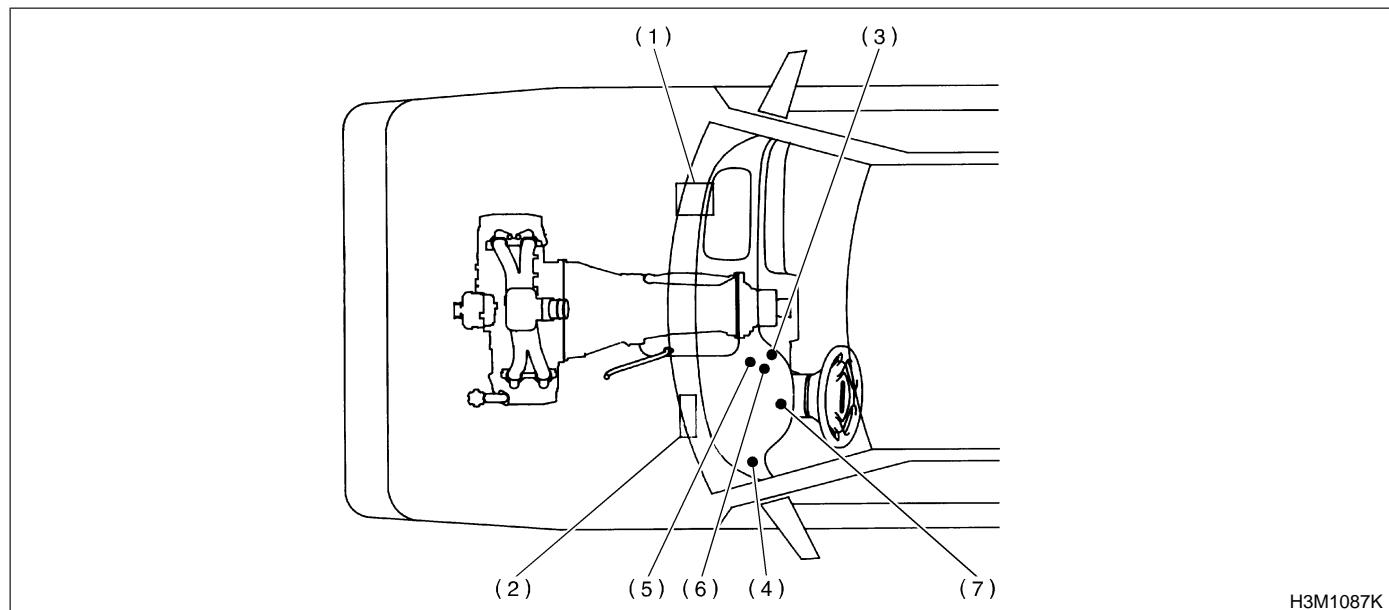
Stop the engine while checking operation of selector lever.

- 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.

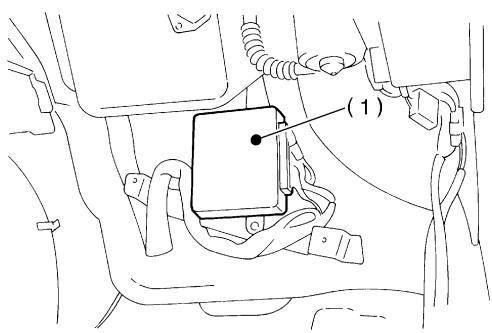


3. Electrical Components Location

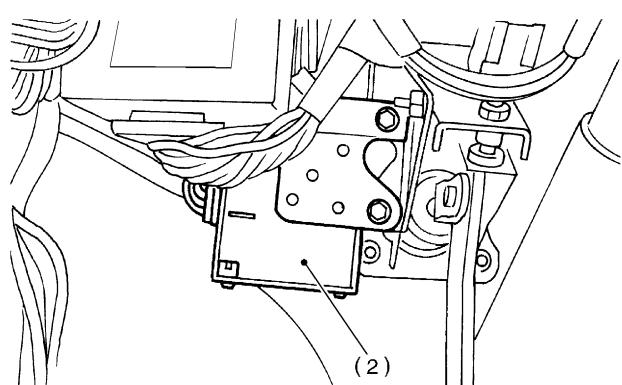
A: MODULE



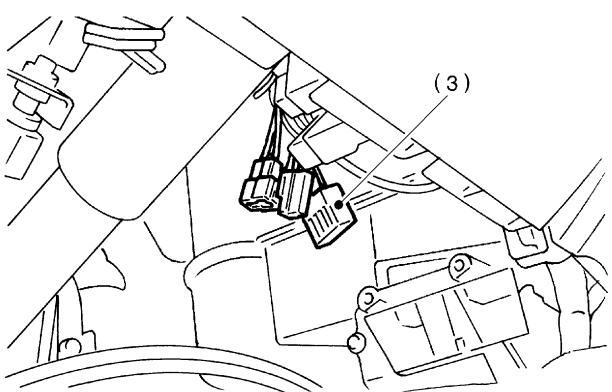
| | | |
|--|--|---|
| (1) ECM | (4) Data link connector (for Subaru select monitor and OBD-II general scan tool) | (6) Diagnosis terminal |
| (2) TCM | (5) Diagnosis connector | (7) AT OIL TEMP indicator light (AT diagnostic indicator light) |
| (3) Data link connector (for Subaru select monitor only) | | |



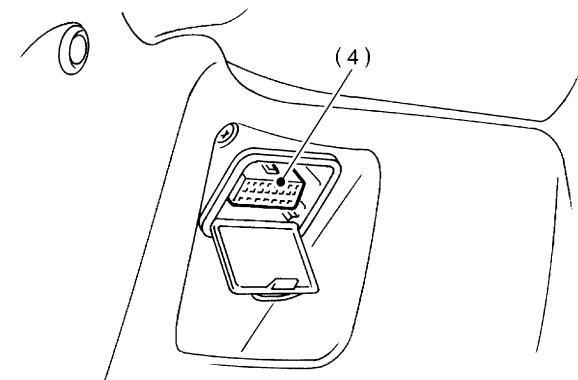
B3M0183E



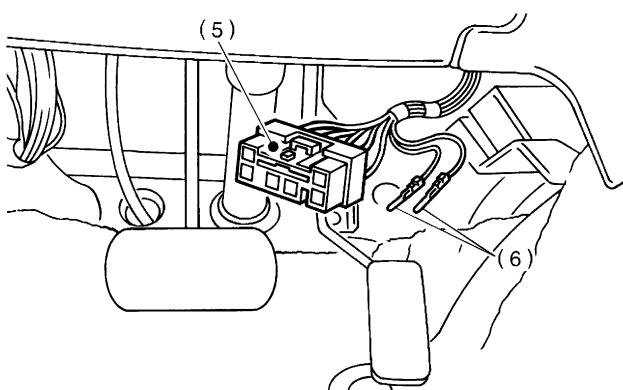
B3M0443K



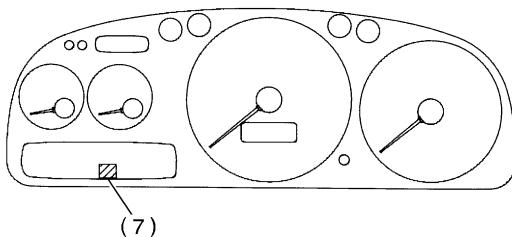
H2M1133F



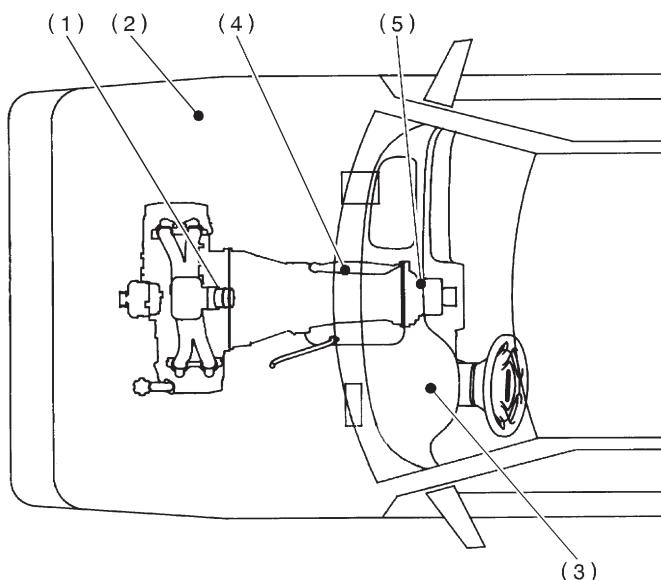
H2M1134G



H3M1161F



H3M1675A

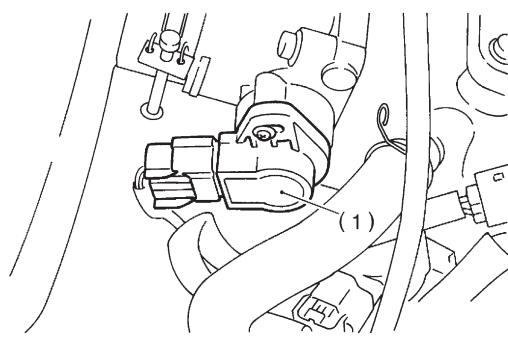
B: SENSOR

H3M1087L

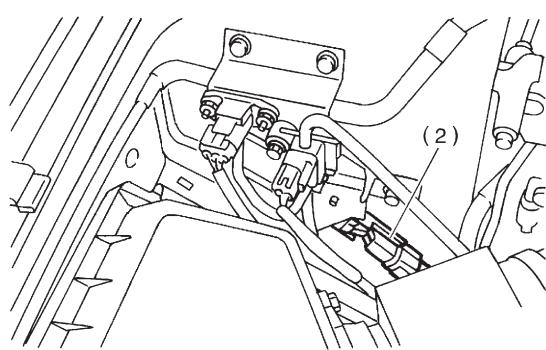
(1) Throttle position sensor
(2) Dropping resistor

(3) Vehicle speed sensor 2
(4) Inhibitor switch

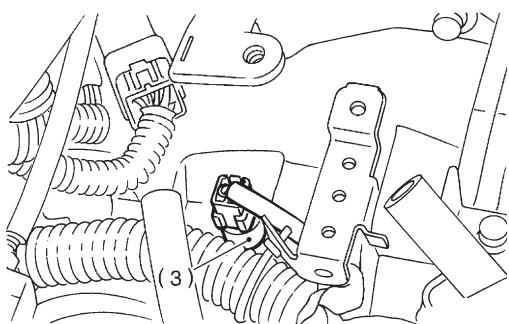
(5) Vehicle speed sensor 1



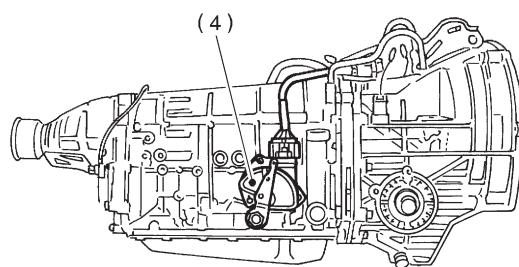
S2M0262B



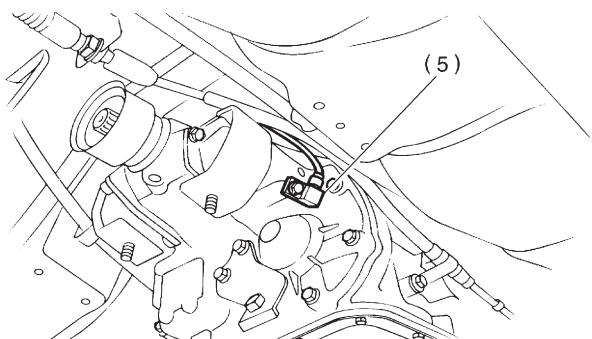
OBD0046F



S3M0058A



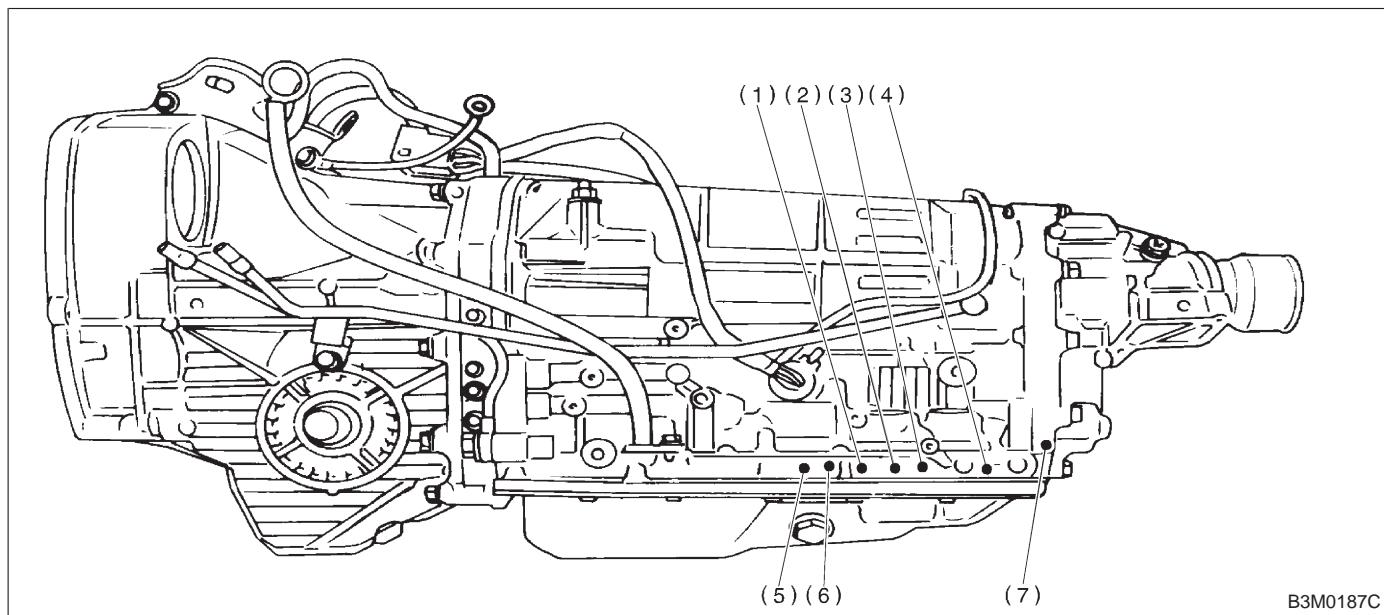
B2M1043J



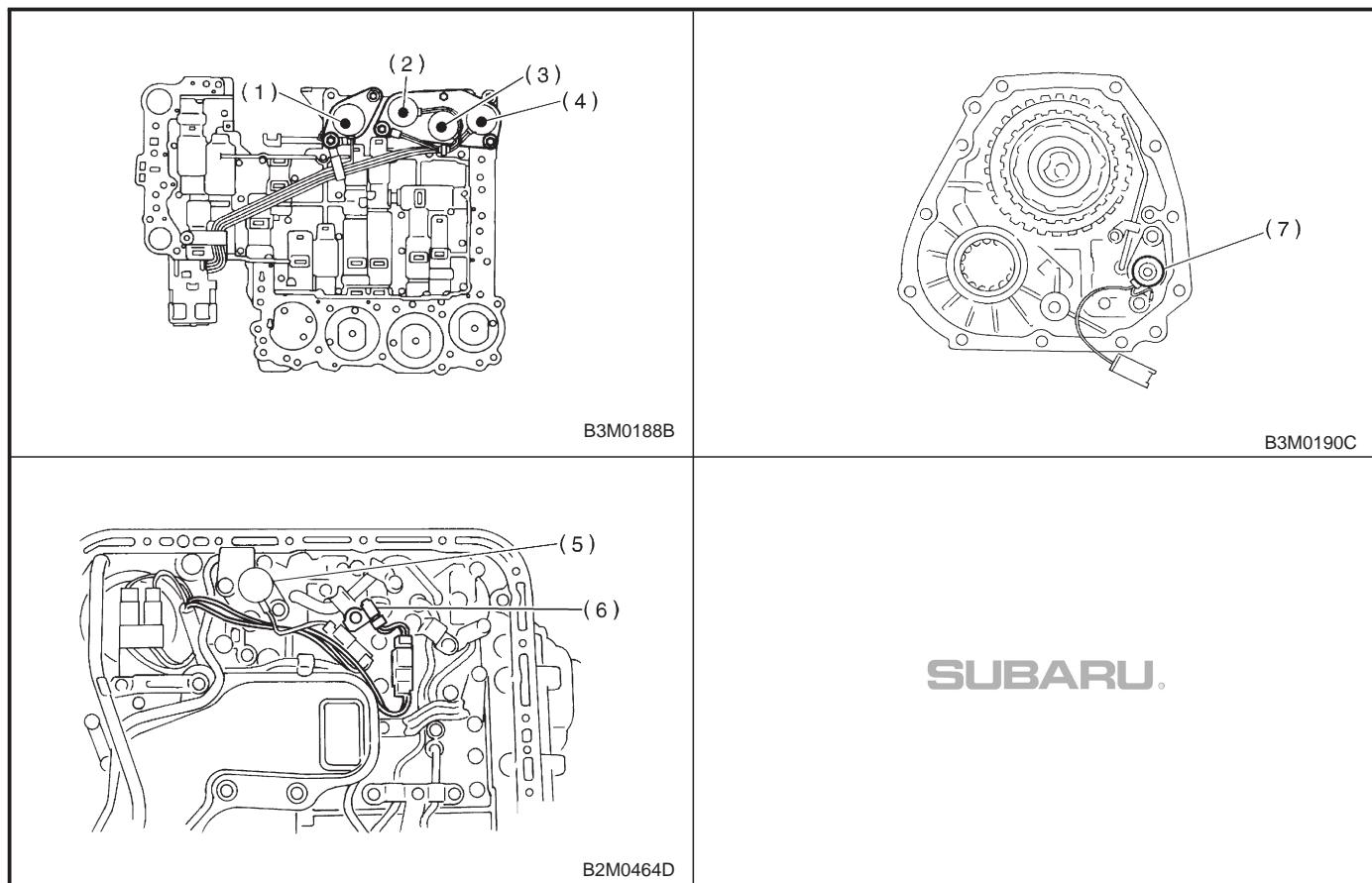
B3M0184H

SUBARU.

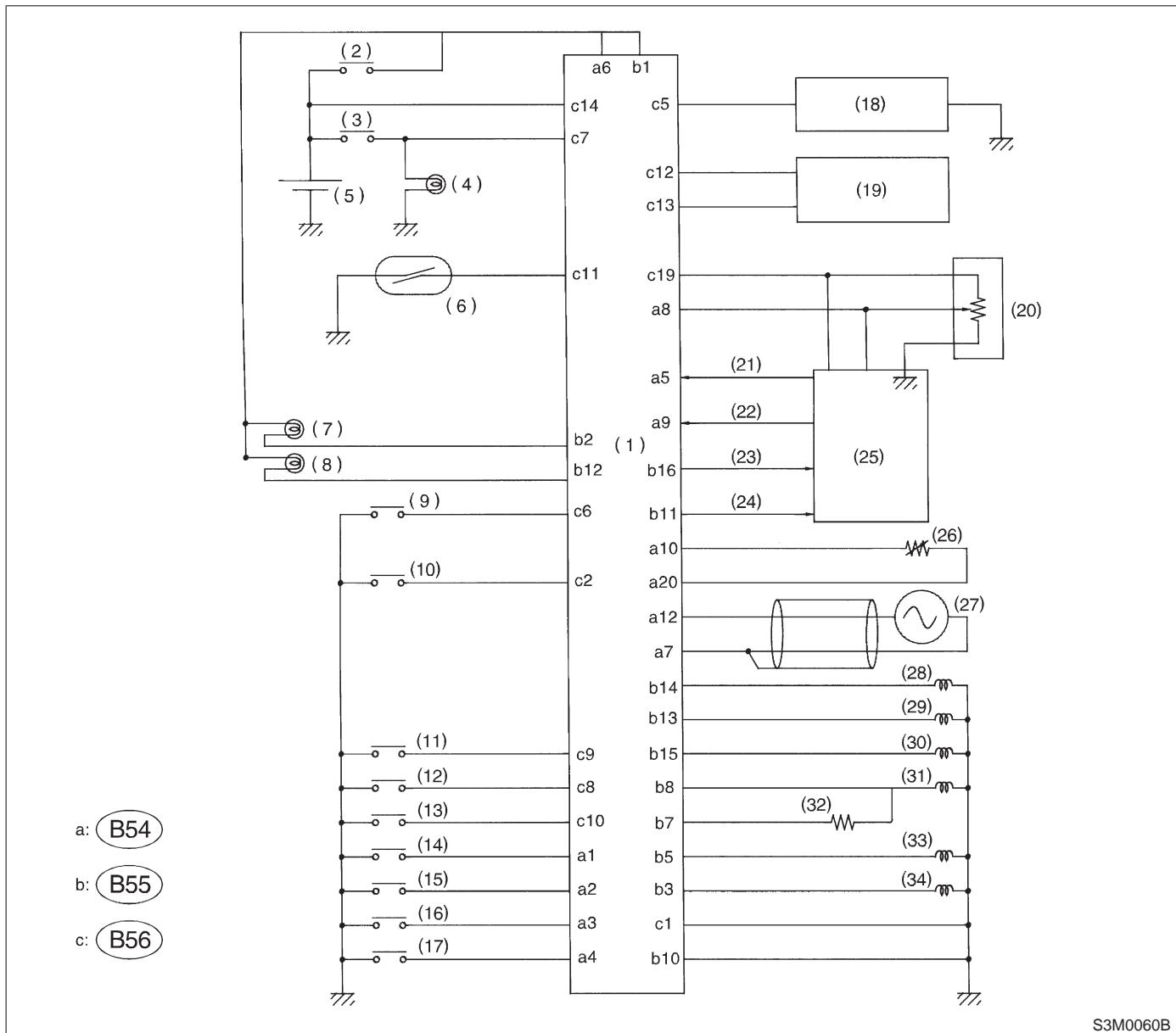
C: SOLENOID



| | | |
|---------------------|----------------------------|---------------------------|
| (1) Duty solenoid A | (4) Solenoid 3 | (7) Duty solenoid C (AWD) |
| (2) Solenoid 2 | (5) Duty solenoid B | |
| (3) Solenoid 1 | (6) ATF temperature sensor | |

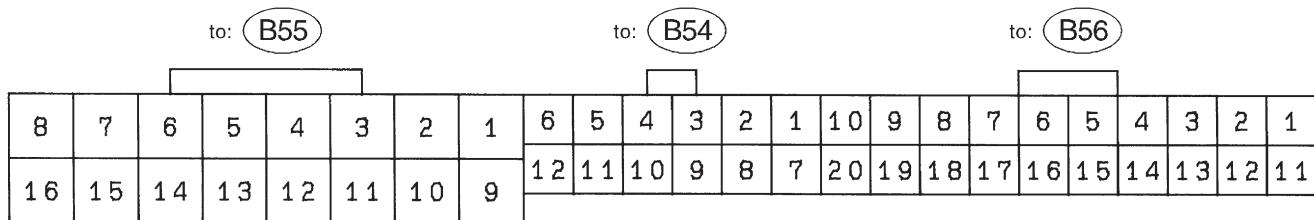


4. Schematic



| | | |
|---------------------------------|-------------------------------|-----------------------------|
| (1) Transmission control module | (13) "N" range switch | (25) Engine control module |
| (2) Ignition switch | (14) "D" range switch | (26) ATF temperature sensor |
| (3) Brake switch | (15) "3" range switch | (27) Vehicle speed sensor 1 |
| (4) Brake light | (16) "2" range switch | (28) Shift solenoid 1 |
| (5) Battery | (17) "1" range switch | (29) Shift solenoid 2 |
| (6) Vehicle speed sensor 2 | (18) ABS control module | (30) Shift solenoid 3 |
| (7) FWD indicator light | (19) Data link connector | (31) Duty solenoid A |
| (8) AT OIL TEMP indicator light | (20) Throttle position sensor | (32) Dropping resistor |
| (9) Diagnosis switch | (21) Engine speed signal | (33) Duty solenoid B |
| (10) FWD switch | (22) Mass air flow signal | (34) Duty solenoid C |
| (11) "P" range switch | (23) Torque control signal | |
| (12) "R" range switch | (24) AT diagnostics signal | |

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



S3M0061A

| Check with ignition switch ON. | | | | | | |
|--------------------------------|------------------|--------------------|-----------------|---|-------------|--|
| Content | | Connec- tor No. | Terminal No. | Measuring conditions | Voltage (V) | |
| Back-up power supply | | B56 | 14 | Ignition switch OFF | 10 — 16 | |
| Ignition power supply | | B54 | 6 | Ignition switch ON (with engine OFF) | 10 — 16 | |
| | | B55 | 1 | | | |
| Inhibitor switch | "P" range switch | B56 | 9 | Select lever in "P" range | Less than 1 | |
| | | | | Select lever in any other than "P" range (except "N" range) | More than 8 | |
| | "N" range switch | B56 | 8 | Select lever in "N" range | Less than 1 | |
| | | | | Select lever in any other than "N" range (except "P" range) | More than 8 | |
| | "R" range switch | B56 | 10 | Select lever in "R" range | Less than 1 | |
| | | | | Select lever in any other than "R" range | More than 6 | |
| | "D" range switch | B54 | 1 | Select lever in "D" range | Less than 1 | |
| | | | | Select lever in any other than "D" range | More than 6 | |
| | "3" range switch | B54 | 2 | Select lever in "3" range | Less than 1 | |
| | | | | Select lever in any other than "3" range | More than 6 | |
| | "2" range switch | B54 | 3 | Select lever in "2" range | Less than 1 | |
| | | | | Select lever in any other than "2" range | More than 6 | |
| | "1" range switch | B54 | 4 | Select lever in "1" range | Less than 1 | |
| | | | | Select lever in any other than "1" range | More than 6 | |
| Diagnosis switch | | B56 | 6 | Diagnosis connector connected | Less than 1 | |
| | | | | Diagnosis connector disconnected | More than 6 | |

3-2 [T500] AUTOMATIC TRANSMISSION AND DIFFERENTIAL

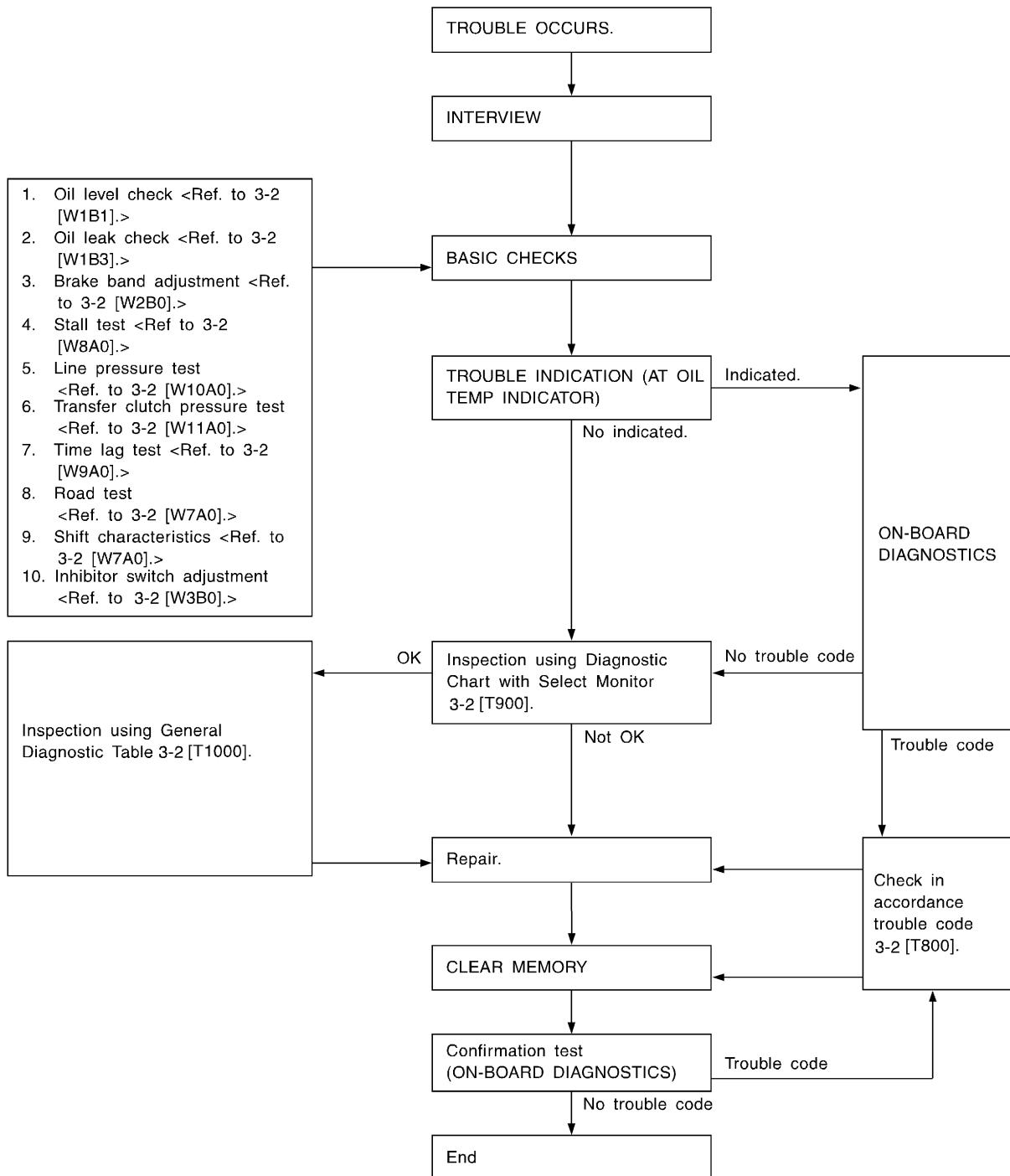
5. Transmission Control Module (TCM) I/O Signal

| Check with ignition switch ON. | | | | | |
|---------------------------------------|--------------------|-----------------|---|-------------------------|------------------------------|
| Content | Connec- tor No. | Terminal No. | Measuring conditions | Voltage (V) | Resistance to body (ohms) |
| Brake switch | B56 | 7 | Brake pedal depressed. | More than 10.5 | — |
| | | | Brake pedal released. | Less than 1 | |
| ABS signal | B56 | 5 | ABS switch ON | Less than 1 | — |
| | | | ABS switch OFF | More than 6.5 | |
| AT diagnostic signal | B55 | 11 | Ignition switch ON (With engine OFF) | Less than 1 | — |
| | | | Ignition switch ON (With engine ON) | More than 10 | |
| Throttle position sensor | B54 | 8 | Throttle fully closed. | 0.5±0.2 | — |
| | | | Throttle fully open. | 4.6±0.3 | |
| Throttle position sensor power supply | B56 | 19 | Ignition switch ON (With engine OFF) | 5.05±0.25 | — |
| ATF temperature sensor | B54 | 10 | ATF temperature 20°C (68°F) | 3.45±0.55 | 2.1 — 2.9 k |
| | | | ATF temperature 80°C (176°F) | 1.2±0.2 | 272 — 374 |
| Vehicle speed sensor 1 | B54 | 12 | Vehicle stopped. | 0 | 450 — 720 |
| | | | Vehicle speed at least 20 km/h (12 MPH) | More than 1 (AC range) | |
| Vehicle speed sensor 2 | B56 | 11 | When vehicle is slowly moved at least 2 meters (7ft). | Less than 1—More than 9 | — |
| Engine speed signal | B54 | 5 | Ignition switch ON (with engine OFF). | More than 10.5 | — |
| | | | Ignition switch ON (with engine ON). | 8 — 11 | |
| Cruise set signal | B56 | 3 | When cruise control is set (SET lamp ON). | Less than 1 | — |
| | | | When cruise control is not set (SET lamp OFF). | More than 6.5 | |
| Torque control signal | B55 | 16 | Ignition switch ON | 5±1 | — |
| Mass air flow signal | B54 | 9 | Engine idling after warm-up | 0.5 — 1.2 | — |
| Shift solenoid 1 | B55 | 14 | 1st or 4th gear | More than 9 | 20 — 32 |
| | | | 2nd or 3rd gear | Less than 1 | |
| Shift solenoid 2 | B55 | 13 | 1st or 2nd gear | More than 9 | 20 — 32 |
| | | | 3rd or 4th gear | Less than 1 | |
| Shift solenoid 3 | B55 | 15 | Select lever in "N" range (with throttle fully closed). | Less than 1 | 20 — 32 |
| | | | Select lever in "D" range (with throttle fully closed). | More than 9 | |
| Duty solenoid A | B55 | 8 | Throttle fully closed (with engine OFF) after warm-up. | 1.5 — 4.0 | 2.0 — 4.5 |
| | | | Throttle fully open (with engine OFF) after warm-up. | Less than 1 | |
| Dropping resistor | B55 | 7 | Throttle fully closed (with engine OFF) after warm-up. | More than 8.5 | 12 — 18 |
| | | | Throttle fully open (with engine OFF) after warm-up. | Less than 1 | |
| Duty solenoid B | B55 | 5 | When lock up occurs. | More than 8.5 | 9 — 17 |
| | | | When lock up is released. | Less than 0.5 | |

| Check with ignition switch ON. | | | | | |
|--------------------------------|--------------------|-----------------|--|---------------|------------------------------|
| Content | Connec- tor No. | Terminal No. | Measuring conditions | Voltage (V) | Resistance to body (ohms) |
| Duty solenoid C | B55 | 3 | Fuse on FWD switch | More than 8.5 | 9 — 17 |
| | | | Fuse removed from FWD switch (with throttle fully open and with select lever in 1st gear). | Less than 0.5 | |
| Sensor ground line 1 | B54 | 7 | — | 0 | Less than 1 |
| Sensor ground line 2 | B56 | 20 | — | 0 | Less than 1 |
| System ground line | B56 | 1 | — | 0 | Less than 1 |
| Power system ground line | B55 | 10 | — | 0 | Less than 1 |
| FWD switch | B56 | 2 | Fuse removed. | 6 — 9.1 | — |
| | | | Fuse installed. | Less than 1 | |

6. Diagnostic Chart for On-board Diagnostics System

A: BASIC DIAGNOSTICS PROCEDURE



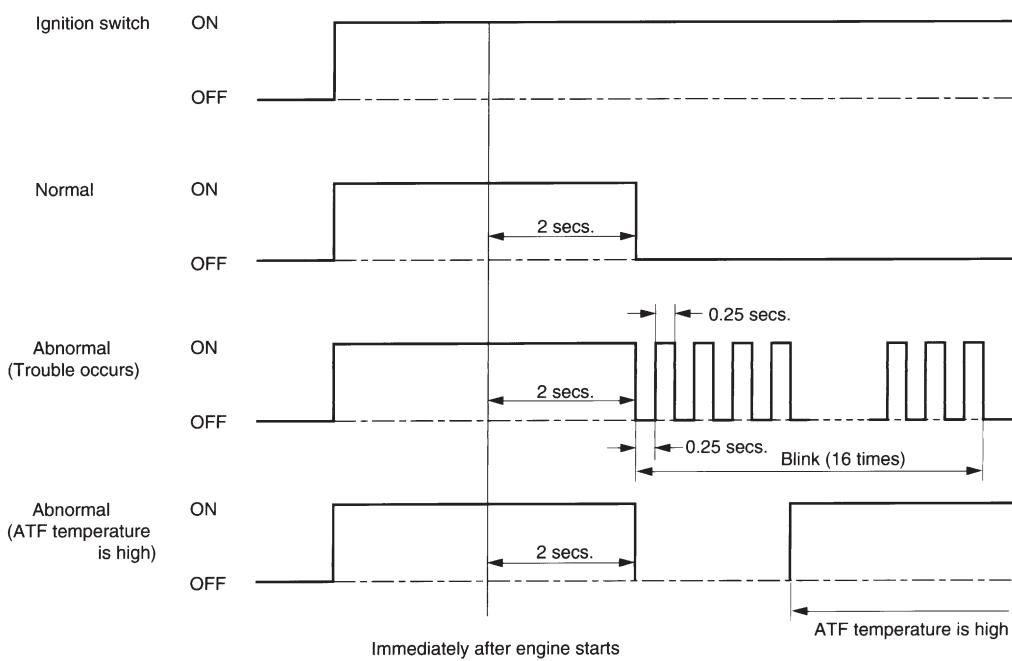
B: ABNORMAL DISPLAY ON AT OIL TEMP INDICATOR

When any on-board diagnostics 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 diagnostics operation. Problems which occurred previously can also be identified through the memory func-

tion. 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.

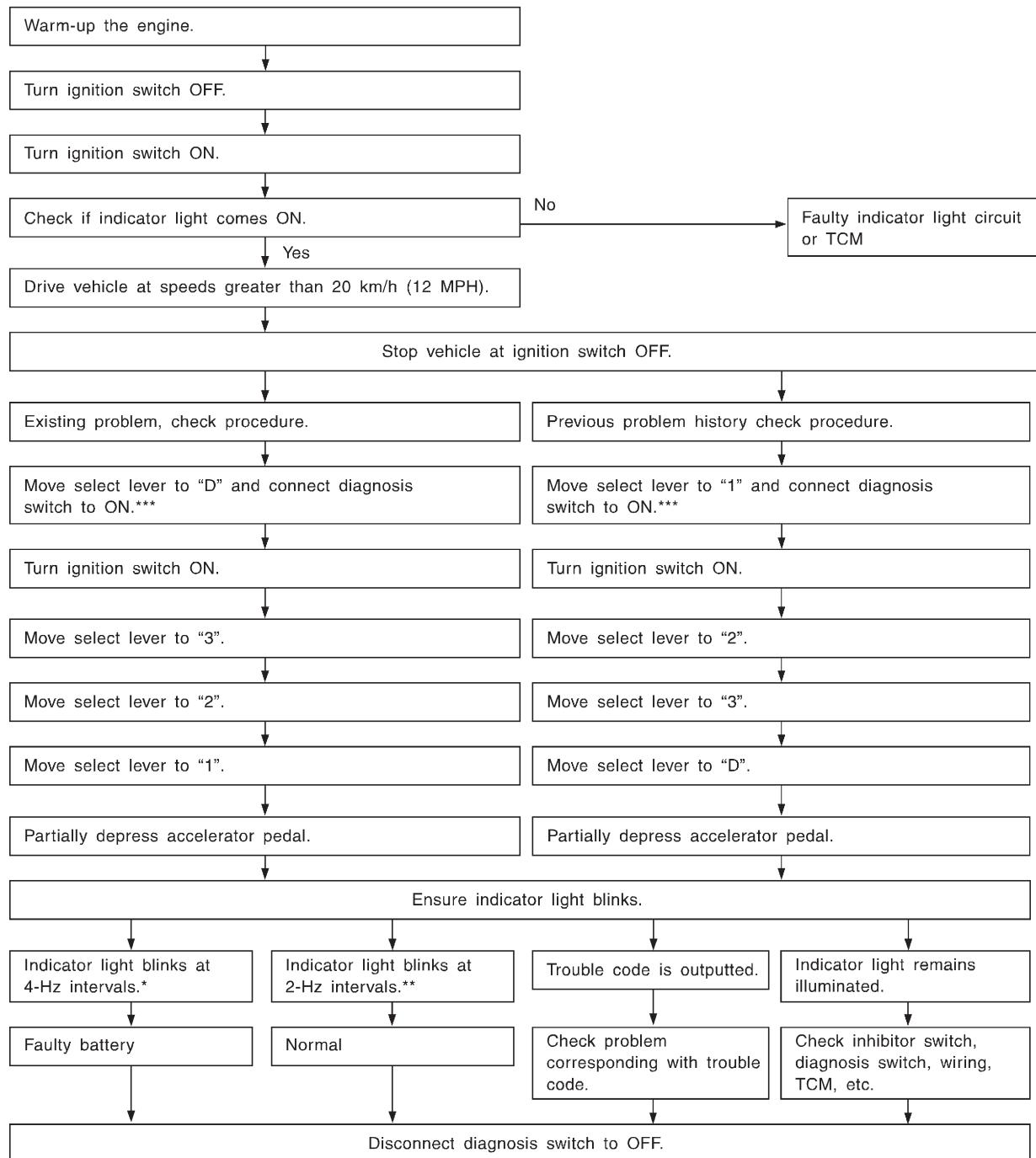
WARNING:

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.

7. Diagnostics for On-board Diagnostics Failed

A: AT OIL TEMP INDICATOR LIGHT

DIAGNOSIS:

- The AT OIL TEMP indicator light circuit is open or shorted.

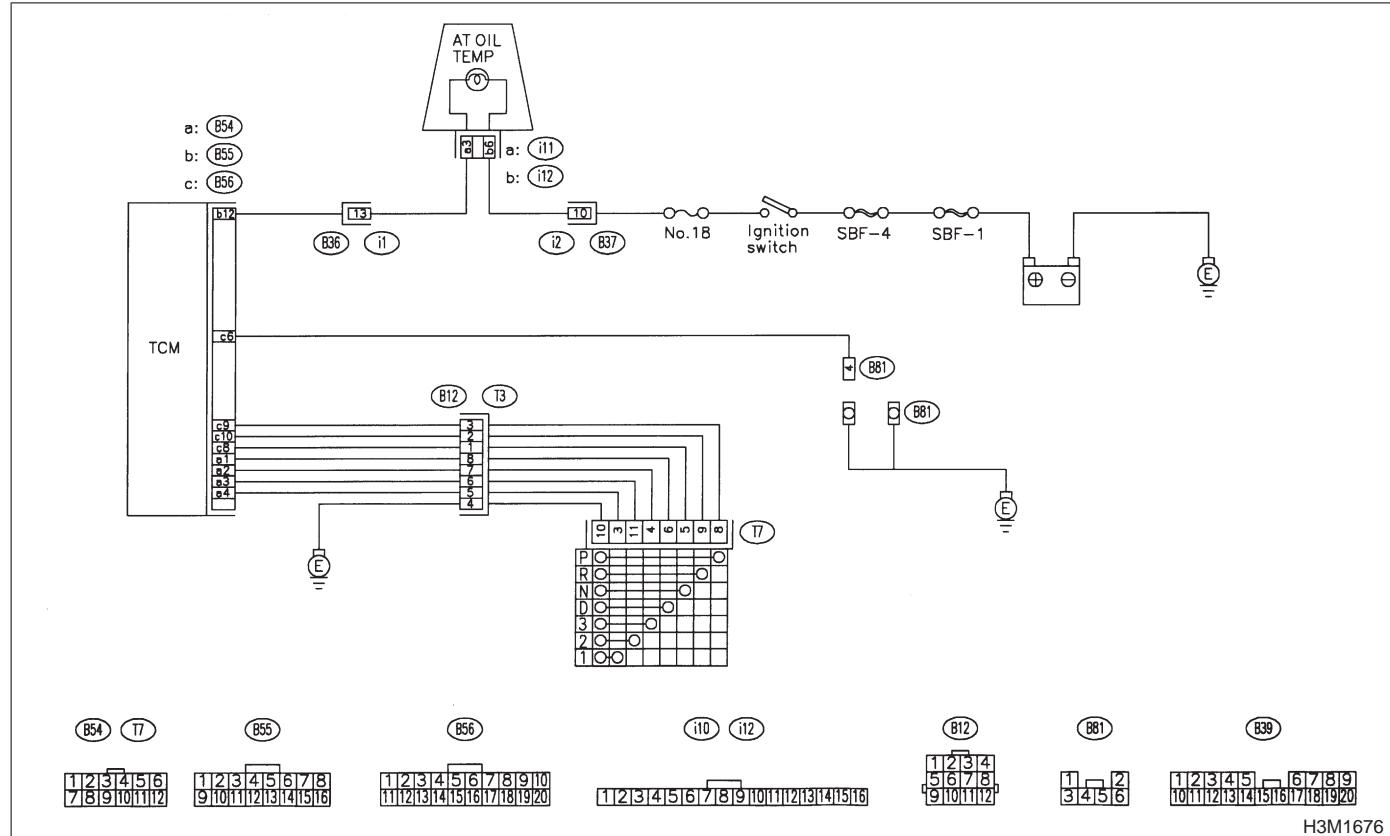
TROUBLE SYMPTOM:

- When ignition switch is turned to ON (engine OFF), AT OIL TEMP indicator light does not illuminate.

TROUBLE 1

- When on-board diagnostics is performed, AT OIL TEMP indicator light remains illuminated. TROUBLE 2

WIRING DIAGRAM:



7A1 : CHECK AT OIL TEMP INDICATOR LIGHT.

Turn ignition switch to ON (engine OFF).

CHECK : *Does AT OIL TEMP indicator light illuminate?*

YES : Go to step 7A2.

NO : Go to step 7A3.

7A2 : CHECK AT OIL TEMP INDICATOR LIGHT.

Perform on-board diagnostics. <Ref. to 3-2 [T6C0].>

-  : **Does AT OIL TEMP indicator light blink?**
-  : A temporary poor contact of the connector or harness may be the cause. Repair harness or connector in TCM, inhibitor switch and combination meter.
-  : Go to step **7A8**.

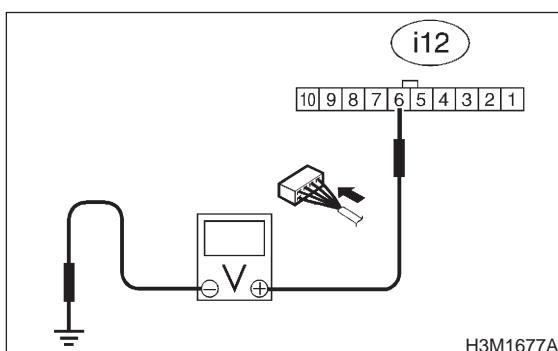
7A3 : CHECK FUSE (NO. 18).

Remove fuse (No. 18).

CHECK : *Is the fuse (No. 18) blown out?*
YES : Replace fuse (No. 18). If replaced fuse (No. 18) is blown out easily, repair short circuit in harness between fuse (No. 18) and combination meter.
NO : Go to step 7A4.

7A4 : CHECK HARNESS CONNECTOR BETWEEN COMBINATION METER AND IGNITION SWITCH.

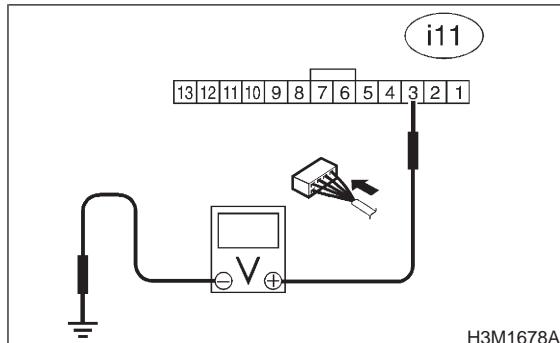
- 1) Turn ignition switch to OFF.
- 2) Remove combination meter.
- 3) Turn ignition switch to ON (engine OFF).
- 4) Measure voltage between combination meter connector and chassis ground.

Connector & terminal*(i12) No. 6 (+) — Chassis ground (-):*

CHECK : *Is voltage more than 10 V?*
YES : Go to step 7A5.
NO : Repair open circuit in harness between combination meter and fuse.

7A5 : CHECK COMBINATION METER.

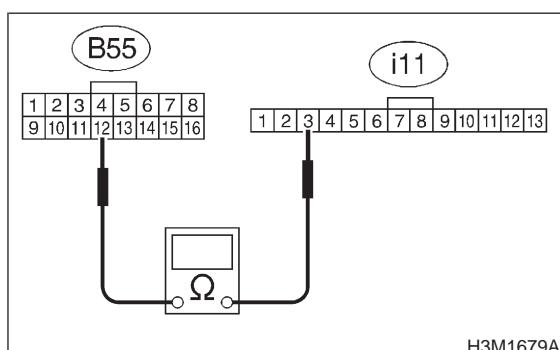
Measure voltage between combination meter connector and chassis ground.

Connector & terminal
(i11) No. 3 (+) — Chassis ground (-):

CHECK : *Is voltage less than 1 V?*
YES : Go to step 7A6.
NO : Replace bulb or combination meter.

7A6 : CHECK OPEN CIRCUIT OF HARNESS.

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

Connector & terminal*(B55) No. 12 — (i11) No. 3:*

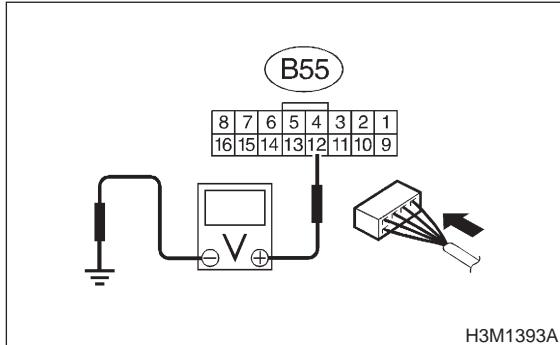
CHECK : *Is the resistance less than 1 Ω?*
YES : Go to step 7A7.
NO : Repair open circuit in harness between TCM and combination meter, and poor contact in coupling connector.

7A7 : CHECK INPUT SIGNAL FOR TCM.

- 1) Turn ignition switch to OFF.
- 2) Connect connector to TCM and combination meter.
- 3) Install combination meter.
- 4) Turn ignition switch to ON (engine OFF).
- 5) Measure voltage between TCM connector and chassis ground.

Connector & terminal

(B55) No. 12 (+) — Chassis ground (-):



CHECK : Is the voltage less than 1 V?

YES : Even if AT OIL TEMP indicator 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 in TCM.

NO : Replace TCM.

7A8 : CHECK INHIBITOR SWITCH.

- 1) Turn ignition switch to OFF.
- 2) Connect Subaru Select Monitor to data link connector.
- 3) Turn ignition switch to ON.
- 4) Subaru Select Monitor to ON.
- 5) Read data on Subaru Select Monitor.
- Range switch is indicated in ON \Leftrightarrow OFF.

CHECK : When each range is selected, does LED of Subaru Select Monitor light up?

YES : Go to step 7A9.

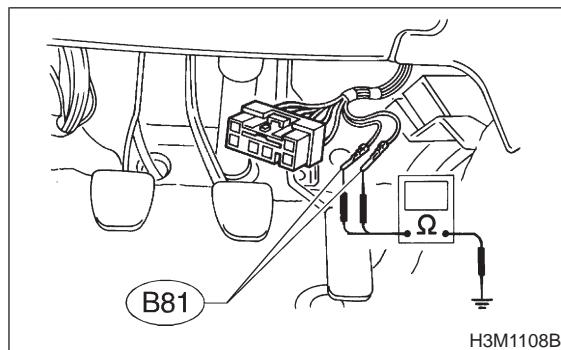
NO : Check inhibitor switch circuit. <Ref. to 3-2 [T9T0].>

7A9 : CHECK DIAGNOSIS SWITCH GROUND LINE.

Measure resistance of harness connector between diagnosis switch terminal and chassis ground.

Terminal

(B81) — Chassis ground:



CHECK : Is the resistance less than 1 Ω ?

YES : Go to step 7A10.

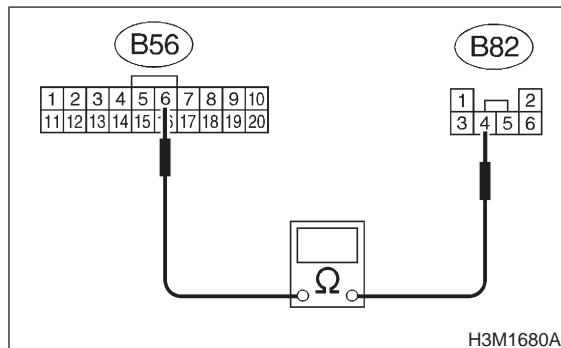
NO : Repair open circuit in harness between diagnosis switch and chassis ground.

7A10 : CHECK HARNESS CONNECTOR BETWEEN TCM AND DIAGNOSIS SWITCH.

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

Connector & terminal

(B56) No. 6 — (B82) No. 4:



CHECK : Is the resistance less than 1 Ω ?

YES : Go to step 7A11.

NO : Repair open circuit in harness between TCM and diagnosis switch.

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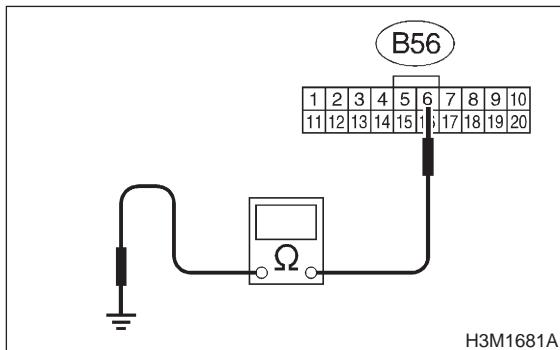
7. Diagnostics for On-board Diagnostics Failed

7A11 : CHECK HARNESS CONNECTOR BETWEEN TCM AND DIAGNOSIS SWITCH.

Measure resistance of harness connector between TCM and diagnosis switch.

Connector & terminal

(B56) No. 6 — Chassis ground:



CHECK : Is the resistance more than $1 M\Omega$?

YES : Go to step 7A12.

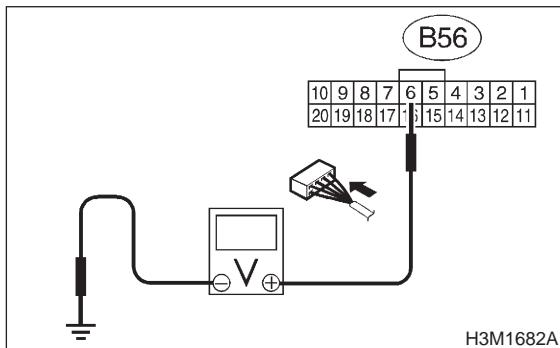
NO : Repair short circuit in harness between TCM and diagnosis switch.

7A12 : CHECK INPUT SIGNAL FOR TCM.

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

Connector & terminal

(B56) No. 6 — Chassis ground:



CHECK : Is the voltage more than 6 V?

YES : Go to step 7A13.

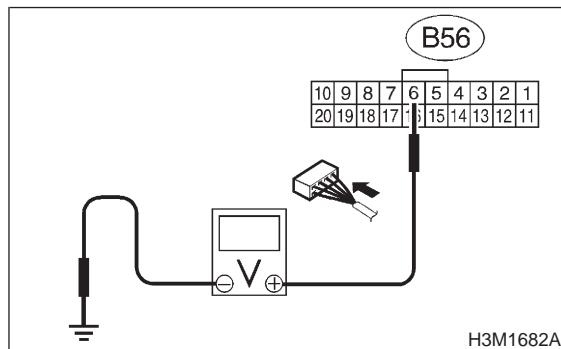
NO : Repair poor contact in TCM.

7A13 : CHECK INPUT SIGNAL FOR TCM.

Measure signal voltage for TCM while connecting the diagnosis terminal to diagnosis connector.

Connector & terminal

(B56) No. 6 — Chassis ground.



CHECK : Is the voltage less than 1 V?

YES : Go to step 7A14.

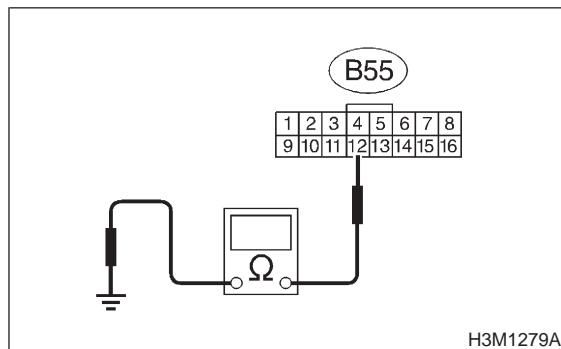
NO : Repair poor contact in diagnosis switch.

7A14 : CHECK SHORT CIRCUIT OF HARNESS.

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

Connector & terminal

(B55) No. 12 — Chassis ground:



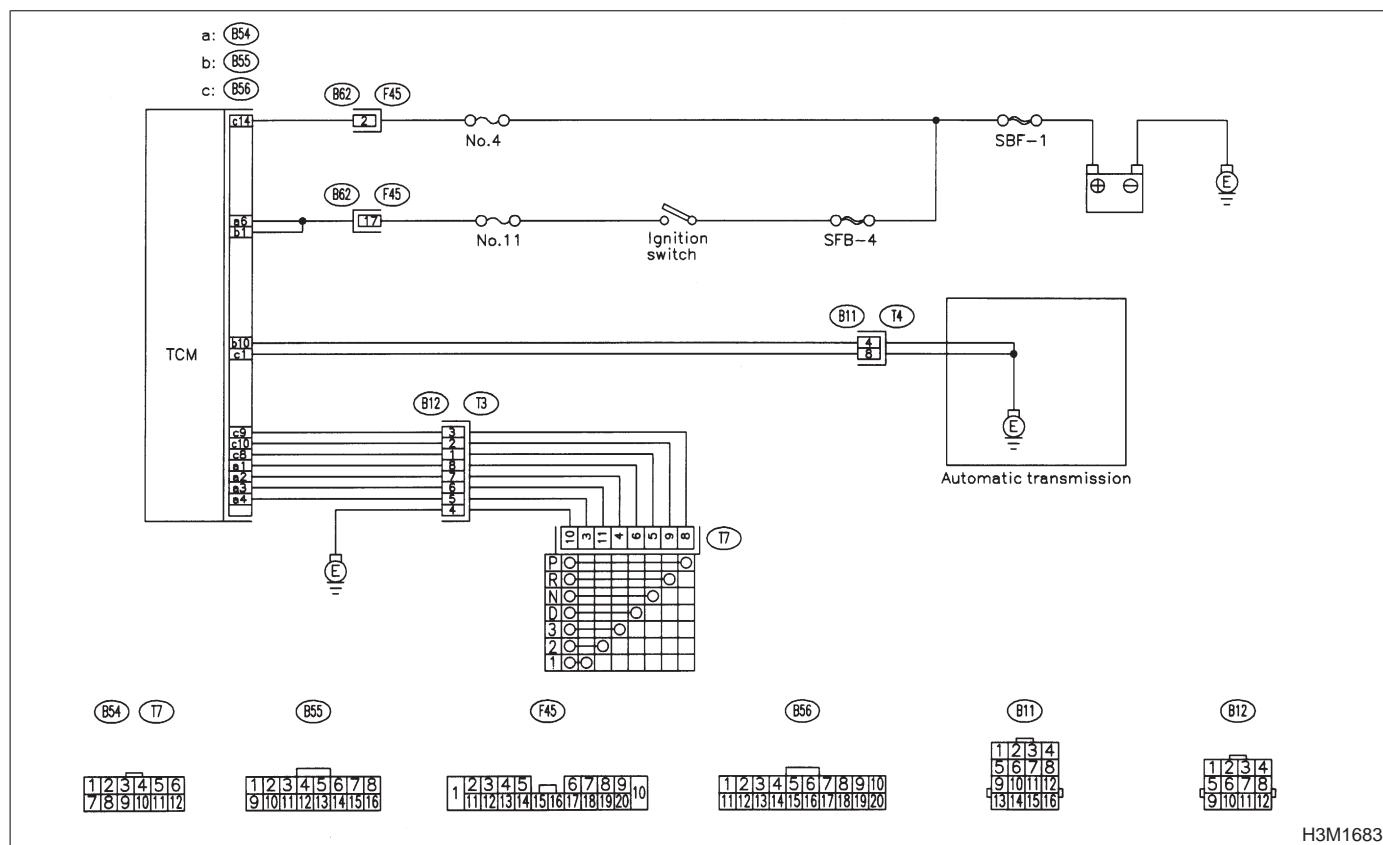
CHECK : Is the resistance more than $1 M\Omega$?

YES : Replace TCM.

NO : Repair short circuit in harness between combination meter connector and TCM connector.

B: CONTROL MODULE POWER SUPPLY AND GROUND LINE

WIRING DIAGRAM:

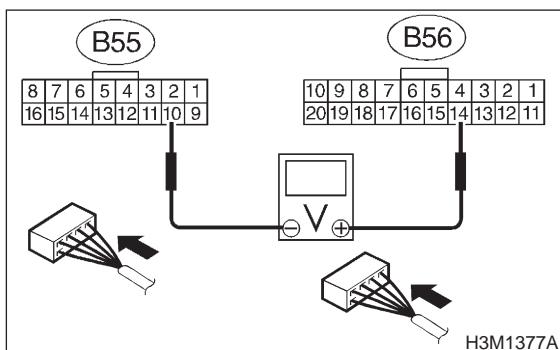


7B1 : CHECK BACK-UP POWER SUPPLY CIRCUIT.

- 1) Turn ignition switch to OFF.
- 2) Measure back-up power supply voltage between TCM connector terminal.

Connector & terminal

(B56) No. 14 (+) — (B55) No. 10 (-):



7B2 : CHECK POOR CONTACT IN TCM.

CHECK : Is there poor contact in TCM?
YES : Repair poor contact.
NO : Go to step 7B3.

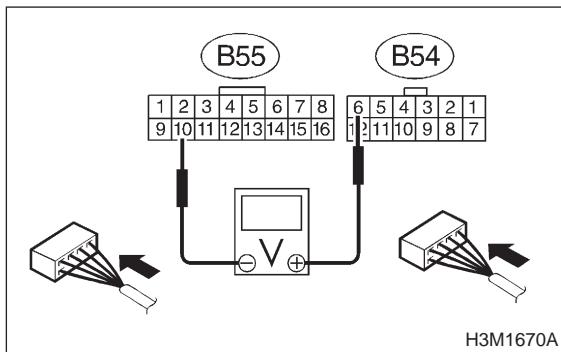
CHECK : Is the voltage more than 10 V?
YES : Go to step 7B2.
NO : Repair harness of back-up power supply circuit.

7B3 : CHECK IGNITION POWER SUPPLY CIRCUIT.

- 1) Turn ignition switch to ON (engine OFF).
- 2) Measure ignition power supply voltage between TCM connector terminal.

Connector & terminal

(B54) No. 6 (+) — (B55) No. 10 (-):



CHECK : *Is the voltage more than 10 V?*

YES : Go to step 7B4.

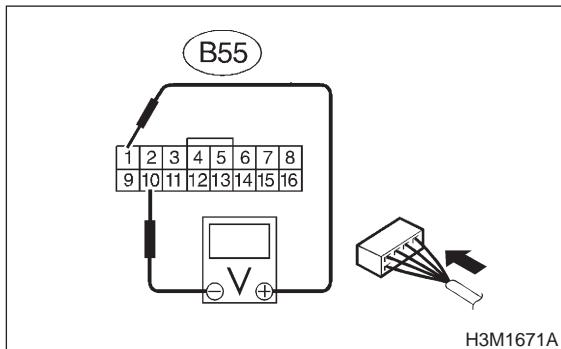
NO : Repair harness of ignition power supply circuit.

7B4 : CHECK IGNITION POWER SUPPLY CIRCUIT.

- 1) Turn ignition switch to ON (engine OFF).
- 2) Measure ignition power supply voltage between TCM connector terminal.

Connector & terminal

(B55) No. 1 (+) — No. 10 (-):



CHECK : *Is the voltage more than 10 V?*

YES : Go to step 7B5.

NO : Repair harness of ignition power supply circuit.

7B5 : CHECK POOR CONTACT IN TCM.

CHECK : *Is there poor contact in TCM?*

YES : Repair poor contact.

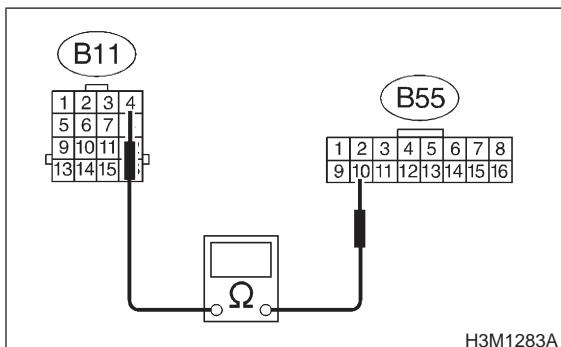
NO : Go to step 7B6.

7B6 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

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

Connector & terminal

(B55) No. 10 — (B11) No. 4:



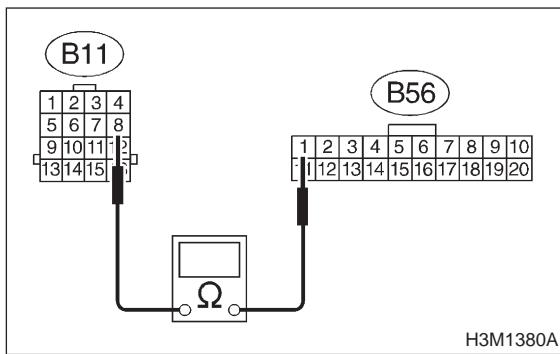
CHECK : *Is the resistance less than 1 Ω?*

YES : Go to step 7B7.

NO : Repair open circuit in harness between TCM and transmission.

7B7 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

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

Connector & terminal
(B56) No. 1 — (B11) No. 8:


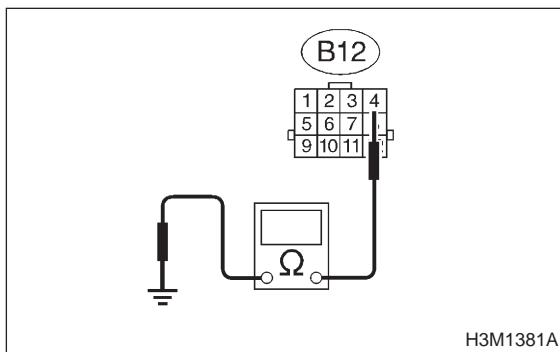
CHECK : *Is the resistance less than 1 Ω?*

YES : Go to step 7B8.

NO : Repair open circuit in harness between TCM and transmission.

7B8 : CHECK HARNESS CONNECTOR BETWEEN INHIBITOR SWITCH AND CHASSIS GROUND.

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

Connector & terminal
(B12) No. 4 — Chassis ground:


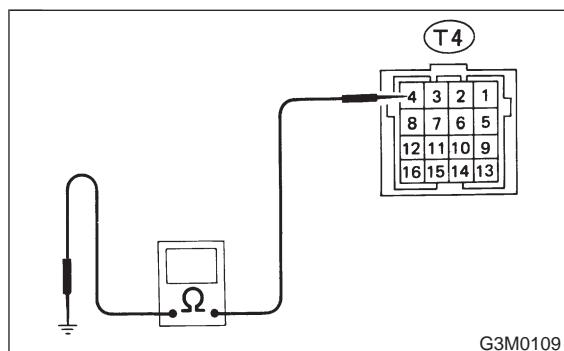
CHECK : *Is the resistance less than 1 Ω?*

YES : Go to step 7B9.

NO : Repair open circuit in harness between TCM and transmission.

7B9 : CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND TRANSMISSION GROUND.

- 1) Drain automatic transmission fluid.
- 2) Remove oil pan.
- 3) Measure resistance of harness between transmission and transmission ground.

Connector & terminal
(T4) No. 4 — Transmission ground:


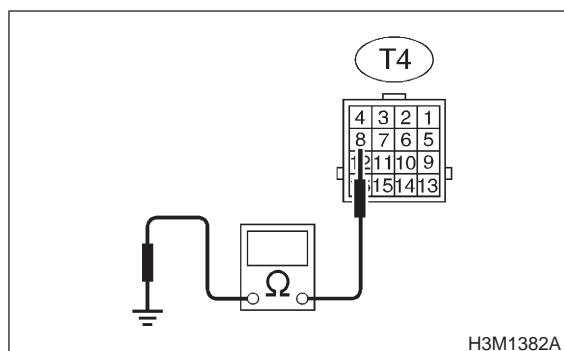
CHECK : *Is the resistance less than 1 Ω?*

YES : Go to step 7B9.

NO : Repair open circuit in harness between transmission and transmission ground.

7B10 : CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND TRANSMISSION GROUND.

Measure resistance of harness between transmission and transmission ground.

Connector & terminal
(T4) No. 8 — Transmission ground:


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

YES : Repair transmission ground terminal.

NO : Repair open circuit in harness between transmission and transmission ground.

8. Diagnostic Chart with Trouble Code

A: LIST OF TROUBLE CODE

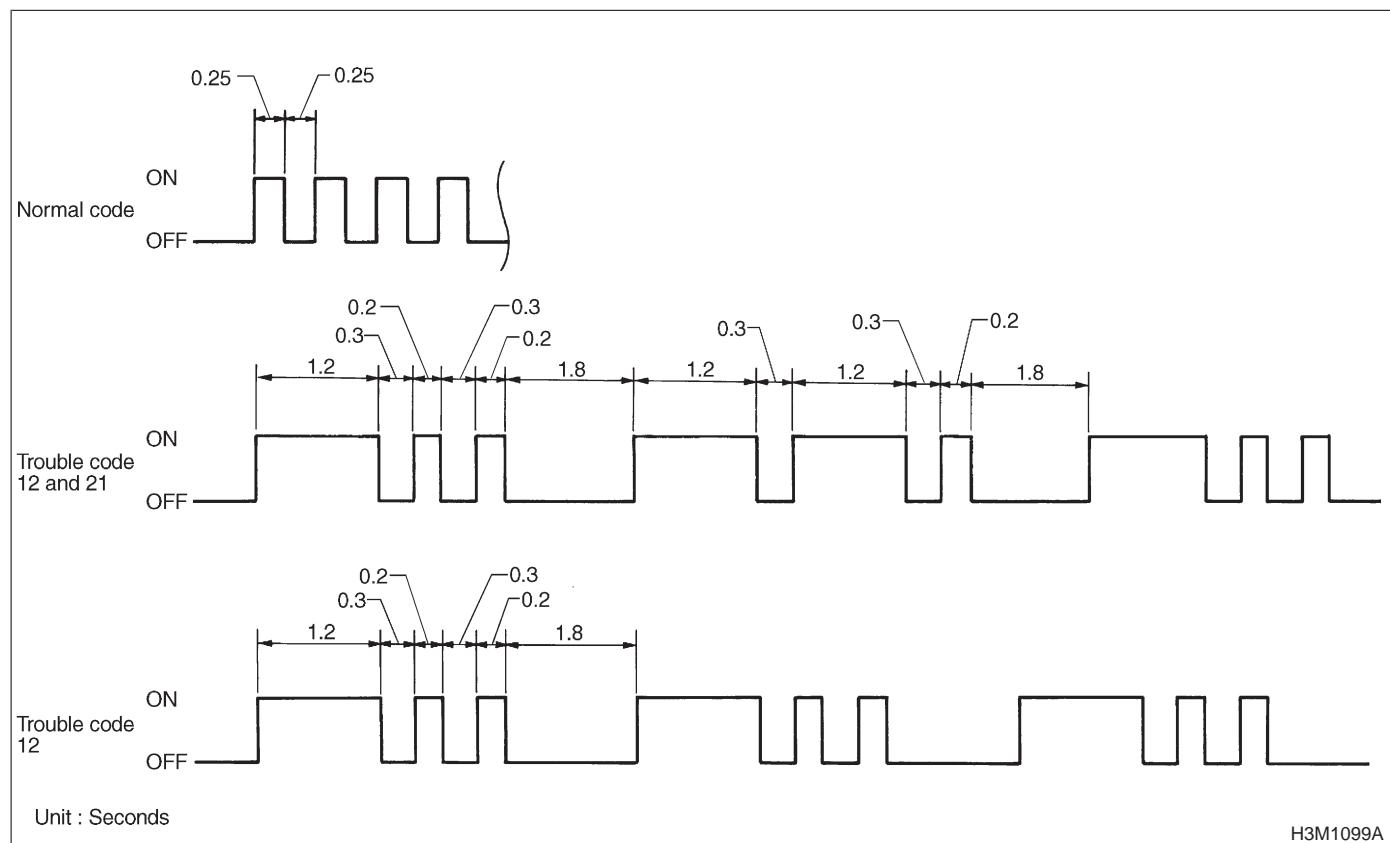
1. TROUBLE CODE

| Trouble code | Item | Content of diagnosis | Title index No. |
|--------------|--------------------------|--|-----------------------|
| 11 | Duty solenoid A | Detects open or shorted drive circuit, as well as valve seizure. | <Ref. to 3-2 [T8C0].> |
| 12 | Duty solenoid B | Detects open or shorted drive circuit, as well as valve seizure. | <Ref. to 3-2 [T8D0].> |
| 13 | Shift solenoid 3 | Detects open or shorted drive circuit, as well as valve seizure. | <Ref. to 3-2 [T8E0].> |
| 14 | Shift solenoid 2 | Detects open or shorted drive circuit, as well as valve seizure. | <Ref. to 3-2 [T8F0].> |
| 15 | Shift solenoid 1 | Detects open or shorted drive circuit, as well as valve seizure. | <Ref. to 3-2 [T8G0].> |
| 21 | ATF temperature sensor | Detects open or shorted input signal circuit. | <Ref. to 3-2 [T8H0].> |
| 22 | Mass air flow signal | Detects open or shorted input signal circuit. | <Ref. to 3-2 [T8I0].> |
| 23 | Engine speed signal | Detects open or shorted input signal circuit. | <Ref. to 3-2 [T8J0].> |
| 24 | Duty solenoid C | Detects open or shorted drive circuit, as well as valve seizure. | <Ref. to 3-2 [T8K0].> |
| 25 | Torque control signal | Detects open or shorted input signal circuit. | <Ref. to 3-2 [T8L0].> |
| 31 | Throttle position sensor | Detects open or shorted input signal circuit. | <Ref. to 3-2 [T8M0].> |
| 32 | Vehicle speed sensor 1 | Detects open or shorted input signal circuit. | <Ref. to 3-2 [T8N0].> |
| 33 | Vehicle speed sensor 2 | Detects open or shorted input signal circuit. | <Ref. to 3-2 [T8O0].> |

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".



B: CLEAR MEMORY

Current trouble codes shown on the display are cleared by turning the ignition switch OFF after conducting on-board diagnostics 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 (Main fuse box).

CLEAR MEMORY:

Removal of No. 4 fuse (for at least one minute)

- The No. 4 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 memory.
- Be sure to remove the No. 4 fuse for at least the specified length of time. Otherwise, trouble codes may not be cleared.

C: TROUBLE CODE 11 – DUTY SOLENOID A –

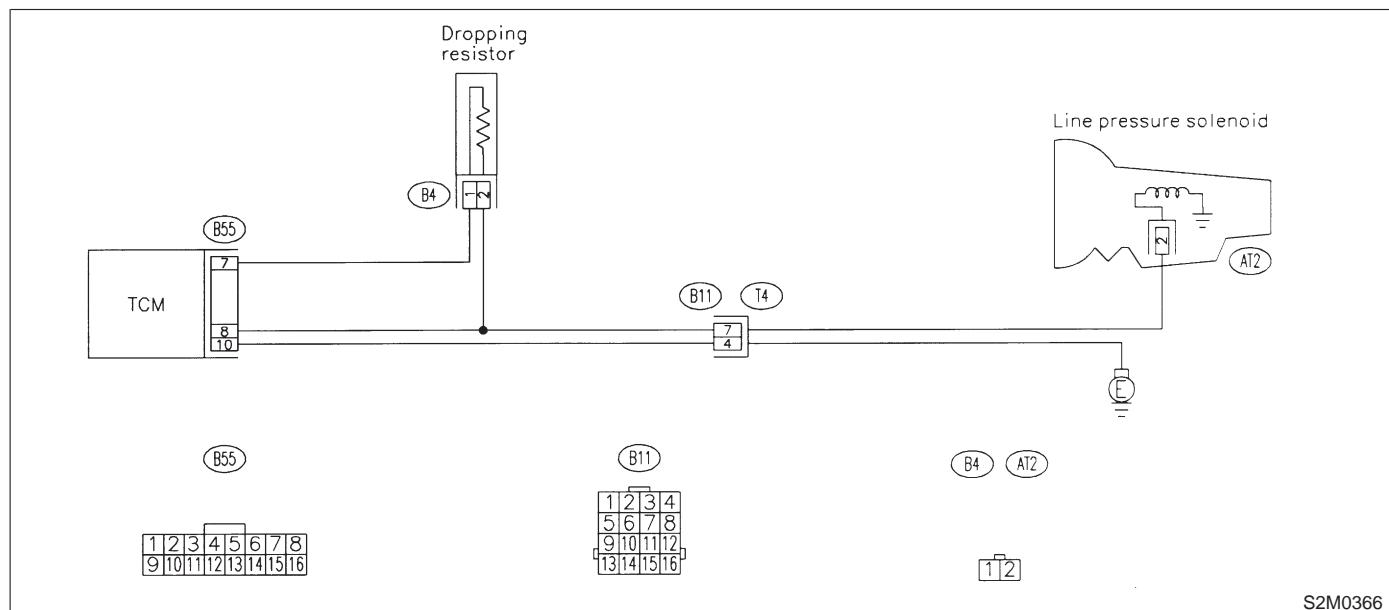
DIAGNOSIS:

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

TROUBLE SYMPTOM:

Excessive shift shock.

WIRING DIAGRAM:

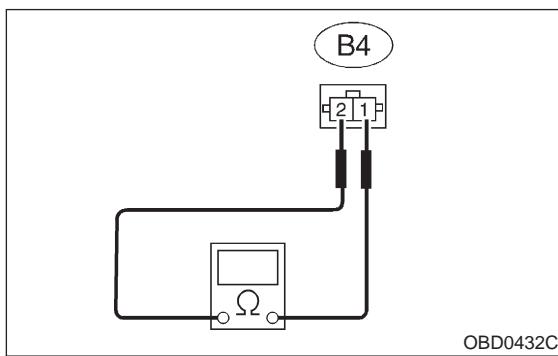


8C1 : CHECK RESISTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from dropping resistor.
- 3) Measure resistance between dropping resistor terminal.

Terminals

(B4) No. 1 — No. 2:

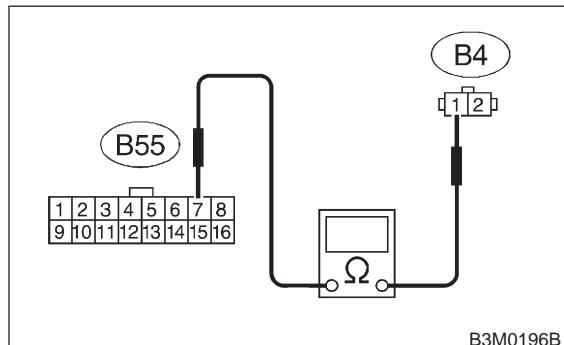


**8C2 : CHECK HARNESS CONNECTOR
BETWEEN TCM AND DROPPING
RESISTOR.**

- 1) Disconnect connector from TCM.
- 2) Measure resistance of harness between TCM connector and dropping resistor connector.

Connector & terminal

(B55) No. 7 — (B4) No. 1:

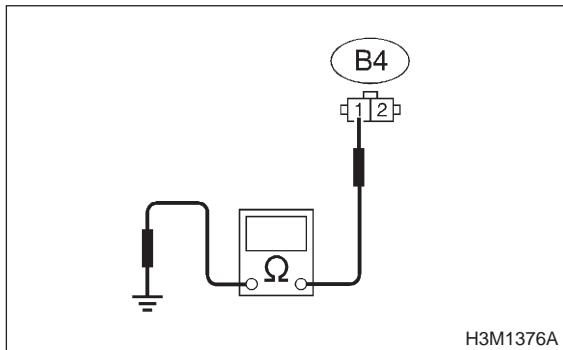


- CHECK** : *Is the resistance between 9 and 15 Ω ?*
- YES** : Go to step **8C2**.
- NO** : Replace dropping resistor.

- CHECK** : ***Is the resistance less than 1 Ω?***
- YES** : Go to step **8C3**.
- NO** : Repair open circuit in harness between TCM and dropping resistor connector.

8C3 : CHECK HARNESS CONNECTOR BETWEEN TCM AND DROPPING RESISTOR.

Measure resistance of harness between dropping resistor connector and chassis ground.

Connector & terminal
(B4) No. 1 — Chassis ground:


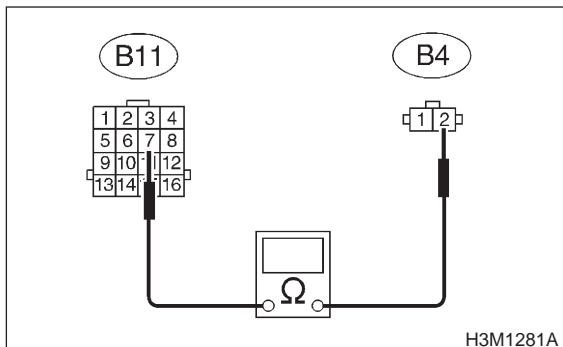
CHECK : *Is the resistance more than $1 M\Omega$?*

YES : Go to step **8C4**.

NO : Repair short circuit in harness between TCM and dropping resistor connector.

8C4 : CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND DROPPING RESISTOR.

- 1) Remove air intake chamber.
- 2) Disconnect connector from transmission.
- 3) Measure resistance of harness between transmission and dropping resistor connector.

Connector & terminal
(B4) No. 2 — (B11) No. 7:


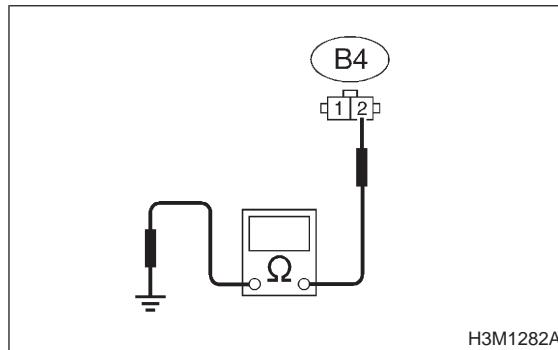
CHECK : *Is the resistance less than 1Ω ?*

YES : Go to step **8C5**.

NO : Repair open circuit in harness between dropping resistor and transmission connector.

8C5 : CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND DROPPING RESISTOR.

Measure resistance of harness between dropping resistor connector and chassis ground.

Connector & terminal
(B4) No. 2 — Chassis ground:


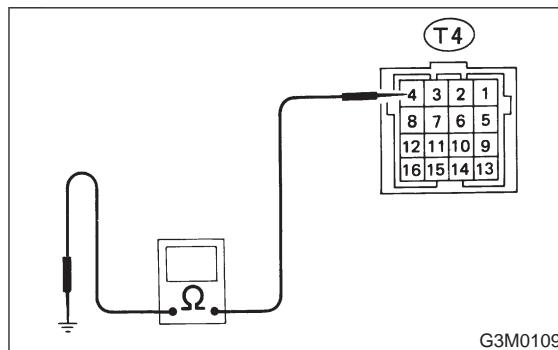
CHECK : *Is the resistance more than $1 M\Omega$?*

YES : Go to step **8C6**.

NO : Repair short circuit in harness between dropping resistor and transmission connector.

8C6 : CHECK DUTY SOLENOID A GROUND LINE.

Measure resistance between transmission connector and transmission ground.

Connector & terminal
(T4) No. 4 — Transmission ground:


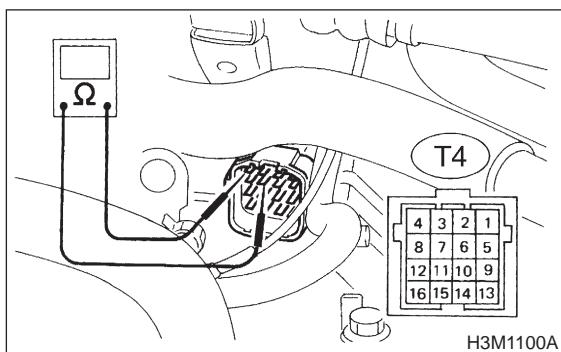
CHECK : *Is the resistance less than 1Ω ?*

YES : Go to step **8C7**.

NO : Repair open circuit in transmission harness.

8C7 : CHECK DUTY SOLENOID A.

Measure resistance between transmission connector receptacle's terminals.

Terminal**(T4) No. 7 — No. 4:**

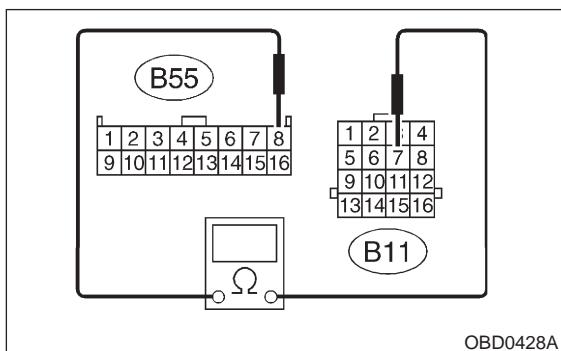
CHECK : Is the resistance between 1.5 and 4.5 Ω?

YES : Go to step 8C8.

NO : Go to step 8C20.

8C8 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

Measure resistance of harness between TCM and transmission connector.

Connector & terminal**(B55) No. 8 — (B11) No. 7:**

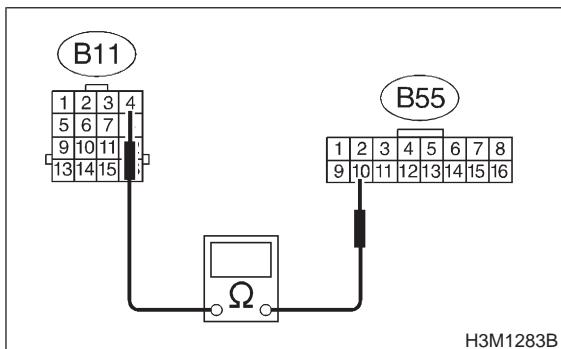
CHECK : Is the resistance less than 1 Ω?

YES : Go to step 8C9.

NO : Repair open circuit in harness between TCM and transmission connector.

8C9 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

Measure resistance of harness between TCM and transmission connector.

Connector & terminal**(B55) No. 10 — (B11) No. 4:**

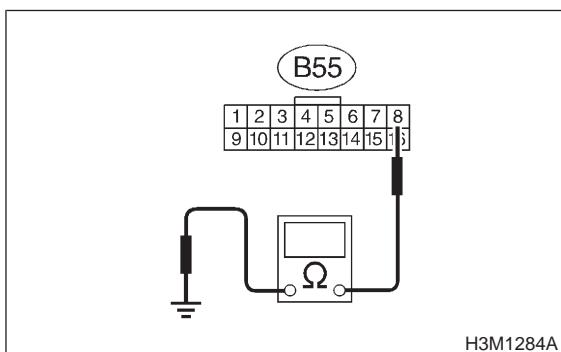
CHECK : Is the resistance less than 1 Ω?

YES : Go to step 8C10.

NO : Repair open circuit in harness between TCM and transmission connector.

8C10 : CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND.

Measure resistance of harness between TCM and chassis ground.

Connector & terminal**(B55) No. 8 — Chassis ground:**

CHECK : Is the resistance more than 1 MΩ?

YES : Go to step 8C11.

NO : Repair short circuit in harness between TCM and transmission connector.

8C11 : PREPARE SUBARU SELECT MONITOR.

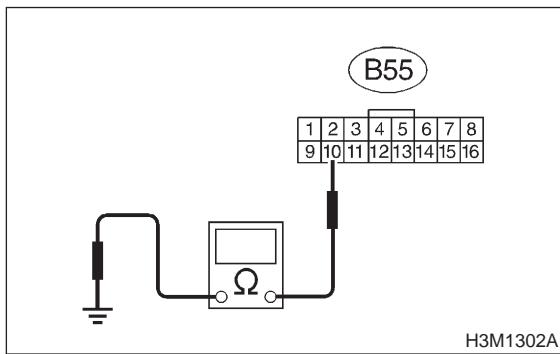
CHECK : Do you have a Subaru Select Monitor?

YES : Go to step 8C17.

NO : Go to step 8C12.

8C12 : CHECK HARNESS CONNECTOR BETWEEN TCM AND CHASSIS GROUND.

Measure resistance of harness between TCM and chassis ground.

*Connector & terminal**(B55) No. 10 — Chassis ground:*

CHECK : Is the resistance more than $1 M\Omega$?

YES : Go to step 8C13.

NO : Repair short circuit harness between TCM and transmission connector.

8C13 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

1) Connect connectors to TCM, transmission and dropping resistor.

2) Start the engine and warm-up the transmission until ATF temperature is above 80°C (176°F).

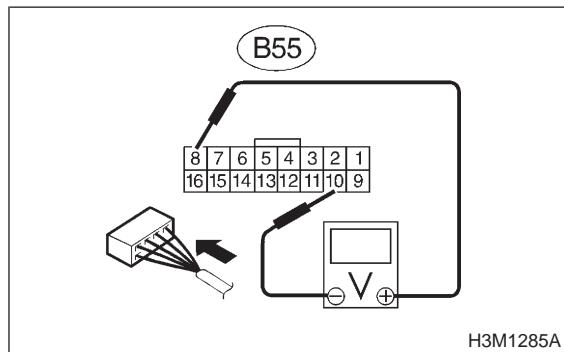
NOTE:

If ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature.

3) Turn ignition switch to ON (engine OFF).

4) Move selector lever to "N".

5) Measure voltage between TCM connector terminal.

*Connector & terminal**(B55) No. 8 (+) — No. 10 (-):*

CHECK : Is the voltage between 1.5 and 4.0 V with throttle fully closed?

YES : Go to step 8C14.

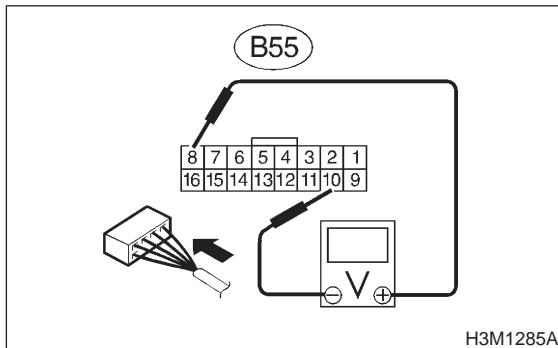
NO : Go to step 8C19.

8C14 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

Measure voltage between TCM connector terminal.

Connector & terminal

(B55) No. 8 (+) — No. 10 (-):



CHECK : Is the voltage less than 1 V with throttle fully open?

YES : Go to step 8C15.

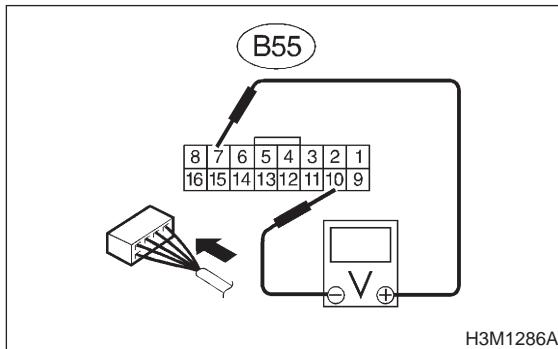
NO : Go to step 8C19.

8C15 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

Measure voltage between TCM connector terminal.

Connector & terminal

(B55) No. 7 (+) — No. 10 (-):



CHECK : Is the voltage more than 8.5 V with throttle fully closed?

YES : Go to step 8C16.

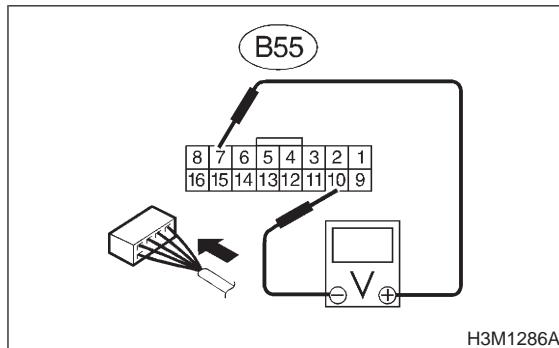
NO : Go to step 8C19.

8C16 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

Measure voltage between TCM connector terminal.

Connector & terminal

(B55) No. 7 (+) — No. 10 (-):



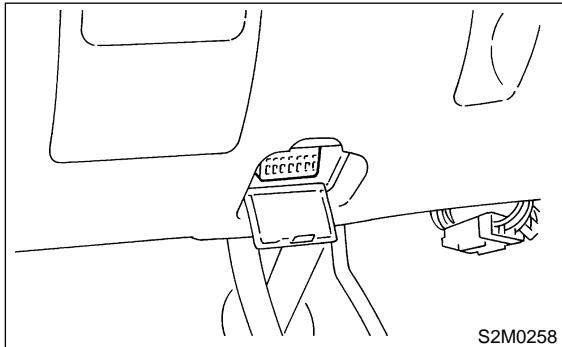
CHECK : Is the voltage less than 1 V with throttle fully open?

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in TCM.

NO : Go to step 8C19.

8C17 : CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR.

- 1) Connect connectors to TCM and transmission.
- 2) Connect Subaru Select Monitor to data link connector.



- 3) Start the engine, and turn Subaru Select Monitor switch to ON.
- 4) Warm-up the transmission until ATF temperature is above 80°C (176°F).

NOTE:

If ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature.

- 5) Stop the engine and turn ignition switch to ON (engine OFF).
- 6) Move selector lever to "N".
- 7) Read data of duty solenoid A using Subaru Select Monitor.
- Line pressure duty is indicated in "%".
- 8) Throttle is fully closed.

CHECK : *Is the value 100%?*
YES : Go to step 8C18.
NO : Go to step 8C19.

8C18 : CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR.

- 1) Turn ignition switch to ON (Engine OFF).
- 2) Throttle is fully open.

CHECK : *Is the value between 10 and 20%?*
YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in TCM.
NO : Go to step 8C19.

8C19 : CHECK POOR CONTACT.

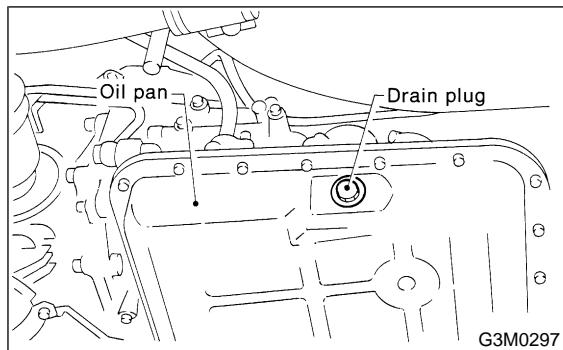
CHECK : *Is there poor contact in duty solenoid A circuit?*
YES : Repair poor contact.
NO : Replace TCM.

8C20 : CHECK DUTY SOLENOID A (IN TRANSMISSION).

- 1) Remove transmission connector from bracket.
- 2) Drain automatic transmission fluid.

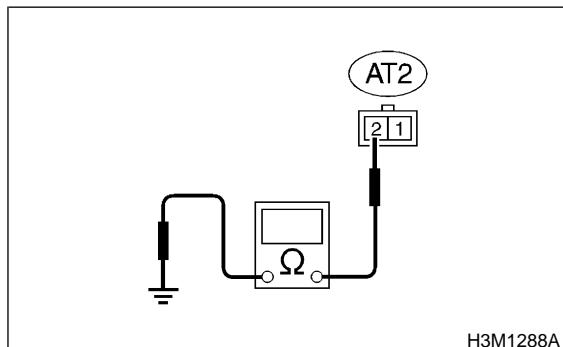
CAUTION:

Do not drain the automatic transmission fluid until it cools down.



- 3) Remove oil pan, and disconnect connector from duty solenoid A.
- 4) Measure resistance between duty solenoid A connector and transmission ground.

**Connector & terminal
(AT2) No. 2 — Transmission ground:**



CHECK : *Is the resistance between 1.5 and 4.5 Ω?*
YES : Go to step 8C21.
NO : Replace duty solenoid A.

3-2 [T8C21] AUTOMATIC TRANSMISSION AND DIFFERENTIAL

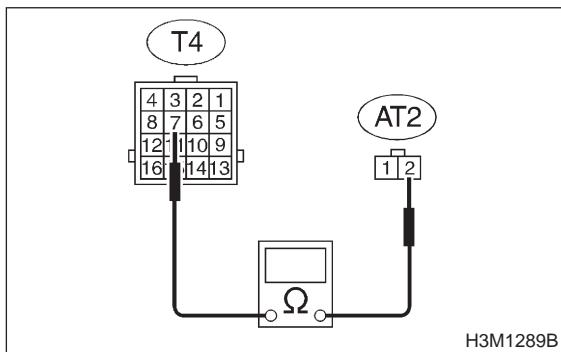
8. Diagnostic Chart with Trouble Code

**8C21 : CHECK HARNESS CONNECTOR
BETWEEN TRANSMISSION AND
DUTY SOLENOID A.**

Measure resistance of harness between duty solenoid A and transmission connector.

Connector & terminal

(T4) No. 7 — (AT2) No. 2:



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

YES : Go to step **8C22**.

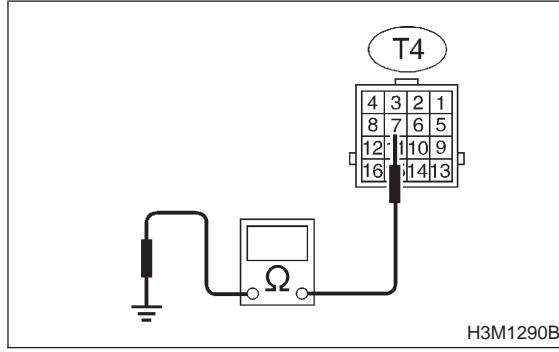
NO : Repair open circuit in harness between duty solenoid A and transmission connector.

**8C22 : CHECK HARNESS CONNECTOR
BETWEEN TRANSMISSION AND
DUTY SOLENOID A.**

Measure resistance of harness between transmission connector and transmission ground.

Connector & terminal

(T4) No. 7 — Transmission ground:



CHECK : **Is the resistance more than 1 MΩ?**

YES : Even if "AT OIL TEMP" 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 in duty solenoid A and transmission connector.

NO : Repair short circuit in harness between duty solenoid A and transmission connector.

MEMO:

D: TROUBLE CODE 12 — DUTY SOLENOID B —

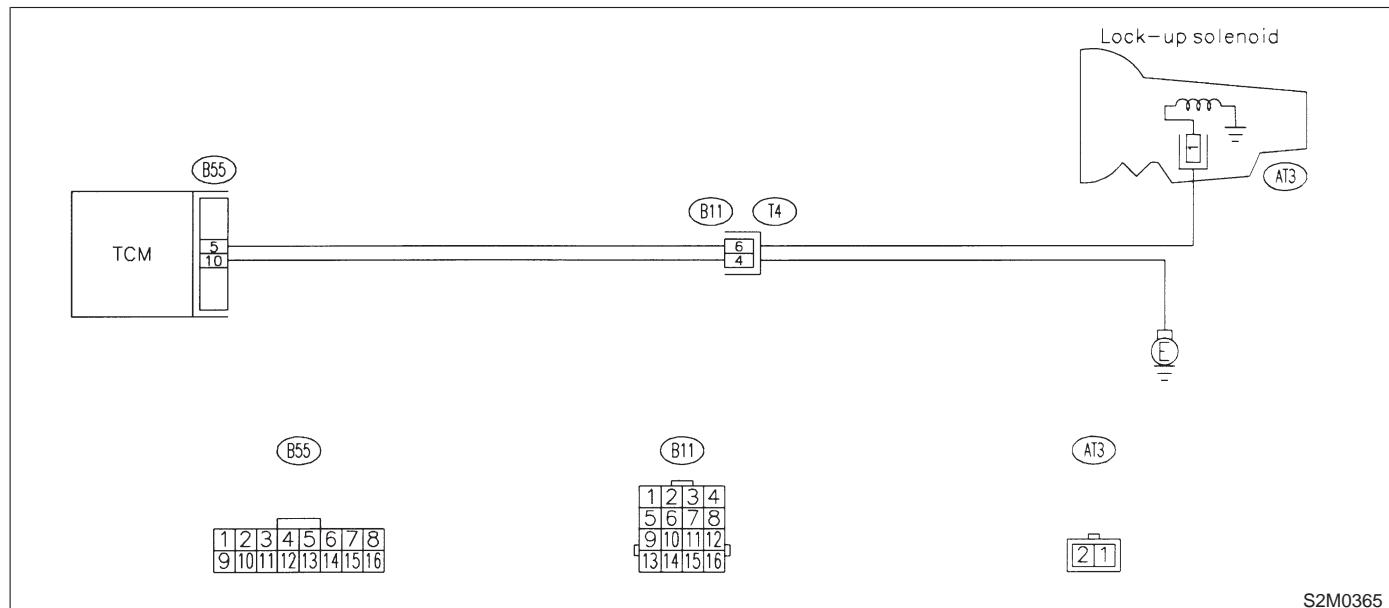
DIAGNOSIS:

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

TROUBLE SYMPTOM:

No “lock-up” (after engine warm-up).

WIRING DIAGRAM:



8D1 : CHECK TROUBLE CODE.

CHECK : Do multiple trouble codes appear in the on-board diagnostics test mode?

YES : Go to another trouble code.

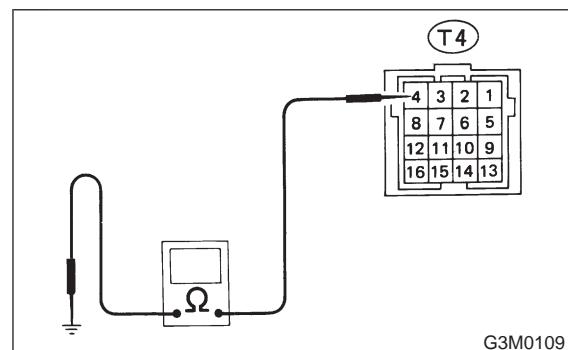
NO : Go to step 8D2.

8D2 : CHECK DUTY SOLENOID B GROUND LINE.

- 1) Turn ignition switch to OFF.
- 2) Remove air intake chamber.
- 3) Disconnect connector from transmission.
- 4) Measure resistance between transmission connector receptacle's terminals.

Connector & terminal

(T4) No. 4 — Chassis ground:



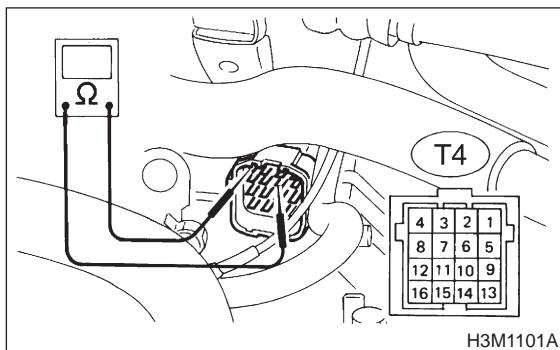
CHECK : Is the resistance less than 1 Ω?

YES : Go to step 8D3.

NO : Repair open circuit in transmission harness.

8D3 : CHECK DUTY SOLENOID B.

Measure resistance between transmission connector receptacle's terminals.

Connector & terminal**(T4) No. 6 — No. 4:**

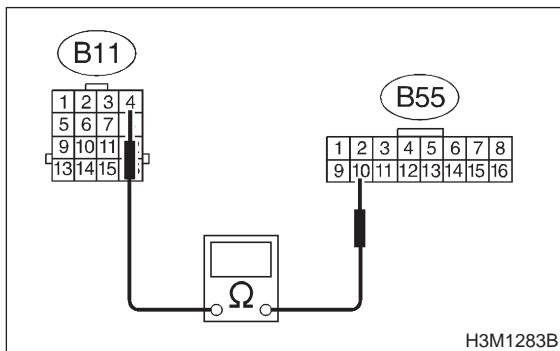
CHECK : Is the resistance less than 1 Ω?

YES : Go to step 8D4.

NO : Go to step 8D14.

8D4 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

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

Connector & terminal**(B55) No. 10 — (B11) No. 4:**

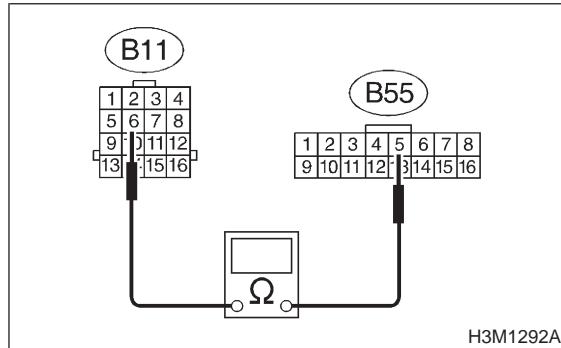
CHECK : Is the resistance less than 1 Ω?

YES : Go to step 8D5.

NO : Repair open circuit in harness between TCM and transmission connector.

8D5 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

Measure resistance of harness connector between TCM and transmission.

Connector & terminal**(B55) No. 5 — (B11) No. 6:**

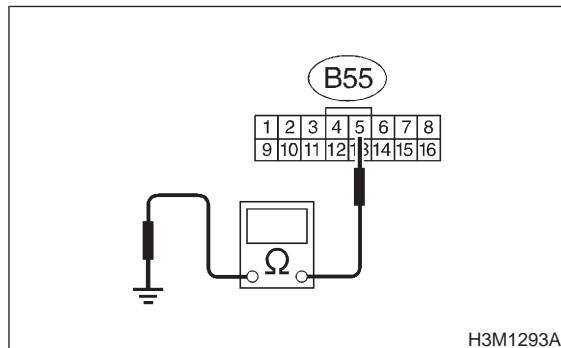
CHECK : Is the resistance less than 1 Ω?

YES : Go to step 8D6.

NO : Repair open circuit in harness between TCM and transmission connector.

8D6 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

Measure resistance of harness connector between TCM and chassis ground.

Connector & terminal**(B55) No. 5 — Chassis ground:**

CHECK : Is the resistance more than 1 MΩ?

YES : Go to step 8D7.

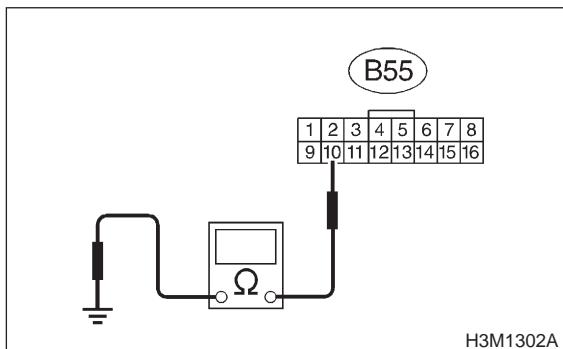
NO : Repair short circuit in harness between TCM and transmission connector.

8D7 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

Measure resistance of harness connector between TCM and chassis ground.

Connector & terminal

(B55) No. 10 — Chassis ground:



CHECK : *Is the resistance more than 1 MΩ?*

YES : Go to step **8D8**.

NO : Repair short circuit in harness between TCM and transmission connector.

8D8 : PREPARE SUBARU SELECT MONITOR.

CHECK : *Do you have a Subaru Select Monitor?*

YES : Go to step **8D11**.

NO : Go to step **8D9**.

8D9 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

- 1) Connect connectors to TCM and transmission.
- 2) Install air intake chamber.
- 3) Lift-up the vehicle and place safety stand.

CAUTION:

Make sure that all wheels are raised off floor.

- 4) Start the engine and warm-up the transmission until ATF temperature is above 80°C (176°F).

NOTE:

If ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature.

- 5) Move selector lever to "D" and slowly increase vehicle speed to 75 km/h (47 MPH). Wheels will lock-up.

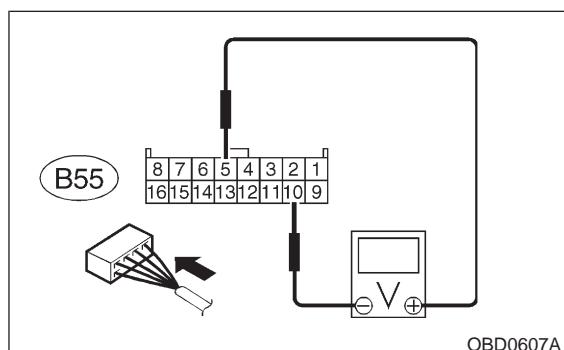
NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

- 6) Measure voltage between TCM connector terminals.

Connector & terminal

(B55) No. 5 (+) — No. 10 (-):



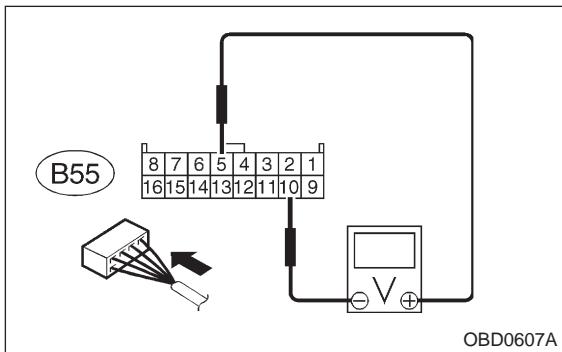
CHECK : *Is the voltage more than 8.5 V?*

YES : Go to step **8D10**.

NO : Go to step **8D13**.

8D10 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

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

Connector & terminal**(B55) No. 5 (+) — No. 10 (-):**

CHECK : *Is the voltage less than 0.5 V?*

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in TCM.

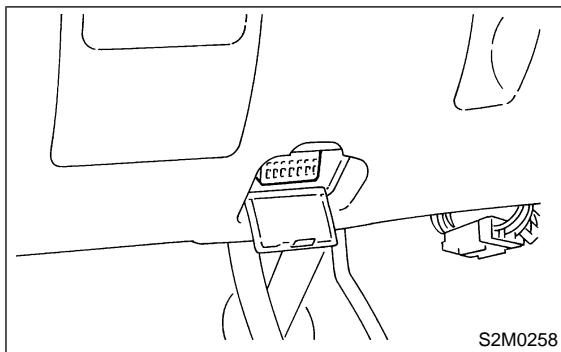
NO : Go to step **8D13**.

8D11 : CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR.

- 1) Connect connectors to TCM and transmission.
- 2) Install air intake chamber.
- 3) Lift-up the vehicle and place safety stand.

CAUTION:**Make sure that all wheels are raised off floor.**

- 4) Connect Subaru Select Monitor to data link connector.



- 5) Start the engine, and turn Subaru Select Monitor switch to ON.

- 6) Start the engine and warm-up the transmission until ATF temperature is above 80°C (176°F).

NOTE:

If ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature.

- 7) Read data of duty solenoid B using Subaru Select Monitor.

● Lock-up duty is indicated in "%".

- 8) Move selector lever to "D" and slowly increase vehicle speed to 75 km/h (47 MPH). Wheels will lock-up.

NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

CHECK : *Is the value 95%?*

YES : Go to step **8D12**.

NO : Go to step **8D13**.

8D12 : CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR.

Return the engine to idling speed and move selector lever to "N".

NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

CHECK : *Is the value 5%?*

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in TCM.

NO : Go to step **8D13**.

8D13 : CHECK POOR CONTACT.

CHECK : *Is there poor contact in duty solenoid B circuit?*

YES : Repair poor contact.

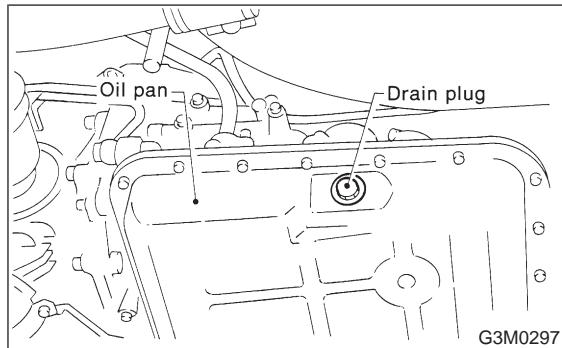
NO : Replace TCM.

8D14 : CHECK DUTY SOLENOID B (IN TRANSMISSION).

- 1) Remove transmission connector from bracket.
- 2) Drain automatic transmission fluid.

CAUTION:

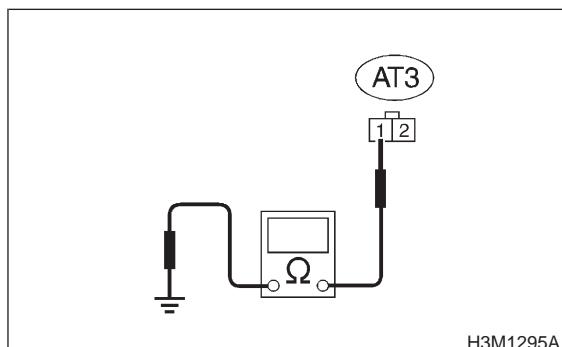
Do not drain the automatic transmission fluid until it cools down.



- 3) Remove oil pan, and disconnect connector from duty solenoid B.
- 4) Measure resistance between duty solenoid B connector and transmission ground.

Connector & terminal

(AT3) No. 1 — Transmission ground:



CHECK : *Is the resistance between 9 and 17 Ω?*

YES : Go to step **8D15**.

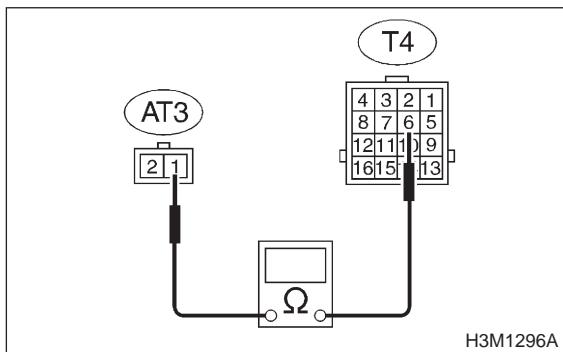
NO : Replace duty solenoid B.

8D15 : CHECK HARNESS CONNECTOR BETWEEN DUTY SOLENOID B AND TRANSMISSION.

Measure resistance of harness between duty solenoid B and transmission connector.

Connector & terminal

(T4) No. 6 — (AT3) No. 1:

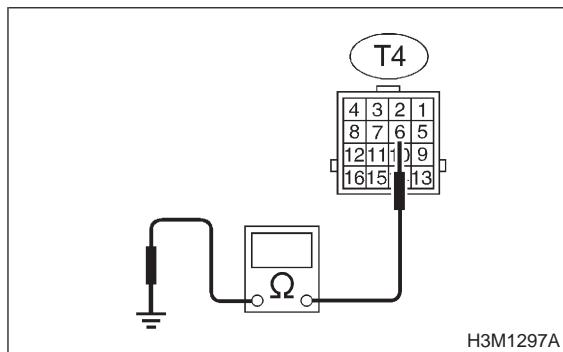


8D16 : CHECK HARNESS CONNECTOR BETWEEN DUTY SOLENOID B AND TRANSMISSION.

Measure resistance of harness between transmission connector and transmission ground.

Connector & terminal

(T4) No. 6 — Transmission ground:



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

YES : Go to step **8D16**.

NO : Repair open circuit in harness between TCM and transmission connector.

CHECK : *Is the resistance more than 1 MΩ?*

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in duty solenoid B and transmission.

NO : Repair short circuit in harness between TCM and transmission connector.

E: TROUBLE CODE 13 — SHIFT SOLENOID 3 —

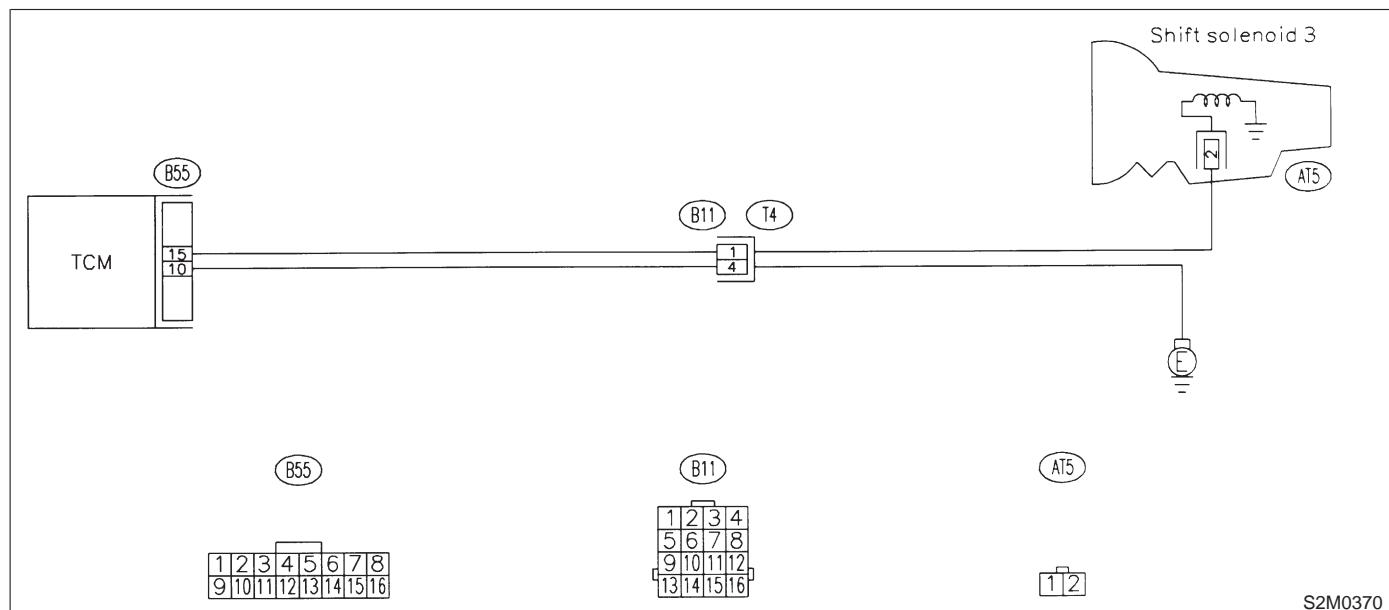
DIAGNOSIS:

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

TROUBLE SYMPTOM:

Ineffective engine brake with shift lever in "3".

WIRING DIAGRAM:

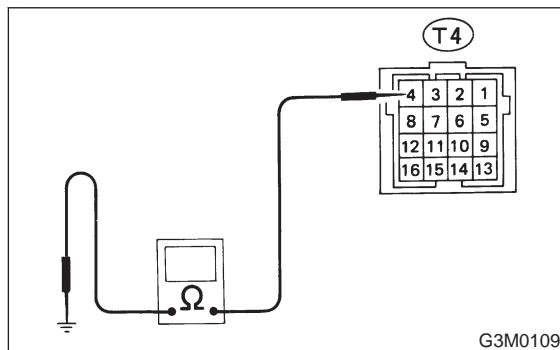


8E1 : CHECK SHIFT SOLENOID 3 GROUND LINE.

- 1) Turn ignition switch to OFF.
- 2) Remove air intake chamber.
- 3) Disconnect connector from transmission.
- 4) Measure resistance between transmission connector and transmission ground.

Connector & terminal

(T4) No. 4 — Chassis ground:



CHECK : Is the resistance less than 1 Ω ?

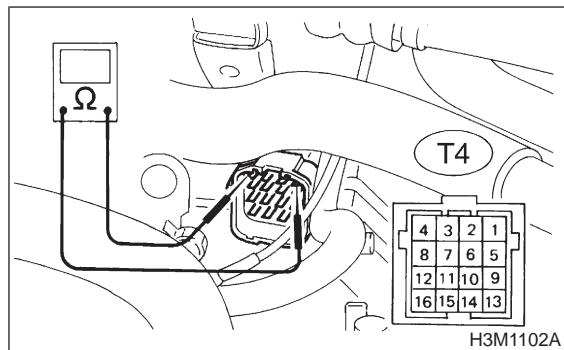
YES : Go to step 8E2.

NO : Repair open circuit in transmission harness.

8E2 : CHECK SHIFT SOLENOID 3.

Measure resistance between transmission connector terminals.

Connector & terminal
(T4) No. 1 — No. 4:



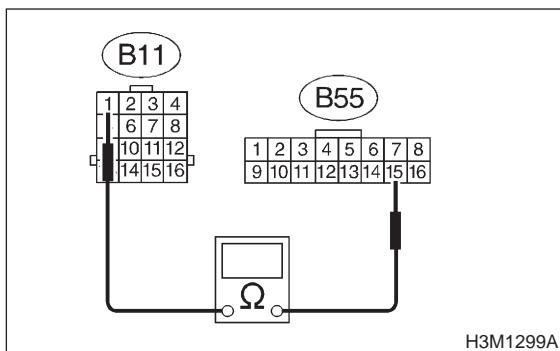
CHECK : Is the resistance between 20 and 32 Ω ?

YES : Go to step 8E3.

NO : Go to step 8E10.

8E3 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

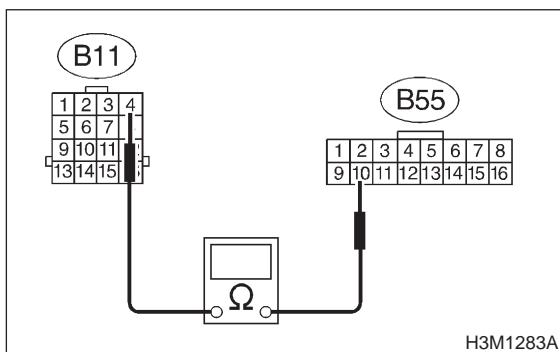
- 1) Disconnect connector from TCM.
- 2) Measure resistance of harness between TCM and transmission connector.

Connector & terminal
(B55) No. 15 — (B11) No. 1:


CHECK : Is the resistance less than $1\ \Omega$?
YES : Go to step 8E4.
NO : Repair open circuit in harness between TCM and transmission connector.

8E4 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

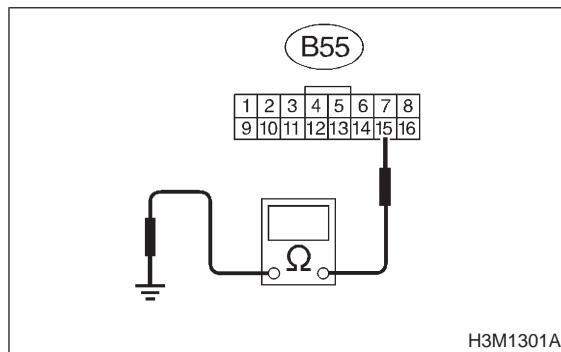
Measure resistance of harness between TCM and transmission connector.

Connector & terminal
(B55) No. 10 — (B11) No. 4:


CHECK : Is the resistance less than $1\ \Omega$?
YES : Go to step 8E5.
NO : Repair open circuit in harness between TCM and transmission connector.

8E5 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

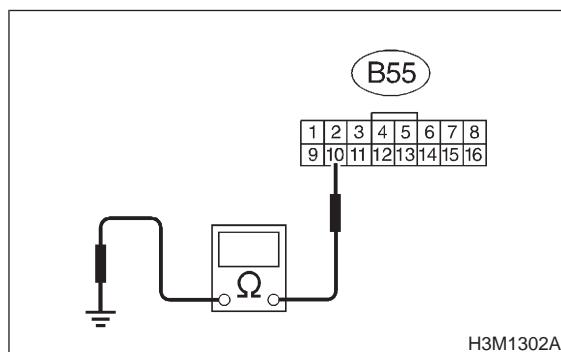
Measure resistance of harness between TCM connector and transmission ground.

Connector & terminal
(B55) No. 15 — Chassis ground:


CHECK : Is the resistance more than $1\ M\Omega$?
YES : Go to step 8E6.
NO : Repair short circuit in harness between TCM and transmission connector.

8E6 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

Measure resistance of harness between TCM connector and transmission ground.

Connector & terminal
(B55) No. 10 — Chassis ground:


CHECK : Is the resistance more than $1\ M\Omega$?
YES : Go to step 8E7.
NO : Repair short circuit in harness between TCM and transmission connector.

8E7 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

- 1) Connect connectors to TCM and transmission.
- 2) Install air intake chamber.
- 3) Lift-up or raise the vehicle and support with safety stand.

CAUTION:

Raise all wheels off ground.

- 4) Start the engine and warm-up the transmission until ATF temperature is above 80°C (176°F).

NOTE:

If ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature.

- 5) Move selector lever to "2", and slowly increase vehicle speed to 35 km/h (22 MPH).

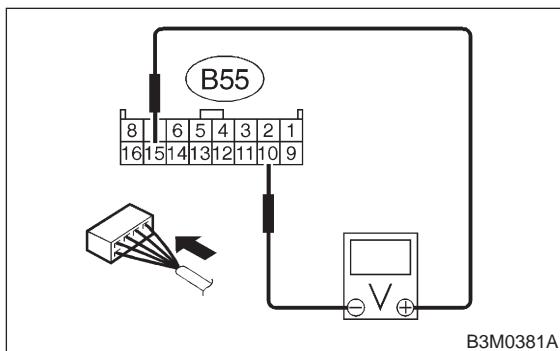
NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

- 6) Measure voltage between TCM connector terminals.

Connector & terminal

(B55) No. 15 (+) — No. 10 (-):



CHECK : **Is the voltage less than 1 V?**

YES : Go to step 8E8.

NO : Go to step 8E9.

8E8 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

- 1) Move selector lever to "D", and slowly increase vehicle speed to 65 km/h (41 MPH).

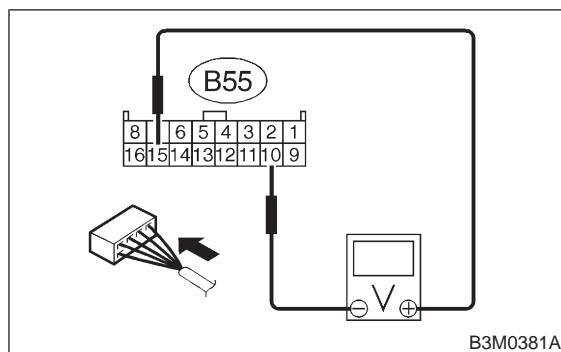
NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

- 2) Measure voltage between TCM connector terminals.

Connector & terminal

(B55) No. 15 (+) — No. 10 (-):



CHECK : **Is the voltage more than 10 V?**

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and contact in the TCM.

NO : Go to step 8E9.

8E9 : CHECK POOR CONTACT.

CHECK : **Is there poor contact in shift solenoid 3 circuit?**

YES : Repair poor contact.

NO : Replace TCM.

8E10 : CHECK SHIFT SOLENOID 3 (IN TRANSMISSION).

- 1) Remove transmission connector from bracket.
- 2) Lift-up or raise the vehicle and support with safety stand.

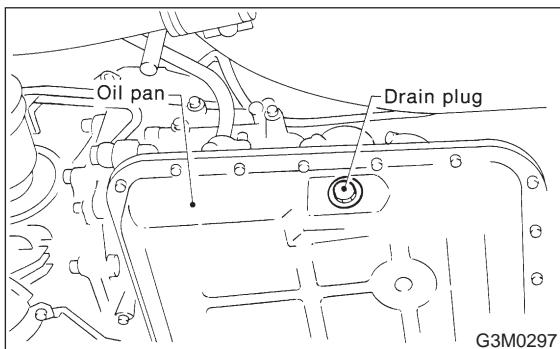
CAUTION:

Raise all wheels off ground.

- 3) Drain automatic transmission fluid.

CAUTION:

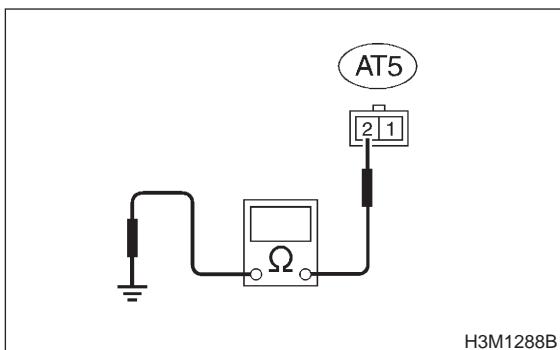
Do not drain the automatic transmission fluid until it cools down.



- 4) Remove oil pan, and disconnect connector from shift solenoid 3.
- 5) Measure resistance between shift solenoid 3 connector and transmission ground.

Connector & terminal

(AT5) No. 2 — Transmission ground:



CHECK : **Is the resistance between 20 and 32 Ω ?**

YES : Go to step 8E11.

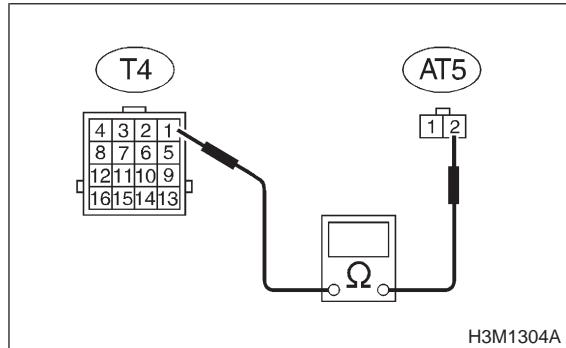
NO : Replace shift solenoid assembly.

8E11 : CHECK HARNESS CONNECTOR BETWEEN SHIFT SOLENOID 3 AND TRANSMISSION.

Measure resistance of harness between shift solenoid 3 and transmission connector.

Connector & terminal

(AT5) No. 2 — (T4) No. 1:



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

YES : Go to step 8E12.

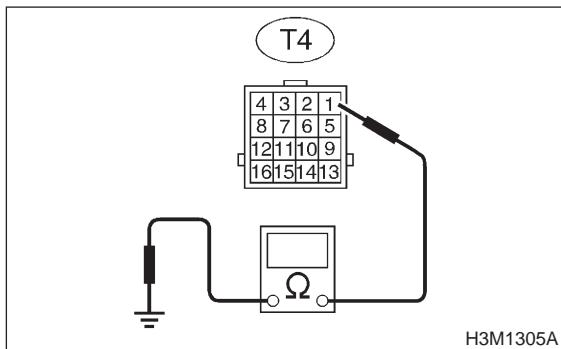
NO : Repair open circuit in harness between shift solenoid 3 and transmission connector.

**8E12 : CHECK HARNESS CONNECTOR
BETWEEN SHIFT SOLENOID 3 AND
TRANSMISSION.**

Measure resistance of harness between shift solenoid 3 connector and transmission ground.

Connector & terminal

(T4) No. 1 — Transmission ground:



CHECK : Is the resistance more than 1 MΩ?

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in shift solenoid 3 and transmission.

NO : Repair short circuit harness between TCM and transmission connector.

MEMO:

F: TROUBLE CODE 14 — SHIFT SOLENOID 2 —

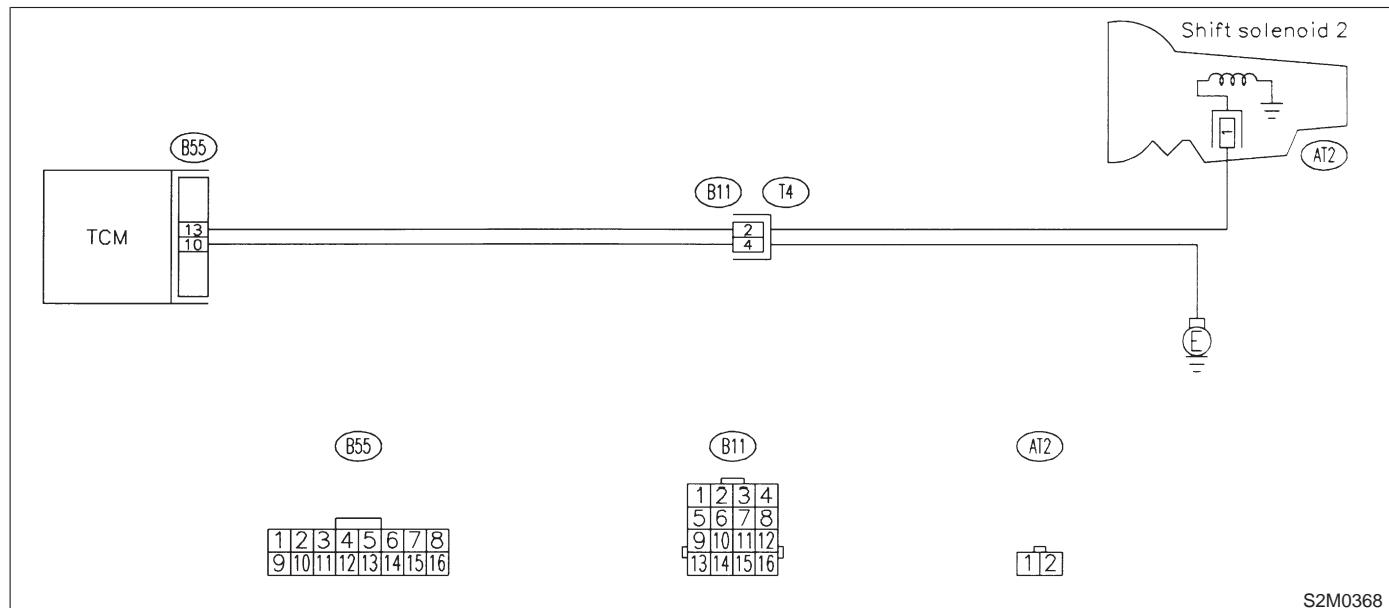
DIAGNOSIS:

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

TROUBLE SYMPTOM:

Does not shift.

WIRING DIAGRAM:



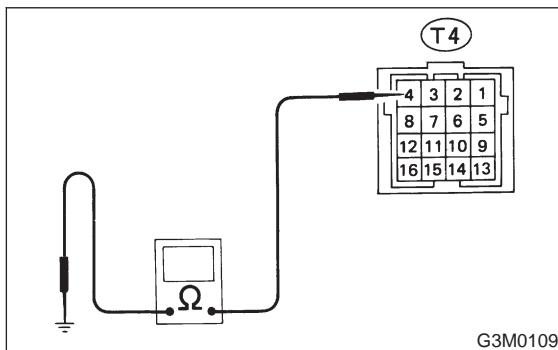
S2M0368

8F1 : CHECK SHIFT SOLENOID 2 GROUND LINE.

- 1) Turn ignition switch to OFF.
- 2) Remove air intake chamber.
- 3) Disconnect connector from transmission.
- 4) Measure resistance between transmission connector and transmission ground.

Connector & terminal

(T4) No. 4 — Chassis ground:



CHECK : Is the resistance less than 1 Ω ?

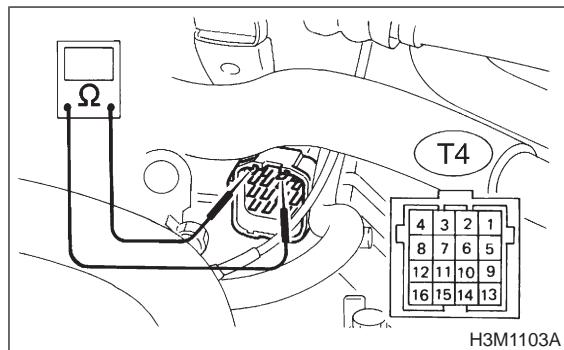
YES : Go to step 8F2.

NO : Repair open circuit in transmission harness.

8F2 : CHECK SHIFT SOLENOID 2.

Measure resistance between transmission connector terminals.

Connector & terminal
(T4) No. 2 — No. 4:



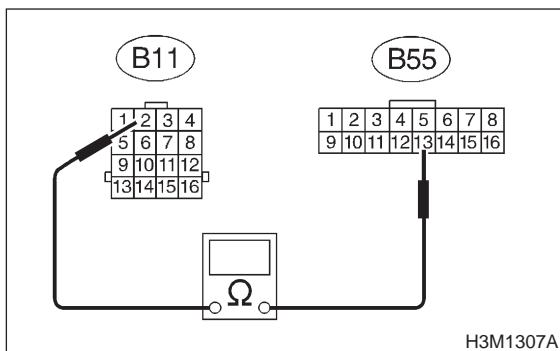
CHECK : Is the resistance between 20 and 32 Ω ?

YES : Go to step 8F3.

NO : Go to step 8F9.

8F3 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

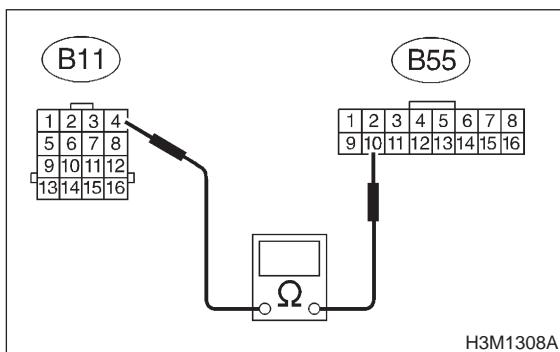
- 1) Disconnect connector from TCM.
- 2) Measure resistance of harness between TCM and shift solenoid 2 connector.

Connector & terminal
(B55) No. 13 — (B11) No. 2:


CHECK : Is the resistance less than $1\ \Omega$?
YES : Go to step 8F4.
NO : Repair open circuit in harness between TCM and transmission connector.

8F4 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

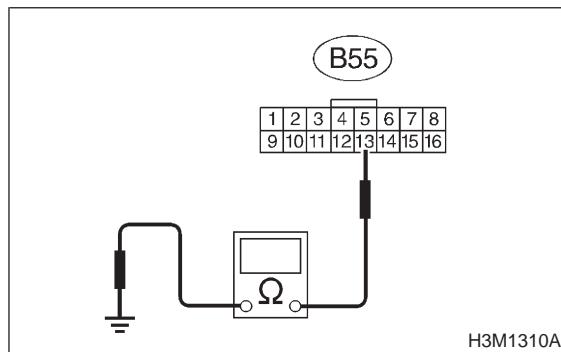
Measure resistance of harness between TCM and shift solenoid 2 connector.

Connector & terminal
(B55) No. 10 — (B11) No. 4:


CHECK : Is the resistance less than $1\ \Omega$?
YES : Go to step 8F5.
NO : Repair open circuit in harness between TCM and transmission connector.

8F5 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

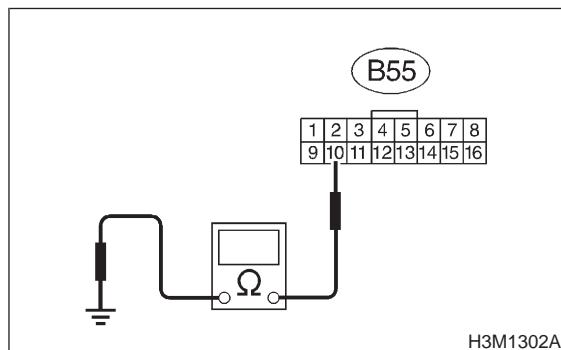
Measure resistance of harness between TCM connector and transmission ground.

Connector & terminal
(B55) No. 13 — Chassis ground:


CHECK : Is the resistance more than $1\ M\Omega$?
YES : Go to step 8F6.
NO : Repair short circuit in harness between TCM and transmission connector.

8F6 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

Measure resistance of harness between TCM connector and transmission ground.

Connector & terminal
(B55) No. 10 — Chassis ground:


CHECK : Is the resistance more than $1\ M\Omega$?
YES : Go to step 8F7.
NO : Repair short circuit in harness between TCM and transmission connector.

8F7 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

- 1) Connect connectors to TCM and transmission.
- 2) Install air intake chamber.
- 3) Lift-up or raise the vehicle and support with safety stand.

CAUTION:

Raise all wheels off ground.

- 4) Start the engine, and warm-up the transmission until ATF temperature is above 80°C (176°F).

NOTE:

If ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature.

- 5) Move selector lever to "D", and slowly increase vehicle speed to 50 km/h (31 MPH).

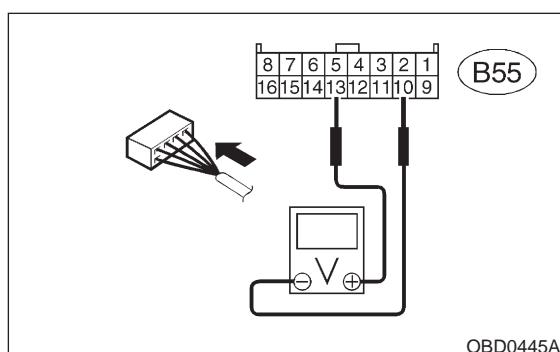
NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

- 6) Measure voltage between TCM connector terminals.

Connector & terminal

(B55) No. 13 (+) — No. 10 (-):



CHECK : *Is the voltage 9 V → 1 V?*

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and contact in the TCM.

NO : Go to step 8F8.

8F8 : CHECK POOR CONTACT.

CHECK : *Is there poor contact in shift solenoid 2 circuit?*

YES : Repair poor contact.

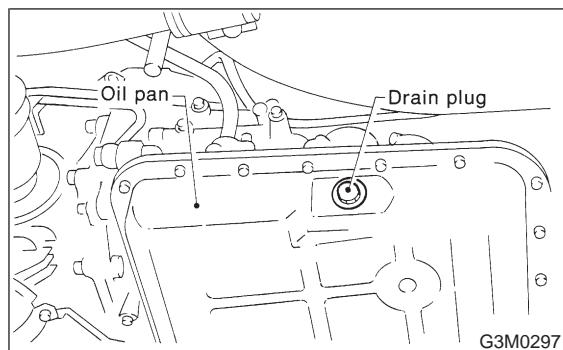
NO : Replace TCM.

8F9 : CHECK SHIFT SOLENOID 2 (IN TRANSMISSION).

- 1) Remove transmission connector from bracket.
- 2) Drain automatic transmission fluid.

CAUTION:

Do not drain the automatic transmission fluid until it cools down.

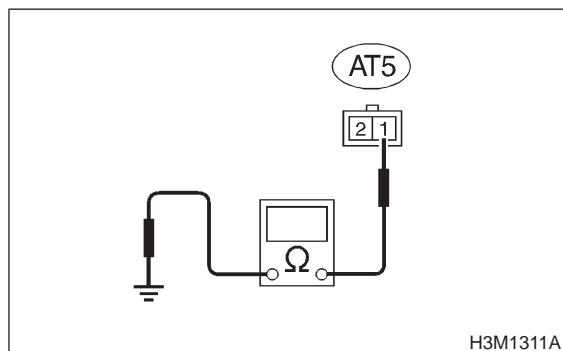


- 3) Remove oil pan, and disconnect connector from shift solenoid 2.

- 4) Measure resistance between shift solenoid 2 connector and transmission ground.

Connector & terminal

(AT2) No. 1 — Transmission ground:



CHECK : *Is the resistance between 20 and 32 Ω?*

YES : Go to step 8F10.

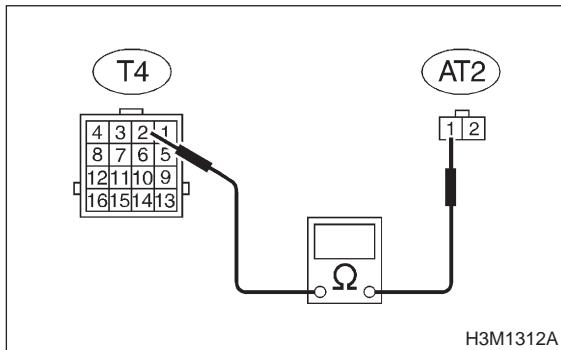
NO : Replace shift solenoid assembly.

**8F10 : CHECK HARNESS CONNECTOR
BETWEEN SHIFT SOLENOID 2 AND
TRANSMISSION.**

Measure resistance of harness between shift solenoid 2 and transmission connector.

Connector & terminal

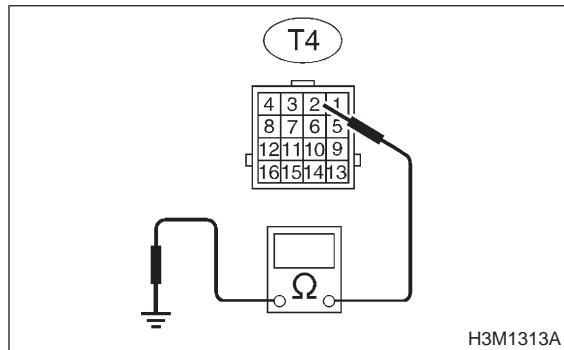
(AT2) No. 1 — (T4) No. 2:


**8F11 : CHECK HARNESS CONNECTOR
BETWEEN SHIFT SOLENOID 2 AND
TRANSMISSION.**

Measure resistance of harness between shift solenoid 2 connector and transmission ground.

Connector & terminal

(T4) No. 2 — Transmission ground:



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

YES : Go to step **8F11**.

NO : Repair open circuit in harness between shift solenoid 2 and transmission connector.

CHECK : *Is the resistance more than 1 MΩ?*

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and contact in the TCM.

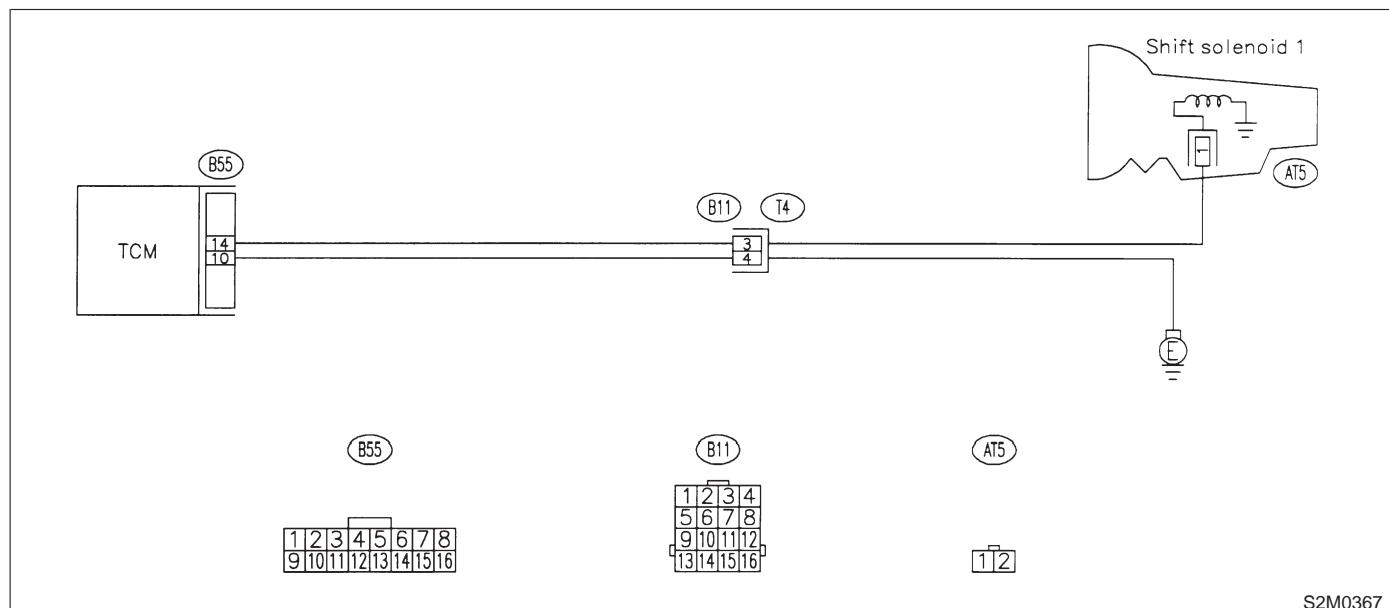
NO : Repair short circuit harness between TCM and transmission connector.

G: TROUBLE CODE 15 — SHIFT SOLENOID 1 —**DIAGNOSIS:**

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

TROUBLE SYMPTOM:

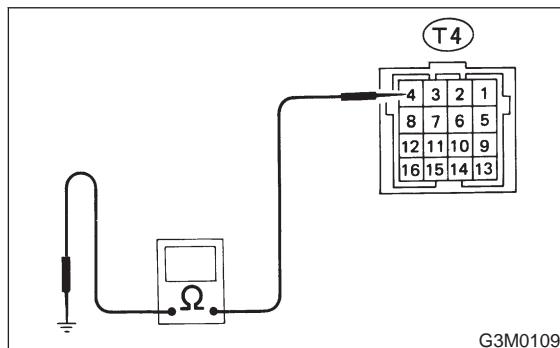
Does not shift.

WIRING DIAGRAM:**8G1 : CHECK SHIFT SOLENOID 1 GROUND LINE.**

- 1) Turn ignition switch to OFF.
- 2) Remove air intake chamber.
- 3) Disconnect connector from transmission.
- 4) Measure resistance between transmission connector and transmission ground.

Connector & terminal

(T4) No. 4 — Chassis ground:



CHECK : Is the resistance less than 1 Ω?

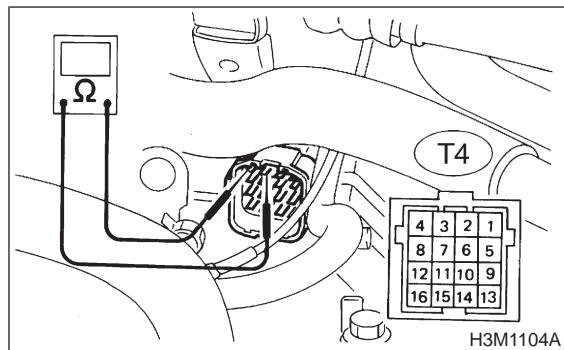
YES : Go to step 8G2.

NO : Repair open circuit in transmission harness.

8G2 : CHECK SHIFT SOLENOID 1.

Measure resistance between transmission connector terminals.

Connector & terminal
(T4) No. 3 — No. 4:



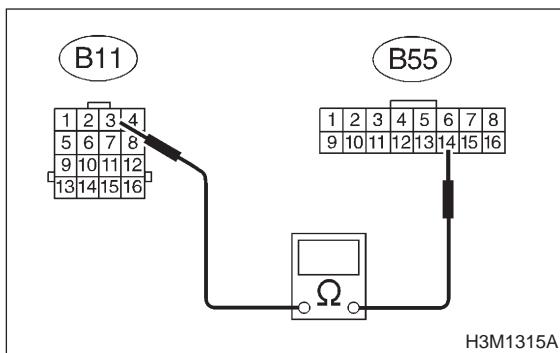
CHECK : Is the resistance between 20 and 32 Ω?

YES : Go to step 8G3.

NO : Go to step 8G9.

8G3 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

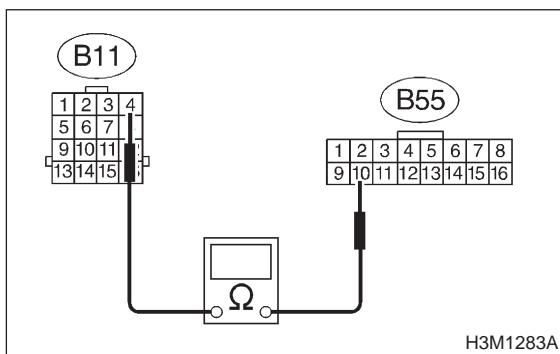
- 1) Disconnect connector from TCM.
- 2) Measure resistance of harness between TCM and shift solenoid 1 connector.

Connector & terminal
(B55) No. 14 — (B11) No. 3:


CHECK : Is the resistance less than $1\ \Omega$?
YES : Go to step 8G4.
NO : Repair open circuit in harness between TCM and transmission connector.

8G4 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

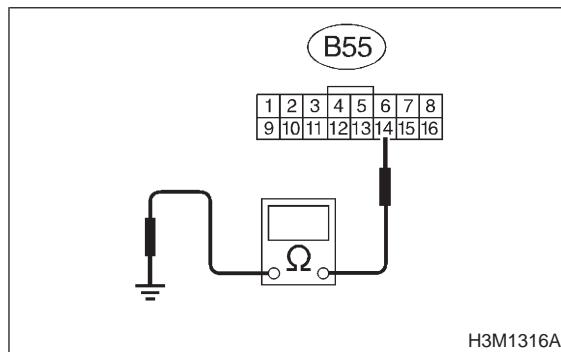
Measure resistance of harness between TCM and shift solenoid 1 connector.

Connector & terminal
(B55) No. 10 — (B11) No. 4:


CHECK : Is the resistance less than $1\ \Omega$?
YES : Go to step 8G5.
NO : Repair open circuit in harness between TCM and transmission connector.

8G5 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

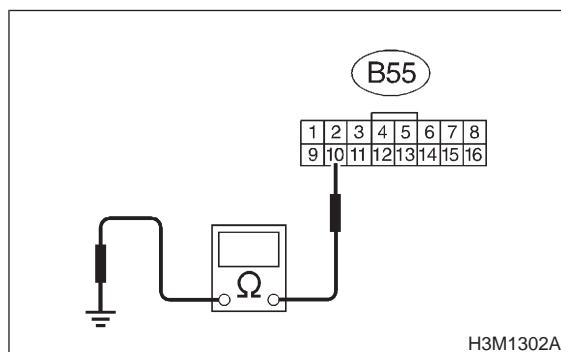
Measure resistance of harness between TCM connector and transmission ground.

Connector & terminal
(B55) No. 14 — Chassis ground:


CHECK : Is the resistance more than $1\ M\Omega$?
YES : Go to step 8G6.
NO : Repair short circuit in harness between TCM and transmission connector.

8G6 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

Measure resistance of harness TCM connector and transmission ground.

Connector & terminal
(B55) No. 10 — Chassis ground:


CHECK : Is the resistance more than $1\ M\Omega$?
YES : Go to step 8G7.
NO : Repair short circuit in harness between TCM and transmission connector.

8G7 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

- 1) Connect connectors to TCM and transmission.
- 2) Install air intake chamber.
- 3) Lift-up or raise the vehicle and support with safety stand.

CAUTION:**Raise all wheels off ground.**

- 4) Start the engine and warm-up the transmission until ATF temperature is above 80°C (176°F).

NOTE:

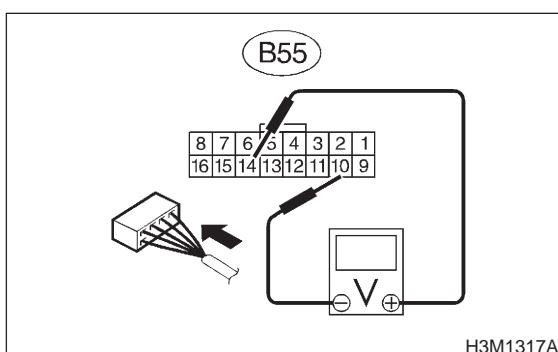
If ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature.

- 5) Move selector lever to "D", and slowly increase vehicle speed to 50 km/h (31 MPH).

NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

- 6) Measure voltage between TCM connector terminals.

Connector & terminal**(B55) No. 14 (+) — No. 10 (-):**

CHECK : *Is the voltage 1 V → 9 V?*

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in the TCM.

NO : Go to step 8G8.

8G8 : CHECK POOR CONTACT.

CHECK : *Is there poor contact in shift solenoid 1 circuit?*

YES : Repair poor contact.
NO : Replace TCM.

8G9 : CHECK SHIFT SOLENOID 1 (IN TRANSMISSION).

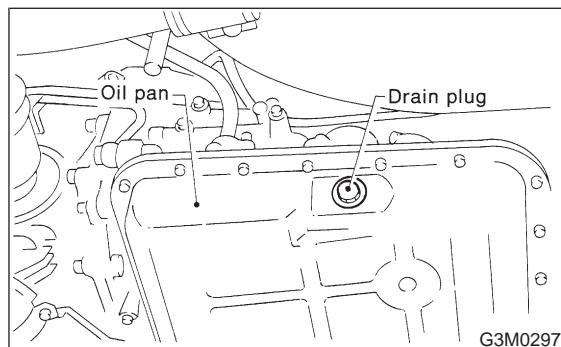
- 1) Remove transmission connector from bracket.
- 2) Lift-up or raise the vehicle and support with safety stand.

CAUTION:**Raise all wheels off ground.**

- 3) Drain automatic transmission fluid.

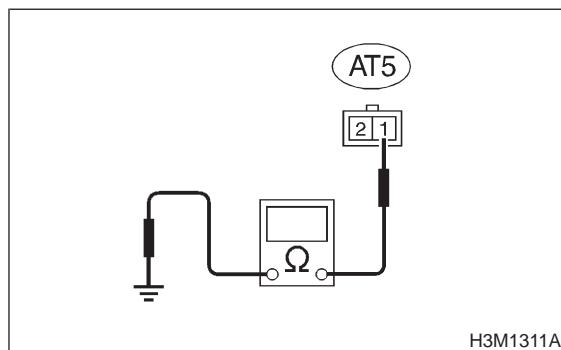
CAUTION:

Do not drain the automatic transmission fluid until it cools down.



- 4) Remove oil pan, and disconnect connector from shift solenoid 1.

- 5) Measure resistance between shift solenoid 1 connector and transmission ground.

Connector & terminal**(AT5) No. 1 — Transmission ground:**

CHECK : *Is the resistance between 20 and 32 Ω?*

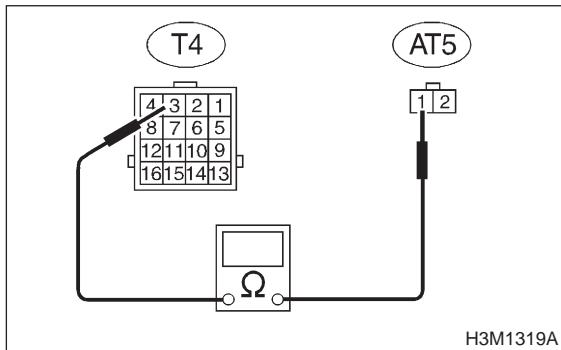
YES : Go to step 8G10.
NO : Replace shift solenoid assembly.

**8G10 : CHECK HARNESS CONNECTOR
BETWEEN SHIFT SOLENOID 1 AND
TRANSMISSION.**

Measure resistance of harness between shift solenoid 1 and transmission connector.

Connector & terminal

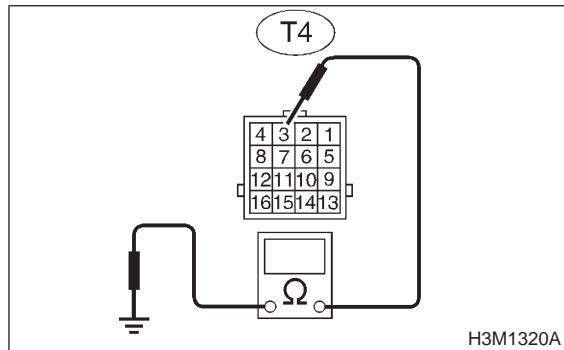
(AT5) No. 1 — (T4) No. 3:


**8G11 : CHECK HARNESS CONNECTOR
BETWEEN SHIFT SOLENOID 1 AND
TRANSMISSION.**

Measure resistance of harness between shift solenoid 1 connector and transmission ground.

Connector & terminal

(T4) No. 3 — Transmission ground:



CHECK : Is the resistance less than $1\ \Omega$?

YES : Go to step 8G11.

NO : Repair open circuit in harness between TCM and transmission connector.

CHECK : Is the resistance more than $1\ M\Omega$?

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in shift solenoid 1 and transmission.

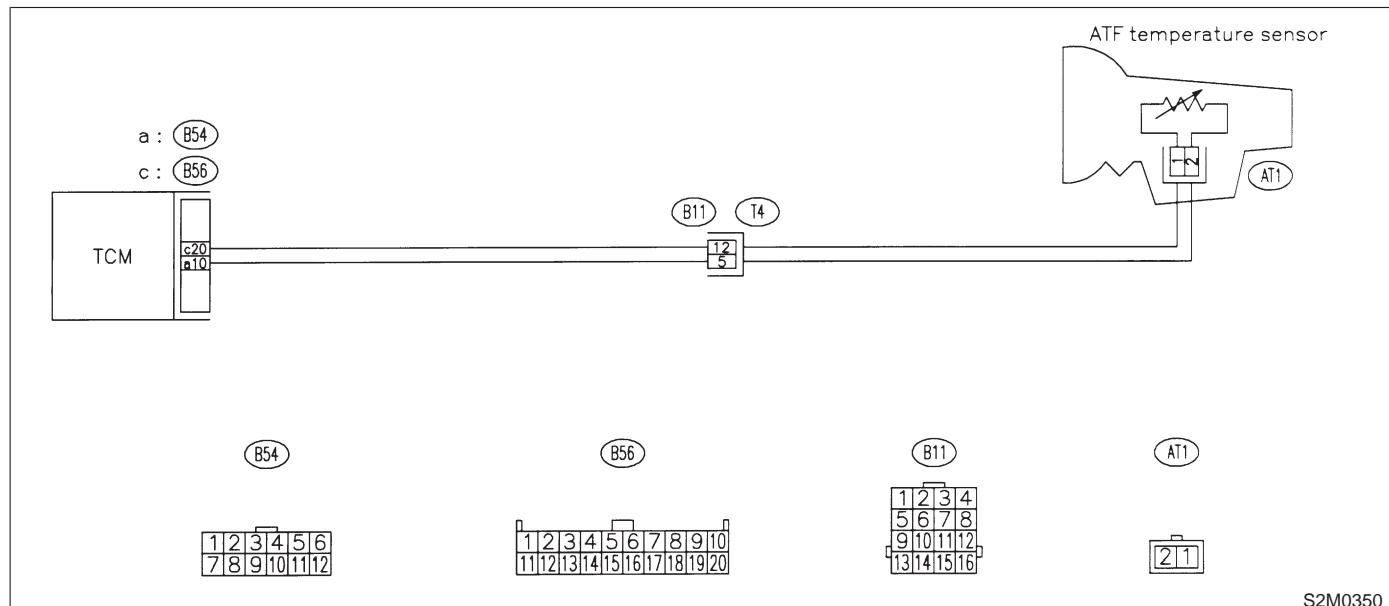
NO : Repair short circuit harness between TCM and transmission connector.

H: TROUBLE CODE 21 — ATF TEMPERATURE SENSOR —**DIAGNOSIS:**

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

TROUBLE SYMPTOM:

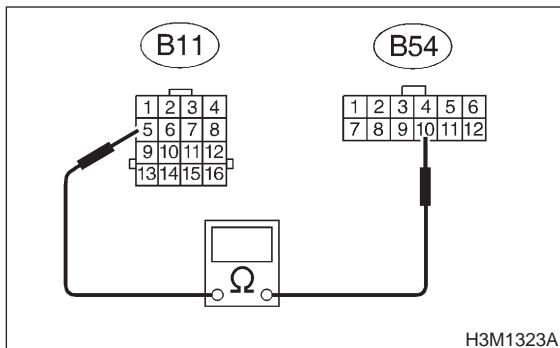
Excessive shift shock.

WIRING DIAGRAM:**8H1 : CHECK HARNESS CONNECTOR BETWEEN TCM AND ATF TEMPERATURE SENSOR.**

- 1) Turn ignition switch to OFF.
- 2) Remove air intake chamber.
- 3) Disconnect connector from transmission and TCM.
- 4) Measure resistance of harness between TCM and transmission connector.

Connector & terminal

(B54) No. 10 — (B11) No. 5:



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

YES : Go to step 8H2.

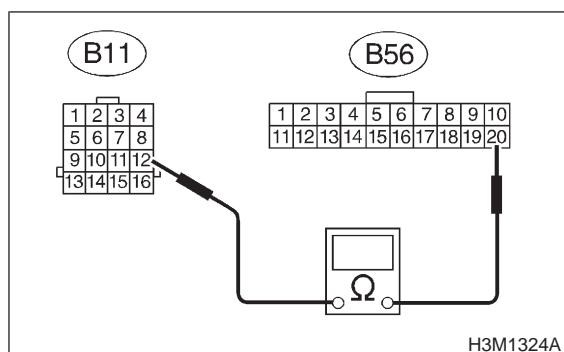
NO : Repair open circuit in harness between TCM and transmission connector.

8H2 : CHECK HARNESS CONNECTOR BETWEEN TCM AND ATF TEMPERATURE SENSOR.

Measure resistance of harness between TCM and transmission connector.

Connector & terminal

(B56) No. 20 — (B11) No. 12:



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

YES : Go to step 8H3.

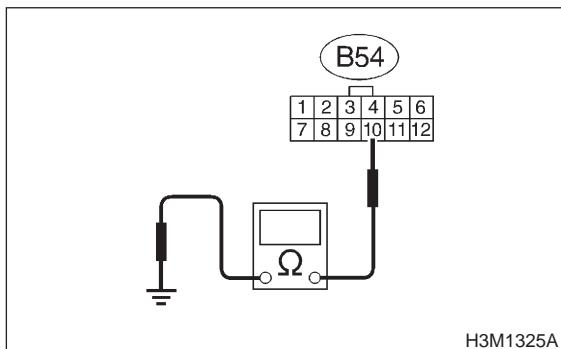
NO : Repair open circuit in harness between TCM and transmission connector.

8H3 : CHECK HARNESS CONNECTOR BETWEEN TCM AND ATF TEMPERATURE SENSOR.

Measure resistance of harness between TCM connector and transmission ground.

Connector & terminal

(B54) No. 10 — Chassis ground:



CHECK : Is the resistance more than $1 M\Omega$?

YES : Go to step 8H4.

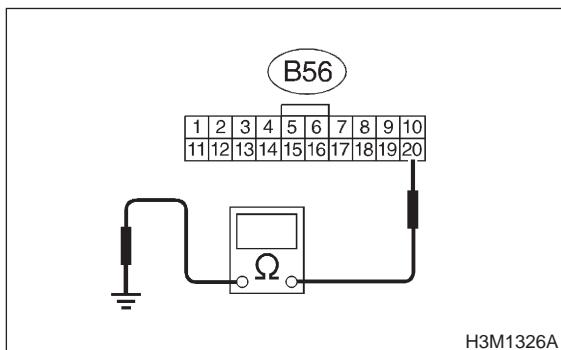
NO : Repair short circuit in harness between TCM and transmission connector.

8H4 : CHECK HARNESS CONNECTOR BETWEEN TCM AND ATF TEMPERATURE SENSOR.

Measure resistance of harness between TCM connector and transmission ground.

Connector & terminal

(B56) No. 20 — Chassis ground:



CHECK : Is the resistance more than $1 M\Omega$?

YES : Go to step 8H5.

NO : Repair short circuit in harness between TCM and transmission connector.

8H5 : CHECK ATF TEMPERATURE SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Connect connectors to transmission and TCM.
- 3) Turn ignition switch to ON and start engine.
- 4) Warm-up the transmission until ATF temperature reaches to 80°C (176°F).

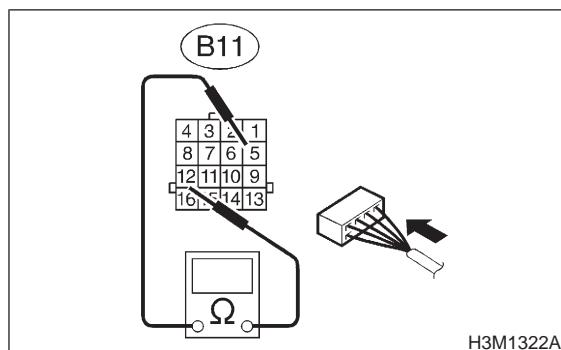
NOTE:

If ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature.

- 5) Measure resistance between transmission connector terminals.

Connector & terminal

(B11) No. 12 — No. 5:



CHECK : Is the resistance between 272 and 374Ω ?

YES : Go to step 8H6.

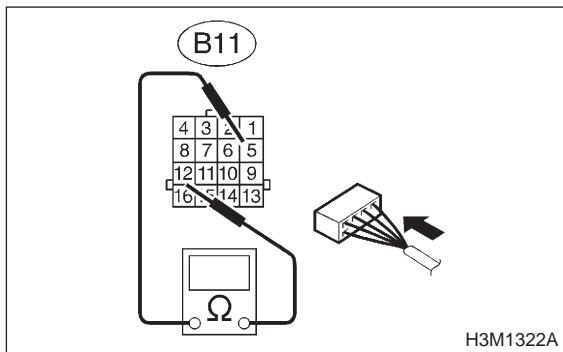
NO : Go to step 8H13.

8H6 : CHECK ATF TEMPERATURE SENSOR.

- 1) Turn ignition switch to ON (engine OFF).
- 2) Measure resistance between transmission connector terminals.

Connector & terminal

(B11) No. 12 — No. 5:



CHECK : Does the resistance value increase while the ATF temperature decreases?

YES : Go to step 8H7.

NO : Go to step 8H13.

8H7 : PREPARE SUBARU SELECT MONITOR.

CHECK : Do you have a Subaru Select Monitor?

YES : Go to step 8H10.

NO : Go to step 8H8.

8H8 : CHECK INPUT SIGNAL FOR TCM.

- 1) Warm-up the transmission until ATF temperature is about 80°C (176°F).

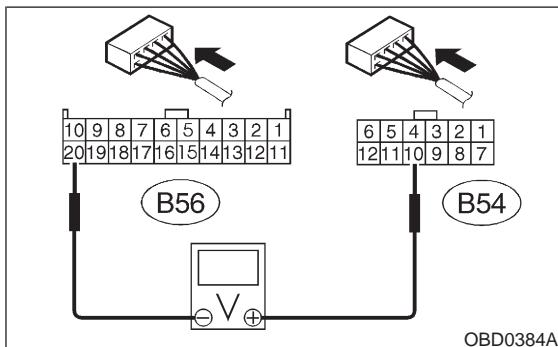
NOTE:

If ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature.

- 2) Measure voltage between TCM connector terminal.

Connector & terminal

(B54) No. 10 (+) — (B56) No. 20 (-):



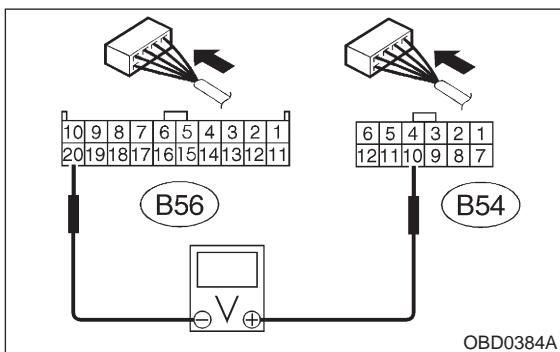
CHECK : Is the voltage between 2.9 and 4.0 V?

YES : Go to step 8H9.

NO : Go to step 8H12.

8H9 : CHECK INPUT SIGNAL FOR TCM.

- 1) Turn ignition switch to ON (engine OFF).
- 2) Measure voltage between TCM connector terminal.

Connector & terminal**(B54) No. 10 (+) — (B56) No. 20 (-):**

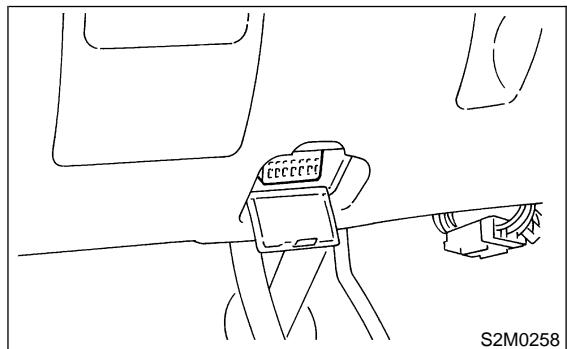
CHECK : *Is the voltage between 1.0 and 1.4 V?*

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and contact in the TCM.

NO : Go to step 8H12.

8H10 : CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.

- 1) Turn ignition switch to OFF.
- 2) Connect connectors to TCM and transmission.
- 3) Connect Subaru Select Monitor to data link connector.



- 4) Start the engine, and turn Subaru Select Monitor switch to ON.
- 5) Warm-up the transmission until ATF temperature is above 80°C (176°F).

NOTE:

If ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature.

- 6) Read data of ATF temperature using Subaru Select Monitor.

● ATF temperature is indicated in "°F" or "°C".

CHECK : *Is the ATF temperature between 70 and 110°C (158 and 230°F)?*

YES : Go to step 8H11.

NO : Go to step 8H12.

8H11 : CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.

Turn ignition switch to ON (engine OFF).

CHECK : *Does the ATF temperature gradually decrease?*

YES : Even if "AT OIL TEMP" light up, the circuit has returned to a normal condition at this time. Temporary poor contact of the connector and harness may be the case. Repair harness and contact in the ATF temperature sensor and transmission connector.

NO : Go to step 8H12.

3-2 [T8H12] AUTOMATIC TRANSMISSION AND DIFFERENTIAL

8. Diagnostic Chart with Trouble Code

8H12 : CHECK POOR CONTACT.

CHECK : *Is there poor contact in ATF temperature sensor circuit?*

YES : Repair poor contact.

NO : Replace TCM.

8H13 : CHECK ATF TEMPERATURE SENSOR (IN TRANSMISSION).

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from transmission.
- 3) Remove transmission connector from bracket.
- 4) Lift-up the vehicle and place safety stand.

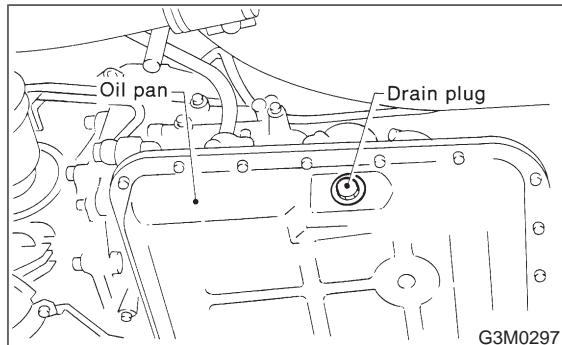
CAUTION:

Make sure that all wheels are raised off floor.

- 5) Drain automatic transmission fluid.

CAUTION:

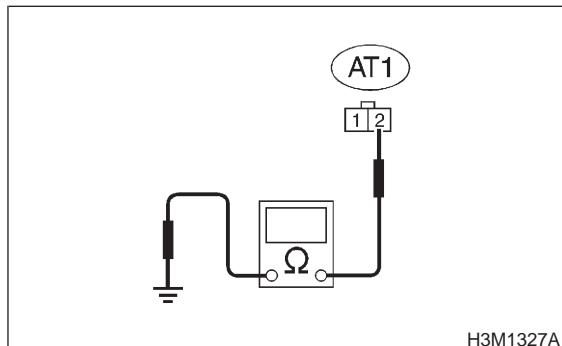
Do not drain the automatic transmission fluid until it cools down.



- 6) Remove oil pan, and disconnect connector from ATF temperature sensor connector.
- 7) Measure resistance between ATF temperature sensor connector and transmission ground.

Connector & terminal

(AT1) No. 2 — Transmission ground:



CHECK : *Is the resistance between 1.5 and 4.5 Ω?*

YES : Go to step 8H14.

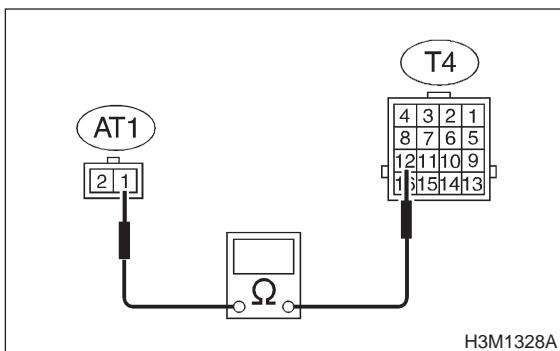
NO : Replace ATF temperature sensor.

8H14 : CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND ATF TEMPERATURE SENSOR.

- 1) Disconnect connector from transmission.
- 2) Measure resistance of harness between ATF temperature sensor and transmission connector.

Connector & terminal

(T4) No. 12 — (AT1) No. 1:



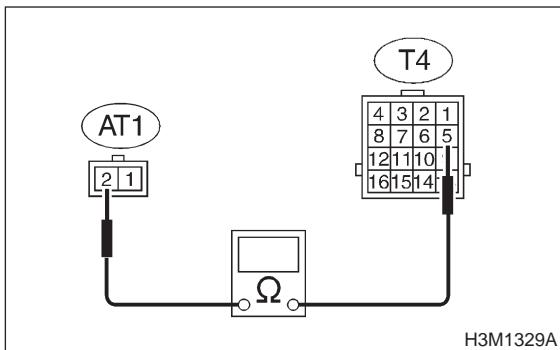
CHECK : Is the resistance less than $1\ \Omega$?
YES : Go to step 8H15.
NO : Repair open circuit in harness between ATF temperature sensor and transmission connector.

8H15 : CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND ATF TEMPERATURE SENSOR.

Measure resistance of harness between ATF temperature sensor and transmission connector.

Connector & terminal

(T4) No. 5 — (AT1) No. 2:



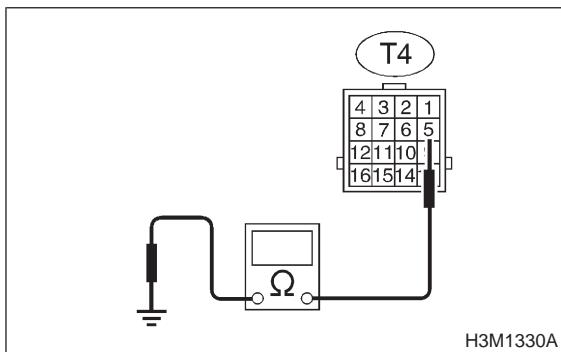
CHECK : Is the resistance less than $1\ \Omega$?
YES : Go to step 8H16.
NO : Repair open circuit in harness between ATF temperature sensor and transmission connector.

8H16 : CHECK HARNESS CONNECTOR BETWEEN TRANSMISSION AND ATF TEMPERATURE SENSOR.

Measure resistance of harness between transmission connector and transmission ground.

Connector & terminal

(T4) No. 5 — Transmission ground:



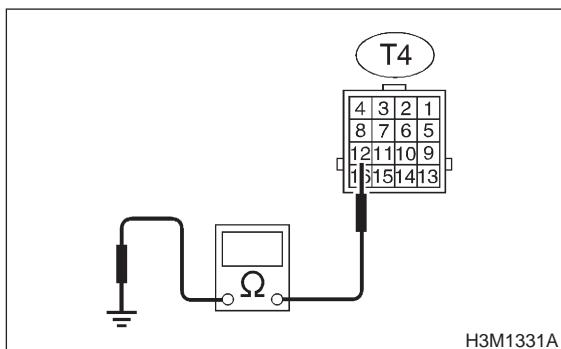
CHECK : Is the resistance more than $1\ M\Omega$?
YES : Go to step 8H17.
NO : Repair short circuit in harness between ATF temperature sensor and transmission connector.

**8H17 : CHECK HARNESS CONNECTOR
BETWEEN TRANSMISSION AND
ATF TEMPERATURE SENSOR.**

Measure resistance of harness between transmission connector and transmission ground.

Connector & terminal

(T4) No. 12 — Transmission ground:



H3M1331A

CHECK : *Is the resistance more than 1 MΩ?*

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and contact in the ATF temperature sensor and transmission connector.

NO : Repair short circuit in harness between ATF temperature sensor and transmission connector.

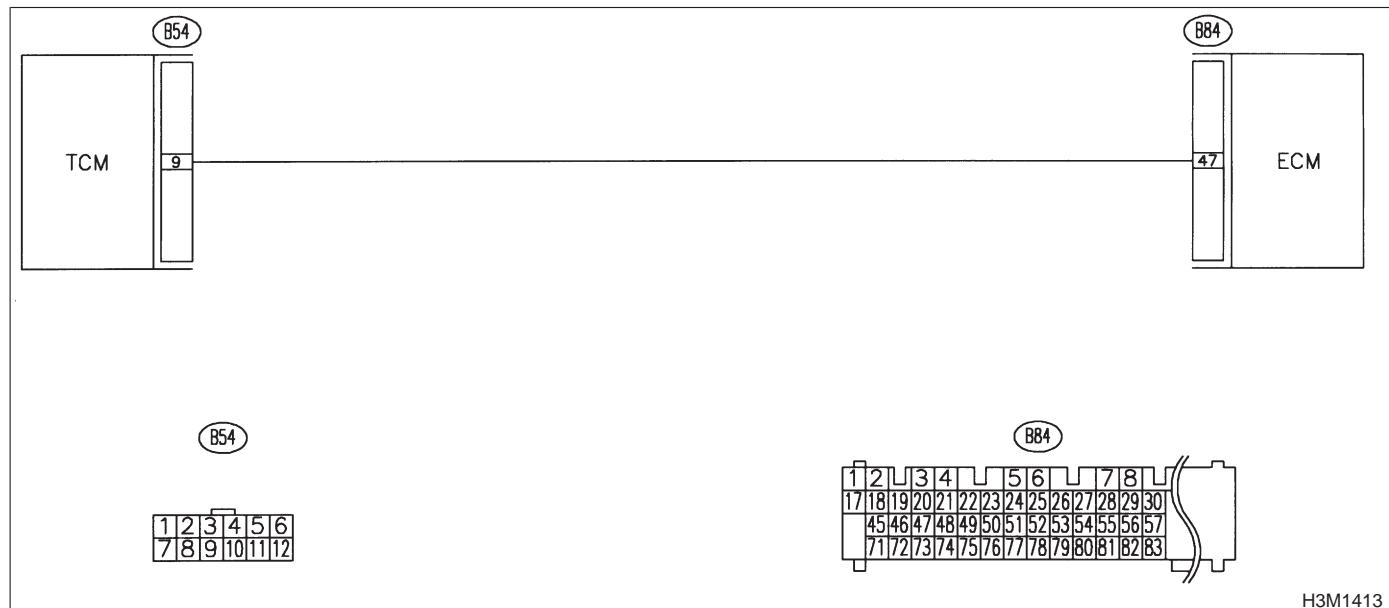
MEMO:

I: TROUBLE CODE 22 — MASS AIR FLOW SIGNAL —**DIAGNOSIS:**

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

TROUBLE SYMPTOM:

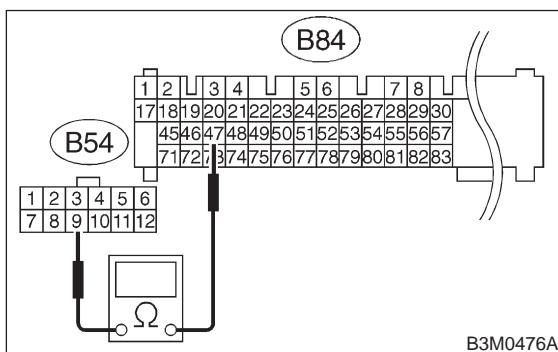
Excessive shift shock.

WIRING DIAGRAM:**8I1 : 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 between TCM and ECM connector.

Connector & terminal

(B54) No. 9 — (B84) No. 47:



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

YES : Go to step **8I2**.

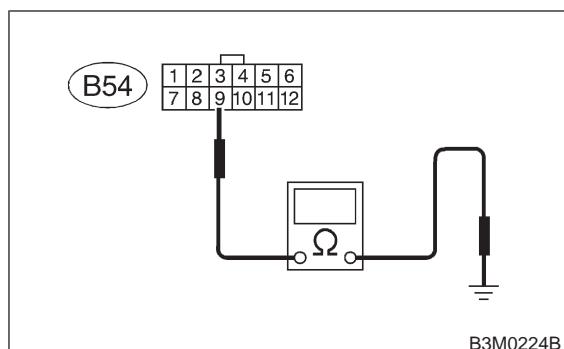
NO : Repair open circuit in harness between TCM and ECM connector.

8I2 : CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.

Measure resistance of harness between TCM connector and chassis ground.

Connector & terminal

(B54) No. 9 — Chassis ground:



CHECK : *Is the resistance more than 1 MΩ?*

YES : Go to step **8I3**.

NO : Repair short circuit in harness between TCM and ECM connector.

8I3 : PREPARE SUBARU SELECT MONITOR.

CHECK : Do you have a Subaru Select Monitor?

YES : Go to step 8I5.

NO : Go to step 8I4.

8I4 : CHECK INPUT SIGNAL FOR TCM.

- 1) Connect connectors to TCM and ECM.
- 2) Start the engine, and warm-up the transmission until ATF temperature is above 80°C (176°F).

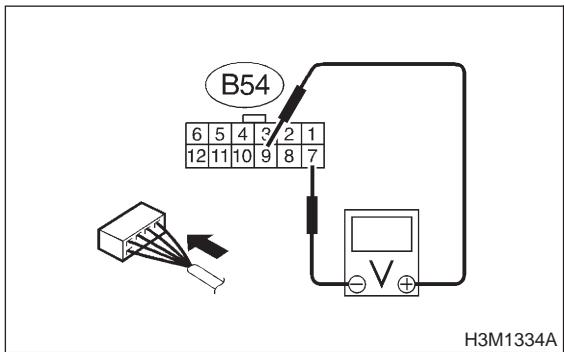
NOTE:

If ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature.

- 3) Engine idling.
- 4) Measure voltage between TCM connectors.

Connector & terminal

(B54) No. 9 (+) — No. 7 (-):



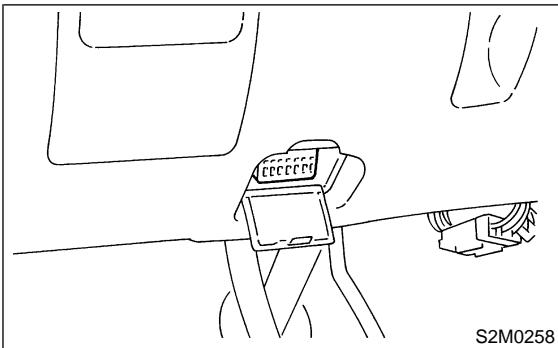
CHECK : Is the voltage between 0.5 and 1.2 V?

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in the TCM and ECM.

NO : Go to step 8I6.

8I5 : CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.

- 1) Connect connectors to TCM and ECM.
- 2) Turn ignition switch to OFF.
- 3) Connect Subaru Select Monitor to data link connector.



- 4) Start the engine, and turn Subaru Select monitor switch to ON.
- 5) Warm-up the engine until engine coolant temperature is above 80°C (176°F).
- 6) Engine idling.
- 7) Read data of mass air flow signal using Subaru Select Monitor.

● Display shows mass air flow signal value sent from ECM.

CHECK : Is the value between 0.5 and 1.2 V?

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in the TCM and ECM.

NO : Go to step 8I6.

8I6 : CHECK POOR CONTACT.

CHECK : Is there poor contact in mass air flow signal circuit?

YES : Repair poor contact.

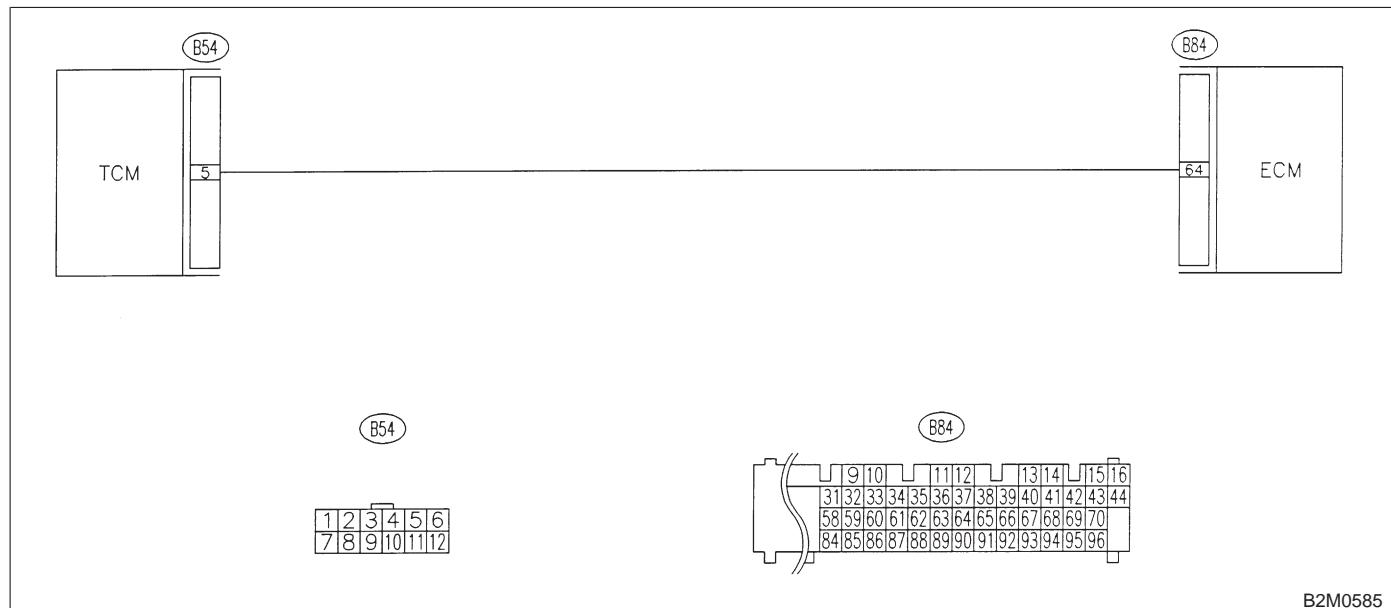
NO : Replace TCM.

J: TROUBLE CODE 23 — ENGINE SPEED SIGNAL —**DIAGNOSIS:**

Engine speed input signal circuit is open or shorted.

TROUBLE SYMPTOM:

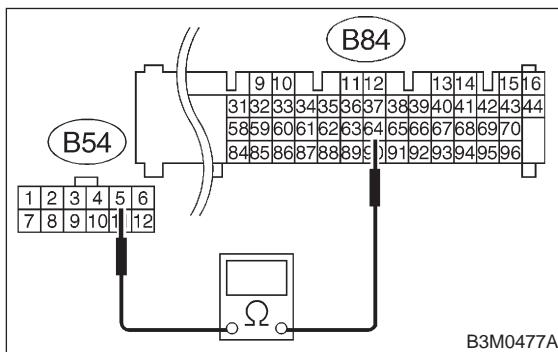
- No lock-up (after engine warm-up).
- AT OIL TEMP indicator remains on when vehicle speed is “0”.

WIRING DIAGRAM:**8J1 : 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 between TCM and ECM connector.

Connector & terminal

(B54) No. 5 — (B84) No. 64:



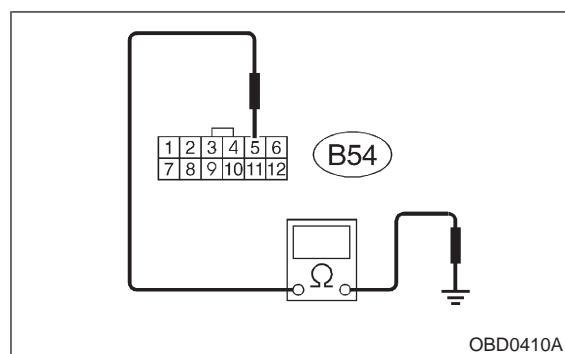
CHECK : **Is the resistance less than 1 Ω ?**
YES : Go to step 8J2.
NO : Repair open circuit in harness between TCM and ECM connector.

8J2 : CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.

Measure resistance of harness between TCM connector and chassis ground.

Connector & terminal

(B54) No. 5 — Chassis ground:



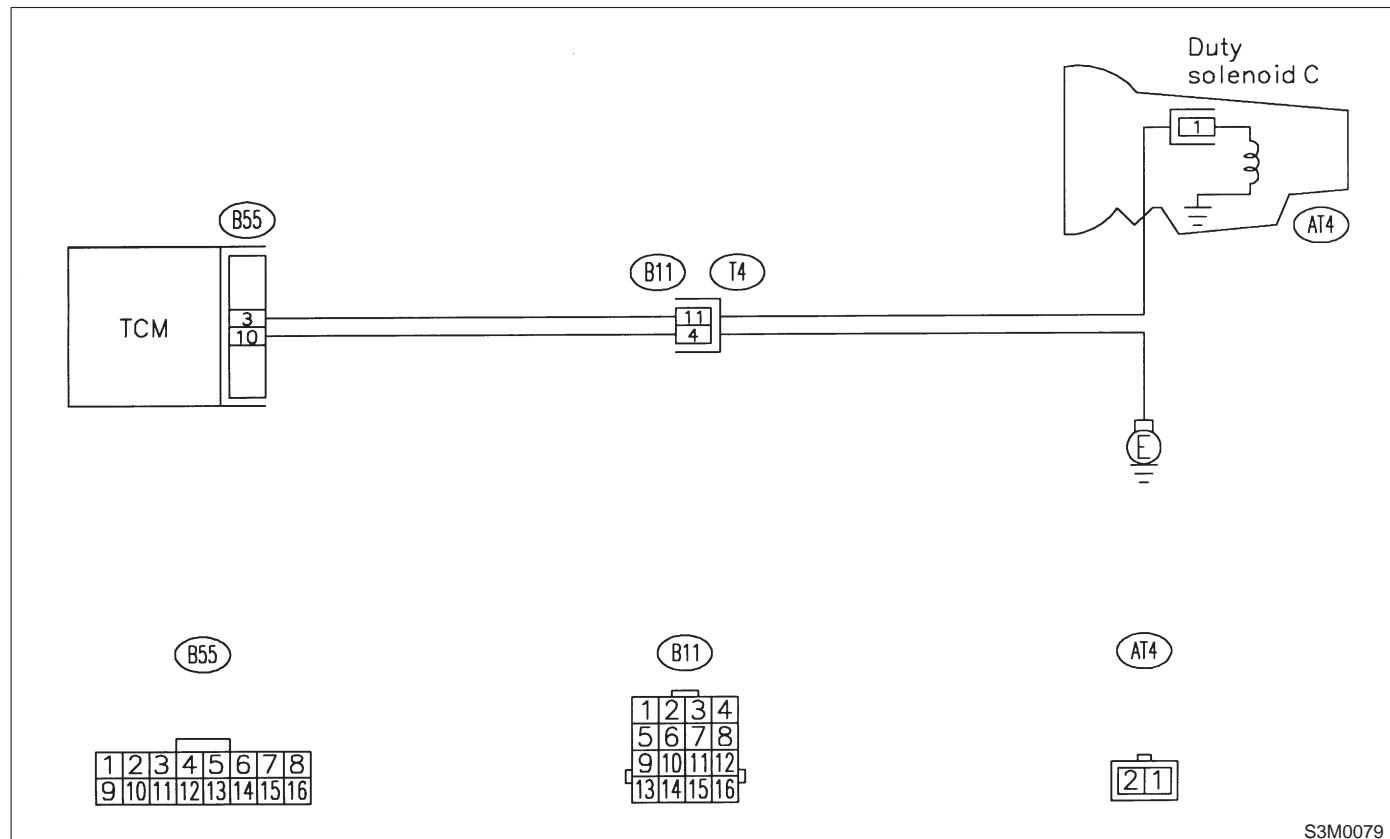
CHECK : **Is the resistance more than 1 Ω ?**
YES : Go to step 8J3.
NO : Repair short circuit in harness between TCM and ECM connector.

K: TROUBLE CODE 24 — DUTY SOLENOID C —**DIAGNOSIS:**

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

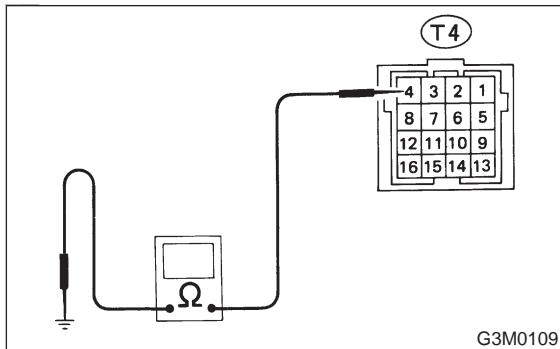
TROUBLE SYMPTOM:

Excessive "braking" in tight corners.

WIRING DIAGRAM:

8K1 : CHECK DUTY SOLENOID C GROUND LINE.

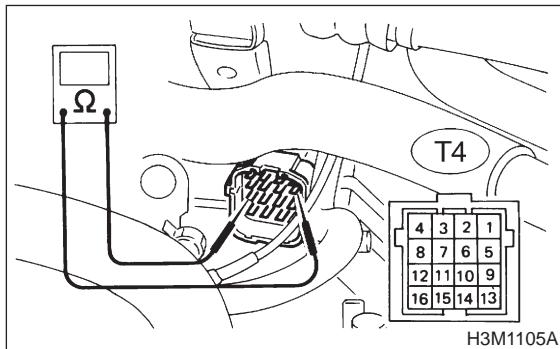
- 1) Turn ignition switch to OFF.
- 2) Remove air intake chamber.
- 3) Disconnect connector from transmission.
- 4) Measure resistance between transmission connector and transmission ground.

Connector & terminal
(T4) No. 4 — Chassis ground:


CHECK : Is the resistance less than 1 Ω ?
YES : Go to step 8K2.
NO : Repair open circuit in transmission harness.

8K2 : CHECK DUTY SOLENOID C.

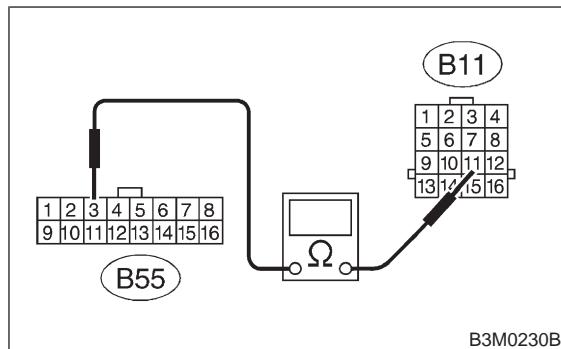
Measure resistance between transmission connector and transmission terminals.

Connector & terminal
(T4) No. 11 — No. 4:


CHECK : Is the resistance between 9 and 17 Ω ?
YES : Go to step 8K3.
NO : Go to step 8K13.

8K3 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

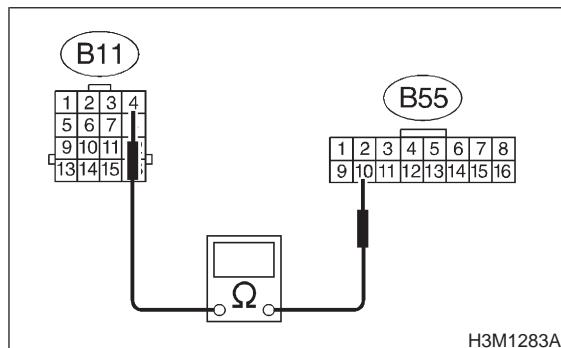
- 1) Disconnect connector from TCM.
- 2) Measure resistance of harness between TCM and transmission connector.

Connector & terminal
(B55) No. 3 — (B11) No. 11:


CHECK : Is the resistance less than 1 Ω ?
YES : Go to step 8K4.
NO : Repair open circuit in harness between TCM and transmission connector.

8K4 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

Measure resistance harness connector between TCM and transmission connector.

Connector & terminal
(B55) No. 10 — (B11) No. 4:


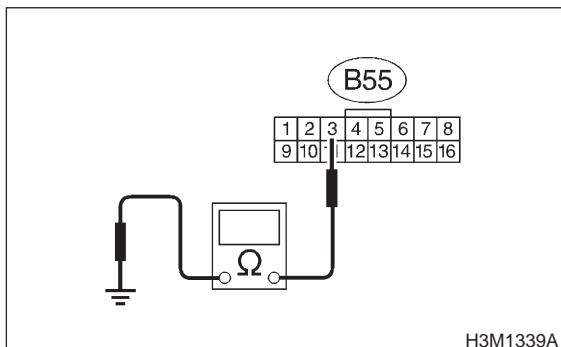
CHECK : Is the resistance less than 1 Ω ?
YES : Go to step 8K5.
NO : Repair open circuit in harness between TCM and transmission connector.

8K5 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

Measure resistance harness connector between TCM and chassis ground.

Connector & terminal

(B55) No. 3 — Chassis ground:



CHECK : Is the resistance more than $1 M\Omega$?

YES : Go to step 8K6.

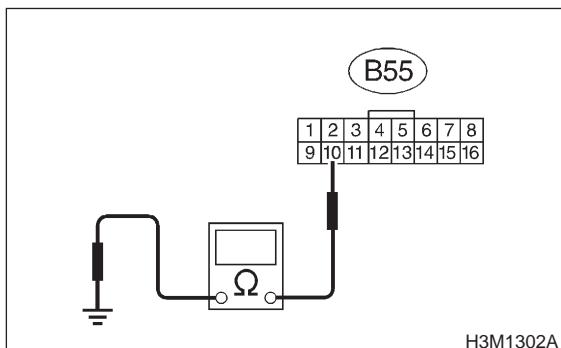
NO : Repair short circuit in harness between TCM and transmission connector.

8K6 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

Measure resistance harness connector between TCM and chassis ground.

Connector & terminal

(B55) No. 10 — Chassis ground:



CHECK : Is the resistance more than $1 M\Omega$?

YES : Go to step 8K7.

NO : Repair short circuit in harness between TCM and transmission connector.

8K7 : PREPARE SUBARU SELECT MONITOR.

CHECK : Do you have a Subaru Select Monitor?

YES : Go to step 8K10.

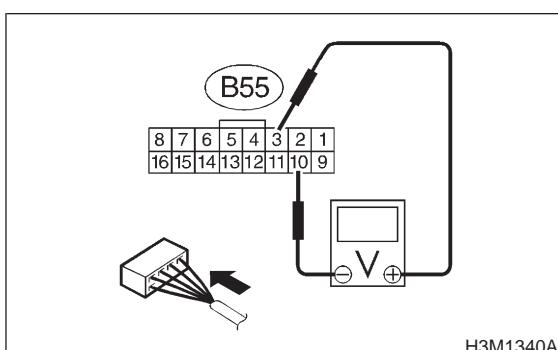
NO : Go to step 8K8.

8K8 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

- 1) Connect connectors to TCM and transmission.
- 2) Install air intake chamber.
- 3) Turn ignition switch to ON (engine OFF).
- 4) Throttle is fully closed.
- 5) Measure voltage between TCM connector terminals.

Connector & terminal

(B55) No. 3 (+) — No. 10 (-):



CHECK : Is the voltage less than 1 V in "P" range?

YES : Go to step 8K9.

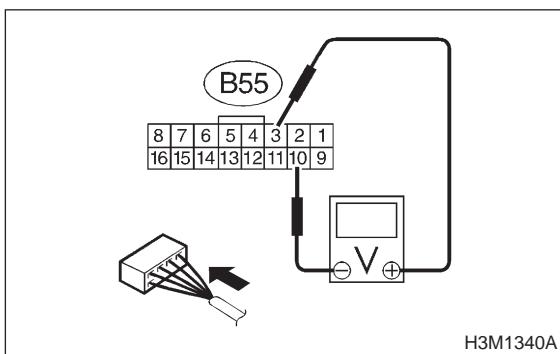
NO : Go to step 8K12.

8K9 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

Measure voltage between TCM connector terminals.

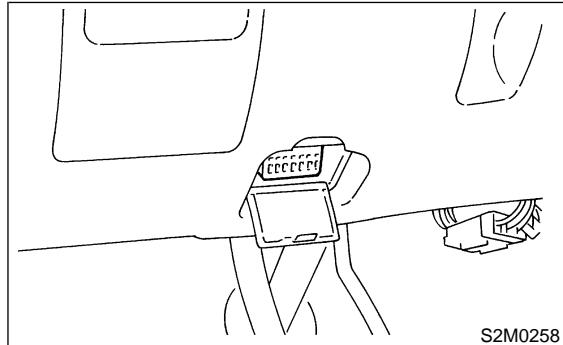
Connector & terminal

(B55) No. 3 (+) — No. 10 (-):



8K10 : CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR.

- 1) Connect connectors to TCM and transmission.
- 2) Install air intake chamber.
- 3) Connect Subaru Select Monitor to data link connector.



CHECK : Is the voltage between 5 and 7 V in "D" range?

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in the duty solenoid C and TCM connector.

NO : Go to step 8K12.

- 4) Turn ignition switch to ON (engine OFF) and turn Subaru Select Monitor switch to ON.
- 5) Move selector lever to "D" with throttle fully open (vehicle speed 0 km/h or 0 MPH).
- 6) Read data of duty solenoid C using Subaru Select Monitor.

● Duty solenoid C is indicated in "%".

CHECK : Is the value between 5 and 10%?

YES : Go to step 8K11.

NO : Go to step 8K12.

8K11 : CHECK OUTPUT SIGNAL EMITTED FROM TCM USING SUBARU SELECT MONITOR.

- 1) Set FWD mode.
- 2) Throttle fully closed.

CHECK : Is the value 95%?

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in the duty solenoid C and TCM connector.

NO : Go to step 8K12.

8K12 : CHECK POOR CONTACT.

CHECK : Is there poor contact in duty solenoid C circuit?

YES : Repair poor contact.

NO : Replace TCM.

3-2 [T8K13] AUTOMATIC TRANSMISSION AND DIFFERENTIAL

8. Diagnostic Chart with Trouble Code

8K13 : CHECK DUTY SOLENOID C (IN TRANSMISSION).

1) Lift-up the vehicle and place safety stand.

CAUTION:

Make sure that all wheels are raised off floor.

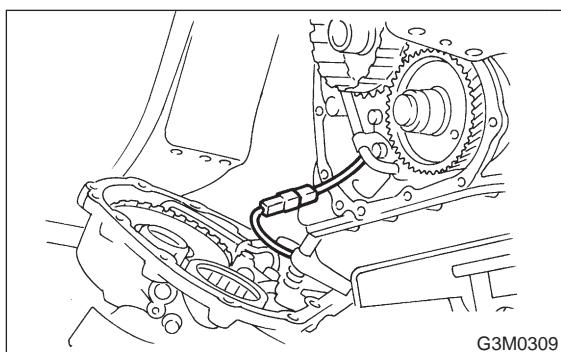
2) Drain automatic transmission fluid.

CAUTION:

Do not drain the automatic transmission fluid until it cools down.

3) Remove extension case, and disconnect connector from duty solenoid C.

<Ref. to 3-2 [W6A0].>

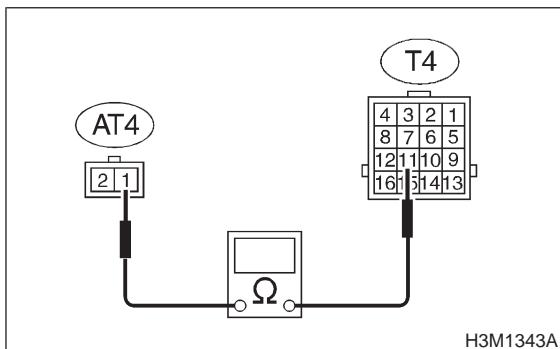


8K14 : CHECK HARNESS CONNECTOR BETWEEN DUTY SOLENOID C AND TRANSMISSION.

Measure resistance of harness between duty solenoid C and transmission connector.

Connector & terminal

(T4) No. 11 — (AT4) No. 1:

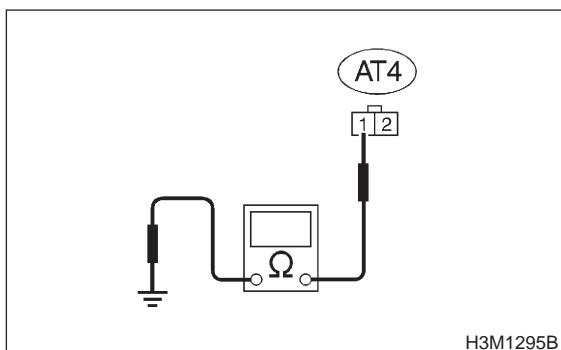


- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step 8K15.
- NO** : Repair open circuit in harness between duty solenoid C and transmission connector.

4) Measure resistance between duty solenoid C connector and transmission ground.

Connector & terminal

(AT4) No. 1 — Transmission ground:



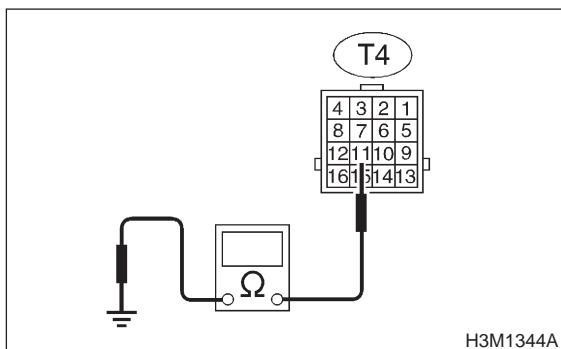
- CHECK** : *Is the resistance between 9 and 17 Ω?*
- YES** : Go to step 8K14.
- NO** : Replace duty solenoid C.

**8K15 : CHECK HARNESS CONNECTOR
BETWEEN DUTY SOLENOID C AND
TRANSMISSION.**

Measure resistance of harness between transmission connector and transmission ground.

Connector & terminal

(T4) No. 11 — Transmission ground:



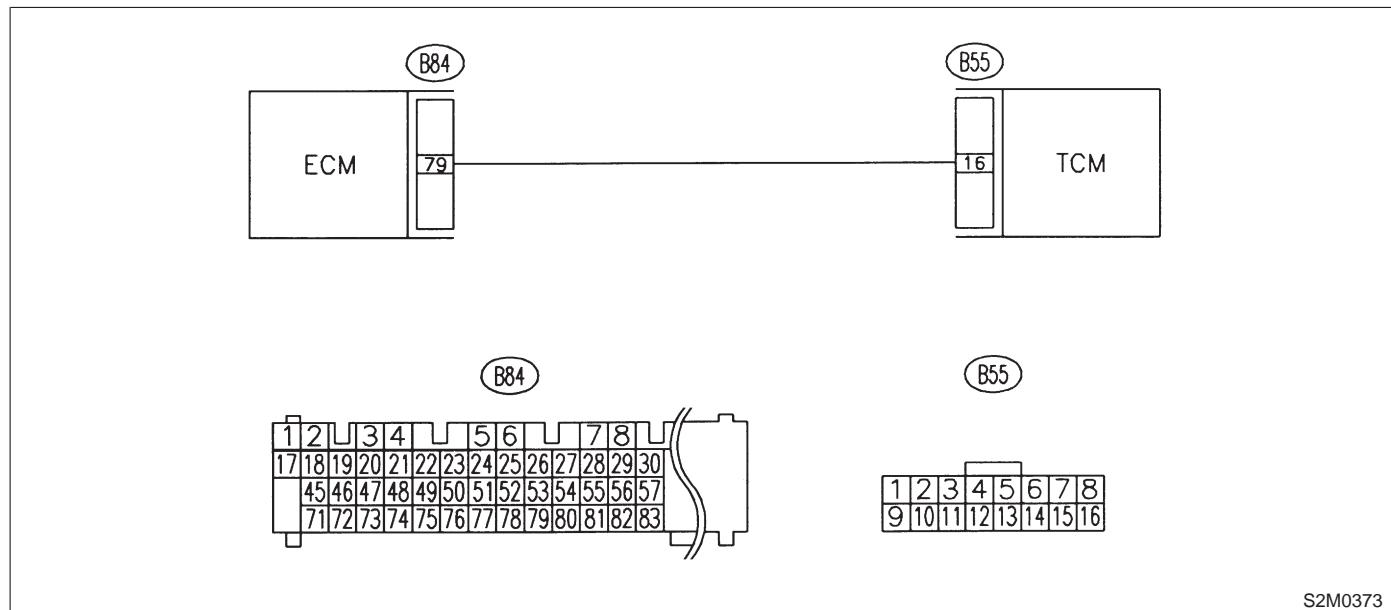
- CHECK** : **Is the resistance more than 1 MΩ?**
- YES** : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and contact in the duty solenoid C and transmission connector.
- NO** : Repair short circuit in harness between duty solenoid C and transmission connector.

L: TROUBLE CODE 25 — TORQUE CONTROL SIGNAL —**DIAGNOSIS:**

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

TROUBLE SYMPTOM:

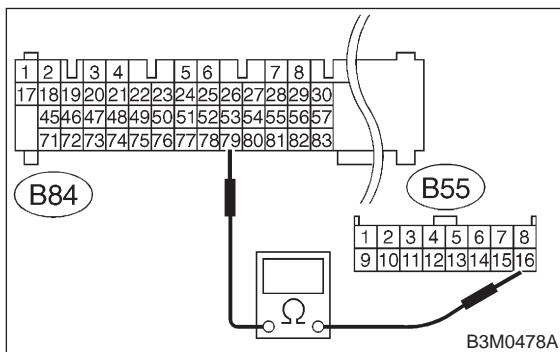
Excessive shift shock.

WIRING DIAGRAM:**8L1 : 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 between TCM and ECM connector.

Connector & terminal

(B55) No. 16 — (B84) No. 79:



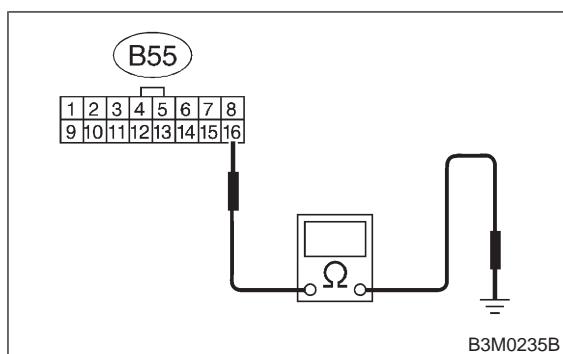
CHECK : **Is the resistance less than 1 Ω ?**
YES : Go to step 8L2.
NO : Repair open circuit in harness between TCM and ECM connector.

8L2 : CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.

Measure resistance of harness between TCM connector and chassis ground.

Connector & terminal

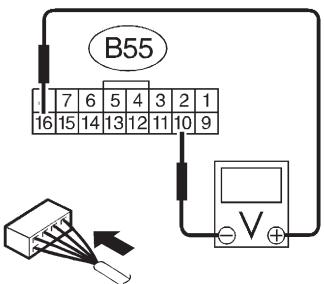
(B55) No. 16 — Chassis ground:



CHECK : **Is the resistance more than 1 $M\Omega$?**
YES : Go to step 8L3.
NO : Repair short circuit in harness between TCM and ECM connector.

8L3 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

- 1) Connect connectors to TCM and ECM.
- 2) Turn ignition switch to ON (engine OFF).
- 3) Measure voltage between TCM connector terminals.

Connector & terminal**(B55) No. 16 (+) — No. 10 (-):**

H3M1347A

8L4 : CHECK POOR CONTACT.

CHECK : *Is there poor contact in torque control signal circuit?*

YES : Repair poor contact.
NO : Go to step **8L5**.

8L5 : CONFIRM TROUBLE CODE 25.

CHECK : *Replace ECM with a new one. Does the trouble code appear again, after the memory has been cleared?*

YES : Replace TCM.
NO : Replace ECM.

CHECK : *Is the voltage between 4 and 6 V?*

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in the TCM and ECM.

NO : Go to step **8L4**.

M: TROUBLE CODE 31 — THROTTLE POSITION SENSOR —

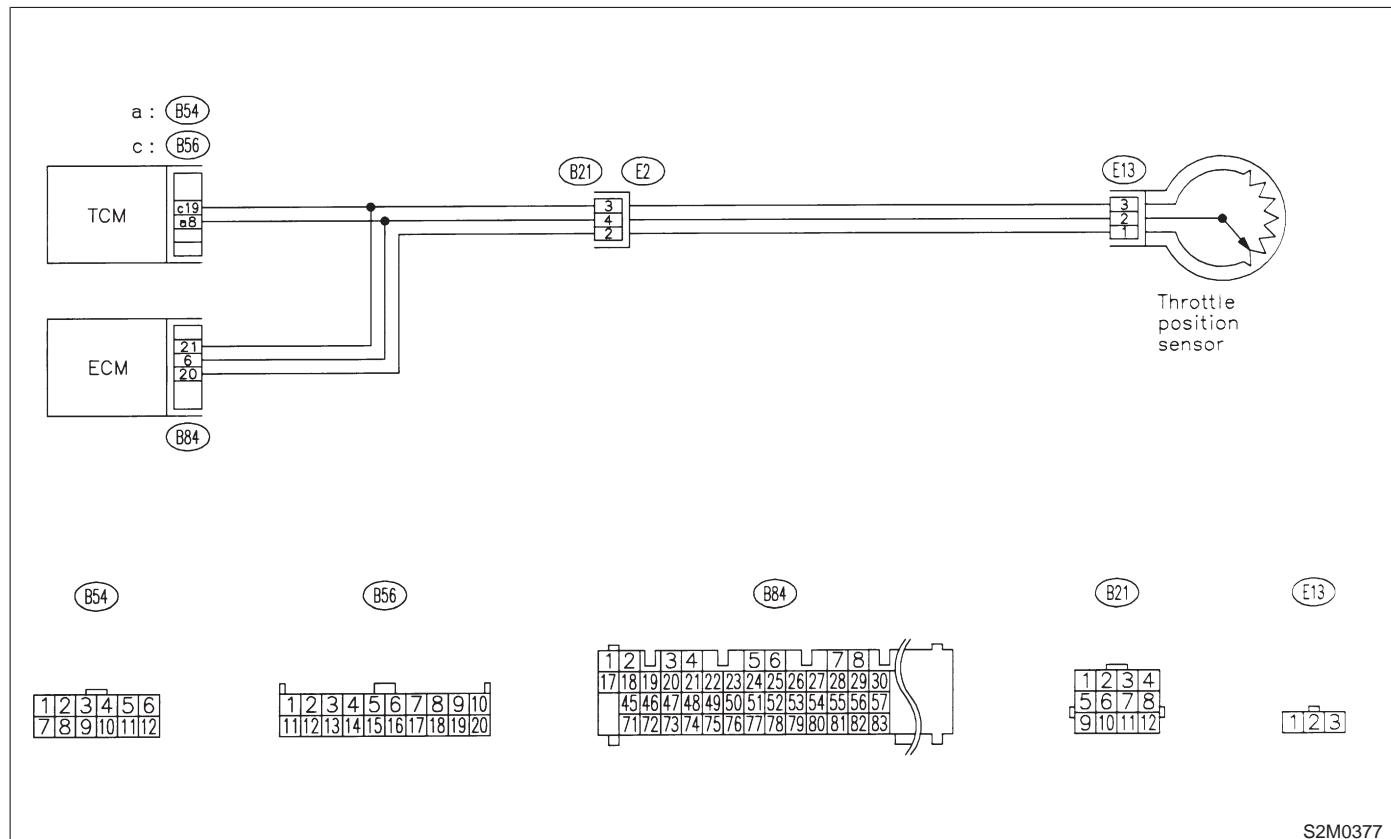
DIAGNOSIS:

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".

WIRING DIAGRAM:

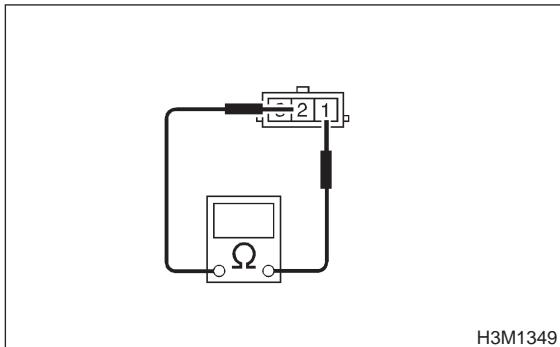


8M1 : CHECK THROTTLE POSITION SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Remove air intake chamber.
- 3) Disconnect connector from throttle position sensor.
- 4) Measure resistance between throttle position sensor connector receptacle's terminals.

Terminals

No. 1 — No. 2:



H3M1349

CHECK : Is the resistance between 0.3 and 0.7 kΩ?

YES : Go to step 8M2.

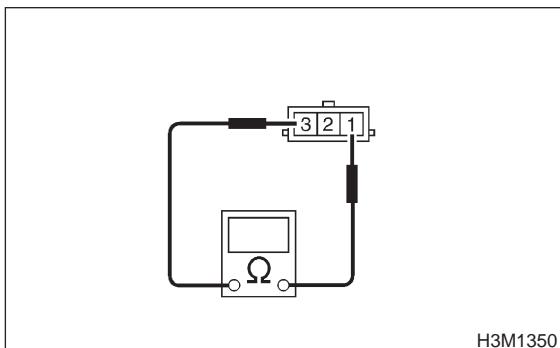
NO : Replace throttle position sensor.

8M2 : CHECK THROTTLE POSITION SENSOR.

Measure resistance between throttle position sensor connector receptacle's terminals.

Terminals

No. 1 — No. 3:



H3M1350

CHECK : Is the resistance between 3.5 and 6.5 kΩ?

YES : Go to step 8M3.

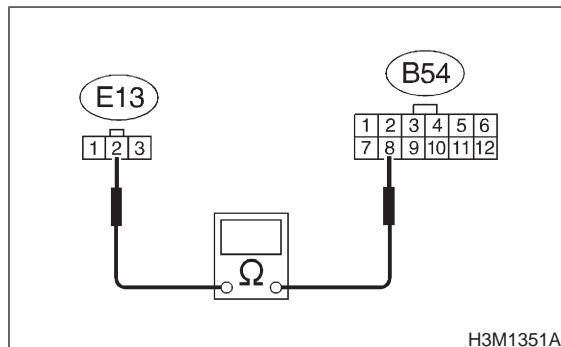
NO : Replace throttle position sensor.

8M3 : CHECK HARNESS CONNECTOR BETWEEN TCM AND THROTTLE POSITION SENSOR.

- 1) Disconnect connector from TCM.
- 2) Measure resistance of harness between TCM and throttle position sensor connector.

Connector & terminal

(B54) No. 8 — (E13) No. 2:



H3M1351A

CHECK : Is the resistance less than 1 Ω?

YES : Go to step 8M4.

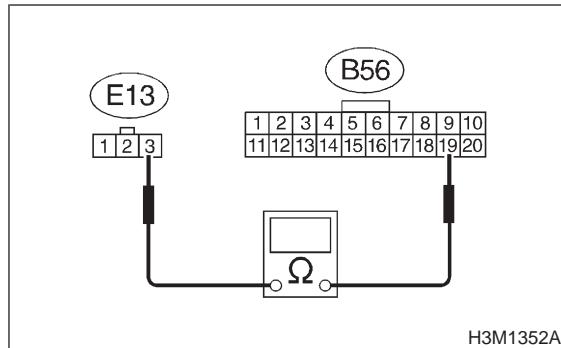
NO : Repair open circuit in harness between TCM and throttle position sensor connector.

8M4 : CHECK HARNESS CONNECTOR BETWEEN TCM AND THROTTLE POSITION SENSOR.

Measure resistance of harness between TCM and throttle position sensor connector.

Connector & terminal

(B56) No. 19 — (E13) No. 3:



H3M1352A

CHECK : Is the resistance less than 1 Ω?

YES : Go to step 8M5.

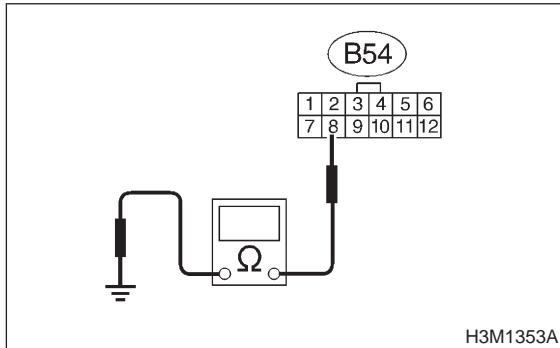
NO : Repair open circuit in harness between TCM and throttle position sensor connector.

8M5 : CHECK HARNESS CONNECTOR BETWEEN TCM AND THROTTLE POSITION SENSOR.

Measure resistance of harness between TCM connector and chassis ground.

Connector & terminal

(B54) No. 8 — Chassis ground:



CHECK : *Is the resistance more than 1 MΩ?*

YES : Go to step 8M6.

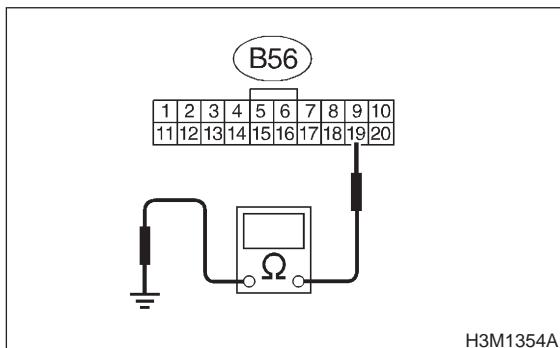
NO : Repair short circuit in harness between TCM and throttle position sensor connector.

8M6 : CHECK HARNESS CONNECTOR BETWEEN TCM AND THROTTLE POSITION SENSOR.

Measure resistance of harness between TCM connector and chassis ground.

Connector & terminal

(B56) No. 19 — Chassis ground:



CHECK : *Is the resistance more than 1 MΩ?*

YES : Go to step 8M7.

NO : Repair short circuit in harness between TCM and throttle position sensor connector.

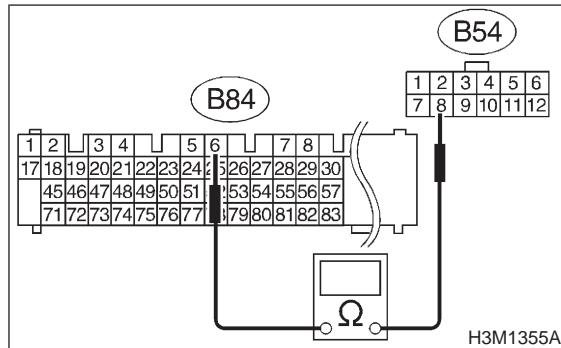
8M7 : CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.

1) Disconnect connector from ECM.

2) Measure resistance of harness between TCM and ECM connector.

Connector & terminal

(B54) No. 8 — (B84) No. 6:



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

YES : Go to step 8M8.

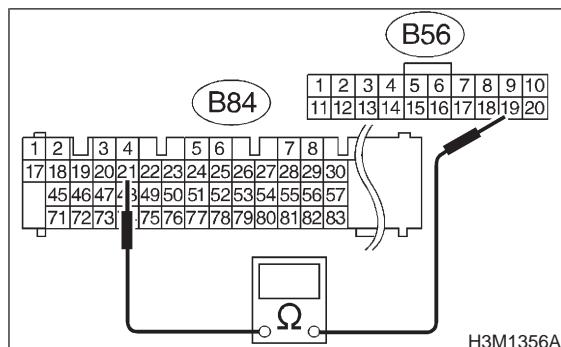
NO : Repair open circuit in harness between TCM and ECM connector.

8M8 : CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.

Measure resistance of harness between TCM and ECM connector.

Connector & terminal

(B56) No. 19 — (B84) No. 21:



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

YES : Go to step 8M9.

NO : Repair open circuit in harness between TCM and ECM connector.

8M9 : PREPARE SUBARU SELECT MONITOR.

CHECK : Do you have a Subaru Select Monitor?

YES : Go to step **8M12**.

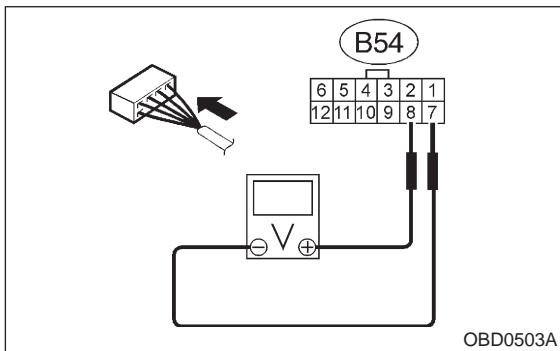
NO : Go to step **8M10**.

8M10 : CHECK INPUT SIGNAL FOR TCM.

- 1) Connect connectors to TCM, throttle position sensor and ECM.
- 2) Install air intake chamber.
- 3) Turn ignition switch to ON (engine OFF).
- 4) Measure voltage between TCM connector terminals.

Connector & terminal

(B54) No. 8 (+) — No. 7 (-):



CHECK : Is the voltage between 0.3 and 0.7 V in throttle fully closed?

YES : Go to step **8M11**.

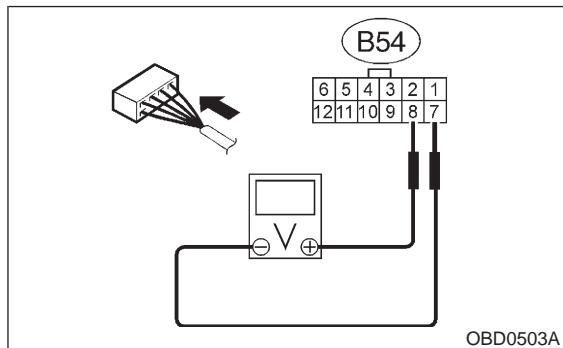
NO : Go to step **8M16**.

8M11 : CHECK INPUT SIGNAL FOR TCM.

Measure voltage between TCM connector terminals.

Connector & terminal

(B54) No. 8 (+) — No. 7 (-):



CHECK : Is the voltage between 4.3 and 4.9 V with throttle fully open?

YES : Go to step **8M14**.

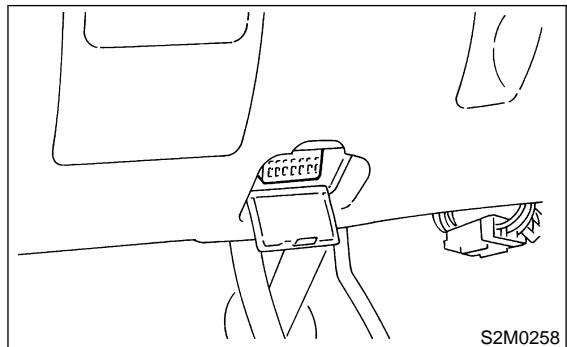
NO : Go to step **8M16**.

8M12 : CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.

- 1) Connect connectors to TCM, throttle position sensor and ECM.

- 2) Install air intake chamber.

- 3) Connect Subaru Select Monitor to data link connector.



- 4) Turn ignition switch to ON (engine OFF).
- 5) Turn Subaru Select Monitor switch to ON.
- 6) Throttle fully closed.
- 7) Read data of throttle position sensor using Subaru Select Monitor.

- Throttle position sensor input signal is indicated.

CHECK : Is the value voltage between 0.3 and 0.7 V?

YES : Go to step **8M13**.

NO : Go to step **8M16**.

3-2 [T8M13] AUTOMATIC TRANSMISSION AND DIFFERENTIAL

8. Diagnostic Chart with Trouble Code

8M13 : CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.

Throttle fully open.

NOTE:

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

CHECK : Is the value voltage between 4.3 and 4.9 V?

YES : Go to step **8M14**.

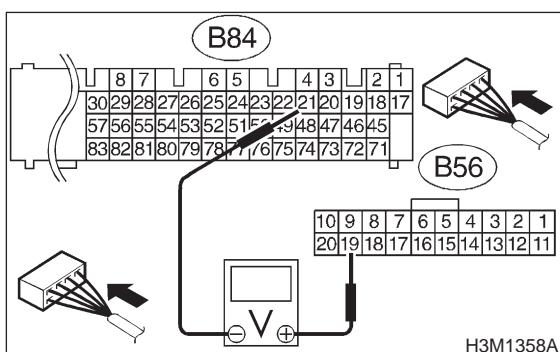
NO : Go to step **8M16**.

8M14 : CHECK INPUT SIGNAL FOR TCM (THROTTLE POSITION SENSOR POWER SUPPLY).

Measure voltage between TCM connector terminals.

Connector & terminal

(B56) No. 19 (+) — (B84) No. 21 (-):



CHECK : Is the voltage between 5.02 and 5.22 V?

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in throttle position sensor circuit.

NO : Go to step **8M16**.

8M15 : CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR (THROTTLE POSITION SENSOR POWER SUPPLY).

Read data of throttle position sensor power supply using Subaru Select Monitor.

● Throttle position sensor power supply voltage is indicated.

CHECK : Is the value voltage between 5.02 and 5.22 V?

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in throttle position sensor circuit.

NO : Go to step **8M16**.

8M16 : CHECK POOR CONTACT.

CHECK : Is there poor contact in throttle position sensor circuit?

YES : Repair poor contact.

NO : Replace TCM.

MEMO:

N: TROUBLE CODE 32 — VEHICLE SPEED SENSOR 1 —

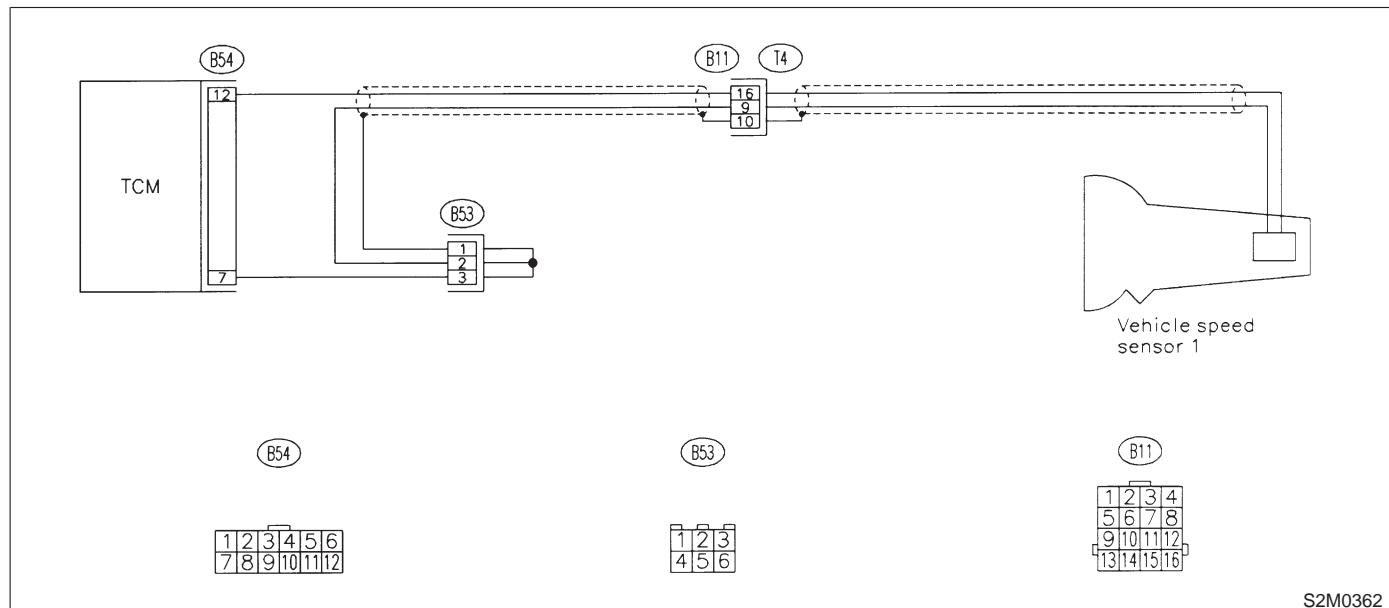
DIAGNOSIS:

Input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

No lock-up or excessive tight corner “braking”.

WIRING DIAGRAM:

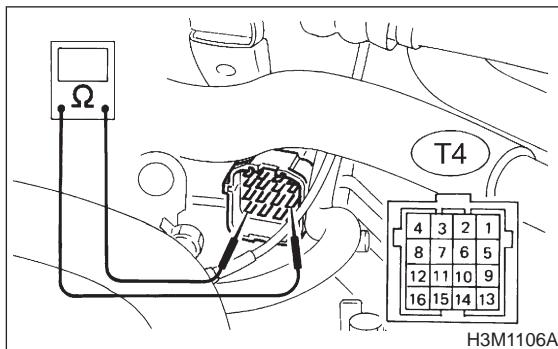


8N1 : CHECK VEHICLE SPEED SENSOR 1.

- 1) Turn ignition switch to OFF.
- 2) Remove air intake chamber.
- 3) Disconnect connector from transmission.
- 4) Measure resistance between transmission connector receptacle's terminals.

Connector & terminal

(T4) No. 16 — No. 9:

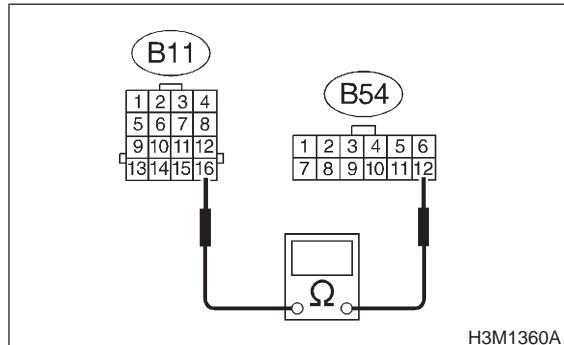


8N2 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

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

Connector & terminal

(B54) No. 12 — (B11) No. 16:



CHECK : Is the resistance between 450 and 720 Ω ?

YES : Go to step 8N3.

NO : Replace vehicle speed sensor 1.

CHECK : Is the resistance less than 1 Ω ?

YES : Go to step 8N3.

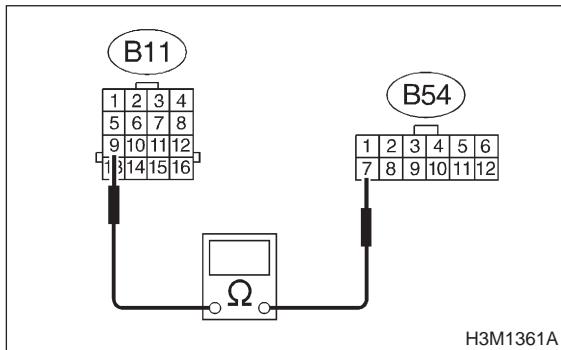
NO : Repair open circuit in harness between TCM and transmission connector.

8N3 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

Measure resistance of harness between TCM and transmission connector.

Connector & terminal

(B54) No. 7 — (B11) No. 9:



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

YES : Go to step 8N4.

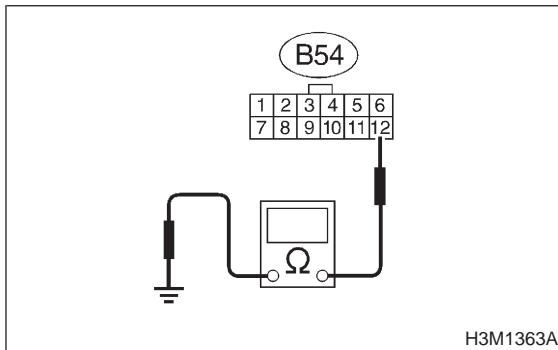
NO : Repair open circuit in harness between TCM and transmission connector.

8N5 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

Measure resistance of harness between TCM and transmission connector.

Connector & terminal

(B54) No. 12 — Chassis ground:



CHECK : *Is the resistance more than 1 MΩ?*

YES : Go to step 8N6.

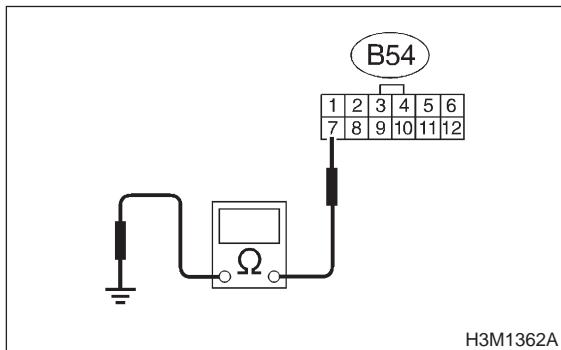
NO : Repair short circuit in harness between TCM and transmission connector.

8N4 : CHECK HARNESS CONNECTOR BETWEEN TCM AND TRANSMISSION.

Measure resistance of harness between TCM and transmission connector.

Connector & terminal

(B54) No. 7 — Chassis ground:



CHECK : *Is the resistance more than 1 MΩ?*

YES : Go to step 8N5.

NO : Repair short circuit in harness between TCM and transmission connector.

8N6 : PREPARE OSCILLOSCOPE.

CHECK : *Do you have oscilloscope?*

YES : Go to step 8N10.

NO : Go to step 8N7.

8N7 : PREPARE SUBARU SELECT MONITOR.

CHECK : *Do you have a Subaru Select Monitor?*

YES : Go to step 8N9.

NO : Go to step 8N8.

8N8 : CHECK INPUT SIGNAL FOR TCM.

- 1) Connect connectors to TCM and transmission.
- 2) Install air intake chamber.
- 3) Lift-up or raise the vehicle and place safety stands.

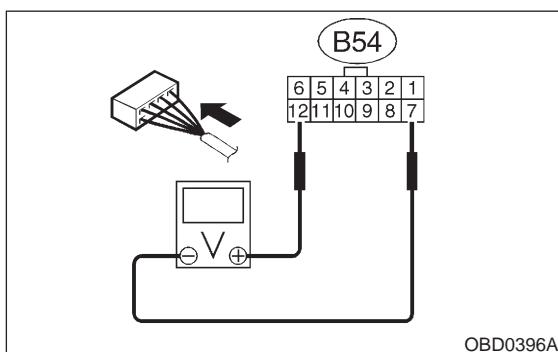
CAUTION:**Raise all wheels off floor.**

- 4) Start the engine and set vehicle in 20 km/h (12MPH) condition.

NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

- 5) Measure voltage between TCM connector terminals.

Connector & terminal**(B54) No. 12 (+) — No. 7 (-):****CHECK**: **Is the voltage more than AC 1 V?****YES**

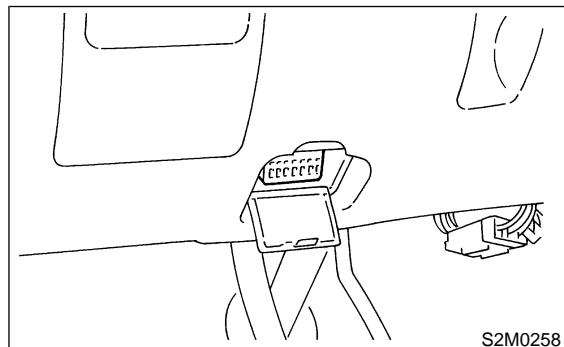
: Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in the TCM and transmission.

NO

: Go to step 8N11.

8N9 : CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.

- 1) Connect connectors to TCM and transmission.
- 2) Install air intake chamber.
- 3) Connect Subaru Select Monitor to data link connector.



- 4) Lift-up or raise the vehicle and place safety stands.

CAUTION:**Raise all wheels off floor.**

- 5) Turn ignition switch to ON and turn Subaru Select Monitor switch to ON.

- 6) Start the engine.

- 7) Read data of vehicle speed using Subaru Select Monitor.

- Compare speedometer with Subaru Select Monitor indications.

- Vehicle speed is indicated in "km/h" or "MPH".

- 8) Slowly increase vehicle speed to 60 km/h or 37 MPH.

NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

CHECK: **Does the speedometer indication increase as the Subaru Select Monitor data increases?****YES**

: Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in the TCM and transmission.

NO

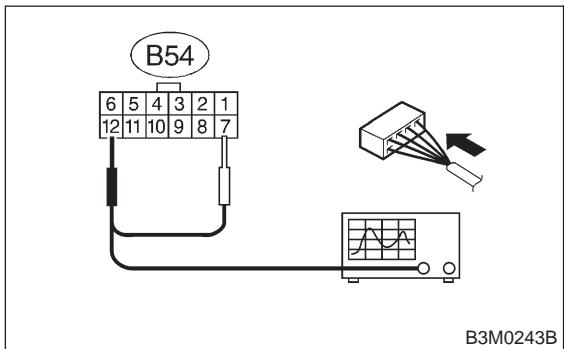
: Go to step 8N11.

8N10 : CHECK INPUT SIGNAL FOR TCM USING OSCILLOSCOPE.

- 1) Connect connectors to TCM and transmission.
- 2) Install air intake chamber.
- 3) Lift-up or raise the vehicle and place safety stands.

CAUTION:**Raise all wheels off floor.**

- 4) Set oscilloscope to TCM connector terminals. Position probe; (B54) No. 12 Earth lead; (B54) No. 7

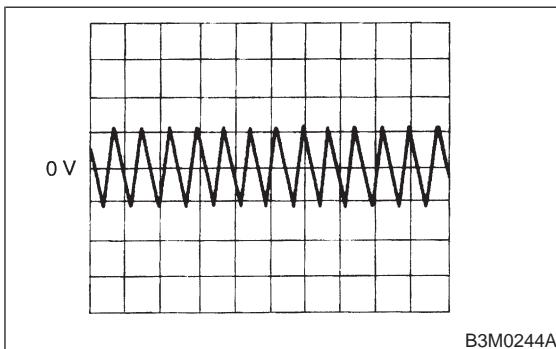


- 5) Start the engine and set vehicle in 20 km/h (12 MPH) condition.

NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

- 6) Measure signal voltage indicated on oscilloscope.



CHECK : *Is the signal voltage more than AC 1 V?*

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in the TCM and transmission.

NO : Go to step 8N11.

8N11 : CHECK POOR CONTACT.

CHECK : *Is there poor contact in vehicle speed sensor 1 circuit?*

YES : Repair poor contact.

NO : Replace TCM.

O: TROUBLE CODE 33 — VEHICLE SPEED SENSOR 2 —

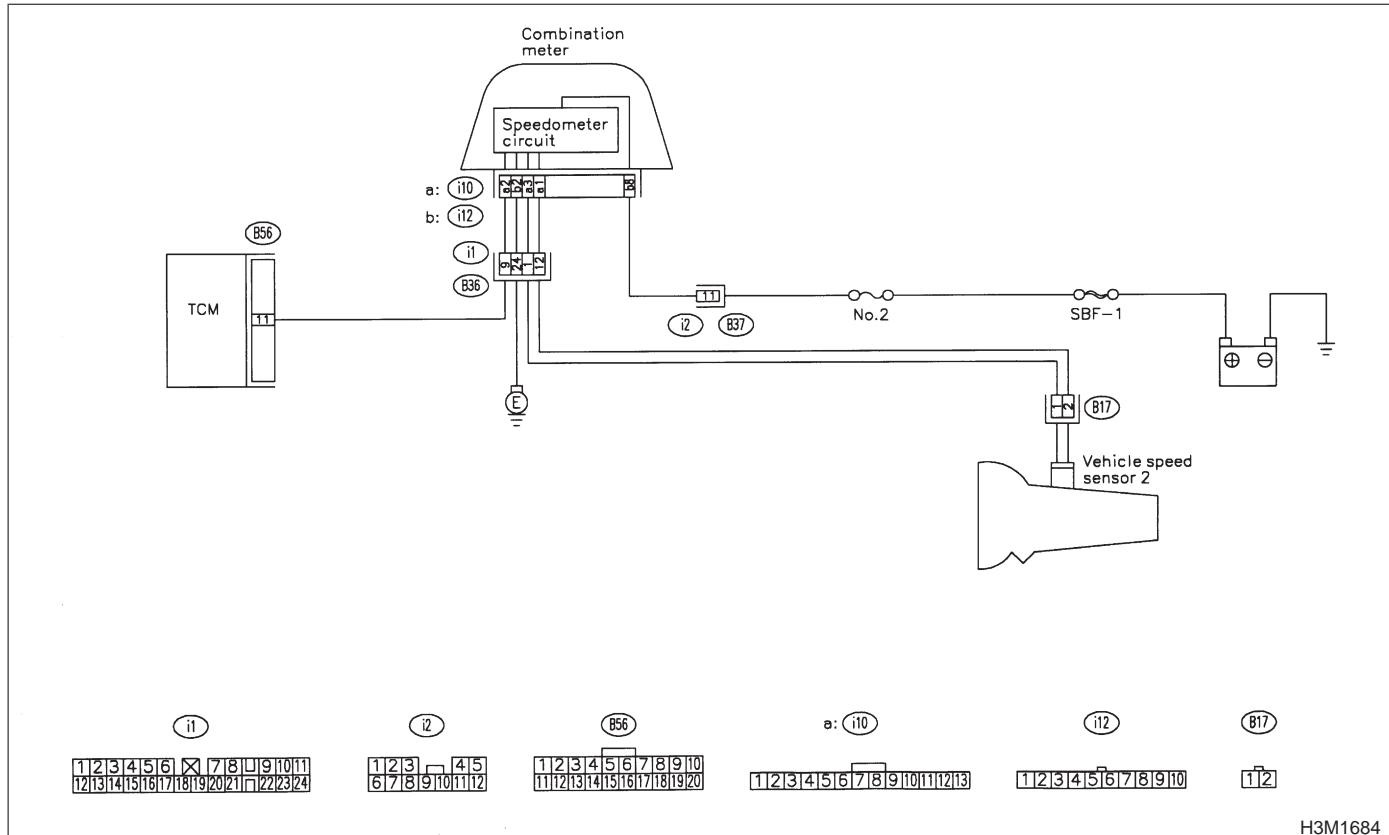
DIAGNOSIS:

- The vehicle speed signal is abnormal.
- The circuit in combination meter is faulty.
- The harness connector between TCM and vehicle speed sensor is in short or open.

TROUBLE SYMPTOM:

- Erroneous idling.
- Engine stalls.
- Poor driving performance.

WIRING DIAGRAM:

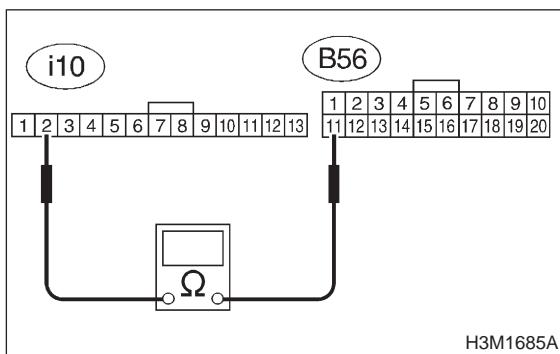


801 : CHECK OPERATION OF SPEEDOMETER.

- CHECK** : Does speedometer operate normally?
 - YES** : Go to step **802**.
 - NO** : Check speedometer. <Ref. to 6-2 [K2A0].>

8O2 : CHECK HARNESS CONNECTOR BETWEEN TCM AND COMBINATION METER.

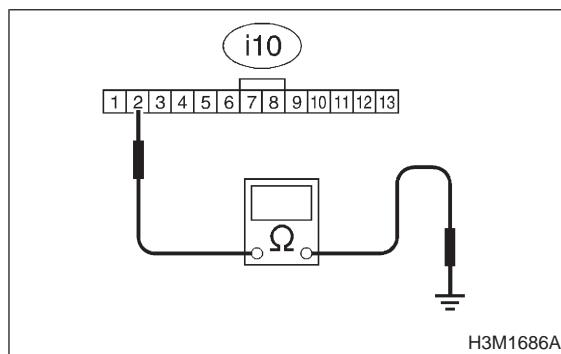
- 1) Turn ignition switch to OFF.
- 2) Remove combination meter.
- 3) Disconnect connectors from TCM and combination meter.
- 4) Measure resistance of harness between TCM and combination meter connector.

Connector & terminal
(B56) No. 11 — (i10) No. 2:


CHECK : *Is the resistance less than 1 Ω?*
YES : Go to step 8O3.
NO : Repair open circuit in harness between TCM and combination meter connector, and poor contact in coupling connector.

8O3 : CHECK HARNESS CONNECTOR BETWEEN TCM AND COMBINATION METER.

Measure resistance of harness between combination meter and chassis ground.

Connector & terminal
(i10) No. 2 — Chassis ground:


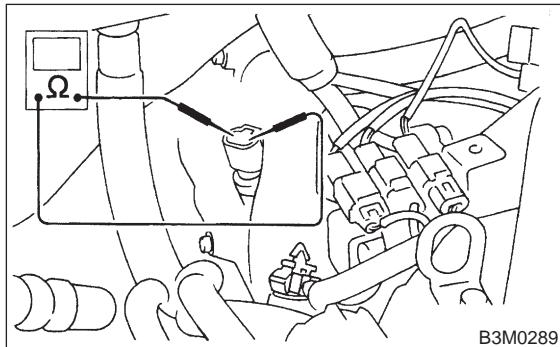
CHECK : *Is the resistance more than 1 MΩ?*
YES : Go to step 8O4.
NO : Repair short circuit in harness between TCM and combination meter connector.

804 : CHECK VEHICLE SPEED SENSOR 2.

- 1) Install combination meter.
- 2) Connect connector to TCM.
- 3) Lift-up the vehicle and place safety stand.

CAUTION:**Raise all wheels off floor.**

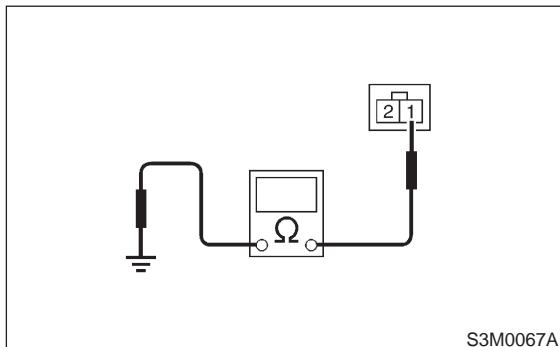
- 4) Disconnect connector from vehicle speed sensor 2.
- 5) Measure resistance between terminals of vehicle speed sensor 2.

Terminals**No. 1 — No. 2:**

CHECK : *Is the resistance between 350 and 450 Ω?*
YES : Go to step 805.
NO : Replace vehicle speed sensor 2.

805 : CHECK VEHICLE SPEED SENSOR 2.

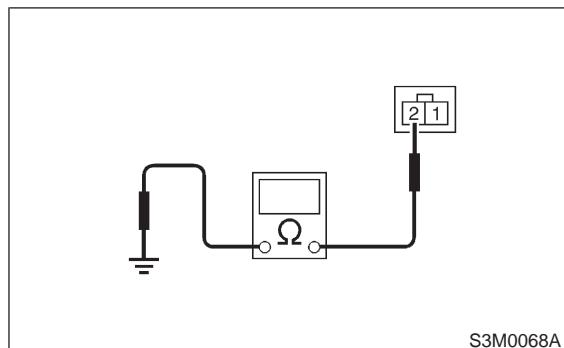
Measure resistance between terminals of vehicle speed sensor 2.

Terminals**No. 1 — Transmission ground:**

CHECK : *Is the resistance more than 1 MΩ?*
YES : Go to step 806.
NO : Replace vehicle speed sensor 2.

806 : CHECK VEHICLE SPEED SENSOR 2.

Measure resistance between terminals of vehicle speed sensor 2.

Terminals**No. 2 — Transmission ground:**

CHECK : *Is the resistance more than 1 MΩ?*
YES : Go to step 807.
NO : Replace vehicle speed sensor 2.

807 : PREPARE OSCILLOSCOPE.

CHECK : *Do you have oscilloscope?*
YES : Go to step 809.
NO : Go to step 808.

8O8 : CHECK VEHICLE SPEED SENSOR 2.

1) Start the engine and set vehicle in 20 km/h (12 MPH) condition.

NOTE:

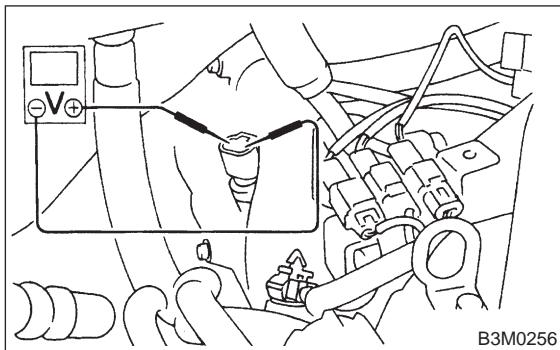
The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunctions. When AT control diagnosis is finished, perform the ABS memory clearance procedure of self-diagnosis system. <Ref. to 4-4 [T6D2].>

2) Measure output signal of vehicle speed sensor 2.

WARNING:

Be careful not to be caught up by the running wheels.

3) Measure voltage between terminals of vehicle speed sensor 2.

Terminals**No. 1 — No. 2:**

CHECK : Is the voltage more than AC 2 V?

YES : Go to step **8O10**.

NO : Replace vehicle speed sensor 2.

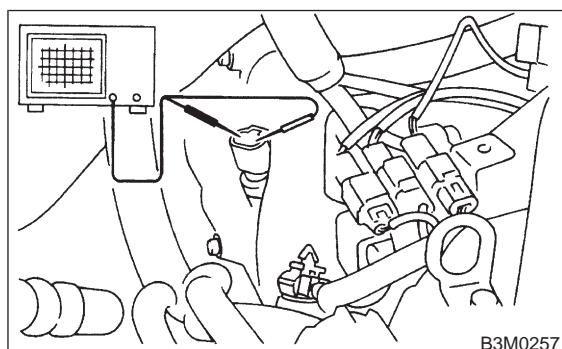
8O9 : CHECK VEHICLE SPEED SENSOR 2 USING OSCILLOSCOPE.

1) Install combination meter.
2) Connect connector to TCM.
3) Lift-up the vehicle and place safety stand.

WARNING:

Make sure that all wheels are raised off floor.

4) Set oscilloscope to vehicle speed sensor 2.

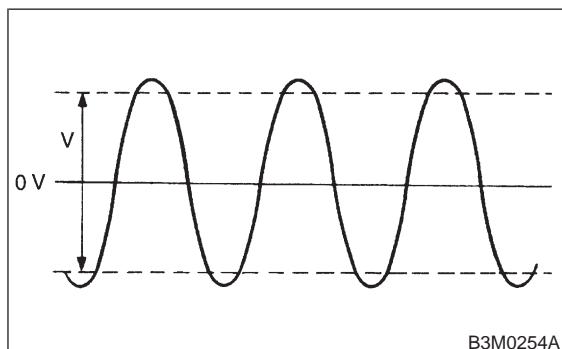
Terminals**No. 1 — No. 2:**

5) Start the engine, and drive the wheels slowly.

NOTE:

The speed difference between front and rear wheels may light 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 [T6D2].>

6) Measure signal voltage indicated on oscilloscope.



CHECK : Is the voltage more than AC 2 V?

YES : Go to step **8O13**.

NO : Replace vehicle speed sensor 2.

3-2 [T8010] AUTOMATIC TRANSMISSION AND DIFFERENTIAL

8. Diagnostic Chart with Trouble Code

8010 : PREPARE SUBARU SELECT MONITOR.

CHECK : Do you have a Subaru Select Monitor?

YES : Go to step 8012.

NO : Go to step 8011.

8011 : CHECK INPUT SIGNAL FOR TCM.

1) Connect connectors to TCM and combination meter.

2) Install combination meter.

3) Lift-up the vehicle and place safety stand.

CAUTION:

Make sure that all wheels are raised off floor.

4) Start the engine, and set vehicle in 10 km/h (6 MPH).

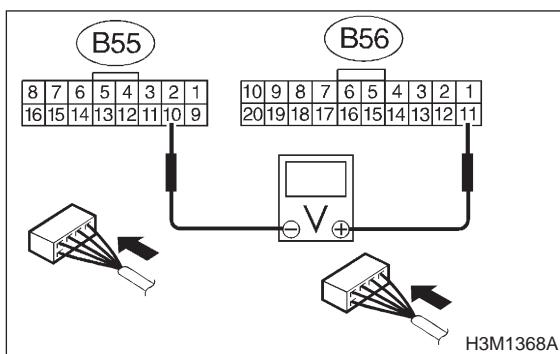
NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

5) Measure voltage between TCM connector terminals.

Connector & terminal

(B56) No. 11 (+) — (B55) No. 10 (-):



CHECK : Is the voltage less than 1 V ⇔ more than 9 V?

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in the TCM.

NO : Go to step 8014.

8012 : CHECK INPUT SIGNAL FOR TCM USING SUBARU SELECT MONITOR.

1) Connect connectors to TCM and combination meter.

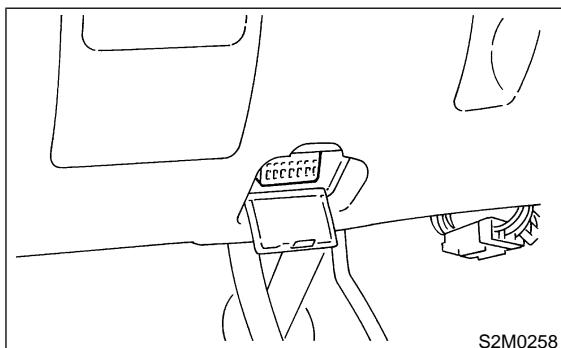
2) Install combination meter.

3) Lift-up the vehicle and place safety stand.

CAUTION:

Make sure that all wheels are raised off floor.

4) Connect Subaru Select Monitor to data link connector.



5) Turn ignition switch to ON and Subaru Select Monitor switch to ON.

6) Start the engine, and drive all wheels.

7) Read data of vehicle speed using Subaru Select Monitor.

● Compare speedometer with Subaru Select Monitor indications.

● Vehicle speed is indicated in "km/h" or "MPH".

8) Slowly increase vehicle speed to 60 km/h or 37 MPH.

NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

CHECK : Does the speedometer indication increase as the Subaru Select Monitor data increases?

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector and harness may be the cause. Repair harness and connector in the TCM.

NO : Go to step 8014.

8013 : CHECK INPUT SIGNAL FOR TCM USING OSCILLOSCOPE.

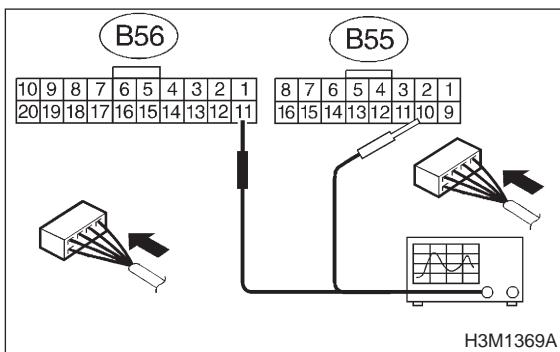
- 1) Connect connectors to TCM and combination meter.
- 2) Install combination meter.
- 3) Lift-up or raise the vehicle and place safety stands.

CAUTION:

Raise all wheels off floor.

- 4) Set oscilloscope to TCM connector terminals.

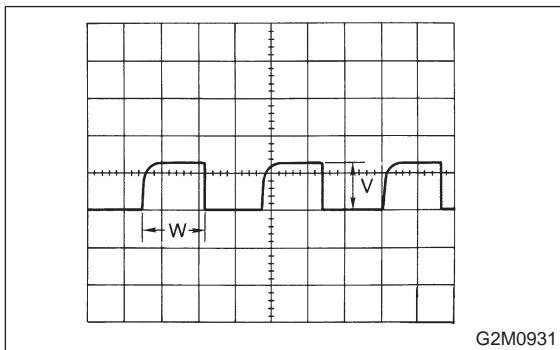
Positive probe; (B56) No. 11
Earth lead; (B55) No. 10



- 5) Start the engine.
- 6) Shift on the gear position, and keep the vehicle speed at constant.
- 7) Measure signal voltage indicated on oscilloscope.

NOTE:

- If vehicle speed increases, the width of amplitude (W) decreases.
- The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>



tact of the connector or harness may be the cause. Repair harness or connector in the TCM.

NO : Go to step 8014.

8014 : CHECK POOR CONTACT.

CHECK : *Is there poor contact in vehicle speed sensor 2 circuit?*

YES : Repair poor contact.
NO : Replace TCM.

CHECK : *Is the voltage more than AC 2 V?*

YES : Even if "AT OIL TEMP" lights up, the circuit has returned to a normal condition at this time. A temporary poor con-

9. Diagnostic Chart with Select Monitor

A: BASIC DIAGNOSTIC CHART

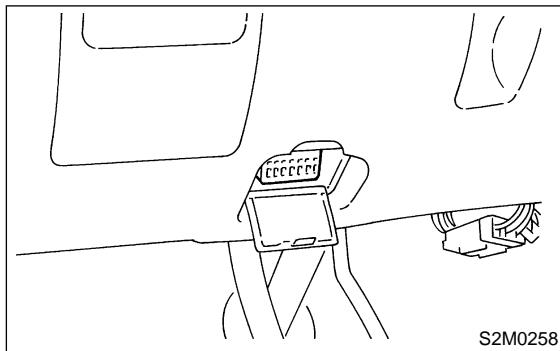
If no trouble codes appear in the on-board diagnostics operation (although problems have occurred or are occurring), measure performance characteristics of sensors, actuators, etc., in the Subaru Select Monitor and compare with the "basic data" to determine the cause of problems.

- 1) Trouble occurs.
- 2) No trouble codes appear in on-board diagnostics operation.
- 3) Measure each item using Subaru Select Monitor.
- 4) Compare measured values with basic data.
- 5) Determine item which is outside basic data specifications.
- 6) Check sensor and actuator affected.

B: BATTERY VOLTAGE

9B1 : CHECK BATTERY VOLTAGE.

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



- 3) Start the engine, and engine idling after warm-up.
- 4) Turn Subaru Select Monitor switch to ON.
- 5) Read data of battery voltage using Subaru Select Monitor.
- Battery voltage applied to TCM.

CHECK : **Is voltage between 10 and 16 V?**

YES : Go to step VEHICLE SPEED SENSOR 1. <Ref. to 3-2 [T9C0].>

NO : Check battery voltage and specification of electrolyte, regulating voltage under no loads and generator (as a single unit).

C: CHECK VEHICLE SPEED SENSOR 1.

9C1 : CHECK VEHICLE SPEED SENSOR 1.

- 1) Lift-up the vehicle and place safety stand.

CAUTION:

Make sure that all wheels are raised off floor.

- 2) Read data of vehicle speed #1 using Subaru Select Monitor.

- Compare speedometer with Subaru Select Monitor indications.
- Vehicle speed is indicated in "MPH" or "km/h".

NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

CHECK : *Does the speedometer indication increase as the Subaru Select Monitor data increases?*

YES : Go to step VEHICLE SPEED SENSOR 2. <Ref. to 3-2 [T9D0].>

NO : Check vehicle speed sensor 1 circuit. <Ref. to 3-2 [T8N0].>

D: CHECK VEHICLE SPEED SENSOR 2.

9D1 : CHECK VEHICLE SPEED SENSOR 2.

Read data of vehicle speed #2 using Subaru Select Monitor.

- Compare speedometer with Subaru Select Monitor indications.
- Vehicle speed is indicated in "MPH" or "km/h".

NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

CHECK : *Does the speedometer indication increase as the Subaru Select Monitor data increases?*

YES : Go to step ENGINE SPEED SIGNAL. <Ref. to 3-2 [T9E0].>

NO : Check vehicle speed sensor 2 circuit. <Ref. to 3-2 [T8O0].>

E: CHECK ENGINE SPEED SIGNAL.

9E1 : CHECK ENGINE SPEED SIGNAL.

- 1) Turn A/C switch to OFF (with A/C models).
- 2) Warm-up the engine until engine coolant temperature is above 80°C (176°F).

NOTE:

If ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature.

- 3) Read data of engine speed using Subaru Select Monitor.

- Engine speed is indicated in "rpm".

NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

CHECK : Does the tachometer revolution increase as the Subaru Select Monitor revolution data increases?

YES : Go to step ATF TEMPERATURE SENSOR. <Ref. to 3-2 [T9F0].>

NO : Check engine speed signal circuit. <Ref. to 3-2 [T8J0].>

F: CHECK ATF TEMPERATURE SENSOR.

9F1 : CHECK AT OIL TEMP WARNING LIGHT.

CHECK : Does the AT OIL TEMP warning light remain on 2 seconds after the engine has been started?

YES : Go to step 9F2.

NO : Check ATF temperature sensor and combination meter circuit. <Ref. to 3-2 [T8H0].>

9F2 : CHECK ATF TEMPERATURE SENSOR.

- 1) Read data of ATF temperature using Subaru Select Monitor.

- ATF temperature is indicated in "°F" or "°C".

- 2) Warm-up the transmission until ATF temperature is above 80°C (176°F).

NOTE:

If ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature.

- 3) Turn ignition switch to ON (engine OFF).

CHECK : Does the ATF temperature change from 176°F (80°C)?

YES : Go to step THROTTLE POSITION SENSOR. <Ref. to 3-2 [T9G0].>

NO : Check ATF temperature sensor circuit. <Ref. to 3-2 [T8H0].>

G: CHECK THROTTLE POSITION SENSOR.

9G1 : CHECK INPUT SIGNAL FOR TCM.

Read data of throttle position sensor using Subaru Select Monitor.

- Throttle position sensor input signal is indicated.

CHECK : Is voltage between 0.3 and 0.7 V when the accelerator pedal is completely released?

YES : Go to step 9G2.

NO : Check throttle position sensor circuit. <Ref. to 3-2 [T8M0].>

9G2 : CHECK INPUT SIGNAL FOR TCM.

CHECK : Is voltage between 4.4 and 4.8 V when the accelerator pedal is completely depressed?

YES : Go to step 9G3.

NO : Check throttle position sensor circuit. <Ref. to 3-2 [T8M0].>

9G3 : CHECK INPUT SIGNAL FOR TCM.

 : Does voltage decrease smoothly when the accelerator pedal is fully depressed and then fully released?

 : Go to step GEAR POSITION. <Ref. to 3-2 [T9H0].>

 : Check throttle position sensor circuit. <Ref. to 3-2 [T8M0].>

H: CHECK GEAR POSITION.

9H1 : CHECK GEAR POSITION.

1) Lift-up the vehicle and place safety stand.

CAUTION:

Make sure that all wheels are raised off floor.

2) Start the engine.
 3) Move select lever to "D", and drive vehicle.
 4) Read data of gear position using Subaru Select Monitor.
 • Gear position is indicated.

NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

 : Does the transmission gear correspond to the gear which is shown on display?

 : Go to step LINE PRESSURE DUTY. <Ref. to 3-2 [T9I0].>

 : Check shift solenoid 1 and shift solenoid 2 signal circuit. <Ref. to 3-2 [T8F0].> and <Ref. to 3-2 [T8G0].>

I: CHECK LINE PRESSURE DUTY.

9I1 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

1) Warm-up the transmission until ATF temperature is above 80°C (176°F).

NOTE:

If ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature.

2) Stop the engine and turn ignition switch to ON (engine OFF).
 3) Move selector lever to "N".
 4) Read data of line pressure duty ratio using Subaru Select Monitor.

• Line pressure duty is indicated in "%".

 : Does the Subaru Select Monitor indicate 100% when the accelerator pedal is completely released?

 : Go to step 9I2.

 : Go to step 9I4.

9I2 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

 : Does the Subaru Select Monitor indicate between 10 and 20% when the accelerator pedal is completely depressed?

 : Go to step 9I3.

 : Go to step 9I4.

9I3 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

 : Does the Subaru Select Monitor change smoothly when the accelerator pedal is fully depressed and then fully released?

 : Go to step LOCK-UP DUTY. <Ref. to 3-2 [T9J0].>

 : Go to step 9I4.

9I4 : CHECK THROTTLE POSITION SENSOR.

NOTE:

For the diagnostics procedure on throttle position sensor circuit, refer to 3-2 [T9G0].

CHECK : *Is there any trouble in throttle position sensor circuit?*

YES : Repair or replace throttle position sensor circuit, refer to 3-2 [T8M0].

NO : Go to step **9I5**.

9I5 : CHECK ENGINE SPEED SIGNAL.

NOTE:

For the diagnostics procedure on engine speed signal circuit, refer to 3-2 [T9E0].

CHECK : *Is there any trouble in engine speed signal circuit?*

YES : Repair or replace engine speed signal circuit, refer to 3-2 [T8J0].

NO : Go to step **9I6**.

9I6 : CHECK ATF TEMPERATURE SENSOR.

NOTE:

For the diagnostics procedure on ATF temperature sensor circuit, refer to 3-2 [T9F0].

CHECK : *Is there any trouble in ATF temperature sensor circuit?*

YES : Repair or replace ATF temperature sensor circuit, refer to 3-2 [T8H0].

NO : Go to step **9I7**.

9I7 : CHECK INHIBITOR SWITCH.

1) Turn ignition switch and Subaru Select Monitor to ON.

2) Read data of range switch using Subaru Select Monitor.

- Range switch is indicated in ON \leftrightarrow OFF.

CHECK : *When each range is selected, does LED of the range switch on Subaru Select Monitor light up?*

YES : Go to step LOCK-UP DUTY. <Ref. to 3-2 [T9J0].>

NO : Check inhibitor switch circuit. <Ref. to 3-2 [T9T0].>

J: CHECK LOCK-UP DUTY.**9J1 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.**

Read data of lock-up duty ratio using Subaru Select Monitor.

- Lock-up duty ratio is indicated in "%".

CHECK : *Does the Subaru Select Monitor indicate 5%?*

YES : Go to step **9J2**.

NO : Go to step **9J3**.

9J2 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

Move selector lever to "D" and slowly increase vehicle speed to 75 km/h (47 MPH).

NOTE:

The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunction. When AT control diagnosis is finished, perform the ABS memory clearance procedure of on-board diagnostics system. <Ref. to 4-4 [T6D2].>

CHECK : *Does the Subaru Select Monitor indicate 95%?*

YES : Go to step TRANSFER DUTY RATIO. <Ref. to 3-2 [T9K0].>

NO : Go to step **9J3**.

9J3 : CHECK THROTTLE POSITION SENSOR.

NOTE:

For the diagnostics procedure on throttle position sensor circuit, refer to 3-2 [T9G0].

CHECK : *Is there any trouble in throttle position sensor circuit?*

YES : Repair or replace throttle position sensor circuit, refer to 3-2 [T8M0].

NO : Go to step **9J4**.

9J4 : CHECK VEHICLE SPEED SENSOR 1.

NOTE:

For the diagnostics procedure on vehicle speed sensor 1 circuit, refer to 3-2 [T9C0].

CHECK : *Is there any trouble in vehicle speed sensor 1 circuit?*

YES : Repair or replace vehicle speed sensor 1 circuit, refer to 3-2 [T8N0].

NO : Go to step 9J5.

9J5 : CHECK VEHICLE SPEED SENSOR 2.

NOTE:

For the diagnostics procedure on vehicle speed sensor 2 circuit, refer to 3-2 [T9D0].

CHECK : *Is there any trouble in vehicle speed sensor 2 circuit?*

YES : Repair or replace vehicle speed sensor 2 circuit, refer to 3-2 [T8O0].

NO : Go to step 9J6.

9J6 : CHECK ENGINE SPEED SIGNAL.

NOTE:

For the diagnostics procedure on engine speed signal circuit, refer to 3-2 [T9E0].

CHECK : *Is there any trouble in engine speed signal circuit?*

YES : Repair or replace engine speed signal circuit, refer to 3-2 [T8J0].

NO : Go to step 9J7.

9J7 : CHECK INHIBITOR SWITCH.

Read data of range switch using Subaru Select Monitor.

- Range switch is indicated in ON \Leftrightarrow OFF.

CHECK : *When each range is selected, does LED of the range switch on Subaru Select Monitor light up?*

YES : Go to step TRANSFER DUTY. <Ref. to 3-2 [T9K0].>

NO : Check inhibitor switch circuit. <Ref. to 3-2 [T9T0].>

K: CHECK TRANSFER DUTY.

9K1 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

- Turn ignition switch to ON (engine OFF).
- Move selector lever to "D".
- Read data of transfer duty ratio using Subaru Select Monitor.
- Transfer duty ratio is indicated in "%".

CHECK : *Does the duty ratio change in response to the depress-release motion of the accelerator pedal?*

YES : Go to step 9K2.

NO : Go to step 9K3.

9K2 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

- Turn ignition switch to OFF.
- Set FWD mode.
- Turn ignition switch to ON (engine OFF).

CHECK : *Does the Subaru Select Monitor indicate 95%?*

YES : Go to step THROTTLE POSITION SENSOR POWER SUPPLY. <Ref. to 3-2 [T9L0].>

NO : Go to step 9K3.

9K3 : CHECK THROTTLE POSITION SENSOR.

NOTE:

For the diagnostics procedure on throttle position sensor circuit, refer to 3-2 [T9G0].

CHECK : *Is there any trouble in throttle position sensor circuit?*

YES : Repair or replace throttle position sensor circuit, refer to 3-2 [T8M0].

NO : Go to step 9K4.

9K4 : CHECK VEHICLE SPEED SENSOR 1.

NOTE:

For the diagnostics procedure on vehicle speed sensor 1 circuit, refer to 3-2 [T9C0].

CHECK : *Is there any trouble in vehicle speed sensor 1 circuit?*

YES : Repair or replace vehicle speed sensor 1 circuit, refer to 3-2 [T8N0].

NO : Go to step 9K5.

9K5 : CHECK VEHICLE SPEED SENSOR 2.

NOTE:

For the diagnostics procedure on vehicle speed sensor 2 circuit, refer to 3-2 [T9D0].

 : *Is there any trouble in vehicle speed sensor 2 circuit?*

 : Repair or replace vehicle speed sensor 2 circuit, refer to 3-2 [T8O0].

 : Go to step **9K6**.

9K6 : CHECK ATF TEMPERATURE SENSOR.

NOTE:

For the diagnostics procedure on ATF temperature sensor circuit, refer to 3-2 [T9F0].

 : *Is there any trouble in ATF temperature sensor circuit?*

 : Repair or replace ATF temperature sensor circuit, refer to 3-2 [T8H0].

 : Go to step **9K7**.

9K7 : CHECK INHIBITOR SWITCH.

Read data of range switch using Subaru Select Monitor.

- Range switch is indicated in ON \Leftrightarrow OFF.

 : *When each range is selected, does LED of range switch on Subaru Select Monitor light up?*

 : Go to step **9K8**.

 : Check inhibitor switch circuit. <Ref. to 3-2 [T9T0].>

9K8 : CHECK ABS SIGNAL.

1) Start the engine, and turn Subaru Select Monitor switch to ON.

2) Read data of ABS signal using Subaru Select Monitor.

- ABS switch is indicated in ON \Leftrightarrow OFF.

 : *Does the LED of ABS switch light up?*

 : Check ABS signal circuit. <Ref. to 4-4 [T10A0].> and <Ref. to 4-4 [T10V0].>

 : Go to step THROTTLE POSITION SENSOR POWER SUPPLY. <Ref. to 3-2 [T9L0].>

L: CHECK THROTTLE POSITION SENSOR POWER SUPPLY.**9L1 : CHECK THROTTLE POSITION POWER SUPPLY.**

Read data of throttle position sensor power supply using Subaru Select Monitor.

- Throttle position sensor power supply voltage is indicated.

 : *Is the value fixed between 5.02 and 5.22 V?*

 : Go to step MASS AIR FLOW SIGNAL. <Ref. to 3-2 [T9M0].>

 : Check throttle position sensor power supply circuit. <Ref. to 3-2 [T8M0].>

M: CHECK MASS AIR FLOW SIGNAL.**9M1 : CHECK INPUT SIGNAL FOR TCM.**

1) Start the engine.

2) Warm-up the engine until engine coolant temperature is above 80°C (176°F).

NOTE:

If ambient temperature is below 0°C (32°F), drive the vehicle until the ATF reaches its operating temperature.

3) Engine idling after warm-up.

4) Move selector lever to "N".

5) Read data of mass air flow signal using Subaru Select Monitor.

- Display shows mass air flow signal value sent from ECM.

 : *Does voltage change in response to the depress-release motion of the accelerator pedal?*

 : Go to step **9M2**.

 : Check mass air flow signal circuit. <Ref. to 3-2 [T8I0].>

9M2 : CHECK ECM.

 : *Has trouble been eliminated after ECM replacement?*

 : Replace ECM.

 : Go to step **9M3**.

9M3 : CHECK TCM.**NOTE:**

Install former ECM.

 CHECK : *Has trouble been eliminated after TCM replacement?* **YES** : Replace TCM. **NO** : Go to step FWD SWITCH. <Ref. to 3-2 [T9N0].>

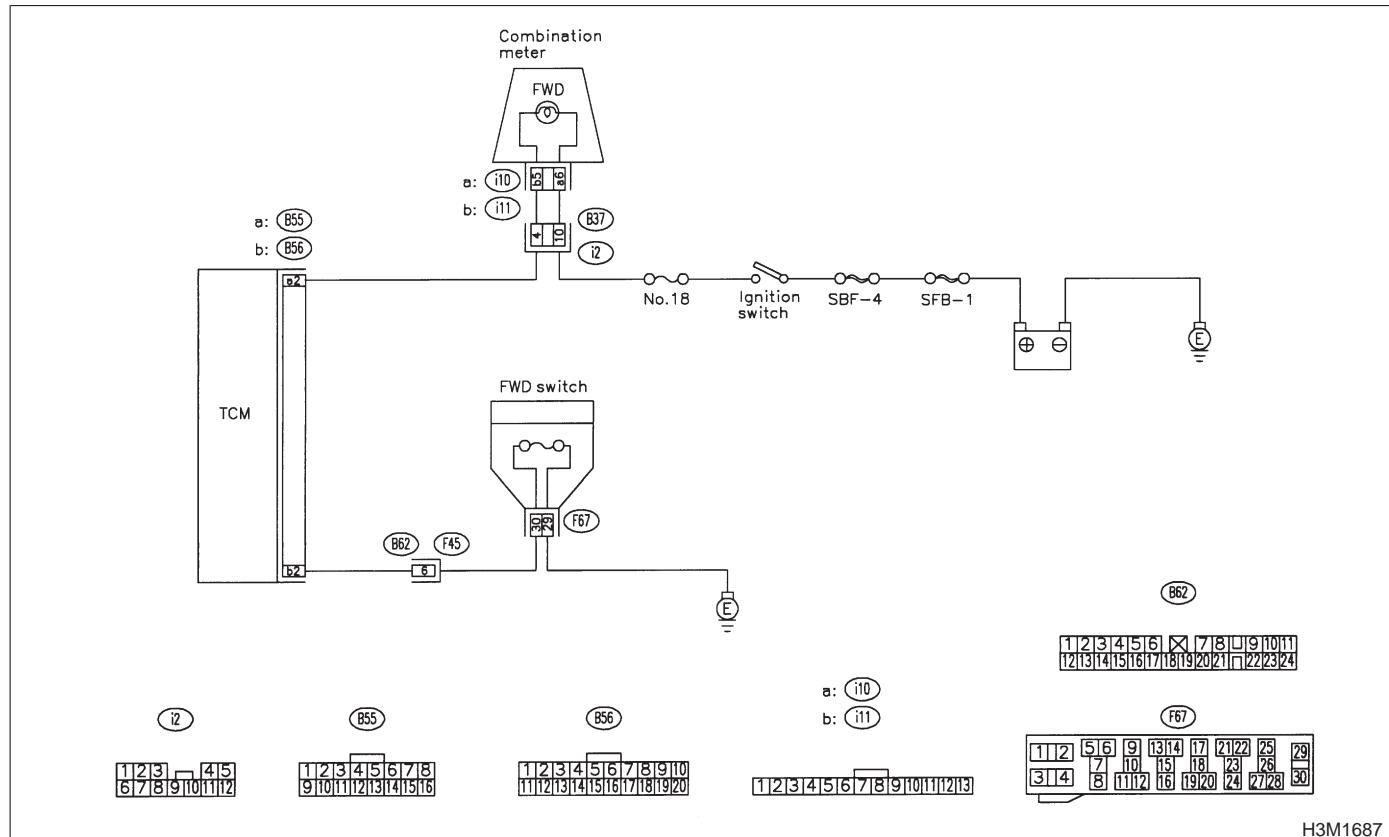
MEMO:

N: CHECK FWD SWITCH.

DIAGNOSIS:

- LED does not come on even if FWD switch is ON.
- FWD switch circuit is open or short.

WIRING DIAGRAM:



9N1 : CHECK FWD SWITCH.

CHECK : When fuse is inserted to FWD switch, does LED light up?

YES : Go to step KICK-DOWN SWITCH. <Ref. to 3-2 [T9O0].>

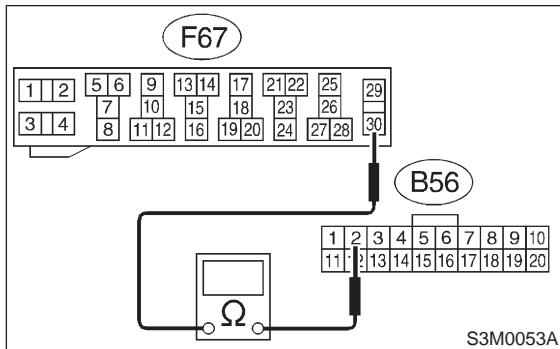
NO : Go to step 9N2.

9N2 : CHECK HARNESS CONNECTOR BETWEEN TCM AND FWD SWITCH.

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

Connector & terminal

(B56) No. 2 — (F67) No. 30:



CHECK : Is the resistance less than 1 Ω?

YES : Go to step 9N3.

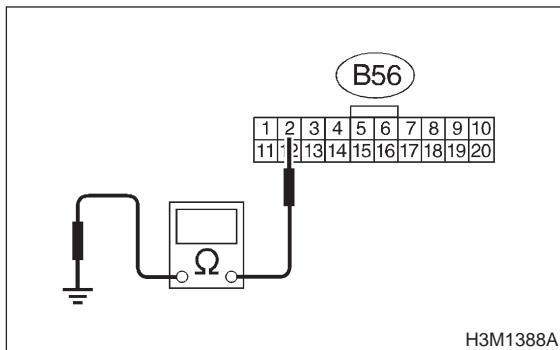
NO : Repair open circuit in harness between TCM and FWD switch connector and poor contact in coupling connector.

9N3 : CHECK HARNESS CONNECTOR BETWEEN TCM AND FWD SWITCH.

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

Connector & terminal

(B56) No. 2 — Chassis ground:



CHECK : Is the resistance more than 1 MΩ?

YES : Go to step 9N4.

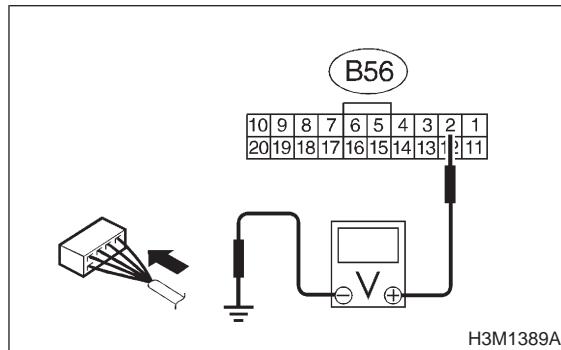
NO : Repair short circuit in harness connector between TCM and chassis ground.

9N4 : CHECK INPUT SIGNAL FOR TCM.

- 1) Turn ignition switch to OFF.
- 2) Connect connector to TCM and FWD switch.
- 3) Turn ignition switch to ON.
- 4) Measure signal voltage for TCM while installing the fuse to FWD switch connector.

Connector & terminal

(B56) No. 2 (+) — Chassis ground (-):



CHECK : Is the voltage less than 1 V in FWD switch while installing?

YES : Go to step 9N5.

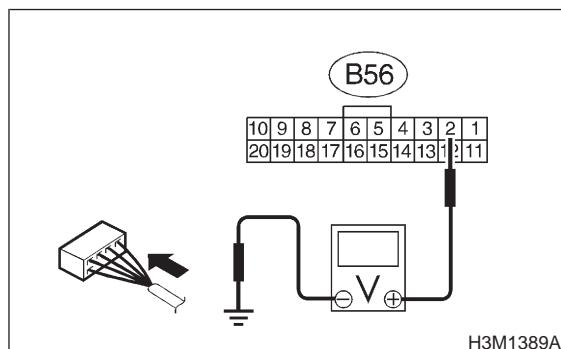
NO : Go to step 9N10.

9N5 : CHECK INPUT SIGNAL FOR TCM.

Measure signal voltage for TCM while removing the fuse from FWD switch connector.

Connector & terminal

(B56) No. 2 (+) — Chassis ground (-):



CHECK : Is the voltage more than 10 V in FWD switch while removing?

YES : Go to step 9N6.

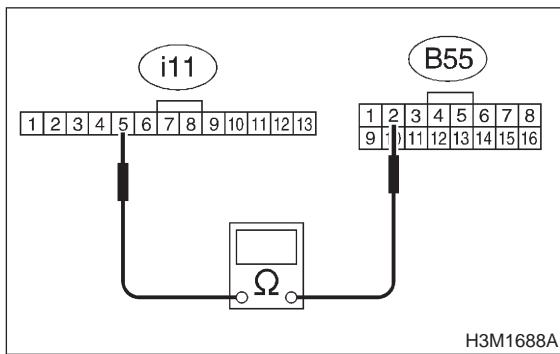
NO : Replace TCM.

**9N6 : CHECK HARNESS CONNECTOR
BETWEEN TCM AND COMBINATION
METER.**

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

Connector & terminal

(B55) No. 2 — (i11) No. 5:



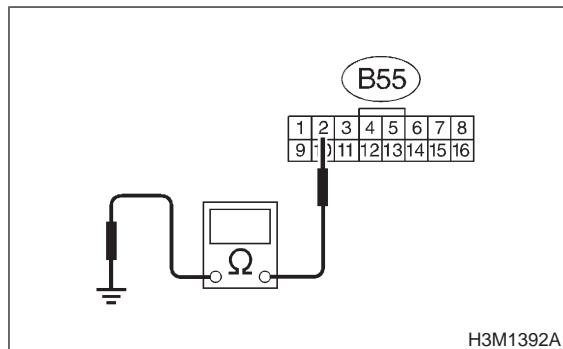
CHECK : **Is the resistance less than 1 Ω?**
YES : Go to step **9N7**.
NO : Repair open circuit in harness between TCM and combination meter and poor contact in coupling connector.

**9N7 : CHECK HARNESS CONNECTOR
BETWEEN TCM AND COMBINATION
METER.**

Measure resistance of harness connector between TCM and chassis ground to make sure that circuit does not short.

Connector & terminal

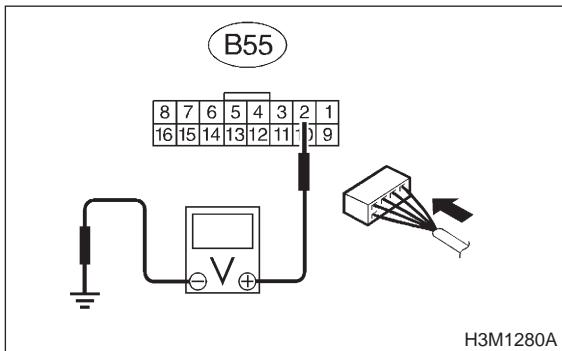
(B55) No. 2 — Chassis ground:



CHECK : **Is the resistance more than 1 MΩ?**
YES : Go to step **9N8**.
NO : Repair short circuit in harness between TCM and combination meter connector.

9N8 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

- 1) Turn ignition switch to OFF.
- 2) Connect connector to TCM and combination meter.
- 3) Install combination meter.
- 4) Turn ignition switch to ON.
- 5) Measure signal voltage for TCM while installing and removing the fuse to FWD switch connector.

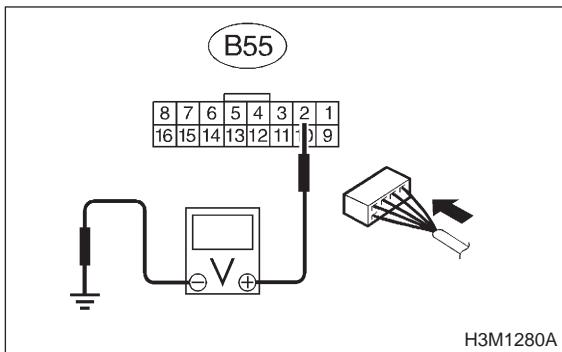
Connector & terminal
(B55) No. 2 — Chassis ground:


CHECK : Is the voltage less than 1 V in FWD switch while installing?

YES : Go to step 9N9.
NO : Go to step 9N10.

9N9 : CHECK OUTPUT SIGNAL EMITTED FROM TCM.

Measure signal voltage for TCM while removing the fuse from FWD switch connector.

Connector & terminal
(B55) No. 2 — Chassis ground:


CHECK : Is the voltage more than 10 V in FWD switch while removing?

YES : Go to step 9N10.
NO : Replace TCM.

9N10 : CHECK POOR CONTACT.

CHECK : Is there poor contact in FWD switch circuit?

YES : Repair poor contact.
NO : Replace TCM.

O: CHECK KICK-DOWN SWITCH.
9O1 : CHECK KICK-DOWN SWITCH.

CHECK : Does the LED of kick-down switch light up?

YES : Replace TCM.
NO : Go to step BREAK SWITCH. <Ref. to 3-2 [T9P0].>

P: CHECK BRAKE SWITCH.
9P1 : CHECK BRAKE SWITCH.

CHECK : When the brake pedal is depressed, does LED light up?

YES : Go to step ABS SWITCH. <Ref. to 3-2 [T9Q0].>
NO : Check brake switch circuit. <Ref. to 2-7 [T10BK0].>

Q: CHECK ABS SWITCH.
9Q1 : CHECK ABS SWITCH.

CHECK : Does the LED of ABS switch light up?

YES : Check ABS switch circuit. <Ref. to 4-4 [T10A0].> and <Ref. to 4-4 [T10V0].>
NO : Go to step CRUISE CONTROL SWITCH. <Ref. to 3-2 [T9R0].>

R: CHECK CRUISE CONTROL SWITCH.
9R1 : CHECK CRUISE CONTROL SWITCH.

CHECK : Does the LED of cruise control switch light up?

YES : Check cruise control set circuit. <Ref. to 2-7 [T10DA0].>
NO : Go to step POWER MODE SWITCH. <Ref. to 3-2 [T9S0].>

S: CHECK POWER MODE SWITCH.**9S1 : CHECK POWER MODE SWITCH.**

 : *Does the LED of power mode switch light up?*

 : Replace TCM.

 : Go to step N/P RANGE SWITCH. <Ref. to 3-2 [T9T0].>

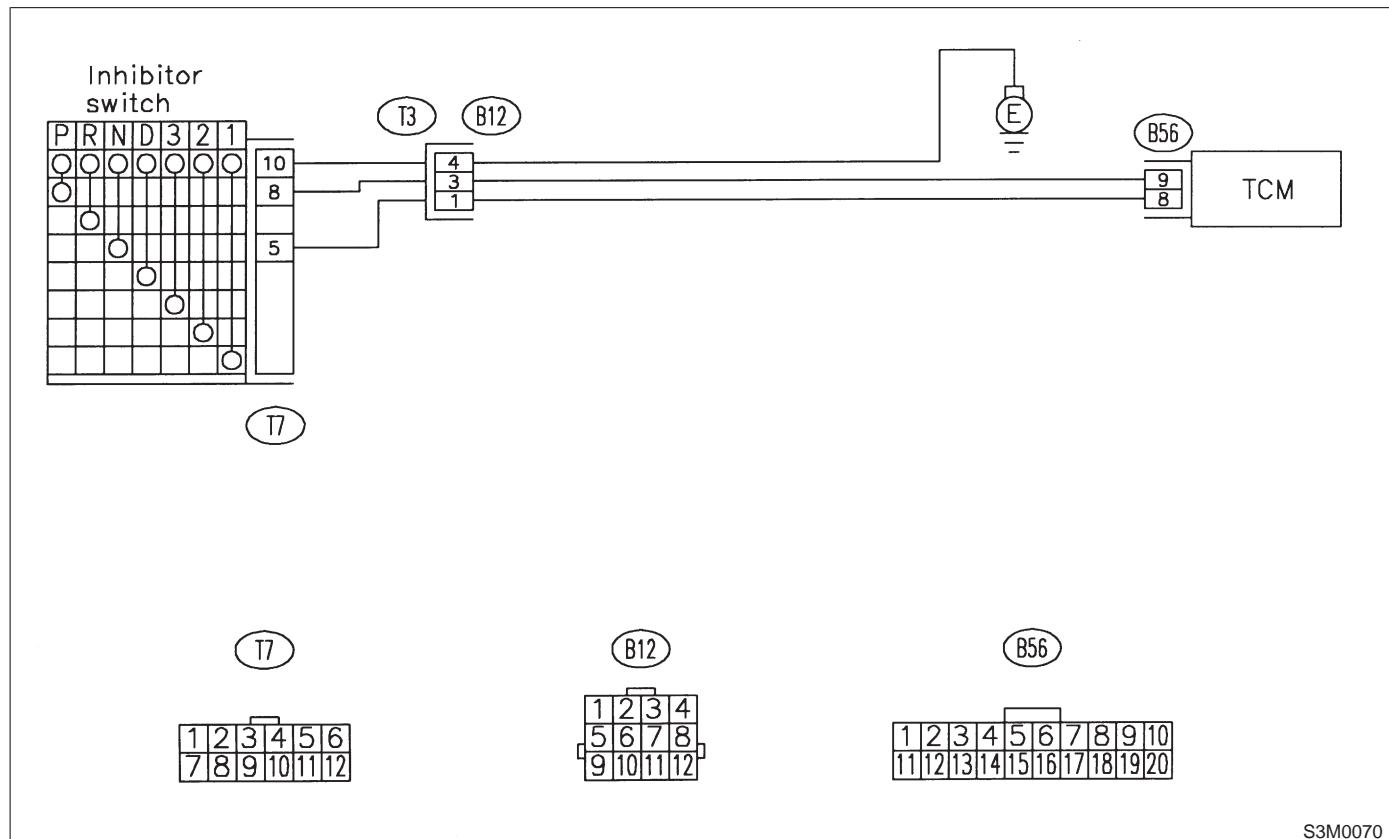
MEMO:

T: CHECK "N/P" RANGE SWITCH.

DIAGNOSIS:

Input signal circuit of "P" or "N" range is open or shorted.

WIRING DIAGRAM:



S3M0070

9T1 : CHECK "P" RANGE SWITCH.

CHECK : When "P" range is selected, does LED light up?

YES : Go to step 9T2.

NO : Go to step 9T3.

9T2 : CHECK "N" RANGE SWITCH.

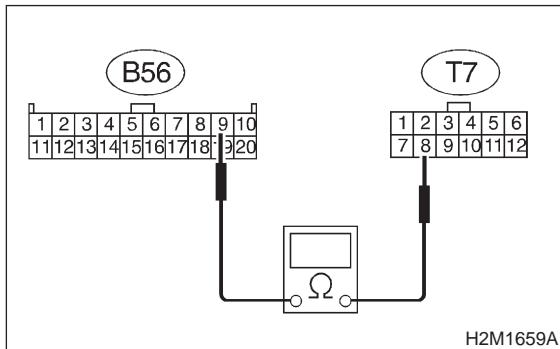
CHECK : When the "N" range is selected, does LED light up?

YES : Go to step "R" RANGE SWITCH. <Ref. to 3-2 [T9U0].>

NO : Go to step 9T4.

9T3 : CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH.

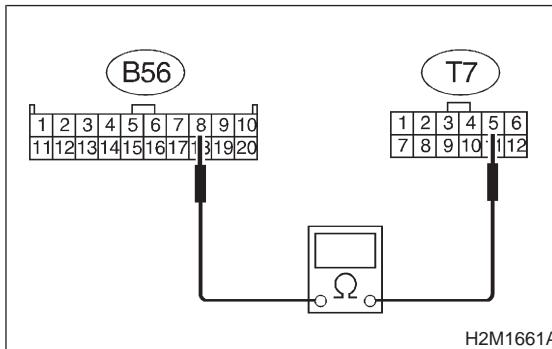
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and inhibitor switch.
- 3) Measure resistance of harness between TCM and inhibitor switch connector.

Connector & terminal
(B56) No. 9 — (T7) No. 8:


H2M1659A

9T4 : CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH.

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

Connector & terminal
(B56) No. 8 — (T7) No. 5:


H2M1661A

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

YES : Go to step **9T5**.

NO : Repair open circuit in harness between TCM and inhibitor switch connector, and poor contact in coupling connector.

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

YES : Go to step **9T6**.

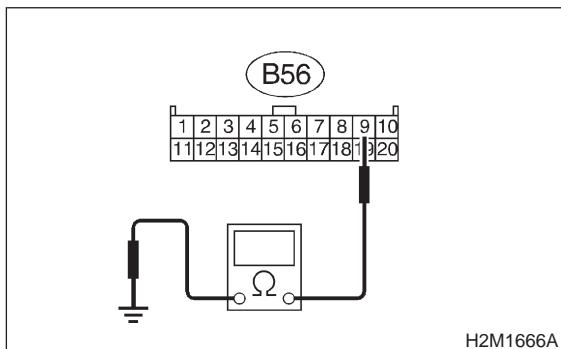
NO : Repair open circuit in harness between TCM and inhibitor switch connector, and poor contact in coupling connector.

9T5 : CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH.

Measure resistance of harness between TCM and chassis ground.

Connector & terminal

(B56) No. 9 — Chassis ground:



CHECK : Is the resistance more than $1 M\Omega$?

YES : Go to step 9T7.

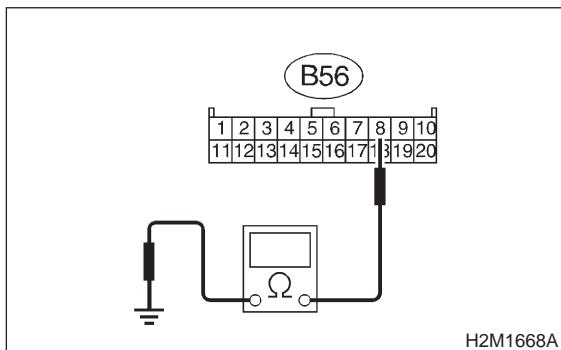
NO : Repair ground short circuit in harness between TCM and inhibitor switch connector.

9T6 : CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH.

Measure resistance of harness between TCM and chassis ground.

Connector & terminal

(B56) No. 8 — Chassis ground:



CHECK : Is the resistance more than $1 M\Omega$?

YES : Go to step 9T9.

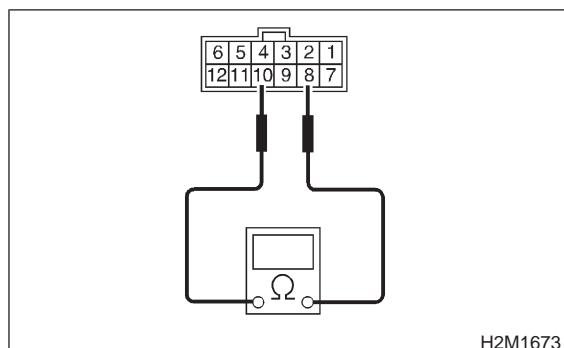
NO : Repair ground short circuit in harness between TCM and inhibitor switch connector.

9T7 : CHECK INHIBITOR SWITCH.

Measure resistance between inhibitor switch connector receptacle's terminals.

Terminals

No. 8 — No. 10



CHECK : Is the resistance less than 1Ω in "P" range?

YES : Go to step 9T8.

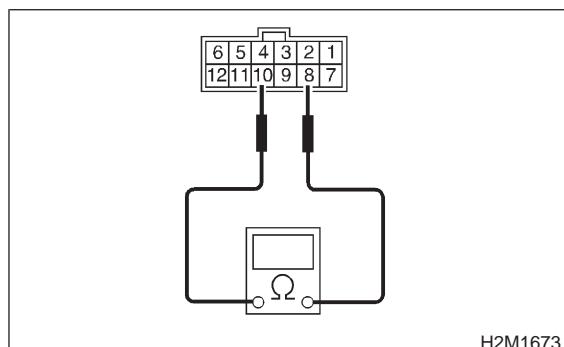
NO : Go to step 9T16.

9T8 : CHECK INHIBITOR SWITCH.

Measure resistance between inhibitor switch connector receptacle's terminals.

Terminals

No. 8 — No. 10



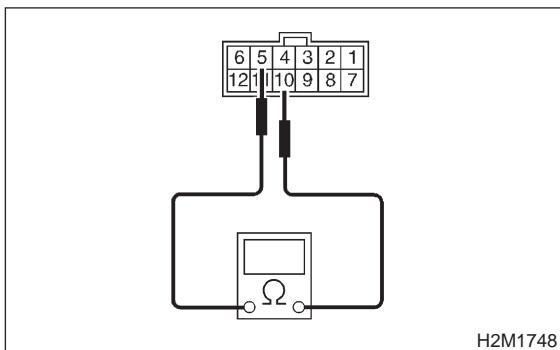
CHECK : Is the resistance more than $1 M\Omega$ in other ranges?

YES : Go to step 9T11.

NO : Go to step 9T16.

9T9 : CHECK INHIBITOR SWITCH.

Measure resistance between inhibitor switch connector receptacle's terminals.

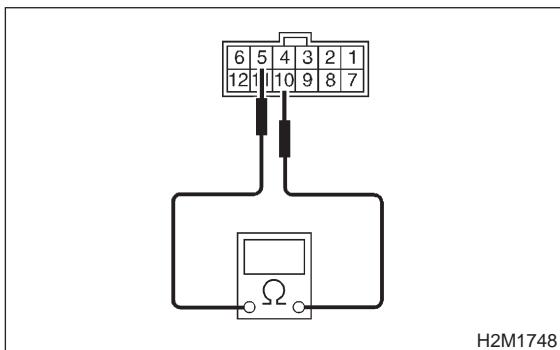
Terminals**No. 5 — No. 10**

CHECK : Is the resistance less than $1\ \Omega$ in "N" range?

YES : Go to step **9T10**.
NO : Go to step **9T16**.

9T10 : CHECK INHIBITOR SWITCH.

Measure resistance between inhibitor switch connector receptacle's terminals.

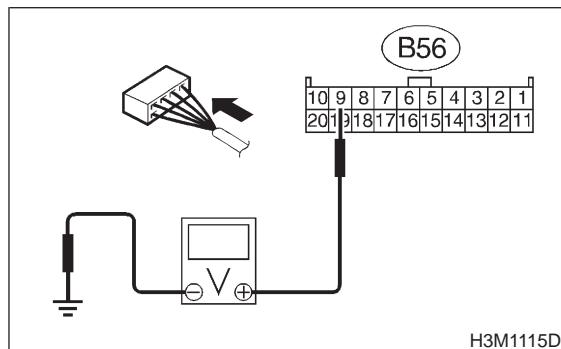
Terminals**No. 5 — No. 10**

CHECK : Is the resistance more than $1\ M\Omega$ in other ranges?

YES : Go to step **9T13**.
NO : Go to step **9T16**.

9T11 : CHECK INPUT SIGNAL FOR TCM.

- 1) Turn ignition switch to OFF.
- 2) Connect connector to TCM and inhibitor switch.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between TCM and chassis ground.

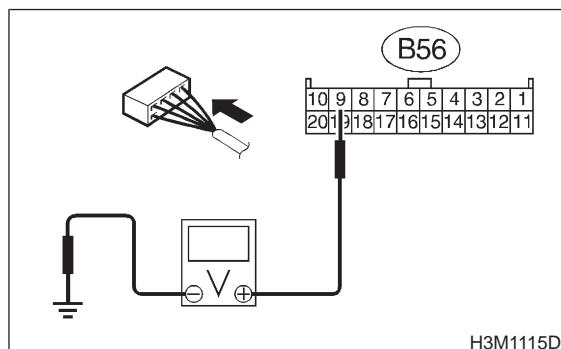
Connector & terminal**(B56) No. 9 — Chassis ground:**

CHECK : Is the voltage less than $1\ V$ in "P" range?

YES : Go to step **9T12**.
NO : Go to step **9T15**.

9T12 : CHECK INPUT SIGNAL FOR TCM.

Measure voltage between TCM and chassis ground.

Connector & terminal**(B56) No. 9 — Chassis ground:**

CHECK : Is the voltage more than $8\ V$ in other ranges?

YES : Go to step **9T15**.
NO : Go to step **9T16**.

3-2 [T9T13] AUTOMATIC TRANSMISSION AND DIFFERENTIAL

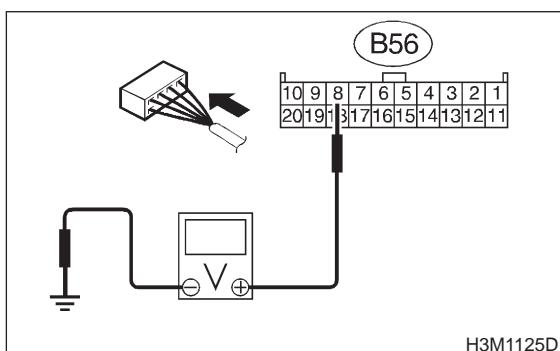
9. Diagnostic Chart with Select Monitor

9T13 : CHECK INPUT SIGNAL FOR TCM.

- 1) Turn ignition switch to OFF.
- 2) Connect connector to TCM and inhibitor switch.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between TCM and chassis ground.

Connector & terminal

(B56) No. 8 — Chassis ground:



CHECK : Is the voltage less than 1 V in "N" range?

YES : Go to step 9T14.

NO : Go to step 9T15.

9T15 : CHECK POOR CONTACT.

CHECK : Is there poor contact in "N/P" range switch circuit?

YES : Repair poor contact.

NO : Replace TCM.

9T16 : CHECK SELECTOR CABLE.

CHECK : Is there faulty connection in the selector cable?

YES : Repair connection of selector cable.

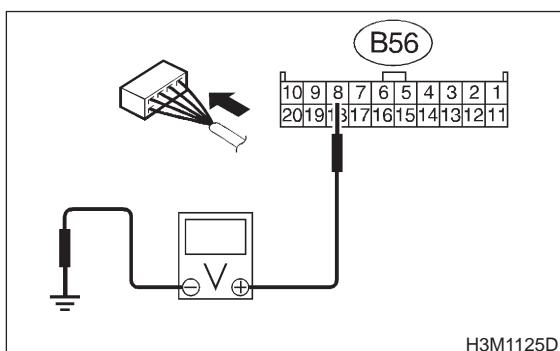
NO : Replace inhibitor switch.

9T14 : CHECK INPUT SIGNAL FOR TCM.

Measure voltage between TCM and chassis ground.

Connector & terminal

(B56) No. 8 — Chassis ground:



CHECK : Is the voltage more than 8 V in other ranges?

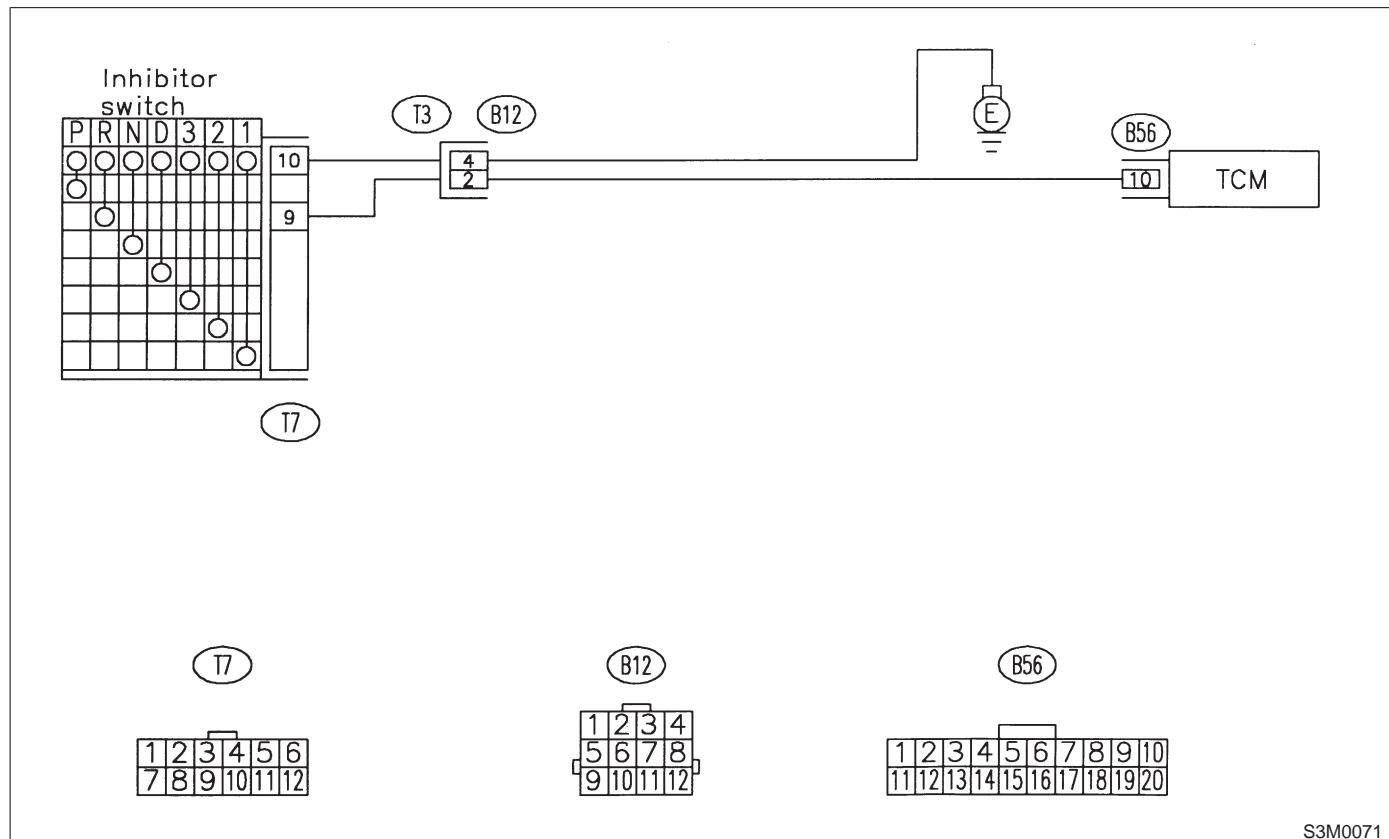
YES : Go to step 9T15.

NO : Go to step 9T16.

MEMO:

U: CHECK “R” RANGE SWITCH.**DIAGNOSIS:**

Input signal circuit of “R” range is open or shorted.

WIRING DIAGRAM:**9U1 : CHECK “R” RANGE SWITCH.**

CHECK : When the “R” range is selected, does LED light up?

YES : Go to step “D” RANGE SWITCH. <Ref. to 3-2 [T9V0].>

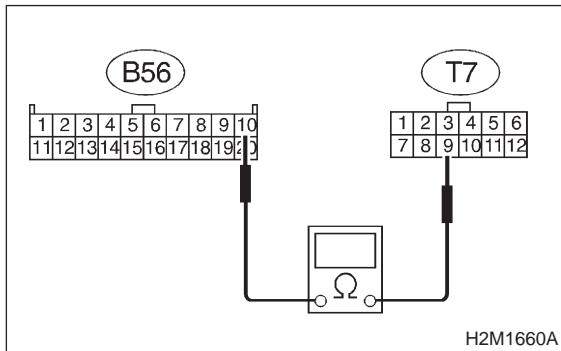
NO : Go to step **9U2**.

9U2 : CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH.

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

Connector & terminal

(B56) No. 10 — (T7) No. 9:



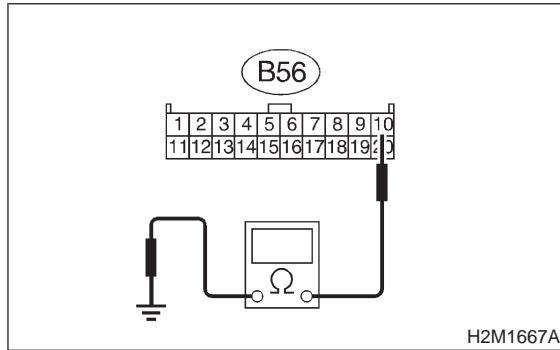
CHECK : Is the resistance less than 1Ω ?
YES : Go to step 9U3.
NO : Repair open circuit in harness between TCM and inhibitor switch connector, and poor contact in coupling connector.

9U3 : CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH.

Measure resistance of harness between TCM and chassis ground.

Connector & terminal

(B56) No. 10 — **Chassis ground**:



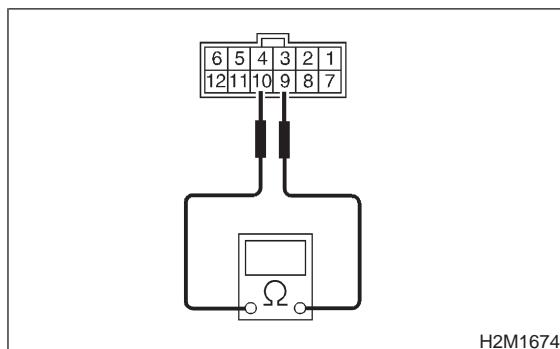
CHECK : Is the resistance more than $1 M\Omega$?
YES : Go to step 9U4.
NO : Repair ground short circuit in harness between TCM and inhibitor switch connector.

9U4 : CHECK INHIBITOR SWITCH.

Measure resistance between inhibitor switch connector receptacle's terminals.

Terminals

No. 9 — No. 10



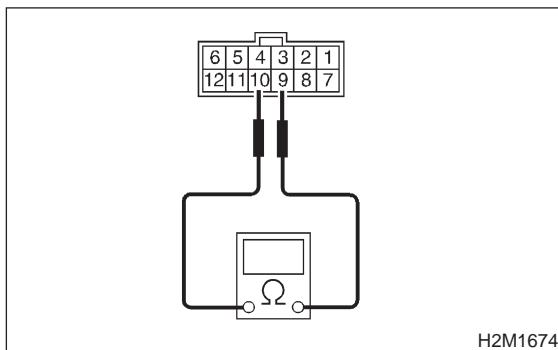
CHECK : Is the resistance less than 1Ω in "R" range?
YES : Go to step 9U5.
NO : Go to step 9U9.

9U5 : CHECK INHIBITOR SWITCH.

Measure resistance between inhibitor switch connector receptacle's terminals.

Terminals

No. 9 — No. 10



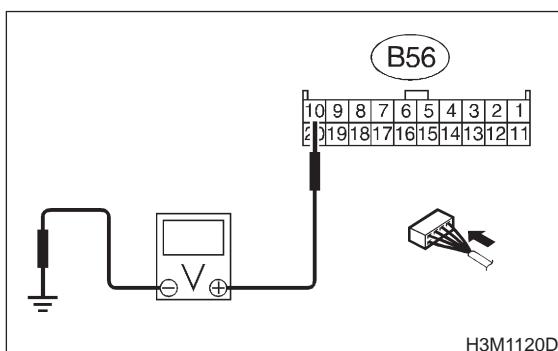
CHECK : Is the resistance more than $1 \text{ M}\Omega$ in other ranges?
YES : Go to step 9U6.
NO : Go to step 9U9.

9U6 : CHECK INPUT SIGNAL FOR TCM.

- 1) Turn ignition switch to OFF.
- 2) Connect connector to TCM and inhibitor switch.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between TCM and chassis ground.

Connector & terminal

(B56) No. 10 — Chassis ground:



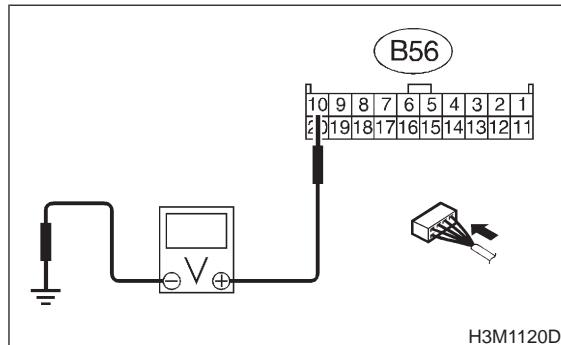
CHECK : Is the voltage less than 1 V in "R" range?
YES : Go to step 9U7.
NO : Go to step 9U8.

9U7 : CHECK INPUT SIGNAL FOR TCM.

Measure voltage between TCM and chassis ground.

Connector & terminal

(B56) No. 10 — Chassis ground:



CHECK : Is the voltage more than 6 V in other ranges?
YES : Go to step 9U8.
NO : Go to step 9U9.

9U8 : CHECK POOR CONTACT.

CHECK : Is there poor contact in "R" range switch circuit?
YES : Repair poor contact.
NO : Replace TCM.

9U9 : CHECK SELECTOR CABLE.

CHECK : Is there faulty connection in the selector cable?
YES : Repair connection of selector cable.
NO : Replace inhibitor switch.

MEMO:

V: CHECK "D" RANGE SWITCH.

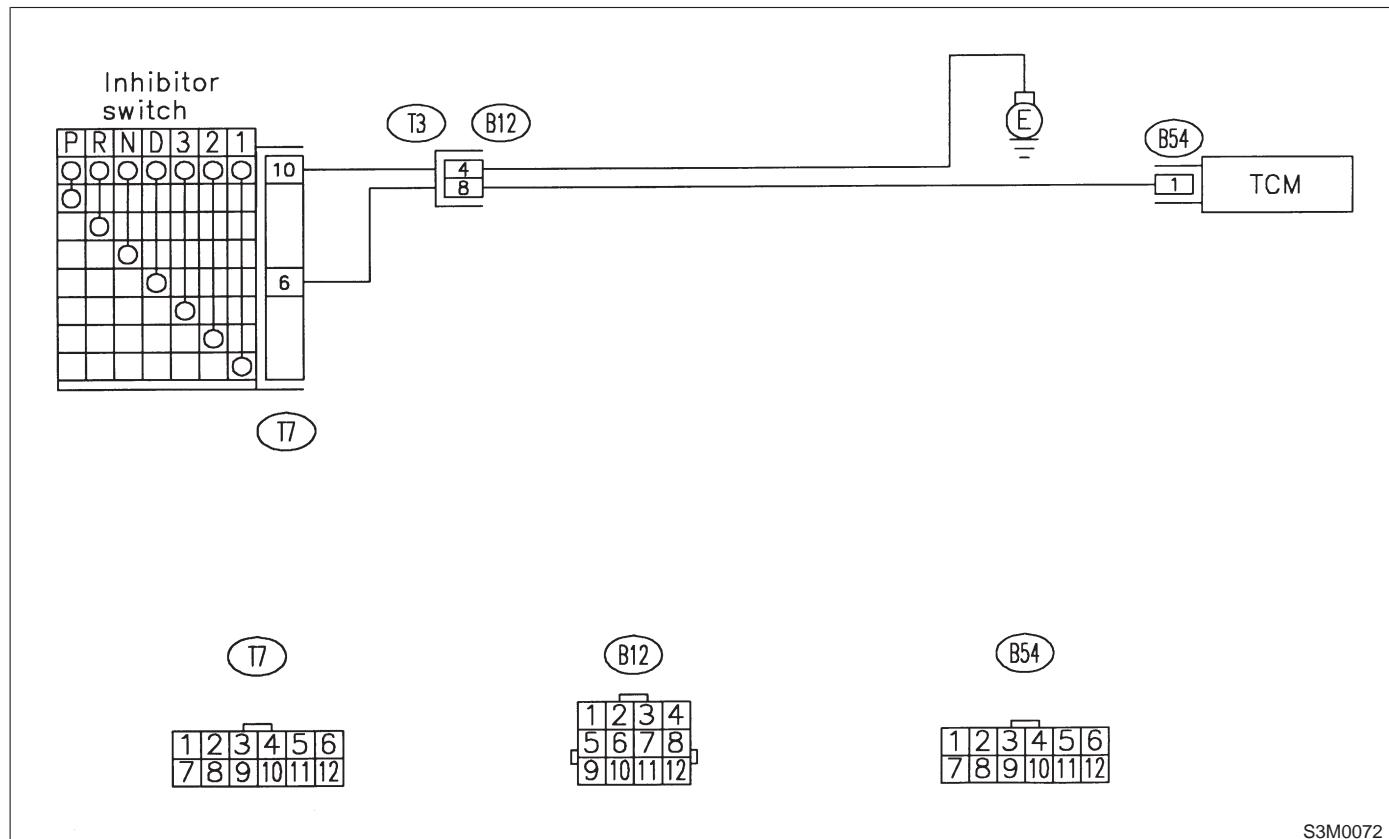
DIAGNOSIS:

Input signal circuit of "D" range is open or shorted.

TROUBLE SYMPTOM:

Shift characteristics are erroneous.

WIRING DIAGRAM:



S3M0072

9V1 : CHECK "D" RANGE SWITCH.

CHECK : When the "D" range is selected, does LED light up?

YES : Go to step "3" RANGE SWITCH. <Ref. to 3-2 [T9W0].>

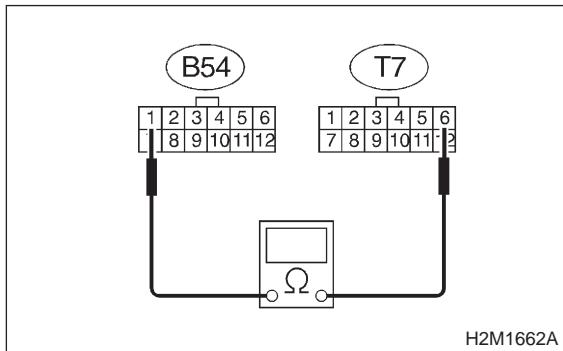
NO : Go to step **9V2**.

9V2 : CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH.

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

Connector & terminal

(B54) No. 1 — (T7) No. 6:



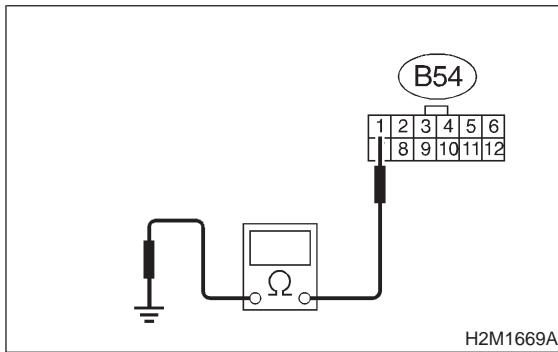
CHECK : Is the resistance less than $1\ \Omega$?
YES : Go to step 9V3.
NO : Repair open circuit in harness between TCM and inhibitor switch connector, and poor contact in coupling connector.

9V3 : CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH.

Measure resistance of harness between TCM and chassis ground.

Connector & terminal

(B54) No. 1 — *Chassis ground*:



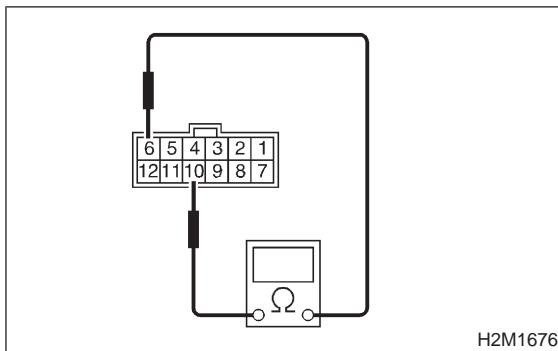
CHECK : Is the resistance more than $1\ M\Omega$?
YES : Go to step 9V4.
NO : Repair ground short circuit in harness between TCM and inhibitor switch connector.

9V4 : CHECK INHIBITOR SWITCH.

Measure resistance between inhibitor switch connector receptacle's terminals.

Terminals

No. 6 — No. 10



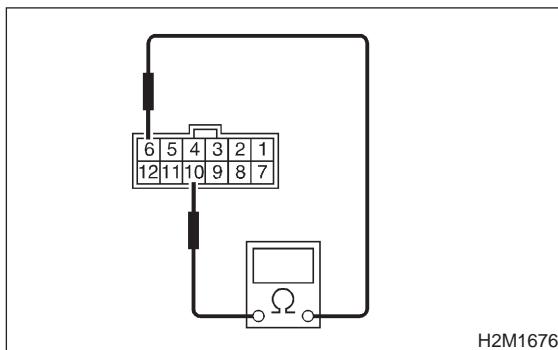
CHECK : Is the resistance less than $1\ \Omega$ in "D" range?
YES : Go to step 9V5.
NO : Go to step 9V9.

9V5 : CHECK INHIBITOR SWITCH.

Measure resistance between inhibitor switch connector receptacle's terminals.

Terminals

No. 6 — No. 10



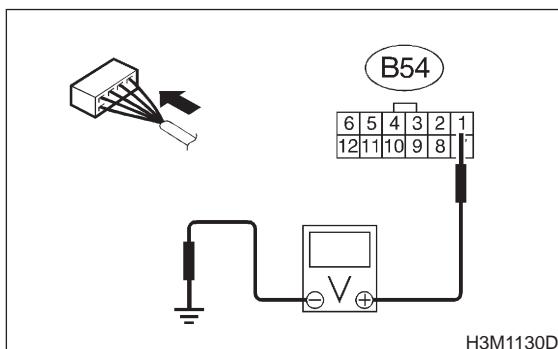
CHECK : Is the resistance more than $1 M\Omega$ in other ranges?
YES : Go to step 9V6.
NO : Go to step 9V9.

9V6 : CHECK INPUT SIGNAL FOR TCM.

- 1) Turn ignition switch to OFF.
- 2) Connect connector to TCM and inhibitor switch.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between TCM and chassis ground.

Connector & terminal

(B54) No. 1 — Chassis ground:



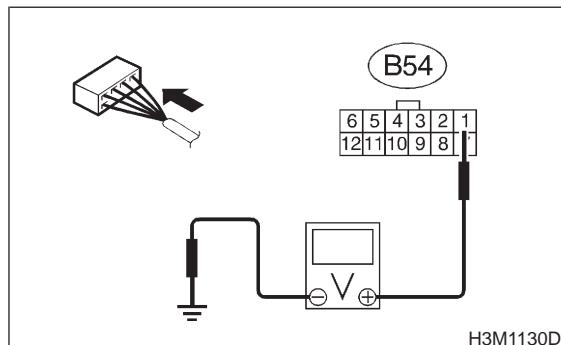
CHECK : Is the voltage less than 1 V in "D" range?
YES : Go to step 9V7.
NO : Go to step 9V8.

9V7 : CHECK INPUT SIGNAL FOR TCM.

Measure voltage between TCM and chassis ground.

Connector & terminal

(B54) No. 1 — Chassis ground:



CHECK : Is the voltage more than 6 V in other ranges?
YES : Go to step 9V8.
NO : Go to step 9V9.

9V8 : CHECK POOR CONTACT.

CHECK : Is there poor contact in "D" range switch circuit?
YES : Repair poor contact.
NO : Replace TCM.

9V9 : CHECK SELECTOR CABLE.

CHECK : Is there faulty connection in the selector cable?
YES : Repair connection of selector cable.
NO : Replace inhibitor switch.

MEMO:

W: CHECK "3" RANGE SWITCH.

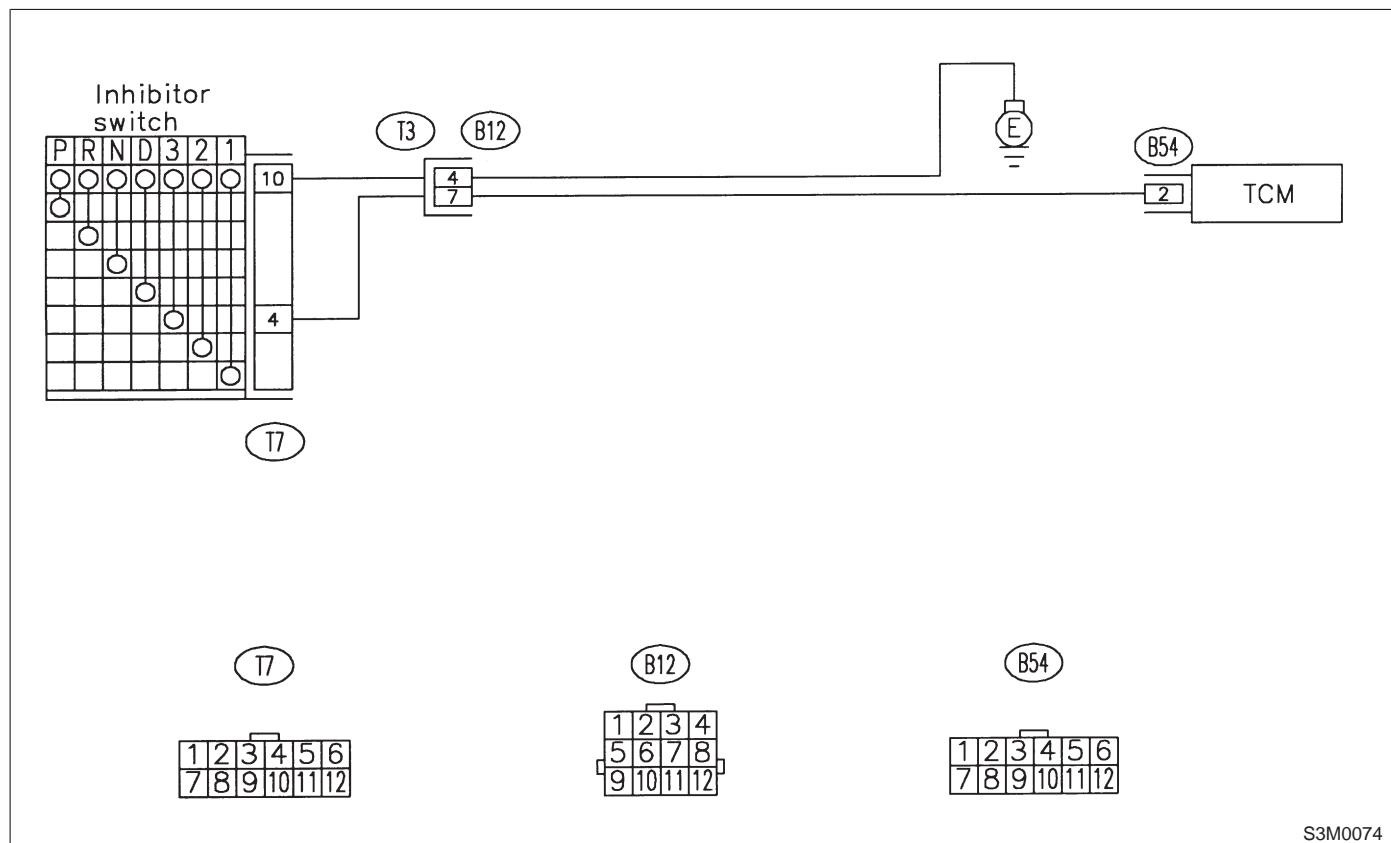
DIAGNOSIS:

Input signal circuit of "3" range is open or shorted.

TROUBLE SYMPTOM:

- Shift characteristics are erroneous.
- Engine brake is not effected when selector lever is in "3" range.

WIRING DIAGRAM:



S3M0074

9W1 : CHECK "3" RANGE SWITCH.

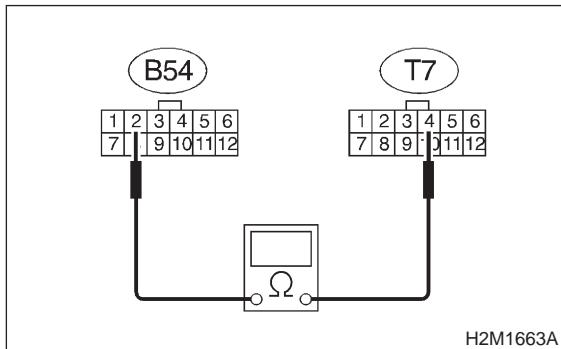
CHECK : When the "3" range is selected, does LED light up?

YES : Go to step "2" RANGE SWITCH. <Ref. to 3-2 [T9X0].>

NO : Go to step **9W2**.

9W2 : CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH.

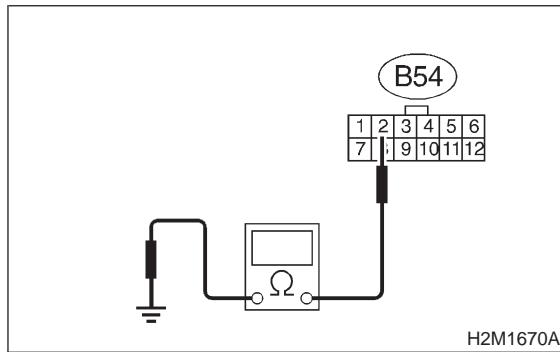
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from TCM and inhibitor switch.
- 3) Measure resistance of harness between TCM and inhibitor switch connector.

Connector & terminal**(B54) No. 2 — (T7) No. 4:**

CHECK : *Is the resistance less than 1 Ω?*
YES : Go to step **9W3**.
NO : Repair open circuit in harness between TCM and inhibitor switch connector and poor contact in coupling connector.

9W3 : CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH.

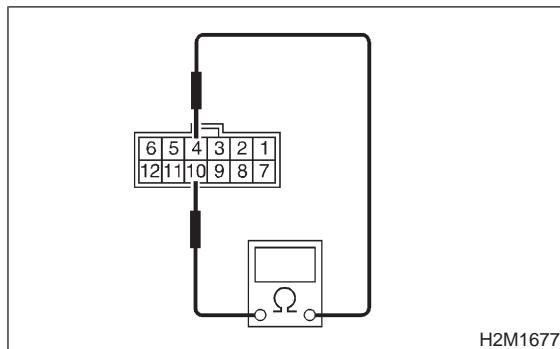
Measure resistance of harness between TCM and chassis ground.

Connector & terminal**(B54) No. 2 — Chassis ground:**

CHECK : *Is the resistance more than 1 MΩ?*
YES : Go to step **9W4**.
NO : Repair ground short circuit in harness between TCM and inhibitor switch connector.

9W4 : CHECK INHIBITOR SWITCH.

Measure resistance between inhibitor switch connector receptacle's terminals.

Terminals**No. 4 — No. 10**

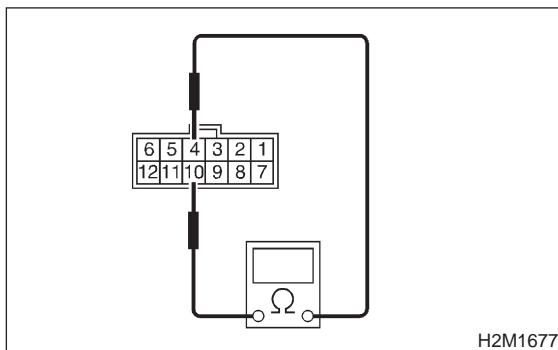
CHECK : *Is the resistance less than 1 Ω in "3" range?*
YES : Go to step **9W5**.
NO : Go to step **9W9**.

9W5 : CHECK INHIBITOR SWITCH.

Measure resistance between inhibitor switch connector receptacle's terminals.

Terminals

No. 4 — No. 10



CHECK : Is the resistance more than $1 M\Omega$ in other ranges?

YES : Go to step 9W6.

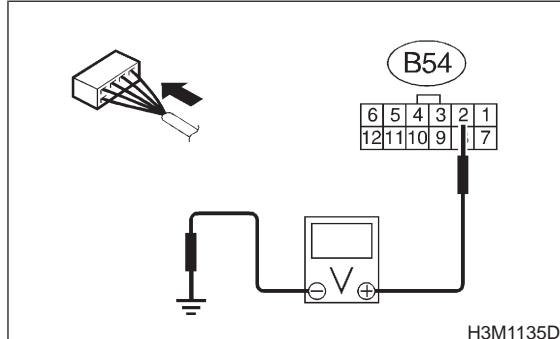
NO : Go to step 9W9.

9W7 : CHECK INPUT SIGNAL FOR TCM.

Measure voltage between TCM and chassis ground.

Connector & terminal

(B54) No. 2 — Chassis ground:



CHECK : Is the voltage more than 6 V in other ranges?

YES : Go to step 9W8.

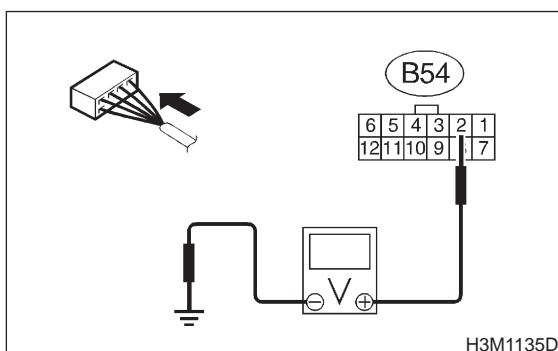
NO : Go to step 9W9.

9W6 : CHECK INPUT SIGNAL FOR TCM.

- 1) Turn ignition switch to OFF.
- 2) Connect connector to TCM and inhibitor switch.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between TCM and chassis ground.

Connector & terminal

(B54) No. 2 — Chassis ground:



CHECK : Is the voltage less than 1 V in "3" range?

YES : Go to step 9W7.

NO : Go to step 9W8.

9W8 : CHECK POOR CONTACT.

CHECK : Is there poor contact in "3" range switch circuit?

YES : Repair poor contact.

NO : Replace TCM.

9W9 : CHECK SELECTOR CABLE.

CHECK : Is there faulty connection in the selector cable?

YES : Repair connection of selector cable.

NO : Replace inhibitor switch.

MEMO:

X: CHECK "2" RANGE SWITCH.

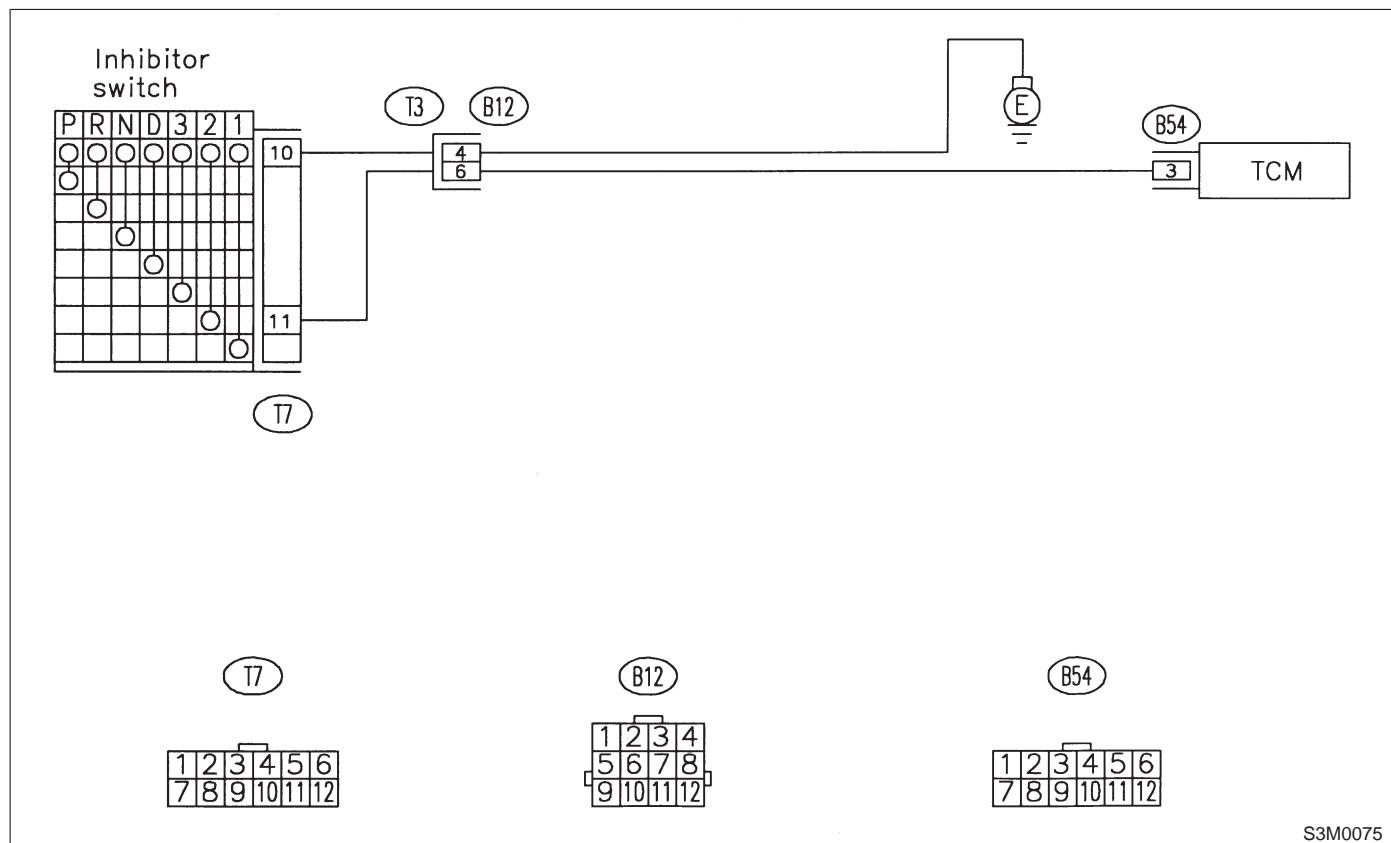
DIAGNOSIS:

Input signal circuit of "2" range is open or shorted.

TROUBLE SYMPTOM:

- Shift characteristics are erroneous.
- Engine brake is not effected when selector lever is in "2" range.

WIRING DIAGRAM:



9X1 : CHECK "2" RANGE SWITCH.

CHECK : When the "2" range is selected, does LED light up?

YES : Go to step "1" RANGE SWITCH. <Ref. to 3-2 [T9Y0].>

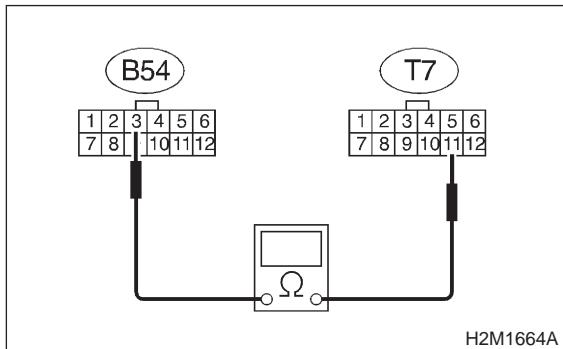
NO : Go to step **9X2**.

9X2 : CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH.

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

Connector & terminal

(B54) No. 3 — (T7) No. 11:



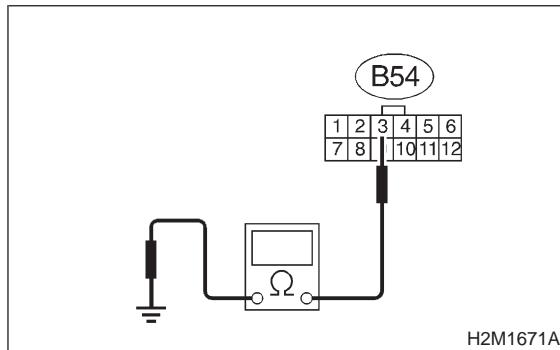
CHECK : *Is the resistance less than 1 Ω?*
YES : Go to step 9X3.
NO : Repair open circuit in harness between TCM and inhibitor switch connector, and poor contact in coupling connector.

9X3 : CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH.

Measure resistance of harness between TCM and chassis ground.

Connector & terminal

(B54) No. 3 — *Chassis ground*:



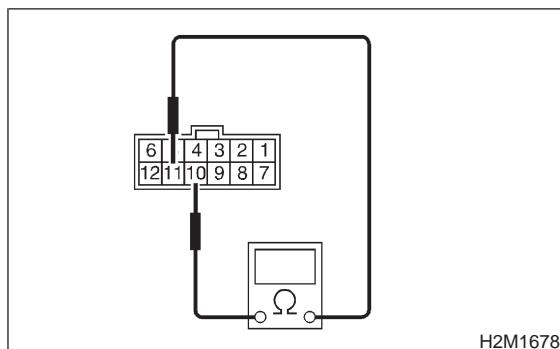
CHECK : *Is the resistance more than 1 MΩ?*
YES : Go to step 9X4.
NO : Repair ground short circuit in harness between TCM and inhibitor switch connector.

9X4 : CHECK INHIBITOR SWITCH.

Measure resistance between inhibitor switch connector receptacle's terminals.

Terminals

No. 11 — No. 10



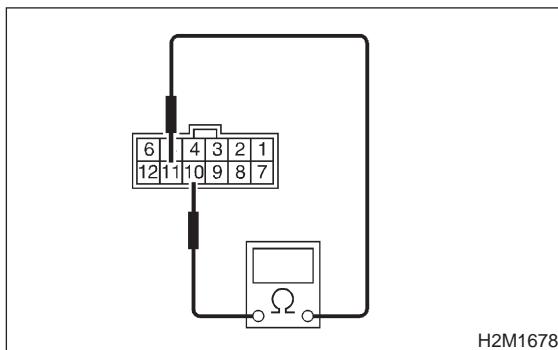
CHECK : *Is the resistance less than 1 Ω in "2" range?*
YES : Go to step 9X5.
NO : Go to step 9X9.

9X5 : CHECK INHIBITOR SWITCH.

Measure resistance between inhibitor switch connector receptacle's terminals.

Terminals

No. 11 — No. 10



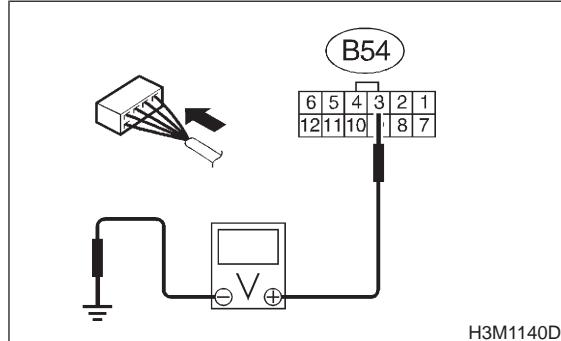
H2M1678

9X7 : CHECK INPUT SIGNAL FOR TCM.

Measure voltage between TCM and chassis ground.

Connector & terminal

(B54) No. 3 — Chassis ground:



H3M1140D

CHECK : Is the resistance more than $1 M\Omega$ in other ranges?

YES : Go to step 9X6.

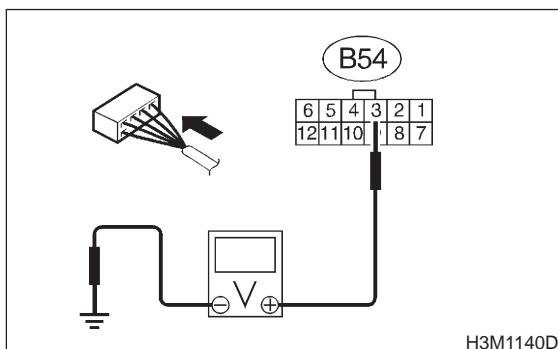
NO : Go to step 9X9.

9X6 : CHECK INPUT SIGNAL FOR TCM.

- 1) Turn ignition switch to OFF.
- 2) Connect connector to TCM and inhibitor switch.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between TCM and chassis ground.

Connector & terminal

(B54) No. 3 — Chassis ground:



H3M1140D

CHECK : Is the voltage less than 1 V in "2" range?

YES : Go to step 9X7.

NO : Go to step 9X8.

CHECK : Is the voltage more than 6 V in other ranges?

YES : Go to step 9X8.

NO : Go to step 9X9.

9X8 : CHECK POOR CONTACT.

CHECK : Is there poor contact in "2" range switch circuit?

YES : Repair poor contact.

NO : Replace TCM.

9X9 : CHECK SELECTOR CABLE.

CHECK : Is there faulty connection in the selector cable?

YES : Repair connection of selector cable.

NO : Replace inhibitor switch.

MEMO:

Y: CHECK "1" RANGE SWITCH.

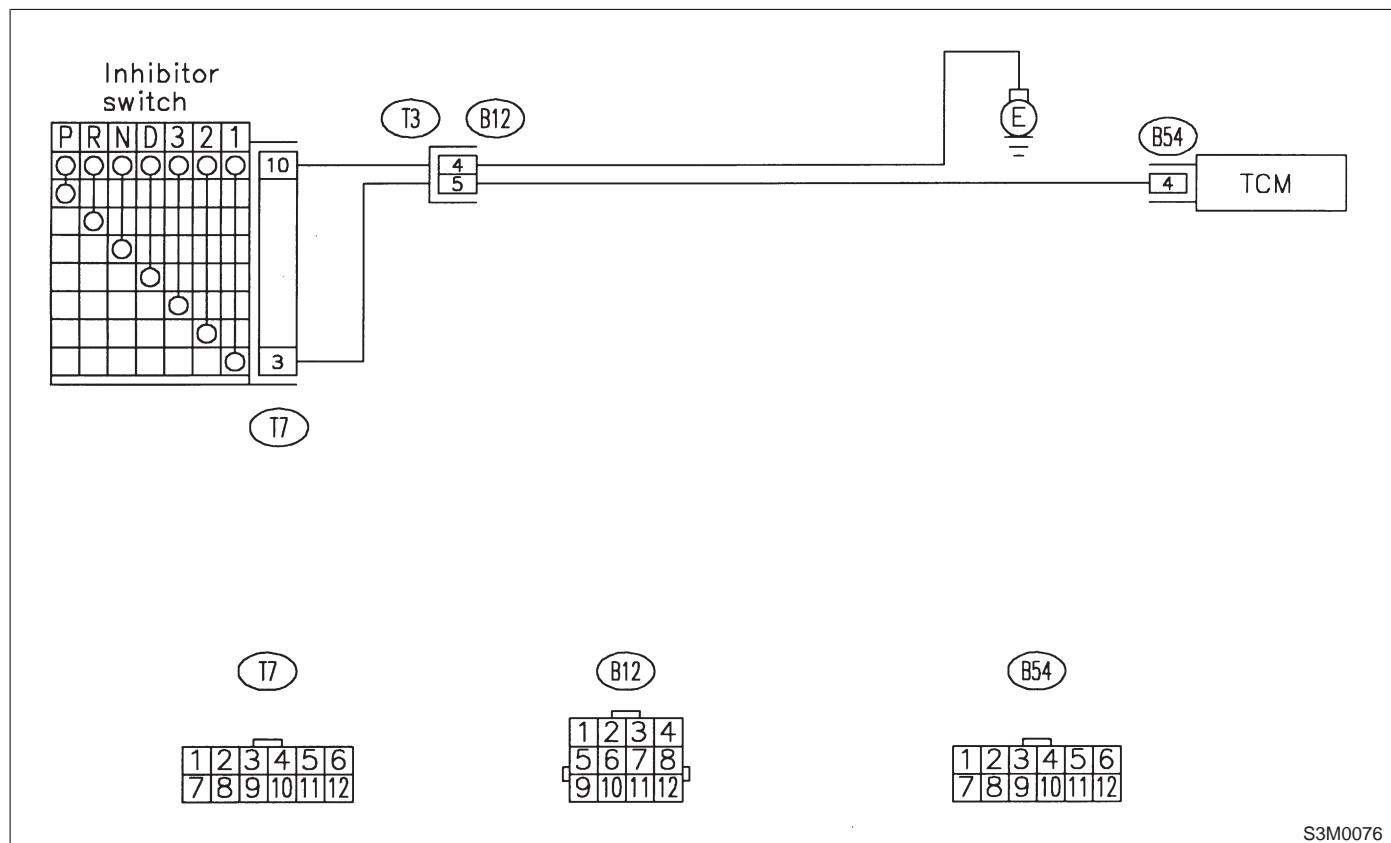
DIAGNOSIS:

Input signal circuit of "1" range is open or shorted.

TROUBLE SYMPTOM:

- Shift characteristics are erroneous.
- Engine brake is not effected when selector lever is in "1" range.

WIRING DIAGRAM:



S3M0076

9Y1 : CHECK "1" RANGE SWITCH.

CHECK : When the "1" range is selected, does LED light up?

YES : Go to step HOLD SWITCH. <Ref. to 3-2 [T9Z0].>

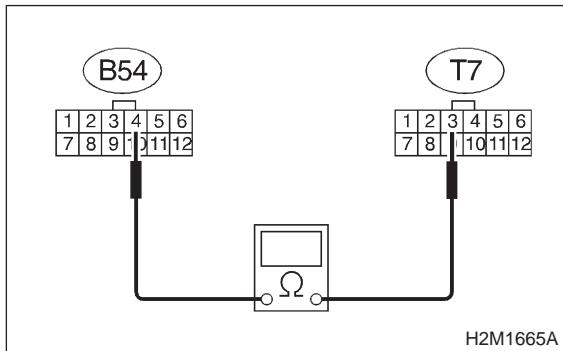
NO : Go to step 9Y2.

9Y2 : CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH.

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

Connector & terminal

(B54) No. 4 — (T7) No. 3:



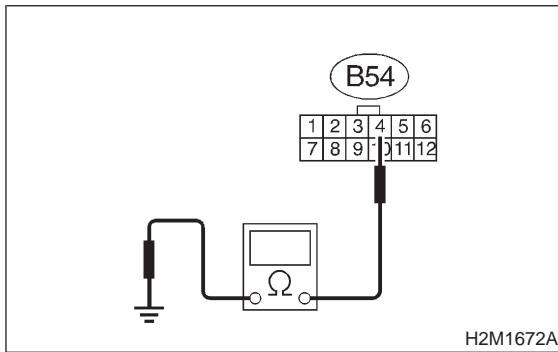
CHECK : Is the resistance less than 1Ω ?
YES : Go to step 9Y3.
NO : Repair open circuit in harness between TCM and inhibitor switch connector and poor contact in coupling connector.

9Y3 : CHECK HARNESS CONNECTOR BETWEEN TCM AND INHIBITOR SWITCH.

Measure resistance of harness between TCM and chassis ground.

Connector & terminal

(B54) No. 4 — Chassis ground:



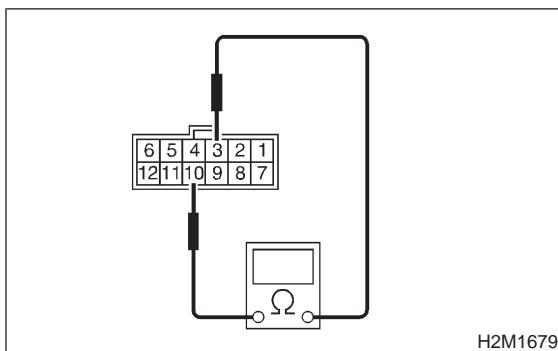
CHECK : Is the resistance more than $1 M\Omega$?
YES : Go to step 9Y4.
NO : Repair ground short circuit in harness between TCM and inhibitor switch connector.

9Y4 : CHECK INHIBITOR SWITCH.

Measure resistance between inhibitor switch connector receptacle's terminals.

Terminals

No. 3 — No. 10



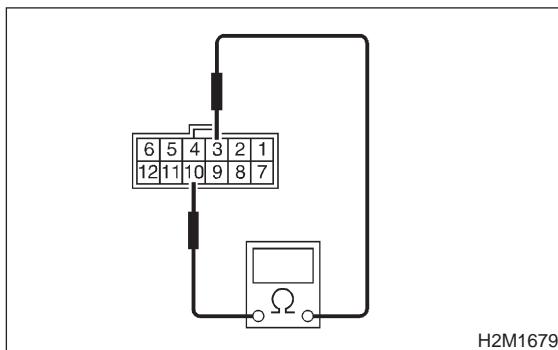
CHECK : Is the resistance less than 1Ω in "1" range?
YES : Go to step 9Y5.
NO : Go to step 9Y9.

9Y5 : CHECK INHIBITOR SWITCH.

Measure resistance between inhibitor switch connector receptacle's terminals.

Terminals

No. 3 — No. 10



CHECK : Is the resistance more than $1 M\Omega$ in other ranges?

YES : Go to step 9Y6.

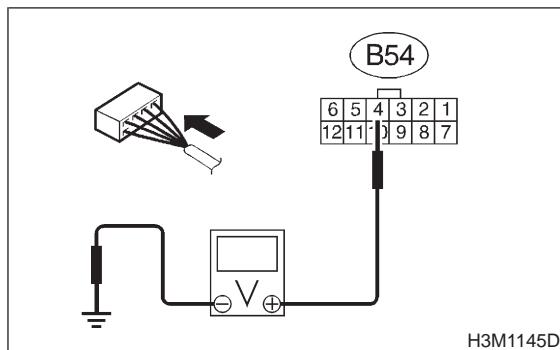
NO : Go to step 9Y9.

9Y7 : CHECK INPUT SIGNAL FOR TCM.

Measure voltage between TCM and chassis ground.

Connector & terminal

(B54) No. 4 — Chassis ground:



CHECK : Is the voltage more than 6 V in other ranges?

YES : Go to step 9Y8.

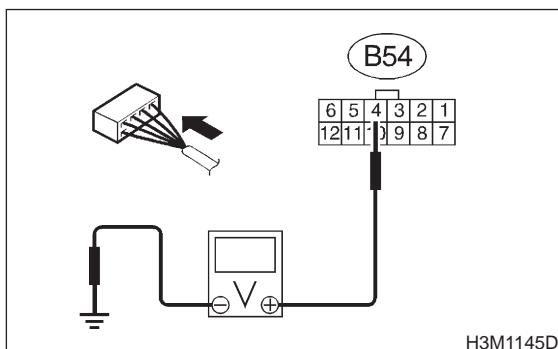
NO : Go to step 9Y9.

9Y6 : CHECK INPUT SIGNAL FOR TCM.

- 1) Turn ignition switch to OFF.
- 2) Connect connector to TCM and inhibitor switch.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between TCM and chassis ground.

Connector & terminal

(B54) No. 4 — Chassis ground:



CHECK : Is the voltage less than 1 V in "1" range?

YES : Go to step 9Y7.

NO : Go to step 9Y8.

9Y8 : CHECK POOR CONTACT.

CHECK : Is there poor contact in "1" range switch circuit?

YES : Repair poor contact.

NO : Replace TCM.

9Y9 : CHECK SELECTOR CABLE.

CHECK : Is there faulty connection in the selector cable?

YES : Repair connection of selector cable.

NO : Replace inhibitor switch.

Z: CHECK HOLD SWITCH.

9Z1 : CHECK HOLD SWITCH.

CHECK : Does the LED of hold switch mode light up?

YES : Replace TCM.

NO : Go to step SHIFT SOLENOID 1. <Ref. to 3-2 [T9AA0].>

AA: CHECK SHIFT SOLENOID 1.**9AA1 : CHECK SHIFT SOLENOID 1.**

CHECK : Does the LED of shift solenoid 1 light up?
YES : Go to step SHIFT SOLENOID 2. <Ref. to 3-2 [T9AB0].>
NO : Check shift solenoid 1 circuit. <Ref. to 3-2 [T8G0].>

AB: CHECK SHIFT SOLENOID 2.**9AB1 : CHECK SHIFT SOLENOID 2.**

CHECK : Does the LED of shift solenoid 2 light up?
YES : Go to step OVERRUNNING SOLENOID. <Ref. to 3-2 [T9AC0].>
NO : Check shift solenoid 2 circuit. <Ref. to 3-2 [T8F0].>

AC: CHECK OVERRUNNING SOLENOID.**9AC1 : CHECK OVERRUNNING SOLENOID.**

CHECK : Does the LED of overrunning solenoid light up?
YES : Check overrunning solenoid circuit. <Ref. to 3-2 [T8E0].>
NO : Go to step ATF TEMPERATURE WARNING LAMP. <Ref. to 3-2 [T9AD0].>

AD: CHECK ATF TEMPERATURE WARNING LAMP.**9AD1 : CHECK ATF TEMPERATURE WARNING LAMP.**

Turn ignition switch to ON (engine OFF).

CHECK : Does temperature warning lamp light up?
YES : Go to step HOLD LAMP. <Ref. to 3-2 [T9AE0].>
NO : Check ATF temperature warning lamp circuit. <Ref. to 3-2 [T7A0].>

AE: CHECK HOLD LAMP.**9AE1 : CHECK HOLD LAMP.**

CHECK : Does the LED of hold lamp light up?
YES : Replace TCM.
NO : Go to step FWD MODE LAMP. <Ref. to 3-2 [T9AF0].>

AF: CHECK FWD LAMP.**9AF1 : CHECK FWD LAMP.**

CHECK : Does the LED of FWD lamp light up?
YES : Check FWD lamp circuit. <Ref. to 3-2 [T9N0].>
NO : Go to step TORQUE CONTROL SIGNAL. <Ref. to 3-2 [T9AG0].>

AG: CHECK TORQUE CONTROL SIGNAL.**9AG1 : CHECK TORQUE CONTROL SIGNAL.**

Turn ignition switch to ON (engine ON).

CHECK : Does the LED of torque control signal light up?
YES : Check torque control signal circuit. <Ref. to 3-2 [T8L0].>
NO : Go to step General Diagnostic Table. <Ref. to 3-2 [T1000].>

10. General Diagnostic Table

| Symptom | Problem parts |
|---|--|
| Starter does not rotate when select lever is in "P" or "N"; starter rotates when select lever is in "R", "D", "3" or "2". | 1) Inhibitor switch 2) Select cable 3) Select lever 4) Starter motor and harness |
| Abnormal noise when select lever is in "P" or "N". | 1) Strainer 2) Duty solenoid C 3) Oil pump 4) Drive plate 5) ATF level too high or too low |
| Hissing noise occurs during standing start. | 1) Strainer 2) ATF level too high or too low |
| Noise occurs while driving in "D1". | 1) Final gear 2) Planetary gear 3) Reduction gear |
| Noise occurs while driving in "D2". | 4) Differential gear oil level too high or too low |
| Noise occurs while driving in "D3". | 1) Final gear 2) Low & reverse brake 3) Reduction gear 4) Differential gear oil level too high or too low |
| Noise occurs while driving in "D4". | 1) Final gear 2) Low & reverse brake 3) Planetary gear 4) Reduction gear 5) Differential gear oil level too high or too low |
| Engine stalls while shifting from one range to another. | 1) Control valve 2) Lock-up damper 3) Engine performance |
| Vehicle moves when select lever is in "N". | 1) Control unit 2) Inhibitor switch 3) Forward clutch |
| Shock occurs when select lever is moved from "N" to "D". | 1) Control module 2) Accumulator ("N" to "D") 3) Control valve 4) ATF deterioration 5) Dropping resistor |
| Excessive time lag occurs when select lever is moved from "N" to "D". | 1) Control module 2) Control valve 3) Forward clutch 4) Duty solenoid A 5) Forward clutch seal ring 6) Front gasket transmission case |
| Shock occurs when select lever is moved from "N" to "R". | 1) Control module 2) Accumulator (4A) 3) Control valve 4) ATF deterioration 5) Dropping resistor |
| Excessive time lag occurs when select lever is moved from "N" to "R". | 1) Control valve 2) Low & reverse clutch 3) Reverse clutch 4) Duty solenoid A 5) Forward clutch seal ring 6) Front gasket transmission case |
| Vehicle does not start in any shift range (engine stalls). | 1) Parking brake mechanism 2) Planetary gear |

| Symptom | Problem parts |
|--|--|
| Vehicle does not start in any shift range (engine revving up). | 1) Strainer 2) Duty solenoid A 3) Control valve 4) Drive pinion 5) Hypoid gear 6) Axle shaft 7) Differential gear 8) Oil pump 9) Input shaft 10) Output shaft 11) Planetary gear 12) Drive plate 13) ATF level too low 14) Front gasket transmission case |
| Vehicle does not start in "R" range only (engine revving up). | 1) Select cable 2) Select lever 3) Control valve 4) Low & reverse clutch 5) Reverse clutch |
| Vehicle does not start in "R" range only (engine stalls). | 1) Forward clutch 2) Band brake 3) Planetary gear 4) Parking brake mechanism |
| Vehicle does not start in "D", "3" or "2" range only (engine revving up). | 1) Forward clutch 2) One-way clutch (1-2) |
| Vehicle does not start in "D", "3", "2" or "1" range only (engine revving up). | 1) Forward clutch |
| Vehicle does not start in "D", "3", "2" or "1" range only (engine stalls). | 1) Reverse clutch |
| Vehicle starts in "R" range only (engine revving up). | 1) Control valve |
| Acceleration during standing starts is poor (high stall rpm). | 1) Control valve 2) Forward clutch 3) Reverse clutch 4) ATF level too low 5) Front gasket transmission case |
| Acceleration during standing starts is poor (low stall rpm). | 1) Oil pump 2) Torque converter one-way clutch 3) Engine performance |
| Acceleration is poor when select lever is in "D", "3" or "2" range (normal stall rpm). | 1) Control module 2) Control valve 3) High clutch 4) Brake band 5) Planetary gear |
| Acceleration is poor when select lever is in "R" (normal stall rpm). | 1) Control module 2) Overrunning clutch 3) High clutch 4) Brake band 5) Planetary gear |
| No shift occurs from 1st to 2nd gear. | 1) Control module 2) Vehicle speed sensor 1 3) Vehicle speed sensor 2 4) Throttle position sensor 5) Shift solenoid 1 6) Shift solenoid 2 7) Control valve 8) Brake band |

3-2 [T1000] AUTOMATIC TRANSMISSION AND DIFFERENTIAL

10. General Diagnostic Table

| Symptom | Problem parts |
|--|---|
| No shift occurs from 2nd to 3rd gear. | 1) Control module 2) Control valve 3) High clutch 4) One-way clutch (3-4) |
| No shift occurs from 3rd to 4th gear. | 1) Control module 2) Accumulator (3R) 3) ATF temperature sensor 4) Control valve 5) Band brake |
| Engine brake is not effected when select lever is in "3" range. | 1) Inhibitor switch 2) Control module 3) Throttle position sensor 4) Control valve 5) Shift solenoid 3 |
| Engine brake is not effected when select lever is in "3" or "2" range. | 1) Control valve 2) Overrunning clutch |
| Engine brake is not effected when select lever is in "1" range. | 1) Control valve 2) Low & reverse brake clutch |
| Shift characteristics are erroneous. | 1) Inhibitor switch 2) Control module 3) Vehicle speed sensor 1 4) Vehicle speed sensor 2 5) Throttle position sensor 6) Control valve |
| No lock-up occurs. | 1) Control module 2) Throttle position sensor 3) ATF temperature sensor 4) Control valve 5) Lock-up facing 6) Engine speed signal |
| Parking brake is not effected. | 1) Select cable 2) Select lever 3) Parking mechanism |
| Shift lever cannot be moved or is hard to move from "P" range. | 1) ATF level too high |
| ATF spurts out. | 1) Differential gear oil too high |
| Differential oil spurts out. | 1) Seal pipe 2) Double oil seal |
| Differential oil level changes excessively. | 1) Transfer clutch 2) Forward clutch 3) Overrunning clutch 4) High clutch 5) Band brake 6) Low & reverse clutch 7) Reverse clutch 8) Lock-up facing 9) ATF deterioration |
| Odor is produced from ATF supply pipe. | 1) Control module 2) Throttle position sensor 3) Accumulator (2A) 4) ATF temperature sensor 5) Duty solenoid A 6) Control valve 7) Band brake 8) ATF deterioration 9) Engine performance 10) Dropping resistor |
| Shock occurs from 1st to 2nd gear. | 1) Control module 2) Throttle position sensor 3) Accumulator (2A) 4) ATF temperature sensor 5) Duty solenoid A 6) Control valve 7) Band brake 8) ATF deterioration 9) Engine performance 10) Dropping resistor |

| Symptom | Problem parts |
|--|--|
| Slippage occurs from 1st to 2nd gear. | 1) Control module 2) Throttle position sensor 3) Accumulator (2A) 4) ATF temperature sensor 5) Duty solenoid A 6) Control valve 7) Band brake |
| Shock occurs from 2nd to 3rd gear. | 1) Control module 2) Throttle position sensor 3) Accumulator (3R) 4) ATF temperature sensor 5) Duty solenoid A 6) Control valve 7) High clutch 8) Band brake 9) ATF deterioration 10) Engine performance 11) Dropping resistor |
| Slippage occurs from 2nd to 3rd gear. | 1) Control module 2) Throttle position sensor 3) Accumulator (3R) 4) ATF temperature sensor 5) Duty solenoid A 6) Control valve 7) High clutch 8) Band brake |
| Shock occurs from 3rd to 4th gear. | 1) Control module 2) Throttle position sensor 3) Accumulator 4) ATF temperature sensor 5) Duty solenoid A 6) Control valve 7) Overrunning clutch 8) Band brake 9) ATF deterioration 10) Engine performance |
| Slippage occurs from 3rd to 4th gear. | 1) Control module 2) Throttle position sensor 3) Accumulator 4) ATF temperature sensor 5) Duty solenoid A 6) Control valve 7) Band brake |
| Shock occurs when select lever is moved from "3" to "2" range. | 1) Control module 2) Throttle position sensor 3) ATF temperature sensor 4) Duty solenoid A 5) Control valve 6) Overrunning clutch 7) Band brake 8) ATF deterioration |
| Shock occurs when select lever is moved from "D" to "1" range. | 1) Control module 2) Throttle position sensor 3) ATF temperature sensor 4) Duty solenoid A 5) Control valve 6) ATF deterioration 7) Low & reverse brake |

3-2 [T1000] AUTOMATIC TRANSMISSION AND DIFFERENTIAL

10. General Diagnostic Table

| Symptom | Problem parts |
|--|--|
| Shock occurs when select lever is moved from "2" to "1" range. | 1) Control module 2) Throttle position sensor 3) ATF temperature sensor 4) Duty solenoid A 5) Control valve 6) Low & reverse clutch 7) ATF deterioration |
| Shock occurs when accelerator pedal is released at medium speeds. | 1) Control module 2) Throttle position sensor 3) ATF temperature sensor 4) Duty solenoid A 5) Control valve 6) Lock-up damper 7) Engine performance |
| Vibration occurs during straight-forward operation. | 1) Control module 2) Duty solenoid B 3) Lock-up facing 4) Lock-up damper |
| Vibration occurs during turns (tight corner "braking" phenomenon). | 1) Control module 2) Vehicle speed sensor 1 3) Vehicle speed sensor 2 4) Throttle position sensor 5) ATF temperature sensor 6) Transfer clutch 7) Transfer valve 8) Duty solenoid C 9) ATF deterioration |
| Front wheel slippage occurs during standing starts. | 1) Control module 2) Vehicle speed sensor 2 3) FWD switch 4) Throttle position sensor 5) ATF temperature sensor 6) Control valve 7) Transfer clutch 8) Transfer valve 9) Transfer pipe 10) Duty solenoid C 11) Transfer clutch hub |
| Vehicle is not set in FWD mode. | 1) Control module 2) FWD switch 3) Transfer clutch 4) Transfer valve 5) Duty solenoid C |
| Select lever is hard to move. | 1) Select cable 2) Select lever 3) Detent spring 4) Manual plate |
| Select lever is too high to move (unreasonable resistance). | 1) Detent spring 2) Manual plate |
| Select lever slips out of operation during acceleration or while driving on rough terrain. | 1) Select cable 2) Select lever 3) Detent spring 4) Manual plate |