5. Diagnostic Chart with Trouble Code

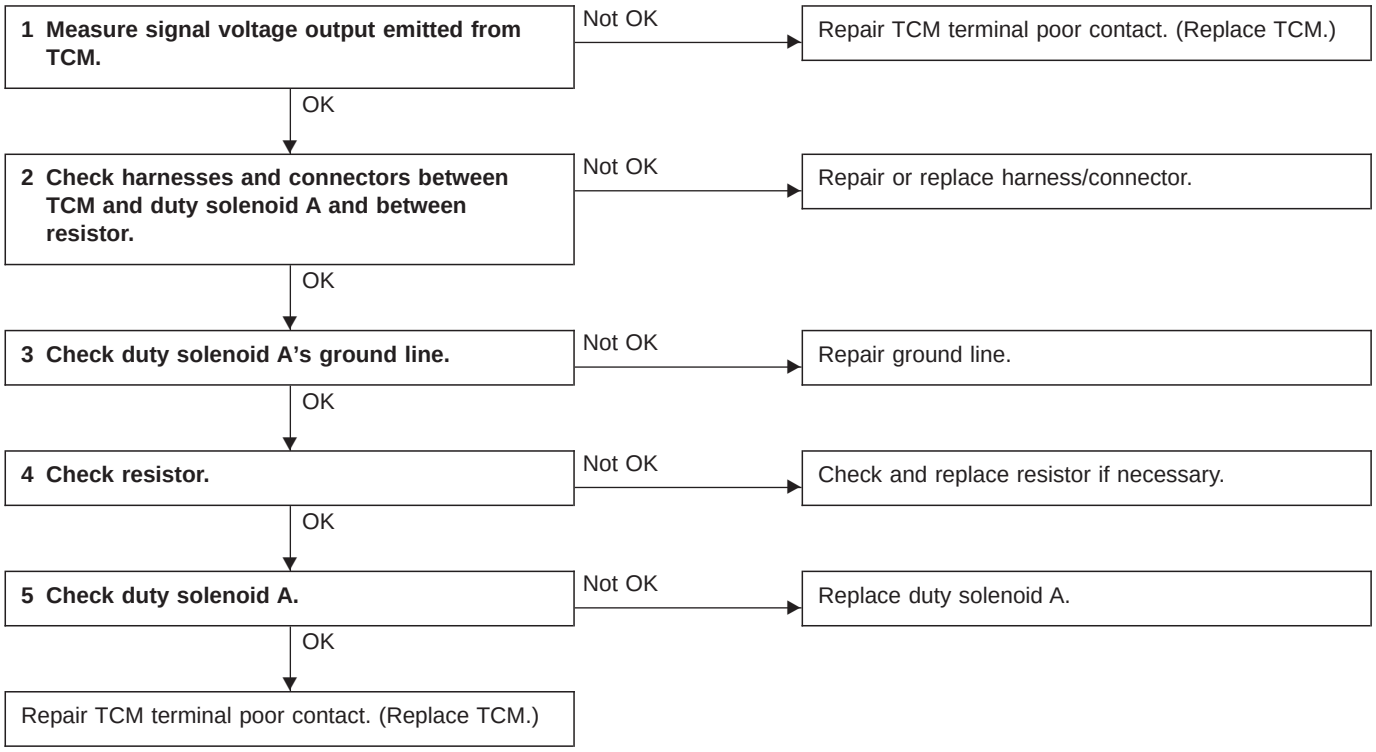
A: TROUBLE CODE 11 — DUTY SOLENOID A —

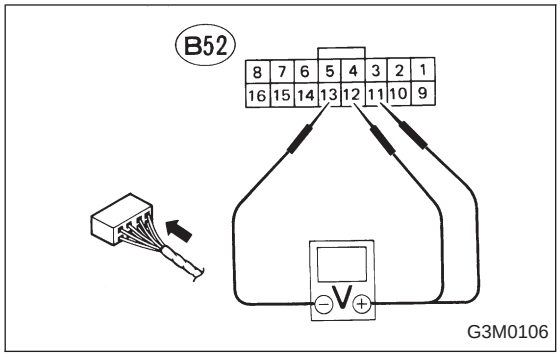
DIAGNOSIS:

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

TROUBLE SYMPTOM:

Excessive shift shock





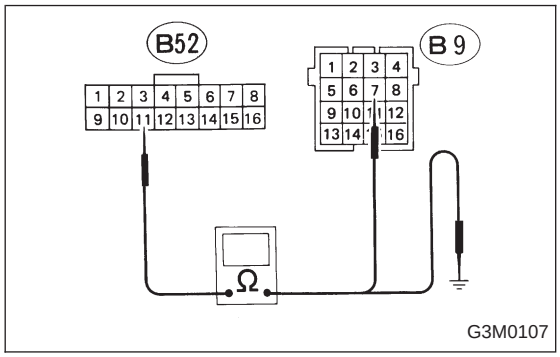
1. MEASURE SIGNAL VOLTAGE OUTPUT EMITTED FROM TCM.

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

Connector & terminal / Specified resistance:
(B52) No. 11 — No. 13 /
1.5 — 4.0 V (Throttle is fully closed.)
0.5 V, max. (Throttle is fully open.)
(B52) No. 12 — No.13 /
8.5 V, min. (Throttle is fully closed.)
0.5 V, max. (Throttle is fully open.)

● **SELECT MONITOR FUNCTION MODE**

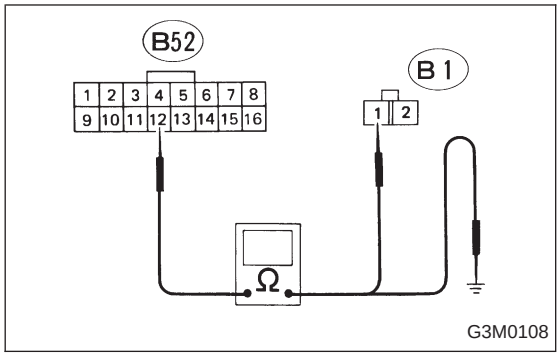
Mode: F11
Condition:
Ignition switch ON (Engine OFF) N range
Specified data:
PLDTY F11
Less than 25% (Throttle is fully open.)
100% (Throttle is fully closed.)



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

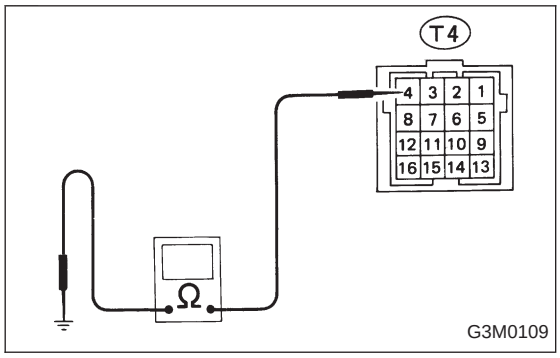
1) Disconnect connector from TCM.
2) Disconnect connector from transmission.
3) Disconnect connector from resistor.
4) Measure resistance between TCM connector and transmission and between TCM connector and body.

Connector & terminal / Specified resistance:
(B52) No. 11 — (B9) No. 7 / 1 Ω, max.
(B52) No. 11 — Body / 1 MΩ, min.



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

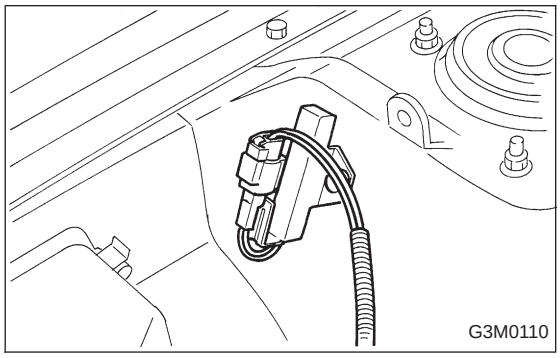
Connector & terminal / Specified resistance:
(B52) No. 12 — (B1) No. 1 / 1 Ω, max.
(B52) No. 12 — Body / 1 MΩ, min.



3. CHECK DUTY SOLENOID A'S GROUND LINE.

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

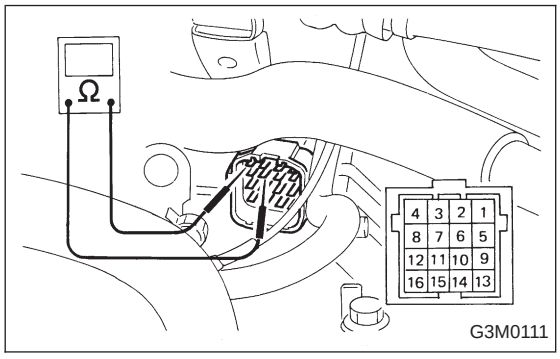
Connector & terminal / Specified resistance:
(T4) No. 4 — Transmission / 1 Ω, max.



4. CHECK RESISTOR.

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

Specified resistance:
9 — 15 Ω



5. CHECK DUTY SOLENOID A.

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

Connector & terminal / Specified resistance:
(T4) No. 7 — No. 4 / 2.0 — 4.5 Ω

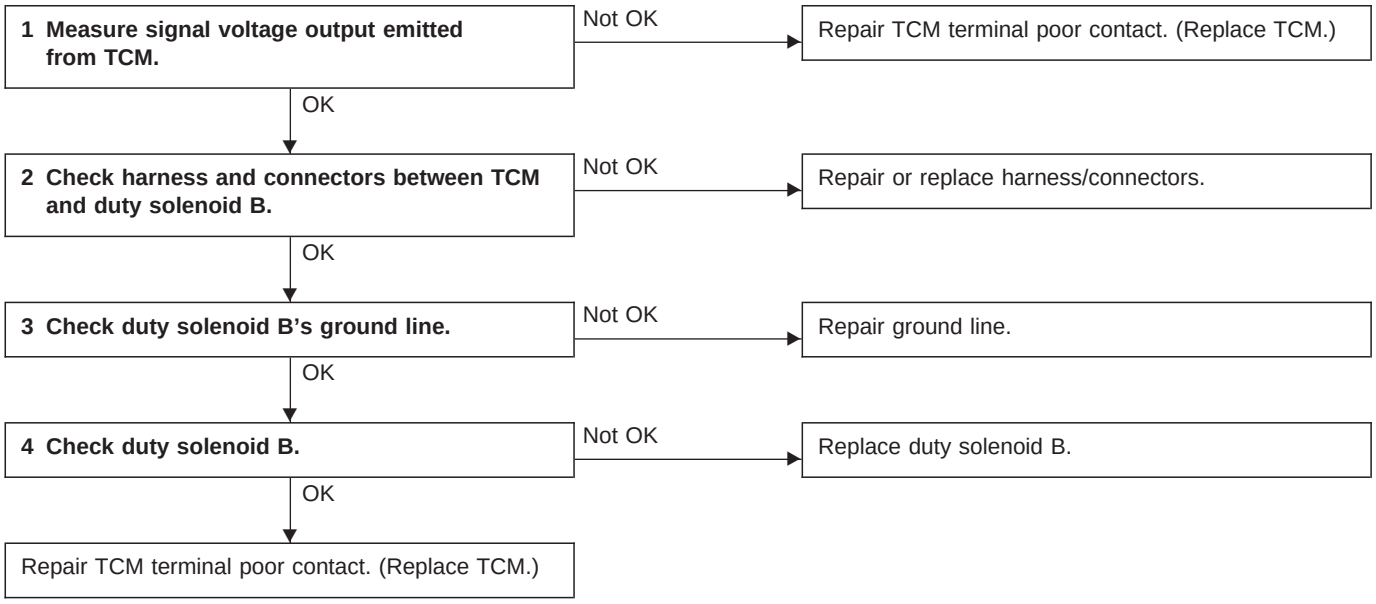
B: TROUBLE CODE 12 — DUTY SOLENOID B —

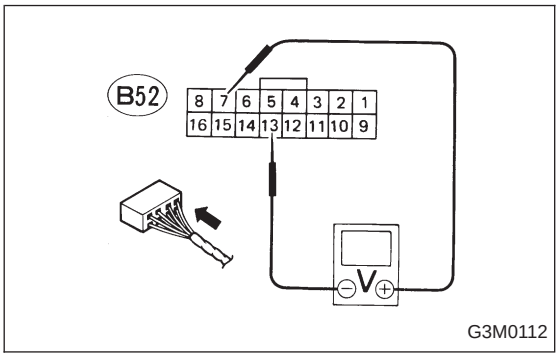
DIAGNOSIS:

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

TROUBLE SYMPTOM:

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





1. MEASURE SIGNAL VOLTAGE OUTPUT EMITTED FROM TCM.

1) Raise vehicle and support with safety stands.

CAUTION:

On AWD models, raise all wheels off ground.

2) Warm-up the engine and transmission.

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

Connector & terminal / Specified voltage:

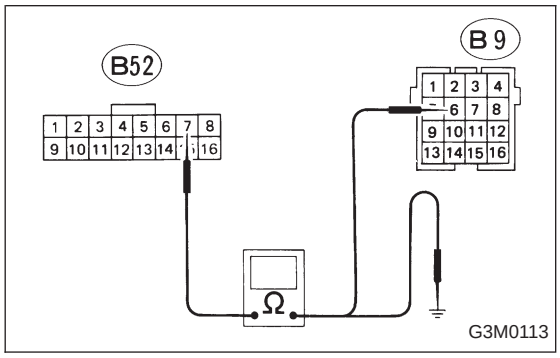
(B52) No. 7 — No. 13 / 8.5 V, min. (when wheels are locked-up.)

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

Connector & terminal / Specified voltage:
(B33) No. 7 — No. 13 / 0.5 V, max.

- **SELECT MONITOR FUNCTION MODE**

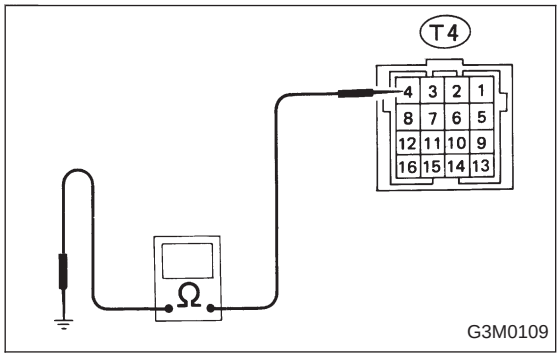
Mode: F12
Condition:
Start the engine and increase vehicle speed to 75 km/h (47 MPH). When wheels are locked-up:
Specified data:
LUDTY F12
95% (Wheel locked-up)
5% (Release)



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

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

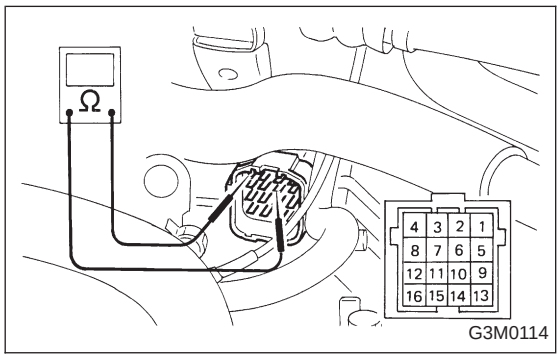
Connector & terminal / Specified resistance:
(B52) No. 7 — (B9) No. 6 / 1 Ω, max.
(B52) No. 7 — Body / 1 MΩ, min.



3. CHECK DUTY SOLENOID B'S GROUND LINE.

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

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



4. CHECK DUTY SOLENOID B.

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

Connector & terminal / Specified resistance:
(T4) No. 6 — No. 4 / 10 — 17 Ω

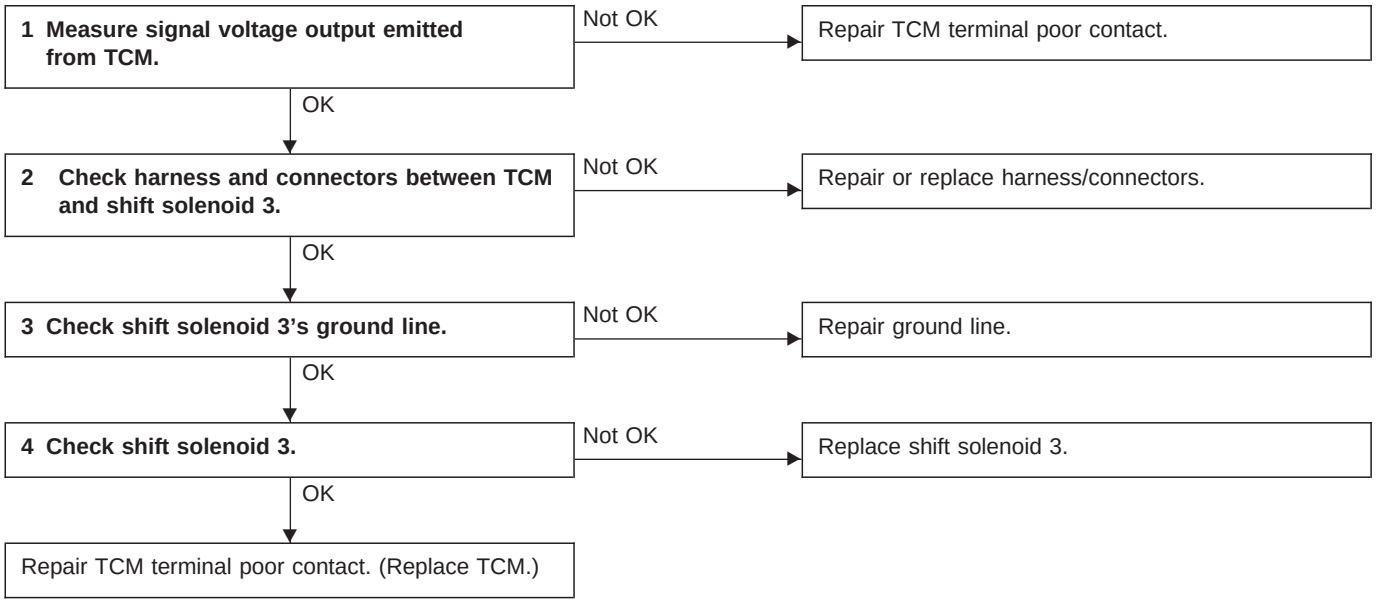
C: TROUBLE CODE 13 — SHIFT SOLENOID 3 —

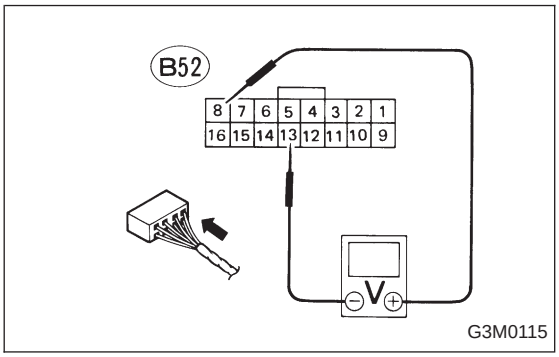
DIAGNOSIS:

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

TROUBLE SYMPTOM:

Ineffective engine brake with shift lever in “3”





1. MEASURE SIGNAL VOLTAGE OUTPUT EMITTED FROM TCM.

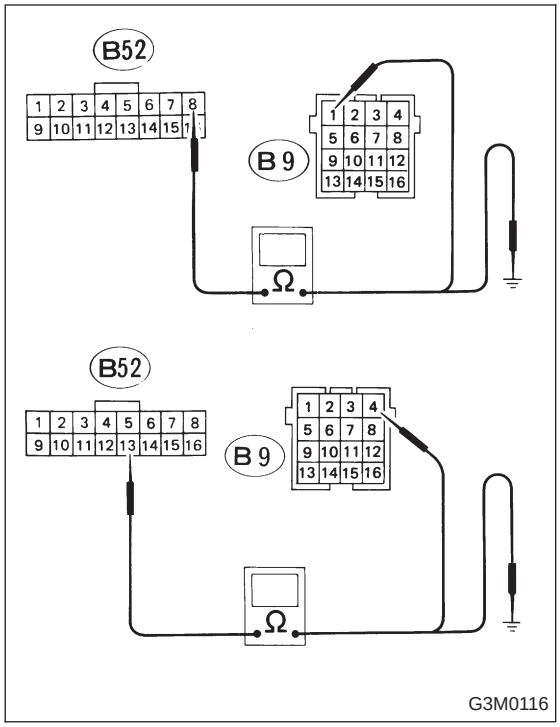
1) Raise vehicle and support with safety stands.

CAUTION:

On AWD models, raise all wheels off ground.

2) Warm-up the engine and transmission.
3) Move shift lever to “D”.
4) Measure signal voltage output emitted from TCM while idling the engine.

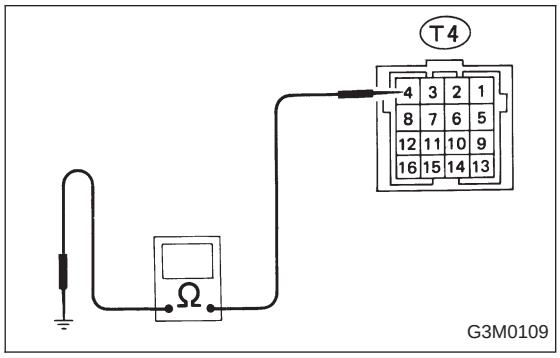
Connector & terminal / Specified voltage:
(B52) No. 8 — No. 13 / 9 V, min.



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

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

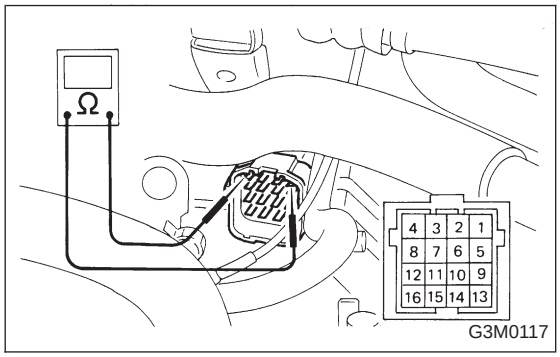
Connector & terminal / Specified resistance:
(B52) No. 8 — (B9) No. 1 / 1 Ω, max.
(B52) No. 8 — Body/ 1 MΩ, min.
(B52) No. 13 — (B9) No. 4 / 1 Ω, max.
(B52) No. 13 — Body / 1 MΩ, min.



3. CHECK SHIFT SOLENOID 3'S GROUNDING LINE.

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

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



4. CHECK SHIFT SOLENOID 3.

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

Connector & terminal / Specified resistance:
(T4) No. 1 — No. 4 / 20 — 30 Ω

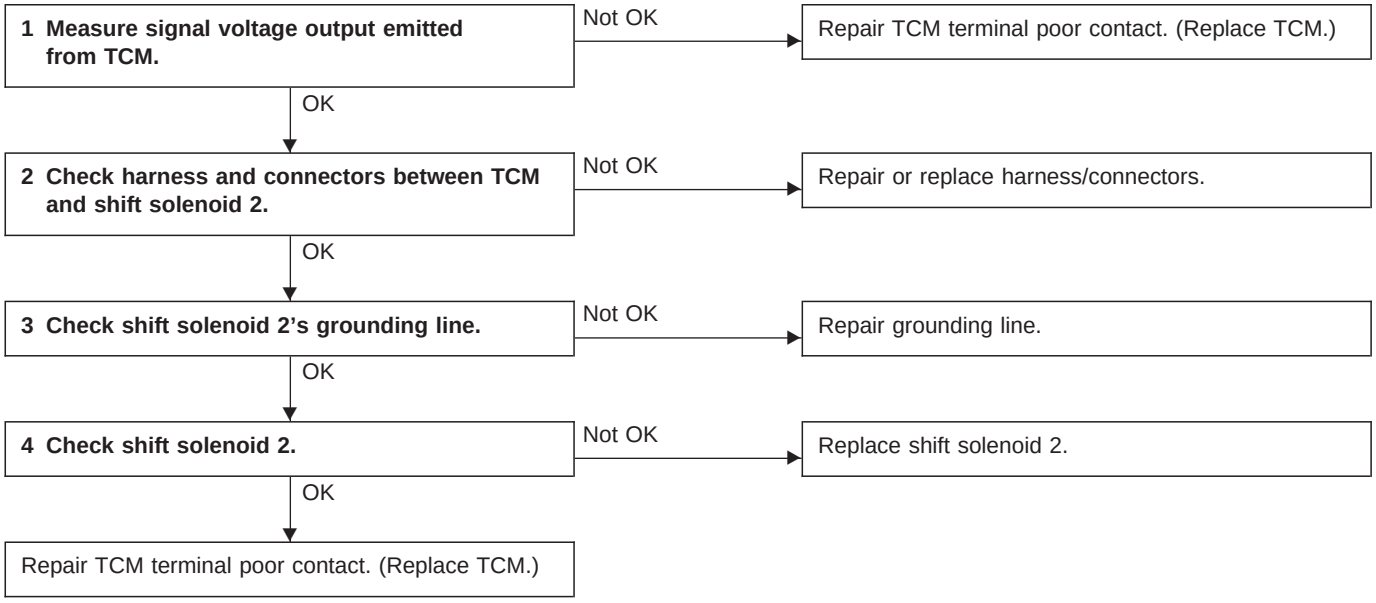
D: TROUBLE CODE 14 — SHIFT SOLENOID 2 —

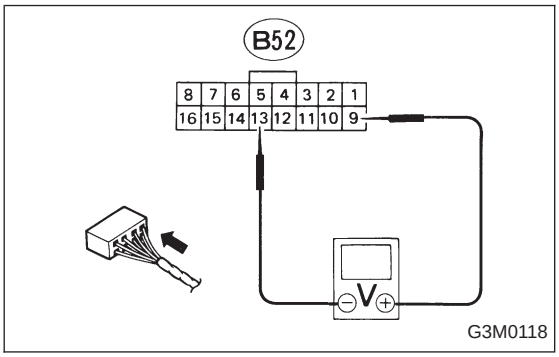
DIAGNOSIS:

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

TROUBLE SYMPTOM:

No shift





1. MEASURE SIGNAL VOLTAGE OUTPUT EMITTED FROM TCM.

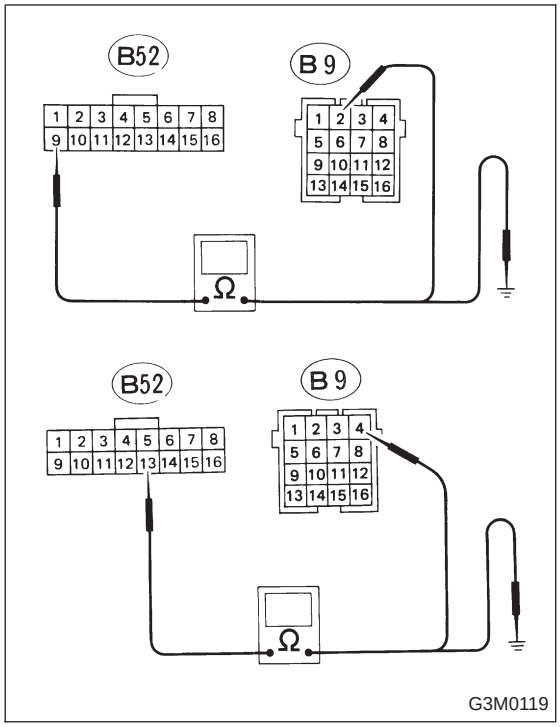
1) Raise vehicle and support with safety stands.

CAUTION:

On AWD models, raise all wheels off ground.

2) Warm-up the engine and transmission.
3) Move shift lever to "D".
4) Measure signal voltage output emitted from TCM while idling the engine.

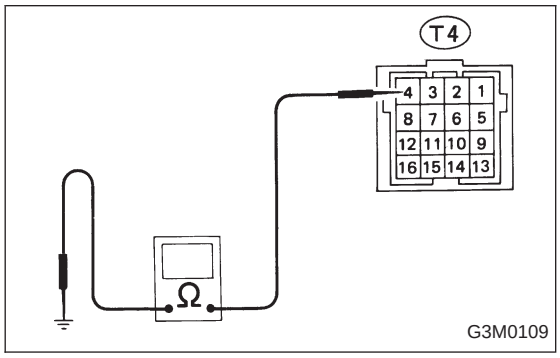
Connector & terminal / Specified voltage:
(B52) No. 9 — No. 13 / 9 V, min.



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

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

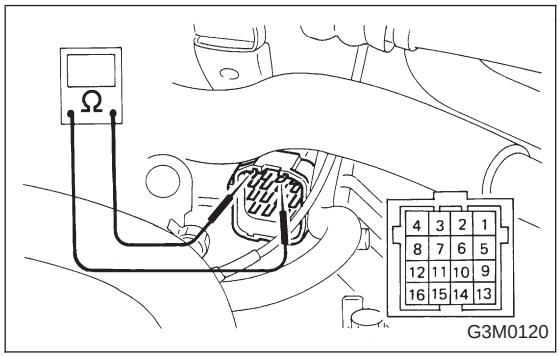
Connector & terminal / Specified resistance:
(B52) No. 9 — (B9) No. 2 / 1 Ω, max.
(B52) No. 9 — Body / 1 MΩ, min.
(B52) No. 13 — (B9) No. 4 / 1 Ω, max.
(B52) No. 13 — Body / 1 MΩ, min.



3. CHECK SHIFT SOLENOID 2'S GROUNDING LINE.

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

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



4. CHECK SHIFT SOLENOID 2.

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

Connector & terminal / Specified resistance:
(T4) No. 2 — No. 4 / 20 — 30 Ω

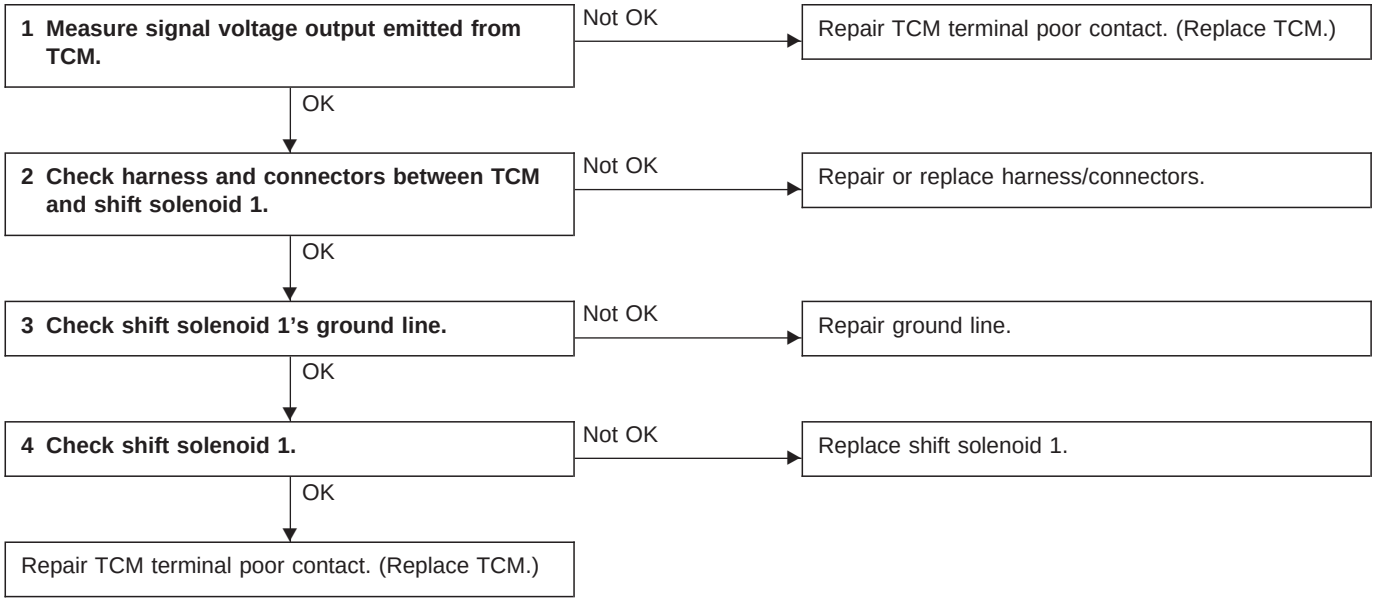
E: TROUBLE CODE 15 — SHIFT SOLENOID 1 —

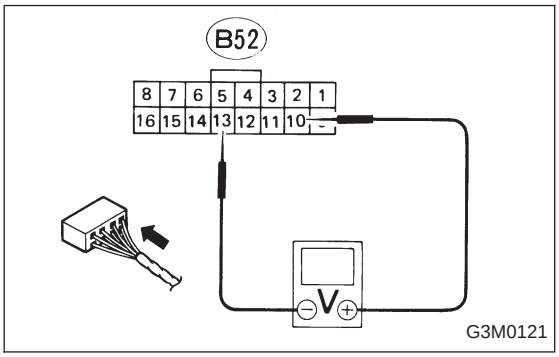
DIAGNOSIS:

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

TROUBLE SYMPTOM:

No shift





1. MEASURE SIGNAL VOLTAGE OUTPUT EMITTED FROM TCM.

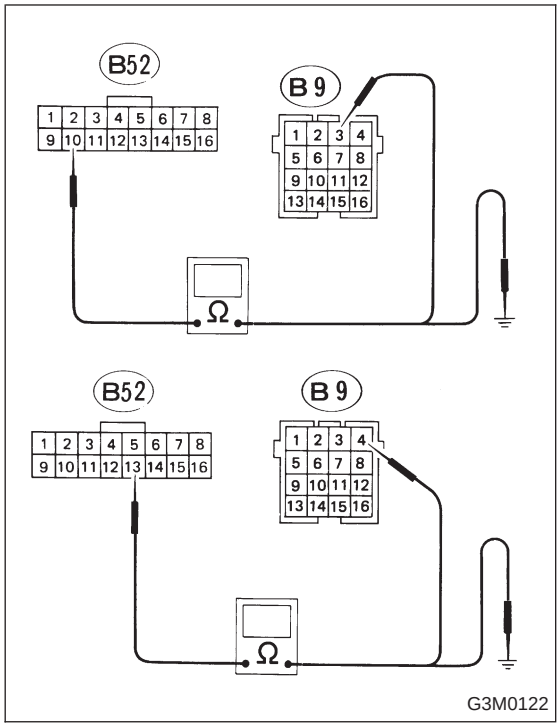
1) Raise vehicle and support with safety stands.

CAUTION:

On AWD models, raise all wheels off ground.

2) Warm-up the engine and transmission.
3) Move shift lever to "D".
4) Measure signal voltage output emitted from TCM while idling the engine.

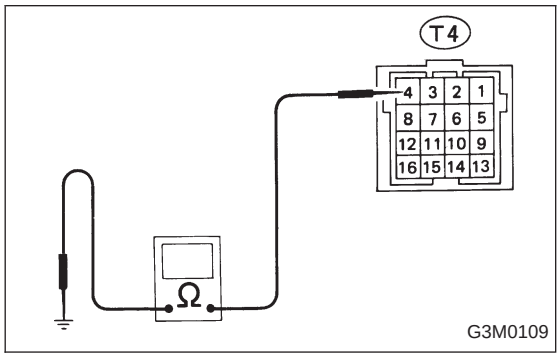
Connector & terminal / Specified voltage:
(B52) No. 10 — No. 13 / 9 V, min.



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

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

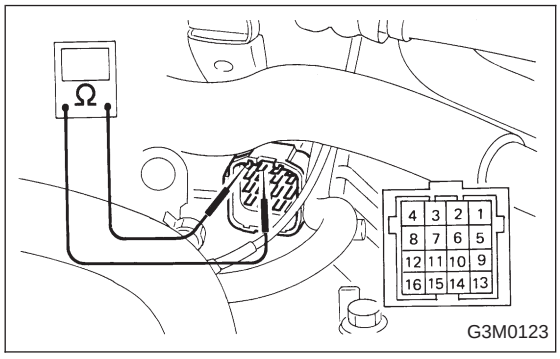
Connector & terminal / Specified resistance:
(B52) No. 10 — (B9) No. 3 / 1 Ω, max.
(B52) No. 10 — Body / 1 MΩ, min.
(B52) No. 13 — (B9) No. 4 / 1 Ω, max.
(B52) No. 13 — Body / 1 MΩ, min.



3. CHECK SHIFT SOLENOID 1'S GROUND LINE.

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

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



4. CHECK SHIFT SOLENOID 1.

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

Connector & terminal / Specified resistance:
(T4) No. 3 — No. 4 / 20 — 30 Ω

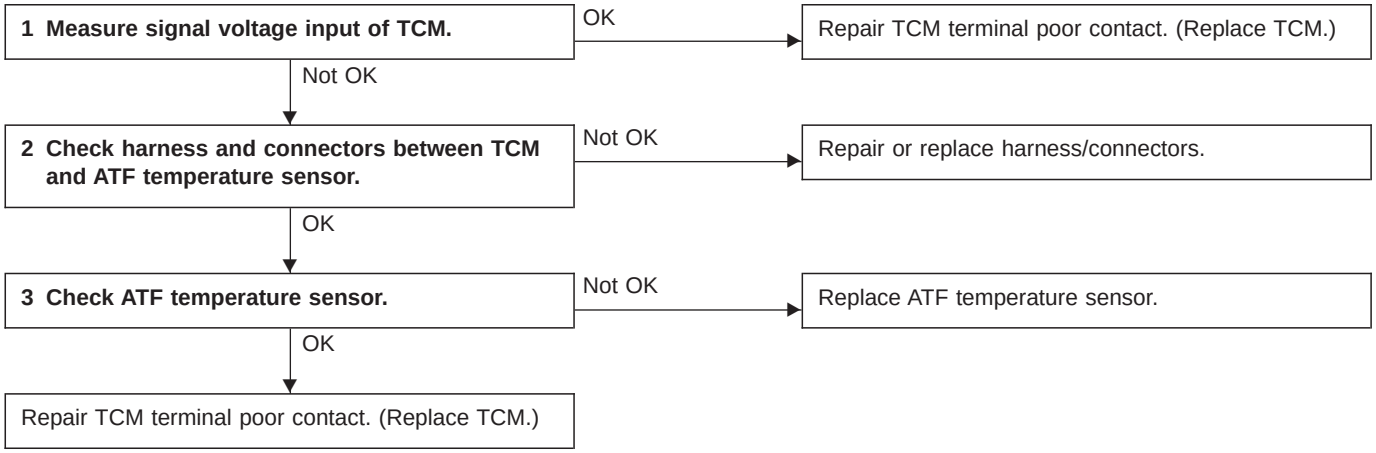
F: TROUBLE CODE 21 — ATF TEMPERATURE SENSOR —

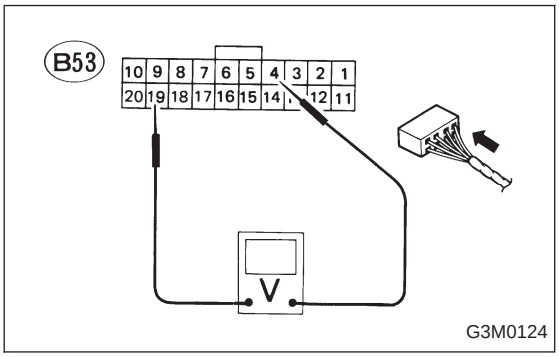
DIAGNOSIS:

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

TROUBLE SYMPTOM:

Excessive shift shock





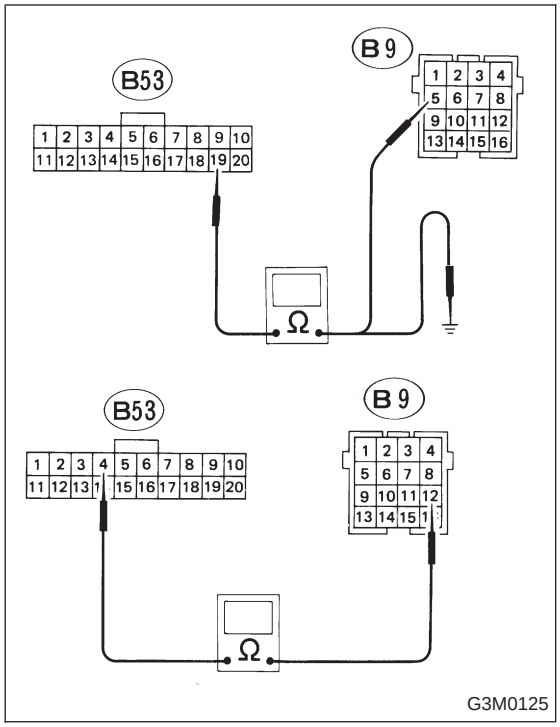
1. MEASURE SIGNAL VOLTAGE INPUT OF TCM.

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

Connector & terminal / Specified voltage:
(B53) No. 19 — No. 4 /
2.9 — 4.0 V [ATF temperature: 20°C (68°F)]
1.0 — 1.4 V [ATF temperature: 80°C (176°F)]

- **SELECT MONITOR FUNCTION MODE**

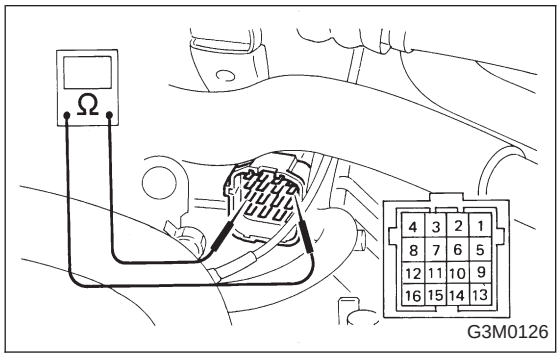
Mode: F08 or F07
Condition:
Warm-up the engine to increase ATF temperature.
Specified data:
ATFT F08 or F07
(Temperature shown on display increases.)



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

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

Connector & terminal / Specified resistance:
(B53) No. 19 — (B9) No. 5 / 1 Ω, max.
(B53) No. 19 — Body / 1 MΩ, min.
(B53) No. 4 — (B9) No. 12 / 1 Ω, max.



3. CHECK ATF TEMPERATURE SENSOR.

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

Connector & terminal / Specified resistance:
(T4) No. 5 — No. 12 /
2.1 — 2.9 kΩ [ATF temperature: 20°C (68°F)]

3) Connect connector to transmission, and warm-up the engine to increase ATF temperature.
4) Stop the engine and disconnect connector from transmission.
5) Measure resistance between transmission connector receptacle's terminals.

Connector & terminal / Specified resistance:
(T4) No. 5 — No. 12 /
275 — 375 Ω [ATF temperature: 80°C (176°F)]

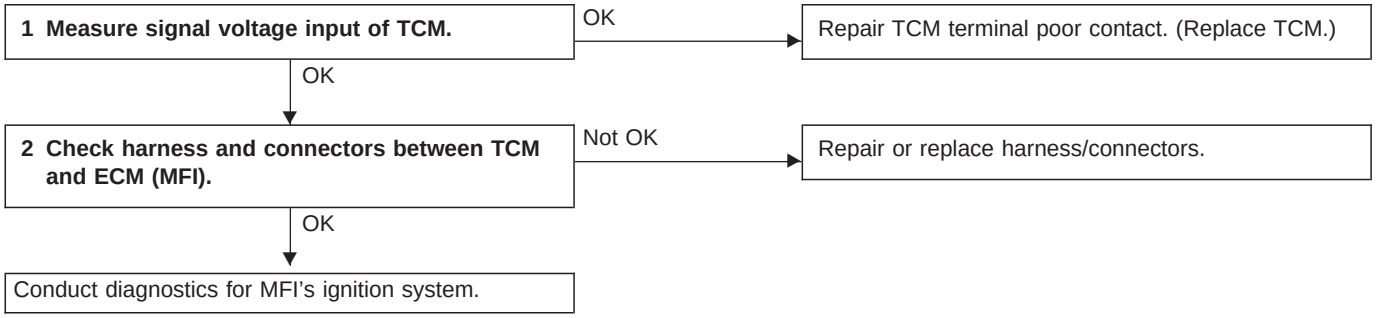
G: TROUBLE CODE 23 — ENGINE SPEED SIGNAL —

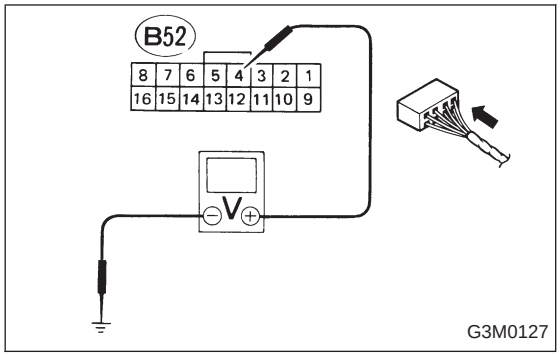
DIAGNOSIS:

Engine speed input signal circuit is open or shorted.

TROUBLE SYMPTOM:

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





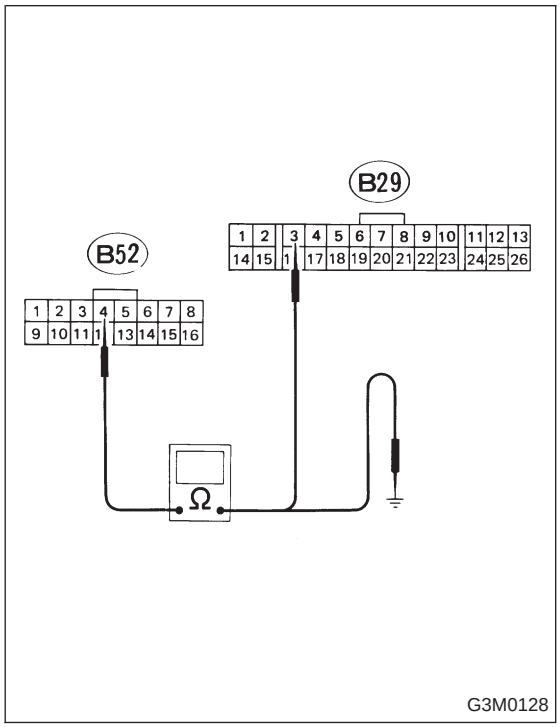
1. MEASURE SIGNAL VOLTAGE INPUT OF TCM.

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

Connector & terminal / Specified voltage:
(B52) No. 4 — Body / 10.5 V, min.

● SELECT MONITOR FUNCTION MODE

Mode: F06
Condition:
After warming-up the engine
Specified data: EREV F06
(Engine speed is shown in rpm.)



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

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

Connector & terminal / Specified resistance:
(B52) No. 4 — (B29) No. 3 / 1 Ω, max.
(B52) No. 4 — Body / 1 MΩ, min.

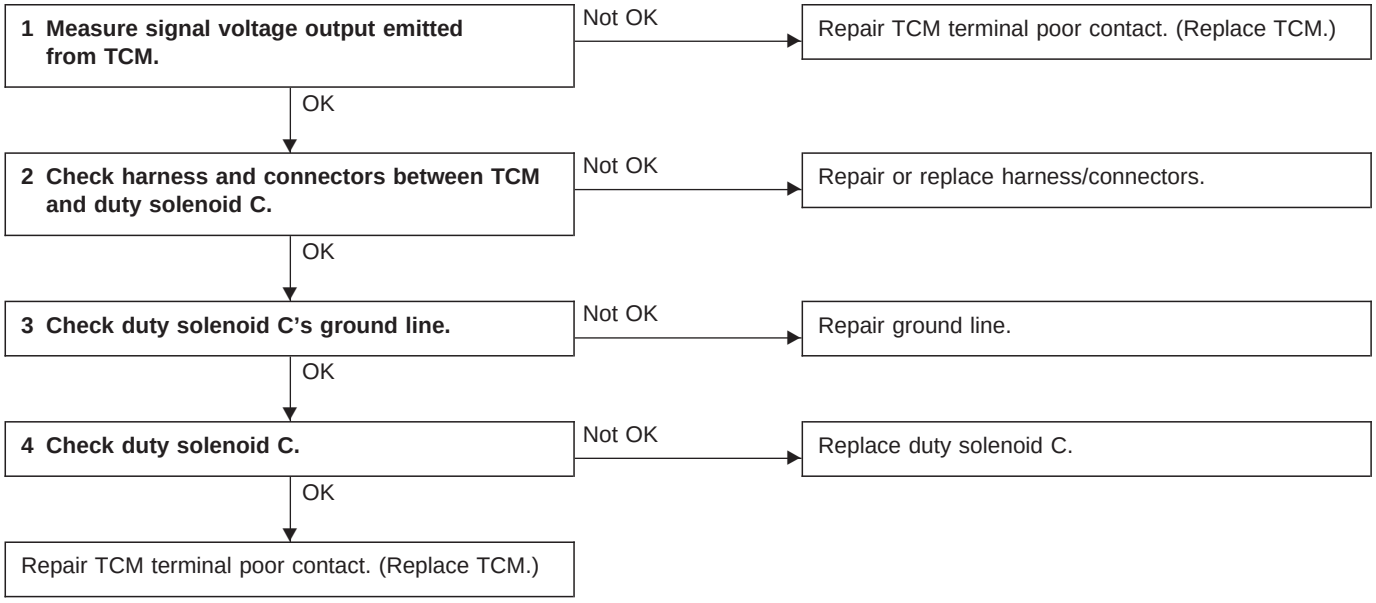
H: TROUBLE CODE 24 — DUTY SOLENOID C —

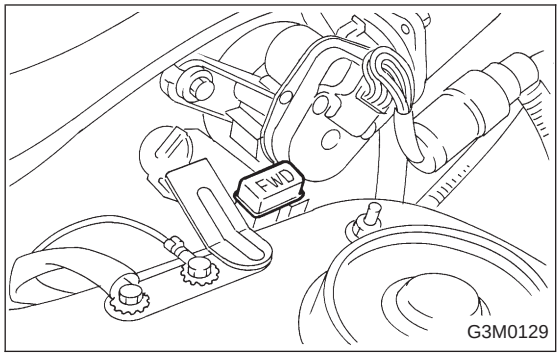
DIAGNOSIS:

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

TROUBLE SYMPTOM:

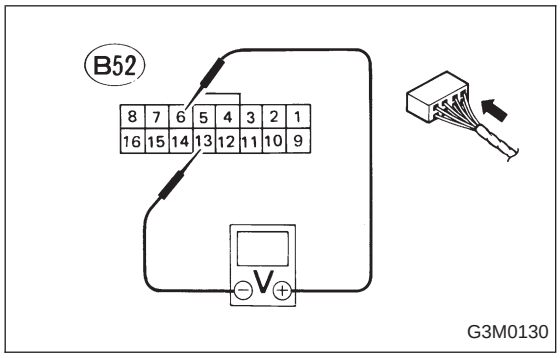
Excessive “braking” in tight corners





1. MEASURE SIGNAL VOLTAGE OUTPUT EMITTED FROM TCM.

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



2) Turn ignition switch ON (with engine OFF).
3) Move select lever to “D”.
4) Measure voltage output emitted from TCM (with accelerator pedal released).

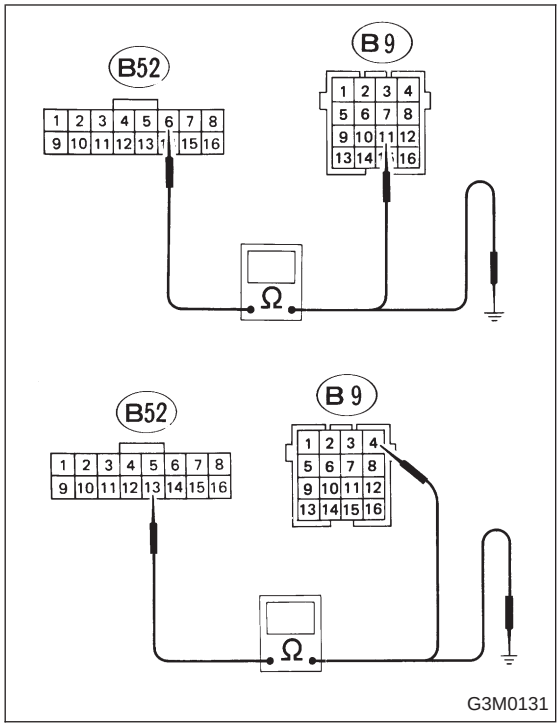
Connector & terminal / Specified voltage:
(B52) No. 6 — No. 13 / 8.5 V, min.

5) Turn ignition switch OFF.
6) Remove spare fuse from FWD switch.
7) Turn ignition switch ON (with engine OFF).
8) Move select lever to “D”.
9) Measure voltage output emitted from TCM (with accelerator pedal fully depressed).

Connector & terminal / Specified voltage:
(B52) No. 6 — No. 13 / 0.5 V, max.

● **SELECT MONITOR FUNCTION MODE**

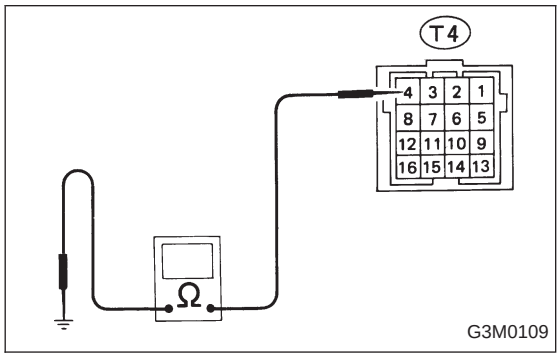
Mode: F13
Condition:
Ignition switch ON (Engine OFF)
Specified data:
4WDTY F13
95% (FWD mode)
25%, max. (AWD mode, D-range, full throttle)



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

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

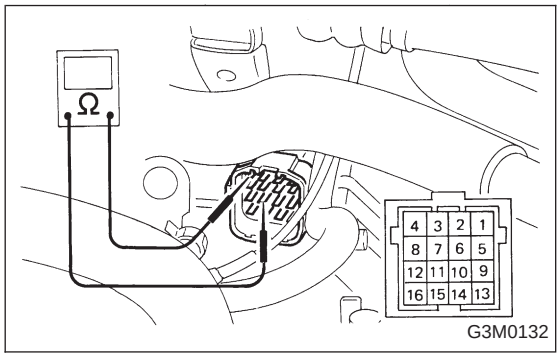
Connector & terminal / Specified resistance:
(B52) No. 6 — (B9) No. 11 / 1 Ω, max.
(B52) No. 6 — Body / 1 MΩ, min.
(B52) No. 13 — (B9) No. 4 / 1 Ω, max
(B52) No. 13 — Body / 1 MΩ, min.



3. CHECK DUTY SOLENOID C'S GROUND LINE.

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

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



4. CHECK DUTY SOLENOID C.

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

Connector & terminal / Specified resistance:
(T4) No. 11 — No. 4 / 10 — 17 Ω

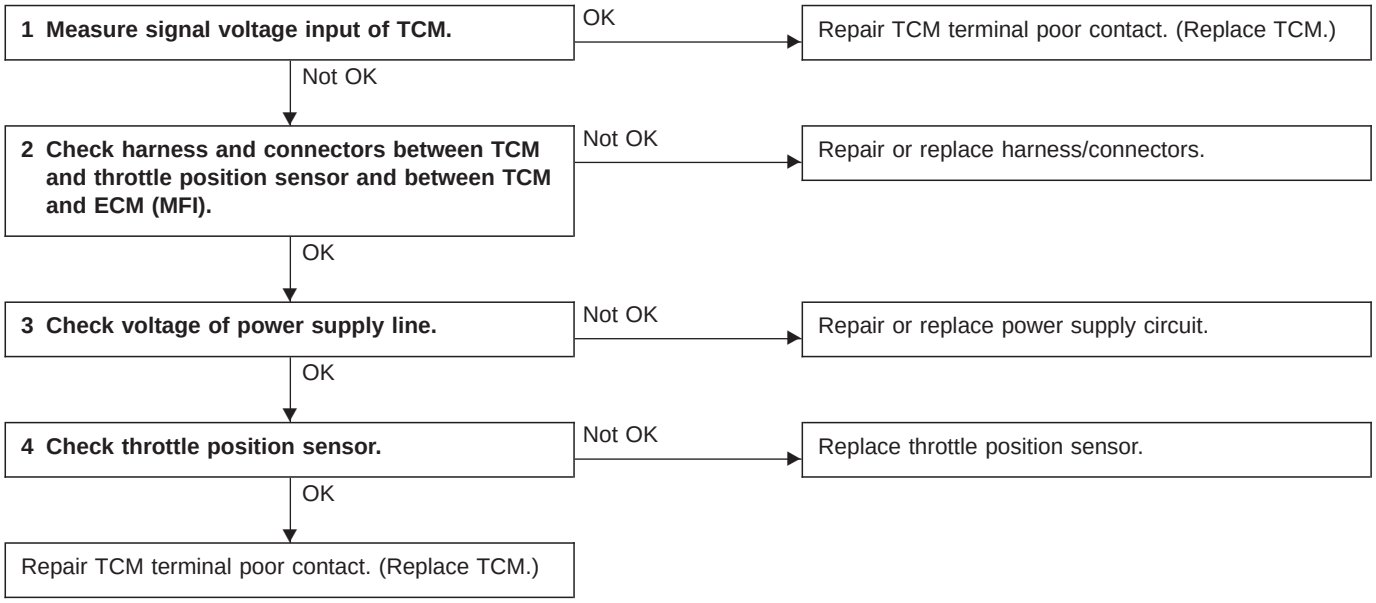
I: TROUBLE CODE 31 — THROTTLE POSITION SENSOR —

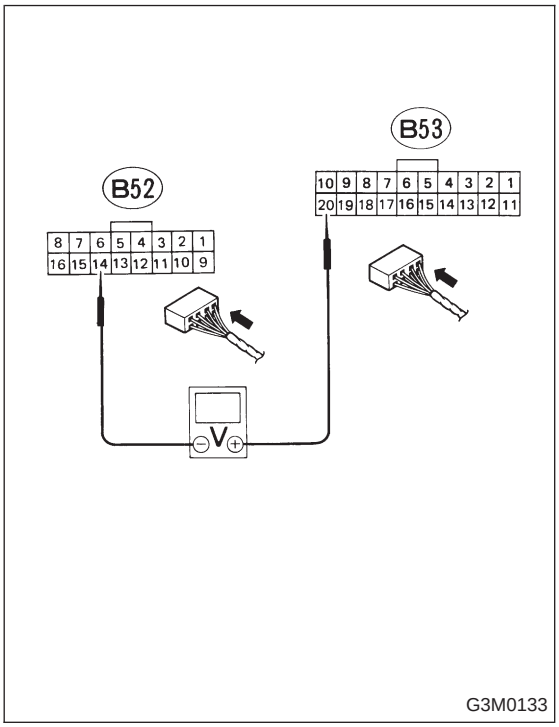
DIAGNOSIS:

Input signal circuit of throttle position sensor is open or shorted.

TROUBLE SYMPTOM:

Shift point too high or too low; engine brake not effected in “3”
range; excessive shift shock; excessive tight corner “braking”





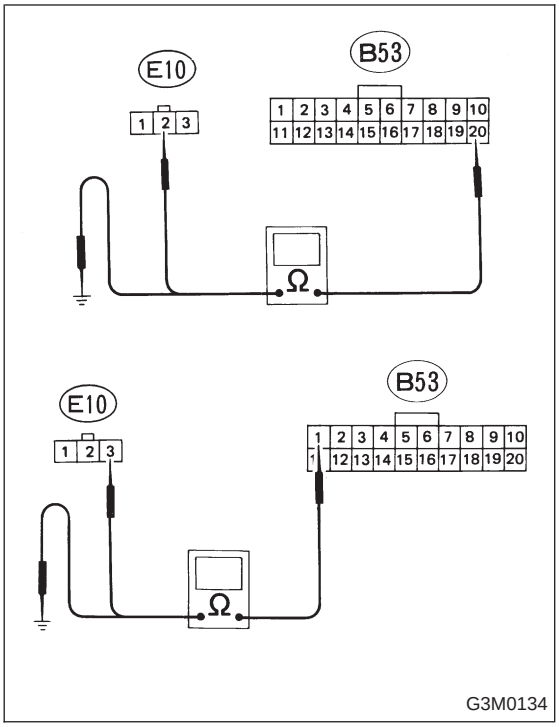
1. MEASURE SIGNAL VOLTAGE INPUT OF TCM.

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

Connector & terminal / Specified voltage:
(B53) No. 20 — (B52) No. 14 /
0.3 — 0.7 V (Throttle fully closed.)
3.9 — 4.3 V (Throttle fully open.)

- **SELECT MONITOR FUNCTION MODE**

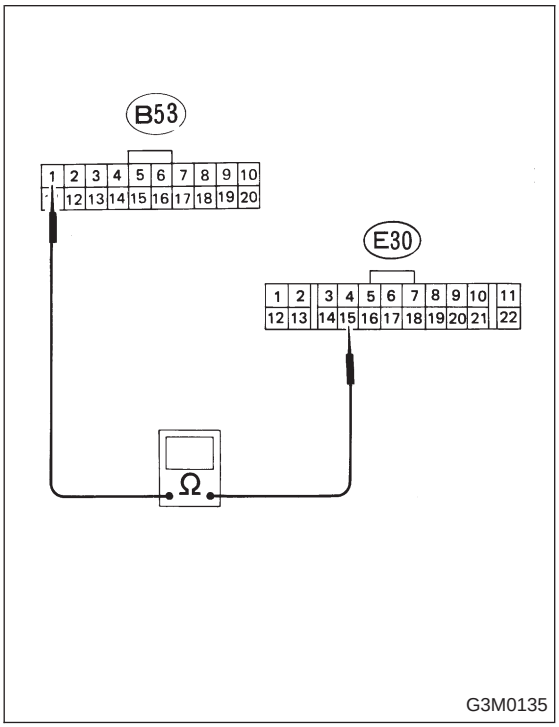
Mode: F09
Condition:
Ignition switch ON (Engine OFF)
Specified data:
THV F09
0.3 — 0.7 V (Throttle fully closed.)
3.9 — 4.3 V (Throttle fully open.)
[Must be changed correspondingly with accelerator pedal operation (from “released” to “depressed” position).]



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

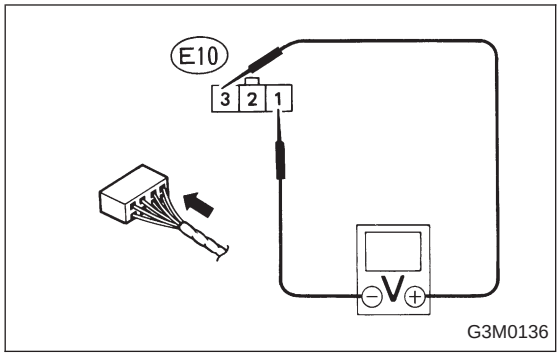
1) Disconnect connector from TCM.
2) Disconnect connector from ECM (MFI).
3) Disconnect connector from throttle position sensor.
4) Measure resistance between TCM and throttle position sensor connectors.

Connector & terminal / Specified resistance:
(B53) No. 20 — (E10) No. 2 / 1 Ω, max.
(B53) No. 20 — Body / 1 MΩ, min.
(B53) No. 1 — (E10) No. 3 / 1 Ω, max.
(B53) No. 1 — Body /1 MΩ, min.



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

Connector & terminal / Specified resistance:
(B53) No. 1 — (E30) No. 15 / 1 Ω, max.



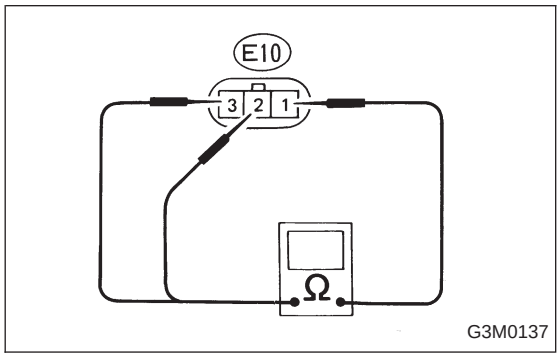
3. CHECK VOLTAGE OF POWER SUPPLY LINE.

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

Connector & terminal / Specified voltage:
(E10) No. 3 — No. 1 / 4.8 — 5.3 V

- **SELECT MONITOR FUNCTION MODE**

Mode: F14
Condition:
Ignition switch ON (Engine OFF)
Specified data:
THVCC F14
4.8 — 5.3 V
(Throttle position sensor power supply voltage is indicated.)



4. CHECK THROTTLE POSITION SENSOR.

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

Terminal / Specified resistance:
(E10) No. 1 — No. 2 /
500 Ω (Throttle fully closed.)
4 — 4.5 kΩ (Throttle fully open.)
(E10) No. 1 — No. 3 / 5 kΩ

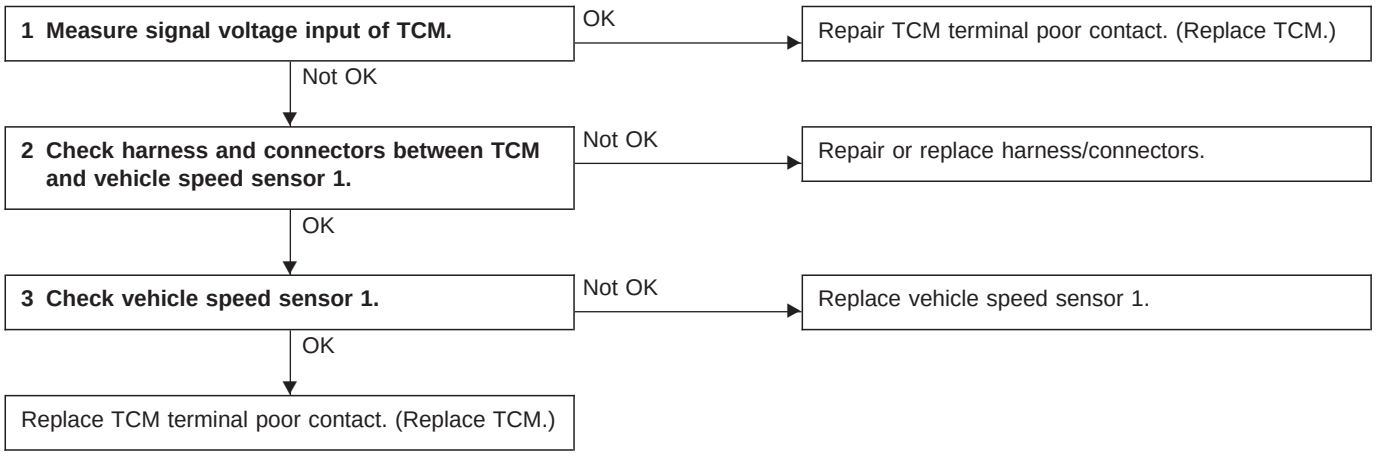
J: TROUBLE CODE 32 — VEHICLE SPEED SENSOR 1 —

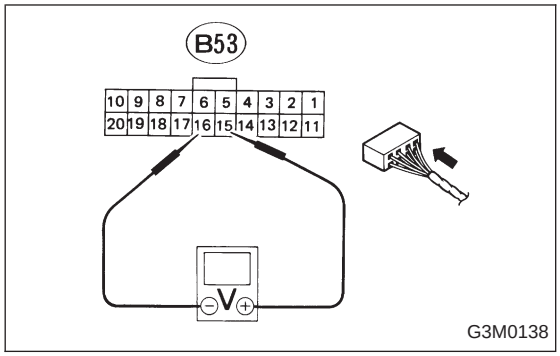
DIAGNOSIS:

Input signal circuit of TCM is open or shorted.

TROUBLE SYMPTOM:

No shift or excessive tight corner “braking”





1. MEASURE SIGNAL VOLTAGE INPUT OF TCM.

1) Raise vehicle and place safety stands.

CAUTION:

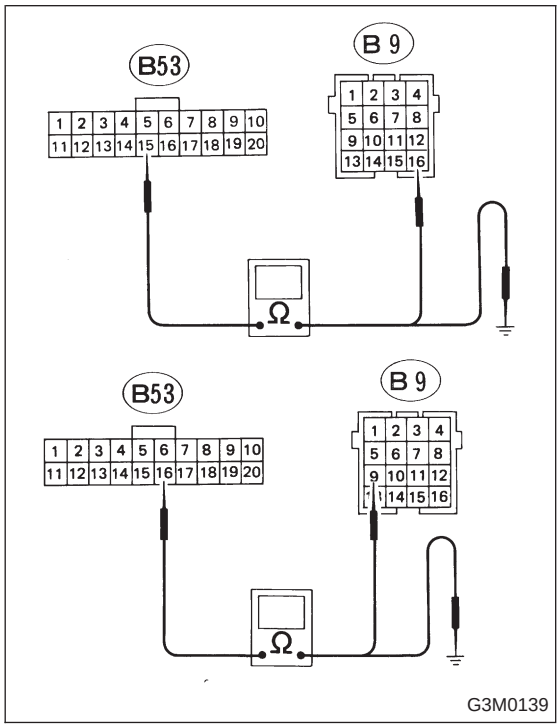
On AWD models, raise all wheels off floor.

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

Connector & terminal / Specified voltage:
(B53) No. 15 — No. 16 / AC 1 V, min.

- **SELECT MONITOR FUNCTION MODE**

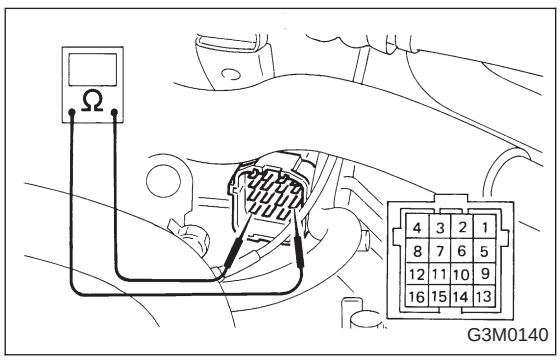
Mode: F02
Condition:
Simulated driving
Specified data:
VSP1 F02
(Vehicle speed) miles/h
Mode F03: "km/h" indication



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

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

Connector & terminal / Specified resistance:
(B53) No. 15 — (B9) No. 16 / 1 Ω, max.
(B53) No. 15 — Body / 1 MΩ, min.
(B53) No. 16 — (B9) No. 9 / 1 Ω, max.
(B53) No. 16 — Body / 1 MΩ, min.



3. CHECK VEHICLE SPEED SENSOR 1.

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

Connector & terminal / Specified resistance:
(T4) No. 16 — No. 9 / 450 — 650 Ω

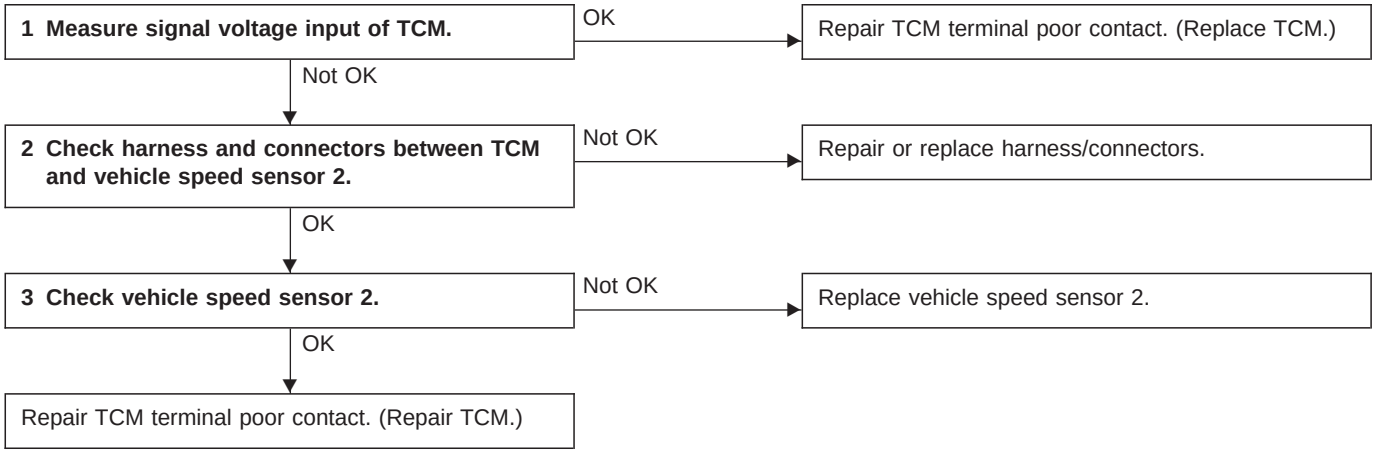
K: TROUBLE CODE 33 — VEHICLE SPEED SENSOR 2 —

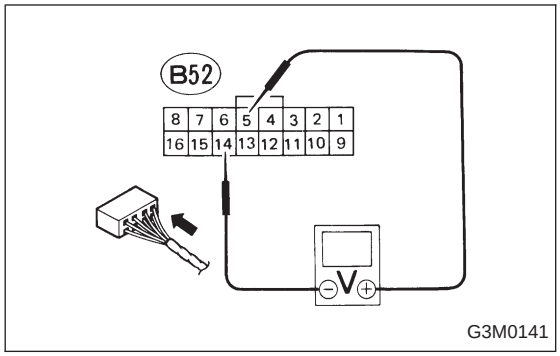
DIAGNOSIS:

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

TROUBLE SYMPTOM:

Improper shift points





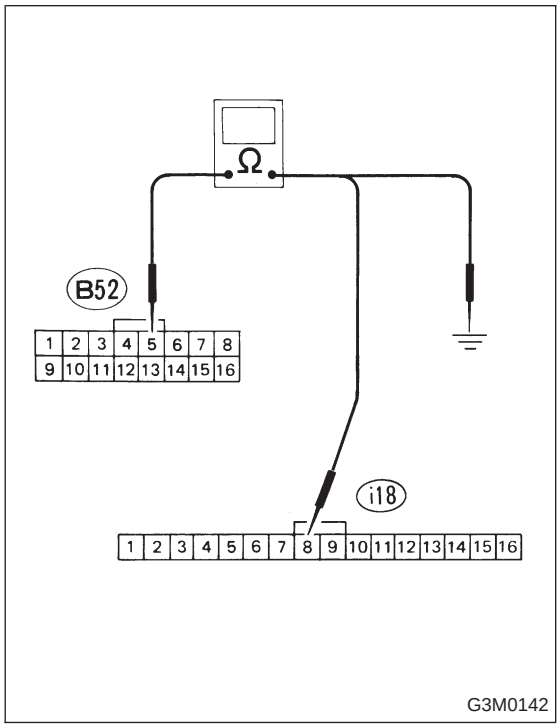
1. MEASURE SIGNAL VOLTAGE INPUT OF TCM.

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

Connector & terminal / Specified voltage:
(B52) No. 5 — No. 14 / repetition of 1 volt (max.) — 4 volts (min.)

- **SELECT MONITOR FUNCTION MODE**

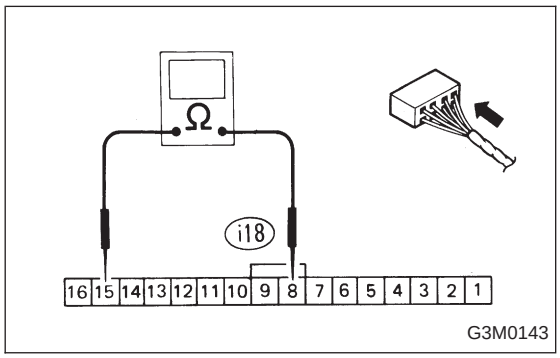
Mode: F04
Condition:
Simulated driving
Specified data:
VSP2 04
(vehicle speed) miles/h
Mode F05: “km/h” indication



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

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

Connector & terminal / Specified resistance:
(B52) No. 5 — (i18) No. 8 / 1 Ω, max.
(B52) No. 5 — Body / 1 MΩ, min.



3. CHECK VEHICLE SPEED SENSOR 2.

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

Connector & terminal / Specified resistance:
(i18) No. 8 — (i18) No. 15 / 0 ↔ More than 1 MΩ