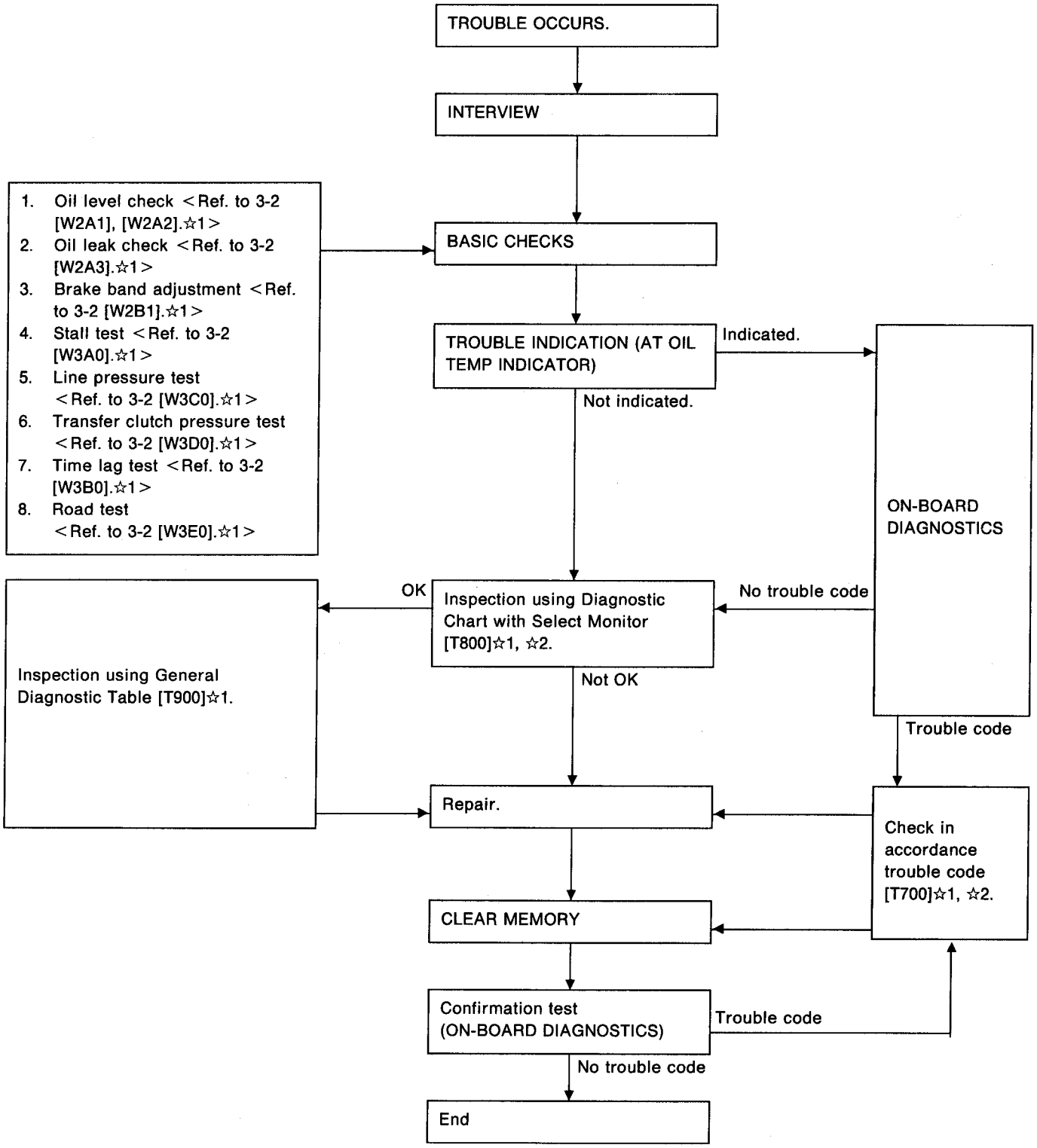
6. Diagnostic Chart for On-board Diagnostics System

A: BASIC DIAGNOSTIC PROCEDURE



D: LIST OF TROUBLE CODE

1. TROUBLE CODE

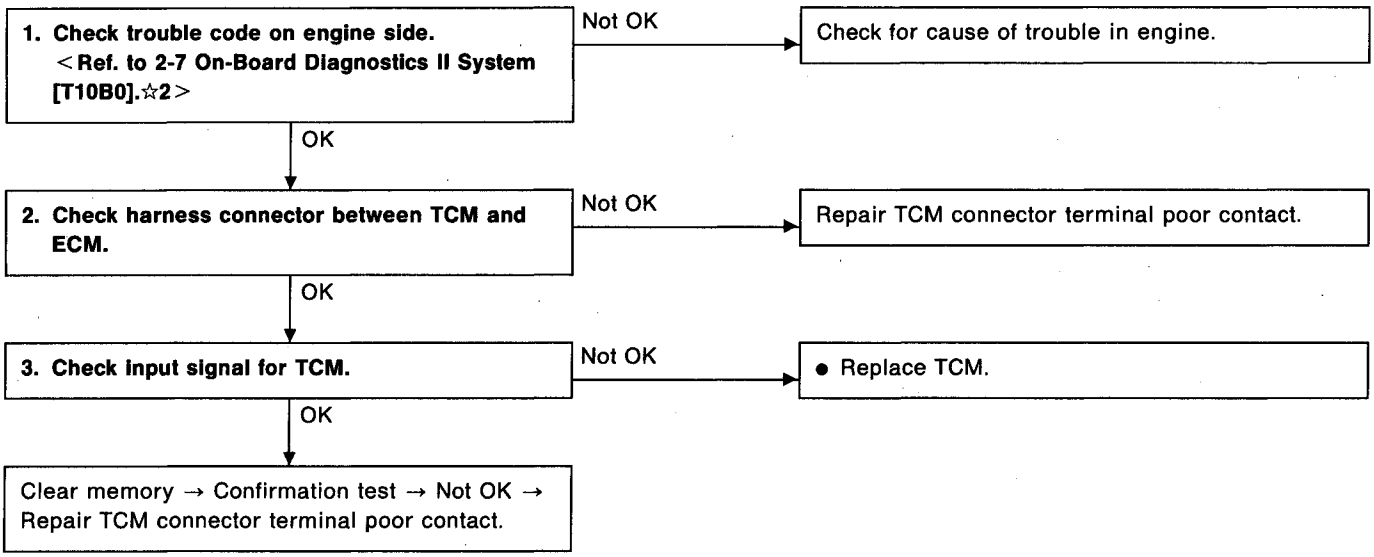
Trouble code	Item	Content of diagnosis	Abbr. (Select monitor)	Page
11	Duty solenoid A	Detects open or shorted drive circuit, as well as valve seizure.	PLDTY	—
12	Duty solenoid B	Detects open or shorted drive circuit, as well as valve seizure.	LUDTY	—
13	Shift solenoid 3	Detects open or shorted drive circuit, as well as valve seizure.	OVR	—
14	Shift solenoid 2	Detects open or shorted drive circuit, as well as valve seizure.	SFT2	—
15	Shift solenoid 1	Detects open or shorted drive circuit, as well as valve seizure.	SFT1	—
21	ATF temperature sensor	Detects open or shorted input signal circuit.	ATFT	—
22	Mass air flow signal	Detects open or shorted input signal circuit.	AFM	4
23	Engine speed signal	Detects open or shorted input signal circuit.	EREV	6
24	Duty solenoid C	Detects open or shorted drive circuit, as well as valve seizure.	4WDTY	—
25	Torque control signal	Detects open or shorted input signal circuit.	TQ.CT	8
31	Throttle position sensor	Detects open or shorted input signal circuit.	THV	10
32	Vehicle speed sensor 1	Detects open or shorted input signal circuit.	VSP1	—
33	Vehicle speed sensor 2	Detects open or shorted input signal circuit.	VSP2	—

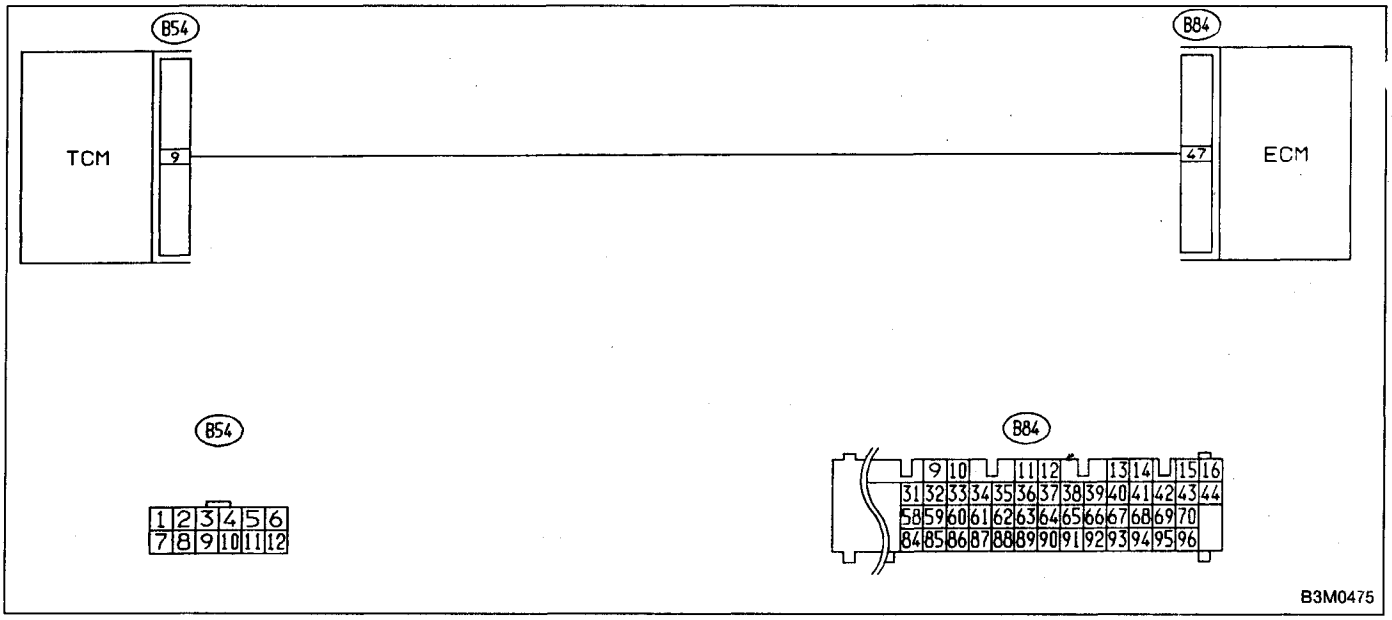
7. Diagnostic Chart with Trouble Code

H: TROUBLE CODE 22
— MASS AIR FLOW SIGNAL —

DIAGNOSIS:

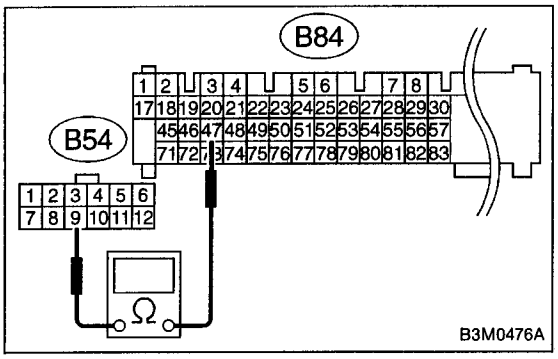
Input signal circuit of TCM from ECM is open or shorted.





1. CHECK TROUBLE CODE ON ENGINE SIDE.

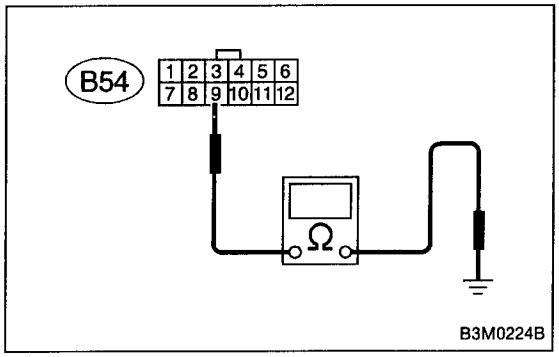
Using Subaru select monitor or OBD-general scan tool, check trouble code of mass air flow sensor on engine side.



2. CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.

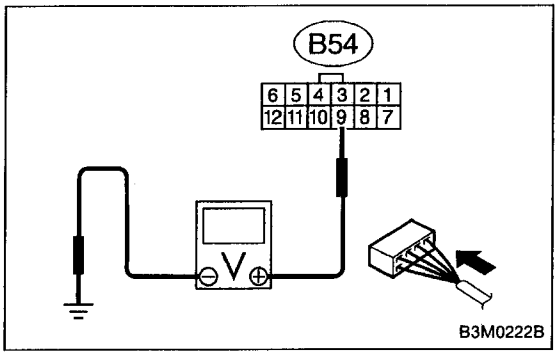
1) Turn ignition switch to OFF.
2) Disconnect connectors from TCM and ECM.
3) Measure resistance of harness connector between TCM and ECM.

Connector & terminal / Specified resistance:
(B54) No. 9 — (B84) No. 47 / 1 Ω, or less



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

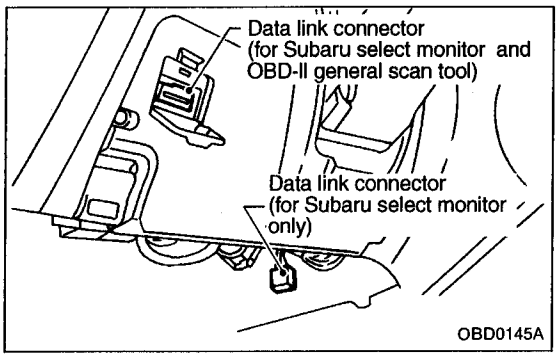
Connector & terminal / Specified resistance:
(B54) No. 9 — Body / 1 MΩ, or more



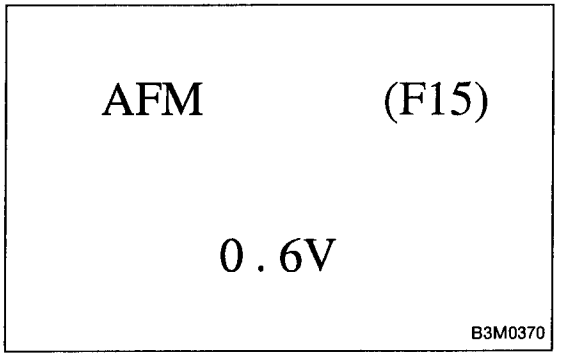
3. CHECK INPUT SIGNAL FOR TCM.

1) Connect connectors to TCM and ECM.
2) Start the engine. (engine idling after warm-up)
3) Measure signal voltage between TCM connector terminal and body.

Connector & terminal / Specified voltage:
Engine warm-up;
(B54) No. 9 — Body / 0.5 — 1.22 V



- Using Subaru select monitor:
  (1) Connect connectors to TCM and ECM.
  (2) Turn ignition switch to OFF.
  (3) Connect the Subaru select monitor to data link connector.
  (4) Turn ignition switch to ON and Subaru select monitor switch to ON.
  (5) Start and warm-up the engine.



(6) Read data on Subaru select monitor.
(7) Designate mode using function key.

Function mode: F15

SPECIFIED DATA:
0.5 — 1.22 V (Engine warm-up)

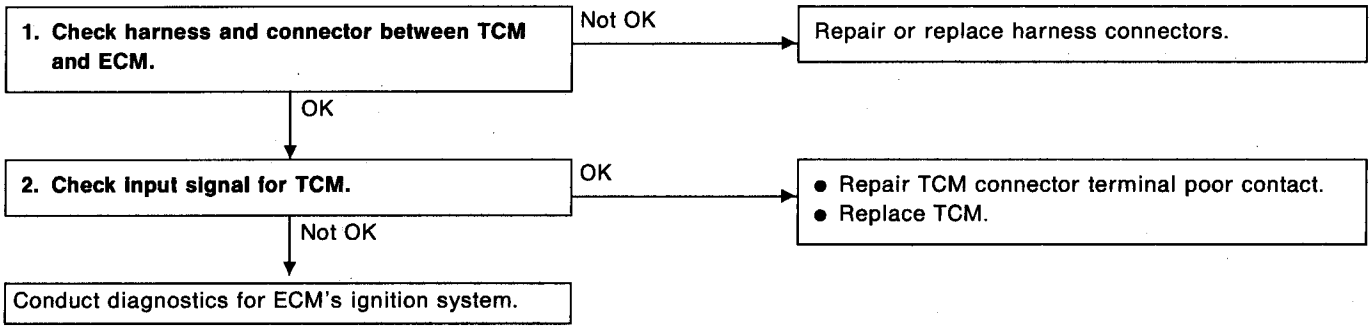
I: TROUBLE CODE 23
— ENGINE SPEED SIGNAL —

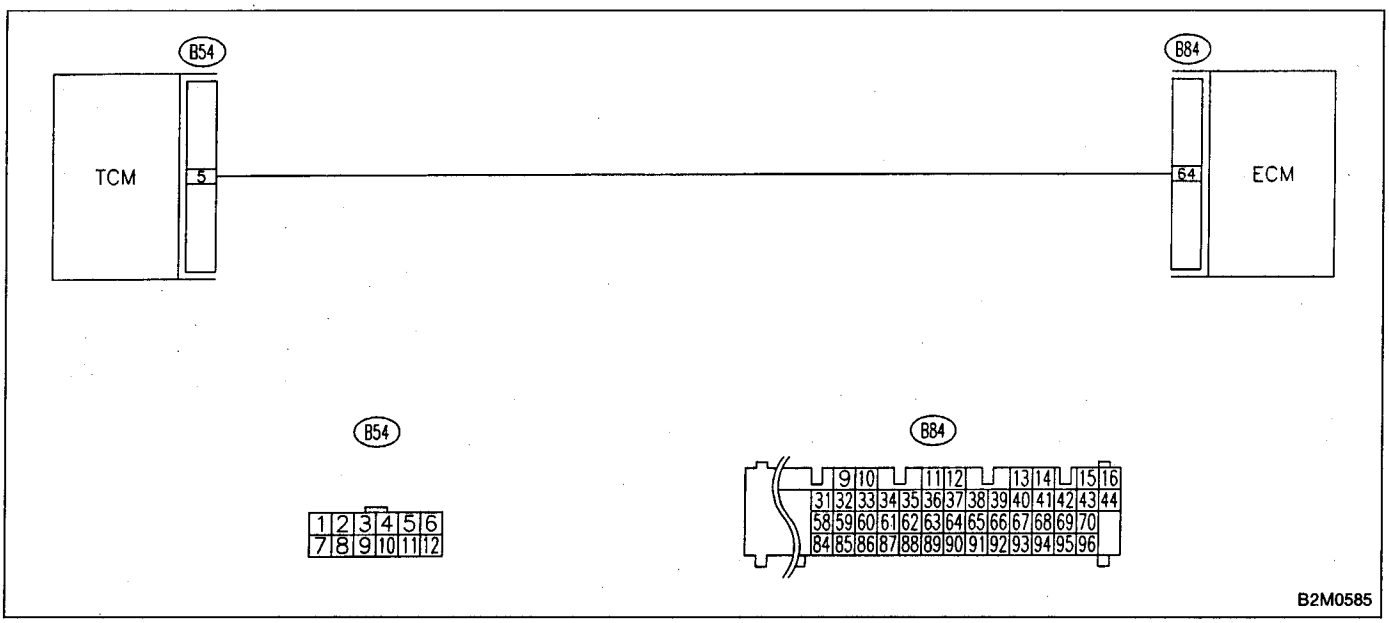
DIAGNOSIS:

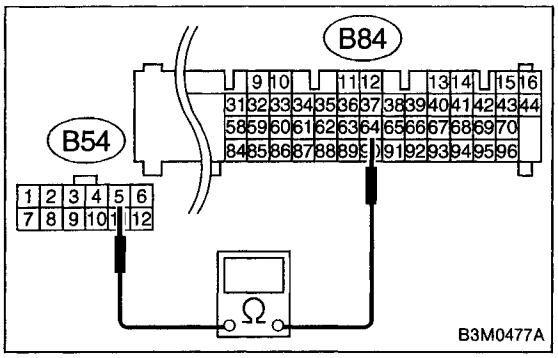
Engine speed input signal circuit is open or shorted.

TROUBLE SYMPTOM:

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



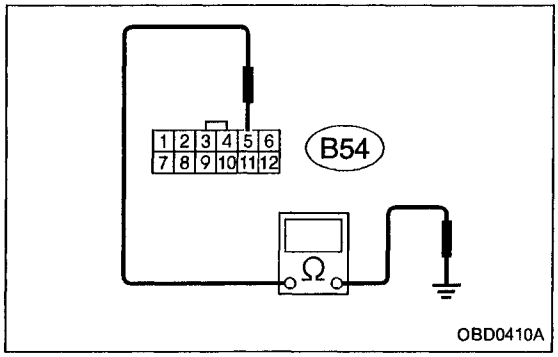




1. CHECK HARNESS AND CONNECTOR BETWEEN TCM AND ECM.

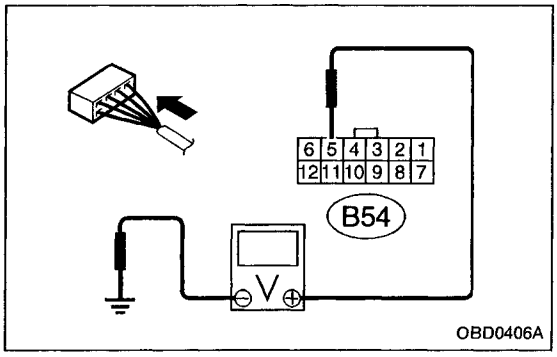
1) Turn ignition switch to OFF.
2) Disconnect connectors from TCM and ECM.
3) Measure resistance of harness connector between TCM and ECM.

Connector & terminal / Specified resistance:
(B54) No. 5 — (B84) No. 64 / 1 Ω, or less



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

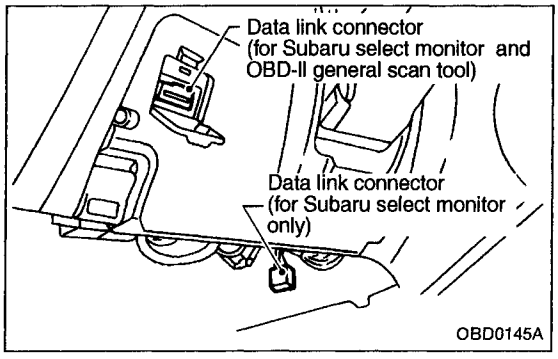
Connector & terminal / Specified resistance:
(B54) No. 5 — Body / 1 MΩ, or more



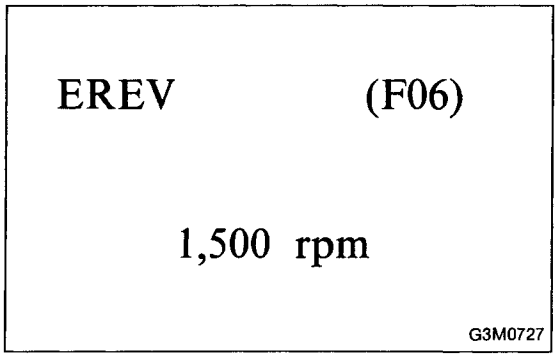
2. CHECK INPUT SIGNAL FOR TCM.

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

Connector & terminal / Specified voltage:
(B54) No. 5 — Body / 10.5 V, or more



- Using Subaru select monitor:
  (1) Connect connectors to ECM and TCM.
  (2) Turn ignition switch to OFF.
  (3) Connect the Subaru select monitor to data link connector.
  (4) Turn ignition switch to ON and Subaru select monitor switch to ON.



(5) Start and warm-up the engine.
(6) Operate at constant engine speed.
(7) Read data on Subaru select monitor.
(8) Designate mode using function key.

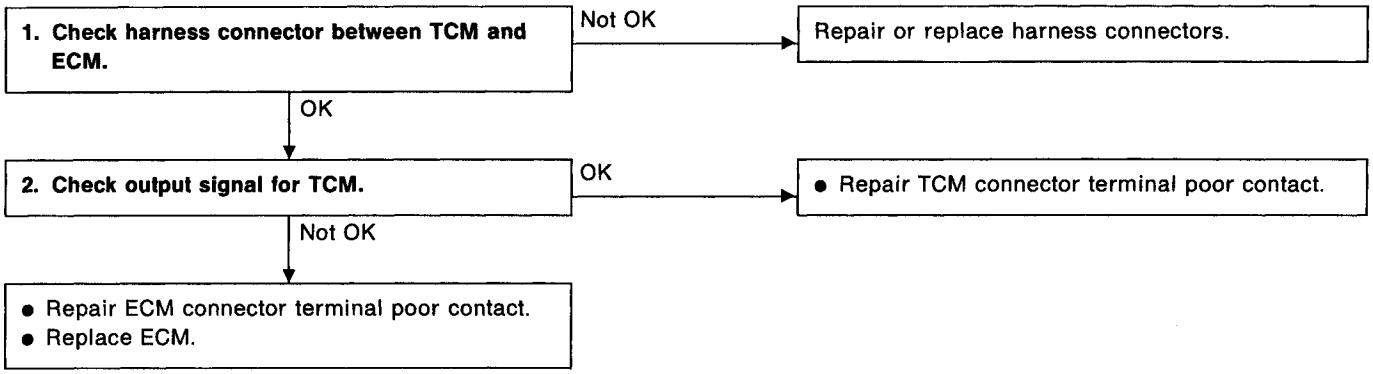
Function mode: F06

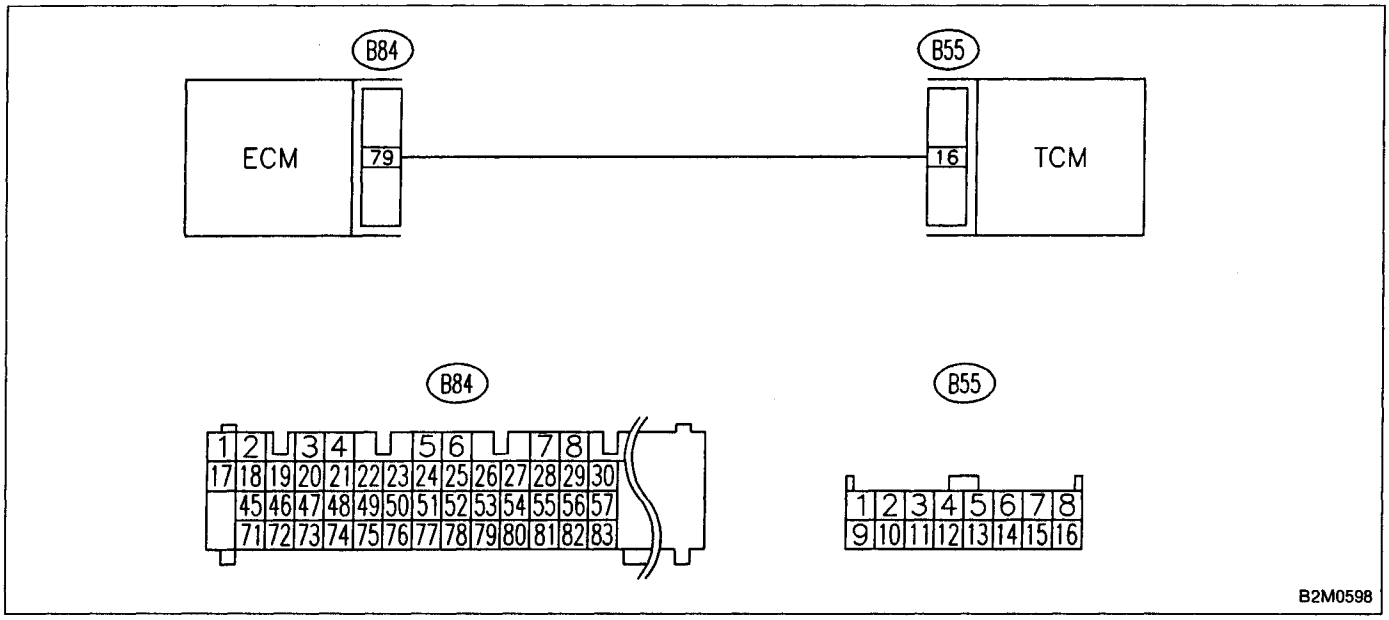
SPECIFIED DATA:
Same as tachometer reading (in combination meter)

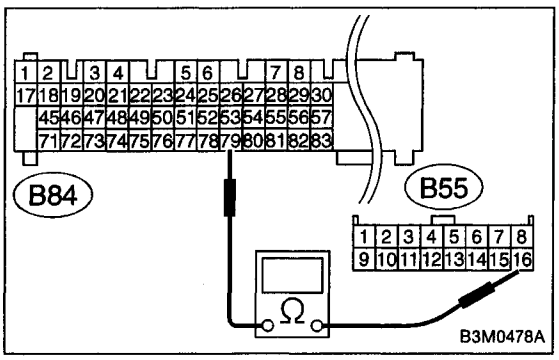
K: TROUBLE CODE 25
— TORQUE CONTROL SIGNAL —

DIAGNOSIS:

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



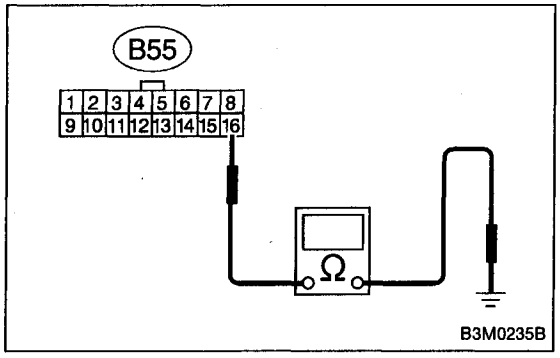




1. CHECK HARNESS CONNECTOR BETWEEN TCM AND ECM.

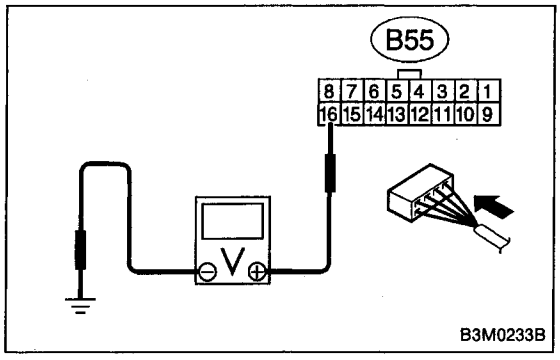
1) Turn ignition switch to OFF.
2) Disconnect connectors from TCM and ECM.
3) Measure resistance of harness connector between TCM and ECM.

Connector & terminal / Specified resistance:
(B55) No. 16 — (B84) No. 79 / 1 Ω, or less



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

Connector & terminal / Specified resistance:
(B55) No. 16 — Body / 1 MΩ, or more



2. CHECK OUTPUT SIGNAL FOR TCM.

1) Connect connectors to TCM and ECM.
2) Turn ignition switch to ON.
3) Measure signal voltage between TCM connector terminal and body.

Connector & terminal / Specified voltage:
(B55) No. 16 — Body / 5±1 V

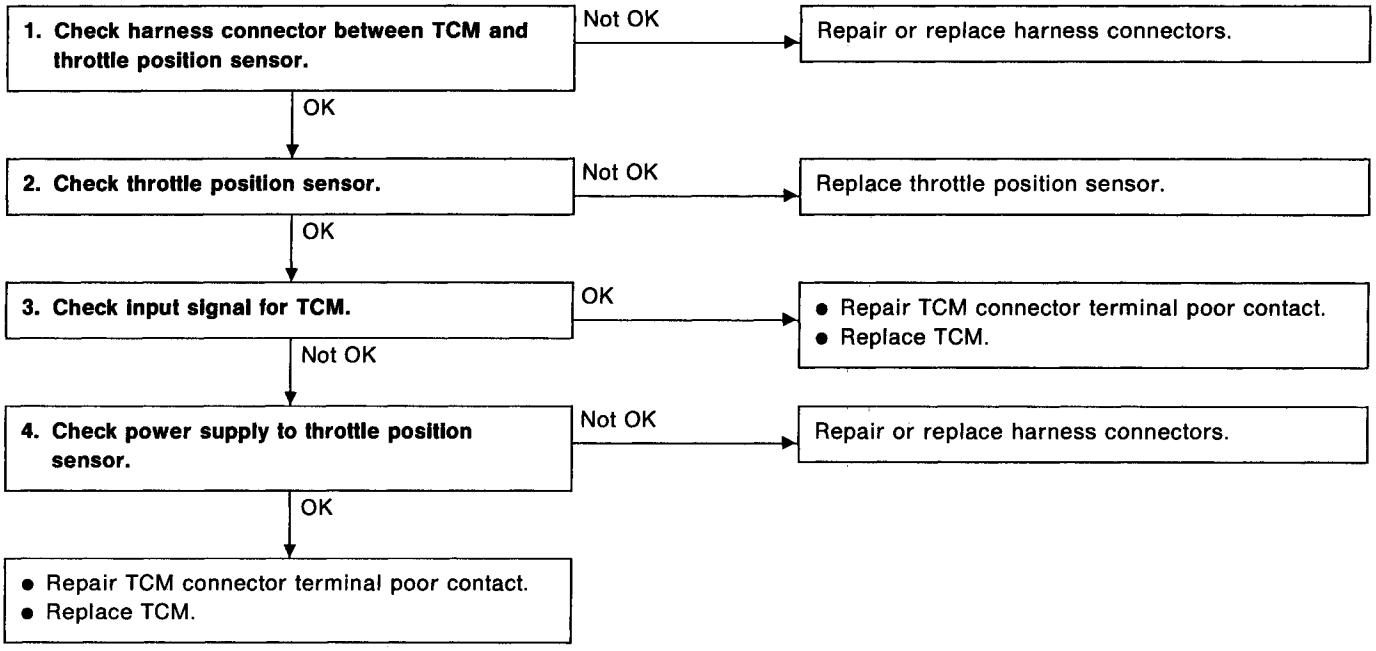
L: TROUBLE CODE 31
— THROTTLE POSITION SENSOR —

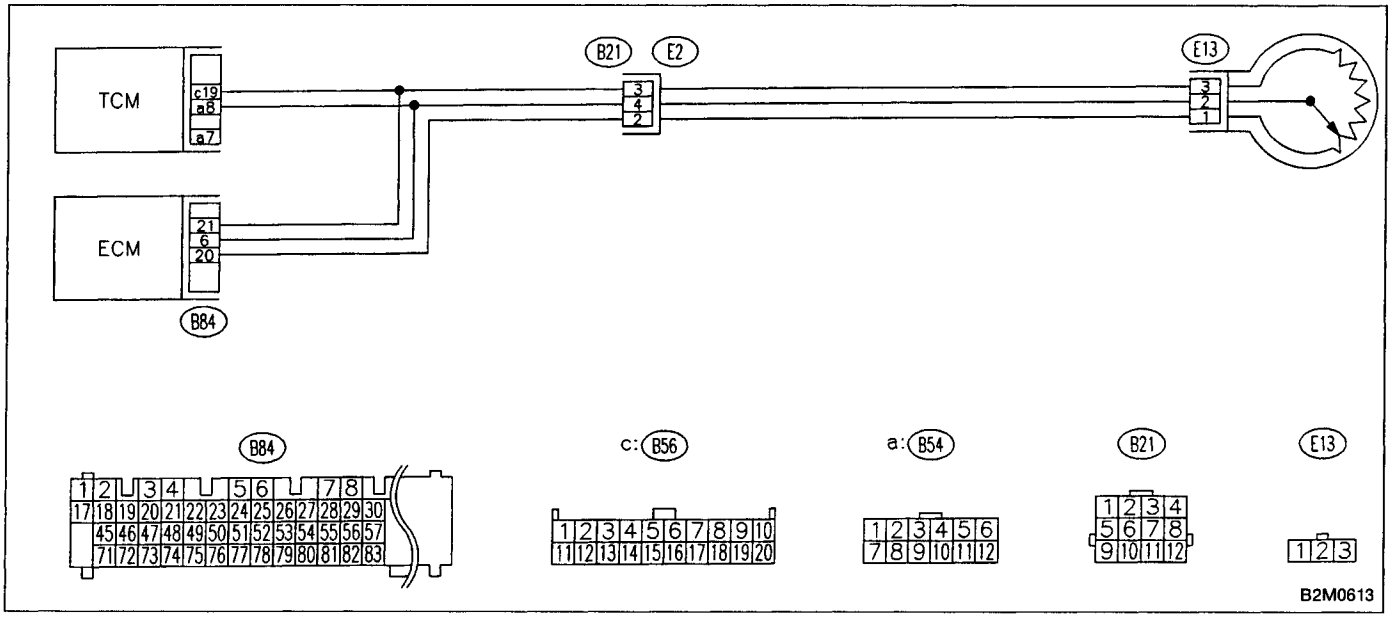
DIAGNOSIS:

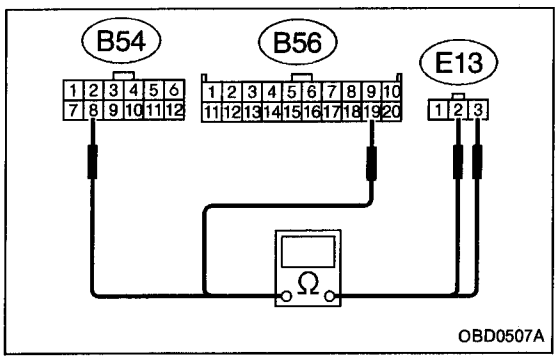
Input signal circuit of throttle position sensor is open or shorted.

TROUBLE SYMPTOM:

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



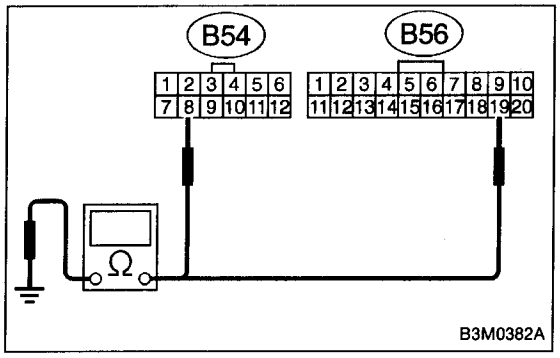




1. CHECK HARNESS CONNECTOR BETWEEN TCM AND THROTTLE POSITION SENSOR.

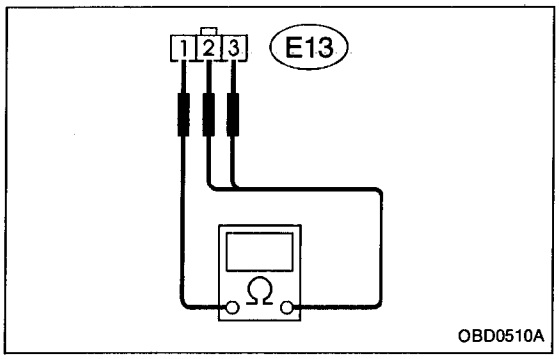
1) Turn ignition switch to OFF.
2) Disconnect connector from TCM and throttle position sensor.
3) Measure resistance of harness connector between TCM and throttle position sensor.

Connector & terminal / Specified resistance:
(B54) No. 8 — (E13) No. 2 / 1 Ω, or less
(B56) No. 19 — (E13) No. 3 / 1 Ω, or less



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

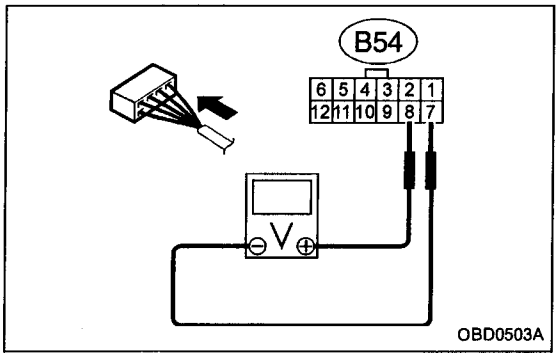
Connector & terminal / Specified resistance:
(B54) No. 8 — Body / 1 MΩ, or more
(B56) No. 19 — Body / 1 MΩ, or more



2. CHECK THROTTLE POSITION SENSOR.

Measure resistance between throttle position sensor terminals.

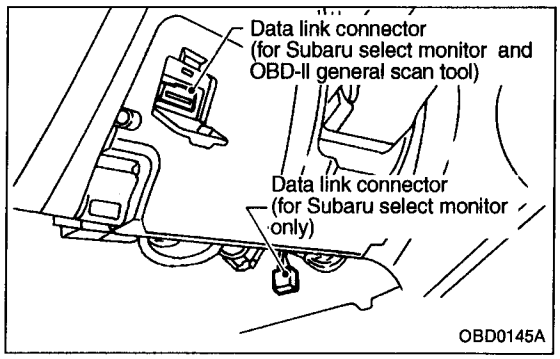
Terminals / Specified resistance:
(E13) No. 1 — No. 2 / 0.3 — 0.7 kΩ
(Throttle fully closed.)
3 — 6 kΩ
(Throttle fully open.)
(E13) No. 1 — No. 3 / 3.5 — 6.5 kΩ



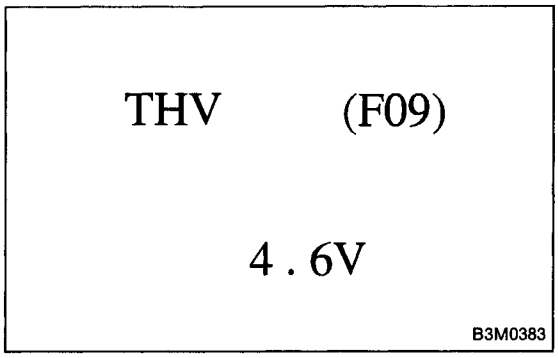
3. CHECK INPUT SIGNAL FOR TCM.

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

Connector & terminal / Specified voltage:
(B54) No. 8 — No. 7 /
0.5 ± 0.2 V (Throttle fully closed.)
4.6 ± 0.3 V (Throttle fully open.)



- Using Subaru select monitor:
  (1) Connect connectors to TCM and throttle position sensor.
  (2) Turn ignition switch to OFF.
  (3) Connect the Subaru select monitor to data link connector.
  (4) Turn ignition switch to ON and Subaru select monitor switch to ON.

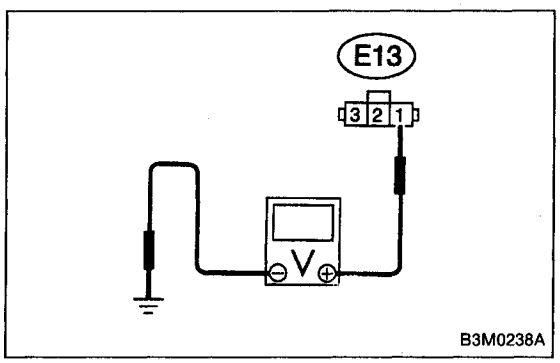


(5) Designate mode using function key.
(6) Read data on Subaru select monitor.

Function mode: F09

SPECIFIED DATA:

0.5 ± 0.2 V (Throttle fully closed.)
4.6 ± 0.3 V (Throttle fully open.)
[Must be changed correspondingly with accelerator pedal operation (from "released" to "depressed" position).]

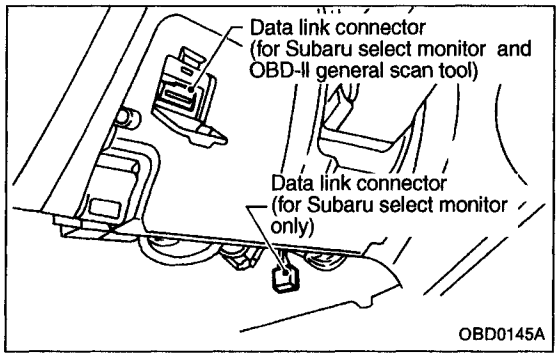


4. CHECK POWER SUPPLY TO THROTTLE POSITION SENSOR.

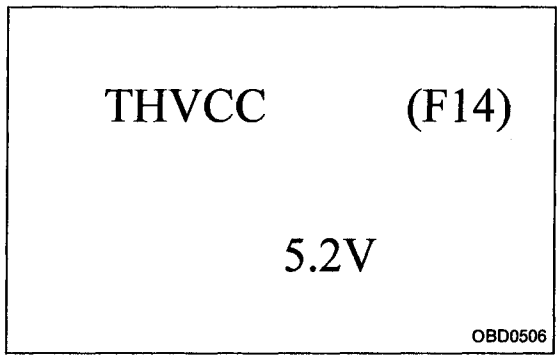
1) Turn ignition switch to OFF.
2) Disconnect connector from throttle position sensor.
3) Turn ignition switch to ON.
4) Measure power supply voltage to throttle position sensor.

Connector & terminal / Specified voltage:

(E13) No. 1 — Body / 5.12 ± 0.1 V



- Using Subaru select monitor:
  (1) Turn ignition switch to OFF.
  (2) Connect the Subaru select monitor to data link connector.
  (3) Turn ignition switch to ON and Subaru select monitor switch to ON.



(4) Designate mode using function key.
(5) Read data on Subaru select monitor.

Function mode: F14

SPECIFIED DATA:

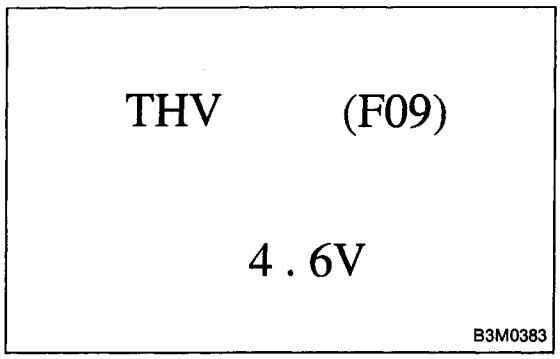
5.12 ± 0.1 V

8. Diagnostic Chart with Select Monitor

B: LIST OF OUTPUT MODES

1. FUNCTION MODE

Mode	Contents	Abbr.	Unit	Contents of display	Page
F00	Mode display	—	—	AT or EGI mode (when monitor is connected.)	—
F01	Battery voltage	VB	V	Battery voltage applied to control unit.	—
F02	Vehicle speed sensor 1	VSP1	m/h	Vehicle speed (miles/h) sent from vehicle speed sensor 1.	—
F03	Vehicle speed sensor 1	VSP1	km/h	Vehicle speed (km/h) sent from vehicle speed sensor 1.	—
F04	Vehicle speed sensor 2	VSP2	m/h	Vehicle speed (miles/h) sent from vehicle speed sensor 2.	—
F05	Vehicle speed sensor 2	VSP2	km/h	Vehicle speed (km/h) sent from vehicle speed sensor 2.	—
F06	Engine speed	EREV	rpm	Engine speed sent from ECM.	—
F07	ATF temperature sensor	ATFT	°F	ATF temperature (°F) sent from ATF temperature sensor.	—
F08	ATF temperature sensor	ATFT	°C	ATF temperature (°C) sent from ATF temperature sensor.	—
F09	Throttle position sensor	THV	V	Voltage sent from throttle position sensor.	15
F10	Gear position	GEAR	—	Transmission gear position	—
F11	Line pressure duty	PLDTY	%	Duty ratio flowing through duty solenoid A.	16
F12	Lock-up duty	LUDTY	%	Duty ratio flowing through duty solenoid B.	17
F13	AWD duty	4WDTY	%	Duty ratio flowing through duty solenoid C.	18
F14	Throttle position sensor power supply	THVCC	V	Power supply voltage to throttle position sensor	19
F15	Mass air flow signal	AFM	V	Output voltage from air flow sensor	19



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

CONDITION:

- Ignition switch ON (with engine OFF)
- Measure voltage while operating throttle valve from a fully closed position to a fully open position.

SPECIFIED DATA:

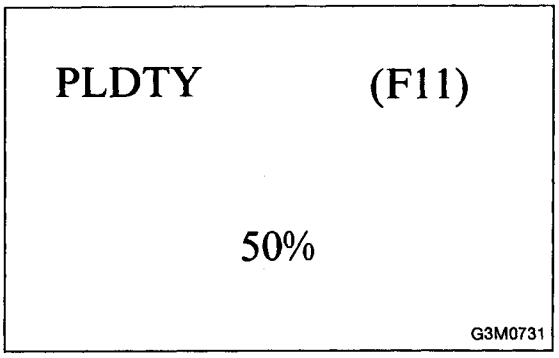
- Fully closed position: 0.5±0.2 V
- Fully open position: 4.6±0.3 V
- From fully closed to fully open position: Voltage must smoothly decrease.
- Open harness: 5.0±0.3 V
- Shorted harness: 0.00 V

Probable cause (if outside "specified data")

1. Throttle position sensor → Check performance characteristics of throttle position sensor. <Ref. to 3-2 [T7L0].☆2>

OK ↓

Check TCM and replace if necessary.



K: MODE F11
— LINE PRESSURE DUTY (PLDTY) —

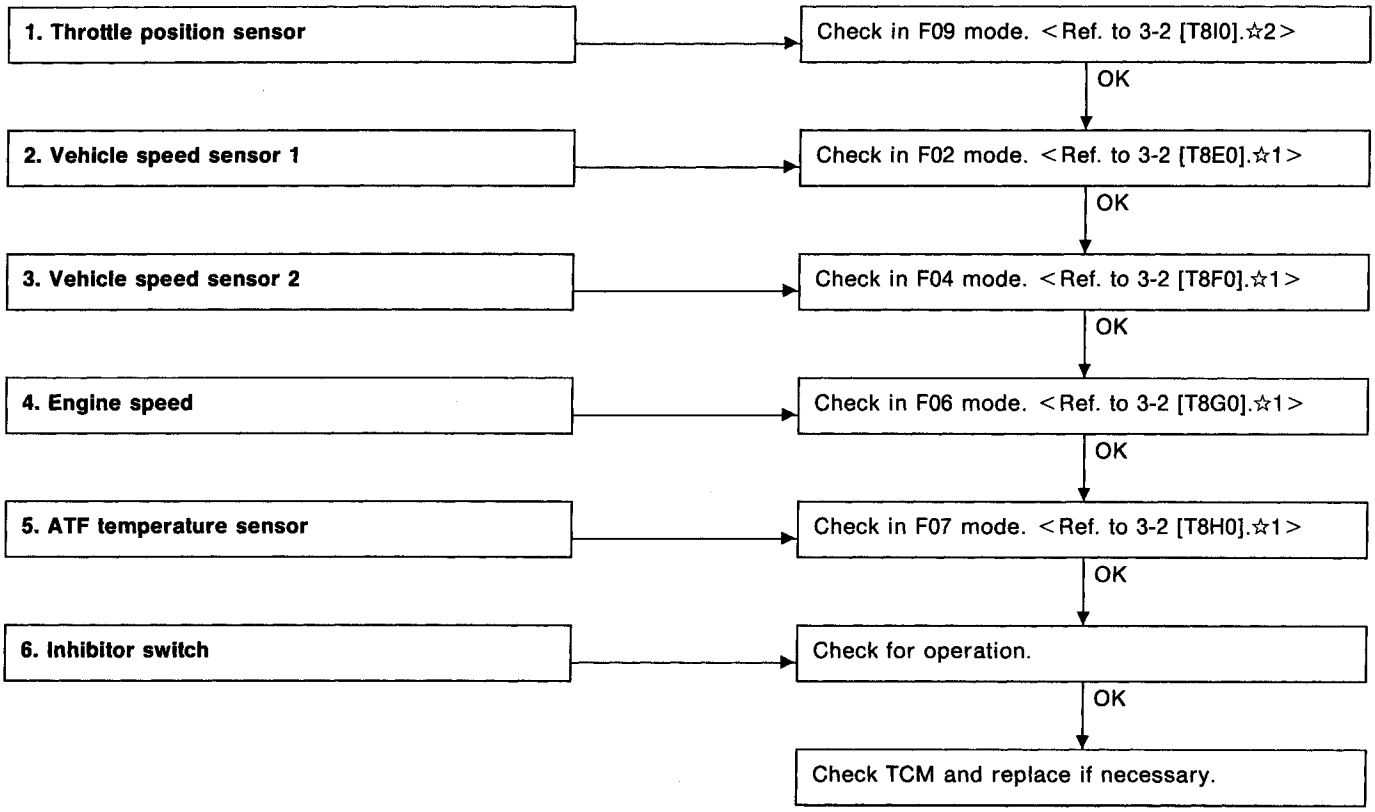
CONDITION:

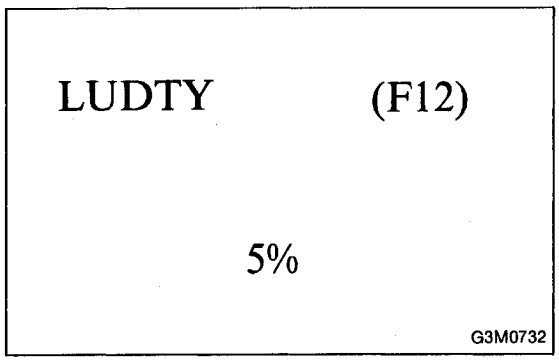
- After sufficient warm-up
- Ignition ON (engine OFF)
- N range

SPECIFIED DATA:

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

Probable cause (if outside "specified data")





L: MODE F12 — LOCK-UP DUTY (LUDTY) —

CONDITION:

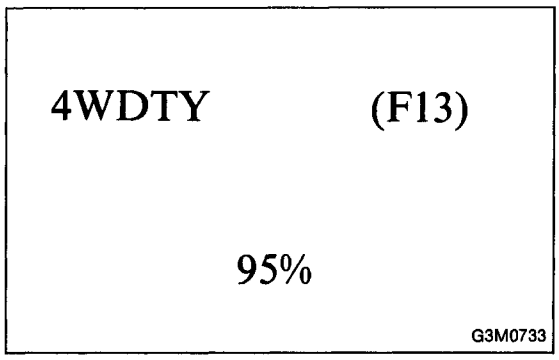
- Idling (after sufficient warm-up) with lock-up system released.
- Driving at 75 km/h (47 MPH) (after sufficient warm-up) with lock-up system applied.

SPECIFIED DATA:

- Lock-up system released: 5%
- Lock-up system applied: 95%

Probable cause (if outside "specified data")

1. Throttle position sensor	Check in F09 mode. <Ref. to 3-2 [T8I0].☆2>
	OK
2. Vehicle speed sensor 1	Check in F02 mode. <Ref. to 3-2 [T8E0].☆1>
	OK
3. Vehicle speed sensor 2	Check in F04 mode. <Ref. to 3-2 [T8F0].☆1>
	OK
4. Engine speed	Check in F06 mode. <Ref. to 3-2 [T8G0].☆1>
	OK
5. Inhibitor switch	Check for operation.
	OK
	Check TCM and replace if necessary.



M: MODE F13 — AWD DUTY (4WDTY) —

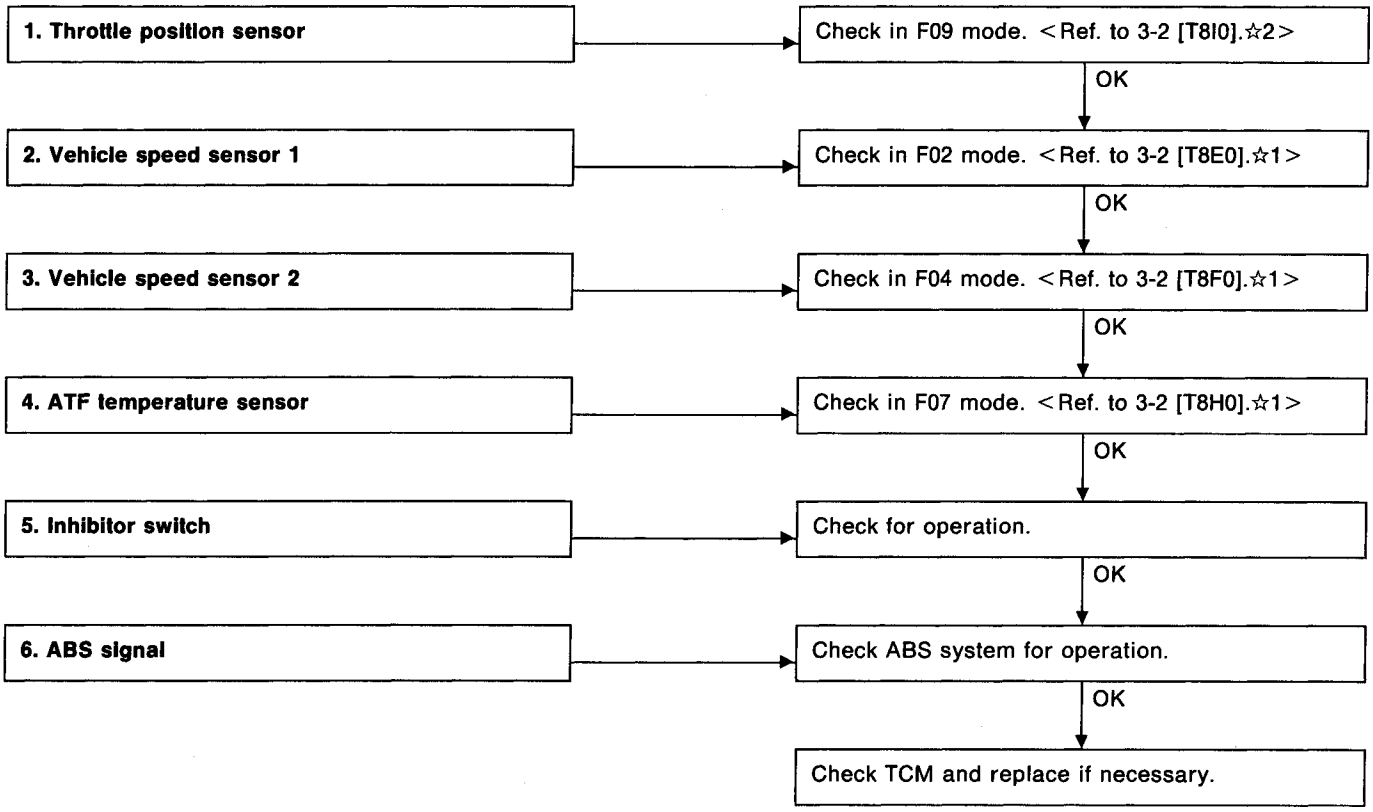
CONDITION:

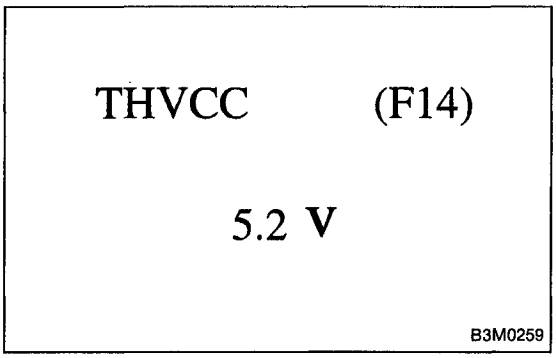
- After sufficient warm-up
- Ignition switch ON (engine OFF)
- FWD mode
- AWD mode, D range, full throttle

SPECIFIED DATA:

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

Probable cause (if outside "specified data")





N: MODE F14
— THROTTLE POSITION SENSOR POWER SUPPLY (THVCC) —

CONDITION:

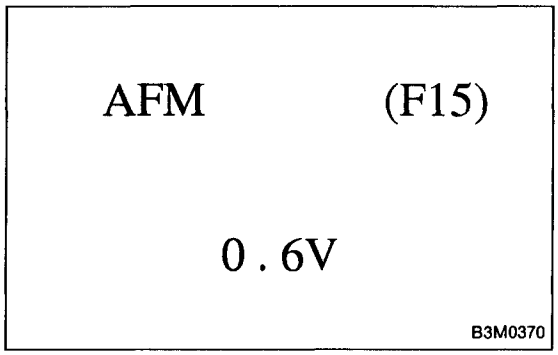
Ignition switch ON (engine OFF)

SPECIFIED DATA:

5.12±0.1 V

Probable cause (Item outside "specified data")

1. Throttle position sensor power supply	Check throttle sensor line. <Ref. to 3-2 [T7L0].☆2>
	OK
	Check TCM and replace if necessary.



O: MODE F15
— MASS AIR FLOW SIGNAL (AFM) —

CONDITION:

- Ignition switch ON (engine ON)
- N range
- Idling

SPECIFIED DATA:

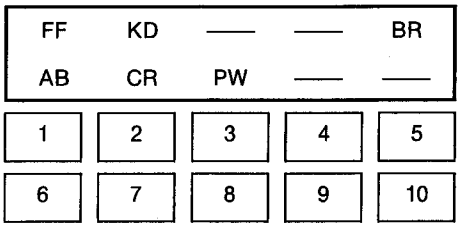
Engine warm-up: 0.5 — 1.22 V

Probable cause (if outside "specified data")

1. Mass air flow signal	Check performance characteristics of mass air flow signal. <Ref. to 3-2 [T7H0].☆2>
	OK
	Check TCM and replace if necessary.

DISPLAY

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



P: MODE FA0
— SWITCH 1 (SW1) —

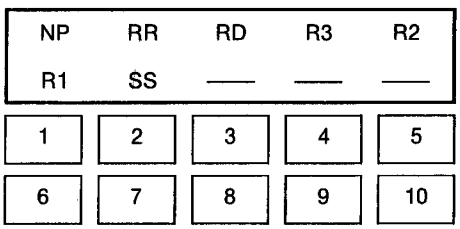
Reference values

- Lights up when the fuse is installed in FWD switch (No. 1).
- Lights up when the brake pedal is depressed (No. 5)
- Lights up when the ABS signal is entered (No. 6).
- Lights up when the cruise control is set (No. 7).

NOTE:
LED Nos. 2 and 8 do not come on.

DISPLAY

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



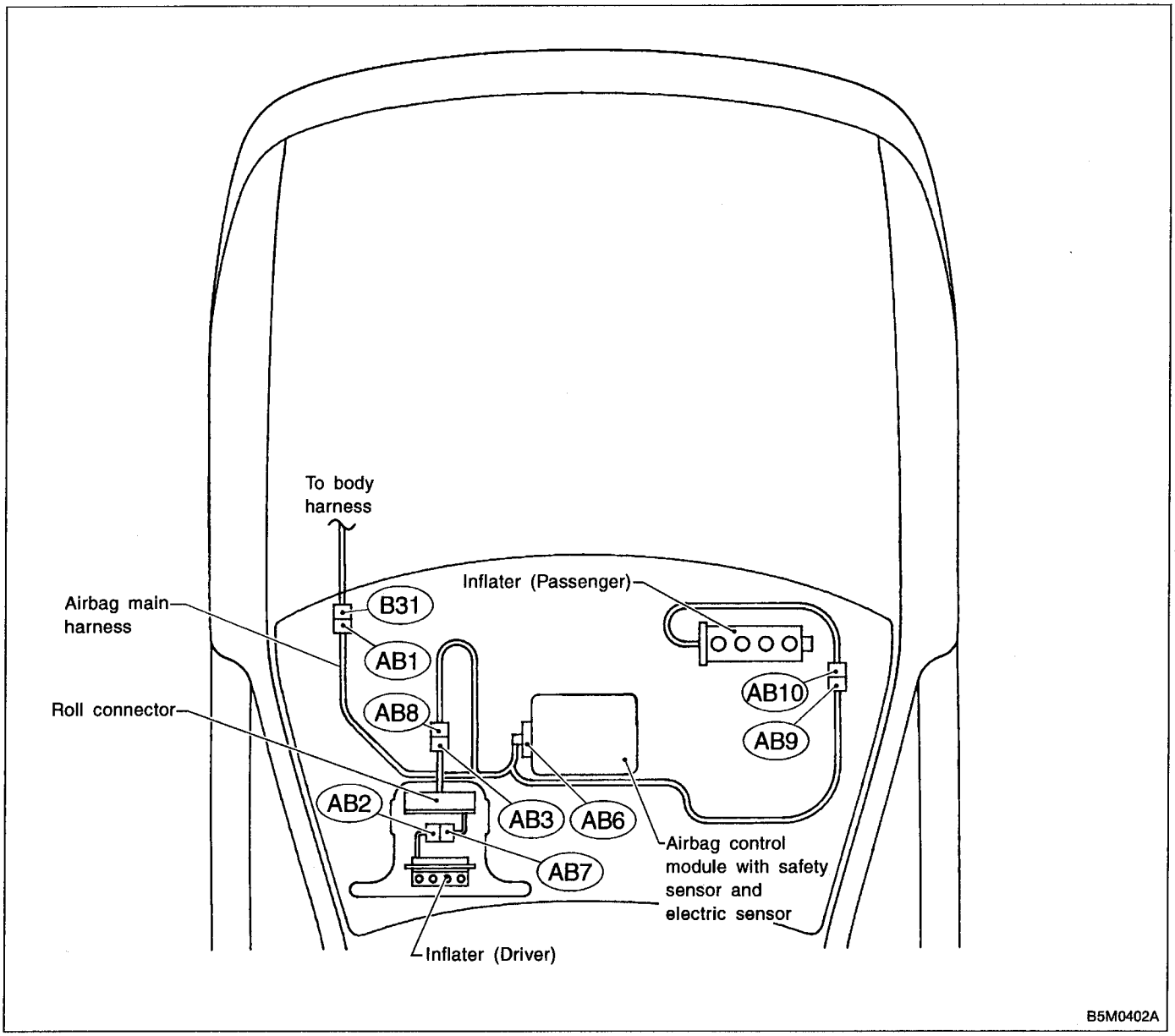
Q: MODE FA1
— SWITCH 2 (SW2) —

Reference values

- Lights up when the N or P range is selected (No. 1).
- Lights up when the R range is selected (No. 2).
- Lights up when the D range is selected (No. 3).
- Lights up when the 3 range is selected (No. 4).
- Lights up when the 2 range is selected (No. 5).
- Lights up when the 1 range is selected (No. 6).
- Lights up when the diagnosis switch is connected (No. 7).

NOTE:
If each LED does not illuminate in the above conditions, inhibitor switch malfunction may occur. Perform diagnostics on inhibitor switch. <Ref. to 2-7 [T10AN0].☆2>

1. Electrical Components Location



Connector No.	(AB1)	(AB2)	(AB3)	(AB6)	(AB7)	(AB8)	(AB9)	(AB10)
Pole	7	3	3	12	3	3	3	3
Color	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Male/Female	Male	Female	Female	Female	Male	Male	Male	Female