

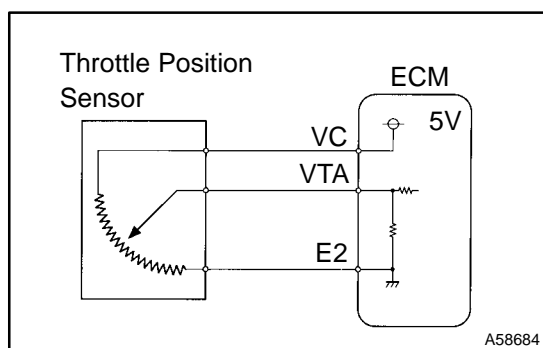
DTC	P0120	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT
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DTC	P0122	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT LOW INPUT
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DTC	P0123	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT HIGH INPUT
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HINT:

This is the purpose for the "throttle position sensor".

CIRCUIT DESCRIPTION

The throttle position sensor is mounted in the throttle body and detects the throttle valve opening angle.

When the throttle valve is fully closed, a voltage of approximately 0.3 to 1.0 V is applied to terminal VTA of the ECM. The voltage applied to terminal VTA of the ECM increases in proportion to the opening angle of the throttle valve and becomes approximately 3.2 to 4.9 V when the throttle valve is fully opened. The ECM judges the vehicle driving conditions from these signals input from terminal VTA, uses them as one of the conditions for deciding the air-fuel ratio correction, power increase correction and fuel-cut control etc.

DTC No.	DTC Detection Condition	Trouble Area
	Condition (a) of DTC P0120, P0122 or P0123 continues for 5 seconds (Open or short in throttle position sensor circuit)	
P0120	Detection conditions for DTCs P0122 and P0123 are not satisfied but condition (a) is satisfied (a) VTA less than 0.1 V or VTA more than 4.9 V	<ul style="list-style-type: none"> • Open or short in throttle position sensor circuit • Throttle position sensor (built in throttle body) • ECM
P0122	(a) VTA stays less than 0.1 V for 5 seconds or more	<ul style="list-style-type: none"> • Throttle position sensor (built in throttle body) • Short in VTA circuit • Open in VC circuit • ECM
P0123	(a) VTA stays more than 4.9 V for 5 seconds or more	<ul style="list-style-type: none"> • Throttle position sensor (built in throttle body) • Open in VTA circuit • Open in E2 circuit • VC and VTA circuit are short-circuited • ECM

HINT:

After confirming DTCs, confirm the throttle valve opening percentage and closed throttle position switch condition using the hand-held tester or the OBD II scan tool.

Throttle valve opening position expressed as percentage		Trouble Area
Throttle valve fully closed	Throttle valve fully open	
0 %	0 %	VC circuit open VTA circuit open or short
Approx. 100 %	Approx. 100 %	E2 circuit open

MONITOR DESCRIPTION

The throttle position sensor varies its resistance with the throttle valve angle. The ECM applies a regulated reference voltage to the throttle position sensor “+: VC” terminal and calculates the angle of the throttle valve based on the voltage present at the throttle position sensor “signal: VTA” terminal.

When the throttle valve is near the fully closed position, the output voltage of the throttle position sensor is low. When it is near the fully open position, the output voltage is high.

If the ECM detects that the output voltage of the throttle position sensor is out of the normal range, the ECM interprets this as a malfunction in the throttle position sensor and sets a DTC.

MONITOR STRATEGY

Related DTCs	P0120	Throttle position sensor range check (fluttering)
	P0122	Throttle position sensor range check (low voltage)
	P0123	Throttle position sensor range check (high voltage)
Required sensors/components	Throttle position sensor	
Frequency of operation	Continuous	
Duration	5 seconds	
MIL operation	Immediately	
Sequence of operation	None	

TYPICAL ENABLING CONDITION

The monitor will run whenever the following DTCs are not present	See “List of Disable a Monitor” (On page 05-25)
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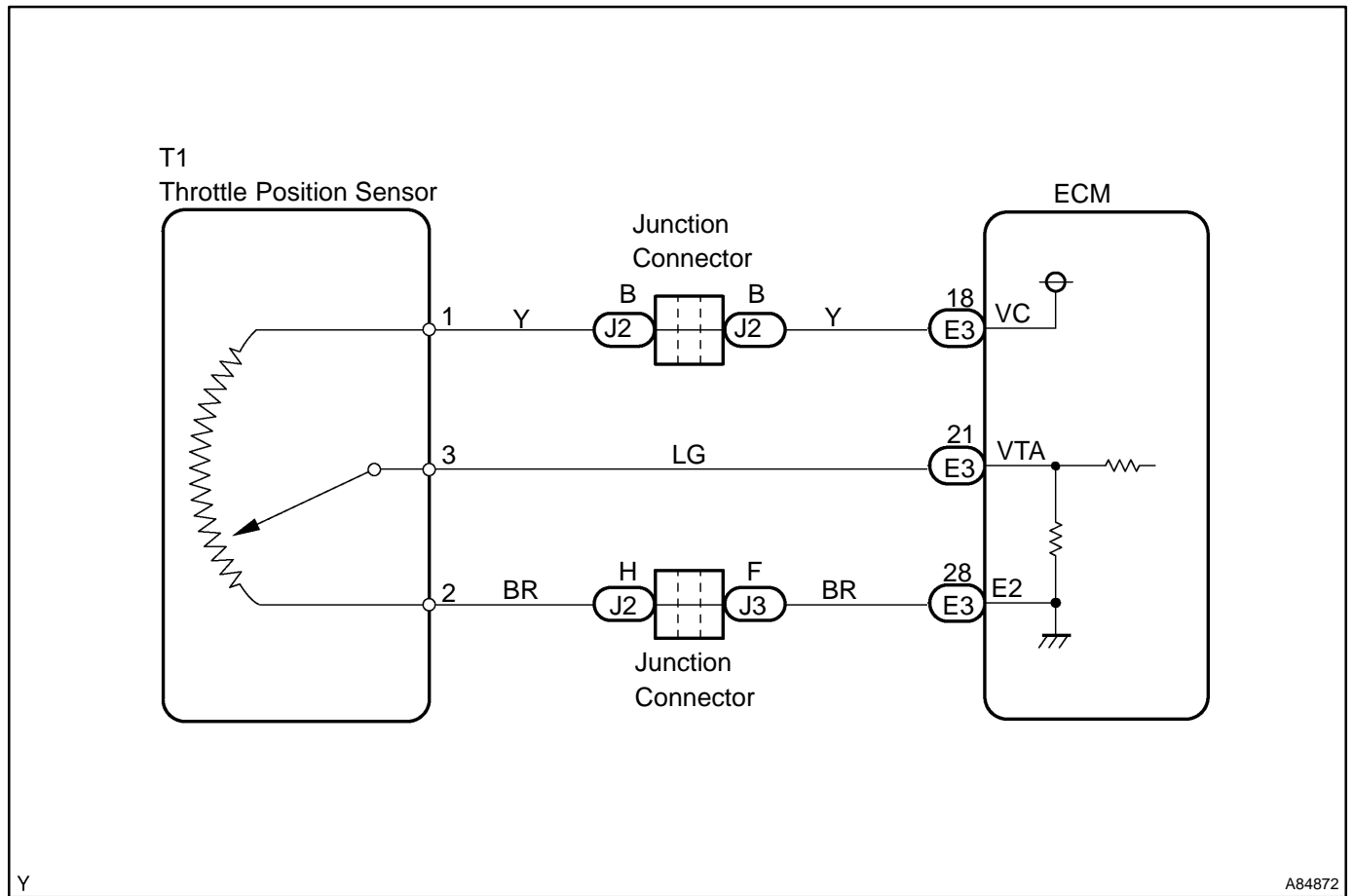
TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
P0120:	
VTA voltage	Flutters beyond the normal range
P0122:	
VTA voltage	less than 0.1 V
P0123:	
VTA voltage	more than 4.9 V

COMPONENT OPERATING RANGE

Parameter	Standard Value
Throttle position sensor voltage	0.1 to 4.9 V

WIRING DIAGRAM



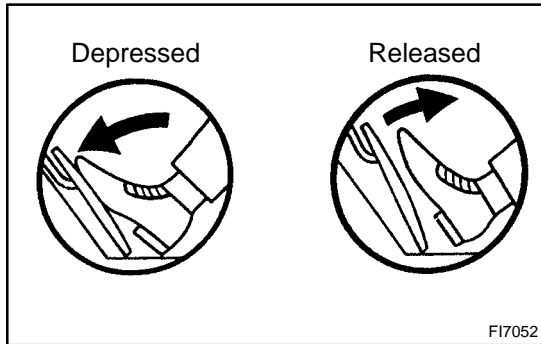
INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may be open.
- Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

Hand-held tester:

1 READ VALUE OF HAND-HELD TESTER(THROTTLE VALVE OPENING PERCENTAGE)



- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) Select the item "DIAGNOSIS / ENHANCED OBD II / DATA LIST / ETCS / THROTTLE POS" and read its value displayed on the hand-held tester.

Result:

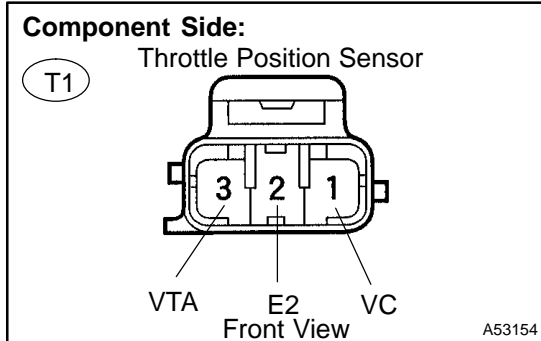
Accelerator Pedal Operation	Throttle Valve Opening Position (%)	Proceed to
Releasing and depressing	0	A
	From approx. 0 to 75	B
	Approx. 100	C

B CHECK FOR INTERMITTENT PROBLEMS (See page 05-41)

C Go to step 4

A

2 INSPECT THROTTLE POSITION SENSOR



- (a) Disconnect the T1 throttle position sensor connector.
- (b) Measure the resistance between the terminals of the throttle position sensor.

Standard:

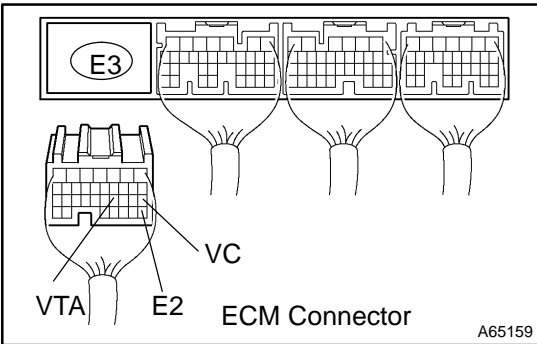
Tester Connection	Throttle Valve	Specified Condition
VC (T1-1) – E2 (T1-2)	—	2.5 to 5.9 kΩ
VTA (T1-3) – E2 (T1-2)	Fully closed	0.2 to 5.7 kΩ
	Fully open	2.0 to 10.2 kΩ

- (c) Reconnect the throttle position sensor connector.

NG REPLACE THROTTLE POSITION SENSOR

OK

3 CHECK HARNESS AND CONNECTOR(ECM – THROTTLE POSITION SENSOR)



- (a) Disconnect the E3 ECM connector.
- (b) Measure the resistance between the terminals of the E3 ECM connector.

Standard:

Tester Connection	Throttle Valve	Specified Condition
VC (E3-18) - E2 (E3-28)	—	2.5 to 5.9 kΩ
VTA(E3-21) - E2 (E3-28)	Fully closed	0.2 to 5.7 kΩ
	Fully open	2.0 to 10.2 kΩ

- (c) Check the resistance between the terminals of the E3 ECM connector.

Standard (Check for short):

Tester Connection	Specified Condition
VC (E3-18) – Body ground	10 kΩ or higher
VTA (E3-28) – Body ground	

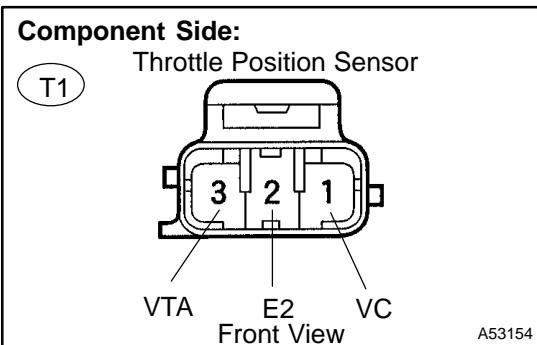
- (d) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM (See page10-11)

4 INSPECT THROTTLE POSITION SENSOR



- (a) Disconnect the T1 throttle position sensor connector.
- (b) Measure the resistance between the terminals of the throttle position sensor.

Standard:

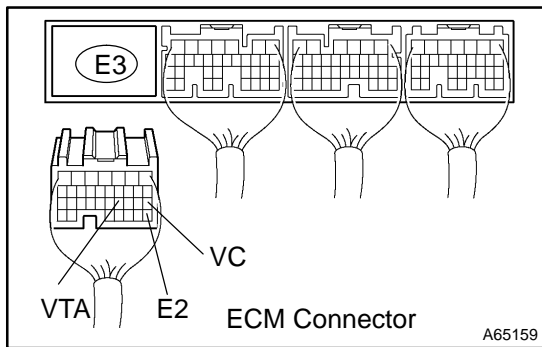
Tester Connection	Throttle Valve	Specified Condition
VC (T1-1) – E2 (T1-2)	—	2.5 to 5.9 kΩ
VTA (T1-3) – E2 (T1-2)	Fully closed	0.2 to 5.7 kΩ
	Fully open	2.0 to 10.2 kΩ

- (c) Reconnect the throttle position sensor connector.

NG → **REPLACE THROTTLE POSITION SENSOR**

OK

5 CHECK HARNESS AND CONNECTOR(ECM - THROTTLE POSITION SENSOR)



- (a) Disconnect the E3 ECM connector.
- (b) Disconnect the T1 throttle position sensor connector.
- (c) Check the resistance between the wire harness side connectors.

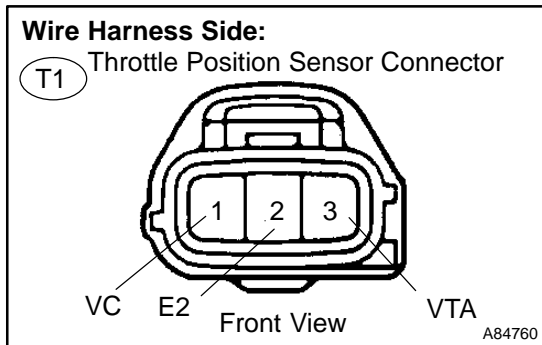
Standard (Check for open):

Tester Connection	Specified Condition
VC (T1-1) - VC (E3-18)	Below 1 Ω
VTA (T1-3) - VTA (E3-21)	
E2 (T1-2) - E2 (E3-28)	

Standard (Check for short):

Tester Connection	Specified Condition
VC (T1-1) or VC (E3-18) - Body ground	10 kΩ or higher
VTA (T1-3) or VTA (E3-21) - Body ground	

- (d) Reconnect the throttle position sensor connector.
- (e) Reconnect the ECM connector.



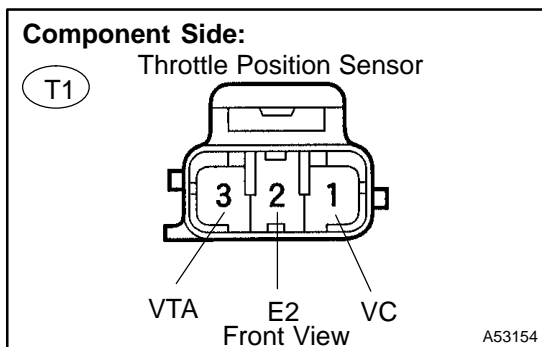
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM (See page 10-11)

OBD II scan tool (excluding hand-held tester):

1 INSPECT THROTTLE POSITION SENSOR



- (a) Disconnect the T1 throttle position sensor connector.
- (b) Measure the resistance between the terminals of the throttle position sensor.

Standard:

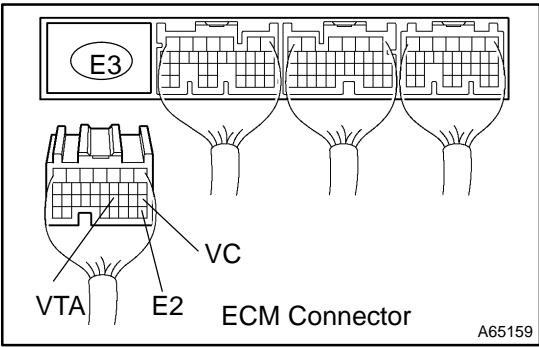
Tester Connection	Throttle Valve	Specified Condition
VC (T1-1) - E2 (T1-2)	—	2.5 to 5.9 kΩ
VTA (T1-3) - E2 (T1-2)	Fully closed	0.2 to 5.7 kΩ
	Fully open	2.0 to 10.2 kΩ

- (c) Reconnect the throttle position sensor connector.

NG → **REPLACE THROTTLE POSITION SENSOR**

OK

2 CHECK HARNESS AND CONNECTOR(THROTTLE POSITION SENSOR - ECM)



- (a) Disconnect the E3 ECM connector.
- (b) Measure the resistance between the terminals of the E3 ECM connector.

Standard:

Tester Connection	Throttle valve	Specified Condition
VC (E3-18) - E2 (E3-28)	—	2.5 to 5.9 kΩ
VTA(E3-21) - E2 (E3-28)	Fully closed	0.2 to 5.7 kΩ
	Fully open	2.0 to 10.2 kΩ

- (c) Check the resistance between the terminals of the E3 ECM connector.

Standard (Check for short):

Tester Connection	Specified Condition
VC (E3-18) - Body ground	10 kΩ or higher
VTA (E3-28) - Body ground	

- (d) Reconnect the ECM connector.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM (See page 10-11)