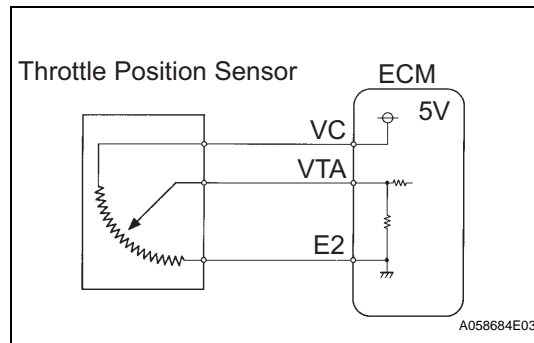


DTC	P0120	Throttle / Pedal Position Sensor / Switch "A" Circuit
DTC	P0122	Throttle / Pedal Position Sensor / Switch "A" Circuit Low Input
DTC	P0123	Throttle / Pedal Position Sensor / Switch "A" Circuit High Input

DESCRIPTION

ES



HINT:

These DTCs relate to the Throttle Position (TP) sensor.

The TP sensor is mounted on the throttle body and detects the throttle valve opening angle.

When the throttle valve is fully closed, the sensor transmits a signal voltage of approximately 0.3 to 1.0 V to terminal VTA of the ECM. This signal voltage increases in proportion to the opening angle of the throttle valve, reaching approximately 3.2 to 4.9 V when the throttle valve is fully open.

The ECM determines the vehicle driving conditions from these signals and uses this information in functions such as air-fuel ratio correction, power increase correction and fuel cut control.

DTC No.	DTC Detection Condition	Trouble Area
P0120	VTA less than 0.14 V, or VTA more than 4.91 V for 5 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> Throttle Position (TP) sensor ECM
P0122	VTA stays less than 0.14 V for 5 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> TP sensor Short in VTA circuit Open in VC circuit ECM
P0123	VTA stays more than 4.91 V for 5 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> TP sensor Open in VTA circuit Open in E2 circuit Short between VC and VTA circuits ECM

HINT:

- Fail-safe mode: When any of these DTCs are set, the ECM enters fail-safe mode. During fail-safe mode, the ECM cuts fuel intermittently. Fail-safe mode continues until a pass condition is detected and the ignition switch is turned OFF.
- When any of these DTCs are set, check the throttle valve opening angle using the intelligent tester.

Throttle Valve Fully Closed	Throttle Valve Fully Open	Trouble Area
0%	0%	VC circuit open VTA circuit open or short
Approximately 100%	Approximately 100%	E2 circuit open

MONITOR DESCRIPTION

The resistance of the Throttle Position (TP) sensor varies in accordance with the throttle valve opening angle. The ECM transmits a standardized reference voltage to the VC terminal of the TP sensor and calculates the throttle valve opening angle based on the voltage received from the VTA terminal of the sensor. When the throttle valve is near the fully closed position, the output voltage of the TP 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 TP sensor is outside the normal range, the ECM interprets this as a malfunction in the TP sensor and sets a DTC.

MONITOR STRATEGY

Related DTCs	P0120: Throttle position sensor range check (fluctuating) P0122: Throttle position sensor range check (low voltage) P0123: Throttle position sensor range check (high voltage)
Required sensors/components (Main)	TP sensor
Required sensors/components (Related)	-
Frequency of operation	Continuous
Duration	5 seconds
MIL operation	Immediate
Sequence of operation	None

ES

TYPICAL ENABLING CONDITIONS

Monitor runs whenever these DTCs not present	None
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TYPICAL MALFUNCTION THRESHOLDS

P0120:

Throttle position sensor voltage	Less than 0.14 V or more than 4.91 V
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P0122:

Throttle position sensor voltage	Less than 0.14 V
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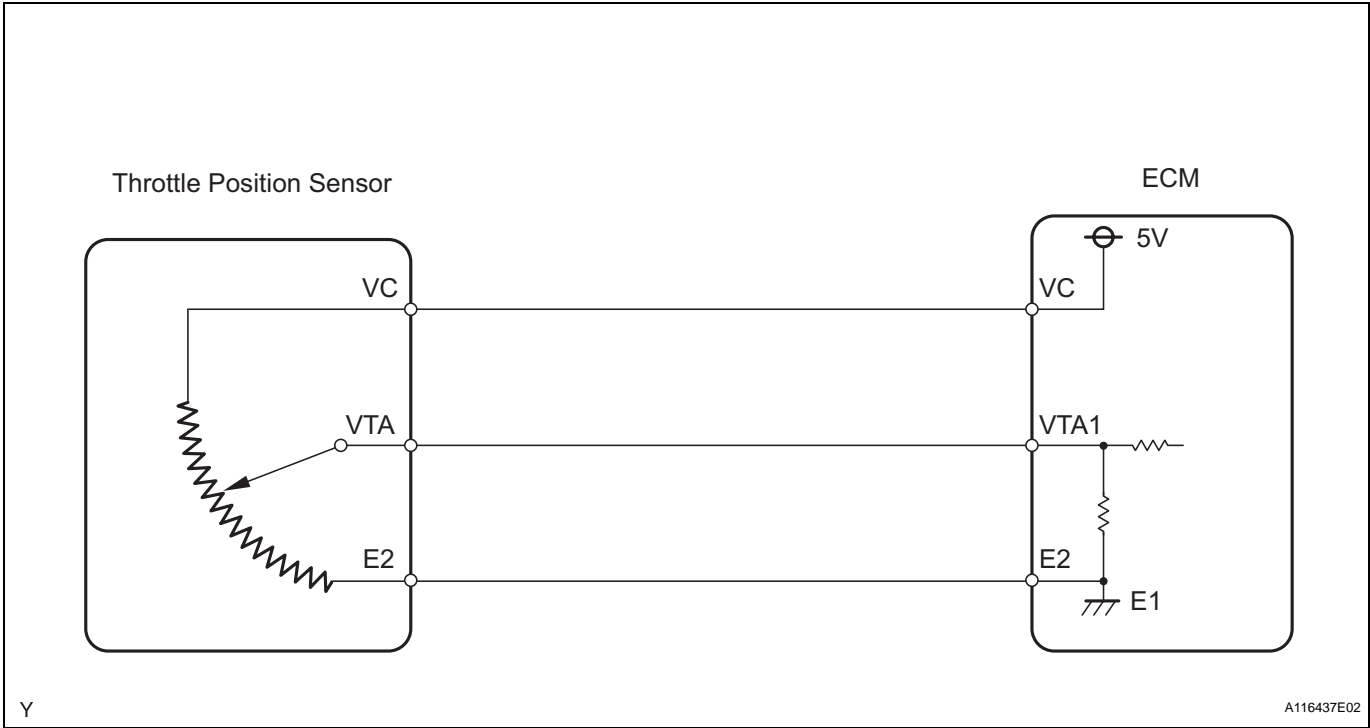
P0123:

Throttle position sensor voltage	More than 4.91 V
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COMPONENT OPERATING RANGE

Throttle position sensor voltage	Between 0.14 V and 4.91 V
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WIRING DIAGRAM



ES

HINT:

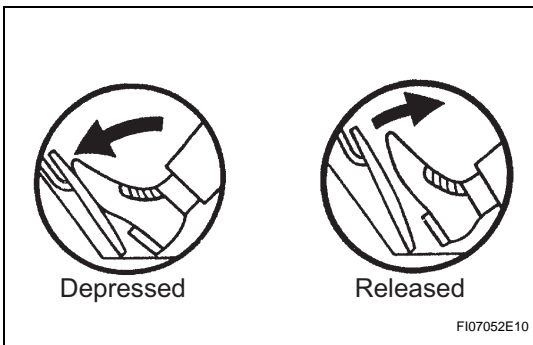
- If other DTCs relating to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester. Freeze frame data records the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 READ VALUE OF INTELLIGENT TESTER (THROTTLE VALVE OPENING PERCENTAGE)

- Connect the intelligent tester to the DLC3.
- Start the engine.
- On the tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ETCS / THROTTLE POS.
- Read its value displayed on the tester when the accelerator pedal is released and depressed.

Result

Throttle Valve Opening Angle (%)	Proceed to
0	A
From approximately 0 to 75	B
Approximately 100	C

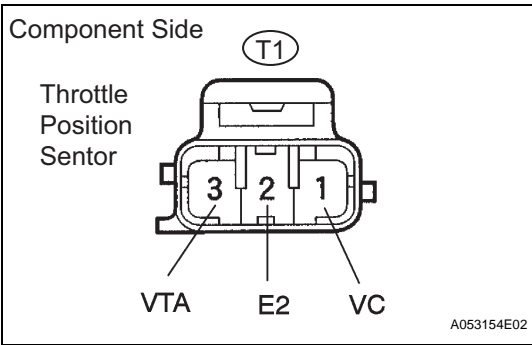


A

B CHECK FOR INTERMITTENT PROBLEMS

C Go to step 4

2 INSPECT THROTTLE POSITION SENSOR



- (a) Disconnect the T1 Throttle Position (TP) sensor connector.
- (b) Measure the resistance of the TP sensor.

Standard resistance

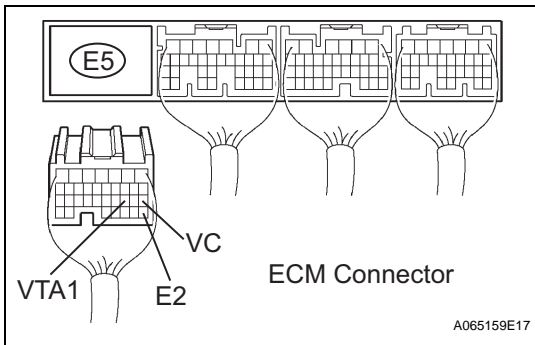
Tester Connection	Throttle Valve Position	Specified Condition
VC (T1-1) - E2 (T1-2)	-	2.5 to 5.9 kΩ
VTA (T1-3) - E2 (T1-2)	Fully closed	0.2 to 5.7 kΩ
VTA (T1-3) - E2 (T1-2)	Fully open	2.0 to 10.2 kΩ

OK

NG → REPLACE THROTTLE POSITION SENSOR

ES

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



- (a) Disconnect the E5 ECM connector.
- (b) Measure the resistance of the ECM connector.

Standard resistance

Tester Connection	Throttle Valve Position	Specified Condition
VC (E5-18) - E2 (E5-28)	-	2.5 to 5.9 kΩ
VTA1 (E5-20) - E2 (E5-28)	Fully closed	0.2 to 5.7 kΩ
VTA1 (E5-20) - E2 (E5-28)	Fully open	2.0 to 10.2 kΩ

Standard resistance (Check for short)

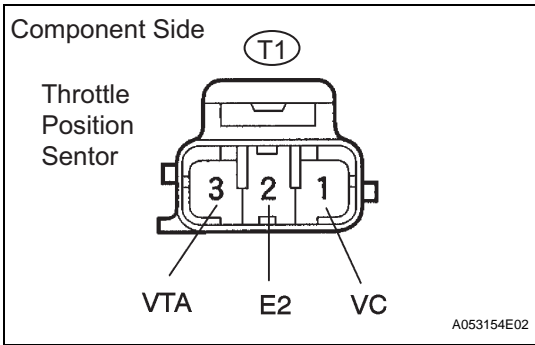
Tester Connection	Specified Condition
VC (E5-18) - Body ground	10 kΩ or higher
VTA1 (E5-20) - Body ground	10 kΩ or higher

OK

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

REPLACE ECM

4 INSPECT THROTTLE POSITION SENSOR



- (a) Disconnect the T1 TP sensor connector.
- (b) Measure the resistance of the TP sensor.

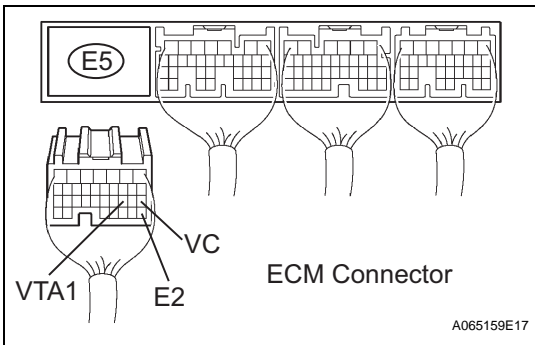
Standard resistance

Tester Connection	Throttle Valve Position	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
VTA (T1-3) - E2 (T1-2)	Fully open	2.0 to 10.2 kΩ

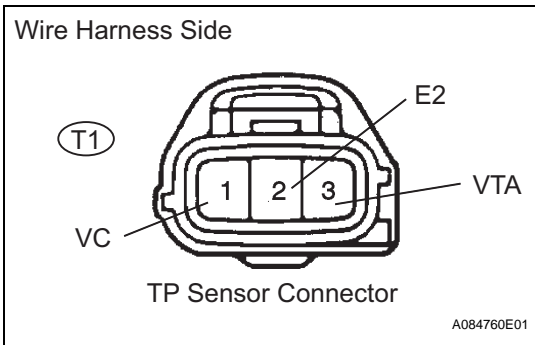
NG → **REPLACE THROTTLE POSITION SENSOR**

OK

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



- (a) Disconnect the E5 ECM connector.



- (b) Disconnect the T1 TP sensor connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance (Check for open)

Tester Connection	Specified Condition
VC (T1-1) - VC (E5-18)	Below 1 Ω
VTA (T1-3) - VTA1 (E5-20)	Below 1 Ω
E2 (T1-2) - E2 (E5-28)	Below 1 Ω

Standard resistance (Check for short)

Tester Connection	Specified Condition
VC (T1-1) or VC (E5-18) - Body ground	10 kΩ or higher
VTA (T1-3) or VTA1 (E5-20) - Body ground	10 kΩ or higher

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

OK

REPLACE ECM

ES