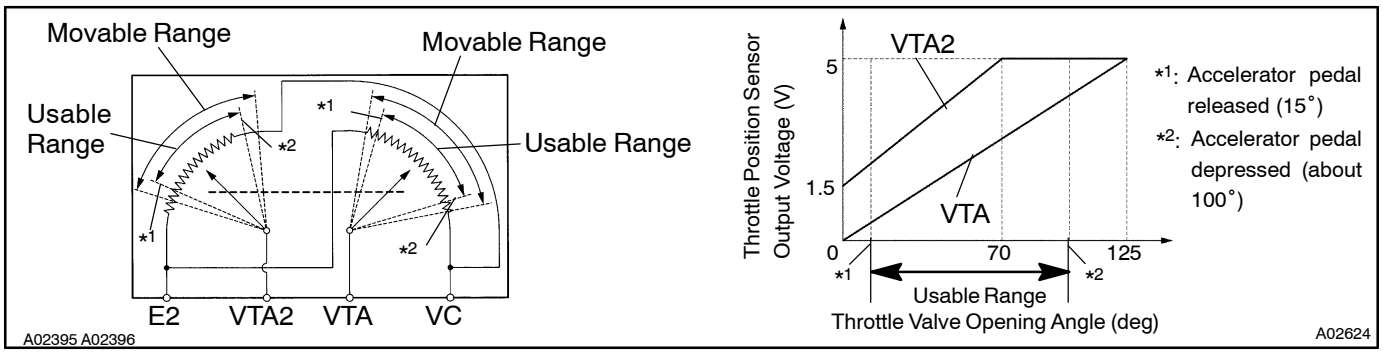
DTC	P0120/41	THROTTLE PEDAL POSITION SENSOR/SWITCH ”A” CIRCUIT MALFUNCTION

HINT:
Specifications for the Australian vehicles are displayed ”Throttle Position Sensor Circuit Malfunction”.

CIRCUIT DESCRIPTION

Throttle position sensor is mounted on the throttle body and it has 2 sensors to detect the throttle opening angle and the malfunction of the throttle position sensor’s own.
The voltage applied to terminals VTA and VTA2 of the ECM changes between 0 V and 5 V in proportion to the opening angle of the throttle valve.
The ECM judges the current opening angle of the throttle valve from these signals input from terminals VTA and VTA2, and the ECM controls the throttle motor to make the throttle valve angle properly in response to the driving condition.
If this DTC is stored, the ECM cuts the power down for the throttle motor, and the throttle valve is fully closed by the return spring.

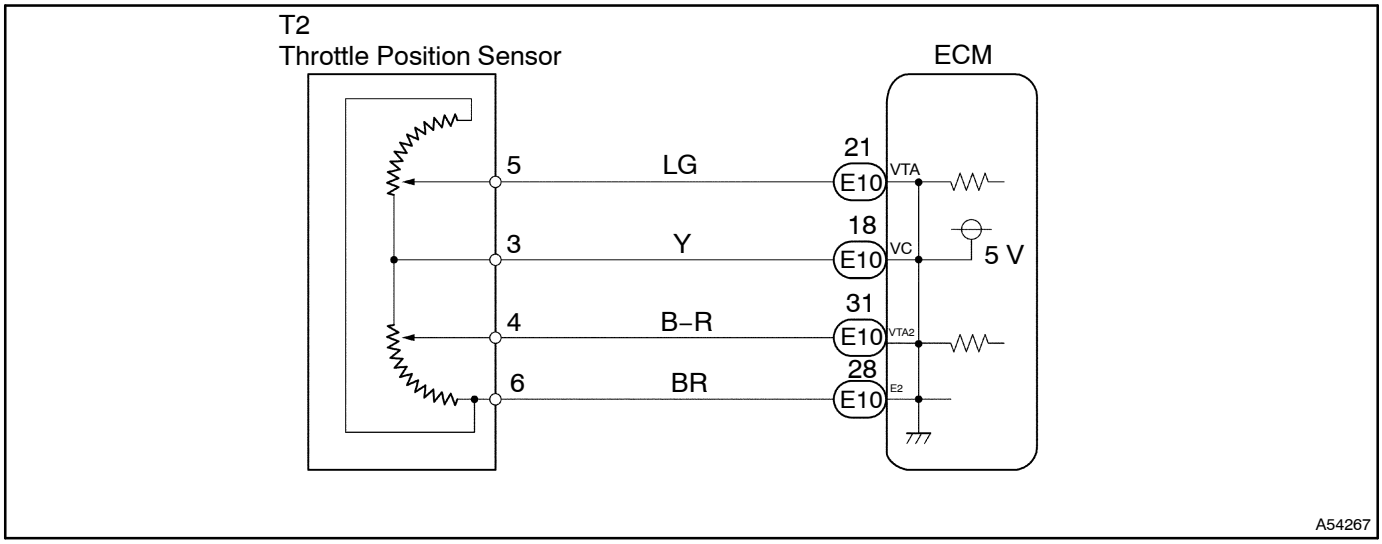


DTC No.	DTC Detection Condition	Trouble Area
P0120/41	Condition (a), (b), (c), (d) or (e) continues for 2.0 seconds: (Idle is ON: 10 seconds) (a) VTA ≦ 0.2 V (b) VTA2 ≦ 0.5 V (c) VTA ≧ 4.8 V (d) When VTA ≧ 0.2 V and ≦ 1.8 V, and VTA2 ≧ 4.97 V (e) VTA–VTA2 ≦ 0.02 V (f) Idle is OFF	• Throttle position sensor circuit • Throttle body (Throttle position sensor) • ECM
	Condition (a) continues for 0.4 seconds: (a) VTA ≦ 0.2 V and VTA2 ≦ 0.5 V	

HINT:
After confirming DTC P0120/41, use a hand–held tester to confirm the throttle valve opening percentage and closed throttle position switch condition.

Accelerator pedal position expressed as percentage and voltage				Trouble area
Accelerator pedal released		Accelerator pedal depressed		
THROTTLE POS	THROTTLE POS #2	THROTTLE POS	THROTTLE POS #2	
0 %	0 V	0 %	0 V	VC circuit open
0 %	2.0 – 2.9 V	0 %	4.6 – 5.0 V	VTA circuit open or ground short
8 – 20 %	0 V	64 – 96 %	0 V	VTA2 circuit open or ground short
100 %	5 V	100 %	5 V	E2 circuit open

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using a hand–held tester, as 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.

When using Hand–held Tester:

1	READ VALUE OF HAND–HELD TESTER

(a) Read the throttle valve opening percentage for the VTA circuit and read the voltage for the VTA2 circuit.

Accelerator pedal	Throttle valve opening percentage (VTA)	VTA2 Voltage
Released	8 – 20 %	2.0 – 2.9 V
Depressed	64 – 96 %	4.6 – 5.0 V

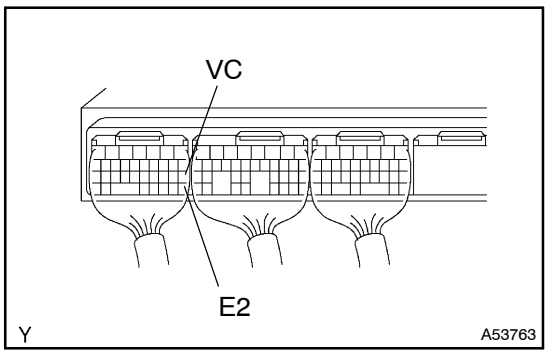
HINT:
The trouble area is found by the throttle valve opening percentage.

Accelerator pedal	Throttle valve opening percentage	Trouble area
Released	100 %	Open E2 circuit
Depressed	100 %	Open VC or VTA circuit
Released	except 0 %	Open or short VTA2 circuit
Depressed	except 100 %	Open or short VTA2 circuit

OK → CHECK FOR INTERMITTENT PROBLEMS

NG

2 CHECK ECM(VC–E2)

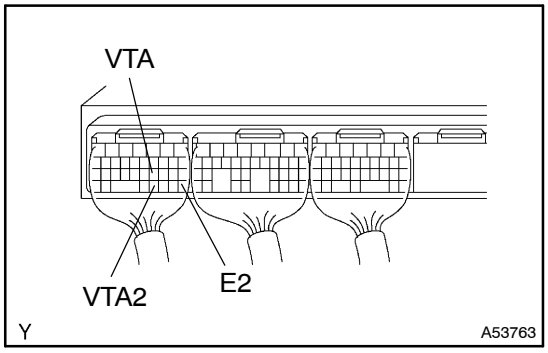


(a) Measure the voltage between terminals VC and E2.
Voltage: 4.5 – 5.5 V

NG → **CHECK AND REPLACE ECM**

OK

3 CHECK ECM(VTA–E2,VTA2–E2)



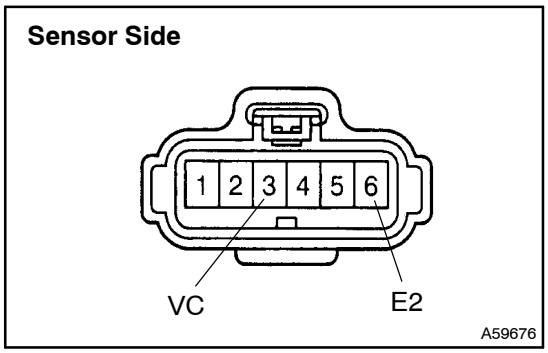
(a) Measure the voltage between terminals VTA and E2, and VTA2 and E2.

Accelerator pedal	Voltage	
	VTA – E2	VTA2 – E2
Released	0.4 – 1.0 V	2.0 – 2.9 V
Depressed	3.2 – 4.8 V	4.6 – 5.0 V

OK → **CHECK AND REPLACE ECM**

NG

4 INSPECT THROTTLE BODY ASSY(THROTTLE POSITION SENSOR)

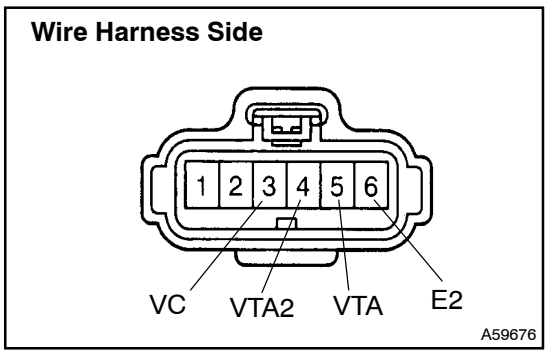


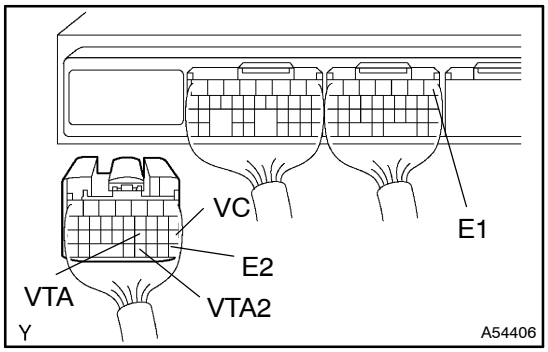
(a) Disconnect the throttle body connector.
(b) Using an ohmmeter, measure the resistance between terminals VC and E2.
Resistance: 1.2 – 3.2 kΩ at 20°C (68°F)

NG → **REPLACE THROTTLE BODY ASSY**

OK

5	CHECK WIRE HARNESS





(a) Disconnect the throttle body connector.
(b) Disconnect the E10 ECM connector.
(c) Check the continuity between terminals in the chart below.

Standard:

Check for open

Throttle position sensor connector terminal	E10 ECM connector terminal	Continuity
VC (3)	VC (18)	Continuity
VTA (5)	VTA (21)	Continuity
VTA2 (4)	VTA2 (31)	Continuity
E2 (6)	E2 (28)	Continuity

Check for short

Throttle position sensor connector terminal	E8 ECM terminal	Continuity
VC (3)	1 (E1)	No continuity
VTA (5)		No continuity
VTA2 (4)		No continuity
ETA (6)		No continuity

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

OK

CHECK AND REPLACE ECM

When not using Hand–held Tester:

Perform the step 2 to 5.