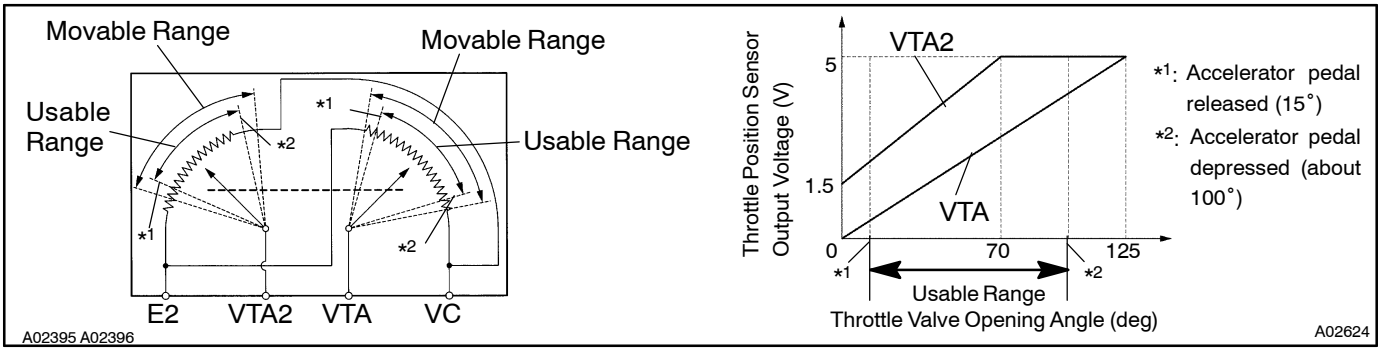
| DTC | P0120/41 | THROTTLE PEDAL POSITION SENSOR/SWITCH ”A” CIRCUIT MALFUNCTION |
|---|---|---|

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.

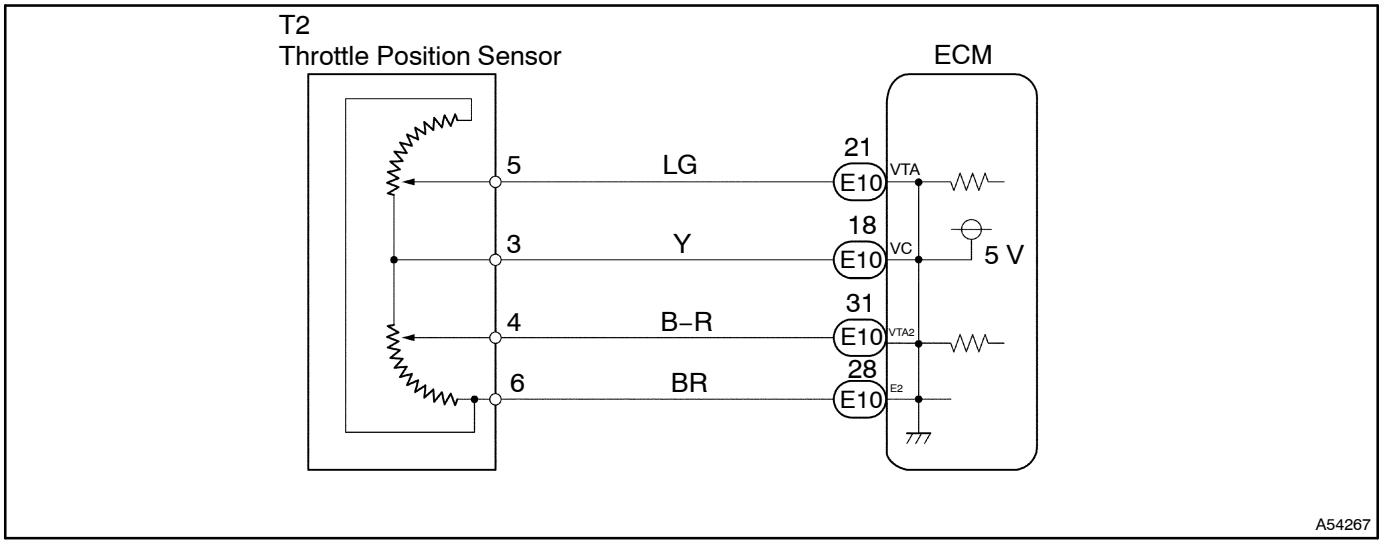



| DTC No. | DTC Detection Condition | Trouble Area |
|---|---|---|
| P0120/41 | Condition (a), (b), (c), (d) or (e) continues for 2.0 seconds: (Idle is ON: 10 seconds)<br>(a) VTA ≦ 0.2 V<br>(b) VTA2 ≦ 0.5 V<br>(c) VTA ≧ 4.8 V<br>(d) When VTA ≧ 0.2 V and ≦ 1.8 V, and VTA2 ≧ 4.97 V<br>(e) VTA–VTA2 ≦ 0.02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

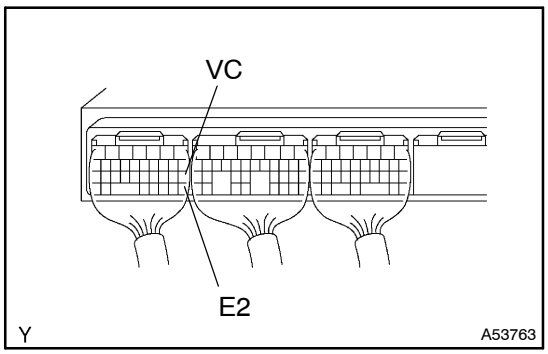
HINT:
The trouble area is found by the throttle valve opening percentage.

| 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)

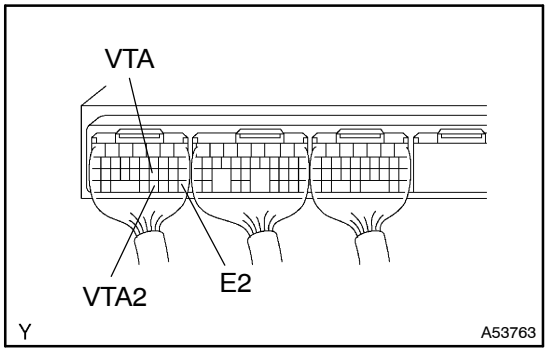



(a) Measure the voltage between terminals VC and E2.
**Voltage: 4.5 – 5.5 V**

**NG** → **CHECK AND REPLACE ECM**

**OK**

## 3 CHECK ECM(VTA–E2,VTA2–E2)



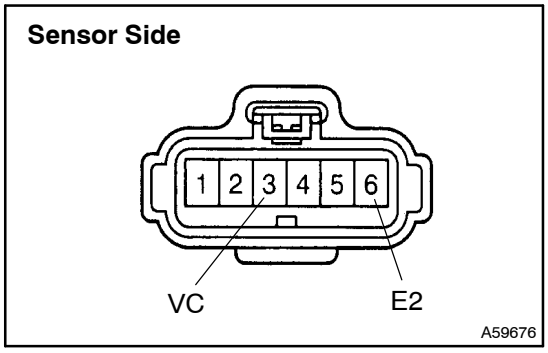

(a) Measure the voltage between terminals VTA and E2, and VTA2 and E2.

| 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)

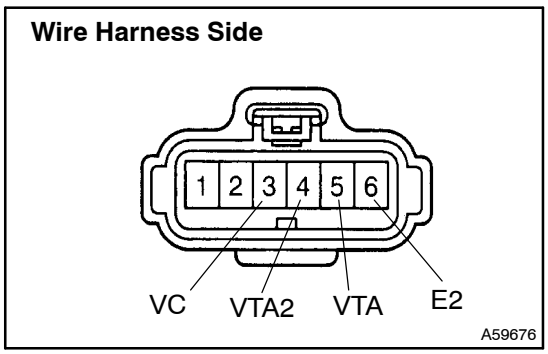


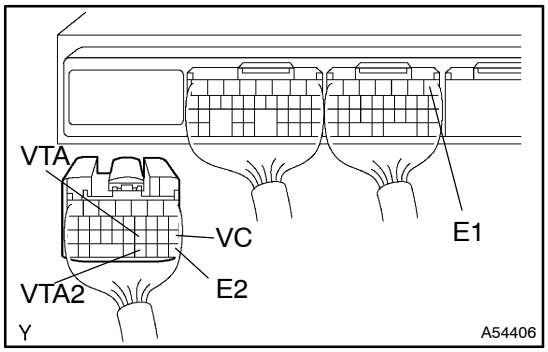

(a) Disconnect the throttle body connector.
(b) Using an ohmmeter, measure the resistance between terminals VC and E2.
**Resistance: 1.2 – 3.2 kΩ at 20°C (68°F)**

**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.