DTC	P2102	THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT LOW

DTC	P2103	THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT HIGH

CIRCUIT DESCRIPTION

The throttle motor is operated by the ECM and it opens and closes the throttle valve.

The opening angle of the throttle valve is detected by the throttle position sensor which is mounted on the throttle body. The throttle position sensor provides feedback to the ECM. This feedback allows the ECM to control the throttle motor and monitor the throttle opening angle as the ECM responds to driver inputs.

HINT:

This Electrical Throttle Control System (ETCS) does not use a throttle cable.

DTC No.	DTC Detection Condition	Trouble Area
P2102	Conditions (a) and (b) continue for 2.0 seconds: (a) Throttle control motor output duty is 80 % or more (b) Throttle control motor current is 0.5 A or less	• Open in throttle control motor circuit • Throttle control motor • ECM
P2103	Following conditions are met. • Throttle control motor current is 10 A or more (0.6 second) • Hybrid IC current limiter port: Fail When electric throttle actuator is ON (i.e. actuator power ON or actuator power supply voltage is 8 V or more)	• Short in throttle control motor circuit • Throttle control motor • Throttle valve • Throttle body assembly • ECM

MONITOR DESCRIPTION

The ECM monitors the flow of electrical current through the electronic throttle motor, and detects malfunction or open circuits in the throttle motor based on the value of the electrical current. When the current deviates from the standard values, the ECM concludes that there is a fault in the throttle motor. Or, if the throttle valve is not functioning properly (for example, stuck ON), the ECM concludes that there is a fault in the throttle motor and turns on the MIL and a DTC is set.

Example:

When the current is more than 10A. Or, the current is less than 0.5A when the motor driving duty ratio is more than 80%. The ECM concludes that the current is deviated from the standard values, turns on the MIL and a DTC is set.

FAIL SAFE

If the Electronic Throttle Control System (ETCS) has a malfunction, the ECM cuts off current to the throttle control motor. The throttle control valve returns to a predetermined opening angle (approximately 16°) by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel–cut) and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue to drive.

If the accelerator pedal is depressed firmly and slowly, the vehicle can be driven slowly.

If a "pass" condition is detected and then the power switch is turned OFF, the fail–safe operation will stop and the system will return to normal condition.

MONITOR STRATEGY

Case 1

Related DTCs	P2102: Throttle actuator control motor current (low current)
Required sensors/components	Throttle actuator motor
Frequency of operation	Continuous
Duration	2 seconds
MIL operation	Immediately
Sequence of operation	None

Case 2

Related DTCs	P2103: Throttle actuator control motor current (high current)
Required sensors/components	Throttle actuator motor
Frequency of operation	Continuous
Duration	0.6 second
MIL operation	1 driving cycle
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

Case 1

P2102: Throttle actuator control motor current (low current)

The monitor will run whenever the following DTCs are not present	See page 05–20
Throttle motor	ON
Difference between motor current of present and 0.016 second ago	Less than 0.2 A

Case 2

P2103: Throttle actuator control motor current (high current)

The monitor will run whenever the following DTCs are not present	See page 05–20
Throttle motor	ON

TYPICAL MALFUNCTION THRESHOLDS

Case 1

P2102: Throttle actuator control motor current (low current)

Throttle motor current	Less than 0.5 A (when motor drive duty is 80 % or more)

Case 2

P2103: Throttle actuator control motor current (high current)

Hybrid IC	Fail

WIRING DIAGRAM

T2
Throttle Body Assy
(Throttle Control Motor)

(Shielded)

ECM
Motor
Control
Circuit

2   L   6   E5   M+
1   P   5   E5   M–
            4   E5   GE01

Y   A82829
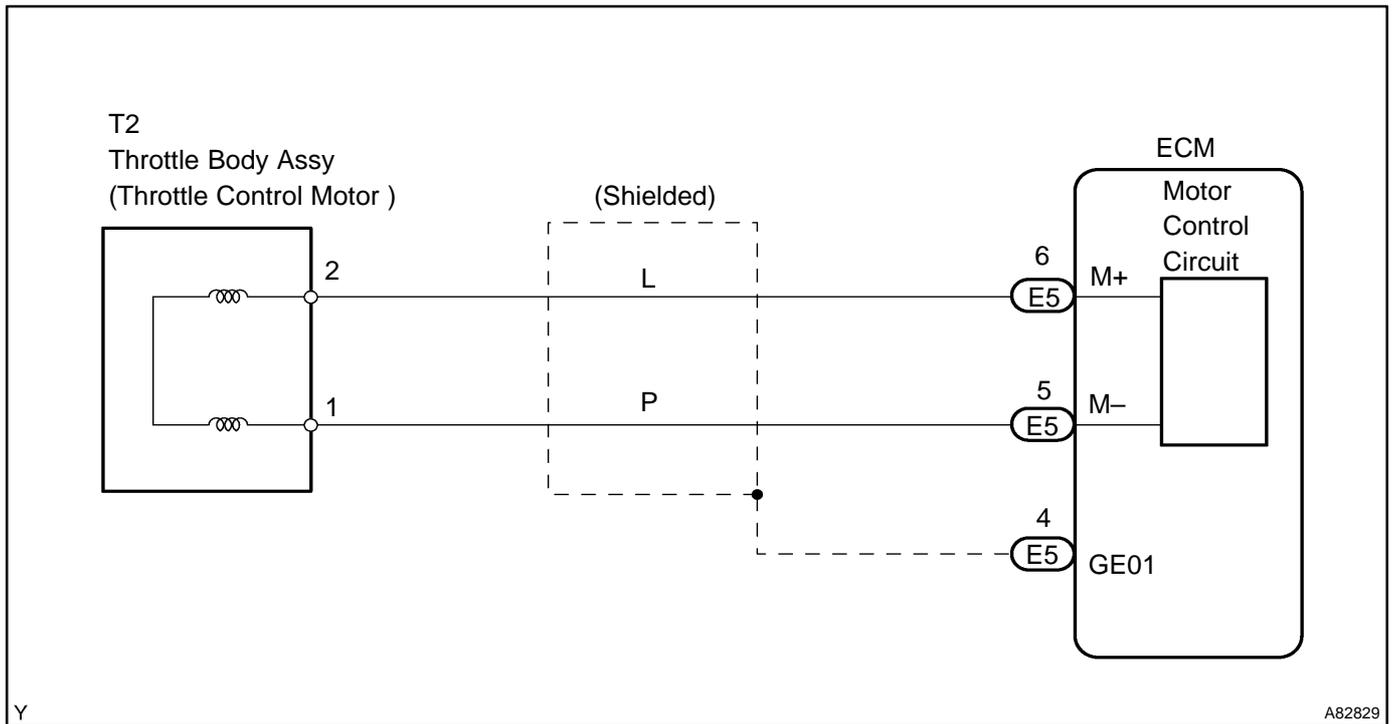
INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand−held tester or the OBD II scan tool. Freeze frame data records the engine condition when malfunction is detected. When troubleshooting, freeze frame data can help deter-mine 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 | INSPECT THROTTLE W/MOTOR BODY ASSY(THROTTLE CONTROL MOTOR) |

Component Side:

Throttle Control Motor Connector

T2

M+   M–

A88591
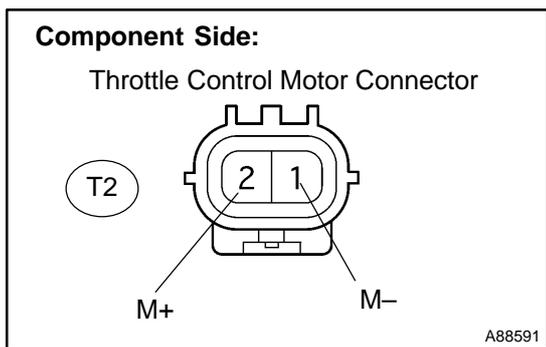
(a)   Disconnect the throttle control motor connector.
(b)   Using an ohmmeter, measure the motor resistance be-tween terminals 1 (M–) and 2 (M+).
   Standard:

Tester Connection	Specified Condition
M– (1) – M+ (2)	0.3 to 100 Ω at 20 °C (68 °F)

NG ▷ | **REPLACE THROTTLE W/MOTOR BODY ASSY (See page 10–13)** |

OK

| 2 | CHECK HARNESS AND CONNECTOR(ECM – THROTTLE CONTROL MOTOR) |

M+   M–

ECM Connector

A65745

Wire Harness Side:
Throttle Control Motor Connector

T2

M–   Front View   M+

A53155
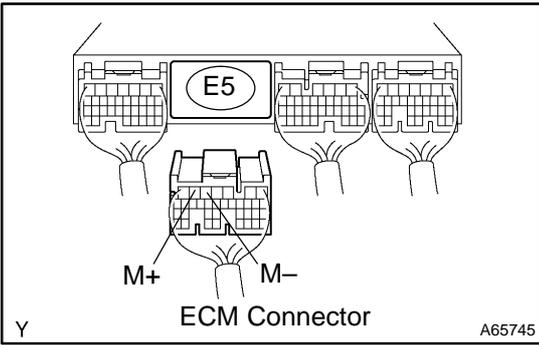
(a) Disconnect the E5 ECM connector.

(b) Disconnect the throttle control motor connector.

(c) Check the resistance between the wire harness side connectors.

Standard: (check for open)

Tester Connection	Specified Condition
Throttle control motor (2) – M+ (E5 –6)	Below 1 Ω
Throttle control motor (1) – M– (E5 –5)	Below 1 Ω

Standard: (check for short)

Tester Connection	Specified Condition
Throttle control motor (2) or M+ (E5–6) – Body ground	10 kΩ or higher
Throttle control motor (1) or M– (E5–5) – Body ground	10 kΩ or higher
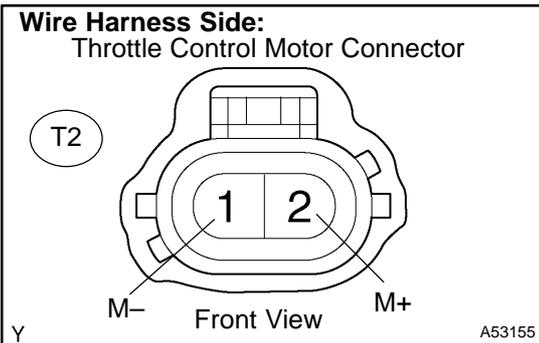
(d) Reconnect the ECM connector and the throttle control motor connector.

> NG > **REPAIR OR REPLACE HARNESS OR CONNECTOR**

> OK

| 3 | INSPECT THROTTLE W/MOTOR BODY ASSY |

(a) Visually check between the throttle valve and the housing for foreign objects.
Also, check if the valve can open and close smoothly.

OK: The throttle valve is not contaminated by foreign objects and can move smoothly.

> NG > **REMOVE FOREIGN OBJECT AND CLEAN THROTTLE BODY**

> OK

REPLACE ECM (See page 10–24)