

**DTC****P1602****Deterioration of Battery****DESCRIPTION**

The ECM determines the battery power according to the voltage of the BATT terminal while the engine is running (not cranking).

DTC No.	DTC Detection Condition	Trouble Area
P1602	Battery power is 0% (1 trip detection logic)	<ul style="list-style-type: none"> <li>• Battery</li> <li>• ECM back-up power source circuit</li> </ul>

**INSPECTION PROCEDURE****1****INSPECT BATTERY**

- (a) Inspect the battery specific gravity.
- (1) Check the specific gravity of each cell.  
**Standard gravity:**  
**1.25 to 1.29 at 20°C (68°F)**
- (b) Inspect the battery voltage.
- (1) After the vehicle is driven for 20 minutes, stop the engine.
  - (2) Turn the ignition switch ON, and turn on the headlights, blower fan and defogger for 1 minute.
  - (3) Turn the ignition switch OFF.
  - (4) Measure the battery voltage.  
**Standard voltage:**  
**9.6 V or more**

**NG****REPLACE BATTERY****OK****CHECK ECU POWER SOURCE CIRCUIT****ES**

<b>DTC</b>	<b>P2102</b>	<b>Throttle Actuator Control Motor Circuit Low</b>
------------	--------------	--

<b>DTC</b>	<b>P2103</b>	<b>Throttle Actuator Control Motor Circuit High</b>
------------	--------------	---

## DESCRIPTION

The throttle actuator is operated by the ECM and opens and closes the throttle valve using gears. The opening angle of the throttle valve is detected by the Throttle Position (TP) sensor, which is mounted on the throttle body. The TP sensor provides feedback to the ECM. This feedback allows the ECM to appropriately control the throttle actuator and monitor the throttle opening angle as the ECM responds to driver inputs.

### HINT:

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

DTC No.	DTC Detection Condition	Trouble Area
P2102	Conditions (a) and (b) continue for 2.0 seconds (1 trip detection logic): (a) Throttle actuator duty ratio 80% or more (b) Throttle actuator current less than 0.5 A	<ul style="list-style-type: none"> <li>Open in throttle actuator circuit</li> <li>Throttle actuator</li> <li>ECM</li> </ul>
P2103	Either of following conditions met (1 trip detection logic): <ul style="list-style-type: none"> <li>Hybrid IC diagnosis signal failure</li> <li>Hybrid IC current limiter port failure</li> </ul>	<ul style="list-style-type: none"> <li>Short in throttle actuator circuit</li> <li>Throttle actuator</li> <li>Throttle valve</li> <li>Throttle body assembly</li> <li>ECM</li> </ul>

## MONITOR DESCRIPTION

The ECM monitors the electrical current through the electronic actuator, and detects malfunctions and open circuits in the throttle actuator based on this value. If the current is outside the standard range, the ECM determines that there is a malfunction in the throttle actuator. In addition, if the throttle valve does not function properly (for example, stuck on), the ECM determines that there is a malfunction. The ECM then illuminates the MIL and sets a DTC.

### Example:

When the electrical current is less than 0.5 A and the throttle actuator duty ratio exceeds 80%, the ECM interprets this as the current being outside the standard range, and illuminates the MIL and sets a DTC. If the malfunction is not repaired successfully, a DTC is set when the engine is quickly revved to a high rpm several times after the engine is started and has idled for 5 seconds.

## MONITOR STRATEGY

Related DTCs	P2102: Throttle actuator current (low current) P2103: Throttle actuator current (high current)
Required Sensors/Components (Main)	Throttle actuator (throttle body)
Required Sensors/Components (Related)	None
Frequency of Operation	Continuous
Duration	2 seconds: P2102 0.1 seconds or 0.6 seconds: P2103
MIL Operation	Immediate
Sequence of Operation	None

## TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not present	None
--	------

### P2102:

Throttle actuator	Activated
Duty-cycle ratio to open throttle actuator	80% or more

Throttle actuator power supply	8 V or more
--------------------------------	-------------

**P2103:**

Throttle actuator	Activated
Throttle actuator power supply	8 V or more
Battery voltage	8 V or more
Starter	OFF

**TYPICAL MALFUNCTION THRESHOLDS**

**P2102:**

Throttle actuator current	Less than 0.5 A
---------------------------	-----------------

**P2103:**

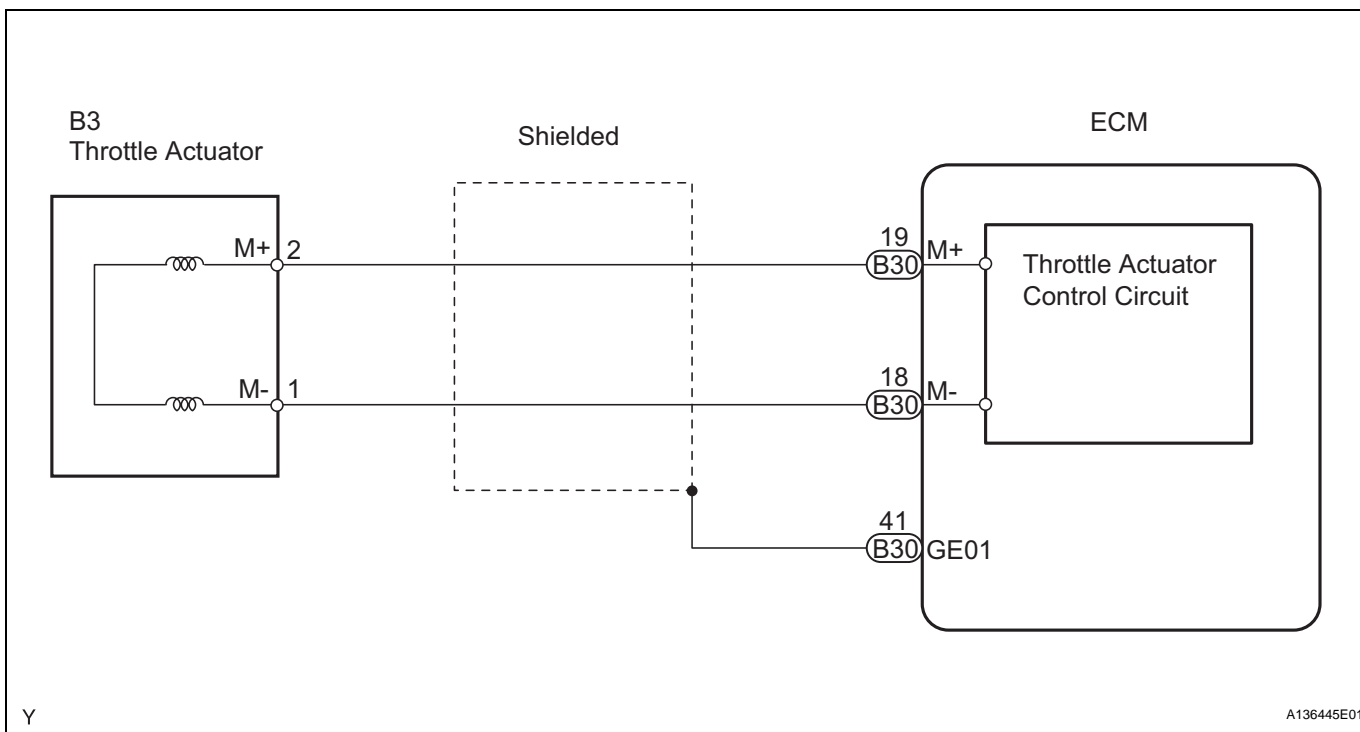
Either of the following condition is met	Condition 1 or 2
1. Hybrid IC diagnosis signal	Fail for 25 times
2. Hybrid IC current limiter port	Fail for 0.6 seconds

ES

**FAIL-SAFE**

When either of these DTCs, or other DTCs relating to ETCS (Electronic Throttle Control System) malfunctions, are set, the ECM enters fail-safe mode. During fail-safe mode, the ECM cuts the current to the throttle actuator off, and the throttle valve is returned to a 6° throttle angle by 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 allow the vehicle to continue at a minimal speed. If the accelerator pedal is depressed firmly and gently, the vehicle can be driven slowly. Fail-safe mode continues until a pass condition is detected, and the ignition switch is then turned OFF.

**WIRING DIAGRAM**



Y

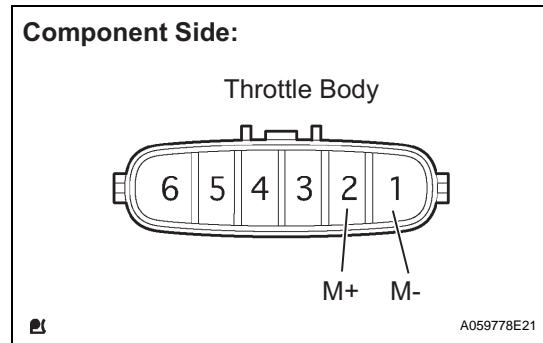
A136445E01

## INSPECTION PROCEDURE

HINT:

- 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 moving or stationary, 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.
- The throttle actuator current (THROTTLE MOT) and the throttle actuator duty ratio (THROTL OPN DUTY / THROTL CLS DUTY) can be read using the intelligent tester. However, the ECM shuts off the throttle actuator current when the ETCS malfunctions.

### 1 INSPECT THROTTLE BODY (RESISTANCE OF THROTTLE ACTUATOR)



- Disconnect the B3 throttle body connector.
- Measure the resistance of the throttle actuator.

**Standard resistance**

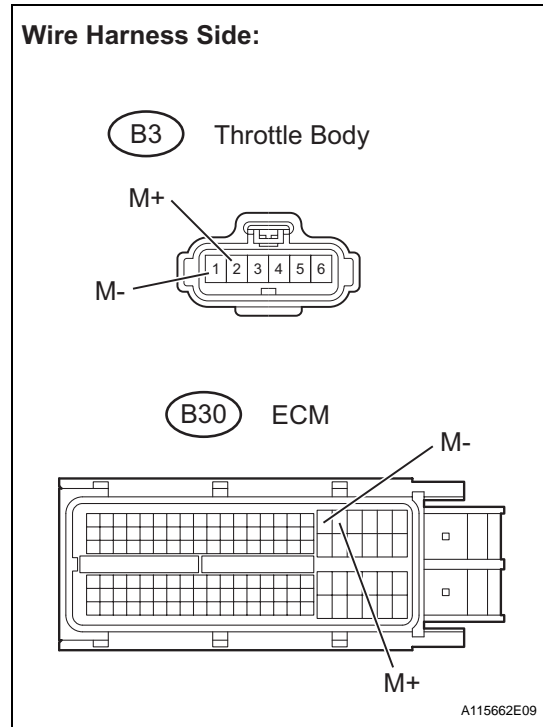
Tester Connection	Specified Condition
2 (M+) - 1 (M-)	0.3 to 100 Ω at 20°C (68°F)

- Reconnect the throttle body connector.

**NG** → **REPLACE THROTTLE BODY ASSEMBLY**

**OK**

### 2 CHECK WIRE HARNESS (THROTTLE ACTUATOR - ECM)



- Disconnect the B3 throttle body connector.
- Disconnect the B30 ECM connector.
- Measure the resistance.

**Standard resistance**

Tester Connection	Specified Condition
B3-2 (M+) - B30-19 (M+)	Below 1 Ω
B3-1 (M-) - B30-18 (M-)	Below 1 Ω
B3-2 (M+) or B30-19 (M+) - Body ground	10 kΩ or higher
B3-1 (M-) or B30-18 (M-) - Body ground	10 kΩ or higher

- Reconnect the throttle body connector.
- Reconnect the ECM connector.

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

**OK**

ES

**3 INSPECT THROTTLE BODY ASSEMBLY**

- (a) Check for foreign objects between the throttle valve and the housing.

**OK:**

**No foreign objects between throttle valve and housing.**

**NG**

**REMOVE FOREIGN OBJECT AND CLEAN THROTTLE BODY**

**OK**

**4 INSPECT THROTTLE VALVE**

- (a) Check if the throttle valve opens and closes smoothly.

**OK:**

**Throttle valve opens and closes smoothly.**

**NG**

**REPLACE THROTTLE BODY ASSEMBLY**

**OK**

**ES**

**REPLACE ECM**