TT418: DTCs P2135 and P2101 Theory and Diagnostics

November 3, 2009

Electrical

APPLIES TO	SYMPTOMS
2008-Later Touring, Police and Trike Models	• Driveability or Performance Concerns • Abnormal or Erratic Mechanical Operation • Intermittent or Erratic Electrical Operation

DTC P2135

General Information

Read this general information to better understand what can set code P2135 in the ECM. After the general information, you will find information about possible root causes and tips for diagnosing and repairing affected vehicles.

NOTE

Throttle Position Sensor circuit codes such as P0120, P0220, P0122, P0123, P0222 or P0223, should take diagnostic priority over a P2135 code. If any of these TP sensor codes exist concurrently with the P2135, they should be investigated first using the Electrical Diagnostic Manual.

The two TP sensors work opposite of each other. As the throttle plate opens, TPS1 voltage ranges from 0.0-5.0V, while TPS2 voltage ranges from 5.0-0.0V. The sum of the two TPS voltages should always measure approximately 5.0V. These wires are: TPS1, BN/V pin 37 of the ECM, and TPS BN/R pin 36 of the ECM.

The TP sensors 1 and 2 should never add to more than 5.13 VDC or less than 4.87 VDC. A sum of voltages out of this range should register a current P2135 code.

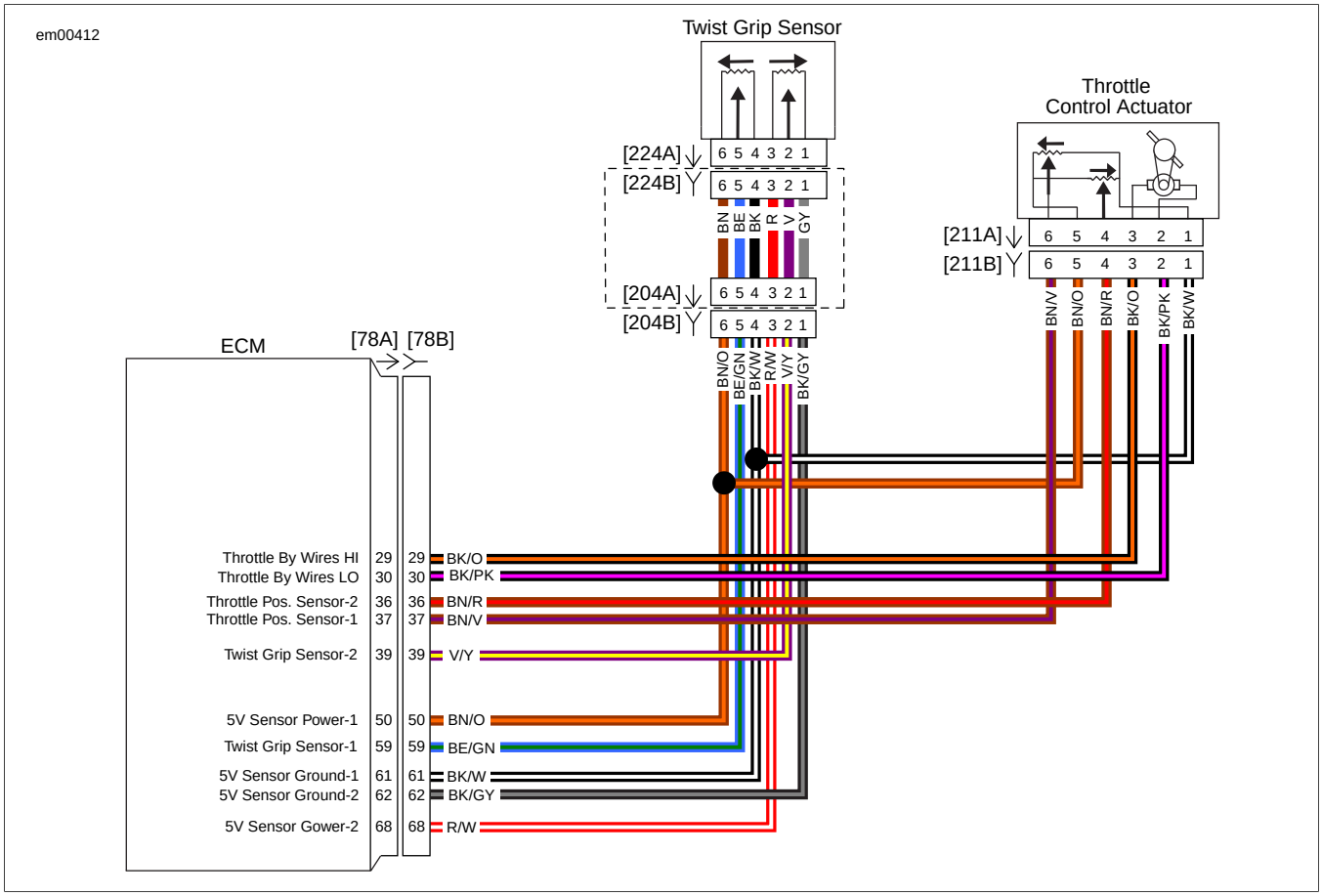

Figure 1. Schematic

Current Root Cause Investigation

It is believed that fretting corrosion is a major contributor to this code. A poor connection at the TCA can affect the sensor voltages reported to the ECM and set the DTC. As you can see from the General Information section, the sensor voltage only needs to be altered by 0.13 VDC to possibly set the code.

The most common vehicles to have these symptoms are those with more than 8000 miles or those vehicles with 103ci and larger engines. The vibration that these connections are exposed to is believed to contribute to the fretting condition.

Repair Procedure

1. While monitoring the TPS 1 and TPS 2 voltage on the DT II, wiggle the TCA and the ECM connectors.
2. If you the voltage changes while moving the ECM connector, inspect/replace the affected ECM terminals (Part No. 72605-08). These wires are: TPS1, BN/V pin 37 of the ECM, and TPS 2, BN/R pin 36 of the ECM.
3. If no voltage change is noted while moving the ECM connector, the connection issue could be in the TCA. Replace pins 1, 4, 5 and 6 at the TCA connector 211B (Part No. 72168-07).
4. Before connecting the TCA connector, clean the male TCA pins with a swab and alcohol, then assemble with dielectric grease (Part No. 99861-02 - Nyogel 760G).

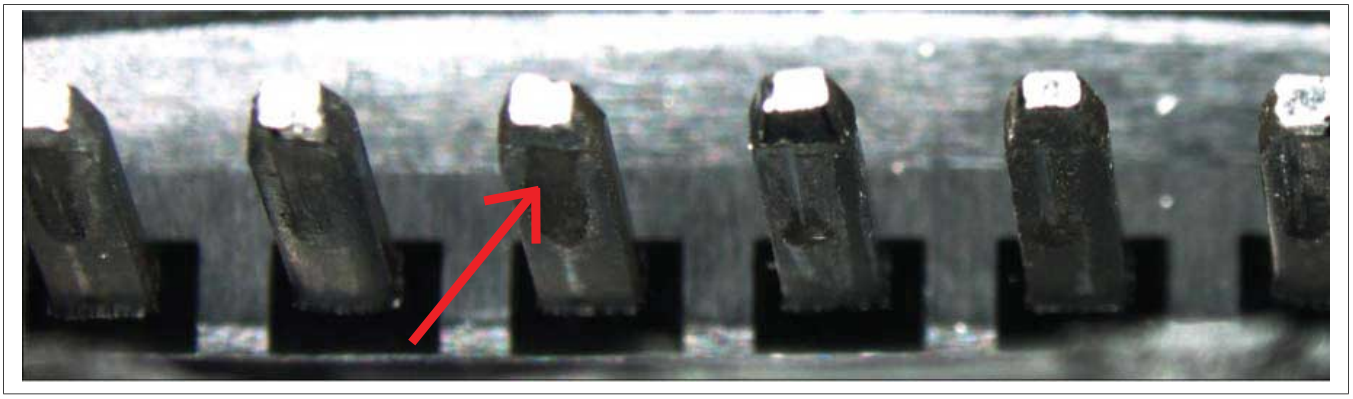

Figure 2. View of Fretting on Pins

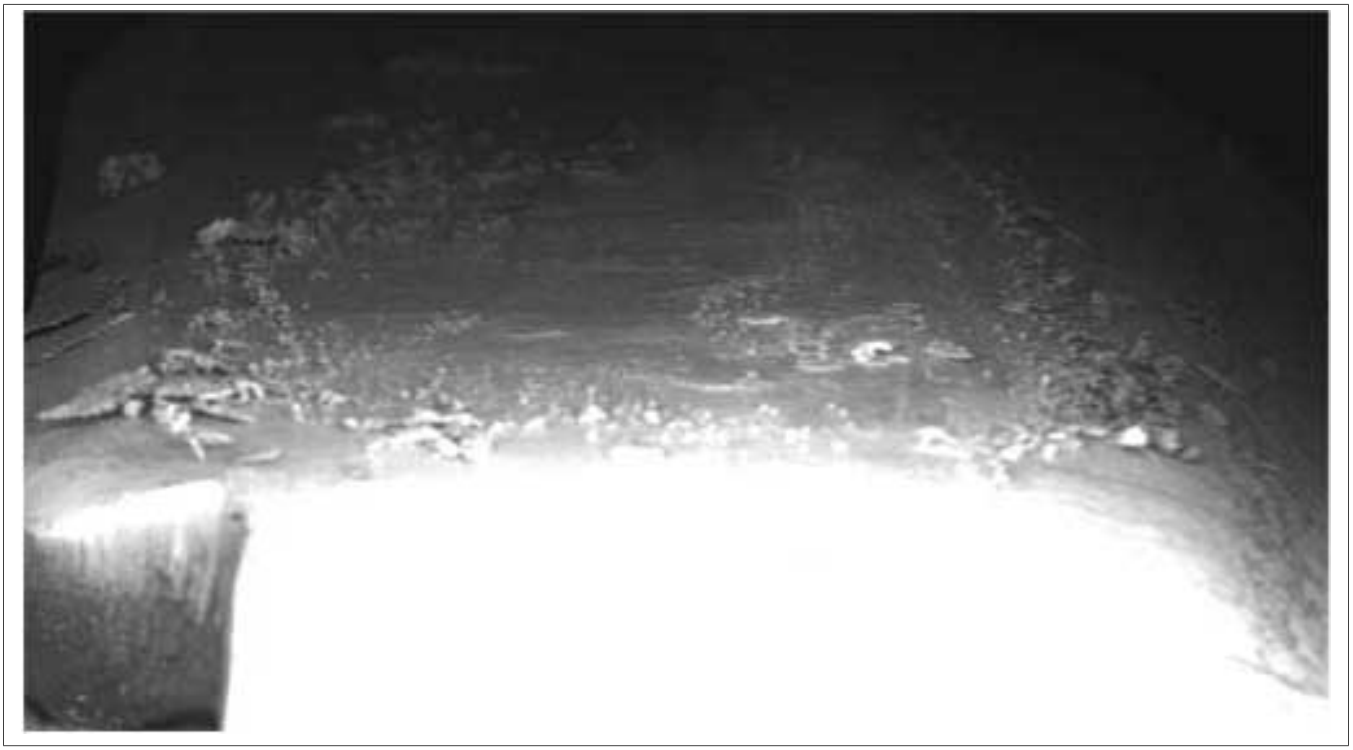

Figure 3. View of Fretting on Pins

DTC P2101

General Information

The TCA contains two potentiometers (designated as TPS1 and TPS2) and an electric DC motor for controlling the actuation of the throttle. TPS1 and TPS2 are mounted in the TCA. They are connected to the keyed shaft for the throttle plate and used to communicate the position of the throttle plate.

Each TPS supplies input to the ECM in response to the positioning of the throttle plate. The ECM activates the motor in the TCA to move the throttle plate, based on signals from the TGS. When the ECM sends voltage modulations to pins 2 and 3 of the TCA to move the throttle motor, it checks for subsequent TP1 and TP2 voltage changes. If it does not sense TP sensor changes, it can set this code.

Current Root Cause Investigation

First verify that the throttle plate moves freely while the engine is not running. If it does not, the TCA should be replaced.

Poor ECM connections seem to be the most likely cause. Be aware that issues with 2008 models may be aggravated by seat pan-to-ECM connector contact.

A poor connection at pins 29 and 30 could cause an interruption in voltage to the throttle motor and cause the code. Similarly the ECM uses voltage from pin 52 YEL/GN to supply power used at pins 29 and 30 and could cause the same symptoms.

Repair Procedure

Identifying connection issues at this location may be difficult.

1. Test the listed wires from the ECM to the TCA for opens and shorts before replacing any parts.
2. If the wires pass a resistance test and wiggle test, and the terminal pass visual inspections, the ECM socket terminals should be replaced. These are pins 29, 30, and 52 at the ECM.
3. After the repair, cycle the ignition switch three times waiting about 10 seconds at each position. Each time the key is turned on, the throttle plate will open slightly, then close again. This is a normal IAC learn function.