



# HOW TO:



## **New, Unusual Running Conditions on 1995-2001 ThunderMax Marelli Touring Models and 2001-2005 Delphi Type Models**

Since 1995, H-D® has been building fuel injected models. Now that these vehicles are starting to age, new and unusual operational problems are appearing, which are worth discussion.

As the oldest cycles in the fleet, 1995-2001 Magnetti-Marelli® equipped models were the first to experience symptoms. Additionally, many aging sensor and wiring problems are present in 2001-2005 Delphi models.

A data collection should be performed with a running log. This will allow the data to be properly analyzed using new tools in the ThunderMax software. ThunderMax diagnostic efforts have uncovered issues related to wiring, degraded sensors, or faulty IAC motors which will make your engine perform poorly. Careful inspection of these areas and components is critical to locating and correcting the problem.

### **Throttle Body Branch Inspection**

The fuel tank must be removed to inspect the engine harness and clips which attach to the m/c backbone on the frame. Many harnesses installed on motorcycles between 1995 and 2003 were tied too tightly to the backbone. When the engine shakes in the chassis, the wiring is pulled which slowly degrading the integrity of the wires. Additionally, the original wiring has already been subjected to 10 to 15 years of stress, heat and vibration, making this area a big target for locating problems. The harness must be released from the last frame clip to allow enough slack to reposition the connectors for the Delphi throttle body. Stress from constant tension could be pulling strands of wires out of the engine harness, creating intermittent and inconsistent engine operation. (See image of harness clip/wiring branches below)

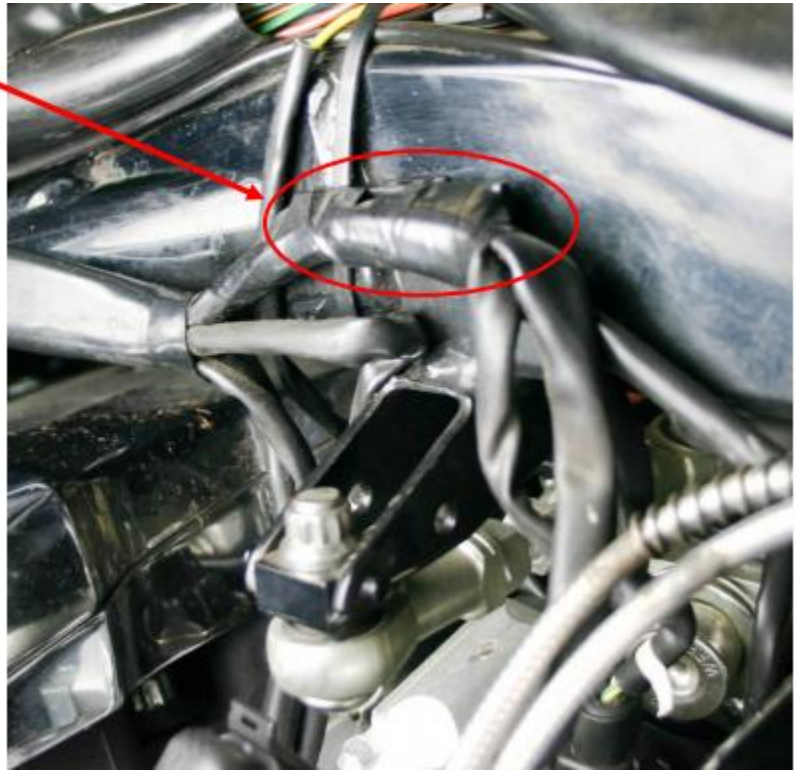


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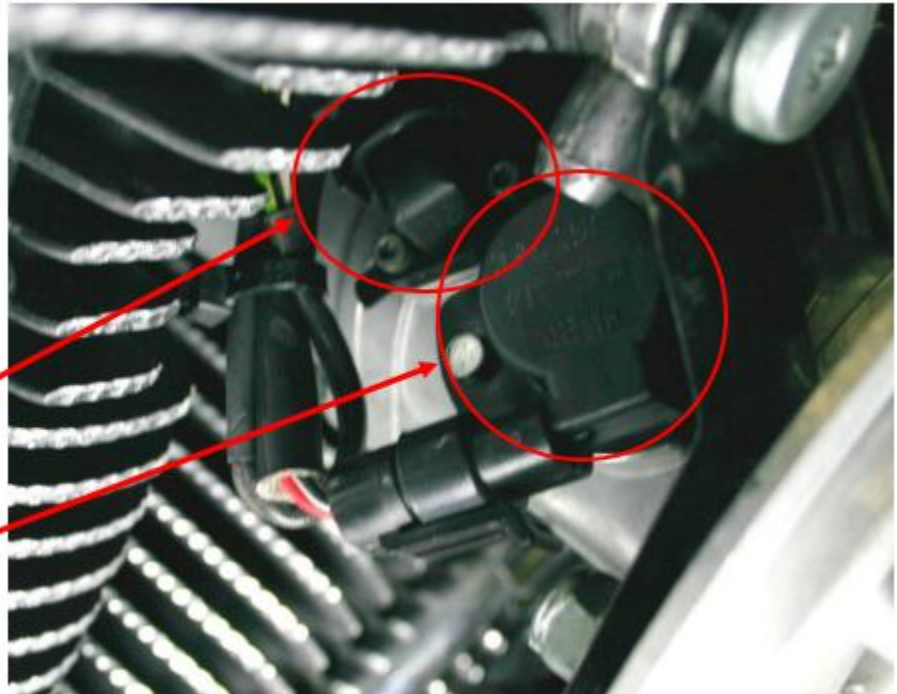
The harness clip may be released or repositioned to allow enough slack for the wiring branch that leads to the TPS and the MAT sensors to prevent excess stress on the wires & terminals.



TPS and MAT sensors at rear of throttle body. Note angle of wiring harness as it enters the terminal connector.

**MAT sensor**  
(Intake Air Temp)

**TPS sensor**  
(Throttle Position)





**MAT harness connector**  
(Intake Air Temp)

**IAC motor**  
(Idle Air Control)

The MAT harness connector and the IAC motor are shown above.

Through monitoring of gauges in the SmartLink software, we have discovered abnormal readings for throttle position, manifold air temp and erratic IAC movement. These will lead to poor performance, poor idle quality or abnormal fuel delivery. These conditions may be intermittent. Wires may be down to a few strands, broken inside the plastic coating, or broken at the terminal in the connector, resulting in intermittent or, eventually, no contact.

Troubleshooting this type of issue can be very time consuming and costly. Some technicians have reported changing results by grabbing, shifting or pulling on engine harness wires. A more accurate method would be to remove the pins from each TB sensor plug and locate damaged or broken wire in the harness. A common technique is to remove the pin from the sensor, and the damaged wire could pull right out of the harness. This will require repair or replacement to the EFI engine harness.



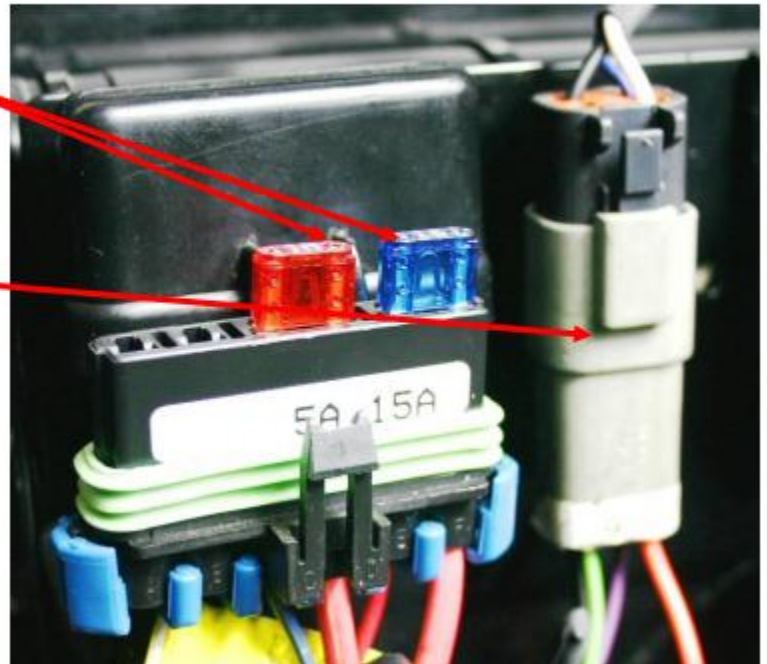
Note- A working, yet faulty, IAC motor will provide erratic A/F readings and poor performance. Replacing the IAC motor is a quick process worth trying.

## Fuse Panel

Corrosion at the terminals of the fuse panel, data port or other connectors is commonly found. Terminal corrosion may be hidden, and may require the removal, inspection and cleaning/repair of the fuse panel.

The ECM and Fuel Pump fuses are located outside of the ECM caddy. The Data Link port is also found in this area.

A typical arrangement from a 2001 model is shown in this view of the exposed fuse block and Data Link.



## ECM Harness Connector

Corrosion may also be found in the ECM harness terminal. Disassembly and careful inspection of the ECM terminals and housing will be required to properly diagnose a problem. Thoroughly clean any corrosion and repair any weak, broken or questionable wiring as needed. The image below shows damage to a Marelli model ThunderMax ECM as a result of power washing a motorcycle with the side cover removed, water invades past the seal entering the harness connector and settling around the ECM connector blades.



An example of ECM damage from corrosives entering the ECM harness connector.

## SENSORS

Abnormal operation could also be related to degradation of sensors. Partial failure of a sensor may not trigger a diagnostic code. If not replaced at install, we strongly recommend replacing the crank position sensor as a routine step during the installation of all ThunderMax Marelli conversion kits. A faulty cylinder head temperature sensor will cause inconsistent performance problems. Cam position sensors, where applicable, should be disconnected as noted in the ThunderMax M.M. kit instructions and good, clean voltage with a reliable grounds are essential. The Diagnostic Trouble Code window in SmartLink offers an overview of sensor status. Abnormal readings from the various sensors can also be detected using the monitor function in SmartLink.



Crank Position sensor is shown above near the oil filter and below the front cylinder.



Head Temp sensor is shown above at the upper left rear of the front cylinder.

**Very Important Note-** The following wiring color codes are provided to help identify the Data Link connection on Marelli Models which is used by the Auto-Tune module for power and communication. **NOTE: Damage will occur to the Auto-Tune module if connected to the Customer Accessory connector, which is similar to the Data link connector.**

### '95 to '01 FL pin #s / wire colors

#### Data Link:

- Pin 1= Light Green/Red
- Pin 2= Black
- Pin 3= Violet/Red
- Pin 4= Red/Orange

#### Customer Accessory Connector:

- Pin 1= Blue
- Pin 2= Red/Yellow
- Pin 3= Orange
- Pin 4= Black

