Advanced Thermal Fan Controller for the 2.3L Mazda6i

Scott Burton June 2006

The Mazda 6i engine management computer is tuned to optimize the operation of the 2.3L engine on regular octane gas. This tuning results in retarding the spark timing as the engines coolant temperature reaches about 208 degrees. (According to OBD data readings on my car.) With the standard thermostat calibration of 190 degrees, engine temperatures will frequently rise above 210 degrees and spark timing will be retarded, resulting is sluggish low RPM acceleration. This modification provides secondary inputs for the fan control relay and the engine coolant temperature sensor to engage the radiator cooling fans at lower temperatures and prevent the engine management computer from retarding the spark advance timing.

How it Works:

The Advanced Thermal Fan Controller provides two extra temperature sensors that provide the following improvements to the engine management system:

- Enables the fan control relay at a lower temperature than the factory setting. The sensor is mounted to the head using an existing accessory mounting bolt. As the head temperature reaches 180F, the radiator cooling fans are engaged.
- Lowers the Engine Coolant Temperature sensor reading by about –8 degrees if engine temps rise above 195 degrees.

The controller mounted on the engine hoist bracket.

Parts of the Advanced Thermal Fan Controller:

(Refer to these numbers in the directions below)

1. **Thermal Fan Control Sensor**
2. **Fan Relay wire**
3. **ECT Adaptor Lead**
4. **ECT Wire Harness Adaptor**
5. **Male & Female Wire Connectors**

Recommended Tools:

- **13mm wrench**
- **Pliers for removing fan relay.**
- **Small wire cutters.**
- **Crimp tool or locking pliers for attaching wire connectors.**

Installation Instructions:

Do not attempt installation on a hot engine !!

1. First, remove the engine 'beauty cover' and set aside. Locate the engine hoist bracket mounted on the rear side of the cylinder head. Loosen and remove the 13mm bolt and engine hoist bracket. (This bolt is very tight so you'll probably need to pull the wrench VERY firmly from the drivers side!)

Remove the 13mm bolt on the engine hoist bracket.

2. Position the provided washer and Thermal Fan Control Sensor (#1) on the bolt in front of the engine hoist bracket as shown. Make sure the flat side of the controller is facing the washer and engine hoist bracket.

Bolt with engine hoist bracket, washer & controller.

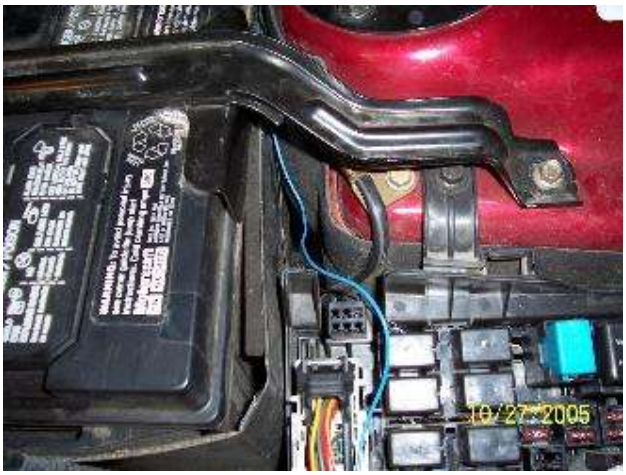
3. Hold the controller in an upright position while you reinstall and tighten the engine hoist bracket. Use a 13mm wrench and tighten down the bolt very tight. Allow the wires to route toward the drivers side of the car and keep them away from the exhaust manifold..

ATFC mounted on the engine hoist bracket.

4. Route the **Blue** fan relay wire (#2) under the fuel lines and around the back of the battery. Let the short wire with the ECT sensor plug (#3) hang loose for now.

Wire routing. (Blue wire shown.)

5. Route the wire around the back of the battery and up towards the fuse panel.

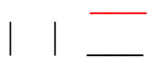


Wire routing around battery. (Blue wire shown.)

6. Remove the fuse panel cover and locate the primary fan relay within the fuse panel. This is the top relay in the 1st row of relays next to the main wire harness. This relay is designated as 'Fan Relay' on the diagram printed on the underside of the fuse panel cover. *Carefully* grasp the primary fan relay with pliers and remove it from the socket.

This is the relay to remove.

7. With the fan relay removed, push the 1/4" end section of stripped wire into the top-right hand connector of the relay socket. Make sure the wire is in contact with the relay socket contacts. The contacts are arranged as shown below. The Red line indicates the desired relay contact hole.

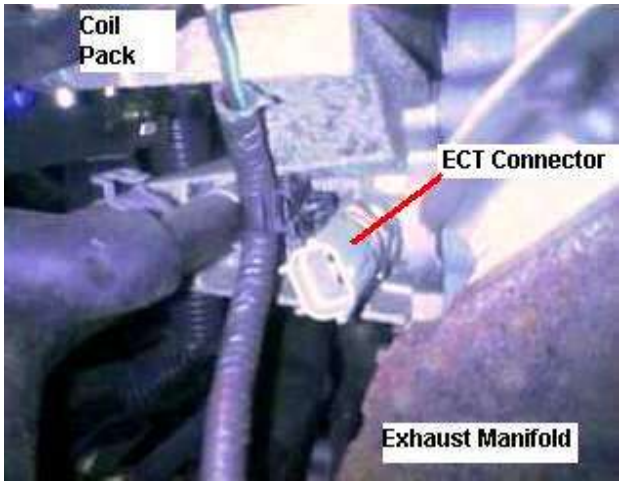


Connect the controller wire here.

8. Push the relay back into its socket to secure the wire in the socket contact. Route the controller wire out of the upper left corner of the fuse panel and replace the cover on the fuse panel.

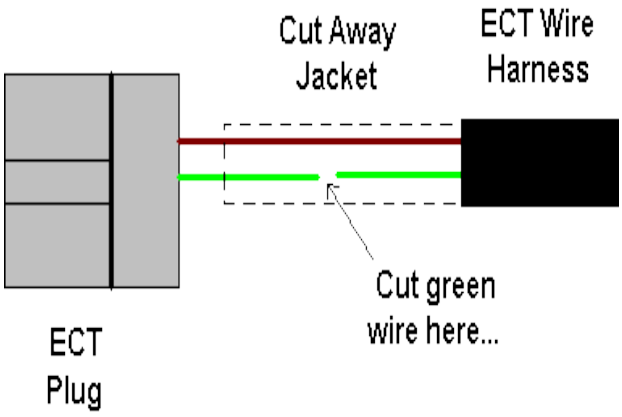
Replace the fan relay and the relay panel cover.

9. Locate the Engine Coolant Temperature (ECT) sensor plug located on the back side of the engine. It can be found below coil pack. Unplug the sensor wire harness plug by squeezing the sides of the plug and sliding it back, away from the ECT connector. (See close up picture at right.)



Close- up of ECT sensor plug on the back of the engine.

10. Using a wire cutter, carefully trim away about 3 inches of the protective jacket covering the 2 wires leading to the ECT sensor plug. When you're finished you should have about 3½ inches of green and brown wire insulation showing. Cut the **green** wire at the mid point of the exposed insulation or about 1 ½ inches behind the ECT plug. Strip away about 1/3" of insulation from both free ends of the green wire.

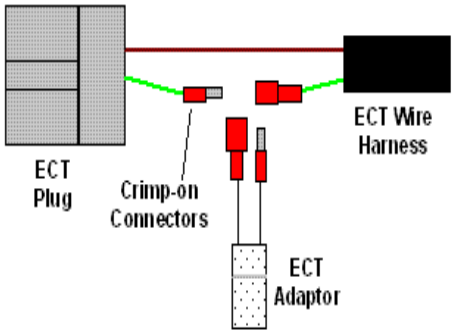


Remove 3" from the jacket and cut the Green wire

11. Using the provided red wire connectors, attach the Male and Female connectors (#5) to the stripped ends of each ECT green wire using a wire crimp tool. Plug the connectors from the ECT Wire Harness Adaptor into the new connectors you have installed on the green ECT wires. (See diagram on right.)

Note: The ECT green wires can be reconnected together if the wire harness adaptor is ever removed.

12. Re-connect the ECT plug back into the socket on the back of the head. Next, connect the loose ECT harness adaptor plug (#4) to the ECT adaptor lead (#3) dangling from the Thermal Fan Control Sensor (#1). Use the provided wire ties and bundle any loose wiring to the ECT wire harness to prevent any wires from touching the exhuast manifold.



Connect the ECT Adaptor to the green ECT wires.

Please send any comments or questions to sdburton@bellsouth.net