

Adjustable Fan Controller for the Mazda6

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With technical advice provided by ShaDrag and DJQuick of Mazda6Club

The Mazda6 engine management computer is tuned to optimize the operation of the engine on regular octane gas. This tuning results in retarding the spark timing as the engine coolant temperature reaches about 208 degrees. (According to OBD data readings on my car.) With the standard thermostat calibration, engine temperatures will frequently rise above 210 degrees and spark timing will be retarded by the ECU resulting in sluggish low RPM acceleration. This modification provides a secondary input for the fan control circuit to enable the operation of the radiator cooling fans at lower temperatures. The early activation of the fans helps to reduce engine coolant temperatures and maintain advanced spark timing for prompt throttle response.

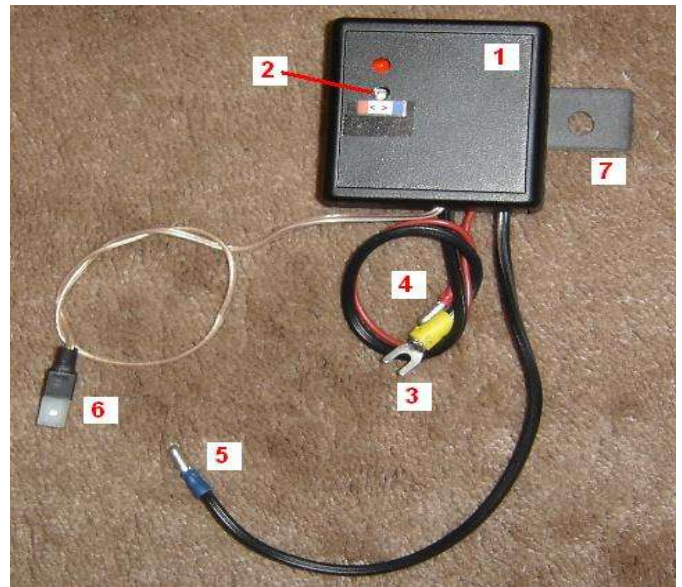
Overview of the Adjustable Fan Controller:

The connections and controls on the Adjustable Fan Controller consist of:

1. Adjustable Fan Controller.
2. Turn-on temperature adjustment.
3. Chassis ground connection.
4. +12 Volt supply wire.
5. Fan control ground wire.
6. Remote thermal sensor plug.
7. Mounting bracket.

Tools Required:

- Pair of pliers, small regular screwdriver
- 10mm, 13mm, & 14mm wrenches.

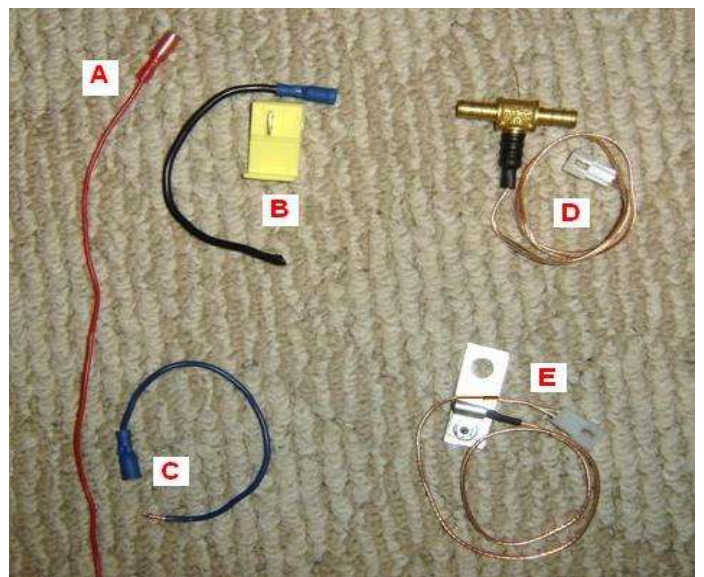


The Adjustable Fan Controller.

Installation Overview:

These installation directions are for both V6 and I4 Mazda6 vehicles with either the coolant or block thermal sensor. Be sure you are using the correct section of instructions for your car. Please make note of the different parts to be installed depending on your car and sensor:

- A) +12 Volt supply lead. (All models)
- B) Heavy black fan ground lead. (V6 only)
- C) Blue Fan Relay Lead (I4 only)
- D) Coolant Thermal Sensor.
- E) Block Thermal Sensor.



V6 & I4 Connectors with Thermal Sensors Options

Thermal Sensor Installation:

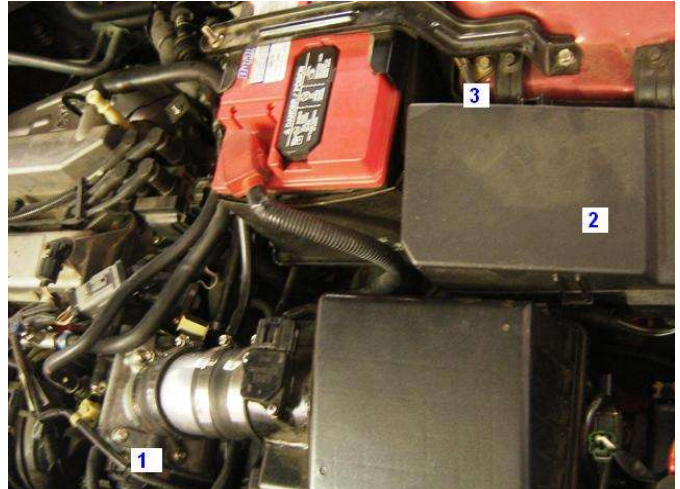
1. Preparation:

If you have a 2.3L, remove the engine cover and set aside. For future reference, identify and locate the (1) throttle body, (2) relay panel, and (3) a readily available chassis ground screw on your V6 or I4 engine bay.

Next, follow steps **2a**, **2b**, or **2c** for the appropriate Thermal Sensor you have purchased.



Mazda6s Engine Compartment



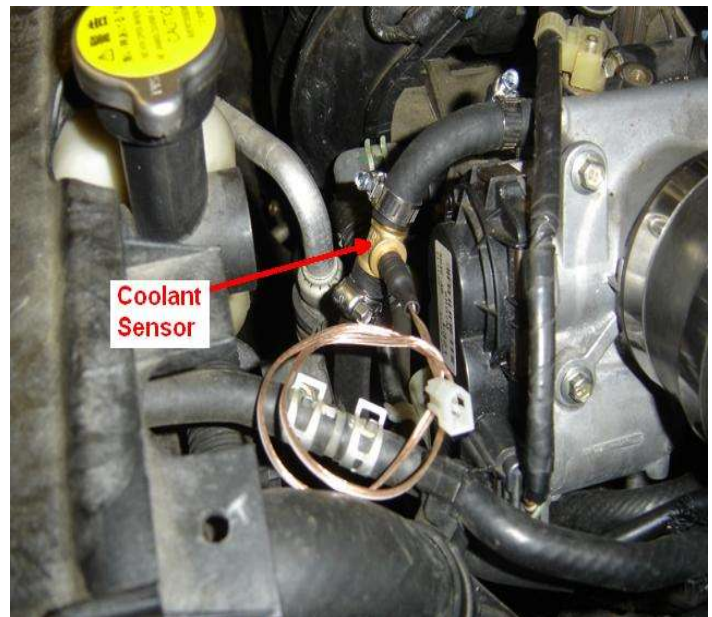
Mazda6i Engine Compartment

2a. Installing the Coolant Thermal Sensor:

The Coolant Thermal Sensor is designed to monitor the temperature of the coolant circulating in the throttle body coolant lines. To install the coolant sensor:

1. Remove the coolant line from the throttle body inlet coolant pipe.
2. Attach the 3" section of hose to the throttle body coolant pipe. Slip the 2 hose-clamps on to the hose.
3. Press the Coolant Thermal Sensor onto the open end of the small hose section.
4. Attach the loose coolant line to the other side of the Coolant Thermal Sensor using the remaining hose clamp..

Note: If the throttle body coolant bypass has been done, the Coolant Thermal Sensor can be used to join the 2 coolant lines.

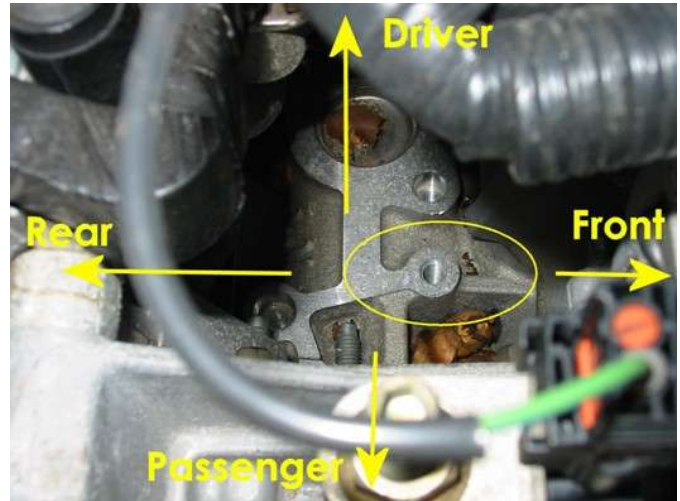


*Coolant Thermal Sensor Installation
(2.3L shown, V6 is similar.)*

2b. Installing a Block Thermal Sensor: (V6)

The Block Thermal Sensor directly monitors the temperature of the engine block. To install the block sensor on the V6 engine:

1. Locate the open 8mm threaded bolt hole on the upper engine block.
2. Attach the Block Thermal Sensor to the threaded hole using the provided bolt being careful to not damage the sensor lead wires.



Location for Block Thermal Sensor on V6.

2c. Installing a Block Thermal Sensor: (I4)

The Block Thermal Sensor directly monitors the temperature of the engine block. To install the block sensor on the 2.3L I4 engine:

1. Locate the engine hoist bracket on the rear right-hand side of the head..
2. Remove the engine hoist bracket using a 13mm wrench.
3. Position the block thermal sensor so that it is between the engine hoist bracket and head and then reinstall the bolt.
4. Tighten the engine hoist bracket bolt to secure the thermal sensor against the head.
5. Route the sensor wire so that it does not come in close contact with the exhaust manifold.
6. Replace the engine beauty cover when completed..



Installation of Block Thermal Sensor on 2.3L I4

Now that the Thermal Sensor is installed, proceed to the V6 or I4 installation steps for your Adjustable Fan Controller...

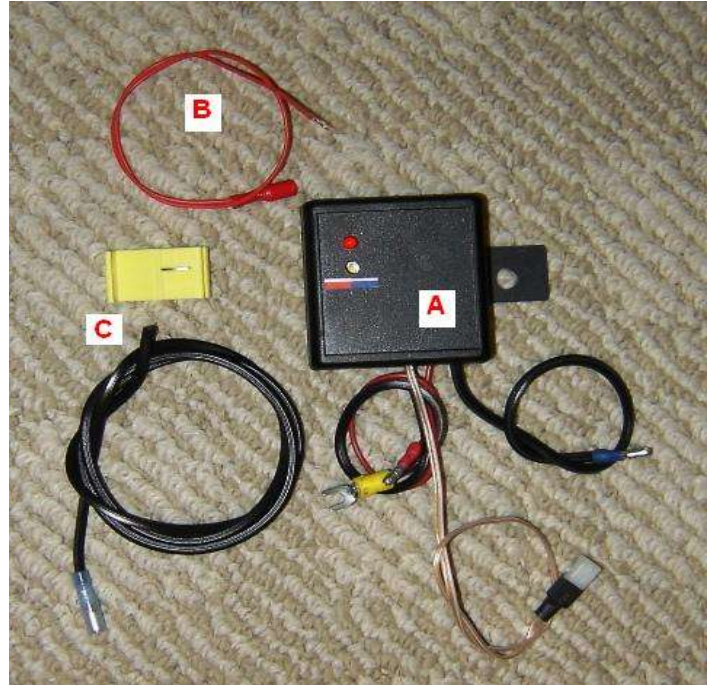
Adjustable Fan Controller Installation on the V6:

1. On the V6 engine, the following components are needed for installation:

A - Adjustable Fan Controller with mounting bracket.

B - Thin **red** +12V power lead.

C - Thick **black** fan ground lead & tap.



V6 Installation Components

2. Remove the cover from the relay panel and identify the 'AC Relay' using the diagram on the underside of the cover. (This relay is used as a convenient source for +12V power.) Remove the AC Relay from its socket and locate the upper right relay contact. Push the 1/4" exposed end of the thin **red** +12V power lead into upper right contact slot so that the exposed wire touches the relay socket contact. The contacts are arranged as shown below with the **RED** line indicating the desired relay contact slot:

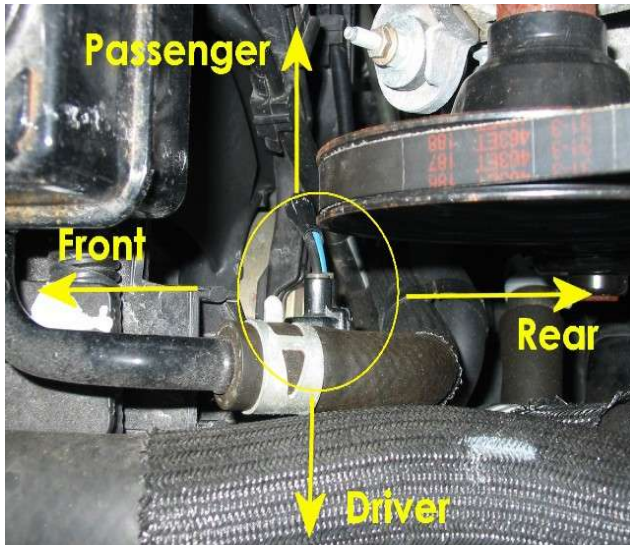


Replace the AC Relay to secure the +12V power lead in the socket. Route the red wire out the rear left corner of the relay panel.

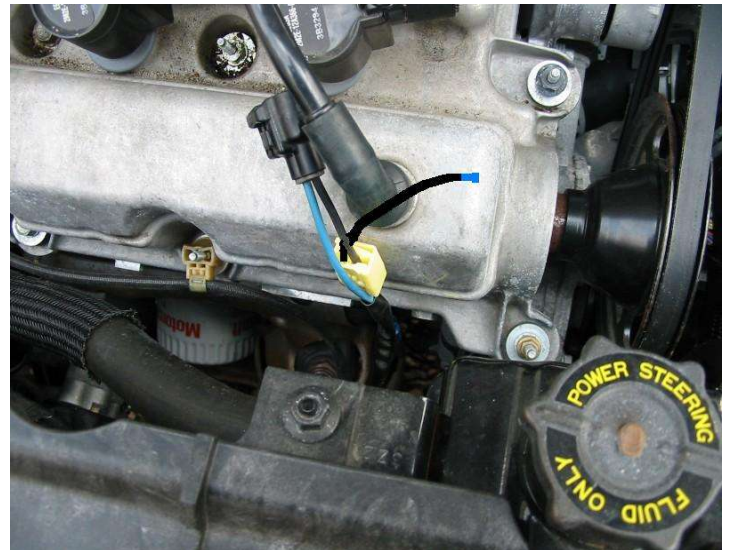


Connect the +12V power lead to the AC Relay

3. Locate the power connector for the radiator fan module and peel back a few inches of the cable housing to expose the thick **black** fan ground wire. Use the supplied yellow scotch-lock to tap the thick **black** ground wire lead onto this wire as shown below. Make sure the connector gets plugged back in.



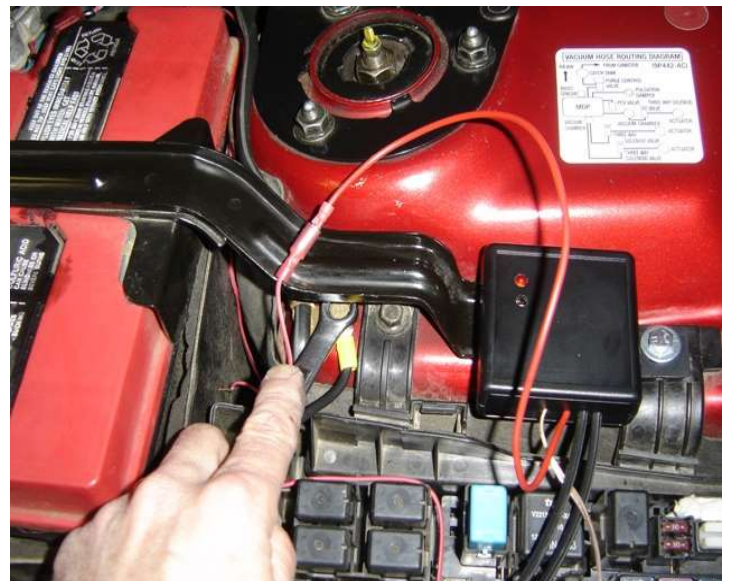
Locate the main plug to the fan control module



Add the scotch-lock tap to the fan ground lead

4. Mount the Adjustable Fan Controller using the right hold-down bolt for the fuse box. Remove the stock bolt and replace it using the provided 10mm bolt and two washers. Using the black washer on the bottom, and the silver washer on top, re-install the bolt through the mounting bracket and back into the fuse box hold-down. Loosen the chassis ground bolt located on the shock tower and slide the yellow lug connector under the ground bolt. Retighten the chassis ground and fuse box hold-down bolts.

Now connect the red power wire to the +12V power lead previously connected to the relay panel. Attach the white connector to the previously installed thermal sensor plug. Connect the remaining wire to the Fan Control module wire tap added in step 3.



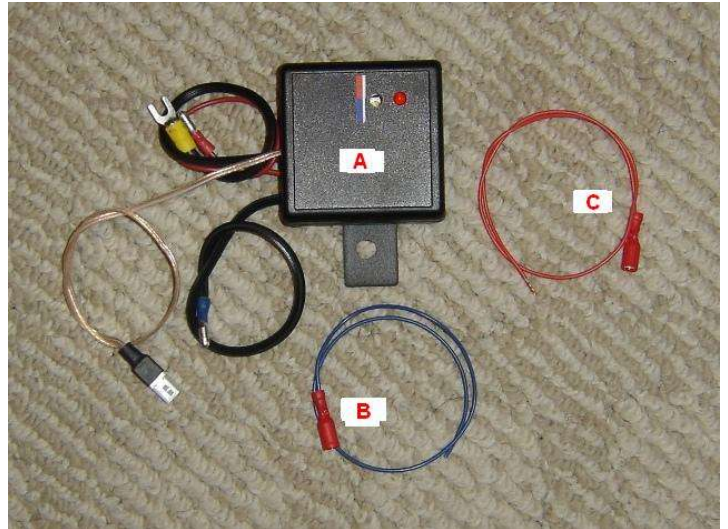
Mount the controller using the new bolt and washers and attach the ground lug

5. Replace the relay panel cover and tuck the loose wires down in the space between the battery and relay panel. Using a small screwdriver, rotate the fan turn-on adjustment to the full clockwise (coolest) setting. Start the engine and let it run for 5-10 minutes with the AC off. When the engine reaches roughly 120F the Red LED should illuminate and the radiator fan should operate. Turning the adjustment counter-clockwise will turn the LED and fan off until the engine temperature rises to the new setting. A setting that supports on-off cycling of the fan should be possible using the coolant thermal sensor.

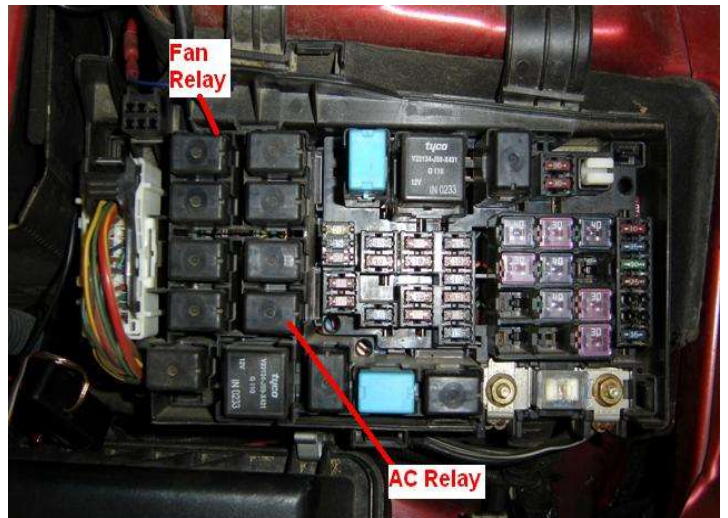
Adjustable Fan Controller Installation on the I4:

1. Installation on a Mazda6i will require the following components:

- A** - The adjustable fan controller
- B** - Short **blue** fan relay lead
- C** - Short **red** +12V power lead.



2. Remove the cover from the relay panel and identify the 'Fan Relay' and the 'AC Relay'. The location of these relays is diagramed on the underside of the relay panel cover.



Location of Fan and AC Relays.

3. Using a pair of pliers or other tool, carefully remove the 'Fan' and 'AC' relays from their sockets. . With the relays removed, identify the upper right-hand contact within each socket. The desired relay contact hole is the **RED** line diagramed below:



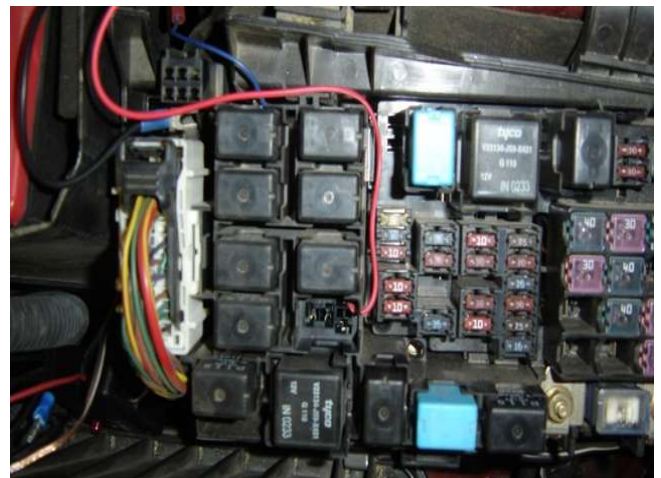
Carefully remove the relays from their sockets.

4. With the relays removed, push the 1/4" stripped end of the short **BLUE** wire into the top right-hand connector of the 'Fan Relay' socket. Make sure the wire is in contact with the relay socket contacts.

Push the 1/4" stripped end of the short **RED** wire into the top right-hand connector of the 'AC Relay' socket. This is actually just a source for +12V, so other wiring options may be more convenient in your vehicle. The **Red** line indicates the desired relay contact hole in the diagram below.

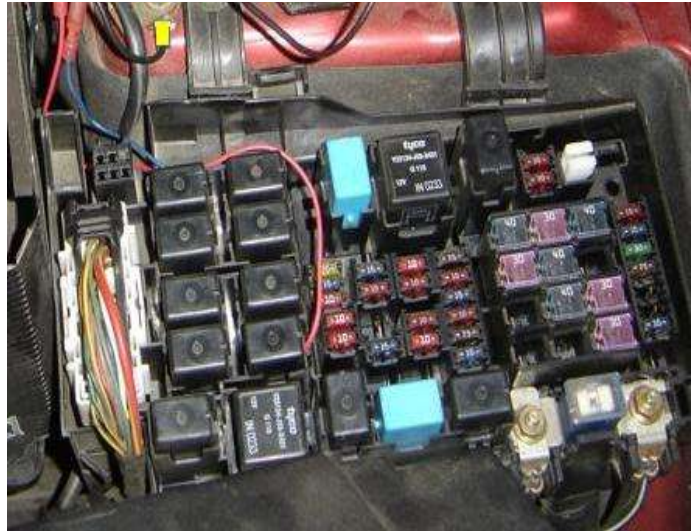


Connect the Blue Fan Relay wire here.



Connect the Red +12V Supply wire here.

5. Push the relays back into their sockets to secure the wires in the socket contacts. Route the wires out of the upper left corner of the fuse panel.



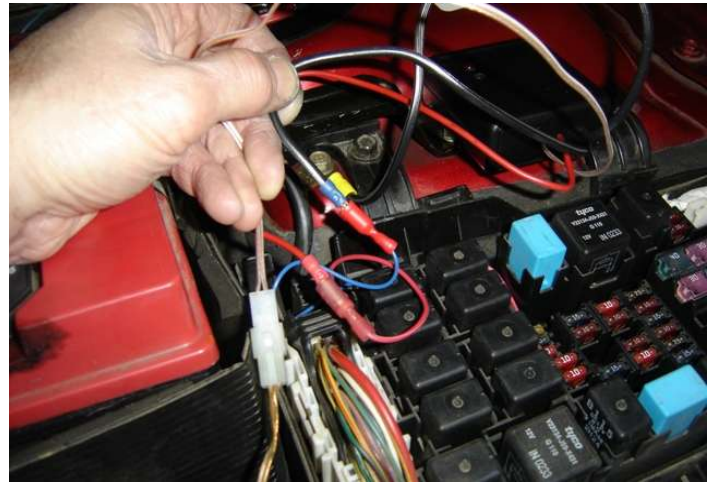
Relays replaced and wires routed to back left corner.

6. Mount the Adjustable Fan Controller using the right hold-down bolt for the fuse box. Remove the stock bolt and replace it using the provided 10mm bolt and two washers. Using the black washer on the bottom, and the silver washer on top, re-install the bolt through the mounting bracket and back into the fuse box hold-down. Loosen the chassis ground bolt located beneath the battery hold down bracket and slide the yellow lug connector under the ground bolt. Retighten the ground, and fuse box hold-down bolts.



Connect the ground connector to the chassis ground tab.

7. Connect the red wire of the controller to the red +12V supply lead previously attached to the relay panel. Attach the controller's black wire to the blue wire attached to Fan Relay. Attach the white connector to the previously installed Coolant or Block thermal sensor.



Connect the power and fan control leads.

8. Replace the relay panel cover and tuck the loose wires down in the space between the battery and relay panel. Using a small screwdriver, rotate the fan turn-on adjustment to the full clockwise (coolest) setting. Start the engine and let it run for 5-10 minutes with the AC off. When the engine reaches roughly 120F the Red LED should illuminate and the radiator fan should operate. Turning the adjustment counter-clockwise will turn the LED and fan off until the engine temperature rises to the new setting. A setting that supports fan on-off cycling should be possible using the coolant thermal sensor.



Testing the fully installed Controller