

Install instructions for the New Diesel Control Module Automated Tstat Control

It is highly recommended that you purchase a Haynes or Chilton's repair manual for your specific vehicle with a schematic wiring diagrams and color coding identification. It will prove very valuable throughout your installation and tuning procedures. **You will also need to purchase a Scan Tool or Data Stream Reader to make your adjustments.**

Mounting your Tstat Switch.

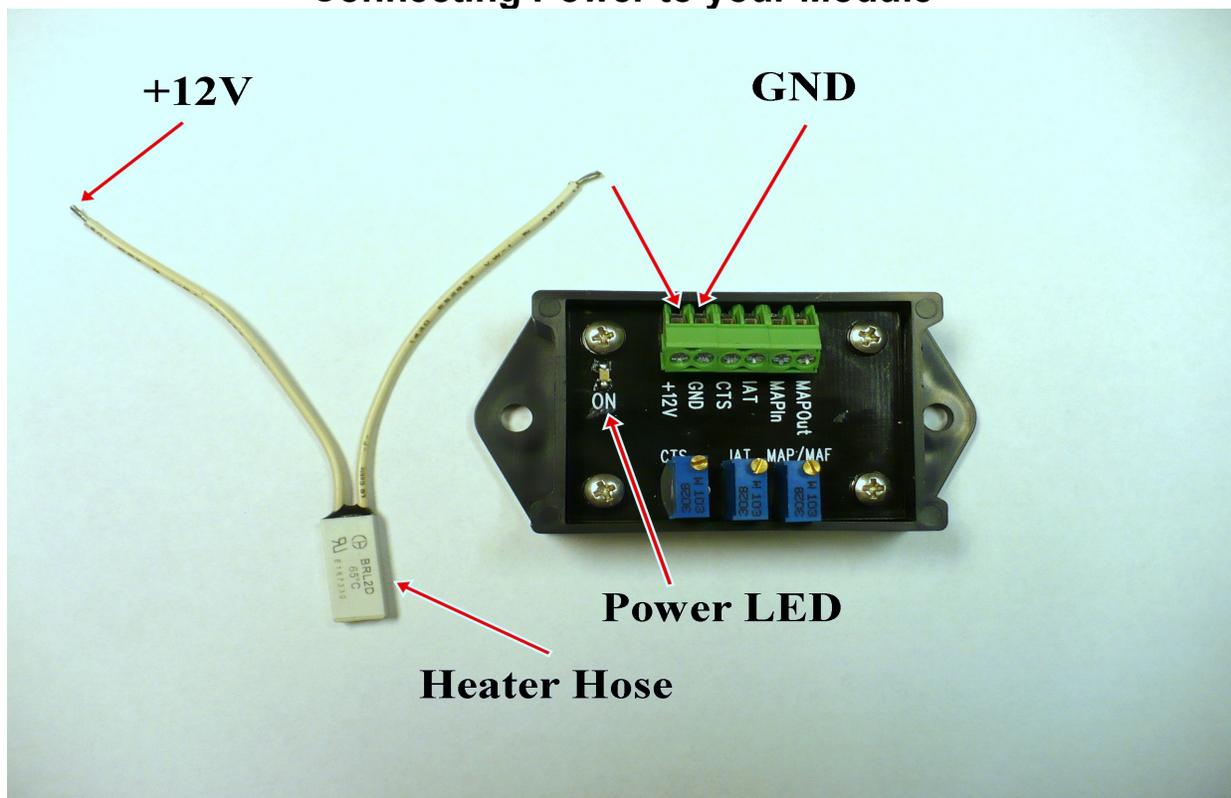
You must mount your Tstat switch on your Inlet Heater hose. If you do not know which hose this is, then just do the following. It is very easy to tell. Start your engine and let it warm up a little. While it is warming up, I want you to find the 2 hoses that run from your water pump to your heater. Your heater is normally mounted inside the passenger compartment behind the firewall. When your vehicle is warmed up a little, I want you to turn your heater on. I don't care if it is 98 degrees outside, go ahead and turn it on. Now go back under the hood and feel the 2 heater hoses that you found before. One of them is going to be warmer than the other one. This will be your inlet heater hose. This is the hose

you will mount your Tstat switch to. We recommend using a universal hose clamp to hold it in place. DO NOT over tighten. Locate the Tstat as close to the water pump as possible. DO NOT let any part of the metal sensor come in contact with the vehicles Ground or ANY metal part of the vehicle. The metal part of the sensor is "HOT" carrying 12+ volts of positive current. Grounding it will immediately destroy the Tstat switch. We do not want to have to SELL you another one.

If you live in a cool climate, it is a good idea to wrap some fiberglass pipe insulation around your hose and Tstat Switch, and then wrap your insulation, and Tstat Switch with black electricians tape. This will insulate your Tstat Switch from cold air flow when you are driving in very cold or below freezing Freezing temperatures.

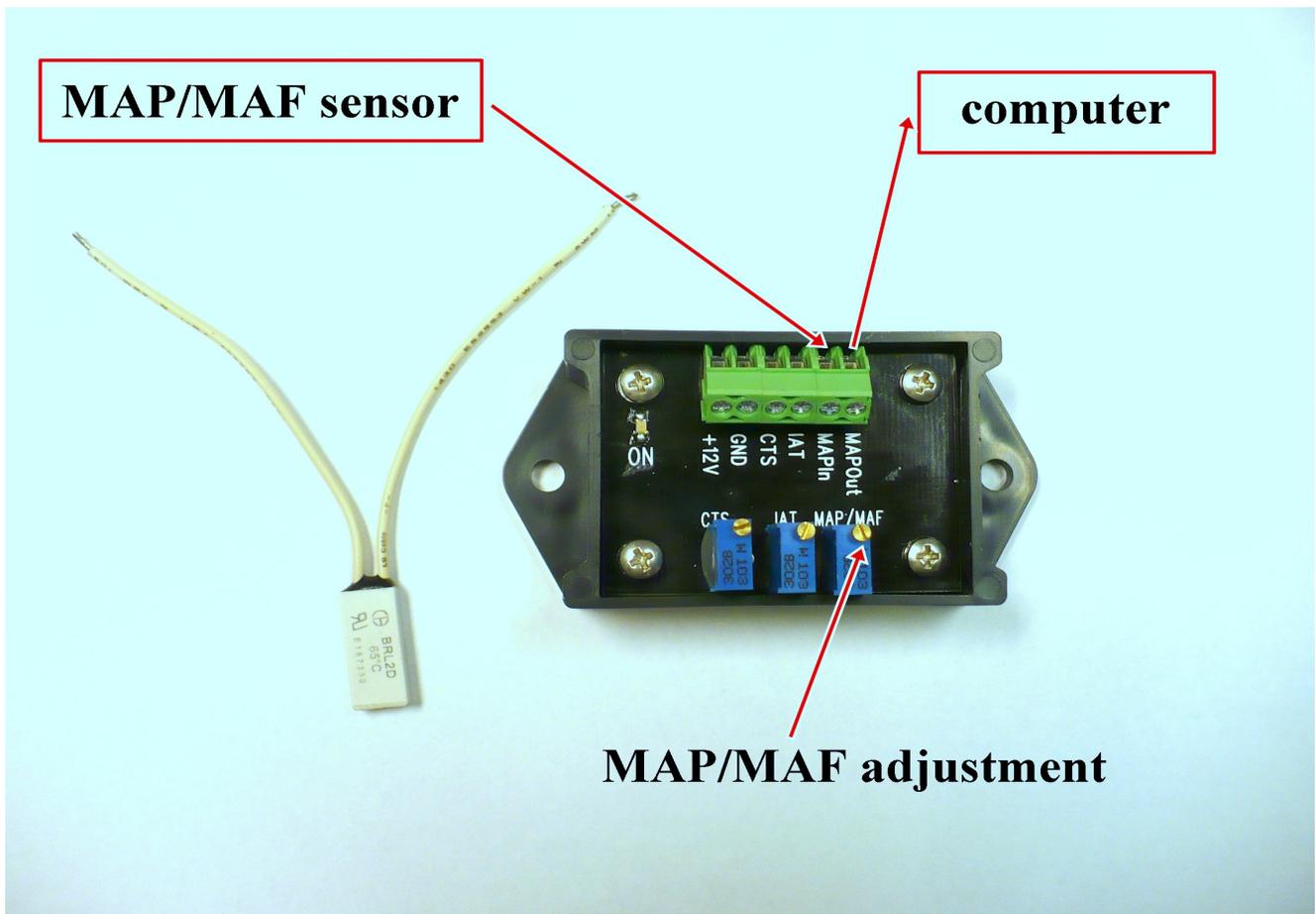
Before you mount your Tstat, you are going to have to solder some wire on each of the 2 wires on your Tstat. One of them has to be long enough to reach your 12 volt (ignition switched) power source, and the other one has to be long enough to comfortably and safely reach your EFIE& MAP/MAF Tuner and attach to the 12+ connector on the Tuner. See Photo below. USE 18 AWG WIRE FOR ALL CONNECTIONS

Connecting Power to your Module



With the new Tstat switching device, you will need to solder on One length of 18 AWG wire to the Tstat stub wire on One side long enough to reach your 12 v ignition switched power source, and on the other side long enough to reach the 12v input of your Diesel AFR Control Module. Refer to above photo. Connect your terminal marked GND to either the negative terminal of the battery or a GOOD clean chassis ground.

Connecting your MAF/MAP Enhancer



This AFR Diesel Control Center contains a voltage based MAF/MAP enhancer, which is prevalent in most vehicles today. There are some vehicles that use a frequency based MAF sensor and a voltage based MAP sensor. These are common, and are usually found in some Ford & GM products. If your vehicle has this combination, use which ever of the two sensors is voltage based. You do not need to adjust the signals of both. Either the MAF or the MAP will work. If your vehicle has a voltage based MAF sensor we recommend using the MAF.

Locate your MAF or MAP sensor. They will normally have three wires.

+ 5volt
- Ground
Signal Wire

Once again, cut the signal wire. Add additional wire if necessary to reach your EFIE mounting location. The wire that goes directly to the MAF or MAP sensor is inserted into **MAP In** connector. The wire that goes to the computer is inserted into the **MAP Out** connector.

Finding the Signal Wire

Of course the easiest way to find the signal wire is to use your manual's wiring diagram for your vehicle. This can tell you the exact wire, and it's color code, and save you some time. But if you didn't take our advice and don't have a wiring diagram, you can still find your signal wire by measuring it

A MAP or a MAF will have 3 wires. One will be 5 volts, which powers the device and is supplied by the ECU. One will be ground, or 0 volts. So if you measure the 3 wires, just eliminate the 5 volt wire and the 0 volt wire, and the remaining wire is the signal wire. This is slightly complicated by the fact that many MAF sensors today also include an Intake Air Temperature sensor in the same housing. In this case you'll have 5 wires going to the sensor. But it's OK, it's easy to find the correct wires you need. The temp sensor will have a ground wire and a signal wire. The signal wire will be up near 5 volts when the sensor is cold, but as it heats up that voltage gets lower. But a temp sensor's voltage will not change when you goose the engine, and that's how you can tell the difference. Also, if you unplug the sensor, and measure the signal wire on the computer side, it will read 5 volts.

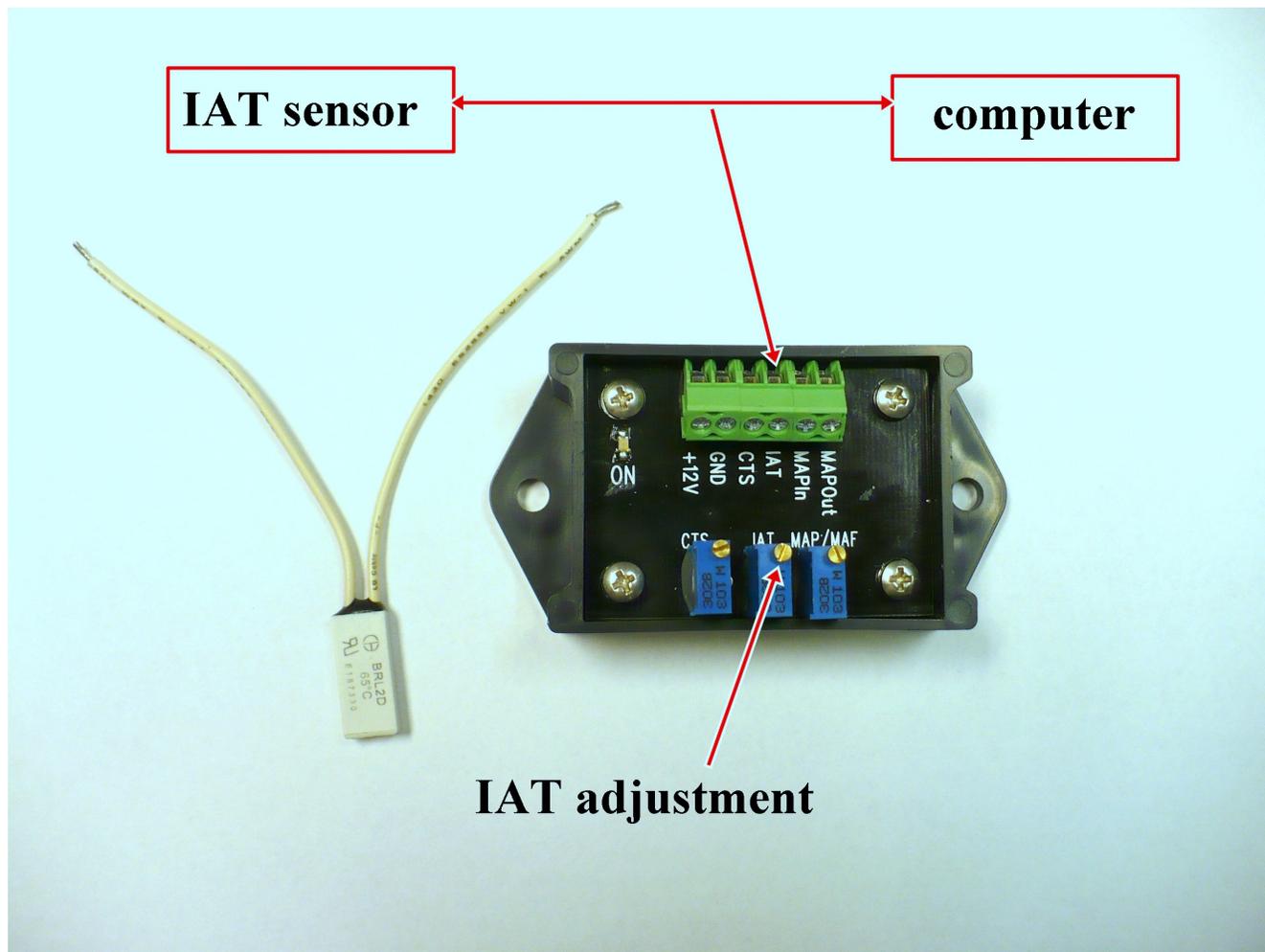
Now, how do you make sure your MAP is a voltage type, and not a frequency type? You will need to watch the voltage as you make changes to the engine's RPMs. The best way is to goose the engine. The voltage will change dramatically on either a MAP or a MAF if it is voltage type. You will see a small change in DC voltage for a frequency type device too, but the changes will be slight, like tenths of a volt. Whereas the changes on a voltage type will be much more dramatic. Changes of over a volt indicate a voltage type MAP or MAF.

Tip: You can steal a straight pin from your wife's sewing box and push it through the insulation of the wire you want to test. Make sure you get into the conductor (wire) inside. This will be much easier than scraping away the insulation to test the wire

Even if you find your signal wire using a diagram, you should still test it before proceeding. You must make sure that you see a voltage change when you rev the engine, and that the voltage drops back down when the engine slows back down again. If you see this phenomena, you can proceed to install the circuit. If you don't see this phenomena, then you have the wrong wire, or an incompatible sensor type. Do not try to use this circuit unless you find a signal wire that matches this phenomena. The biggest single cause of failure for any sensor modification project is to mis-identify the signal wire. So it's best to be absolutely sure.

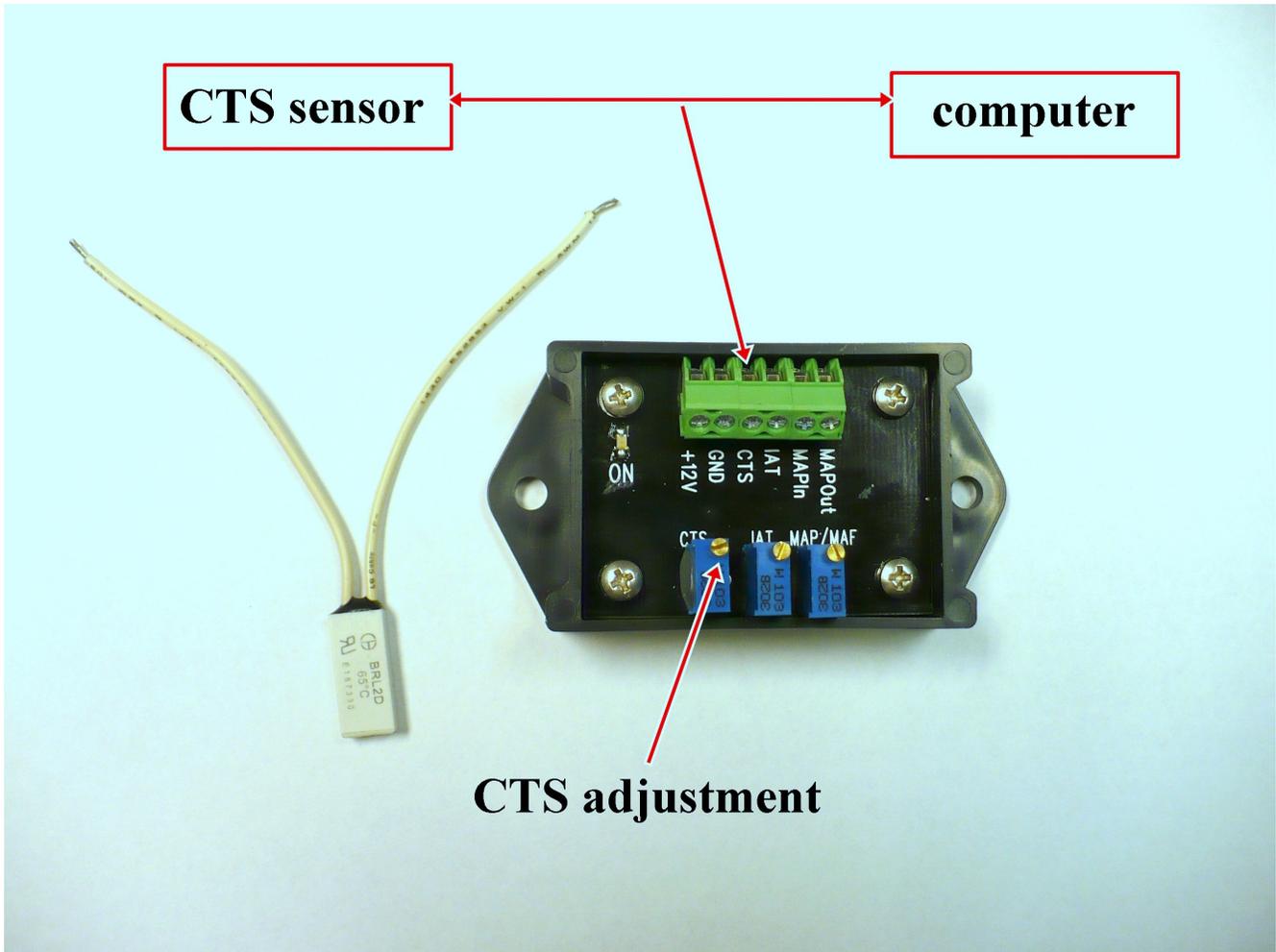
*Note If your vehicle is one of the very rare models that uses frequency based circuitry for both the MAF & MAP sensor this MAF/MAP enhancer will not work with your vehicle. Contact us and we will advise you where you can purchase a frequency based MAF/MAP enhancer.

Connecting your IAT enhancer.



Locate your IAT (intake air temperature) sensor. There will be 2 wires going to the sensor. You will **NOT** be cutting any wires. You will skin off some of the insulation from the signal wire. Refer to your manuals diagram. If you are uncertain, here is an easy method. Turn on the ignition switch but do not start the engine. Measure the voltage on both wires to ground. The wire with the highest voltage will be your signal wire. Solder on a length of wire sufficient in length to reach your AFR Control Center and attach it in the terminal marked IAT as pictured above.

Connecting your CTS.



Locate your **CTS**. **A word of caution:** Some vehicles have 2 almost identical **CTS**. (coolant temperature sensor's) One is for operation of a temperature gauge or indicator, and one that supplies information to the ECU. Make certain that you locate and connect to the one that is supplying information to the ECU. The one you are looking for will have 2 wires, one will be around *5 volts input to the sensor, this is your signal wire. Your connections will be exactly the same as you performed on your **IAT** sensor. This time you of course run your connecting wire to the connector marked **CTS**. If you are having trouble locating your CTS, refer to your repair manual for it's location. If you are still unable to locate it, it would probably be a good idea to contact your favorite mechanic or repair facility.

*** Some model diesel engines will use more or less than a 5 volt input on the signal wire. Check the voltage on both wires, and attach to the wire with the highest voltage.**

We have Pre-Set all of your Control Potentiometer's to " 0", Full Counter Clockwise. You will begin all of your tuning by turning the individual "Pots" Clockwise.

Sequential Timing: What to expect.

When you start your vehicle your ECU will take a barometric reading from you MAF/MAP sensor.

When the temperature of your engine coolant in your radiator hose reaches 160 F. the Power ON LED will light and activate the Diesel AFR Module.

Adjustment of your MAF/MAP Enhancer. With the engine running, and using your Scan Tool, turn the MAF/MAP potentiometer clockwise until you see a 10 to 15% reduction in air flow (or Load) on your Scan Tool.

Further fine tuning of this device will greatly improve your results. **This can only be accomplished with a Scan Tool, or Live Data Stream reader.**

Your objectives are to accomplish in the following order.

1. Use you MAF/MAP adjustment to lean out (lessen) the fuel supplied to and reduce your injector pulse rate.
2. Use your IAT adjustment to retard the ignition timing closer to TDC.
3. Use you CTS adjustment to fool the computer and make it choose a leaner mapping table.

MAF/MAP adjustment. You will want to adjust this adjustment to show a 10% to 15% load reduction on your scan tool or data stream reader.

CTS adjustment. You will want to adjust this adjustment to read a minimum of 10 degrees F. warmer than your engine's or radiator's thermostat's rated temperature.

IAT adjustment. You will want to adjust this adjustment to read a minimum of 80 to 100 degrees F warmer than ambient temperature. (normally in the 180 F. to 205 F. range)

These are all suggested starting position adjustments. You will need to make test runs and further fine tuning adjustments to attain maximum fuel savings. You very possibly will need to increase or decrease the amount of HHO from your HHO Generator to your engine to maximize your fuel gains.

There are a variety of Scan Tools and Live Data Stream programs that are transmitted to your lap top computer available on the market. Needless to say some are much more elaborate than others. Some are capable displaying your fuel reduction and injector pulse rate as well as your LTFT (long term fuel trim) and STFT (short term fuel trim). The more capabilities your device has, the easier the tuning process will be. Unlike the OBD II scan tools for gasoline powered vehicles which are using a universal diagnostic system, different type scan devices, are required for different model diesel's.

This Module is designed to make adjustment's to 3 of the common sensors found in 95% of all diesel engines. These 3 sensors play a large roll in determining the vehicles AFR (air fuel ratio). In your diesel powered vehicle there may be other devices that also have an effect on AFR. This varies tremendously from one manufacturer to another, and from one model to another.