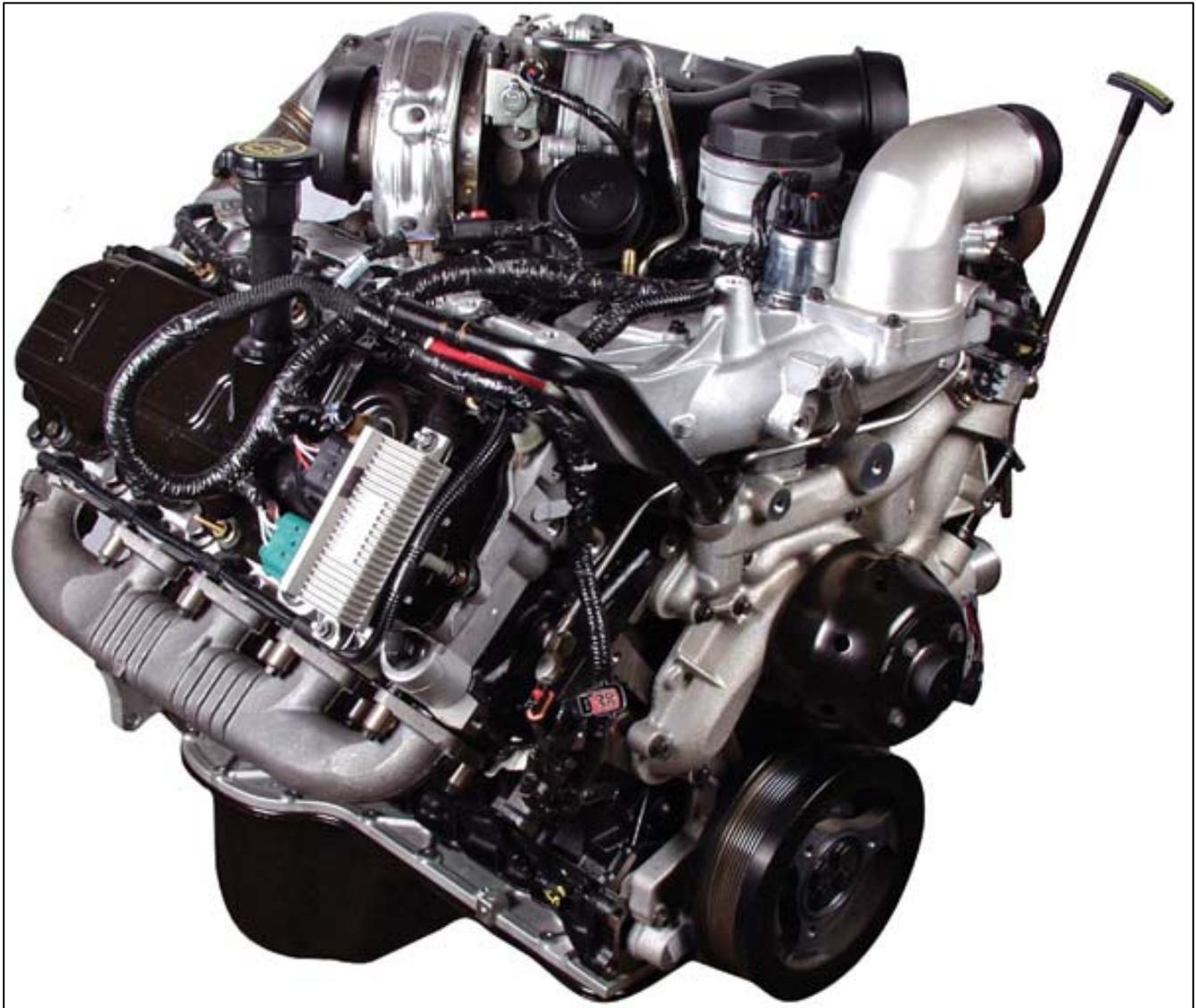




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Installation Instructions
For
#63011 Striker Diesel MD Power Modules
2003-2007 Ford
Powerstroke 6.0L Diesel

1st Edition June 2008

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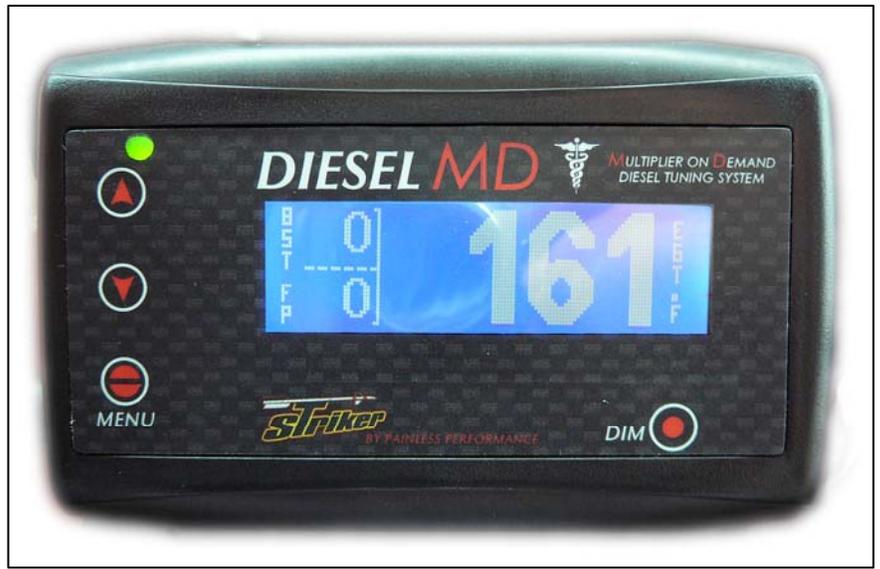
Please read these entire instructions before beginning the installation. Make sure the ignition key has been off for two or more minutes before any connections are made. After a few simple connections the tune-ability that you have always wanted from your Powerstroke diesel will be available at a touch of a button. Welcome to the new era of plug in play diesel power modules.

Parts List:

- 1- Striker Diesel MD Power Module
- 1- Engine Wire Harness
- 10- 7" tie wraps
- 1- Instruction Sheet
- 4- Inches Velcro
- 1- Parts Bag Kit

Tool List:

- Phillips and flat head screwdrivers
- Wire strippers
- Terminal crimpers
- Drill and Drill bits
- 3/8 Ratchet and Metric sockets



ENGINE HARNESS

DIESEL MD HARNESS

PARTS KIT



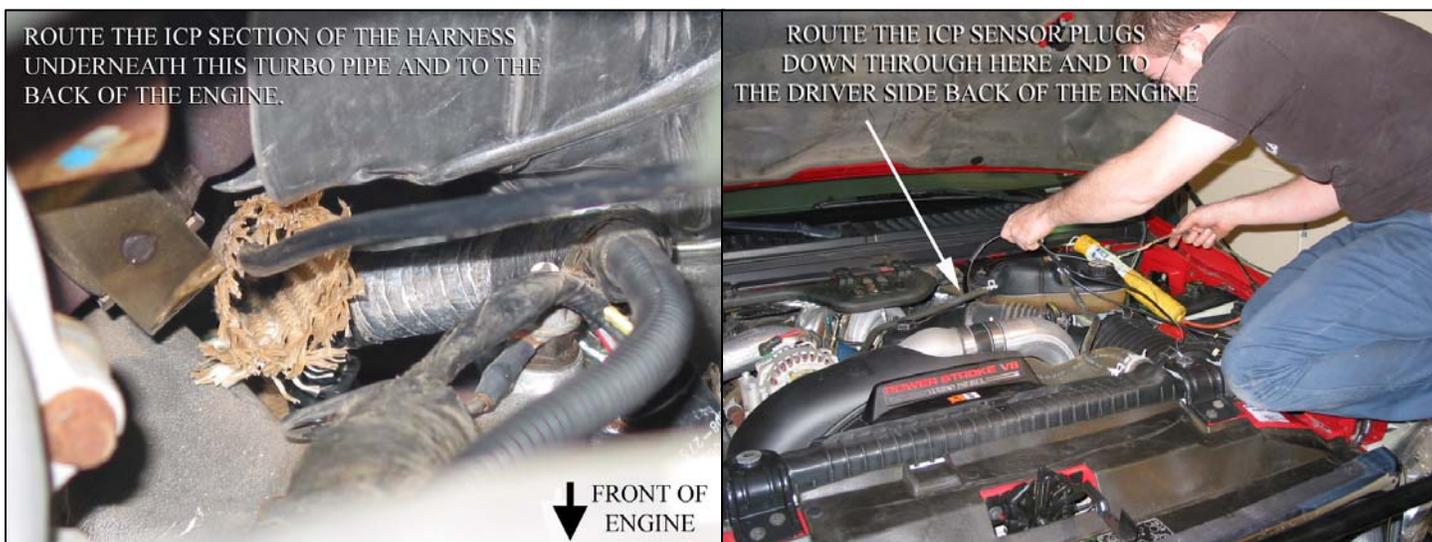
NOTE: The 63011 Striker Diesel MD kit does not include a thermocouple. The Diesel MD module has capabilities of reading a K-type thermocouple if you so choose to purchase and install one separately. If a thermocouple is already installed in your vehicle, you may double up the Diesel MD thermocouple wires with the mechanical gauge wires. If this doubling is done, you may experience a slight misreading of both the EGT gauges.

Harness Installation:

The Striker Diesel MD Power Module is shipped with a harness to match your vehicles configuration. Harness alterations are not needed. If difficulties during installation are experienced please contact us via phone at 800-423-9696 or email to tech@painlessperformance.com. Three connections will be made in the engine compartment and two under the dash. Make sure to route all wires and connectors away from potential hot spots on the engine. Securely attach the wires using the supplied tie wraps.

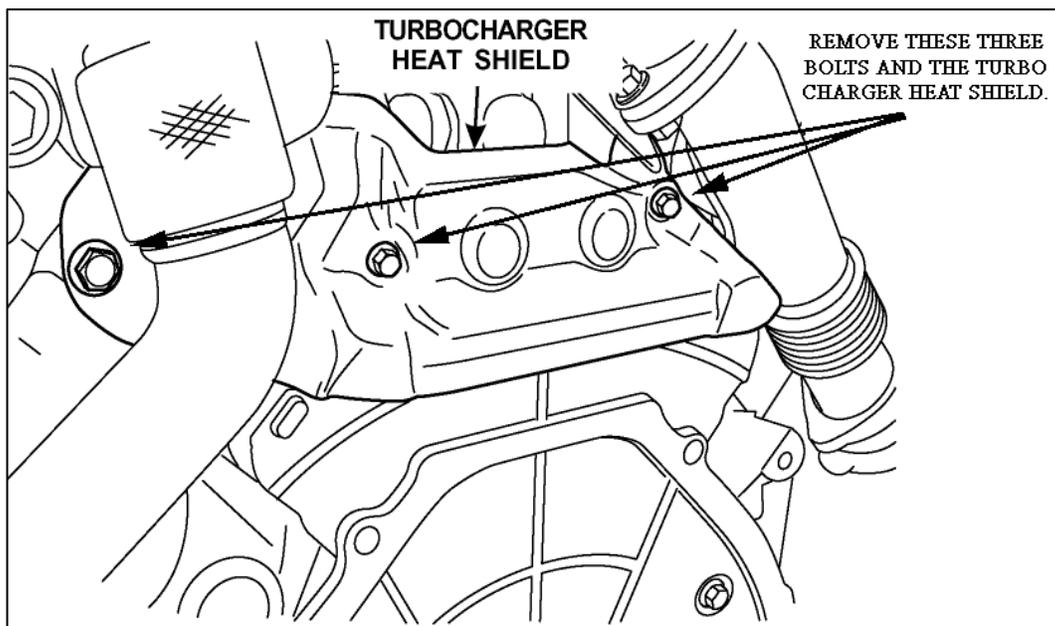
2003 & Early 2004 Injection Control Pressure Sensor Connector:

On 2003 and some early 2004 trucks the ICP sensor is mounted at the back of the engine underneath a heat shield. The heat shield can only be seen from underneath the truck with a flash light pointed towards the top rear of the engine from the driver side of the transmission. If your truck has the ICP sensor mounted here; route the ICP sensor connectors on the Diesel MD engine wire harness underneath the turbo charger and to the back of the driver side of the engine. Turbo chargers get extremely hot; make sure to route wires away from touching any turbo charger piping or exhaust piping. It is advisable to wrap this part of the harness with a heat resistant material to ensure thermal protection.

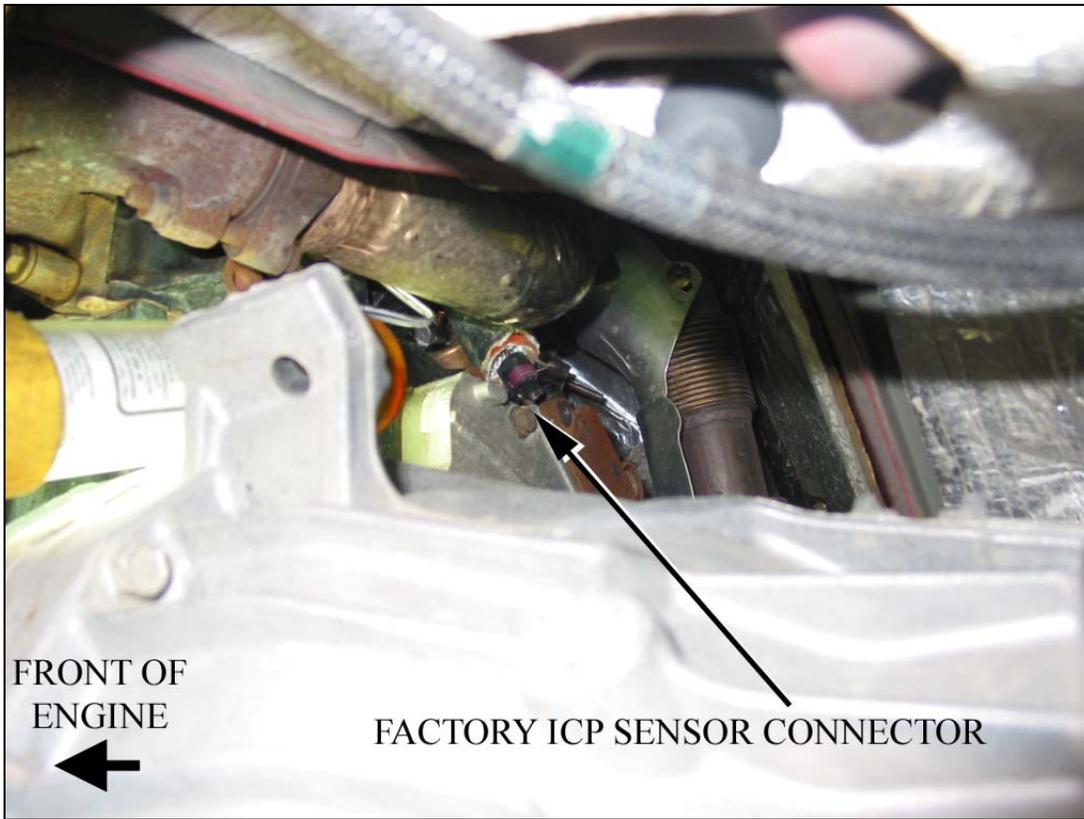


Turbo Heat Shield:

2003 and some early 2004 trucks will require reaching up behind the engine and transmission from underneath the truck, on the driver's side, to reach the ICP Sensor connector. Remove the turbo charger heat shield.



Behind the turbo charger heat shield the ICP sensor can be found mounted into the engine. The factory ICP sensor connector will have insulation surrounding it and the wires from it. This insulation must be pulled back in order to reach and unplug the factory ICP sensor connector.



Disconnect the factory ICP sensor connector. Plug this male connector into the female ICP connector on the Diesel MD engine harness. Plug the male ICP connector on the Diesel MD engine harness into the ICP sensor. Reinstall the turbo charger heat shield.



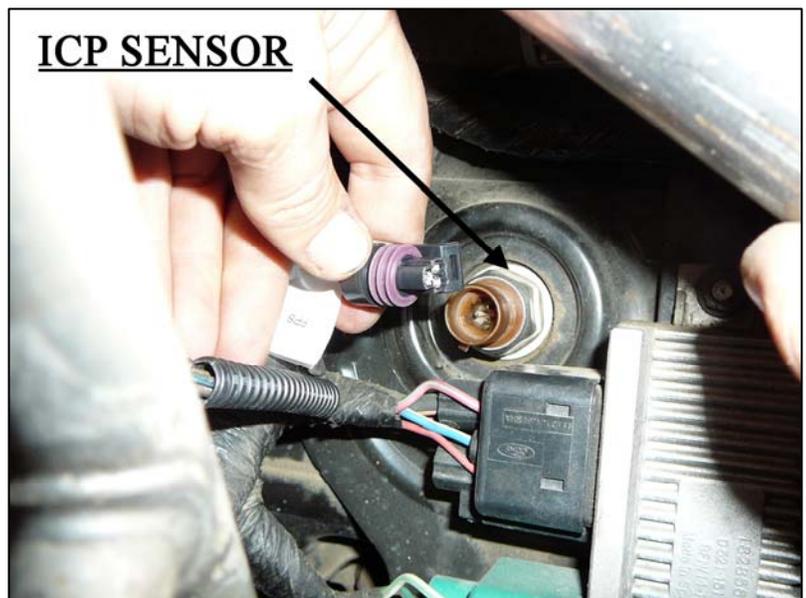
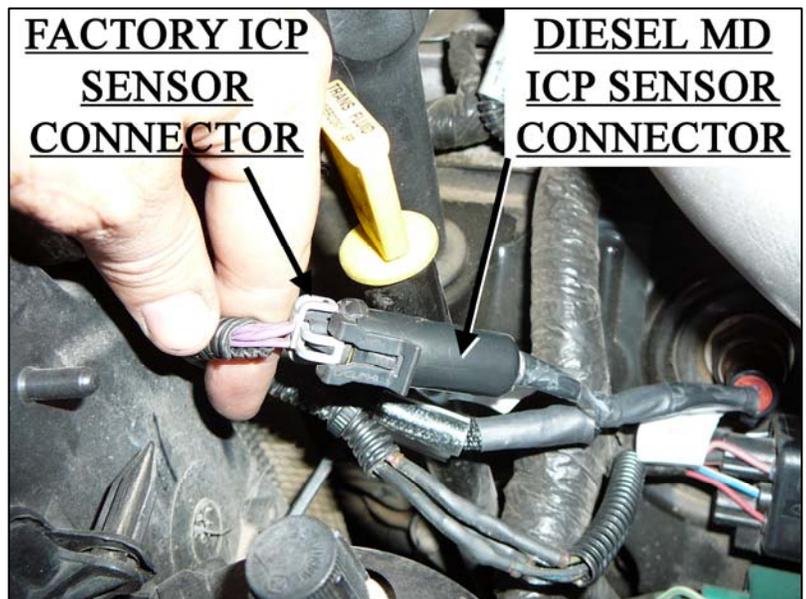
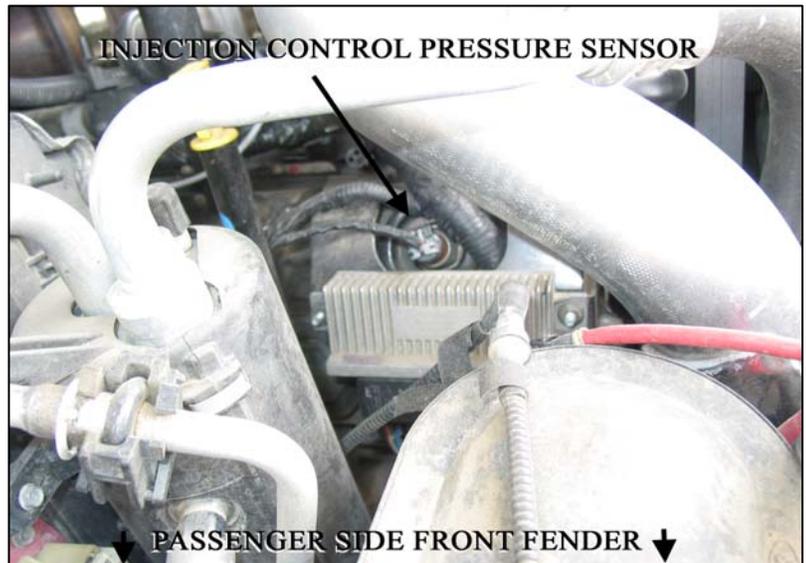
Late 2004 and later model trucks ICP sensor location

Most late 2004 and later trucks have the ICP sensor mounted in the passenger side valve cover. Route the ICP sensor connectors on the Diesel MD engine harness over to the passenger side valve cover.

NOTE: engine oil deposits where the sensor and connector mate is an indication of a leaky ICP sensor and will cause connection problems. Clean all of the oil out of the sensor and connector before connecting to the Diesel MD harness.

Unplug the male factory ICP sensor connector and connect this to the female ICP sensor connector on the Diesel MD engine harness. Some factory ICP sensor connectors will have a white or yellow terminal position lock that will need to be removed in order to make a good connection to the Diesel MD harness.

Plug the Diesel MD harness male ICP sensor connector into the ICP sensor on the valve cover.



Boost Pressure Sensor Connection:

Locate the boost pressure sensor. It is located on the passenger side firewall on all 6.0L Powerstroke trucks. Disconnect the factory male boost sensor connector from the sensor.



Connect the factory male boost pressure sensor connector to the female boost pressure sensor connector on the Diesel MD engine harness. Connect the Diesel MD engine harness male boost pressure sensor connector to the boost pressure sensor.



Remove the black plastic cover shown above. Drill a hole in this plastic cover big enough to accommodate the thermocouple wire and the four pin Deutsch connector labeled **Engine A** on the Diesel MD module harness. Reinstall the cover to the firewall.



Since the Diesel MD module harness comes attached to the Diesel MD module, we suggest that you route the harness inside the cab and loosely tie wrap it in place before you push the **Engine A** 4 pin Deutsch connector and the thermocouple wire through the firewall. Keep in mind the **Engine A** connector must reach and plug into the **Engine B** connector on the engine harness.



Mounting the Diesel MD:

One potential place to keep the Diesel MD is the cubby hole just below the AC/Heat controls. Make sure when you route the Diesel MD module harness over to the hole in the firewall that you stay away from any moving parts of the steering column, brake, accelerator and gear shifter.

In parts kit is some Velcro. You can use this Velcro to attach the Diesel MD module on the dash.

If neither of these options suits your needs, many electronic retailers offer suction cup window mounts that should allow you to mount the Diesel MD onto the windshield.

Once you have decided where to mount the Diesel MD route the module harness over to the hole in the firewall and push through the **Engine A** connector and pyrometer wire.



Thermocouple:

If you are not using a pyrometer then roll up the wire and store it inside the cab. If you are using a pyrometer, route the wire to the thermocouple and attach it using the two #6 ring terminals supplied from the parts kit. Wires connect red to red and yellow to yellow. Use the heat shrink provided from your thermocouple kit to protect the terminals from grounding.

Power and Ground:

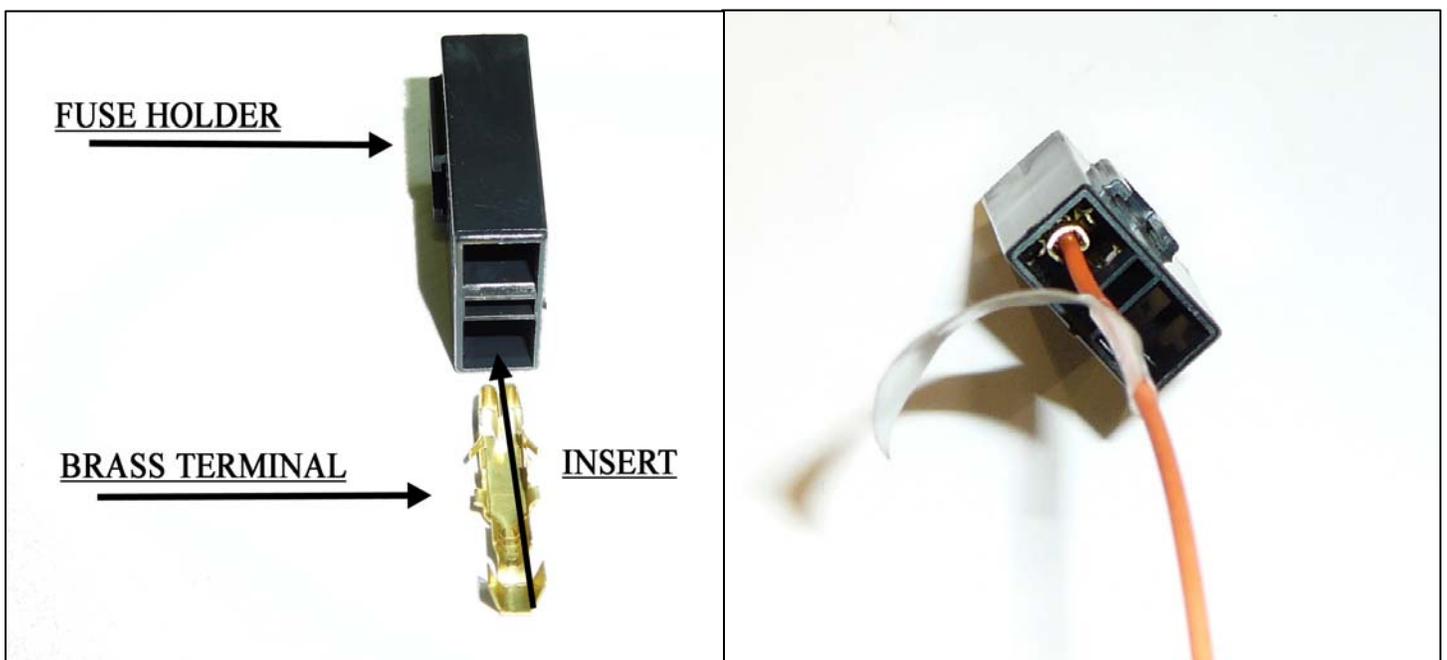
In the parts kit is a fuse holder, two brass terminals for the fuse holder, a 5 amp fuse, two blue Posi-taps, one insulated ring terminal and two self tapping black sheet metal screws. On the Diesel MD module harness there is an orange wire labeled **RUN/START 12VOLT** and a black wire labeled **GROUND**. The orange power wire can be either connected to the fuse block under the steering column cover or the ignition switch wires.

Power:

If you plan to wire the orange power wire for the Diesel MD into the ignition switch wires on the bottom of the steering column, please fuse the circuit. All of the parts you need to fuse this power circuit can be found in the parts kit. Find a good place to mount the fuse holder. Figure out what length the orange wire labeled **RUN/START 12VOLT** needs to be to reach the fuse holder. Cut it to length, strip 3/8" of the insulation from the copper and terminate one of the brass terminals to the wire. Take the extra orange wire from the parts kit and terminate the other brass terminal to one side of it in the same fashion.



Push both terminated wires into the fuse holder. The terminals insert with the flat side to the outside of the fuse holder. Push the barbed steel mounting clip into the slot on the back side of the fuse holder. Use one of the black self tapping screws to mount the fuse holder.

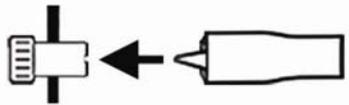
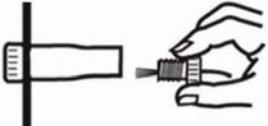


Route the open ended orange wire up to the ignition switch connector as shown below. Connect this orange wire to one of these two wires coming from the ignition switch connector depending on which year of vehicle you have. Use one of the supplied Posi-taps to make this connection. See the diagram to the right for instruction of how to use a Posi-tap product. Use one of the self tapping black sheet metal screws to mount the fuse holder under the dash. Insert the fuse into the holder.

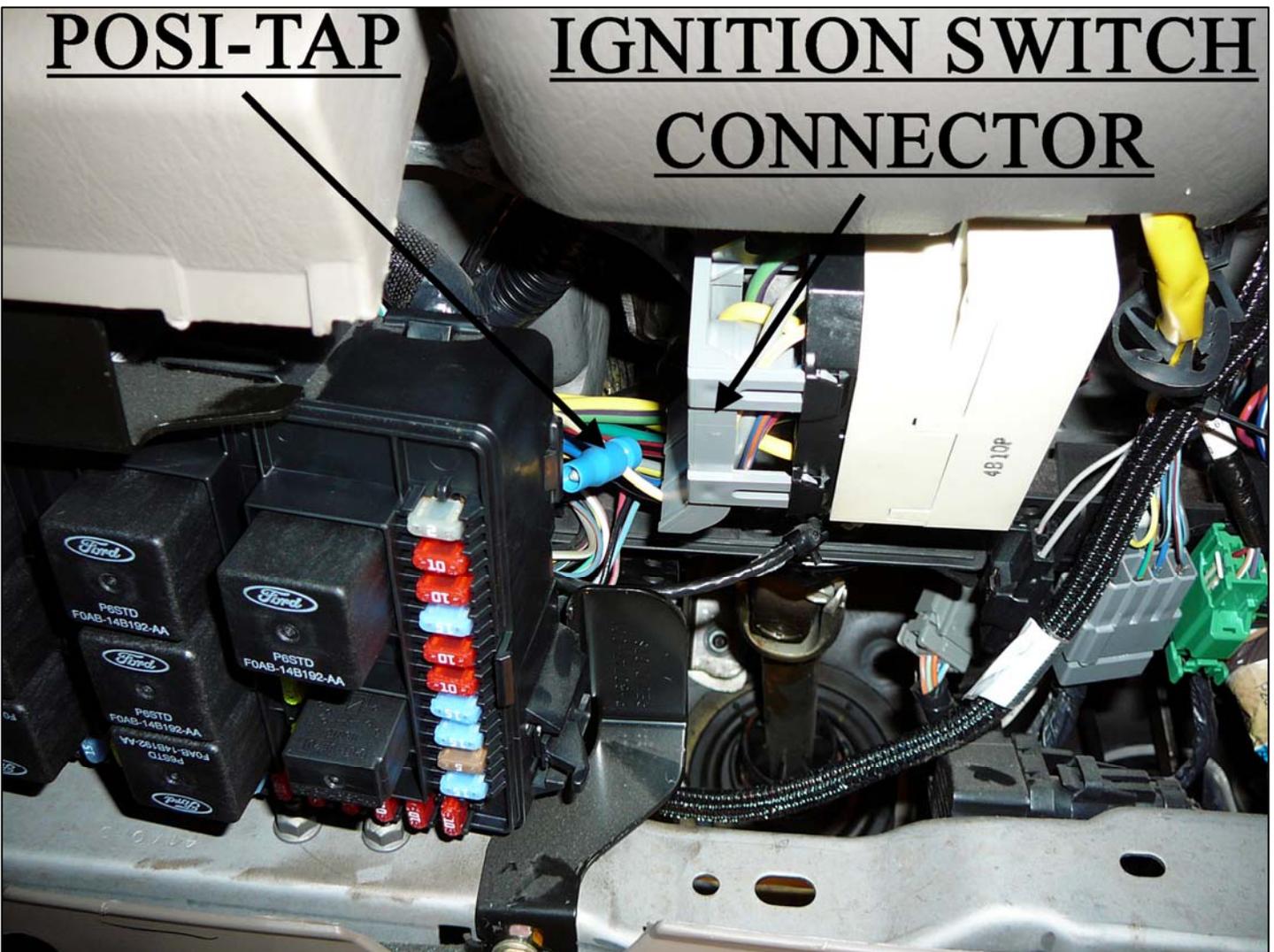
IGNITION SWITCH WIRE:

- 2003-2004 White/Yellow wire
- 2005-2007 Red/Lt. Green wire

Posi-Tap™ Instructions

- 1. Insert**
Insérer / Inserte 
- 2. Tap**
Joindre / Empalme 
- 3. Strip**
Dénuder / Pelar 
- 4. Tighten**
Visser / Aprete 

Patent# 5,228,875 5,695,369 5,868,589 6,692,313 Jap 2881414,
Aus 708700, Tia 103534 Can 2204826 Mex 200626 Korea 477279,
China Z197105562.9 & others pending.

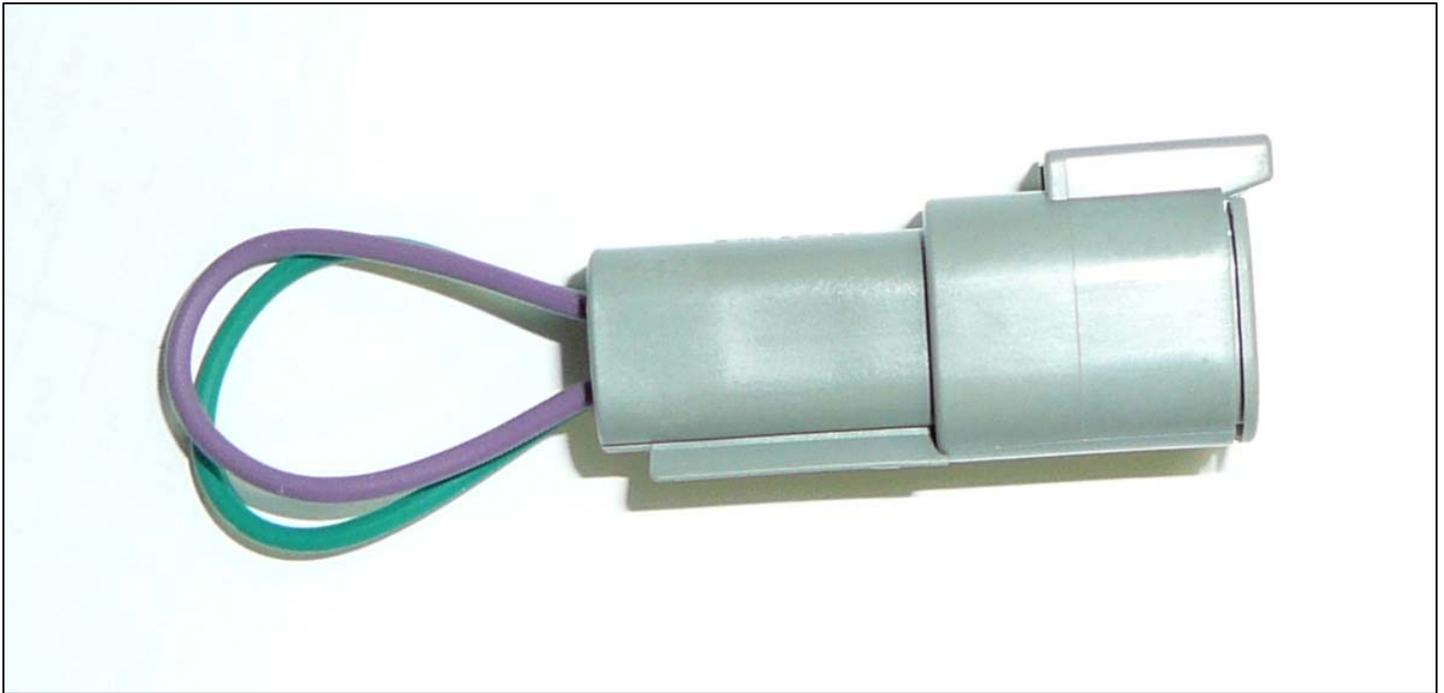


GROUND:

Route the black wire labeled **GROUND** over to a clean grounding source. Metal brackets under the dash are an excellent choice for this ground. It is suggested to not ground this module on top of other ground wires but to instead use the other self tapping black sheet metal screw to make a new ground into one of the metal brackets. Crimp the red insulated ring terminal onto the ground wire and then run the screw into one of the metal brackets.

FINALIZING INSTALLATION:

1. Plug the **Engine A** and **Engine B** connectors into each other.
2. Finish tie wrapping the harness away from any moving parts of the steering column or pedals.
3. Double check all connections made during this installation. A wrong connection will result in a check engine light and possibly a no start situation so double check just to be sure.
4. Pictured below you see a small pigtail that came in parts bag of your Striker Diesel MD kit. This pigtail mates to the **Engine B** connector on the Diesel MD engine harness. Keep this pigtail in your glove box. If operational issues arise with the Diesel MD, a Painless tech may ask you to use this to help troubleshoot the problem.



INITIAL START UP

Turn the ignition key on. To the right is the Diesel MD start up screen. Every time the module is turned off and then on this screen will show for a few seconds. If the screen does not light up and show this display then you have a power or ground connection problem. Make sure your ignition 12Volt wire has power with the ignition key on and in crank and the ground wire has continuity to ground at all times.



The Diesel MD module will then show the default display screen as shown above. Start the engine. If it does not start or you get a check engine light, go to the troubleshooting section at the end of this manual. After the engine starts you should notice the EGT gauge digits will increase (if you have the thermocouple wires connected to a thermocouple) and the fuel pressure digits will change.

IDLE CALIBRATION

NOTE: The Diesel MD will revert back to display mode if there has been more than 5 seconds since the last push of a button.

NOTE: The user menu is cyclical. Pressing the menu button will cycle through the modifiable settings and then back to the beginning.



NOTE: You must do this Idle Calibration step before the Diesel MD module will allow you to change between and/or modify the power levels.

With the engine running, at idle and in park; push the **MENU** button until the screen above shows on the display. This is the idle calibration screen. Note: On your Diesel MD these values will be B: 00 F: 00 until you have finished this calibration. Push and release the up arrow button. The Diesel MD will record the idle voltage values for the MAP and fuel pressure sensors. After it records these two values it will revert back to the default display after about five seconds. Only do this idle calibration once unless instructed to do so by a Painless tech or these instructions. You may now select power levels up or down and also modify the power level scale factors.

What is the idle calibration for? The idle calibration is needed in order for the Diesel MD module to know when your vehicle is at idle. At idle there is no modification to either the fuel or boost pressure signals. We have found that modifying either of these signals when at idle can cause idle down problems (engine bucking) when rolling to a stop and can cause hard to start issues.

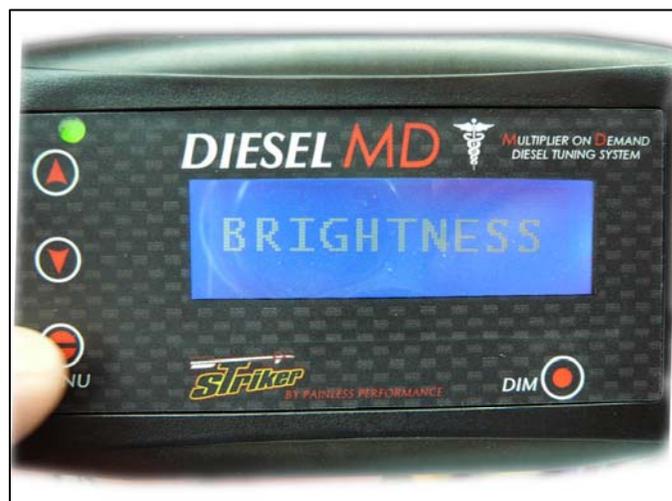
EGT WARNING ADJUSTMENTS

Push the MENU button until the screen above shows on the display. This is the setting for the EGT warning light shown in this picture as the green LED. This is a three color (green, yellow, red) LED. Glows green at all times the module is powered up and the EGT reading is below 90% of the setting shown on this screen. Glows yellow when the EGT reading is 90-99% of the setting shown on this screen. Glows red when the EGT reading is 100%+ the setting shown on this screen. By default this setting is 1250 degrees Fahrenheit. Press the up or down arrows to change this setting by 10 degree increments.



BRIGHTNESS ADJUSTMENTS

The backlight brightness of the screen can be changed one of two ways. Either use the DIM button on the front of the module or press the menu button until you see the screen show **BRIGHTNESS**. If you use the DIM button you will notice the display will dim incrementally to its lowest setting and then cycle back to its highest setting. Or, press the MENU button until you see **BRIGHTNESS** on the screen, you may then change the backlight brightness by pressing the up or down arrowed buttons.



CONTRAST ADJUSTMENTS

The contrast of the screen can only be changed by pressing the menu button until you see **CONTRAST** on the screen. Press the up or down arrowed buttons to make adjustments while **CONTRAST** is displayed.



DISPLAY SELECTION

Press the **MENU** button until **DISPLAY** is shown on the screen. Press the **UP/DOWN arrowed keys** to select which display you want. There are five displays to choose from. All five are shown below. Once you have chosen the preferred display just leave it displayed on the screen for a few seconds and the Diesel MD will automatically start to show live sensor signals from your truck. You can change the display at any time.



NOTE: The displayed fuel pressure and boost pressure values are actual signals from the engine sensors. Please keep this in mind as you continue to read this manual and program your Diesel MD.

FUEL PRESSURE/BOOST/EGT

BOOST/
FUEL PRESSURE/ EGT

EGT

BOOST

FUEL PRESSURE



PROFILE SELECTION



There are ten user adjustable profiles and one stock profile preprogrammed into the Diesel MD. Pressing the up/down arrowed keys during normal operation will toggle up or down through the profiles. Listed below you see the ten profiles with the boost and fuel pressure scale factors respectively.

Profile S: This is the stock profile. With this profile selected the signals from the sensors are what your vehicle's PCM receives. In other words there are no modifications to the signals and the scale factors are both 1.00.

	<u>BOOST</u>	<u>FUEL PRESSURE</u>
<u>Profile 1:</u>	1.00	0.97
<u>Profile 2:</u>	1.00	0.95
<u>Profile 3:</u>	1.00	0.93
<u>Profile 4:</u>	0.97	0.90
<u>Profile 5:</u>	0.94	0.88
<u>Profile 6:</u>	0.91	0.85
<u>Profile 7:</u>	0.88	0.81
<u>Profile 8:</u>	0.85	0.77
<u>Profile 9:</u>	0.82	0.73
<u>Profile 10:</u>	0.79	0.68

STORE USER CONFIGURATION



Press the **MENU** button until **Store Config** is shown on the display. Press the **UP** arrowed button. The Diesel MD has now stored all of the settings you have modified. These are now the settings the Diesel MD uses each time you start your vehicle. If you modify any of these settings, it will be necessary to store it as the configuration again if you want the Diesel MD to start up with the new settings. See below for a list of these settings.

- Display selection
- Idle Calibration
- Desired Profile
- Brightness
- Contrast
- EGT Degree Warning Indicator

ADJUSTING PROFILE SCALE FACTORS

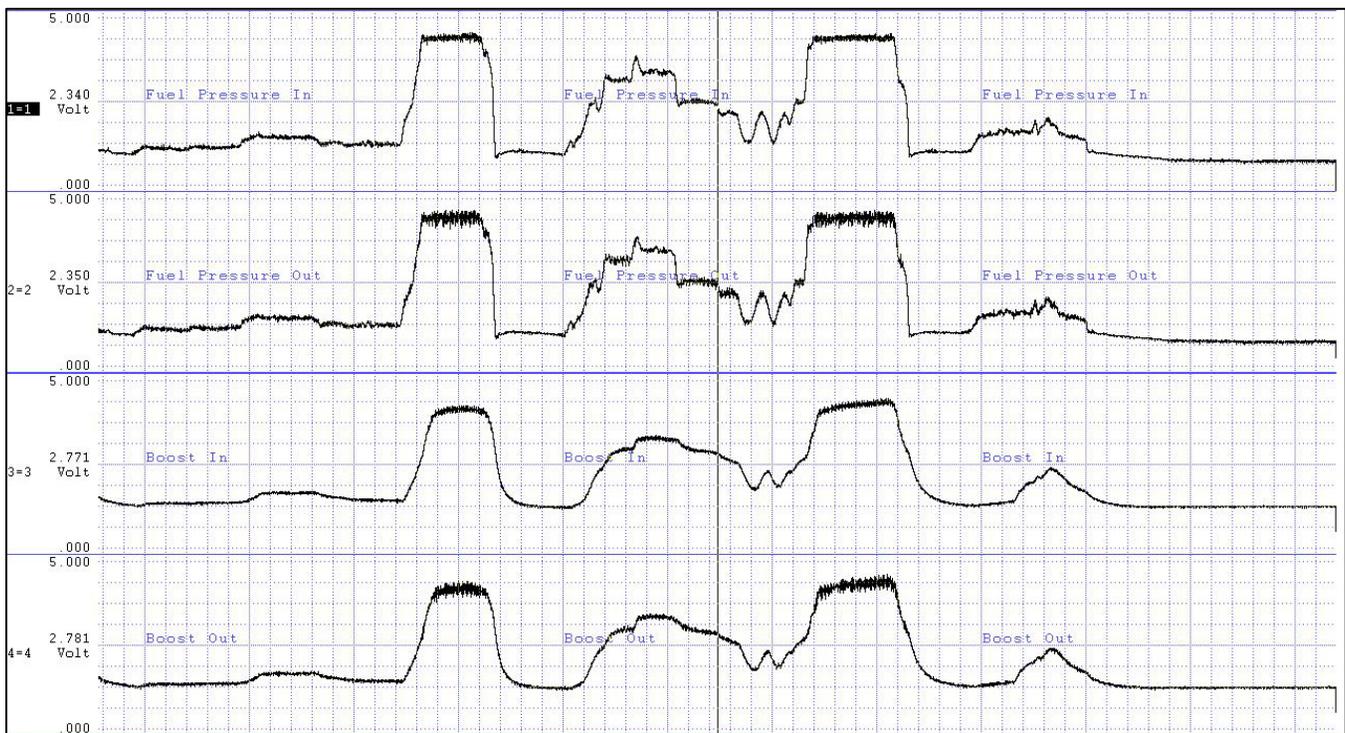
Profile S is not adjustable and will always be a stock setting. Profiles 1-10 are user adjustable. This section of the manual shows you what you are modifying and what the results of the modifications can be. **Make modifications in small increments.** It is your responsibility to make intelligent decisions as to what and how much of each scale factor you will modify. Diesel MD modules are preprogrammed to produce a respectable increase of horsepower and torque from your 6.0L Powerstroke. Scale factor modifications and the results from those modifications will vary. Bolt-ons, down-loaders, injectors and **any** other aftermarket product claiming to modify, increase, improve or change anything on your vehicle can significantly change the way the Diesel MD works on your vehicle.

NOTE: SOME MODIFICATIONS TO THE SCALE FACTORS WILL RESULT IN DIAGNOSTIC TROUBLE CODES, CHECK ENGINE LIGHTS, DAMAGED ELECTRICAL AND MECHANICAL PARTS AND POSSIBLY PUT THE ENGINE INTO LIMP MODE OR FAILURE. ALL MODIFICATIONS ARE DONE AT YOUR OWN RISK.

All data in this section was taken from a 2004 Ford Powerstroke 6.0L Excursion.

Below you see a data log screen of both the fuel pressure and boost pressure sensor 0-5 Volt signals. 0 Volts is 0 PSI and 5 Volts is maximum PSI for both the fuel pressure and boost pressure sensors. The first line is labeled Fuel Pressure In. This is the 0-5 Volt signal from the Injection Control Pressure Sensor, which monitors the high pressure injection oil for the injectors, which is picked up or intercepted by the Diesel MD. The second line is labeled Fuel Pressure Out. This is the 0-5 Volt signal sent out of the Diesel MD to the vehicle's PCM. Notice that the in and out signals are the same. They are the same because the Diesel MD was in Profile S for this data log. Voltage in = Voltage out in Profile S because the scale factor is set at 1.00. Line three is labeled as Boost In. This is the 0-5 Volt signal from the Boost (MAP) sensor. It is intercepted by the Diesel MD. Line 4 is labeled Boost Out. This is the signal sent out of the Diesel MD to the vehicle's PCM. Notice that the in and out signals are the same. For the same reason the first two lines are the same holds true for the second set.

Profile S



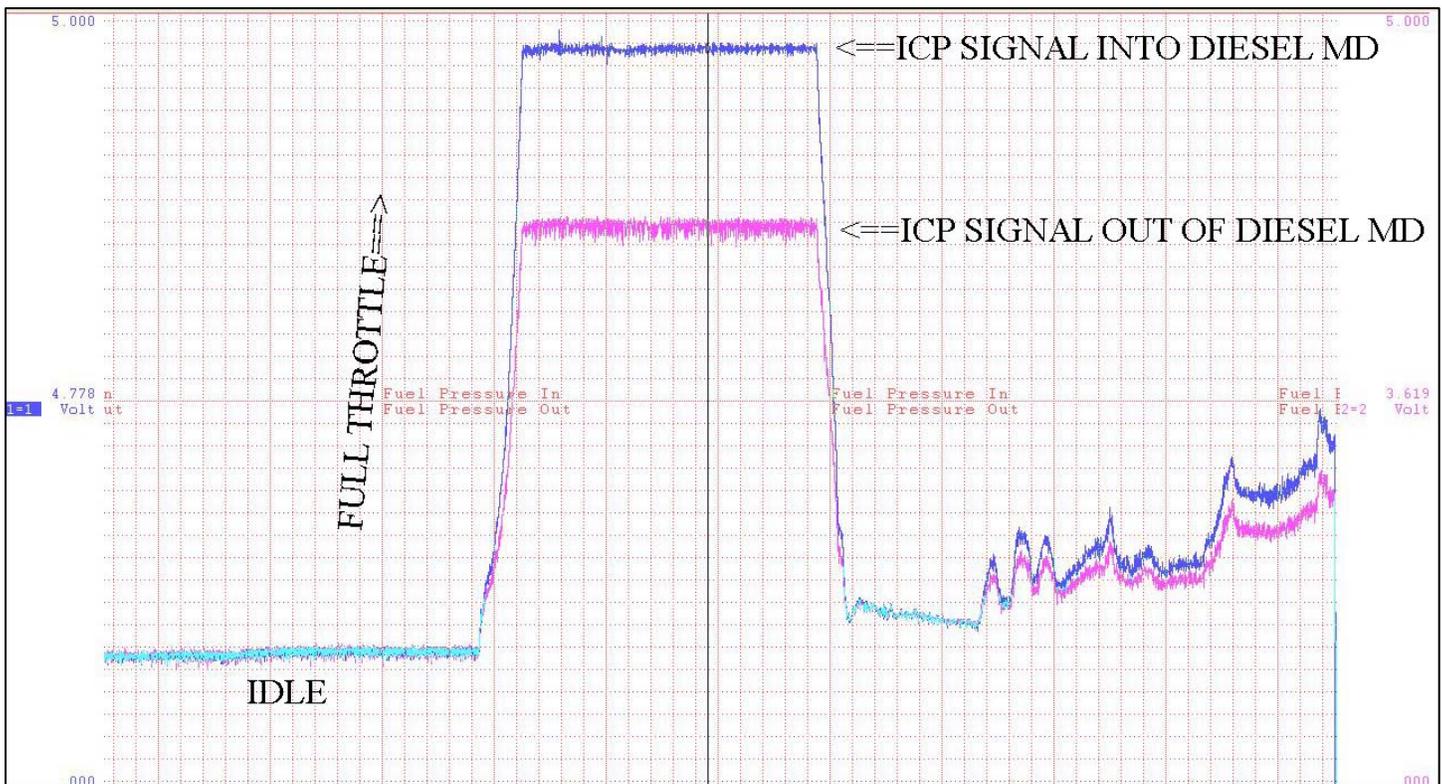
Fuel Pressure

On 6.0L Ford Powerstroke engines fuel pressure is actually injection oil pressure measured by the Injection Control Pressure (ICP) sensor. Powerstroke engines use a H.E.U.I. injection system that is part mechanical and part electrical. The ICP sensor is just one of the electrical parts used by the H.E.U.I. injection system and just so happens to be one of the sensors we monitor with the Diesel MD.

What is the Fuel Pressure Sensor scale factor?

What does it mean to modify a scale factor? Scale factors are used by the Diesel MD to calculate output voltages from input voltages. Let's use Profile 10 and its scale factors as an example to clarify. If the Diesel MD has 4.7 Volts as an input from the fuel pressure sensor and the scale factor is set at 0.68, the output will be 3.66 Volts. The graph below exactly illustrates this scenario. If the scale factor is less than 1.00, the Diesel MD shows the vehicle's PCM a lower than actual ICP sensor value. If the scale factor is more than 1.00, the Diesel MD shows the vehicle's PCM a higher than actual ICP sensor value.

Profile 10 Fuel Pressure Sensor (ICP) signals



Dark Blue= ICP signal into Diesel MD from the ICP sensor

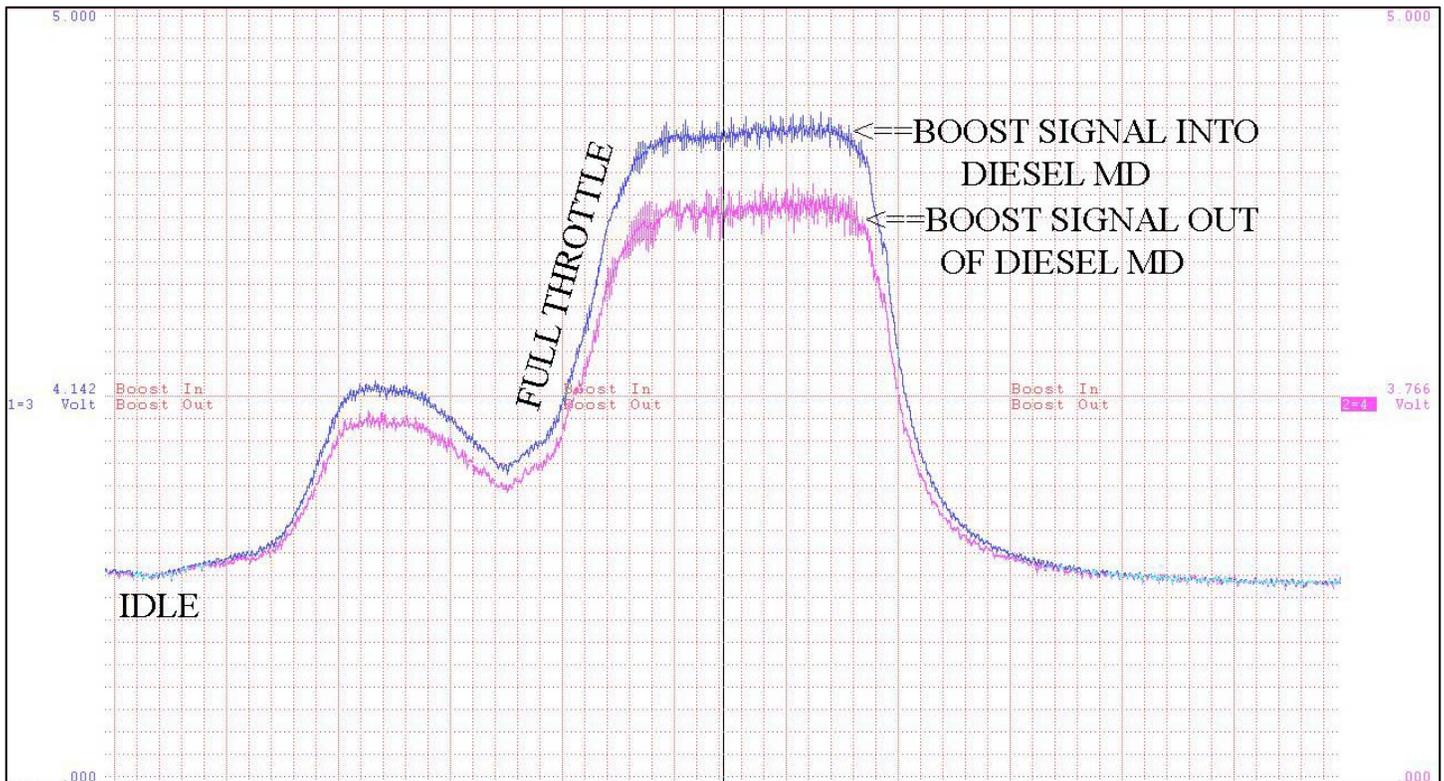
Pink= ICP signal out of Diesel MD to the PCM

Light Blue= ICP signal in and out are the same because engine is at idle

BOOST PRESSURE

6.0L Powerstroke engines are fitted with a Variable Geometry Turbo (VGT). VGT's get their name from the adjustable vanes which focus exhaust gas onto the turbine. Vehicle PCMs control the variable vanes through the use of hydraulic pistons, solenoids and vane position sensors. VGT turbochargers can function as a small and large turbo. To help spool up at low rpms the PCM commands the turbo exhaust vanes into a position that more accurately focuses exhaust gas across the turbine. To stop over boost and excessive turbo shaft speed the PCM moves the vanes to less of a focus on the turbine. Desired vane position is calculated by the vane position sensor, boost sensor (MAP), ambient pressure sensor and exhaust back pressure sensor.

The Diesel MD intercepts the boost sensor signal, modifies it and then sends it to the PCM. In the graph below you can see the modification to the signal in Profile 10. As the boost signal rises off of idle, the Diesel MD begins to change the signal seen by the PCM. 0.79 is the scale factor for boost in Profile 10. Voltage into the Diesel MD is 4.142 Volts. Voltage out of the Diesel MD is 3.766 Volts. By telling the PCM it has less boost than it actually does the PCM reacts by keeping the VGT vanes more focused on the turbine which spools it up faster and produces more boost.



Dark Blue=BOOST signal into Diesel MD from the MAP sensor

Pink=BOOST signal out of Diesel MD to the PCM

Light Blue=BOOST signal in and out are the same because engine is at idle

MODIFYING THE SCALE FACTORS

With the ignition key off, press and hold the **MENU** button while turning the key to the on position. If done correctly the **Profile Config** display shown below with show on the screen.



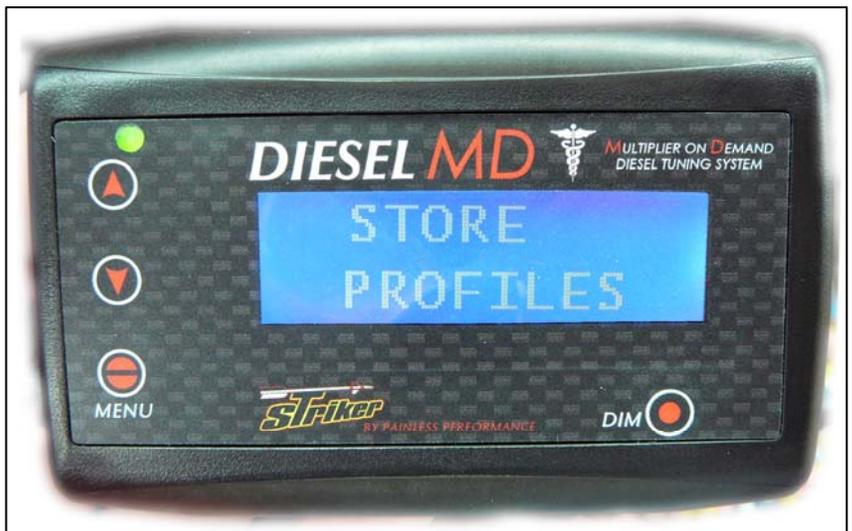
Press the **MENU** button. Select which profile you want to modify the scale factors for by using the **UP** or **DOWN** arrowed buttons then press the **MENU** button again. For this example we will use profile 1 as shown to the right.



Press the **MENU** button once you find the profile you want to modify. A new screen will pop up showing the two scale factors for the specific profile you selected. The screen to the right shows the scale factors for profile one. Notice the asterisk next to the **BST: 1.00** line. This asterisk depicts which factor will be modified when pressing the **UP** or **DOWN** arrowed buttons. Using the **UP** or **DOWN** arrowed buttons to change the Boost scale factor. Press the **MENU** button to move the asterisk down the **FP: 0.97** line. Use the **UP** or **DOWN** arrowed buttons to modify this scale factor as well. Changes are made by hundredths.



Once you have modified the scale factors. Press the **MENU** button. The display shown to the right will show on the screen. Press the **UP** arrowed button to store your modifications to the scale factors.



At this point the Diesel MD will loop back to the **Profile Config** screen. Either press the **MENU** button and then choose another profile to modify or turn the ignition key off and then back on to revert back to normal operating mode.

FACTORY REFRESH

Because the Diesel MD gives you the ability to modify the scale factors any way possible, we also include a way for you to revert back to the factory settings programmed into the module here at the factory. This is called a factory refresh. Once the Diesel MD is refreshed all of the saved information from the modifiable settings saved through the use of the **Store Config** or **Profile Config** is erased. So, if you have specific settings you have modified and want them that way again, we suggest you right them down below before refreshing the module.

To refresh the module hold the **UP** arrowed button while turning the ignition key to the on position. The screen will now display **FACTORY REFRESH**. Let go of the **UP** button and wait about two minutes. After the Diesel MD is done refreshing it will reboot to the start up screen showing Painless Performance and then go to its normal default operating mode. At this point you will need to program all of the user configurations just as you did when first installed. The scale factors will also revert to factory settings.

EGT WARNING: _____

<u>PROFILE</u>	<u>BOOST SCALE FACTOR</u>	<u>FUEL PRESSURE SCALE FACTOR</u>
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____
10	_____	_____

Recommendation:

It is recommended to uninstall this harness and module before any work is done on the vehicle by a dealership.

TROUBLE SHOOTING:

Module won't power up:

1. Check fuse in fuse holder. If blown replace it.
2. Check 12 Volt and ground connections are not hooked up in reverse. Orange is 12 Volt wire. Black is ground wire. Correct? Go to step 3.
3. With a **Volt meter (do NOT use a test light)** check for 12 volts on both sides of the fuse in the fuse holder when the ignition switch is in the crank and run positions. If 12 Volts is not present, check Posi-tap connection at ignition switch wire. Make sure the Posi-tap pierced the ignition switch wire and that the orange wire is making continuity to the Posi-tap. If there is 12 Volts on one side of fuse and not the other then the fuse is bad or the crimps on the terminals were not done properly. Use the two extra fuse holder terminals in the parts kit to redo this connection.
4. Check ground wire for continuity to ground. No, go to step 4. Yes, call Painless tech line.
5. Check ground wire for good crimp at ring terminal. Use new terminal to fix if bad crimp is evident.

Check engine light:

1. Does the Diesel MD module power up? Yes, go to next step. No, go to top of page and read "Module won't power up" section.
2. Check connections made at ICP and boost sensors. Make sure connectors are fully seated into their mates.
3. Make sure there is no engine oil in the ICP sensor and the factory ICP sensor connector. ICP sensors have been known to leak oil into the electrical connection area and this will cause connection problems.
4. With the key off unplug the Engine A and Engine B connectors. Plug the PP-692 pigtail into the Engine B connector. This creates a signal loopback from the ICP and boost sensors directly to the vehicles' ECM. In other words it takes the Diesel MD module out of the signal loop. Start the engine. If your ICP and boost sensor connections are good you should not receive any diagnostic trouble codes nor should you see a check engine light.
5. As stated earlier in this installation manual, modification of scale factors can cause the ECM to log diagnostic trouble codes and cause the resultant check engine light.

Pyrometer not reading:

1. Check wire connection to thermocouple. Wires should be connected red to red and yellow to yellow.
2. Check to make sure the red and yellow wires are not shorted together.
3. Check to make sure the thermocouple wires are not shorted to ground.

PAINLESS WIRING OFFERS A TECHNICAL ASSISTANCE LINE TO ANSWER ANY QUESTIONS YOU MAY HAVE. THE NUMBER IS (800) 423-9696. PHONES ARE ANSWERED MONDAY THROUGH FRIDAY FROM 8 AM TO 5 PM CENTRAL TIME, NOT INCLUDING HOLIDAYS. PLEASE LEAVE A MESSAGE IF YOU ARE UNABLE TO REACH US AND WE WILL RETURN YOU'RE CALL AS SOON AS POSSIBLE.

Painless Performance Limited Warranty and Return Policy

Chassis harnesses and fuel injection harnesses are covered under a lifetime warranty. All other products manufactured and/or sold by Painless Performance are warranted to the original purchaser to be free from defects in material and workmanship under normal use. Painless Performance will repair or replace defective products without charge during the first 12 months from the purchase date. No products will be considered for warranty without a copy of the purchase receipt showing the sellers name, address, and date of purchase. You must return the product to the dealer you purchased it from to initiate warranty procedures.