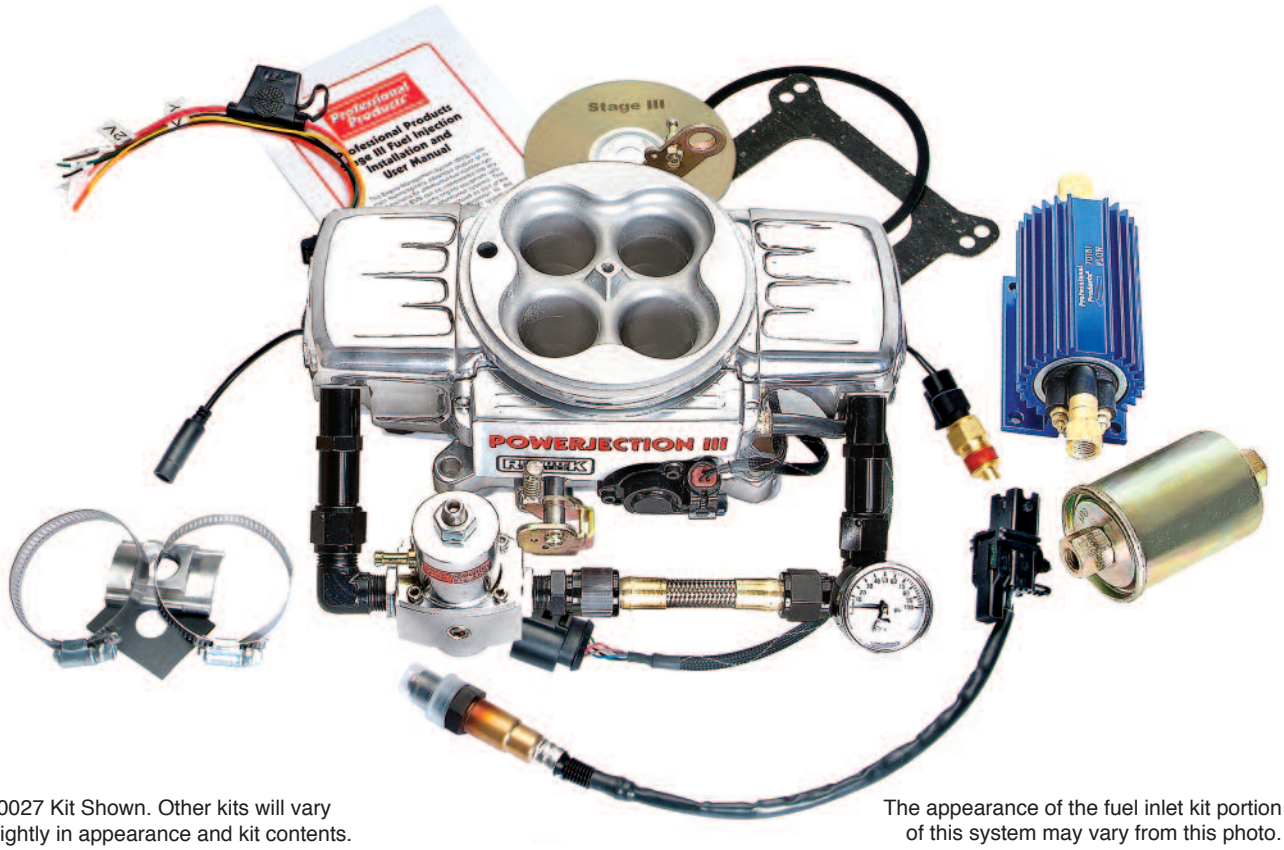
Professional Products®

POWERJECTION™ III

Installation Instructions & User Manual

for 70020, 70021, 70026, & 70027 Kits

and 70028, 70029 plus 70120 through 70129 Kits



70027 Kit Shown. Other kits will vary slightly in appearance and kit contents.

The appearance of the fuel inlet kit portion of this system may vary from this photo.

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IMPORTANT - READ THIS FIRST

The Powerjection III EFI System comes from the factory with a basic profile program already installed in the ECU/EMS mounted on the throttle body. See the supplementary Quick Install instruction sheet. If your engine matches, or is close to, the engine that our basic profile is designed for, you do not need to do anything but install your Powerjection III System (pages 3 through 7 in this instruction book) and drive it. We also have several other basic profiles (called Calibration Files) stored on the Dashboard install disc packaged with this kit. Again, read the information on the Quick Install sheet to see if any of these other Calibration Files match your engine. If they do, you will need to follow the directions in this manual starting on page 7 with opening the Dashboard. Then jump to FILE on page 12. In Step 4 you can choose any of the other available basic Calibration Files, assuming one of them fits your engine. Follow the instructions on page 12 on selecting a new map and substituting it for the default map loaded into your system from the factory.

If none of the installed Calibration Files work for you, you can very easily program your own by just entering a few simple inputs as outlined in the "Creating Your Base Profile" section starting on page 8 of these instructions.

DEFINITION OF SOME COMMON TERMS USED IN THIS INSTRUCTION BOOKLET

ECU/EMS - ECU (engine control unit) or EMS (engine management system) are interchangeable terms and are used to describe the miniature computer mounted on the throttle body.

MAP - This term is actually used to describe two different things. We have tried to differentiate by using lower case for one and caps for the other. The map or "MAP" is the program that is created to "map" your engine's functions. MAP stands for manifold absolute pressure. See "kPs" for more detail.

kPa - This abbreviation stands for kilopascals and is the metric term used for both vacuum and pressure. You are probably used to seeing "inches of vacuum" and "pounds per square inch" of pressure. We use kilpascals because the measure terms are the same. 0-100 kPs covers the vacuum part of the scale while 100 and up is the pressure part of the scale. A reading of 100 kPs is zero inches of vacuum and zero PSI. While your Dashboard software shows the kPs reading as the dominant number, directly below that reading we convert the number to inches of vacuum or PSI.

WATER - Some of the charts and tables in Dashboard software use the term "water." This terms applies to your engine coolant.

DASHBOARD - This is the software that is on the supplied disc. This provides you with the ability to infinitely tailor your system. Also contains features for advanced tuners.

FUEL WIZARD - This is the part of the Dashboard software that allows you to customize the base map for your specific engine.

TARGETED AIR/FUEL RATIO - The base map installed in your computer, or the map you otherwise select, establishes what the computer thinks is your ideal air/fuel ratio for optimum performance. The "Adaptive Learning" feature of this system will also modify the actual Air/Fuel Ratio as the vehicle is driven. This A/F ratio may change at various rpm's or driving conditions, which is unlike a carburetor or some competitive fuel injection systems which attempt to run a fixed A/F ratio all of the time.

DATA LOGGING - The supplied software is capable of recording a wide range of data while you drive your vehicle and then will allow you to see a timeline of what has actually occurred during vehicle operation. Laptop must be connected to do this.

ADAPTIVE LEARNING - This feature was pioneered by Professional Products for aftermarket EFI systems. By using a wide band oxygen sensor, the sensor can determine the actual air/fuel ratio of the engine. The computer then makes the necessary adjustments on the fly to maintain the targeted air/fuel ratio at all times under all conditions. These adjustments are occurring on a constant basis as the vehicle is driven.

CLOSED LOOP - Closed loop is the default setting for the ECU/EMS. With it turned on the "Adaptive Learning" feature is functional. To shut off "Adaptive Learning" you will need to turn off the "Closed Loop" feature.

PULSE WIDTH - This refers to the length of time that an injector nozzle is open and injecting fuel into the airstream. It is measured in milliseconds. This is controlled by the ECU/EMS mounted on the Powerjection III throttle body. While this setting can be changed, it normally is left alone and the basic map you are using determines what it should be under varying condtions.

MAP Sensor - The manifold absolute pressure sensor provides instantaneous manifold pressure information to the ECU/EMS. The data is used to calculate air density and determine the engine's air mass flow rate, which in turn determines the required fuel metering for optimum combustion.

INTRODUCTION

Thank you for your purchase of the Professional Products Powerjection III Fuel Injection System. In this manual we will outline the procedure for installing the unit on your vehicle as well as how to navigate and use the Stage III Dashboard software.We feel this is the easiest system to install and utilize. If during the installation you have any question about the installation procedure, please call our Technical Support Line at 323-779-2020. The Technical staff is fully equipped and knowledgeable to assist you with every step of the installation and programming.

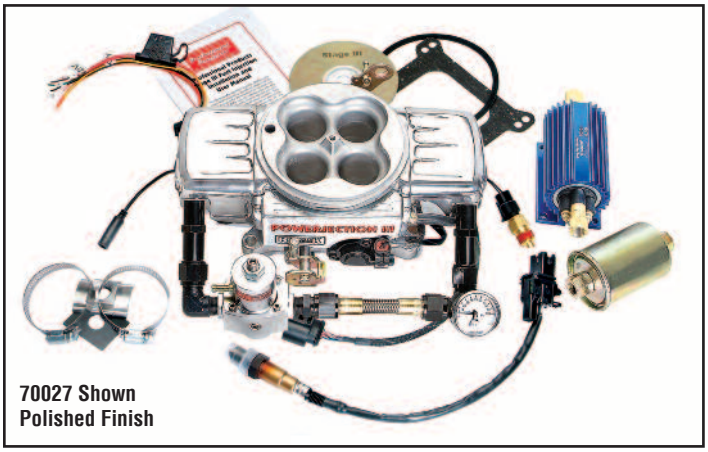
VARIOUS POWERJECTION III VERSIONS

The Powerjection III is available in two different versions. The Throttle body assembly part numbers 70020 (Satin Finish) & 70021 (Polished Finish) come without any fuel system. These part numbers will require the user to supply the following components:

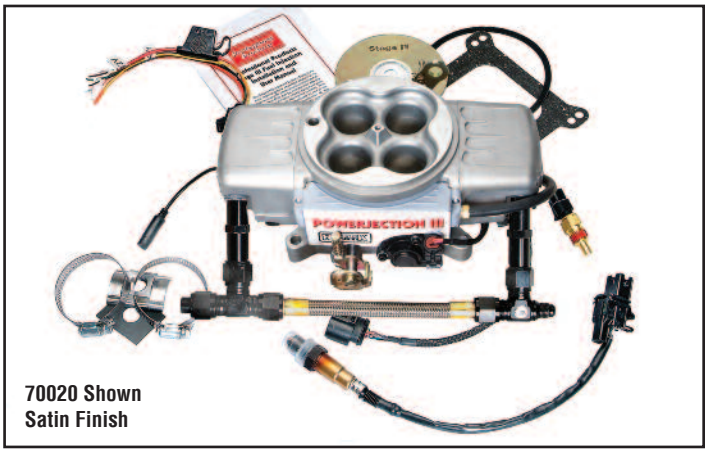
• EFI Rated Fuel Pump • EFI Rated 10 micron Fuel Filter • Fuel Pressure Regulator • Fuel Pressure Gauge

These versions were designed for those who already have existing components or wish to supply their own components.

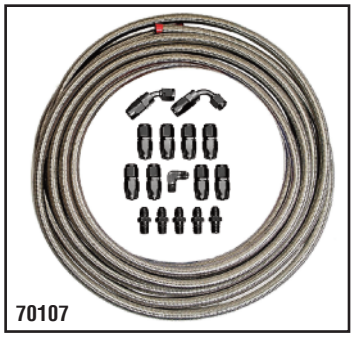
The second version part numbers 70026 (Satin Finish) & 70027 (Polish Finish) come with the above listed components as an "all inclusive" package for those needing all the components.



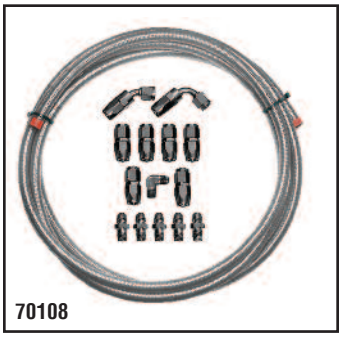
70027 Shown
Polished Finish



70020 Shown
Satin Finish



70107



70108

All systems will require the use of a return fuel line. A return fuel line is a separate fuel line that allows unused fuel to return back to the fuel tank. We offer a return fuel line kit part number 70107 for use with the Powerjection III systems. This kit includes 25-feet of -06AN stainless braided fuel line and all necessary -06AN hose ends and fittings to plumb the fuel pump, fuel filter and to connect to the EFI system. Note that any of the Powerjection III systems can be converted to a returnless setup by incorporating our 70035 FuelOnDemand Kit. This kit also provides many other features that extend the life of your electric pump and also lessen the pump noise at idle or low speeds, particularly on very large pumps. We also offer our 70108 Fuel Line Kit for use with returnless systems.

All Powerjection III systems are tested live in a test engine cell to ensure they are fully operational as part of the extensive quality control measures maintained throughout the entire build process of the Powerjection III system. Butterflies are adjusted and the idle is set for you on a running engine. (Set for a SB engine - you may need some minor adjustment.)

BEFORE GETTING STARTED

Check the list at the right to make sure you have all the necessary components required to make up the kit.

Almost all EFI systems require a vented fuel tank. This system is no exception. The fuel tank MUST be vented and the use of a vented fuel cap WILL NOT be sufficient. Minimum vent size should be 1/4-inch. This system also requires a return fuel line from the throttle body unit back to the fuel tank. (Unless you are also incorporating our FuelOnDemand kit) It is necessary to install a vent and provisions for the return fuel line if these are not already present. If these modifications need to be performed, remove the fuel tank using the vehicles manufacturer's guidelines and have experienced personnel make the modifications. If any welding is performed on the tank it must be fully flushed all gasoline and gasoline fumes.

The Powerjection III throttle body will fit the common square-bore intake manifold that a Holley 4150 will fit. The linkage of the throttle body is the same as a Holley 4150 so there should be no need to modify the linkage for the accelerator if the vehicle is presently equipped with a Holley. Carburetor adapters can be purchased from speed shops to adapt your intake to the 4150 square bore. If you have a spread bore carburetor style manifold you can utilize a Professional Products #52111 Manifold Adapter Plate Kit to allow the Powerjection III to fit your manifold.

Powerjection III Fuel Injection System Component Check List

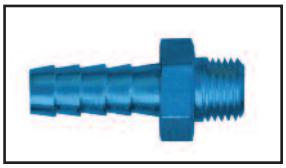
1. Throttle body with EMS and dual feed inlet
2. Throttle body mounting gasket
3. Air cleaner mounting gasket
4. Coolant temperature sensor
5. Wide-band O^2 sensor
6. Sub-harness
7. O^2 sensor bung
8. Bung gasket
9. (2) Worm gear clamps for installing O^2 sensor bung
10. Stage III Dashboard Software CD
11. Installation / User manual
12. USB to Serial Cable Adapter
13. Fuel Pressure Regulator (70026/70027 Only)
14. Fuel Pressure Gauge (70026/70027 Only)
15. Fuel Pump (70026/70027 Only)
16. Fuel Filter (70026/70027 Only)

We recommend the installation of a pre-filter to avoid damaging the fuel pump in case you have foreign particles in the gas tank. Note that most small filters sold for EFI systems will not work properly. We have tested a number of common filters and they cause fuel cavitation and erratic operation. We recommend the Professional Products #10210 or #10211 Inline Filter.

TOOLS AND ADDITIONAL PARTS YOU MAY NEED

The tools required to install the Powerjection III EFI systems are common hand-tools (Excluding tools for modifications to install a fuel vent and fuel return port in the fuel tank). You will need a wire stripper/crimper and a small assortment of wire terminals and wire. While we attempt to supply every needed component with these systems, each vehicle application may require different style(s) of terminals and thus are not included. Read through the installation process prior to starting the installation and determine the style and quantity of terminals needed for your specific application. On the Powerjection III system if you have power brakes and/or a transmission vacuum modulator you will need the appropriate vacuum splice or "T" to connect to a 3/8-inch vacuum port. These are available at most auto parts stores. The fuel pump and EFI supplied inline filter require male 1/4-NPT fittings. The fuel lines need to be a minimum of a 3/8-inch hose or -06AN hose. All fuel lines on the pressure side of the fuel pump to the throttle body are required to be EFI pressure rated hose and we highly recommend the use of factory steel lines or AN style fittings and hose. Note that Professional Products offers a full line of hose and fittings including a 1/4-NPT x 3/8 barbed fitting (#10244) specifically designed to be used with the supplied Powerjection III EFI fuel pump, and filter. See the Professional Products website for fittings and hose. **www.professional-products.com**

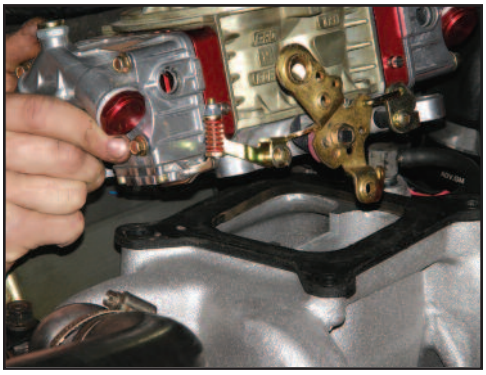
Use Professional Products 1/4-NPT x -06AN fitting in fuel pump and filter if using -06AN hose. #15239 (blue) or 16239 (black) or #17239 (polished).



Use Professional Products 1/4-NPT x 3/8 hose barbed fitting if you are using slip-on and clamped fuel hose lines. This type of fitting is required on pressure side.

INSTALLING THE POWERJECTION III EFI SYSTEM

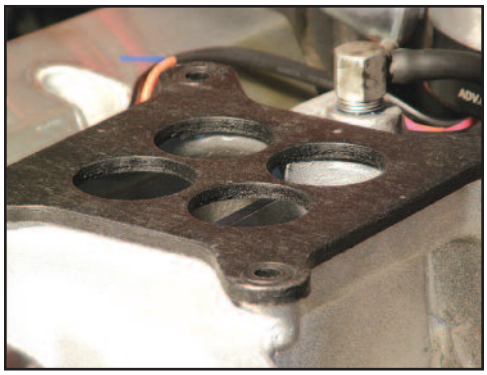
1. Disconnect the battery for safety. **2.** Disconnect the fuel lines and linkage from the stock carburetor.



3. Left - Remove the carburetor following the vehicle manufacturer's guidelines.

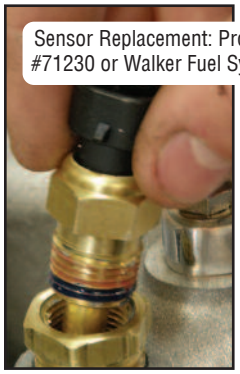
4. Right - Install the Powerjection III throttle body insulating mounting gasket supplied with your system. **You must use this gasket.** The thickness of this gasket assists in insulating engine heat affecting the fuel in the throttle body. It also features reinforcement bushings to prevent over-tightening which can cause distortion of the mounting flange(s).

Replacement mounting gasket is Walker Fuel Systems part number G1037



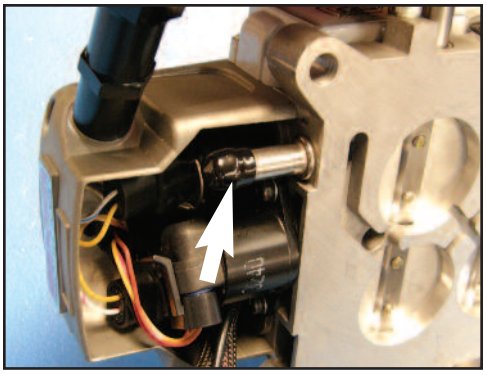
5. Left - Install the Powerjection III throttle body assembly onto your manifold. Note: You may need longer carburetor studs. Use Professional Products #20151. Connect your throttle linkage and the throttle return spring. Mount with nuts and washers and tighten. The EMS grounds through the mounting of the throttle body.

6. Right - Install the 3/8-NPT Coolant Temperature Sensor into one of the manifold water ports. You may need a reducer bushing.
Connect harness from throttle body to the coolant temperature sensor.



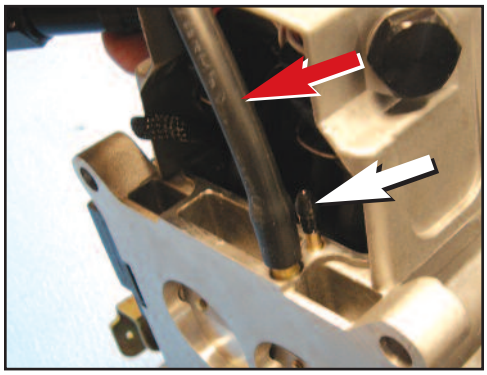
Sensor Replacement: Professional Products #71230 or Walker Fuel Systems #211-1012.

7. Connect your power brake (If equipped) vacuum line to the vacuum port on the rear base of the throttle body. If the vehicle requires vacuum for the transmission modulator you will need to connect to this port as well. If both a power brake unit and transmission modulator are used, you will need to install a vacuum T to accommodate the vacuum lines. The port nipple in the throttle body is a 3/8-inch. If you are using a vacuum advance distributor, connect distributor vacuum line to upper port on front base of throttle body. Cap any unused vacuum nipples. See below.



7a. Left - Remove plastic cap from rear vacuum nipple in throttle body for power brake and/or transmission vacuum modulator line.

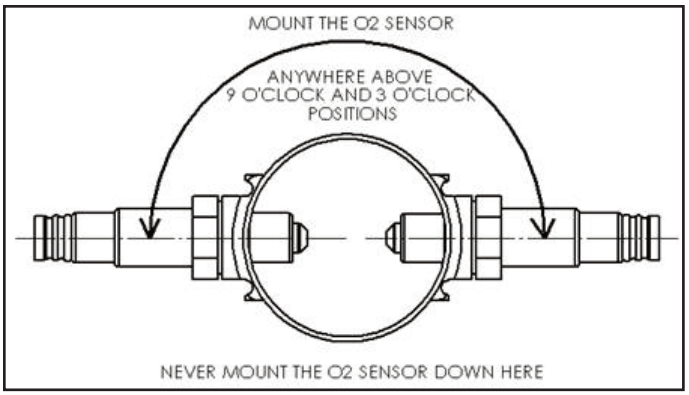
7b. Right - Remove plastic cap from front vacuum nipple (white arrow) in throttle body for vacuum line from vacuum advance distributor. Existing vacuum line (red arrow) is for the MAP sensor which is built into the throttle body. We do not recommend putting a tee in this line for any other vacuum use.

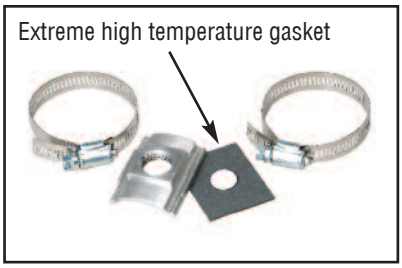


OXYGEN SENSOR INSTALLATION

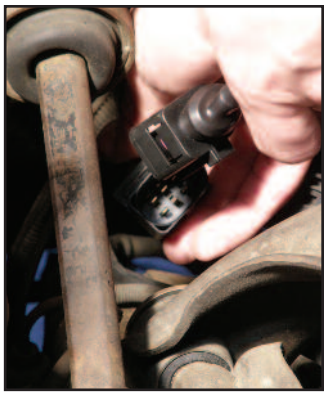
8. Below Left - If no previous oxygen sensor was used; locate a suitable location to install the supplied oxygen sensor bung. The location should be just past where the head pipe connects to the exhaust manifold. If headers are used, make sure it is about 4-6 inches past the collector pipe. If it is placed in the exhaust on a horizontal pipe, make sure that the angle of the sensor mounting is between the 9 o'clock and (going over the top to the) 3 o'clock position (this prevents condensation and exhaust debris from possibly contaminating the sensor). Drill a 5/8-inch hole. Open both supplied hose clamps, place on exhaust pipe and start the worm-gear hose clamps. Place the supplied gasket over the hole and place the stainless steel bung over the gasket holding it in place and tighten the hose clamps to secure the bung. OPTIONAL: You can weld the bung into place without the use of the gasket and clamps. **9. Below Right** - Plug the harness cable from the throttle body into the cable from the Oxygen Sensor. Using cable ties, keep harness away from exhaust or moving parts.

Oxygen sensor replacement number is Walker Fuel Systems 250-25022



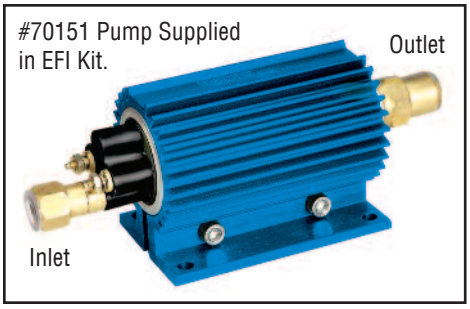


Professional Products #71250 Clamp-On Oxygen Sensor Bung Kit. The bung itself is made of stainless steel and can either be clamped on or welded on to exhaust.



FUEL DELIVERY SYSTEM INSTALLATION

The supplied fuel pump and the EFI fuel filter (70026 & 70027 only) have ¼-female pipe threads on the inlet & outlets. You will need to supply the fittings necessary for each of these to connect your fuel lines to. These fittings MUST BE 3/8-inch / -06AN size or larger. Install the fittings into the fuel filter using blue Loctite #246. **Never use Teflon tape in the fuel system.** If you have also purchased either a #70107 or #70108 Fuel Line Kit, these kits will have all the necessary fittings you need.

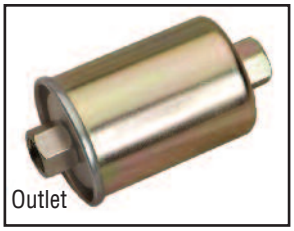


Remove the fuel inlet and outlet fittings from the fuel pump. Install your pre-selected fittings into the removed fittings using blue Loctite #246 sealant. **Never use Teflon tape in the fuel system.** If you attempt to install your fuel line fittings into the inlet and outlet fittings of the pump with the fittings still installed in the pump, you may damage the pump.

Reinstall the fuel inlet fitting onto the fuel pump taking care to not over-tighten.

Next install the brass outlet fitting on to the pump making sure the sealing washer is in place.

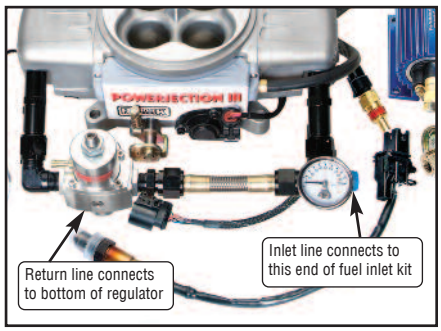
Tighten the outlet fitting, taking caution not to over-tighten. The inlet threads are fragile and may break if over-tightened.



Install the fuel pump. **The fuel pump must be mounted in a position below the fuel tank level and within (2) feet of the fuel tank** so that fuel can gravity feed and prime the pump. This is true of all electric EFI fuel pumps, not just the Professional Products pump.

Connect a ground wire on the negative side of the fuel pump and ground to the chassis.

Install a fuel line from the fuel tank supply outlet to the fuel pump inlet. A pre-filter should NOT be used inline between the fuel supply and the fuel pump inlet unless you have the correct filter. Many of the commonly available filters used before the fuel pump will cause a vacuum between the pump and filter. This vacuum situation will cause the fuel to aerate and cavitate inside the pump. Using the stock sock/screen type filter located in the gas tank will be sufficient in catching any large debris that can cause damage to the fuel pump. However, if you feel you want to use a pre-filter we have tested and had good luck with the Professional Products #10210 (red/blue) or #10211 (aluminum) Inline Street Filter. This filter has 3/8-NPT ports and you can use a pair of Professional Products #10232 (2 to a pack) 3/8" hose nipple fittings. This filter is used on the low pressure side of the pump so ordinary hose nipple fittings and clamps are suitable.



Install a fuel line from the pump outlet to the supplied (70026 / 70027 only) EFI inline fuel filter. If you are supplying your own fuel filter, it must be EFI rated and filter to 10 microns.

Install a fuel line from the EFI filter to the fuel inlet on the right front of the Powerjection III throttle body. **NOTE: All Fuel lines from the fuel pump to the fuel pressure regulator need to be a minimum size of 3/8 inch inside diameter hose or -06AN lines and must be rated for high pressure fuel injection use.**

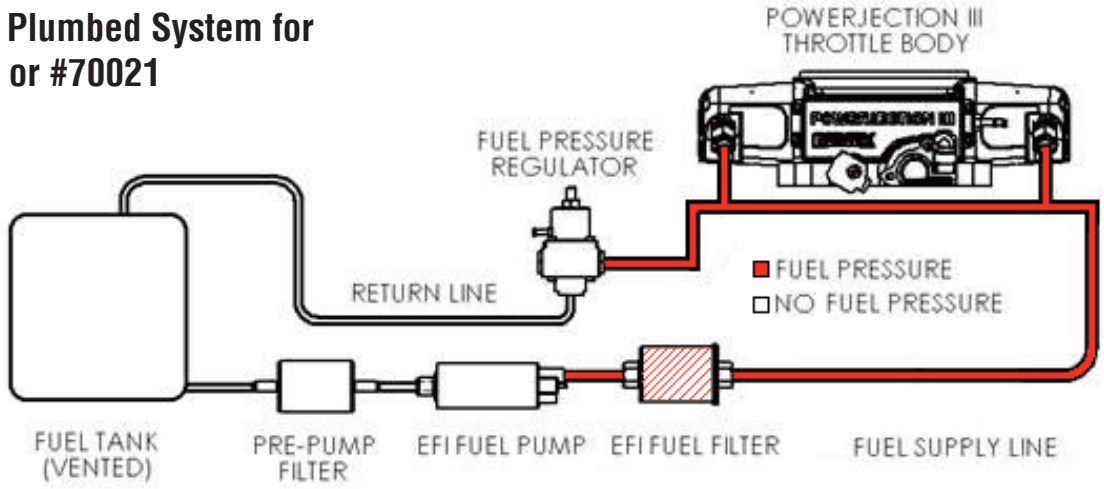
NOTE: The fuel pump and all fuel lines need to be mounted and / or shielded and routed away from any heat source which may create vapor lock.


#10210 Pre-Filter

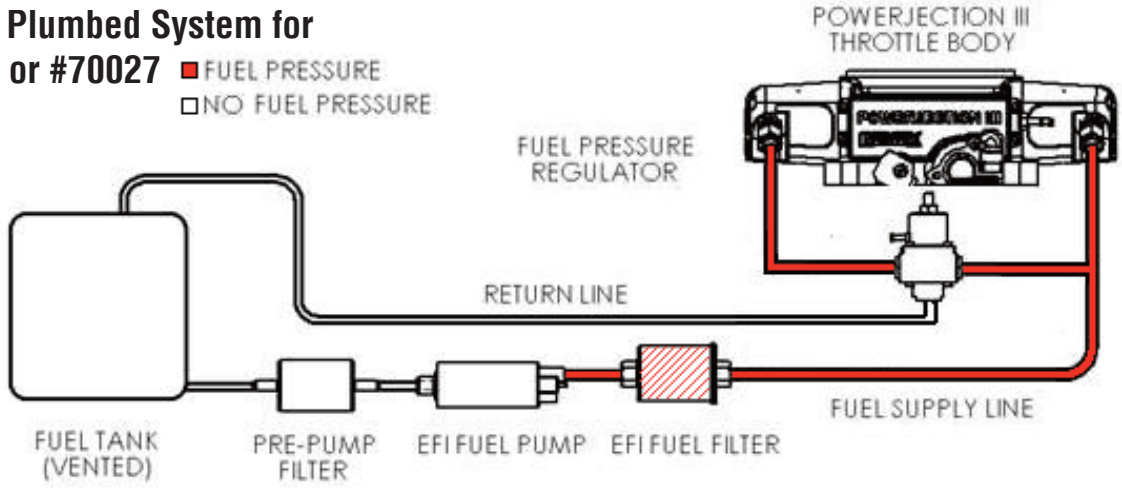
Install a return fuel line from the fuel tank forward to the bottom of the fuel pressure regulator and connect. (It is not required that the return fuel line be EFI rated). Note: If using a regulator not supplied with your system, be sure you know which port is for the return.

The above instructions are extremely important and must be followed. Please carefully read the above instructions and make sure that you perform all of the steps exactly as outlined.

Typical Plumbed System for #70020 or #70021

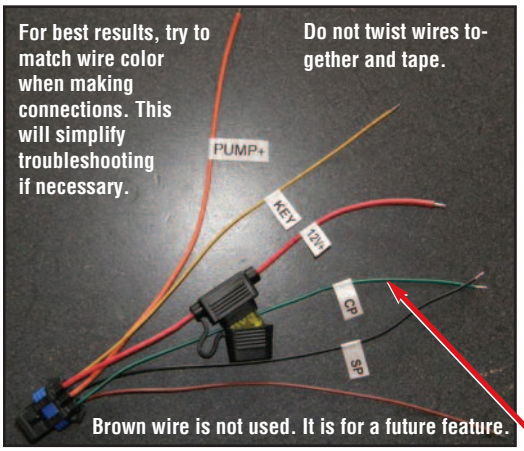


Typical Plumbed System for #70026 or #70027



WIRING HARNESS INSTALLATION

The supplied wiring sub-harness has a 6-pin connecter with six wire leads coming out. You will need to have additional wire and connectors to connect four of these wires to their appropriate connections. When selecting your wire, it must be of the same gauge as the wire you are splicing it to. Soldering your wire to the appropriate wire on the sub-harness and protecting the connection with heat shrink is recommended for making these connections. Crimp style butt connectors may work although they are prone to having poor connections and may not make a positive connection.



Wire Legend:
Orange Wire - Fuel Pump
Yellow Wire - Ignition Key
Red Wire - 12V source
Green Wire - Tach Output of amplifier box (MSD 6A)
Black Wire - Negative side of coil if using a ready-to-run two wire distributor. No amplifier box.
Brown Wire - Not used. This is for a future feature.

1. Connect the 12V fused red wire directly to the battery.

2. Connect the orange “Pump” wire to the positive side of the electric fuel pump. (If using your existing fuel pump, eliminate your previously installed power feed to it.)

3. Connect the yellow “Key” wire to a source that supplies battery voltage when the key is in the “On” position and in the “Crank” position. Also, verify that the voltage to the yellow ignition wire does not drop below 9 volts when cranking the engine. You can connect the “Key” wire to the positive side of the ignition coil only if you are not running an MSD ignition with an amplifier box. If a ballast resistor or resistor wire inline is used, DO NOT connect the “Key” wire to the coil. Locate a place before the resistor that is 12V or at the ignition switch or fuse panel.

4A. If using a ready-to-run type distributor you will need to connect the black “SP” wire to the negative side of the ignition coil.

4B. If using an MSD ignition system with an amplifier box you must use the green “CP” wire and connect it to the tachometer output.

Green wire connects to tach output on spark box

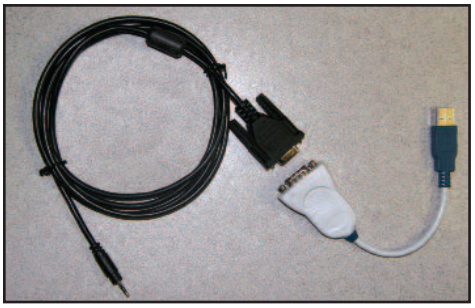
Very Important Note: Do not connect both the Green "CP" Wire and the Black "SP" Wire at the same time. It has to be one or the other. Tape off the unused wire so it cannot ground itself against metal. This is very important as severe damage to the computer can occur. The unused brown wire does not have to be taped off as it is not live.

FINAL STEPS TO THE MECHANICAL PORTION OF THE INSTALLATION

1. You need to make sure you have the battery negative cable grounded to the engine block and that you have a quality engine to chassis / body ground strap. An improper ground connection will result in erratic performance.
2. The vehicles battery must be fully charged. Be sure the throttle body is properly tightened and secured with lock washers.
3. Re-install and connect the battery. Turn the key to the “ON” position only and look for any visible fuel leaks. If you have fuel leaks, correct before proceeding any further with the installation.
4. Adjust the fuel pressure by turning the adjustment screw on top of the fuel pressure regulator to 42-45 PSI as read on the fuel gauge. If the initial reading is higher, you may need to turn the key off and bleed the pressure off by loosening the fuel supply line to the fuel inlet rail and reducing the fuel pressure. Adjust and test for proper fuel pressure again.
5. Do not attempt to start the vehicle at this time.

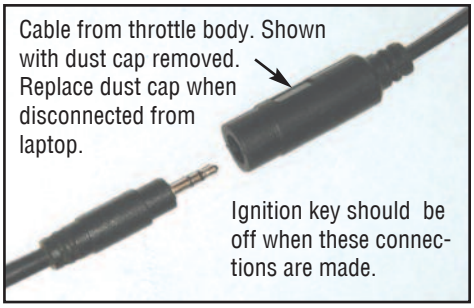
INSTALLING THE DASHBOARD SOFTWARE

1. The supplied software is designed to be used with the Powerjection III and is compatible with the Windows 7 operating system. You will need a PC laptop with a CD drive to complete the installation.
2. Insert the supplied Dashboard CD into the CD drive. The Install Wizard will pop up and guide you through the installation process. If the Wizard does not pop up, go to My Computer and double click the drive the CD is in. Then the Install Wizard should pop up to continue the install process. Once the software is installed into your laptop, you will need to connect it to the Powerjection III throttle body harness.
3. See photos and notes below to complete this stage of the installation.



The two cables shown above will allow you to connect your laptop to the Powerjection III.

Connect the USB end of the cable to the USB port in your laptop

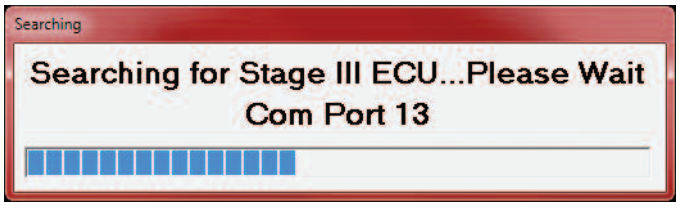


Connect the other end of the cable assembly into the single pin connector from the throttle body.

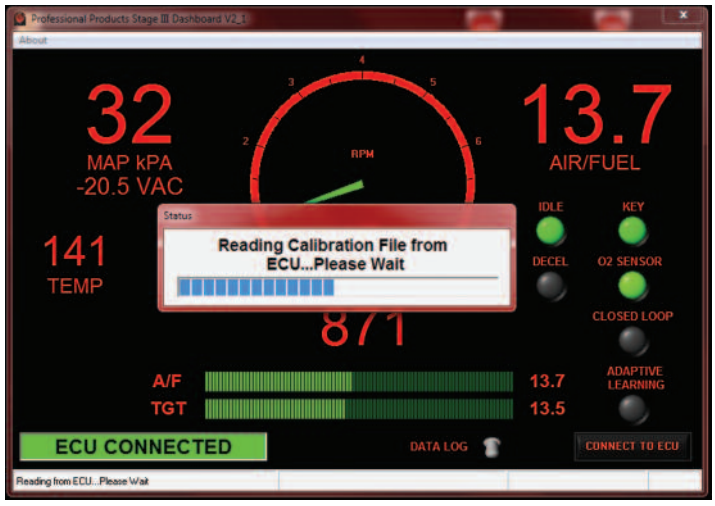
OPENING THE DASHBOARD ON YOUR LAPTOP

1. The icon at left will be on your laptop desktop. Click on it to open your Dashboard software.

2. When the Dashboard opens, you will see the window at right that tells you the Dashboard is searching through 29 Comm Ports to locate the Stage III ECU (ECU is the computer mounted on your throttle body).



3. If the Dashboard cannot find your ECU a blank Dashboard screen will come up. If you get a blank screen, then in order to connect to your Stage III ECU you can either turn your key to the "on" position and hit the “Connect to ECU” button to start the ECU search again, or you can close and re-open the Dashboard program with the key "on" to commence the new auto search. When the Dashboard finds the ECU you will see a window come up as shown above with the word "Connecting" in yellow. See above left image.



4. When fully connected to the ECU the status will change from the yellow "Connecting" to the green "ECU Connected." See above right image. A pop-up in the middle of the screen lets you know the system is reading the ECU calibration files. When the load status completes, the pop-up goes away and you are now online with your Powerjection III ECU.

NOTE: The Powerjection III ECU has a run profile already loaded in its memory. The Dashboard software also comes with additional profiles in the Calibration File Folder. The already installed run profile is set up for 300 HP small block Chevy with a medium rise street manifold and a stock to mild cam. If your engine is close to this profile (it doesn't have to be a small block Chevy) you can skip to the "Starting Your Vehicle for the First Time" section on page 11. We still suggest you read through the next few pages so you are familiar with what your EFI can do.

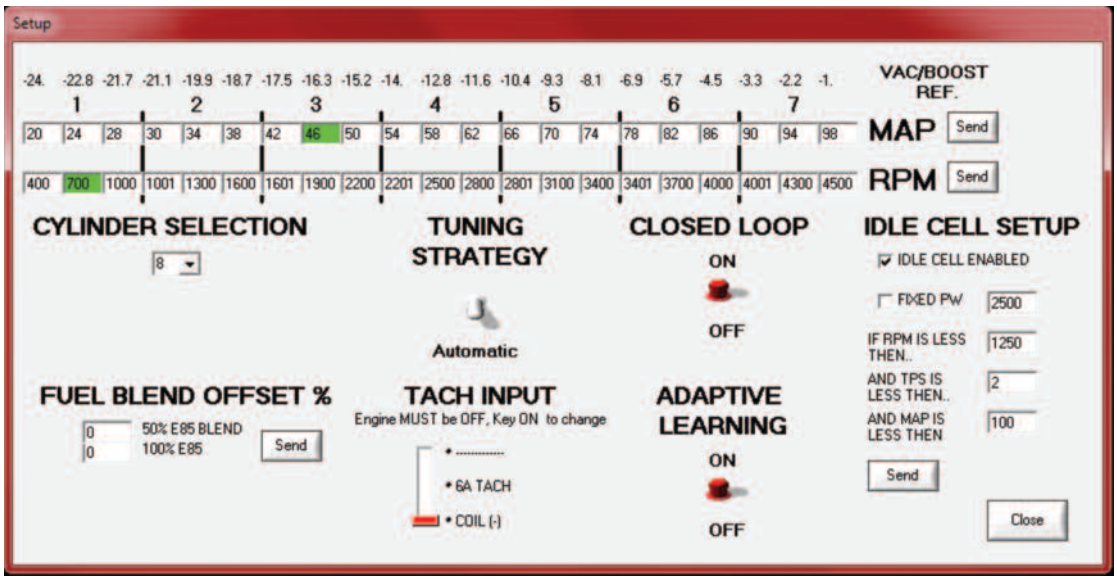
CREATING YOUR BASE "PROFILE" FOR THE POWERJECTION III EFI SYSTEM

We will take you through the steps necessary to create your custom profile and get your vehicle started. Most applications require answering a few questions only and will not require an advanced calibration. The only time you may need to do an advanced calibration is if your engine is very radical with a big cam.

In the "Using Your Stage III Software" section we will break down and define what each item on each page represents and how to alter it for tuning your particular vehicle.

To create your first base map program, make sure your laptop is connected to the Stage III EMS as explained earlier, then turn your ignition key "on" and click the "Dashboard" icon on your desktop. The main screen will appear. See image at below left. Then select "Setup" from the menu at the top of the screen and then select "Main Setup." See image at below right. You will then get the Main Setup screen shown below.

Main Setup



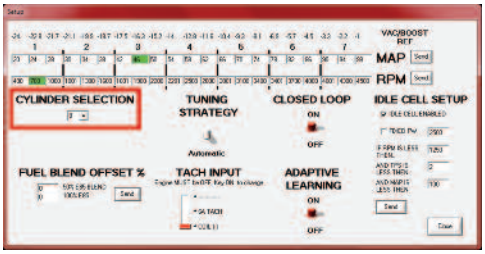
The Main Set Up screen will appear as shown above. There are several inputs that may need to be made. Details on each will be given below.

- MAP Boundaries Note: Default values are for unblown applications.
- RPM Boundaries Note: Default value is 4500 RPM
- Cylinder Selection (# of cylinders) 8 is the default setting.
- Tuning Strategy Automatic is the default setting.
- Tach Input Coil (-) is the default setting.
- Closed Loop On is the default setting.
- Adaptive Learning On is the default setting.
- Idle Cell Setup (Defaults): Enabled, RPM less than: 1250, TPS less than: 2, MAP less than: 100

NOTE: Do not adjust "Fuel Blend Offset %." This is for future development. If you are using E85 contact technical support at 323-779-2020.

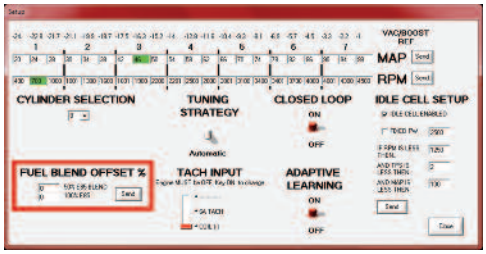
For the last four (Tuning strategy, Tach input, closed loop and adaptive learning) you will need to left-click to toggle button icon and it will toggle between the two available choices.

MAP & RPM: For unblown applications, leave the MAP and RPM boundary tables at the default settings. We will further explain the setup for these boundaries in "Boosted Applications" section.

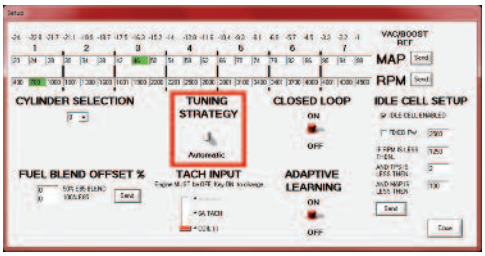


Cylinder Selection: Select the number of cylinders of your engine; 4, 6, or 8. Eight is default.

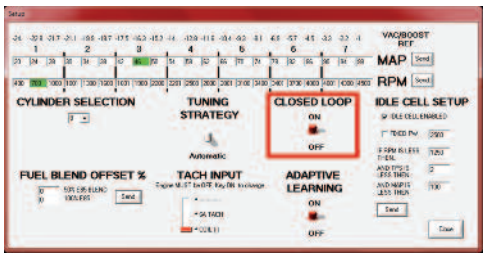
Fuel Blend: The default setting is gasoline. This system is capable of operating on E85 and various blends of gasoline and E85. Please call the Professional Products tech department if you want to run something other than gasoline.

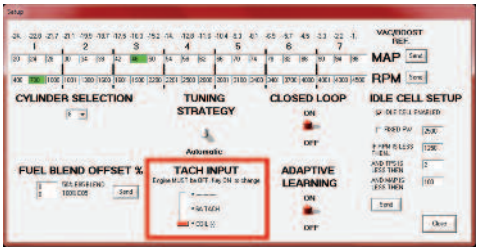


Tuning Strategy: Please select "Automatic" so that the computer can generate the fuel curve. We will discuss "Manual Tuning" in the Advanced Tuning Section of these instructions.



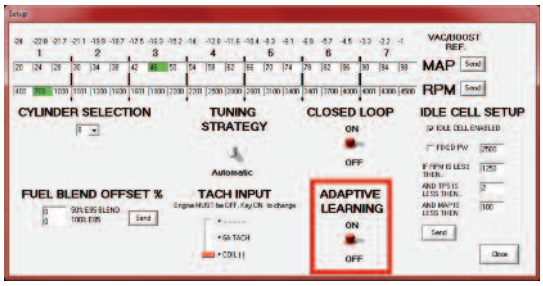
Closed Loop: The default setting should be "On." If not, toggle to "On." Toggling is accomplished by placing your cursor over the toggle switch and left clicking your mouse.



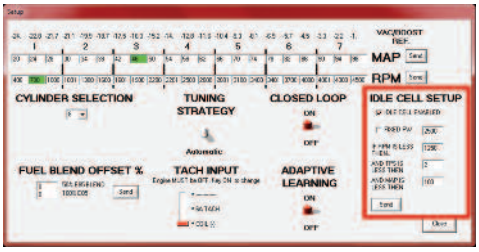


Above: It is very important that you select the "Tach Input" to match the way you wired the green or black wires from your EFI system. See page 6 of instructions.

Tach Input: Select "6A Tach" if using an amplifier spark box (MSD or other) and you used the green wire. Or "Coil (-)" if connecting the distributor reference black wire to the coil. Engine must be "off" and ignition switch "On" to change the Tach Input.



Adaptive Learning: The default setting should be "On." If not, toggle to "On."



Note: This section is for advanced tuners only. For most applications, the adjustments outlined here to the Idle Cell are not necessary.

Idle Tuning: The Idle Tuning strategy allows you to setup a specific idle cell that is separate from the fuel map. This allows you to specify a separate desired air/fuel mixture for when the engine is in an idle situation.

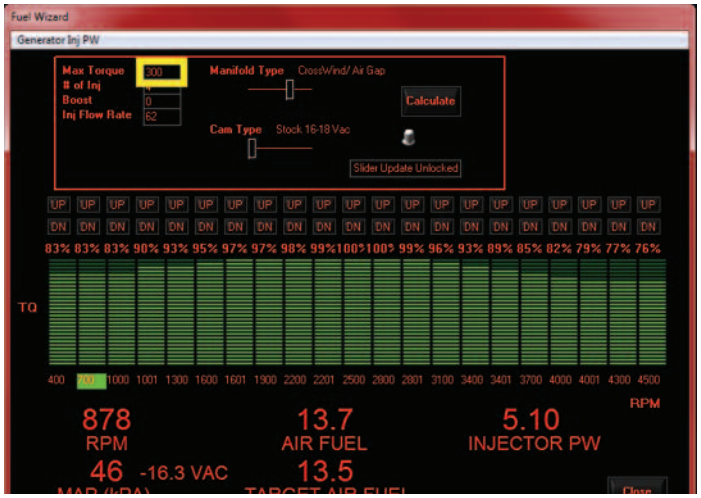
Idle Cell Enabled: This feature can be enabled or disabled by simply adding or removing the check mark in the **Idle Cell Enabled** check box.

Fixed PW: By checking the Fixed PW box you can set a fixed desired pulse width for idle. This feature can be used for an engine that has a lot of valve overlap/rough idle. It can also be used as a trouble shooting tool to fix the fuel delivery at idle to diagnose a non-fuel related problem.

There are specific values that need to be met to achieve the idle cell:
RPM Must be less than the number in the box.
TPS Must be less than the number in the box.
MAP Must be less than the number in the box.

FUEL WIZARD

Next select "Fuel Wizard' from the Setup. See image at below left.

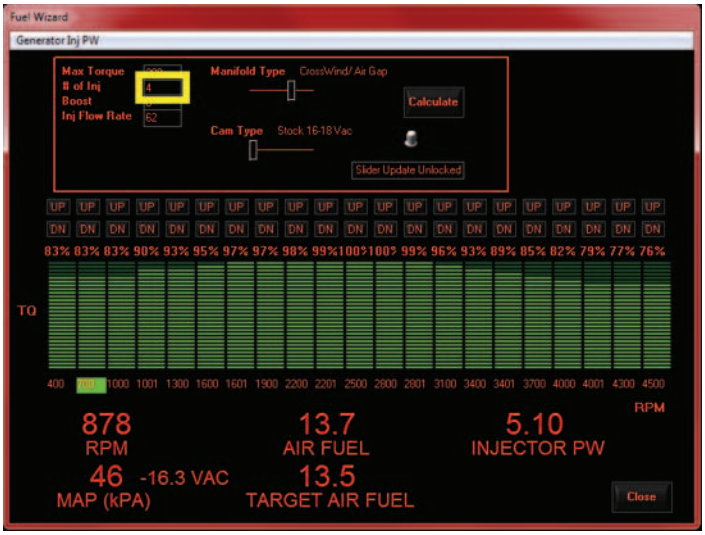


When the "Fuel Wizard" window opens (see above right) you will need to set several options as follows:

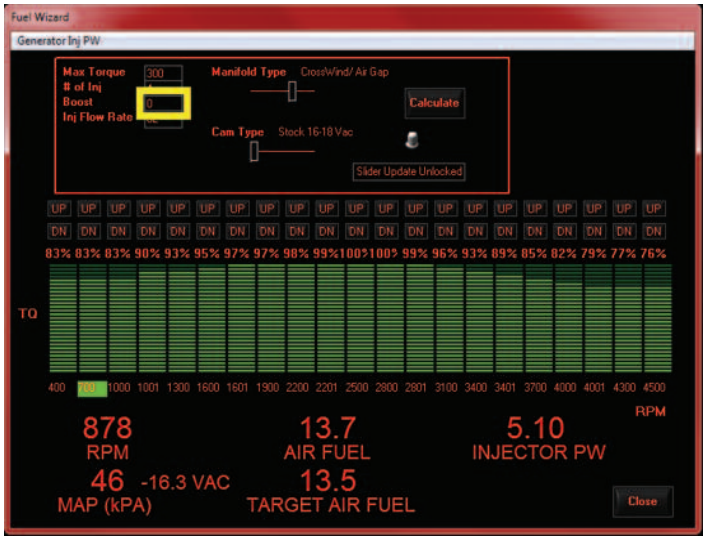
- Estimated Maximum RW Torque (or actual if known)
- Number of injectors. (This will be 4 unless running a dual EFI)
- Boost (if supercharged or turbocharged)
- Injector Flow Rate (Default is 62 lbs/hr.)
- Intake Manifold Type (We provide selections for you)
- Camshaft Type (We provide selections for you)

Torque: The first value to be entered (see chart above right, torque box is highlighted) is Torque. This needs to be a realistic value. If you are running a stock engine the torque values can be researched online. If you have a crate engine the supplier of the engine should have supplied you with a maximum torque rating. If you don't know what your maximum torque figure is, try to find a crate motor listing that is similar to your engine and use that number. If you enter a wrong value it can be changed later. If you put in too high of a number the engine will run rich, too low and it will run lean. The default number is 300 (lb/ft). To change it, double click on the number for torque, enter your value and and click outside the area to save it. We use torque because it represents the fuel required by the engine. The number should be the maxium rear wheel torque of your engine. Horsepower is a math equation derived from torque and RPM and does not provide an accurate fuel requirement for your engine like a torque listing does.

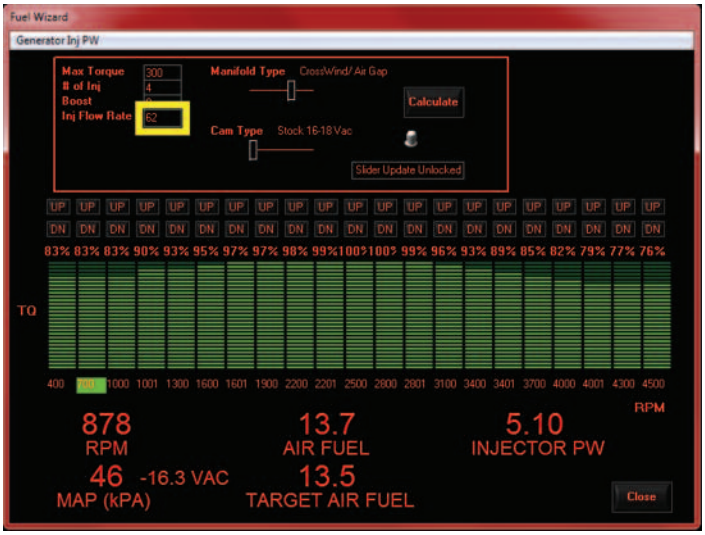
Note on Torque Specs: Many torque figures given in engine spec sheets are flywheel torque. Our profiles use rear wheel torque. If you start with a flywheel torque value, reduce it by 20% for the purposes of developing your engine's profile. For a quick approximation of your engine torque go to the Professional Products website (www.professional-products.com) and then click on "Handy Formulas." See "CID To Torque Comp Ratio" chart.



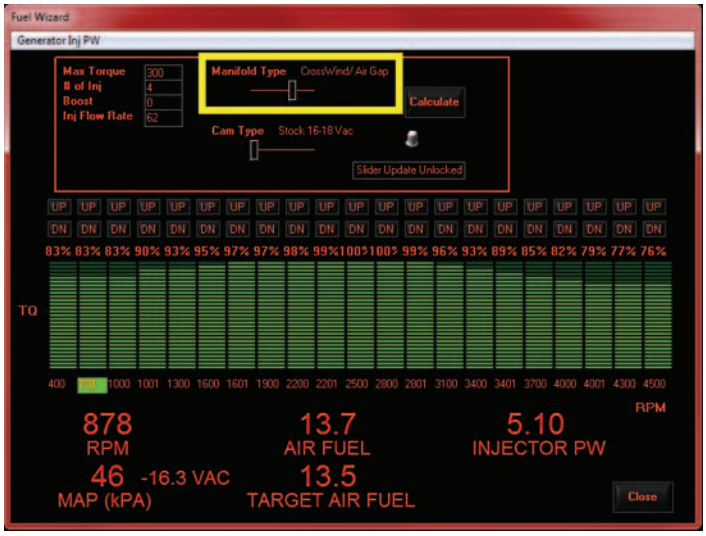
Number of Injectors: This value will always be four unless you are running one of our dual EFI setups and then it will be eight.



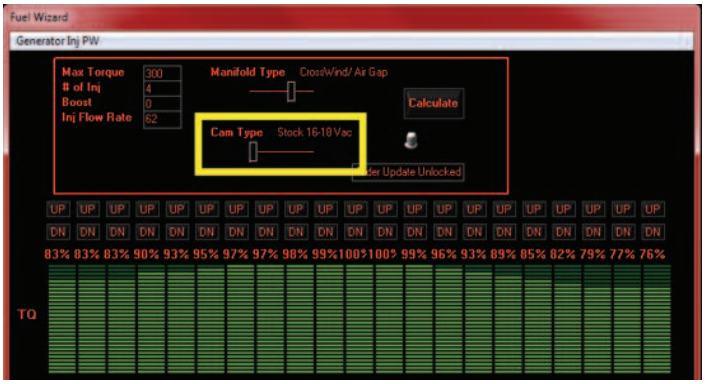
Boost: If your engine is normally aspirated (unblown) the value is zero and that is the default. If running a blower, then enter the maximum boost your engine is set up to produce.



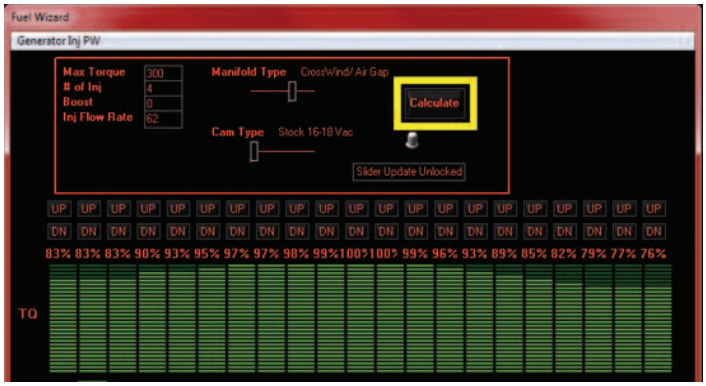
Injector Flow Rate: This value will always be 62 unless you have a custom setup with different flow rate injectors. If you have something other than 62 lb./hr. injectors, enter the correct number in this box.



Intake Type: Choose from the following: 1. Stock/Cyclone/Performer/Action+Plus, 2. Typhoon/Performer RPM/Stealth, 3. Crosswind/Air Gap, 4. Hurricane/Victor/Super Victor/Team G.

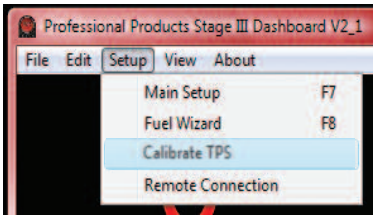


Camshaft: Choose based on engine vacuum. Stock 16-18" • Mild Stock 15-17" • Street Performance 14-16" • Performance RPM 13-15" • Hot Street 11-14" • Strip/Street 9-12" • Pro-Street/Race 6-10" • Boost 14-16"
Note: After you start your engine and your vacuum reading is different from what you entered, go back and select the correct cam type based on actual vacuum reading and then recalculate the base map. (Calculating is shown at right.) Left click on "Cam Type" slider and drag from left to right . You will see the camshaft name and vacuum reading appear above the slider. Just slide it to your desired vacuum reading.

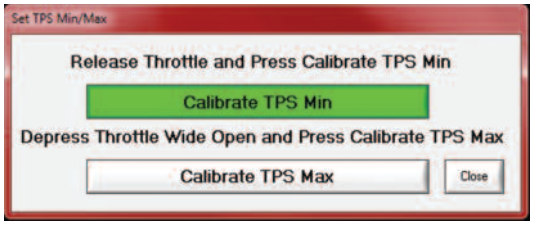


Calculate: The last step in creating a base profile is to apply all the entered information. Verify that the **"Slider"** is in the unlocked position. If not, left click on the toggle switch. It will read **"Slider Unlocked."** Now, with it unlocked, left click on the **"Calculate"** button. You will see a change in the bar graph on the screen. This is your new profile. Now lock the slider by left clicking on it. This will prevent inadvertant changes to your base profile. **Note: We will explain how to move the bar sliders in the "Using Your Stage III Software" section.** Now close out of the Fuel Wizard by clicking "Close" in the lower right corner of the screen.

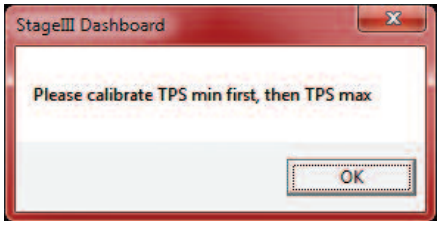
CALIBRATING THE THROTTLE POSITION SENSOR



This next step is to Calibrate the Throttle Position Sensor (TPS). Click on "Setup" and select "Calibrate TPS."



The TPS Calibration window will open. With the accelerator released and the throttle fully closed, press the "Calibrate TPS Min" button. Next depress the accelerator pedal fully to the floor and while fully held down, click the "Calibrate TPS Max" button.



If you accidentally click on "Calibrate TPS Max" before the minimum calibration has been fully set, the above window will alert you to that fact. Then you need to repeat the "Calibrate TPS Min" step. After both Min and Max have been set, close the Set TPS window by clicking on "Close" in lower right corner of window.

STARTING YOUR VEHICLE FOR THE FIRST TIME WITH THE POWERJECTION III EFI SYSTEM

Note: When you turn the key to the "on" position, you will hear the fuel pump come on for a few seconds and then shut off. This is normal. The EMS needs to receive a distributor reference signal when the engine is turning over to maintain power to the fuel pump. This is a safety feature built into the system in case the vehicle is in an accident and the engine stops; power is shut off to the fuel system.

1. Turn the key on. Confirm that the fuel pump activates and shuts off after a couple of seconds.
2. Check again for fuel leaks and repair as needed.
3. Start the engine. And let it idle and come up to a temperature of about 150 degrees.
4. Check and adjust the fuel pressure to 45 pounds as necessary. To adjust, turn the regulator top adjustment screw clockwise for more pressure and counter-clockwise for less pressure. On non-boosted applications, do not connect a vacuum line to the pressure regulator. **The nipple fitting on the regulator is a vent. Do not cap or plug it.**

Note: These adjustment steps are for the fuel pressure regulator supplied with the fuel system, if using another brand of regulagtor, consult with the manufacturer for proper instructions on changing the pressure.

5. Note the idle RPM. The idle RPM warm (engine temp 180° minimum), should be 900 – 1000 RPM. If adjustment is needed read below. Note, when making idle adjustments, place tape over IAC hole in top of throttle body.

The Primary and secondary throttle shafts need to move in an almost 1:1 ratio. If you need to make an adjustment you will need to adjust the primary and secondary idle screws the same. Keep in mind that adjusting one screw to the desired RPM will not work properly. You need to adjust the primary to a 50% increase or decrease from the actual RPM to the desired RPM then adjust the secondary screw to the final desired RPM. After the desired RPM is set, you will need to recalibrate the throttle position sensor (TPS) following the same steps as outlined above in the "Creating your profile"

Note: With the engine off and air cleaner off, you should be able to look down in the bores of the throttle body and see that the openings for the primary throttle blades and secondary throttle blades are opened the same amount.

6. Install an appropriate sized air cleaner ¼-20 stud into the throttle body.
7. Install the supplied air cleaner mounting gasket and your air cleaner making sure to secure properly. Drive your vehicle and enjoy!

NAVIGATING THE DASHBOARD

Now that you have driven your car for some period and have given the "Adaptive Learning" feature the opportunity to dial your Powerjection III system into your style of driving, you can learn a lot about your system by reconnecting your laptop and checking out the various settings. You can also make a wide variety of adjustments in your system if desired. Unless you have a highly modified engine, the settings that either came as a default or the new map that these instructions walked you through earlier should provide optimum performance for your vehicle. However, for those of you who want to delve deeper into the Powerjection III's capabilities, this section is for you.

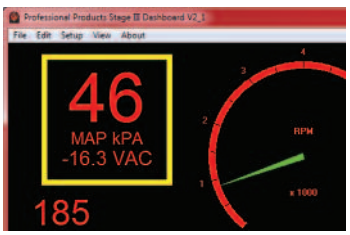
When you open the dashboard it will display the telemetry of the engine as follows:

- MAP / Vacuum Reading
- Coolant Temperature
- R.P.M.
- Actual Air Fuel Ratio (In 2 plcs)
- Targeted Air Fuel Ratio

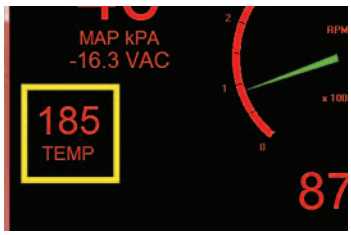
When lit up, the status items are active. When not lit, they are not active. These items are:

- Key
- O^2 Sensor
- Closed Loop
- Adaptive Learning
- Idle
- Decel

Also displayed is the status of the ECU connection, the button to connect to the ECU and the toggle to turn data logging on and off.



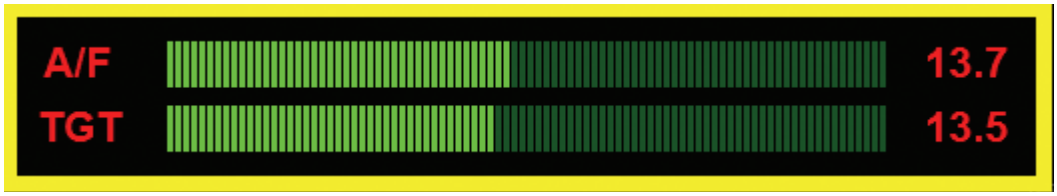
MAP: The MAP (Manifold Absolute Pressure) is displayed in both kPa and inches of vacuum or PSI. Zero inches of vacuum equals 100 kPa.



Coolant Temperature: The engine coolant temperature is expressed in degrees of Fahrenheit.

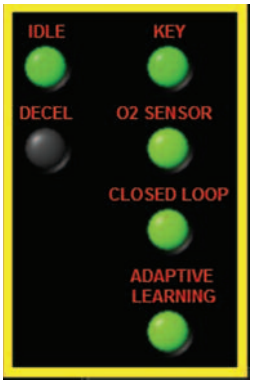
R.P.M. This is the large round dial in the center of the screen. It provides both an analog sweep arm and a digital readout.

Air Fuel Ratio: This is displayed in two locations. It shows numerically the air to fuel ratio. The sample shows a 13.7 to 1 air to fuel ratio.



TARGETED AIR/FUEL RATIO: This is displayed beneath the tachometer. It is a digital bar graph showing the actual air/fuel (A/F) ratio at the top and the targeted air/fuel ratio (TGT). The targeted number comes from a table that is derived from the information you input to create the base profile. The targeted number can also be set manually to your desired number. We will discuss setting your desired target in the "Advanced Tuning" section.

STATUS LIGHTS: The Status Lights will let you know: **Idle:** Indicates you are in the idle mode. **Decel:** Indicates that you are in the Decel Fuel Cutoff mode. **Ignition Key Status:** When key is in the "On" position the light will be lit. **Oxygen Sensor Status:** When lit it indicates that the oxygen sensor is working properly. **Closed Loop Status:** When lit the EMS/ECU is operating in closed loop. **Adaptive Learning Status:** When lit, the EMS/ECU is learning and updating.



Status Lights

DATA LOGGING: When Data Logging is turned on a complete record of your vehicles operation is stored in the computer. You can go back at any time and review all of the stored data. Data logging is turned on by toggling the switch shown at right. Switch is white in the down position when turned off and red in the up position when turned on.

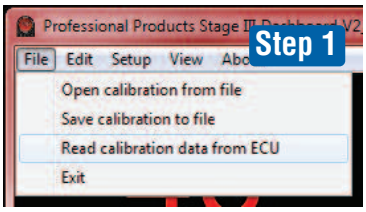
See pages 19 and 20 for complete details on how to access and use the Data Logging capabilities of your Powerjection III System.

USING YOUR STAGE III SOFTWARE

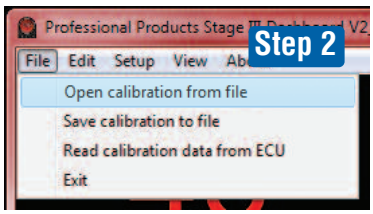
There are a number of adjustments that can be made while driving the car with your laptop connected to the Powerjection III System. **Note: Never attempt to make corrections or adjustments to your system while driving alone. We suggest you have a friend assist. One person drives while the other person monitors the laptop and makes the adjustments. Trying to do it by yourself could lead to losing control of your vehicle.**

With your Dashboard open on your laptop, at the top left you will see several choices: File, Edit, Setup, View, and About. We will discuss each of these various choices in detail on the following pages.

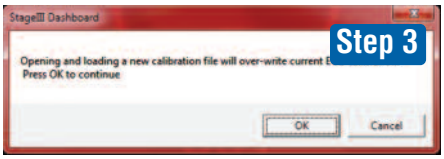
FILE



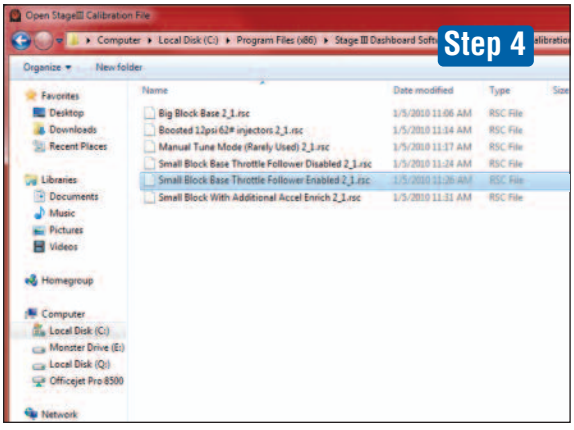
1. Under **File** you have four options:
- Open calibration from file
- Save calibration to file
- Read calibration data from ECU
- Exit



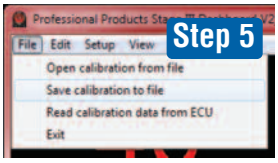
2. Open Calibration from file: This will open a window on the laptop that lists stored calibration files and calibration files made and stored by you. Calibration files use the extension **".RSC"**

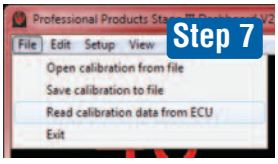


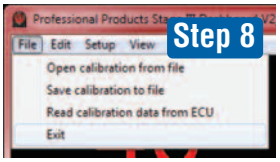
3. A pop-up will appear asking you to confirm that you wish to load a new Calibration File. This will overwrite the current profile in the ECU/EMS. Note: You may wish to save the previous profile in the ECU/EMS to the Calibration File folder before loading in a new file. Click "OK" to save file.

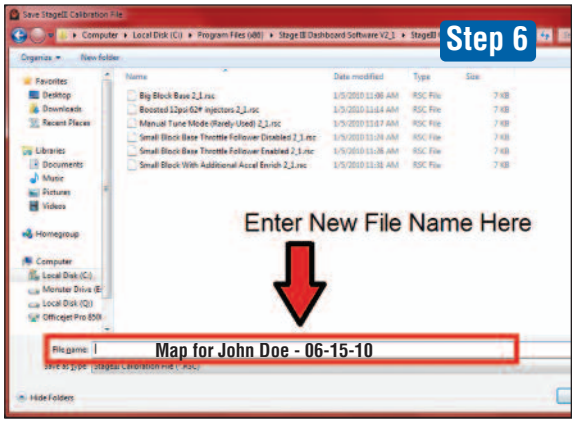


4. The Calibration File Folder will open and then you select the file you wish to load into the ECU/EMS. By default, if you do not see the Calibration Files, go to: C:\Program Files\Stage III Dashboard Software V2_0\StageIII Calibration Files





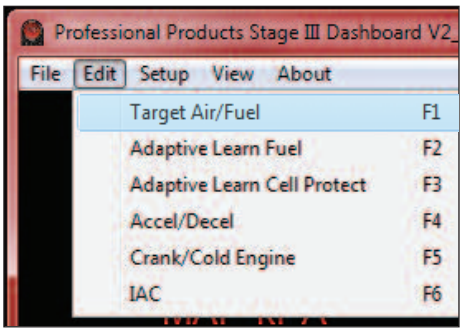




5. Save Calibration to File: This allows saving the current loaded calibration in the ECU/EMS with the changes you have made in your laptop. You need to name the file something descriptive so you can easily recognize it.
6. Enter the file name and date and click "Save."
7. Select **Read Calibration from File.** This downloads the current profile in the ECU/EMS to the Dashboard.
8. Select **Exit.** This closes the Stage III Dashboard.

EDIT

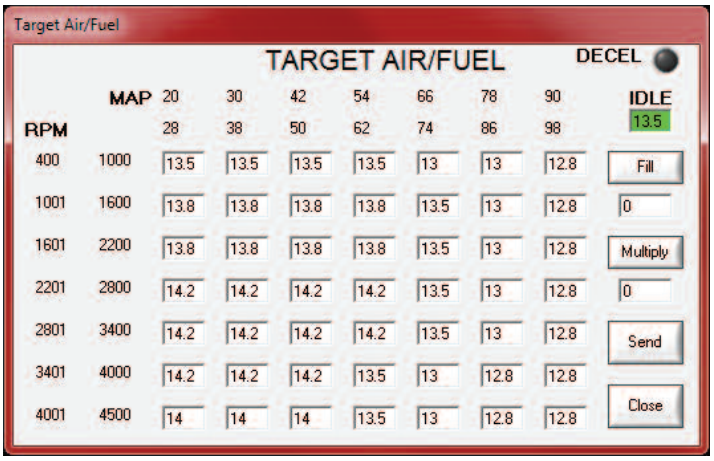
In the **Edit** portion of the software you can make a number of changes to your Powerjection III EFI System. Please note that most of the items covered in this section are for advanced users who want to fine tune their system for specific uses or for engines that are radically modified. If you elected to use the Base Calibration or any of the optional calibrations already loaded into the system (see page 12), then in most instances you will not need to perform any of the adjustments or settings outlined in this section of the instruction manual. However, in some instances you may need to make some minor adjustment and in that case you will need to utilize the information provided in this section of the instruction manual.



Edit: Under Edit you can edit the following:

- Target Air/Fuel Ratio
- Adaptive Learning Fuel
- Adaptive Learning Cell Protect
- Accel/Decel
- Crank/Cold Engine
- Idle Air Control (IAC)

TARGET AIR/FUEL



Target Air/Fuel: This table allows you to alter the targeted air to fuel ratio that the ECU/EMS uses in closed loop. Across the top are the MAP (Manifold Absolute Pressure) boundaries and down the left are the RPM boundaries. Note that each MAP column has two numbers which represent a high and low range. MAP is expressed in kPa. The RPM also has two numbers for each row which also represents an RPM range. By entering the value you want in each of the cells allows you to vary your A/F ratio in various rpm ranges in concert with various vacuum levels. Note that 10.0 is very rich and 20.0 is very lean.

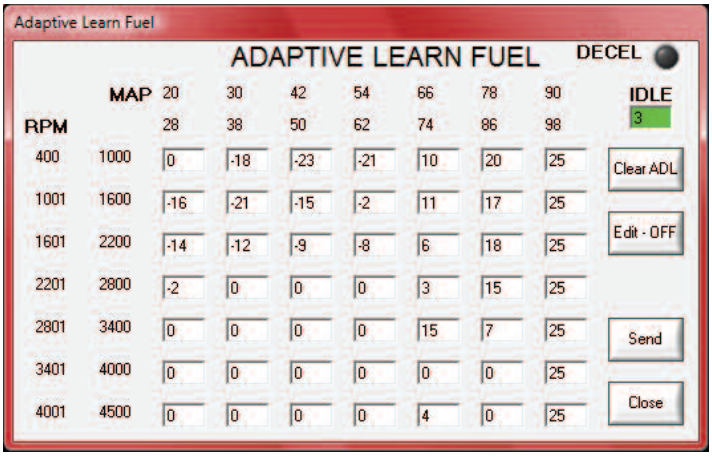
To alter a cell one at a time, double click on the cell and enter a new value. If you want to change all the cells to the same number, double click on the cell below **Fill** and enter a new number. Then click the Fill button and all the cells will change to that number.

If you want to increase or decrease all the cells by the same percentage, you can use the Multiply function. To increase all the cells by 10%, enter 1.1 in the cell below the **Multiply** button, then click on the **Multiply** button. All the cells will rise in value by 10% creating a leaner A/F mixture. (A 5% increase would use a value of 1.05). To decrease all cells by 10% enter 0.9 (5% would be 0.95) and click the **Multiply** button. All the cells will lower by 5% creating a 5% richer mixture.

When you have finished making all the changes, click on **Send** to save the entered data to the ECU/EMS. Then click **Close** to close the window and save all the changes.

Note: These values directly affect the mathematical formula that drives your ECU/EMS. By raising or lowering these values, the output pulse-width will be altered. These values are also used as the target values for Closed Loop and Adaptive Learning.

ADAPTIVE LEARN FUEL



Adaptive Learn Fuel: This table shows the amount of learning that your ECU/EMS has performed in the specific Load/RPM cell.

Note: In order for this feature to work, you must go to the Main Setup (see page 8) and switch both "Adaptive Learn Fuel" and "Closed Loop" to the active status.

The numbers in the cells are expressed in percentages. For example, a cell with a "30" means that the ECU/EMS has learned that 30% more fuel is needed to achieve the targeted air/fuel ratio as set in the Air/Fuel table. It then adds this 30% to the base profile number to obtain the correct pulse width (PW) for the injectors. A "-30" means that the ECU/EMS is subtracting 30% of the fuel from the base profile to obtain the correct PW in order to achieve the target air/fuel ratio.

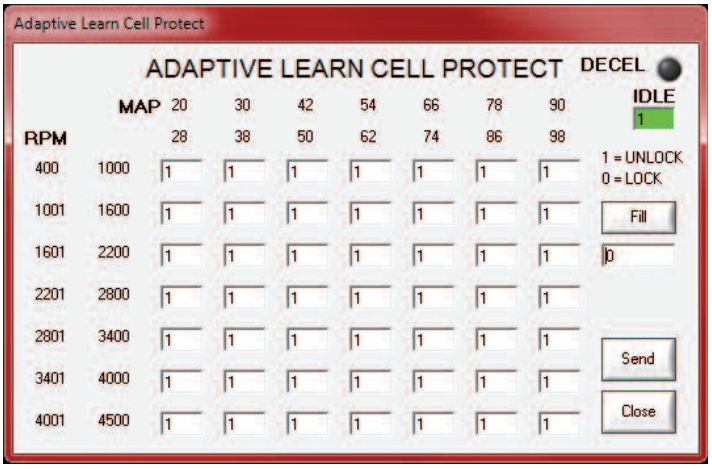
You may wish to make changes to this table because you have found that a particular RPM range of your engine combination likes either more or less fuel in order to get the maximum power and performance.

You can make changes to the learned values if you need to by clicking on **Edit.** Then by clicking on the cell you want to change you can enter the value you want. Changing the value will change the injection pulse width by the percentage that you enter. Remember these numbers are percentages. After you have made your changes, click on **Send** to update. Lastly, click **Edit** once more so the ECU/EMS will make changes automatically.

You can quickly zero all the cells by clicking on the **Clear ADL** button. A pop-up will appear confirming that you really want to do this. If so, click **OK**.

Note: Clearing the Adaptive Learn Fuel (by clicking on Clear ADL) will make them all zero even if the cell(s) are protected. So be very sure this is what you want to do before proceeding.

ADAPTIVE LEARN CELL PROTECT



In the previous Adaptive Learn Fuel table you could enter changes to the individual cells. However as long as the Adaptive Learning feature was turned on, these cells will change as you drive the vehicle.

The table above allows you to protect/lock the cells that you changed on the "Adaptive Learn Fuel" table. Entering "1" unlocks the cells and the cells can be altered in the “Adaptive Learn Fuel” table. Note that "1" is the default setting so you were able to make the changes without having to unlock the cell.

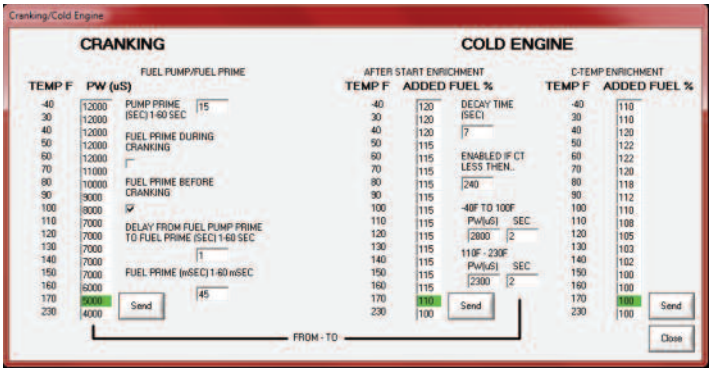
Entering “0” (Zero) locks that cell and the EMS/ECU will not be able to automatically change the value unless it is unlocked by entering "1."

You can manually double-click a cell and change it from 1 to 0 to lock. You can also use the “Fill” option by entering a 1 or 0 and clicking “fill”. This will fill all the cells to the option you chose.

The lock function is used if you have entered a number in the Adaptive Learn Fuel Table that you wish to remain constant and not update. For instance, you may have found that increasing or decreasing the value in the Adaptive Learn Fuel table made the vehicle respond better to your liking, you may want to lock / protect that cell so that the EMS does not update it.

After making your desired changes, click **Send** to update the ECU/EMS. To close the table, click **Close** in the lower right hand of the window.

CRANKING/COLD ENGINE

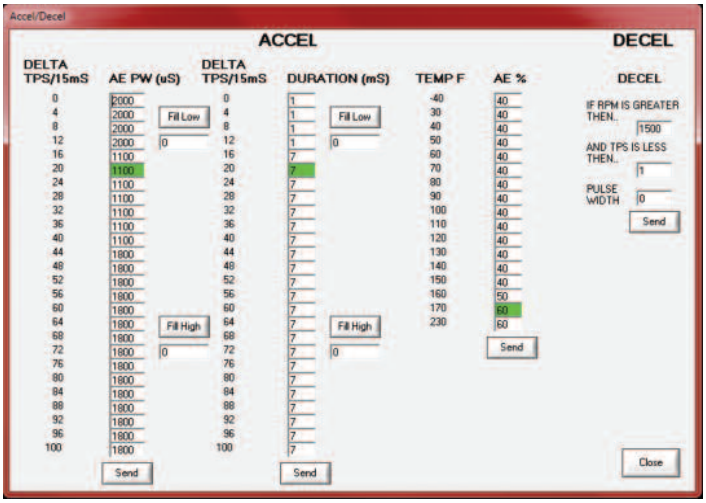


In most instances the parameters in this window will not need to be changed. This window allows you to change the cranking fuel, start-up enrichment, cold fuel enrichment and fuel pump prime. The pulse-width for cranking is temperature dependent and the value is in microseconds.

CRANKING - The cranking pulse-width is only active while the engine is cranking and when the engine gets above 401 RPM the profile takes over the running fuel control. If you are experiencing excessive cranking times you can adjust this parameter.

The “Pump Prime” will turn the fuel pump on when the key-power is turned on for a period of time (1 to 60 seconds) to prime the system, and then shut off. It will not turn on again until the engine begins cranking over and the ECU/EMS receives a signal from the ignition system.

ACCEL/DECEL



Note: The adjustments made to this window are recommended to be made by experienced tuners. The default values will work fine for the vast majority of applications. If you experience hesitation issues, adjust the targeted air fuel ratio for the given RPM/load or add/subtract fuel in the Adaptive Learn table in the cell which is causing your hesitation.

On the above Accel/Decel table you can adjust the pulse-width for your acceleration enrichment, the duration of time you want that percentage added, as well as deceleration fuel cutoff values.

The Acceleration Enrichment (AE) acts like an accelerator pump on a carburetor, it shoots additional fuel upon the event of a rapid throttle opening. The quicker you open the throttle the more fuel your engine will require. This window allows you to adjust your AE for your specific vehicle.

The AE (Acceleration Enrichment) and the Duration Tables can be rapidly filled by using the **Fill Low** and **Fill High** buttons.

The acceleration pulse-width cells can not be less than 1100uS (Microseconds) or more than 32000uS.

The AE "Fill Low" button will auto-fill the pulse-width entered for the acceleration from 0 to 12% TPS time. (TPS/5mS - Speed of throttle opening) The duration "Fill Low" will also auto-fill the time (Milliseconds) you wish for the AE to be in use.

The "Fill High" will auto-fill from 20 –100% the value entered. In the AE table and also the duration table.

You can independently fill each cell with the desired value by clicking on the cell and entering the value.

To make the values apply, you must click the **Send** button under each table.

The Decel function is to reduce the fuel injected while decelerating. You can enter the pulse-width you desire and at what RPM and throttle angle it becomes active. After entering the values click **Send** to update the profile.

After making any adjustments to the tables, you can click **Close** to close the window.

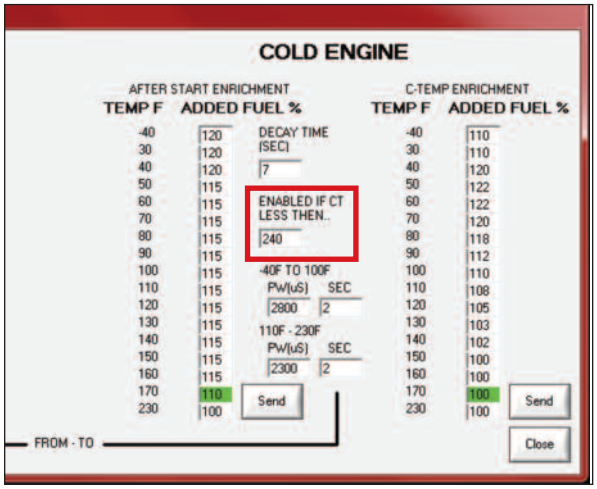
The “Fuel Prime” can be thought of as an accelerator pump on a carburetor when you step on it before starting. The EMS will open the fuel injectors to spray fuel for easier start-ups for a desired amount of time (1 to 60 milliseconds). The default value will be sufficient 99% of the time.

You also have the option of choosing when the Fuel Prime occurs. You can choose to prime the engine while you begin cranking or you can prime after a specified delay time from when the EMS receives key power.

COLD ENGINE -This section of the window allows for you to add a percentage of fuel to the profile for cold engines to allow proper running until it reaches operating temperature. This section can be thought of as a choke system of a carburetor. (Cold Engine continued on next page)

COLD ENGINE continued

After Start Enrichment - Here you can enter a value as a percentage above base for added fuel at certain temperatures after the engine has immediately started. For example, in the window at right at 40 degrees of coolant temperture the system will add 20% more fuel, and at 50 degrees it drops to 15% more fuel and by the time the temperature reaches 230 degrees it will not be adding any additional fuel. It will add the fuel for the allotted time entered into the "Decay Time" field and then transition over to the "C-Temp Enrichment" (C-Temp is Coolant Temperature). The After Start Enrichment is enabled if the engine temperature, as read by the coolant temperature sending unit, is less than the value entered into the "Enabled If" cell.



Note: The value in the "ENABLED IF CT LESS THAN" cell should never need adjusting.

C-Temp Enrichment - This is the percentage of fuel being added to the profile after the decay time has expired of the "After Start" enrichment. This is the "choke" system of the injection system. The enrichment percentage typically would decrease from high values at cold temperatures to 100% at 170 degrees.

Intermediate Pulse Width - To avoid a situation where an engine starts and pulls an extremely high vacuum at a relatively low rpm (causing the injector pulse width to drop to the minimum 1100) we have incorporated an "Intermediate Pulse Width." You will find these values in the Afterstart Enrichment area of the cold engine parameters. You can follow the "from - to" line at the bottom of the page from your cranking pulse width over to the intermediate pulse width. As soon as the engine starts and exceeds 401 RPM, it will inject the intermediate pulse width for the entered number of seconds. The best way to figure out what the intermediate pulse width should be is to look at your "Injected Pulse Width" on the Real Time Data screen (F11) for the given temperature. Generally 2-3 seconds is an acceptable amount of time.

To make the any changes active, you have to click **Send**. Clicking **Close** will close the window.

IDLE AIR CONTROL (IAC)

IAC CONTROL - The injection system is equipped with an "Idle Air Control Motor" that assists in start-up idle speed control and prevents engine stall on deceleration. The motor controls a valve that meters bypassed air to enter the engine. The movement of this valve takes place in "Steps". The total number of steps the valve has is 130.

C-TEMP BASED IAC BASE POS - This is the base position for the IAC at the given temperatures. This value should not exceed 23 when warm and the idle is properly set. (Butterflies)

(A) IAC CRANKING POSITION - When the engine is in "Cranking" mode, the IAC motor will position itself to the value entered in the "IAC CRANKING POSITION" cell.

It will then "decay" (reduce) the position in steps entered for each revolution of the engine, after started, down to the value entered in the "C-TEMP BASED IAC BASE POS". The value on the C-Temp based IAC position table is the number of steps the IAC is open for the corresponding temperature.

(B) STALL SAVER - This feature helps to prevent engine stalling. You can enter a value (RPM) that you want the feature to become active and the amount of steps you want it to add to prevent stalling when the throttle plates rapidly close. The decay value is the number of steps per revolution to reduce back to the IAC position on the C-Temp table.

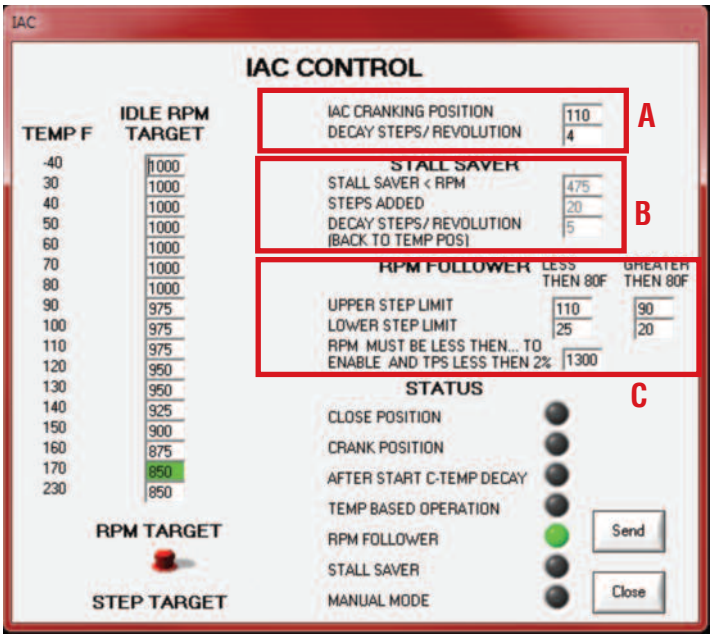
NOTE: The above parameter usually does not require change.

(C) RPM FOLLOWER - The RPM Follower lets the IAC motor control the engine idle speed automatically. The follower can be used to make up for different loads applied to the engine while idling such as A/C and putting an automatic transmission in gear.

RPM must be less then…: RPM must first be less than this value for the RPM Follower to activate.

NOTE: Throttle Position must always be less than 2% for RPM Follower to become active.

IAC Control - With our new and improved IAC controls you easily change from two different modes: RPM Target and Step Target. RPM Target means



that the EMS will attempt to automatically control your engine idle RPM based on coolant temperature. You just need to enter your desired idle speed for each coolant temp displayed. Further IAC control is found under "RPM Follower" where you can set minimum and maximum step limits based on coolant temperature. Always be sure to set the RPM threshold 500 to 1,000 RPM higher than your maxium target RPM. In the RPM Target mode the Stall Saver setting becomes inactive because it is not needed. The further the actual RPM is away from the target RPM, the faster the IAC moves to compensate.

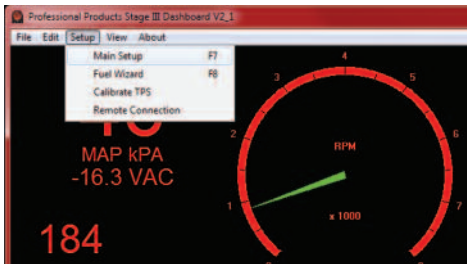
In the Step Target Mode, the IAC motor will stay in the position you command as long as the Stall Saver and cranking positions are not needed. In this mode you must manually set each IAC position based on coolant temperature. When using Step Target, the RPM Follower parameters are not used.

After entering your desired values you must click **Send** to update the profile.The bottom portion of the window allows you to see the status of the IAC motor.

- Close Position: is active when the key is off.
- Cranking Position: is active when the RPM is 400 or less.
- After Start C-Temp Decay: active for the amount of time in the decay table.
- Temp Based Operation: IAC function is active when Step Target is selected.
- RPM Follower: IAC function is active when the RPM Target is selected.
- Stall Saver: is active when the EMS reads the parameters entered in "Stall Saver".
- Manual Mode: This is used for troubleshooting purposes only.

SETUP

In this section you can make a number of fine tuning adjustments including tips on how to configure your system if you are running E85 gasoline. You can also further refine your fuel delivery by using slider bars while driving the vehicle as opposed to entering values as previously discussed. This section also discusses calibrating the TPS and how you can connect your laptop to our technical support personnel so that we can view what screen is showing at the same time you are looking at it. This can be valuable when trouble shooting a problem that you cannot resolve on your own or over the phone.



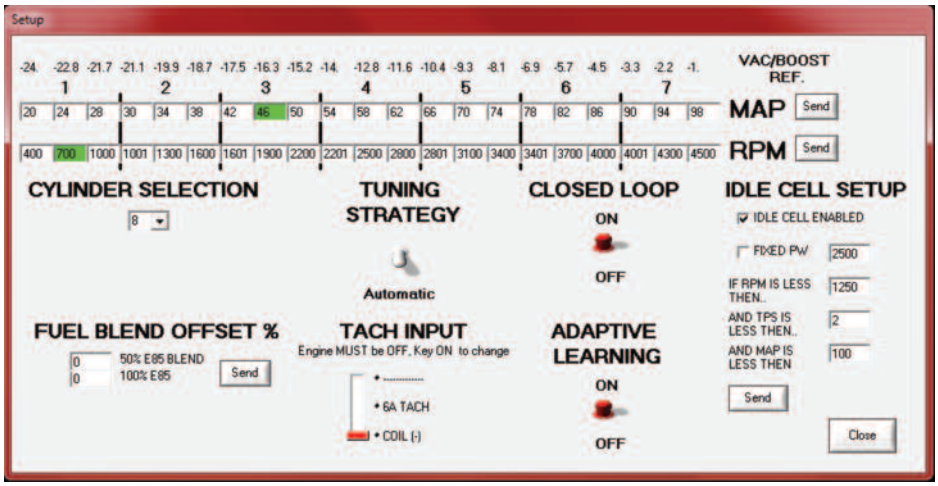
Setup: Under Setup you can select the following:

- Main Setup
- Fuel Wizard
- Calibrate TPS
- Remote Connection

MAIN SETUP

Main setup is where you will input values for RPM boundaries and MAP boundaries if you need them to differ from the default settings. You just double-click in the cell and then enter the new value. The value for MAP must be kPa values and the vacuum line above will change automatically to correspond with the entered value affer "Send" is pressed.

You also make the cylinder selection, tuning strategy, learning ability, closed loop and tach input.



TUNING STRATEGY

Choosing "Automatic" allows for the EMS to calculate fuel delivery. "Manual" tuning will be discussed in the future in an advanced tuners manual.

CLOSED LOOP

Selecting Closed Loop "On" allows for the Stage III EMS to learn the fuel curve of the engine. In order to work, Adaptive Learning must also be in the "On" position. Closed loop comes on at 40 degrees Fahrenheit. In the "Off" position, it will not use the O^2 sensor reading in the equation to adjust the fuel delivery. On motors using leaded fuels, the O^2 sensor life will be shortened. You may wish to use the O^2 for some learning and then turn closed loop off. When Closed Loop is off, the EMS will use the learned data in the Adaptive Learning to calculate fuel delivery.

Note: Running leaded fuel and turning CL off does not save the sensor from contamination. You will need to physically remove the sensor and insert a plug in the bung.

ADAPTIVE LEARNING

With Closed Loop on and Adaptive Learning on, the ECU/EMS will learn fuel values for your engine and place the learned percentage on the Adaptive Learning Table. If any cells have a value (Learned or manually input) in a cell, the ECU/EMS will use the value even if "Closed Loop" is off.

FUEL WIZARD

Under "Setup" select "Fuel Wizard."

We used part of the Fuel Wizard in the "Creating Your First Profile." Here we will discuss more details about what you can do with the Wizard.

With your engine running you can click on the "UP" or "DN" button to add or remove fuel for a given RPM listed below the bar graph. (No MAP relationship)

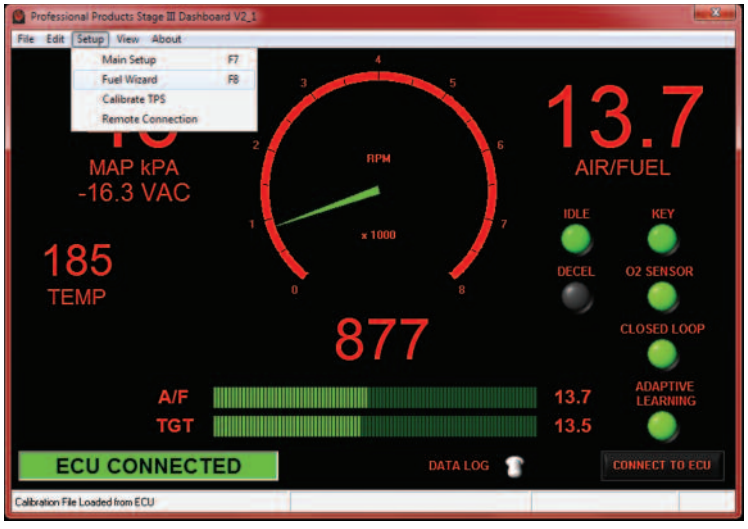
You may find that your engine will run more efficient by adding or subtracting fuel while the engine is in operation.

You should lock the slider prior to making any changes to the bar graph. This prevents you from accidently recalculating which will change any changes you made to the bar graph.

Q: Why would you want to alter this?

A: It is a quicker method of altering the fuel delivery than typing values into individual cells of the Adaptive Learn Table.

NOTE: If you make changes this way, you need to save this as a profile to your laptop.

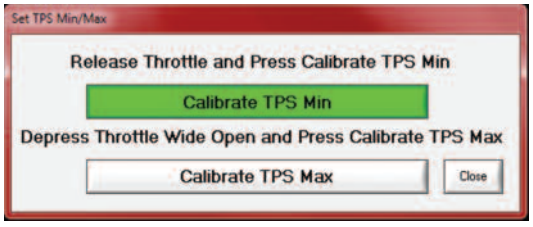


CALIBRATE TPS

Under "Setup" select "Calibrate TPS." This procedure is used to calibrate the TPS so that the EMS knows what the closed throttle and the fully opened throttle positions are.

To calibrate the throttle position sensor (TPS), click on “Setup” and choose “Calibrate TPS”

The TPS calibration window will open. With the accelerator released and throttle closed, press the “Calibrate TPS Min” button. Next fully depress (Push to the floor) the accelerator and while held down click the “Calibrate TPS Max” button.



Note: If you accidently click “Calibrate TPS Max” before the minimum calibration has been set, a pop-up window will display telling you to set the minimum value first.

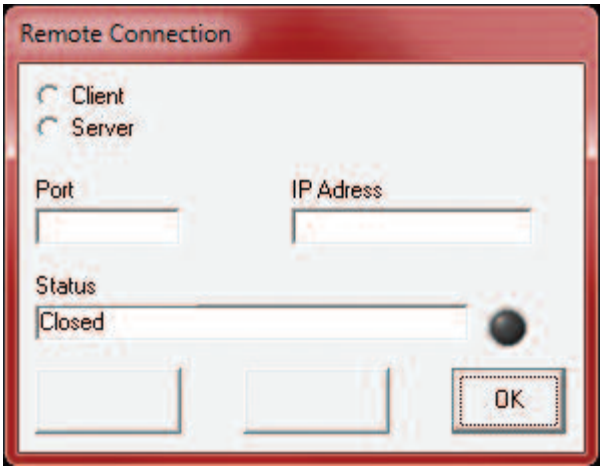
REMOTE CONNECTION

This feature allows you to connect live via the internet to Professional Products Technical Support so that Technical Support can view what you are viewing on your Stage III Dashboard at the same time live.

To use this function you must have a broadband Internet connection (not dial-up) and contact Technical Support By phone at (323) 779-2020.

When speaking with you on the phone, Technical Support will supply you verbally the needed information to input to complete the remote connection.

NOTE: While connected to Technical Support, the support staff has no control of your laptop/computer. A member of the support team may suggest/request what changes need to be done and you, the user, will have to input the information on your laptop.

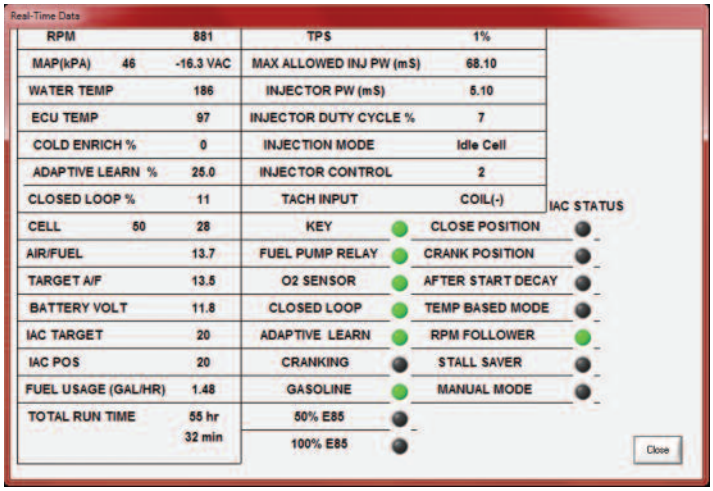


VIEW

View allows you to view:
- Real-Time ECU Data
- Histogram

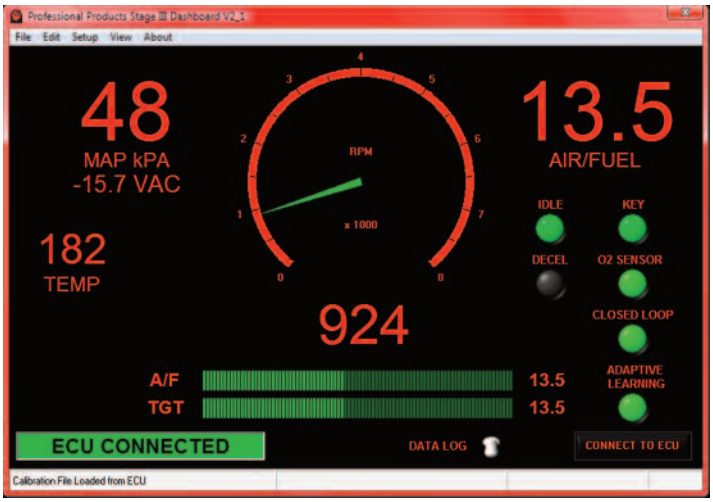
Real-Time ECU Data

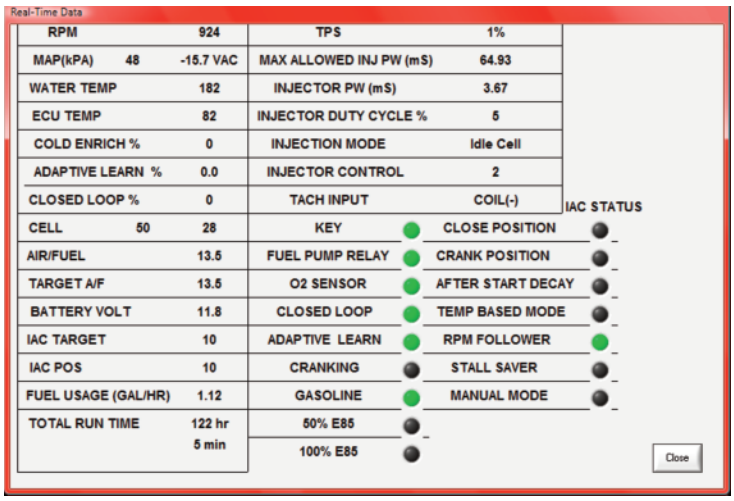
Selecting this allows you to view in real time:
- RPM
- MAP / Vacuum
- Water Temperature
- ECU Temperature
- Coolant Enrichment
- Adaptive Learn Fuel Percentage
- Closed Loop Percentage
- Cell
- Air Fuel Ratio
- Targeted Air Fuel Ratio
- Battery Voltage
- IAC Target
- IAC Position
- Fuel Usage In Gallons Per Hour
- Total Run Time
- TPS Position percentage
- Maximum Allowed Injector Pulse Width
- Injector Pulse Width
- Injection Mode
- Tach Style Input
- Key (on or off)
- Fuel Pump Relay (active or non-active)
- Oxygen Sensor (Active or non-active)
- Closed Loop (Active or non-active)
- Adaptive Learning (On or off)
- Cranking (In cranking mode or not)
- Gasoline, 50% or 100% E85 (Only one of the 3 will be active)
- Close Position
- Crank Position
- After Start Decay
- Temp Based Mode
- RPM Follower
- Stall Saver
- Manual Mode



RPM: The Engine speed currently being monitored by the ECU.
MAP: The MAP / vacuum reading currently being monitored by the ECU.
Water Temp: The coolant temperature of the engine and read by the ECU.
Coolant Enrich%: The amount of cold enrichment percentage programmed.
Adaptive Learn Fuel %: The percentage value the ECU has learned.
Closed Loop%: The Percent of change the closed loop is making toward the Adaptive Learn Fuel.
Cell: The current cell that the engine is in.
A/F: The air fuel ratio currently read by the oxygen sensor.
Target A/F: The programmed targeted air fuel ratio.
Battery Volt: The current battery voltage read by the ECU.
IAC Target: The programmed target of the Idle Air Control Motor.
IAC POS: The current position of the Idle Air Control Motor.
Fuel Usage Gal/Hour: The amount of fuel the engine is using in gallons per hour at that exact time.
Total Run Time: The total time the ECU has been active. (Key on power)
TPS: The current position of the throttle position sensor.
Max Allowed Injector PW (mS): Max allowable Pulse Width at the current RPM and Load.
Injector PW (mS): Injected pulse width at that exact time.
Injection Mode: 1. Crank, 2. Auto, 3. Manual, 4. Deccel, 5. Standby (KOEO), 6. Clear Flood, 7. Fixed PW, 8. Idle Cell.
Tach Input: The input style selected during the setup in setup>main setup.
Key: Green indicates the key is on. Black indicates the key is off.
Fuel Pump Relay: Green indicates the relay is active. Black is off.
O^2 Sensor: Green indicates the O^2 sensor is being monitored/used.
Note: Green does not mean the sensor is good. Over time, oxygen sensors will degrade from normal use and need to be replaced. The replacement interval is approximately 30,000 miles.
Adaptive Learn: Green indicates it is turned on. Black indicates off. This is turned off or on in the main setup.
Cranking: This will be yellow when the engine is cranking only.
Gasoline: This is the default value. Only one of the 3 fuel types will be lit up green. For E85 use, contact Technical Support.
Close Position: When the key is turned off the IAC goes to a Home or "Closed."
Crank Position: The IAC motor is in the cranking position.
After Start Decay: The IAC motor is decaying from the crank position to the target base position.
Temp Based Mode: IAC motor position is temperature based.
RPM Follower: IAC motor maintains desired engine RPM.
Stall Saver: The stall saver feature is active.

Here are screen shots of the Dashboard and Real-Time Data. You can see how the values from the Real-Time Data match those on the Dashboard.





HISTOGRAM

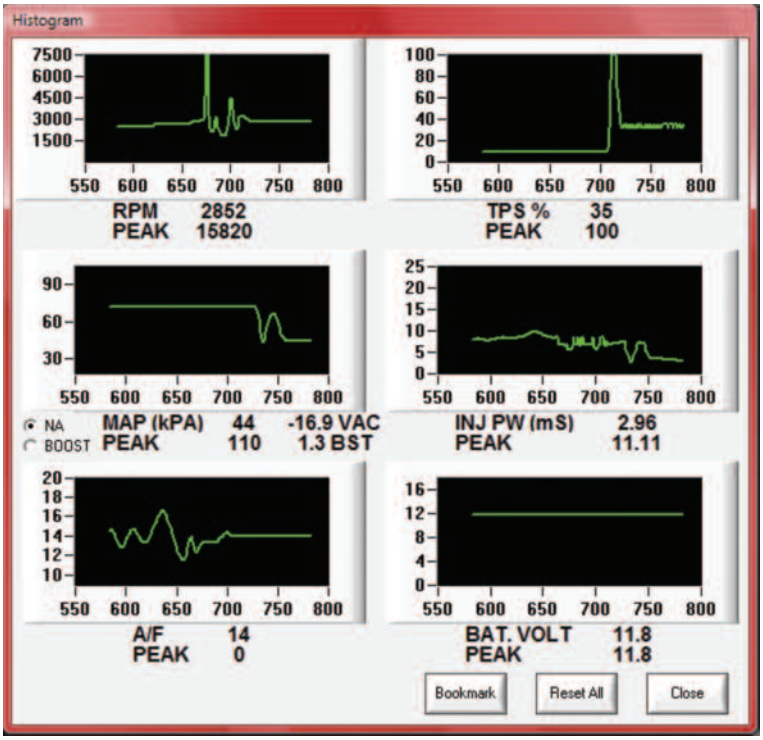
This feature allows you to see what is occurring in real time with:

- RPM
- TPS
- MAP / Vac
- Injector Pulse Width
- A / F (Air Fuel Ratio)
- Battery Voltage

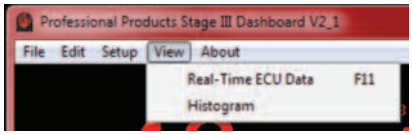
Also displayed are the peak value the EMS recorded during the current key-on /run session. Under the MAP screen is a choice of "NA" and "BOOST." Click the appropriate one for your application. It changes the scale for load on the left side of the MAP screen.

Clicking “Reset All” will reset the peak values that have been recorded. If you are data logging, you can click “Bookmark” to mark a specific location you saw while observing the histogram for ease in finding while reviewing the data log

Bookmark Button - Bookmarking can be used for troubleshooting. With the Histogram open, press the Bookmark button when the issue occurs and a placemark will be saved in the log file. (You must be data logging at the time in order for this to occur.)

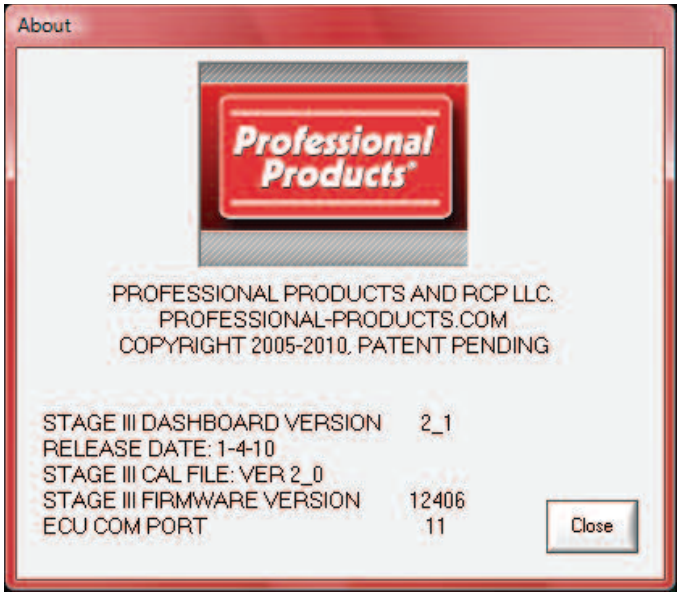


ABOUT



About opens a box displaying information about:

- Dashboard Version
- Release Date
- Calibration File Version
- Firmware Version
- Comm Port the ECU is using.

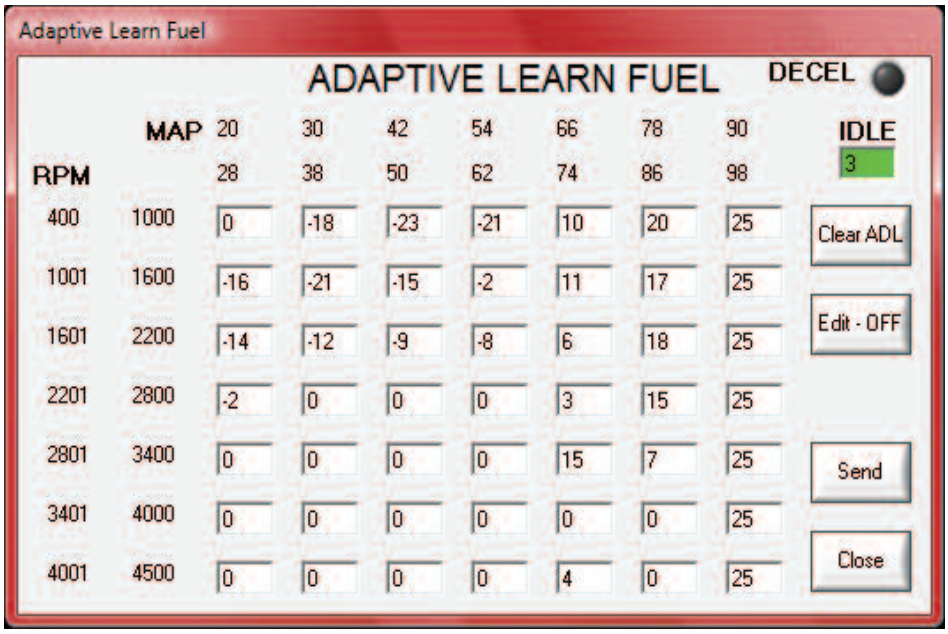


BOOSTED APPLICATIONS

If your engine is running a supercharger or turbocharger you will need to set your "MAP" and "RPM"boundaries in **Setup**. The Powerjection III MAP sensor integrated into the EMS is a 2.5 Bar MAP and will measure up to 21 pounds of boost. If you are a draw-through blown (supercharger or turbocharger is downstream from the EFI throttle body) system, you will need to relocate the vacuum line that now runs from EMS to the throttle body. Remove the vacuum line from the throttle body (cap the nipple) and route it to the intake/plenum so the MAP can sense boost. If you are a utilizing a blow-through system, there is no need to relocate the vacuum line.

All boosted applications will require a vacuum line routed from the vent nipple on the fuel pressure regulator to the intake/plenum.

The screen shot at right is of the boosted calibration file. It already has some adaptive learning already in it. You may find that on a boosted application up to about 7PSI, loading this file may learn faster.



DATA LOGGING

The Powerjection III system with Stage III EMS has the ability to data-log many parameters. The parameters are:

RPM	**MAP / Vacuum**	**A/F**	**Water Temp**	**Closed Loop Status**	**Fuel Pressure**
Bookmark	**TN**	**CE% (Cold Enrichment)**	**TPS**	**Injector PW**	**Injector Mode**
ADL Fuel%	**CL%**	**Fuel Gal/Hr**	**Target A/F**	**Battery**	**IAC Position**
Target IAC Position	**Relay**	**Comm Stat**	**Key**	**Inj DC%**	**Base PW Index**
IAC Status	**AE**	**AE Time**	**CS Error**	**Flex Fuel**	**O2 Status**
Cold Temp Index	**Map Index**	**Cranking LED**	**RPM Index**	**ADL LED** / **Version**	**EEPROM Status**
Run Minutes	**Run Hours**	**EEPROM TEST**	**Max Allowed PW**	**Inj Cont**	**Max PW Check**

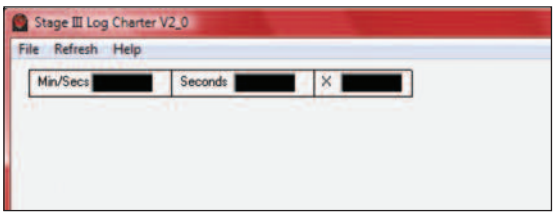
Many of these parameters are for engineering diagnostics and may only need to be viewed if you are asked to data log for diagnostic purposes by the Tech Support department. The most common items you may utilize are:

- RPM
- MAP / Vacuum
- A/F
- Target A/F
- TPS
- Coolant (Water) Temp
- O2 Status
- Injector Pulse-width

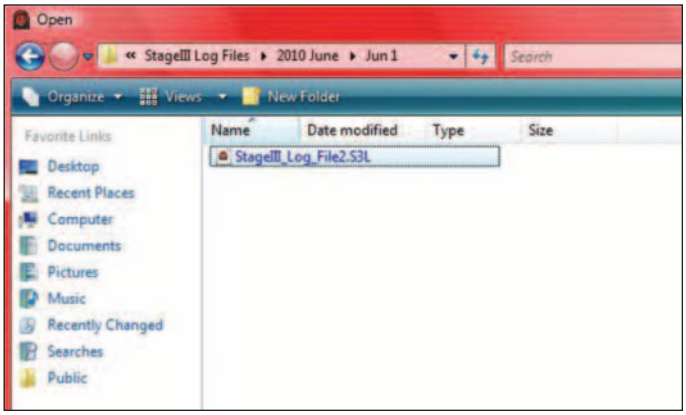
To Data Log you need to have your laptop connected to the EMS and toggle the data logging button to "ON" (Red) on the Dashboard. It will begin logging. After you have accomplished your data logging, turn the toggle off. The data log file is automatically saved during the data log run.

The files are saved in the Log Charter folder under year> month> day>number. See window at lower right. See next steps to access that window.

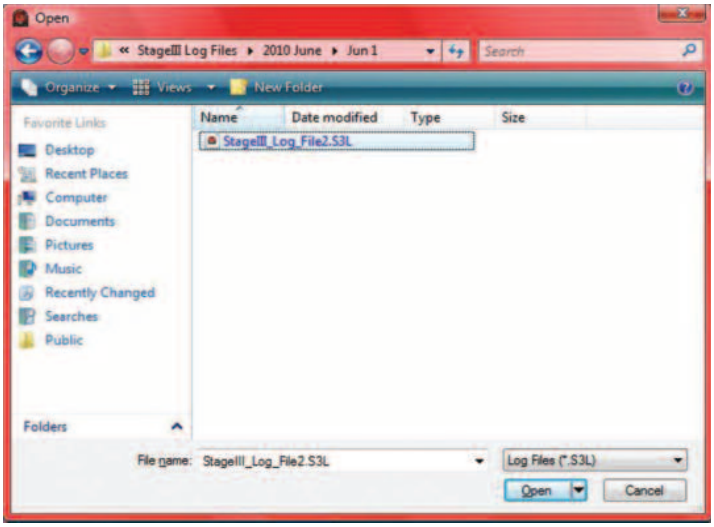
To view a data log after you have created one you need to click on the “Log Charter” shortcut icon (lower left) on your desktop. This will open the log charter window (lower center). Then select **File** and then **Open**. See the window below center. This will then open the window below.

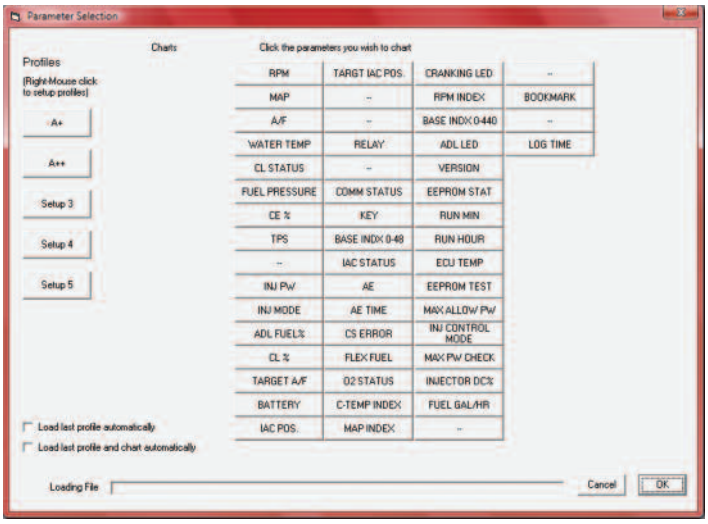


When the window at right opens, you will need to go to: C:>Program Files>Stage III Dashboard Software V2_1> Stage III Log Files>Month>Date. Highlight the "Date" that you want to open and click on the "Open" button at the bottom right of the window.

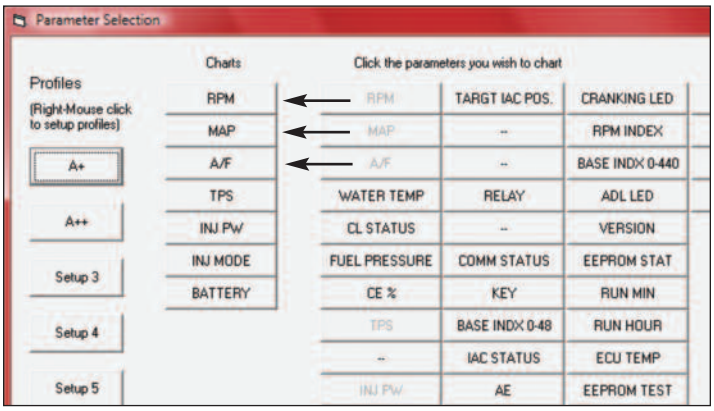


Then the file(s) for the day will display. If more than one data log file was created the same day, each of the created logs will be numbered numerically in the order the log was created. See below. Next highlight the particular file you wish to view and click the "Open" button. You will see the window shown at below. This is the the Parameter Selection window. Select the parameters you wish to view.





As you click on each parameter that you want to view, it will move to the left (see arrows at right) under the "Chart" column. After you have made your choices of the parameters you want to view (choose as many as you want) then click on the "OK" button in the lower right of the window. The viewer will now open. See below. In this sample the RPM, MAP, and A/F were selected to view.



Each parameter has a vertical red cross hair that can be moved laterally by moving your mouse. The "Y" value at the left of each window indicates the value at the cross hair.

Across the top are time tables. The value shown in the time tables represent where the cross hair is in the log