

Professional Products®

POWERJECTION™ III

Installation Instructions & User Manual

70020 70021 70026 70027 70028 70029 Kits



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

Powerjection III is
protected by US Patent:
#7,735,475

Professional Products

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INTRODUCTION

Thank you for your purchase of the Professional Products **Powerjection III** Fuel Injection System. In the manual we will outline the Powerjection III installation and use of the Stage III Dashboard software. If during installation you have any questions about the procedure or software, please call our Technical Support Line at 323-779-2020. The technical staff is knowledgeable and fully equipped to assist you with every step of your experience.

IMPORTANT INFORMATION — PLEASE READ

The Powerjection III throttle body fits common square-bore carburetor applications directly or on spread bore manifolds with adapter #52111. The throttle body linkage is the same as a 4150 style carburetor. Therefore, no modification to the throttle or transmission linkage should be necessary.

The Powerjection III EFI comes with a base calibration installed for an engine of approximately 340-360 CID and/or about 300 horsepower. If your engine is in this range there should be minimal laptop tuning needed.

The included CD will install the Dashboard software on your PC to interface with the ECU and will also install several base calibrations for other engine combinations. The software is also downloadable from www.professional-products.com/forum

The Powerjection EFI will not correct a damaged, improperly running, or poor mechanical condition engine. The Powerjection III system will only optimize the current condition of your engine when calibrated properly.

The starting and charging system must be in good condition and able to support the additional load of the EFI system. Low cranking voltage will create start-up issues. Make sure you have adequate cranking voltage and make all necessary repairs before installing the Powerjection III system.

The 70120-70127 EFI kits are the same as the 70020-70027 except for the 1200 CFM Throttle body and the #96 lb/hr injector flow rate injectors.

WARNING! – Never use Teflon tape on Any A/N fitting or anywhere else in the fuel system. Teflon tape can break free, clog injectors, and will not be covered by warranty. Use **Loctite #246 sealant for pipe thread connections.**

SYSTEM COMPONENTS AND CONTENTS

70020-04	USB-to-Serial Adapter and Serial Cable		Items Included in Kit 70026 — 70029
70020-05	Gasket kit -Throttle body, Air cleaner	10409	Fuel Inlet Kit (70028 - 70029)
70020-09	Stage III Dashboard Software CD	11113	Fuel Pressure Gauge
70320-05	Vehicle Wiring Sub-harness	70042	Fuel Inlet With Regulator (70026 - 70027)
70331	ECU	70151	Fuel Pump 220 LPH
71200	Coolant Temperature Sensor	70160	Fuel Filter
71240	Wideband O ² sensor	70035	Fuel On Demand kit (70028 - 70029)
71250	O ² sensor bung kit		
	Installation / User manual		

COMMON TERMS USED IN THIS MANUAL

ADAPTIVE LEARN – This feature was pioneered by Professional Products for aftermarket EFI systems. By using a wide band oxygen sensor, the ECU can determine the actual Air Fuel Ratio of the engine. The ECU makes necessary adjustments to maintain the Target Air Fuel Ratio. These adjustments are occurring constantly while the engine is running.

AIR FUEL RATIO (AFR) – The mixture of air and fuel to promote combustion. A “*Rich*” AFR (e.g. 12.5) is a value less than 14.7 AFR for gasoline and “*Lean*” is an AFR greater than 14.7 (e.g. 15.5). Rich or Lean can also refer to the actual AFR relative to your Target Air Fuel Ratio. Other fuels like Ethanol have stoichiometric Air Fuel Ratio of 9.0:1.

ALPHA-N —A mode that allows fuel to be calculated based on throttle position and RPM. Useful on engines with very high duration and overlap camshafts. Can also be used in a boosted application where the fuel system adds additional fuel per pound of boost based on the ECU mounted MAP sensor to determine boost pressure.

CLOSED LOOP – Closed loop allows the ECU to make short term adjustments to the fueling. This feature combined with Learn Fuel allows the ECU to make short term (Closed Loop), quick, non-saved changes and long term saved (Learn Fuel) changes to the engine’s fueling requirements.

DASHBOARD - This is your ECU interface software. It provides you with the ability to infinitely tune your system to your engine’s needs.

DATA LOGGING – Allows you to record all the data the ECU can produce while you drive your vehicle and then will allow you to see a timeline of what has actually occurred during vehicle operation. Laptop connection is required.

ECU - engine control unit - the computer mounted on the throttle body that controls the fueling, spark and idle system. Uses Water temp, RPM (From tach input or 2-wire), MAP, TPS, and wideband AFR to determine the fueling needs of the engine. Will recalculate the engines fueling needs based on feedback from the o2 sensor.

FUEL WIZARD - This Dashboard tool allows you to customize the base fuel map for your engine. It takes into account engine torque and your engine’s torque curve to generate a basic fuel table that the Learn Fuel will alter to your engines needs.

IAC — Idle Air Control is a stepper motor that moves a

plunger in and out of the IAC orifice which allows air to pass around the throttle blades to control idle speed. The IAC orifice has a limited range of airflow so the throttle blade position passes the majority of the engine’s idle airflow at idle. The IAC trims the throttle bypass airflow so that RPM can be controlled without having to change the throttle angle for cold starts.

kPa – Kilopascal is a metric measurement of pressure. 10-100 kilopascals equal the 26.5”-0” vacuum range while values greater than 100 indicate boost. The Dashboard software shows the kPa reading as the dominant number that references to tables, directly below that reading is inches of vacuum or PSI (in boost).

MAP / Manifold Absolute Pressure – This is the absolute (not gauge) pressure inside your intake manifold measured in kilopascals (kPa). This reading takes into account atmospheric pressure and altitude. MAP is one of the main inputs to determine air density and thus air flow into your engine. A map (small case) can refer to your fuel “map” or chart.

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 either milliseconds (ms) or microseconds (us)

SPARK ADVANCE —The position in crankshaft degrees before Top Dead Center that the spark plug is ignited to produce the most power. The proper application of spark timing will give the engine the optimal power by allowing the maximum cylinder pressure to be placed on the piston top at approximately 10-17 degrees after Top Dead Center. Too much advance will cause pre-ignition or “pinging” and too little timing will cause overheating of the exhaust from late ignition.

TOP DEAD CENTER — Position of the piston in relationship to the crankshaft where the piston is at it’s highest point in the engine block.

TARGET A/F – Commands the Target Air Fuel Ratio that the ECU is to achieve at specific RPM and MAP ranges. The Target A/F changes with load (MAP) and RPM

TPS% — The Throttle Position Sensor is used to determine load. It also determines acceleration enrichment by measuring the rate at which the throttle is opened and applying extra fuel in proportion to the opening rate.

WATER – Coolant temperature in degrees Fahrenheit. Determines coolant based engine operation parameters.

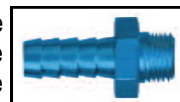
TOOLS, EQUIPMENT, AND FITTINGS

The only specialized tools required are for fuel tank modifications or welding equipment should you decide to weld on the O₂ bung kit. A selection of hand tools, a wire stripper and crimper, soldering iron, solder, wire terminals, and heat shrink tubing should be the main requirements. Determine all wire terminals and lengths before you begin so that your installation goes smoothly. If you have power brakes, a PCV system, and/or a transmission vacuum modulator you will need the appropriate vacuum splice or "T" to connect to the



1/4-NPT x -06AN
#15239 (blue)
#16239 (black)
#17239 (polished)

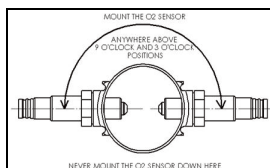
3/8-inch vacuum port at the rear of the throttle body or to the intake manifold. The fuel pump and EFI inline filter require male 1/4-NPT fittings. The feed line to the fuel pump must be 3/8-inch hose or -06AN *minimum*. All pressure-side fuel lines to the throttle body are required to be fuel injection rated (working pressure is 45 PSI). We highly recommend the use of steel lines in good condition or AN style fittings and braided hose for all applications. See Powerflow fuel line kits 70107 (return style) or 70108 (returnless) for a complete fuel line kit.



1/4-NPT x 3/8 hose
barb fitting #10244

WIDEBAND OXYGEN SENSOR INSTALLATION

We suggest installing the o₂ sensor bung kit first so if necessary the vehicle can be driven to a muffler shop before disassembly.



Position the O₂ sensor in the collector on the number one bank of cylinders or in the extension pipe on a stock exhaust. Mark the pipe between 9 and 3 o'clock. This prevents condensation from collecting in and destroying the sensor. Drill a 5/8 inch hole. Place supplied hose clamps on

exhaust pipe and start the worm-gears. Place the gasket over the 5/8" hole and place the stainless steel bung over the gasket. Tighten the hose clamps to secure. Optionally you can weld the bung in place. Keep all wiring away from sharp edges and hot exhaust. Plug the harness cable from the throttle body into the cable from the Oxygen Sensor. Using cable or zip ties, keep harness away from exhaust or moving parts. Do not drive with the o₂ disconnected from the ECU.



#71250 O₂ Bung Kit – Stainless
Can be welded if desired

FUEL SYSTEM INSTALLATION AND REQUIREMENTS

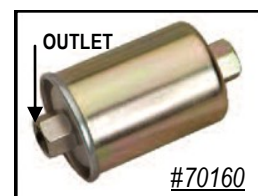
- All fuel lines from tank to pump must be 3/8 inch minimum.
- All fuel line from the pump to the throttle body should be 3/8" or -06 AN and pressure rated for fuel injection use (45 PSI).
- Always mount the fuel pump away from heat sources and/or be heat shielded to prevent damage to the pump and cavitation issues caused by heat. Cavitation is like severe engine detonation and will destroy the pump.
- The fuel pump must be mounted in a position at or below the fuel level and as close as possible to the fuel tank. In-line EFI fuel pumps do not siphon fuel like mechanical pumps.
- We recommend an in-tank fuel pump installation if possible. The #70151 fuel pump can be mounted in-tank if desired. A pre-filter or sock will be required.
- We recommend our 10210 or 10211 35 micron pre-filter for the fuel pump to prevent debris from entering the fuel pump when using older gas tanks.
- Use a 10 micron EFI rated filter between the pump and throttle body such as our 70160 filter.
- Double check for any fuel leaks.
- Extinguish all flames.

Install a fuel line from the fuel tank outlet to the fuel pump inlet. Using the stock sock/screen type filter located in the gas tank is usually sufficient to catch large debris that can damage the fuel pump. Here is a suggested pre-filter: Professional Products #10210 (red/blue) or #10211 (aluminum) Inline Street Filter equipped with 3/8 NPT ports Use Professional Products #10232 (2 to a pack) 3/8" hose nipple fittings. Install a fuel line from the pump outlet to the 70160 EFI inline fuel filter (70026-70029 kits



#10210

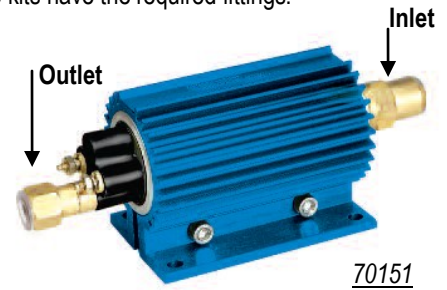
only). Filter requirements are EFI pressure rated and 10 micron filtering. Install a fuel line from the EFI filter to the fuel inlet on the right front of the Powerjection III throttle body. Install a return fuel line from the fuel tank forward to the bottom of the fuel pressure regulator and connect. (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 line.



#70160

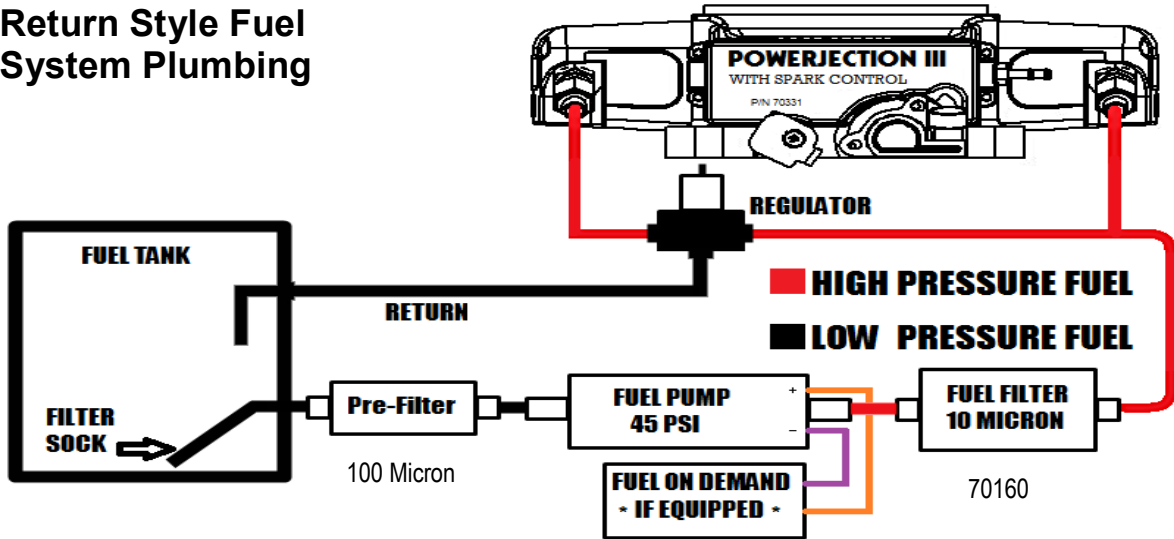
The 70151 fuel pump outlet has 1/4" Straight thread and the 70160 fuel filter has 1/4- NPT pipe female threads. You will need appropriate fittings to connect the fuel lines. Do not over tighten or the inlet or outlet threads can strip destroying the fuel pump. Use blue Loctite #246 sealant. The inlet threads are fragile and may break if over-tightened. Reinstall the inlet and outlet fittings in the pump. Make sure the sealing washer is in place on the outlet. Tighten the outlet fitting, taking caution not to over-tighten. Install the fuel pump. To reduce noise, place rubber vibration dampers between the pump and mounting point. Install the fittings into the fuel filter using blue

Loctite #246. If you have purchased a Fuel Line Kit #70107 or #70108, these kits have the required fittings.

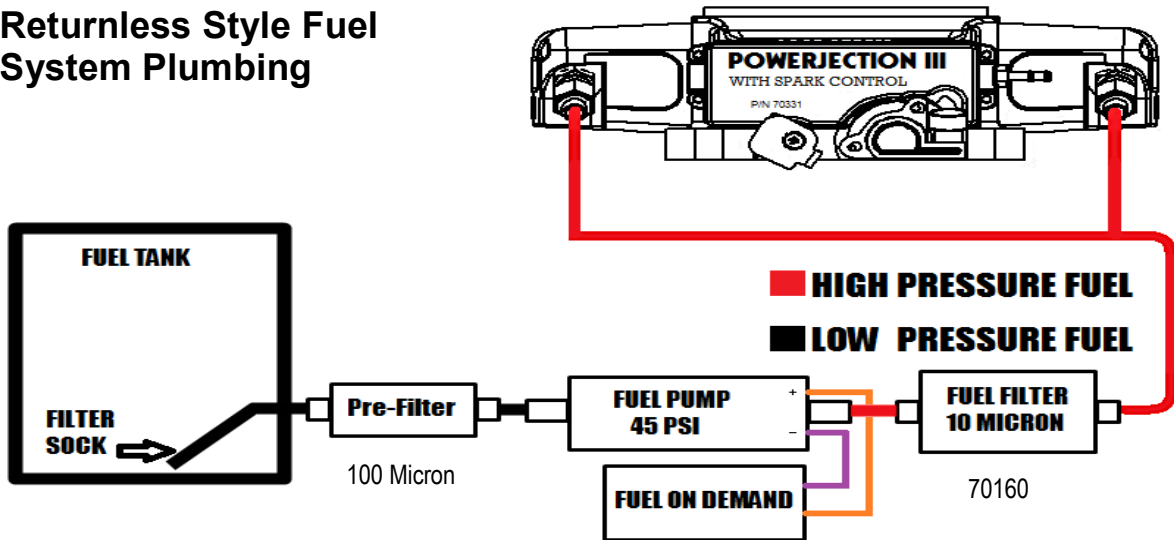


NOTE: Fuel tanks taller than 18" will require a bulkhead fitting or sump placed low on the tank for proper fuel flow to the EFI fuel pump.

Return Style Fuel System Plumbing



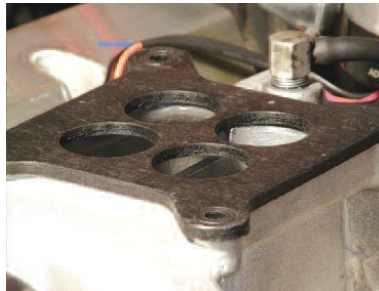
Returnless Style Fuel System Plumbing



INSTALLING THE **POWERJECTION III** THROTTLE BODY



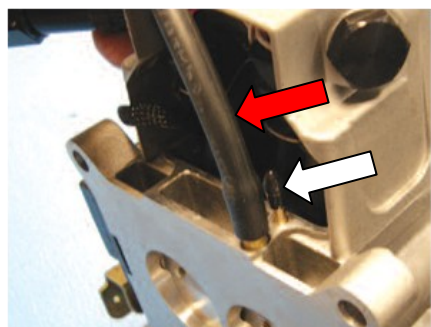
1. Disconnect the battery.
2. Remove fuel lines and linkage.
3. **Left**-Remove the carburetor following manufacturer's guidelines.
4. **Right**-Install the Powerjection III throttle body insulating and mounting gasket supplied. This gasket reduces heat to the fuel in the throttle body and features reinforcement bushings to prevent over-tightening which can cause distortion of the mounting flange.



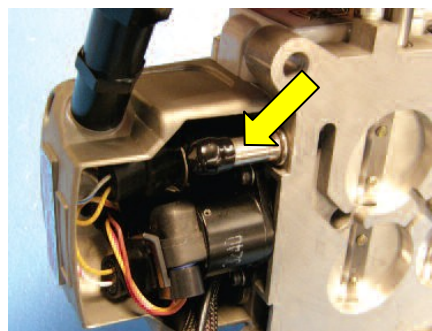
5. **Left**-Install the Powerjection III throttle body assembly onto your manifold. Note: You may need longer carburetor studs: use #20151. Connect your throttle linkage and the throttle return spring. Mount with nuts and washers and tighten. The ECU grounds in the throttle body. A throttle return spring can be used



6. **Right**-install the 3/8-NPT Coolant Temperature Sensor into one of the manifold water ports. You may need a reducer bushing from 1/2" to 3/8" NPT. Connect harness from throttle body to the coolant temperature sensor.



7. **Right**-Connect your power brake booster vacuum line to the 3/8 inch vacuum port (yellow arrow) on the rear base of the throttle body or to a suitable intake manifold fitting. Connect all full time vacuum lines like the transmission to this port.



8. **Left**-Ported Vacuum (white arrow) is for vacuum advance distributors. The full time vacuum port (red arrow) is for the MAP sensor ONLY which is built into the ECU. DO NOT tee into this line. The MAP line can be moved to the pressure side of the intake if used on a supercharged draw through application. Make sure to use cable or zip ties to secure the MAP connections.

CRANKING AND CHARGING SYSTEM REQUIREMENTS

Modern EFI systems require tighter voltage control than carbureted applications. The ECU, fuel pump and injector fuel delivery are all affected by increases or decreases in voltage. Cranking voltage dropout is a common cause of a no-start condition with an EFI equipped vehicle as the ECU needs a minimum voltage to function properly. Here are some electrical parameters to verify before you complete your Powerjection III installation.

1. Voltage at the ECU and KEY wire during cranking must be greater than 9 volts for proper operation.
2. The alternator must be capable of supporting the extra load of the EFI system and fuel pump.
3. Operating (running) voltage should be at least 13.5 Volts at the ECU.
4. Voltage drops caused by corroded battery cables or poor connections can cause ECU drop out while cranking. Check your battery cables and replace if suspect.

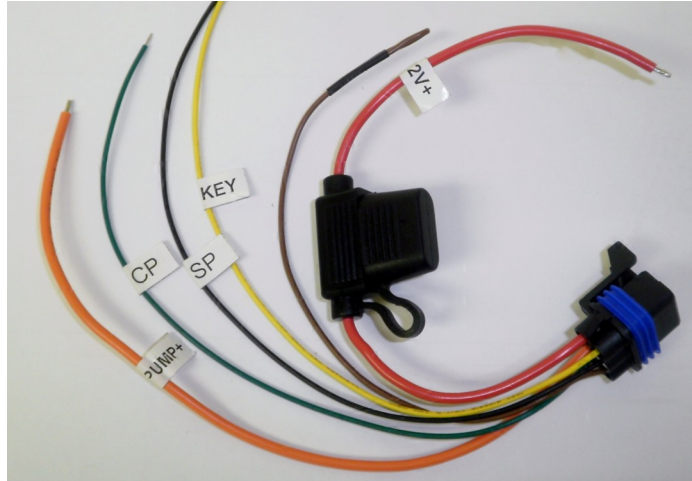
WIRING HARNESS INSTALLATION

Always use the same or larger gauge wire than the wire you are splicing. Soldered connections are superior to butt splices in most applications. Use heat shrink tubing when soldering. Butt splicing while efficient can result in a poor connection over time because of heat, oxidation and vibration.

NEVER twist wires together and tape them.

NEVER attach any EFI connection to the coil from Powerjection when using a capacitive discharge ignition amplifier or multi spark system. Doing so voids warranty and will destroy the ECU!

- **RED (12V)** 12 Volt fused wire goes directly to the battery or to a battery disconnect switch.
 - Battery disconnects are acceptable if the system is allowed to power down and save data for 1 minute before disconnection from battery power.
- **YELLOW (KEY)** Must be connected to the ignition switch as a power source. The connection must have power in the Crank position and On / Run position. Verify that voltage does not drop below 9 volts at the connection when cranking the engine.
 - **Do not use the choke wire or the (+) coil (points type distributors)** as this can be variable, low voltage or may drop out.
- **BLACK (SP)** TACH input. Connect to the (-) coil wire in a standard distributor/coil application or the TACH terminal of an HEI distributor.
 - If using a multi-spark or capacitive discharge ignition system or computer controlled distributor connect to the Tach output of the ignition amplifier or distributor. **DO NOT connect to the (-) coil terminal!**
- **GREEN (CP)** Spark Output — Connect to the Points Input of a multi-spark amplifier or capacitive discharge ignition system if using a fixed advance (locked out) 2-wire distributor ONLY. In all other applications this wire can be taped back into the harness.
- **ORANGE (PUMP+)** 12 Volts output to run the fuel pump. Connect to the positive side of the electric fuel pump
 - Can also be connected to the KEY input of the 70035 Fuel On Demand to power it up with the EFI system.
 - If using an existing fuel pump, connect to the previously installed power feed. The orange wire can also trigger a relay to run the fuel pump if desired.
- **BROWN (E85)** Ground if running 100% E85 mixture or apply 2.5 Volts if running 50% E85. Not used in most applications.



DISTRIBUTOR AND SPARK CONTROL SETUP

Set the Tach Input in the Dashboard Setup —> Main Setup to 2-Wire

Timing control requires a locked advance distributor—NO centrifugal advance.

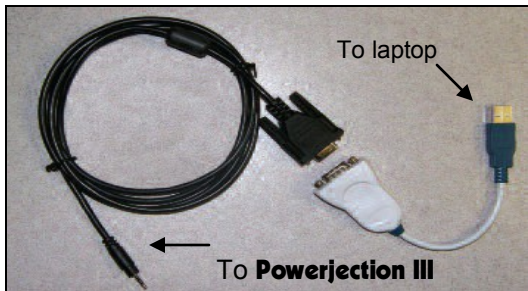
1. Check with your distributor manufacturer about locking out the advance mechanism and lock the advance system down.
 - Purchase a lockout mechanism for your distributor from the manufacturer if necessary.
1. Install the distributor at 10 degrees before TDC mechanical advance in all applications.
 - This is the reference advance (adjustable in Dashboard)
1. Do not use vacuum advance on your distributor if equipped!
2. Connect the 2-wire input of Powerjection (Violet/Purple) to the 2-wire magnetic pickup of the distributor.
3. Start the vehicle.
4. Verify your timing is 14 degrees total advance at idle at the crankshaft.

Note: All factory Powerjection calibrations come with 14 degrees advance at idle.

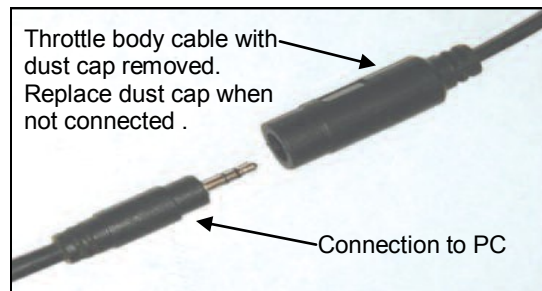


DASHBOARD SOFTWARE INSTALLATION

1. The supplied software is compatible with Windows XP through Windows 7 operating systems. You will need a PC with a CD drive to complete the installation. Software and updates are available for download from the Professional Products forum: www.professional-products.com/forum
2. Insert the Dashboard CD into your CD or DVD drive. The Install Wizard will pop up and guide you through the installation process. If the Wizard does not open, go to My Computer and double click the proper optical drive. The Install Wizard should pop up to continue the install process. If not, click on "P3 Fuel Injection Dashboard V3_0.exe"
3. Once the software is installed into your laptop, you will need to physically connect your PC to the Powerjection III throttle body ECU connector.
4. Ensure that connectors fully seat or communications will not be established.
5. Keep data cable away from spark plug wires, ignition amplifiers, and other noise sources to prevent communications issues from occurring.



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



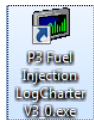
Connect the other end of the cable assembly into the single pin connector from the throttle body.

RUNNING THE DASHBOARD SOFTWARE

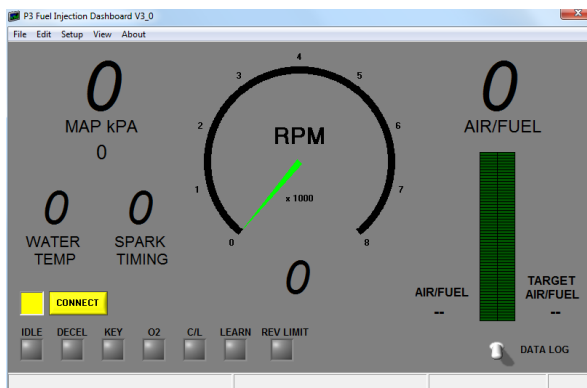
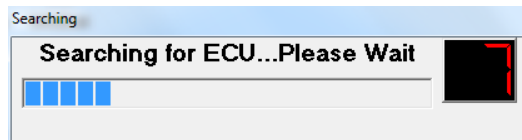


Click this icon to open the Dashboard software and connect to your ECU.

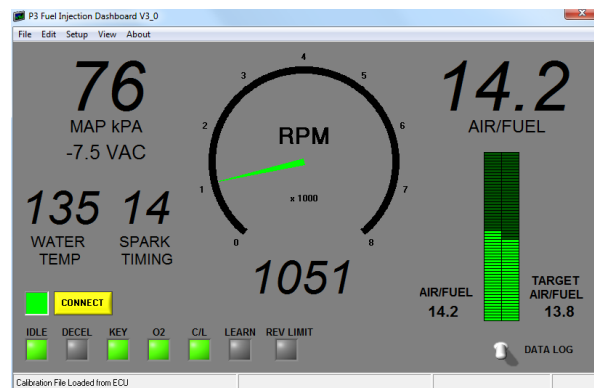
Click this icon to open the Log Charter to view stored data logs.



The Dashboard software will now search for your ECU. Make sure the ignition key is on. The software will continuously search for the ECU.



Shown is the Main Dashboard when the ECU is disconnected (left) and connected (right). All functions are available from the Main Dashboard other than reviewing Data Logs. If you wish to connect to your ECU when offline, click on the yellow CONNECT button. When connected the yellow square will change to green. Once connected it will read the calibration from the ECU and display current operating conditions of the engine.



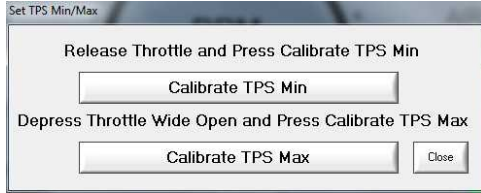
The signal lights at the bottom indicate when individual functions are active (Green or Red) or inactive (Gray).

To log data while driving, click on the **DATALOG** switch in the lower right. It will then turn red while recording and white when not recording. Files are saved to your laptop at:

C:\P3 EFI v3_0\EFI Log Files

IDLE ADJUSTMENT PROCEDURE

NOTE: Any mechanical adjustment to the throttle stop screws will require you to go to: **SETUP** → **CALIBRATE TPS** and click on **CALIBRATE TPS MIN**.



This procedure assumes the primary to secondary throttle link adjustment is correct and that you have appropriate fueling established at idle. If not, close both throttle blades completely. Adjust the primary to secondary throttle link to remove all play between the primary and secondary shafts. Open the secondary blade one turn and then the primary blade one turn from contact. This will be your “zero” adjustment.

Preparations:

1. Make sure the engine is at **full operating temperature** - Make sure it's at thermostat temperature or slightly higher.
2. Open **Real Time ECU Data** or **IAC**
3. Check that TPS is reading **1%** or less
4. If **TPS** is higher than 1% then **CALIBRATE TPS MIN**
5. If the engine is idling significantly lower or higher than the **IDLE RPM TARGET**, adjust the throttle blades with the idle stop screws a minimum of 1/4 turn each, then **CALIBRATE TPS MIN**
6. When making throttle adjustments, adjust the front and rear idle stop screws the same amount. If you move the front 1/8 turn move the rear 1/8 turn. This is required for proper mixture distribution and best idle quality.

If you get lost, close both the front and rear blades fully and then open the rear and front screw one full turn. Then **Calibrate TPS Min**.

Automatic transmissions:

1. Set your desired **IN-GEAR** idle RPM with the **IDLE RPM TARGET vs. Coolant Temp F** table under **EDIT** → **IAC**
2. Set your **PARK/NEUTRAL RPM** approximately 100-150 RPM higher than the **IN-GEAR** settings with the mechanical throttle stops. This will vary with the camshaft and torque converter characteristics.
3. **IN-GEAR IAC** counts at full operating temperature should be less than 40 ideally but may be more depending on the torque converter stall speed and camshaft choice.
4. **CALIBRATE TPS MIN**

Manual transmissions:

1. Set your desired idle RPM with the **IDLE RPM TARGET vs. Coolant Temp F** table under **EDIT** → **IAC**
2. Adjust the Idle Stop Screws so that you have between 4 and 12 **IAC POS** counts while viewing the **REAL TIME ECU DATA** or **IAC**. See image below as a guide.
3. **CALIBRATE TPS MIN**

Above: IAC is reading in the proper range of 4-15 counts for a Manual transmission and TPS is reading 1% or less at idle

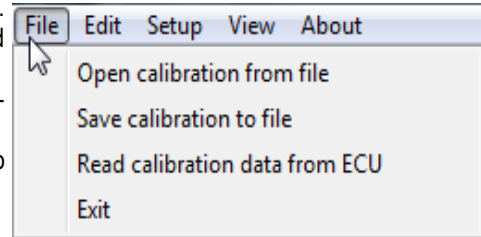
DASHBOARD - MENU FUNCTIONS

Open calibration from file - Loads a calibration to the ECU from your laptop.

Note: You must KEY OFF until the ECU disconnects from the Dashboard software before re-starting the engine after loading a new calibration.

Save calibration to file - Saves your currently loaded calibration to your laptop. **Note:** May not be the stored calibration in your ECU.

Read calibration data from ECU - Reads the current running calibration into laptop memory. Does not save the data to your laptop.



This is the installation directory for Powerjection Calibrations on your laptop:

C:\P3 EFI v3_0\EFI Calibration Files

These are the main adjustment tables and that you will use to properly calibrate the ECU to your specific engine.

Fuel Table - Represents the base map fueling in pulse width.

Target Air/Fuel - Air Fuel ratio the ECU is attempting to achieve.

Learn Fuel - Adjustments the ECU has made to fueling from the base table.

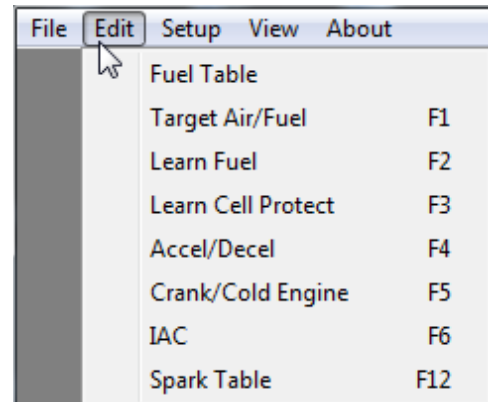
Learn Cell Protect - Enables or disables ECU learning cells.

Accel/Decel - "Pump Shot" functions and fuel cut off.

Crank/Cold Engine - Starting parameters and cold operation adjustments.

IAC - Idle Speed and Idle Air Control functions.

Spark Table - Commanded spark timing table.

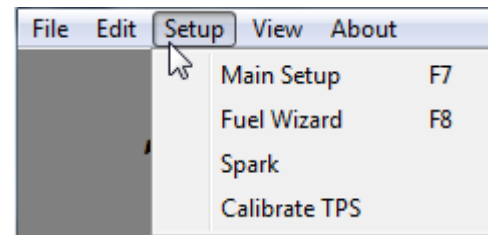


Main Setup - RPM, MAP and/or TPS range setup, Learn and Closed Loop Enable, Tach Input, Cylinder Selection, Idle cell, Fuel Mode, Fuel Blend, TPS Mode or MAP Mode, Boost setup.

Fuel Wizard - Base fuel map setup via cam & intake manager, Max Torque, Injectors, Injector flow rate, Boost, Torque Sliders vs. RPM.

Spark - Spark system parameters, RPM and MAP and/or TPS range setup. Rev Limiter, Pickup Input Delay, MAP or TPS mode switch

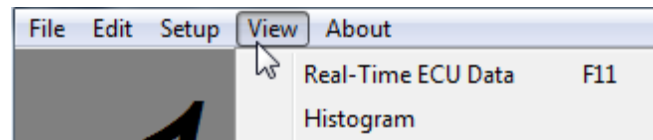
Calibrate TPS - Calibrate the minimum & maximum TPS position



Real-Time ECU Data - View Live Data from the ECU and covers all parameters that can be logged by the data logger.

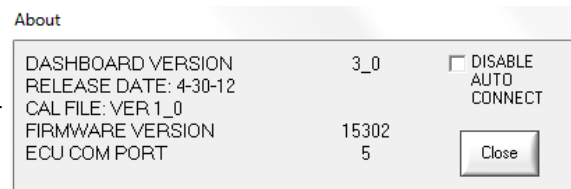
Histogram - Graphic representation of specific live data.

Also creates bookmark events in data logs for easier review.



About - Lists Dashboard Version, Firmware Version and the COM port used by your laptop.

Disable Auto Connect - Turns off the Auto Connect function if working off line or if you do not want Dashboard to search for your ECU. This function disables (no check mark) after Dashboard 3.0 is closed and goes back to searching for the ECU the next time it is opened.



DASHBOARD - EDIT MENU

Learn Fuel shows what the ECU is adding or subtracting from the Fuel Wizard or Fuel Table to keep the AFR on Target. The ECU has a limit of +/- 25% from the base calculations. There's no "right" value for Learn Fuel only that the system is adjusting properly. If you are seeing learn values of -25% or +25% in many places you will need to make adjustments to the Fuel Wizard (in automatic mode) or the Fuel Table (in manual mode), to bring the fueling in line. **Note:** If you change the Fuel Wizard substantially and do not clear the Learn Fuel table the ECU will use the stored Learn Fuel values to make additional corrections. It is advisable to clear the Learn Fuel when making significant changes to the Fuel Wizard or Fuel Table.

Target Air/Fuel sets the AFR that the ECU is attempting to achieve vs. RPM and either TPS or MAP (see Main Setup). The base calibration should be very close for most naturally aspirated engines.

For normal gasoline motors 14.7 AFR is considered stoichiometric. For 10% Ethanol Blends it is 14.4 AFR. Wide Open Throttle AFR for naturally aspirated engines should be in the 12.4-13.1 AFR range. Boosted engines will be richer than 12.0 generally.

To richen a cell decrease the value, to lean out a cell increase the value. Wide open throttle is to the right of the table and high vacuum is on the left side.

It is not recommended to set AFR leaner than 15.0 at cruise or at higher manifold pressures (68+ kPa) as engine damage could occur. However the Idle cell can be leaner with very large camshafts to promote a better idle quality.

Fuel Table - Shows you the cell you are operating in along with AFR, Target AFR, and final Injector Pulse Width. In Automatic Mode this table represents the underlying fuel calculations from the Fuel Wizard and is not adjustable.

In Manual Tuning mode the adjustment buttons (+ - x /) are available to change the fueling per RPM and either MAP or TPS depending on the selected mode in Main Setup. To change a cell or range of cells, Click and Drag around the cells, use the math functions to modify the cells and click SEND. The changes are output to the ECU once SEND is clicked. Used in conjunction with the Learn Fuel table you can dial in your Fuel Table to optimize the calibration for almost any engine.

DASHBOARD - LEARN CELL PROTECT

Learn Cell Protect enables or disables Adaptive Learning in individual cells. A one (1) means that Learn Fuel is enabled in that cell and a zero (0) disables Learn Fuel for that cell.

You may wish to disable Learn Fuel in individual cells to keep the learned values from changing. For example, you have the fueling dialed in at steady state but when you transition, the engine goes momentarily rich. You don't want the ADL changing things so you set that cell to zero to protect it. This is also useful for Nitrous applications where you do not want the Learn Fuel to adjust the AFR when nitrous is enabled. Note that Closed Loop adjustments will continue even with cells disabled.

Learn Cell Protect

LEARN CELL PROTECT

DECEL

RPM	MAP	20	32	44	56	68	80	92	IDLE
		28	40	52	64	76	88	100	
400	1200	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>
1400	1800	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>
2000	2500	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="0"/>
2750	3250	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="0"/>
3500	4000	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="0"/>
4250	4750	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="0"/>
5000	5500	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="0"/>

1 = UNLOCK
0 = LOCK

DASHBOARD - ACCEL/DECEL FUELING

Accel Settings control the transitional fueling of the engine. In carburetor terms this is called Pump Shot. The Decel function reduces or removes fuel during a deceleration event to conserve fuel. To calibrate Pump Shot you must have the Learn Fuel optimized in steady state conditions. To optimize the Pump Shot you will need to be logging data and observe controlled throttle transitions to determine the need of more or less Pump Shot fueling. See tuning suggestions for more details.

AE PW (uS) - determines how much additional fuel is injected per injector cycle during a transition vs. differential TPS (change in TPS% every 15 mSec). A rapid throttle change will use values further down the table than a slow throttle change. For example: you are idling and go to WOT immediately. The ECU will use the value at 100 TPS. However if you are cruising at 20% TPS and you

move the throttle to 36% TPS in that 15 mSec window, the ECU will use the value at 16 TPS.

DURATION (mS) - Determines how long the AE PW is held on after the first injection pulse vs. differential TPS like AE PW. This will affect the overall amount of fuel that is injected during a throttle transition. Larger values will keep the Pump Shot in longer and shorter values will reduce the pump shot.

Accel/Decel

ACCEL

DECEL

TPS	AE PW (uS)	TPS	DURATION (mS)	TEMP F	AE %	DECEL
0	<input type="text" value="1500"/>	0	<input type="text" value="1"/>	0	<input type="text" value="60"/>	IF RPM IS GREATER THAN: <input type="text" value="2200"/> AND TPS IS LESS THAN: <input type="text" value="2"/> PULSE WIDTH: <input type="text" value="1600"/>
4	<input type="text" value="1500"/>	4	<input type="text" value="2"/>	30	<input type="text" value="60"/>	
8	<input type="text" value="1500"/>	8	<input type="text" value="3"/>	40	<input type="text" value="60"/>	
12	<input type="text" value="0"/>	12	<input type="text" value="4"/>	50	<input type="text" value="60"/>	
16	<input type="text" value="1800"/>	16	<input type="text" value="7"/>	60	<input type="text" value="50"/>	<input type="button" value="Send"/>
20	<input type="text" value="1800"/>	20	<input type="text" value="7"/>	70	<input type="text" value="40"/>	
24	<input type="text" value="1800"/>	24	<input type="text" value="7"/>	80	<input type="text" value="40"/>	
28	<input type="text" value="1800"/>	28	<input type="text" value="7"/>	90	<input type="text" value="40"/>	
32	<input type="text" value="1800"/>	32	<input type="text" value="7"/>	100	<input type="text" value="40"/>	
36	<input type="text" value="1800"/>	36	<input type="text" value="7"/>	110	<input type="text" value="40"/>	
40	<input type="text" value="1800"/>	40	<input type="text" value="7"/>	120	<input type="text" value="40"/>	
44	<input type="text" value="1800"/>	44	<input type="text" value="7"/>	130	<input type="text" value="40"/>	
48	<input type="text" value="1800"/>	48	<input type="text" value="7"/>	140	<input type="text" value="40"/>	
52	<input type="text" value="1800"/>	52	<input type="text" value="7"/>	150	<input type="text" value="40"/>	
56	<input type="text" value="1800"/>	56	<input type="text" value="7"/>	160	<input type="text" value="40"/>	
60	<input type="text" value="1800"/>	60	<input type="text" value="7"/>	170	<input type="text" value="40"/>	
64	<input type="text" value="1800"/>	64	<input type="text" value="7"/>	180	<input type="text" value="40"/>	
68	<input type="text" value="1800"/>	68	<input type="text" value="7"/>	190	<input type="text" value="40"/>	
72	<input type="text" value="1800"/>	72	<input type="text" value="7"/>	200	<input type="text" value="40"/>	
76	<input type="text" value="1800"/>	76	<input type="text" value="7"/>	210	<input type="text" value="40"/>	
80	<input type="text" value="1800"/>	80	<input type="text" value="7"/>	220	<input type="text" value="40"/>	
84	<input type="text" value="1800"/>	84	<input type="text" value="7"/>	230	<input type="text" value="40"/>	
88	<input type="text" value="0"/>	88	<input type="text" value="0"/>			
92	<input type="text" value="1800"/>	92	<input type="text" value="7"/>			
96	<input type="text" value="1800"/>	96	<input type="text" value="7"/>			
100	<input type="text" value="1800"/>	100	<input type="text" value="7"/>			

DECEL - Applies a fixed pulse width - **PULSE WIDTH** - when **IF RPM IS GREATER THAN** is above the set point and **AND TPS IS LESS THAN** is less than the set point. The pulse width can be set to zero (no fuel in decel) or to a set pulse width. Having a minimum pulse width can reduce exhaust rumble or backfire as the engine transitions to decel mode.

DASHBOARD - SPARK TABLE

The **SPARK TABLE** controls the spark advance of your engine if you have a 2-wire locked advance distributor and an ignition amplifier or multi-spark system. The table is referenced by RPM and either MAP or TPS depending on the mode chosen in Main Setup.

When setting the initial timing for your engine, refer to this table and match the spark advance on the table with what you see at the crankshaft. NOTE: Do not put too much idle advance or you can create stalling issues when revving the engine and returning to idle.

In Manual Tuning mode the adjustment buttons (+ - x /) are available to change

the spark advance vs. RPM and either MAP or TPS depending on the selected mode. To change a cell or range of cells, Click and Drag around the cells, use the math functions to modify the cells and click SEND. The changes are output to the ECU once SEND is clicked. Be cautious with spark advance as there is no knock detection system. Minimum timing is 10 degrees BTDC.

	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84	88	92	96	100
400	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
800	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
1200	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
1400	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
1600	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
1800	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
2000	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
2250	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
2500	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
2750	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
3000	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
3250	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
3500	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
3750	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
4000	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
4250	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
4500	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
4750	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
5000	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
5250	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
5500	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34

DASHBOARD - MAIN SETUP

Calibrate your MAP/TPS and RPM so that you have larger cells where you do most of your driving so that you are not changing cells frequently when in a steady state mode.

MAP/TPS - Calibrates the MAP or TPS range breakpoints for your engine. For a 10 PSI boosted application the MAP range would be 20 kPa to 170 kPa.

FUEL RPM - Calibrates the RPM range breakpoints for your engine. Set the maximum RPM at the rev limit for your engine. 400 is the fixed minimum as the engine is considered to be in cranking fuel mode below 400 RPM.

LEARN - Enables Adaptive Learn Fuel (Red=On) **C/L** - Enables Closed Loop fuel control (Red=On)

TACH INPUT - Use Coil (-) TACH OUT (default).

For distributors with a 2-wire retractor output use the 2-Wire setting which allows spark control only in this mode.

CYLINDER SELECTION - 4, 6, or 8 cylinder engines (8=default). Rotaries use the 4 cylinder setting.

MAP/RPM OR TPS/RPM MODE - Speed density (MAP <— most common) or Alpha-N (TPS <— special cases) selection. If your engine has very low vacuum you can use the TPS mode to give you more stable engine operation. You will need to calibrate the Boost kPa and % Fuel adder when in TPS mode boosted applications.

IDLE CELL SETUP - Declares the engine operating in the Idle Fueling Cell. Can be disabled with the check box so there is

no idle cell. It is advisable to enable the Idle Cell function to keep give the engine a stable idle zone separate from the main fueling. RPM, TPS, and MAP parameters must all be met to enter idle cell fueling.

FIXED PW - Keeps the idle pulse width consistent independent of manifold pressure or RPM when in the Idle Cell.

IF RPM IS LESS THEN - MAX RPM for Idle Cell Enable

AND TPS IS LESS THAN - MAX TPS for Idle Cell Enable

AND MAP IS LESS THAN - MAX MAP for Idle Cell Enable

FUEL MODE - Automatic —Fuel Wizard generated fueling.

Manual - allows you to fine tune the fuel table to your engine.

FUEL BLEND OFFSET - Works with the Brown wire grounded to enable additional fuel (in percent) to be added globally. Used for E85 applications. To get the 50% E85 Blend apply 2.5 Volts to the Brown wire.

DASHBOARD - FUEL WIZARD

Use the Fuel Wizard to set up a base table for either Automatic tuning mode or Manual Tuning mode of the fuel table. The wizard shapes the torque (fuel) curve of your engine based on your inputs. Torque raises and lowers the overall fueling where Manifold and Cam shape the curve.

Warning: If you press **CALCULATE** after altering your Manual Fuel Table it will be reset to the configuration in the fuel wizard and sent to the ECU. **DO NOT press CALCULATE if you have a customized Manual tune!**

CALCULATE - Recalculates the entire fuel table and sends it to the ECU after changes are made to the Manifold and Cam selectors.

TORQUE - Max torque at the wheels that the engine will produce in foot lbs. To estimate rear wheel torque subtract approximately 60-100 ft/lbs from an engine dyno torque specification.

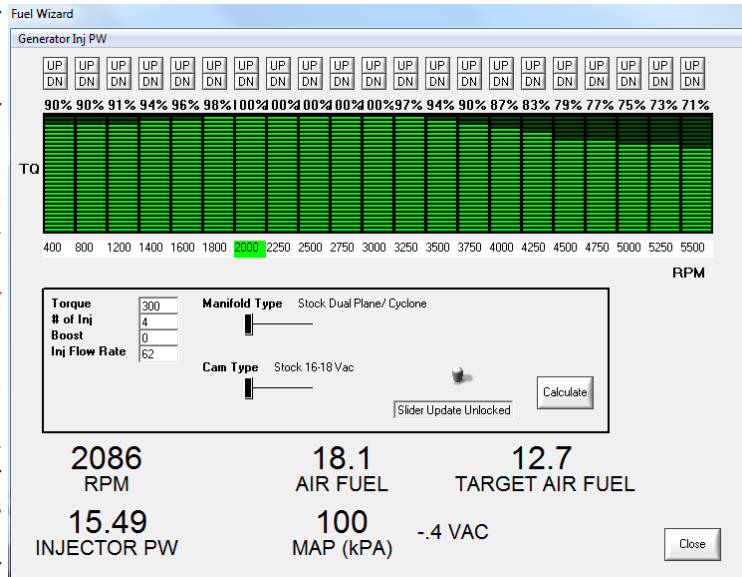
OF INJ - Number of fuel injectors installed (4 for Powerjection 3)

BOOST - Maximum Amount of Boost (PSI). Zero for naturally aspirated or nitrous motors.

INJ FLOW RATE - Flow rate of the injectors in lbs/hr at the operating pressure (45 PSI). 62 is default.

MANIFOLD TYPE - Alters the torque curve based on manifold design. A stock manifold will move the torque down low and a single plane intake will move the torque curve to high RPMs.

CAM TYPE - A stock cam will require more fuel (torque) at the lower RPMs and much less at top RPM. A high duration/high overlap cam will require less fuel at the low RPMs and much more at the mid range and top RPMs.

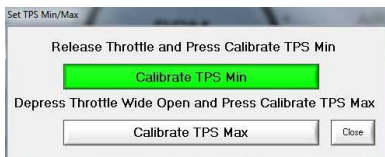
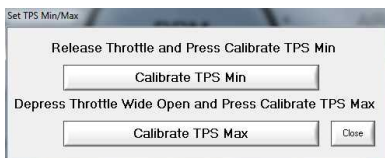


SLIDER UPDATE LOCKED/UNLOCKED - Unlock (toggle up) if you are using the Manifold & Cam selections to create the base fuel calibration.

SLIDER UPDATE UNLOCKED - Lock the green slider bars (toggle down) so that when you press "CALCULATE" your customized slider selections will not be altered.

TQ SLIDERS (Green bars) - Sets the percentage of maximum torque for your engine combination at individual RPM steps. Input your complete torque curve for your engine by calculating the percent of maximum torque for each RPM step.

DASHBOARD - CALIBRATE TPS



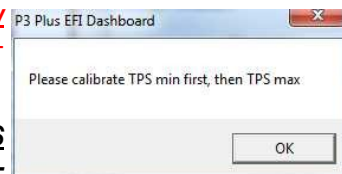
You **must** calibrate the throttle position sensor **any** time you make a mechanical adjustment to the throttle blade position or if you replace the TPS sensor.

Begin with a closed throttle and click **Calibrate TPS Min**. Now hold the throttle wide open and click **Calibrate TPS Max**. Your TPS is now calibrated.

TPS percentage can be viewed by clicking **View** → **Real Time ECU Data** or **EDIT** → **IAC**

If your TPS reads 100% when the throttle is closed, you **must** calibrate it or the engine will not start because it will enter Clear Flood (flooded engine) mode.

When you press Calibrate TPS Min or Max the bar turns green while clicking and returns to gray afterwards. The calibration is complete when you see the bar turn green while clicking it.



This error will occur if you attempt to **Calibrate TPS Max** before **Calibrate TPS Min**.

Note: You may **Calibrate TPS Min** with the engine running or not running.

DO NOT Calibrate TPS Max with the engine running.

DASHBOARD - SPARK SETUP

NOTE: Spark parameters are only applicable when using a 2-Wire Distributor and it is selected in MAIN SETUP

Calibrate your MAP/TPS and RPM so that you have larger cells where you do most of your driving so that you are not changing cells frequently when in a steady state mode.

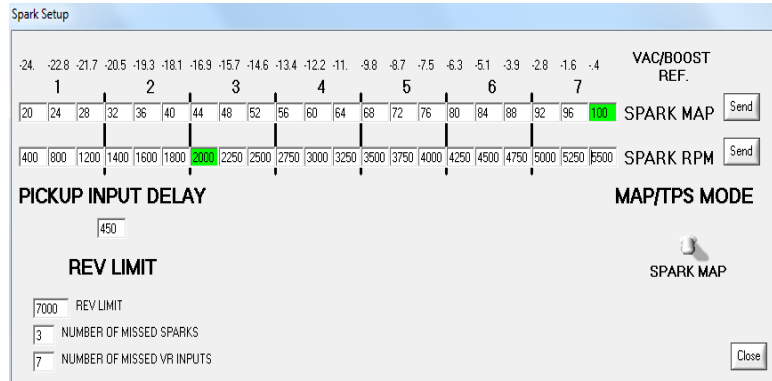
MAP/TPS - Calibrates the MAP or TPS range breakpoints for your engine. For a 10 PSI boosted application the MAP range would be 20 kPa to 170 kPa.

SPARK RPM - Calibrates the minimum (Fixed at 400) and maximum RPM range breakpoints for your engine. Set the maximum RPM at the rev limit for your engine.

PICKUP INPUT DELAY - Calibrates the offset time for your reluctor input at high RPM. Increase/decrease if you have a timing discrepancy between calculated advance (in the Spark Table) and actual advance at the crankshaft.

REV LIMIT - RPM that the rev limiter should take action

NUMBER OF MISSED SPARKS - How many spark events



are missed per number of VR inputs (Reluctor Inputs) Raising this value will cause a harsher rev limit.

NUMBER OF MISSED VR INPUTS - How many reluctor inputs are used to produce a proper rev control. The base settings are for a V8 engine and generally do not need to be changed. Higher Missed VR Inputs make a softer the rev limit. Numbers should always be odd (5,7,9,11,13...).

DASHBOARD - REAL TIME ECU DATA

This screen allows you to see all parameters the ECU logs.:
RPM

MAP / Vacuum
Water Temperature
ECU Temperature
Coolant Enrichment
Learn Fuel Percentage
Closed Loop Percentage
Cell (1-50 Corresponds to RPM/MAP Cells)
Air Fuel Ratio
Targeted Air Fuel Ratio
Battery Voltage
IAC Target
IAC Position
Targeted Idle Speed
Battery Compensation
Total Run Time
Throttle Position Percentage
Maximum Allowed Injector Pulse Width
Base Pulse Width (Manual Mode ONLY)
Injector Pulse Width
Injector Duty Cycle Percentage
Injection Mode (Manual, Automatic, Cranking, Decel)
Tach Input (Coil or Reluctor)
Spark Advance in Degrees
Initial Offset (for locked out distributor with phased cap)



IAC Status Lights:

Close Position—Closing IAC during shut-down
Crank Position—Open IAC to Crank Position
After Start Hold—Timed IAC hold
RPM Follower—Controlling Idle RPM
Temp Based Mode—Used in Step-based Mode
Stall Saver—Stall saver active in Step Based Mode
Manual Mod—Enabled

Other Items—Enabled is Green

Key—Key switch is on
Fuel Pump Relay—Enabled
Tach Pickup—Receiving tach input
O2 Sensor—In Ready condition
Closed Loop—Enabled
Learn Fuel—Enabled
After Start Fuel—Enabled
Cranking—In Cranking Mode
Gasoline—Fuel is gasoline
50% E85—Fuel is Mixed E85
100% E85—Fuel is 100% E85

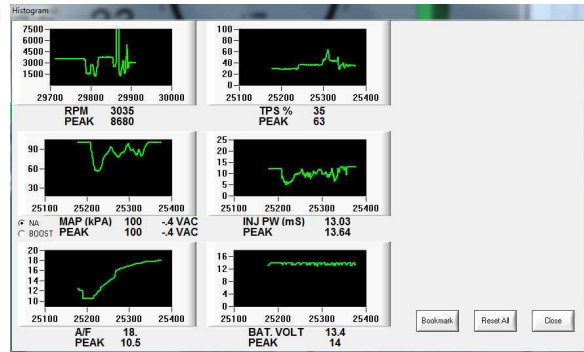
DASHBOARD - HISTOGRAM

This feature allows you to see what is occurring in real time along with peak values for:

- RPM
- TPS
- MAP / Vacuum or Boost (selectable)
- Injector Pulse Width
- A / F (Air Fuel Ratio)
- Battery Voltage

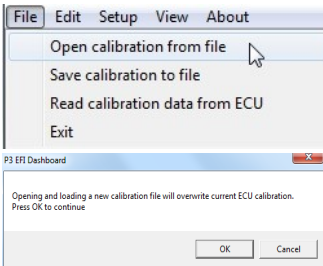
Under the MAP screen is a choice of "NA" and "BOOST." Click the appropriate one for your application. It changes the scale for load on the left side of the MAP screen. Clicking "Reset All" will reset the peak values that have been recorded.

If you are data logging, you can click "Bookmark" to mark a specific location you saw while observing the histogram for ease in finding this event while reviewing the data log



DASHBOARD - LOADING/SAVING A CALIBRATION

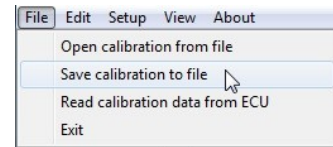
All base calibration files are located in: "C:\P3 EFI V3_0\EFI Calibration Files"
Calibration file extensions end in ".P3C"



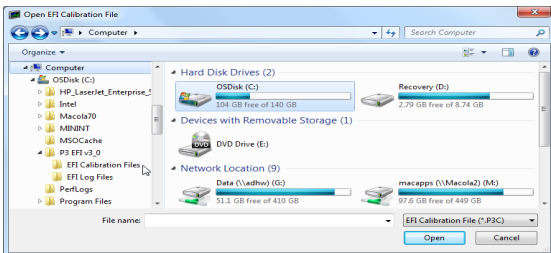
Click on File → Open calibration from file to load a new file to your ECU.

Click on File → Save calibration to file to save your modified calibration to a new file.

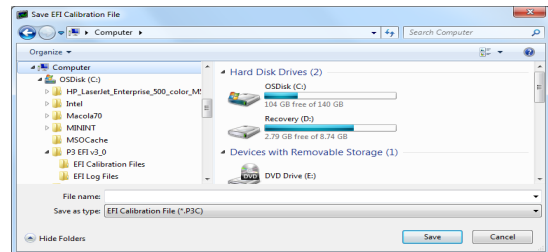
Click "OK"



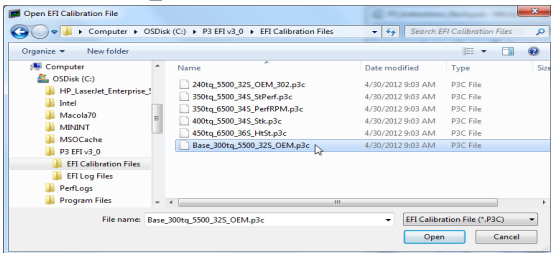
Click Computer → {Hard drive}{C:} and double-click (C:)



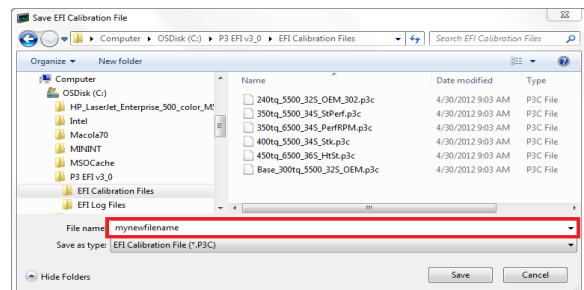
Click Computer → {Hard drive}{C:} and double-click (C:)



Double Click on P3 EFI v3_0 → EFI Calibration Files and select "300TQ_Base.P3C" for the base calibration. Press OK



Double Click on P3 EFI v3_0 → EFI Calibration Files and name the file. Click Save when done.



Turn the ignition **KEY OFF**. Allow the ECU to disconnect from the Dashboard software **before re-starting** the engine after loading a new calibration to allow the ECU to save the data.

CALIBRATION FOR STARTUP

1. Turn the Key on and connect to the ECU with a laptop.
2. The fuel pump will come on for 15-20 seconds and shut off. This is a **safety feature** of the Powerjection system. In case the vehicle is in an accident where the engine shuts off the fuel pump will also shut off.
3. You should see and / or hear the "Priming Shot" of fuel when the key is turned on. This shows the ECU is functioning properly, and that battery and key power exist in the "Run" or "On" position.
4. Make sure fuel pressure is at 45 PSI while the pump is running. If you have a Fuel On Demand returnless system the pressure may vary somewhat with the engine off: this is normal. You can type "**TOOL**" on your keyboard to use the fuel pump relay controls to enable the relay and set your fuel pressure.
5. Calibrate your TPS Minimum & Maximum
6. Verify the RPM range of your engine in Main Setup. The base calibration range is 400 - 5500 RPM
7. Check that you have a reasonable torque setting in the Fuel Wizard for your engine. Verify your Manifold & Cam choice.
8. Save a copy of your modified calibration using File -> Save Calibration to File
9. Key Off for a minute to allow the ECU to save data.
10. Start the engine.
11. Observe the Air Fuel Ratio - Cold engines (below 70 F) need to be in the mid to high 12 AFR range for proper starting and running for the first 30 seconds. Warmer engines may have AFR's in the mid 13's to low 14's.
12. After coolant temperature exceeds 70F Closed Loop will enable and the ECU will begin to control the fueling of the engine.
13. Allow the engine to warm to 145 F where Learn Fuel is enabled, view the Learn Fuel Table to see if you need to add or subtract fuel. If your Idle Cell is reading +25 or -25 you need to add fuel (+25) or subtract fuel (-25) This can be achieved by changing the torque +/-25 or by altering the cam or intake choice.
14. Once the engine is at full operating temperature you can proceed to idle speed adjustments.

ADJUSTING THE FUEL WIZARD

To properly calibrate your Powerjection system you need some information about your engine. If you are missing information you can calibrate around the missing information although the calibration procedure may take longer.

1. Engine torque—either wheel torque or engine torque
2. Camshaft duration to determine engine operating range
3. Intake manifold type

Torque # of Inj	300
	4

Start and run the engine with the Learn Fuel table open. Note the values in the Learn Fuel Table. **Note:** Any time you change the cam, intake, or torque values the ECU will still retain the Learn Fuel values. Either edit the Learn Fuel values directly or click **Clear LF** to clear all of the learned values.

		LEARN FUEL							DECEL
	MAP	20	32	44	56	68	80	92	IDLE
RPM		28	40	52	64	76	88	100	18
400	1200	0	10	14	16	17	19	20	Clear LF
1400	1800	14	16	18	20	22	24	25	Edit - OFF
2000	2500	13	15	19	21	23	25	25	
2750	3250	-2	-2	1	3	6	7	8	
3500	4000	-18	-16	-14	-12	-10	-9	-7	Send
4250	4750	-24	-20	-18	-16	-14	-12	-12	
5000	5500	-25	-25	-23	-20	-15	-13	-13	Close

In this example, the cam and intake choice should be made less aggressive to add low RPM fuel and less high RPM fuel.

		LEARN FUEL							DECEL
	MAP	20	32	44	56	68	80	92	IDLE
RPM		28	40	52	64	76	88	100	-24
400	1200	0	-24	-24	-18	-14	-12	0	Clear LF
1400	1800	-25	-25	-21	-17	-14	-12	-9	Edit - OFF
2000	2500	-25	-25	-20	-14	-10	-8	-4	
2750	3250	-12	-10	-8	-3	2	5	6	
3500	4000	-4	-2	-2	4	6	9	10	Send
4250	4750	-6	-4	2	6	9	13	14	
5000	5500	-7	-5	-3	4	8	7	9	Close

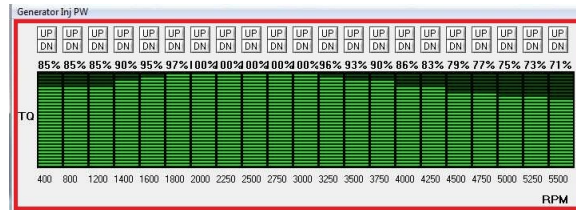
In this example, the cam and intake choice should be made more aggressive to remove low RPM fuel.

		LEARN FUEL							DECEL
	MAP	20	32	44	56	68	80	92	IDLE
RPM		28	40	52	64	76	88	100	24
400	1200	-5	0	12	25	25	25	25	Clear LF
1400	1800	-8	9	23	15	20	17	20	Edit - OFF
2000	2500	1	5	13	15	21	18	20	
2750	3250	-12	-2	0	7	6	18	20	
3500	4000	-7	-10	4	14	25	19	25	Send
4250	4750	0	0	0	10	20	20	20	
5000	5500	0	0	0	10	20	20	20	Close

In this example, the engine simply needs more fuel across the board. Increase the Torque (10-25 ft/lbs) then click on the Calculate button in the Fuel Wizard.

ADJUSTING THE FUEL WIZARD SLIDERS

The fuel sliders in the Fuel Wizard allow you to move the fuel curve for your exact engine combination. The UP / DN buttons alters fuel 1% at a time at individual RPM breakpoints. If you are observing your Learn Fuel values per row you can customize the fuel sliders to minimize the Learn Fuel excursions from the zero point. To see the Learn Fuel adapt at idle, alter the fuel sliders in the idle range and wait for the Learn Fuel to move. Once Learn Fuel moves towards zero you are done with that range. Evaluate each RPM range to optimize fueling. Note that the Learn Fuel will not be zero across the board as it



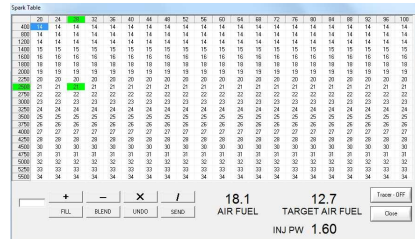
continuously adjusts for atmospheric conditions and engine variations. Evaluate individual RPM rows in the Learn Fuel Table for best fueling for that range.

SPARK SETUP

If you are running a locked advance 2-wire distributor and an ignition amplifier you can take advantage of the spark control parameters of the Powerjection III EFI system.

The Spark system can be run in Speed Density (MAP) mode or Alpha-N (TPS) mode. Alpha-N adjustments are TPS and RPM based where Speed Density is MAP and RPM based. The initial (static) advance should be 10 degrees with base calibrations. You should see 14 degrees advance at the crankshaft. Synchronize the distributor to 14 degrees if you see higher or lower timing. Minimum spark advance is 10 degrees. An average motor will need between 10-20 degrees of timing at idle and 25-40 degrees of timing at wide open throttle depending on the combination of parts. High vacuum conditions

lower your cylinder pressure and allow more advance. Our base calibration has 32 degrees at wide open throttle. The total range of adjustment is 30



crankshaft degrees. All of our calibrations have 14 degrees of timing at idle so that you can synchronize the EFI commanded spark with spark advance at the crankshaft easily. The initial offset can be adjusted in advanced tuning which is described on our forum. (See Page 1 for link)

IGNITION PICKUP INPUT DELAY

Since there are a variety of ignition retractor types available we have an Ignition Pickup Input delay. The programmed value of 450 is suitable for most types. The adjustment procedure is to synchronize your timing at idle by adjusting the distributor to 14 degrees at idle and then checking your advance at higher RPM to make sure the commanded spark advance is equal to the actual spark advance. For example, you have 32 degrees of timing commanded but you are seeing 28 degrees at 3500 RPM (no load). You need to increase the Pickup Input Delay.

Conversely, if you have 32 degrees commanded, and you are seeing 36 degrees at 3500 RPM then you need to decrease the Pickup Input Delay.

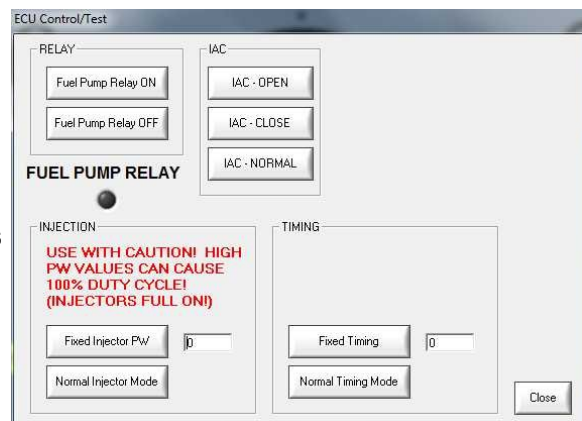


You can also type "TOOL" on the keyboard to open the ECU Control/Test function and set a fixed advance by clicking the Fixed Timing and putting in a timing value. The ECU will then output the Fixed Timing value and you can time your engine

ECU CONTROL/TEST MENU

The ECU Control/Test menu can be accessed by typing "TOOL" on your keyboard. This menu allows you to control some functions of the ECU manually.

The Fuel Pump relay can be enabled and disabled. Useful for diagnosing startup Air Fuel ratios and setting fuel pressure regulators. The IAC can be stepped open or closed one step at a time. You can control your injector pulse width (BE CAUTIOUS!) and your Ignition timing (BE CAUTIOUS!) by placing values in the boxes and clicking the appropriate button. The system can be reverted back to ECU control by clicking Normal Mode for the specific functions.



TROUBLESHOOTING GUIDE

Issue	Possible Cause	Action
Engine won't start	Battery fuse blown Battery wire not hooked up Key wire not hooked up No tach signal No fuel No fuel pressure Low battery voltage TPS not adjusted properly Throttle blade adjustment Cranking PW too low	Check fuse on main harness. Replace with same size fuse if blown. Check for voltage to RED wire in main harness connector Check for voltage to yellow KEY wire in main harness connector Verify RPM on Dashboard. Check black coil/tach connection or 2-wire connection. Fill up gas tank. Prime fuel pump. Check pump wire connections. Adjust fuel pressure regulator. Use Data Log software to check for at least 9 volts during cranking Calibrate TPS in Dashboard software. Must read 1% or less at idle. See REAL TIME ECU DATA or IAC to view percentage. Open throttle blades to allow air into the engine.—Then Calibrate TPS Min Increase cranking PW in CRANKING/COLD ENGINE
Engine starts but dies	No power during cranking to KEY wire No fuel pressure No tach signal Loss of tach signal Throttle blade adjustment Corrupt file	Check for voltage to the key wire (yellow) while cranking—Take a Datalog of the engine starting and determine if “KEY” parameter drops to ZERO while cranking Prime fuel pump. Check pump wire connections. Adjust fuel pressure regulator. Verify RPM on Dashboard. Check black coil/tach connection or 2-wire connection. Check wire for a loose or broken connection. Open throttle blades to allow air into the engine.—Then Calibrate TPS Min Reload last known good base calibration file. Check cranking/ charging system with datalog software Battery must be above 9 volts during cranking.
Engine runs rough	EMS is still learning Torque set too high or low Low or high fuel pressure Out of fuel	Let the system learn. Run engine at low RPMs and steady loads first and work up to the higher RPM ranges and steady loads Check your LEARN FUEL table or AFR. If Idle Learn Cell reads a large negative number, lower the Max Torque in the FUEL WIZARD. If the idle cell in the LEARN FUEL table reads a large positive number, raise the Torque in the FUEL WIZARD. Zero to slightly negative is best in the Idle Learn Cell. Adjust fuel pressure to 45psi. Make sure there is enough gas in tank.
High Idle	Throttle blade adjustment TPS not adjusted properly	Close throttle blades to allow less air into the engine.—Then Calibrate TPS Min Calibrate TPS in Dashboard software. Must read 1% at closed. See REAL TIME ECU DATA to view percentage.
Hesitation on acceleration	Throttle blades not set 1 to 1 Losing fuel pressure	After desired throttle blade adjustment is reached use the adjustable progressive linkage to make the primary and secondary throttle blades open at the same time. Check fuel system for clogged filters, pinched fuel lines, and leaks in the fuel system.
Engine stalls on Decel	Decel RPM set to low Throttle blade adjustment	Raise the RPM under DECEL in ACCEL/DECEL table. This can be found in the Dashboard software under EDIT —> ACCEL/DECEL . Refer to instructions on how to set idle properly.