PRO-FLO® 4
ELECTRONIC FUEL INJECTION

Installation Instructions

Edelbrock®

TABLE OF CONTENTS

Introduction..... 1-2
Tools and System Requirements..... 3
Fuel System Requirements..... 3-4
Primary Kit Components (4150) 5
Component Layout (4150) 6-7
Primary Kit Components (XT) 8
Component Layout (XT) 9-10
Main Harness Layout 11
Wideband Oxygen Sensor Installation 12
Checking Hood Clearance 13
Pro-Flo 4 Installation 14-18
Fan and Tach Outputs..... 18-19
Harness Schematics 20-25
Wiring w/ Pro-Flo Distributor & CDI Box..... 26
Pro-Flo 4 EFI Setup Wizard Map Matrix 27-28
Warranty..... 29

Please visit the Edelbrock Support Forum for the latest Pro-Flo 4 news and important updates:
https://forums.edelbrock.com/

INTRODUCTION

Thank you for selecting the Edelbrock *Pro-Flo 4* EFI system. This is an electronic fuel injection system intended for V8 engines originally equipped with carburetors. The *Pro-Flo 4* EFI system can be paired via bluetooth connection with an exclusive tuning software, E-Tuner 4, which is available as a free app for most Android-based tablets and smartphones. The use of a laptop PC is not required for tuning. The E-Tuner 4 Android app will enable real-time system performance monitoring and fine tuning adjustments. The *Pro-Flo 4* EFI system offers you the most bang for your buck, along with out-of-the-box performance from a name you can trust....Edelbrock!

If you have any questions, call our EFI Tech Support at: 800-416-8628, 7am-5pm PST, Monday through Friday.

IGNITION COIL SELECTION

WARNING

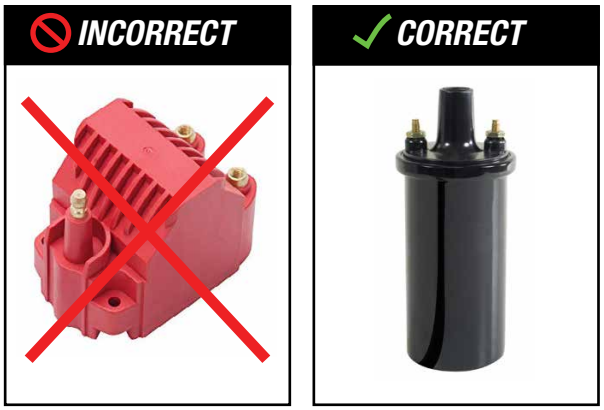
IMPROPER COIL SELECTION MAY CAUSE SEVERE DAMAGE TO PRO FLO 4 ECU!

The Edelbrock ***Pro-Flo 4*** EFI system has an internal coil driver capable of direct firing an inductive ignition coil. An inductive coil alone will support most applications without the need of a CDI box. Edelbrock ignition coil part #22746 is recommended. The following is a list of alternative coils that have been validated by Edelbrock to work well with the ***Pro-Flo 4*** system:

- MSD Blaster 2 #8202
- MSD Street Fire #5524
- Pertronix Flame-Thrower #40111
- Bosch "Blue Coil" #9220081083
- Jegs High Energy Ignition Coil #40105
- Summit Racing High Output Coil #G5215
- Summit Racing High Output Coil #G5219

If not using a coil from this list, ensure that the coil's primary resistance is at least 0.6 Ohms and inductance is at least 6.0mH. ***Pro-Flo 4*** can NOT directly fire low resistance, low inductance coils that are intended for use with a CDI box otherwise severe damage may result. Generally, acceptable coils are round cannister type. Unacceptable coils are typically square or dome type coils. If choosing to use a CDI type coil, a CDI box must also be used. Damage caused by improper coil selection is not covered under warranty. A CDI box is recommended for high horsepower and high rpm (>6,500 rpm) engines.

Note that Edelbrock ignition coils part #22740, #22741 & #22742 are intended for use with the Edelbrock Max-Fire distributors only and are NOT compatible with the ***Pro-Flo 4***. Using these coils with the ***Pro-Flo 4*** may damage the system.



FUEL PUMP SELECTION

WARNING

IMPROPER FUEL PUMP SELECTION MAY CAUSE SEVERE DAMAGE TO PRO FLO 4 ECU!

The ***Pro-Flo 4*** ECU is configured to directly power a fuel pump. The ECU's pump circuitry is rated for 10 Amps. Before connecting the fuel pump lead in the wiring harness to any fuel pump, the fuel pump's current draw rating must be checked – see pump manufacturer's specs for this information.

A conventional Walbro 255 LPH type pump or equivalent is typically acceptable. Many larger, high output performance fuel pumps will draw more than 10 Amps requiring the use of a relay. Damage caused by improper fuel pump selection is NOT covered under warranty. See FUEL SYSTEM REQUIREMENTS section for more information.

E-TUNER 4 SOFTWARE UPDATES

Edelbrock may periodically releases improved versions of the **E-Tuner 4** app software. These updates can include improvements to pre-installed calibration maps, additional calibration maps and updates to the user interface to improve the overall functionality of the software. It is recommended to check the Google Play Store or the Edelbrock website to verify that you have the most recent version of the app.

IMPORTANT WARNINGS

Before beginning the installation, verify that all components are present in the box. Inspect each component for damage that may have occurred in transit. If any parts are missing or damaged, contact Edelbrock Technical Support at (800) 416-8628, not your parts distributor.

CAREFULLY STUDY AND UNDERSTAND ALL INSTRUCTIONS BEFORE BEGINNING THIS INSTALLATION.

NOTE*: The installation can be accomplished using common tools and procedures. However, it is highly recommended to have a solid understanding of automotive repairs and modifications, and be familiar with and comfortable working on your vehicle and your vehicle's fuel system. If you do not feel comfortable working on your vehicle, it is recommended to have the installation completed by a professional mechanic.*

PROPER INSTALLATION IS THE RESPONSIBILITY OF THE INSTALLER. IMPROPER INSTALLATION WILL VOID ALL MANUFACTURER'S STANDARD WARRANTIES AND MAY RESULT IN POOR PERFORMANCE AND/OR DAMAGE TO THE ENGINE AND/OR VEHICLE.

WARNING: *The Edelbrock **E-Tuner 4** Software is intended to be used as a hands-free tuning tool and gauge display. Any function that requires prolonged attention should only be performed after coming to a complete stop. Distracted driving is extremely dangerous and illegal in most states. If adjustments are to be made during driving, always stop the vehicle in a safe location before performing any adjustments, or have a passenger perform the necessary adjustments. Please check with your local laws for legal mounting locations in your vehicle.*

O2 SENSOR INSTALLATION

It is suggested that the O2 sensor bung be installed by a professional muffler shop prior to the installation of the Edelbrock ***Pro-Flo 4*** EFI system. DO NOT drive the vehicle with the O2 sensor unplugged, sensor damage will occur. An O2 sensor bung plug is provided for your convenience. Refer to Page #12 for the O2 sensor installation procedure.

EMISSION CONTROLS

The Edelbrock ***Pro-Flo 4*** EFI system will not accept stock emissions control systems. Check your local emissions laws for requirements before installing the ***Pro-Flo 4*** EFI system. This system is not legal for use on pollution-controlled motor vehicles.

FUEL REQUIREMENTS

Because the ***Pro-Flo 4*** EFI system uses a wideband oxygen (O2) sensor, unleaded fuel must be used at all times. Using leaded fuels will damage the O2 sensor and void your warranty. If leaded fuel is present in your fuel tank, the tank must be drained and filled with unleaded fuel. It is also recommended to have a full fuel tank before operating the vehicle (after the installation).

NOTE*: E85 fuels are not compatible with any **Pro-Flo 4** EFI systems.*

AUTOMATIC TRANSMISSION CHECK

For best performance, economy, and emissions, the transmission kick down and shift points must be checked before and after the ***Pro-Flo 4*** EFI installation.

SPARK PLUG WIRES

High EMI suppression spark plug wires are necessary, do not use solid core spark plug wires. Resistor type spark plugs are necessary.

EXHAUSTS SYSTEM

For best results, headers are recommended. For the Self Tuning function to properly operate, the exhaust system must be completely sealed from header flange surface at cylinder heads to tailpipe. The exhaust system should be completely inspected prior to installing the ***Pro-Flo 4*** EFI system. All gaskets and hardware should be replaced. All hardware torques should be checked on regular basis.

CHARGING SYSTEM

The ***Pro-Flo 4*** EFI System requires a constant battery voltage of 12.0 volts or greater to operate properly. Recommended battery capabilities are: 1000CA @32°F / 800CA @0°F. The vehicle's battery must be in good operating condition capable of maintaining a proper charge at all times. Verify the vehicle's charging system is operating properly and that the system voltage maintains 12.0 volts, or greater, at all times. All chassis grounds must be tight and clean. A ground cable from the engine block to chassis should be employed. All battery cables must be in good condition providing a clean tight connection to the battery.

BATTERY CHARGER PRECAUTIONS: PLEASE ADHERE TO THE FOLLOWING GUIDELINES OR DAMAGE TO ECU MAY OCCUR.

- Be sure the battery has a full charge prior to attempting to start the vehicle.
- Never use the "engine start or jump start" setting on a charger to start the engine.
- Do not set the battery charger above 10 amps when charging.
- Never turn on the ECU or attempt to start the engine with the battery charger connected
- Make sure the charger is not charging over 18.0 volts.
- If the battery is completely discharged, it is best to disconnect the negative terminal on the battery when charging.

COOLING SYSTEM

The minimum temperature requirement for the thermostat is 180°F.

TOOLS AND SYSTEM REQUIREMENTS

Use the following checklist for items needed.

- ❑ Wrench / Socket Set
- ❑ 7/8" Oxygen Sensor Socket or Equivalent
- ❑ Pliers (channel locks and hose clamp)
- ❑ Screwdrivers (Phillips and Flathead)
- ❑ Gasket Scraper or Equivalent
- ❑ Timing light
- ❑ Shop Rags
- ❑ Edelbrock Gasgacinch #9300
- ❑ Loctite 598 OEM High Temperature Silicone Gasket (O2 Sensor Compatible)
- ❑ Vehicle Wiring Diagram (if available)
- ❑ Thread Sealer
- ❑ High-Heat Anti-Seize Compound
- ❑ 180°F Thermostat
- ❑ Resistor Type Spark Plugs (Use correct heat range for your particular application)
- ❑ High EMI Suppression Spark Plug Wires (DO NOT use solid core spark plug wires)
- ❑ EFI Fuel System (See fuel system recommendation)
- ❑ Mechanical Fuel Pump Block Off Plate (Except for vehicles running a Fuel Sump System #3605, 3606, 3607 & 36052)
- ❑ Fuel fittings (Additional fittings may be required depending on routing preferences. Visit www.russell.com)
- ❑ 30 AMP Automotive Relay (If using electric fans - One relay required for each accessory)

FUEL SYSTEM REQUIREMENTS

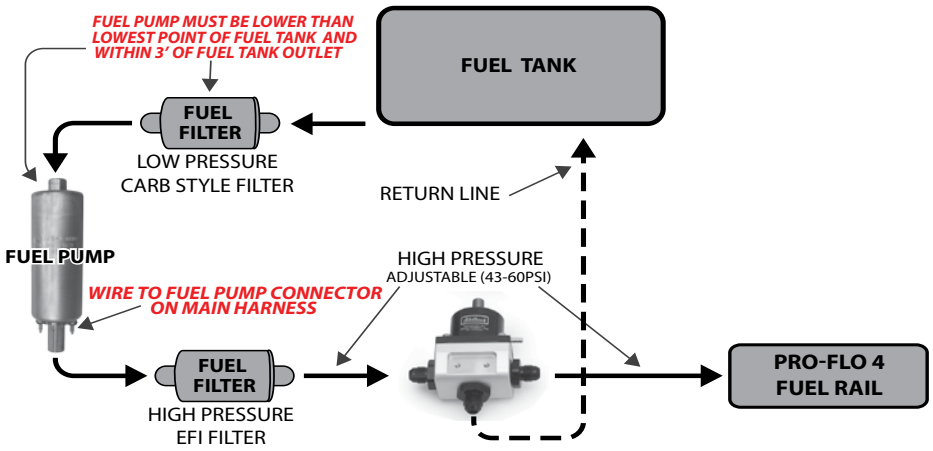
The ***Pro-Flo 4*** EFI system requires a high pressure fuel system providing 43-45 or 58-60 psi of fuel pressure with a minimum flow rating of 57 GPH (215 liter/hr). These fuel system requirements can support up to 600 HP. The following recommended options are available separately.

NOTE: Fuel pressure has a direct role in how much fuel is delivered to the engine when the injectors are opened. The higher the fuel pressure, the more fuel that is delivered during an injector opening event. It is critical for the proper operation of your fuel injection system that the fuel pressure matches the injector pulse widths demanded by the calibration for your specific application. For the recommended fuel pressure setting for your engine application, please refer to the ***Pro-Flo 4*** EFI setup Wizard Map Matrix on pages 27-28.

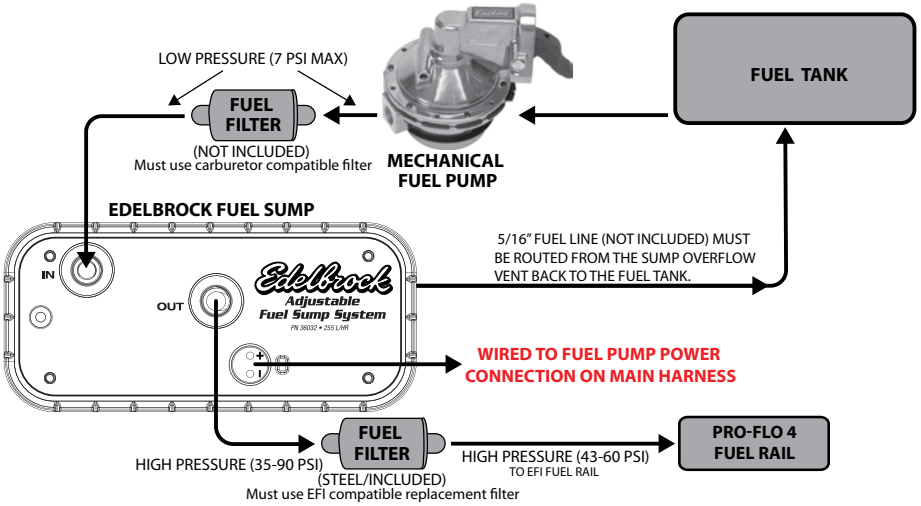
Fuel Pressure Regulator Vacuum Reference: The Fuel Pressure Regulator MUST reference manifold pressure to ensure a proper fuel pressure differential during an injector opening event under high vacuum conditions. The vacuum reference will lower fuel pressure slightly under idle and cruise conditions. The amount of pressure reduction will vary from engine to engine. During wide open throttle conditions, the fuel pressure should read the set point value of 43psi or 58psi depending on your application. The fuel pressure regulator should always be set to the target pressure with the vacuum reference hose disconnected from the Fuel Pressure Regulator. The hose from the manifold MUST be plugged to prevent a vacuum leak when setting the pressure. Remove the plug and reconnect the vacuum line to the fuel pressure regulator after target pressure is achieved.

SUGGESTED EDELBROCK FUEL SYSTEM KITS

Part Number 3604 Adjustable Return-Style EFI Fuel Kit: Includes an inline 67 GPH (255 LPH) fuel pump, adjustable EFI fuel pressure regulator, pre-pump and post-pump fuel filters, twenty feet of 3/8" fuel injection fuel hose and all necessary fittings, mounts and clamps. Capable of supporting 600 HP.

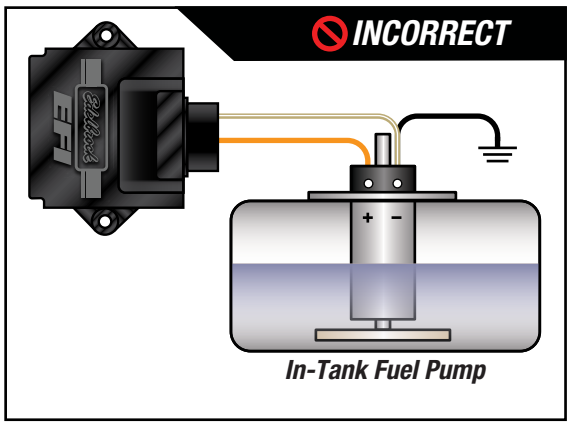


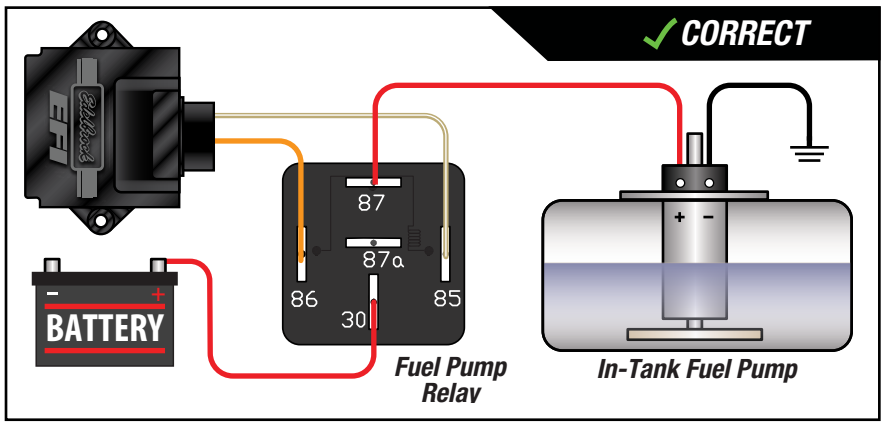
Part Number 36031 Universal EFI Fuel Sump System: Equipped with an internal 67 GPH (255 LPH) fuel pump and adjustable fuel pressure regulator. Uses engines stock mechanical fuel pump to provide fuel to the internal high pressure EFI fuel pump.



IN-TANK FUEL PUMPS

The ***Pro-Flo 4*** system controls the fuel pump by switching the pump's ground on and off. The pump's 12v feed is constantly on whenever the system is powered on. Most in-tank fuel pumps have the pump's ground post tied directly to chassis ground. Because of this, in-tank fuel pumps will not function correctly when connected directly to the ***Pro-Flo 4*** wiring harness. If using an in-tank fuel pump with the ***Pro-Flo 4***, a relay must be added to correctly power the fuel pump.

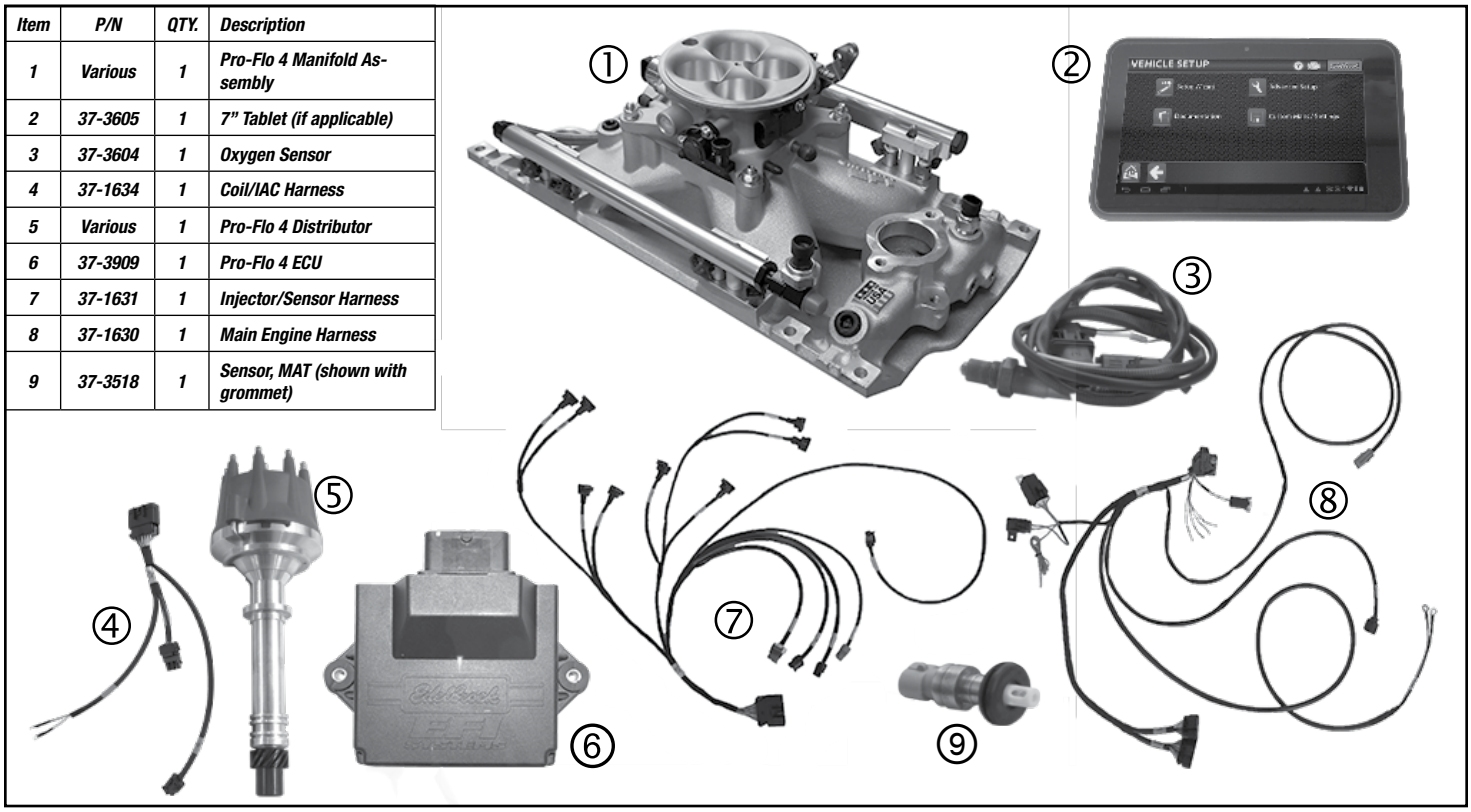




PRIMARY KIT COMPONENTS (4150)

(Images are for reference only and may not represent actual components.)

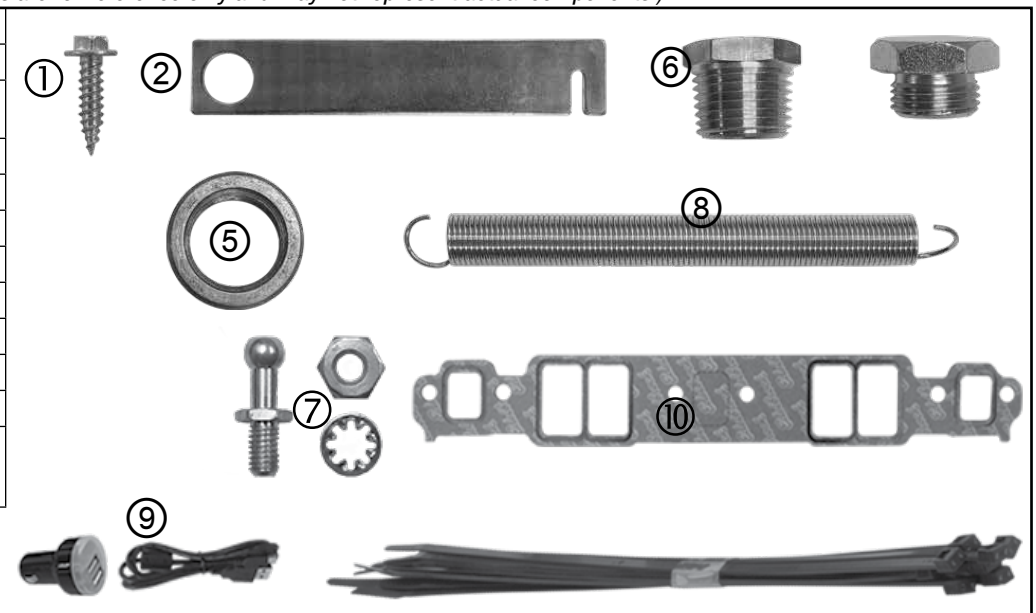
Item	P/N	QTY.	Description
1	Various	1	Pro-Flo 4 Manifold Assembly
2	37-3605	1	7" Tablet (if applicable)
3	37-3604	1	Oxygen Sensor
4	37-1634	1	Coil/IAC Harness
5	Various	1	Pro-Flo 4 Distributor
6	37-3909	1	Pro-Flo 4 ECU
7	37-1631	1	Injector/Sensor Harness
8	37-1630	1	Main Engine Harness
9	37-3518	1	Sensor, MAT (shown with grommet)



MAIN HARDWARE (4150)

(Images are for reference only and may not represent actual components.)

Item	P/N	QTY.	Description
1	36-3505	2	Sheet Metal Screw
2	38-0590	1	Throttle Return Spring Bracket
3	40-3970	1	1/2" to 3/8" Pipe Reducer
4	52-8097	1	Oxygen Sensor Bung Plug
5	52-9710	1	Oxygen Sensor Bung
6	74-4920	1	Throttle Return Spring
7	8016	1	Throttle Linkage Hardware
8	Various	2	Intake Manifold Gasket
9	37-1549	1	Car Charger w/USB Cable
10	78-2004	10	11" Tie Wraps
11	37-3496	1	Distributor Extension Harness (Ford and some Chrysler Only) Not Pictured



PRO-FLO 4 4150 STYLE MANIFOLD - COMPONENT LAYOUT

The Edelbrock Pro-Flo 4 EFI system delivers fuel and air to the engine via an induction system consisting primarily of a 4-barrel throttle body, dual fuel rails, and eight fuel injectors. The induction system is fully assembled, tested, pressure checked, and flowed at the Edelbrock Factory in Torrance, California. Avoid disassembling these components if possible.

***NOTE**: ALL VACUUM PORTS HAVE FULL-TIME VACUUM. UNUSED PORTS MUST BE CAPPED TO AVOID VACUUM LEAKS.*

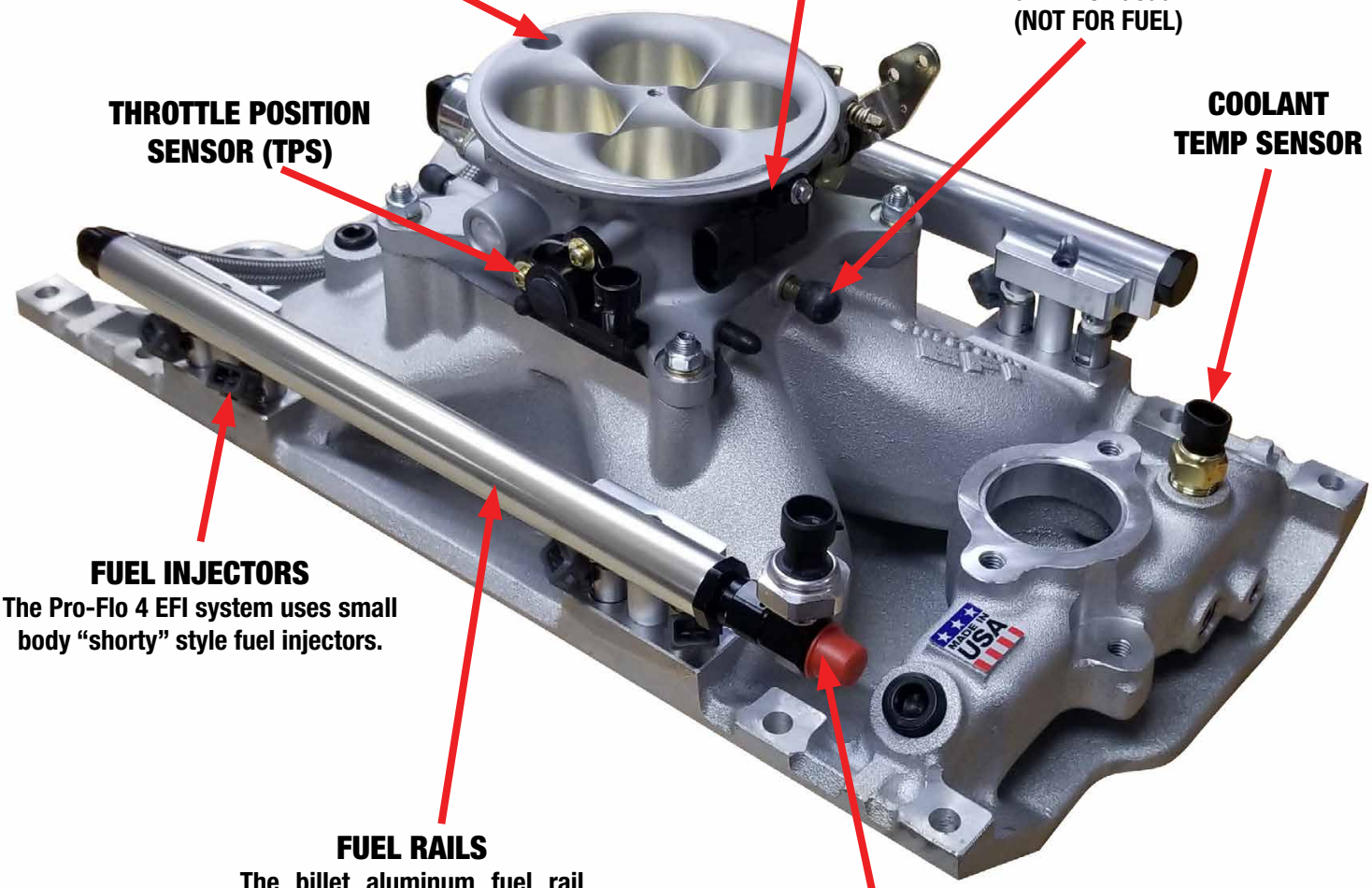
4-BARREL THROTTLE BODY
The Pro-Flo 4 system uses a 4150 style flanged throttle body with four throttle blades arranged in a conventional 4-barrel pattern. The air valve can flow up to 1000 CFM.

MAP SENSOR

3/8" PCV PORT
Full Time Vacuum
(NOT FOR FUEL)

THROTTLE POSITION SENSOR (TPS)

COOLANT TEMP SENSOR



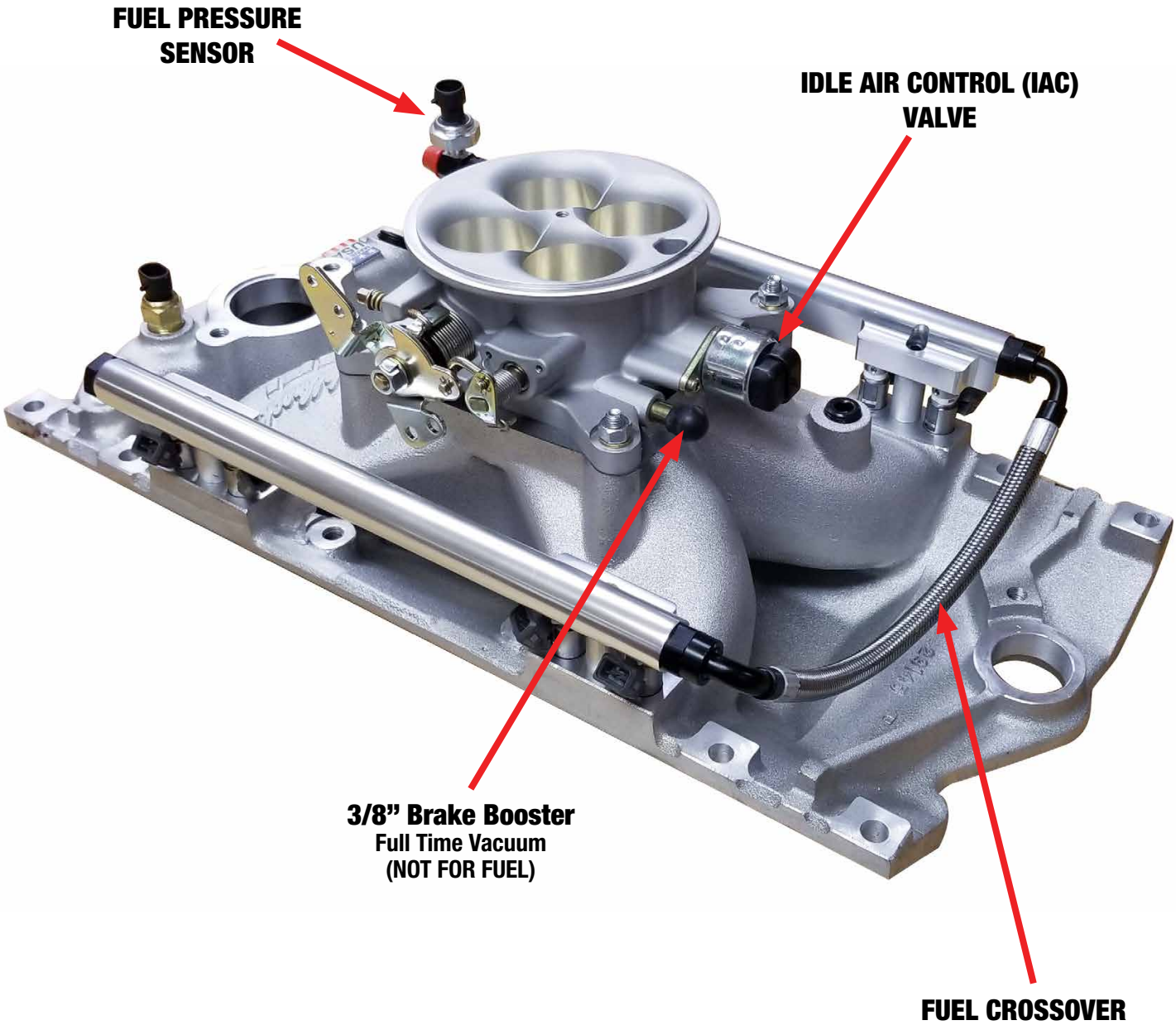
FUEL INJECTORS
The Pro-Flo 4 EFI system uses small body "shorty" style fuel injectors.

FUEL RAILS
The billet aluminum fuel rail assemblies distribute the high pressure fuel to the injectors.

FUEL INPUT
Fuel Pressure Sensor
-6 AN Male

(Images are for reference only and may not represent actual components.)

PRO-FLO 4 4150 STYLE MANIFOLD - COMPONENT LAYOUT

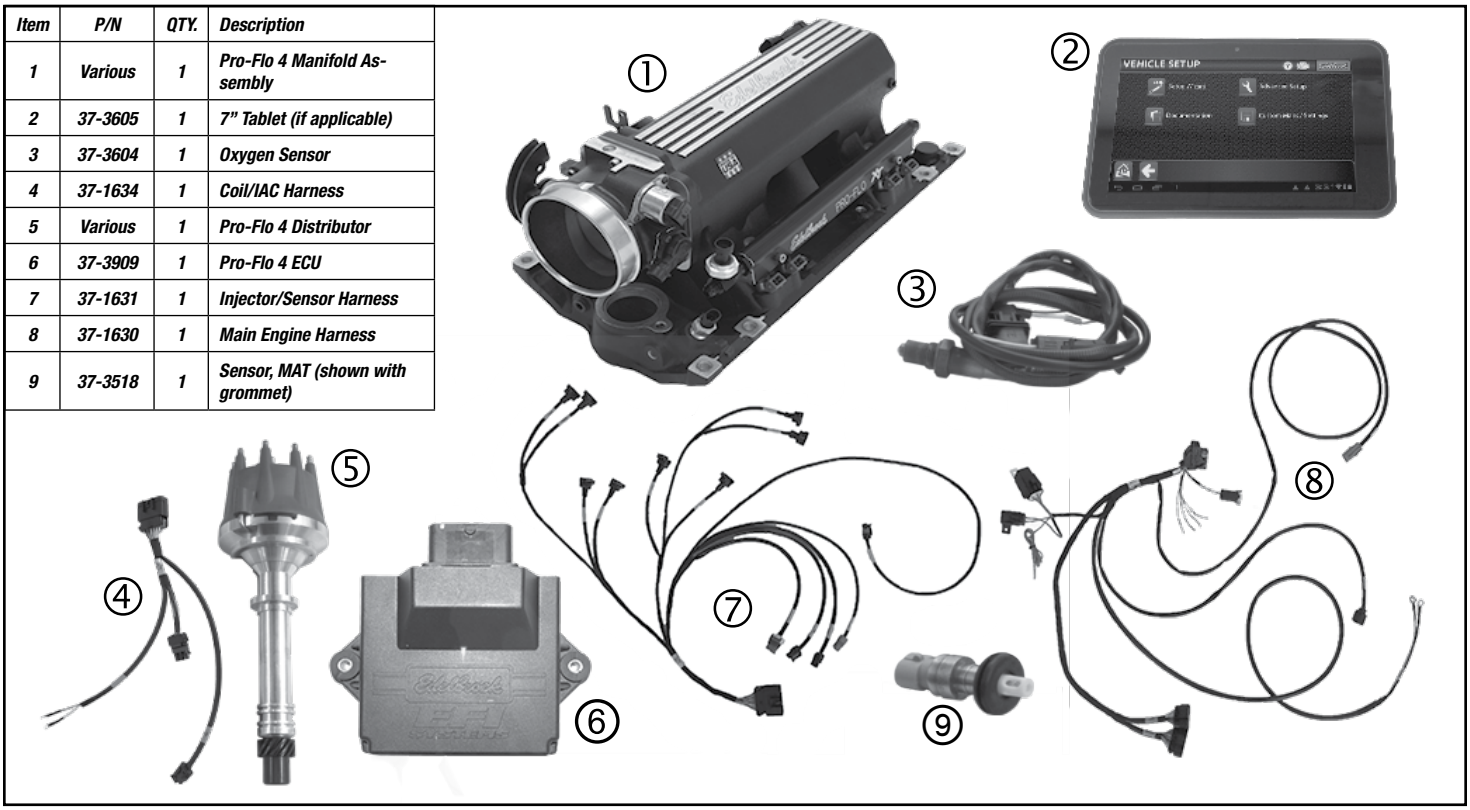


(Images are for reference only and may not represent actual components.)

PRIMARY KIT COMPONENTS (XT)

(Images are for reference only and may not represent actual components.)

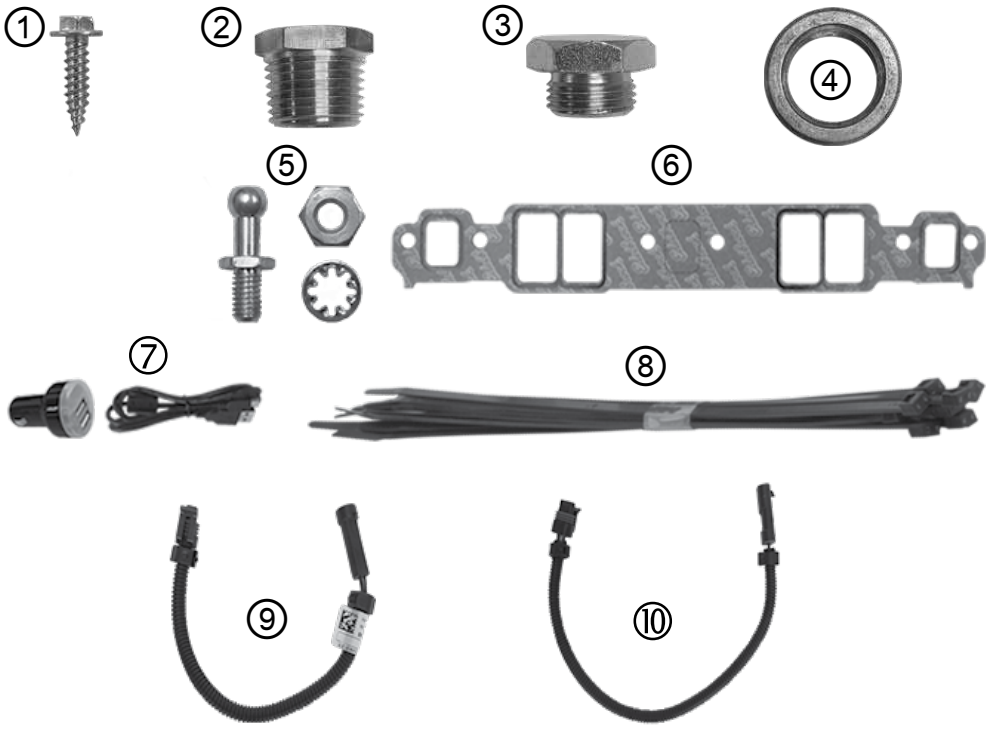
Item	P/N	QTY.	Description
1	Various	1	Pro-Flo 4 Manifold Assembly
2	37-3605	1	7" Tablet (if applicable)
3	37-3604	1	Oxygen Sensor
4	37-1634	1	Coil/IAC Harness
5	Various	1	Pro-Flo 4 Distributor
6	37-3909	1	Pro-Flo 4 ECU
7	37-1631	1	Injector/Sensor Harness
8	37-1630	1	Main Engine Harness
9	37-3518	1	Sensor, MAT (shown with grommet)



MAIN HARDWARE (XT)

(Images are for reference only and may not represent actual components.)

Item	P/N	QTY.	Description
1	36-3505	2	Sheet Metal Screw
2	40-3970	1	1/2" to 3/8" Pipe Reducer
3	52-8097	1	Oxygen Sensor Bung Plug
4	52-9710	1	Oxygen Sensor Bung
5	8016	1	Throttle Linkage Hardware
6	Various	2	Intake Manifold Gasket
7	37-1549	1	Car Charger w/USB Cable
8	78-2004	10	11" Tie Wraps
9	37-1635	1	TPS Extension Harness
10	37-1636	1	IAC Extension Harness
11	37-3496	1	Distributor Extension Harness (Ford and some Chrysler Only) Not Pictured



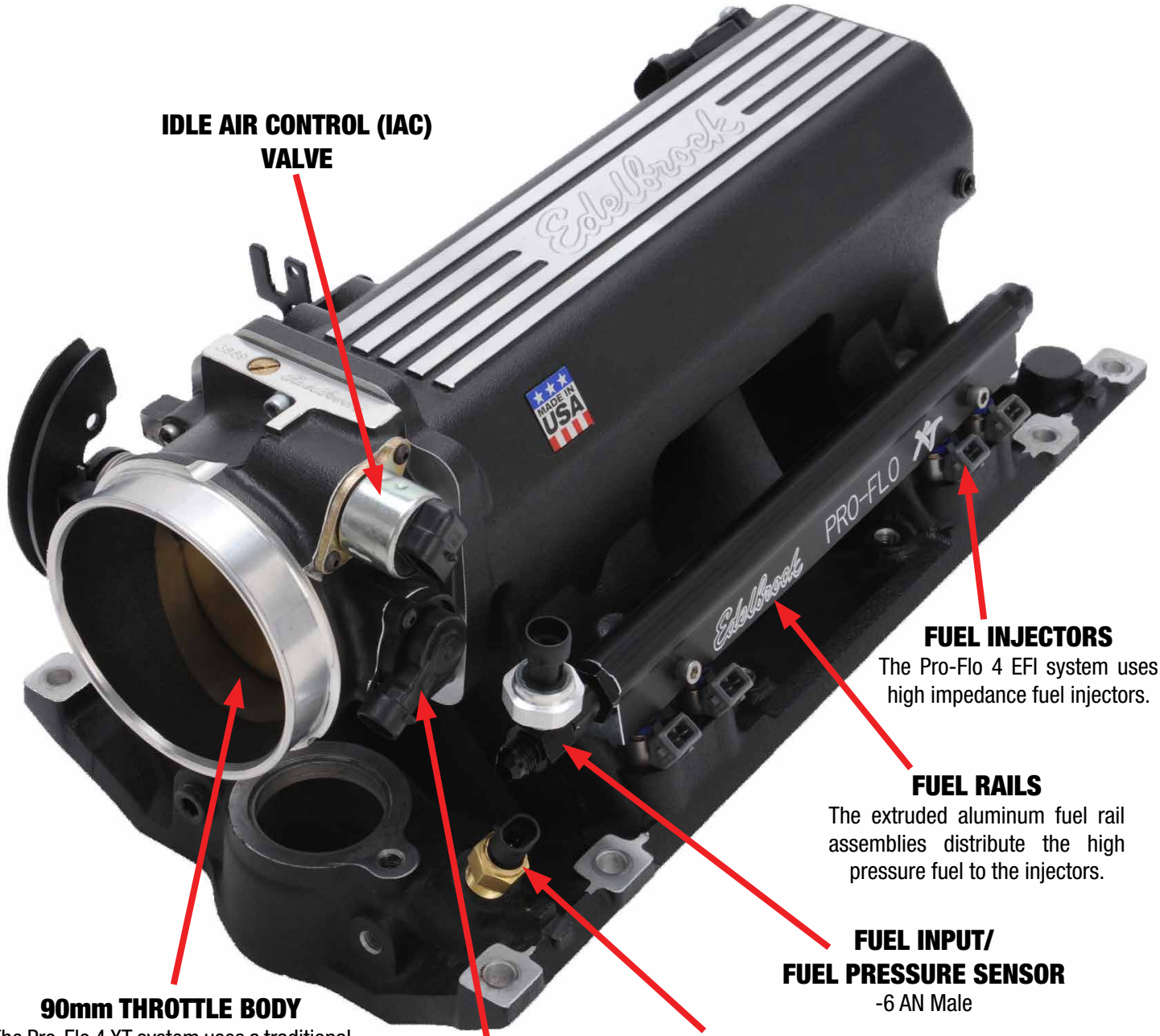
PRO-FLO 4 XT MANIFOLD - COMPONENT LAYOUT

The Edelbrock Pro-Flo 4 XT EFI system delivers fuel and air to the engine via an induction system consisting primarily of a traditional 90mm throttle body, dual fuel rails, and eight fuel injectors. The induction system is fully assembled, tested, pressure checked, and flowed at the Edelbrock Factory in Torrance, California. Avoid disassembling these components if possible.

NOTE: ***Recommended water neck: GM Part Number 10108470***

***NOTE**: ALL VACUUM PORTS HAVE FULL-TIME VACUUM. UNUSED PORTS MUST BE CAPPED TO AVOID VACUUM LEAKS.*

**P/N 357903 SHOWN*



IDLE AIR CONTROL (IAC) VALVE

FUEL INJECTORS
The Pro-Flo 4 EFI system uses high impedance fuel injectors.

FUEL RAILS
The extruded aluminum fuel rail assemblies distribute the high pressure fuel to the injectors.

FUEL INPUT/ FUEL PRESSURE SENSOR
-6 AN Male

90mm THROTTLE BODY
The Pro-Flo 4 XT system uses a traditional 90mm throttle body. The air valve can flow up to 1100 CFM.

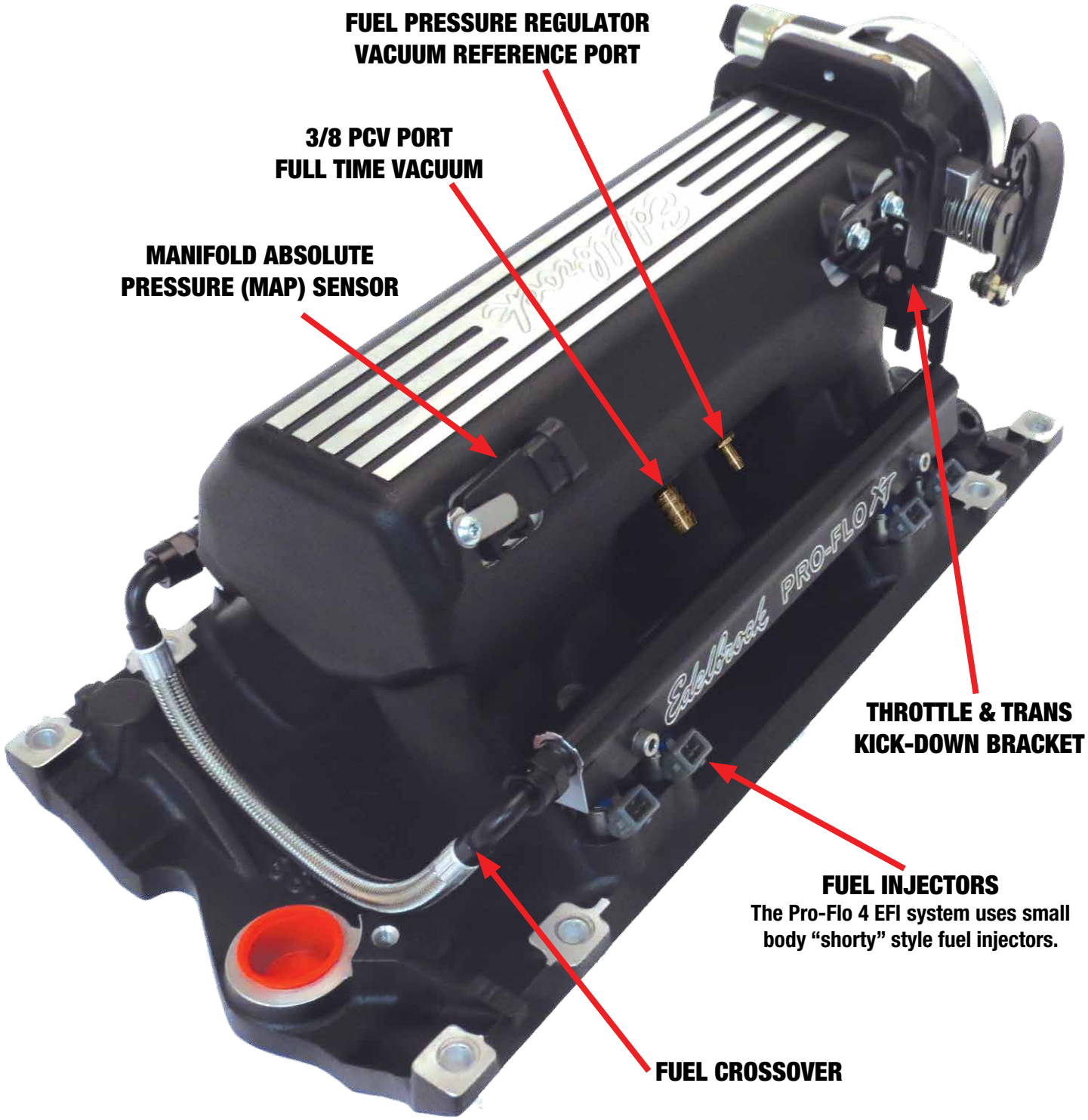
COOLANT TEMP SENSOR

THROTTLE POSITION SENSOR (TPS)

(Images are for reference only and may not represent actual components.)

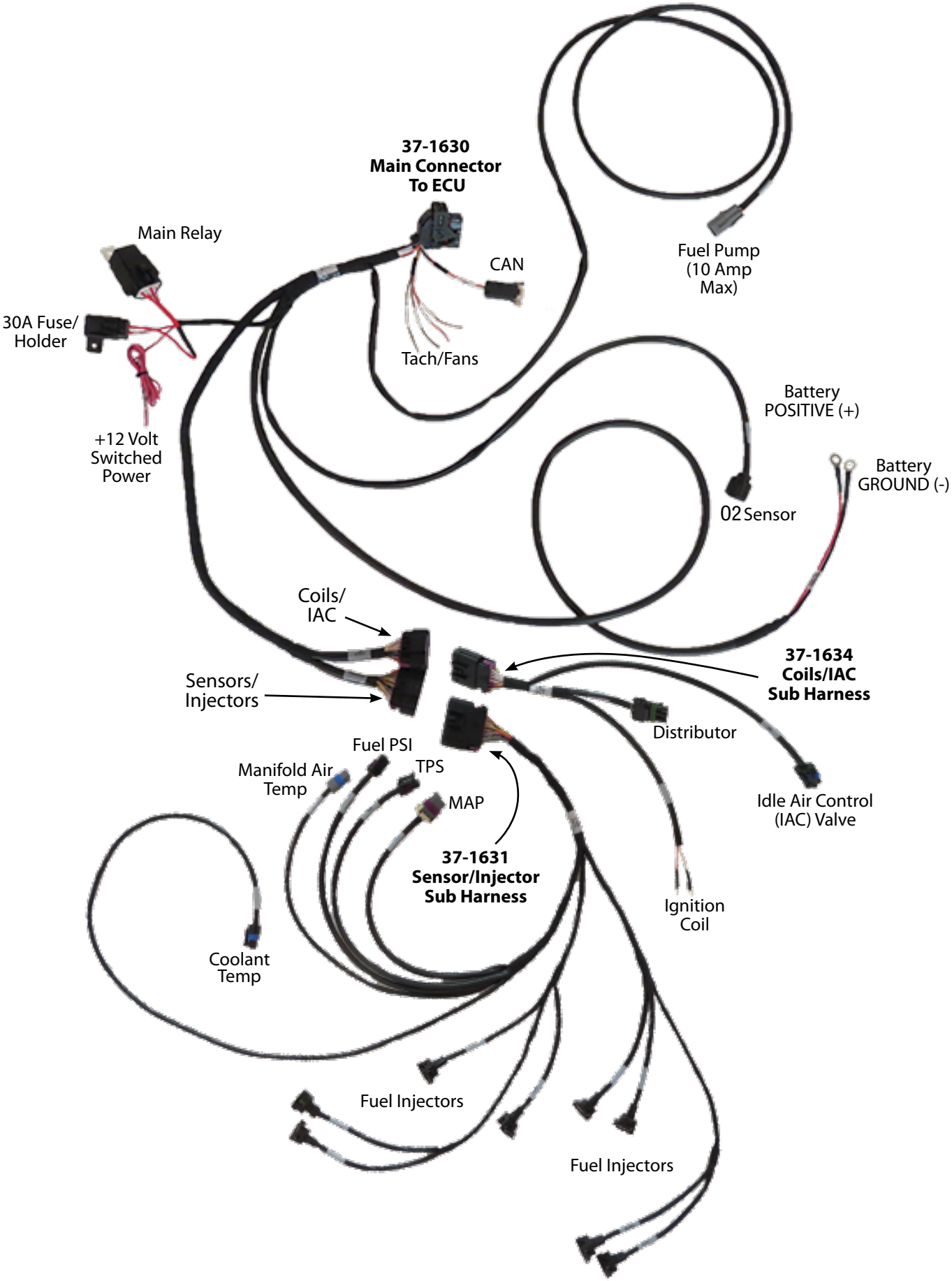
PRO-FLO 4 XT MANIFOLD - COMPONENT LAYOUT CON'T

**P/N 357903 SHOWN*



(Images are for reference only and may not represent actual components.)

HARNESS LAYOUT



WIDEBAND OXYGEN (O2) SENSOR INSTALLATION PROCEDURE

The O2 sensor must be installed in the exhaust system using the supplied O2 sensor bung from the hardware bag. The O2 sensor is required as it measures the oxygen content of the exhaust gas, which is used by the ECU to manage fuel delivery under closed loop control.

NOTE: It is suggested that the O2 sensor bung be installed by a professional muffler shop prior to the installation of the Edelbrock ***Pro-Flo 4*** EFI system. DO NOT drive the vehicle with the O2 sensor unplugged as this will damage the O2 sensor. An O2 sensor bung plug is provided for your convenience.

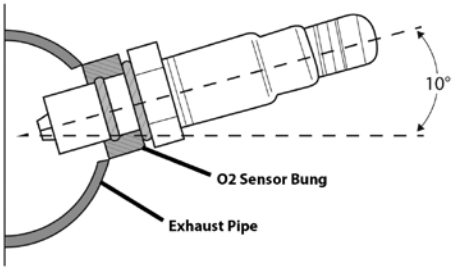
Because of harness length constraints, it is highly recommended to install the O2 sensor and the ***Pro-Flo 4*** ECU on the same side of the vehicle.

WARNING: A properly sealed exhaust system is critical for the ***Pro-Flo 4*** EFI to function properly. Any air leaks in the exhaust system, upstream of the O2 sensor, will skew the O2 sensor's output resulting in improper calibration which can lead to engine damage. Improper installation of the O2 sensor and any damage that may result is not covered by any Edelbrock Warranty.

1. Verify that the header and tailpipe gaskets and flanges are in good condition. It is recommended to replace any damaged gaskets and flanges as they may cause exhaust leaks, which can lead to inaccurate Air Fuel Ratio (AFR) readings. Torque all fasteners to manufacturer's specifications to avoid any possible exhaust leaks.

   WARNING: The exhaust system must be completely sealed from cylinder head to tailpipe. This is the number one cause of poor performance as exhaust leaks affect the air/fuel mixture seen by the ECU. Use locking type hardware to secure exhaust headers to cylinder heads and exhaust collector to mid-pipe. DO NOT USE NYLOC NUTS. Retorque exhaust hardware on a regular basis to ensure exhaust leaks do not occur. Be sure any RTV Silicone used to seal the exhaust system is compatible with Oxygen Sensors. This information will be found on the silicone tube packaging.

   The O2 sensor bung must be installed in the exhaust system as close to the engine as possible, after the header collector and before the catalytic converter (if equipped). This location must be approximately 10° above horizontal and within reach of the O2 sensor harness connector on the ***Pro-Flo 4*** main harness. **NOTE:** There must be at lease 24" of exhaust pipe after the O2 sensor. Open headers or "zoomies" will cause the sensor to read incorrectly.



2. Mark the drilling location on the exhaust system pipe with a permanent or paint marker. Check the proposed mounting location to ensure the clearance for the O2 sensor is adequate and that the O2 sensor connector on the main harness will reach the O2 sensor location. Make sure to take engine movement into consideration when checking for clearance.

3. Drill a 5/8" hole at your mounting location. Deburr and clean the hole as needed.

4. Fit the provided bung onto the hole opening. Secure the bung with a clamp and weld the bung into place.

5. Once the installation of the bung is complete, make sure to clean the threads of the fitting to ensure it's free of debris.

   NOTE: The O2 sensor bung uses an M18 x 1.5 thread pitch.

6. If you are ready to install the ***Pro-Flo 4*** EFI system, proceed to Step #9 to install your O2 sensor. Otherwise, if your ***Pro-Flo 4*** EFI System will be installed at a later time, temporarily install the O2 sensor bung plug supplied in the hardware bag. You MUST apply a high-heat anti-seize compound (not included) to the threads of the O2 sensor bung plug and install into the bung using an 7/8" oxygen sensor socket or 7/8" wrench. This will allow you to drive the vehicle until the O2 sensor is installed.

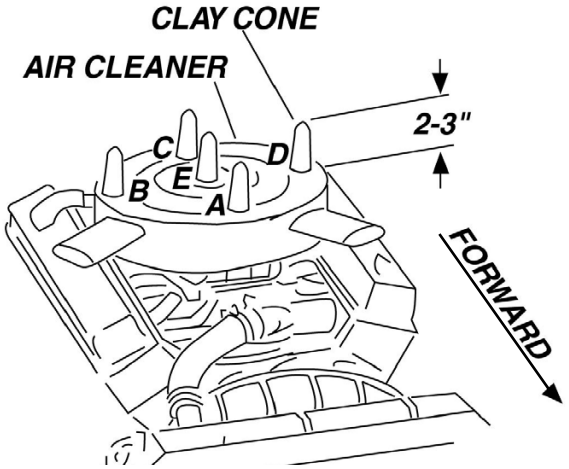
7. When you are ready to begin installation of the ***Pro-Flo 4*** EFI system, remove the O2 sensor bung plug.

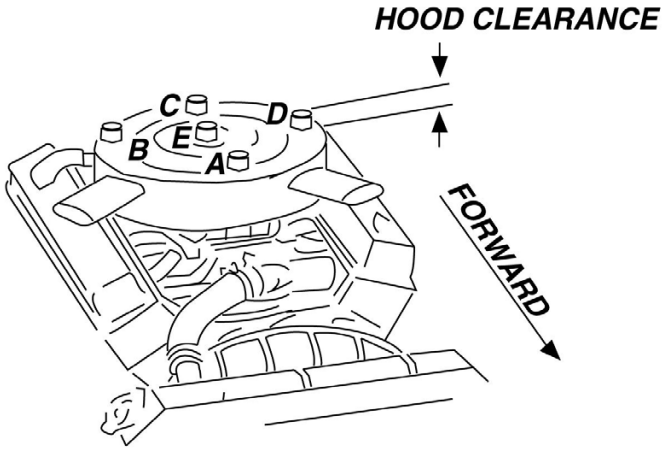
8. Apply a high-heat anti-seize compound (not included) to the threads of the O2 sensor and install into the bung using an 7/8" oxygen sensor socket or 7/8" wrench.
   NOTE: Avoid contacting tip of O2 Sensor with any anti seize compound, damage may occur.

9. Connect the O2 sensor to the O2 sensor connector on the main ***Pro-Flo 4*** ECU harness.

DETERMINING HOOD CLEARANCE

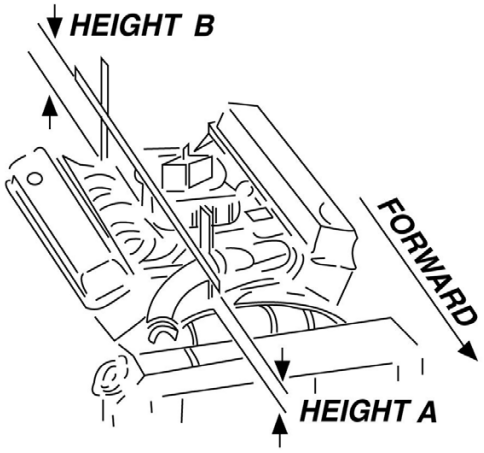
1. Prior to installing the ***Pro-Flo 4*** EFI system, it is highly recommended to verify that you will have enough hood clearance.
2. Using modeling clay or putty, not included, make five small cones about 2-3 inches high.
3. Position the cones on the air cleaner at front, rear, each side, and on the center stud.
4. Close the hood to locked position and re-open.
5. The height of the cones indicate the amount of clearance between the hood and the air cleaner. Record these measurements.





MANIFOLD & CARBURETOR HEIGHT VS. *PRO-FLO 4* HEIGHT

1. Remove the factory air cleaner.
2. Lay a straightedge, such as a yardstick, across the top of the carburetor from front to back.
3. Measure from the base of the manifold end seal surfaces to the straightedge.
4. Record these measurements (height A and height B).
5. Add height A and height B and divide by two to get the average height. Ex: (A+B) / 2
6. Measure the ***Pro-Flo 4*** system from the base of the manifold to the top of the throttle body or the highest point of the manifold (XT models).
7. Compare the two measurements. If the ***Pro-Flo 4*** unit is taller, subtract the difference from the hood clearance figure to determine the new hood clearance.



CAUTION: *Because of engine torque, it is recommended to maintain at least 1/2-inch of clearance between the hood and air cleaner. If hood clearance is insufficient, a low profile air cleaner may solve the problem.*

***PRO-FLO 4* EFI INSTALLATION**

TIP: Due to the many different types of cylinder head and valve cover designs, it is highly recommend that the Pro-Flo 4 intake manifold be "dry fitted" without gaskets or sealant to check for proper fitment before final installation. Check for adequate clearance around the fuel injector bosses and valve cover mounting rails on cylinder heads as well as clearance with valve covers themselves. Minor sanding or grinding may be required.

NOTE: Though visually different, the installation procedure is relatively the same between manifolds using 4150 style throttle bodies and XT type throttle bodies.

1. Disconnect the battery. Drain the radiator coolant (radiator drain plug is typically located on lower right facing engine).
   WARNING! Do NOT drain coolant while engine is HOT!
2. Remove the gas cap to release any fuel pressure present in the system. Remove the air cleaner, throttle linkage, vacuum and fuel line from the carburetor. Remove all brackets and the radiator hose (if applicable) from the intake manifold. TIP: Tag all linkages, vacuum and fuel lines. This will simplify the installation.
3. Rotate the engine to 12° Before Top Dead Center (BTDC) on the compression stroke of cylinder #1.
4. Remove the distributor hold down clamp and remove the distributor from the engine.
5. Clean all debris from the intake manifold and unbolt the carburetor and intake manifold.
   NOTE: Removal of the valve covers may be required on some applications. If valve covers are removed, replace the valve cover gaskets as needed.
6. Place rags or paper towels into the cylinder head ports and lifter valley to prevent debris from falling into the ports and combustion chambers.
7. Remove the gaskets and gasket residue using a metal scraper. Vacuum up any debris before proceeding.
8. Remove the rags or paper towels from the cylinder head ports. Using a shop rag and degreaser, clean the head/manifold mating surface.
9. Apply two (2) thin layers of Gasgacinch to the head/manifold mating surface (Figure 1) and one (1) side of the supplied intake manifold gaskets (Figure 2). Let the Gasgacinch tack up for about one (1) minute.

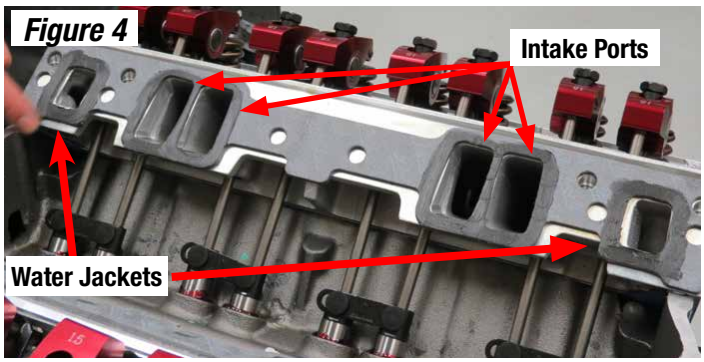
Figure 1

Figure 2

10. Position the intake manifold gaskets (side with Gasgacinch) onto the cylinder heads making sure to align the intake ports. Press down firmly to secure (Figure 3).
11. Using finger, apply a thin layer of gasket maker around the intake ports and a slightly thicker layer around the water jackets (Figure 4). Do this for both intake manifold gaskets.

Figure 3

Figure 4



12. Apply a bead of gasket maker about a 1/4” thick to the front and rear of the block as shown (Figure 5).

13. Wipe down the intake manifold’s mating surface with degreaser (Figure 6). Carefully position the intake manifold onto the cylinder heads.

14. Torque all manifold bolts in a crisscross pattern starting with the inner bolts and working outwards. Refer to the vehicle’s service manual for proper torque spec and procedures.
NOTE: On most applications, removal of fuel rails prior to installing the manifold assembly is not required.

15. Reinstall the valve covers if removed. Attach the throttle linkage and verify it moves freely without interference. Any throttle linkage interference MUST be resolved before proceeding.

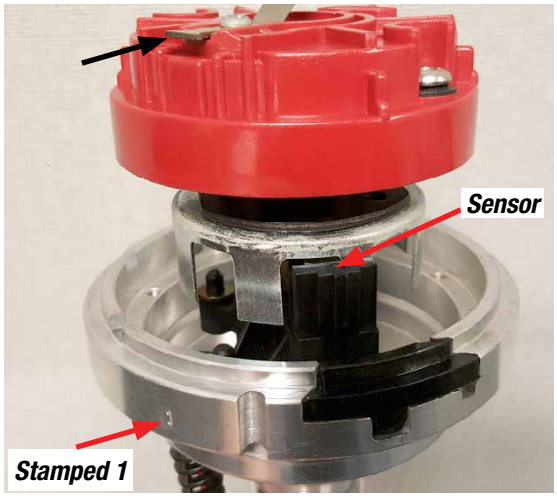
16. Verify the engine is still positioned at 12 degrees before top dead center with cylinder #1 on a compression stroke.

17. Install the gasket onto the distributor housing and apply a liberal amount of lubricant to the distributor gear.
NOTE: Disregard distributor housing O-rings on Chevrolet applications.

18. Install the Edelbrock Pro-Flo distributor so that the rotor is pointed in the proximity of the #1 stamped on the outside of the distributor housing and the short trigger tooth is just entering the distributor sensor.
NOTE: You may need to remove and reinsert the distributor a few times to get the alignment correct. Make sure that the distributor seats down completely and has full engagement with the oil pump drive. You may need to rotate the oil pump shaft to ensure it is engaged properly.

19. Tighten the hold down clamp leaving it just loose enough that you can rotate the distributor during the timing procedure. The final timing will be set using the **E-Tuner 4** Android app.

DISTRIBUTOR ROTOR LOCATION AT INSTALLATION POINTING TO #1 ON SIDE OF HOUSING WITH ENGINE AT 12° BTDC CYLINDER #1 ON COMPRESSION STROKE.



20. Install the spark plug wires. Position cylinder 1 spark plug wire on the distributor cap post located at the 1 stamped on the distributor housing.

21. Find a suitable mounting location for the ECU. This should be on the same side of the vehicle as the O2 sensor. Recommended mounting locations are the fender well, inner fender panel or inside the vehicle on the passenger side kick panel. Be sure the O2 sensor connection reaches the main harness connector.
NOTE: It is recommended to mount the ECU in a location away from excessive heat, vibration, possible water exposure and as far away from spark plug wires, and ignition related components as possible.

22. Using the supplied sheet metal screws from hardware bag, mount the ECU to the desired mounting location.

23. Connect the ***Pro-Flo 4*** main harness to the ECU. Find a suitable harness route in the engine compartment for the main harness from the ECU to the harness connections at the rear of the engine. **TIP:** For most installations, the harness fits best if routed from the rear of the engine back towards the firewall, across the firewall, then forward towards the ECU location.
NOTE: Avoid routing the harness near any ignition related components (ignition coil, distributor, spark plug wires). Also avoid routing near the headers, sharp edges, or any tight radius corners that may damage the harness

24. Route the power and ground leads on the main harness towards the battery. Connect the RED POWER lead (+12 Volt) and the BLACK GROUND (-) lead to the appropriate battery terminals. If necessary, the power and ground leads may be extended to reach the battery. However, the use of 12 gauge wire or larger is required.
WARNING: All power and ground leads must connect directly to the battery. **DO NOT RUN POWER TO THE STARTER OR GROUND TO ENGINE BLOCK OR CHASSIS!**

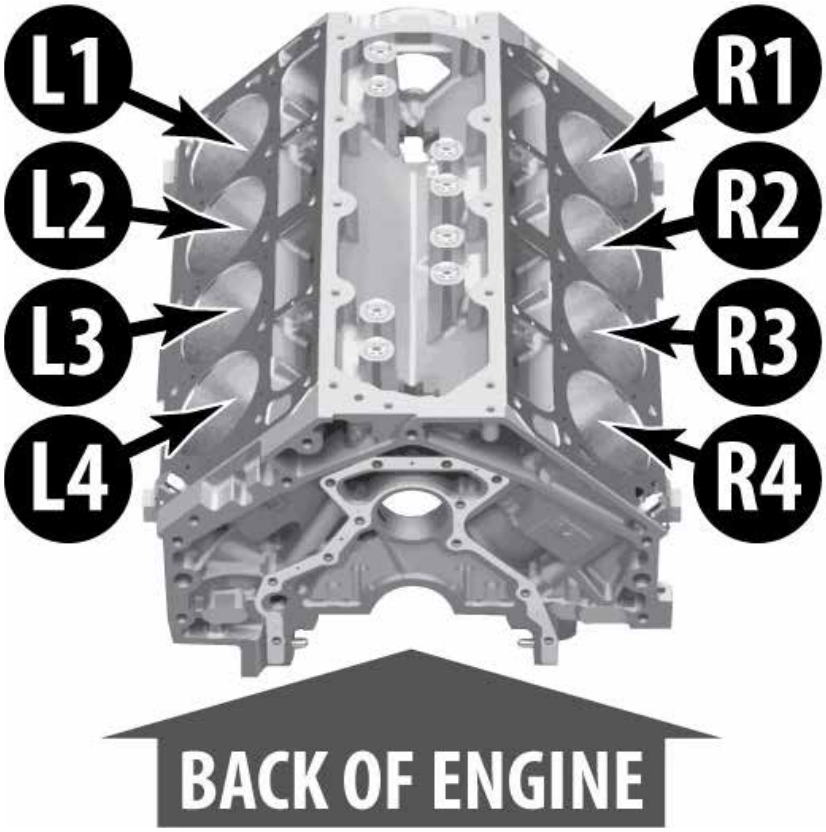
25. Securely mount the Fuse Holder and the Main Relay in an accessible location.

26. Connect the Pink/Black IGN switched wire on the main harness to a +12 Volt switched power source that provides +12 Volts when the key is both "ON" and "CRANKING".
NOTE: It is critical that the switched +12 Volts to the IGN switch wire is constant during cranking. This is a common issue on vehicles with no start or hard to start issues. Do not connect this to the positive side of the coil.

27. Secure the harness and leads with tie wraps from the hardware bag. Avoid over tensioning wire ties as this may damage the harness.

28. If not already completed, remove the previously installed O2 sensor bung plug from the bung in the exhaust system and install the O2 sensor into the bung using an 7/8" oxygen sensor socket or 7/8" wrench. Connect the main harness lead labeled "O2 Sensor" to the O2 sensor connector. Secure the O2 sensor lead as to avoiding contact with the exhaust pipes. Make sure to leave plenty of air space between the harness and the exhaust manifolds/headers. A 12" extension is available from www.bmotorsports.com #CONN-85773

29. Connect the 37-1631 sub harness to the main harness connector labeled SENSORS/INJECTORS. Route the harness around the intake manifold and make the following connections:
    - MAP - Manifold Absolute Pressure (MAP) sensor is either mounted directly to throttle body or on a bracket with a hose.
    - TPS - Throttle Position Sensor (TPS) is mounted directly to throttle body inline with the throttle blade shaft.
    - FUEL PSI - The fuel pressure sensor fitting is assembled to the fuel inlet fitting on fuel rail. The fuel inlet may be on left or right fuel rail. Locate the fuel pressure inlet fitting as necessary for the most convenient fuel supply hose routing on your application.
    - AIR T - Mount the air temperature sensor in the air cleaner base. Drill the air cleaner base with a ¾ drill and deburr any sharp edges. Install the air temperature sensor grommet in the base, then slide sensor into grommet. Connect the main harness air temp connector to the sensor.
    - COOL T - Coolant Temp Sensor is typically pre-installed in intake manifold in water crossover passage.



    - INJECTORS - Injector connectors are marked L1-L4 and R1-R4. The L connectors go on the left side of the engine and the R connectors on the right side of the engine. Order of injectors 1-4 is from front of engine to rear of engine. See image above.

30. Connect the 37-1634 sub harness into the main harness connector labeled COILS/IAC. Connect the IAC connector to the IAC motor located on the throttle body.

    DISTRIBUTOR CONNECTION - Connect the 3-pin connector on the distributor to the ***Pro-Flo 4*** #37-1634 Coil/IAC sub harness connector labeled DISTRIBUTOR. Ford and some Chrysler applications with distributor located at front of engine will use the provided distributor extension harness.

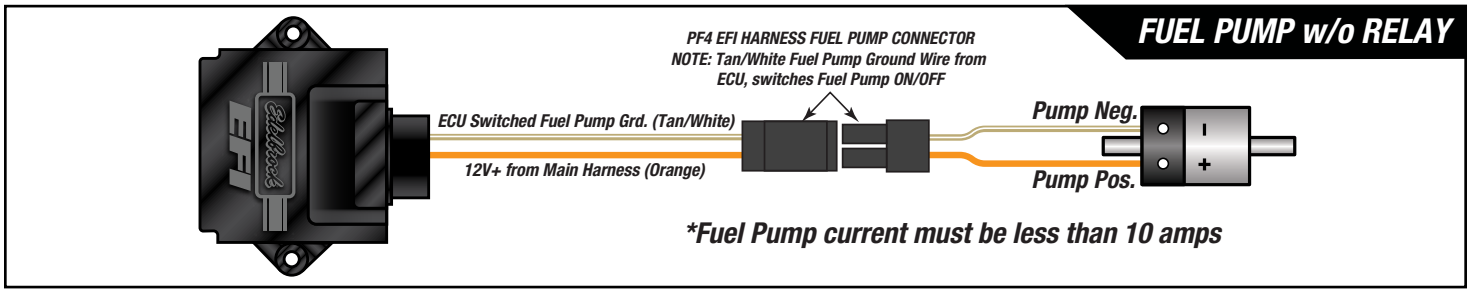
    COIL CONNECTION WITHOUT CDI BOX - The coil can be directly fired without the use of a CDI box. Use the supplied sub harness #37-1634 to attach the coil directly. The Orange wire goes to the positive (+) terminal and the White wire goes to the negative (-) terminal. Connect the #37-1634 ignition coil harness to the #37-1630 main harness.

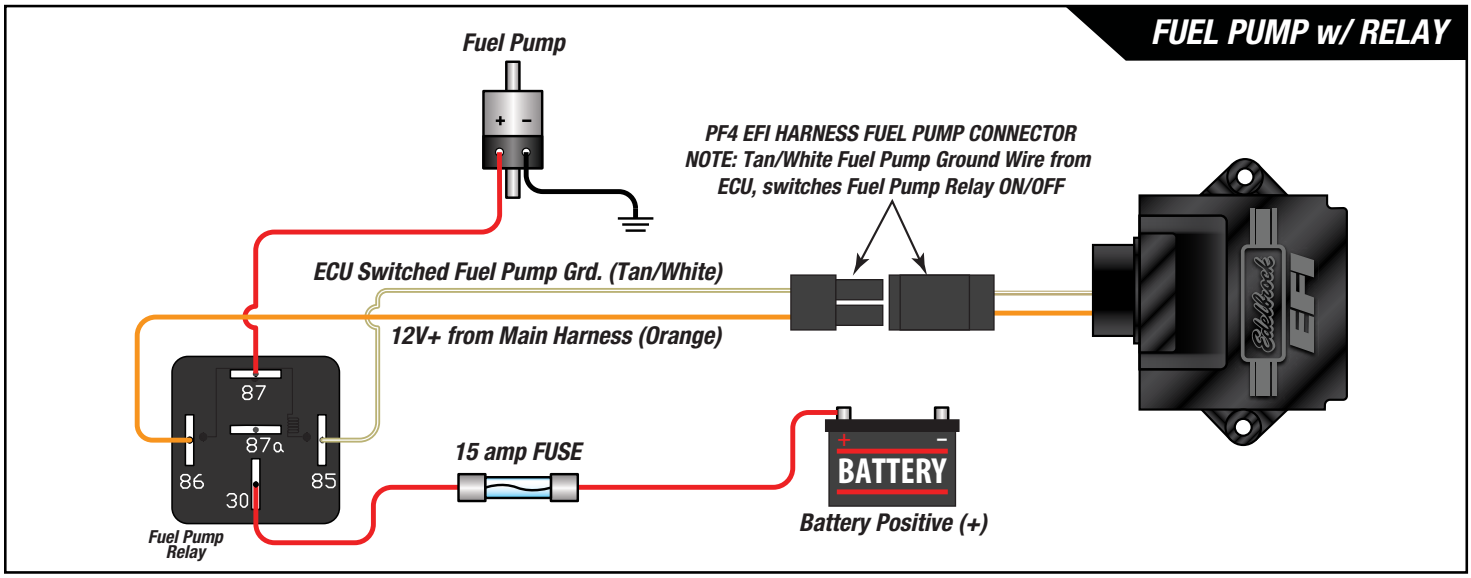
    COIL CONNECTION WITH CDI BOX - Cut off the eye terminal on the white/negative coil wire of the #37-1634 sub harness and terminate it to the WHITE trigger signal wire on the CDI box. Cut off the eye terminal on the orange coil positive wire of the #37-1634 sub harness and terminate it to the smaller RED key on power of the CDI Box. Connect the Battery power and ground wires for the CDI Box and the Hi Voltage Coil Wires from CDI box to Coil (refer to the diagram on Page 18). Connect the 37-1634 ignition coil harness to the 37-1630 main engine harness.

31. Due to the universal nature of the ***Pro-Flo 4*** EFI system, it's impossible to preset the throttle blades to best fit all the different possible idle characteristics of engine and cam size combination. To help the engine idle during initial startup, it is recommended to adjust the throttle screw as needed to keep the engine from stalling.
    - Street/Stock Cam (210° or Less): Turn (clockwise) the throttle screw 1/2 turn from the current factory setting.
    - Mild Cam (210° or 230°): Turn (clockwise) the throttle screw 1 turn from the current factory setting.
    - Race Cam (230° or Greater): Turn (clockwise) the throttle screw 1.5 turns from the current factory setting.

32. Install the throttle return spring and bracket from hardware bag. Manifold bolt locations are ideal mounting points.

33. INSTALL THE FUEL DELIVERY SYSTEM. Use the provided 2 pin male Weather Pack connector and terminals to build a plug-in fuel pump power/ground connection with the fuel pump power lead in the main wiring harness labeled "Fuel Pump". Maximum fuel pump current must be less than 10 Amps if powering the pump directly from the ECU. If using a fuel pump that draws more than 10 Amps during normal operation, a relay must be used – see fuel pump wiring diagrams below. When the ignition switch is first turned on, the ECU will run the fuel pump for 8 seconds to prime the fuel system and then shut off. The fuel pump will be turned on anytime an RPM signal is detected by the ECU. Refer to your fuel system's installation instructions then return to this manual and continue to the next step.





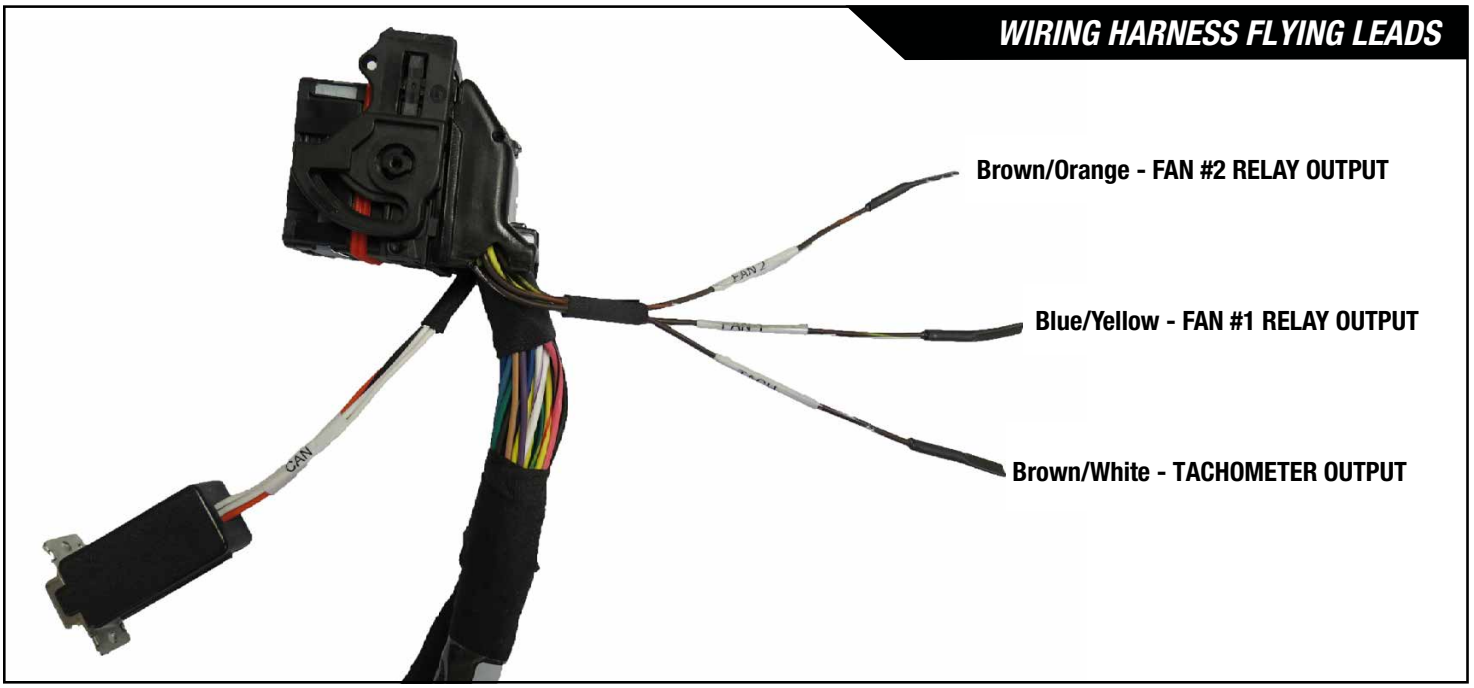
34. Once the ***Pro-Flo 4*** EFI System and the fuel delivery system have been installed, continue to the Quick Start Guide and E-Tuner User's Manual to use the **E-Tuner 4** Setup Wizard to complete your installation. The **E-Tuner 4** Setup Wizard for ***Pro-Flo 4*** EFI systems includes calibrations for most popular engine configurations and power levels. It is important that you choose the proper calibration that is closest to your engine/EFI system configuration. The most important details include engine displacement, maximum HP, injector size, fuel pressure (43 or 58 psi), camshaft specification, expected engine vacuum at idle. For further information regarding these details and suggested fuel pressure for your application please refer to the ***Pro-Flo 4*** EFI Setup Wizard Matrix at the back of these instructions.
NOTE: Some application specific calibrations are pre-loaded into the **E-Tuner 4** app and must be directly loaded onto the ECU. These files are accessible in the tablet app by going to ECU Settings>Load Map>Other Cals.

35. If supplying your own Android device, refer to the E-Tuner User's Manual for further information.

FAN & TACHOMETER OUTPUTS

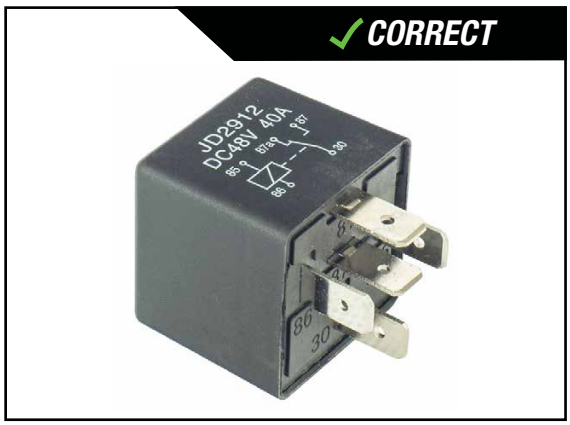
The main harness has three flying leads near the ECU connector: two outputs for triggering electric fan relays and one output for tachometer signal. All three outputs are GROUND outputs that are rated to 1.0 Amp. Do NOT connect ECU fan outputs directly to electric fans. Fan outputs can only be used to trigger relays – see fan diagrams on the next page. Use only Bosch type automotive relays. Do not use heavy duty relays – see relay selection below.

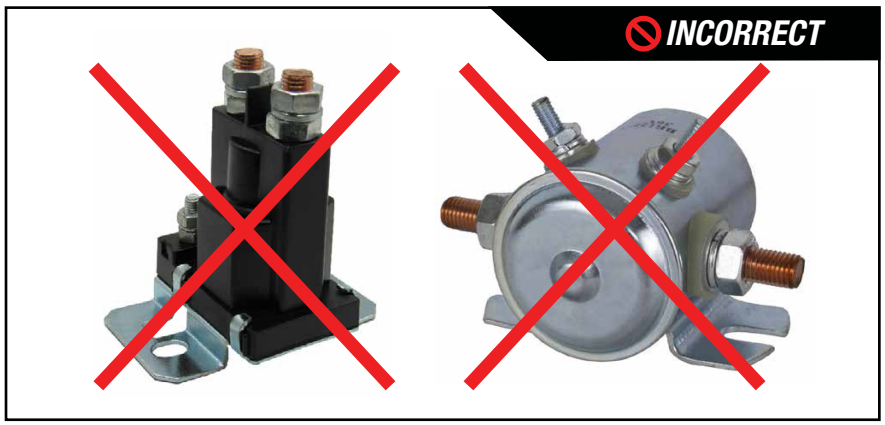
Tach signal output is 12v square wave. Many old style tachometers require a coil primary signal and may not work with a square wave signal. If tach does not work, try moving tach signal to coil negative post.



RELAY SELECTION

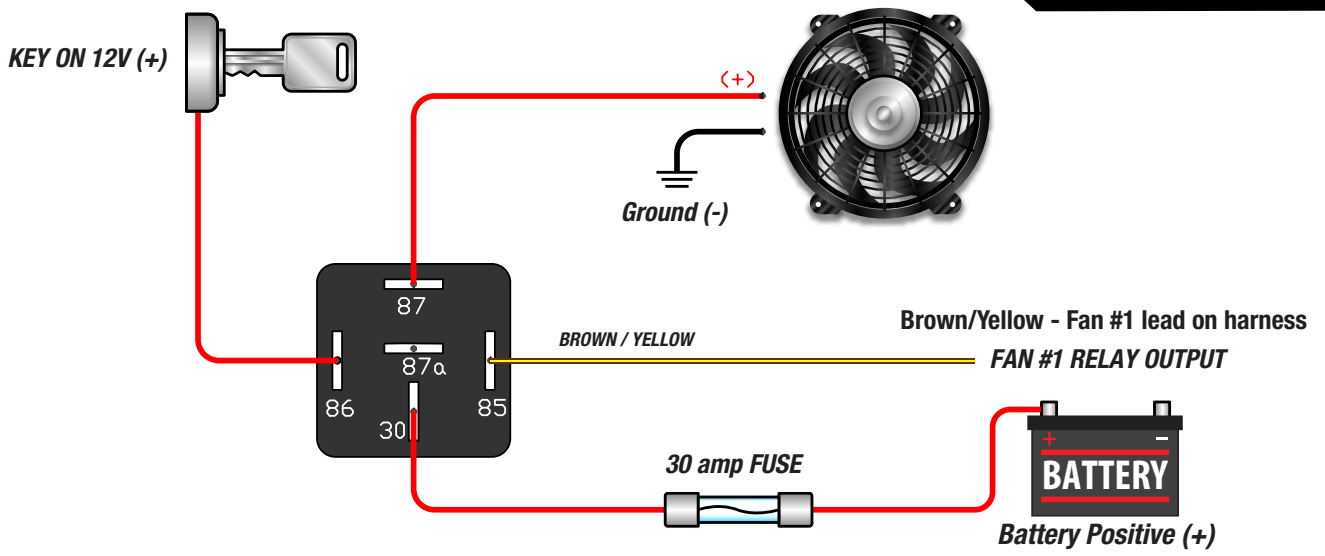
Be sure to use Bosch style 12v relays. Do not use "heavy duty" style relays or solenoids. Doing so could damage the ECU.



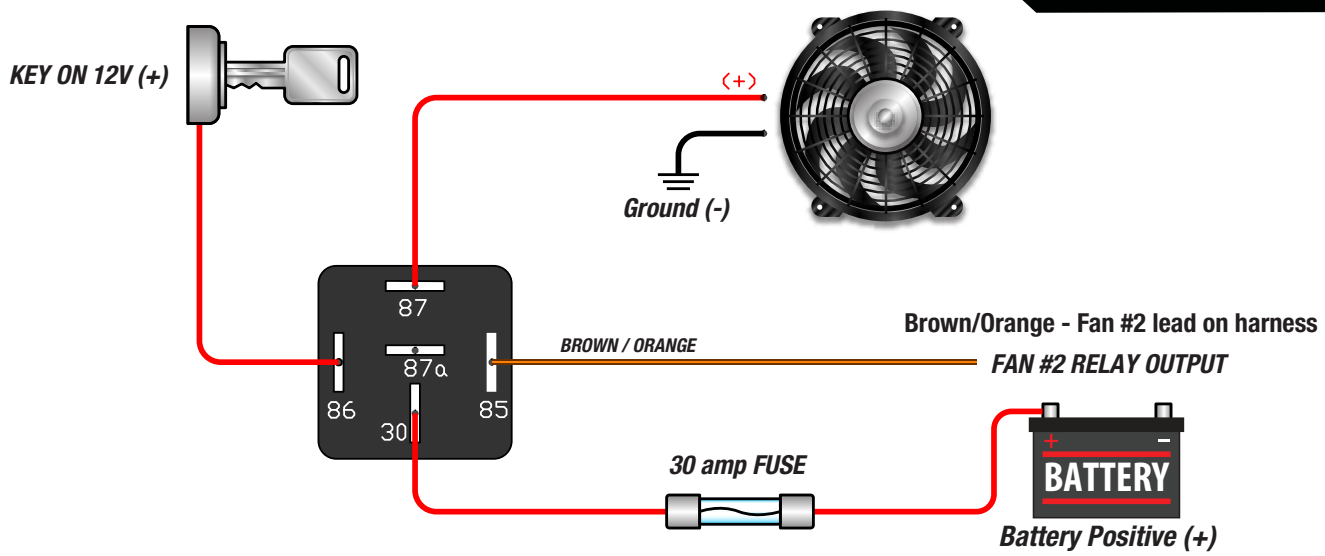


FAN & TACHOMETER DIAGRAMS

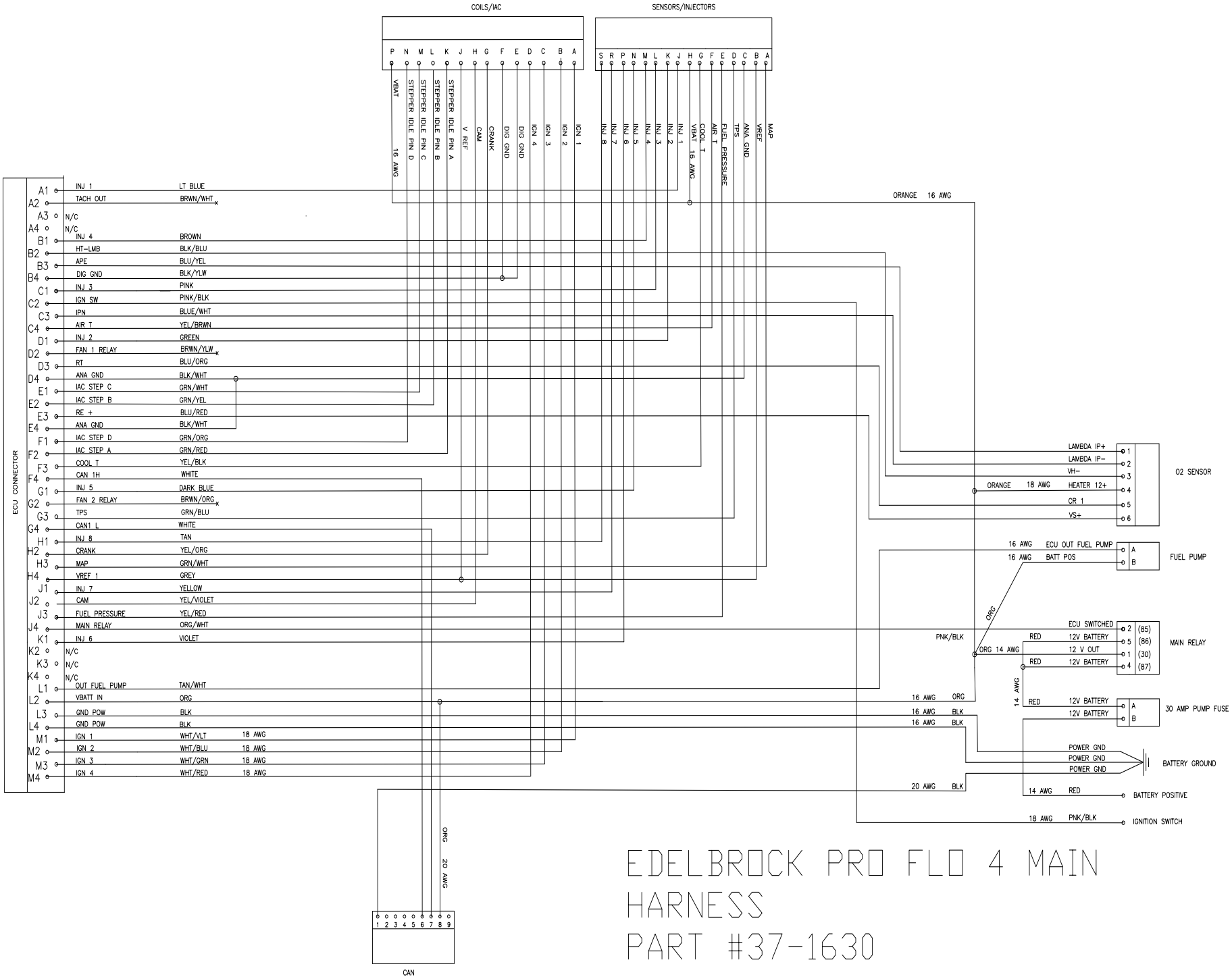
FAN #1 DIAGRAM



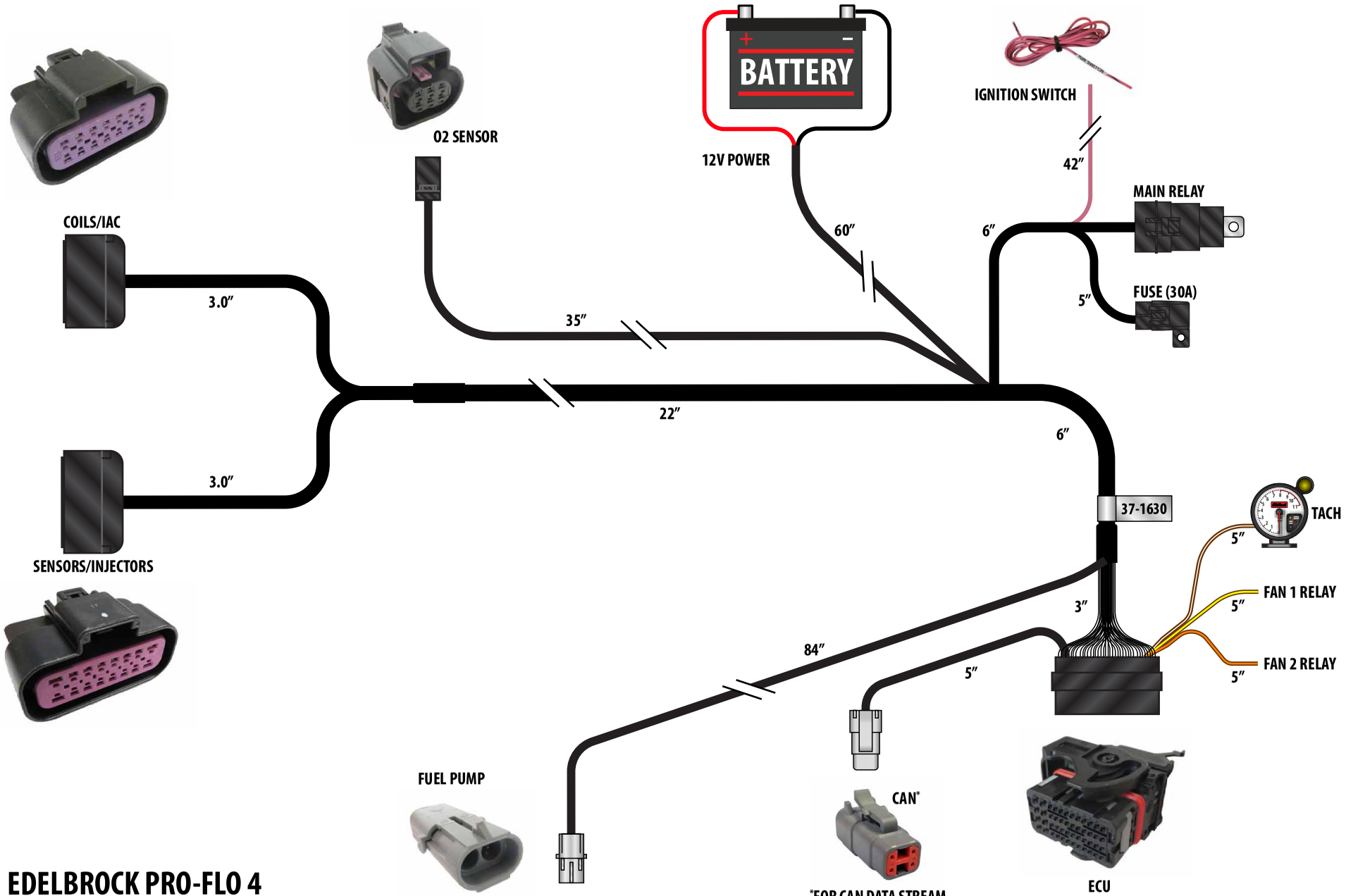
FAN #2 DIAGRAM



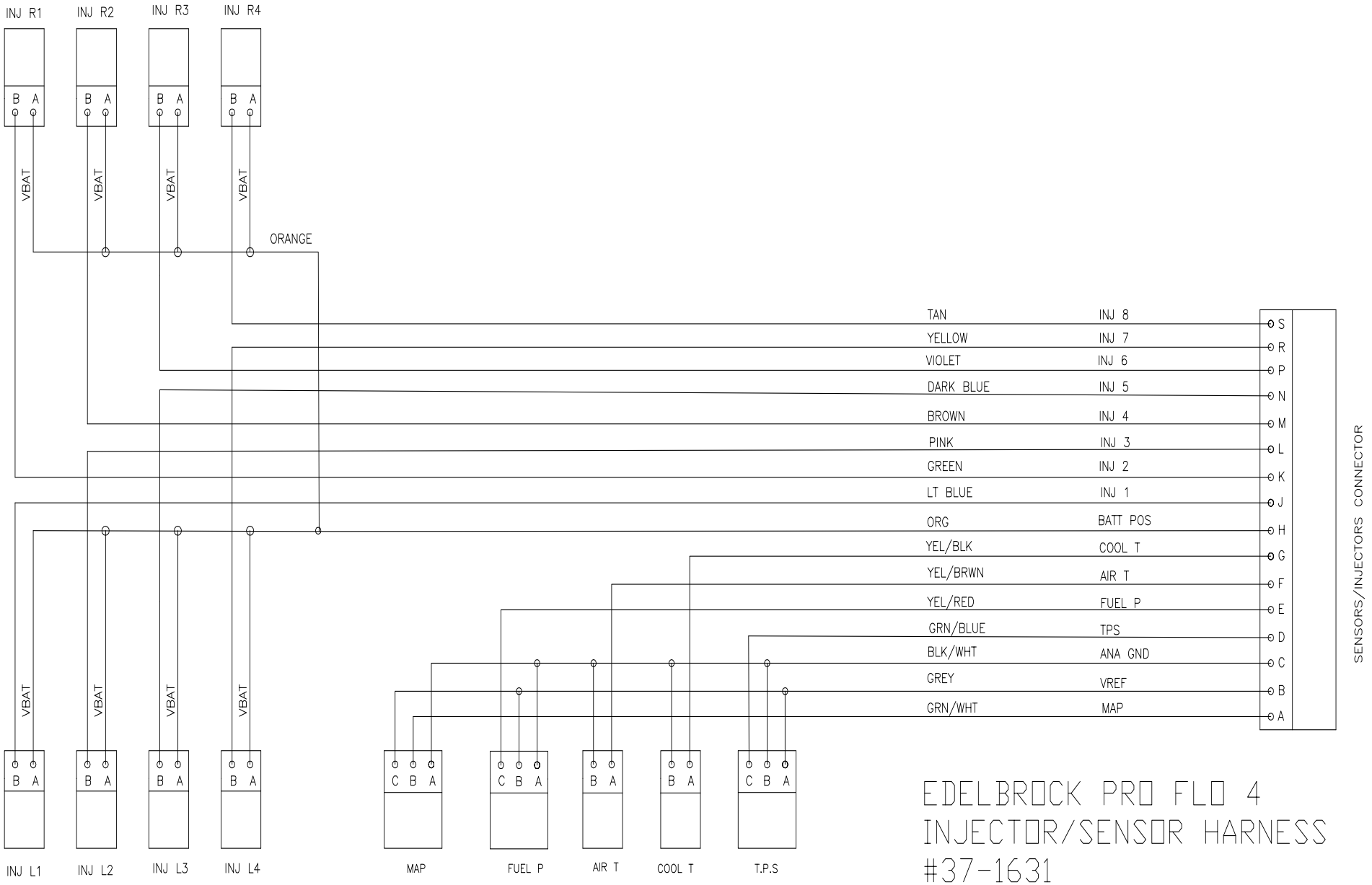
TACHOMETER



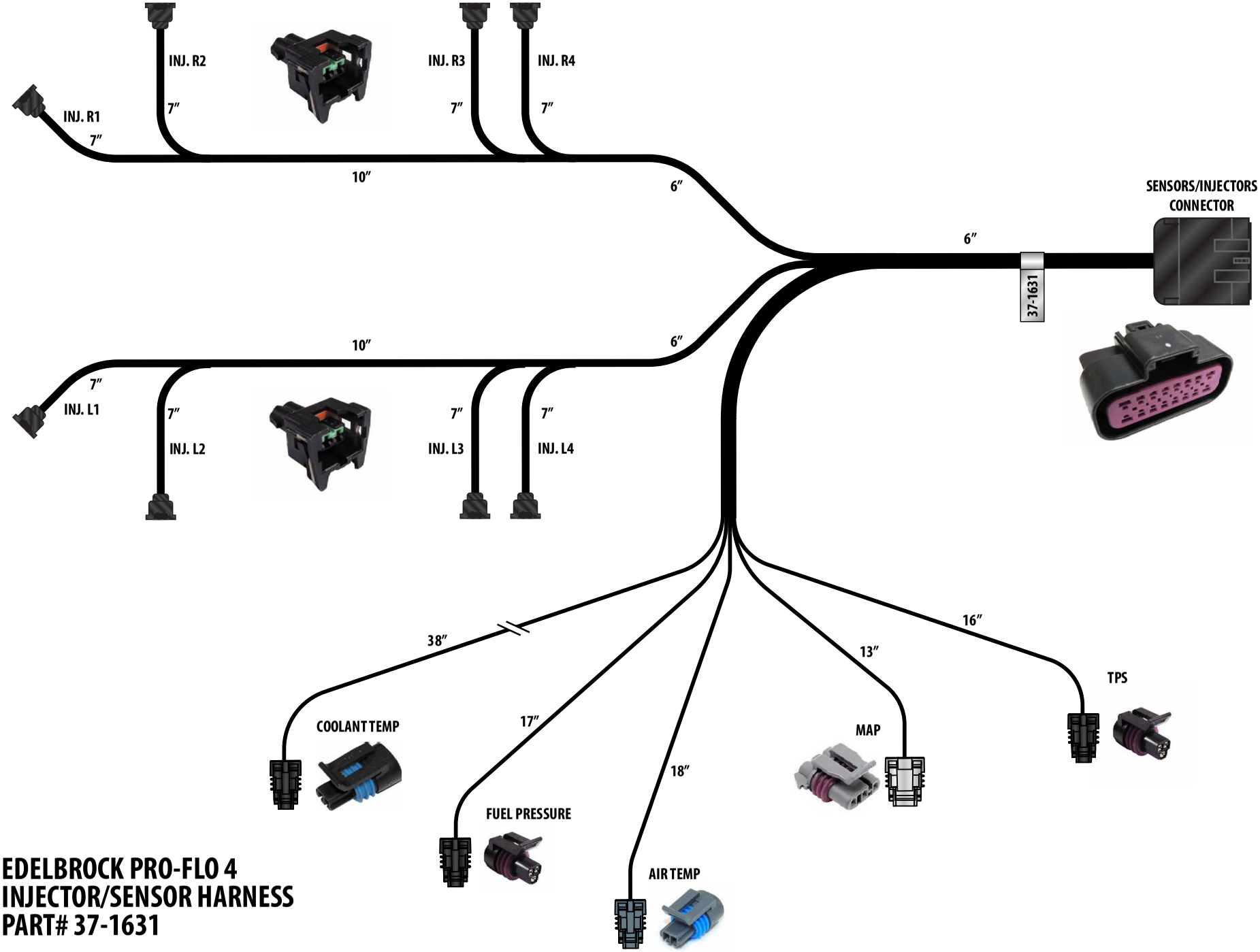
EDELBROCK PRO FLO 4 MAIN HARNESS PART #37-1630



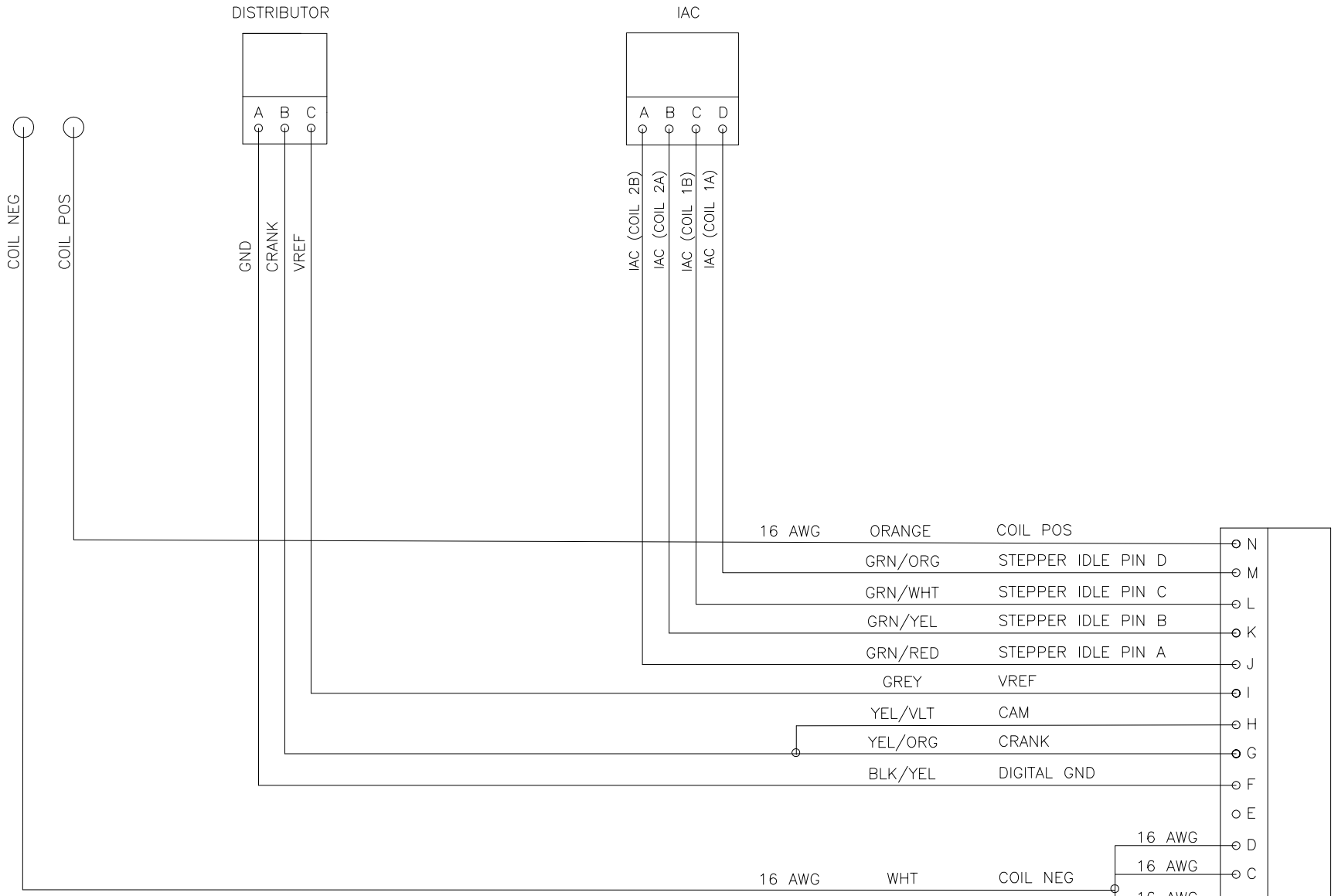
EDELBROCK PRO-FLO 4
MAIN HARNESS
PART# 37-1630



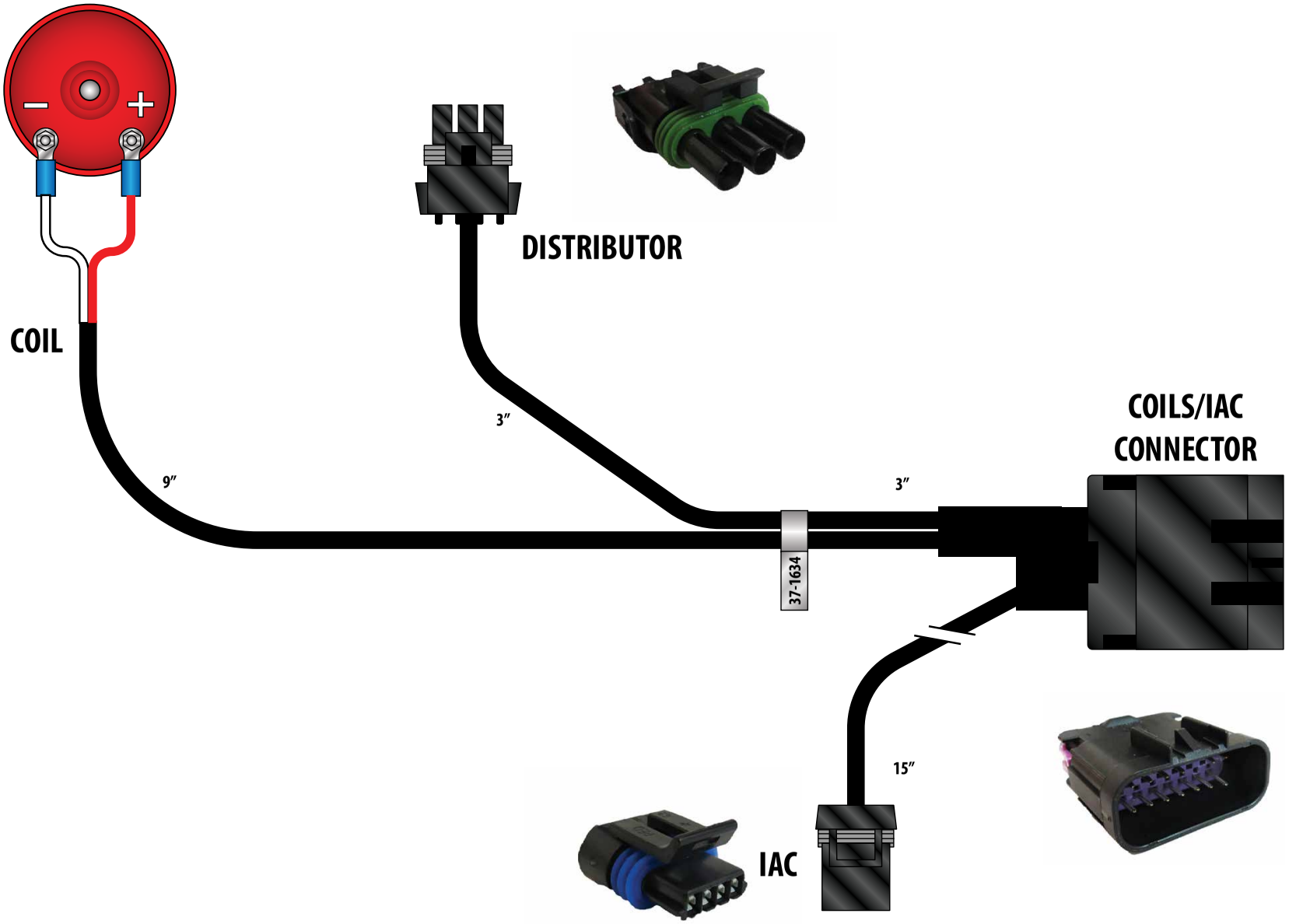
EDELBROCK PRO FLO 4
INJECTOR/SENSOR HARNESS
#37-1631



EDELBROCK PRO-FLO 4
INJECTOR/SENSOR HARNESS
PART# 37-1631

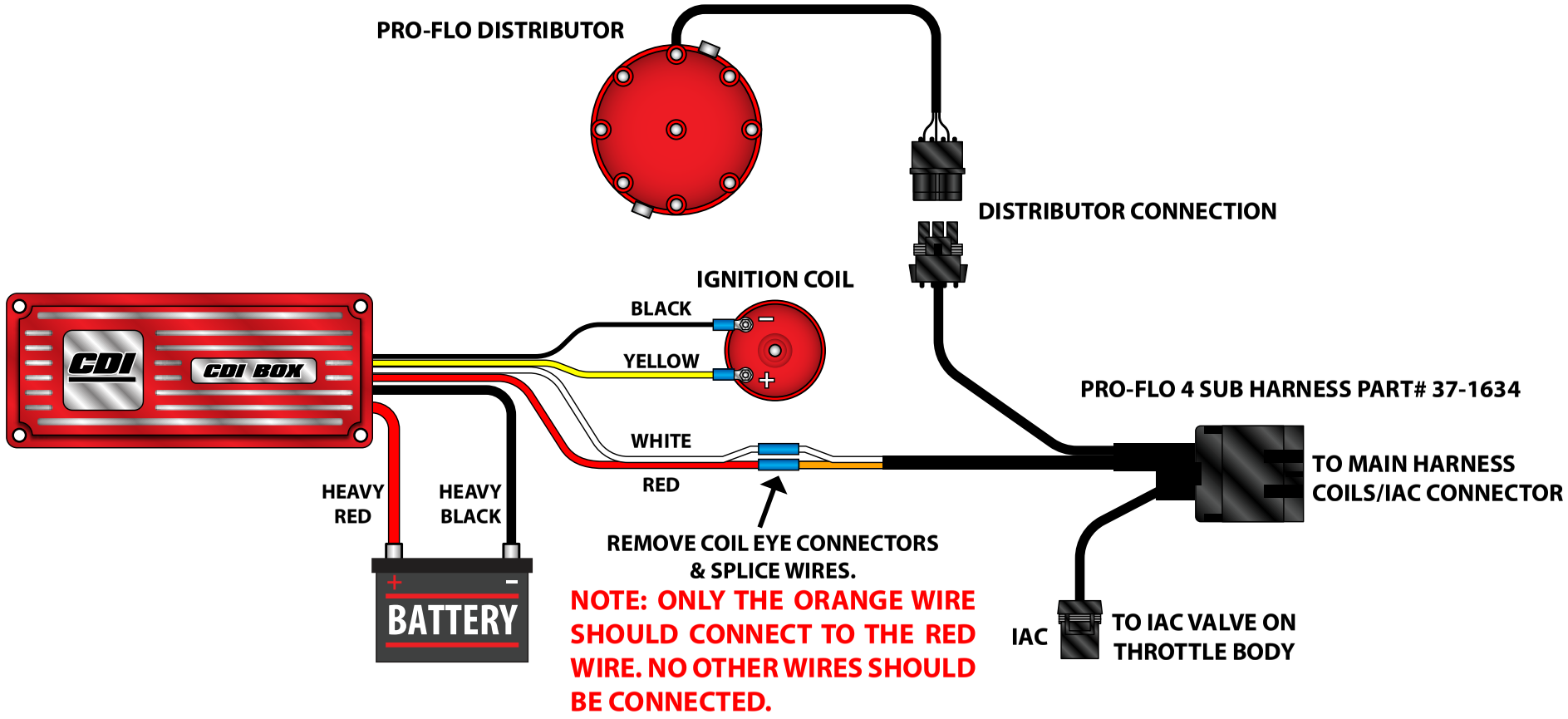


EDELBROCK PRO FLO 4
IAC/IGNITION HARNESS
#37-1634



EDELBROCK PRO-FLO 4
IAC/IGNITION HARNESS
PART# 37-1634

TYPICAL PRO-FLO 4 EFI WITH CDI BOX EXAMPLE



SCHEMATIC FOR REFERENCE ONLY
REFER TO CDI MANUFACTURER INSTRUCTIONS FOR MORE DETAIL

PRO-FLO 4 SETUP WIZARD MAP MATRIX - NATURALLY ASPIRATED

CAL. I.D	FUEL PRESSURE	CUBIC INCHES RANGE	CATEGORY	CAMSHAFT DURATION @ 0.050 LIFT	GAUGE PRESSURE. IDLE VACUUM	INJECTOR SIZE	HP Level
5000	43 PSI	280-330	STOCK	210 OR LESS	20.0 - 16.0	29	400
5002	43 PSI	280-330	MILD	210 TO 230 DEG.	16.0 - 12.0	29	400
5003	43 PSI	280-330	RACE	230 OR GREATER	12.0 - 5.0	29	400
5004	58 PSI	280-330	RACE	230 OR GREATER	12.0 - 5.0	29	450
5006	43 PSI	331-380	STOCK	210 OR LESS	20.0 - 16.0	29	400
5008	43 PSI	331-380	MILD	210 TO 230 DEG.	16.0 - 12.0	29	400
5009	58 PSI	331-380	MILD	210 TO 230 DEG.	16.0 - 12.0	29	450
5010	58 PSI	331-380	RACE	230 OR GREATER	12.0 - 5.0	29	450
5011	43 PSI	331-380	STOCK	210 OR LESS	20.0 - 16.0	35	450
5013	43 PSI	331-380	MILD	210 TO 230 DEG.	16.0 - 12.0	35	450
5014	58 PSI	331-380	MILD	210 TO 230 DEG.	16.0 - 12.0	35	550
5015	43 PSI	331-380	RACE	230 OR GREATER	12.0 - 5.0	35	450
5016	58 PSI	331-380	RACE	230 OR GREATER	12.0 - 5.0	35	550
5017	43 PSI	381-405	STOCK	210 OR LESS	20.0 - 16.0	29	400
5019	58 PSI	381-405	MILD	210 TO 230 DEG.	16.0 - 12.0	29	450
5020	58 PSI	381-405	RACE	230 OR GREATER	12.0 - 5.0	29	450
5021	43 PSI	381-405	STOCK	210 OR LESS	20.0 - 16.0	35	450
5023	43 PSI	381-405	MILD	210 TO 230 DEG.	16.0 - 12.0	35	450
5024	58 PSI	381-405	MILD	210 TO 230 DEG.	16.0 - 12.0	35	550
5025	58 PSI	381-405	RACE	230 OR GREATER	12.0 - 5.0	35	550
5026	43 PSI	406-439	STOCK	210 OR LESS	20.0 - 16.0	35	450
5028	43 PSI	406-439	MILD	210 TO 230 DEG.	16.0 - 12.0	35	450
5029	58 PSI	406-439	MILD	210 TO 230 DEG.	16.0 - 12.0	35	550
5030	58 PSI	406-439	RACE	230 OR GREATER	12.0 - 5.0	35	550
5031	58 PSI	406-439	RACE	230 OR GREATER	12.0 - 5.0	42	625
5032	43 PSI	440-480	STOCK	210 OR LESS	20.0 - 16.0	35	450
5033	43 PSI	440-480	MILD	210 TO 230 DEG.	16.0 - 12.0	35	550
5034	58 PSI	440-480	RACE	230 OR GREATER	12.0 - 5.0	35	550
5035	58 PSI	440-480	RACE	230 OR GREATER	12.0 - 5.0	42	625
5036	58 PSI	481-510	STOCK	210 OR LESS	20.0 - 16.0	35	550
5037	58 PSI	481-510	MILD	210 TO 230 DEG.	16.0 - 12.0	35	550
5038	43 PSI	481-510	RACE	230 OR GREATER	12.0 - 5.0	60	800
5039	43 PSI	511-565	RACE	230 OR GREATER	12.0 - 5.0	60	800

PRO-FLO 4 SETUP WIZARD MAP MATRIX - FORCED INDUCTION

CAL. I.D	FUEL PRESSURE	CUBIC INCHES RANGE	CATEGORY	CAMSHAFT DURATION @ 0.050 LIFT	GAUGE PRESSURE. IDLE VACUUM	INJECTOR SIZE	HP Level
5100	43 PSI	280-330	MILD	210 TO 230 DEG.	16.0 - 12.0	60	625
5101	43 PSI	280-330	RACE	230 OR GREATER	12.0 - 5.0	60	625
5102	58 PSI	280-330	RACE	230 OR GREATER	12.0 - 5.0	60	750
5103	43 PSI	331-380	MILD	210 TO 230 DEG.	16.0 - 12.0	60	625
5104	58 PSI	331-380	MILD	210 TO 230 DEG.	16.0 - 12.0	60	750
5105	43 PSI	331-380	RACE	230 OR GREATER	12.0 - 5.0	60	625
5106	58 PSI	331-380	RACE	230 OR GREATER	12.0 - 5.0	60	750
5107	43 PSI	331-380	RACE	230 OR GREATER	12.0 - 5.0	80	850
5108	43 PSI	381-405	MILD	210 TO 230 DEG.	16.0 - 12.0	60	625
5109	58 PSI	381-405	MILD	210 TO 230 DEG.	16.0 - 12.0	60	750
5110	43 PSI	381-405	RACE	230 OR GREATER	12.0 - 5.0	60	625
5111	58 PSI	381-405	RACE	230 OR GREATER	12.0 - 5.0	60	750
5112	43 PSI	381-405	RACE	230 OR GREATER	12.0 - 5.0	80	850
5113	58 PSI	406-439	MILD	210 TO 230 DEG.	16.0 - 12.0	60	750
5114	43 PSI	406-439	MILD	210 TO 230 DEG.	16.0 - 12.0	80	850
5115	43 PSI	406-439	RACE	230 OR GREATER	12.0 - 5.0	80	850
5116	58 PSI	406-439	RACE	230 OR GREATER	12.0 - 5.0	80	975
5117	58 PSI	440-480	MILD	210 TO 230 DEG.	16.0 - 12.0	60	750
5118	43 PSI	440-480	MILD	210 TO 230 DEG.	16.0 - 12.0	80	850
5119	43 PSI	440-480	RACE	230 OR GREATER	12.0 - 5.0	80	850
5120	58 PSI	440-480	RACE	230 OR GREATER	12.0 - 5.0	80	975
5121	43 PSI	481-510	MILD	210 TO 230 DEG.	16.0 - 12.0	80	850
5122	58 PSI	481-510	RACE	230 OR GREATER	12.0 - 5.0	80	975
5123	*65 PSI*	481-510	RACE	230 OR GREATER	12.0 - 5.0	80	1050
5124	*65 PSI*	511-565	RACE	230 OR GREATER	12.0 - 5.0	80	1050

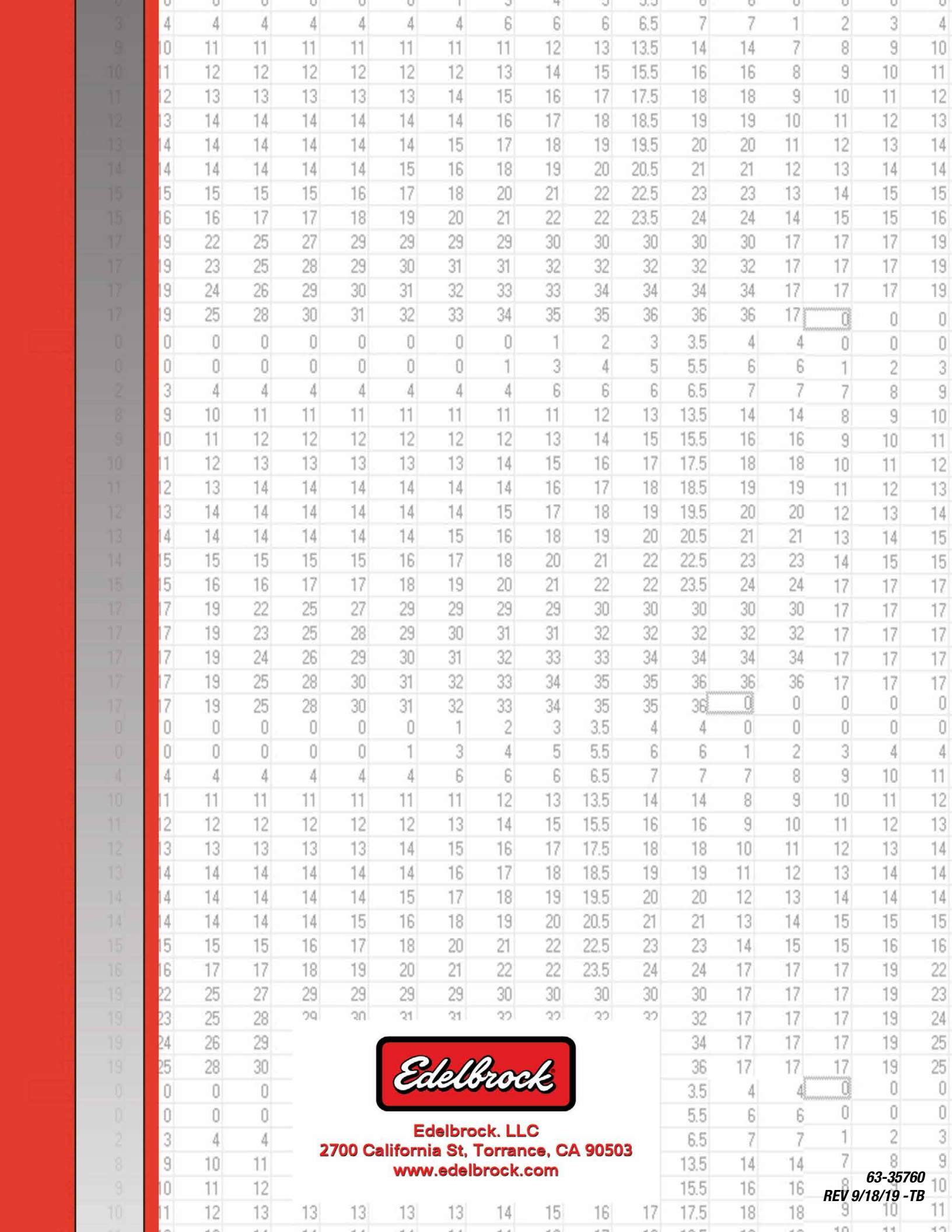
NOTES

WARRANTY

Edelbrock warrants the Edelbrock Pro-Flo 4 EFI system to be free from defects in both workmanship and materials for a period of two years from date of purchase, provided that the product is properly installed and subjected to normal use and service, is not used for racing or competition purposes and that the product is not modified or altered in any way unless specified by our instructions. Our warranty service and repair facility is located at 2700 California Street, Torrance, CA 90503. Customers requiring warranty assistance should contact the dealer from whom they purchased the product. In turn, the dealer will contact Edelbrock, and we will determine the method of satisfying the warranty. Should Edelbrock determine that the product needs to be returned to the factory, it should be accompanied by proof of purchase and a clear description of the exact problem. The product must be returned freight pre-paid. If a thorough inspection of the product by the factory indicates defects in workmanship or material, our sole obligation shall be to repair or replace the product. This warranty covers only the product itself and not the cost of installation or removal.

EDELBROCK LLC SHALL NOT BE LIABLE FOR ANY AND ALL CONSEQUENTIAL DAMAGES OCCASIONED BY THE BREACH OF ANY WRITTEN OR IMPLIED WARRANTY PERTAINING TO THIS SALE, IN EXCESS OF THE PURCHASE PRICE OF THE PRODUCT SOLD.

If you have any questions regarding this product or installation, please contact our Technical Department from 7am-5pm, Pacific Standard Time, Monday through Friday at: 800-416-8628.



Edelbrock. LLC
2700 California St, Torrance, CA 90503
www.edelbrock.com

63-35760
REV 9/18/19 -TB

PRO-FLO® 4 ELECTRONIC FUEL INJECTION

Edelbrock®

Quick Start Guide & E-Tuner User's Manual

TABLE OF CONTENTS

Quick Start Guide 1
Setup Wizard: Naturally Aspirated 1-6
Setup Wizard: Forced Induction 6-10
General Android Device Recommendations..... 11
E-Tuner Home Menu Overview 12
Bluetooth Pairing 13-14
Advanced Tuning Menus 14-23
ECU & MAP Settings.....23-24
E-Tuner Gauge Displays..... 25
Edelbrock E-Tuner Display Definitions.....26-27
Pro-Flo 4 Naturally Aspirated Tuning Guide 28
Pro-Flo 4 Forced Induction Tuning Guide 29-31

Please visit the Edelbrock Support Forum for the latest Pro-Flo 4 news and important updates:
https://forums.edelbrock.com/

QUICK START GUIDE

If your Pro-Flo 4 kit included a tablet, follow these steps to use the Setup Wizard. If using a user supplied Android device, it must first be paired with the ECU before using the Setup Wizard – see Page 15. **Tablets that are included in Pro-Flo 4 kits are already paired from the factory.**

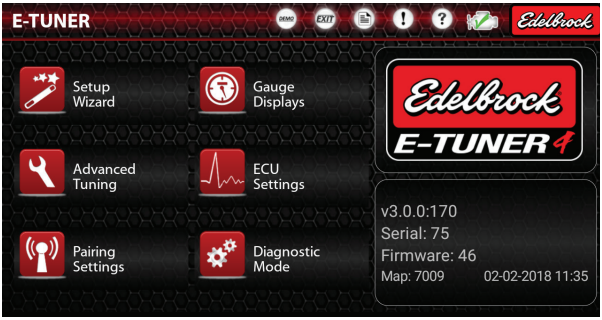
TOOLS NEEDED

- Flat tip screwdriver
- Timing light (for engines with distributors only – not required for LS engines)

1. Power on the tablet by pressing and holding down the power button until the screen turns on.

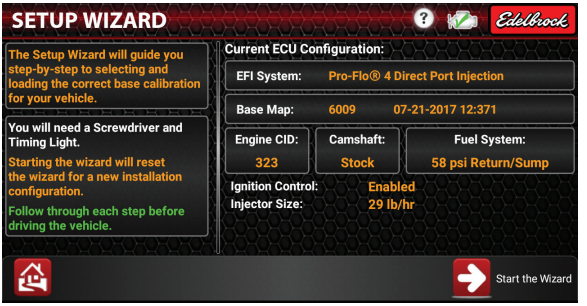
2. If the tablet isn't adequately charged, or isn't turning on, connect a USB charger to the Micro USB slot.

3. Find the E-Tuner App. icon on the home screen and tap it to launch the E-Tuner App.



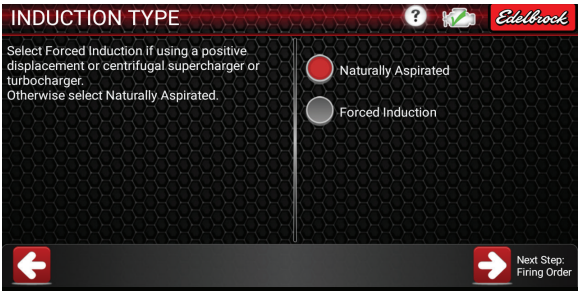
4. With the ignition switch turned ON, tap the engine icon with RED X to connect the ECU. The title bar across the top of the screen will flash yellow indicating that the device is attempting to communicate with the ECU. Once E-Tuner connects to the ECU, the engine icon will show a GREEN check.

5. Tap the Setup Wizard icon. Once the Wizard opens, tap the Start the Wizard right arrow.

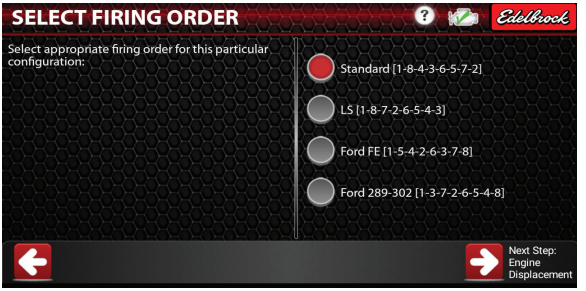


SETUP WIZARD FOR NATURALLY ASPIRATED

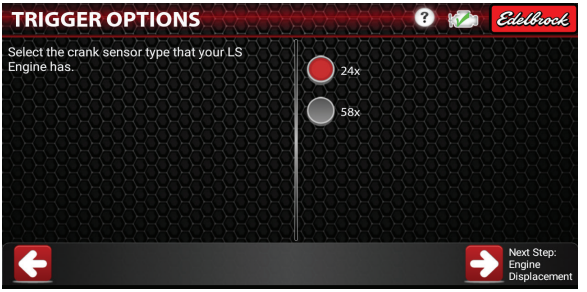
6. Select the engine's induction type. If Naturally Aspirated, continue with the steps below. If Forced Induction, go to Page 8. Tap Right Arrow to continue.



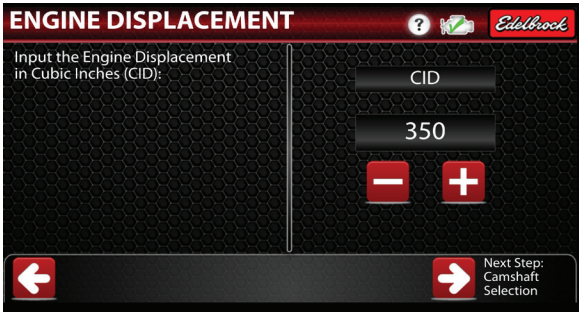
7. Select the engine firing order for your application. Tap Right Arrow to continue.



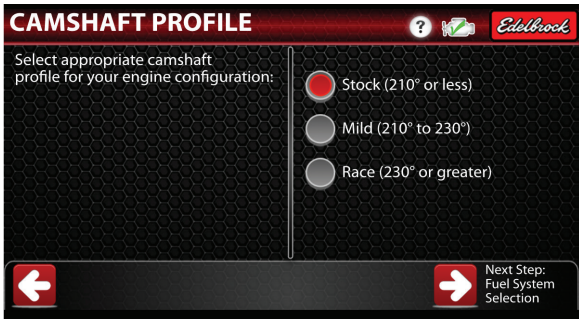
7b. If engine is Chevy LS, choose trigger type: 24x or 58x. Tap Right Arrow to continue.



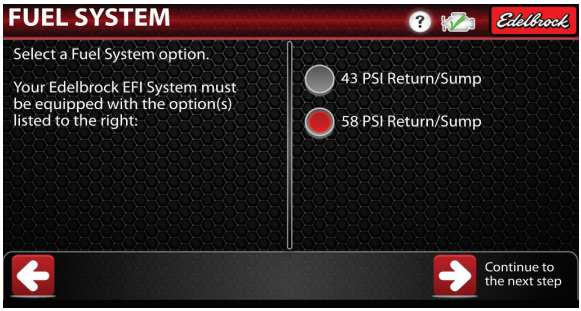
8. Use the “+” and “-” buttons to enter the displacement of your engine. Tap the Right Arrow to continue.



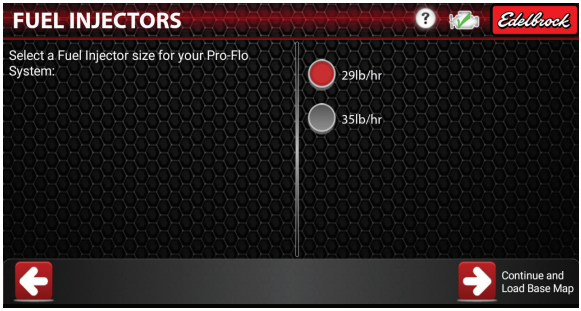
9. Select the proper camshaft profile. Please refer to the cam card included with your camshaft, if applicable. Tap the Right Arrow to continue.



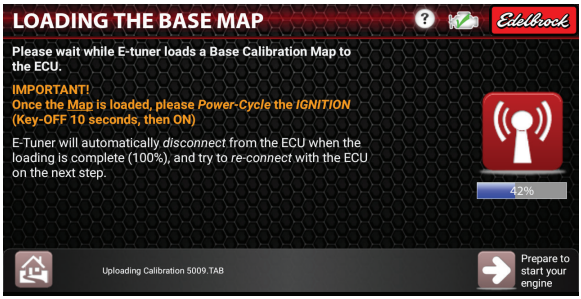
10. Select the fuel pressure being used. Refer to Setup Wizard Map Matrix in the back of the kit installation instructions for proper fuel pressure setting for your configuration. Tap the Right Arrow to continue.



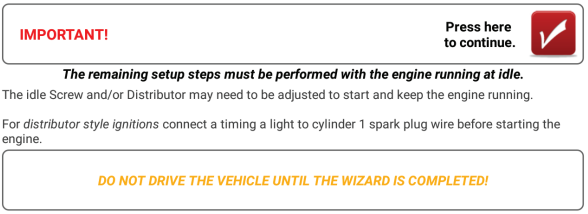
11. Select the injector size included on your kit. Displayed fuel injector flow sizes vary depending on available base calibrations for your configuration. The color band on injector body indicates injector size. White=29lb/hr, Green=35lb/hr, Orange=42lb/hr & Blue=60lb/hr. Tap the Right Arrow to continue.



12. The Wizard will automatically start loading a base map. When the map is finished loading, you will be prompted to power cycle the ECU. Turn the ignition switch off, wait for the main relay to click off (approx. 10 seconds) and then turn the ignition switch back on. Tap **OK** to close the popup window then tap the Right Arrow to continue.

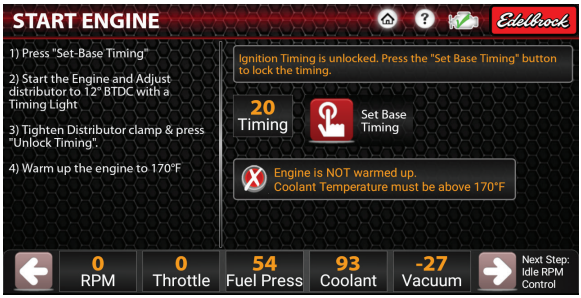


13. Read the important warning then tap the check mark to continue. ***Do NOT start the engine or drive the vehicle until prompted to do so.***

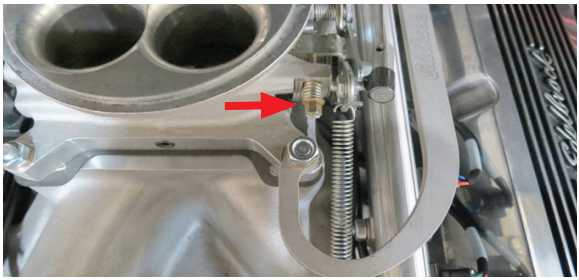


14. For LS engines, skip to step 15. Connect a timing light to cylinder #1 spark plug wire.

a. Click the **Set Base Timing** icon to lock the timing at 12° BTDC.



b. Start the engine and adjust the throttle body screw, as needed, to maintain idle. **Do NOT drive the vehicle yet.**



c. With a timing light, rotate the distributor until the ignition timing shows 12° BTDC, then tighten down the distributor clamp.

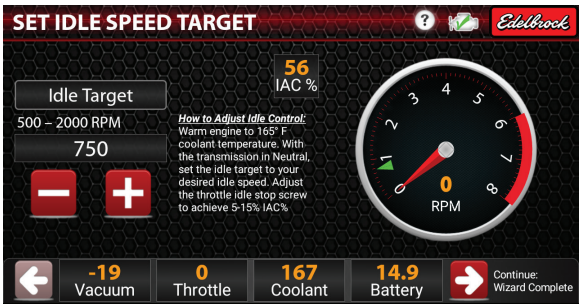
d. Tap **Unlock Timing** and continue to let the engine warm up to 165°F. Once engine is fully warmed up, tap the Right Arrow to continue.

15. Set Idle Speed Target to desired RPM.

a. If engine temp is above 165°F, use the "**+**" and "**-**" buttons to set the Idle Target to desired RPM.

b. Once Idle Target RPM has been set, adjust the throttle body idle screw until the IAC % reads 5-15%. **NOTE:** If the Throttle value goes above 1% during idle screw adjustment, the IAC control may shut off. Power cycling the ECU (ignition switch off, wait 10 seconds for main relay to click off, ignition switch back on) will reset the TPS to 0%.

c. After Idle Target RPM and IAC position have been set, tap the Right Arrow to complete the Wizard.

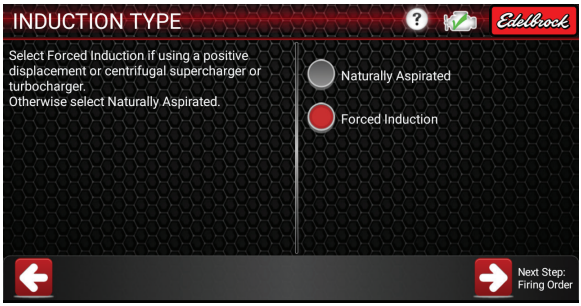


16. The Setup Wizard is now complete and the vehicle can now be driven. It's highly recommended to put the vehicle through various loads and conditions to help the system learn.

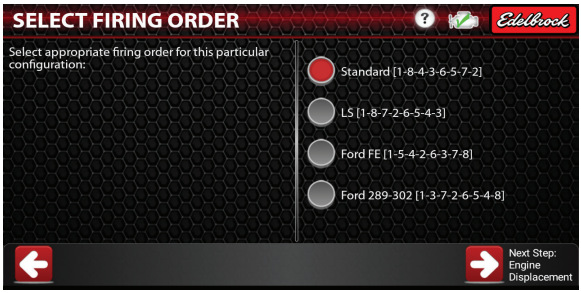
TIP: The key to driving your vehicle initially with the Pro-Flo 4 EFI System is to employ smooth slow throttle transitions and accelerations. Try to drive the vehicle in a manner that covers all conditions, such as: light load, heavy load, high RPM and low RPM. See page 30 for additional tuning recommendations.

SETUP WIZARD FOR FORCED INDUCTION

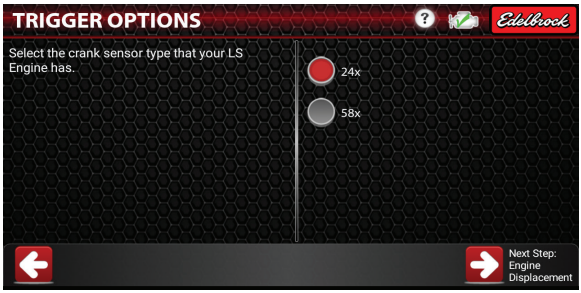
6. Set Induction Type to Forced Induction and tap the Right Arrow to continue.



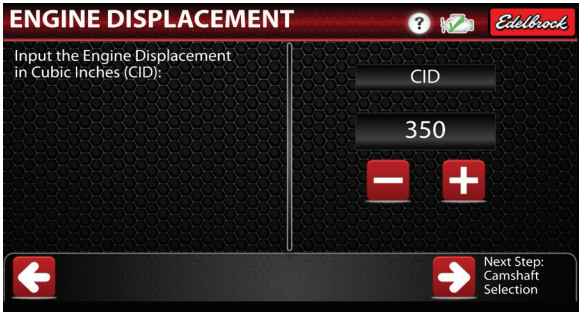
7. Select the engine firing order for your application. Tap Right Arrow to continue.



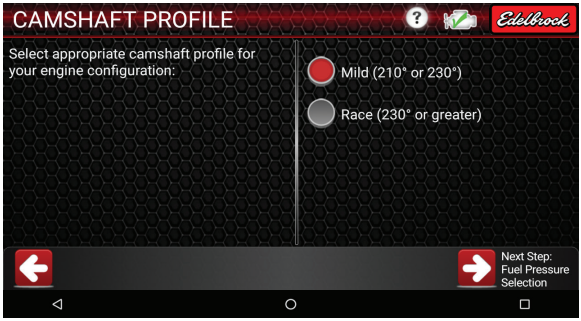
7b. If engine is Chevy LS, choose trigger type: 24x or 58x. Tap Right Arrow to continue.



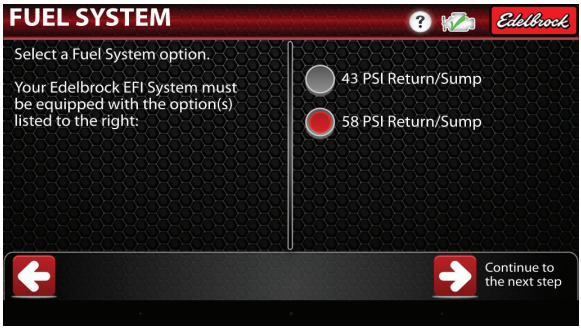
8. Use the "**+**" and "**-**" buttons to enter the displacement of your engine. Tap the Right Arrow to continue.



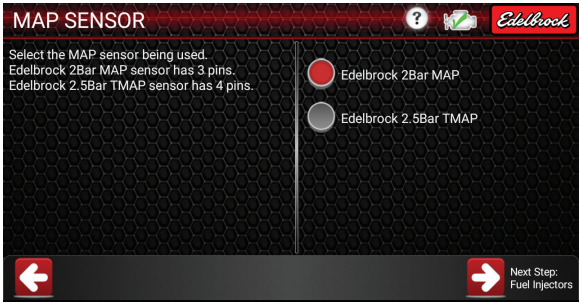
9. Select the proper camshaft profile. Note that Forced Induction base calibrations are configured for Mild or Race cams only. Tap the Right Arrow to continue.



10. Select the fuel pressure being used. Refer to Setup Wizard Map Matrix in the back of the kit installation instructions for proper fuel pressure setting for your configuration. Tap the Right Arrow to continue.

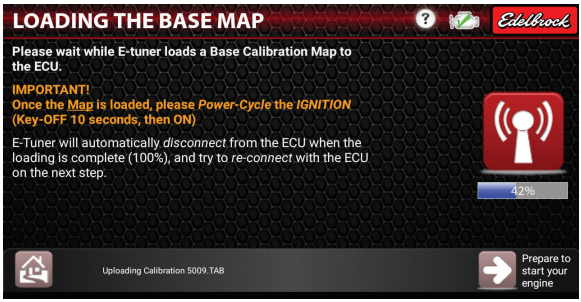


11. Select the MAP sensor being used. The Edelbrock 2-Bar MAP sensor has 3 pins and the Edelbrock 2.5-Bar TMAP sensor has 4 pins. Tap the Right Arrow to continue.

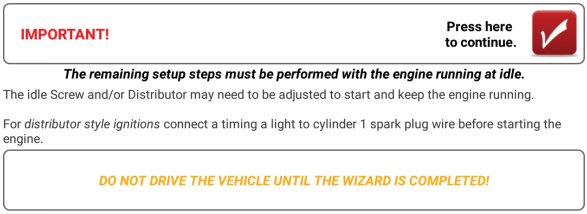


12. Select the injector size included on your kit. Displayed fuel injector flow sizes vary depending on available base calibrations for your configuration. The color band on injector body indicates injector size. Blue=60lb/hr. & Red=80lb/hr.. Tap the Right Arrow to continue.

13. The Wizard will automatically start loading a base map. When the map is finished loading, you will be prompted to power cycle the ECU. Turn the ignition switch off, wait for the main relay to click off (approx. 10 seconds) and then turn the ignition switch back on. Tap **OK** to close the popup window then tap the Right Arrow to continue.

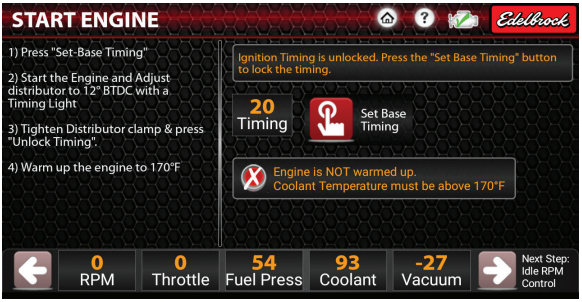


14. Read the important warning then tap the check mark to continue. ***Do NOT start the engine or drive the vehicle until prompted to do so.***

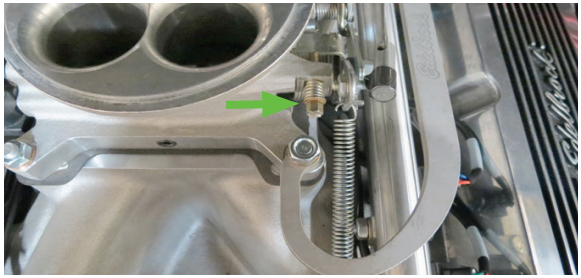


15. For LS engines, skip to step 16. Connect a timing light to cylinder #1 spark plug wire.

a. Click the **Set Base Timing** icon to lock the timing at 12° BTDC.



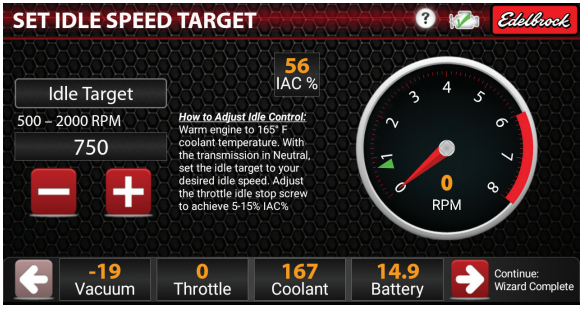
b. Start the engine and adjust the throttle body screw, as needed, to maintain idle. **Do NOT drive the vehicle yet.**



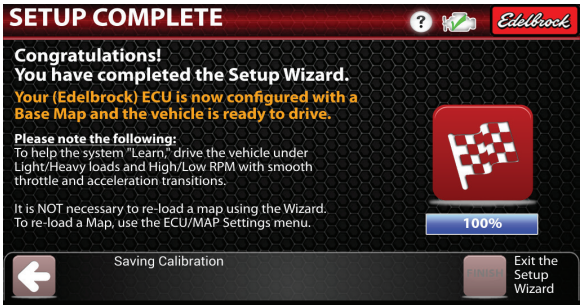
c. With a timing light, rotate the distributor until the ignition timing shows 12° BTDC, then tighten down the distributor clamp.

d. Tap **Unlock Timing** and continue to let the engine warm up to 165°F. Once engine is fully warmed up, tap the Right Arrow to continue.

16. Set Idle Speed Target to desired RPM.
    a. If engine temp is above 165°F, use the "**+**" and "**-**" buttons to set the Idle Target to desired RPM.
    b. Once Idle Target RPM has been set, adjust the throttle body idle screw until the IAC % reads 5-15%. **NOTE:** If the Throttle value goes above 1% during idle screw adjustment, the IAC control may shut off. Power cycling the ECU (ignition switch off, wait 10 seconds for main relay to click off, ignition switch back on) will reset the TPS to 0%.
    c. After Idle Target RPM and IAC position have been set, tap the Right Arrow to complete the Wizard.



17. The Setup Wizard is now complete and engine tuning can commence. Refer to the Forced Induction tuning guide on Page 31.



GENERAL ANDROID DEVICE RECOMMENDATIONS

The Edelbrock EFI E-Tuner app is compatible with most Android based Smartphones and tablets operating on Android 5.0 and later. However, due to slight variations in device specifications and operating systems, some devices may work better than others, and in rare cases, some devices may not function at all. If an Android device is being supplied separately, it is highly recommended to read the following guidelines for the best performance and user experience. Any device that is known to be "incompatible" or "problematic" will either be specified on the Google Play Store app page or will fail to download.

NOTE: All information in this guide is also available in app by pressing the icon in the upper right hang corner.

Android Device Types:

Smartphones (5" – 6") or Tablets (7" – 8")

Screen Resolution should be at minimum 1024 x 600 pixels.

NOTE: *Screens sizes in the 3" - 4" or 10" - 12" range, or screens with lower resolutions are supported but not recommended for the E-Tuner App.*

Android Operating System

Edelbrock's E-Tuner Android app is optimized for Android 5.0 and newer.

Bluetooth

It is recommended that the Android device has at least Bluetooth 2.0 or higher.

NOTE: *Not all devices with Bluetooth may communicate properly with the Edelbrock ECU.*

WI-FI / Data (3G/4G)

Wi-Fi or a Data Plan will be necessary for downloading the E-Tuner app from the Google Play store and for downloading any updates that may be released.

To Download or Update the App

Open the Google Play Store and search for "Edelbrock E-Tuner PF4". This will require a Google Account, if one is not set up, follow the on-screen tutorial to do so.

Edelbrock may periodically push out updates to the app. It is highly recommended to download these updates as they will include vital improvements as well as bug fixes.

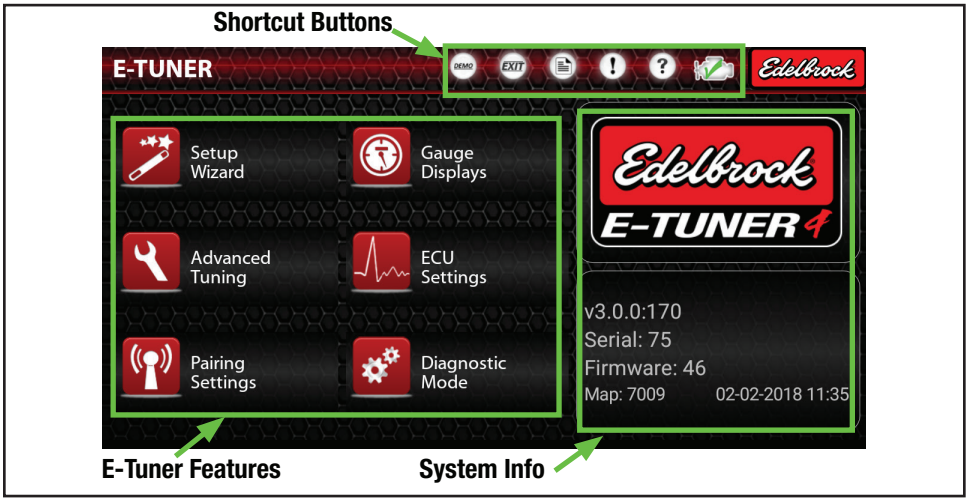
To check for updates, go to the Google Play Store or the Edelbrock website.

Starting the Edelbrock E-Tuner App:

From the Android Home Screen, find the Edelbrock E-Tuner icon and select it. The icon may be on a different part of the home screen, or select the "All Apps" icon and find it in that menu.

E-Tuner Home Menu Overview

The E Tuner APP and Tablet are for setting up, tuning and troubleshooting the Pro-Flo 4 EFI system. The Tablet does not have to be permanently used for the EFI system to operate.



All of the E-Tuner's functions can be conveniently accessed directly from the main menu.

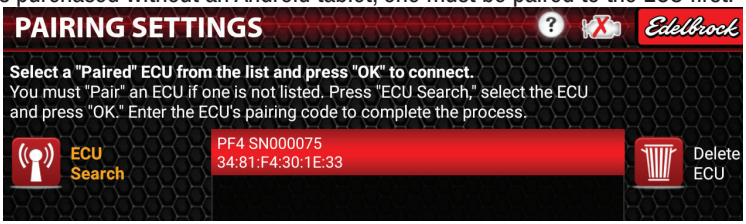
- **E-Tuner Features**
  - **Setup Wizard** - Initiates E-Tuner's step-by-step guide to selecting & loading a proper base calibration for your specific engine combination.
  - **Advanced Tuning** - Provided to make modifications beyond the basic settings that were configured during the initial setup of the Pro-Flo 4.
  - **Pairing Settings** - Use this menu to pair an Android device with the Pro-Flo 4 ECU.
  - **Gauge Displays** - Displays essential parameters to monitor proper Pro-Flo 4 performance.
  - **ECU Settings** - Contains all the functions related to saving and restoring the ECU's map and firmware settings.
  - **Diagnostic Mode** - Diagnostic Mode can be used to help determine if a sensor is unplugged, damaged or otherwise reading outside of its expected range. If the vehicle runs poorly, check the status of each of the parameters on this page.
  - **Demo Mode** - Use to preview the main E-Tuner app features without being connected to the ECU.
- **System Info** - This screen will display the system info when connected to an ECU (Serial #, ECU Firmware, Map, EFI System, and App Version).
- **Main Menu Shortcut Buttons** - Exit, Installation Documents, Warnings, Help, and Connection Status.

The HELP icon provides detailed information regarding the selected menu page currently in use.

NOTE: *Edelbrock pairs each ECU and Tablet before shipping them. If you purchased a Pro Flo 4 kit that came with a tablet, it will already be paired and you can skip the steps below and go to Connecting to ECU After Pairing. If you did not purchase a Pro Flo 4 kit with tablet, proceed to the next step.*

Pairing Settings:

The ECU must be paired to an Android device and powered ON before attempting to connect. All ECU connections can be managed from the E-Tuner's Pairing Settings menu. If the Pro-Flo 4 EFI system was purchased without an Android tablet, one must be paired to the ECU first.



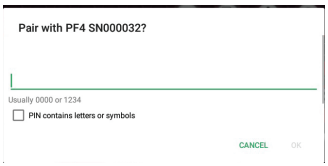
Bluetooth Pairing:

When using an Android device that was not supplied with the Pro-Flo 4 EFI kit, follow the pairing instructions below. E-Tuner will search for a Pro-Flo 4 ECU that is within a "discoverable" range. This discovery range should be as close as possible, within 10-15 feet of the ECU for best results. However, this can vary between different smartphones, tablets, and vehicles. The chances of successfully pairing will decrease if the Android device is too far away from the ECU or if the signal is too weak.

To Pair with an ECU:

- Turn the ignition to the ON position to power on the ECU.
- Press ECU Search and wait for your ECU to be listed. Pro-Flo 4 ECU's are identified by their six digit serial number: PF4 SNXXXXXX. The Bluetooth pairing code is the ECU's complete six digit serial number which is displayed in the ECU search results.
- Select your ECU and press OK to start connecting.

- When prompted for a pairing code, input the ECU's full six digit serial number. Example: If the ECU's serial number is SN001234, the pairing code is 001234. After inputting the code, press Done then OK. There is a 10 second time limit to complete this process.



- The top of the screen will flash yellow and the hourglass icon will spin while the app tries to connect.

- If the pairing and connection are successful, the app will show a green check mark icon. Once connected, the Setup Wizard (see Quick Reference Guide) can be used to configure the ECU, watch the Gauge Displays to monitor the system, or change settings in the Advanced Tuning Section

Connecting to the ECU, After Pairing:

It should not be necessary to repeat the pairing procedure once the pairing code has been entered and the Android device and the ECU are connected. **NOTE:** *If the ECU is deleted or unpaired, it will be necessary to revisit the Pairing Procedure menu before any further communications can be made.*

The **Connection Button** is to start or stop a connection with the ECU when the system is powered on. This is shown in the upper right-hand corner of the menu, next to the Edelbrock Logo.

Connection Button

To Start Connecting to an ECU: Key ignition power on and press the connection button while a RED X icon is shown. This icon will turn into a rotating hourglass and a yellow bar will flash at the top of the screen until E-Tuner is connected. This icon will turn into a GREEN check mark when E-Tuner is connected with the ECU.

To Stop a Bluetooth Connection: Press the GREEN check mark icon. The icon will return to a RED X. This may take a few seconds to disconnect.

Bluetooth connection will also be stopped each time the app is closed. If the flashing yellow bar is active on the menu, the Connection Button can be pressed to open a popup with quick access to the **Pairing Settings Menu.**

Notes on how the E-Tuner connects to the ECU:

- During a key OFF event, the ECU requires 10 seconds to fully shut down. The GREEN check may continue to display for a few seconds before becoming a RED X.
- If the ECU was connected with the E-Tuner app and a different app is toggled to, E-Tuner will try to reconnect the next time the app is resumed.
- If the app is having a hard time connecting, the best recommendation is to turn the ignition off and wait until the RED X appears and then turn the ignition back on.
- If the ECU is turned off while the app is connected, the Bluetooth connection must be reestablished by pressing the RED X.

ADVANCED TUNING MENUS

Air Fuel Ratios

Pro-Flo 4 has user settable Air Fuel Ratio (AFR) targets for four different engine load zones:

Idle, Cruise, Acceleration, and Boost.

IDLE load zone is active when TPS is less than 2% and engine speed is less than 1400 rpm.

CRUISE load zone is active when TPS is 2% or more but less than 50% and engine speed is greater than 1400 rpm.

ACCELERATION load zone is active when either TPS is more than 50% or MAP is more than -7.5 InHg.

BOOST load zone is active when MAP is more than +0.8 PSI.

The default values provided in the base calibration are good starting points that should perform well for most applications. **A lower AFR target is richer and a higher AFR target is leaner.**

Default AFR Targets
Idle 13.4
Cruise 13.9
Acceleration 12.8
Boost 11.6

AFR Target Tuning Guidelines

Idle AFR Target

Suggested Range: 13.0 - 14.7

Some larger displacement engines with larger camshaft profiles may require a richer idle (lower the AFR target). Observe idle quality when making adjustments. Idle set-point can also have some effects on light throttle cruise and tip-in performance. Typically try to run as lean an AFR target as practical to maintain best engine response, driveability and fuel economy.

Cruise AFR Target

Suggested Range: 13.0 - 14.0

Adjust Cruise AFR set point for smoothest steady state cruise performance. The target can be leaned out slightly (higher AFR) for increased fuel economy. If this set-point is too lean, it can cause a stumble under acceleration as well as hunting and an increase in coolant temperature while cruising.

Acceleration AFR Target

Suggested Range: 12.0 - 12.9

For NA engines, Acceleration load state is same as being at WOT. For forced induction engines, Acceleration load state is higher engine load without being in boost. For Acceleration AFR targets, it is recommended to start more conservative with a richer (lower) AFR target.

Boost AFR Target

Suggested Range: 11.0 - 11.9

For forced induction engines only. When in boost, a richer AFR target is required to help cool and control combustion to prevent detonation. This is especially true when running pump gas.

Fuel Modifiers

Manually add or subtract fuel to the main fuel map to help reduce AFR corrections. Fuel Modifier adjustments can be made globally or individually to each of the four engine load zones: Idle, Cruise, Acceleration and Boost.

For Fuel Modifier changes to be most effective, it's suggested that Self-Learning be turned off and cleared.

To Make A Global Fuel Modifier Adjustment

1. Tap the Self-Learn Enabled button to turn Self-Learn OFF (RED X). Tap the Clear Self-Learn button and select YES to clear the Self-Learn fuel map.
2. Run the engine in the Idle, Cruise and Acceleration load zones to see what the average Short Term Fuel Trim (Short FT) value is.
3. Raise (+) or lower (-) the Global modifier value to match or be close to the observed Short FT value. Doing this will change all 4 Fuel Modifiers at the same time.
4. Make small changes and monitor the engine's performance before re-adjusting the Global modifier.

The objective is to adjust the Global modifier until the Short FT values start reducing to be near zero percent. If no further changes are needed, re-enable the Self-Learn and Press OK exit the page.

When necessary, Fuel Modifier tuning beyond a global adjustment may be made to the individual engine load zones.

To Make An Individual Fuel Modifier Adjustment

1. Tap the Self-Learn Enabled button to turn Self-Learn OFF (RED X). Tap the Clear Self-Learn button and select YES to clear the Self-Learn fuel map.
2. Run the engine in only one of the individual engine load zones to see what the average Short Term Fuel Trim (Short FT) value is. Monitor the status of the GREEN light that indicates which engine load zone is active.
3. Raise (+) or lower (-) the specific engine load zone modifier value to match or be close to the observed Short FT value. Doing this will only change the specific engine load zone being adjusted.
4. Make small changes and monitor the engine's performance before re-adjusting the specific engine load zone modifier.

The objective is to adjust each engine load zone modifier until the Short FT values in each engine load zone start reducing to be near zero percent. It is recommended to start fine tuning in Idle first then move to the Cruise, Acceleration and Boost zone afterwards. Adjust the corresponding modifier, observe the engine performance, and make re-adjustments as necessary until you are satisfied with how the engine is running in all load zones.

Acceleration Fuel

Acceleration Fuel is a fuel enrichment function that will inject additional fuel into the engine during rapid throttle openings. This feature operates on the same principle as a carburetor acceleration pump.

To Adjust Acceleration Fuel Modifiers

Increase (+) and decrease (-) the Pump Shot and Shot Duration to the desired values.

PUMP SHOT (%)

Adjustment range: -100 to 100%

Controls the amount of additional fuel that is injected for acceleration enrichment. If the engine stumbles, pops, or exhibits sluggishness on initial throttle opening, adjust the Pump Shot to improve the acceleration performance.

Note: Pump Shot is a GLOBAL modifier. Acceleration fuel added via this parameter will be added to ALL temperature ranges. If you would like to add extra Acceleration Fuel to a specific temperature range, press the Advanced button towards the bottom left.

SHOT DURATION

Adjustment range: -5 to +5

Specify the amount of time (duration) the Acceleration fuel event will last. If the engine accelerates initially then stumbles, or lays down, adjust the Shot Duration.

DECEL FUEL CUT (rpm)

Adjustment range: 1000 to 6000 RPM

Specify the RPM threshold for fuel cutoff on deceleration. If the engine RPM is greater than the specified fuel cutoff RPM AND the TPS reads 0% the engine will cut fuel to the injectors and enter Deceleration Fuel Cutoff (DFCO). During DFCO the observed AFR will go LEAN, fueling will be restored when the RPM drops below the threshold.

Accel Fuel Tuning Tip

It is best to not tune the Accel Fuel values until the ECU's Self-learn function has had sufficient time to properly adjust the base fuel map. Make small changes and allow plenty of time between changes to properly evaluate positive or negative results.

The ADVANCED tab opens a page for more refined Acceleration Fuel calibration.

Acceleration Fuel vs Water Temperature

This menu will allow for fine tuning of the Acceleration Fuel. Increase the amount of Acceleration Fuel by the indicated percentage while within one of seven specific coolant temperature ranges. The currently operating breakpoint will be indicated by the green LED. Once the LED is no longer visible the engine is fully warmed up.

To Adjust Acceleration Fuel vs Water Temp

Raise (+) and lower (-) the percentage of extra Acceleration Fuel added during aggressive acceleration events and throttle openings. Remember that acceleration fuel adjustments from this page are only active while the coolant is within the specified range. If the vehicle stumbles, pops, or exhibits sluggishness on initial throttle opening adjust the Acceleration Fuel at the current temperature breakpoint.

Cold Start Enrichment

For cold conditions or when the engine coolant temp is below 165°F, the amount of fuel delivered can be adjusted to help the engine start and remain running during warm up. This modifier has no effect once the engine is warmed up.

Increase (+) and decrease (-) the Cold Start percentage to adjust fueling when the engine coolant temp is cold. The objective is to get Short FT value to be as small as possible.

The ADVANCED tab opens a page of options provided for further calibrating the Cold Start Enrichment

Cold Start vs Water Temperature

This menu will allow for fine tuning of the engine's fueling while it warms up. The fuel injection amount can be increased or decreased by the indicated percentage while within one of six specific coolant temperature range in order to achieve the desired target AFR. The currently operating breakpoint will be indicated by the green LED. Once the engine coolant temperature reaches 165°F, the engine is at operating temperature and additional enrichment is no longer needed.

Adjusting Cold Start vs Water Temp

Increase (+) and decrease (-) the percentage of Cold Start Fuel Enrichment. Doing so will adjust the amount of fuel being injected to help the engine run as it warms up.

Crank Fuel

The Crank Fuel modifier will set the amount of extra fuel that is sprayed while the engine is trying to start (cranking mode). This function takes affect during both warm & cold starting conditions.

The ADVANCED tab opens a page of options provided for further calibrating the Crank Fuel vs Water Temperature

Crank Fuel vs Water Temperature

This advanced function adjusts the cranking fuel contribution at various water temperatures. A larger value increases cranking fuel, a smaller value will decrease the cranking fuel. An indicator light will illuminate during key ON indicating the Coolant Temperature range currently active. For adjustment of Crank Fuel above 165 degrees Coolant Temperature use standard Cold start page.

Self-Learn Settings

Set Self-Learn Speed

Select between FAST, MEDIUM, and SLOW learn speeds. Typically FAST learning is ideal for new installs. Once the vehicle has been driven through various load/RPM conditions AND the observed AFR correction is within +/- 5% it is advised to set the Learn Speed to MEDIUM or SLOW.

Self-Learn Minimum RPM

Sets an RPM threshold under which the ECU's Self-Learning function will be disabled.

Closed-Loop Minimum RPM

Sets an RPM threshold under which the ECU's Closed-Loop functionality will be disabled. Warning: While the Closed-Loop function is disabled the Self-Learn function is also implicitly disabled.

Base-Timing

Setting the Base Timing is important for accurate ignition control with the Pro-Flo 4 system. Proper Base Timing ensures that the commanded ignition timing advance value in the ECU is the actual ignition timing advance value applied to the engine.

NOTE: Base timing is already set for LS engines and is non-adjustable.

Base Timing Procedure

1. Connect adjustable/dial-back timing light, put inductive clamp around #1 sparkplug wire and loosen the distributor hold-down clamp.
2. Start the engine and let it idle.
3. Launch E-Tuner app and connect to ECU via Bluetooth.
4. Go Advanced Tuning>Base Timing and press Set Base Timing. This will lock the ignition timing to 12 degrees BTDC.
5. Using timing light, rotate distributor in either direction until timing mark aligns with 12 degrees BTDC. Tighten the distributor clamp and recheck timing with timing light to make sure it has not moved.
6. Press Unlock Timing. This will re-enable the standard ignition timing control function.

The Base Timing setup procedure is now completed. The ignition timing can now be adjusted electronically from the Spark Control menu to adjust your initial timing, total timing as well as vacuum advance and boost retard.

Spark Control

Pro-Flo 4 features a simplified ignition timing advance mapping function that consists of four main components:

- **IDLE SPARK**
- **ADVANCE START**
- **TOTAL SPARK**
- **TOTAL SPARK RPM**

Raise (+) and lower (-) the setting values to adjust the spark curve.

Idle Spark

Distributor default: 15°

LS default: 12°

This value represents the ignition timing advance applied at idle. Idle Spark timing can be adjusted in 0.25 degree increments.

Typical values: 17°- 25°

Advance Start

Distributor default: 1200 RPM

LS default: 1000 RPM

This value represents the RPM at which the ECU will start advancing the timing towards the Total Spark value. Advance Start can be adjusted in 50 RPM increments.

Typical values: 1000-2000 RPM

Total Spark

Distributor default: 36°

LS default: 22°

This value represents the TOTAL (maximum) ignition timing advance that the ECU will advance towards as engine speed is increased above the Advance Start value. This is the final ignition timing advance that is applied at 0" InHg or 0 PSI boost (before vacuum advance or boost retard timing adjustments are applied). Total Spark can be adjusted in 0.25 degree increments.

Typical values: 20° - 38°

Total Spark RPM

Distributor default: 3000 RPM

LS default: 4500 RPM

This value represents the RPM at which Total Spark is applied. The ECU will stop advancing the ignition timing once at this RPM. The ignition timing will be held at the Total Spark value for all engine speeds above the Total Spark RPM setting. Total Spark RPM can be adjusted in 50 RPM increments.

Typical values: 3000-5000 RPM

Vacuum Advance/Boost Retard

The Vacuum Advance and Boost Retard timing control functions round out the Pro-Flo 4's simplified ignition timing advance mapping function. These two ignition timing modifiers adjust the ignition timing relative to the engine's manifold pressure to give full 3D ignition mapping.

In **VACUUM**, the ignition timing is advanced to increase the engine's torque output in lighter loads.

In **BOOST,** the ignition timing is retarded to prevent knock when cylinder pressure is high.

Vacuum Advance

Raise (+) and lower (-) the value in 0.25° increments.

Adjustment range: 0.0° to 10.0°

Default value: 5.0°

Vacuum Advance is applied linearly from no advance at 0 InHg to full advance at -30 InHg.

If Vacuum Advance is set to 10° and manifold pressure is -15 InHg, 5° of timing advance will be applied.

Typically run as much Vacuum Advance as practical without inducing detonation.

Boost Retard

Raise (+) and lower (-) the value in 0.25° increments.

Adjustment range: 0.0° to 3.0°

Default value: 2.0°

Boost Retard specifies the amount of ignition timing to pull out per 1 psi of boost.

If Boost Retard is set to 2.0° and manifold pressure is 10 PSI, 20° of timing retard will be applied.

Typically start out very conservatively by pulling out too much timing in boost and then slowly REDUCE Boost Retard to find best power without inducing detonation.

IT IS HIGHLY RECOMMENDED THAT FORCED INDUCTION ENGINES BE TUNED ON A DYNO IN ORDER TO PROPERLY SET BOOST RETARD.

Idle Tuning

The engine must be running and fully warmed up (coolant temp >165°F) with the TPS value showing 0% before the Idle Target RPM can be changed. If TPS value is not 0%, with your foot off the throttle pedal, turn the ignition switch off and allow the ECU to completely shut down (main relay must click off) and then turn the ignition switch back on. This allows the ECU to perform its TPS autozero procedure. Repeat this process as necessary until TPS shows 0%.

Wait for the **Idle Target Status** to indicate that it is OK to Adjust the Idle Target. When the indicator is ready, adjust the Idle Target to your desired idle RPM speed. Once you have selected your desired idle speed, the IAC% should indicate anywhere from 5-15%. It may be necessary to adjust the mechanical idle screw in order to achieve these numbers. Opening throttle blades reduces IAC%, closing throttle blades increases IAC%

The Idle Target cannot be adjusted while the engine is warming-up. The ECU will automatically control and adjust this target during engine warm-up (coolant temp <165°F). During cold starts and as the engine warms up, the Idle Target RPM will be higher than normal as the ECU is trying to maintain a fast idle to help the engine warm up. Once coolant temp reaches 165°F, the Idle Target will stabilize to your desired idle speed rpm.

Notes on Idle Target Adjustment

The value displayed for the Idle Target will ALWAYS reflect the current Idle Target RPM that the ECU is trying to achieve.

For hot restarts, the IAC may open to flare the idle RPM higher than normal before gradually settling back down to your desired Idle Target RPM.

During hot restarts or if the engine stalls, please wait for the Idle Target to come to its lowest value before attempting to adjust the value again.

Once Idle Tuning is complete, it is good practice to Reset Self-Learn (located in the ECU Settings menu). If at any time the idle speed becomes unsteady or “hunts”, it may be a result from a bad correction value in the Self-Learn table. Resetting the Self-Learn should help fix those issues.

Limiters

Pro-Flo 4 offers two different limiter functions: a Rev-Limiter and a Boost Cut Limiter.

Boost Cut is for Forced Induction engines only; the Rev-Limiter applies to all engines.

Rev-Limit (RPM)

The Rev-Limit function will cut-off fuel and spark to the engine to safely limit engine speed to prevent engine damage from an over-rev condition.

The Rev-Limiter set-point is adjustable from 3000 to 8000 RPM.

You can raise (+) and lower (-) this value in 50 RPM increments.

Boost Cut (PSI)

The Boost Cut Limiter function will cut-off fuel and spark to the engine to safely limit manifold pressure to prevent engine damage from an overboost condition.

The Boost Cut Limiter set-point is adjustable from 5 to 20 psi.

You can raise (+) and lower (-) this value in 1 PSI increments.

Set to max value to disable Boost Cut.

NOTE: Boost Cut Limiter will become active when manifold pressure is greater than limiter set-point for more than 1/2 second. Once Boost Cut Limiter is active, manifold pressure must be less than limiter set-point AND TPS must be less than 25% before limiter will deactivate

Fan Controls

Raise (+) and lower (-) the desired coolant temperatures to trigger when the radiator cooling fans turn ON.

Two independent radiator cooling fan set-points are available. Cooling fans will be activated when coolant temp reaches these set-points and will shut off automatically when the coolant temp drops 10° below these set-points.

NOTE: Typical configuration is that Fan 1 will be turned on first at a lower temp and Fan 2 is set to turn on at a slightly higher temp. Example: Fan 1 on at 190°, Fan 2 on at 200°.

Refer to the Pro-Flo 4 Installation Instructions for fan wiring diagrams and instructions. A relay must be used to power radiator cooling fans! Do NOT connect the fan output wires from the ECU to the fans directly! This will damage the ECU!

On/Off

In some scenarios it may be necessary to enable/disable these functions for proper tuning and/or troubleshooting. Press each button to turn each of the functions ON or OFF.

A **GREEN** light indicates the function is enabled and a **RED** light indicates the function is disabled.

Idle Control

During normal operation, the ECU's Idle Control function will actively open and close the IAC and advance and retard the ignition timing to try and make the engine speed the same as the Idle Target RPM. By disabling Idle Control, the IAC will only follow its commanded base position based on coolant temp (more open when coolant temps are cold, closes as engine warms up) and ignition timing feedback will cease.

Self-Learn

During normal operation, the ECU's Self-Learn function will apply the Short Term Fuel Trim closed loop AFR correction values to a secondary fuel map that allows the system to correct the base fuel map over time. If Self-Learn is disabled, the system will continue to operate using the base fuel map and closed loop AFR correction only. The ECU will NOT save any closed-loop correction values to the Self-Learn fuel map.

Closed Loop

During normal operation, the ECU's Closed Loop AFR control function will add or subtract fuel from the base fuel map in order to meet the current AFR Target. Disabling Closed Loop will cause the engine to run entirely off of the base fuel map only without AFR correction. Self-Learning relies on Closed Loop feedback thus if Closed Loop is disabled, Self-Learn is disabled as well.

Fuel Sump PWM

Intended for use with the Edelbrock Fuel Sump only! This function will Pulse Width Modulate (PWM) the Edelbrock Fuel Sump to run the fuel pump at lower speeds during times of lower fuel demand to reduce fuel system temperatures. If you are having issues with fuel boiling while using the Edelbrock Fuel Sump try enabling PWM. If you are NOT using the Edelbrock Fuel Sump, make sure that this option is DISABLED (RED).

ECU & MAP SETTINGS

Reset

Reset Self-Learn

This function will clear out the Self-Learn table in the ECU. This is particularly useful if you are experiencing stuttering or surging during certain driving conditions. When the Self-Learn table is RESET the vehicle will need to be driven through various Load and RPM ranges to ensure optimal vehicle drivability.

Tap the Reset Self Learn button and then tap YES at the warning prompt.

Reset ECU Modifiers

This function will reset all the Advanced Tuning settings to their default values. It is strongly recommended to save ECU settings before restoring to defaults.

Tap the Reset ECU Modifiers button and then tap YES at the prompt.

Back Up

Save Current Map

This function will allow the user to save a copy of the base map in use by the vehicle's ECU. If you would like to change maps at any time it is recommended that you save a backup copy of the map that was previously in use. After loading a base map from the Setup Wizard it is recommended to save a backup of this map as well.

Before saving a calibration, the ignition switch must be on but the engine must be off. Tap the READ button to start saving the cal. When saving is complete, name the cal and tap SAVE.

Save ECU Settings

This function will allow the user to save the Self-Learn Table as well as the current values for all user set Modifiers on the Advanced Tuning pages. It is recommended to save a backup of the ECU Settings after the vehicle has been allowed time to learn and the correction displayed at the tablet is within +/-5%. Please note that ALL saved settings and maps will be saved to the My Maps folder and can be re-loaded to the ECU using the Restore options.

Before saving ECU Settings, the ignition switch must be on but the engine must be off. Tap the READ button to start saving the settings file. When saving is complete, name the file and tap SAVE.

Restore

Load Map

If you received a custom ECU map from Edelbrock or you would like to load a new base map without using the Setup Wizard use this option to load it into the ECU.

Before loading a map, the ignition switch must be on but the engine must be off. Tap the Load Map button, select the appropriate cal file directory (My Maps, Pro-Flo 4 or Other Calibrations), select the appropriate cal file, select the Induction Type, Firing Order and MAP Sensor and then tap LOAD.

Restore ECU Settings

Load previously saved ECU configuration settings from this menu. This will restore all the values from Advanced Tuning settings and the Self-Learn fuel map.

Before loading ECU Settings, the ignition switch must be on but the engine must be off. Tap the Restore ECU Settings button, select appropriate .LRN file and then tap LOAD.

Load ECU Firmware

In most instances a firmware change is only necessary after a significant update release. Unless instructed to do so, firmware updates are typically not required. Always follow any supplemental instruction guides.

Before loading ECU Firmware, the ignition switch must be on but the engine must be off. Tap Load ECU firmware button, select appropriate .HDR file and then tap LOAD.

NOTICE!

- The ECU requires 10-12 seconds to fully shut down during a key OFF event. During this time, the IAC valve locates its “home” position. If a rapid key OFF-ON is performed the idle speed at startup may be momentarily unstable.
- Files can not be saved or loaded when the engine is running.
- Always power cycle the ECU (key off 12 seconds, then key on) after loading a map or firmware file to apply new changes.
- When flashing firmware, always make sure the Bluetooth connection is stable and consistent before attempting to load a firmware file. It is recommended to use the E-Tuner app while being as close to the ECU.

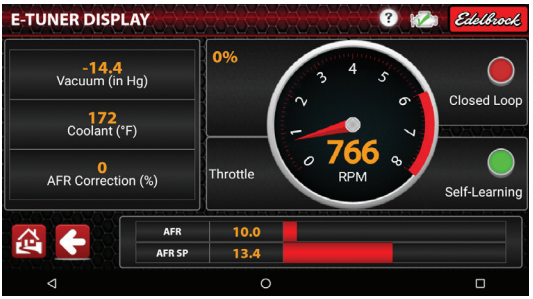
E-TUNER GAUGE DISPLAYS

The E-Tuner app features 3 different gauge displays to monitor live engine & ECU sensor data. In order to view data you must first be connected to the ECU (GREEN checkmark).

E-Tuner Display

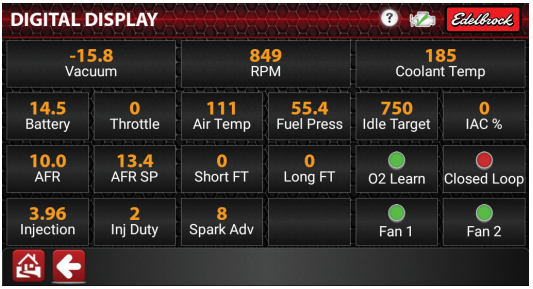
This display is most suitable for users who are new to the Pro-Flo 4 EFI system and want to familiarize themselves with how the main components and sensors work together.

This dashboard displays essential parameters to monitor proper system performance: RPM, Throttle (TPS), Manifold Pressure, Coolant, Short Term Fuel Trim (Short FT), AFR, AFR Set-Point, as well as active/inactive



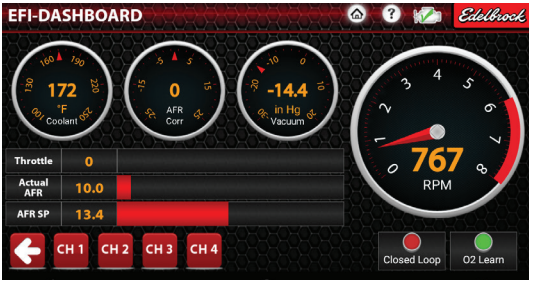
Digital Display

This page displays all parameters used by the Pro-Flo 4 system and is useful for keeping an eye on multiple system parameters or for help while troubleshooting.



EFI Dashboard Display

This display offers several different layout options rather than an all-in-one view. All information and data shown is the same as the other display pages. To switch between different layouts, press the different channel buttons.



EDELBROCK E-TUNER DISPLAY DEFINITIONS

RPM: The current engine speed will be displayed here in units of Revolutions per Minute (RPM). On circular tach gauges, the current Rev-Limit setting will be shown as a thick RED arc along the outer edge of the gauge. The Rev-Limit can be adjusted by going to Advanced Tuning>Limiters>Rev-Limiter. If the engine RPM reaches the Rev-Limit, the gauge will be highlighted in RED until the RPM drops below the limit.

Manifold: Displays the amount of pressure inside the intake manifold. The amount of "negative pressure" or vacuum is measured in units of inches of Mercury (InHg). The amount of "positive pressure" or boost is measured in units of Pounds Per Square Inch (PSI).

Coolant Temp: Displays the engine's coolant temperature at the location of the coolant temperature sensor, in units of degrees Fahrenheit. Many functions of the Pro-Flo 4 ECU reference this measurement. Functions such as Fan Control, Cold-Start, Self-Learning, and Idle are influenced by the coolant temperature.

Battery: Displays the system's current voltage as measured at the ECU. Good indicator of the general capability of the vehicle's charging system. Typical values should be between 12.5 - 14.0 V.

Throttle: Displays how much the throttle blades are open inside the throttle body. The ECU reports throttle position as a percentage of open throttle. Please note, that at Idle, the Throttle should read 0%.

Air Temp: Displays the temperature of the engine's incoming air charge. Air Temp channel can also give a good estimate of the under the hood temperature.

Fuel Press: Displays the system's fuel pressure as measured at the fuel rail. A drop in fuel pressure during hard acceleration may indicate a fuel supply issue. Typical values should be between 40-45 PSI or 55-60 PSI.

Idle Target: Displays the current Idle RPM Target. The Idle RPM Target when at operating temp (>160°F) is set in Advanced Tuning>Idle Tuning. When the engine's coolant temp is cold (<160°F), the Idle RPM Target will be increased to help the engine warm up more quickly and will eventually decay down to the regular Idle RPM Target.

IAC %: Displays how open or closed the IAC (Idle Air Control) motor is. The IAC% channel should be used as a tool for properly adjusting the idle screw to set the base idle speed. A lower value indicates that the IAC is having to supply little additional air to help the engine idle. A higher value indicates that the IAC is having to supply a lot of additional air to help the engine idle and that the idle screw may need to be increased. Ideally, the idle screw should be adjusted so the IAC% is 0-15% with the engine at operating temp.

AFR: The Air Fuel Ratio is measured by the wideband oxygen sensor and is displayed as AFR gasoline (Stoich 14.7). Higher values are leaner and lower values are richer. The lowest possible value that can be sensed is 11.0. A value of 10.0 will be displayed any time the sensor is warming up or not ready to report accurate AFR readings. Note that when Decel Fuel Cut Off is active, AFR will report full lean – this is normal and expected.

AFR SP: The Air Fuel Ratio Set Point is the AFR value the ECU is trying to achieve. This value is set in the Air Fuel Ratios menu from the Advanced Tuning section. The AFR SP will change as the engine is operated in the different engine load zones.

Short FT: Stands for Short Term Fuel Trim. This is the percentage of fuel that the closed loop AFR correction function has added or subtracted from the base fuel injection amount to achieve the desired target AFR at any specific moment. As the vehicle is driven through various load and RPM conditions, the Self-Learn function will apply and save these values to the Long Term Fuel Trim (Long FT) map and this value will decrease. Ideally, Short FT values will be less than +/-10%. If Short FT values are more than this, apply Fuel Modifiers as necessary to reduce the closed loop AFR correction amount.

Long FT: Stands for Long Term Fuel Trim. This is the percentage of fuel that the Self-Learn table has "learned" and is being added or subtracted from the base fuel injection amount to try and maintain the target AFR at any specific moment.

Injection: This value is the amount of time, displayed in milliseconds, that the fuel injectors are open to deliver fuel. For the same load and RPM, a higher Injection value should result in a richer AFR and a lower Injection value should result in a leaner AFR.

Inj Duty: Displays the Injector Duty Cycle value. Injector Duty Cycle is a comparison of the injector on time versus the current engine cycle time and is shown as a percentage. As engine RPM increases, the engine cycle time decreases as does the available injection time. All Pro-Flo 4 systems are configured with injectors sized to support the advertised power level at no more than 85% injector duty. Injector duty values greater than 85% indicate that the fuel supply setup is marginally capable of supporting the current power level. If injector duty is greater than 85% when at WOT and max power, consider raising the fuel pressure slightly. If more fuel pressure does not help to significantly reduce injector duty, larger fuel injectors may be required.

Spark Adv: Displays the current ignition timing value being applied to the engine in degrees before TDC. The ignition timing curve is set in the Advanced Tuning>Spark Control. When in idle mode, the ECU will rapidly advance and retard the ignition timing to control idle speed thus fluctuation in Spark Adv are normal.

Status Indicators

O2 Learn: When indicator light is GREEN, Self-Learn function is active and Short FT values are being written to the Learn fuel map. The "learned" values are then applied as a Long Term Fuel Trim which can be monitored by looking at the Long FT read out. For Self-Learn to be active, Closed Loop Correction must be active and engine coolant temp must be >165°F. The indicator light will be RED if these conditions are not met or if Self-Learn has been turned off in the On/Off Options.

Closed Loop: When indicator light is GREEN, the ECU is actively controlling fuel corrections using the Closed Loop Correction function. When the indicator light is RED, the ECU is in Open Loop mode and no AFR corrections will be made. Closed Loop will be off for up to 30 seconds after the engine has been started as the O2 sensor warms up. After the O2 sensor has fully warmed up, the Closed Loop indicator will turn GREEN. Note that Closed Loop will turn off during periods of rapid throttle movement and during deceleration.

Fan 1/2: When indicator light is GREEN, the corresponding fan output has been turned on to trigger a cooling fan relay. If cooling fans aren't triggered on, the indicator light is RED. Note that the fan outputs are only turned on when the engine is running.

PRO-FLO 4 NATURALLY ASPIRATED TUNING GUIDE

The following is a guideline to driving procedures that helps assist the self-learning function of the Pro-Flo 4 EFI system. Please note that there is never really a time when the self-learn function is actually complete. The system is always adjusting for various weather, road load and engine functions that may affect engine performance. A good indication of self-learn progress is the amount of Short FT % being applied under various driving conditions. As the self-learn progresses Short FT Corr % should reduce to values near 0%. In order for the self-learn function to actually correct a specific load point the engine must actually drive through that specific point.

The best procedure for assisting self-learn is to first verify that all functions of the EFI System are properly installed and functioning correctly.

Warm the vehicle to operating temperature (165 F degrees)and verify that both the O2 learn and Closed Loop indicators are lit. Drive the vehicle in an ordinary manner and observe the Short FT Corr % values. If at any point the vehicle does not run accordingly, observe the Short FT Corr % values. If the value exceeds 10%, try holding the Throttle steady so the vacuum and RPM remain steady at the point of issue. The Short FT Corr % value should reduce and the engine should begin to run better. Try to revisit the Vacuum and RPM points around the point of issue to help compensate. Try to avoid fast erratic throttle movement when assisting self-learn. If issue is severe and corrections exceed 15% see Fuel Modifiers Page.

Continue driving the vehicle, when road conditions safely permit try running the engine through various load and RPM points. For example:

- Steady Highway driving consistently varying throttle and RPM.
- Low gear light slow acceleration from low to high RPM.
- High gear light acceleration from low to high RPM.
- High gear slow steep hill acceleration.
- Hard acceleration from low to high RPM.

As the vehicle is driven, AFR Corrections should reduce. When performance is acceptable, save the Map and ECU Settings (ECU Settings) and slow the Self Learn setting to medium or slow (Advanced Tuning_Air Fuel Ratios_Advanced).

NOTE: *Do not make any adjustment to the Acceleration Fuel initially. Allow the self-learn adequate time to apply corrections to the base calibration prior to making any Acceleration Fuel adjustments.*

WARNING: *WOT conditions must be performed on a closed track in a controlled environment.*

PRO-FLO 4 FORCED INDUCTION TUNING GUIDE

When tuning a FI engine, attention must be paid to ensuring that AFRs are on track with the desired target AFR and a proper ignition timing advance value must be found that gives best power without incurring knock. While most NA street engines are fairly easy to tune because they're more tolerant of AFR and timing variances, FI engines have a narrower range of acceptable AFRs and timing advance in boost and detonation and engine damaged can occur if not properly tuned. Use of a dyno is highly recommended when tuning a FI engine. If not comfortable with the tuning requirements necessary to safely tune a FI engine, seek the help of an experienced tuning professional.

The following is a general FI tuning guide that may be used to familiarize one with the typical FI tuning process on a dyno. A generally safe approach is to start out by running overly conservative ignition timing while fueling adjustments are made and then once AFRs are satisfactory, start introducing more ignition timing advance to optimize engine power.

Forced Induction Tuning

Fuel Tuning Concept - AFR Feedback vs Feedforward

When using Pro-Flo 4 with a NA engine, the typical fuel tuning/learn process is that the system is ran using closed loop AFR control and the short term fuel trim values (Short FT in E-Tuner app) are automatically applied to a secondary long term fuel trim "learn" map. Over time, as the secondary learn fuel trim map is populated with values that help correct the AFRs, the Short FT values are gradually reduced until nearly zero. This AFR control process is in reaction to the error between desired AFR and actual AFR and relys on feedback from the system's wideband O2 sensor to gradually correct fueling over time to eventually have optimized AFRs.

FI engines can also be tuned using this same process however, in cases where Short FT values are positive because base fueling is too lean, it's more ideal to quickly correct AFRs proactively using feedforward correction than to rely on the system to react to AFR error using AFR feedback. The reason for this is if AFR feedback should stop working for any reason, AFRs will already be closer to target or slightly rich whereas it would be very undesirable to have an excessively lean AFR in boost which may cause knock or engine damage.

To expedite the fuel tuning/learn process, feedforward fuel trims can be used to get AFRs closer to target without relying on feedback from the O2 sensor or waiting for the secondary learn fuel map to be populated. This is done by monitoring the Short FT values and then adjusting fuel trims to immediately reduce the Short FT value. When running the engine, closely watch the Short FT value. If it is negative then base fueling is already rich and it is safe to allow the system to learn on its own. If Short FT values are positive, use feedforward correction by taking the Short FT value and applying it as Fuel Modifier trim. For instance, if running in the Boost AFR target range, Short FT is +10%, set the Boost fuel trim to +10%. The next time the engine is ran through the Boost AFR target zone again, the feedforward fuel trim will add 10% more fuel ahead of time which should result in a Short FT value that is closer to zero.

Ultimately, the primary objective is to always have AFRs on the richer side with slightly negative Short FT values versus having positive Short FT values because AFRs are too lean.

Initial Fuel Tuning

Set Idle, Cruise and Acceleration AFR targets to desired values. Set base Spark Control settings to values that are commonly used for the type of engine being ran. Run engine in idle, cruise and acceleration load states with Self Learning turned on. Monitor AFRs and Short and Long FT values. Check that engine sub-systems (fuel system, cooling system, oiling system, ignition system, etc) are all functional and free from defects before moving onto making boost.

Boost Fuel Tuning

Set Boost AFR target to desired value. Set Boost Retard to value that will result in very conservative timing when in boost – 2.0°-2.5° per pound of boost is typically a good starting point. Set Boost Cut limiter to be slightly higher than max expected boost value. Start by making loaded pulls or sweeps at less than full throttle to less than max rpm. The tuning process will be to make successive pulls while incrementally increasing throttle to slowly work into boost. For instances, first pull should be made at 30% throttle (this low of a throttle position may not make any boost). The next pull should be made at 40% throttle and then the next pull should be 50% throttle and so on eventually working to WOT. While making these pulls, closely monitor AFRs and the Short FT value. Ideally, Short FT will be a negative value. If Short FT is +5% or more, apply an equal trim in the Boost fuel modifier. If at any point AFRs show significantly leaner than the AFR target and Short FT is a large positive value, immediately lift off the throttle to abort the run, apply appropriate fuel trim adjustments and then try again.

The tuning objective is to have AFRs be on target without having large positive Short FT values. Once boost AFRs and Short FT values are acceptable, boost ignition tuning can be started.

Boost Ignition Tuning

The tuning process will be to increase ignition timing incrementally by reducing the Boost Retard value in small steps in order to find the ignition timing advance value that results in best power. Start out by first having too high a Boost Retard value (2.0°-2.5° timing retard per pound of boost) and then decrease Boost Retard in 0.25° increments while making successive dyno pulls to record torque and power. With Boost Retard set high, the final ignition timing value in boost will be low and measured power should also be low. In most cases, reducing Boost Retard by 0.25° results in the boost ignition timing advancing by 2°. Each time Boost Retard is decreased, make a WOT pull and record torque and power. As Boost Retard is decreased and boost ignition timing advance is increased, measured power should increase significantly. In some instances, power gains of 30-50 hp can be made by reducing Boost Retard by only 0.25°.

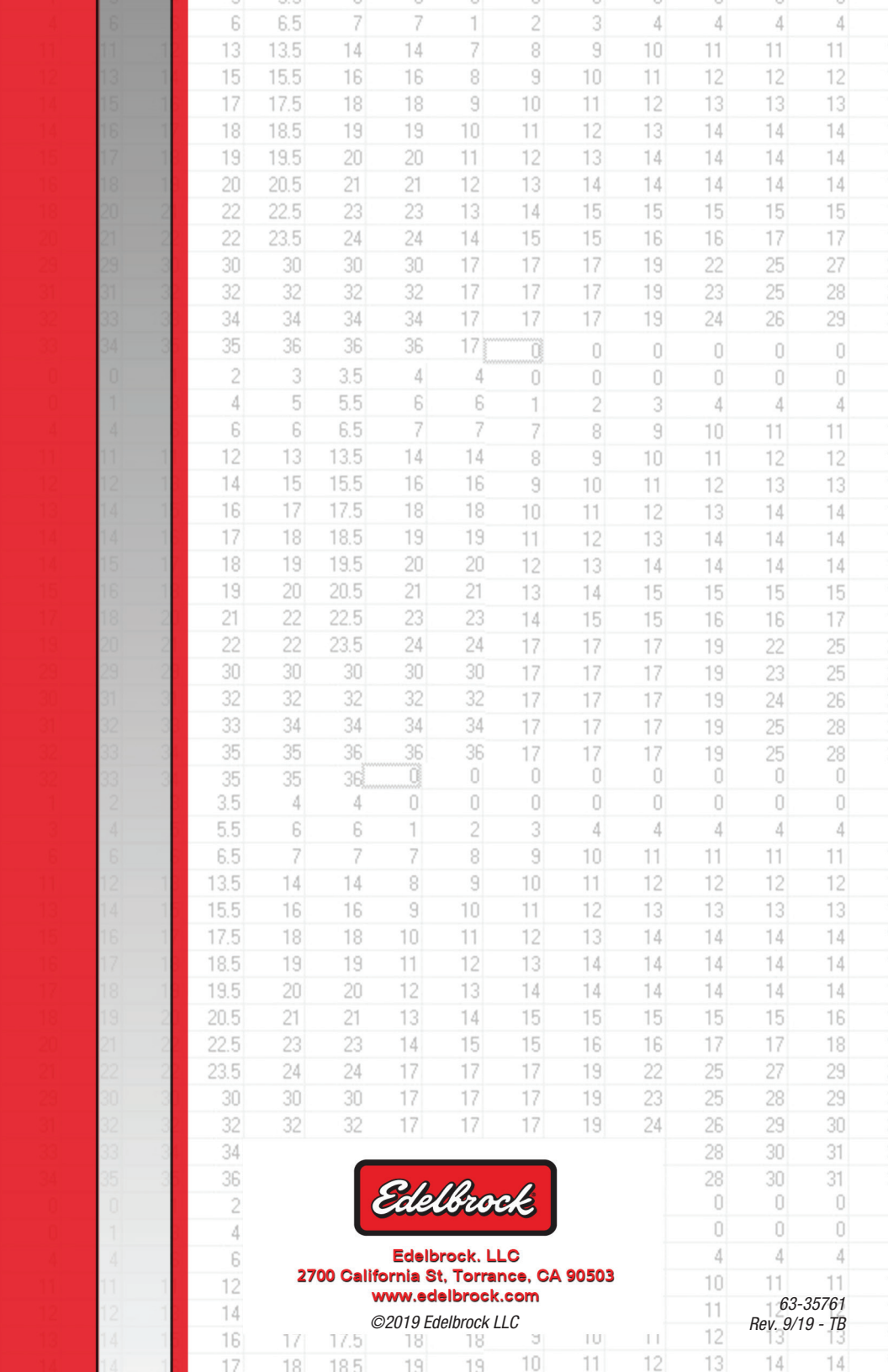
Continue to repeat this process of making pulls after decreasing Boost Retard in 0.25° increments until the power gain after advancing the boost ignition timing results in a much smaller power increase. A point will eventually be reached where more boost timing advance does not result in any additional power. The timing advance value at this point is the optimal boost ignition timing for best power. Continuing to advance timing beyond this point may result in knock and engine damage. It may be advisable to increase the Boost Retard by 0.25° to slightly retard the boost timing from peak power in order to increase the safety margin against knock.

Example scenario: Base ignition timing is 30°. First WOT pull is made with Boost Retard set to 2.0°. Engine makes 10 psi of boost. Final timing advance will be 30° - (2.0° x 10 psi) = 10° in boost. Power measured is 600 hp. Decrease Boost Retard to 1.75°. Final timing advance will be 30° - (1.75° x 10 psi) = 12.5° in boost. Power measured is 640 hp. Decrease Boost Retard to 1.5°. Final timing advance will be 30° - (1.5° x 10 psi) = 15° in boost. Power measured is 675 hp. Decrease Boost Retard to 1.25°. Final timing advance will be 30° - (1.25° x 10 psi) = 17.5° in boost. Power measured is 700 hp. Decrease Boost Retard to 1°. Final timing advance will be 30° - (1° x 10 psi) = 20° in boost. Power measured 710 hp. Have now reached point of diminishing returns. Would be safest to go back to a Boost Retard value of 1.25°.

Tuning Tips

Note that engines with big bore diameters may want more timing advance in boost to make best power versus engines with smaller bore diameter.

Once optimal boost ignition timing advance for best power has been found, its advisable to remove and inspect the spark plugs. Typical indicator for proper ignition timing is color change on ground strap that occurs in the middle of the bend. Too much ignition timing will have the color change closer to the spark plug threads and too little timing will have the color change closer to the end of the ground strap.



Edelbrock. LLC
2700 California St, Torrance, CA 90503
www.edelbrock.com

©2019 Edelbrock LLC

63-35761
Rev. 9/19 - TB