



**Installation Manual
For The Ford ACCEL
Digital Fuel Injection
Engine Management
System
Part #74030**

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ACCEL/DFI

Prior to starting the installation of your ACCEL DFI system, read this manual carefully!!

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Some parts are not legal for sale or use in California or on any pollution-controlled motor vehicle.

INTRODUCTION

CONGRATULATIONS! You have just purchased the finest engine management system available. EFI control is an exact science that ACCEL has made simple. This manual is written to assist you with the installation of your new system to your FORD application. Please read this manual carefully.

Prior to starting your installation, please verify the contents of your ACCEL DFI package. You should find the following components:

Quantity	Component
(1)	Electronic Control Module (ECM)
(1)	Main Wiring Harness (MWH)
(1)	Injector Wire Harness (IWH)
(1)	Manifold Absolute Pressure (MAP) sensor
(1)	Heated Oxygen Sensor with mounting nut
(1)	Coolant Temperature Sensor (CTS)
(1)	6 way to 4 way TFI adapter harness
(1)	Throttle Position Sensor (TPS) conversion connector
(1)	Idle Air Control (IAC) Motor
(1)	Idle Air Control (IAC) Motor Housing
(1)	IAC Motor Housing Adapter Plate
(1)	IAC Adapter Plate with gasket and screws

If your are missing any item , please contact your dealer immediately.

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Although this package is designed to allow you to convert a carbureted engine to fuel injection or allow you better control over your present fuel injected engine, it does not include the hydraulic portion of the installation. If you need a fuel pump, filter, fittings, etc. contact your local ACCEL EMIC center for the proper ACCEL DFI part numbers for your application.

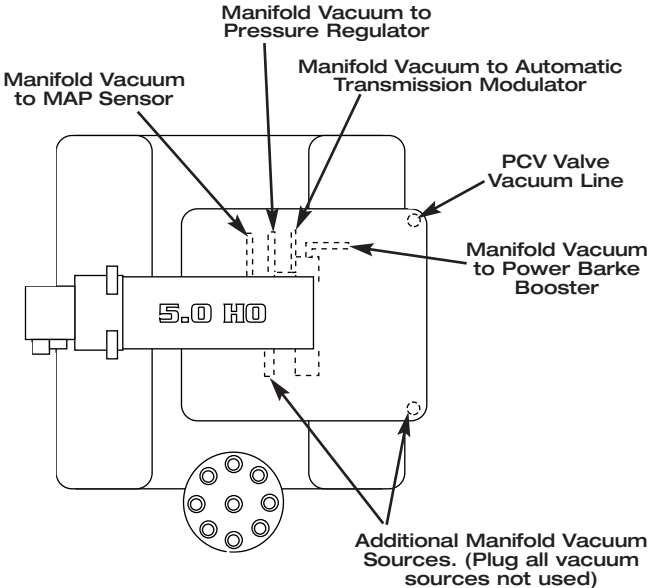
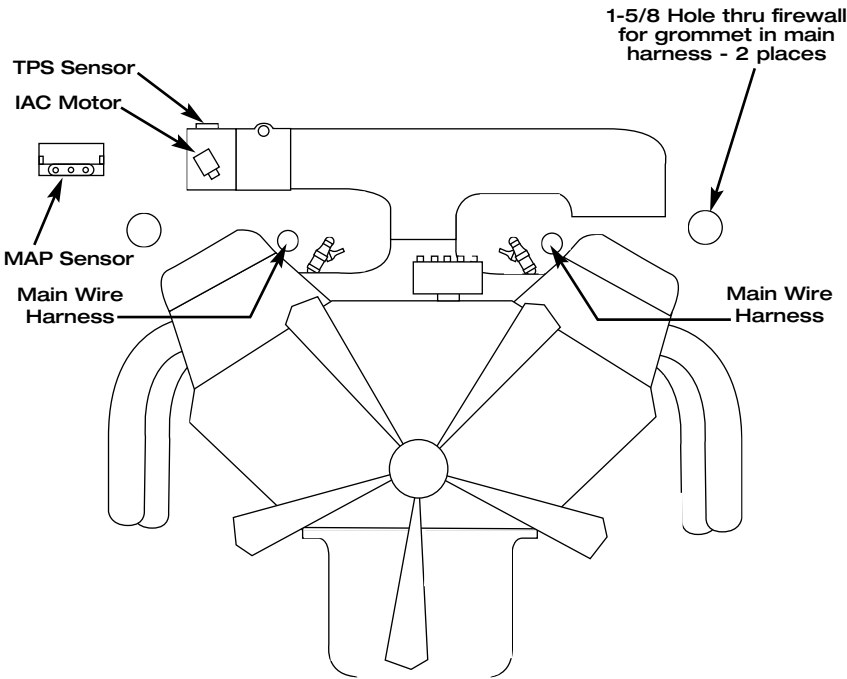
I. OBTAINING YOUR MANIFOLD

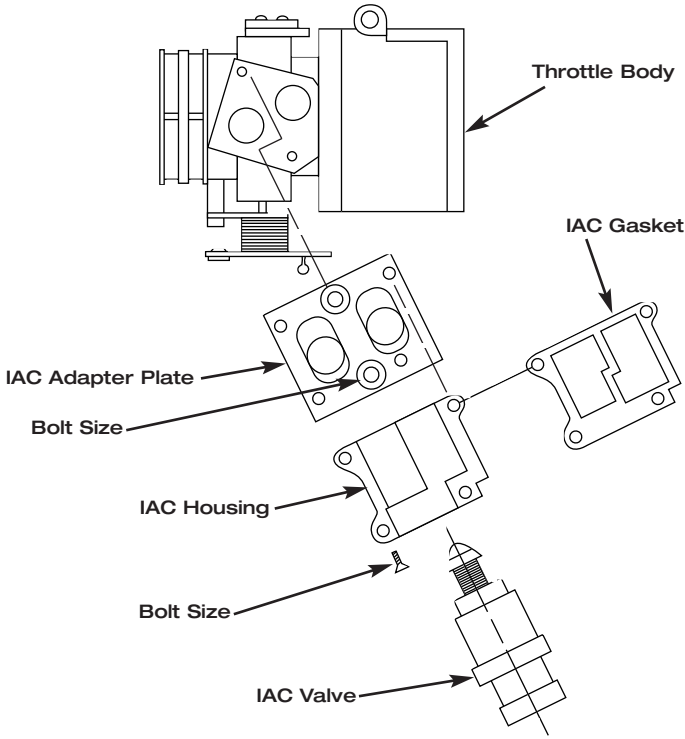
Currently ACCEL DFI only has manifolds for Chevrolet applications, for your Ford application you may use an OEM or aftermarket fuel injection manifold. Talk to some of our ACCEL DFI's EMIC centers for fabricating or modifying a carbureted style manifold for your application. ACCEL DFI EMIC Centers can also sell, install, and tune all ACCEL DFI products. For the nearest dealer to you please call: 1.800.992.2235.

II. SETTING UP YOUR MANIFOLD

Prior to installing your manifold make sure that all gasket surfaces are clean. ACCEL recommends using a 180 degree thermostat in most applications. Place your thermostat and gasket onto your manifold, put your thermostat housing onto the manifold and bolt in place. When installing your fuel injectors, be careful not to cut the O-Rings. A small amount of oil on each O-Ring will aid in the assembly. Please reference a service manual for proper torque sequence and vacuum line routing. If this is a custom manifold, please contact your fabricator for this information.

NOTE: It is recommended at this point to use a hole saw (i.e. Green Lee punch) to put two (2) 1-5/8" diameter holes in the firewall to accommodate the main wiring harness. Please refer the figure below.



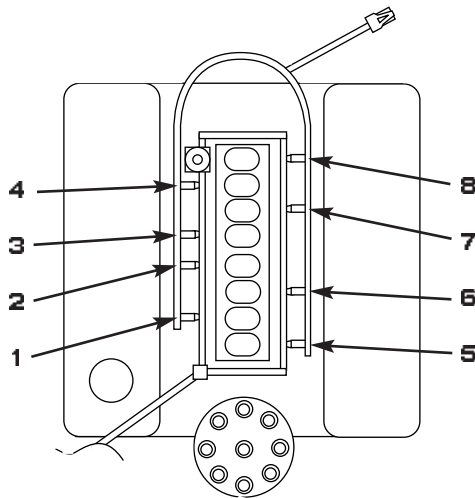


III. MOUNTING YOUR ECM

The ECM comes with three (3) mounting tabs designed for a #8 sheet metal screw. It is recommended that you mount the ECM in the passenger side kick panel. If the kick panel has an air vent incorporated into it, **DO NOT** mount the ECM here. This unit is not waterproof and therefore needs to be mounted in a location free of moisture. The alternate locations are in the dash board and behind the glove box. **NEVER MOUNT THE ECM IN THE ENGINE COMPARTMENT!**

IV. INJECTOR HARNESS INSTALLATION

This ACCEL DFI system is simultaneous double fire, therefore it does not matter what injector connector goes to what injector. For your convenience the connectors are paired in sets of two, similar to the way the injectors are mounted in the manifold. Lay the injector harness so that it lays naturally on the manifold. Clip the connectors onto the fuel injectors making sure that the metal clips snap into place.



V. MAIN WIRE HARNESS ROUTING AND CONNECTIONS

An overview diagram of the main wiring harness is shown at the end of this section. Please reference this when making the connections between the ECM and the corresponding sensors/components. The harness can be routed and connected as follows: Begin by connecting the 32 pin and 24 pin ECM connectors to the ACCEL DFI ECM, making sure that the tabs snap into place. Then route the longer of the

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two legs through the drivers side firewall hole that you cut in step two followed by the shorter leg through the passenger side firewall hole. Continue pulling the harness legs through the firewall until the rubber grommets seat themselves in the firewall. Once the grommets have been properly seated into the firewall, each leg can be routed between the manifold and the valve covers.

The drivers side leg will contain connectors for the following:

- MAP (3-pin green male connector)
- Computer Controlled Ignition (4-pin male black connector, for a TFI you will use the TFI adapter)
- ESC (purple wire, bare lead)
- Air (2-pin gray connector)
- Coolant (2-pin black connector)
- TPS (3-pin black male connector)

Make sure to connect the switched +12 volt wire (long pink wire with a female spade connector) to a switched ignition accessory in the fuse box. The switched ignition accessory **MUST** maintain 12 volts during cranking. If it does not, the vehicle will not start.

NOTE: If you are not controlling timing with the ACCEL DFI ECM (using a non-computer-controlled ignition system such as a points distributor) you will not be using the computer-controlled ignition connector (4-pin male black connector) or the ESC connector (purple wire with bare lead).

The passenger side harness leg will contain the following sensor connections:

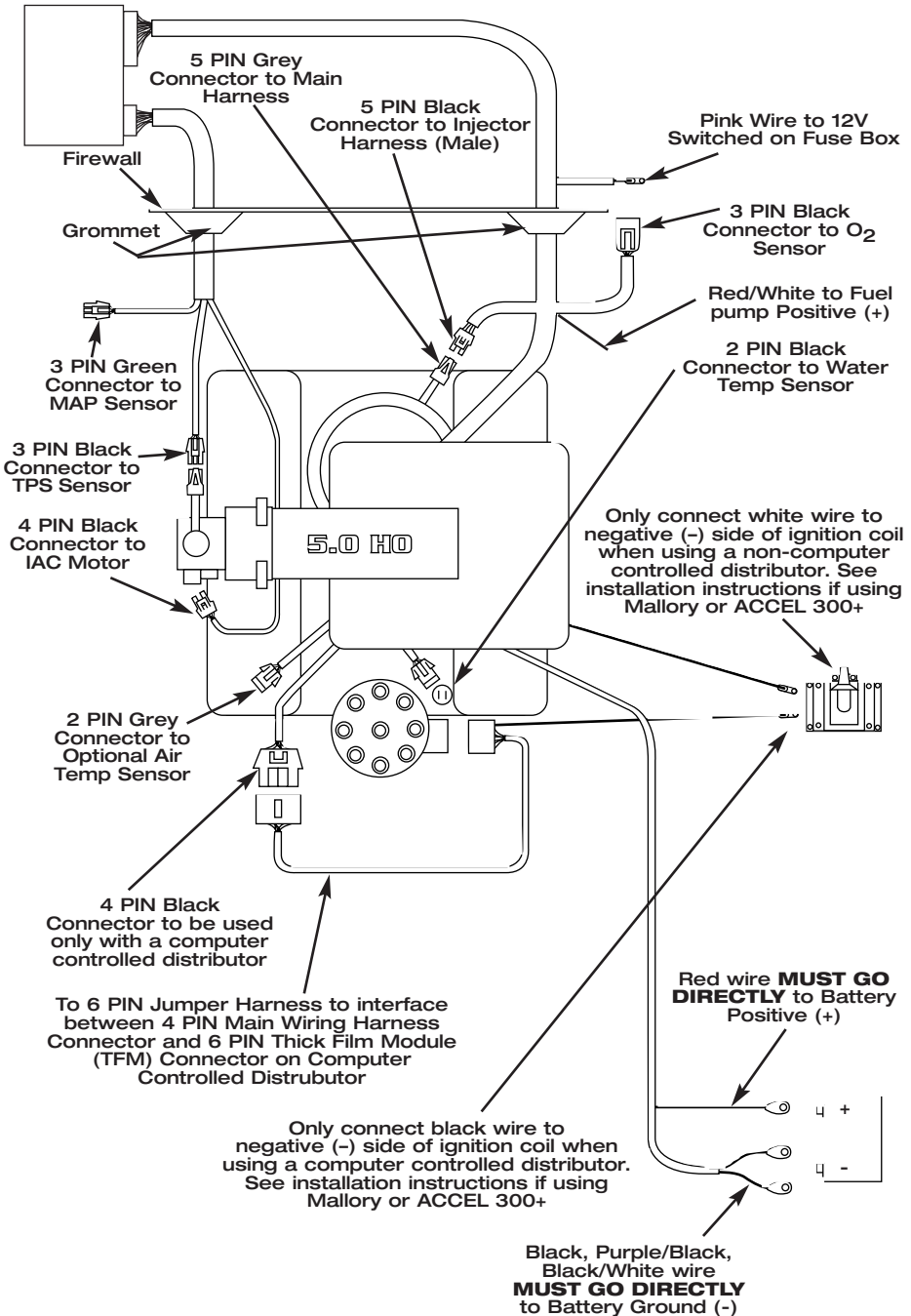
- Oxygen (3-pin female black connector)
- Injector (5-pin round white connector)
- Tach pick-up (1-pin brown connector)
- Fuel pump (bare lead, red wire with white stripe)
- IAC (4-pin square male black connector)

Connect each to the appropriate sensor using the diagram at the end of this section. If you need to lengthen the fuel pump wire to reach your fuel pump, make sure to use at least 14 gauge wire, soldering and heat shrinking the connection between the two wires. Finally be sure to connect both the positive and ground terminals on the main wiring harness **DIRECTLY** to the battery. If you fail to do this, intermittent and unusual problems may occur.

NOTE: If you are controlling timing with the ACCEL DFI ECM (using a computer-controlled ignition system, TFI, etc.) the Tach pick-up will not be used. If you connect the Tach pick-up and the computer-controlled ignition connector at the same time, your ACCEL DFI ECM will cancel them both out resulting in a no spark (no RPM signal) situation. In many cases this will also damage your ECM.

At this time you can connect your User Interface Module (UIM, or Power Tuner) to the MWH by connecting the 6-way connector (located near the ECM connectors) to the 6-way connector on the UIM. If you did not order a UIM there is nothing for you to do with the 6-way connector on the MWH. If using a UIM mount the unit with two (2) #8 sheet metal screws or 20 pan head screws with nuts, in a location convenient to the driver.

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VI. CHOOSING YOUR DISTRIBUTOR

NON-COMPUTER-CONTROLLED IGNITION

If you are using a stand-alone magnetic pick-up distributor, points distributor, etc., the Tach pick-up (1-pin brown connector) must be used. Connect this lead to the negative side of the coil. If the brown connector must be removed, make sure not to remove the 39K ohm resistor which is located 3" away from the existing connector.

NOTE: If you are using an aftermarket ignition enhancer box (i.e. ACCEL 300+, Mallory Hyfire) the MWH's Tach pick-up connector **MUST** be connected to the enhancer box's Tach output signal. It is also necessary to remove the 39K ohm resistor from the Tach pick-up wire. It is located 3" from the end of the Tach pick-up lead. **DO NOT** connect this lead to the negative side of the coil if using an enhancer box. This can result in ECM damage.

ACCEL strongly urges the use of a good quality suppression wire such as ACCEL 300+ or ACCEL RFI Suppression Wires. We have encountered problems (including not suppressing electrical noise) with various ignition wires available on the market such as helically-wound or solid core. The use of these wires may interfere with the operation of the ECM. Further, some high energy aftermarket ignition units also produce electrical fields which will interfere with the ECM's operation. Use of these units is strictly at the risk of the owner. Call ACCEL for recommendations of ignition system compatibility.

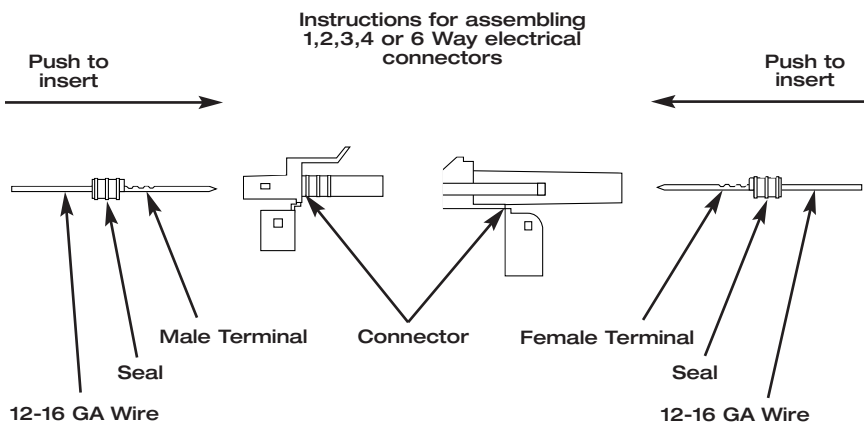
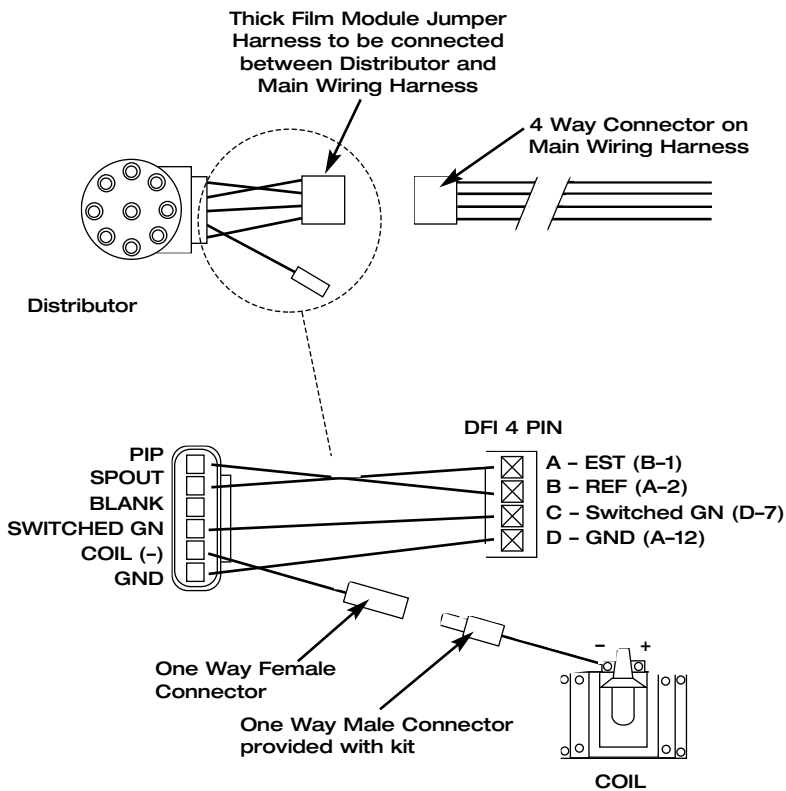
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The total advance to which you set the engine will depend upon the engine you have. Vacuum advance should be controlled with the EGR port, which is located before the throttle blades. ACCEL DFI recommends a distributor with an adjustable vacuum advance. Once the total advance is set, connect the vacuum line to the canister. Adjust the canister to maintain 20-26 degrees with a hot idle at 800 RPM. Again, this is ACCEL's recommendation, depending upon compression ratio and cam profile, you may have to decrease this to avoid detonation.

COMPUTER-CONTROLLED IGNITION

If you are using a TFI distributor you will need to connect the TFI adapter harness to the 4-pin black ignition control connector on the MWH. After doing so you can plug the 6-way end into your TFI distributor; the 1-pin black connector will go to the negative side of your ignition coil or points/lead of your enhancer box. You can also control timing by using a magnetic pick-up distributor or crank trigger. In order to do so you must get a modification done to your ACCEL DFI ECM (ACCEL DFI part number 74043-I). This modification will come with the necessary wiring (this wiring will replace the TFI adapter) but will not come with an enhancer box that is required. If you will need this modification, contact ACCEL DFI for further instructions and a shipping address.

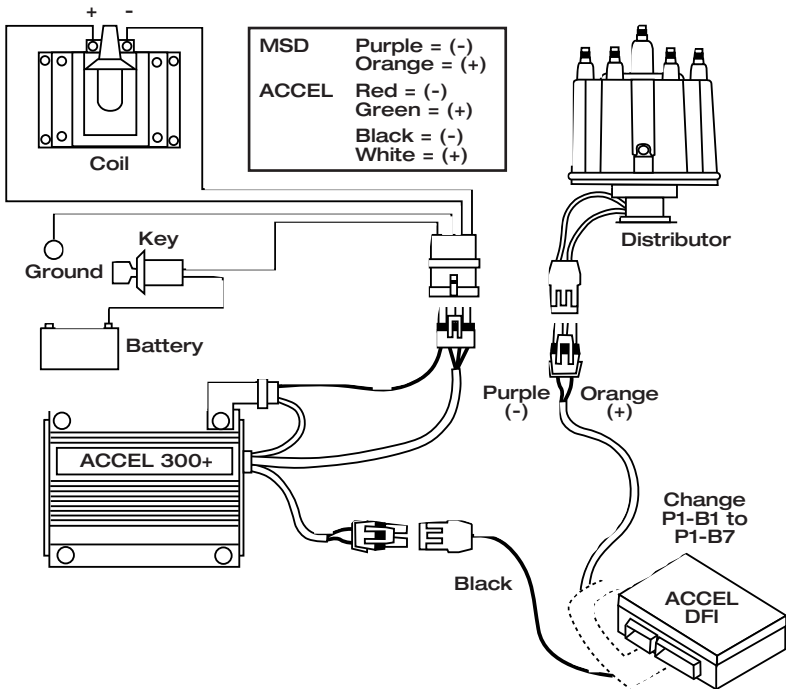
In order to set the initial timing, the ignition bypass connectors (two 1-pin connectors) incorporated into the ignition control leg must be disconnected. With the engine running hot at 800 RPM, manually adjust the distributor to 6 degrees BTDC. Once adjusted, reconnect the ignition bypass line. As soon as you connect the bypass line the ACCEL DFI ECM regains control of the timing. The spark



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curve is pre-programmed into the ECM from ACCEL DFI. It has initial timing of 20 degrees BTDC and a total timing of 34 degrees BTDC in by 3000 RPM. The timing curves, as well as all other tables in the ECM, can be adjusted to better suit your engines requirements using ACCEL DFI's calibration software "CALMAP".

NOTE: If an aftermarket ignition enhancer box is used (i.e. ACCEL 300+, MALLORY HyFire), the TFI distributor can be wired as described by the manufacturer of the enhancer box. However, if you are controlling timing with a magnetic pick-up distributor or a crank trigger, refer to the illustration below.



**VII. FUEL PUMP MOUNTING
AND HIGH PRESSURE LINE INSTALLATION**

ACCEL DFI currently has two high pressure fuel pumps available: part number 74701, an external mount fuel pump which can support up to 450 horsepower @ 45 PSI, and part number 74702 which can support up to 840 horsepower @ 45 PSI. This fuel pump can be mounted in the fuel tank or on the frame rail. You can use part number 74710 to mount this pump onto your frame rail. Regardless of the fuel pump used, be sure to mount your fuel pump near the tank at a point of fuel level and in a protected area. System components must also be protected and shielded from exhaust and engine compartment heat as well as from potential road damage.

FUEL PUMP WIRING

The fuel pump requires a +12 volt source. If your vehicle was originally an EFI vehicle and already has a fuel pump installed, you still **MUST** use the ACCEL DFI wiring. Connect the +12 VDC side of the fuel pump to the ACCEL DFI main wiring harness, using the red wire with white tracer. The fuel pump relay is already an integral part of the main wiring harness and is controlled by the ECM, therefore no wiring is necessary for the relay. A pump will draw between 4 and 8 amps of current depending on size and fuel system pressure, so 14 gauge wire should be used from the pump to the red wire with white tracer. Also, be sure to solder the connection between these two wires. The ground for the fuel pump can be at any clean, paint-free point on the chassis to the negative (-) terminal of the fuel pump. Make sure that wiring between the fuel pump and the engine compartment does not hang below the vehicle, interfere with rotating parts, or become exposed to excess heat.

MECHANICAL PUMP REMOVAL

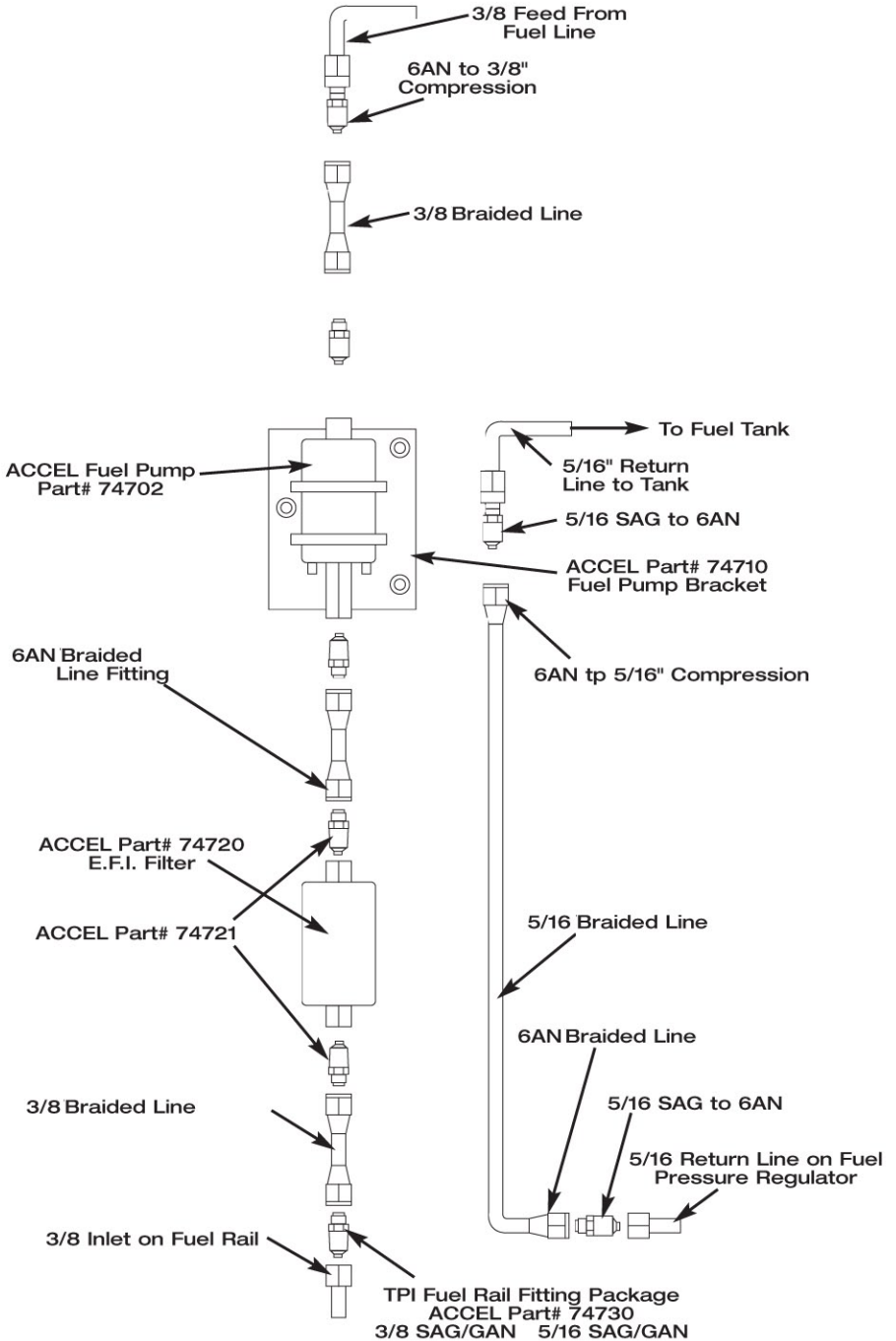
If your engine was carbureted, be sure to either cap off the fittings on your mechanical pump or remove the pump and cover the opening with a block off plate.

HIGH PRESSURE FUEL FILTER MOUNTING

Locate the high pressure fuel filter at the outlet of the high pressure fuel pump on the frame rail. It is recommended to place a filter between the fuel tank outlet and the pump inlet if the pickup tube in the tank does not have a filter. Failure to do so can result in fuel pump damage. ACCEL DFI high pressure filter, part number 74720 requires 3/8" Saginaw fittings. If your filter does not have these fittings you can use part number 74721, these adapter fittings will fit the 74720 filter and allow you to use a 6AN fitting.

ROUTING HIGH PRESSURE FUEL HOSE

At this point the high pressure circuit of the fuel system can be plumbed (refer to diagram at the end of this section). If the existing fuel supply line cannot sustain 150 PSI fuel pressure (ACCEL recommends a fuel line rated to at least 330 PSI), then it must be replaced with high pressure fuel line/tubing. Remember, with a carburetor, your fuel system operated at about 6 PSI. However, with fuel injection, the system operates around 50 PSI of fuel pressure. Never take any chances. If in doubt, replace the hose. You will need a minimum of 3/8" ID supply line and 5/16" ID return.



NOTE: If using ACCEL Pump Part #74701, please contact ACCEL/DFI Technical Service for proper plumbing instruction.

DUAL FUEL TANKS

It is important to note that for vehicles with two fuel tanks and/or a class "A" RV, it is highly recommended that a boost pump be installed in each tank and feed through a multi-port switching valve, especially when operating in hot climates. Boost pumps used on such vehicles as a 1985 Ford F-250 5.0L EFI will work well for this type of application. The switching valve from a 1984 Ford Diesel or a 1986 Chevrolet C-10 (305 CID) will work well in dual tank applications. Dual tank equipped vehicles must be plumbed to return excess fuel to the tank which is supplying fuel to the EFI system to avoid tank overflow problems. The remotely-activated dual tank three-way valves described above will work well in these applications.

A NOTE TO THE INSTALLER

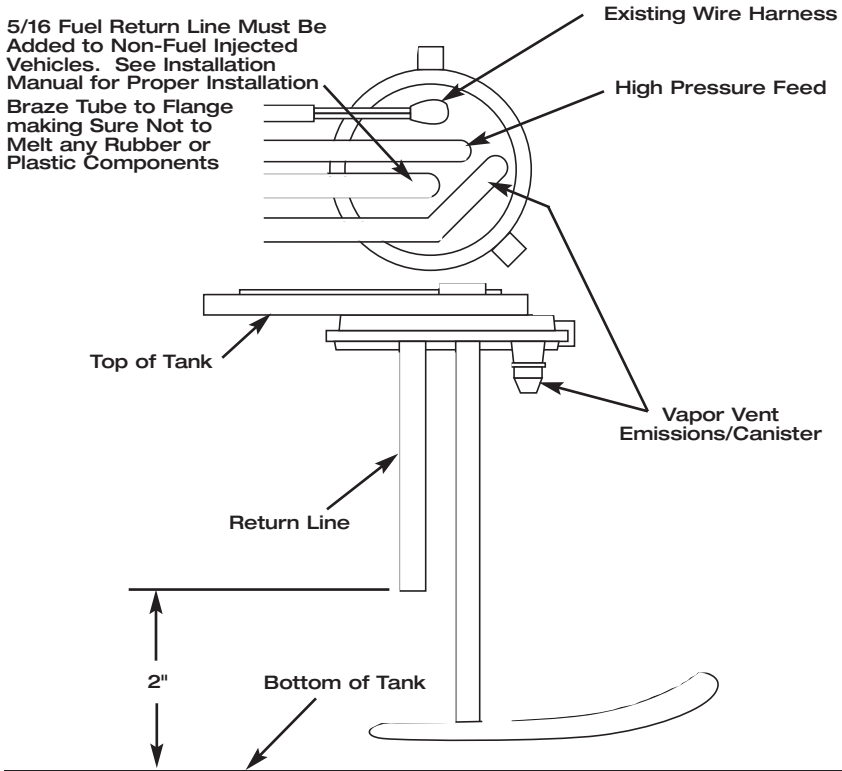
There seems to be a misunderstanding with some people that a fuel pump "produces pressure". This is not accurate. What actually happens is the pump produces fuel flow at a given system pressure which is dictated by the pressure regulator. The pressure regulator has a spring which is preset to provide a certain system pressure, i.e. 45 PSI. The regulator opens as the pressure in the fuel line increases due to the flow of fuel provided by the pump.

As the pressure drops, due to bypassing of fuel to the tank, the regulator closes at a pressure of 45 PSI (this pressure is variable on adjustable regulators). This process will begin again as pressure raises. Therefore, the pressure regulator is a dynamic modulating device which always tries to seek its preset pressure.

SENDING UNIT MODIFICATIONS

To install a return line in your tank, remove the sender assembly from the fuel tank and drill a 5/16" hole through the top of the flange. Be sure to give yourself enough room to weld the tube into place, welding procedures are discussed later in this section. ACCEL DFI jumper line kit, part number 74731, will supply you with this line as well as other lines that you may need. Pre-bend a piece of 5/16" fuel line so that the in-tank portion end is 2" from the bottom of the tank and away from existing outlet tubes (See figure at the end of this section). Ensure that the installation of this tube does not interfere with any other components on the tank unit. Clean the unit with soap and water prior to the next step. Seal and secure the return line to the flange by welding or brazing with low heat so that flange warpage does not occur. Also make sure that applied heat does not damage the sending unit wires or wire seals. Clean the welded area and check for cracks or holes in the flange, tubes or welded area.

Check the condition of the filter sock on the pick-up tube. If the sock is torn or contaminated, replace it. Again, if you are not using a filter sock in your application then install a filter between the fuel tank supply line and the inlet side of your fuel pump.



RETURN FUEL LINE INSTALLATION

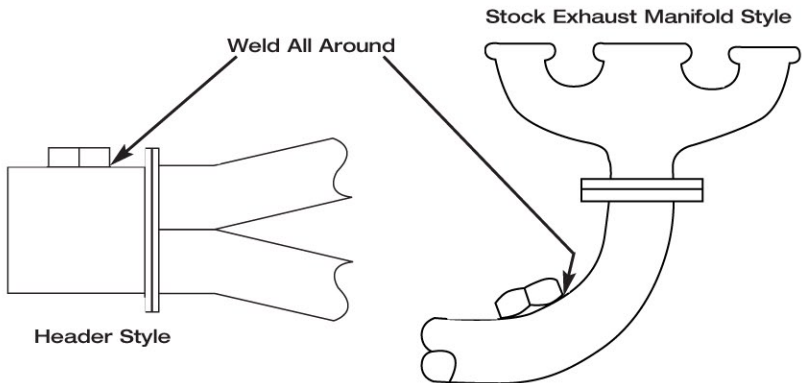
If your vehicle was originally equipped with a carburetor, you **MUST** run a 5/16" ID (inner diameter) or larger return line from the engine (fuel pressure regulator) to the fuel tank. Some vehicles with carburetors came with 1/4" diameter return lines. This is too small in ID (inner diameter) and will create an unacceptable amount of back pressure in the fuel line, thus causing a rich condition. Using good judgment install a fuel line from the pressure regulator outlet to the fuel tank with restriction free bends in protected areas (refer to the diagram at the end of the "Routing High Pressure Fuel Hose" section). The fitting at

the pressure regulator is a #5 AN fitting and ACCEL DFI recommends a #5 AN to 5/16" Aeroquip stainless fuel line connector to connect the 5/16" return fuel line.

ACCEL DFI recommends using a good fuel line for supply and return line plumbing, such as a double braided stainless steel AQP by Aeroquip.

VIII. MOUNTING THE OXYGEN SENSOR

The ACCEL DFI System comes with an oxygen sensor and a M18 X 1.5 hex nut. This nut is to be welded to the collector (preferably the passenger side) of the exhaust header. Prior to mounting the nut, drill a perpendicular 5/8" diameter hole in the exhaust pipe of header collector. You will want to mount this nut closest to the header flange (or exhaust manifold) without interfering with exhaust connecting flanges.



IX. AIR CLEANER ASSEMBLY

If you are using a stock throttle body on your application, the ACCEL POWERFILTER division of ACCEL may very well have a high performance reusable air cleaner for you. They may also have one for your custom application, contact ACCEL's Technical support team for more information.

At this point all the electrical connections should be made between the sensors, computer, and optional equipment. Keep in mind that you will have at least one extra connector that will not be used on the main wiring harness. Now connect the positive terminal to the positive side of the battery, and the ground wires to the negative battery terminal (refer to the diagram in section V).

X. STARTING THE VEHICLE

Turn the ignition key to the run position. Do not crank yet. The fuel pump should run for two seconds, then shut off. Now turn the ignition key off. Repeat this procedure of turning the key on and off four times, listening carefully for the fuel pump. This is needed to prime the fuel delivery system. The best way to check if the system is priming is to connect a fuel pressure gauge to the shroeder valve on the fuel rail. ACCEL DFI offers gauges for some Ford applications, check your application with one of ACCEL's dealers. Now check for leaks along the entire length of the vehicle. Crank the engine. After the engine starts, the engine should fast idle and the speed will decrease as the coolant temperature heats up. If the engine does not start after ten seconds of cranking, check the following:

- A) All electrical and mechanical connections are made securely.
- B) There are no fuel leaks.
- C) The fuel feed line is pressurized with fuel. The most common problem is the fuel pump is wired backward. On the ACCEL pumps, the positive (+) and negative (-) designations are casted in the pump adjacent to the terminals. If the ACCEL 74702 pump is wired backwards, it will run backwards.
- D) Ensure that the engine timing is properly set.

XI. OPTIONAL ITEMS

(1) User Interface Module (UIM, part number 74500)

This option allows the driver to change the three dimensional fuel table while the engine is running. The UIM contains two potentiometers for increasing or decreasing the amount of fuel supplied to the engine during idle and WOT. The idle potentiometer provides the user with the ability to increase or decrease the amount of fuel at idle and part throttle by 10%. The WOT potentiometer comes into play only when the throttle is fully opened. The percent increase and decrease is 25%. The UIM does not change the amount of fuel delivered during cranking.

The UIM must remain connected to the main wiring harness after adjustments are made to the ECM. If it is disconnected, the ECM will automatically default back to its preset values.

If your engine requires a somewhat different calibration than is noted on the ECM or you are calibrating a unique engine combination, use the ACCEL DFI Serial

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Communications Interface option, CALMAP (part number 74990-S with a 5ft cable, 74990-L with a 25ft cable). This software will allow you to customize the Fuel and Timing curves as well as all other parameters in the ECM.

FAN CONTROL KIT (PART NUMBER 74171)

This kit includes a harness with a integral relay that interfaces between the ECM and the fan. This allows you to turn on an electric fan at a given engine temperature via CALMAP. This kit does not include a fan.

NITROUS OXIDE CONTROL (part numbers listed below)

Single Stage Harness Only

Part Number 74253

Multi-Stage Harness Only

Part Number 74697

Although ACCEL DFI currently does not have complete nitrous oxide kits available for Ford applications, we do offer the necessary wiring to allow you to control your nitrous through the ACCEL DFI ECM. The part numbers listed above are ready to plug into your ACCEL DFI ECM and nitrous solenoid to give you exact delay control, ignition timing and fuel control over your nitrous system. ACCEL can also offer you the nitrous solenoid, contact your local ACCEL EMIC dealer for more information.

XII. TROUBLE SHOOTING GUIDE

The following are some common problems we have encountered with various installations.

Injectors not firing (clicking) - the vehicle will not start:

- Usually due to a low battery. Voltage must be above nine (9) volts during cranking to activate the ECM.
- Injector harness not connected to the main wiring harness.
- Short in either pin P1-C7 or P1-C8. Check continuity to battery positive (+) and negative (-) wires with an OHM meter.
- Tach wires to positive (+) side of coil instead of negative (-).
- P1-D7 (long pink wire with female spade connector) not receiving +12 volts during cranking. Usually due to connecting this wire to a voltage source that is disabled during cranking.

Runs rich at idle:

- Vacuum line to fuel pressure regulator not connected.
- MAP sensor vacuum line pinched.
- UIM idle knob turned all one way.
- Wrong injectors for the application.
- Return fuel line is too small/restricted.
- Calibration in the ECM is wrong for the application.

Runs rich all the time:

- Wrong injectors for the application
- Return line is too small/restricted.
- Calibration in the ECM is wrong for the application.

Engine cranks a while before starting:

- +12V and ground terminals not connected directly to battery.
- Fuel pump is not priming the fuel system.

If you are experiencing problems please contact your ACCEL dealer, or feel free to call ACCEL's technical service line and talk to an ACCEL DFI technical representative at 1.216.398.8300 ext. 5.



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