

**Fuel injection installation for Pinzgauer  
Using the Beck injection manifold  
By Jim LaGuardia**



This system will work with many Engine management computer systems and is intended for those who have the technical knowledge and wish to fuel inject a Pinzgauer on their own.

These instructions detail installation using an EMS Stinger 4, or EMS 8860,6860,4860 Sequential Injection computer system

To install fuel injection on a Pinzgauer you will need to first obtain all the required parts, and remove the fuel tank to install a fuel return line.



After tank is out, you will need to drill a hole big enough for a 5/16" steel tube to fit through to the right of the fuel supply pipe flange (use bendable brake line), and braze or weld in place and test for leaks. The line should hug the tank on the outside and go at least 8-10" into the tank

or you can use the factory dual output fuel pick up used on Ambulances, #7121672022 .



Next replace the gasket and secure modified fuel supply/return line to the tank, and re-install tank.

## **PARTS LIST**

Now you will need the following items ; EFI Manifold and Crank sensor mount kit with tone wheel, Accelerator cable kit with brackets and Air cleaner adaptor ring(available from [WWW.GOATWERKS.COM](http://WWW.GOATWERKS.COM))

In addition to the main hardware kit, you will need a 20amp 12/24 power converter or larger) EFI computer of your choice

I recommend the EMS Stinger 4, or EMS 4860, 6860, or 8860 Sequential computers. ([http://www.emsnorthamerica.com/ecu\\_specifications.htm](http://www.emsnorthamerica.com/ecu_specifications.htm))



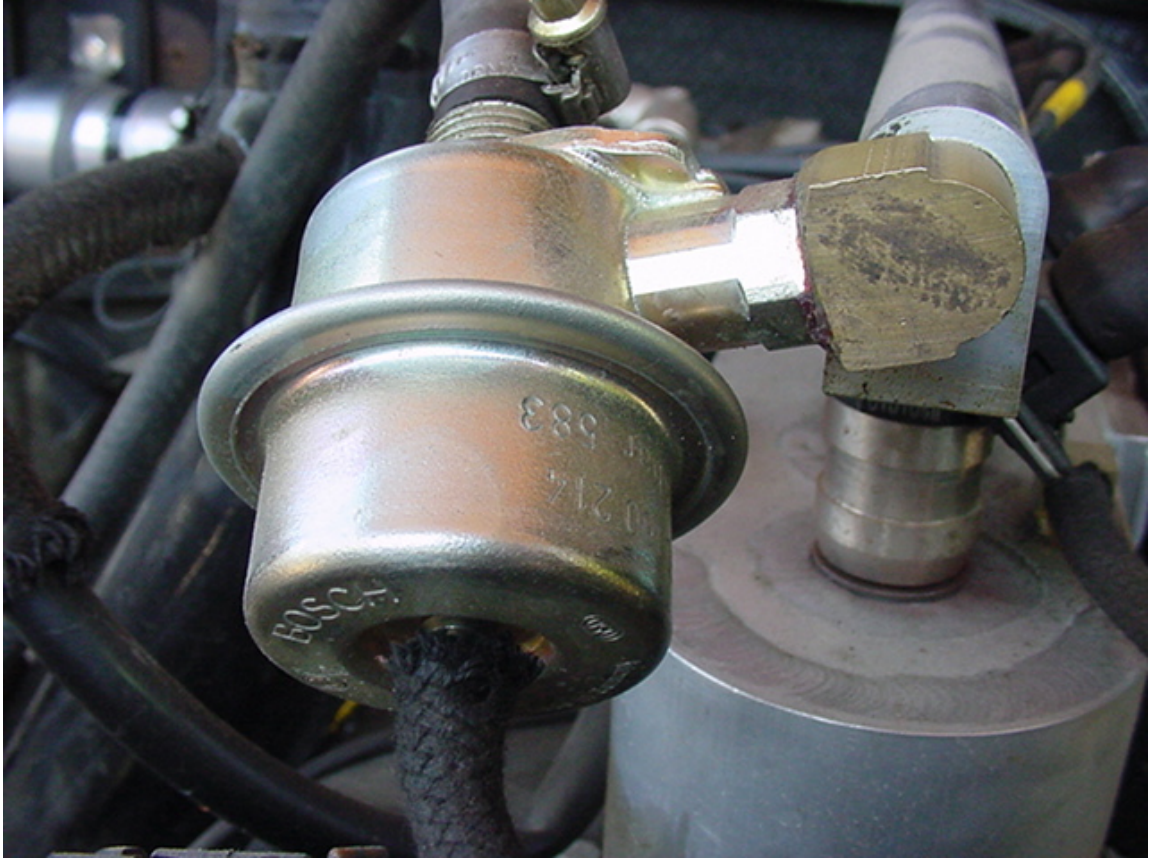
4 standard sized Bosch 30lb injectors(Accel #150130, or 150830 work great),



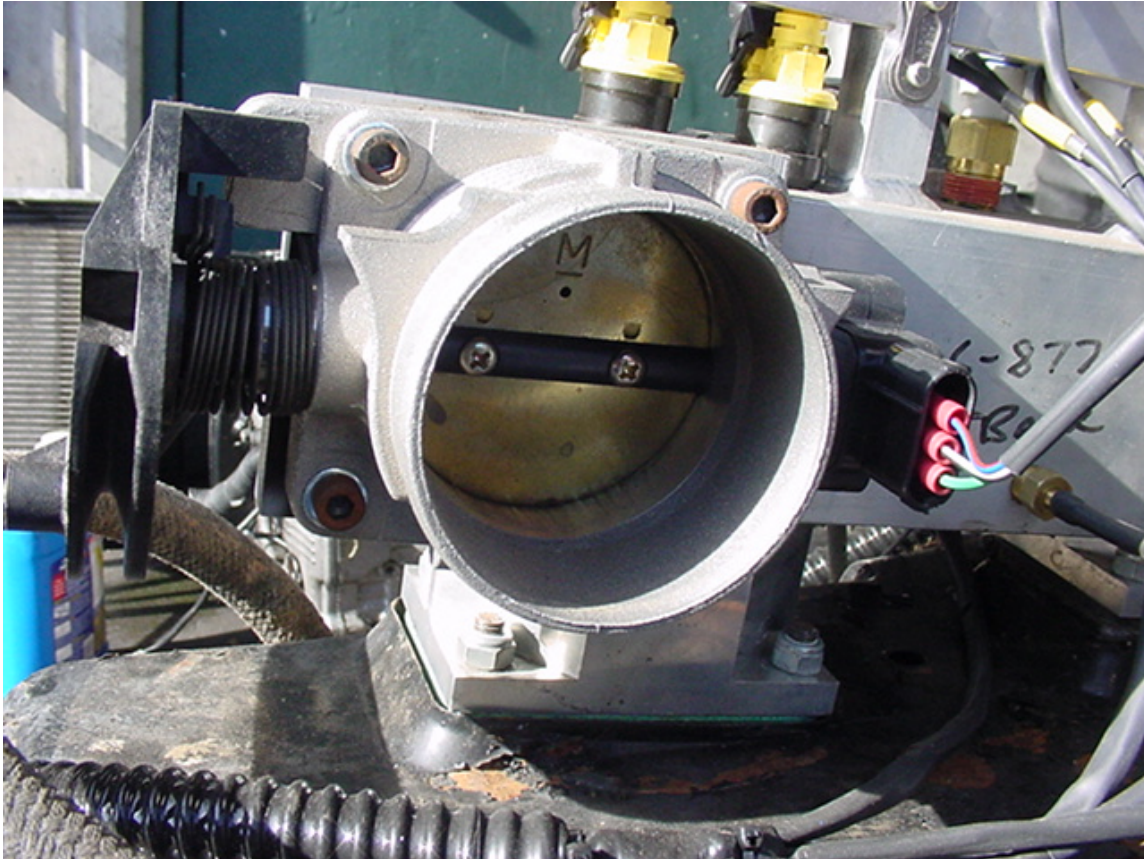
1 electric fuel pump  
(Bosch # 0580464048, or Pierburg # E3000-49687, Carter #P72018),



1 2.5 bar Fuel pressure regulator (Bosch #0280160001 (5/16" inlet & outlet) or 0280160214 (14mmx1.5) works, also Niehoff #21717),



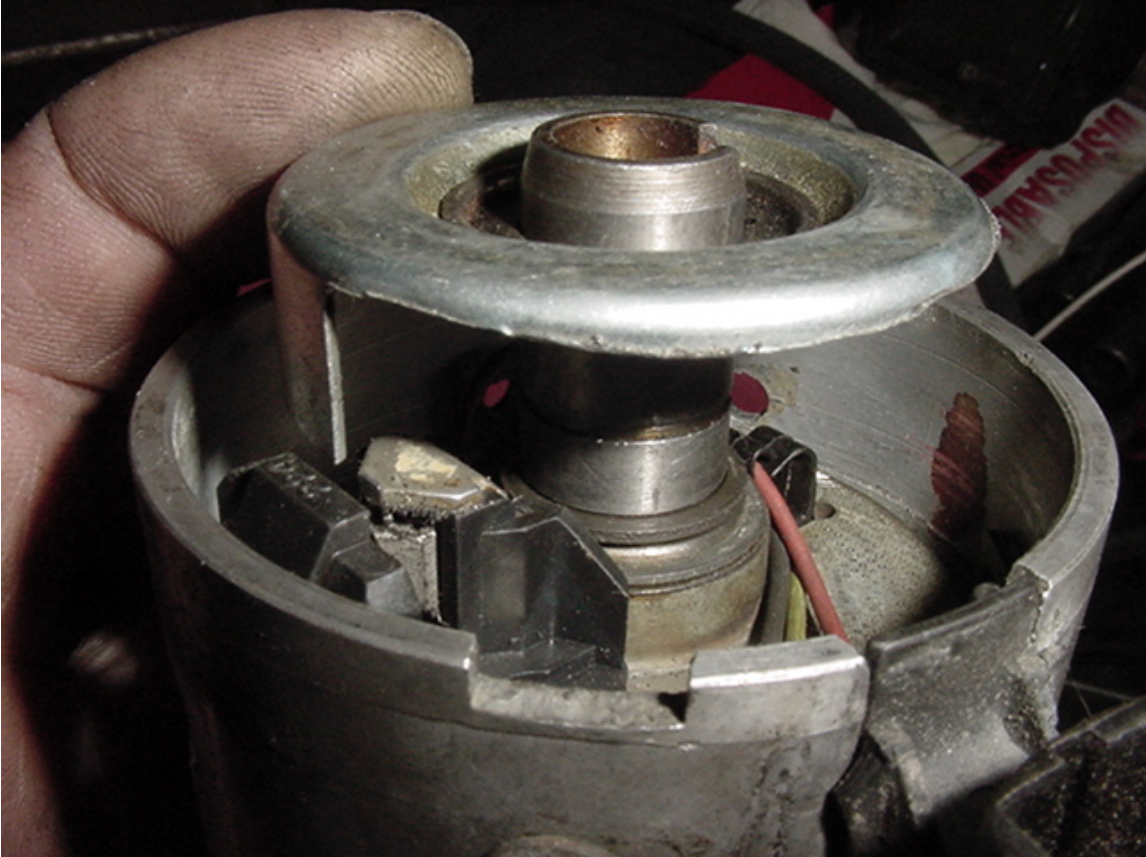




1 throttle body from a 98-01 Ford explorer 4.0l v6 #F77Z 9E926 AD [www.ford-auto-parts-dealer.com](http://www.ford-auto-parts-dealer.com),



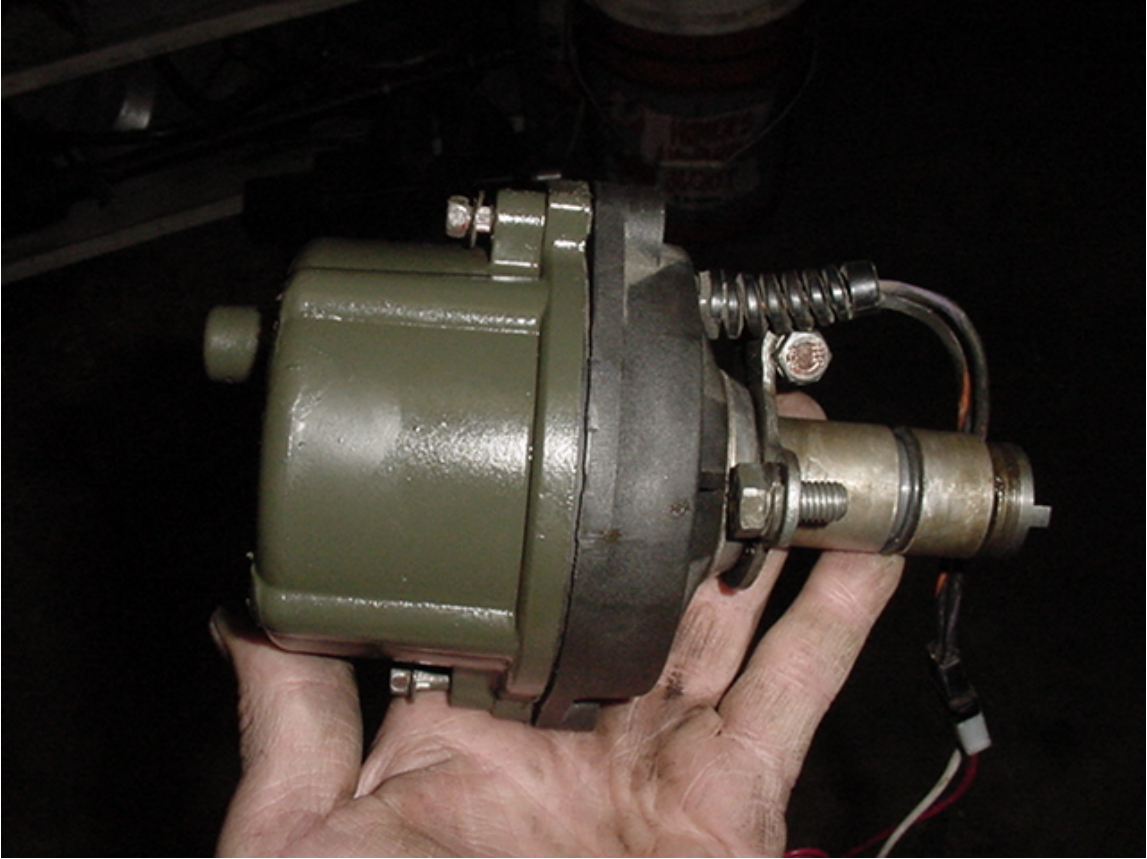
Crank sensor(Wells#SU4214) Subaru



Sync sensor (optional) I used a Modified VW  
MSD distributor#8485  
You can also modify a VW type 3 or 4 Hall type  
distributor by removing 3 of the 4 windows  
and machining the housing to drop into the  
Pinz engine.



You can use a sync sensor in batch mode for better idle control with Stinger or 8860 computers. Sync sensor is required for sequential injection.



MSD8485 (only 1 tooth used)



Coolant (oil) Temp sensor (Wells#SU109)

Or Bosch(cyl head temp) 0280130012

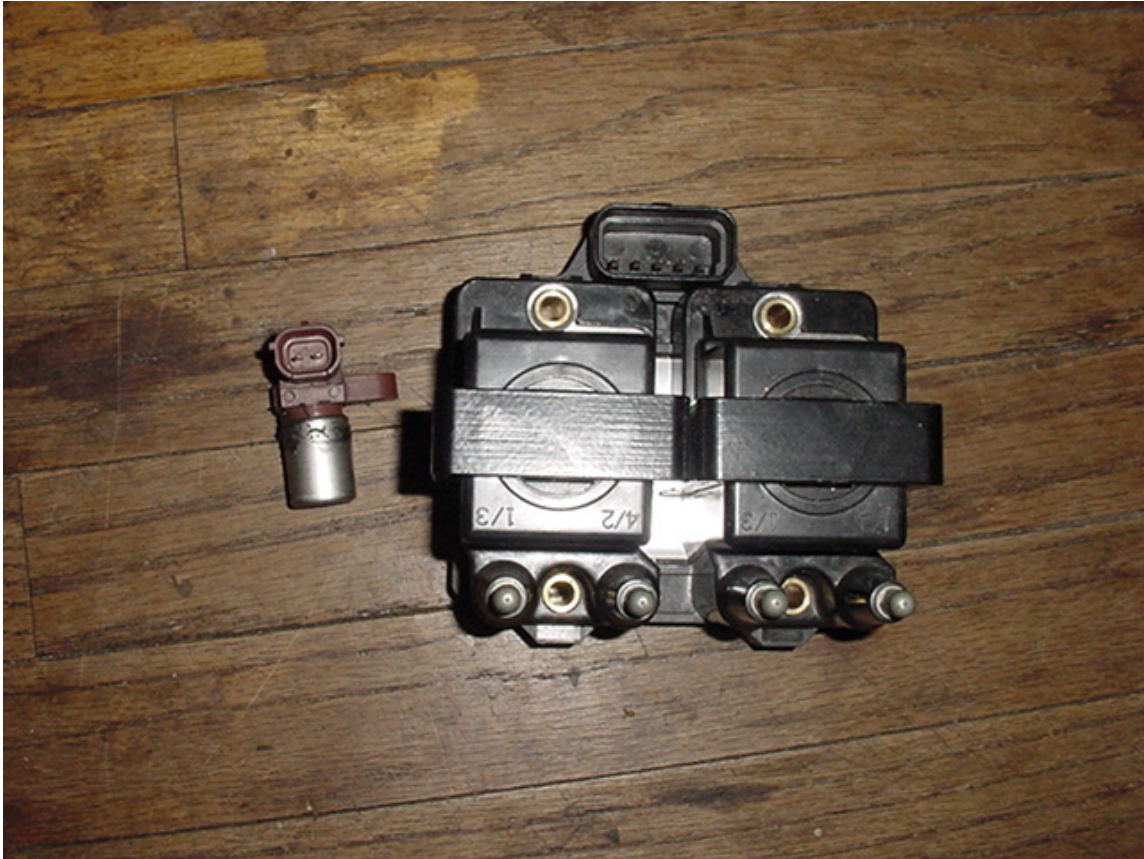




Air intake temp sensor (Wells#SU107) GM

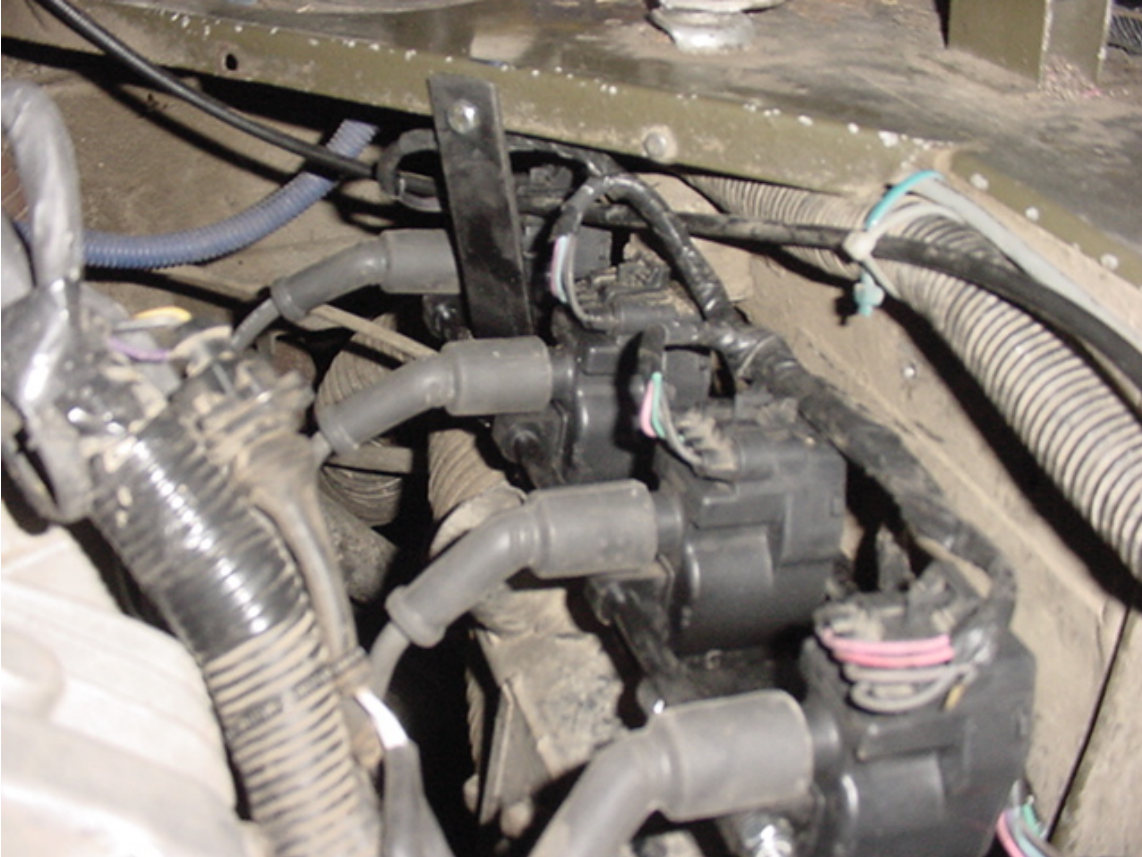
Throttle position sensor (Wells#TPS265) Ford





For batch fire use 97-2000 1.8 liter Saturn Coil pack(Duralast#C1235) and module(Delco # 21024773, Duralast# SA102)

,



for Sequential ignition use 4 separate coils with built in igniters, I used GM LS1, LS2 coils on my final build as they are easily obtained on Ebay(Delco D580-D581-D585).

4 Spark plug wires(stock LS1 wires )or (2 14" and 2 17")for use with Saturn coil pack.

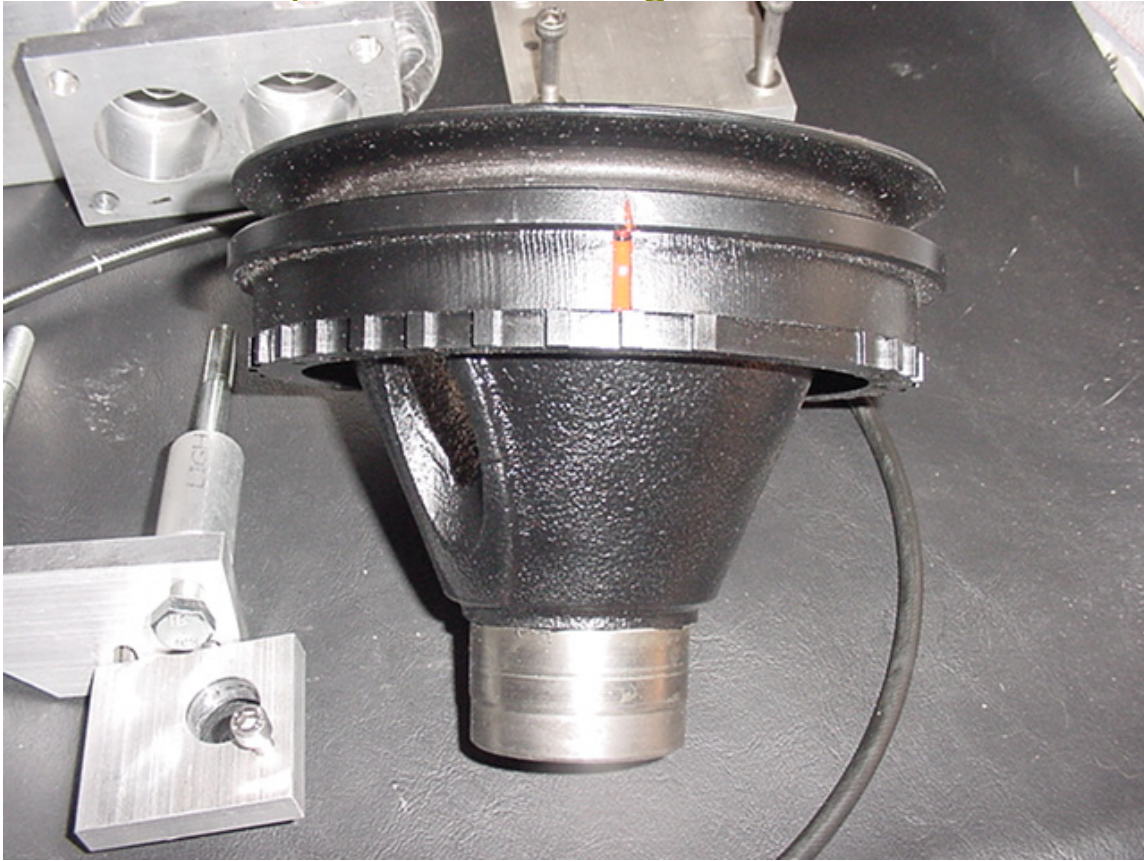
1 or 2 fuel filters(pre and post pump prevents injector damage if pump fails),

about 3 ft of 3/8" fuel hose (supply side), and 10ft of 5/16"High pressure fuel injection hose with full radius clamps , a few assorted fuel fittings and

1 24v 30amp relay

## Installation instructions

### Step 1, sensor ring installation



The "Tone wheel" is indexed to the adaptor ring and the TDC mark on the crank pulley. The pulley must be cut on a lathe(or brake lathe) to snug fit of sensor ring adaptor. Align the index mark of the adaptor ring with the TDC mark on the pulley and Drill and tap the first hole ,Use the aluminum ring for the template and install first screw loosely, repeat till all screws(at least 4) are tightened. Install the Tone Wheel onto locating pegs and secure with supplied screws. Re-install crank pulley to engine.

## Crank Sensor and bracket

Remove both upper Fan housing mounting bolts and replace with bolts bracket and spacer.





Secure crank sensor to bracket and adjust the air gap to the top of the teeth to .020"-.040" and secure all attaching bolts.

## Engine preparation

Start by removing air filter assembly, post , Carbs and fuel pump, use a VW pump block off plate to cover hole(or leave pump in place, loop a hose ,inlet to outlet).

Remove plug wires and Mil spark plugs(leave dist and cap) but disconnect and remove Ignition Coil(power wire will be used for injection system)

secure , remove terminal from plug, or cut off fuel solenoid wires.

Remove all accelerator linkage, and fuel lines.

## Coolant(oil)temp sensor

Install computer oil temp sensor in block above pan rail, at lower boss on thermostat housing, in oil pan, or use VW cylinder head temp sensor



## Air intake temp sensor

Install the sensor into the air horn base of the air cleaner inlet.





## **Intake manifold**

Before bolting down check for even seating on gaskets, mounting holes may be enlarged if necessary, as there are minor engine production variances.

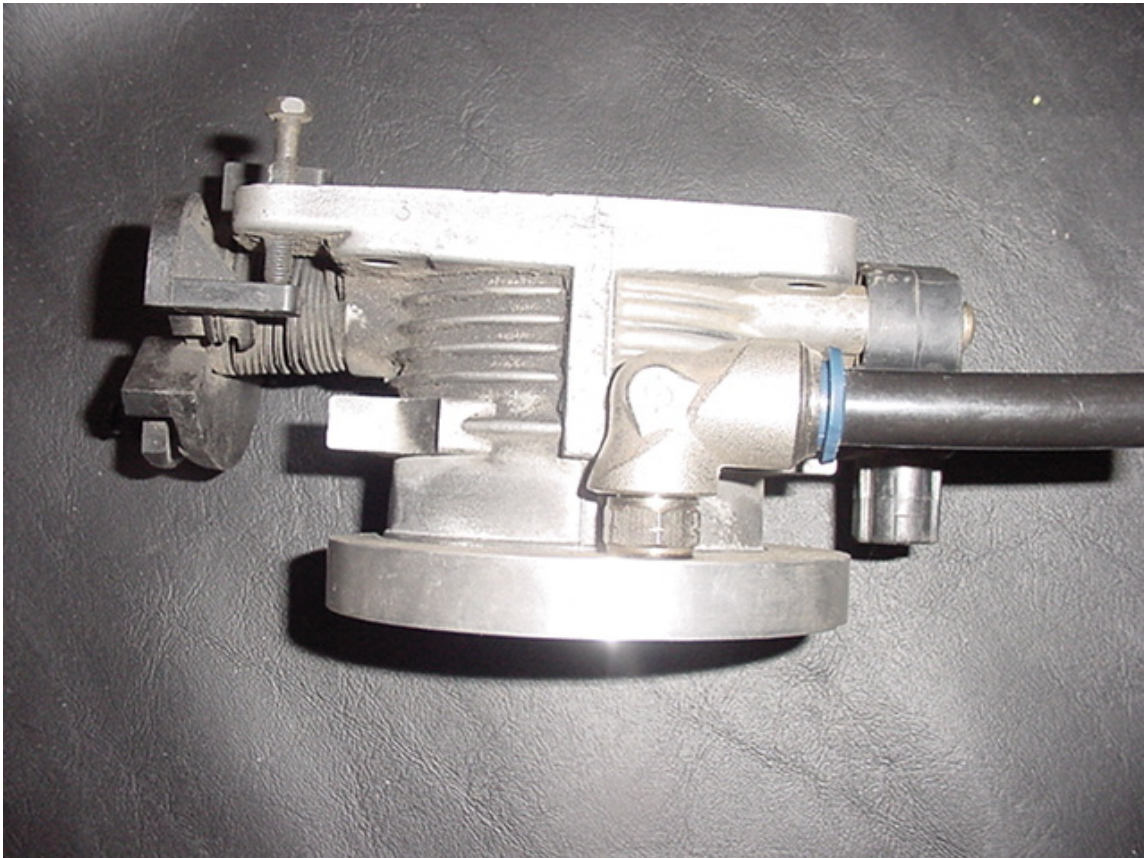
It is easier to tighten the front mounting nuts with the front shroud tin removed.

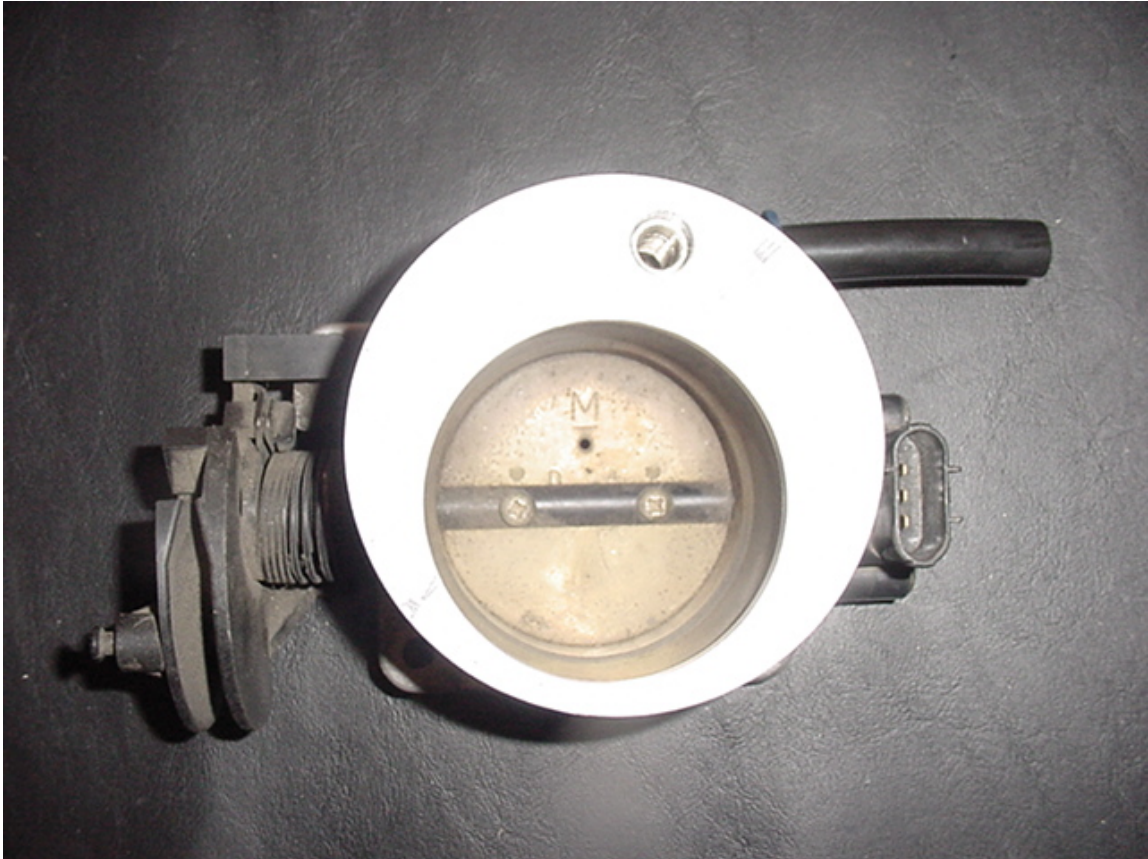
Accelerator cable bracket attaches to last mounting stud on driver side.

Tighten all 8 mounting nuts (My computer coil harness grounds to the engine at intake).

## Air cleaner adaptor

Position the adaptor ring leaving room for the TPS plug to fit past the boot. After finding the position, apply small amount of JB weld or epoxy and tap ring onto throttle body till it is seated.

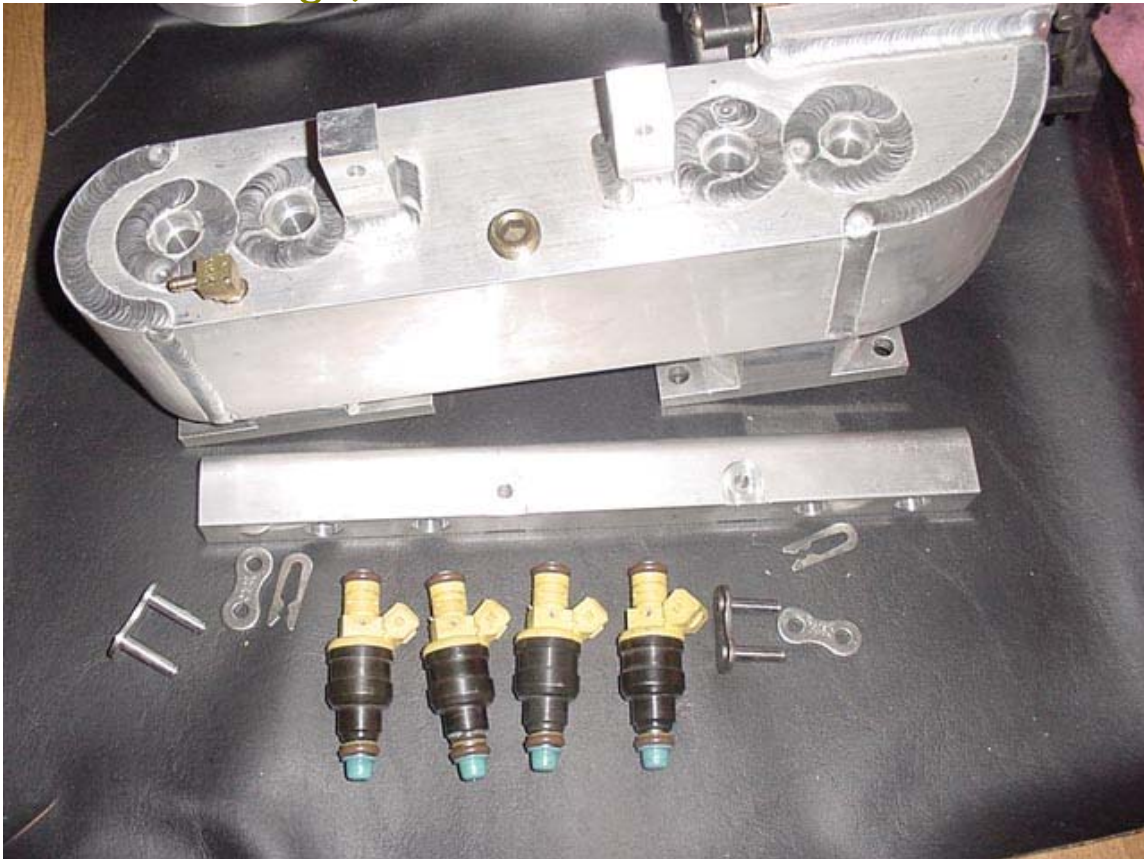




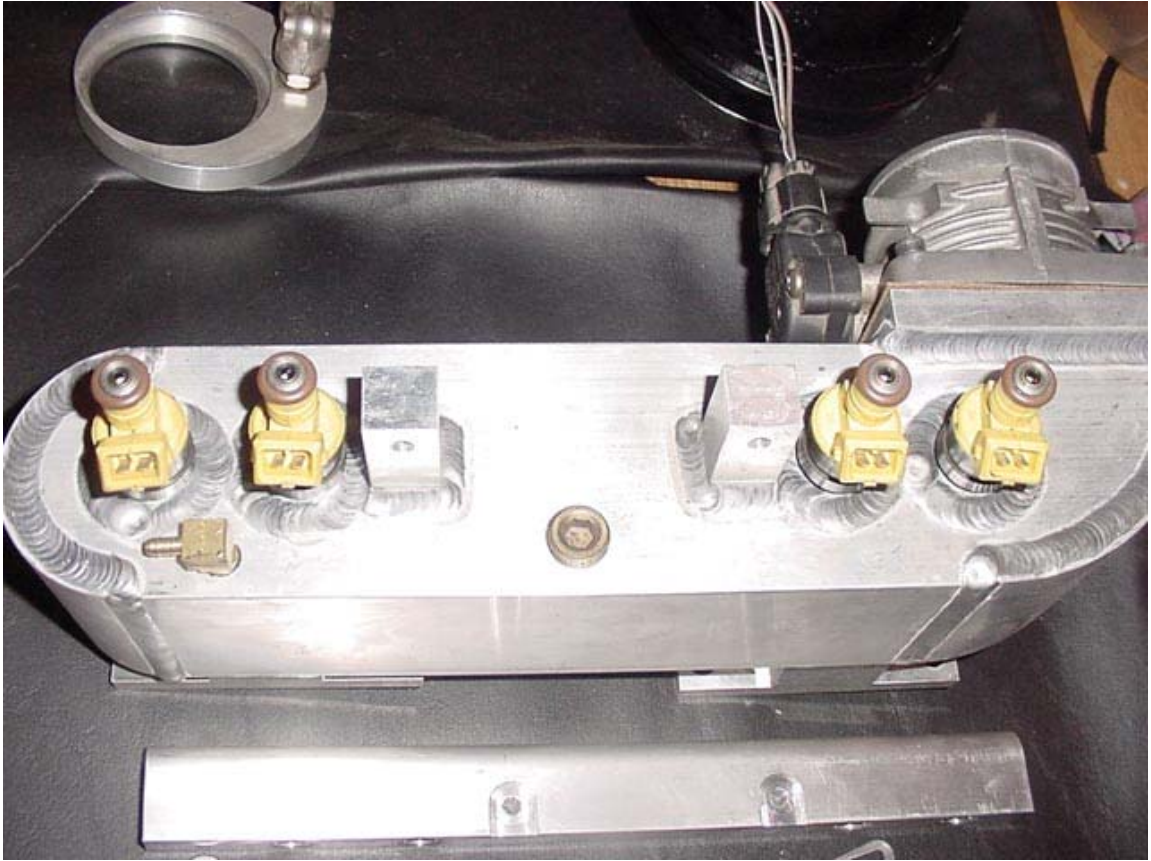
There is plenty of room on the adaptor ring to tap an IAC circuit return port.

## Installing injectors to manifold

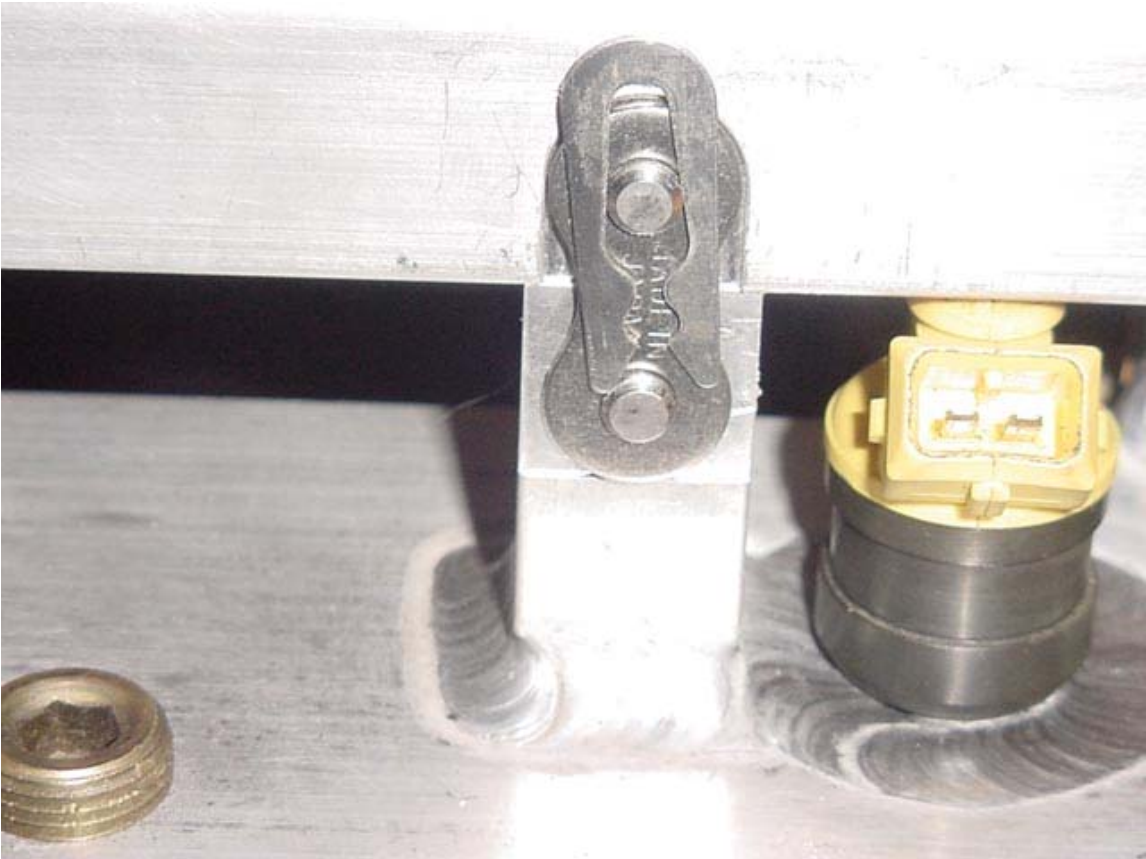
Remove fuel rail link fasteners and install fittings for fuel inlet and return lines (rail is fitted with #6 AN fittings on both ends or 1/4" NPT fittings).



Lube the injector o-rings with oil or Vaseline. After seating the injectors into the manifold with connector ends facing the driver side, press fuel rail onto injectors (wiggle them to get the rail seated)

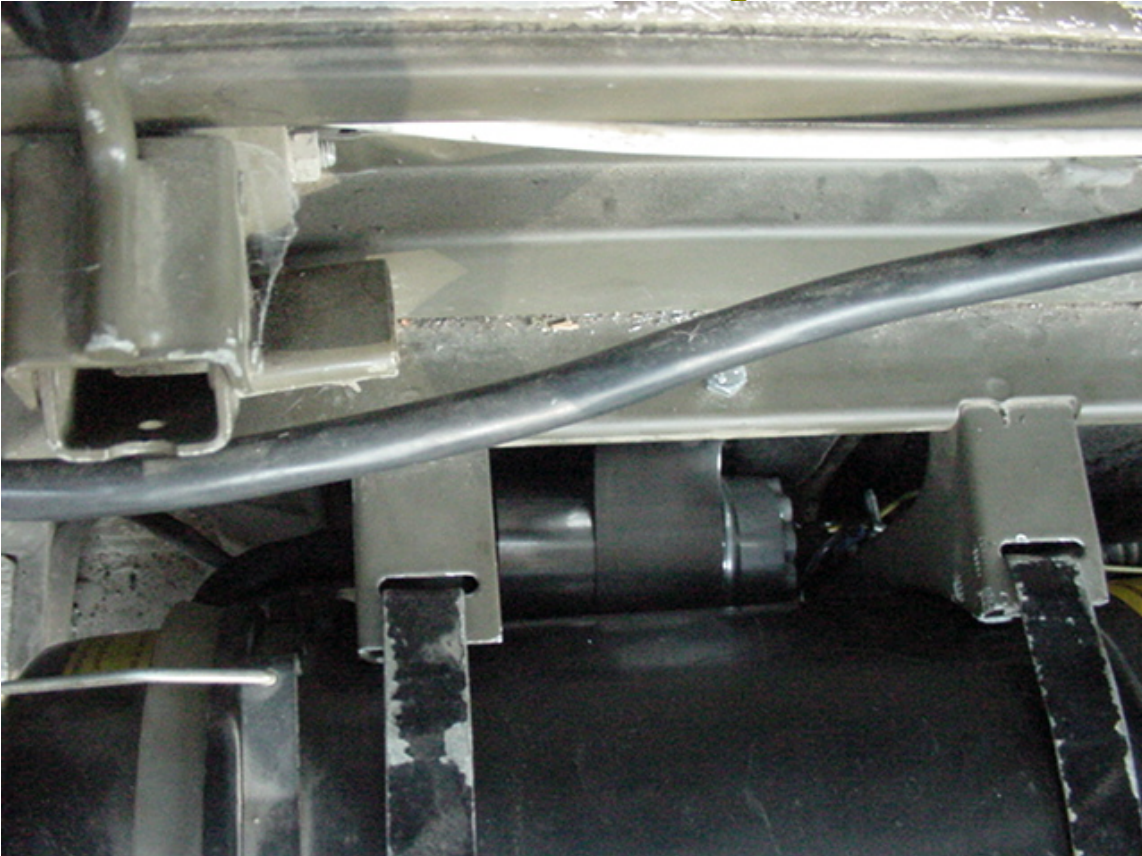


, and secure fuel rail with link fasteners.



## Fuel delivery and return

Install the fuel pump on the gunnel wall between the air filter mountings



or add a mounting tab 8 ½" x2" onto back of gas tank guard if equipped





, use 3/8" fuel hose from source to pump, and (optional) pre filter.

The lower you mount the pump, the longer the life of the pump.

Use 5/16" high pressure fuel injection hose and full radius clamps for delivery side. I originally used AN fittings on both ends of the fuel rail and counter bored the return fitting to use a hose from a Mercedes gas engine to attach the fuel regulator on mine. You can also use a 1/4" 90 deg x 5/16" pipe to hose fitting for Bosch adjustable regulator or carefully re-tap a 1/4" 90 deg fitting to 14mm 150 pitch for Volvo 2.5bar regulator and clock the regulator into the fitting so the return line faces to the rear of the engine. Attach 5/16" high pressure fuel injection hose and full radius clamps from regulator to fuel return line on tank(route return hose along dipstick tube).

Fuel rail pressure should be 29-36psi

Note: If running 24-28lb injectors, you must run fuel pressure 36-40psi for best results

## Accelerator cable

Using the supplied cable and adaptor, attach the cable to the throttle body and engine bracket (mounted at rear intake mounting bolt).



Attach front bracket to cable and align cable with accelerator adaptor, drill and pop rivet bracket to the lip on the body



, or secure with screws, cut cable to length and secure into adaptor with set screw. Adjust travel at adaptor end.

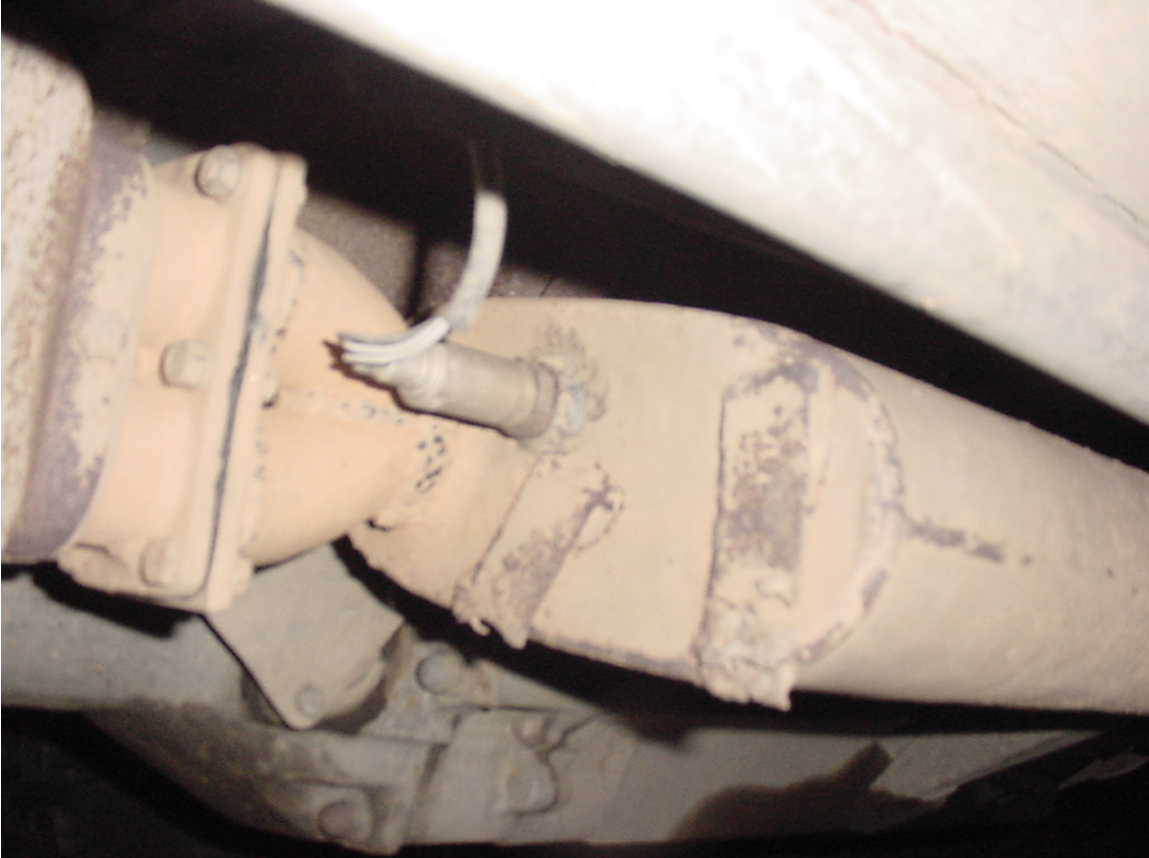


This leaves the hand throttle intact, if you choose not to use an Idle control valve for cold starts. When cold, you control cold idle speed by locking hand throttle. There is already a port tapped on the manifold to incorporate an IAC for those that want to use it or install it in the future.

### **O2 sensor**

To tune most EM systems you need an o2 sensor for optimal results. Locate this sensor

at the muffler inlet. You can also use dual sensors (one in each pipe) but it is not required.





## **Batch fire coils and module mounting**

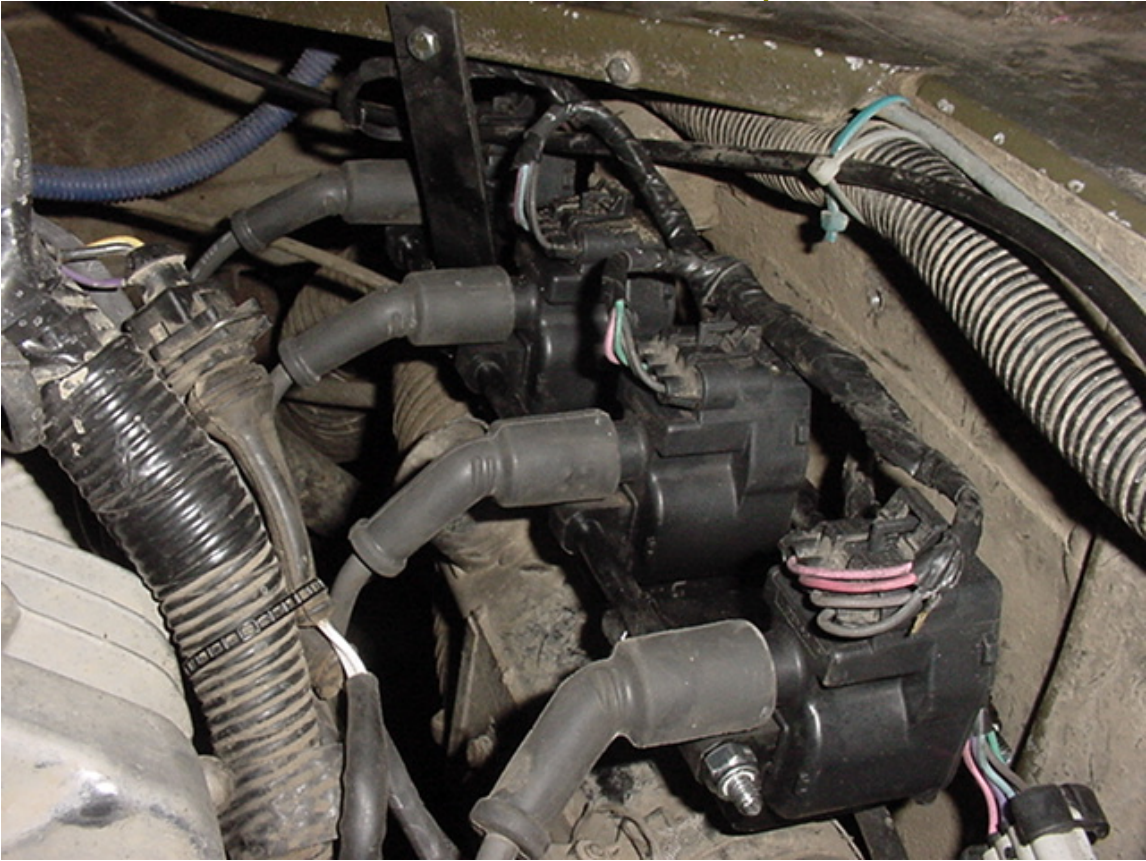
I first used a GM ignition module and coil pack from a 97 Saturn 1.8L

Mounted to the body above the heater control valve behind the spring mount on the heat sink provided in the kit.





Later I mounted the LS2 coils in the same location when I switched to Sequential fire.





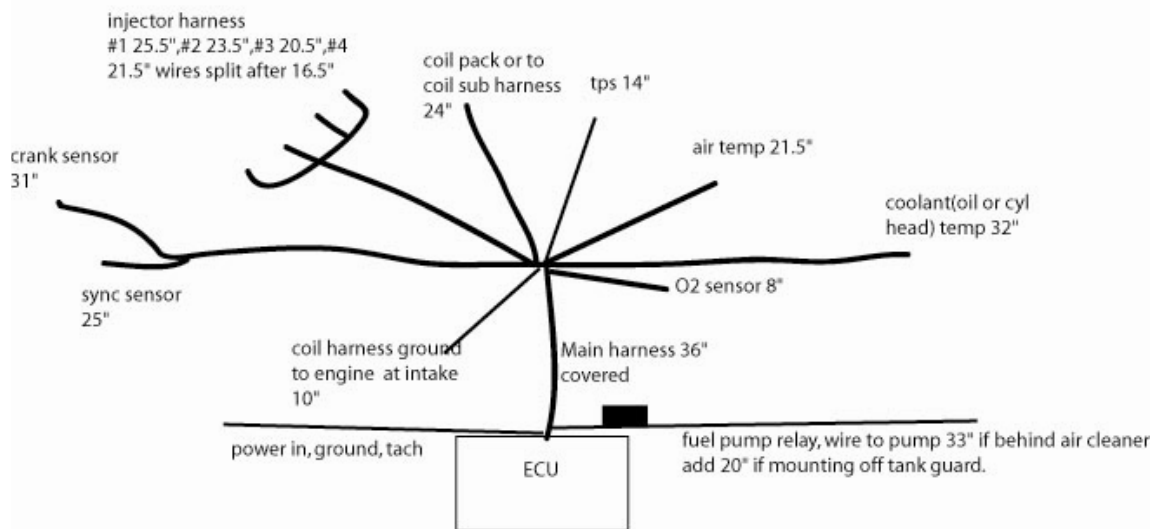
## Computer

Install the computer of your choice or use an EMS Stinger or 8860,6860,4860 (I have running maps for these 4 computers)  
I used the coil power wire to trip a 70 amp 24v relay to power the 24/12 voltage converter to the computer (I ran a separate 24v power feed from battery to relay supply).



# Basic wire harness lengths

Pinzgauer basic fuel injection harness layout  
all branch measurements are taken from the 36" split point



## **Fuel economy**

I make no guarantees, but I am getting the same mileage as carbs using batch fire 12-14mpg, but I was using oversized injectors, I just changed them out for 30 lb ones and expect to get a little more with them. All I have is 2hrs dyno time to get these results.

Update: since upgrading to true sequential, I am now getting better mileage (14-18mpg) and even better power response on acceleration and up steep grades. Feel free to e-mail questions to [info@goatwerks.com](mailto:info@goatwerks.com)