

# *Zetec Turbo How To Full Instructions*

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This guide is based on turbo charging an 1800cc Zetec engine. Before the guide starts, if you want to turbo a 2.0cc engine you must replace the sump, flywheel, clutch and ideally the oil pump with 1800cc ones. In general you are better off using the 1800cc engine you will also require the 1.8 waterpump

however if you want more power then go for the 2.0 as it will produce more torque this guide will take you through whats needed and also more advanced stuff for advanced users

As you would imagine, certain parts of the Zetec engine need to be modifications need to take place if your going to turbo charge a standard based engine more power = more stress = you need to modify the engine so now i guess your thinking great lets get started, but be patient and read carefully on following engine modifacations need for this conversion

sorting out your compression  
Exhaust Manifold Modifaction  
Injector information  
Engine Breather Modifaction  
Turbo Return & Turbo Oil Supply  
What Conrod Bolts you need as well as turbo



## Compression Reduction

If you want to run at power between 180 bhp- 240 bhp then you can save hundreds of pounds using the budget method

Get a drawing with all dimensions of your head gasket, make sure the main bore diameters are such that the gasket was seating entirely on the plate with no risk of overhang into the bore, whilst also ensuring clearance for the pistons, as they protrude from the block about 0.5mm at TDC.

Go to a engineers and give them the plan, they will laser cut the design for you with a 99.99% accuracy rate.

you need to get is 2.5mm steel or alloy

is just as good. This gives you a compression rate of 8:2:1 CR

As a guide you should be paying £30-£60 for this all in, that's a big difference from £600 +. The plate works fine and the head gasket sits nicely on top.

and if done correct you will have a reliable motor

### another hint

instead of paying 500-600 pounds on forged pistons, get yourself some mahle c20let calibra pistons

these are forged as standard and can be had for 100 pounds for a complete set (please note this will only work on 2.0 engines not 1.6 or 1.8 due to the 86mm piston size)



**Step2: Exhaust manifold:**

The exhaust manifold used can be the standard Escort Turbo or Fiesta Turbo item with T3 turbo attached. The port centres are the same on Zetec and CVH engines which is handy, but the studs are in the wrong positions - all 8 need to be re drilled and tapped in the correct position. You can use a new exhaust gasket is used as a template to mark out the new hole positions, then drill and tap the new holes.

Be very careful while drilling the clock as the CVH manifold bolt holes will pass through an oil chamber, so make sure you get all the swarf out to save any problems.

You will be happy to know that there are two alternative methods you can use. These are:-

Similar to the compression plate you can get a plate cut using the exhaust manifold as a guide then just spot weld it into place, then attach the exhausts

Or

The way we do it,, use the standard Zetec manifold and make the turbo fit on. This will put the turbo in a different position but you don't run the risk of loosing compression, people with even the most basic welding skills can do this, just takes a bit of fiddling



### **Step 3: Injectors and Fuel Rail:**

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You have a few options as to what fuel rail you use. The most obvious is the Fiesta RS Turbo rail. The only modification you need to do is make brackets so it can be mounted onto the inlet manifold.

You can also use Vauxhall 2.0 8V fuel rails with the same bracket modification as above.

To fit the cosworth injectors into the Zetec inlet manifold, a few modifications are needed..

A custom rail has to be fabricated to start - can be produced from copper piping and injector connector stubs salvaged from another rail.

The original injector mounting casting is modified to remove excess unnecessary metal where the original fuel pipe connections and regulator attach - the injectors fitted into the pockets nicely, with the o-rings sealing correctly at the bottom. A thin o-ring is fitted to the top of the body to hold it snugly in the casting.

It down to personal preference though

however i would suggest bosch 803 greens as best injectors to use

We always use the Vauxhall rail as they have never faulted us



### **Step 4: Block Breathers and Turbo Oil Return.**

The main Zetec breather assembly mounts on the front of the

block, and completely interferes with the exhaust manifold and turbo, so needs to be removed and blanked off with a plate:

To compensate additional breather port is drilled into the back of the block, with an oil return fitting in the sump. A similar fitting is positioned in the front of the sump to accommodate oil return from the turbo. The existing breather port on the cam cover is also available to breath from.



### **Step 5: Coolant and Inlet Air Temperature sensors:**

The positions of both these sensors is retained in the original Zetec positions, coolant in the top of the thermostat housing and inlet air temp. in the back of the inlet manifold opposite the throttle housing.

The threads of these two sensors is different, so adaptor sleeves need to be made to fit the sensors in the BSP threaded ports of the Zetec - M14x1.25mm for the inlet air sensor and M12x1.25mm for the coolant sensor.

We found that the standard sensors do just the same, so no really need to change them over, depends how picky you are

### **Step 5: Management:**

This is down to yourself, if you just want a reliable turbo car then choose the OFAB ECU out of a Fiesta RST.

If you want to go cossie then you will need all the sensors and ECU set up professionally.

RS Turbo management is good up to 250bhp, as we have found with all our conversions

Note

the best managment i advize is Megasquirt as it has a basemap



plus its not that hard to plum in and you can map it with your laptop  
Plus you can download maps and updates from the net, very Cool

<http://www.megasquirt.info/>

## **Water pump NOTE**

for 1.8 builds use your existing water pump

for 2.0 turbo builds use a 1.8 water pump as the 2.0 spins opposite direction.

## **Coil pack leads**

**the standard coil packs and ht leads on both cc engines are ok to use no mod needed.**

**Thats it Sounds Easy eh, Well it is When you know what your doing.**

**turbo charge your Zetec safely and without spending £4000.**

**understanding of problems you may come across while doing this**

**We would be happy if you had any questions or feedback if you would**

**email us on:- [p\\_picardo@hotmail.com](mailto:p_picardo@hotmail.com)**

**Please enjoy the finished cars, and good luck with your project.**

**[Advanced Zetec Turbo Information Next Pages](#)**

**>>>>>>>**

## **Ignition**

standard Zetec coil pack is fine, as are the Ht leads

use proper ford parts, do not skimp here.

## **Water Pump**

**please not if ur useing your existing 1.8 zetec engine the 1.8 waterpump is fine to use**

**if your useing the 2.0 engine you need the 1.8 water pump,  
the reason is because the 2.0 waterpump spins the wrong way.**

**so please note if ur building a 2.0 zetec turbo build "USE THE 1.8 WATERPUMP"**

## **Inlet Manifold**

**if your build is a 1.8 use the 1.8 inlet manifold**

**if your build is the 2.0 you will need the 1.8 manifold as the 2.0 is plastic  
so please use ur standard inlet manifold for 1.8 builders or for 2.0 use the 1.8 inlet.**



**picture above is a 1.8 inlet with custom made injector rail**







heres a example of the efi inlet with custom fuel rail to accomadate the third party injectors

[here is the complete Zetec turbo Technical Guide for advanced builders](#)

## Choosing your engine

The 1.8 as fitted in the XR2i and RS 1800 is a possibility, although most people opt for the 2.0, which has the obvious advantage of the extra capacity and a wider choice of pistons.

The 2.0 is more expensive and sometimes harder to find than the 1.8

## What Modifacations need doing to the block?

**Oil feed and return** The turbo requires a high pressure supply of oil for cooling and lubrication which then drains out of the turbo and is returned to the engine.

## Oil feed and return ( continued)

The feed is taken from a T-piece between the block and the oil pressure switch.

the escort rs turbo braided hose line can be used

the return should be above oil level and normally goes into the block

the the rear of the zetec block theres a oil preasure switch which you take out and replace

with a t-piece that screws in so you can connect the t3 turbo hose to turbo.

the on end of t-piece you screw your oil switch back in, Simple!

## Compression

the change required for the engine is to reduce the compression ratio from 10:1 to

between 7.2:1 or 9:1

### Methods

Forged low-compression pistons

(Aftermarket pistons produced with a low CR specifically for turbocharged applications)

+ Strong, reliable

- None

## Methods (continued)

### Spacer plate

(a thin metal plate to space out the head from the block)

+ Cheap

- boost still limited due to stock cast pistons

### Skimmed pistons

(machining the crowns of the standard cast pistons)

+ Cheap

- Further weakens pistons that are already unsuitable for turbocharging, boost levels are severely limited

the most common source for 2.0 pistons is the Vauxhall C20LET

from the Cavalier and Calibra Turbo. Fitted to a Zetec these will give a CR of 7.4:1

The C20LET bore is 86mm, compared to the 2.0 Zetec's 84.8mm,

so a slight overbore of the block is required

This will take the original 1998cc to 2045cc. Also required is modification to the rods to accept the 21mm wrist pin.

## Head Gasket

(Focus) Zetec head gasket is fine for turbocharged use and has been used without problems

## Strengthening - Cheapest

## Strengthening - Cheapest (Continued)

the increased stress on the engine from turbocharging, key areas need to be strengthened. not much needs to be done in order for an engine producing a fair amount of power to be reliable

The weakest link is the connecting rod bolts  
replace these with for ARP conrod bolts items (around £80)



The rods themselves will handle around 250bhp

## Inlet Manifold

the standard Zetec injectors are not able to flow enough for much more than a couple of pounds of boost.

The Zetec manifold is retained, but the fuel rail is replaced with one that uses end-fed injectors such as the FRST or XR2i item. The complication

here is that there is no simple and obvious way to mount the rail. Some fabrication will be necessary

## Inlet Manifold (continued)

- + Ports well matched
- Requires adaptation / replacement of the fuel rail

FRST / XR2i EFi manifold and adaptor plates

This avoids needing to adapt the fuel rail by using it with the manifold it was intended with.

Two spacer plates are required. One to address the mismatched mounting holes the manifold and head, and another to "sandwich" the upper and lower portions of the manifold to clear the rocker cover, which sits higher than the CVH.

The failing point here is that the ports differ in shape between the two engines, so the airflow is disturbed somewhat, inhibiting power.

- + Direct bolt on fit.
- Ports not matched.

## Injectors And Fuel Pump

The T25 EEC-IV Escort Cosworth's item will fit for a mild upgrade (up to 250bhp)

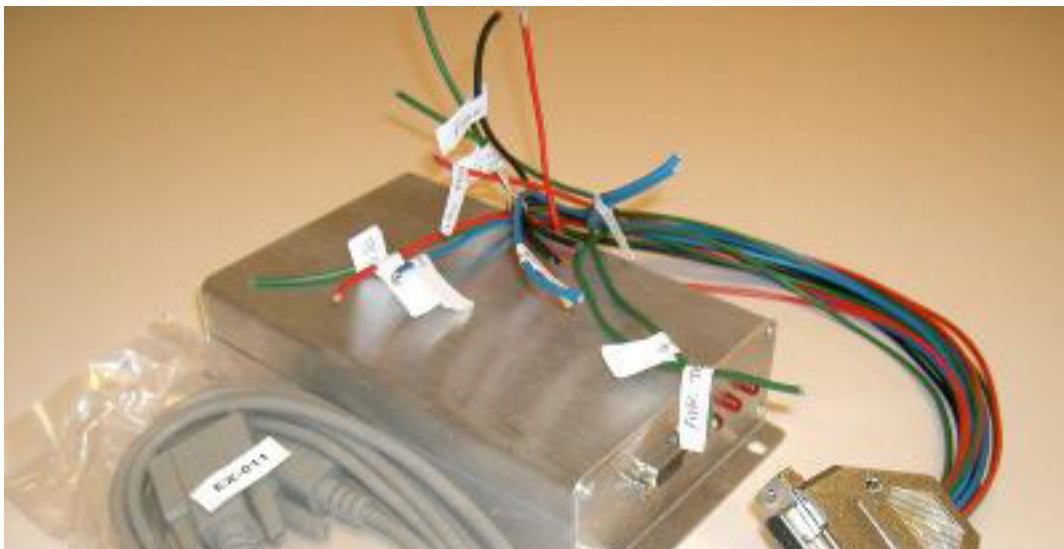
230bhp, EEC-IV injectors

The practical limit for "Beige" 701 injectors, commonly sold as part of the 195 "Stage 2" chip upgrade for the FRST. Maybe suitable for low boost conversions.

## Management

Simple Megasquirt, already built, easy to install, runs great, best and cheapest.

alot of people try and use ofab for managment, but its just too much hassle  
also too much on the pocket **Be Warned!!!!**



# Exhaust Manifold And Downpipe

The standard, cast ERST option is the cheapest, although it does present a problem

the bolt pattern does not align with the Zetec head. This can be rectified cheapest way:

Adaptor plate  
Quicker and easier than tapping,

where space between the engine and can be had for around 50 pounds

## Turbo Choice

to keep things simple use a escort rs cosworth t3 or even a rs turbo t3 turbo  
this will bolt onto your rs turbo t3 manifold which bolts onto your  
freshly built adaptor plate

## An Important Note About Build Budgets

### Building a Zetec Turbo

or having one built for you is never a cheap project. The biggest "hidden" expense is that of all the ancillary parts - gaskets, bolts, piping and hoses etc. All the little things mount up to a fair amount of your budget so it's advisable to have 50% more funds available than you think it will cost.

Having said that, in terms of cost for performance  
the Zetec Turbo represents exceptional value for money.

HAPPY BUILDING





Before you think your ready to build a full zetec turbo, please read the guide through and through  
DO not start your projecct if you dont know what your doing as you will prob make things worse  
when you have read this guide over and over and are confedent and have the knowledge  
then welcome to the zetec turbo world and good luck please take your time  
and when finished your mates will envy you, you will have the knowledge  
to help others and finally you will have ONE FAST CAR :-)





we hope you find this guide very usefull and hope you too can build your very own zetec turbo

advice regarding there zetec turbo build can contact us

[p\\_picardo@hotmail.com](mailto:p_picardo@hotmail.com)

More Power, More Torque, More Bhp, More Wheel spins, More Attitude!

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