

The Evolution of T400 WRC - The Power Engineering Focus

After 3 months of hard work, the Power Engineering WRC inspired Focus has finally evolved into a flame throwing 400 horsepower monster.



This is how it happened.

Back in 2000, we at Power Engineering felt it was necessary to branch into the world of Focus tuning and build a car to fit alongside our Impreza and Evo. The purchase of V948 FTA, a 3 door 1.8 Ford Focus was the start of our passion for the Ford Focus and also helped us to start our strong allegiance with the Ford Focus Owners Club.

After going through the various tuning stages; normally aspirated, supercharged and then turbocharged we felt that it was time to make a statement to the vast number of Focus owners and set out to build the ultimate car.

The Engine and Turbo

Our goal was 400 bhp, so changing the engine was a must. It was converted to a 2.0 litre using a standard 2.0 Focus engine block. With the addition of shortened steel con-rods for strengthening and to lower the compression ratio, a figure of 8.2:1 was achieved. A fully ported gas flow cylinder head was integrated which included special profile Piper cams, adjustable cam pulleys and strengthened head bolts. The standard Mahle pistons were considered of suitable quality and are still being used.

A Hybrid version of the Garrett GT28 roller bearing turbo has been mounted using a tubular stainless steel exhaust manifold and 3" high flow down-pipe. This has been joined to our custom made, 3" stainless steel, de-cat exhaust system with a 4" slash cut tailpipe and a Blitz Electronic Boost controller has been used to allow a more accurate and more flexible boost control.



With the turbocharged engine, cooling was the next concern. The engine and turbo must have sufficient cooling to remain reliable. Our solution was to fit a large air/air intercooler at the front of the car which was piped using polished aluminium tubing and a combination of silicone hosing. This cooled the intake temperature sufficiently, allowing us to run at the high boost levels required to achieve the target 400bhp. To aid the cooling even further, at full boost we have used an ERL Aquamist System 1S water injection system that also helps prevent detonation.

Other additions to the engine bay are a Bailey Motorsport oil breather tank and a silicone hose set. The polished water header tank, power steering tank, fuse box cover and battery cover were all supplied by Spec-R Fabrications.



The final piece of the power puzzle was the addition of a Nitrous Oxide Systems wet nitrous kit which added another 55 horsepower.



Engine management and fuel injection

To be able to set the car up as a turbocharged car we took the decision early on in the project to use an Omex 500 management system. This system compliments the original Ford EEC IV management system and gives us the flexibility of having full control of fuelling and ignition whilst retaining some of the original features that the standard Ford ECU provides.

With such high horsepower and boost levels the standard fuel system was not capable of providing the fuel levels demanded by such a high performance engine. To increase fuel flowrates, we fitted Bosch 803 high flow injectors with a high flow fuel pump. This combination gave us enough fuel to keep things cool and safe.

Brakes

The next question was... 'Now we've got a 400bhp Focus, how are we going to stop it?' After exploring numerous options, the fitment of a Tarox 6-Pot front brake kit was the solution we were looking for. ST170 callipers and discs were added to the rear with EBC Greenstuff pads. To handle the high temperatures we added Castrol SRF racing brake fluid. With its higher boiling point and our previous track experience we were confident that this combination would give us the stopping power we needed.



Suspension and Chassis

Having a car that will handle correctly can actually be a lot more beneficial than just having a powerful car. However, in true Power Engineering style, we wanted both.

All of the standard suspension has gone. We fitted a Spax RSX coil over suspension kit, which has allowed us to adjust both the hardness and the ride height. Combined with Powerflex suspension bushes, Eibach anti-roll bars and a good geometry set-up, we have created a handling package worthy of our quoted 'Ultimate Focus'.

To keep the chassis as stiff as possible and to protect the driver, we have fitted a half/rear roll cage from Safety Devices.

Transmission

As with most of the original components, at 400bhp you start to reach the limits. We knew that the standard IB5 gearbox would have to be replaced.

Our aim was two fold; to keep the tyres on the tarmac and keep the gears in tact. We approached Quaife and after a series of meetings came up with a strengthened semi-helical gear set with the Quaife ATB differential used in the Focus RS. The clutch was upgraded to a Hybrid version of the AP Racing ceremetallic paddle clutch.

Body

As we were advised – 'All go and no show!' wouldn't be acceptable for our ultimate Focus.

So, what styling kit do we use? – There could only be one option – a full WRC one!

After weeks of discussion and persuasion, we managed to get a WRC kit from a 2003 WRC car. Needless to say, we can't tell you anymore about that, except that we couldn't have done without it!



Wheels

To keep to the WRC theme we've added white 8" x 18" Speedline Gt-One alloys that were made for the Group 'A' Escort Cosworth and added our own graphics. Finished with Avon ZZ3 225/40/18 tyres, the outside was complete.



Interior

Although the body of the car is rally inspired it is still a road car and we had to compromise somewhere. The standard interior has been mainly retained with the addition of a few extras.

The front seats have been replaced by Leather Cobra Seats with an embroidered Power Engineering logo, the door cards have been upholstered to match and the door handles and radio surround have been made in Carbon fibre. To keep an eye on boost pressures we have fitted an SPA digital gauge into the dash surround.

The rear of the car has also had some changes made. It's been stripped of its seats to allow room for the rollcage and we've fitted it out with stainless steel covered panels to house the NOS bottle and a polished aluminium tank from Spec-R for the water injection.

Where is it now?

The car will be appearing at numerous shows around the country over the summer. If you can't wait, come and visit Power Engineering in Uxbridge, call 01895 255699 or go to www.powerengineering.co.uk for further information.

