

Forge

MOTORSPORT

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AUTO **Italia**

FORGING AHEAD

How to help yourself to more power than an Abarth 500 Esseesse for a fraction of the price

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Ffft-ffttt-sshhh-tuf-tuf-tuffff? OK, I give in. I'm never going to come up with exactly the right combination of consonants to evoke the sound of this dump valve venting its compressed gas to the atmosphere. And as for the sound of the air intake sucking said atmosphere back into the engine, just a couple of feet from my nose, I'm not even going to try it.

Whatever those elusive spellings may be, there is no doubt about one thing: the sound I'm hearing is loud. As in *very loud*. It's like something from the turbocharged soundtrack of *The Fast and the Furious* – a cacophony of wastegate chatter, induction gossip, exhaust noise pollution.

The reason is simple: this is no ordinary Abarth 500 I'm driving. Indeed it's the closest thing to a turbocharged nutter Abarth I've come across so far. It's what happens when renowned tuner Forge Motorsport gets its hands on Fiat's baby turbo engine and tries to extract as much power as possible from simple bolt-on modifications.

The most immediately obvious changes – they are just so noisome – are the blow-off valve and the cold air intake. Forge has also bolted on a big new intercooler and turbo actuator and remapped the ECU. The result is a package that boosts power and torque by significant amounts for a price that will have you beaming from ear to ear.

The great thing about Fiat's 1.4-litre turbo powerplant is that it's so tuneable. Lots of Fiat Group cars now use it, offering power outputs ranging from 120bhp right up to and beyond 170bhp. And that's only 'official' packages. If you use aftermarket items, that figure can go a lot higher.

British tuner Forge is the very epitome of the aftermarket developer. Its latest project started out as a standard Abarth 500. Unlike some tuning companies, Forge likes to test everything it does, every change it makes, on an engine dynograph. So the first thing it did was put the showroom-fresh 500 on the dyno at nearby PowerStation to get some base-line power figures. Interestingly it discovered that the standard



FORGE MOTORSPORT ABARTH 500

output of the engine wasn't what Abarth claims. Far from having the stated peak of 135bhp at 5500rpm, the actual figure was no less than 146bhp at 5775rpm – some 11bhp above the factory's conservative claim! This scenario has been repeated on other dynos around the country, we understand, and this figure is typical for an Abarth 500 engine – it usually nets between 145 and 150bhp.

The torque story is a little different: while Abarth claims a factory figure of 152lb ft at 3000rpm, Forge's dyno printout reveals a peak of 148lb ft at 4020rpm, although the torque curve is pleasingly flat from 2500rpm to 5200rpm.

So your Abarth 500 gets more power than you might have expected out of the box. Buy Abarth's other 'box', the Esseesse package, and you'll boost that figure to 160bhp at 5750rpm and 169lb ft at 3000rpm. But the package is expensive at £2750 and it has to be carried out within 12 months or 20,000km of the car's first registration by Abarth-trained spannermen. Anyone who wants to tune an Abarth 500 after a year is going to have to go aftermarket. That's where the chaps at Forge Motorsport step in. They've come up with a cheaper way to get even more power than the Esseesse package.

Here's the easiest way to get Esseesse power from the standard Abarth 500 engine. Forge's remap pretty much mimics that of Abarth's Esseesse package and nets you the same 160bhp as the 'SS'. The net gain of 14bhp is delivered at 5510rpm, a little lower down the rev range than the official package. So why consider Forge rather than the official Abarth route? While Abarth's Esseesse remap can only be bought as part of a major (£2750) package, Forge's simple 160bhp remap costs only £350 including VAT. That represents £25 per horsepower gained – a darned good ratio in anyone's book.

BELOW: Forge's package is well-engineered and offers a cheaper and less restrictive alternative to the official kit

Forge has much more up its sleeve though. It has developed a whole range of underbonnet goodies for the wee Abarth. Not only does Forge do all its own development but all its gear is immaculately crafted in its own workshops in Gloucester – not for Forge outsourced Chinese parts. The quality of the welds is fantastic and the superb billet metal it uses imparts great strength and longevity.

Let's start with the induction kit because it dominates the view under the bonnet. While Abarth's Esseesse uses a simple BMC panel air filter, Forge has developed a full intake kit. Priced at £233, the induction kit replaces the existing filter and displaces the whole engine cover as it charts its route over the top of the engine. Why such a route? Well, there's no space to draw air in from the front of the car, so the next best place is the scuttle panel just under the windscreen. This is a low-pressure area aerodynamically speaking, so it's a good place from which to draw cold air.

The induction kit consists of a high-flow filter in a carbon-fibre canister, joined by silicone hosing. (Incidentally, Forge offers this smoother silicone hose for the standard Abarth filter for £85, in a choice of red, blue or black). The new induction package maximises the density of charge air entering the turbo intake. You can't actually see the most photogenic bit of the kit at all: the alloy intake cone is hidden right up under the scuttle panel. Forge's dyno figures show that simply fitting this cold air intake adds 7bhp and 11lb ft of torque.

The main effect of the new intake is to make the 500 very noisy indeed. You either love the sound of air rushing into a turbo or you don't. If you're 18 and like watching *The Fast and the Furious* on YouTube you'll be very happy. If you're 48 and like listening to *Gardeners' Question Time* on Radio 4, the relentless sucking sound



will start to get tiresome very quickly indeed.

Same comment applies to the ffffft-ftttt of Forge's blow-off valve (also known as a dump valve). When you take your foot off the accelerator, this little valve vents excess gas to the atmosphere in a very extrovert (read noisy) way. Priced at £162, it includes a replacement solenoid to work with the engine management and can even be tuned with replacement springs if you want. If the noise is too much for you, it's possible to keep the standard rubber pipe to the valve.

Next: nestling down beside the engine is a new turbo actuator (priced at £125) made from billet aluminium, which means it can hold boost higher up the rev range than the standard rubber-based item. It's a two-part assembly, allowing easy servicing and maintenance, and rod adjustment if you so wish. Forge's choice of actuator spring is set to match factory boost levels (or slightly above) but you can order a stiffer spring too.

Probably the most impressive bit of kit of all is Forge's new intercooler. This replaces the twin-cooler set-up of the factory Abarth, which has one intercooler at each corner of the front end. As you can imagine, the pipe runs for this parallel twin-intercooler system are pretty long, and the bore of the pipework is narrow too. Fitting one big intercooler with short, big-bore pipework lowers the resistance in the system and realises the true potential of the turbocharger. It's sited right up front to benefit from the air flow and has an intercooler surface area that's about 50% bigger than standard. It's designed to be suitable either for standard turbo and ECU software or tuned conversions.

The intercooler (price £645) adds 6bhp and 10lb ft of torque on its own. Put it together with the intake and the net gain is 13bhp and 21lb ft. Mix the whole package together – intercooler, intake, actuator, blow-off valve and remap – and power reaches a peak of

TECHNICAL SPECIFICATIONS

FORGE ABARTH 500 ON THE DYNO

	POWER	MAX TORQUE
STANDARD:	146bhp @ 5775rpm	148lb ft @ 4020rpm
ECU REMAP:	160bhp @ 5510rpm	173lb ft @ 4030rpm
INTERCOOLER ONLY:	152bhp @ 5475rpm	158lb ft @ 4010rpm
INTERCOOLER		
+ INDUCTION:	159bhp @ 5320rpm	169lb ft @ 6185rpm
FULL PACKAGE:	175bhp @ n/a	185lb ft @ n/a

Check out Forge's website www.forgemotorsport.co.uk for more details.

175bhp, and torque rises to 185lb ft. That's a gain of almost 30bhp on the dyno, and an even more impressive 37lb ft of extra torque.

The full Forge engine package will cost you £1600, which undercuts the Esseesse package by £1150. OK, you don't get Abarth's special 17in wheels, drilled front brake discs, uprated pads or lowering springs (or that evocative Esseesse wooden box to swoon over). However, you do get even better performance.

Of course this Forge package is just the start if you want to do more tuning. Forge hasn't altered the turbocharger or boost, for example, nor has it touched the engine's internals. But as it stands, here is a car that comfortably beats an Esseesse in a straight line – and all for just £1600.

As it stands, this car is plenty quick enough. It's clearly quicker than an Esseesse and its power is instantly accessible from as low as 2500rpm. There's no let-up in the flow of torque right up to and beyond 5000rpm, and the dyno graph confirms that you get more power than standard right across the rev range.

Personally I couldn't live with that shouty induction roar. I would happily sacrifice the 7bhp that the intake adds for a bit of peace and quiet. But then, I do find myself listening to Radio 4 quite a lot these days. ■

BELOW: No bodykits and bulges on the Forge Abarth 500, just improved performance through effective engineering

