

Blowing the 5.0

INSTALLING A VORTECH SUPERCHARGER ISN'T SO DIFFICULT...REALLY

› text and photography by Ricardo Topete

It is the general consensus among Mustang enthusiasts that a supercharger, or blower, is the Holy Grail among speed parts. Sure, there are other modifications that can add just as much power as a supercharger kit, however, there is something so special about a supercharger under the hood of a Mustang that a nitrous system or stroker motor just cannot duplicate.

To prove this, go to any gathering where Mustangs are present and you will see that the cars that seem to garner

the most attention from on-lookers are those with supercharger systems.

Before we continue, understand that

we are not proclaiming the supercharger as a superior method of making power over a nitrous, turbo or naturally aspirated combination. Which method of making power works best is personal and often debatable (Chris Hemer's article "Bolted, Blown or Stroked?" found elsewhere in this issue helps focus some of the decision-making with regards to which power option is right for you). Our intention here is to give you idea of what's involved with adding a supercharger to a Mustang. For that, we'll take a look at the function, contents, and installation procedures of a Vortech Supercharger kit, and hopefully help you determine whether a supercharger is the best plan of attack for you.

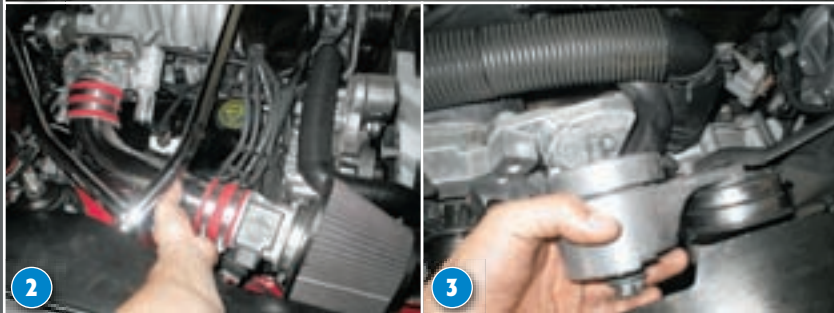
In its purest form a supercharger acts as an air compressor. It draws in air, compresses it and force-feeds it into the engine to produce more power than an engine would normally be able to produce. This pressurized air that is building up inside the engine is referred to as positive pressure, or "boost." Boost is a method of measuring the output of a given supercharger and, generally speaking, the higher the boost level the more power potential.

Naturally, a high-output supercharger will require different equipment to perform to its full capacity versus a conservative supercharger that produces a more modest boost level. Probably the two most important ingredients in the supercharger recipe are fuel and ignition timing. With the added oxygen that a supercharger will provide, a corresponding amount of additional fuel



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1 This is the Vortech kit for the '93 Cobra.



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2 Disconnect the battery, drain approximate one gallon of coolant from the radiator and remove the air induction system from the engine.

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3 Remove the factory belt and belt tensioner.

must be added. Also, with the increased cylinder pressure that is created by boost, the ignition timing must be retarded appropriately. Failure to make these adjustments will result in catastrophic engine damage. This explains why some mild supercharger kits will only include basic accessories while other higher output versions include more

elaborate equipment, such as larger fuel pumps, by-pass valves and ignition timing control devices.

Vortech Engineering is recognized as a leader in centrifugal supercharging technology. With supercharger kits for virtually every Mustang ever built, including V-6, 4.6 SOHC, 4.6 DOHC and of course 5.0 engines, you are

bound to find one to suit your needs. Vortech's philosophy of delivering "safe boost" assures the best blend of overall performance and long-term reliability. These kits are designed to provide the best possible horsepower at a safe boost level—an ideal condition. If max power isn't your thing and you prefer the bling-bling, any Vortech can be ordered in a polished finish.

These supercharger kits feature Vortech's famous oil lubricated gear-driven technology for unmatched reliability, 50-state smog-legal certification, three-year, 36,000 mile warranty, and, of course, that distinctive and lovely supercharger gear whine. Furthermore, all the necessary components required for a clean, safe and effective installation are included—oil feed and oil return line, high efficiency by-pass valve, cast aluminum brackets, air inlet tubing, discharge tubing, K&N air filter, high output T-Rex fuel pump, fuel management unit, boost timing master control, necessary pulleys, hardware, tensioner, and belts. In short, everything except the mechanic to install it for you. Keep in mind that the list of contents may vary from one supercharger kit to another, depending on the exact year, model and engine that it is intended for.

Bolted, Blown or Stroked?



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7 Use a 3/8-inch NPT tap to thread the hole in the oil pan. Hint: Cover the tap with heavy grease to prevent metal chips from falling into the oil pan.

8 Thread the supplied 3/8-inch brass fitting into the oil drain hole. Be sure to apply silicone sealer to the threads of the fitting.

9 Remove the factory oil pressure sender (near the oil filter) and install the hardware supplied for the oil feed line. Re-connect the stock oil pressure sender to the supplied T-fitting just installed. Next, route the supplied oil line towards the passenger side of the engine. Be sure to keep it away from moving parts.

10 Assemble the main bracket and supercharger mounting plate using the supplied hardware. You will sandwich the smog pump between the mounting bracket and the supercharger plate.

4 Remove the alternator and smog pump, and unbolt the bracket from the cylinder head.

5 Remove the stock crank pulley and replace it with the Vortech-supplied crank/supercharger pulley.

6 The oil drain is placed on the passenger side of the oil pan. Mark and drill a small pilot hole, then, using the supplied Vortech punch, enlarge the hole to approximately 9/16-inch diameter. This method will safely "roll" the oil pan lip to allow for threads to be cut.



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For assistance with this story, we contacted the dedicated staff of Mustang gurus at GTR High Performance in Rancho Cucamonga, California. As it turns out, GTR was scheduled to install two different Vortech Supercharger kits into two different customer's Cobras. GTR had managed to corral two of Ford's most sought after Mustangs: a 1993 SVT Cobra owned by Mark Walker, and a 1995 SVT Cobra owned by Ron Cooper. As you may already know, the Cobra engine has been upgraded in comparison to the standard 5.0L—most notably with the Cobra upper/lower intake manifold,

24 pound/hour fuel injectors, 1.7 roller rocker arms and improved cast-iron Cobra cylinder heads.

Mark has already outfitted his '93 Cobra with some popular upgrades. Goodies such as the MSD ignition amplifier, MAC headers, MagnaFlow H-pipe, Flowmaster muffler system and rear gears had found their way onto this show-winning pony. Ron decided to do a tad more with his daily-driven '95 Cobra. This snake was ready for the hunt, equipped with headers, MagnaFlow H-pipe, Borla cat-back kit, 65mm throttlebody, rear gears and

a Vortech/Saleen upper and lower intake manifold. Both of these cars are indicative of what the average Mustang enthusiast has on their ride—nothing too wild, but certainly improved over stock. Both vehicles provided an excellent foundation upon which to add a supercharger.

GTR gave us a glimpse of what is involved in tackling a job of this magnitude. Keep in mind that this is a relatively time-consuming and demanding installation procedure (according to Vortech, expect about 10 hours of labor time for a trained professional, more for the



11 Align the assembled bracket and bolt to the passenger-side cylinder head.

12 The factory smog pump hoses will have to be trimmed according to Vortech's specs to fit onto the relocated smog pump.

13 Cut the upper radiator hose and insert the supplied chrome tube to allow for clearance to the supercharger.

14 Secure the Vortech supercharger to the bracket with the supplied bolts.

15 Attach the FMU to a suitable place on the passenger shock tower area. Route the factory fuel lines into and out of the FMU according to the diagram provided by Vortech.

16 The Anderson PowerPipe is routed through a circular opening in the

fenderwell. However, it will be necessary to enlarge the opening to fit the PowerPipe. A cut-off wheel works well for this.

17 Connect the PowerPipe to the inlet on the supercharger using the supplied tubing.

18 Attach the factory mass air meter to the PowerPipe inside the fenderwell, then install the supplied K&N air filter.

backyard mechanic). However, it can be accomplished by the more experienced do-it-yourselfer with access to a wide assortment of tools. Don't feel up to the task? The crew at GTR offers installation on-site. If you decide to give it a shot, make sure you don't bite off more than you can chew. GTR has seen countless customers attempt a supercharger installation only to find out it is beyond their scope, or worse—ending up damaging vital parts during the process. The moral of the story: be realistic and know your capabilities.

On the surface, it may seem as if both

of these projects are identical to one another since both vehicles have 5.0 Cobra engines and both are receiving Vortech S-Trim superchargers. Although there are some inherent similarities between the two with regards to the installation procedures, the team at GTR took a slightly different approach on the '95 Cobra. Since Ron's '95 Cobra was slightly more modified than Mark's '93 Cobra, and Ron was in search of more power than what the Vortech S-Trim kit would have provided on its own, some variations were performed.

For instance, a larger Walbro 255

liter/hour high-pressure fuel pump was installed versus the Vortech supplied T-Rex fuel pump (which provides approximately 200 liters/hour). Next, modified Ford Racing 30 lb/hr fuel injectors were used instead of the factory 24 lb/hr units, along with a Lightning 80mm mass air meter versus the factory 70mm piece. Finally, a DiabloSport computer chip was used to dial everything in. These upgrades over the Vortech-supplied parts were done strictly in search for more power, and to allow for more "growing room" in the future.

› Bolted, Blown or Stroked?

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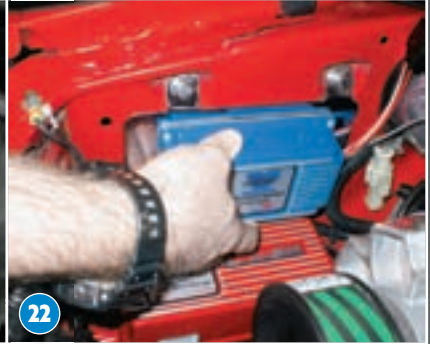
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The '93 Cobra has a slightly different agenda, and was content to receive the Vortech S-Trim as provided out of the box. The only extra perk was the addition of an Anderson Ford Motorsport PowerPipe. Anderson Ford's PowerPipes replace the Vortech supplied inlet tubing with a four-inch diameter inlet pipe for additional airflow into the supercharger. This translates into more boost output and consequently more power. It is common to see about one- to three-psi increase in boost level (depending on the extent of modifications) by upgrading to a PowerPipe. As if that wasn't reason enough to add one, all of Anderson Ford's PowerPipes feature a ceramic coating for lasting good looks and durability. Anderson Ford offers PowerPipes for all popular supercharger kits for 1986 and newer Mustangs. Priced at only \$244.99, it is a relative bargain considering the power gains possible.

ENOUGH TALK... WHAT ABOUT THE RESULTS?

Vortech has provided us with preliminary

data. A '93 Cobra in stock form puts out 235 horsepower and 285 lb-ft torque. With the Vortech in place, the output jumps to 376 horsepower and 400 lb-ft torque. The '95 Cobra model spits out 240 horsepower and 290 lb-ft torque from the factory, and with the Vortech strapped in place the company tells us this dims to 355 horsepower and 377 lb-ft torque. The above data provided by Vortech are flywheel figures, not rear wheel horsepower figures.

Fortunately for us, the '95 Cobra had been dyno-tested just a few days prior to having the Vortech installed to establish a baseline. As tested by Powertrain Dynamics, the '95 Cobra managed to put down 254 hp at 5,100 rpm and 289 lb-ft torque at 4,200 rpm to the rear wheels. After completing the Vortech installation, another test and some custom chip tuning by Powertrain Dynamics was performed, and this time we saw 372 hp at 5,100 rpm and 395 lb-ft torque at 4,700 rpm at the wheels. The Cobra was allowed to cool down and another run revealed 387 hp and 405 lb-ft torque—a sweet 133 hp and 117 lb-ft torque jump. This clearly

19 Connect the supplied vacuum hose from the FMU to the vacuum source. Hint: the vacuum tree on the driver-side firewall makes a good source.

20 The Vortech T-Rex fuel pump is mounted under the car, just in front of the spare tire wheelwell. Connect the fuel lines and electrical connections according to the Vortech diagrams.

21 Connect the oil supply line to the supercharger. Be sure to route the oil line away from any moving parts.

22 The Vortech/MSD Boost Timing Master must be mounted in the engine compartment. We found some open space on the passenger side right next to the MSD ignition which GTR had previously installed. Wire the Boost Timing Master according to the instructions Vortech provides.

23 The installation is complete.

24 As discussed earlier, here is the Vortech Supercharger kit for the '94-'95 Mustang. Notice the minor differences between this and the Vortech kit for '87-'93 Mustangs.

demonstrates the effects of colder air, and offers a glimpse of what an intercooler is capable of. Keep in mind that both installations were done using the stock supercharger pulley (which is designed to produce eight psi). Even larger power gains are only a pulley swap away for the greedy type.

By now some of you are contemplating selling your first-born child to put a Vortech under your Mustang's hood. You may not have to go to that extreme since the Vortech superchargers are relatively affordable. At the time of this writing, Vortech had a list price of \$2,918 for the '93 Cobra kit, while the '95 kit listed at \$2,900. Considering the tremendous power potential and prestige that a blower can provide, many would consider that a small price of admission. ■

SOURCES

GTR HIGH PERFORMANCE

(909) 987-4386
www.gtrhipo.com

VORTECH

www.vortechsuperchargers.com

ANDERSON FORD MOTORSPORT

www.andersonfordmotorsport.com

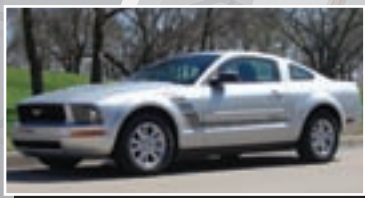
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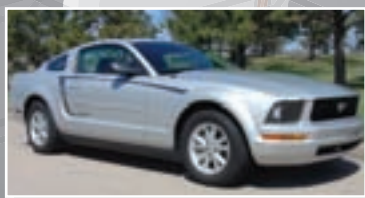
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