

KENNE BELL TWIN SCREW SUPERCHARGER UPGRADES

Our primary goals were to develop a direct bolt on upgrade replacement supercharger for the relatively inefficient stock Eaton superchargers (see catalog and website for comparisons and 3rd party magazine dyno tests). NOTE: All HP and torque numbers are rear wheel. Just bolting on the Kenne Bell Twin Screw in place of an Eaton results in substantial power gains. Power consumption is less, and air charge is lower.

At one time, not too long ago, many assumed the Kenne Bell Twin Screw and Eaton Roots were the same supercharger. Back-to-back tests on the ultra accurate and respected Kenne Bell Dynojet between the Eaton and Twin Screws on a 4.6 Mustang, Lightning, '03 Cobra and '07 Shelby forever changed the way the automotive industry perceives these products. It is now clear to all that the Twin Screw concept is superior in air charge temperature, parasitic loss, boost and (overall) adiabatic efficiency. Replacing the Eaton supercharger with the Kenne Bell Twin Screw on the Lightning, Cobra and Shelby is now an accepted and proven practice for anyone desiring more boost/air flow, power, performance, and acceleration.

The Stage 1, 2 and 3 Kits are a snap to install and upgrade. And they are complete with Calibration. No extras or add ons are required. No "re-tuning" is required as the kit comes with the HP optimized. There's a STREET and SHOOT OUT mode calibration for each Stage.

KIT CHOICES

Almost 100% of the kits ordered are Stage 3. Stage 3 was also the Shelby choice for the ultra powerful 725HP "World's Most Powerful Production Musclecar" Super Snake. The 725HP is actually a CONSERVATIVE rating. Magazines that have tested these cars place the engines at 800HP.

WARNING: These kits were designed to produce maximum power and performance - up to 801RWHP and 9 second 1/4 mile potential. YOU MUST RESPECT THIS CAR. It is FAST and incredibly powerful. Traction is a problem with any high HP vehicle, so exercise extreme caution when driving the Shelby on the track or street. Street Drag Radials are recommended for any application. Clutch, driveshaft and rear end reliability will, as with all high performance cars, depend on driving style and engine HP selected. Pulley, boost and octane recommendations should be used as a guide only. Ambient temperatures, fuel octane, driving style, spark plugs, tune etc. are just some of the variables that can affect the engine detonation threshold. Kenne Bell offers supercharger pulleys that cover a wide boost/HP range (10-23 psi) and 540-801HP that can be adjusted for any combination or application.

DRAG STRIP PERFORMANCE

Muscle Mustangs & Fast Fords Magazine tested a Kenne Bell Stage 3 powered Shelby Super Snake and ran a 10.80/134.1 mph with 93 octane. The ONLY addition was a set of slicks for traction. These times require the engine produce 790HP. The 2-1/2" pulley adds another 109HP (900 engine HP) which can put the car into the 9's @ 142 mph.

DRIVESHAFT

An upgraded one piece driveshaft is a must. We sell the Inland Empire Driveline that we helped develop. Works with lowered cars. Always use an approved drive shaft loop. If lowering the car be sure there is adequate driveshaft to tunnel clearance.

ENGINE LOWERING / BODY RAISING KITS

Not recommended because it alters the driveshaft angle, reduces header ground clearance and is expensive. Engine lowering/body raising kits that provide extra clearance for larger 3.3 superchargers which provide NO HP ADVANTAGE even at 23 psi. New front springs, motor mounts etc. must be installed and the sway bar spaced down 1/2". DO NOT buy one of these kits and modify your Shelby this way for extra clearance with the Kenne Bell 2.8H. It will fit under the hood.

CRANK DAMPER

All '08 Shelby GT500's use an improved more durable/lighter weight damper. We highly recommend that '07 Shelby owners upgrade to this new damper. It is available from www.fordracingparts.com (Part# M612SVT). DO NOT use heavy larger than the stock (7.1") overdrive pulley. The one big 8" we're familiar with did increase the boost on the Eaton, but it also ripped the end off the crankshaft. A 7.1" x 2.5" is 2.83 ratio x 6500 rpm=18395 rpm beyond what Eaton recommends - and max for our 18000 recommendation. So don't use a larger than 7.1" damper with our kits.

TIRES

We strongly recommend you first add Street Drag Radials - but the stock driveshaft will not hold up with the additional traction and shock to the drivetrain. Again, always upgrade to a one piece driveshaft.

KENNE BELL '07 SHELBY

Car - 100% stock engine, clutch and trans with a Kenne Bell Stage 3 Kit.

Fuel - Racing fuel or mixes at 18 psi.

Nitrous - None. Never. It skews or distorts the "real" performance of any car and makes comparisons impossible.

Driveshaft - Kenne Bell.

Fuel System - Kenne Bell Dual BOOST-A-PUMP™ with stock injectors, fuel lines and rails.

2.8H (807HP) vs. 3.3/3.4 (792HP)

See "2.8, 2.8H, 3.3/3.4 Dyno Tests." All our kits work with the stock hood. CAUTION: DO NOT cap or restrict the hood air vents. They go nowhere and do nothing - except to relieve underhood air pressure so the hood won't blow off. Kenne Bell tested several 3.3/3.4's on the Shelby. After extensive research and testing, there were 9 reasons we chose the 2.8H size over the 3.3.

1. In back to back controlled 5.4 GT Shelby engine dyno tests by Accufab - EVEN WITH "MAMMOTH" MANIFOLDS, the 3.3 and 2.8H MADE THE SAME HP (See Ford GT Engine Dyno Test Summary "875HP Ford GT Dyno Thrash"). Back to back Shelby Kit Dynojet tests - 2.8H (807HP) vs. 3.3

(792HP).

2. Feedback from Shelby owners indicated a fiberglass replacement hood was not acceptable.

3. Because of its 3/4" additional height, we were unable to fit the 3.3 under the stock hood - or between the firewall and radiator with the inlet manifold size we chose. Supercharger size is academic if the inlet manifold is undersized.

4. 23 psi and 801HP on a 100% stock engine with a 2.8H appeared more than adequate as it made more HP at the same 23 psi. And the 2.8H had already made 1000 engine HP. So, we decided 1000HP was more than enough for 99% of our customers. SUPERCHARGER RATINGS DO NOT MEAN THE ENGINE WILL MAKE MORE HP.

5. Even at 24 psi, we were able to develop considerably MORE HP with the 2.8H - and when compared on the Supercharger Dyno, the 2.8H again bested the 3.3's.

6. The 3/4" longer 3.3 limited the depth and air flow of the inlet manifold we deemed necessary to support 1000HP. The 2.8H with the Kenne Bell 1835 cfm "Mammoth" manifold worked better than the 3.3 with a smaller manifold. It's all about air flow.

7. Then, there was the higher cost of the 3.3 - and the hood. We just could not justify it. Hoods alone are \$600-\$1000, and tack on another \$500-\$1000 for installation, fit, finish, matching paint and stripes. And hoods don't make HP.

8. 3.3's weigh more than a 2.8 and we saw no advantage to more weight on the front of the car.

9. The larger 3.3 finned supercharger case gives off MORE HEAT and results in higher underhood temperatures.

1174HP+ KB 2.8H SHELBY 5.4 4V MAMMOTH™ INLET COMPARISON JUST HOW EFFICIENT IS AN OFF THE SHELF MAMMOTH™ KIT AS COMPARED TO A 2000+HP INLET SYSTEM?



“BIG HORN” 2000HP PROTOTYPE TEST INLET SYSTEM



1174HP KB 2.8H MAMMOTH™ SHELBY 5.4 4V ENGINE DYNO TESTS JUST HOW EFFICIENT IS THE MAMMOTH™?

We're often asked "how our manifolds and superchargers compare to the competition" and "can they be improved upon." Well, we don't just guess at our data. We KNOW how our products perform because we test, test, test . . . The 2.8H MAMMOTH™ Kits were engineered to support all the air flow necessary to produce 1200+HP with minimum inlet restriction (Twin Screws DO NOT like ANY inlet restriction). One of our many tests you may find interesting is an engine dyno test comparison on a built Shelby GT 500 engine with mild street cams, ported heads, long tubes and a Kenne Bell 2.8H MAMMOTH™ Kit. At 23 psi (stock crank pulley and 2-1/2" SC pulley) it cranked out 1018HP at only 6500 RPM, a conservative tune of 11.5 AFR ratio and only 20° timing. But at the higher 26 psi (+60HP), 12.5 AFR (+20HP), 24° (+16HP) and 7500 RPM (+60HP) power is 1174. All with no special cooling. Note: The intercooler water actually flowed through the engine first and then through the intercooler. Ice water would have made 1204HP according to our

past test data. The dyno fuel system was made up of an Aeromotive #11102 pump with a Kenne Bell BOOST-A-PUMP™ (needed to make 1000HP with 60lb injectors). Once again, STOCK fuel rails. Don't we keep telling you stock rails support 1000HP. Oops - we were wrong - 1200HP!

Since the purpose of the tests was to verify the HP potential of our Shelby 2.8H MAMMOTH™ Kit, we challenged the "standard" MAMMOTH™ Inlet Manifold / Dual 75mm Throttle Body with our Big Horn / Dual 105mm 2000HP rated inlet. We use this set up on exotic ultra high HP street rods, off road, etc. The "Big Horn" improved power by only 7HP, but installing our prototype dual 77mm in place of the dual 75mm brought back the 7HP. These tests clearly proved the MAMMOTH™ manifold more than adequate for 1200HP with air flow restriction being virtually "0".

Who said a supercharged 5.4L Ford 4V can't run with the Chevies? Who said a KB 2.8H won't make more HP than a 3.3. It was making 20HP/psi boost and still pulling HARD with no boost drop off. And who said only dual turbos can make over 1000HP and don't use any engine HP to drive THEIR compressors. Not true.

So when you hear claims about the competitions manifolds being "better," ask to see the flow and dyno test data.

1200HP KB 2.8H MAMMOTH™ SHELBY 5.4 4V JUST HOW EFFICIENT IS THE MAMMOTH™?

Who said a 3.3 will make more HP than the Kenne Bell 2.8H MAMMOTH™ Kit. We took a Shelby GT 500 Kenne Bell Supercharged engine out of the car and installed cams, headers and ported heads to see just how much HP the MAMMOTH™ Kit would make at 23 psi and 26 psi on an engine dyno. 1200HP sound like enough? Next we installed the "Big Horn Dual 105" inlet system which can support 2000HP just to see if the "standard" MAMMOTH™ manifold could be improved upon at the +1000HP level. The "Big Horn" improved output by only 8HP. But by installing our prototype dual 77mm throttle bodies in place of the dual 75's, we pick up 8HP and matched the Big Horn.



2.8H vs. 3.3 DYNO TESTS

Maximum advertised rpm for a 3.3 is 14000 vs. 18000 for the higher revving Kenne Bell 2.8H. The 2.8H produces **MORE HP, BOOST and CFM** at 18000 than the 3.3 at 14000 (max rpm). All data is verified by actual back to back engine dyno tests with dual 75mm throttle body and a very low restriction inlet manifold on both. *Note: Again, this huge inlet manifold could never be used on the Shelby with a 3.3 because of firewall space limitations.* Since 23-24 psi is the maximum boost recommended for either the 2.8H or 3.3 superchargers - both are capable of 24 psi - we saw no reason to consider a 3.3 - unless we wanted a physically larger, heavier, but rpm limited (14000 rpm) supercharger that necessitated replacing the hood or lowering the engine and raising the body. The 2.8H did require a 1/2" smaller pulley to make the same boost as a 3.3. Both superchargers were also compared on the Kenne Bell Supercharger Dyno. The ultra efficient, lightweight and compact billet 2.8H excelled in all areas over the 3.3 including giving off less heat in the engine compartment. "Bigger was not better" for the Shelby. For more information, see Ford Tech "2.8H, 2.8, 3.3/3.4, TVS Dyno Tests & Potential HP."

OTHER PRODUCTS

As compared to other vehicles we've analyzed, the '07 Shelby makes so much power and torque with only the Kenne Bell Kit (up to 801HP) one has to question the wisdom of even considering expensive headers, cams, heads etc. and compromising the driveability, economy, idle, tune or quietness of the vehicle. The 2 most popular aftermarket products, a larger mass air meter and throttle body can be purchased direct from Kenne Bell, already accurately dyno tested, tuned, proven and an integral part of the kits. We realize that there will be numerous companies offering cool air kits and meters for the Shelby. Sorry, but our recommendation is to use Kenne Bell. If you decide otherwise, be sure to have it re-tuned.

AIR FLOW

As with any other inlet or exhaust component(s) "If there's no restriction, there can't be any gain." Raising HP/air flow in and out of the engine incrementally increases potential restriction and losses. At Kenne Bell, we use special atmospheric pressure sensors to analyze these restrictions. We work with superchargers, manifolds, meters, throttle bodies, heads, exhaust, headers, etc. on a daily basis. We are a R & D and manufacturing company with a rich heritage in vehicle tuning. For example: We mount a sensor behind each component to measure it's respective restriction, if any. Imagine a vacuum gauge behind the filter, MAF meter, throttle body, front and rear of the inlet manifold. Is there any better way of monitoring the component restriction?

FILTER / METER (KENNE BELL LOW RESTRICTION KITS)

The Kenne Bell Big Oval Meter/Filter flows twice as much air as the stock canister/filter/meter assembly. They are a matched pair. The stock assembly chokes off a lot of HP and air and gets worse as power increases. It only flows 140 more cfm with the filter completely removed. We recommend the 130mm Kenne Bell Filter/Meter Kit for ANY Shelby - stock or Kenne Bell application.

Note: Rotating any meter, even slightly, affects air flow through the meter. That alters both the fuel and spark settings creating driveability and HP. So we "degree" our meter with a locating plate. Our calibrations reflect this meter location. NEVER change it or the location.

THROTTLE BODY

The little stock 60mm begins to hurt power at 435RWHP (See Dyno Tests). That's around 500 engine HP, the stock Shelby rating. The popular Accufab Big Oval 130mm (1530 cfm) was also too small. Ford realized this when they chose a dual 70mm (1640 cfm) for the GT Supercar. Our dyno tests show this 70mm good to 680HP. The Kenne Bell Dual 75mm (1880 cfm) makes 26-74HP over the stock 60mm(1050 cfm) - and it's bolted to our huge 168mm manifold that can support any size throttle body. A big dual 75 is useless if the air is restricted in the manifold. Lowering inlet restriction has a threefold advantage. 1. It raises atmospheric pressure to the supercharger, 2. It lowers supercharger parasitic losses and 3. it reduces air charge temps. See "Throttle Body Air Flow, HP Ratings,"

KENNE BELL INLET MANIFOLD ("MAMMOTHFOLD™")

This is the final link to supplying adequate air flow to the supercharger. No porting or other mods are required. It accepts a 60mm reducer adaptor (stock throttle body) or a 75mm can be bolted directly to the manifold. Size does matter in this case. It's big, but it has to be to supply unrestricted air flow to the supercharger. No other Shelby manifold can compare to the Kenne Bell "MAMMOTHFOLD™."

INLET LOSSES

Reducing inlet frictional losses with a larger Low Restriction Inlet Kit, Meter, Tube, Throttle Body and Inlet Manifold will make the supercharger more efficient (cooler air charge temp - lower parasitic loss - less rpm/heat). Both boost and HP will increase given the same pulley size. And HP will increase even with a smaller pulley and the same boost.

INLET HOSE

The Stage 3 Inlet Hose measures 163mm across and flows considerably more air than the stock hose. It links the meter to the Dual 75mm Throttle Body. The rubber "pleats" are necessary to allow for engine movement.

FUEL SYSTEM OVERVIEW

We speak from experience. Kenne Bell uses a sophisticated one of a kind fuel flow bench capable of testing injectors, pumps, fuel lines, fuel rails, regulators, filters or any other component related to fuel systems or hydraulic engineering. The flow bench, coupled with our dyno, scanners, data acquisition, and other tools allows us to pass on our findings to our customers. We recommend reading "Fuel Pump Figuring" on our website (<http://www.kennebell.net/media/media-home.htm>) & "Fuel Pump Tech Sheet." The Shelby fuel system has been extensively tested on the Kenne Bell flow bench and dyno. Those who spout free advice proclaiming "you need bigger injectors, bigger pumps, 3 pumps, adjustable regulator, more fuel, etc..." would be better to first to ask 1. How much power the engine is making? 2. What the AF ratio is, 3. Total timing, 4. Boost, 5. Fuel pressure, and perhaps 6. What kind of fuel system is it? The stock Shelby pumps, fuel lines and rails are adequate to 1000HP with the BOOST-A-PUMP™ so don't waste your \$ on larger lines, rails and extra pumps, etc.

To summarize, more fuel doesn't necessarily make more HP. Ideal AF ratio always makes best power. Higher fuel pressure always increases fuel flow but is not acceptable at idle on part throttle. Avoid adjustable regulators. The best method of increasing fuel pressure on a returnless system like the Shelby is with a Kenne Bell BOOST-A-PUMP™. That's precisely what it was designed for. FMU's aren't recommended on the Shelby nor are adjustable regulators, inline pumps or larger in tank pumps.

$$\sqrt{\frac{\text{New Pressure}}{\text{Old Pressure}}} \times \text{Old Flow Rate} = \text{New Flow Rate}$$

Stock injectors can support up to 801HP with ONLY the BOOST-A-PUMP™. Use 72lb injectors after 750 for a safety margin.

FUEL PUMPS

The BOOST-A-PUMP™ coupled to the stock dual pumps make 800RWHP with ease. And the BOOST-A-PUMP™ with it's "0" failure rate is more reliable than the pumps themselves. CAUTION: Do not allow ANYONE to install "return system" pumps on your "returnless" system. Not good! In fact, we DO NOT recommend a returnless system of any kind for the Shelby. The stock system with our Dual BOOST-A-PUMP™ supports 800+HP to the rear wheels with stock 52lb injectors and up to 1000HP with the "Competition" BOOST-A-PUMP™ and 72lb injectors - all with the STOCK PUMPS, FUEL LINES & RAILS. And we made 1200HP on an engine dyno with stock fuel rails. Who needs anything else? Don't waste your money on the Ford GT pumps (see BOOST-A-PUMP™ Tech Tips). They're only minimally better (241L vs. 233L). Remember that lower fuel pressure with a larger injector will result in more fuel pump volume and potential HP.

PULLEYS

No expensive overdrive or underdrive pulleys are necessary with the Kenne Bell 2.8H. Our 2-1/2" x stock 7.1" is 2.84 ratio, 23 psi boost and 800HP. Avoid heavy "oversize" crank pulleys. DO NOT use "10% over" crank pulleys. They exceed RPM limit of supercharger by 10%.

MAX BOOST

18 psi is max for street use with the 2.8H. And don't let the tuner do the "high boost (+18 psi) - retarded timing" game on the street (idling, etc.). The timing reduces HP but DOES NOT lower the supercharger heat generated by high boost. Remember the Kenne Bell tests: 1° timing = 4.5HP and 1 psi boost = 15HP (approx. 3.3° timing).

THROTTLE BODY SPACER

Save your \$. No HP gain.

SPARK PLUGS

Use NGK TR6. Gap at .025"-.030" unless using Kenne Bell BOOST-A-SPARK™ ignition. Then .040" OK for fatter longer spark gap. The more powerful BOOST-A-SPARK™ is capable of "jumping" larger plug gaps.

IGNITION

Kenne Bell BOOST-A-SPARK™ is highly recommended for insurance or when engine spark misfire occurs. It's better than constantly changing spark plugs. The BOOST-A-SPARK™ is rated the most proven and efficient, lowest cost and easiest to install ignition for the Shelby - or any '96 up coil ignition modular Ford engine.

COILS

We've done many tests on the various coils. Believe it or not, no HP gain. If the engine misfires, get a BOOST-A-SPARK™ and save yourself a lot of expense and agony. Our test engines make up to 1200HP and 26 psi boost with STOCK coils. If they made more HP, we'd use them.

4.10 / 3.73 GEARS

Surprise. 3.73 gears lose 18RWHP vs. the stock 3.3. 4.10 gears probably lose yet another 10HP. We didn't test the 4.10's - only the 3.73's. This is a good change for a centrifugal or turbo that lacks low and mid range boost. Gets that rpm up quicker. Think about it. At 2500 rpm, stock torque is 390 ft. lbs. The Kenne Bell produces up to 680 ft lbs at 2500. That's enough torque to drive up the Empire State Building. With 3.73 or 4.10's you can forget low gear. It'll be tire smoke only.

SHIFTER

We use Steeda shifters on all our Mustangs.

"TUNES"

The Stage 3 Kit is furnished with a Kenne Bell calibration that works with any pulley up to 801HP. Higher boost levels will, of course, require race fuel, octane booster or a blend. Not necessary to re-calibrate/re-tune. LEAVE IT AS IT IS. If there is a pinging issue, 1). find the mechanical problem. Never try to fix a mechanical problem with a "tune" and 2). install a larger lower boost pulley or 3). use octane booster. Remember - if it's not a mechanical problem, it's a fuel octane issue.

HEADERS

Lots of money for headers and installation for a relatively small power gain. ANY leaks can create serious tuning issues and a loss in fuel economy and driveability. And yes, "headers" SHOULD make more HP than we claim. We're not saying headers don't make ANY HP, but they don't make much. The chassis simply does not allow for manufacturers to use large enough header primaries. The 1-5/8" and 1-3/4" are too restrictive for substantial power gains. Ask ANYONE knowledgeable on headers about 1-5/8" or 1-3/4" primary for a 700-800RWHP engine. At least 2" and preferably 2-1/8" is minimum for high HP engines. And remember that headers primaries do not distinguish between engine size, etc. It's exhaust flow vs. tube size. East Coast Speed made only 2HP (764 vs. 762) on back to back Shelby header tests.

EXHAUST

Actual HP gains will, of course, always depend on the air flow (HP) through the system. The greater the air flow HP, the higher the restriction and greater the potential HP gain. We saw nothing at 650RWHP, but 25HP at 800RWHP. The best system we tested was Bassani.

CATS

No HP gain. Just more noise and dirty air.

CAMS

The Shelby is DBW (drive by wire). The DBW operates off inferred vacuum which gets it's reading from the SIP sensor. Rougher duration cams lower vacuum readings at all engine speeds. Oops! You may experience bogging, surging, idling problems that you will blame on the throttle body. NOT SO. Ford GT cams seem to work OK. Other cams? Your only choice may be to REMOVE THEM.

HEAT EXCHANGER

The larger Fluidyne unit lowered air charge temp 15°. A good investment for any Shelby.

LARGER RADIATOR

Our data logged road tests indicated 8° lower temps.

NITROUS

We don't like the stuff. It's a crutch that distorts the performance of a vehicle making tangible comparisons impossible. If using Nitrous, keep in mind that more HP requires more fuel, so you may want to step up to the competition BOOST-A-PUMP™ to further increase fuel pump delivery.

“DO NOT’S” SUMMARY

Here's a few DO NOT'S to consider. Keep in mind that we are merely trying to help our customers avoid problems - for them and Kenne Bell. We don't have an agenda as we don't sell or profit from headers or custom tunes.

1. DO NOT . . . Headers? Lots of work and expense for relatively small, if any, HP gains. And leaks create serious tuning issues.
2. DO NOT - NEVER have your car tuned with the cheapie non calibrateable dyno “wide band” AF ratio system. They can be “off” by 1-2.5 points and burn your motor down or kill the cats.
3. DO NOT waste your \$ on larger fuel rails, lines, extra pumps, 4.10 gears and ignition coils.
4. DO NOT re-tune (tweak) the Kenne Bell Calibration (tune) unless changing gears and/or injectors (+800HP).
5. DO NOT assume a custom tune will make more HP.
6. DO NOT believe you need a custom tune “because all cars are different.” NOT SO.
7. DO NOT “Death Tune” it (big timing retard-higher boost). Overheats supercharger and shortens exhaust valve life.
8. DO NOT re-tune car to solve an installation and/or mechanical problems (vacuum leak, sensors, wiring, fuel system, etc.).
9. DO NOT believe you must re-tune when changing pulleys.
10. DO NOT re-tune because the engine pings. Think OCTANE and BOOST. Try reducing boost (larger pulley) or increasing octane.
11. DO NOT install cams other than the Ford GT cams - unless grinder has a tune for his specific cams with a DBW throttle body.
12. DO NOT consider any product (breathers, cams, 4.10 gears) which can adversely affect the drive by wire calibrations.
13. DO NOT change ANY part in the kit. It's all as good as it gets.
14. DO NOT remove the cats - even if the “experts” claim it's big HP gains. Our tests indicate “0” HP.