

FORWARD vs REARWARD FACE SUPERCHARGER

One of the most frequently asked questions we receive is “Why is a forward face supercharger better?” There are 2 approaches to feeding air to a positive displacement supercharger on the Corvettes and Mustangs - forward face (“F”) and backward face (“B”).

APPEARANCE

First of all, we are old school hot rodders who prefer the arrogant vintage look of a bad ass top mount underhood supercharger with the drive pulley up front. We feel strongly that superchargers must point forward - just like the engine - with the drive wheels at the rear of the car. That is the way hot rods and dragsters have been doing it for 60 years. We evaluated and tested both forward and backward face designs with serpentine and cog belts, but decided on the F for several reasons. Both work. The following are our reasons for preferring the F concept.

1. COMPLEXITY The rear face obviously requires the addition of a jackshaft and the accompanying bearings, bracket, pulleys and another belt.

2. DURABILITY was a big concern because our kits utilize larger more powerful superchargers 2.6 and 2.8 that are revved higher. We decided that long term reliability could be compromised because of the added stress imposed by rev limiters, burn outs, power shifting etc.

3. POWER CONSUMPTION was higher because of the jackshaft system. It sure didn't use LESS HP to drive the extra shaft assembly.

4. BELT SLIPPAGE was a problem for us with the B because of pulley space limitations at the rear of the supercharger. To make good power requires a big displacement supercharger which in turn necessitates larger pulleys with greater belt contact to minimize slippage. Our kit is designed for boost levels of 6-20 psi with 2.5"-4.12" pulleys and up to 1000HP. We like big OD pulleys with high belt patch contact, particularly with the popular OEM 6 rib systems. The Kenne Bell supercharger, with it's lower parasitic loss, coupled with a big 6 rib pulley does extremely well with the 6 rib system. For example: A 33% larger pulley (4" vs 3") is the same as going to an 8 rib (33% larger) belt. On the majority of boost upgrades (up to 12 psi), our customers don't need to purchase the more expensive 8 rib system. A pulley change on our supercharger is only a 4 minute job. And servicing one belt is easier than two, particularly when one is at the rear of the supercharger. The 2 relatively small rear pulleys and only 180° of belt wrap with a short belt without a tensioner didn't give us the belt contact and reliability that we needed without going to a cog belt drive.

5. COST The cost of the added belt, pulleys, brackets, jackshaft, bearings etc. for the B was about the same as our F dual 76/93mm manifold and the big 93mm tube system.

6. AIR FLOW At first glance, the B may appear superior because the inlet is visually a shorter straight path into the supercharger. Not so if a F is properly engineered. The design of inlet systems is hardly a new science to Kenne Bell, so all we had to do was minimize the restriction between the MAF and the throttle body with our huge “0” restriction 93mm tube. It can easily supply enough quality air for a whopping 700+HP with an upgraded 90mm throttle body mounted on the 93mm Kenne Bell inlet manifold. And yes, the 93mm inlet manifold that mounts to the supercharger has a 90° bend. Don't 90° bends restrict air flow? Of course they can, but if sized, shaped and transitioned smoothly, the restriction/power loss is negated. Each and every inlet component was tested on the flow bench and dyno. Then we compared the F and B systems at various power levels. These engines won't make the HP we advertise without a highly efficient inlet system. Kenne Bell has been designing inlet systems, manifolds and ram air kits for 30 years. This is our 22nd inlet manifold design. We like to think we've figured out how to make them work - like @ 1000HP - without having to turn the supercharger around backwards.

7. EXPERIENCE Jim Bell has been around long enough to remember the old OEM Thunderbolt, Olds 442, etc. with their headlight and bumper fed inlet hoses feeding the carburetors. Kenne Bell designed the first ram air kit for the 5.0 Mustangs in 1989. Then there was the turbo Buick, GN and Syclone/Typhoon, '03 Cobra, etc. We've sold thousands. It's part of our history and image. We just prefer the look of the huge intimidating 93mm tube, particularly when coupled to the industry's largest billet Twin Screw.

Since inlet systems continue to be an interesting topic for discussion, we will continue to publish more information (dyno and flow bench tests). We hope that we've answered your questions.

Prior to testing an inlet system with stock and upgraded components, we first flow test and optimize the complete inlet system and the individual components (filter, MAF, inlet tube, throttle body and inlet manifold). By testing pieces separately, we can determine their restriction and how they affect the air flow through the tract. Then we repeat the tests on a dyno measuring the loss through each part and how it affects HP and boost. Finally, we dyno test larger MAF meters and throttle bodies at various HP levels. Keep in mind that what is “0” restriction at 549HP may still be “0” at 600HP, but may be slightly restrictive or excessively restrictive at 700HP or . . . ? It's all about air flow and HP - how they

relate to each other and the supercharger at varying levels. MAF meters (stock and 100mm), larger inlet pipes, ported throttle bodies, etc. were also tested at 500, 600 and 700RWHP. Then there's the fuel system. Can't make HP without fuel - but that's another entirely different subject.

We publish a lot of technical information on the Kenne Bell website under "Tech Tips" and try to answer any questions our customers may have. We also recognize that there are often good intelligent questions and discussions on website about product, design and theory that warrant a response from a manufacturer. Our goal is to respond, attempt to be non-commercial in our remarks, and answer your questions and concerns.

See "Inlet System Development & Testing" for more info on test procedures.



The entire KB Cool Air Kit with production inlet manifold is flow tested.