

## TECH TIPS

### GM VORTEC ENGINES

#### 4.8, 5.3, 6.0, 8.1

#### CONCEPT

**TWIN SCREW** - From the beginning, we knew the best supercharger choice was the highly efficient Twin Screw, specifically, the billet case Autorotor with it's "new design" rotor profiles. It was more efficient (lower discharge temp and less parasitic loss) than the Roots type and did not suffer from the dreaded boost lag of the centrifugals. Please note that the Twin Screw **IS NOT a Roots Type/Eaton Supercharger**.

**ECM CALIBRATION (stock or piggyback)** - The GM Vortec engines and the ECM (Engine Control Module) are engineering marvels. There is no question that the new engine family responds exceptionally well to supercharging and is capable of reliably handling the additional horsepower from the supercharger. However, for a kit to function properly, the fuel, spark, etc. must be re-calibrated for a supercharger. We had 2 choices - a "piggy back" ECM system or a simple flash reprogramming of the stock ECM. ①The "piggy back" computer concept that others use required harnessing, tapping, cutting, soldering or re-routing 14 wires to relays, ignition, grounds, hot, WMIL, EGT, mass air meter, auxiliary injectors, CPS sensor, TPS, ECM etc. into a new computer and modifying the signals to the stock ECM. *Note: This is what can cause things like the temperature gauge to go berserk anytime the engine sees boost.* ②We chose to simply download the new Kenne Bell calibration into the stock ECM thereby eliminating all the re-wiring, waterproofing, piggyback ECM, additional labor and gauge malfunctioning. The stock ECM also allows us far more flexibility in programming.

**AUXILIARY FUEL (Wet vs. Dry)** - Unlike other kits that use two auxiliary injectors to squirt fuel into the inlet manifold entrance and runners, all Kenne Bell Vortec kits include 8 new 50% larger replacement injectors. This approach maintains the factory "dry" manifold concept and superior cylinder to cylinder fuel distribution by eliminating the "runner puddling" and poor fuel distribution associated with the auxiliary injector "wet" manifold (see catalog for comparison). Every engine manufacturer in the world would agree that the best place for any fuel injector is in the intake port it feeds. Just look into a stock manifold opening and ask yourself "How can the fuel EVER find it's way to the pistons?"

**COOL AIR** - The Vortec engine powered SUV's and trucks utilize an excellent filter assembly that flows a tremendous amount of air. The bad news is the location in the hot engine compartment and where it ingests air from the metal fenderwell increases inlet air temp a whopping 20°. If you were a filter, would you like to be in a 200° engine compartment sucking air from a hot metal fenderwell - or outside in cool dense air? Kenne Bell is the only company to supply an entirely new Cool Air Kit which relocates a new K&N cone filter outside the engine compartment behind the front bumper. This allows air to be drawn in at ambient temperature, much cooler than the stock air box.

**TRANSMISSION** - We optimize the shift points for our supercharger and firm up the shifts at WOT.

#### IGNITION TIMING

You may be interested in knowing how the ECM communicates with the engine. The GM factory ECM adjusts (advances and retards) ignition timing based on air inlet temperature, engine temperature, fuel octane, knock etc. whether the engine is stock or supercharged. These timing changes protect the engine from knocking, but also varies HP and torque output proportionally. For example: The 8.1 timing was set by GM engineers to vary from a maximum of 21° (413HP supercharged RW) to whatever timing retard it takes to protect the engine from knock. 14° is 383HP. This 4HP per degree is about par for any modern V8 engine. Therefore, the Vortec engines power output is dependent on ignition timing and the trick is to reduce the amount of retard with the "coolest" supercharger and inlet system. Read on.

#### COOL AIR, FUEL OCTANE & KNOCK

Your Vortec will run better on a cooler day because cool air makes more power (more oxygen molecules) and allows the ECM to advance ignition timing. All Kenne Bell Vortec kits replace the stock "fenderwell" air box design with a new Kenne Bell Cool Air System that supplies 20° cooler air to the engine. Again, cooler air means more ignition advance and increased power and lower octane requirements. And then there's the cooler denser air charge of the Twin Screw - up to 30% cooler than the Eaton Roots style.

#### INTERCOOLERS?

The Autorotor 422JE was designed specifically for Kenne Bell non-intercooled kits. The air discharge temperature is the coolest of ANY supercharger we ever tested - and we've tested a few. Using this "new design" rotor profile in conjunction with another Kenne Bell exclusive - the cool air kit - eliminates the need for an intercooler. We've tested intercooled systems that reduce air charge temperature 25°. Again, our 422JE alone is 20° cooler than the Roots style.

#### OTHER BOLT ON PRODUCTS

**CAT BACKS** - There may be 25 aftermarket companies offering various exhaust systems for the 4.8, 5.3, 6.0 and 8.1, but that doesn't change the fact that our dyno tests indicated a "0" HP gain. This was verified by Kennedy's Dyno (716-693-5353) and several others. And there never was or never will be anything in an exhaust tip. If you like exhaust systems for the noise, fine. Forget about any HP gains.

**INLET** - There is also "0" HP gains in the inlet system (filter, cool air or "hot air" systems, throttle body, mass air meter, throttle body spacer and inline fans or "air swirling" devices). The ONLY way to increase inlet HP is to relocate the filter OUTSIDE the engine compartment as we do with our kits.

**ECM** - Since the ECM automatically advances timing to the ideal safe setting, there's little if any HP left in "chips" or "calibration." Surely not the 20% you see advertised for superchargers. That is psycho babble!

**HEADERS** - We have seen 10HP on 4.8, 5.3, 6.0 headers without pre-cats. Never tested headers on the 8.1, but don't look for much. The newest engines have pre-cats, leaving no room for long tube headers and forcing the aftermarket to the less desirable "shortie" headers. 2-5HP is all you can expect from these compromised headers. That's about 10' (½ car length) at most in a ¼ mile!

#### RPM LIMITERS / SHIFT POINTS

The Kenne Bell boost curve is perfectly flat from 2000 to the factory shift points. We will not increase rpm limiters or shift points as GM has determined that they are optimum for truck and SUV engines with their inherently low rpm VE. If a supercharged Vortec is held in gear beyond the factory shift points, the boost will rise rapidly from 6 to 10 psi in 1000 rpm. Don't do it! The boost increase does not mean you are making more power. The engine simply does not flow air well at this rpm so the supercharger is "taking advantage" of it.

#### KENNE BELL POWER RATINGS

All our supercharger dyno tests are based on optimum conditions. Fuel octane, adjusted ignition timing, ambient temperature etc. will all combine to vary engine output.

The GM factory engineers aren't dummies. They certainly knew how to optimize the inlet and exhaust system of the Vortec engines. Our advice is to "supercharge it or save your money." Supercharging, more than ever before, has become the best choice - and although relatively expensive - quite often, the ONLY choice for improving performance.

**4.8, 5.3, 6.0 & 8.1 GM VORTEC****BILLET ALUMINUM TWIN SCREW SUPERCHARGER KITS**

Kenne Bell, the Number 1 manufacturer of Twin Screw supercharger kits proudly introduces the kits everyone has been waiting for. Whether your preference is the classic OEM black-satin look or show polished, these billet aluminum kits offer the ultimate in underhood elegance with unsurpassed performance at any vehicle or engine speed.

Kenne Bell's innovative engineering expertise is apparent in every facet of these kits. Like our award winning Ford, Mercury, Lincoln, Chrysler, Dodge, Jeep and Mazda applications, the new 8.1 and 6.0, 5.3, 4.8 kits for the GM '99 up Vortec engines incorporate the latest in Twin Screw technology, calibration and engineering. Designed specifically for Kenne Bell, the Autorotor 422JE incorporates new redesigned rotor profiles that produce boosted air 20° cooler than any Twin Screw supercharger we ever tested. It's a whopping 30% cooler than the Eaton/Roots style while using 30% less engine power to drive. And it doesn't have the power and torque robbing boost lag of the centrifugals and turbos.

**8.1 GM VORTEC**

There's more. The Kenne Bell kits feature many engineering advances not found in other kits i.e. "dry" manifold design and even fuel distribution to all cylinders, external cool air system (20° cooler), 8 new oversize port injectors, 100% OEM gauge operation, Godzilla brackets, rear supercharger brace and easy installation.

Others use a "piggy back" computer system that requires harnessing, tapping, cutting, soldering or rerouting 14 wires to relays, ignition, grounds, hot, WMIL, computer, EGT, mass air meter, auxiliary injectors, CPS sensor, TPS, ECM etc. Sound complex and expensive to install? It is. We simply "flash" the new Kenne Bell calibration into the stock ECM and extend the wires to the IAT, ECT and TPS.

<b>FEATURES</b>	<b>KENNE BELL</b>	<b>OTHERS</b>
<b>Air Inlet System</b>	<b>External Cool Air Kit</b>	<b>Stock Filter Box</b>
<b>Filter</b>	<b>K&amp;N Hi-Flo</b>	<b>K&amp;N Stock Replacement</b>
<b>Manifold</b>	<b>"Dry"</b>	<b>"Wet"</b>
<b>Fuel Distribution</b>	<b>Excellent</b>	<b>Poor</b>
<b>Fuel System (Injectors)</b>	<b>8 Oversize Port</b>	<b>2 Auxiliary Manifold</b>
<b>Calibration Concept</b>	<b>Reflash Stock ECM</b>	<b>Piggyback ECM</b>
<b>Additional ECM Wiring</b>	<b>Wire Extensions Only</b>	<b>14 Wires</b>
<b>Temperature Gauge</b>	<b>Fully Operational</b>	<b>Non-operational w/Boost</b>
<b>Supercharger</b>	<b>Billet Aluminum</b>	<b>Cast Aluminum</b>

PART# **TS9000-4.8** 6 PSI KIT ('99 UP 4.8 GM) W/COMPUTER UPGRADE, NEW INJECTORS

PART# **TS9000-5.3** 6 PSI KIT ('99 UP 5.3 GM) W/COMPUTER UPGRADE, NEW INJECTORS

PART# **TS9000-6.0** 6 PSI KIT ('99 UP 6.0 GM) W/COMPUTER UPGRADE, NEW INJECTORS

PART# **TS9000-8.1** 6 PSI KIT ('99 UP 8.1 GM) W/COMPUTER UPGRADE, NEW INJECTORS