

HOW IT WORKS

The vane in the Switchblade makes it take off like a small A/R turbine housing, and then opens at a preset boost pressure, making it perform like a big turbine housing. Giving you the best of both worlds, quick spool up on takeoff, and great power on the top end.

Simpler, and More Efficient than Any Other Turbo Design On the Market

The Switchblade is a VGT (Variable Geometry Turbocharger) that has the convenience of spooling up like a small turbo that can open up like a large turbo. By doing this, the Switchblade greatly increases engine efficiency and performance.

The principle factor influencing the impressive performance enhancement of the Switchblade turbo design is the ability to take a larger than normal turbine housing and get it to spool up quickly like a smaller turbine housing and then to open up and to perform like a large turbine housing in the upper engine rpm range. This is accomplished by using a single vane to pinch down the volute (exhaust gas passage to the turbine wheel) there by taking the low flow and pressure of the exhaust gas at lower engine rpm's and increasing the gas pressure impacting the turbine wheel. This results in quicker spool up getting increased oxygen into the cylinders quicker and more completely and efficiently combusting the fuel charge. The results are much quicker low engine rpm torque and decreasing exhaust particulates (smoke).

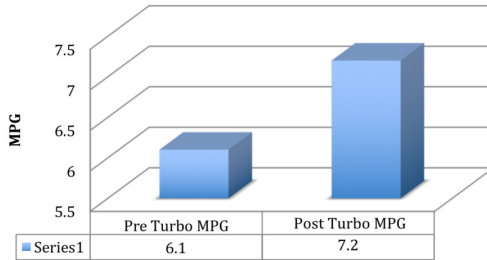
As the boost increases the vane automatically starts to open reducing back pressure and then the magic of the larger turbine housing at higher engine rpm appears. On takeoff, the vane is closed pinching the exhaust flow down to the smaller end of the turbine housing scroll before it can impact the turbine wheel with more force at lower engine rpm's. Using the vane lets us use a larger turbine housing than a conventional turbo would need to get low-end performance and then open up the vane to get better top end performance with the bigger turbine housing.

When boost pressure hits a predetermined level the vane actuator starts opening the vane and allows more and more exhaust gas access thru the volute slot to impact more of the turbine wheel circumference. The vane opening decreases the exhaust back pressure letting the engine to take advantage of the larger turbine housing and breathe more efficiently.

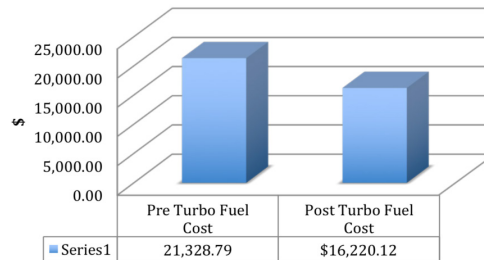
The Switchblade Turbo is a very simple design performing like two turbo's in one, NO nozzle vanes to change to suit different driving styles, vane operation is automatically self-controlled.

HOW IT WORKS CONTINUED

MPG Comparison

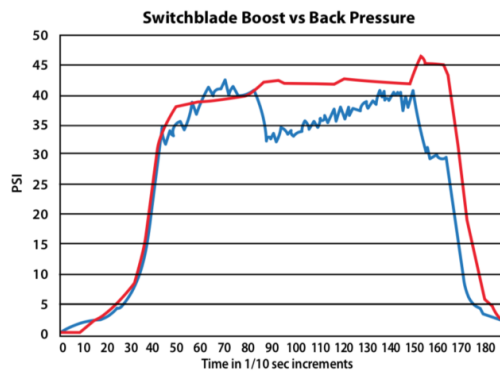
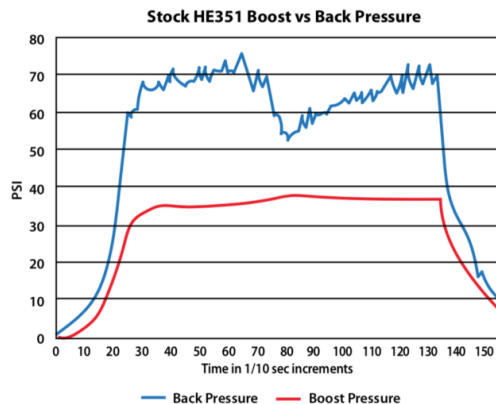


Fuel Cost over 3 Month Period



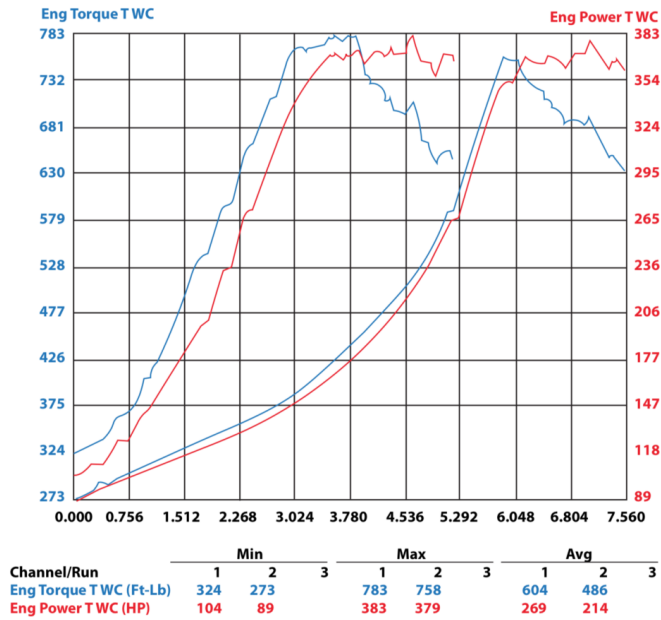
Power & Performance Results

Data was collected every Friday over a period of 3 months. The data was averaged over the 3 months resulting in a average mpg of 7.2. The pre-turbo upgrade data was gathered over a 3 month period leading up to the turbo upgrade. The turbo upgrade improved mpg from 6.1 mpg to 7.2 mpg a ~15% improvement.



The graphs at left illustrate the impact that the Switchblade has on the performance of the turbo. There is a traditional trade off between quick spool up times and top end performance. A smaller housing enables the turbo to generate boost more quickly; however, creates engine back pressure under towing or heavy use conditions. The Switchblade uses a significantly larger turbo than the stock configuration and is able to spool up quicker due to the directed flow over the turbine tips. Note the difference in back pressure and boost pressure between the Switchblade and the stock with similar spool up times. This reflects the turbo's ability to respond quickly from low flow conditions and still provide vastly superior performance under heavy use conditions.

HOW IT WORKS CONTINUED



The horsepower and torque lines on the right side of this graph are an S363 turbo without the Switchblade vane. The horsepower and torque lines on the left side of this graph are the same turbo with the Switchblade vane.

All other factors such as fuel, tuning were untouched, with the vane being the only variable.



The vane used to enhance performance in the Switchblade Turbo



Variable Geometry Turbo parts found in Honeywell Models, like the Detroit Series 60



Variable Geometry Turbo parts found in various Holset and Cummins Turbos

800.782.0127 | M-F: 8am-5pm | S-S: Closed

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