It's a Turbo Reliably DOUBLE your horsepower!

BY CHRIS RADEMACHER

We hang out with Trey Lokey from OHV Turbos. Sit down, hang on and shut up.

Whether you're new to turbochargers or haven't heard any good press about turbochargers or superchargers for UTV/SxS's, we're going to do our best to educate you on what works, what to watch out for, and what to expect if you purchase one from OHV Turbos or one of their dealers. As we begin the journey for more power, there's really 4 common ways to increase your UTV's power:

1) Bolt-On Applications
2) Big Bore Kits
3) Engine Swaps
4) Boosted Applications

So, let's talk briefly about the advantages and disadvantages of each of these, starting with bolt-on parts. These include high flow air filters, high flow exhausts, ported and polished heads, camshafts, timing keys, bored throttle bodies, fuel injection systems, and high compression pistons. There's more, but these are the most common that you'll see on these 1-2 cylinder engines. Typically, if all these items are added to your machine, outside of going too high with a high compression piston, you'll still be able to run on high octane pump gas and be only marginally less reliable than stock. The increase can be marginal as well, if all these items don't work well together. But, in most cases, if performed by a reputable shop, adding these bolt-on items will make around 10-15 HP at best.

You've probably heard there's no replacement for displacement, right? Well, this refers to adding CC's to your motor by boring out the cylinder and/or adding additional stroke to the motor. There's been some reliability issues primarily to do with heat and too high of compression, but if built right, these can add 10-20 HP on pump gas and 20-30 HP on race gas on a Rhino. Having to run race gas, though, can get very expensive, not to mention the hassle, as well. Oh, and did I mention that these kits range from $3K from the low end to up over $10K for a full race setup? And, this leads me to the next option, which is much more reliable, because the stock motor is higher displacement.

As more and more people have taken the Rhino 660 engines to the outer limits of power by the above two methods, a lot of folks are realizing that a complete engine swap can be had for roughly the same amount of money, but remain factory reliable, which is a huge plus. But, the reality is that most folks won't hassle with this option, because it will likely entail having to buy a completely new bike, sell off parts, swap engines, do some extensive fabrication work, electrical work, etc, and hope it all works in unison. But, the power potential is only limited by your pocketbook and your ability to not sweat the small stuff.

Lastly, there's boosted applications to reach your desired power level. What is boost, you ask? Well, there's really two ways to go about this: a Supercharger or Turbocharger. Instead of atmospheric pressure being the source of intake pressure, a supercharger and turbocharger compress the intake air to force more into the combustion chamber which, in turn, requires more fuel resulting in more power. They're also the least affected by higher altitudes, resulting in the least amount of power loss of all 4 methods. This is why

they've been so popular in snowmobiles over the years. Given the design of our vehicles, in our opinion, a Turbocharger is the preferred method for multiple reasons:

1) ***Mud & deep water crossings are a non-issue, because there's no exposed belt like there is with a supercharger***
2) ***Turbochargers are 10-15% more efficient than a supercharger, creating more power per psi of boost = safer***
3) ***Turbos are a lot quieter than a supercharger, quieting down both the intake and exhaust, as well***
4) ***There's no drag on the motor to turn the turbine which equals more power***

Now, don't get me wrong, a supercharger is a good system for those that aren't as concerned with the above. But with the varying conditions we like to ride in, we opted for the Turbocharger system from OHV Turbos made by MC Xpress. Trey Lokey owns OHV Turbos and is the exclusive US distributor of these kits for the Yamaha Rhino and other UTV's in the near future. His goal is to establish a large nationwide dealer network. MC Xpress has been the world leader in manufacturing bolt on Turbos for snowmobiles, motorcycles and ATV's since 1991. They produce and sell more kits than all the others combined, if this gives you any idea of their success and reliability. And, in my experience, there's lots of different ways to skin the cat, but there's no excuse for cutting corners, because that's when you get in trouble. And, this is why you've heard some horror stories and poor public reception to turbochargers and superchargers for your UTV. The fact is that not all kits are created equal. So, let's talk about why some folks have had trouble in the past. There are really 4 key areas that create a reliable turbo charged Rhino:

1) ***Temperature***
2) ***Pressure***
3) ***Timing***
4) ***Fuel Octane/Quality***

Temperature refers to the intake air temperatures that enter the engine. The cooler the intake air temps, the more power and less detonation that will occur. What is detonation you ask? Well, it's quite simple, really. It's the result of the intake air temps being so hot that the engine pre-ignites the fuel before it's supposed to, which is what causes pinging and, ultimately, engine failure. To cure this, or help prevent the hot compressed air from the turbocharger from entering the engine, it flows through a custom designed intercooler to drop these temperatures. Without an intercooler, you can't run as much pressure (psi) and the result is less power and more wear and tear on your engine, not to mention the increased potential detonation.

Pressure (psi) is how many pounds per square inch that the turbo is adding to the intake air. With each added psi, the more fuel you need to compensate and the more power you're going to produce. This is where most people get greedy and blow up their engines. If your psi is too high for the octane of fuel you're running, the engine will blow up. We didn't want to have to run race gas, so to eliminate all potential issues with blowing the motor, MC Xpress recommends running a low compression piston or thicker head gasket and no more than 11 psi on high octane pump gas. Can higher numbers be run? Sure, you just have to run race gas and beef up the internals of the motor to be completely safe. MC Xpress wanted a complete bolt-on system capable of running efficiently and safely on pump gas, and they achieved this very well.

Timing is another aspect that comes into play more often with boosted applications. If your timing is advanced too far, this is another cause of engine failure while under boost. If anything, most boosted applications retard the timing to prevent detonation.

Fuel octane/quality is the last part of making sure your boosted engine runs to its peak performance without detonation. If you run low octane fuel, you have to turn the boost down, and vice versa. OHV Turbos and MC Xpress have already done the homework and testing for you. Instead of having to figure out all this stuff on your own, you can easily/safely run 11 psi for the end result 60 Rear Wheel HP. This is over double a stock Rhino 660's RWHP, which makes these Rhinos an absolute blast to drive.

And, you're probably thinking anyone can make these sorts of claims, but where are the hard results of the testing? Well, in typical Cartwheelin' fashion, we've done extensive real world testing on OHV Turbo's 660 Rhino versus a stock Rhino 660 from Rhinos 4 Rent at Glamis. In addition, we chose to install a kit on the Cartwheelin' Rhino and have before and after results on pavement, as well. So, how'd it turn out, you ask?

Testing @ Glamis

We did some runs in the sand of Glamis with Trey's Rhino 660 and a borrowed Rhino 660 from Rhinos 4 Rent. A big thanks to them for helping us out with our testing. Trey's Rhino had an aluminum roof, speaker rack, and 26" tires in comparison to the bone stock Rhino from www.rhinos4rent.com. Here are the results from our runs:

Sand Run		Turbo 660	Stock 660	Difference	Average
4wd	Run #1	11.66 sec	13.91 sec	1.38 sec	1.36 sec
	Run #2	12.07 sec	13.47 sec	1.4 sec	
	Run #3	12.23 sec	13.53 sec	1.3 sec	
2wd	Run #1	12.08 sec	13.85 sec	1.77 sec	1.48 sec
	Run #2	12.45 sec	13.84 sec	1.39 sec	
	Run #3	12.35 sec	13.64 sec	1.29 sec	

As you can see the results are pretty impressive. Not only did we take off nearly 1.5 seconds, but that equated to 4-5 lengths.

Another thing to mention is that during our initial dune testing at Glamis, I was following Troy in the Cartwheelin' Rhino and Trey in his Turbo 660 Rhino. Trey had no problems carving any bowl and climbing any of the hills we came to, where there were many occasions that Troy had to turn downhill and make another attempt. It seems that the harder you push these Turbo equipped Rhinos, the better they perform. For example, running up Oldsmobile Hill was no problem for the OHV Turbo Rhino. In fact, it beat our RZR up it, and it probably had at least 300-400 more lbs of weight. That was impressive!

So, needless to say, after Troy got spanked in his decked out long travel Rhino by Trey's pretty stock Turbo'd Rhino, he just had to have one. And, in my opinion, this is really where it got fun. Remember how I said the Turbo seems to make a bigger difference the more loaded it is? Well, CartWheelin's Rhino is rather decked out with a 4 seat cage, bigger tires and wheels, lots of electronics, bumpers, aftermarket seats, HID lights, long travel, etc.

Pavement Runs	Turbo @ 9.5 psi		Stock	
	Time	Speed	Time	Speed
Run #1	15.78 sec	58 mph	17.03 sec	51 mph
Run #2	15.59 sec	58 mph	17.00 sec	51 mph
Run #3	15.35 sec	58 mph	16.81 sec	51 mph
Average	15.57 sec	58 mph	16.95 sec	51 mph
Difference	1.38 sec and 7 mph			

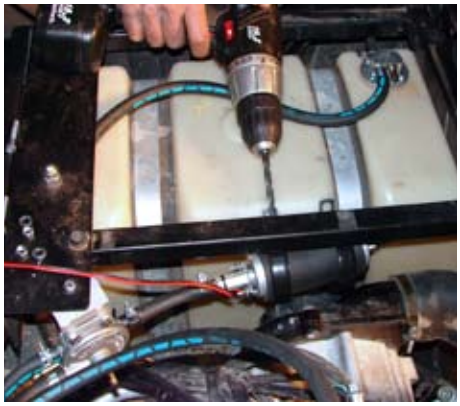
We ended up swapping out the narrow band AFR guage for a higher quality Wide Band AFR guage, which is why you'll notice we've turned down the boost from 11 psi to 9.5 psi. We have some final tuning to do once we receive the guage, but overall we'll easily achieve over a 1.5 second and probably 8 mph difference. And, you're probably thinking exactly what Troy was thinking…is that it? Well, let's put this into perspective. Out at the dunes doing some testing, under full throttle load on Sand Highway, we were only able to achieve 33-35mph with the stock motor. Once we installed the OHV Turbo Kit, we were running 51-53 mph over the same sections of Sand Highway. That is huge! We gained 18-20 mph out at the dunes, not to mention the awesome acceleration it has now. Now we can really take advantage of the Rhino Mafia Long Travel w/ Radflo Shocks. Before, we could never get to the top of the whoops, and now it's no problem.

Overall, we were extremely impressed with the quality and ease of installation of the kit. We were so impressed, that instead of boring you with the step by step instructions on the install, we wanted to provide you with real life impressions and results. But, for those wondering just how exactly the air flows through this Turbo setup, here you go:

Here's the intake hose with the air filter just on the inside of the fender material underneath the driver's seat.

After running through the turbo, the compressed air runs through the intercooler, which drops the intake air temps dramatically. You'll also notice the blow off valve, which keeps the turbo from over-boosting and created un-needed backpressure on the turbo:

From there, it enters the intake plenum, which is there to smooth out the pulses created by a 1 cylinder engine:



Next the air enters the carburetor and the fuel enters the equation, which is now regulated by an all new fuel system capable of keeping up with the added requirements that the Turbo creates. It includes the electric fuel pump and fuel regulator and requires no modifications to the fuel tank:

For more information on the OHV Turbo Kit, contact Trey Lokey @ 719-539-3989. And, if after reading all this you're still concerned if this is the way to go for your application, I'm sure Trey will give you honest and accurate responses to your questions.

From here, the engine goes through the combustion process and the exhaust leaves the engine, which you can see above with the stock system and the modified system with the Turbo. We chose to weld it, because it's permanent, but you can also clamp it for easy removal.

Next, the exhaust exits the vehicle through the stock muffler, which I think is another added advantage of this kit: It's quieter than stock! On its way out, we monitor the AFR for tuning purposes by using a Wide Band O2 sensor welded into the muffler, which you can see above.

So there you have it! For the same money as a small big bore kit or bolt on engine parts, you can over double your engines output. The fact is there is no cheaper way to achieve this much power…period! It really doesn't get any simpler than this, and it's safe and reliable to boot. Just be careful racing on public roads! (We were legal)