

## Ballistic Cycles Hubless Showstopper



The infamous 30 inch Hubless bagger built by Mike and Tim McNamer of Ballistic Cycles started life as a bone stock, pristine condition Harley Davidson Road king pictured on the left. After roughly 2200 hours of fabrication, design and assembly our Hubless masterpiece was no longer a concept, it had now become a reality. We built this bike for many reasons, first was to raise the bar in our industry and, second was to participate in the 2014 HOTBIKE power tour. Third was to show the masses what a bone stock Harley Davidson could be turned into with some creativity and vision.



**Hubless wheel:** Having been in the custom motorcycle business for 15+ years we have had the pleasure of becoming acquainted with some amazingly talented people. With an undertaking of this level the engineering had to be spot on. So for this reason we

recruited a friend and very experienced machinist out of Canada. When it comes to Hubless wheels he is definitely the leading authority in the field. With his guidance and knowledge combined with our skills it was a match made in heaven. A few phone calls and sketches later it wasn't long before we were well on our way to the world's





first 30 inch Hubless wheel bagger. The heart of the Hubless wheel assembly which makes it all possible is a 28" wind turbine bearing. This bearing is made with super tight tolerances and high load ratings making it perfect for a 30" Hubless motorcycle wheel. 4 billet aluminum rings had to be machined to fasten together around the bearing and compress in key areas. This design essentially extends the inner and outer surfaces of the bearing while keeping all the grease contained inside and the dirt and road debris out. A mounting surface feature was machined into the 2 inner halves for attaching the assembled wheel to the front end, while the other 2 outer rings are made to hold a tire and brake rotors, thus completing our wheel assembly.

**Brakes:** The brake surfaces are integrated as part of the wheel assembly. Segments cut from 409 stainless steel in a repeating pattern form the brake discs. These segments are fastened into a groove on the surface of the wheel forming our perimeter style rotors. Custom prototype hydraulic hand controls were built to transfer the fluid to our front brake system and hydraulic clutch.

**Front fork:** The front end is truly one of a kind. It was custom machined to work similar to a "Girder" style front end. It was also designed to incorporate our complete integrated braking system. Essentially we made the front end a large brake caliper of sorts with fluid passages and brake bores. A unique custom air cylinder was designed and built to handle the lifting and suspension dampening.

The front end uses tapered Timken bearings and races for consistent smooth articulation instead of weak bushings prone to failure. We even went as far as making custom plugs to conceal the heads of all the fasteners.



**Air system:** As with most of the custom bikes on the market these days air suspension has become the norm in the industry. We utilized a large on board air compressor fed to a storage tank which stores a constant air supply. This allows us to have instant height control on the fly. Simple mechanical paddle switches are all that is necessary to operate the system. One switch controls the front and the other the rear. A pressure switch is used to maintain a constant 175 psi in our storage tank at all times. Even if the compressor were to fail at any point chances are there would still be enough air supply to lift and lower the bike a few times without needing replenishing.

**Frame modifications:** Right from the start we needed some extra room and a stiffer front motor mount rigid enough to endure the extra load from the turbo system. So this meant the stock dual frame tube design had to go. Soon after mounting our chassis in the frame jig, making some measurements and cut marks, it wasn't long before we had come up with a much stronger, better looking, heavy wall, single tube frame section ready to weld in. We decided to stretch the rear swingarm 3 inches and drop the seat area 2 inches as well. By adding length to the wheelbase and lowering the riders sitting position we're adding to the stability and overall handling of the motorcycle.



**Turbo system:** The turbo system we designed for this bike was quite a mechanical feat in itself. We're running two 53mm self-oiling Aerochargers, a custom made set of 304 stainless steel exhaust runners, an adjustable turbo smart Blow off valve along with combining both an Air/Air and optional



Liquid/Air intercooler making this one of a kind system truly unique. Our "heat-sink style" plenum intercooler works great for all your typical riding conditions, while our liquid cooled option is more for the speed freak really looking to run the motor hard and aggressive, i.e. "Under high boost for extended periods of time".

Hyperflow clamshell style tube connections and V-band clamps were installed for quick disconnection of the intercooler. This allows for much easier removal and installation of the race car style aluminum body.

**Drivetrain:** After disassembly and inspection of the stock 88 ci motor



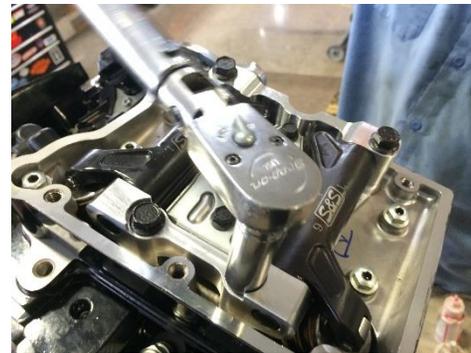
went extremely well, we decided it was time for some serious upgrades. First on the list was removing the stock wrinkle finish paint and giving the parts a fresh coat of gloss black powdercoat. We then focused our attention on the crankshaft assembly and installed a much stronger S&S rotating assembly equipped with 4.375 H-beam steel rods. This upgrade along with a set of fresh 3.937 Nikasil plated Revolution cylinders and forged 9:8.1 pistons now brings our displacement up to 107ci. In order to better handle the quick



revs of our turbo engine we also had our crankcase fitted with a Timken tapered bearing upgrade. Our crank was then balanced, pinned and welded before re-installing into the reworked cases. The cylinder heads were completely stripped and fitted with new guides, seats, valves and heavy springs before a stage III port and polish job was completed. The oil pump was replaced with a fueling "race series" billet pump along with an S&S gear driven valve-train system. Fueling 594 reaper cams and adjustable pushrods were also installed.



ARP cylinder studs hold the top end down while the rest of the drivetrain was fitted with stainless ARP 12 point fasteners. On the top side, heavy duty Delkron billet rocker shaft supports and S&S roller rockers were installed to handle the extra HP.



HD transmissions are built extremely well. They can handle quite a bit of abuse right from the factory so very minimal attention was needed here. The gearbox and primary drive were fitted with a hydraulic clutch actuator, a complete BDL scorpion "lock up" clutch system, and automatic chain tensioner.

**Aluminum Body:** After the frame, Turbo system and driveline was now nearly complete we turned our attention to the body of the motorcycle. We definitely wanted to stay true to our original and unique style with a free flowing aggressive design, so after careful consideration of what materials to use, aluminum came to be our material of choice. Light in weight but strong was the idea. The aluminum alloy chosen for this particular project was 5000 series. This series of material has magnesium added for better workability without work hardening, and also has great welding properties. After roughly 1400hrs of fabrication and metal working, two 4x8 sheets of material and a whole lot of welding it was finally looking like a world class motorcycle with a mind blowing flow to it. Being that the finished

body panels were so light, all that was needed to fasten them to the chassis were a few well-placed rubber mounts and hangers. Another key feature we added was a custom made retractable license plate system to the rear fender in order to keep unobstructed clean flowing lines.



**Fuel system:** As with any high rev turbo engine a good fuel delivery system is absolutely necessary. With this particular motorcycle the standard fuel tank location was already being occupied by other components so we chose to do something different by fabricating and mounting two 4 gallon fuel cells in the rear of the bike. By doing this it also helped to balance the weight of the motorcycle and bring the center of gravity closer to where it was needed acting as a type of ballast to offset the extra weight of the Hubless wheel. Our fuel system was comprised of an external MDS race car fuel pump coupled to an adjustable rising rate fuel regulator which precisely sets and monitors the pressure needed to feed our high flow fuel injectors. The engine management system “ECM” is managed by the tried and true Thundermax Efi module. No other tuner even comes close to the adjustability of this unit. With our calculations of engine displacement, fuel flow and boost capability we are estimating the Horse power to be in the 220 range when completely dialed in.

**Maintenance:** As with anything mechanical or motorized there will always be a need for service, things fail and parts can break that’s just reality. Even though there are many custom one of a kind parts used in the building of this motorcycle we made sure to keep things easily accessible in case of any issues or failures.

We definitely wouldn’t recommend taking something like this to your local garage mechanic for service needs aside from routine checkups and oil changes. We strongly recommend to all of our customers for anything requiring major disassembly or diagnosis to always take it to the original builder for service. This will save headaches down the road guaranteed.

**Paint:** We had a few paint schemes in mind from the beginning of the build, one was very elaborate and time consuming with lots of bio-mechanical airbrush work and the other was a nice graphic/color scheme. As the bike started to near its completion and the number of days were getting shorter till the



beginning of the Hot bike road tour event, we soon realized there wasn't enough time before the event for a scheme we felt the bike deserved. Our only choice was to improvise with a temporary vinyl wrap then add a simple graphic scheme to accent the flowing body lines. The vinyl wrap was easily removed after the tour and the bike was given a more suitable paint scheme that it has now.

**Power Tour:** The Hot bike power tour was basically a 1000+ mile road trip with stops in 5 different cities spread across 5 days. The event was put together in 2013 with a great turnout of over 300+ riders. In order to boost the popularity of this event in 2014 they decided to invite some of the Industries best custom builders to come and show off their amazing motorcycles and it was a great way to prove that they could be ridden cross country like any other motorcycle. We were fortunate enough to be chosen as one of the participants in this event, and therefor decided to use this amazing bike to represent our company. The ride started on August 16 in Joplin, Missouri. All of the bikes were then ridden each day approximately 200-250 miles to each different destination on the tour and finally ending on August 21<sup>st</sup> in the Wisconsin dells. Our Hubless bike rode amazingly well out on the open road which is what it was essentially built for, in fact it was the most stable bike on the road compared to all of the other motorcycles on the ride, especially at higher speeds. It glided across the interstate like it was on rails and ran like a dream throughout the event. The only problem we encountered on the ride was toward the end of the event where we picked up a piece of road debris and punctured our front tire, being that we were close to home at this point we decided to drive back to our shop and swap out the tire. We then rejoined the group the next morning to complete the ride.



**Awards won:** This bike has won many prestigious awards since its completion, it was crowned the Baddest Bagger in Sturgis by taking best of show in every event in which it was entered, which has never been done before in the history of the circuit.

List of events:

Sturgis, Baddest Bagger:  
Best of show

Sturgis, Easyrider show: Best  
of show

Sturgis, Nastiest Bagger: Best  
of show

Millwaukee H-D museum:  
First place, pro class

Daytona, Perewitz show:  
Best of show, and Best paint

Daytona, full throttle show:  
Best of show, pro class

Minnesota, Donnie smith  
invitational: judges pick (Best  
of show)