

Revolution Performance

Twin Cam 107" Big Bore Kit Installation: Part 1

Story by **Jason Mook** – Photos by **Jesse B. Nelson**

When Harley-Davidson introduced the 96" Twin Cam Motor in 2007, the increased displacement was obtained by increasing the stroke of the engine. Keeping the bore size the same, the 4-inch stroke found in the 88" motors was increased to 4 3/8 inch to gain the additional cubic inches. The 96" Twin Cam Motor was well received, as splitting the cases was no longer needed, and a top end kit was all that was required to reach a displacement of 103". The aftermarket was quick to respond with technology that would allow displacement increases above 103", without the necessity of boring the case spigots. Revolution Performance's 107" Big Bore Kit, yielding a 10.5:1 compression ratio, fits in this category. The all aluminum cylinders from Revolution Performance have a bore that are plated with Nickel Silicon Carbide, providing 30-40 degree cooler temperatures than their stock cast iron counterpart. The Nickel-Sil is structurally stronger than cast iron, while still able to be serviced if necessary. These cylinders are the last ones you will ever need to buy. In conjunction with the 107" Big Bore Kit, Revolution Performance also offers headwork, in the form of an exchange program, or performing service on your own heads. For this project, we choose a Stage II CNC Porting, with bigger valves, and springs that can accommodate up to a .650" lift set of cams. In Part 1, the top end of the 2009 96" motor is torn down in preparation for the Big Bore Kit. To see all the products and services offered by Revolution Performance, visit www.RevPerf.com.

Difficulty Level: 4/5

Estimated Time to Complete: 3.0 hours



Revolution Performance's 107" Big Bore Kit and Stage II Heads.



The 2009 Bagger with stock 96 cubic inch motor.

Tool & Supplies Needed

- SAE Wrench Set
- SAE Socket Set
- 3/8" Ratchet Driver
- SAE Allen Wrenches
- Torx Drivers
- Small Flathead Screwdriver
- Wrist Pin Removal Tool
- Pushrod Tube Removal/Installation Tool
- Center Jack
- 3/8" Rubber Hose, 4" Long (4 Required)
- Clean Shop Rags
- Eye Protection



1 Remove the seat from the motorcycle. Disconnect the negative terminal from the battery.



2 Remove the hardware holding the dash to the fuel tank.



3 Remove the dash from the top of the fuel tank.



4 Disconnect the wiring for the fuel pump and fuel level sending unit.

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Unplug the vent line from the top of fuel tank.



Disconnect the fuel line fitting from the quick-connect on the left lower side of the fuel tank.



Use a T40 Torx to remove the four mounting bolts for the fuel tank.



Lift the fuel tank up and off the backbone of the motorcycle.



Unplug the positive and negative wires for the horn.



Remove the two bolts holding the horn mount/top motor bracket with a 9/16" wrench.



The top motor bracket can be removed from the cylinder heads.



With a 3/16" Allen and 7/16" wrench, remove the floorboard mounting hardware.

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Remove the floorboard from the mounting brackets.



Use a 5/16" Allen to remove the bolt holding the right rear floorboard-mounting bracket.



After removing the hardware holding the exhaust to the transmission bracket, remove the exhaust flange nuts with a 1/2" socket.



Remove the exhaust system from the motorcycle.



Use a 7/16" socket to remove the hardware holding the heat guards from the frame.



Remove the air cleaner filter and outer cover from the backing plate.



With a 3/16" Allen, remove the three bolts holding the backing plate to the throttle body.



Remove the backing plate and breather hoses.



Use a 7/16" deep well socket to remove the breather bolts from the cylinder heads.



Disconnect the wiring from the servomotor on the throttle body.



Unplug the connectors from the fuel injectors and sensors on the throttle body.



With a long 1/4" Allen, remove the two right side bolts holding the throttle body to the heads. The left side bolts are loosened using a 1/2" wrench.



Remove the throttle body from in between the cylinder heads from the right side of the motorcycle.



With a T45 Torx driver, remove the bolt holding the front motor stabilizer link to the frame.



The front motor bracket can be taken off after removing the two bolts with a 9/16" wrench.



Using a 7/16" socket, remove the six bolts holding the rocker box top.

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Remove the rocker box top and gasket from the lower rocker box housing. Repeat the process for the other rocker box.



Remove the spark plugs from each cylinder head.



With a 3/4" deep well socket, the engine temperature sensor can be removed from the front cylinder head.



To access the pushrods, remove the top clips from the pushrod tubes. Use a center jack under the frame to raise the rear wheel off the lift.



Put the transmission in sixth gear. Rotate the motor until the piston of the cylinder you are working is at TDC (top dead center) of the compression stroke. Verify the pushrods of that cylinder rotate freely by hand.



With a 3/8" wrench, loosen the two bolts holding the breather assembly.



Loosen the four bolts holding the rocker arm pedestal with a 1/2" wrench.



Remove the rocker arm pedestal from the lower rocker box housing.

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37 The pushrods and tubes are removed next. Repeat the process for the second cylinder, ensuring it is at TDC of the compression stroke when performing work.



38 Loosen the six bolts holding the lower rocker housing to the head.



39 Remove the lower rocker housing from the cylinder head.



40 With a 1/2" 12 point socket, break the four head bolts loose.



41 Remove the head bolts from the cylinder studs.



42 Lift the cylinder head up and off the cylinder. Repeat the process for the other cylinder head.



43 Raise the cylinder up and off the cylinder studs. It helps to keep the motorcycle in gear with the rear wheel on the lift to prevent the piston from moving while raising the cylinder.



44 Place clean shop rags in the case spigot. This is to prevent the wrist pin from falling in the engine case when it is removed.

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45 Slip the 3/8" rubber hose over the outside cylinder studs for the pistons to rest on. This will help prevent damage to the piston or cylinder stud.



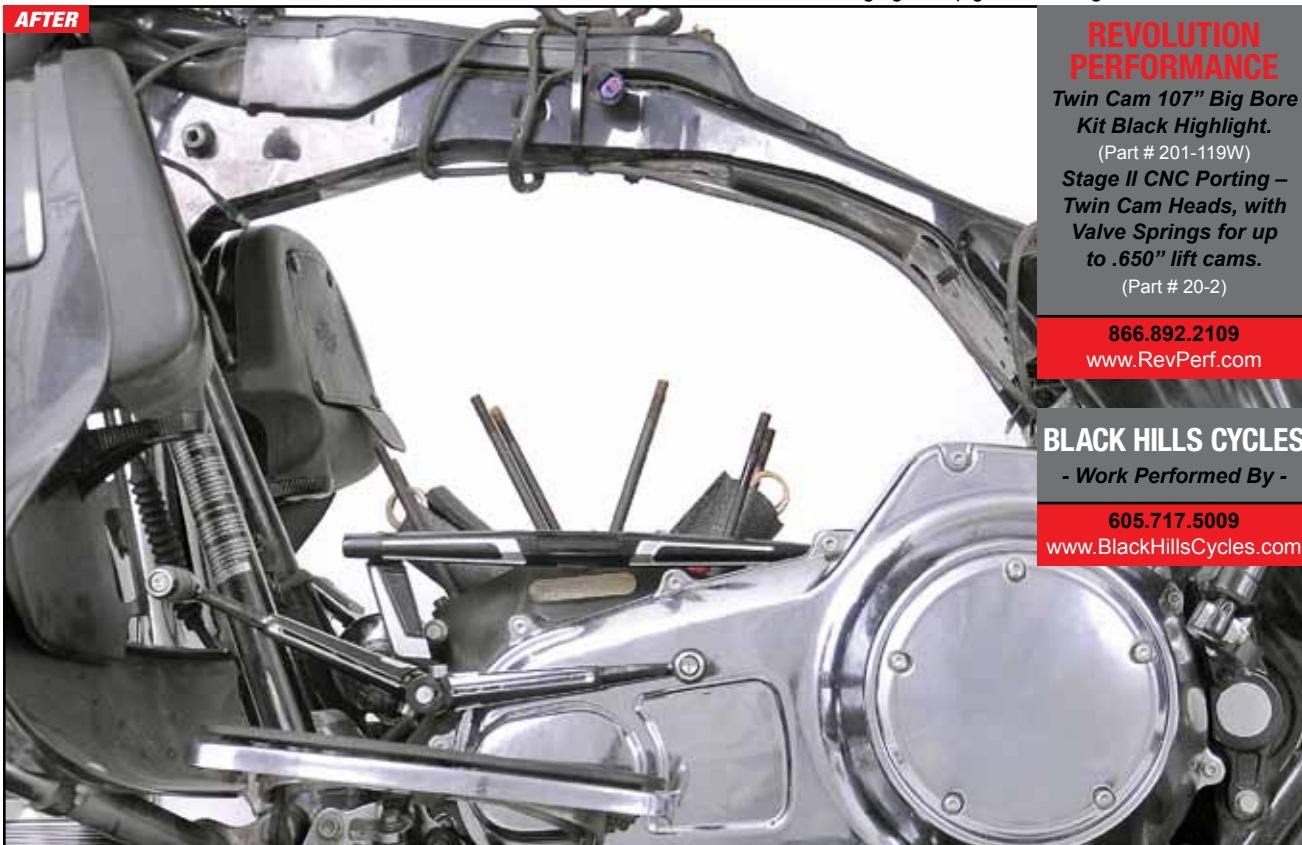
46 Use a small flathead screwdriver to remove the wrist pin retaining clip from the piston. Wear eye protection during this step.



47 Use the wrist pin removal tool to clear the wrist pin from the connecting rod.



48 Remove the piston from the connecting rod. Maintain control of the connecting rod to prevent it from damaging the spigot of the engine case.



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Twin Cam 107" Big Bore Kit Black Highlight.

(Part # 201-119W)

Stage II CNC Porting – Twin Cam Heads, with Valve Springs for up to .650" lift cams.

(Part # 20-2)

866.892.2109

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The top end teardown is complete. The 96" Twin Cam motor is ready for 107 cubic inches of displacement.