# S&S CAMS & POWER VISION

*Part III: We gained six ponies and 11 ft-lbs. of torque with this bolt-in cam kit!*

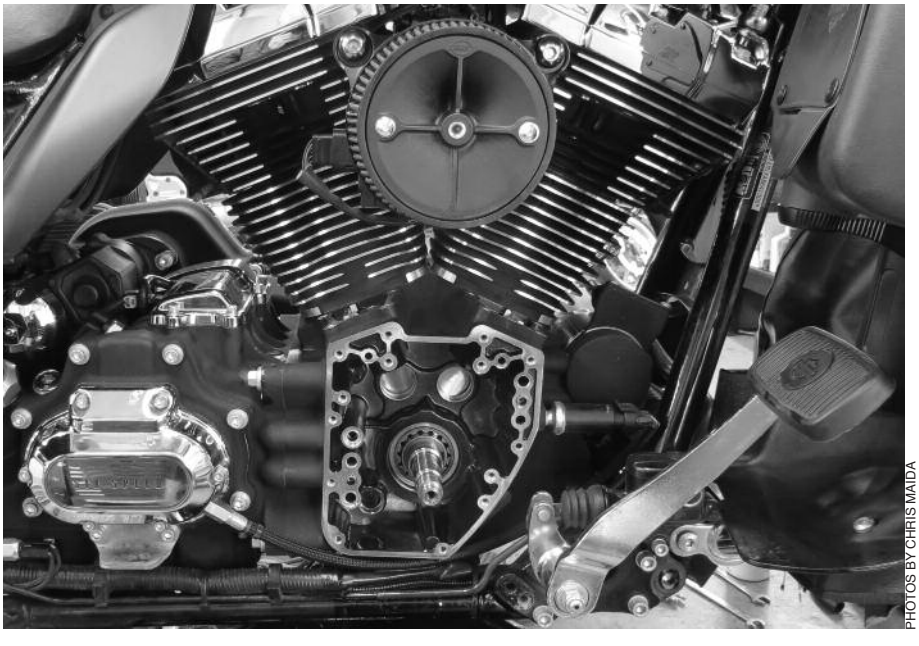
LAST MONTH WE SHOWED YOU HOW TO INSTALL A SET OF S&S Cycle's Power Tune Duals headers and crossover pipe, as well as a set of its SPO Touring mufflers, onto a 2010 Electra Glide Ultra Limited 103″. We got a power boost of 5 hp and 3 ft-lbs. of torque. The issue before that, we bolted on a S&S Airstream Stealth air cleaner kit and got a power increase of 7 hp and 8 ft-lbs. of torque. For both installations, we didn't need to install an EFI fuel tuner. The stock ECM was able to recalibrate itself to work with the new high-performance equipment, since we did them one at a time.

As is usually the case, the quest for more power continues, so we're throwing a set of S&S Cycle's 551C chain-driven cams (#106-4858/$314.95) in our ever-quickening Ultra. Made for 2007 and later Touring bikes, the 551C is a low-to-midrange, torque-improving cam grind designed to provide an increase in power from idle to 4000 rpm. This cam set will work best with 96″-106″ stock or mildly modified engines. And these cams are designed to use all the other stock components such as lifters, pushrods, rocker arms, and valve springs, so there's no extra expense. In fact, this is a perfect kit to install when you have to pull apart the gearcase section to replace worn cam tensioner shoes. The labor and parts costs are the same, except for the price of the new cams.

This young-in-years engine had quite a bit of mileage on it, so we decided to play it safe and also upgrade the lifters

## TOOLS NEEDED

- Assembly lube
- Blue Loctite
- Red Loctite
- Torx T-25
- Torx T-27
- 3/16″ Allen
- Snap ring pliers
- Steel straightedge
- Flat feeler gauge
- 1/4″ wrench
- 5/16″ socket
- 7/16″ wrench (2)
- 1/2″ socket
- 9/16″ socket
- Torque wrench (in-lbs.)
- Torque wrench (ft-lbs.)
- Dial indicator
- JIMS alignment dowels (2)
- SE locking tool
- SE inner cam bearing puller
- SE inner cam bearing installer ■



**1** Our 2010 Electra Glide Limited is up on Dan's lift with the complete exhaust system, both side covers, and air cleaner cover removed, as well as the right floorboard and pushrod assemblies. The gearcase section is emptied, and the inner cam bearings are removed.

PHOTOS BY CHRIS MAIDA

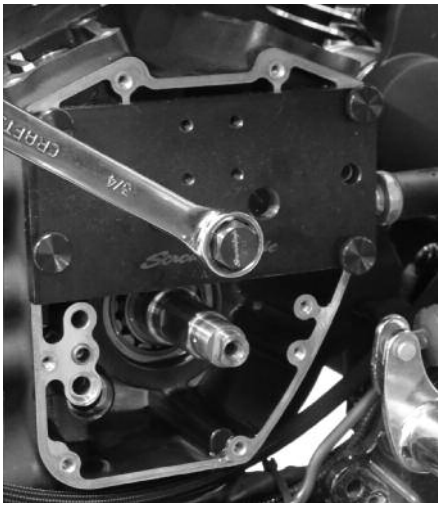

**2** Dan first checks the pinion shaft runout using a dial indicator. He gets only 0.002", which is acceptable. Dan also checked the pinion shaft bushing in the support plate for excessive wear.

(tappets) with a S&S Tappet Set (#33-5350/$129.95). The S&S lifters are precision-machined to provide a precise fit and are a perfect value for engines with bolt-in cams, stock cams, and other performance valvetrain products.

So we didn't have to open up the rocker boxes, we simply cut out the stock pushrods and replaced them with S&S' Quickee Pushrod and Cover Kit (#106-6051/$224.95). Using the Quickee kit, we leave the rocker boxes just as they are, greatly reducing labor costs. These pushrods are made of chromoly steel, so they flex less, which leads to more accurate valve timing. The Quickee kit works with all displacement Twin Cams and includes chrome pushrod covers.

Just like with the air cleaner and pipes, this isn't a street-legal set of cams. And though you can get away without a fuel tuner when doing an air cleaner or pipe swap, and sometimes both like we did, there's no way you'll get by without one when installing cams. That's why we installed a Dynojet Power Vision tuner ($549). We didn't get the Auto Tune feature with the Power Vision since S&S has





**3** Dan changes the inner cam bearings using a SE puller and installer and the S&S-supplied bearings. Once he has removed the tool, Dan puts some assembly lube onto both bearings.

**4** Once he has inspected the oil pump, put some assembly lube onto all the gerotor gears, and slipped a new S&S-supplied O-ring (don't reuse the old one!) onto the pump snout, Dan reinstalls the pump onto the pinion shaft.

**5** Dan then positions both new S&S cams into the stock H-D inner cam chain with their alignment dots next to each other, noting the directional mark he made on the chain when he removed it.

a downloadable map for this exact three-part power package that worked great.

We also did this third part of our power upgrade project at Rob's Dyno, but Dan was the one turning the wrenches for us instead of Rob. The accompanying dyno chart tells you what the bike now puts out at wide-open throttle, but how does it feel to ride the Ultra with its new S&S Cycle performance enhancements? Rob says, "This setup is great for touring! There's gobs of torque at low rpm and it pulls like a freight train in sixth gear." Well, there ya go!

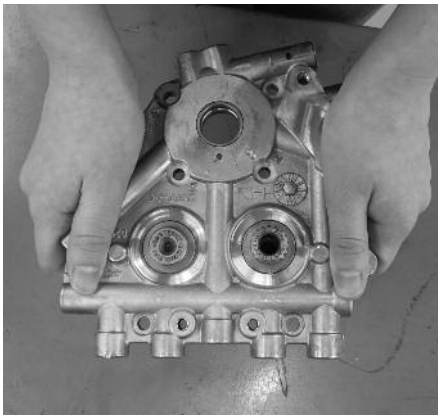
## SOURCES

**DYNOJET RESEARCH**
702/399-1423
Dynojet.com

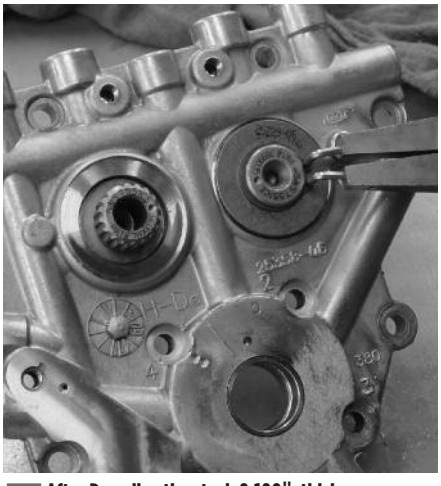
**ROB'S DYNO SERVICE**
978/895-0441
RobsDyno.com

**S&S CYCLE INC.**
866/244-2673
SSCycle.com

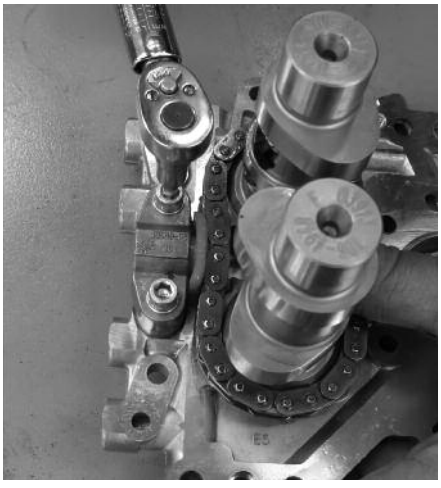




**6** With some assembly lube on the bearing surfaces on the end of the cams, Dan slips the stock support plate over the cams. He then checks that the dots are still aligned using a steel straightedge.



**7** After Dan slips the stock 0.100"-thick spacer over the end of the front cam, he secures it using a new S&S-supplied retaining ring and external ring pliers. He then moves the retaining ring to ensure it's fully in its groove.



**8** Dan installs the stock inner hydraulic chain tensioner using the stock bolts, blue Loctite, and a 3/16" Allen. He torques the bolts to 90-120 in-lbs.

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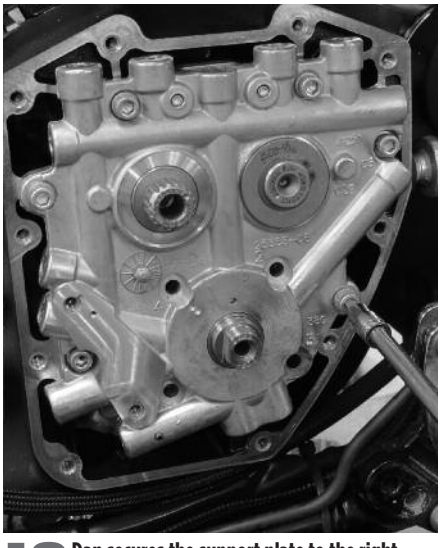
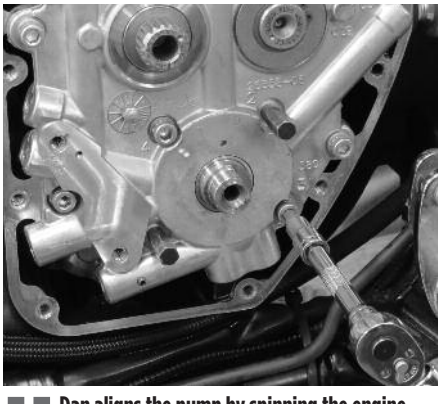
frankenstein

**9** After putting two new O-rings on the right case and putting assembly lube on the cam lobes and chain, Dan slips the support plate assembly into the right case.



**10** Dan secures the support plate to the right case using the stock bolts, a little blue Loctite, and a 3/16" Allen. He torques the bolts to 90-120 in-lbs. as per the procedure in the H-D manual.



**11** Dan aligns the pump by spinning the engine while using two JIMS alignment dowels, a 5/16" socket, blue Loctite, and the stock bolts. When done, all four bolts are torqued to 90-120 in-lbs.

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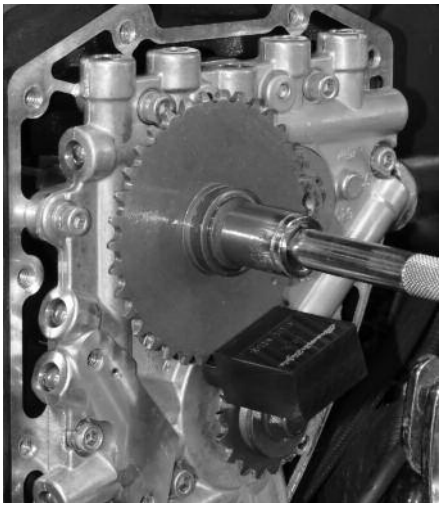
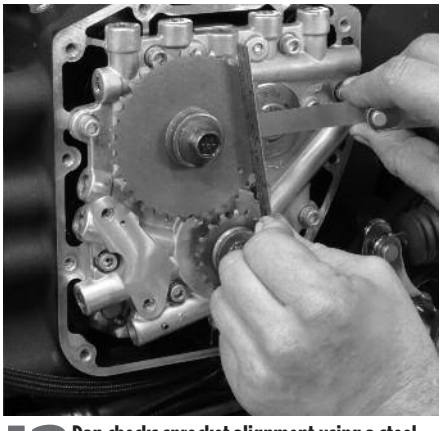
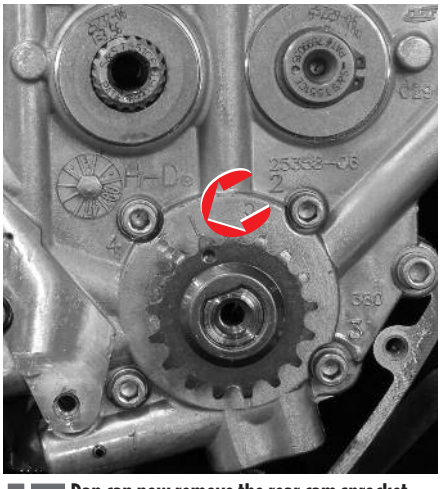


**12** After slipping the original spacer onto the rear cam, Dan secures both stock sprockets onto the rear cam and pinion shaft using the stock hardware, SE sprocket lock, and 9/16" and 1/2" sockets.

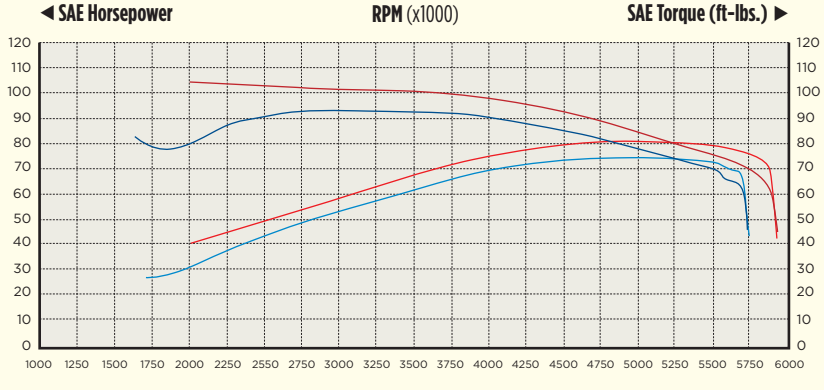
**14** To check that there's endplay on the rear cam, Dan makes sure the rear cam sprocket rotates freely and has slight in-and-out movement.



**13** Dan checks sprocket alignment using a steel straightedge across the face of both sprockets. He uses a flat feeler gauge to see that the gap between them is under 0.010".

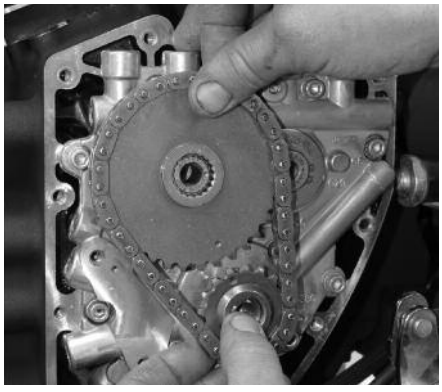


**15** Dan can now remove the rear cam sprocket, and turn the engine over until the pinion sprocket alignment is aligned with the line (arrow) on the face of the support plate.

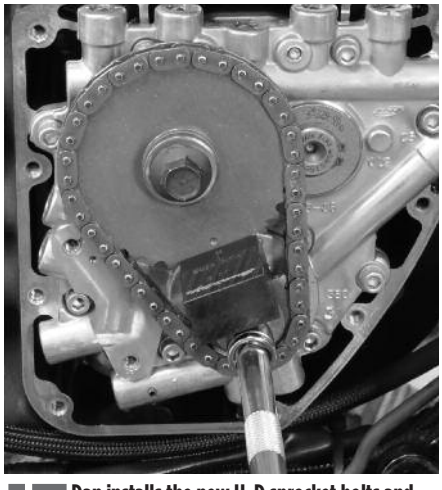



**Baseline** • Max Power = **75.2** • Max Torque = **93.6**
**S&S Cams** • Max Power = **81.3** • Max Torque = **104.8**
CF: SAE, SMOOTHING @ 5

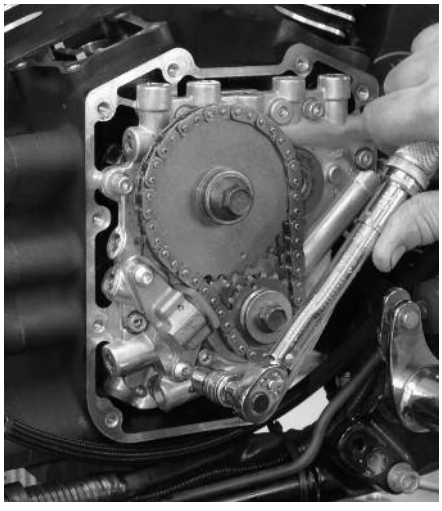
Dyno provided by
**Robs Dyno Service**
**robsdyno.com**



**16** After Dan positions both sprockets into the stock cam chain (noting the directional mark he made earlier) with their alignment dots next to each other, he slips both sprockets onto their respective shafts.



**17** Dan installs the new H-D sprocket bolts and washers using the SE locking tool, red Loctite, and a 1/2" and 9/16" socket. He torques the bolts to 25 and 35 ft-lbs., respectively, as per the service manual procedure.



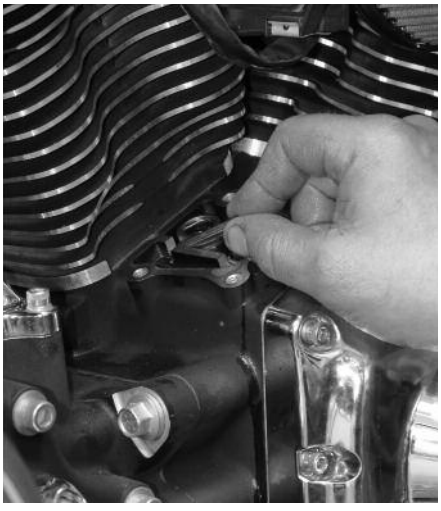
**18** Dan installs the stock outer hydraulic chain tensioner using the stock bolts, some blue Loctite, and a Torx T-27. He then torques the bolts to 90-120 in-lbs.

cruze tools

Lindby

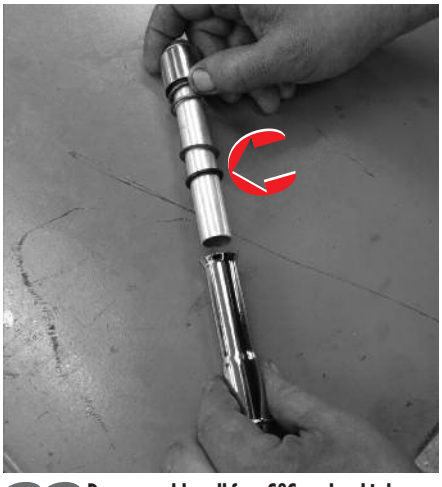
**19** With a new S&S-supplied gasket in place, Dan installs the cam cover using the stock bolts, blue Loctite, and a 3/16" Allen. He torques the bolts to 90-120 in-lbs. as per the service manual procedure.

**20** Dan pumps up each of the four new S&S lifters with fresh engine oil through the oil hole in the side of the lifter until the oil comes out of the oil hole in the top of the lifter.

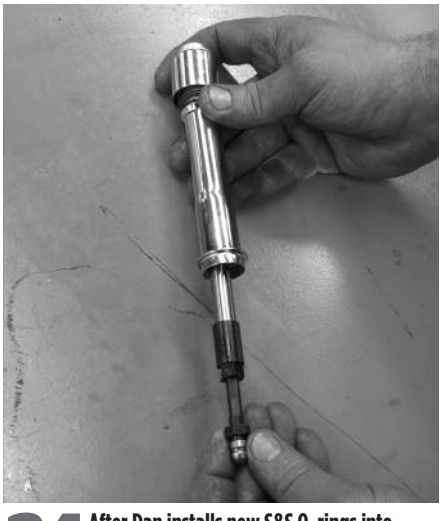


**21** Dan drops the lifters into their bores in the right case with a flat side of the lifter against the wall. He next puts both alignment pins in their slots in the right case.

**22** After putting new H-D lifter cover gaskets in place, Dan reinstalls the stock covers using the stock bolts, blue Loctite, and a 3/16" Allen. He torques the bolts to 90-120 in-lbs. in a crisscross pattern.



**23** Dan assembles all four S&S pushrod tubes, using the stock collar, spring, and steel washer. The new S&S O-ring is the last part (arrow) on the upper tube.



**24** After Dan installs new S&S O-rings into both heads and all four lifter covers, he slips the new S&S adjustable pushrods into their tubes. These pushrods are all the same length until adjusted.

## TIPS & TRICKS

DAN MAKES A MARK ON BOTH cam drive chains so they will be moving in the same direction as before when they go back in with the new S&S cams.

Before assembling anything, Dan makes sure all old gasket material is removed from the stock parts and cases. He also uses a Q-tip soaked in brake cleaner to break down and remove any oil trapped in the bolt holes.

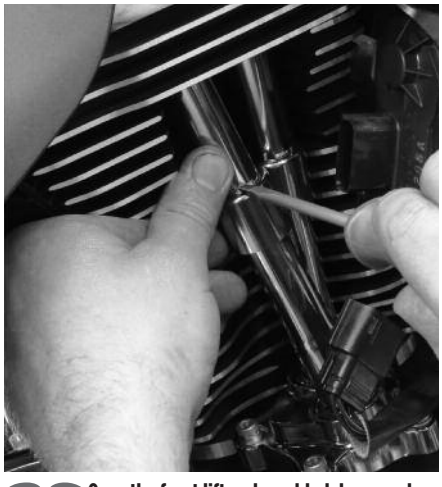
Don't mix up the cam support plate bolts with the cam cover bolts, which are longer. If you do, you will crack the right case since the longer cam cover bolts will bottom out in the right case.

Dan aligns the oil pump by spinning the engine while torquing two JIMS alignment dowels in stages to 45 in-lbs. using a 5/16" socket. He then installs two of the stock bolts, with blue Loctite on them, and torques all four to 90-120 in-lbs. He then removes the two dowels and installs the last two stock bolts, with blue Loctite on them, using a 3/16" Allen and torques the bolts to 90-120 in-lbs.

When checking the sprocket-to-sprocket alignment, push the rear cam sprocket all the way in against the support plate. Then lay a steel straight-edge across the face of both sprockets, but the straightedge must be flat against the pinion sprocket. Use a flat feeler gauge to see what the gap is between the steel straightedge and the outer face of the rear cam sprocket. It must be under 0.010". If it's not, change the rear sprocket spacer to make it so.

When adjusting the pushrods, make sure both lifters for the cylinder you're going to work on are at their lowest point. After adjusting the pushrods as per the S&S instructions, you have to wait until the lifters have bled down before rotating the engine and do the same for the other set of pushrods. The lifters have bled down when you can spin the pushrods with your fingers. ■

**25** After he has rotated the engine so the front lifters are at their lowest point, Dan positions the front pushrods and tubes in the engine and adjusts them using a 1/4" wrench and two 7/16" wrenches.



**26** Once the front lifters have bled down and Dan has done the same for the rear pushrods, he pops the top clips into all four pushrod tubes using a flat-bladed screwdriver.


**27** Once Dan has fully assembled the bike and cranked the engine over until the oil light goes out, Rob uses a Dynojet Power Vision fuel tuner and the maps on the S&S web site to dial in the engine. **MB**