

FEULING® CAMPLATE INSTALLATION INSTRUCTIONS FOR H-D TWIN CAM® ENGINES '99 - '16
HIGH FLOW Part #'s: 8000, 8010, 8011, 8015 **OE+ Part #'s 8030, 8031, 8032, 8033**
Part #'s 8011 & 8032 See supplemental instruction sheet



#8000



#8010



#8011



#8015

The Feuling® HIGH FLOW camplates for Twin Cam® engines increases engine oil flow and volume by enlarging critical oil passages and oil pump reservoirs. The cam plate is blue printed and matched to the Feuling oil pumps; this allows the Twin Cam® Engine to take full advantage of the increased volume from the Feuling high volume oil pumps. Made from 7075 billet aluminum, the hard alloy increases the strength and hardness while maintaining tighter tolerances at operating temperature. The Alloy allows elimination of the pinion shaft bushing, and on part #8015 it also allows elimination of the cam bearings. HIGH FLOW camplates are anodized and OE+ camplates are natural finish.

Increased oil flow to pinion shaft and connecting rod bearings and optimized oil flow to the lifters, piston cooling jets, cam gears and or chain tensioners.

Cooler engine temperatures and more Horsepower and Torque to the rear wheel

Tighter cam bearing bore tolerance for improved press fit on #'s 8000, 8010, 8011, 8030, 8031, 8032

Pressure relief valve and spring are designed for increased volume and pressure, eliminating the need to stretch the spring or use a shim.

IMPORTANT NOTICE

This installation should be done by an experienced mechanic who has access to a factory service manual and all required tools. This procedure requires use of specialty tools.

CAUTION

Incorrect installation can cause engine damage not covered under warranty. Failure to install components correctly can cause engine seizure. Engine seizure may result in serious injury to motorcycle, operator, passenger, and/or others.

IMPORTANT NOTICE

Measure flywheel pinion shaft run out. Excessive pinion shaft run out will cause camplate, oil pump, cam chain, cam gear damage and or failure. Excessive pinion shaft run out will void manufacturer's warranty. Damage created by valvespring coil bind and or valvespring surge will void manufacturer's warranty.



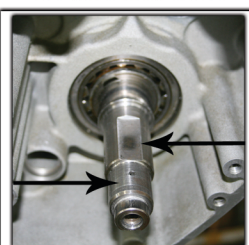
THE FEULING® HIGH FLOW CAMPLATES ARE ONLY COMPATIBLE WITH THE FEULING® HP+® & RACE SERIES® OIL PUMPS, DUE TO THE ENLARGED OIL PASSAGES & CAMPLATE KIDNEY SHAPES



THE FEULING® OE+ CAMPLATES #8030, 8031, 8032, 8033 FOLLOW THE SAME INSTALLATION INSTRUCTIONS AS THE FEULING HIGH FLOW CAMPLATES WITH THE ADDITION OF THE 1/4" SELF TAPPING SCREW FOR USE ON 'A' ENGINES WHEN THE 'BOSS' IS NOT PRESENT, USE LOCTITE & TORQUE SCREW TO 35-45 IN-LBS. FEULING® OE+ CAMPLATES ARE COMPATIBLE WITH FEULING® OE+, FACTORY HD® AND AFTERMARKET OIL PUMPS

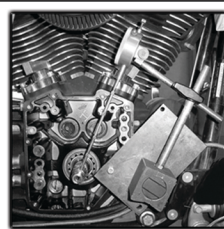
1. Refer to HD® manual, engine section, reference sub assembly service and repair bottom end, for removal of camplate, oil pump and cams.
2. Inspect the pinion shaft for burrs, use a scotch pad or emery cloth to assure smoothness of shaft. Measure the pinion shaft and pinion shaft bore of camplate, recommended clearance (+/- .0005" - .0025")
3. Inspect flywheels for pinion shaft run out. Feuling recommends a maximum run out tolerance of 0.0025". If installing gear drive camshafts the run out tolerance is very important, it is advisable to be under the maximum tolerance.

INSPECT PINION SHAFT



Remove burrs & scoring from pinion shaft to assure smoothness

MEASURE CRANK RUN OUT



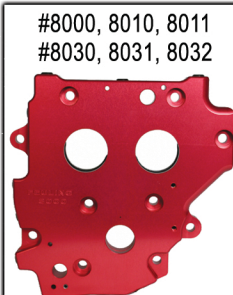
Dial indicator with Magnetic base



Feuling Runout Measuring Tool #9015

Max run out 0.0025"

WASH & INSPECT NEW CAMPLATE



#8000, 8010, 8011
#8030, 8031, 8032

Inspect cam & pinion bores for size & fitment

verify camplate has all external plugs & pressure relief valve, spring & roll pin are installed

10 Plugs

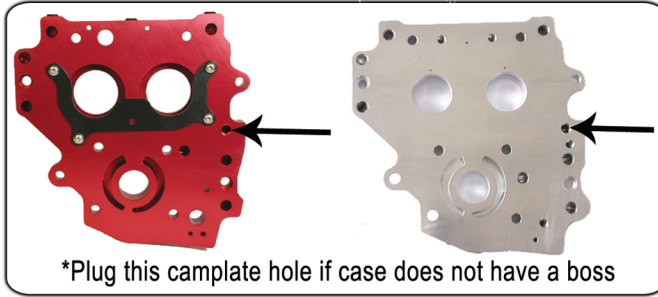
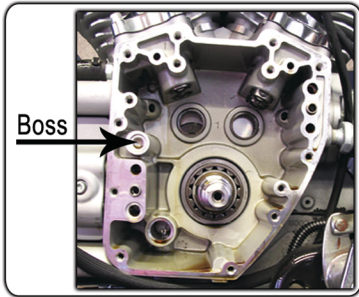


#8015 & 8033

12 plugs

4. Wash and clean Feuling camplate and all related components. Inspect cam & pinion shaft bores for burrs, if needed use a scotch pad to clean the surface. Clean camchest and all mating surfaces, it is recommended to clean and flush oil tank, any residue/debris in oil tank will flow directly through the newly installed oil pump & camplate, causing catastrophic damage not covered under warranty.

5. Refer to pictures, Examine the camchest and note the addition of a boss on the late 99A crankcase. The boss is designed to feed the B motor crank balance shaft chain tensioner. Note, 'A' motors with the boss will **NOT** have a through hole and 'B' motors will have a through hole including a screen.



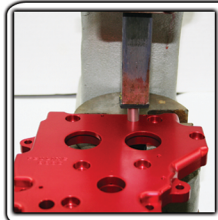
6. If the boss is present, as shown in figure 1, install the proper factory O-ring into the groove of the boss on the engine case.

7. If the boss is NOT present in the camchest then it is required to install the supplied 1/16" pipe plug (HIGH FLOW camplate), 1/4" Self tapping screw (OE+ Camplate) into the correct camplate hole as shown in pictures. Use Loctite and torque 1/16" plug to 55 – 60 in-lbs, 1/4" self tapper 35-45 in-lbs. If the engine is an 'A' motor and the boss is present and is not a through hole you can install the supplied plug for added security if desired to prevent leakage. Tighten plug flush with camplate face and make sure there isn't an interference with the case boss. The use of the O-ring is still required.

8. Camplates **#8010 & 8031** - Chain Drive Systems require tensioner pins, tensioner tower and fasteners, which are included in the #8010 & 8031 camplate kit, if needed Feuling sells the pins & tower separately see part #7078. If using a gear drive cam system no pins or tower are used.



Camplates #8010 & 8031 Install guide tower on camplate for Chain Drive Cam Systems



Press pins into camplate for Chain Drive Systems

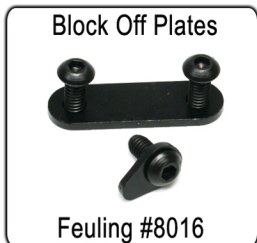


Apply extreme pressure lube on pins prior to pressing into camplate



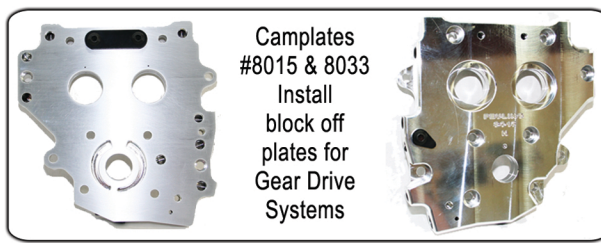
Feuling #7078

9. Camplate **#8015 & 8033** – If using gear drive cams the oil holes for the hydraulic chain drive tensioners must be blocked off. Feuling offers a block off plate kit part #8016



Block Off Plates

Feuling #8016



Camplates #8015 & 8033 Install block off plates for Gear Drive Systems



Apply Loctite to block off plate bolts

10. Camplates **#8000, 8010, 8030, 8031**. Install new cam bearings into camplate using the correct bearings for your model camshafts. Install camshafts and then install the Feuling bearing retainer plate. Install bearings and cams using the proper tools and extreme pressure lube, according to the appropriate H-D® manual.



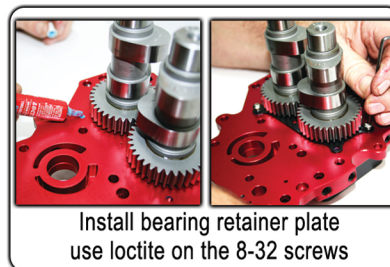
Press in new cam bearings with proper tools using press lube on bearings & bores



Verify bearings are flush with camplate



Press in camshafts use lube & proper tools



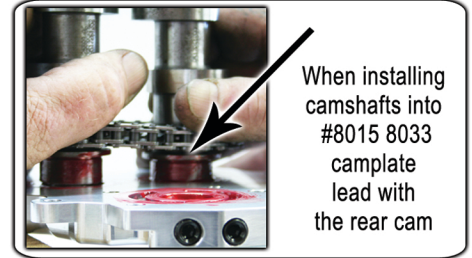
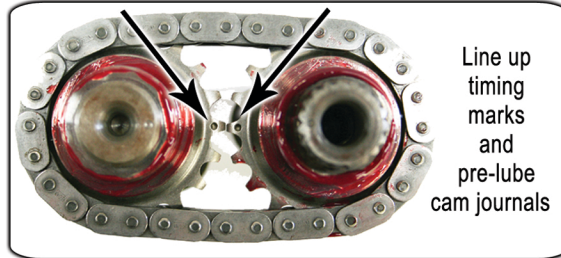
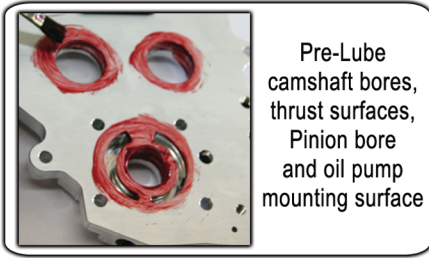
Install bearing retainer plate use loctite on the 8-32 screws



Bearing Retainer Plate

Feuling #8001

11. Camplate #8015 8033 - Install camshafts into well lubed camshaft bores, lead with rear camshaft. Install spacer washers, front camshaft retaining ring and chain tensioners, for chain drive set-up. If different thickness spacers are desired for alignment of chains or gears see your H-D dealer for different thickness spacers.



12. Apply engine assembly lube to the pinion shaft, oil pump gears, oil pump housings, oil pump sub seal, camplate oil pump mating surface, camplate oil passages, pinion shaft bore, camshaft bores, camshafts, spacer washers, chain tensioners, scavenge port hole of engine case and apply engine oil or moly lubricant to the oil pump and camplate bolts and overhead flanges.

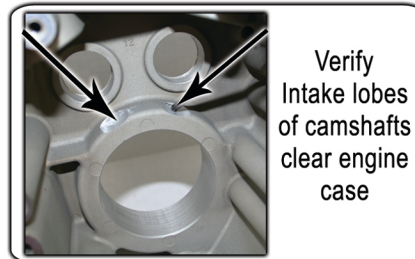


13. Bolt the complete Feuling Oil Pump to the camplate **finger tight**, with the pressure housing of the pump facing the camplate. **DO NOT** use loctite or any type of hardening compound on oil pump or camplate bolts or O-rings, the compound will interfere with stack up tolerance. Grease can be used to hold O-rings in place and moly lube or engine oil should be used on all bolts and overhead flanges

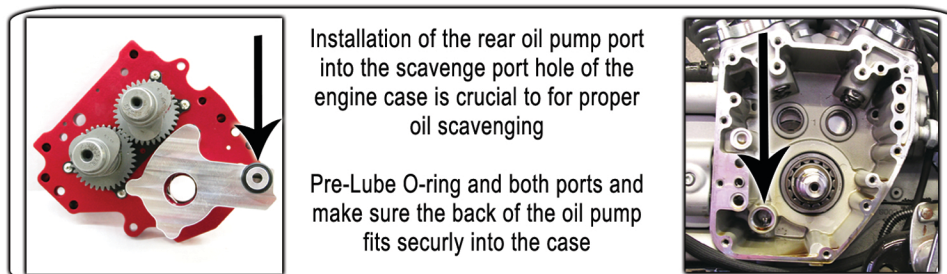
14. Check oil pump O-rings for proper fit.



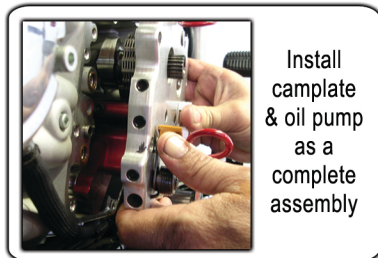
15. Verify camshaft lobes DO NOT interfere with the engine case. Install new O-rings into proper location on crankcase.



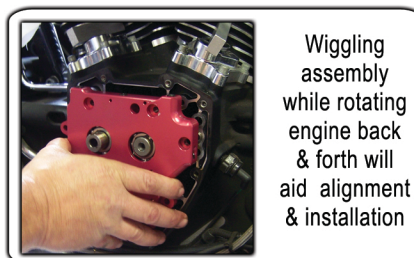
16. Pre-Lube scavenge port hole of engine case and rear pick up port of the oil pump, this connection is crucial for proper oil scavenging.



17. Installation - Align the Gerotor gear flats of the oil pump with the crankshaft flats. Slide the complete assembly onto the crankshaft, using slight pressure, slip oil pump pick up port into scavenge port hole of crankcase. It's helpful to use pressure from your thumb to push on the oil pump housing to assure proper fit into the scavenge port hole of case, at the same time wiggling assembly to align camplate with dowel pins on engine case. It's helpful to rotate the engine back and forth to help slide the assembly into position.



Install camplate & oil pump as a complete assembly

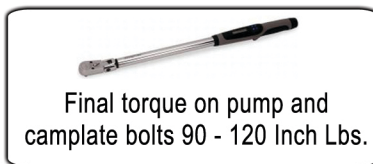


Wiggling assembly while rotating engine back & forth will aid alignment & installation

18. Tighten camplate bolts first - With camplate & oil pump bolts only finger tight rotate engine over several times. This will center the camplate assembly. Alternately tighten all camplate bolts to 10 inch lbs. Then rotate engine over again and final torque camplate bolts to 90 – 120 inch lbs.

19. With oil pump bolts only finger tight, rotate engine over several times. This will center the oil pump gerotors and pump housings to crankshaft. Alternately tighten the four oil pump bolts to 10 inch lbs. Rotate engine over again then final torque the oil pump bolts to 90 – 120 inch lbs.

THIS TIGHTENING SEQUENCE WILL CENTER THE CAMPLATE AND OIL PUMP TO THE CRANKSHAFT AND IS THE ONLY RECOMMENDED PROCEDURE. FIRST CENTER CAMPLATE THEN CENTER OIL PUMP



Final torque on pump and camplate bolts 90 - 120 Inch Lbs.



PARTS LIST

<u>PART #</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
8000	CAMPLATE ASSEMBLY-GEAR DRIVE '99-'06 EXC. '06 DYNA	1
8010	CAMPLATE ASSEMBLY-CHAIN DRIVE '99-06 EXC. '06 DYNA	1
8015	CAMPLATE ASSEMBLY-'06 DYNA & NEWER MODELS	1
8000-01	RELIEF VALVE (PLUNGER)	1
8000-02	SPRING, RELIEF VALVE	1
8000-03	1/8" ROLL PIN	1
8000-04	3/8" - 24 PLUG, #8000, #8010	10
8000-05	3/8" - 24 PLUG, #8015	12
8000-06	PLATE, BEARING RETAINING, #8000, #8010	1
8000-07	8 - 3/2 X 3/8" SCREWS, RETAINING PLATE, #8000, #8010	4
8000-08	1/16" PIPE PLUG, (BOSS HOLE)	1
8000-09	CHAIN TOWER, #8010	1
8000-10	8-3/2 X 7/8" SCREWS, TOWER, #8010	2
8000-11	TENSIONER PINS #8010	2
8015-01	BLOCK OFF PLATES	2
8015-02	1/4"-20 BUTTON HEADS, BLOCK OFF PLATES	2

WARRANTY:

All parts are guaranteed to the original purchaser to be free of manufacturing defects in materials and workmanship for a period of twelve (12) months from the date of purchase. Merchandise that fails to conform to these conditions will be repaired or replaced at FOP's option if the parts are returned to FOP by the purchaser within the (12) month warranty period. In the event warranty service is required, the original purchaser must notify FOP of the problem immediately. Some problems may be rectified by a telephone call and need no further action. A part that is suspect of being defective must not be replaced without prior authorization from FOP. If it is deemed necessary for FOP to make an evaluation to determine whether the part was defective, it must be packaged properly to avoid further damage, and be returned prepaid to FOP with a copy of the original invoice of purchase and a detailed letter outlining the nature of the problem, how the part was used and the circumstances at the time of failure. After an evaluation has been made by FOP and the part was found to be defective, repair, replacement or refund will be granted.

Excessive flywheel pinion shaft run out will damage camplate, oil pump, lifters and or cause engine damage and or failure. Damage to Feuling® products due to excessive pinion shaft run out will void manufacturer's warranty.

ADDITIONAL WARRANTY PROVISIONS:

FOP shall have no obligation in the event an FOP part is modified by any other person or organization, or if another manufacturer's part is substituted for one provided by FOP. FOP shall have no obligation if an FOP part becomes defective in whole or in part as a result of improper installation, improper break-in or maintenance, improper use, abnormal operation, or any other misuse or mistreatment. FOP shall not be liable for any consequential or incidental damages resulting from the failure of an FOP part, the breach of any warranties, the failure to deliver, delay in delivery, delivery in non-conforming condition, or any other breach of contract or duty between FOP and the customer. The installation of parts may void or otherwise adversely affect your factory warranty. In addition, such installation and use may violate certain federal, state and local laws, rules and ordinances as well as other laws when used on motor vehicles operated on public highways, especially in states where pollution laws may apply. Always check with federal, state, and local laws before modifying your motorcycle. It is the sole and exclusive responsibility of the user to determine the suitability of the product for his/her use, and the user shall assume all legal, personal injury risk and liability and all other obligations, duties and risks associated therewith. Our high performance parts, engines and motorcycles are intended for experienced riders only. Feuling® Oil Pump Corporation reserves the right to change prices and/or discounts without notice and to bill at the prevailing prices at the time of shipments. The words Harley®, Harley-Davidson® and H-D® and all H-D® part numbers and model designations are used in reference only. Feuling® Oil Pump Corporation is in no way associated with, or authorized by Harley-Davidson Motor Co®. To manufacture and sell any of the engine parts described in this instruction sheet.