# 8011

# 8032

# FEULING

**FEULING® CONVERSION HIGH FLOW AND OE+ CAMPLATE INSTALLATION INSTRUCTIONS**

## SUPPLEMENTAL INSTRUCTIONS

**PART #'S: 8011 & 8032**
**FOR H-D TWIN CAM® ENGINES**

**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**

FEULING® camplates #8011 & 8032 allow use of the early style '99-'06 Twin Cam® chain drive camshafts with the late style '07 - '16 Twin Cam® hydraulic chain tensioner system.

FEULING® part #8011 & #8032 include an assembled-conversion camplate, bearing retaining plate and retaining plate hardware. Customer is responsible for attaining the needed chain drive components, cam bearings and '99-'06 style camshafts to complete the assembly.

***PICTURE OF FEULING KIT #7090**

1. This is a supplemental instruction sheet for FEULING part #8011 & #8032and is to be used in conjunction with the main FEULING camplate instruction sheet.

2. Inspect pinion shaft and measure crankshaft run out, wash clean and inspect the FEULING camplate.

3. Camplate bearings - you can use either style cam bearings, the ball bearing style Feuling #2075 for both front and rear cams or the ball bearing style on the front cam and the roller bearing style HD #8983 on the rear cam. each set up will require aligning of the outer sprockets to line up the chain. Different thickness cam sprocket alignment spacers are available from your HD dealer.

4. Install cam bearings, bearing retaining plate, early style twin cam camshafts ('99-'06) with the early style inner cam chain Feuling #8062, HD #25607-99 then install the outer front cam retaining ring HD # 11494.

5. Install the late style inner hydraulic tensioner unit, Feuling #8076, HD # 39969-06, use a dab of loctite on the fasteners.

6. After assembly of the oil pump and proper installation of the complete unit into the camchest Install the late style outer cam and crank drive sprockets, use a flat edge and line up the sprockets using different thickness spacers to adjust the alignment. This alignment is critical for tensioner pad wear longevity.

7. Install the late style outer drive sprockets with the late style outer chain Feuling #8061, HD #25675-06, lining up the timing marks on the sprockets.

8. Install the late style outer hydraulic tensioner unit Feuling #8075, HD # 39968-06, use a dab of loctite on the fasteners.

9. Proceed with final installation following the proper instruction.

Install cam bearings, camshafts and front cam outer retaining ring

Install inner hydraulic tensioner unit

Align the outer chain sprockets using the proper thickness sprocket alignment spacer

Install outer sprockets with chain and outer hydraulic tensioner unit

**'99 – '06 Required parts**

2 Chain drive camshafts (Front & Rear)
1 Inner cam chain, Feuling #8062, HD# 25607-99
1 Outer cam sprocket alignment spacer kit, Feuling #8040, HD #25285-08
1 Front cam retaining ring, Feuling #3042, HD# 11494
2 Outer camplate bearings, Feuling #2078, HD #8983 + 8990

**'07 – '16 Required parts**

1 - Outer chain, Feuling #8061, HD # 25675-06
1 - Outer cam sprocket 34 tooth, Feuling #1092, HD # 25728-06
1 - Outer crank sprocket 17 tooth, Feuling #1091, HD# 25673-06
1 - Outer hydraulic tensioner, Feuling #8075, HD # 39968-06
1 - Inner hydraulic tensioner, Feuling #8076, HD # 39969-06
Screws needed W/HD Tensioners (Qty. 2 - 1/4-20 x 3/4") (Qty. 2 - 1/4-20 x 1-1/4")

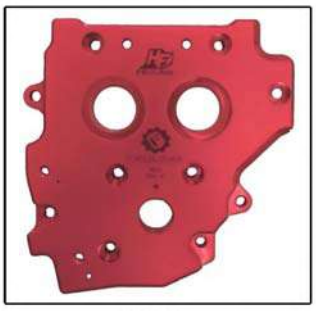
# FEULING

*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 maintaing 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


10 Plugs

Inspect cam & pinion bores for size & fitment

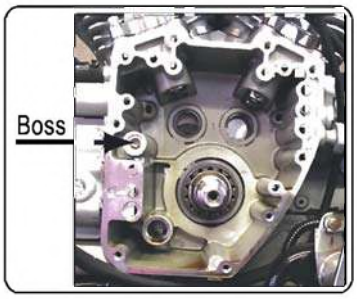
verify camplate has all external plugs & pressure relief valve, spring & roll pin are installed

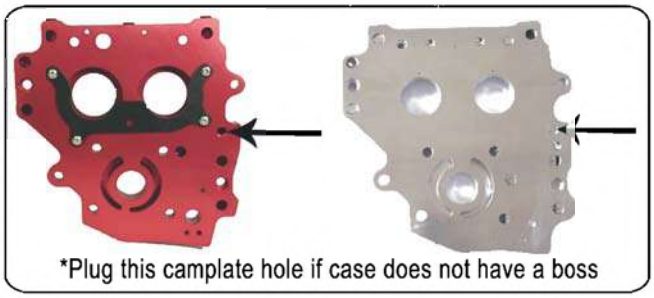
#8015 & 8033

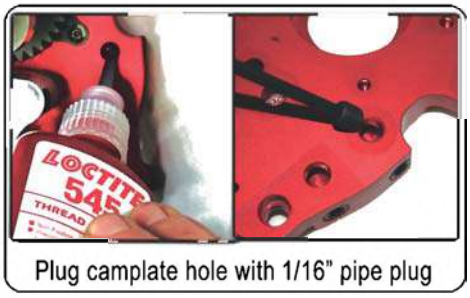

12 plugs

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 <u>NOT</u> have a through hole and 'B' motors will have a through hole including a screen.





*Plug this camplate hole if case does not have a boss



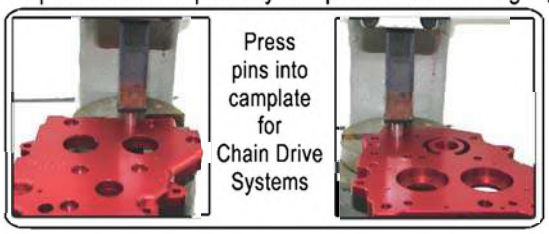
Plug camplate hole with 1/16" pipe plug

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 <u>**#8010 & 8031**</u> - 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

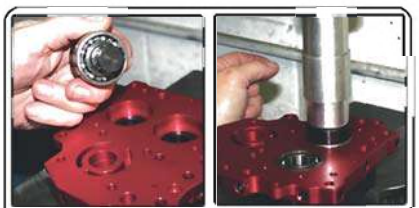
9.Camplate <u>**#8015 & 8033**</u> – If using gear drive cams the oil holes for the hydraulic chain drive tensioners must be blocked off. Feuling offers a block off plate kit part #8016


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 <u>**#8000, 8010, 8030, 8031**</u>. 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 toolsusing press lube on bearings & bores


Verify bearings are flush with camplate

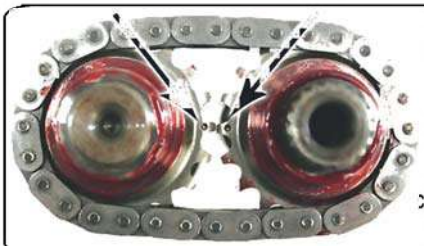

Press in camshafts use lube & proper tools


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

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.

Pre-Lube camshaft bores, thrust surfaces, Pinion bore and oil pump mounting surface



Line up timing marks and pre-lube cam journals

When installing camshafts into #8015 8033 camplate lead with the rear cam

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 underhead 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 underhead flanges

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

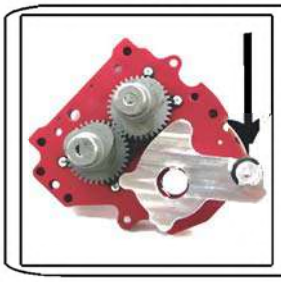
Bolt oil pump to camplate finger tight, DO NOT use loctite or hardening compond on pump or camplate bolts or O-rings

Verify all O-rings are installed correctly

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

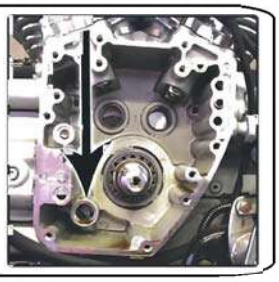
Verify Intake lobes of camshafts clear engine case

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.

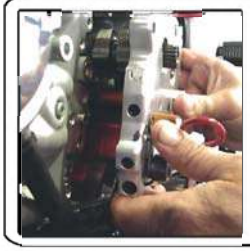


Installation of the rear oil pump port into the scavenge port hole of the engine case is crucial to for proper oil scavenging

Pre-Lube O-ring and both ports and make sure the back of the oil pump fits securly into the case



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

| PART # | DESCRIPTION | QTY. |
|---|---|---|
| 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 - 32 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 | 8-32 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 |

# FEULING®

## FEULING® CAMSHAFT INSTALLATION INSTRUCTIONS FOR H-D TWIN CAM® ENGINES

'07-UP GEAR DRIVE

'99-'06 GEAR DRIVE

07-UP CHAIN DRIVE

NOTE: SOME OF FEULING'S PRODUCTS: NAMELY CAMSHAFTS, VALVE-SPRINGS, AND HIGH FLOW FUEL INJECTORS ARE NOT LEGAL FOR SALE OR USE IN CALIFORNIA ON ANY POLLUTION CONTROLLED MOTOR VEHICLES. THE FOLLOWING DISCLAIMER IS ASSOCIATED WITH THESE FEULING® PRODUCTS.

DISCLAIMER: NOT LEGAL FOR SALE OR USE IN CALIFORNIA ON ANY POLLUTION CONTROLLED MOTOR VEHICLES

**WAKE UP YOUR TWIN CAM® ENGINE WITH A SET OF FEULING® REAPER® SERIES CAMSHAFTS. FEULING® USES THE FORCE OF THE REAPER'S® SCYTHE TO PUT THE POWER BAND WHERE IT COUNTS, CREATING A REAL SEAT OF THE PANTS FEEL. THE REAPER® CAMSHAFT PROFILES PRODUCE MORE POWER AND MORE TORQUE INCREASING CRANKING COMPRESSION, IMPROVING THROTTLE RESPONSE, ACCELERATION AND FUEL MILEAGE. DYNO PROVEN AND TRACK TESTED.**

**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 CAM CHAIN, CAM GEAR, CAM SUPPORT PLATE AND OIL PUMP DAMAGE AND OR FAILURE. EXCESSIVE PINION SHAFT RUN OUT WILL VOID MANUFACTURER'S WARRANTY.**

| GRIND | | VALVE LIFT | OPEN | CLOSE | DURATION @.053° | LIFT @ TDC | LOBE CENTERLINE | FITMENT |
|---|---|---|---|---|---|---|---|---|
| 525 | INTAKE | 525" | 4° | 42° | 226° | .099° | .109° | 525 Cams are a direct bolt in replacement for T/C 88", 95" 96" & 103" engines, can be used with stock valve springs, pushrods & lifters |
| | EXHAUST | 535" | 51° | 5° | 236° | .112° | .113° | |
| 543 | INTAKE | 543" | 15° | 43° | 238° | .160° | .104° | 543 Cams are a direct bolt in replacement for T/C 96", 103" & 110" engines. '99-'04 T/C 88" & 95" engines require higher lift valve springs, can be used with stock pushrods and lifters |
| | EXHAUST | 553" | 56° | 12° | 248° | .140° | .112° | |
| 574 | INTAKE | 574" | 15° | 45° | 240° | .163° | .105° | 574 Cams are a direct bolt in replacement for T/C 96", 103" & 110" engines. Performance pushrods and lifters are recommended but not required. '99-'04 model 88" & 95" require higher lift valve springs |
| | EXHAUST | 574" | 61° | 14° | 255° | .143° | .113.5° | |
| 594 | INTAKE | 594" | 19° | 56° | 255° | .190° | .108.5° | 594 Cams require performance valve springs, pushrods, lifters, clutch and Increased compression ratio. |
| | EXHAUST | 604" | 64° | 16° | 260° | .167° | .114° | |
| 630 | INTAKE | 630" | 20° | 58° | 258° | .188° | .109° | 630 Cams require performance valve springs, pushrods, lifters and Increased compression ratio. |
| | EXHAUST | 630" | 60° | 19° | 263° | .171° | .112.5° | |

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

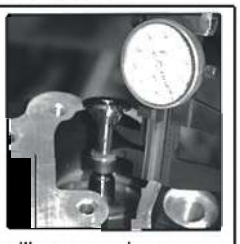
Feuling Runout Measuring Tool #9015

Max run out 0.0025"

MEASURE VALVE SPRING COIL BIND CLEARANCE & VALVE SEAL TO RETAINER CLEARANCE

Installed valve spring height is critical!

Too little clearance will create coil bind



causing valve-train damage while too much will cause spring surge. Ideal valve spring clearance is achieved at open spring height. Reference your valve spring specs and recommendation

4. Clean and inspect new camshafts. 

5. Clean and inspect camplate and all related components. Inspect camplate pressure relief valve & spring. Inspect camplate, cam & pinion shaft bores for size and burrs. 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 & camshafts causing catastrophic damage not covered under warranty.

Inspect pressure relief valve


Feuling camplate pressure testing tool

Inspect camplate pinion & cam bores for size & fitment

verify camplate has all external plugs

Inspect camplate for scoring, if scoring is present replace camplate. Scoring will effect oil psi & oil scavenging

6. Verify cam lobes DO NOT interfere with the engine case, high lift cams with modified pistons will require measurement of valve to piston clearance. Clay pistons, install cylinder heads use lightweight checking springs, install proper gaskets, cycle engine then measure clay.

Verify Intake lobes of camshafts clear engine case

Crank bearing boss & lifter bosses

Measure valve to piston clearance

clay pistons and measure thickness of clay after cycling engine

7. Install new inner cam bearings into engine case, use the correct bearings for your model engine and use the proper installation tools. Feuling has a full line of camshaft installation kits for all T/C models.

Replace inner cam bearings use the proper tools


Apply extreme pressure lube on bearings & cams prior to pressing in

Feuling has a full line of cam installation kits

8. Install new outer cam bearings in '99-'06 Except '06 dyna style camplates, use the correct bearings, press lube and proper installation tools, verify the bearings are installed flush with camplate face. It is important that these bearings are installed straight.

Press in new cam bearings using the proper tools use high pressure press lube on bearings & bores

Verify bearings are flush with camplate

9. Gear Drive camshafts - Install the cam keys into camshafts then press the inner cam gears onto the camshafts. Use the proper tools.

Install cam keys - use arbor press or vise with soft jaws

Line up gear with camshaft

Press cam gears onto camshafts

10. Camplate style '99-'06 Except '06 dyna - Install camshafts, press camshafts into camplate bearings using the proper tools then install the bearing retainer plate. Gear Drive systems - Install retaining ring on front camshaft.



Line up timing marks, press in camshafts using lube and the proper tools



Install bearing retainer plate using loctite

Feuling #8001


Bearing Retainer Plate


Install retaining ring

11. Installing gear drive camshafts in camplate with hydraulic chain tensioners - '06 Dyna and '07 - Up style – 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

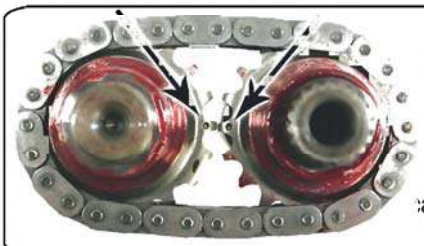

Feuling #8016

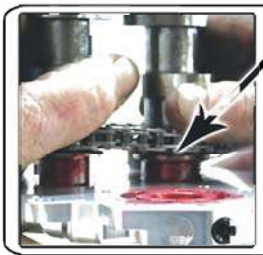

Install block off plates when installing gear drive cams in hydraulic tensioner style camplates

Apply Loctite to block off plate bolts

12. Installing camshafts into '06 Dyna and '07 - Up style camplate: 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.


Pre-Lube camshaft bores, thrust surfaces, Pinion bore and oil pump mounting surface

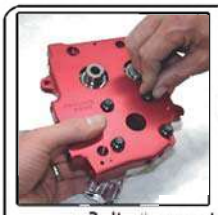

Line up timing marks and pre-lube cam journals


When installing camshafts into the late model camplate lead with the rear cam

13. Apply engine assembly lube to oil pump gears, oil pump housings, camplate oil pump mating surface, pinion shaft bore, camshaft bearings, camshaft bores. Bolt oil pump to camplate, Do not use loctite on oil pump & camplate bolts.



Apply engine assembly lube to oil pump housings & gears



Bolt oil pump to camplate finger tight DO NOT use loctite or hardening compound



Verify all O-rings are installed correctly

14. Apply engine assembly lube to camshafts, inner cam bearings, pinion shaft, scavenge port hole of engine case and pick up port of oil pump. Installation of the rear oil pump port into the scavenge port hole of the engine case is crucial for proper oil scavenging. Install camplate assembly, align the oil pump gear flats with the crankshaft flats, slide assembly onto crankshaft, using slight pressure slip oil pump pick up port into port hole of case then slide camplate onto dowel pins.




Apply engine assembly lube to camshafts, inner cam bearings, scavenge port hole of case and pick up port of oil pump


Install camplate & oil pump as a complete assembly


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

15. 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.

16. 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.

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

17. Inspect lifter to roll pin clearance. Cycle the camshafts and verify the lifter does not drop below the roll pin then verify the bottom of the lifter flats do not interfere with the roll pin at peak lift

Inspect lifter to roll pin clearance

18. Installing Gear Drive System - Line up gear timing marks then tighten with crank and pinion bolts and hardened spacers. Use new bolts and washers and use loctite on bolt threads and lube on bolt underhead flanges. Torque to spec. Gear drive systems require measuring back lash, measure in 4 locations taking the average. Gear drive systems may also require clearancing inside of cam cover.

Install gears with key way, line up timing marks

Part #3042

Use new crank and cam bolts and washers.

Use loctite on threads and lube on underhead flanges

Measure cam gear back lash

Inspect cam cover for gear to cover clearance

19. Installing Chain Drive - Refer to your factory service manual. Line up sprocket timing marks use new cam and crank bolts and washers use loctite on bolt threads and lube on bolt underhead flanges. Chain drive systems require sprocket spacing for proper chain alignment - see dealer if different thickness spacers are required.

Install sprockets inspect sprocket spacing for proper chain alignment. Chain alignment is crucial for tensioner pad longetivity

**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. Valve spring coil bind and spring surge will cause lifter and camshaft damage. Damage to Feuling® products due to valve spring coil bind and or spring surge 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.

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