FEULING RACE SERIES

# FEULING

FEULING HORSEPOWER PLUS

## FULL TRAVEL LIFTER INSTALLATION INSTRUCTIONS

FULL TRAVEL HYDRAULIC LIFTER PART #'s: 4000, 4017, 4018, 4019, 4025, 4050, 4051, 4052, 4061, 4062

**IMPORTANT NOTICE:**
This installation should be done by an experienced mechanic who has access to a factory service manual and all required 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. Removal of the rocker arms and or pushrods with the valve train loaded can damage rocker arms, push rods, bushings and or camplate. Rotate engine to TDC of compression stroke on the servicing cylinder.

**WARRANTY NOTE:**
Standard 1 year warranty included, an additional 1 year warranty is available for a total of 2 years if product is installed by a professional V-Twin installer, crankshaft runout is below 0.005", oil tank is dropped and cleaned at time of install and the WARRANTY REGISTRATION form is filled out – form can be found on www.feulingparts.com/warranty.

**SOLID LIFTER NOTE:**
Feuling recommends starting with zero lash cold, then finding the sweet spot for your engine combination.

## INSTRUCTIONS:

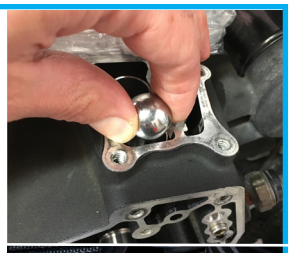
1. For removal of lifters & inspection of lifter bores, refer to the factory service manual for your model & year engine.

2. Clean, inspect and measure lifter bores to make sure the tolerances are within specification. For maximum lifter performance Feuling® recommends a lifter to lifter bore clearance of 0.001"-0.0015". If needed, Feuling® offers oversized lifters Part #'s 4051 (+0.001") & 4052 (+0.0015").

LIFTER BORE MEASURING BALLS (PART #9004)


There are multiple methods to measure lifter to lifter bore clearance. An easy & accurate method is to use Feuling tool #9004, set of precision ground balls to accurately measure lifter bore diameter & roundness.

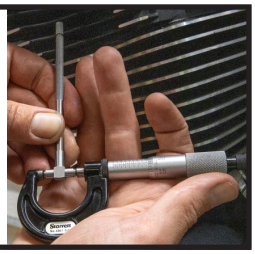
The correct size ball will pass through the lifter bore 'snugly', this will give you the correct bore size taking roundness of the bore into account.



NOTE: Recommended lifter to lifter bore clearance 0.001"-0.0015". The closer the clearance is to 0.001", the higher the oil psi at the lifter will be, producing a quieter, happier valvetrain.

← INTERNAL DIAL CALIPER
MEASURE LIFTER BORES
SNAP GAUGE →

Measure gauge to get bore diameter.



Measure lifter O.D. & subtract from bore size to get clearance.

Pump up each lifter prior to installation.

OIL CAN (PART #9005)

3. Thoroughly clean & inspect each new Feuling® lifter, clean your pushrods & make sure the center oil through hole is open & free of debris.

4. Use an oil squirt can to fill & pump up the lifters with oil through the side feed hole, pump oil through the feed hole until the air bubbles are pushed out & lifter is rock hard. If needed work the oil back and forth through the feed hole & pushrod seat. Light weight oil can be helpful.

5. Apply engine assembly lube or liberal amounts of engine oil to the lifters, rollers, lifter bores and camshaft lobes.

6. We recommend that you use an oil can to fill the pushrod oil holes & rocker arms with engine oil before final installation.

7. Install lifters in the lifter bores of the crankcase, with the lifter flats facing forward & rearward. Avoid cam damage! Do not drop lifters onto cam lobes.

TWIN CAM ENGINES: face the side oil feed holes inward towards the cylinders.

M8 ENGINES: face side oil feed holes towards each other.

8. Check all clearances - lifter to camshaft lobe clearance, lifter to lifter blocks, lifter flats to roll pin, pushrod to pushrod tubes & if using one piece pushrods check length for proper pre load on lifters. M8 ENGINES: Lifter body to camshaft flange clearance on front exhaust lifter/cam lobe.

9. Assemble & adjust one cylinder at a time, the servicing cylinder needs to be on TDC of compression stroke so the cam lobes are at their lowest point.

10. Run the correct pre-load on your lifters! We recommend running hydraulic lifters just under 1/2 travel at operating temperature.

A.) Feuling full travel lifters are designed to run with 0.090"- 0.110" of cold pre-load (total lifter travel = 0.200")

Always start with fully pumped up lifters! When using adjustable pushrods start at zero lash & adjust the pushrod longer, crushing the lifter to add pre-load. It is helpful to have the rocker arm in hand to feel for zero lash. We DO NOT recommend bottoming the lifter & adjusting back upwards. If using one piece pushrods, have the correct lengths to achieve correct pre-load. See Feuling One Piece Pushrods (TC: #4072, 4073) (M8: #4088).

11. Know your adjustable pushrod thread pitch! Feuling® adjustable pushrods have changed throughout the years, Feuling has produced rods with 32, 24 & 20 threads per inch. Our current line up: HP+ & RS = 24 TPI, QUICK install = 20 TPI & FAST install = 32 TPI. - See adjustment chart below.

12. Refer to your factory service manual for final assembly.

*CORRECT ADJUSTMENT REQUIRES STARTING WITH FULLY PUMPED UP LIFTERS

CHART FOR ADJUSTABLE PUSHRODS PRELOAD ADJUSTMENT

| THREADS PER INCH | DISTANCE PER 1 FULL TURN | TURNS TO .100" | FLATS TO .100" |
|---|---|---|---|
| 20 | 0.050" | 2 | 12 |
| 24 | 0.0417" | 2.39 | 15 |
| 28 | 0.0357" | 2.80 | 17 |
| 32 | 0.0313" | 3.19 | 20 |
| 36 | 0.0275" | 3.63 | 22 |
| 40 | 0.0250" | 4 | 24 |

## NOTES:

A.) Majority of engines will see 0.010-0.020" of growth with temperature which reduces the initial cold pre-load set on the lifters, use our recommended pre-load settings.
B.) Never set more lifter pre-load on the lifter than what you have for valve to piston clearance, we recommend a min of 0.020" less lifter pre-load than piston to valve clearance.
C.) M8 Engines - Smaller than stock base circle cams can have a clearance issue between lifter body and camshaft flange on front exhaust lifter.

## TROUBLE SHOOTING NOISY VALVE-TRAIN

1. Lifter adjustment - Starting with a fully pumped up lifter, from zero lash put 0.90" - 0.100" of pre-load on Feuling® hydraulic lifters.
2. Lifter to lifter bore clearance out of spec, Feuling® recommends a clearance of 0.001" - 0.0015" for proper oil psi at lifter.
3. Pushrods flexing & hitting pushrod tubes - look for a shiny ring witness mark around pushrod normally seen up towards the cylinder head.
4. Low oil pressure - inspect pressure relief valve, excessive wear in oil pump and or camplate face.
5. Pushrod center oil hole plugged.
6. Clearance for roller rocker arms on underside of rocker box covers .
7. Steep ramped camshafts, valves closing so fast the valves bounce off valve seats - see Feuling® Beehive valvesprings.
8. Excessive crankshaft runout.
9. Gear drive camshafts, excessive gear drive backlash or excessive crankshaft runout.
10. Rocker arms/bushings out of tolerance.
11. Valvespring clearance to lower rocker box housing.
12. Valvespring coil bind and or valvespring harmonics - match up valvespring open height with peak lift of camshaft.
13. Leaky/broken piston cooling jets.

* STANDARD 1 YEAR WARRANTY:
- WARRANTY COVERS MANUFACTURE DEFECTS.
- DOES NOT COVER PARTS THAT HAVE FAILED DUE TO IMPROPER INSTALLATION, MAINTENANCE, EXCESSIVE CRANKSHAFT RUNOUT, OR MISUSE.
- DOES NOT COVER ANY CONSEQUENTIAL DAMAGE RESULTING FROM A FAILURE OF A FEULING PRODUCT.

* OPTIONAL 2 YEAR WARRANTY:
- ADDITIONAL YEAR WARRANTY IS ONLY AVAILABLE IF PARTS ARE INSTALLED BY A PRO FESSIONAL INSTALLER.
- THE ONLINE WARRANTY FORM MUST BE COMPLETED BY THE DEALER PRIOR TO BIKE DELIVERY.
- OIL TANK MUST BE DROPPED & CLEANED.- CRANKSHAFT RUNOUT MUST BE BELOW 0.005"

NOTE : FOR FULL WARRANTY INFORMATION VISIT WWW.FEULINGPARTS.COM/WARRANTY



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