



INSTRUCTIONS

-J01428

REV. 12-21-98

Kit Number 25633-86B

XL HIGH PERFORMANCE CAM KIT

General

This kit is designed for use on 1986 to 1990 XL Sportsters with 4 speed transmissions.

CAUTION

This engine related performance part is intended for High Performance or Racing applications and is not legal for sale or use on pollution controlled motor vehicles. This kit may reduce or void the limited vehicle warranty. Engine related performance parts are intended for the experienced rider only.

WARNING

The rider's safety depends on the correct installation of this kit. Follow the procedures listed in this Instruction Sheet and in the appropriate Service Manual. If the procedures are not within your capabilities, or if you do not have the correct tools, have your Harley-Davidson dealer perform the installation.

NOTE

A Service Manual is available from your Harley-Davidson dealer.

Kit Contents

This kit contains the following items:

QTY	DESCRIPTION	PART NUMBER
8	Valve spring collar key	18211-86
4	Collar, valve spring (upper)	18216-98
4	Collar, valve spring (lower)	18217-98
4	Valve Spring unit	18218-98
8	Shim, valve spring .015	18224-98
8	Shim, valve spring .030	18225-98
1	Cam, XL 4 speed set	25657-86
1	Seal driver	94450-86

Installation of this kit will require the following gaskets available from your Harley-Davidson dealer:

QTY	DESCRIPTION	PART NUMBER
1	Gasket kit, top overhaul	17032-86B
1	Camgear cover gasket	25263-86

Installation

1. Refer to the Service Manual and follow the procedure under Stripping the Motorcycle for Engine Repair.
2. Remove cylinder heads.
3. Compress valve springs and remove upper collar keys, upper collar, and lower collar on all four valves.

NOTE

Do not remove valves. If valves are removed, new seals must be installed.

CAUTION

Because of the large diameter of the springs in this kit, there may be slight interference between the spring and the rocker box. If interference is detected, it will be necessary to remove a small amount of material from the rocker box.

4. See Figure 1. Install lower valve spring collars, upper collars, and collar keys. Check installed spring height. Add shims (see note below) or remove material from spring seat to reach installed spring height. Remove upper collar keys and upper collars.

NOTE

Shim to desired seat pressure by placing shims under lower collar, but do not use more than .075 in. of shims.

5. Assemble cylinder heads following Service Manual procedures, using springs, collars and keys from this kit.
6. Follow procedures in Service Manual and install heads and remaining components disassembled in Step 1.

*SEAT PRESSURE NOTE

Every .015 in. reduction in spring height = 5 lbs. more of seat pressure. For example:

1.785 in. installed spring height = 160 lbs. seat pressure
 1.770 in. installed spring height = 165 lbs. seat pressure

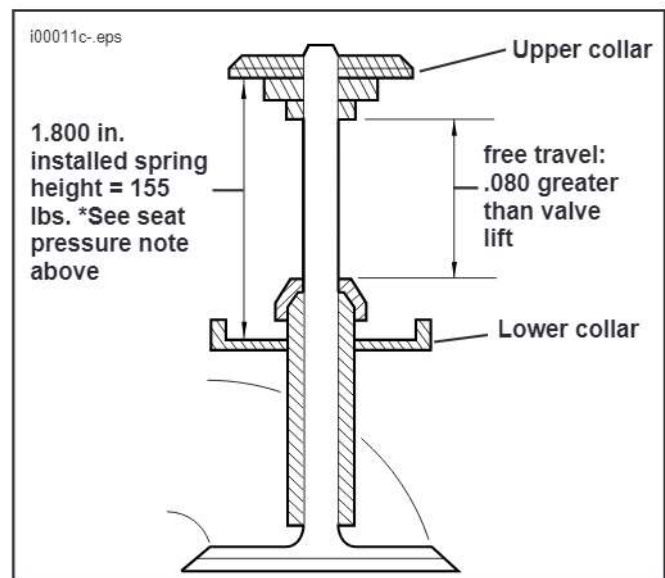


Figure 1. Valve Free Travel Check and Installed Valve Spring Height

Camshaft Installation

Camshaft installation requires the removal of the tappet guides, tappets and gear case cover. The cams in this kit may be used with the stock hydraulic tappets.

Following the Service Manual procedures to perform the following:

1. Remove tappet guides and tappets. Remove push rods and push rod covers if they have not already been removed.
2. Remove ignition components from gear cover and the two bolts that retain the oil filter housing.
3. Remove the gear cover screws and gear cover.

NOTE

It is not necessary to remove pinion gear, oil pump gear, or oil pump.

4. See Figure 2. Rotate engine to align timing marks. Cams are numbered 1 to 4 from the rear exhaust (1) to the front exhaust (4). Remove camshaft 2. One at a time, remove camshaft 1, 3 and 4 and replace with the appropriate camshaft from this kit. Be careful to maintain timing mark alignment. Install camshaft 2 from this kit last. Carefully check alignment of all timing marks.
5. Following Service Manual instructions, assemble gear case cover and check that minimum camshaft end play is present. After final assembly, torque cover screws to 80-110 in-lbs.
6. Install tappet guides and tappets using new O-rings. Be sure tappets are fully oiled.
7. Install ignition components.
8. Place modeling clay on the piston valve reliefs. Clay must be about 1/8 in. thick.
9. Following Service Manual procedures, install cylinder heads using old head gaskets. Tighten cylinder head screws to 7 ft-lbs following the pattern in the Service Manual.
10. Following Service Manual procedures, check push rod length.
11. Install push rods.

CAUTION

Wait ten minutes before turning engine after installing push rods. This wait allows tappets to bleed down and prevents bending push rods or valves.

12. Rotate engine so that both valves of the front cylinder are partially open. Shine a light through the exhaust port and look through the spark plug hole. Turn engine, if required, to the point where the exhaust and intake valve heads cross.

There should be 0.040 in. clearance between the two valve heads. See Figure 3. A wire gauge may be used to make this measurement. If insufficient clearance exists on 883cc engines, the edges of both the intake and exhaust valves may be ground at a 45° angle as shown in Figure 3.

13. Repeat Step 13 for the rear cylinder.
14. Carefully turn the engine through two full revolutions by hand. (This will open the valves and compress the clay in the valve reliefs on the pistons. Clay thickness will be measured when heads are removed later.)

NOTE

Exhaust and intake valves from 1200cc engine should have been beveled prior to assembling them into head.

Do not reduce the valve margin to less than 0.031 in. On 1200cc engines, grind the valve seats deeper into the head to obtain the 0.040 in. clearance between valve heads.

NOTE

Do not remove heads to bevel valves on 883cc engines or grind valve seats deeper on 1200cc engines at this time — continue with the remaining checks.

15. Rotate engine so that both valves of the front cylinder are fully closed. Check for clearance between the top of the upper spring collar and the bottom of the rocker arm. If less than 0.010 in., mark the offending area of the rocker arm. Remove the rocker arm and carefully grind or file to establish the correct clearance. The area must be polished to remove all tool marks after grinding or filing.

CAUTION

Failure to polish the rocker arm could result in a fatigue failure of the rocker arm.

16. Repeat Step 15 for the rear cylinder.
17. Remove the heads and perform the following:
 - A. Measure the clay thickness in the valve reliefs on the pistons at its thinnest point. This measurement must be at least 0.080 in. If 0.080 in. clearance is not present, the valve reliefs must be machined deeper to obtain the 0.080 in. clearance.

CAUTION

Do not deepen valve reliefs more than 0.020 in. or piston will be ruined.

- B. If 0.040 in. clearance was not present when checked in Step 13, remove and bevel the intake and exhaust valves on 883cc engines. If 0.040 in. clearance is not present on 1100cc engines, the valve seats must be ground deeper to obtain the clearance. After grinding valve seats, assemble the engine and recheck the valve head clearance per Step 13.

NOTE

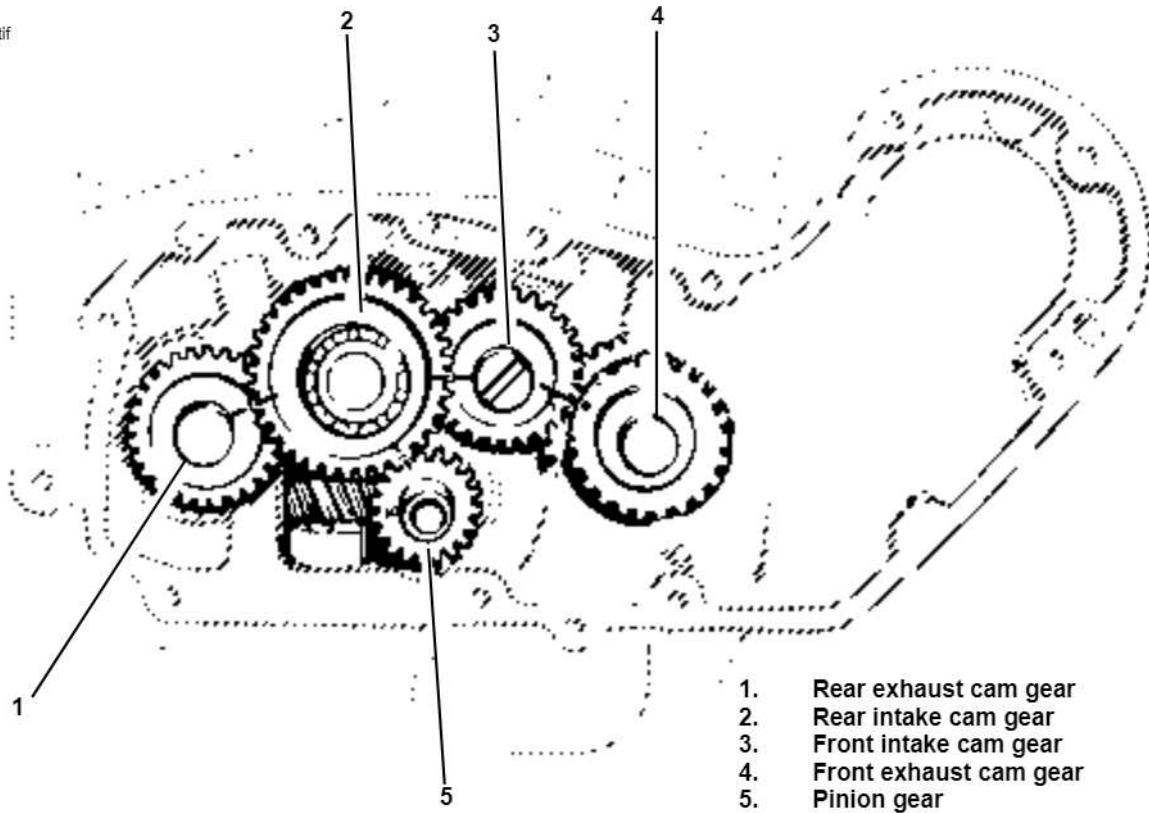
If valve seats are ground, recheck valve stem protrusion, distance between valve spring collars, and push rod length. Free travel will be increased and need not be rechecked. Install new valve guide seals if valves were removed.

18. Following Service Manual procedures, assemble the engine using new gaskets and check push rod length if valve seats were ground.
19. Check ignition timing following Service Manual procedures.

Obtaining Optimum Engine Output

To obtain maximum engine output available with installation of this Screamin' Eagle Cam Kit, Harley-Davidson recommends carburetor, air cleaner, exhaust system, and ignition module changes. See your Harley-Davidson dealer for details.

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1. Rear exhaust cam gear
2. Rear intake cam gear
3. Front intake cam gear
4. Front exhaust cam gear
5. Pinion gear

Figure 2. Proper Alignment of Camshaft Timing Marks

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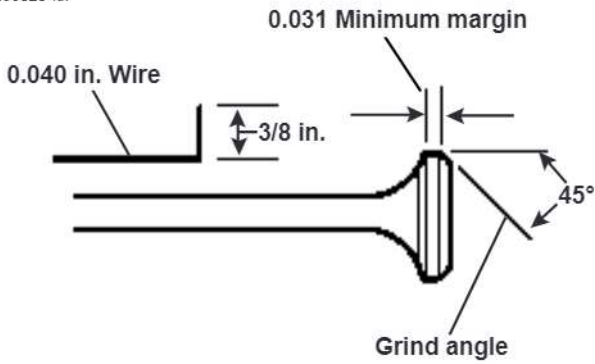


Figure 3. Beveling Valve Heads



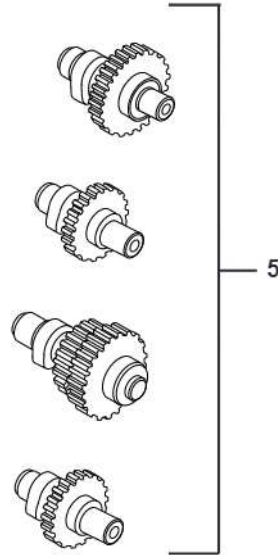
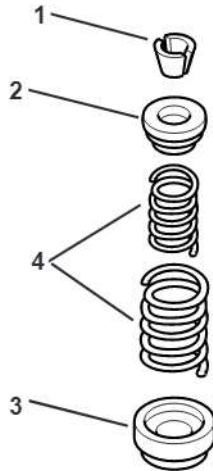
Service Parts

Part No. 25633-86B

Date 12/98

XL Hi-Performance Cam Kit

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Item	Description	Part No.	Item	Description	Part No.
1	Valve spring collar key (8)	18211-86	6	Shim, valve spring .015 in. (8) (not shown)	18224-98
2	Collar, valve spring, upper (4)	18216-98	7	Shim, valve spring .030 in. (8) (not shown)	18225-98
3	Collar, valve spring, lower (4)	18217-98	8	Seal driver (not shown)	94450-86
4	Valve spring unit (4)	18218-98			
5	XL cam set	25657-86			