



# INSTRUCTIONS

-J01325

REV. 1-10-01

Kit Number 25649-01

## XL HIGH PERFORMANCE CAM SET

### General

This cam set is designed for use on 2000 and later XL Evolution Sportsters.

#### 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

A Service Manual is needed to install this kit. The rider's safety depends upon the correct installation of this kit. If the procedure is not within your capabilities or you do not have the correct tools, have your Harley-Davidson dealer perform the installation. Improper installation of this kit could result in death or serious injury.

Because of the high lift characteristics of these camshafts, Harley-Davidson recommends the purchase and installation of Screamin' Eagle Performance Valve Spring Kit (P/N 18223-98).

#### NOTE

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

Kit contents:

QTY	DESCRIPTION	PART NUMBER
1	Cam, XL 5 speed set	25649-01

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

QTY	DESCRIPTION	PART NUMBER
1	Gasket kit, top overhaul	17032-91
1	Camgear cover gasket	25263-90C

#### CAUTION

The cams in this kit have greater lift and much longer duration than the stock cam. Some engines do not have valve clearance notches in the piston crowns. On these engines there will be insufficient valve-to-piston clearance.

### Valve Clearance Measuring Procedure

When installing non-stock cams, piston-to-valve clearance must be checked. This procedure may be done in the following manner:

- Apply 1/8 in. layer of clay to crowns of pistons (in areas where valves meet pistons.)
- Assemble heads and valve train, and tighten cylinder studs to torque as listed in appropriate Service Manual.
- Turn engine through two complete revolutions by hand.
- Remove heads and measure clay at its thinnest point.
- Clay must measure 0.080 in. at thinnest point. If this measurement does not meet minimum thickness, depth of valve notches must be increased; however, the depth of the notches must not exceed 0.135 in.

#### NOTE

Valves must be properly adjusted and new cam installed when claying pistons.

### Installation-Valve Springs and Collars

1. Refer to the Service Manual and follow the procedure under Stripping the Motorcycle for Engine Repair.

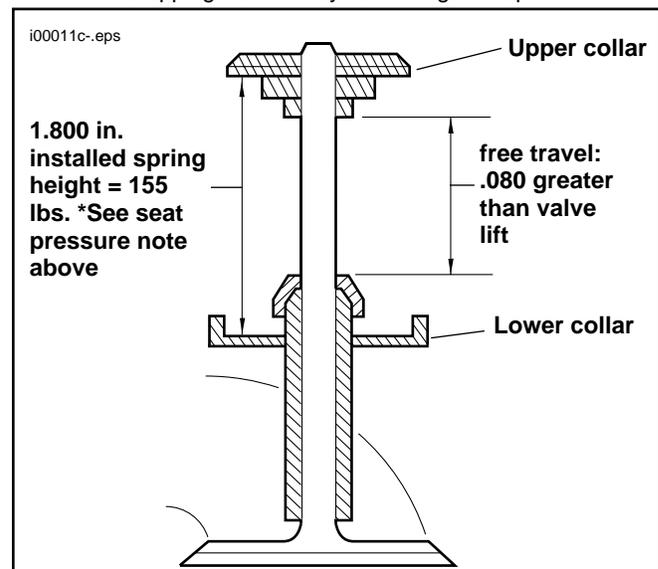


Figure 1. Valve Free Travel Check and Installed Valve Spring Height

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.*

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.
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*

## 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.

Follow the Service Manual procedures and 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 degree angle as shown in Figure 3.

13. Repeat Step 12 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.*

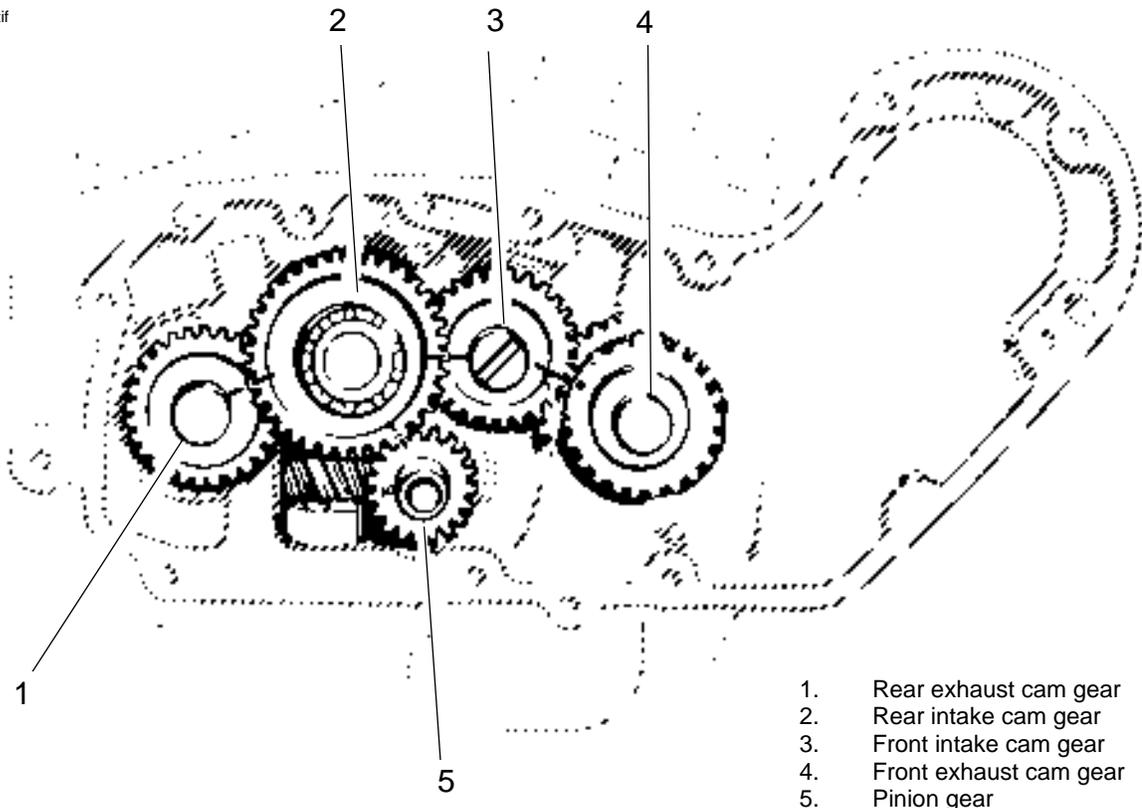
15. Rotate engine so that both valves of the front cylinder are fully closed. Check for clearance between the top of the upper spring collar and the bottom of the rocker arm. If less than 0.010 in., mark the offending area of the rocker arm. Remove the rocker arm and carefully grind or file to establish 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.

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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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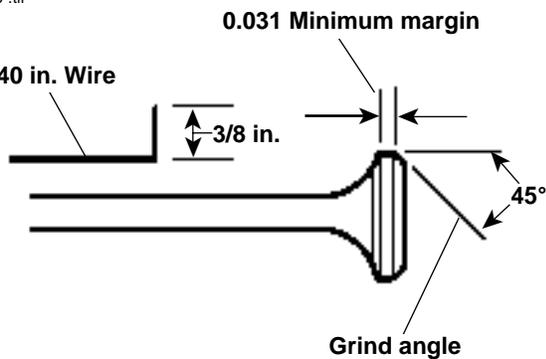


Figure 3. Beveling Valve Heads

**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 12.

**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.



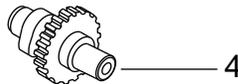
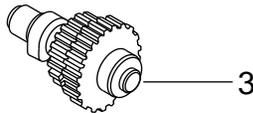
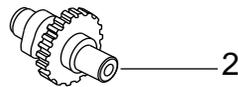
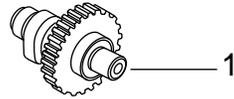
# Service Parts

Part No. 25649-01

Date 1/01

XL High Performance Cam Set

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Item	Description
1	Camshaft, front intake
2	Camshaft, front exhaust
3	Camshaft and gear, rear intake
4	Camshaft, rear exhaust