



INSTRUCTIONS

-J03649

2010-02-17

XL HIGH PERFORMANCE CAM SET

GENERAL

Kit Number

25649-01A

Models

This kit fits 2000 and later XL Sportster model motorcycles. Refer to the Screamin' Eagle catalog for additional information.

Additional Parts Required

Installation of this kit will require the purchase of the following gaskets which are available from any Harley-Davidson dealer:

Gasket kit, Top overhaul, part number 17032-91.

Cam gear cover gasket, part number 25263-90C.

NOTE

Because of the high lift characteristics of these camshafts, Harley-Davidson recommends the purchase and installation of Screamin' Eagle Performance Valve Spring Kit, part number 18223-98 for 2000 to 2003 motorcycles. Valve spring replacement is not required for 2004 and later models.

NOTE

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.

▲ WARNING

Rider and passenger safety depend upon the correct installation of this kit. Use the appropriate service manual procedures. If the procedure is not within your capabilities or you do not have the correct tools, have a Harley-Davidson dealer perform the installation. Improper installation of this kit could result in death or serious injury. (00333b)

NOTE

This instruction sheet references service manual information. A service manual for your model motorcycle is required for this installation and is available from a Harley-Davidson Dealer.

Kit Contents

See Figure 4 and Table 1.

NOTE

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

NOTE

When installing non-stock cams, piston-to-valve clearance must be checked.

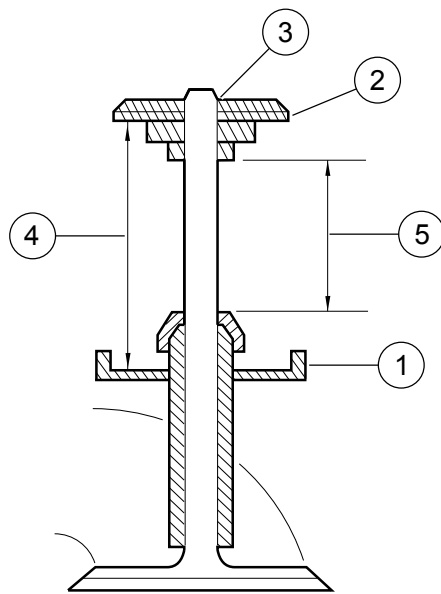
1. Apply 1/8 in. (3.175 mm) layer of clay to crowns of pistons (in areas where valves meet pistons.)
2. Assemble heads and valve train, and tighten cylinder studs to torque as listed in appropriate service manual.
3. Turn engine through two complete revolutions by hand.
4. Remove heads and measure clay at its thinnest point.

NOTE

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

5. Clay must measure 0.080 inch (2.032 mm) 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 inch (3.429 mm).





1. Lower valve spring collar
2. Upper valve spring collar
3. Collar keys
4. 1.800 inch (45.72 mm) installed spring height=155 lbs (70.3 Kg).
5. Free travel: greater than valve lift

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

Installation-Valve Springs and Collars

1. For 2000 to 2003 motorcycles, 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.

4. See Figure 1. Install lower valve spring collars (1), upper collars (2), and collar keys (3). 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 inch (1.905 mm) 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.

NOTE

See Figure 1. 1.800 inch (45.72 mm) installed spring height (4) equals 155 lbs (70.4 Kg). Free travel (5) must be 0.080 inch (2.032 mm) greater than valve lift.

NOTE

Every 0.015 inch (0.381 mm) reduction in spring height = 5 lbs. (2.267 Kg) more of seat pressure. For example:

1.785 inch (45.34 mm) installed spring height = 160 lbs. (72.57 Kg) seat pressure.

1.770 inch (45.0 mm) installed spring height = 165 lbs. (74.84 Kg) seat pressure.

Camshaft Installation

NOTE

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** (9.0-12.4 Nm).
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 inch (3.175 mm) thick.
9. Following service manual procedures, install cylinder heads using old head gaskets. Tighten cylinder head screws to 7 ft-lbs (0.79 Nm) following the pattern in the service manual.
10. Following service manual procedures, check push rod length.
11. Install push rods.

NOTE

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

NOTE

See Figure 3. The 0.040 inch (1.016 mm) wire gauge used in the next step should have a 3/8 inch (9.52 mm) minimum tang in order to check for proper valve clearance.

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. See Figure 3. There should be 0.040 inch (1.016 mm) clearance between the two valve heads. 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.

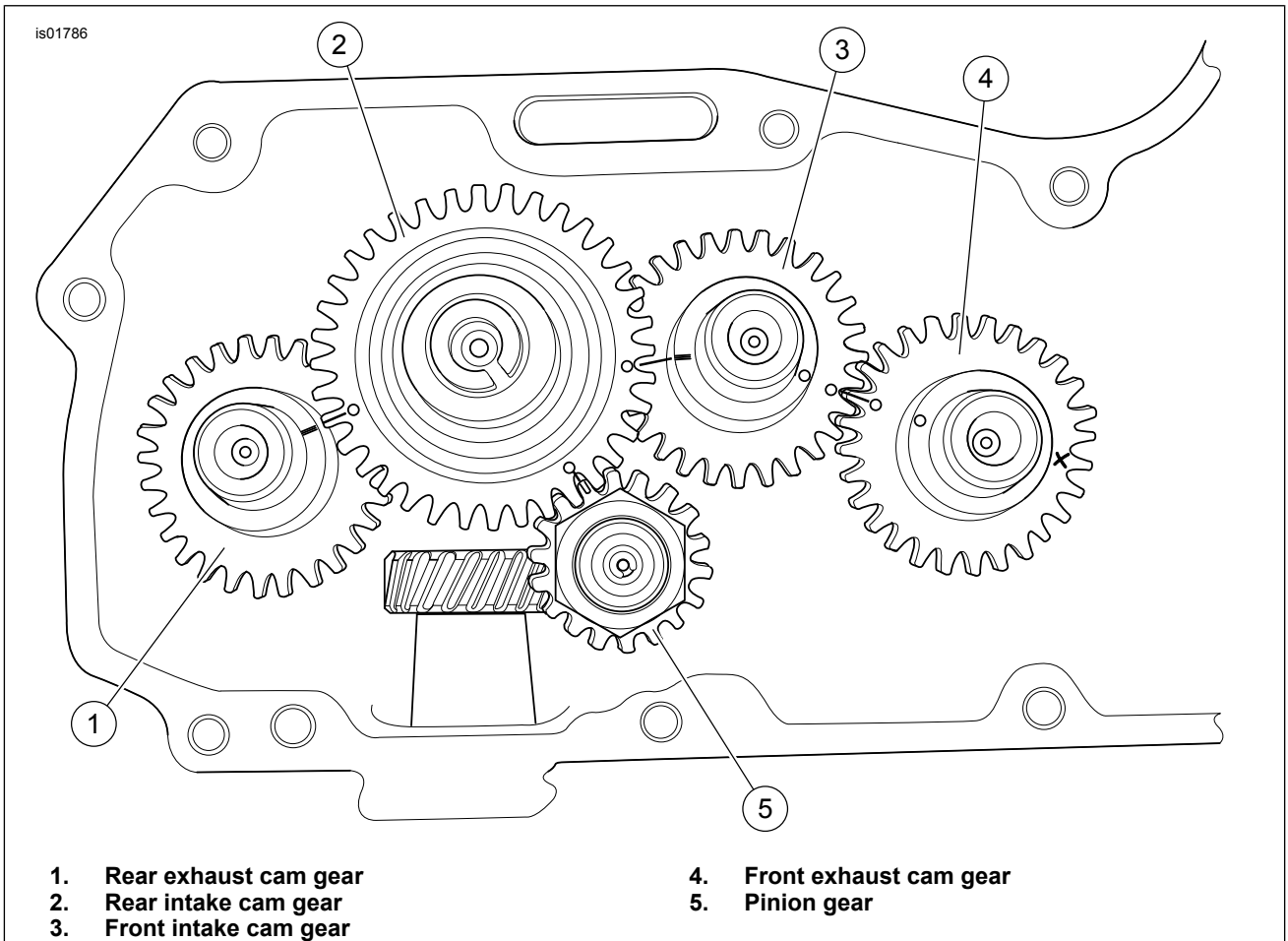


Figure 2. Proper Alignment of Camshaft Timing Marks

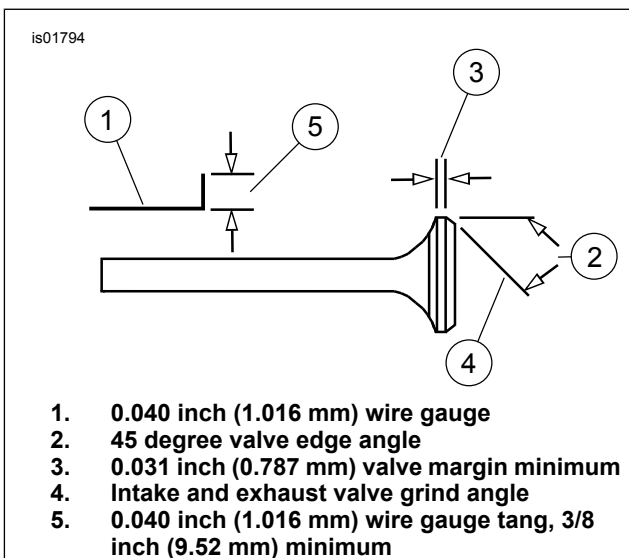


Figure 3. Beveling Valve Heads

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 inch (0.787 mm). On 1200cc engines, grind the valve seats deeper into the head to obtain the 0.040 inch (1.016 mm) 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 inch (0.254 mm), 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.

NOTE

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

16. Repeat Step 15 for the rear cylinder.

NOTE

Do not deepen valve reliefs more than 0.020 inch (0.508 mm) or piston will be ruined.

17. Remove the heads and perform the following: Measure the clay thickness in the valve reliefs on the pistons at its thinnest point. This measurement must be at least 0.080 inch (2.032 mm) If 0.080 inch (2.032 mm) clearance is not present, the valve reliefs must be machined deeper to obtain the 0.080 inch (2.032 mm) clearance. If 0.040 inch (1.016 mm) clearance was not present when checked in Step 13, remove and bevel the intake and exhaust valves on 883cc engines. If 0.040 inch (1.016 mm) 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

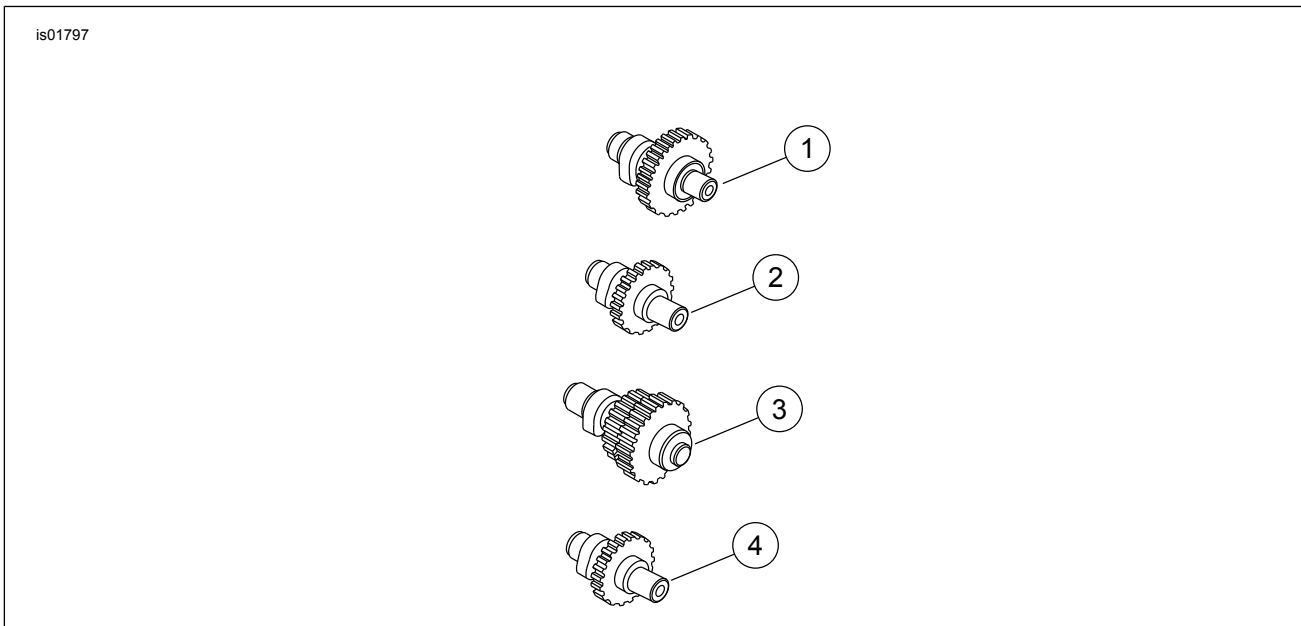


Figure 4. Service Parts: XL High Performance Cam Set

Table 1. Service Parts Table

Item	Description (Quantity)	Part Number
1	Camshaft, front intake	Not Sold Separately
2	Camshaft, front exhaust	Not Sold Separately
3	Camshaft and gear, rear intake	Not Sold Separately
4	Camshaft, rear exhaust	Not Sold Separately