INSTRUCTIONS

-J01930 2011-05-27

SCREAMIN' EAGLE PRO TWIN CAM 88 CAM KITS

GENERAL

Kit Numbers

25121-03, 25149-00, 25152-00, 25155-00, 25137-00, 25122-02, 25133-04, 25376-03, 25400029

Models

For model fitment information, see the P&A Retail Catalog or the Parts and Accessories section of www.harley-davidson.com (English only).

Additional Parts Required

Installing these camshaft kits requires the separate purchase of the following kits from a Harley-Davidson Dealer:

Table 1. Additional Parts Required

Description (Quantity)	Part Number
Adjustable or Perfect Fit Pushrods	See Screamin' Eagle Pro Catalog
Cam Service Kit	17045-99D
Drive Gear Retention Kit	25533-99A
Splined Drive Sprocket (1999 Models only)	25716-99

Separate purchase of the Cam Spacer Kit (Part No. 25938-00) is recommended. This kit contains five different spacers to achieve proper sprocket alignment.

The 251, 257, 258, 260, 264 and 266E cams cannot be used with stock valve springs, or coil bind may result. Refer to the Screamin' Eagle Pro catalog for the proper valve springs to fit your application.

⚠ WARNING

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 a Harley-Davidson dealer perform the installation. Improper installation of this kit could result in death or serious injury. (00308a)

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.

Tools and Supplies Required

Separate purchase of the following is required for proper installation of this kit:

- Camshaft/Camshaft Bearing Remover/Install tool (Part No. HD-46344)
- Crankshaft/Camshaft Sprocket Locking Tool (Part No. HD-42314)
- Loctite® 243 (Blue) Medium Strength Threadlocker and Sealant (Part No. 99642-97)
- Loctite 262 (Red) High Strength Threadlocker (Part No. 94759-99)
- Loctite Cleaner/Primer 7649 (Part No. 98968-99)

If installing this kit on a fuel injected motorcycle, it is required that a recalibration of the ECM be performed with either a download cartridge or the "SE Super Tuner." See a Harley-Davidson dealer for details.

Kit Contents

Table 2. Kit Contents

Description (Quantity)	Part Number
204 Cam	25149-00
211 Cam	25152-00
251 Cam	25121-03
253 Cam	25376-03
257 Cam	25155-00
258 Cam	25137-00
260 Cam	25122-02
264 Cam	25133-04
266E Cam	25400029

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.

There are no Service Parts available with this kit.

INSTALLATION

NOTE

Installing this kit requires removal and re-installation of the Cam Support Plate. See the ENGINE, BOTTOM END Cam Support Plate, Removal and Disassembly/Assembly (Camshaft, Camshaft Bearings) section of the applicable service manual for instructions. Replace information pertaining to cam compartment components with the following information:

*"**NOTE:** Crank and primary cam-sprocket flange bolts are specially hardened, and the flat washers are of a special diameter and have ground surfaces. Use only the parts provided in the Drive Gear Retention Kit, part number 25533-99A, when installing this kit. The crank and primary-cam sprocket flange bolts are **NOT** interchangeable.*

⚠ WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect battery cables (negative (-) cable first) before proceeding. (00307a)

1. Refer to the service manual and follow the instructions given to remove the seat and disconnect the battery cables, negative cable first.

2. Refer to the applicable service manual and follow the instructions to remove and discard the crank and primary cam sprocket flange bolts and washers.
3. **For 1999 Models Only:** Refer to the service manual to remove and discard the existing cam drive sprocket.
4. Remove the cams and cam bearings from the cam support plate according to ENGINE, BOTTOM END Cam Support Plate, Disassembly/Assembly (Camshaft, Camshaft Bearings) instructions in the service manual. Discard cam bearings.
5. Inspect crankshaft bushings for wear and replace as needed. Refer to the service manual for inspection and replacement procedures.

Install New Cam Bearings

NOTE

See Figure 2. If not enough of the splined shaft is exposed to install the sprocket, leave out the spacer (4) and proceed to Step 2.e. When the bearing inner race is started onto the machined area, remove the flange bolt (5), washer (6), and sprocket, then re-assemble using the spacer (4). Repeat Step 2.e to fully install bearing inner race.

1. See Figure 1. Obtain new Rear Cam Roller Bearing Kit (Part No. 8983) from Cam Service Kit (Part No. 17045-99D).

NOTICE

To center thrust washer, be sure O-ring is installed in relief groove. Damage to bearing cage and engine can occur if thrust washer is not centered. (00473d)

2. See Figure 2. Install O-ring, thrust washer and bearing inner race onto rear camshaft as follows:

    a. To properly locate thrust washer, install O-ring in grinding relief groove. Groove is on the splined end between the machined area and the secondary cam sprocket. Exercise caution to avoid stretching or breaking the O-ring. Since the O-ring is not sold separately, damage will require purchase of new roller bearing kit.

    b. Slide thrust washer down rear camshaft until centered over O-ring in grinding relief position.

    c. Slide bearing inner race down rear camshaft until contact is made with shoulder of machined area.

    d. Install primary cam sprocket spacer and sprocket on camshaft and secure using thicker flat washer and long flange bolt.

    e. Wrap a cloth around camshaft to get a firm grip and also to protect hand from sharp edges of sprocket. Use a 9/16 inch box wrench and turn flange bolt (5) in a clockwise direction. Bearing inner race is fully installed when it makes firm contact with the thrust washer (2).

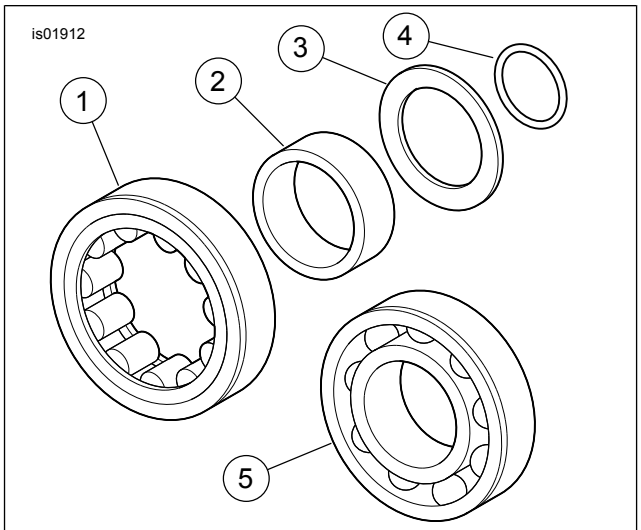
    f. Verify that thrust washer is locked in place and cannot be rotated. If necessary, install shaft in vise with brass jaw inserts, and further tighten flange bolt until the desired result is achieved.

NOTE

See Figure 1. The front and rear cam bearings are no longer interchangeable. The rear uses a roller bearing and the front uses a ball bearing.

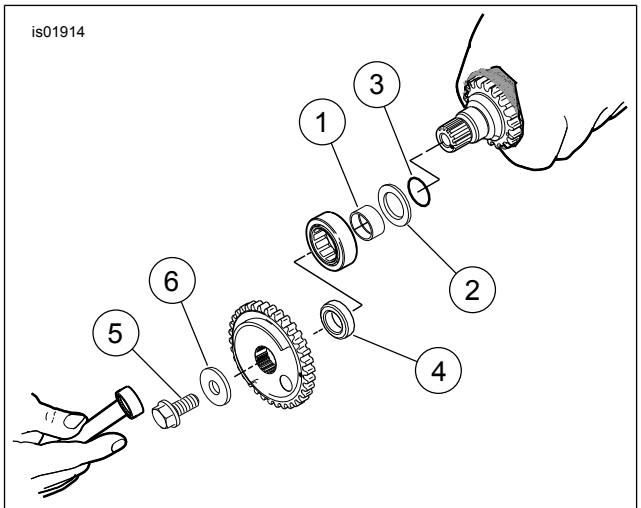
Bearings may be a press-to-loose fit. If necessary, clean bearing OD and apply Loctite® Threadlocker 243 (Blue) before installation. Avoid getting compound on rollers or bearing ID.

    g. Remove flange bolt, flat washer, sprocket and spacer.



1. Rear roller bearing
2. Bearing inner race
3. Thrust washer
4. O-ring
5. Front ball bearing

Figure 1. Cam Bearings



1. Inner race
2. Thrust washer
3. O-ring
4. Spacer
5. Flange bolt
6. Flat washer

Figure 2. Install Bearing Inner Race (All Models except 1999 Shown)

3. See Figure 1. Install **new** front ball cam bearing and rear roller bearing into cam support plate according to the following:

    a. See Figure 3. Obtain the Camshaft/Camshaft Bearing Remover/Installer (Part No. HD-43644).

b. With the secondary cam chain side facing upward, place cam support plate on support block, so that outer races of bearings are properly supported. Note that one corner of the support block is contoured to accommodate the chain guide blocks cast into the front of the support plate.

c. Center new bearing over bearing bore with the lettered side up. Slide pilot shaft of bearing driver through bearing into hole of support block.

d. See Figure 4. Center bearing driver under ram of arbor press. Press on driver until bearing makes firm contact with counterbore in cam support plate.

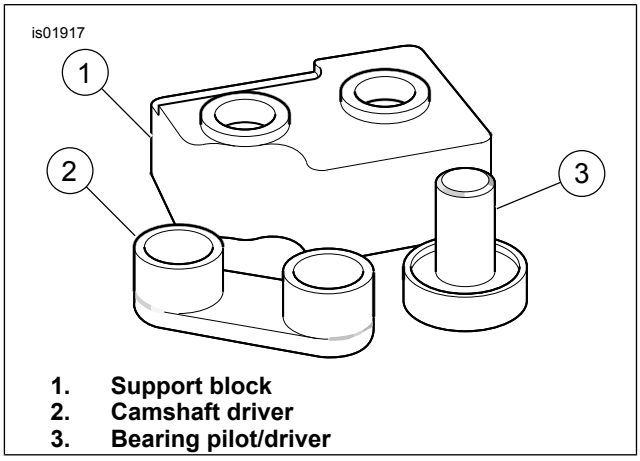
4. Repeat Steps 3.a through 3.d to install second bearing.

5. Apply Loctite Medium Strength Threadlocker 243 (Blue) to threads of four bearing retainer plate screws. Fasten bearing retainer plate to the cam-support plate. Tighten the screws to 2.3–3.4 N·m (20–30 **in-lbs**) in a crosswise pattern. **For All Models Except 2005-Later:** Verify that the hole in the retainer plate is properly aligned with secondary cam chain oiler.

6. Place the cam support plate back on the support block, if removed. The block supports inner races of bearings as camshafts are installed.

7. See Figure 5. Align punch marks on teeth of secondary cam sprockets (outboard faces). Use a colored marker to carefully mark the punch mark locations on the inboard side of the sprocket teeth. These marks help align the camshafts when they are pressed into the bearings.

8. Place the secondary cam chain around the sprockets of both the front and rear camshafts. To maintain the original direction of rotation, the colored mark placed on the chain link during disassembly must face opposite the cam support plate during installation.



1. Support block
2. Camshaft driver
3. Bearing pilot/driver

Figure 3. Camshaft and Camshaft Bearing Remover/Installer

9. Position the camshafts on opposite ends of the chain, then verify that the colored marks placed on the inboard side of the sprocket teeth are aligned.

NOTE

Do not mix camshafts during the press procedure. The rear camshaft, which can be identified by the splined shaft, must press into the roller bearing at the rear of the cam support plate.

10. Maintaining the position of the camshafts on the chain with the colored marks in alignment, place the sprocket ends of the camshafts into the bearings.

11. Place the cup of the camshaft driver over end of the front camshaft only.

NOTICE

During press procedure, keep tensioner shoe clear of chain to prevent damage to tensioner assembly. (00474b)

12. Center the end of the front camshaft under the ram, then slowly apply pressure to the driver just to start the front camshaft into the bearing ID.

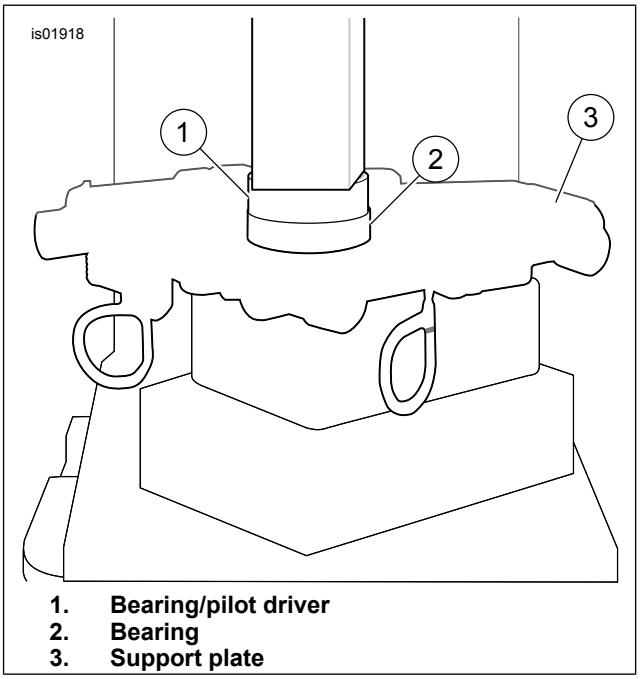
NOTICE

Be sure rear camshaft is aligned during press procedure. Misalignment can cause inner race to catch on bearing rollers resulting in bearing damage. (00475b)

13. Slowly apply pressure to the driver on the front camshaft, while moving the rear camshaft as necessary to guide the inner race between bearing rollers.

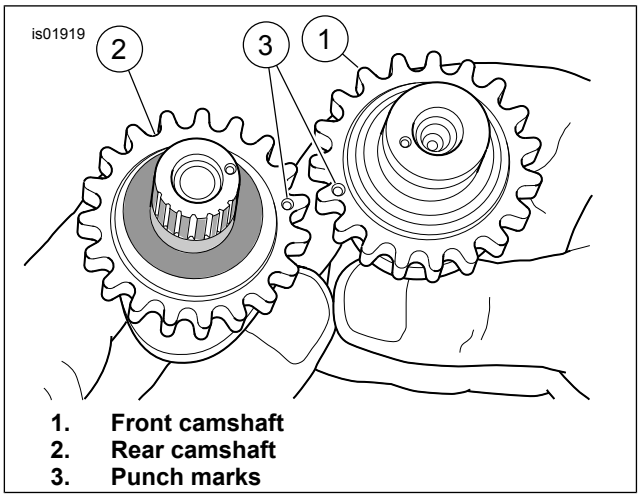
14. When the inner race on the rear cam is started into the roller bearing, apply pressure to the driver until the front camshaft is fully seated. If necessary, keep finger pressure at the top of the rear camshaft so that the assembly remains square and the inner race moves to the installed position in the roller bearing.

15. After installing new cams, check for proper cam-to-cam timing using a straightedge along the punch marks as described in the service manual.



1. Bearing/pilot driver
2. Bearing
3. Support plate

Figure 4. Press Bearings into Cam Support Plate



1. **Front camshaft**
2. **Rear camshaft**
3. **Punch marks**

Figure 5. Align Punch Marks on Teeth of Camshaft Sprockets

16. Install the new retaining ring in the groove at the end of the front camshaft.

NOTE

Replace the original O-ring between the oil pump and cam plate with a new O-ring (part no. 11286) and replace original cam plate to crankcase O-ring with new O-ring (part no. 11301) from service kit (part no. 17045-99D).

17. Replace needle bearings in crankcase. Refer to the service manual for procedure.

NOTE

Before proceeding, check the clearance between the cam lobes and case.

18. Install the cam plate according to ENGINE, BOTTOM END Cam Support Plate, Disassembly/Assembly instructions in the service manual.

19. Apply a thin film of clean H-D 20W50 engine oil to the splines of the rear cam.

NOTE

Verify alignment at crank and primary cam sprocket punch marks as described in service manual.

Verify alignment at crank and primary cam sprocket faces. Use spacers provided in kit (part no. 25938-00) to maintain alignment at ±0.10 in (2.54 mm).

20. Install splined sprocket (part no. 25716-99) onto rear camshaft according to ENGINE, BOTTOM END Cam Support Plate, Disassembly/Assembly (Camshaft, Camshaft Bearings) instructions in the service manual. Use new spacers provided in kit (part no. 25938-00) in place of those listed in the service manual.

21. Use new cam drive sprocket flange bolt (part no. 996), washer (part no. 6294), crank flange bolt (part no. 898A) and flat washer (part no. 6278A) provided in kit (part no. 25533-99A).

⚠ WARNING

Apply threadlocker to maintain clamp load on flange bolt. A loose flange bolt can cause engine failure, which could result in death or serious injury. (00476c)

22. Install new flange bolts and washers as follows:

    a. Verify threads are clean and free from oil then apply Loctite Cleaner/Primer 7649 (Part No. 98968-99).

    b. Apply Loctite High Strength Threadlocker 262 (red) (Part No. 94759-99) to threads of flange bolts.

    c. Apply a thin film of clean H-D 20W50 engine oil to both sides of flat washers.

    d. Start flange bolt with flat washer to secure crank sprocket to end of crankshaft.

    e. Start flange bolt with flat washer to secure primary cam sprocket to end of camshaft.

    f. See Figure 6. Position Crankshaft/Camshaft Sprocket Locking Tool (Part No. HD-42314) between the crank and primary cam sprockets to prevent rotation. The handle of the tool is stamped "Crank" and "Cam" for proper orientation.

    g. Tighten crank and primary cam sprocket flange bolts to 20.3 N·m (15 ft-lbs).

    h. Loosen each flange bolt one full turn.

    i. Tighten the crank flange bolt to 32.5 N·m (24 ft-lbs) final torque value.

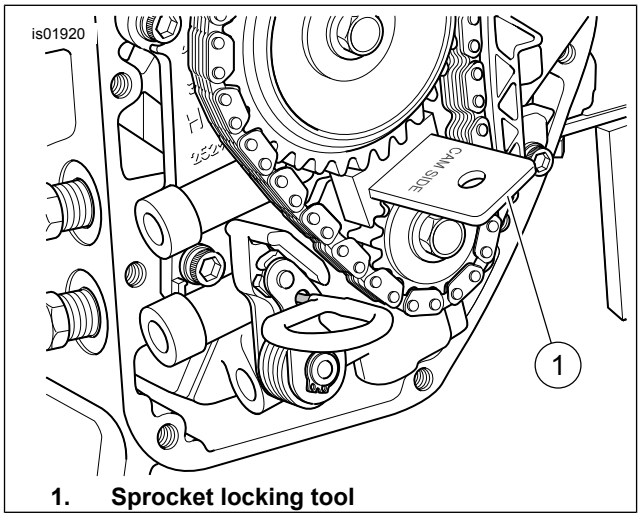
    j. Tighten the primary cam sprocket flange bolt to 46 N·m (34 ft-lbs) final torque value.

    k. Remove the sprocket locking tool and follow instructions in the service manual for unloading the primary cam chain tensioner.

NOTE

Replace original cam cover gasket with new cam cover gasket (part no. 25244-99A) from Cam Service Kit (part no. 17045-99D).

23. Install the cam cover according to ENGINE, BOTTOM END, Cam Support Plate, Disassembly/Assembly instructions in the service manual.



1. **Sprocket locking tool**

Figure 6. Crankshaft/Camshaft Sprocket Locking Tool

NOTE

After installing non-stock cams, check piston-to-valve and valve-to-valve clearances. If using adjustable pushrods, they will need to be extended to fully collapse the lifters.

Measuring Piston-to-Valve Clearance

1. Apply 0.125 inch (3 mm) layer of clay to crowns of pistons in areas where valves meet pistons.
2. Refer to the service manual and assemble the heads and valve train and tighten cylinder studs to torque specified.
3. Wait 10 minutes before turning the engine after installing pushrods. This allows tappets to bleed down and prevents the pushrods or valves from being bent.

NOTE

Make sure the pushrods can be spun with fingertips before rotating the engine.

4. Turn engine through two complete revolutions by hand.
5. Remove heads and measure clay at its thinnest point.

NOTE

Clay must measure 0.080 inch (2.03 mm) at its thinnest point. If this measurement does not meet minimum thickness, depth of valve notches must be increased. The depth of the notches must not exceed 0.135 inch (3.43 mm).

If oversized valves are used, radial clearance should also be checked. Radial clearance of 0.050 inch (1.27 mm) is recommended.

Measuring Valve-to-Valve Clearance

1. Refer to the service manual and assemble the heads and valve train and tighten cylinder studs to torque specified.

NOTE

Make sure the pushrods can be spun with fingertips before rotating the engine.

2. Wait ten minutes before turning the engine after installing pushrods. This allows tappets to bleed down and prevents you from bending push rods or valves.

NOTE

See Figure 7. If it is necessary after inspection to grind the intake and exhaust valves in order to meet the 0.040 inch clearance between the two valve heads, the margins (3) must be measured as follows: 0.031 inch minimum margin on exhaust valves and 0.015 inch minimum margin on intake valves.

3. Rotate the 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 to view the valves. Turn engine, if required, to the point where the exhaust and intake valve heads cross, where both valves are off their seats by an equal amount.
4. A 0.040 in (1.02 mm) clearance is required between the two valve heads. Use a wire gauge (1) to measure this distance. To adjust the clearance, grind the edges of the intake and exhaust valves at a 45 degree angle (2).
5. Repeat Steps 1 and 2 for the rear cylinder.

⚠ WARNING

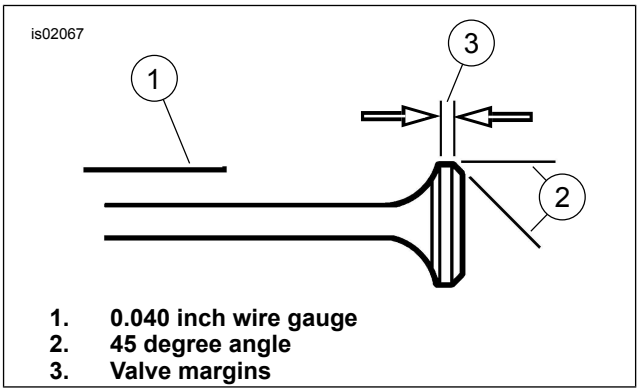
Connect positive (+) battery cable first. If positive (+) cable should contact ground with negative (-) cable connected, the resulting sparks can cause a battery explosion, which could result in death or serious injury. (00068a)

6. Connect the battery cables, positive cable first.

⚠ WARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

7. Install the seat.



1. 0.040 inch wire gauge
2. 45 degree angle
3. Valve margins

Figure 7. Beveling Valve Heads