



INSTRUCTIONS

-J03086

REV. 7-11-03

Kit Numbers 29775-02A

SCREAMIN' EAGLE TWIN CAM BIG BORE (1550) CONVERSION AND (EFI) STAGE 2 KIT

General

This kit is designed for installation on all Harley-Davidson 2001 and later Softail, 2002 and later Touring, 2004 and later Dyna Twin Cam 88 Model Motorcycles.

See Service Parts illustration for kit contents.

NOTE

Replace original oil pump to cam plate O-ring with new O-ring (part number 11286) and replace original cam plate to crankcase O-ring with new O-ring (part number 11301).

NOTE

Replace original cam cover gasket with new cam cover gasket (part number 25244-99).

Additional Parts Required

Installation of the camshafts included in this kit requires the separate purchase of Spacer Kit (part number 25938-00) from any Harley-Davidson Dealer.

NOTE

A Service Manual for your motorcycle is available at any Harley-Davidson Dealership.

CAUTION

Installation of this kit requires the Electronic Control Module to be recalibrated. Failure to do so may result in severe engine damage. See any Harley-Davidson dealer for recalibration.

CAUTION

This engine related performance part is intended for High Performance and 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.

CAUTION

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 any Harley-Davidson dealer perform the installation. Improper installation of this kit could result in death or serious injury.

⚠ WARNING

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

⚠ WARNING

Disconnect negative (-) 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. (00049a)

⚠ WARNING

Gasoline is extremely flammable and highly explosive under certain conditions. Do not smoke or allow open flame or sparks anywhere in the area when draining or servicing the fuel system. Drain gasoline into approved gasoline container only. Inadequate safety precautions could result in death or serious injury.

Installation

Installation of this kit is divided into 5 steps:

- 1). Big Bore Cylinder and Piston Conversion
- 2). High Performance Camshafts
- 3). High Performance Clutch Diaphragm Spring
- 4). Calibrate the ECM
- 5). High Performance Air Cleaner

CAUTION

Gaskets provided in the 1550 conversion kit, eliminate the need for original headgasket O-rings. For this reason, DO NOT install the O.E. (original) O-rings (Part number 11273) to top of cylinder dowels or severe engine damage may occur.

1). BIG BORE CYLINDER AND PISTON CONVERSION

Installation of this kit requires removal of the cylinder heads, cylinders and pistons. Refer to section 3, ENGINE: STRIPPING MOTORCYCLE FOR SERVICE and TOP END OVERHAUL of the applicable Service Manual for instructions.

2). HIGH PERFORMANCE CAMSHAFTS

Installation of this kit requires removal and re-installation of the Cam Support Plate. Refer to Section 3, ENGINE: BOTTOM END Cam Support Plate, Removal and Disassembly/Assembly (Camshaft, Camshaft Bearings) of the applicable Service Manual for instructions.

Removal of Old Cam Bearings

1. Remove crank and primary cam sprocket flange bolts and washers according to applicable Service Manual. Discard cam drive sprocket flange bolts and washers.
2. Remove existing cam drive sprocket according to instructions in applicable Service Manual.
3. Remove cam bearings according to ENGINE, BOTTOM END Cam Support Plate, Disassembly/Assembly (Camshaft, Camshaft Bearings) instructions in applicable Service Manual. Discard cam bearings.

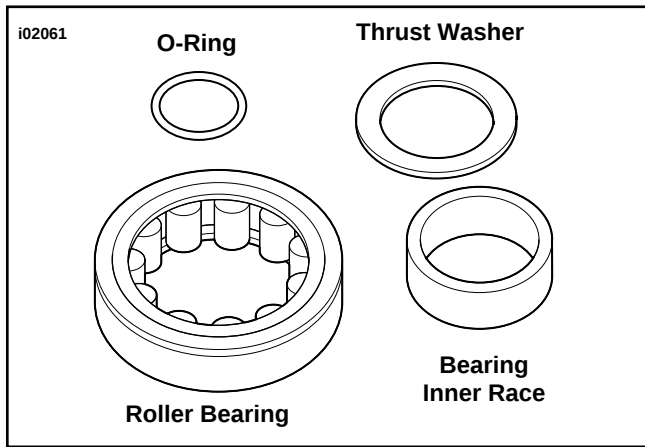


Figure 1. Rear Cam Roller Bearing Kit (Part number 8983)

Install New Cam Bearings

1. See Figure 1. Install new Rear Cam Roller Bearing (part number 8983) according to the following:
2. *Install O-ring, thrust washer, and bearing inner race onto rear camshaft as follows:*
 - a. To properly locate thrust washer, first 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.

CAUTION

The thrust washer will be offset to one side if the O-ring is not installed in the grinding relief groove. Damage to the bearing cage can occur if the thrust washer is not properly centered.

- 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.

NOTE

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

- e. See Figure 2. Wrap a shop rag around camshaft to get a firm grip and also to protect hand from sharp edges of sprocket. Using a 9/16 inch box wrench, turn flange bolt in a clockwise direction. Bearing inner race is fully installed when it makes firm contact with the thrust washer.
- f. Verify that thrust washer is locked in place and cannot be rotated. If necessary, install shaft in vise using brass jaw inserts, and further tighten flange bolt until the desired result is achieved.
- g. Remove flange bolt, flat washer, sprocket and spacer.

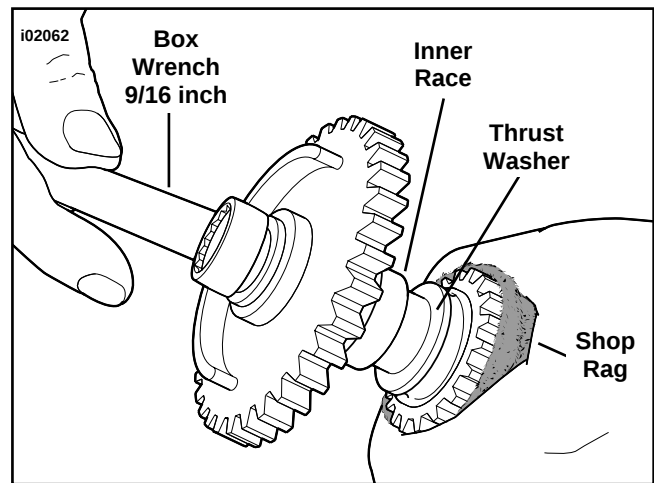


Figure 2. Install Bearing Inner Race (with O-Ring and Washer)

3. See Figure 3. Install new cam bearings into cam support plate according to the following:

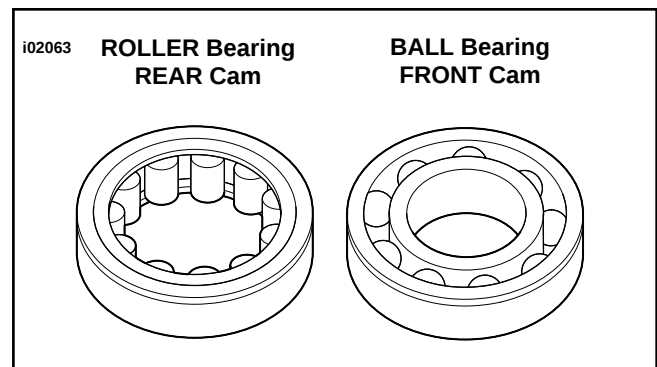


Figure 3. Cam Bearings

NOTE

Be aware that the front and rear cam bearings are not interchangeable. The rear cam utilizes a roller bearing while the front cam utilizes a ball bearing.

- a. See Figure 4. Obtain the CAMSHAFT/CAMSHAFT BEARING REMOVER/INSTALLER (HD-43644)

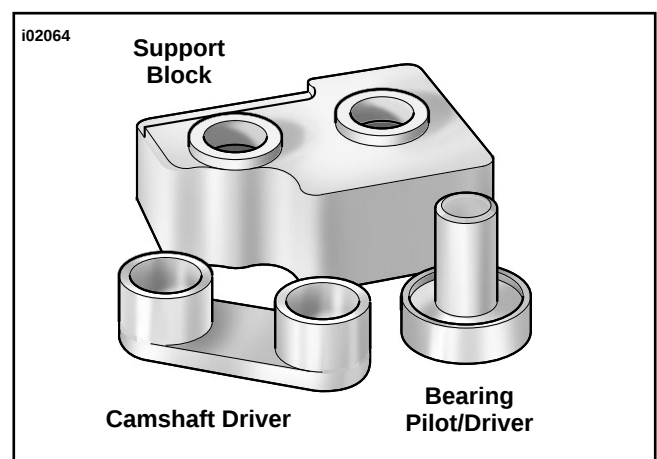


Figure 4. Camshaft/Camshaft Bearing Remover/Installer (Part number HD-43644)

NOTE

Bearing fit may be a light press or slightly loose fit. If deemed necessary, clean bearing O.D. and apply Loctite® Low Strength Threadlocker 242 (Blue) before installation, but exercise caution to avoid getting compound on rollers or bearing ID.

- 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 5. Center bearing driver under ram of arbor press. Press on driver until bearing makes firm contact with counterbore in cam support plate. Repeat Steps a through c to install second bearing.
4. Apply a small dab of Loctite Medium Strength Threadlocker 243 (blue) to threads of four bearing

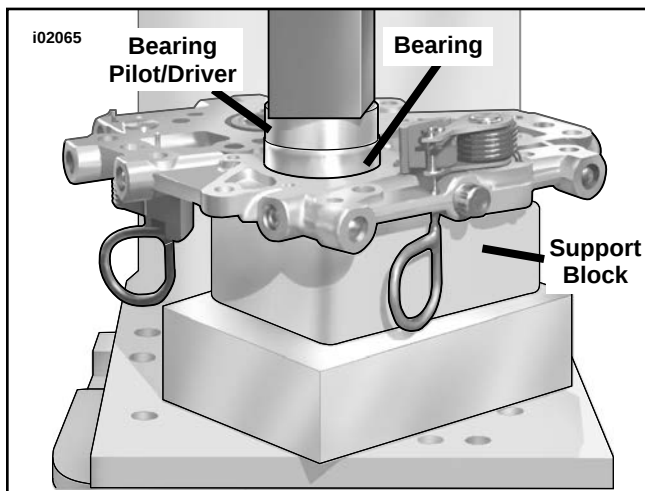


Figure 5. Press Bearings into Cam Support Plate

retainer plate screws. Using a T20 TORX® drive head, secure bearing retainer plate to cam support plate. Tighten screws to 20-30 in-lbs (2.3-3.4 Nm) in a cross-wise pattern. Verify that hole in retainer plate is properly aligned with secondary cam chain oiler.

5. Start camshafts into cam bearings.
6. Place cam support plate back on support block, if removed. The block properly supports inner races of bearings as camshafts are installed.
7. Align punch marks on teeth of secondary cam sprockets (outboard faces). See Figure 6. Using a colored marker, carefully mark the punch mark locations on the inboard side of the sprocket teeth. These marks are needed to observe proper orientation of 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, be sure that the colored mark placed on the chain link during disassembly is facing opposite the cam support plate during installation.

9. Orient the camshafts so that they are positioned on opposite ends of the chain, and then verify that the colored marks placed on the inboard side of the sprocket teeth are still in alignment.
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.

NOTE

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

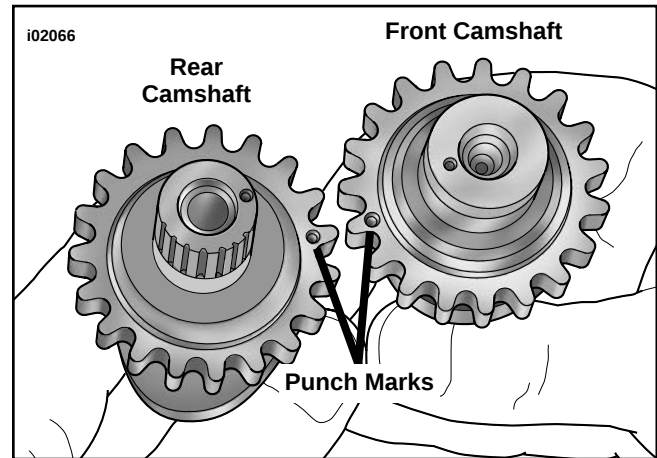


Figure 6. Align Punch Marks on Teeth of Camshaft Sprockets.

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

CAUTION

Be sure that tensioner shoe is clear of the secondary cam chain during the press procedure. Contact can result in damage that requires replacement of the tensioner assembly.

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

CAUTION

If rear camshaft is not properly aligned, edge of installed inner race can catch on bearing rollers. Bearing damage can result if contact occurs during the press procedure.

13. Slowly apply pressure to driver on front camshaft, while wiggling rear camshaft as necessary to guide inner race between bearing rollers.
14. When inner race on rear cam is started into roller bearing, apply pressure to driver until front camshaft is fully seated. If necessary, keep finger pressure at top of rear camshaft to ensure that assembly remains square and inner race moves to installed position in roller bearing.
15. After installing new cams, check for proper cam to cam timing using straightedge along punch marks as described in Service Manual.
16. Install new retaining ring in groove at end of front camshaft.

NOTE

Replace original oil pump to cam plate O-ring with new O-ring (part number 11286) and replace original cam plate to crankcase O-ring with new O-ring (part number 11301).

17. Install cam plate according to ENGINE, BOTTOM END Cam Support Plate, Disassembly/Assembly instructions in applicable Service Manual.
18. Apply a thin film of clean H-D 20W50 engine oil to the splines of the rear cam.
19. Install splined sprocket (part number 25716-99) onto rear camshaft according to ENGINE, BOTTOM END Cam Support Plate, Disassembly/Assembly (Camshaft, Camshaft Bearings) instructions in applicable Service Manual. Use new spacers provided in kit (part number 25938-00) in place of those listed in Service Manual.

NOTE

Verify alignment at crank and primary cam sprocket punch marks as described in Service Manual. For crank and primary faces use spacers provided in kit (part number 25938-00) to maintain alignment at + or - 0.10".

20. Use new cam drive sprocket flange bolt (part number 996), new washer (part number 6294), new crank flange bolt (part number 898A) and new flat washer (part number 6278A).
21. Install new flange bolts and washers as follows:
 - a. Ensure threads are clean and free from oil then apply Loctite® Primer 7649.
 - b. Apply Loctite® High Strength Threadlocker 262 (red), to threads of flange bolts.

WARNING

Failure to use Loctite® 262 (Red) may result in a joint that will not maintain proper clamp load and may loosen under certain circumstances causing engine failure which could result in death or serious injury.

- 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 7. Position CRANKSHAFT/CAMSHAFT SPROCKET LOCKING TOOL (HD-42314) between the crank and primary cam sprockets to prevent rotation. The handle of the tool is stamped "Crank" and "Cam" to ensure proper orientation.
- g. Tighten crank and primary cam sprocket flange bolts to 15 ft-lbs (20.3 Nm).
- h. Loosen each flange bolt one full turn.
- i. Tighten the **crank** flange bolt to 24 ft-lbs (32.5 Nm) final torque value.
- j. Tighten the primary **cam** sprocket flange bolt to 34 ft-lbs (46.0 Nm) final torque value.
- k. Remove the sprocket locking tool and follow instructions in Service Manual for unloading the primary cam chain tensioner.

NOTE

Replace original cam cover gasket with new cam cover gasket (part number 25244-99).

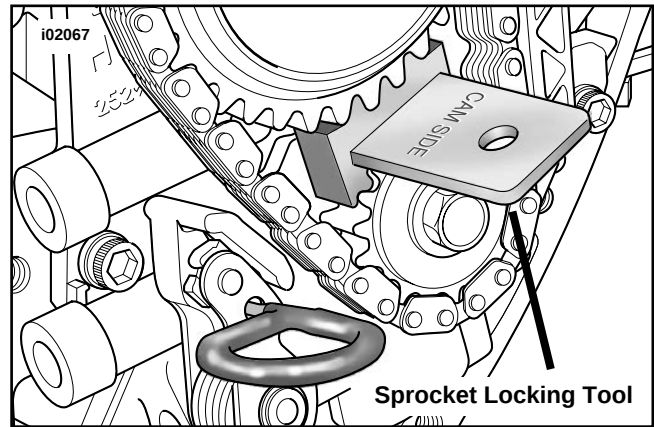


Figure 7. Crankshaft/Camshaft Sprocket Locking Tool (Part number. HD-42314)

22. Install the cam cover according to section 3, ENGINE: BOTTOM END, Cam Support Plate. Refer to the assembly instructions in the applicable Service Manual for instructions.

Install New Pistons, Cylinders, and Cylinder Heads

BIG BORE CYLINDER AND PISTON CONVERSION

- **Assembly** - Refer to the ENGINE section of the appropriate Service Manual for installing pistons, cylinders and cylinder heads.

3). HIGH PERFORMANCE CLUTCH DIAPHRAGM SPRING

1. Disassembly - Refer to the DRIVE section of the appropriate Service Manual to remove primary chaincase, chain, diaphragm spring retainer and diaphragm spring.
2. Assembly - Refer to the DRIVE section of the appropriate Service Manual for installing diaphragm spring retainer, diaphragm spring, chain and primary chaincase.

4). HIGH PERFORMANCE AIR CLEANER

Follow the instructions included with the High Performance Air Cleaner in this kit for installation.

Have dealer recalibrate the ECM prior to starting vehicle.

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)

23. Connect the battery cables, positive cable first.
24. Refer to the Service Manual, and follow instructions to install the seat.

5). CALIBRATE THE ECM

WARNING

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



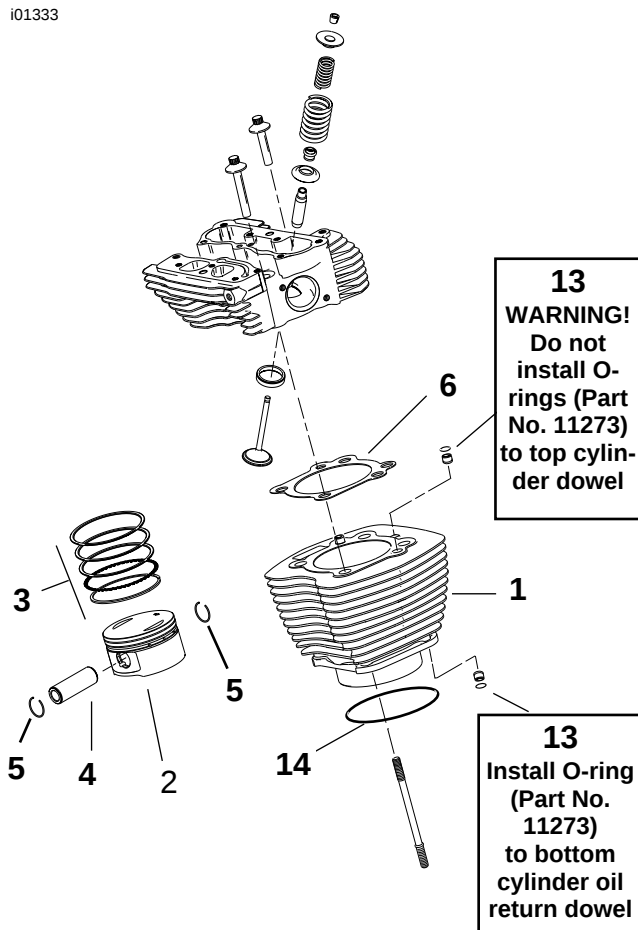
Service Parts

Part Number 29775-02A

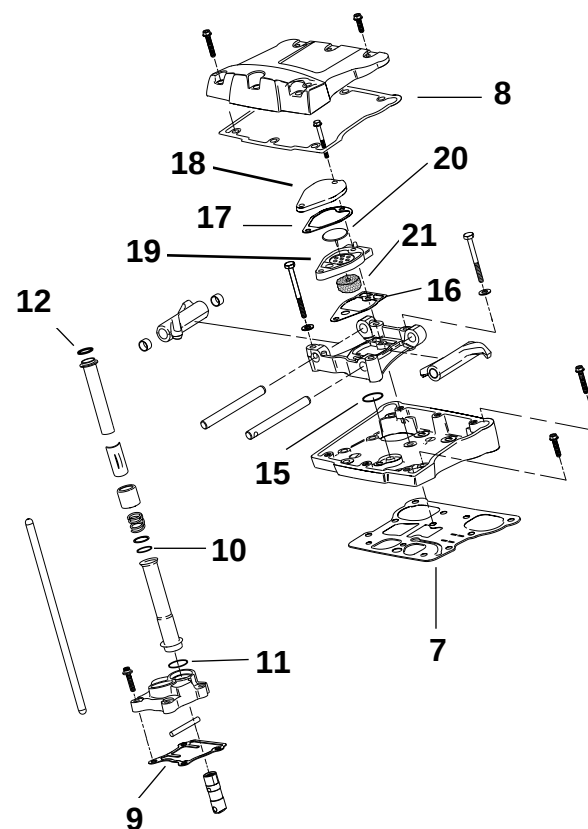
Date 7/03

Twin Cam Big Bore/EFI Stage 2 Kit

i01333



i01332



Item	Description	Part No.
1	1550 Cylinder assembly (Black) (2)	16547-99
2	1550 Piston (2)	22114-99A
3	1550 Piston ring set (2))	21918-99
4	Piston pin (2)	22132-99
5	Piston pin circlip (4)	22097-99
6	1550 Head gasket (2)	16787-99
7	Gasket, rocker cover base (2)	16719-99
8	Gasket, rocker cover top (2)	17386-99
9	Gasket, tappet cover (2)	18635-99
10	O-ring, middle push rod cover (4)	11132
11	O-ring, lower push rod cover (4)	11145
12	O-ring, upper push rod cover (4)	11293
13	O-ring, cyl. deck ring dowel (2)	11273
14	O-ring, cyl. spigot (2)	11256

Item	Description	Part No.
15	O-ring, rocker arm support (2)	11270
16	Gasket, breather baffle (2)	17643-02
17	Gasket, breather cover (2)	17643-02
18	Cover, breather (2)	17647-02
19	Baffle, breather (2)	17648-02
20	Umbrella valve (2)	26858-99
21	Filter element, breather (2)	63815-99
22	Seal, exhaust (Not shown)	17048-98
23	Seal, intake manifold/EFI module (2) (Not shown)	26995-86B
24	Valve seal kit (1) (Not shown)	18004-86
25	Clutch, spring (Not shown)	37951-98

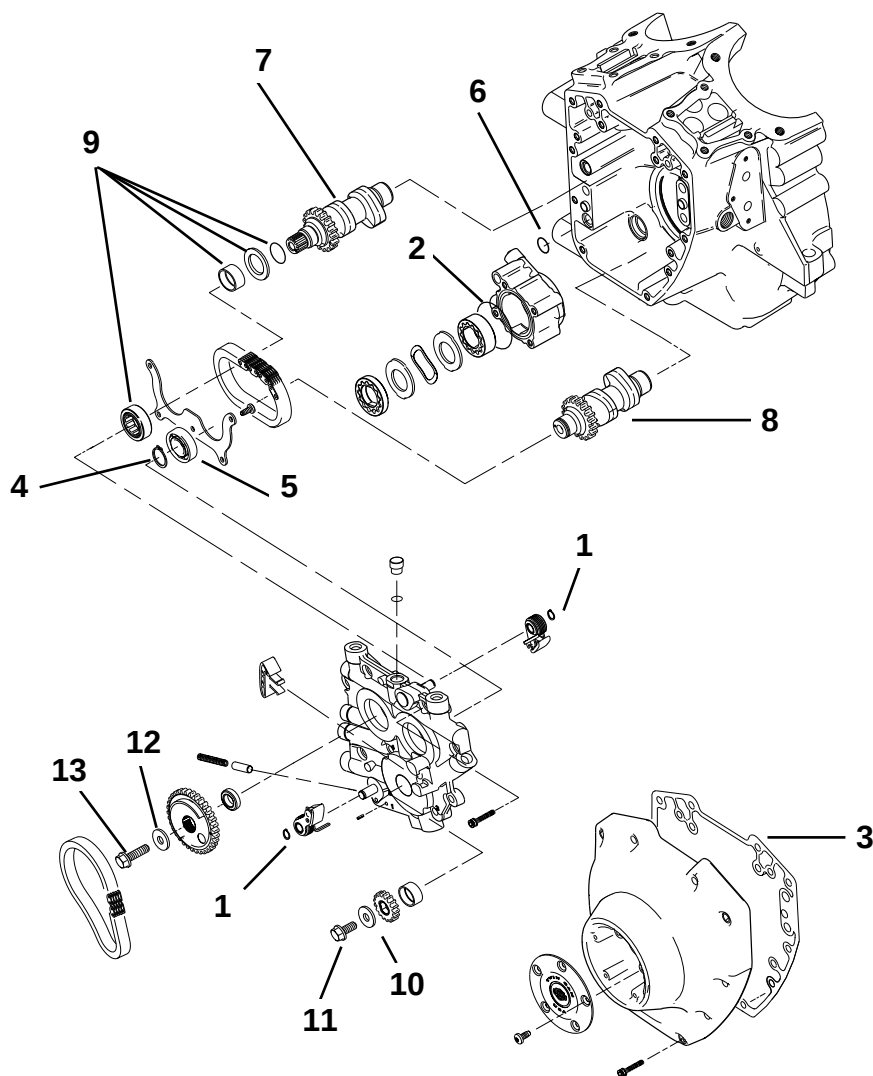


Service Parts

Part Number. 29775-02A | Date 7/03

Twin Cam Big Bore/EFI Stage 2 Kit

i02070



Item	Description	Part No.	Item	Description	Part No.
1	Retaining ring (2)	11031	10	Washer (crank)	6278A**
2	O-ring, oil pump to cam plate (1)	11286	11	Capscrew, flanged (crank)	898A**
3	Gasket, cam cover (1)	25244-99	12	Washer (cam)	6294**
4	Retaining ring, camshaft (1)	11494	13	Capscrew, flanged (cam)	996**
5	Bearing, camshaft ball (1)	8990A	14	Loctite® 262, high strength threadlocker (red) (not shown) (1)	94673-99
6	O-ring, cam plate to crankcase (1)	11301			
7*	Stage 2 camshaft, rear (1)	not sold			
8*	Stage 2 camshaft, front (1)	not sold			
9	Bearing kit, camshaft roller (1)	8983			

* Cam set available in kit No. 25937-99A

**Parts only available together as Kit No. 25533-99A