

## GENERAL

### NOTES

- It is assumed that each step performed on one cylinder is automatically repeated on the other.
- Do not mix 2007 pistons with earlier style pistons. New style pistons have tapered wrist pin boss. The wrist pin portion of the connecting rod is also tapered.

This section provides a sequential process for engine reassembly after a complete [3.16 TOP END OVERHAUL: DISASSEMBLY](#). If you reached this section after an inspection or repair procedure, start where necessary and continue to the end of the section.

- Piston installation-see below.
- Cylinder installation-see [page 3-39](#).
- Cylinder head installation-see [page 3-42](#).
- Push rods, lifters and covers installation-see [page 3-46](#).
- Rocker arm support plate installation-see [page 3-47](#).
- Breather assembly installation-see [page 3-48](#).

## PISTON

PART NO.	SPECIALTY TOOL
HD-42317	Piston pin circlip remover/installer
HD-42320-A	Piston pin remover

1. Slide approximately 6.0 in. (152 mm) of plastic tubing, rubber hose or conduit over each cylinder stud, if removed. Use material with I.D. of 0.5 in. (12.7 mm) to protect cylinder studs and piston from damage.
2. Apply clean H-D 20W50 engine oil to piston pin, piston bosses and upper connecting rod bushing.
3. Remove water pipe insulation from connecting rod shank.
4. See [Figure 3-29](#). Place piston over rod end so that the arrow stamped at the top of the piston points toward the front of the engine.
5. See [Figure 3-30](#). Insert piston pin (1) through pin bore and upper connecting rod bushing. Push pin until it contacts circlip installed in opposite pin boss. Verify that end gap (3) for circlip is 180 degrees from opening (2).
6. Place clean shop towels over the cylinder and lifter bores to prevent the piston pin circlip from falling into the crankcase. Verify that the circlip groove is clean and free of dirt and grime.



Figure 3-29. Piston Installation Arrow

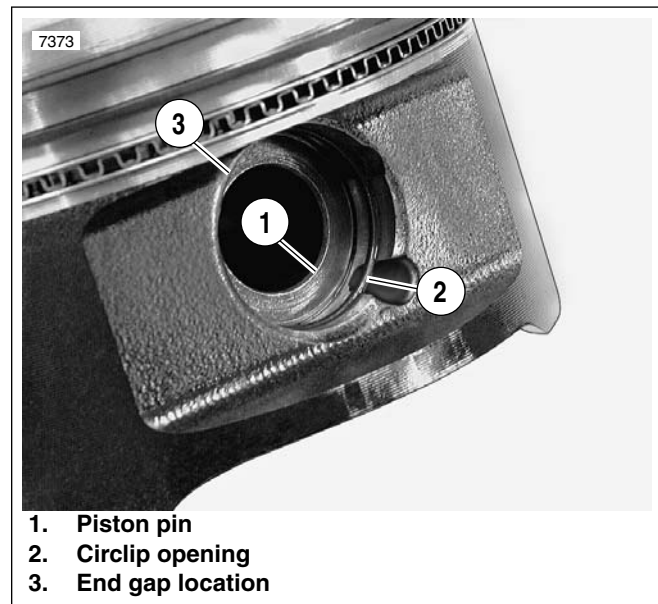


Figure 3-30. Preinstalled Circlip

**CAUTION**

**Do not reuse piston pin circlips. The circlips may weaken during removal causing them to break or dislodge during engine operation, a condition that will result in engine damage.**

7. Install **new** piston pin circlip with the PISTON PIN CIRCLIP REMOVER/INSTALLER (Part No. HD-42317).
  - a. See [Figure 3-31](#). Slide circlip down nose of tool until it contacts claw. Lightly squeeze handles of tool to capture circlip in claw.
  - b. Releasing pressure on handles, rotate circlip so that the end gap is centered at top of tool and then recapture in claw.
  - c. Tilt the circlip forward until the end gap contacts nose of tool.
  - d. See [Figure 3-32](#). Insert the tool (1) into the piston pin bore until claw is aligned with slot (2) in piston.
  - e. Firmly push the tool into the piston pin bore until it bottoms. Release handles and remove tool.
  - f. Inspect the circlip to verify that it is fully seated in the groove.

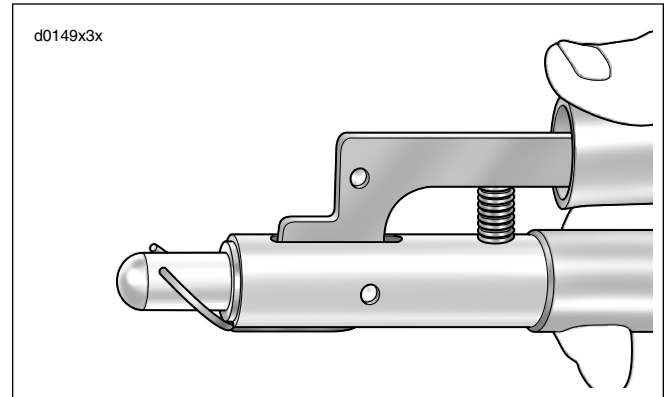
**CYLINDER**

PART NO.	SPECIALTY TOOL
HD-42322	Piston support plate
HD-95952-1	Threaded cylinders
HD-95952-33C	Connecting rod clamping tool
HD-96333-51C	Piston ring compressor
HD-96333-103	Ring compressor band

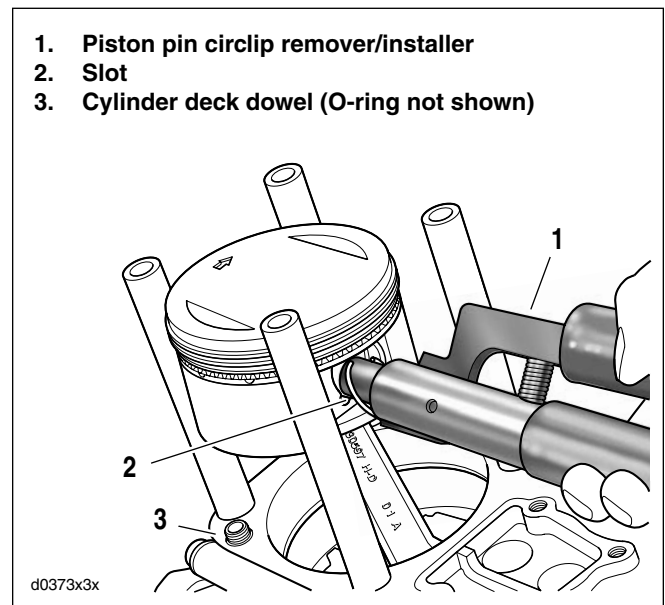
**NOTE**

*O-rings that are missing, distorted, pinched or otherwise damaged will result in either oil leakage or low oil pressure. Use of the wrong O-ring will have the same results. Since many O-rings are similar in size and appearance, always use new O-rings keeping them packaged until use to avoid confusion.*

1. See [Figure 3-32](#). Apply a very thin film of clean H-D 20W50 engine oil to **new** O-rings for both cylinder deck dowel pins (3). Install and verify that O-ring is properly seated in groove.



**Figure 3-31. Aligning Circlip**



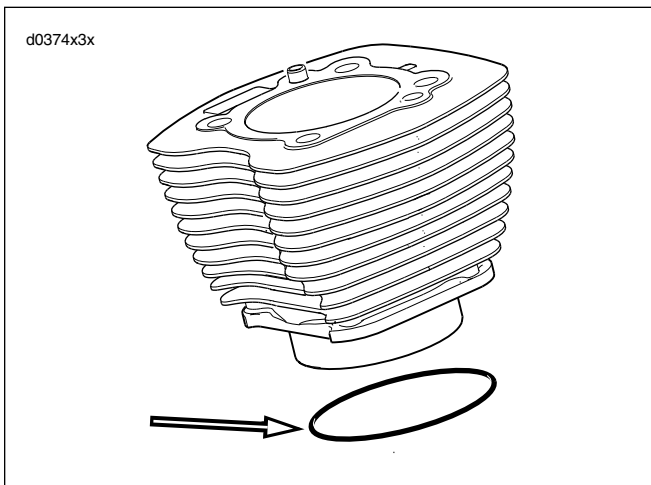
**Figure 3-32. Pin Circlip Remover/Installer (Part No. HD-42317)**

- See [Figure 3-33](#). Apply a very thin film of clean H-D 20W50 engine oil to **new** O-ring seal for the bottom of the cylinder liner. Install **new** O-ring seal.

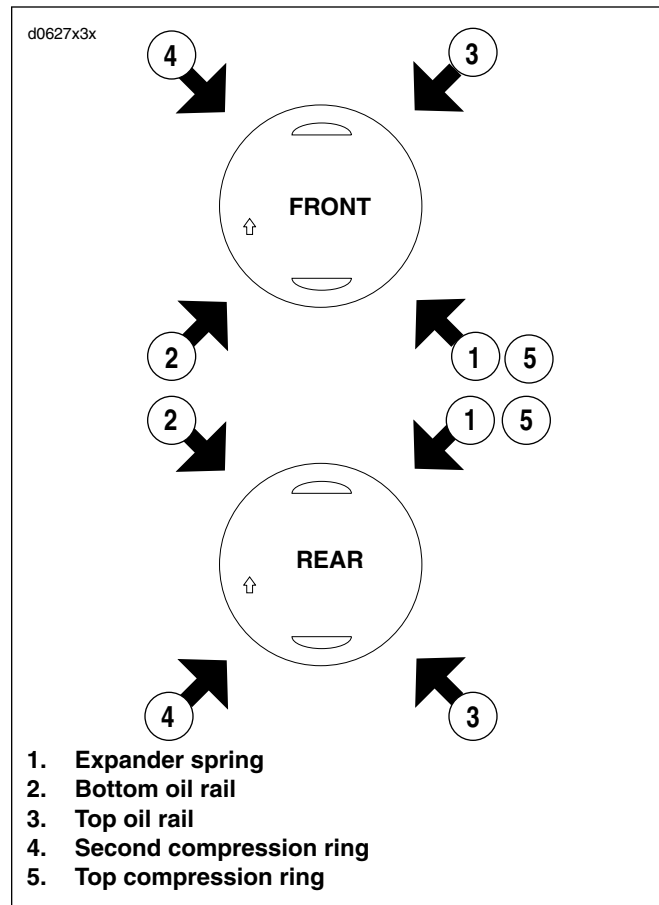
**NOTE**

*Excessive lubrication of cylinder sleeve O-ring seal will result in oil weepage between cylinder and crankcase as engine is run. This condition may be incorrectly diagnosed as an oil leak.*

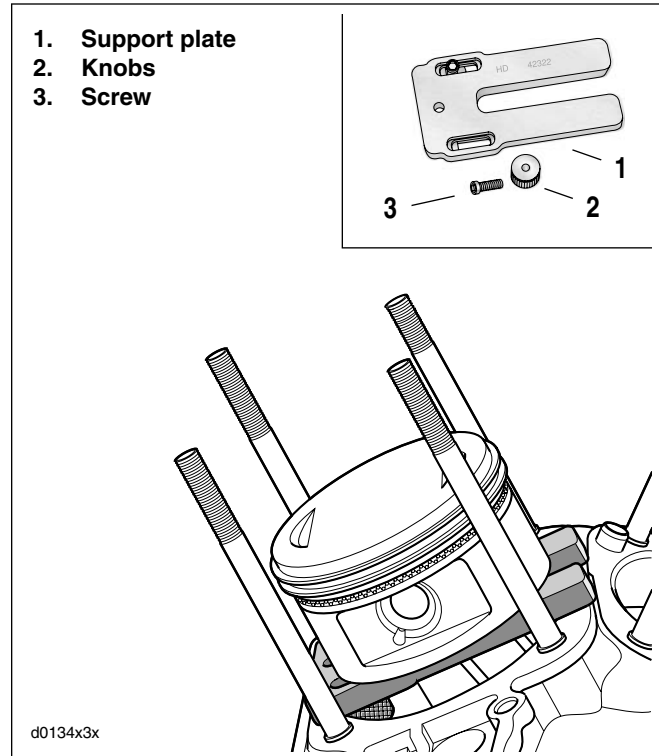
- See [Figure 3-34](#). Verify that the piston ring end gaps are staggered. Rotate each ring to position the gap 90 to 180 degrees from the gap in the ring above it. Locate the top piston ring (5) gap towards the intake port.
- Apply clean H-D 20W50 engine oil to piston, piston rings and cylinder bore.
- Remove protective covers from cylinder studs. Rotate engine until piston is at top dead center. If necessary, see under [3.16 TOP END OVERHAUL: DISASSEMBLY](#).
- See [Figure 3-35](#). Install the PISTON SUPPORT PLATE (Part No. HD-42322).
  - Slide both adjustable knobs (2) on support plate (1) down away from forked end. Tighten knobs when contact is made with flats at end of slots.
  - With the forked end of the tool pointing towards the center of the engine and the adjustable knobs facing downward, capture shank of connecting rod in fork. Lay tool on cylinder deck so that adjustable knobs contact wall of cylinder bore.
  - Rotate engine until piston skirt is centered and firmly seated on top of support plate.



**Figure 3-33. O-ring Seal For Cylinder**



**Figure 3-34. Piston Ring Alignment**

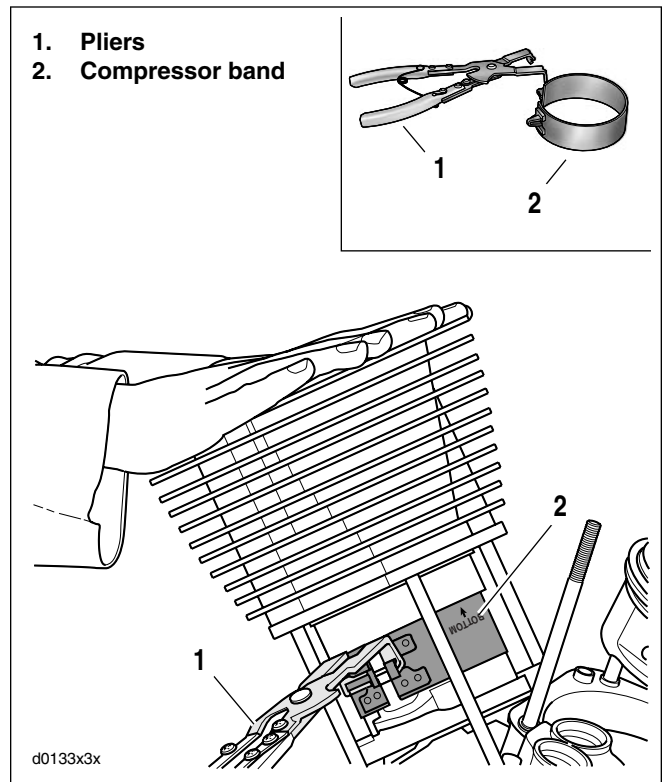


**Figure 3-35. Piston Support Plate (Part No. HD-42322)**

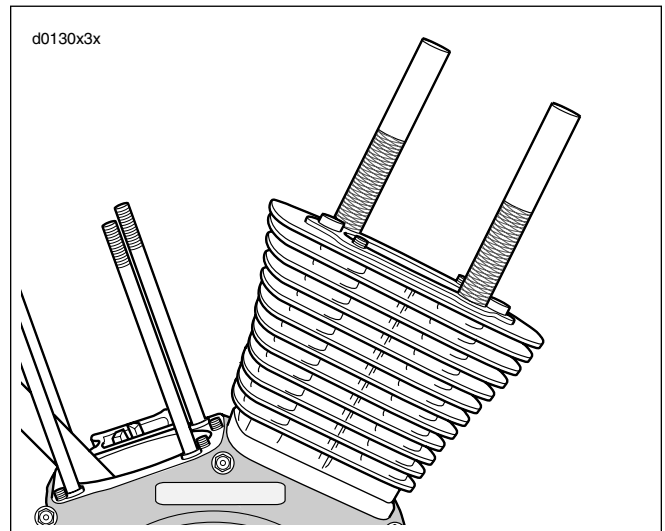
7. See [Figure 3-36](#). Install cylinder using PISTON RING COMPRESSOR (Part No. HD-96333-51C).
  - a. Fit tabs on pliers (1) into slots of ring compressor band (2). The arrow stamped on the band indicates the side that faces up, so disregard the word “bottom.” Place band around piston. Press the lever on the right side of the pliers to open the jaws for band expansion.
  - b. Orient tool so that the top of the band is positioned between the top compression ring and the piston crown. Tightly squeeze handles of tool to compress piston rings. The ratcheting action of the tool allows release of the handles after the rings are compressed.
  - c. With the indent in the cooling fins facing the right side of the engine, gently slide cylinder over the cylinder studs and the piston crown resting it on the top of the ring compressor band.
  - d. Place the palms of both hands at the top of the cylinder. Push down on the cylinder with a sharp, quick motion to pass the piston ring area.
  - e. Rotate the engine slightly to raise piston off support plate. Remove pliers from band and then remove band from around shank of connecting rod.
8. Remove shop towels from around the crankcase bore exercising caution to keep out any dirt or debris.
9. Carefully set the cylinder over the two dowel pins in the cylinder deck. Push down on the cylinder until it is fully seated in the crankcase bore.

## NOTE

See [Figure 3-37](#). To hold the first cylinder in position while installing the second, install **THREADED CYLINDERS** (Part No. HD-95952-1) from **CONNECTING ROD CLAMPING TOOL** (Part No. HD-95952-33C) onto cylinder studs with the knurled side down. This will prevent the piston rings from raising the cylinder as the engine is rotated to bring the other piston into position for installation of the second cylinder.



**Figure 3-36. Piston Ring Compressor  
(Part No. 96333-51C)**



**Figure 3-37. Install Threaded Cylinders to Studs  
(Part No. HD-95952-1)**