

REMOVAL/DISASSEMBLY

See [CYLINDER AND PISTON](#) under [3.14 TOP END OVERHAUL: DISASSEMBLY](#) to remove cylinder and piston from engine.

CLEANING, INSPECTION, AND REPAIR

PART NO.	SPECIALTY TOOL
HD-33446-A	Cylinder torque plates
HD-33446-86	Torque plate bolts

- Soak cylinder and piston in an aluminum-compatible cleaner/solvent until deposits are soft, then clean with a brush. Blow off loosened carbon and dirt particles and wash in solvent.

WARNING

Compressed air can pierce the skin and flying debris from compressed air could cause serious eye injury. Wear safety glasses when working with compressed air. Never use your hand to check for air leaks or to determine air flow rates. (00061a)

- Clean oil passage in cylinder with low pressure compressed air.
- Clean piston ring grooves with a piece of compression ring ground to a chisel shape.
- Examine piston pin to see that it is not pitted or scored.
- Check piston pin bushing to see that it is not loose in connecting rod, grooved, pitted or scored.
 - A piston pin properly fitted to upper connecting rod bushing has a 0.00125 to 0.00175 in. (0.0317-0.0444 mm) clearance in bushing.
 - If piston pin-to-bushing clearance exceeds 0.00200 in. (0.0508 mm), replace worn parts. See [3.16 CYLINDER AND PISTON, CONNECTING ROD BUSHINGS](#).

- Clean piston pin lock ring grooves.
- Examine piston and cylinder for cracks, burnt spots, grooves and gouges.

NOTE

Check connecting rod for up and down play in lower bearings. When up and down play is detected, flywheel and connecting rod assembly must be replaced. This requires removing and disassembling engine crankcase.

Checking Gasket Surface

CAUTION

If either cylinder gasket surface does not meet flatness specifications, replace cylinder and piston.

- See [Figure 3-47](#). Check that cylinder top (head) gasket surface is flat within 0.006 in. (0.15 mm). Lay a straight edge across the surface, then try to insert a feeler gauge between the straightedge and the gasket surface.
- Check that the cylinder base gasket surface is flat within 0.008 in. (0.20 mm). Lay a straightedge across the surface, then try to insert a feeler gauge between the straightedge and the gasket surface.

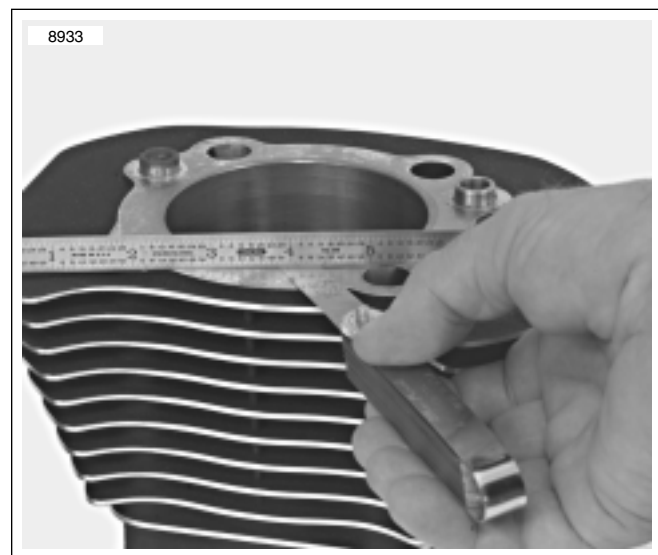


Figure 3-47. Checking Gasket Surfaces

Measuring Piston to Cylinder Fit

NOTE

This inspection is very heat sensitive. Do not check piston running clearance immediately after honing or deglazing cylinder. Even holding the piston in your hand for too long can cause measurements to vary by as much as 0.002 in. (.051 mm). Both piston and cylinder must be at room temperatures before proceeding.

1. Measure the piston running clearance. Proceed as follows:

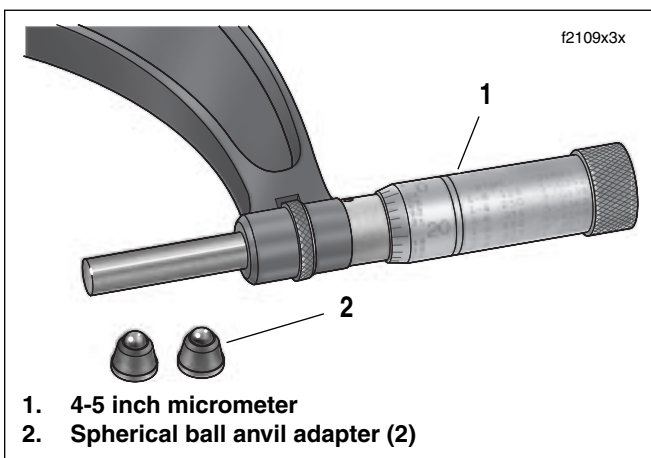
NOTE

Check the piston clearance in the cylinder in which the piston will run. The torque plates must be installed on the cylinder to simulate an assembled cylinder for accurate measurement of cylinder.



Figure 3-49. Measurement Area

- a. See Figure 3-49. the measurement is taken on bare aluminum to avoid measuring errors. An oval-shaped opening in the coating is present on each side of the piston for proper placement of the micrometer.



1. 4-5 inch micrometer
2. Spherical ball anvil adapter (2)

Figure 3-50. Micrometer with Anvil Adapters

NOTE

The oval openings are too small for a standard flat anvil micrometer. Using such a device would result in measuring errors. See Figure 3-50. Use a 3-4 inch blade or ball anvil style micrometer, or a 4-5 inch micrometer with spherical ball anvil adapters.

- b. Measure the piston skirt at the oval openings and then transfer that measurement to a dial bore gauge.
- c. Using a grease pencil, mark the top, middle and bottom of the piston ring travel zone in the cylinder bore. Measure at markings in cylinder parallel and perpendicular to crankshaft.
- d. Replace piston and/or cylinder if running clearance exceeds 0.003 in. (0.076 mm).

Boring and Honing Cylinder

1. The cylinder must be bored with gaskets and torque plates attached. Bore the cylinder to 0.003 in. (0.08 mm) under the desired finished size.
- 2.hone the cylinder to its finished size using a 280 grit rigid hone followed by a 240 grit flexible ball hone. Honing must be done with the torque plates attached. All honing must be done from the bottom (crankcase) end of the cylinder. Work for a 60° crosshatch pattern.

Final cylinder bore sizes, after honing are as follows:

Table 3-42. Cylinder Final Bore Sizes

BORE SIZES	883 CC	1200 CC
Standard bore*	3.0005 in. (76.213 mm)	3.4978 in. (88.844 mm)
0.005 in. O.S. bore 0.13 mm	3.0048 in. (76.323 mm)	3.502 in. (88.95 mm)
0.010 in. O.S. bore 0.25 mm	3.0098 in. (76.449 mm)	3.507 in. (89.08 mm)

*All bore sizes + 0.0002 in.