

Engine Block

Piston Ring End Gap

1. Using a piston, push a new ring into the cylinder bore 15–20 mm (0.6–0.8 in.) from the bottom.
2. Measure the piston ring end-gap with a feeler gauge:
 - If the gap is too small, check to see if you have the proper rings for your engine.
 - If the gap is too large, re-check the cylinder bore diameter against the wear limits on page 7-9. If the bore is over limit, the engine block must be rebored.

Piston Ring End-Gap:

Top and Second Ring

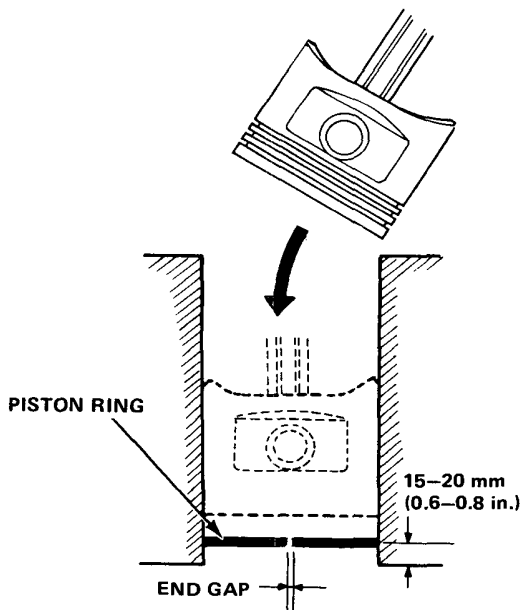
Standard (New): 0.15–0.35 mm (0.006–0.014 in.)

Service Limit: 0.60 mm (0.024 in.)

Oil Ring

Standard (New): 0.3–0.9 mm (0.012–0.035 in.)

Service Limit: 1.1 mm (0.043 in.)



Piston Ring Replacement

1. Using ring expander, remove old piston rings.
2. Clean all ring grooves thoroughly.

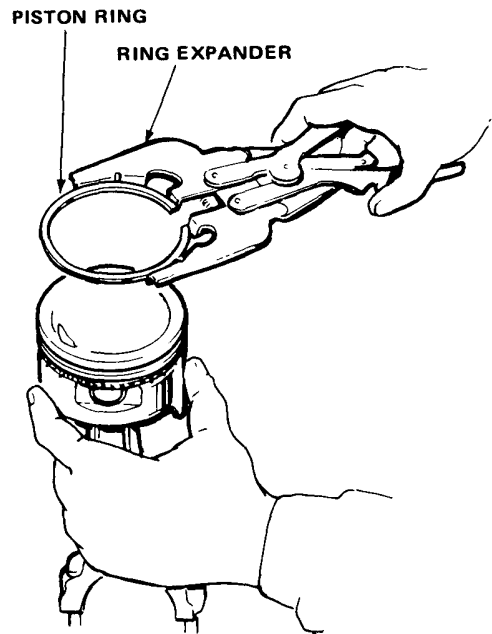
NOTE: Use squared-off broken ring, or file down blade on ring groove cleaner to fit (compression rings are 1.5 mm wide; oil ring is 4.0 mm wide).

CAUTION: Do not use a wire brush to clean ring lands, or cut ring lands deeper with cleaning tool.

NOTE: If piston is to be separated from connecting rod, do not install new rings yet.

3. Install new rings in proper sequence and position (page 7-15).

NOTE: Do not re-use old piston rings.





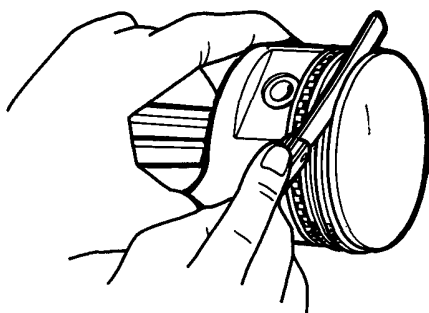
Ring Land Clearances

After installing new set of rings, measure ring-to-land clearances:

Top/Second Ring Clearance:

Standard (New): 0.03–0.06 mm
(0.0012–0.0024 in.)

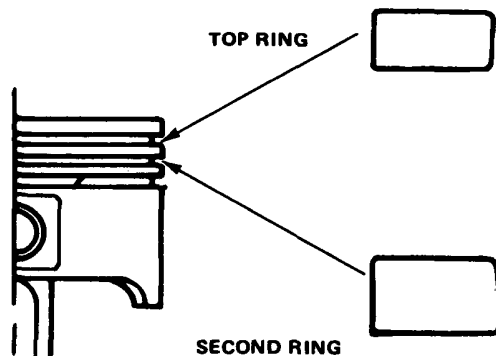
Service Limit: 0.13 mm (0.005 in.)



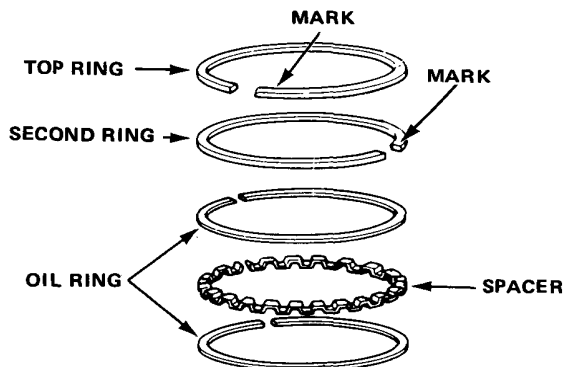
Piston Ring Alignment

1. Install the rings as shown on page 7-14.

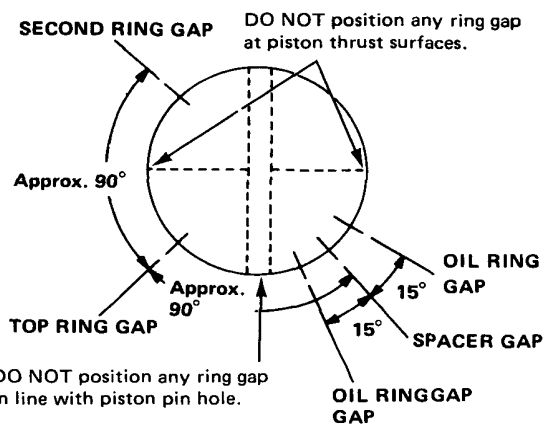
Identify top and second rings by the chamfer on the edge, and make sure they are in proper grooves on piston.



2. Rotate the rings in grooves to make sure they do not bind.
3. The manufacturing marks must be facing upward.




4. Position the ring end gaps as shown:



Engine Block

Piston Installation

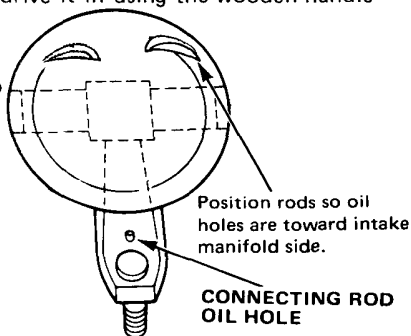
 Before installing the piston, apply a coat of engine oil to the ring grooves and cylinder bores.

1. If the crankshaft is already installed:

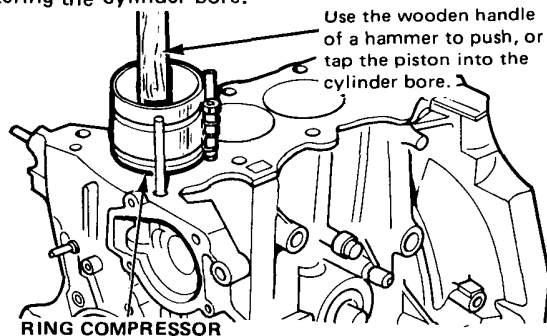
- Remove the connecting rod caps, then slip short sections of rubber hose over the threaded ends of the connecting rod bolts.
 - Install the ring compressor, check that the bearing is securely in place, then position the piston in the cylinder and drive it in using the wooden handle of a hammer.
- Stop after the ring compressor pops free and check the connecting rod-to-crank journal alignment before driving rod into place.
- Install the rod caps with bearings, and torque the nuts to 28 N·m (2.8 kg·m, 20 lb·ft).

2. If the crankshaft is not installed:


- Remove the rod caps and bearings, install the ring compressor, then position the piston in the cylinder and drive it in using the wooden handle of a hammer.
- Position all pistons at top dead center.



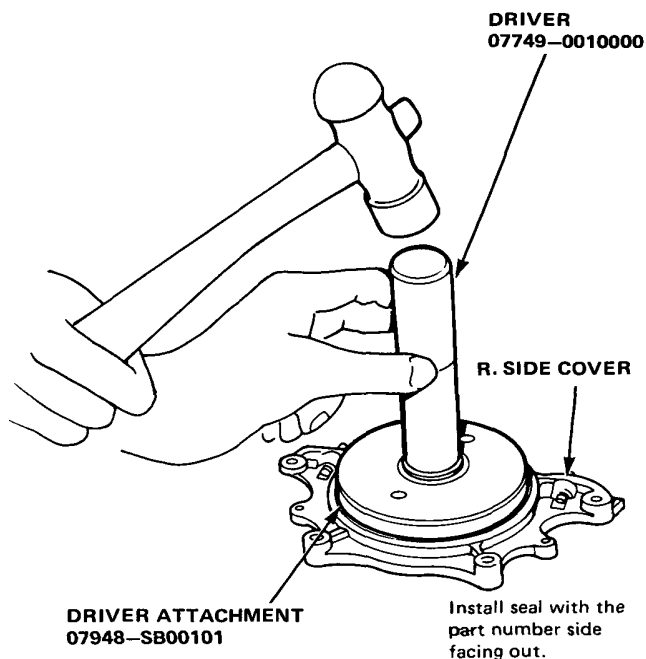
NOTE: Maintain downward force on ring compressor to prevent rings from expanding before entering the cylinder bore.



Oil Seal Installation

 The seal surface on the block should be dry. Apply a light coat of oil to the crankshaft and to the lip of seal.

1. Drive in flywheel-end seal until to bottoms against R. side cover.



NOTE: Refer to page 8-7 for steps on the oil pump side oil seal.

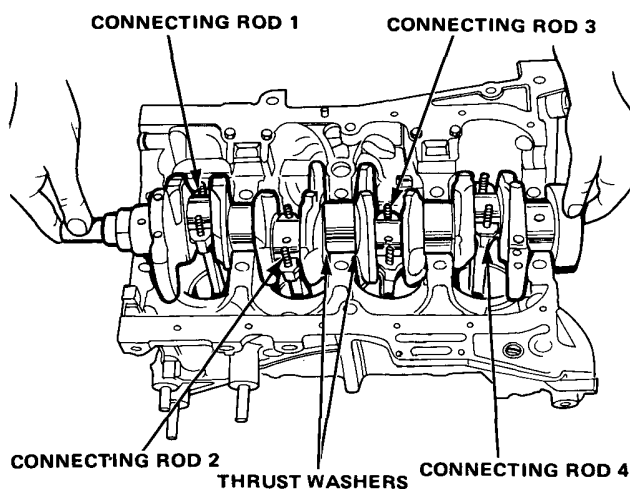


Crankshaft Installation



Before installing the crankshaft, apply a coat of engine oil to the main bearings and rod bearings.

1. Insert bearing halves in the engine block and connecting rods.
2. Hold the crankshaft so rod journals for cylinder No. 2 and No. 3 are straight down.
3. Lower the crankshaft into the block, seating the rod journals into connecting rods No. 2 and No. 3 and install rod caps and nuts finger tight.



4. Rotate the crankshaft clockwise, seat journals into connecting rods No. 1 and No. 4, and install the rod caps and nuts finger tight.
5. Install the thrust washers, main bearing halves and cap, check clearance with plastigage (page 7-5), then torque the nuts to 50 N·m (5.0 kg-m, 36 lb-ft), Oil thrust washer surfaces.
6. Check the rod bearing clearance with plastigage (page 7-5), then torque nuts to 28 N·m (28 kg-m, 20 lb-ft).

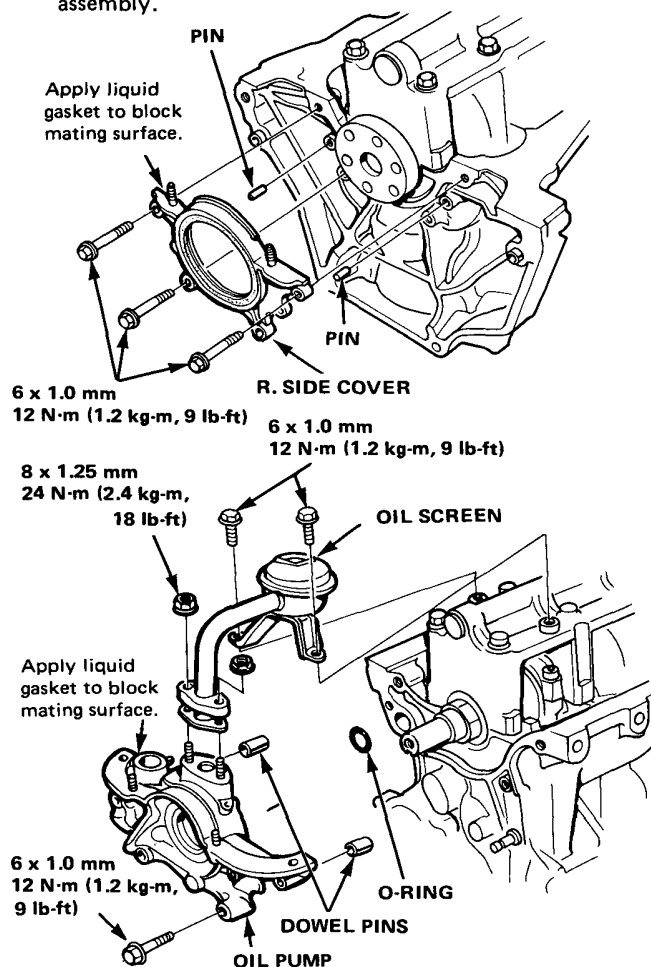
NOTE: Reference numbers on connecting rod are for big-end bore tolerance and do NOT indicate the position of piston in engine.

CAUTION: Whenever any crankshaft or connecting rod bearing is replaced, after reassembly run the engine at idling speed until it reaches normal operating temperature, then continue to run for approximately 15 minutes.

7. Apply non-hardening liquid gasket to the block mating surface of the right side cover and oil pump case, and install them on the engine block.

NOTE:

- Use HONDA PARTS NO 08740-99986 as a liquid gasket.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket by starting with an even bend, centered between edges of the mating surface.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
- Do not allow the liquid gasket to dry before assembly.
- Fill the case with clean engine oil 30 minutes after assembly.



8. Install the oil strainer.
9. Install the oil pan.