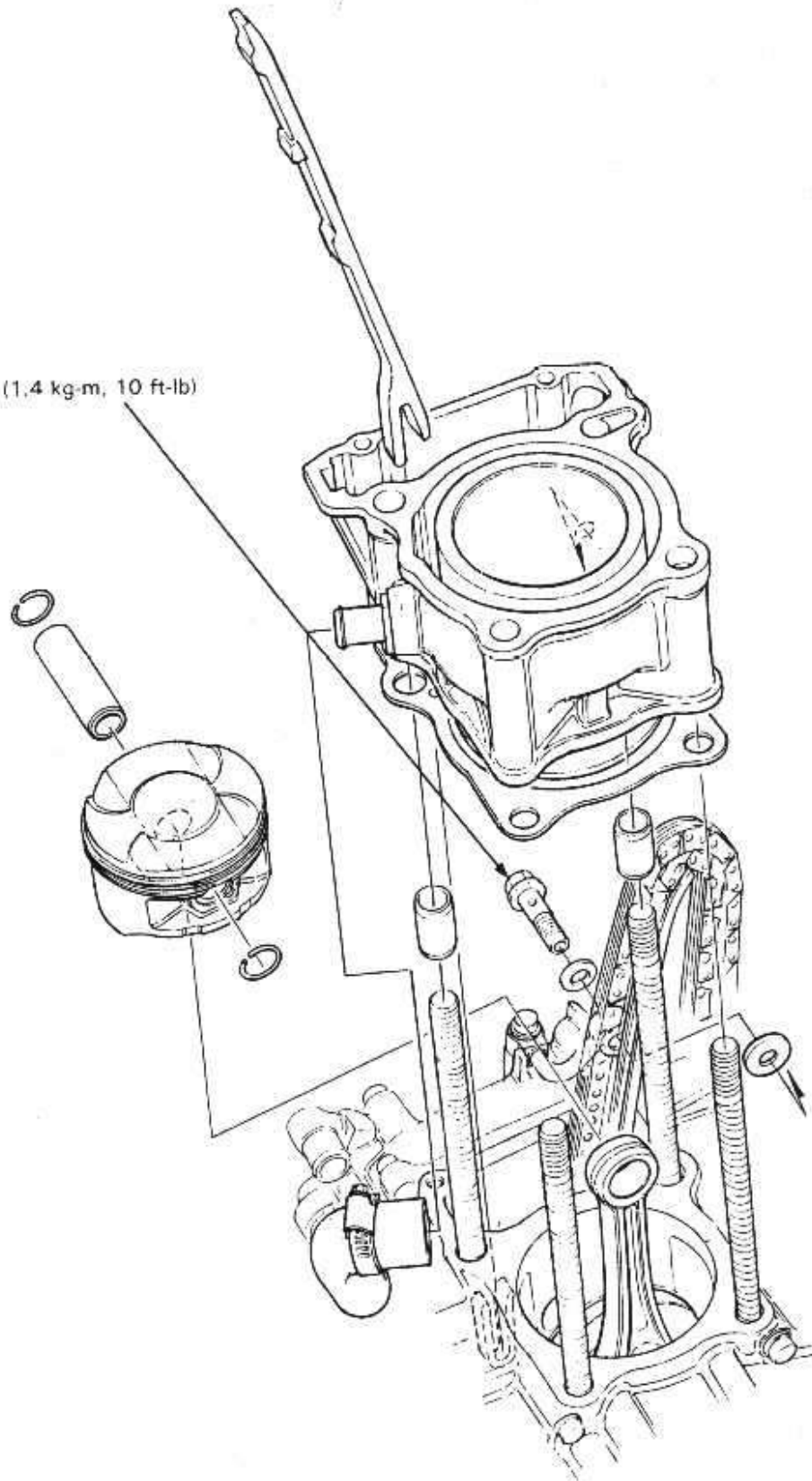


CYLINDER/PISTON

CYLINDRE/PISTON

ZYLINDER/KOLBEN

(1) 14 N·m (1.4 kg-m, 10 ft-lb)



CYLINDER/PISTON

| | | | |
|-----------------------------|------|------------------------------|------|
| SERVICE INFORMATION | 10-1 | PISTON REMOVAL/INSPECTION | 10-3 |
| TROUBLESHOOTING | 10-1 | PISTON/CYLINDER INSTALLATION | 10-6 |
| CYLINDER REMOVAL/INSPECTION | 10-2 | | |

SERVICE INFORMATION

GENERAL

- Cylinder and piston servicing can be accomplished without removing the engine from the frame.
- Cylinder head coolant is fed through water jackets in the cylinder.

SPECIFICATIONS

Unit: mm (in)

| ITEM | | STANDARD | SERVICE LIMIT | |
|--|---------------------------------|-------------------------------|-----------------------------|--------------|
| Cylinder | I.D. | 70.00–70.01 (2.755–2.756) | 70.10 (2.760) | |
| | F type: | 68.50–68.51 (2.696–2.697) | 68.60 (2.701) | |
| | Out-of-round | — | 0.05 (0.002) | |
| | Taper | — | 0.01 (0.0004) | |
| | Warpage | — | 0.01 (0.0004) | |
| Piston, piston ring and piston pin | Piston O.D. | 69.97–69.99 (2.755–2.756) | 69.85 (2.750) | |
| | F type: | 68.47–68.49 (2.695–2.696) | 68.35 (2.691) | |
| | Piston pin hole I.D. | 17.002–17.008 (0.6694–0.6696) | 17.02 (0.670) | |
| | Piston pin O.D. | 16.994–17.000 (0.6691–0.6693) | 16.98 (0.669) | |
| | Piston pin-to-piston clearance | 0.002–0.014 (0.00008–0.0006) | 0.04 (0.002) | |
| | Piston ring-to-groove clearance | Top | 0.015–0.050 (0.0006–0.002) | 0.10 (0.004) |
| | | Second | 0.015–0.045 (0.0006–0.0018) | 0.10 (0.004) |
| | Piston ring end gap | Top/second | 0.20–0.35 (0.008–0.014) | 0.45 (0.018) |
| | | Oil (side rail) | 0.20–0.70 (0.008–0.028) | 0.90 (0.035) |
| | Piston-to-cylinder clearance | 0.010–0.040 (0.0004–0.0016) | 0.10 (0.004) | |
| Connecting rod small end I.D. | 17.016–17.034 (0.6699–0.6706) | 17.045 (0.6711) | | |
| Connecting rod-to-piston pin clearance | 0.016–0.040 (0.00063–0.0016) | 0.06 (0.0024) | | |

TORQUE VALUE

Oil pipe bolt

14 N·m (1.4 kg·m, 10 ft·lb)

TROUBLESHOOTING

Low compression

- Worn cylinder or piston rings
- Leaking head gasket
- Incorrect valve timing

Excessive smoke

- Worn cylinder and piston rings
- Improperly installed piston rings
- Damaged piston or cylinder

Overheating

- Excessive carbon deposits on piston or in combustion chamber
- Faulty cooling system (Section 5)

Piston noise

- Worn cylinder and piston
- Excessive carbon deposits

CYLINDER/PISTON

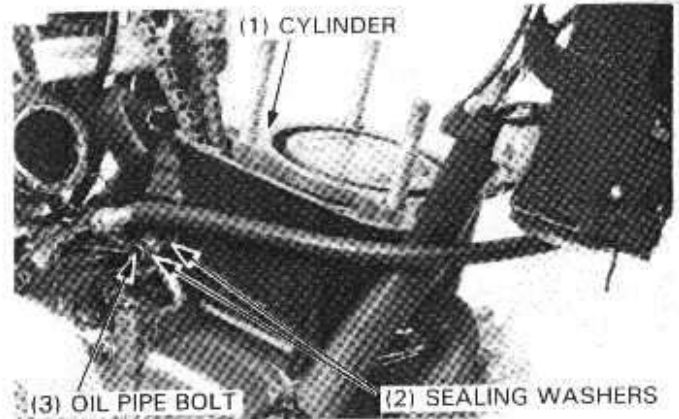
CYLINDER REMOVAL/INSPECTION

Remove the cylinder head (section 9).

Remove the oil pipe bolt and sealing washers.
Remove the cylinder.

NOTE

- Do not let the cam chain fall into the crankcase.



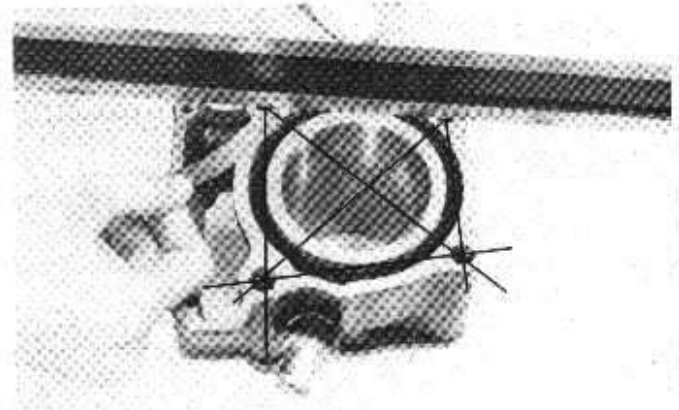
Clean the top of the cylinder thoroughly.

NOTE

- Avoid damaging the gasket surface.

Inspect the top of the cylinder for warpage.

SERVICE LIMIT: 0.01 mm (0.0004 in)

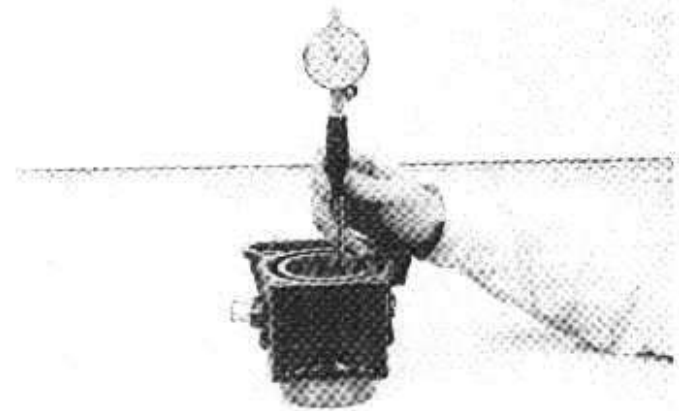


Inspect the cylinder walls for scratches and wear.
Measure and record the cylinder inside diameter at the three levels in both an X and Y axis. Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 70.10 mm (2.760 in)
68.60mm (2.701 in) (F type)

Measure the piston O.D. (page 10-4) and calculate the piston-to-cylinder clearance. Take the maximum reading to determine the clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

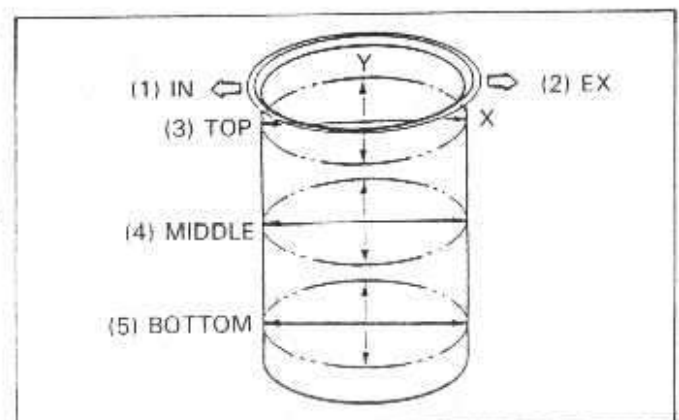


Calculate the cylinder for taper at three levels in an X and Y axis. Take the maximum reading to determine the taper.

SERVICE LIMIT: 0.01 mm (0.0004 in)

Calculate the cylinder for out-of-round at three levels in an X and Y axis. Take the maximum reading to determine the out-of-round.

SERVICE LIMIT: 0.05 mm (0.002 in)



CYLINDER/PISTON

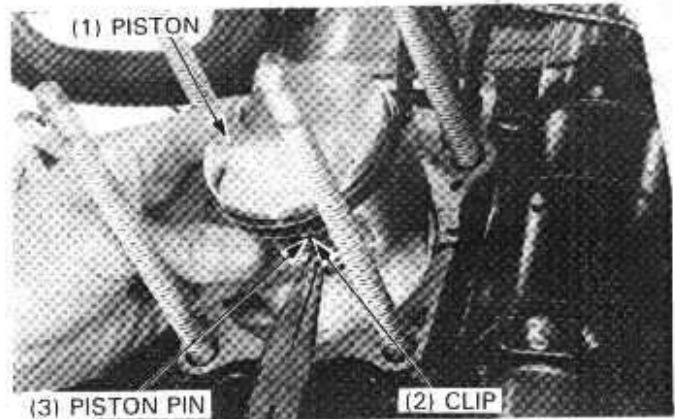
PISTON REMOVAL/INSPECTION

Place clean shop towels in the crankcase to keep the piston pin clips, or other parts, from falling into the crankcase.

Remove the piston pin clips with pliers.

Press the piston pin out of the piston.

Remove the piston pin and piston.

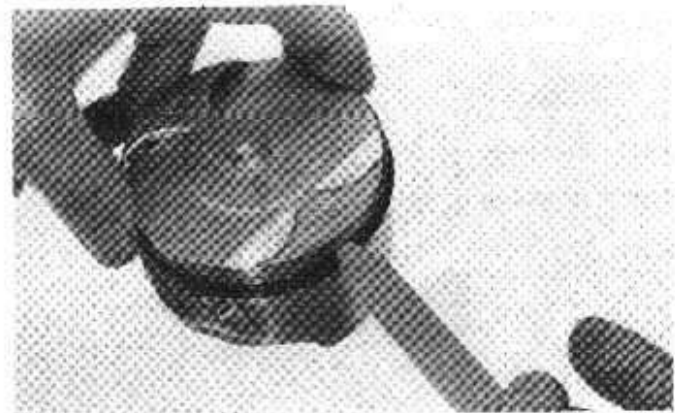


PISTON/PISTON RING INSPECTION

Measure the piston ring-to-groove clearance.

SERVICE LIMITS:

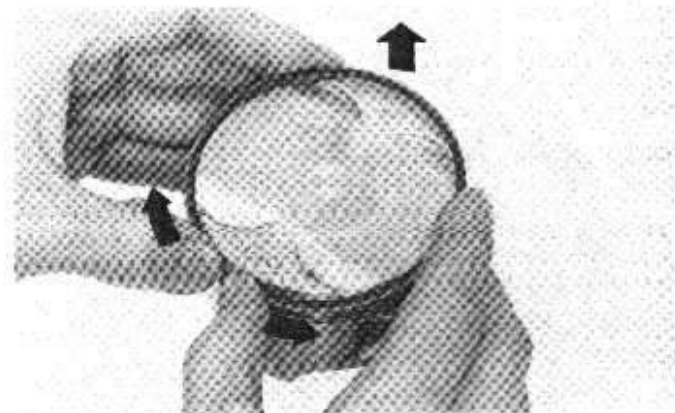
TOP: 0.10 mm (0.004 in)
2nd: 0.10 mm (0.004 in)



Remove the piston rings.
Inspect the piston for damage and the ring grooves for wear.

CAUTION

- *Piston rings are easily broken; take care not to damage them during removal.*



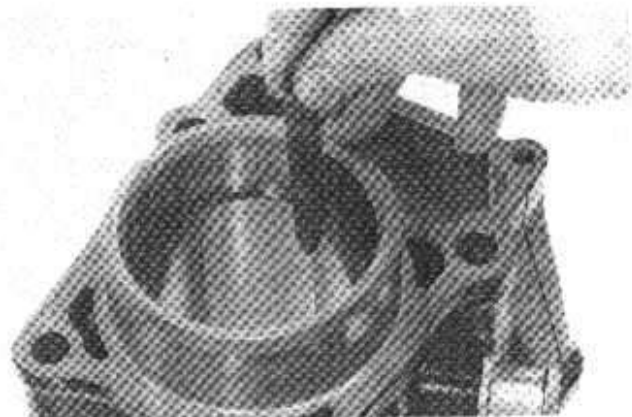
Insert each piston ring into the cylinder, about 20 mm (0.75 in) in from the bottom.

To ensure that it's square in the bore, use a piston to push it in.

Measure the ring end gap.

SERVICE LIMITS:

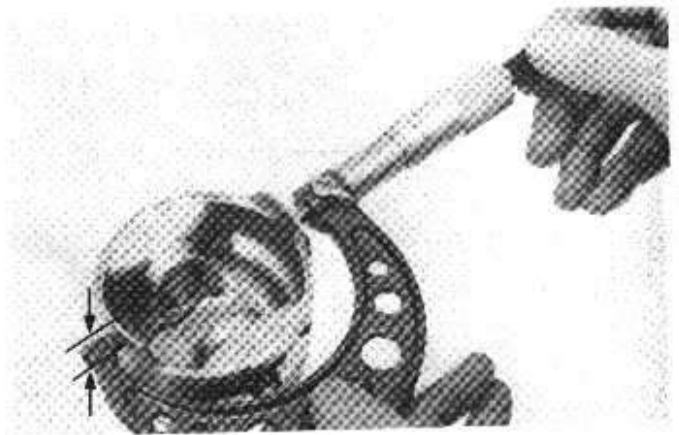
TOP: 0.45 mm (0.018 in)
2nd: 0.45 mm (0.018 in)
Oil: 0.90 mm (0.035 in)



CYLINDER/PISTON

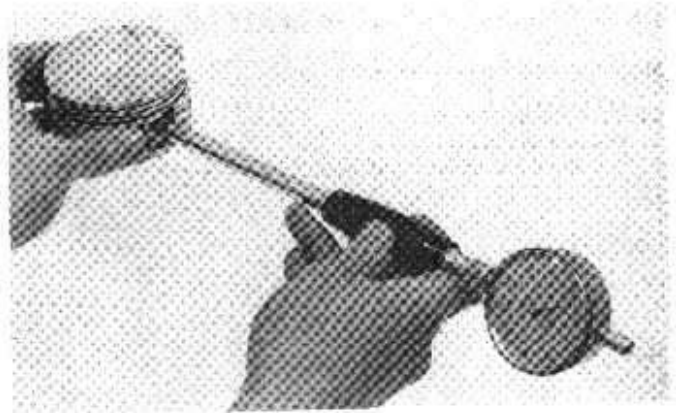
Measure the piston diameter 8 mm (0.3 in) from the bottom.

SERVICE LIMIT: 69.85 mm (2.750 in)
68.35 mm (2.691 in) (F type)



Measure the piston pin bore.

SERVICE LIMIT: 17.02 mm (0.670 in)

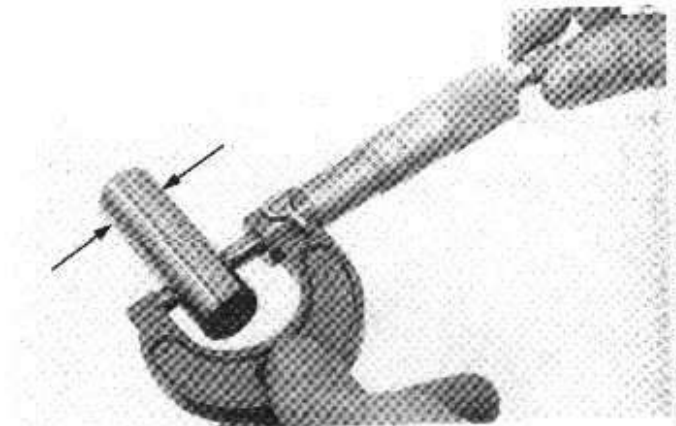


Measure the piston pin O.D..

SERVICE LIMIT: 16.98 mm (0.669 in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.04 mm (0.002 in)

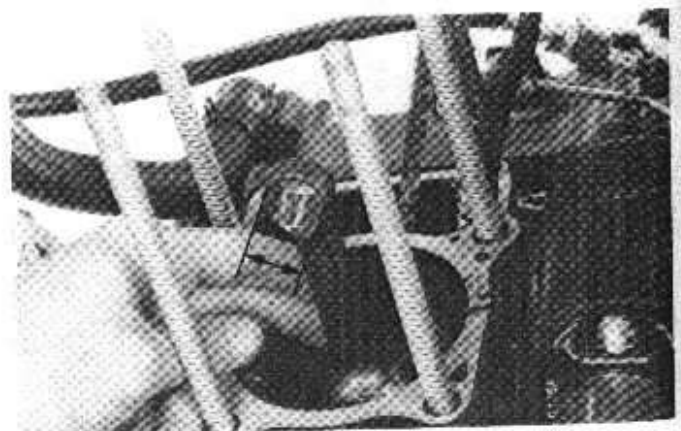


Measure the I.D. of the connecting rod small end.

SERVICE LIMIT: 17.045 mm (0.6711 in)

Calculate the connecting rod-to-piston pin clearance.

SERVICE LIMIT: 0.06 mm (0.0024 in)



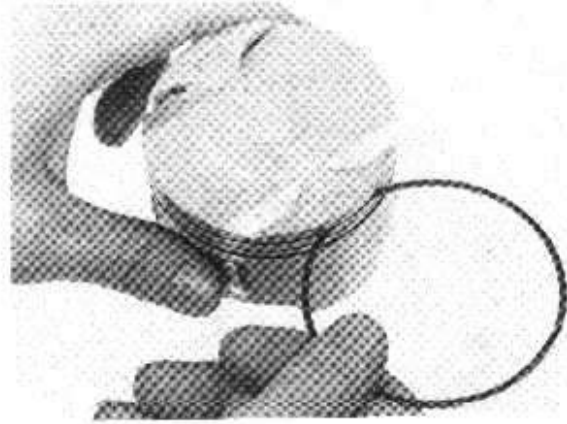
CYLINDER/PISTON

PISTON RING INSTALLATION

Clean the piston ring grooves thoroughly. Check for clearness by holding a ring in the grooves while turning the piston.

CAUTION

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



Install the piston rings with the marks facing up.

CAUTION

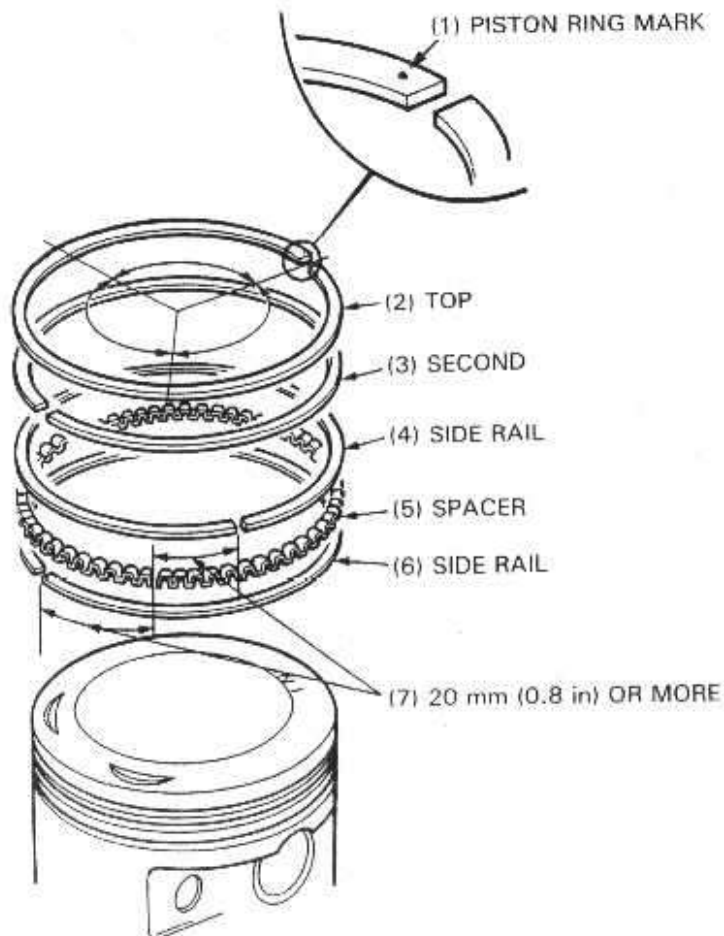
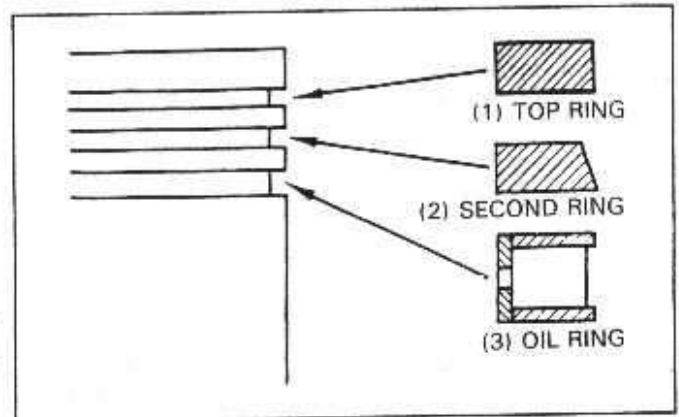
- Avoid piston and piston ring damage during installation.

Stagger the compression (1st and 2nd) and oil rings (side rails) 120 degrees apart as shown.

NOTE

- Install the oil ring spacer first, then install the side rails.

After installation, rings should be free to rotate in the grooves.



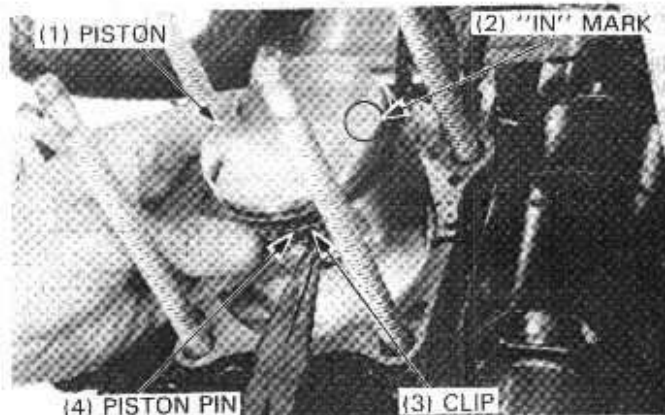
CYLINDER/PISTON

PISTON/CYLINDER INSTALLATION

Install the piston and piston pin. Position the piston "IN" mark on the intake valve side.
Install new piston clips.

NOTE

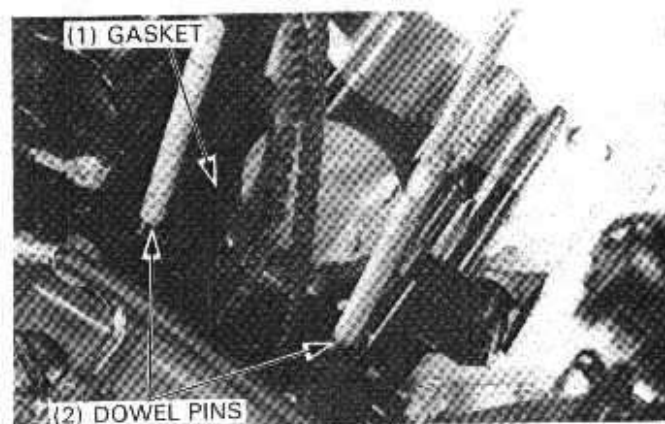
- Do not align the piston pin clip end gap with the piston cut-out.
- Place a shop towel around the piston skirt and in the crankcase to prevent the piston pin clips from falling into the crankcase.



Carefully clean any gasket material from the crankcase mating surface.

Apply a liquid sealant to the crankcase mating area to prevent oil leaks.

Install dowel pins and a new cylinder base gasket.

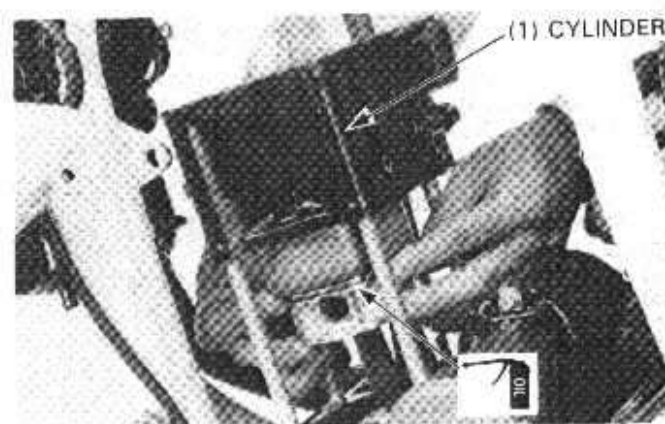


Coat the cylinder bore, piston and piston rings with fresh engine oil.

Carefully lower the cylinder over the piston by compressing the piston rings, one at a time.

CAUTION

- Do not force the cylinder over a ring; you may damage the piston and piston ring.



Tighten the oil pipe bolt (with new sealing washers) to the specified torque.

TORQUE: 14 N·m (1.4 kg-m, 10 ft-lb)

NOTE

- Install the larger outside diameter sealing washer between the cylinder and oil pipe.

Install the cylinder head (section 9).

