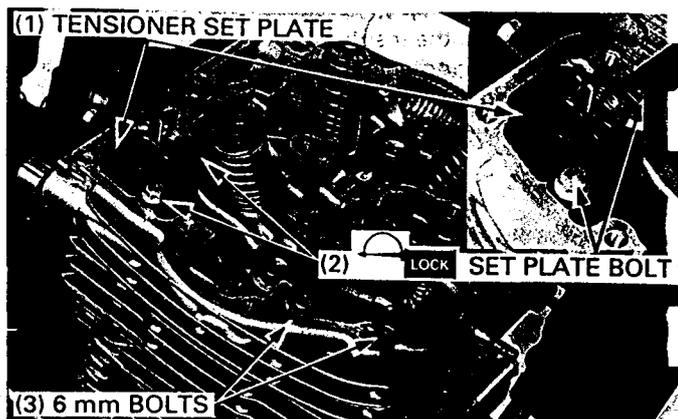


CYLINDER HEAD/VALVES

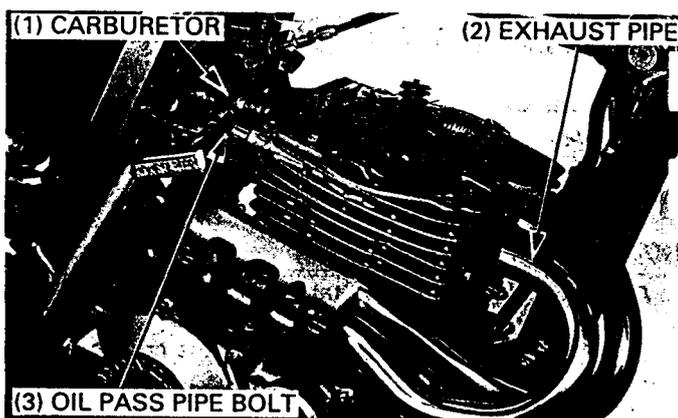
Install the cam chain tensioner set plate. Apply thread lock to the set plate bolts.
Install and tighten the two set plate bolts and two 6 mm cylinder head bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7.2 lbf·ft)



Install the carburetor (page 5-10).
Install the oil pass pipe with the two 7 mm bolts and two new sealing washers.
Install the exhaust pipe (page 2-5).

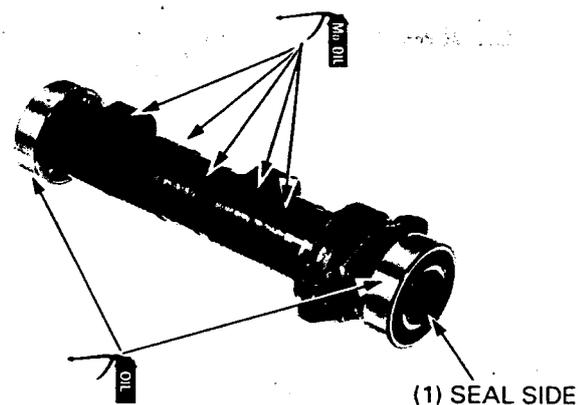
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



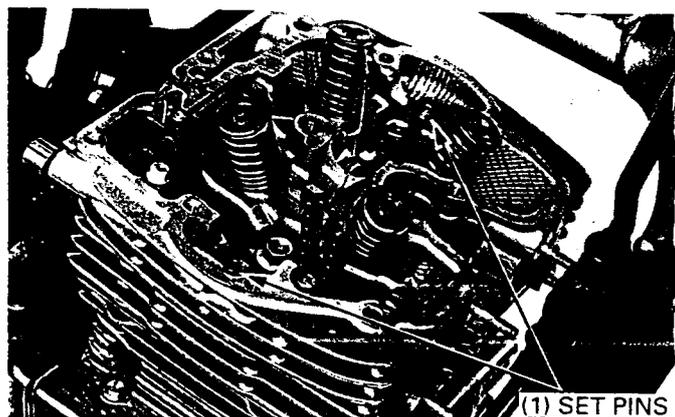
CAMSHAFT INSTALLATION

Apply oil to the camshaft bearings and install them onto the camshaft.
Apply molybdenum disulfide oil to the cam lobes and journals.

Superficie di appoggio di un albero



Install the camshaft bearing set pins.



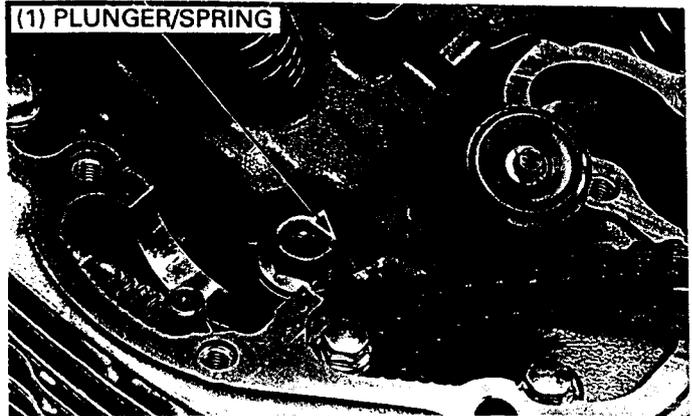
Stentuffo / Anzale vendino
Pinnone

CYLINDER HEAD/VALVES

Install the plunger and spring.

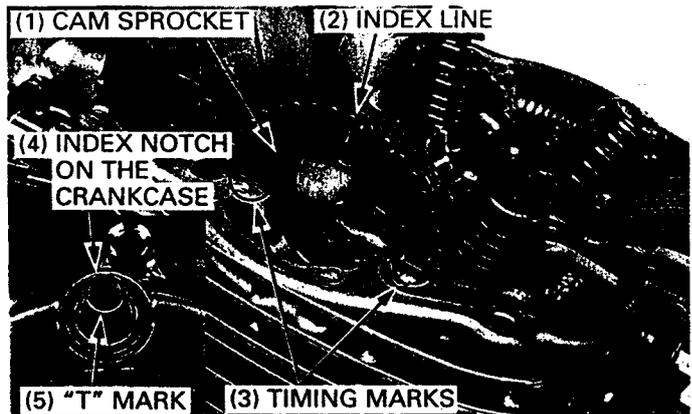
NOTE

- Be careful not to drop the plunger or spring into the crankcase.



Rotate the flywheel counterclockwise to align the "T" mark with the index notch on the left crankcase cover to the correct.

Place the cam sprocket with its groove facing up; align the timing marks on the cam sprocket with the upper surface of the cylinder head and install the cam chain over the sprocket without rotating the sprocket.

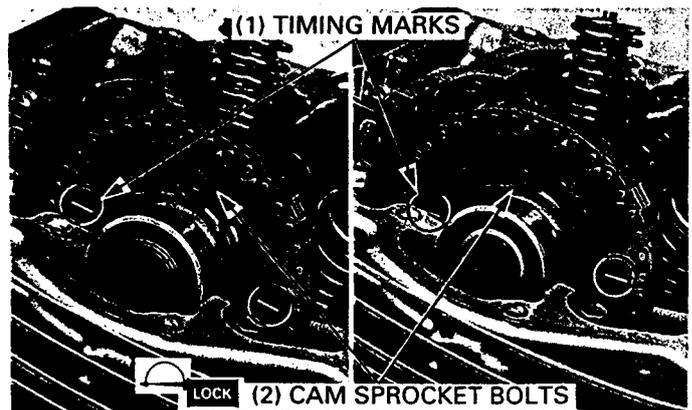


Install the camshaft through the sprocket. Apply thread lock to the cam sprocket bolts. Position the cam sprocket onto the shoulder of the camshaft and install a cam sprocket bolt.

Rotate the flywheel counterclockwise. Install the other sprocket bolt.

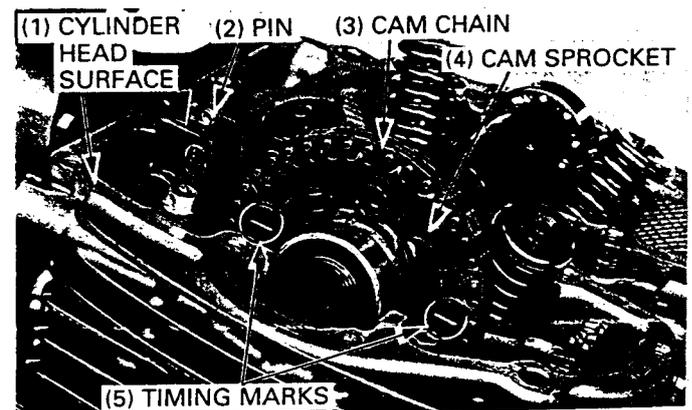
Tighten the cam sprocket bolt on the groove side, then tighten the other sprocket bolt, to the specified torque.

TORQUE: 20 N-m (2.0 kgf-m, 14 lbf-ft)



Rotate the flywheel counterclockwise to align the "T" mark with the index notch and make sure that the timing marks on the sprocket align with the upper surface of the cylinder head.

Remove the pin from the cam chain tensioner.

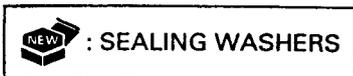
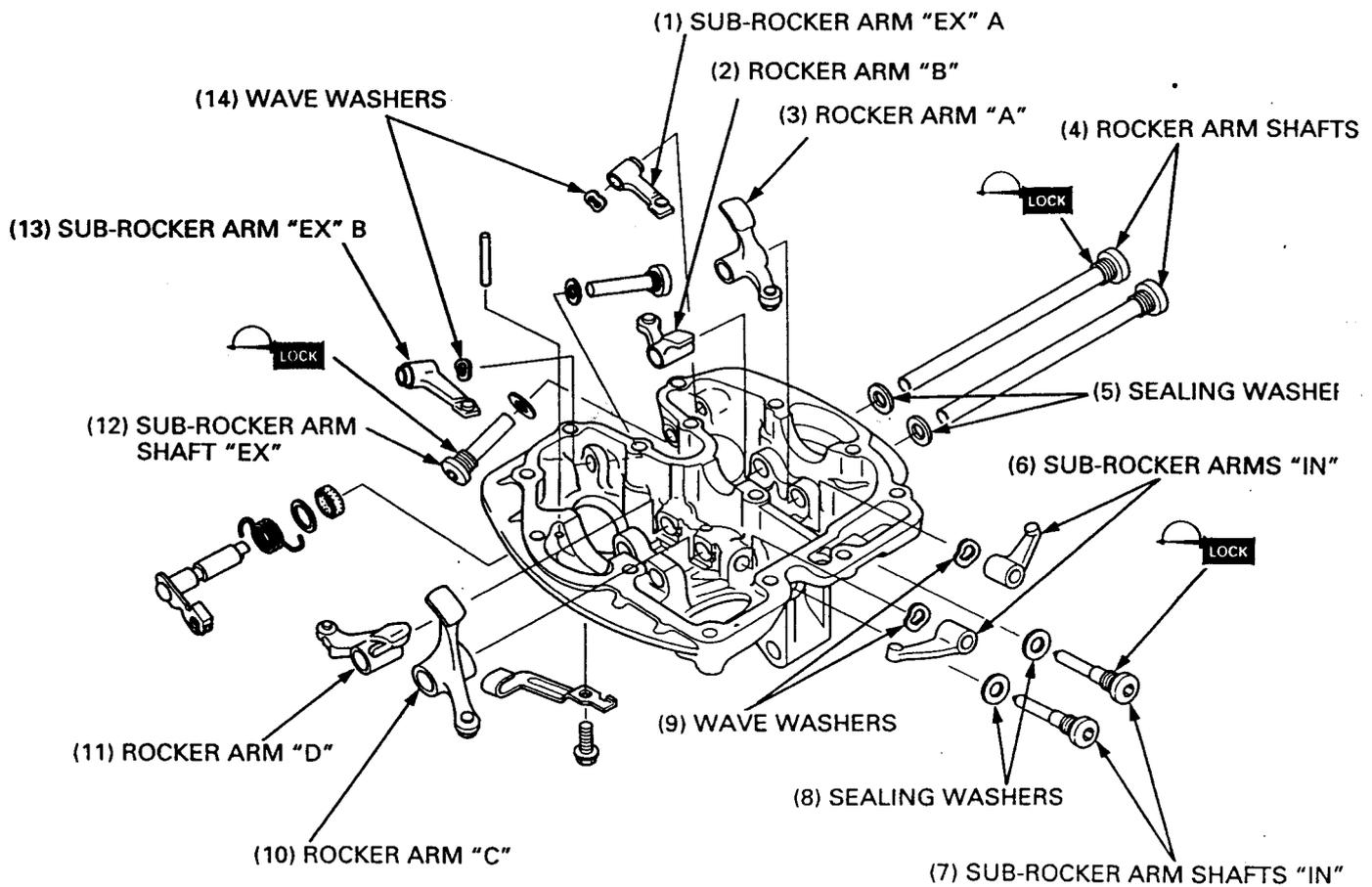


CYLINDER HEAD/VALVES

CYLINDER HEAD COVER ASSEMBLY

Apply oil to the rocker arm-to-shaft sliding surface and sub-rocker arm-to-shaft sliding surface.

Apply molybdenum disulfide oil to the rocker arm slipper, sub-rocker arm slipper and adjusting screw contact points.

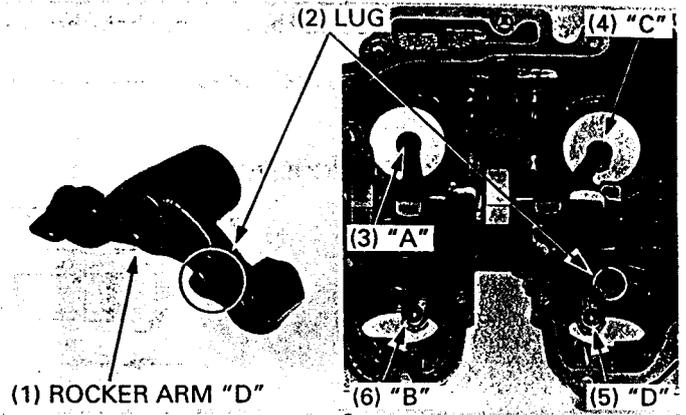


CYLINDER HEAD/VALVES

Install the rocker arms.

NOTE

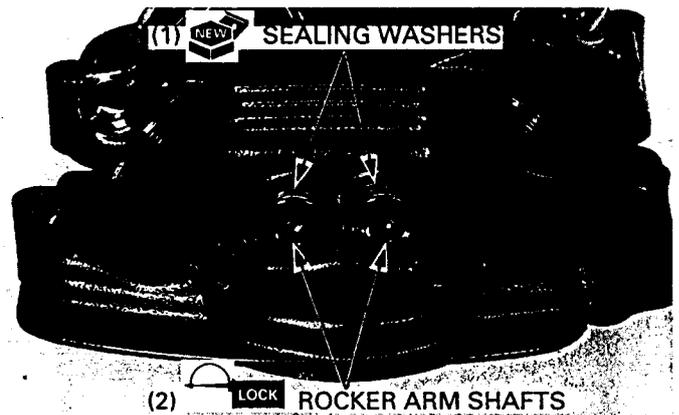
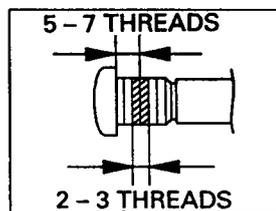
- Note the location of the rocker arm with a decompression lug.



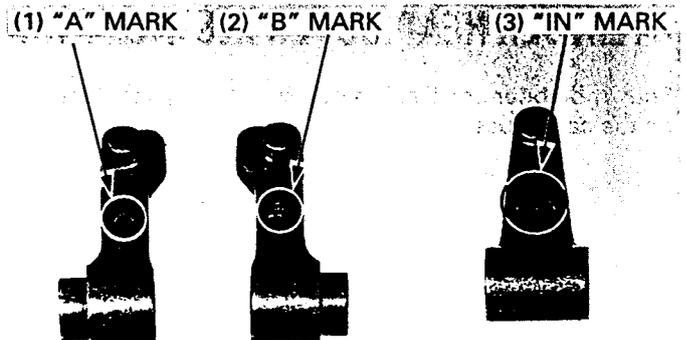
Apply locking agent to the rocker arm shaft threads as shown.

Install the rocker arm shafts and new sealing washers and tighten them.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)

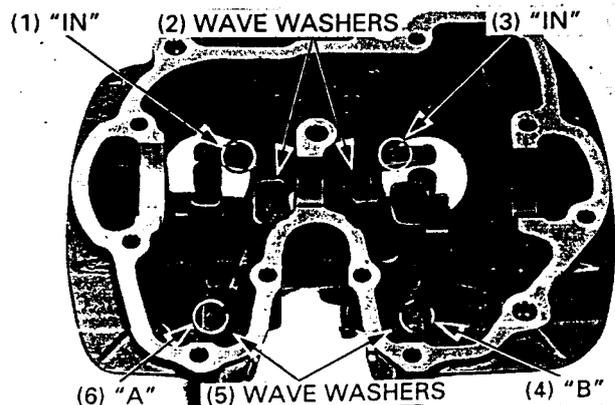


Install the sub-rocker arms and wave washers.



NOTE

- Install the intake sub-rocker arm with the "IN" marks facing the valve.
- Install the exhaust sub-rocker arm with the "A" mark to the left, "B" mark to the right.

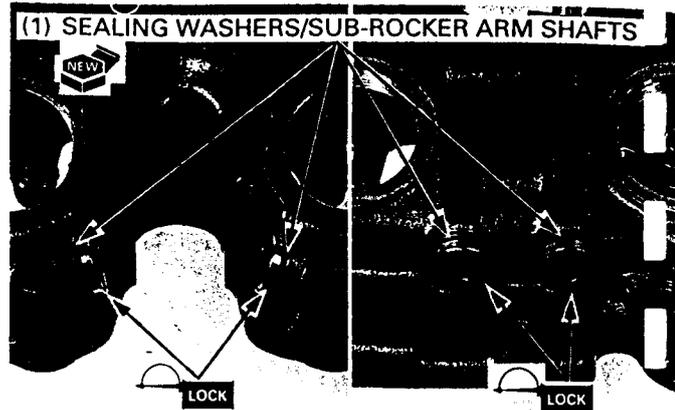
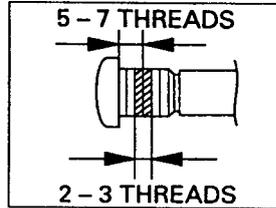


CYLINDER HEAD/VALVES

Apply locking agent to the sub-rocker arm shaft threads as shown.

Install the sub-rocker arm shafts and new sealing washers and tighten them.

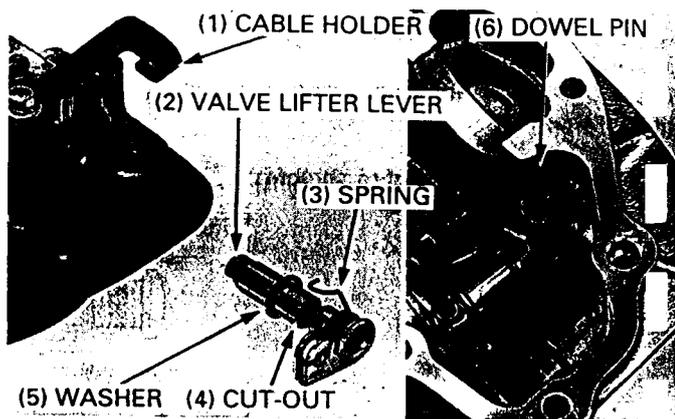
TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



Install the decompressor cable holder, washer, spring and valve lifter lever into the cylinder head cover.

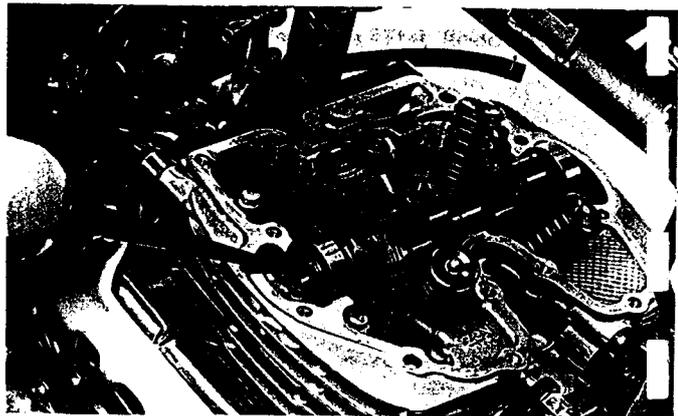
Align the cut-out of the lever shaft with the hole in the cylinder head cover.

Press the dowel pin into the cylinder head cover.



CYLINDER HEAD COVER INSTALLATION

Pour molybdenum disulfide oil into the cylinder head and on the cam lobes.

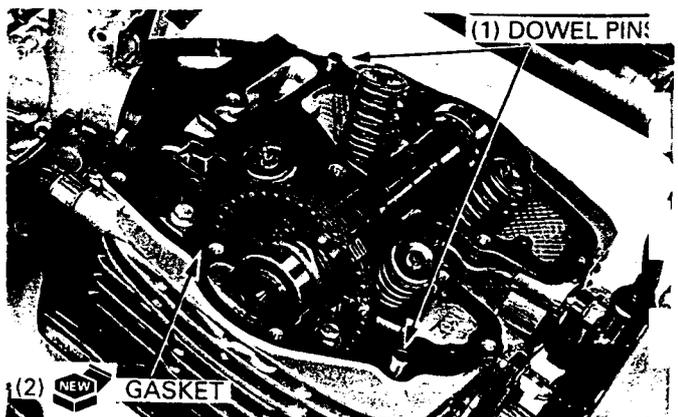


Install a new cylinder head cover gasket and dowel pins.

NOTE

- Be careful not to damage the silicone coating on the gasket surfaces.

Rotate the crankshaft until all the cam lobes are facing down.

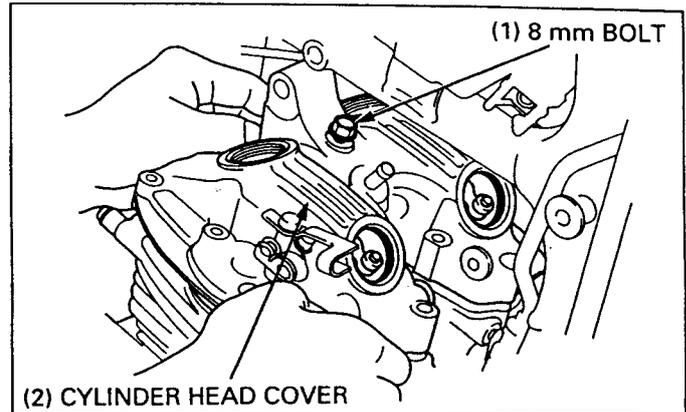


CYLINDER HEAD/VALVES

Loosen all valve adjusting screws.
Install the cylinder head cover and 8 mm bolt.

NOTE

- Make sure all the sub-rocker arms are properly positioned between the valve stem tops and the rocker arm adjusting screws.

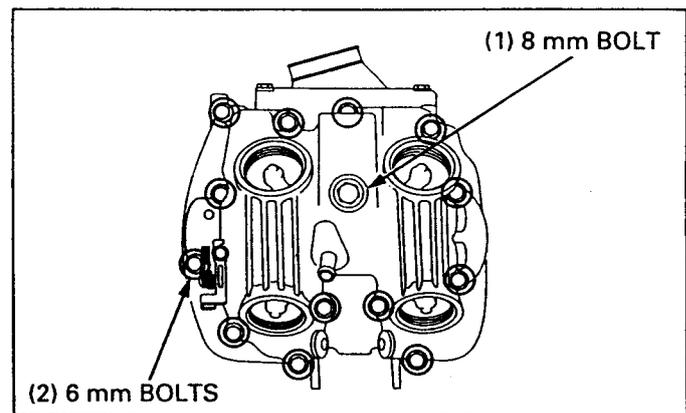


Install all cylinder head cover bolts.
Tighten the 8 mm cylinder head cover bolt, then tighten the 6 mm cylinder head cover bolts, to the specified torque.

TORQUE: 8 mm bolt: 24 N-m (2.4 kgf-m, 17 lbf-ft)
6 mm bolt: 12 N-m (1.2 kgf-m, 9 lbf-ft)

NOTE

- Tighten the 6 mm head cover bolts in a crisscross pattern in two or more steps.



Adjust the valve clearance (page 3-8).

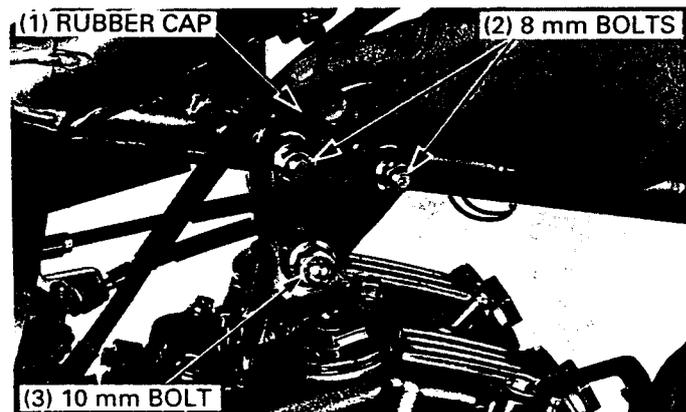
Install the upper hanger plates and bolts, tighten the nuts to the specified torque.

TORQUE: 8 mm bolt: 26 N-m (2.7 kgf-m, 20 lbf-ft)
10 mm bolt: 64 N-m (6.5 kgf-m, 47 lbf-ft)

NOTE

- Install the hanger plates with the marks facing out.

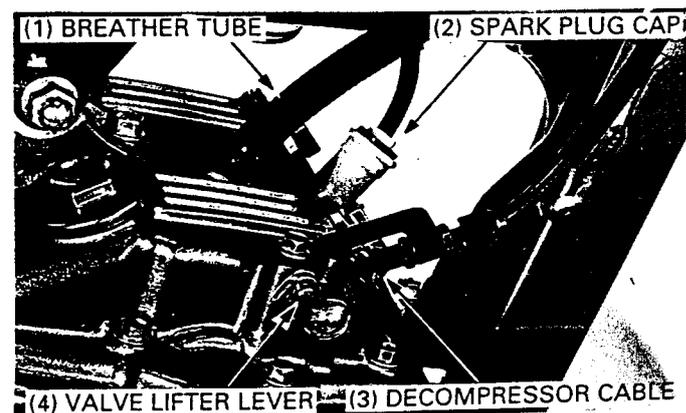
Install the rubber caps.



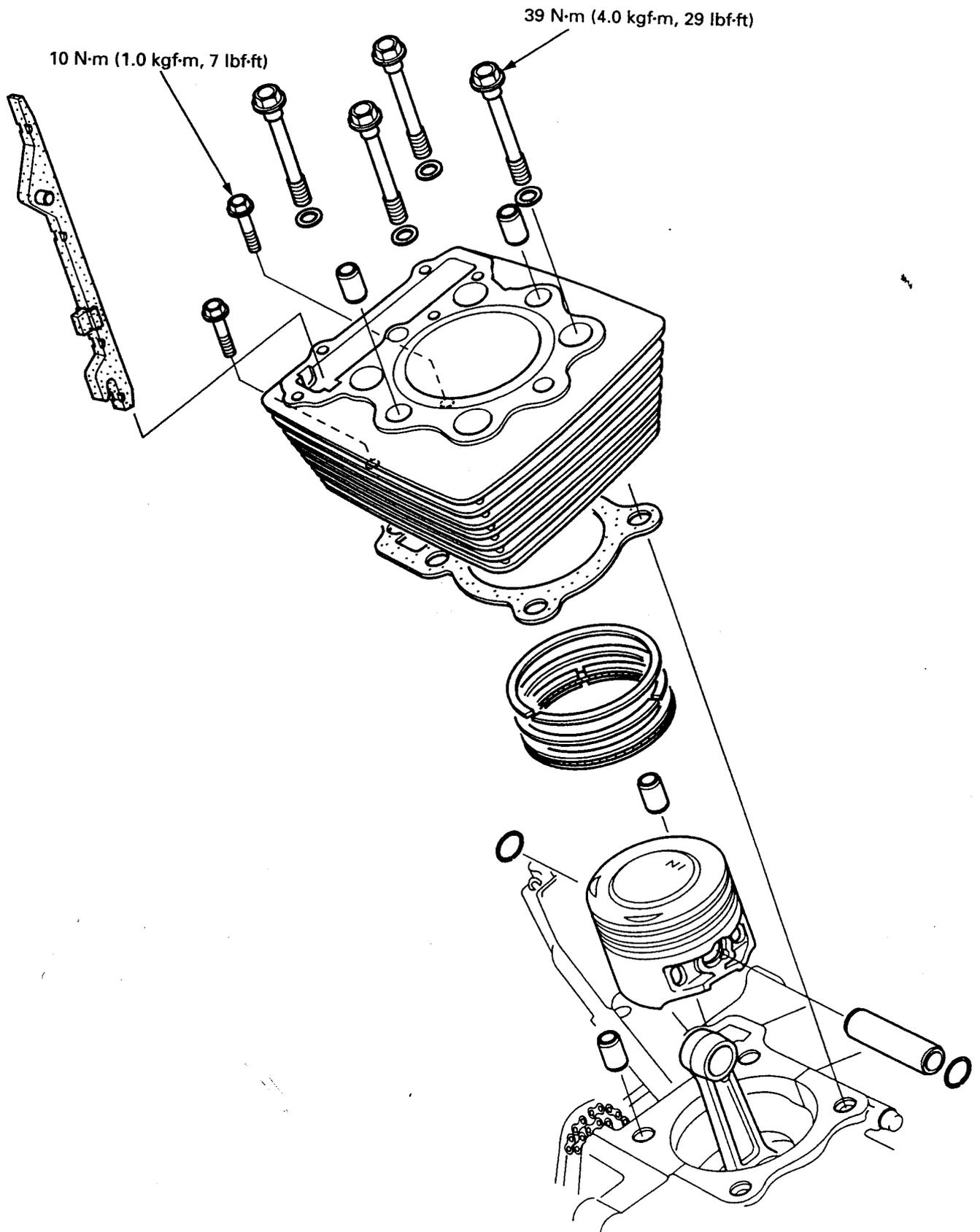
Install the breather tube.
Install the decompressor cable to the valve lifter lever.
Install the spark plug cap.

After installing, adjust the decompressor system (page 3-12).

Install the fuel tank (page 5-3).
Install the seat (page 2-2).



CYLINDER/PISTON



8. CYLINDER/PISTON

SERVICE INFORMATION	8-1	PISTON REMOVAL	8-4
TROUBLESHOOTING	8-2	PISTON INSTALLATION	8-6
CYLINDER REMOVAL	8-3	CYLINDER INSTALLATION	8-7

SERVICE INFORMATION

GENERAL

- This section covers maintenance of the cylinder and piston. These services can be done with the engine installed in the frame.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Be careful not to damage the mating surfaces when removing the cylinder from the crankcase.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Cylinder	I.D.	73.000 – 73.010 (2.8740 – 2.8744)	73.11 (2.878)	
	Taper	—	0.05 (0.002)	
	Out of round	—	0.05 (0.002)	
	Warpage	—	0.10 (0.004)	
Piston, piston ring and piston pin	Piston mark direction		"IN" mark facing to the intake side	
	Piston O.D.		72.965 – 72.985 (2.8726 – 2.8734) at 19 mm (0.7 in) from bottom of skirt	
	Piston pin hole I.D.		17.002 – 17.008 (0.6694 – 0.6696)	
	Cylinder-to-piston clearance		0.015 – 0.045 (0.0006 – 0.0018)	
	Piston pin O.D.		16.994 – 17.000 (0.6691 – 0.6693)	
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	
	Piston ring-to-ring groove clearance	Top	0.015 – 0.050 (0.0006 – 0.0020)	0.12 (0.005)
		Second	0.015 – 0.050 (0.0006 – 0.0020)	0.12 (0.005)
	Piston ring end gap	Top	0.15 – 0.30 (0.006 – 0.012)	0.40 (0.016)
		Second	0.30 – 0.45 (0.012 – 0.018)	0.55 (0.022)
		Oil (side rail)	0.2 – 0.7 (0.01 – 0.03)	0.86 (0.034)
	Piston ring mark	Top	mark facing up	—
		Second	mark facing up	—
Connecting rod small end I.D.		17.016 – 17.034 (0.6699 – 0.6706)	17.06 (0.672)	
Connecting rod-to-piston pin clearance		0.016 – 0.040 (0.0006 – 0.0016)	0.09 (0.004)	

CYLINDER/PISTON

TORQUE VALUES

Cylinder bolt (10 mm)
(6 mm SH)

39 N·m (4.0 kgf·m, 29 lbf·ft) Apply oil to the thread and flange surface.
10 N·m (1.0 kgf·m, 7 lbf·ft)

TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problem can be diagnosed by a compression test or by tracing engine noises to the top-end with a sounding rod stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather tube. If the tube is smoking, check for a seized piston ring.

Low compression

- Worn cylinder or piston ring

High compression

- Excessive carbon build-up on piston crown or on combustion chamber

Excessive smoke

- Worn cylinder, piston or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

Rough idle

- Low cylinder compression

Over heating

- Excessive carbon build-up on the piston head or combustion chamber

Knocking or abnormal noise

- Worn piston and cylinder
- Excessive carbon build-up

CYLINDER REMOVAL

Remove the cylinder head (page 7-7).
 Remove the cam chain guide.
 Remove the cylinder 6 mm bolts.
 Remove the cylinder 10 mm flange bolts and washers.

NOTE

- Loosen the bolts in a crisscross pattern in two or more steps.

Remove the cylinder.

Remove the gasket and dowel pins.

CYLINDER INSPECTION

Inspect the cylinder walls for scratches and wear.

Measure and record the cylinder I.D. at three levels in both an X and Y axis. Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 73.11 mm (2.878 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: 0.05 mm (0.002 in)

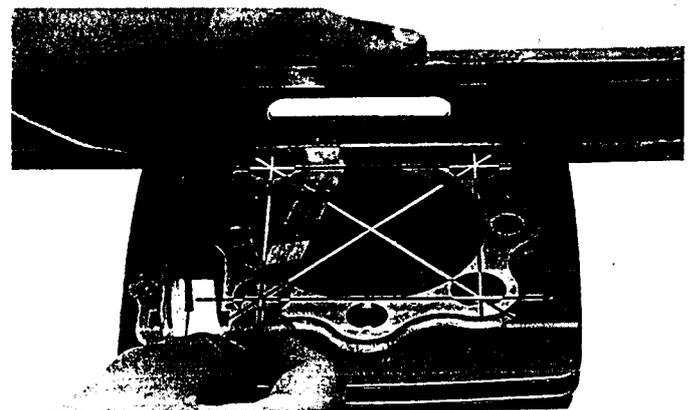
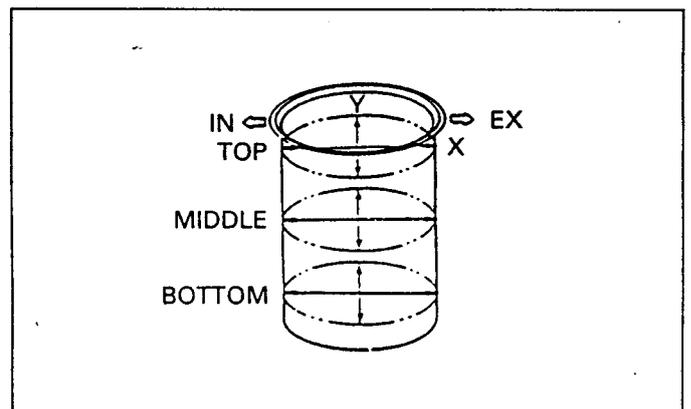
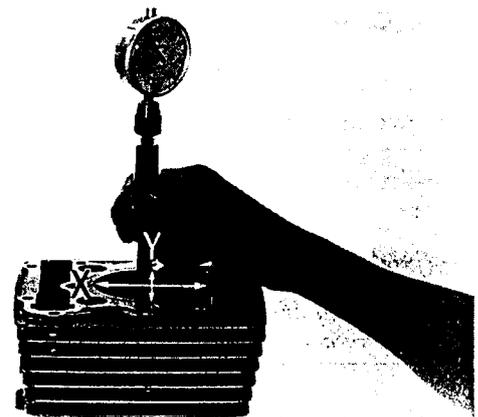
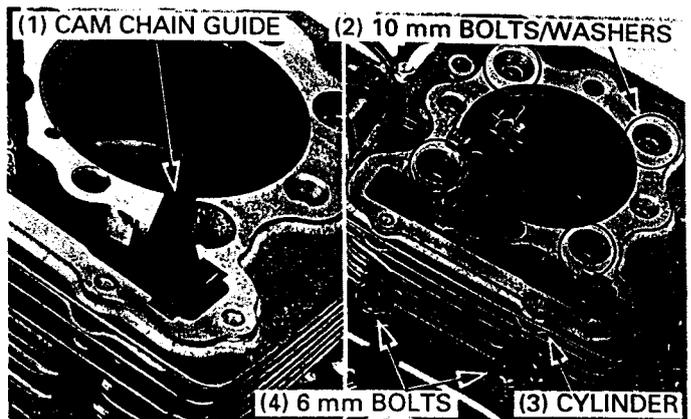
Calculate the cylinder for out-of-round at three levels in an X and Y axis.

Take the maximum reading to determine the out-of-round.

SERVICE LIMIT: 0.05 mm (0.002 in)

Inspect the top of the cylinder for warpage.

SERVICE LIMIT: 0.10 mm (0.004 in)



CYLINDER/PISTON

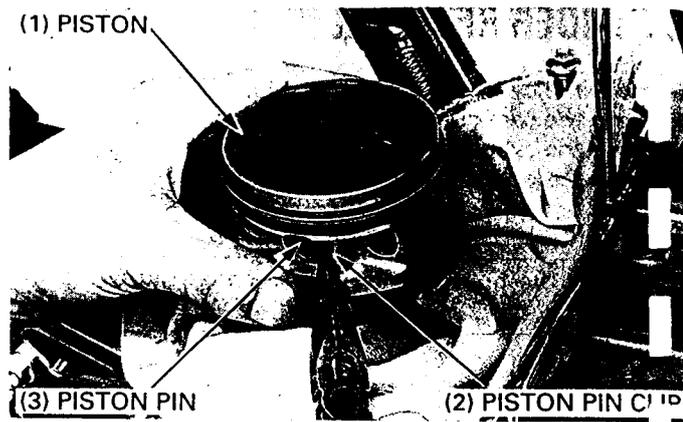
PISTON REMOVAL

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

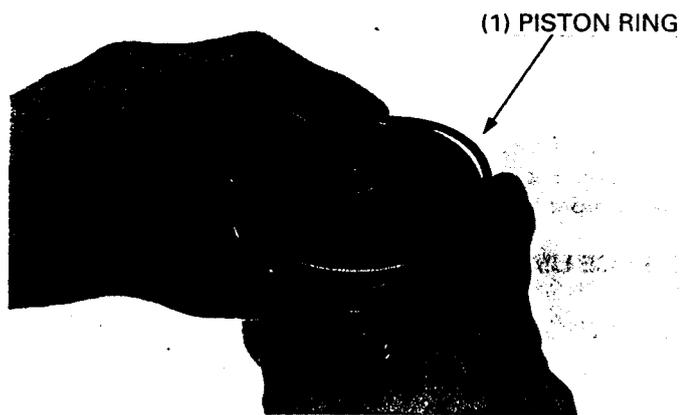
Remove the piston rings.

Remove the carbon or deposits from the piston head or piston ring grooves.

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

CAUTION

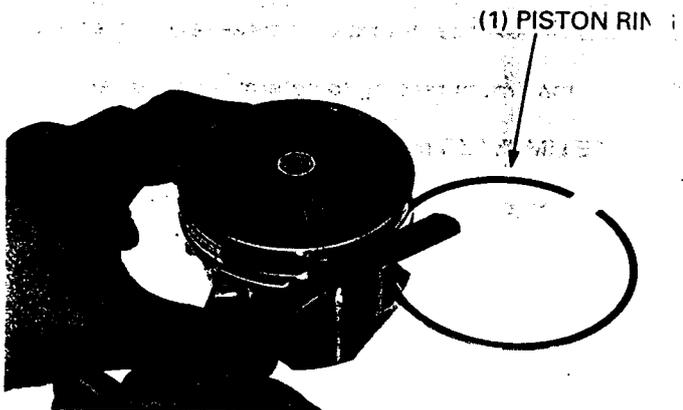
- *Piston rings are easily broken; take care not to damage them during removal.*



Install the piston ring as shown.

Measure the piston ring-to-groove clearance.

SERVICE LIMITS: TOP: 0.12 mm (0.005 in)
2nd: 0.12 mm (0.005 in)

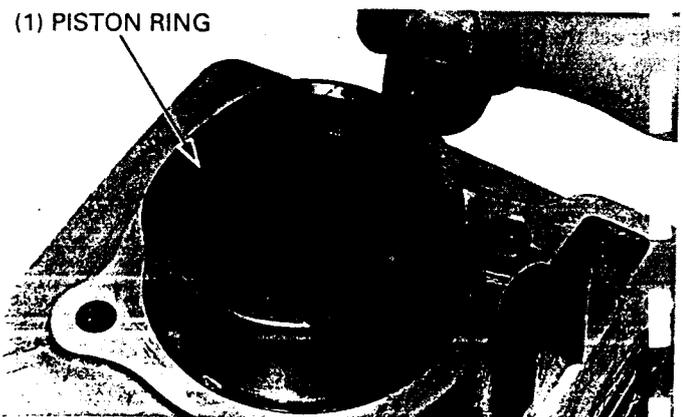


Insert each piston rings into the cylinder, about 20 mm (0.75 in) in from the bottom.

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

Measure the ring end gap.

SERVICE LIMITS: TOP: 0.40 mm (0.016 in)
2nd: 0.55 mm (0.022 in)
OIL: 0.86 mm (0.034 in)

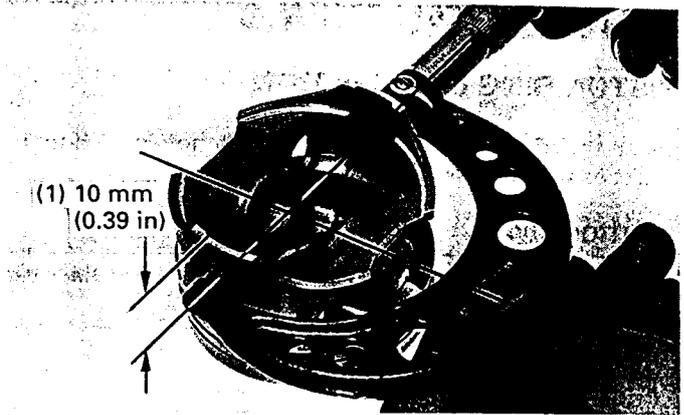


Measure the piston diameter 10 mm (0.39 in) from the bottom of the skirt and at a right angle to the piston hole.

SERVICE LIMIT: 72.88 mm (2.869 in)

Calculate the piston-to-cylinder clearance, by subtracting the piston O.D. from the maximum cylinder I.D. measurement.

SERVICE LIMIT: 0.10 mm (0.004 in)



Measure the piston pin bore.

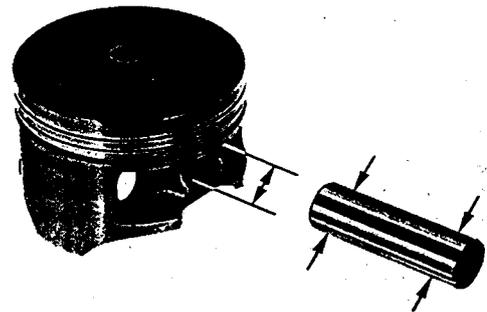
SERVICE LIMIT: 17.07 mm (0.672 in)

Measure the piston pin O.D..

SERVICE LIMIT: 16.97 mm (0.668 in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.07 mm (0.003 in)



CONNECTING ROD SMALL END INSPECTION

Measure the connecting rod small end I.D..

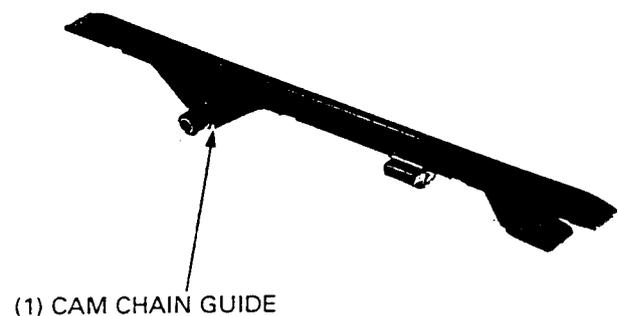
SERVICE LIMIT: 17.06 mm (0.672 in)

Calculate the piston pin-to-connecting rod small end clearance.

SERVICE LIMIT: 0.09 mm (0.004 in)



Inspect the cam chain guide for wear or damage.



CYLINDER/PISTON

PISTON INSTALLATION

PISTON RING INSTALLATION

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

CAUTION

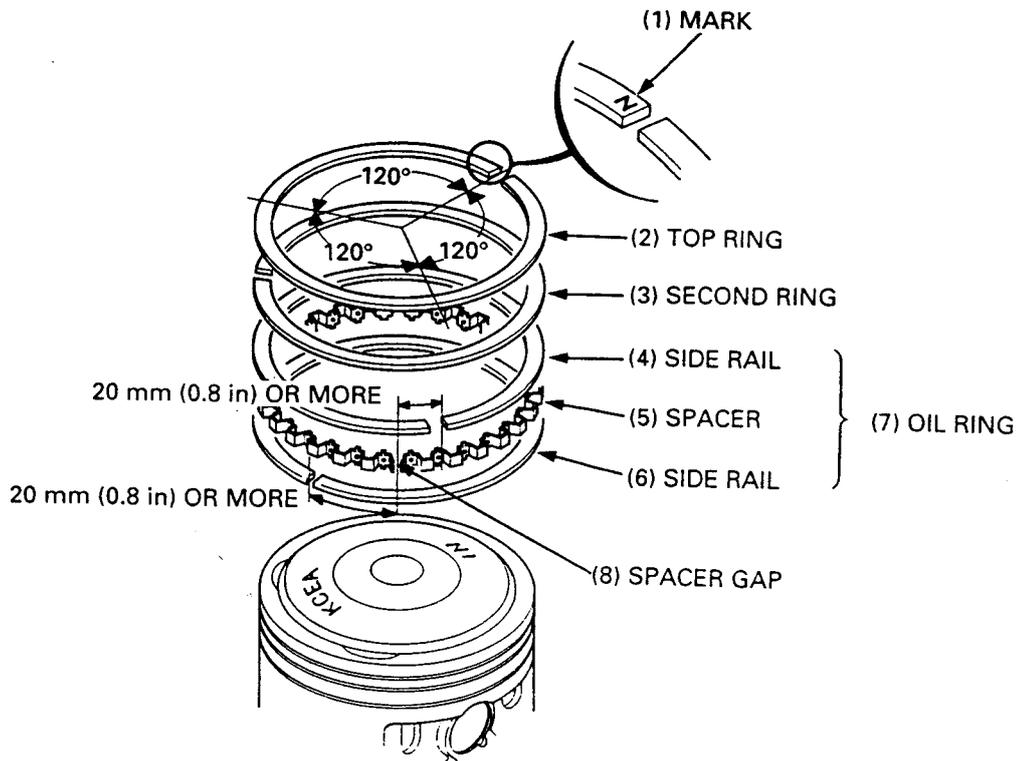
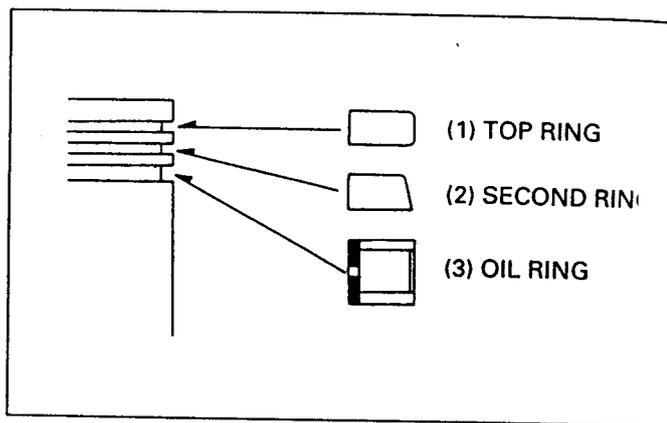
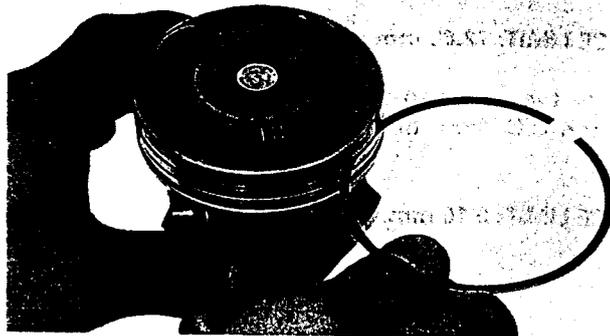
- Do not use a wire brush to clean ring lands, or cut lands deeper with a cleaning tool.

Apply engine oil to the piston rings.

Install the piston rings.

NOTE

- Be careful not to damage the piston and piston rings during assembly.
- Install the piston ring on the piston with the mark facing up.
- After installing the rings they should rotate freely, without sticking.
- Space the ring end gaps 120 degrees apart.
- Do not align the piston ring end gap with the piston pin hole or 90 degrees to the piston pin hole.
- Space the side rail gaps 40 mm (1.6 in) or more apart as shown.



CYLINDER/PISTON

Apply molybdenum disulfide oil to the connecting rod small end and piston pin.

NOTE

- Place a shop towel around the piston skirt and in the crankcase to prevent the piston pin clips from falling into the crankcase.

Install the piston with the "IN" mark facing the intake side.

Install the piston pin.

NOTE

- Do not align the piston pin clip end gap with the piston cut-out.
- Be careful not to drop the piston pin clip into the crankcase.

Remove the shop towel.

CYLINDER INSTALLATION

Carefully clean any gasket material from the crankcase mating surface.

CAUTION

- Be careful not to damage the cylinder mating surface.

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

Install the dowel pins and new gasket.

Coat the cylinder bore and piston with fresh engine oil.

Install the cylinder.

Apply engine oil to the cylinder 10 mm flange bolts threads and flange surface and washers.

Install the bolts and washers.

Tighten the bolts to the specified torque.

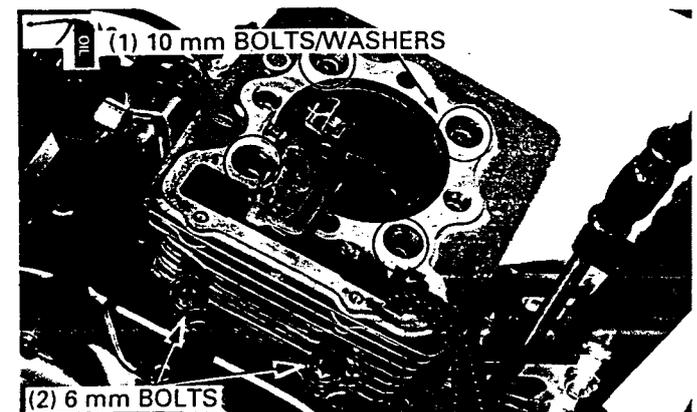
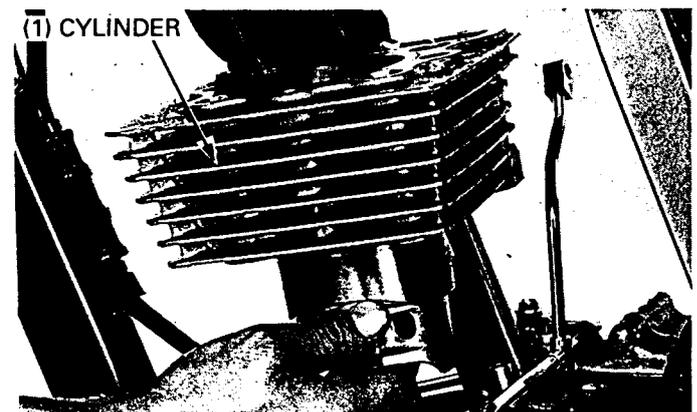
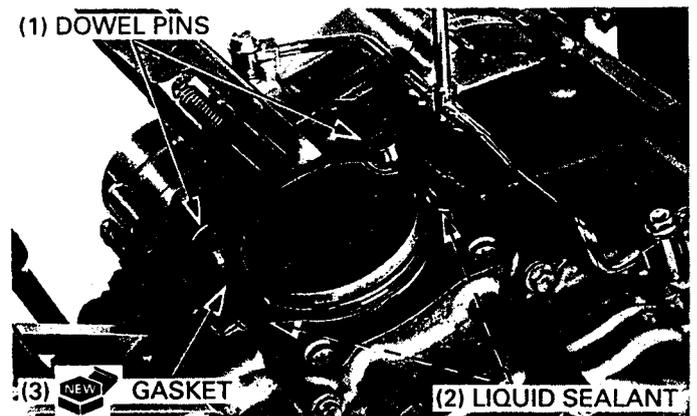
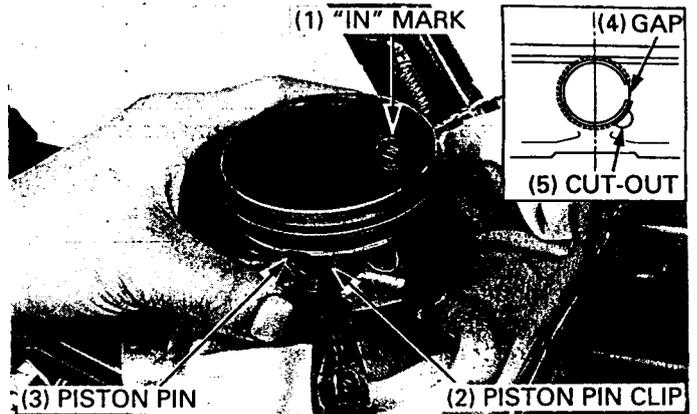
TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

NOTE

- Tighten the bolts in a crisscross pattern in two or more steps.

Install the cylinder 6 mm bolts and tighten them.

TORQUE: 10 N·m (1.0 kgf·m, 7.2 lb·ft)



CYLINDER/PISTON

Install the cam chain guide.

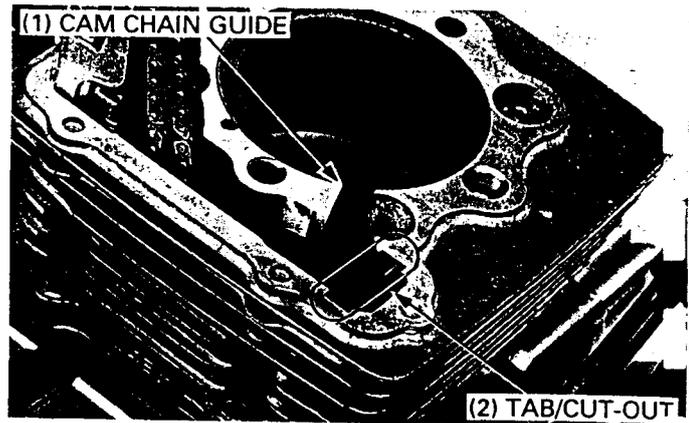
NOTE

- Fit the cam chain guide tab in the cylinder cut-out as shown.
- Push the guide in until it bottoms in the crankcase guide hole.

Install the cylinder head (page 7-15).

Install the camshaft (page 7-16).

Install the cylinder head cover (page 7-20).



MEMO
