

11. CYLINDER/PISTON

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SERVICE INFORMATION

GENERAL

- Cylinder head coolant is fed through water jackets in the cylinder.
- Be sure that the water pipe O-ring, gasket and dowel pins are in place before installing the cylinder head.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D. '83:		79.500–79.515 (3.1299–3.1305)	79.67 (3.137)
	I.D. After '83:		76.500–76.515 (3.0118–3.0124)	76.66 (3.018)
	Out-of-round		—	0.05 (0.002)
	Taper		—	0.05 (0.002)
	Warpage		—	0.10 (0.004)
Pistons, piston rings, and piston pins	Piston skirt O.D. '83:		79.470–79.490 (3.1287–3.1295)	79.35 (3.124)
	Piston skirt O.D. After '83:		76.210–76.230 (3.0004–3.0012)	76.09 (2.996)
	Piston pin hole		20.002–20.008 (0.7875–0.7877)	20.05 (0.789)
	Piston pin O.D.		19.994–20.000 (0.7872–0.7874)	19.80 (0.780)
	Piston pin-to-piston clearance		0.002–0.014 (0.0001–0.0005)	0.10 (0.004)
	Piston ring-to groove clearance	Top/second	0.03–0.035 (0.0012–0.0014)	0.25 (0.010)
		Oil	0.03–0.035 (0.0012–0.0014)	0.10 (0.004)
	Piston ring end gap	Top/second	0.20–0.35 (0.0079–0.0138)	0.50 (0.002)
		Oil (side rail)	0.30–0.90 (0.0118–0.035)	1.1 (0.04)
Piston-to-cylinder clearance			0.010–0.045 (0.0004–0.0018)	0.32 (0.013)

TROUBLESHOOTING

Low or uneven compression

1. Worn cylinder or piston rings.
2. Leaking head gasket.
3. Incorrect valve timing.

Excessive smoke

1. Worn cylinder and piston rings.
2. Improperly installed piston rings.
3. Damaged piston or cylinder.

Overheating

1. Excessive carbon deposits on piston or combustion chamber.
2. Faulty water pump

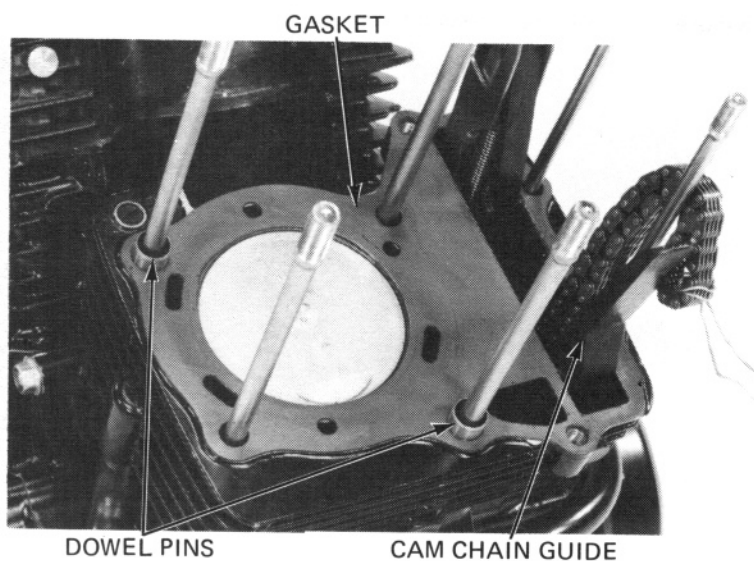
Piston noise

1. Worn cylinder and piston.
2. Excessive carbon deposits.

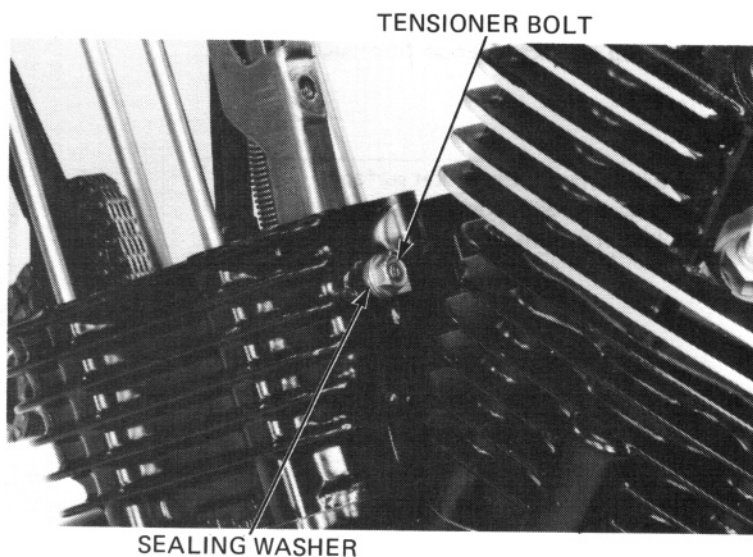
CYLINDER REMOVAL

Remove the cylinder heads (Refer to Section 10).

Remove the gaskets and dowel pins and the cam chain guides.

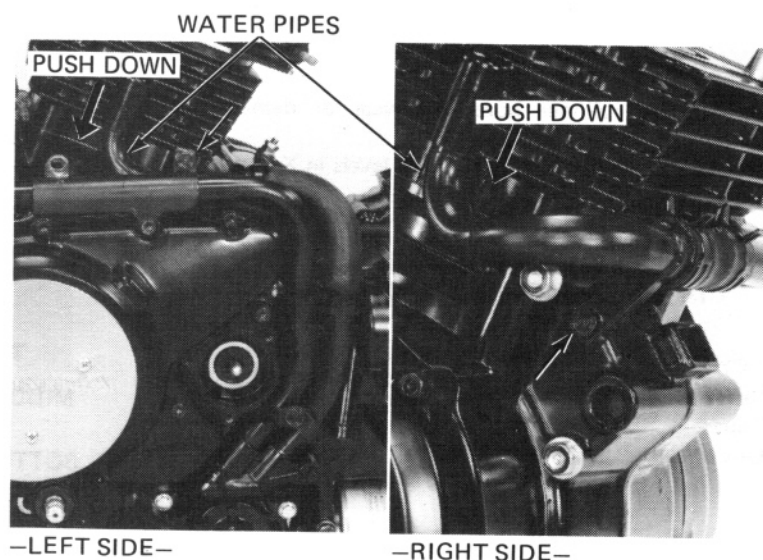


Remove the cam chain tensioner bolt and sealing washer.



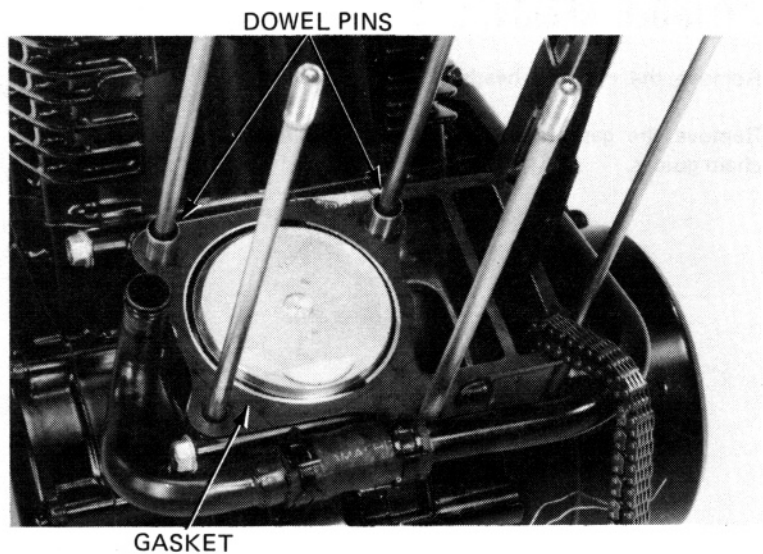
Remove the union bolts and remove the right and left water pipes from the cylinders by pulling them out by hand.
Remove the O-rings from the water pipes.

Remove the cylinders.



CYLINDER/PISTON

Remove the gaskets and dowel pins.



Clean the top of each cylinder thoroughly with a scraper.

NOTE:

- Avoid damaging the gasket surface.
- The gasket will come off easier if it is soaked in solvent.



CYLINDER INSPECTION

Inspect the cylinder bores for wear or damage.

Measure the cylinder I.D. at three levels in X and Y axis.

SERVICE LIMIT:

'83: 79.67 mm (3.137 in)

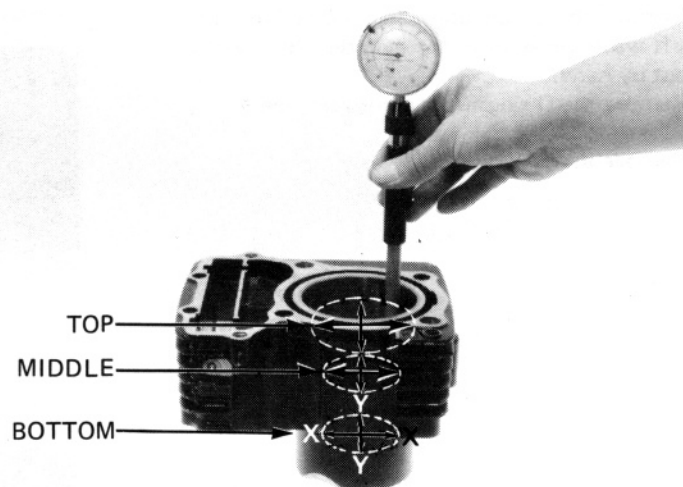
After '83: 76.66 mm (3.018 in)

Calculate the taper and out of round.

SERVICE LIMIT:

Taper: 0.05 mm (0.002 in)

Out of round: 0.05 mm (0.002 in)

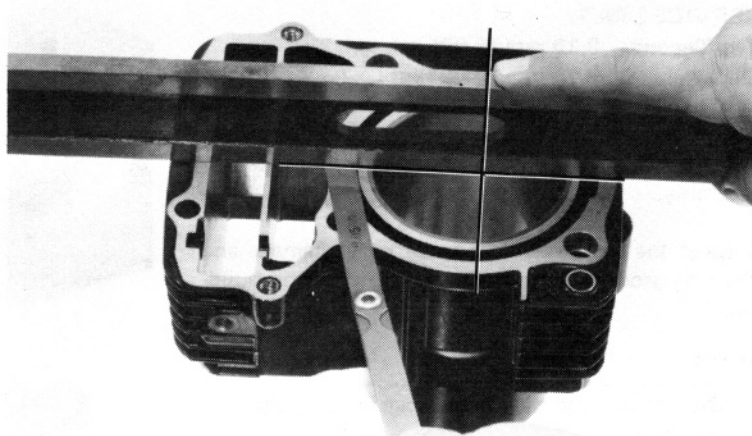


Inspect the cylinders for transverse warpage across the top.

NOTE:

Measure warpage using a straight edge and feeler gauge in the directions shown.

SERVICE LIMIT: 0.10 mm (0.004 in)



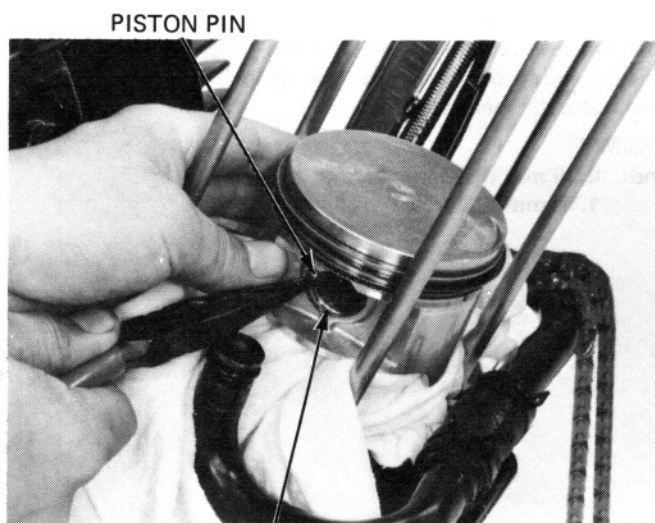
PISTON REMOVAL

Place a shop towel into the crankcase and remove the piston pin clips.

NOTE:

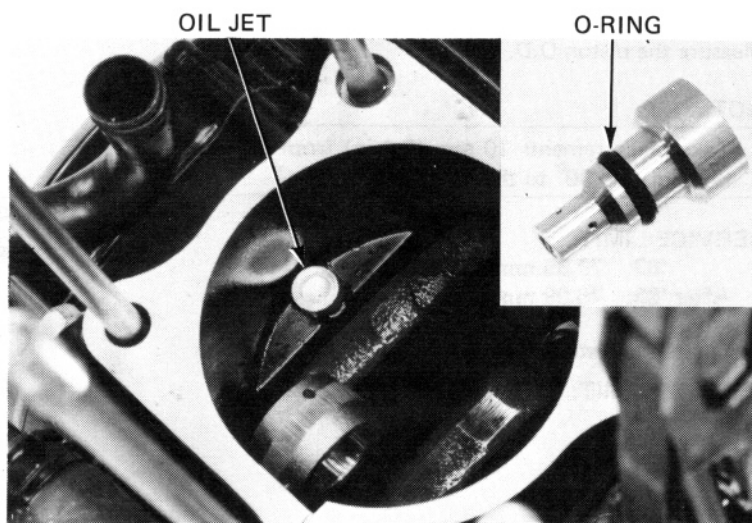
Do not let the clips fall into the crankcase.

Push the piston pin out and remove the piston.



PISTON PIN CLIP

Remove the oil jet and check for clogging.
Check the O-ring for damage or deterioration.



CYLINDER/PISTON

PISTON/PISTON RING INSPECTION

Measure the piston ring-to-groove clearance.

SERVICE LIMIT:

Top/Second: 0.10 mm (0.004 in)

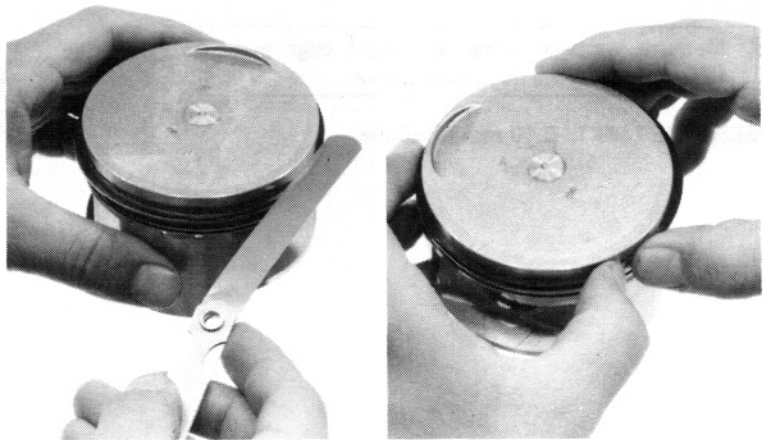
Oil: 0.10 mm (0.004 in)

Remove the piston rings and mark them to indicate the correct cylinder and piston position for re-assembly.

Inspect the piston for cracks or other damage and the ring grooves for excessive wear or carbon build-up.

NOTE:

Do not damage the piston rings when removing them.

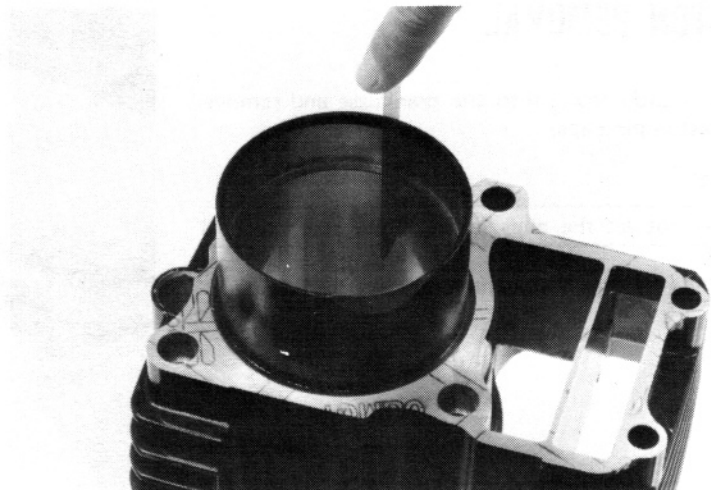


Measure the top and second piston ring end gaps; using a piston, push the ring into the cylinder squarely and make the measurement.

SERVICE LIMIT:

Top/Second: 0.50 mm (0.02 in)

Oil: 1.10 mm (0.04 in)



Measure the piston O.D.

NOTE:

Take measurements 10 mm (0.4 in) from the bottom, and 90° to the piston pin hole.

SERVICE LIMIT:

'83: 79.35 mm (3.124 in)

After '83: 76.09 mm (2.996 in)

Calculate the piston-to-cylinder clearance.

SERVICE LIMIT: 0.32 mm (0.013 in)



Measure each piston pin hole I.D.

SERVICE LIMIT: 20.05 mm (0.789 in)

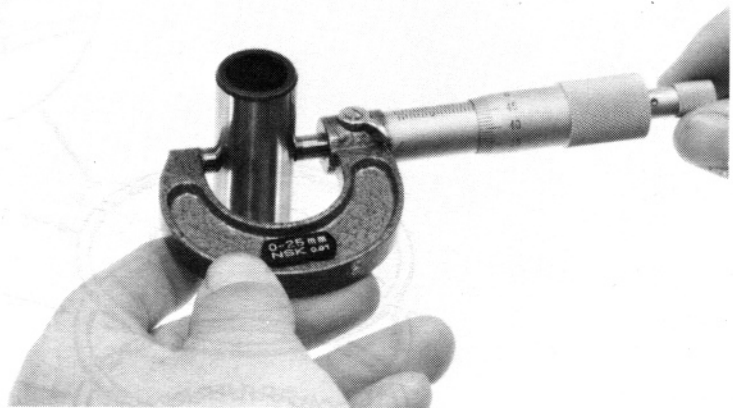


Measure each piston pin O.D.

SERVICE LIMIT: 19.80 mm (0.780 in)

Calculate the piston pin to piston clearance.

SERVICE LIMIT: 0.25 mm (0.010 in)



PISTON RING INSTALLATION

Clean the piston domes, ring lands, and skirts.

NOTE:

Insert the outside surface of the ring into the proper ring groove and roll around in the groove to make sure that the ring has a free fit around the piston's circumference.



CYLINDER/PISTON

Carefully install the piston rings onto the piston with the markings facing up.

NOTE:

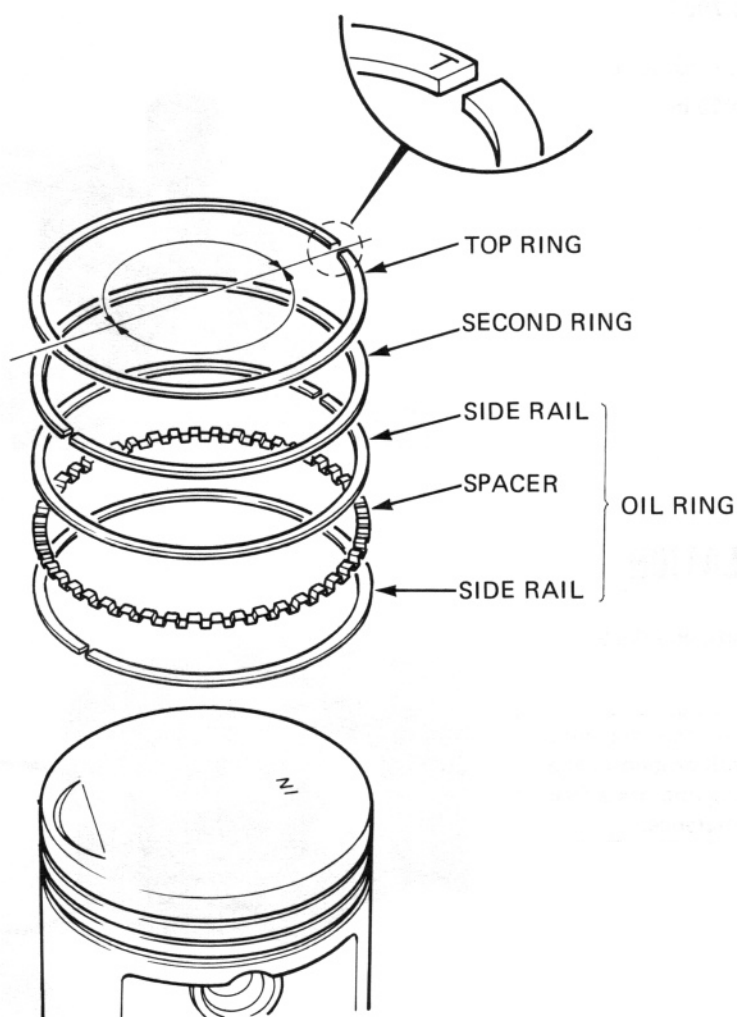
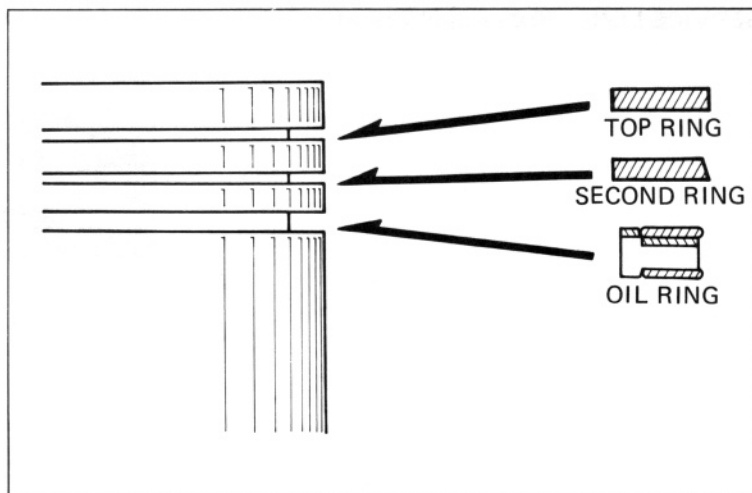
Be careful not to damage the piston and piston rings during assembly.

Stagger the ring end gaps 180° apart from each other as shown.

NOTE:

To install the oil ring, install the spacer first, then install the side rails.

After installing the rings, check that they rotate freely without sticking.



PISTON INSTALLATION

Install the oil jets.

NOTE:

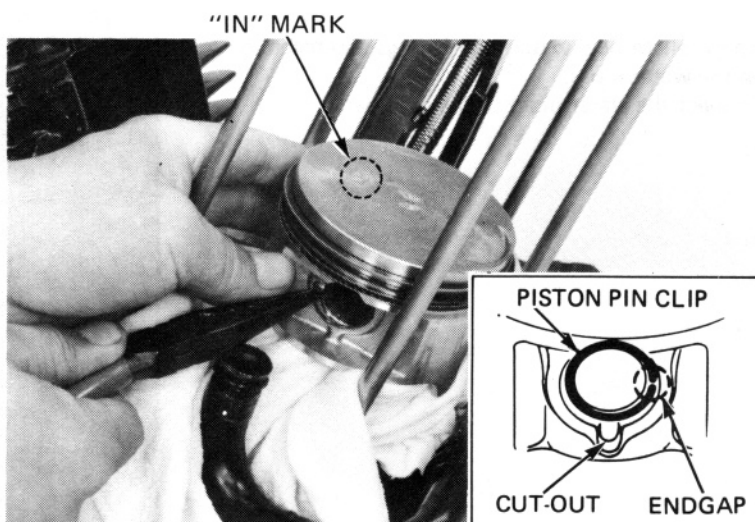
Before installing the oil jets, make sure that the O-Rings are installed on the oil jets.



Coat the rod small end with molybdenum disulfide grease. Assemble the piston and connecting rod with the piston and piston pin clips as shown.

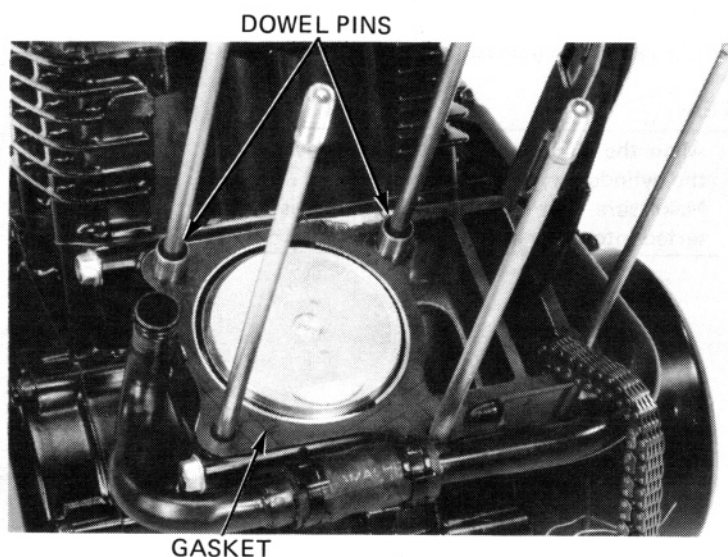
NOTE:

- Install the pistons with the marking "IN" facing towards the inlet side.
- After installing the piston pin clips, make sure that they are seated properly and not aligned with the cutout in the piston.
- Do not let the piston pin clips fall into the crankcase.



CYLINDER INSTALLATION

Install the gasket and dowel pins.



CYLINDER/PISTON

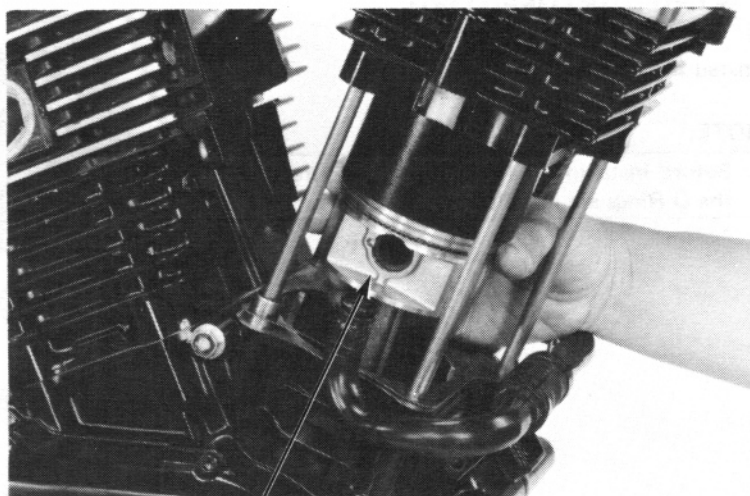
Coat the cylinders, piston rings/grooves and pistons with oil.

Install the piston assemblies into the cylinders from the top of the crankcase while compressing the piston rings with your fingers.

Be sure each assembly is returned to its original position as noted during removal.

NOTE:

Be careful not to damage the piston rings during assembly.

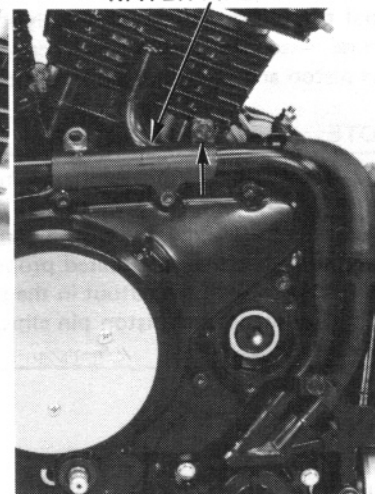
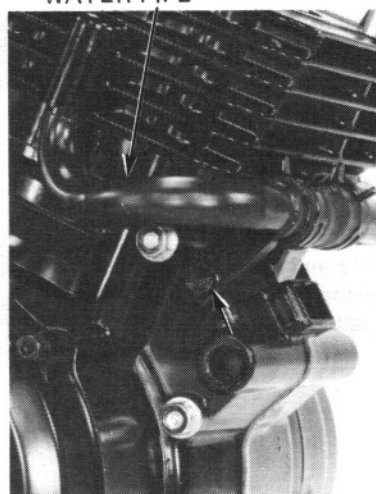


PISTON

FRONT CYLINDER
WATER PIPE

Apply oil to new water pipe O-rings and place them on the water pipes.

Connect the water pipes to the cylinders.

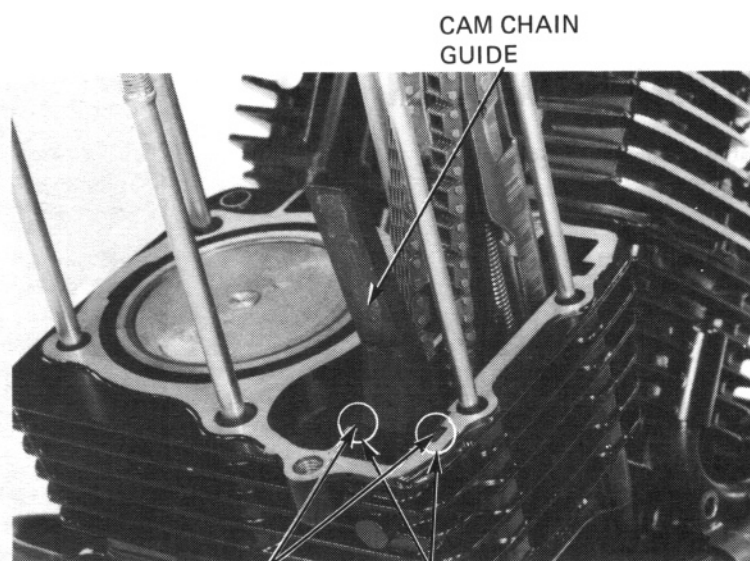


REAR CYLINDER
WATER PIPE

Install the cam chain guides.

NOTE:

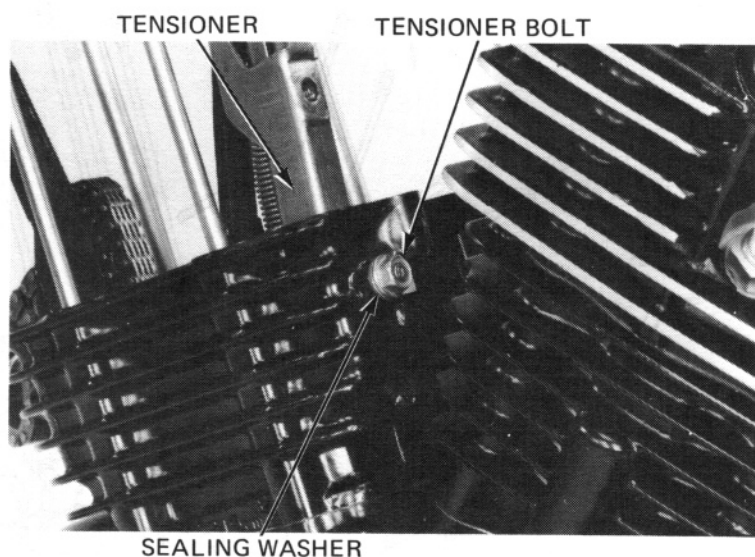
- Align the guide bosses with the grooves in the cylinders.
- Make sure that the end of the guide is inserted into place in the crankcase.



BOSSSES

GROOVES

Install the tensioner bolts and sealing washers while pulling up on the tensioners.



Install the dowel pins.
Install new gaskets.
Clean the cylinder contacting faces of the cylinder heads of gasket material and carbon deposits.
Install the cylinder heads (Page 10-18).

