



HONDA
CX500

6. CYLINDER HEAD/VALVE

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SERVICE INFORMATION

• WORKING PRACTICE

All cylinder head maintenance and inspection can be accomplished with the engine installed. Before removing the cylinder heads, it is necessary to drain coolant from the cylinder water jackets by removing the drain bolts.

• SPECIAL TOOLS

Special tools

VALVE GUIDE DRIVER ATTACHMENT (IN/EX) 07943-4150000
VALVE GUIDE REAMER (IN/EX) 07984-6110000

Common tools

VALVE SPRING COMPRESSOR 07757-0010000
VALVE GUIDE REMOVER (6.6 mm) (IN/EX) 07742-0010200


• SPECIFICATIONS

			Standard	Service Limit
Cylinder compression (cold)			12 ± 2 kg/cm ² / 700 rpm	—
Rocker arms	Shafts and holders	Rocker arm I.D.	14.016–14.027 mm (0.5518–0.5522 in.)	14.05 mm (0.5531 in.)
		Rocker arm shaft O.D.	13.982–14.000 mm (0.5505–0.5512 in.)	13.96 mm (0.5496 in.)
		Rocker arm holder I.D.	14.00 –14.027 mm (0.5512–0.5522 in.)	14.05 mm (0.5531 in.)
Valve spring	Free length	Outer (IN)	50.4 mm (1.9842 in.)	48.5 mm (1.9094 in.)
		Inner (IN)	50.3 mm (1.9803 in.)	48.4 mm (1.9055 in.)
		Outer (EX)	50.4 mm (1.9842 in.)	48.5 mm (1.9094 in.)
		Inner (EX)	50.3 mm (1.9803 in.)	48.4 mm (1.9055 in.)
	Preload/Length	Outer (IN)	28 kg/39.9 mm (61.7 lbs/1.5709 in.)	26.5 kg/39.8 mm (58.4 lbs/1.5670 in.)
		Inner (IN)	11.5 kg/37.9 mm (25.4 lbs/1.4921 in.)	10.5 kg/37.9 mm (23.2 lbs/1.4921 in.)
		Outer (EX)	28.5 kg/39.9 mm (62.8 lbs/1.5709 in.)	26.5 kg/39.8 mm (58.4 lbs/1.5670 in.)
		Inner (EX)	11.5 kg/37.9 mm (25.4 lbs/1.492 in.)	10.5 kg/37.9 mm (23.2 lbs/1.4921 in.)
Valves and valve guides	Stem O.D.	(IN)	6.580– 6.590 mm (0.2591–0.2594 in.)	6.54 mm (0.2575 in.)
		(EX)	6.550– 6.560 mm (0.2579–0.2583 in.)	6.54 mm (0.2565 in.)
	Guide I.D.	(IN)	6.6000–6.6200 mm (0.2598–0.2606 in.)	6.70 mm (0.2638 in.)
		(EX)	6.6000–6.6200 mm (0.2598–0.2606 in.)	6.70 mm (0.2638 in.)
	Stem-to-guide clearance	(IN)	—	0.10 mm (0.040 in.)
		(EX)	—	0.10 mm (0.040 in.)
Cylinder head	Valve seat width		1.1–1.3 mm (0.04–0.05 in.)	2.0 mm (0.08 in.)
	Warpage		—	0.10 mm (0.040 in.)

TROUBLESHOOTING

Engine top-end problems are usually performance related which can be diagnosed by a compression test, or are noises which can usually be traced to the top-end with a sounding rod or stethoscope.

Low Compression or Uneven Compression

1. Valve
 - Incorrect valve clearance
 - Burned or bent valves
 - Broken valve spring
 - Incorrect valve timing
 - Sticking valve
2. Cylinder head
 - Leaking or damaged head gasket
 - Warped or cracked cylinder head
3. Cylinder and piston

High Compression

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

Excessive Noise

1. Incorrect valve adjustment
2. Sticking valve or broken valve spring
3. Damaged rocker arm or camshaft
4. Bent push rod

Contaminated Engine Oil or Coolant

1. Leaking head gasket



ROCKER ARM/CYLINDER HEAD REMOVAL

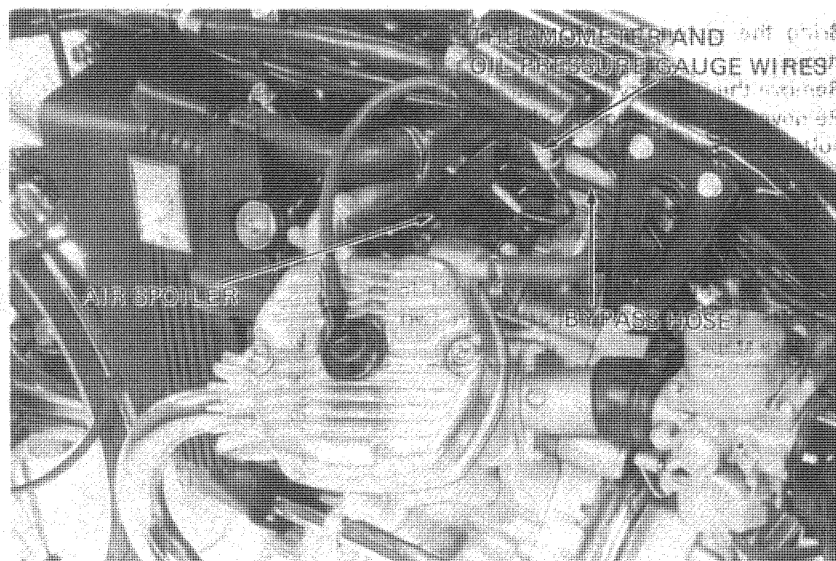
Disconnect the thermometer and oil pressure gauge wires.

Remove the by-pass hose.

Remove the air spoiler.

Remove the spark plug caps.

Remove the cylinder head cover.

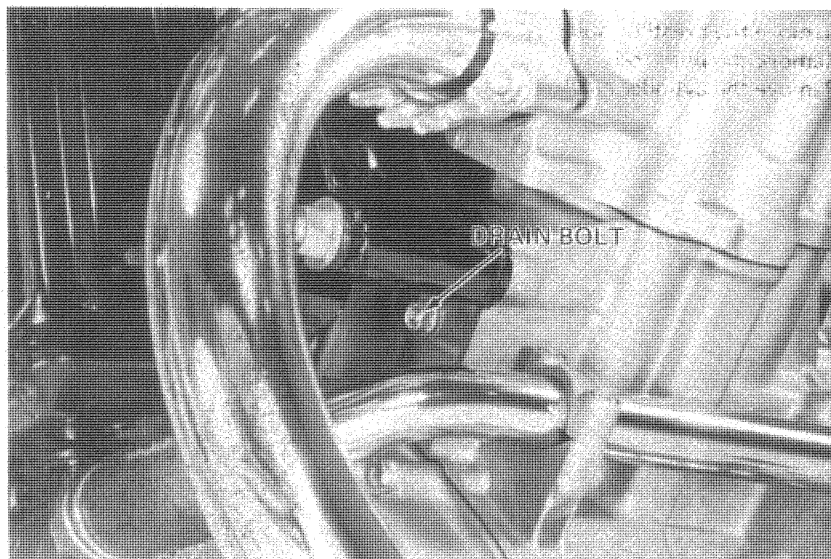


Remove the radiator cover (Page 9-3).

Remove the radiator drain bolt and drain the coolant.



Remove the cylinder drain bolts to drain the coolant.





Bring the piston to TDC of the compression stroke.

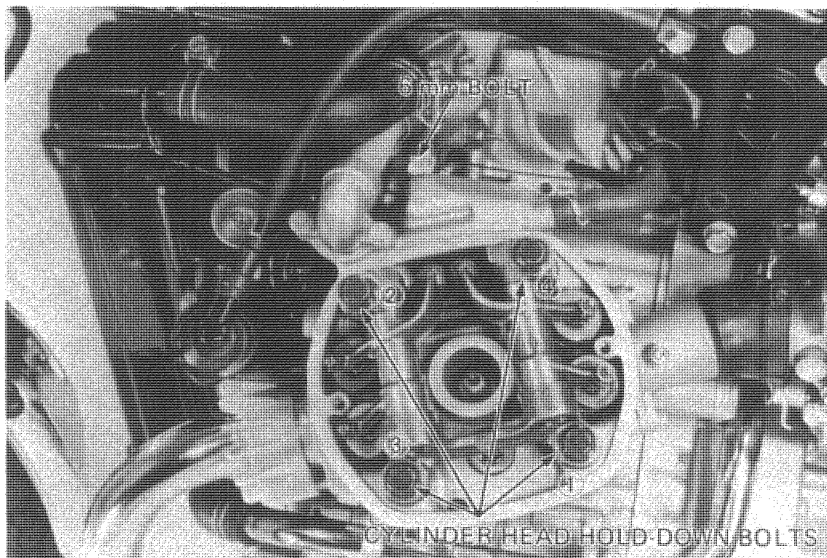
Remove the 6 mm cylinder head bolts.

Remove the remaining cylinder head hold-down bolts.

NOTE

The engine must be cool before removing the cylinder heads.

Loosen the cylinder head hold-down bolts in a criss cross pattern in two or more steps.

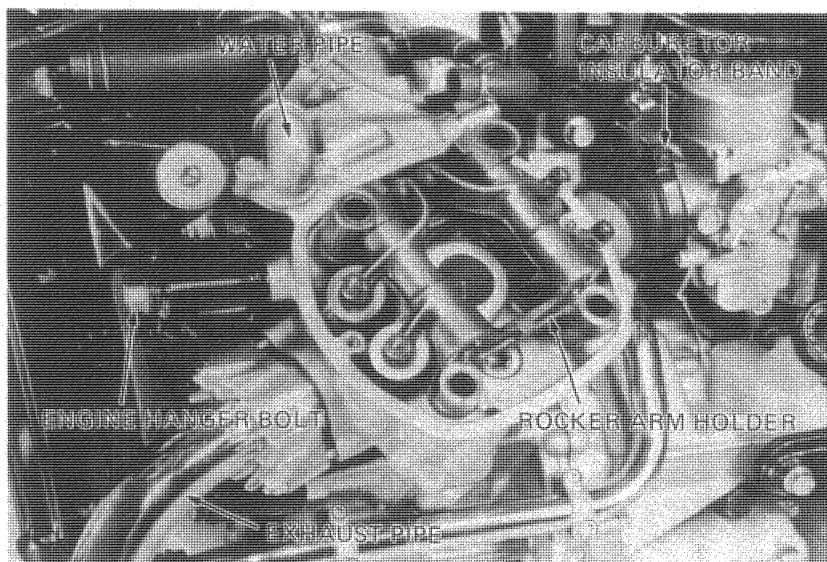


Remove the rocker arm holder assembly.

Remove the exhaust pipe.

Remove the engine hanger bolts.

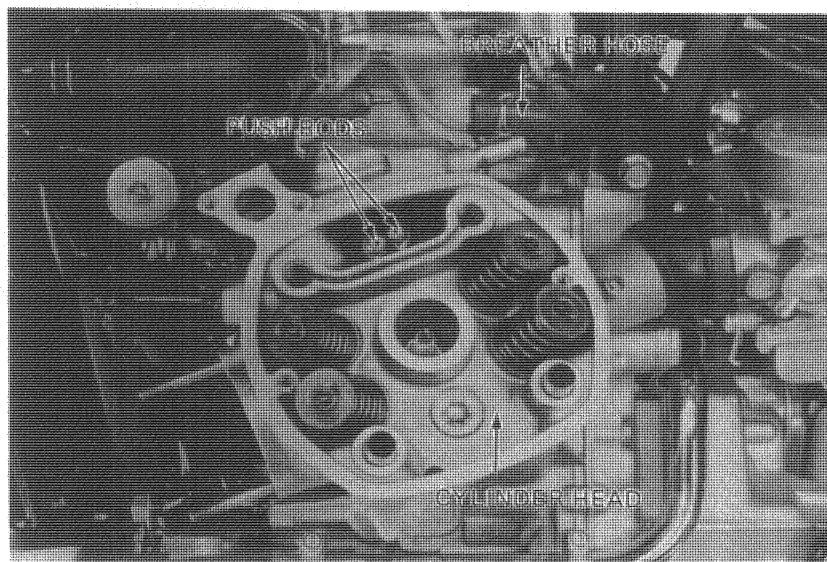
Loosen the carburetor insulator band.



Remove the breather hose.

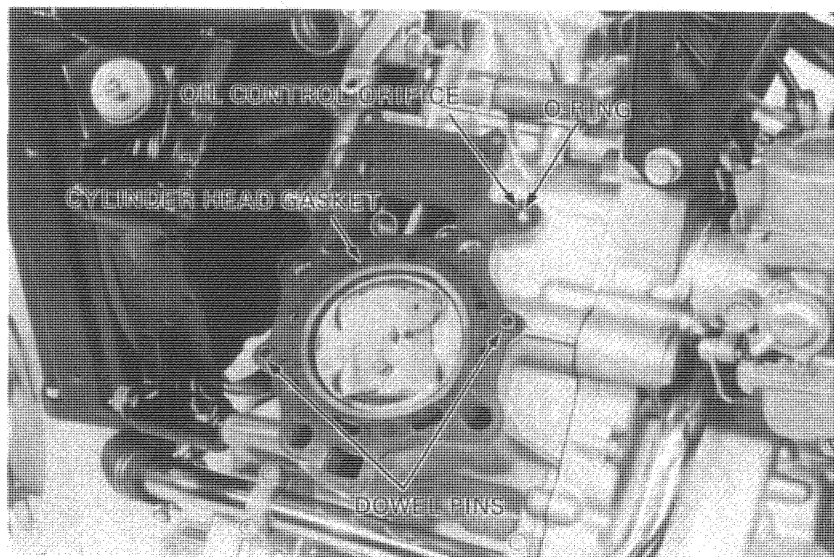
Remove the push rods.

Remove the cylinder head.



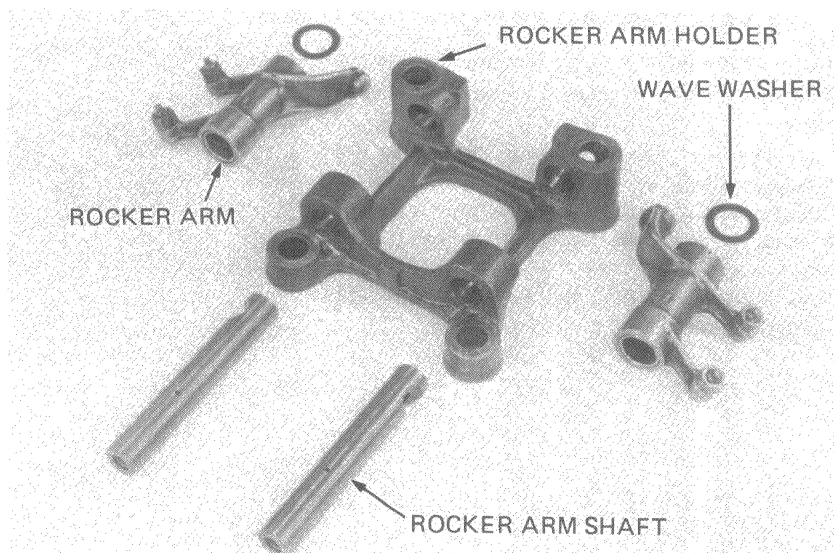


Remove the cylinder head gasket, dowel pins and O-rings.



- **ROCKER ARM HOLDER DISASSEMBLY**

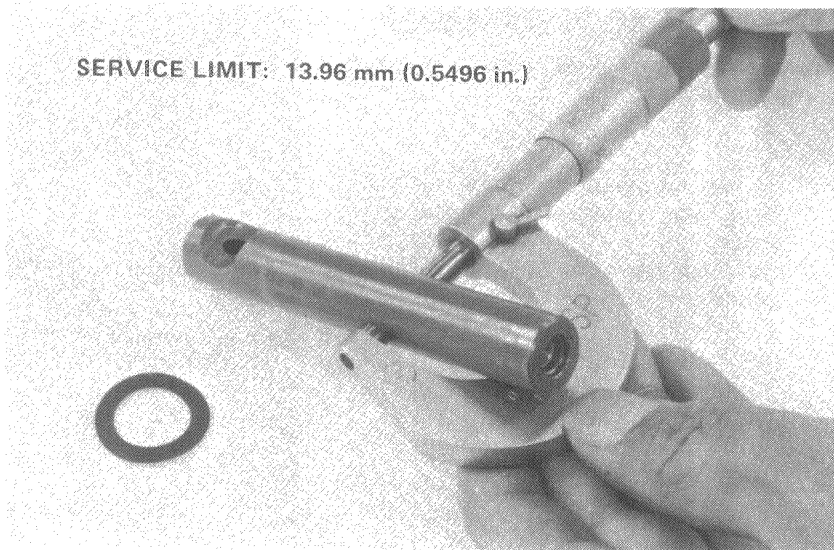
Withdraw the rocker arm shafts and remove the wave washers and rocker arms.



- **ROCKER ARM SHAFT INSPECTION**

Measure the O.D. of each rocker arm shaft. Examine the wave washers for damage. Inspect each shaft for damage, scoring or nicks.

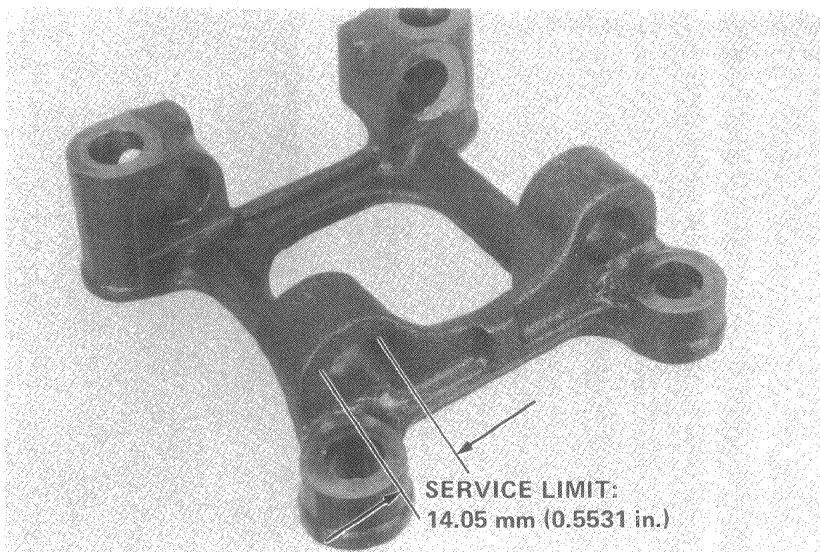
SERVICE LIMIT: 13.96 mm (0.5496 in.)





• ROCKER ARM HOLDER INSPECTION

Measure the rocker arm holder I.D.

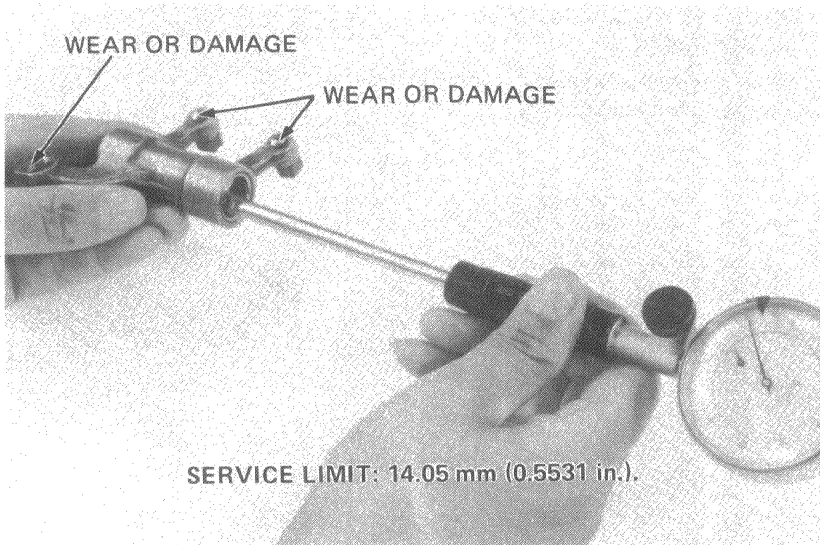


• ROCKER ARM INSPECTION

Inspect each rocker arm for scoring, damage, or clogged oil holes. Measure the arm I.D. of each rocker.

If a rocker arm shows wear or damage to the adjusting screw or push rod contact faces, inspect the push rods and stem contact faces for scoring, scratches, or evidence of insufficient lubrication.

Inspect the push rods for wear, damage and trueness.

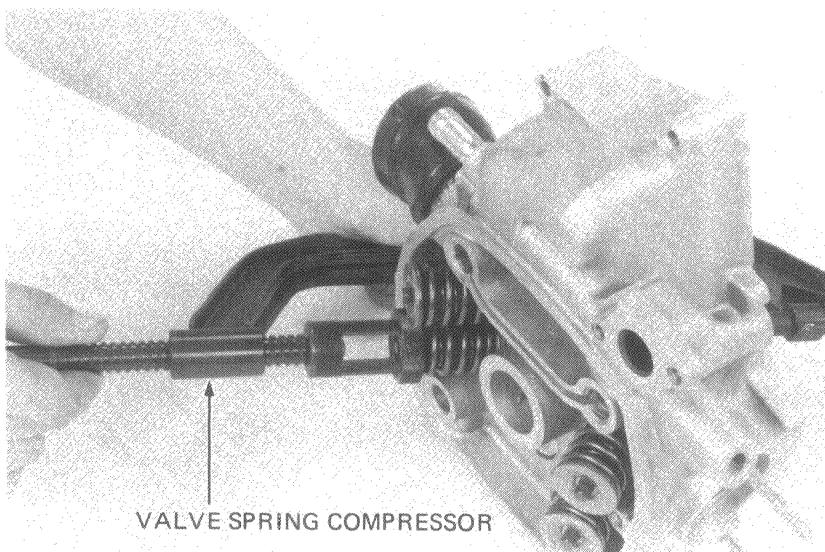


CYLINDER HEAD DISASSEMBLY

Remove the valve spring cotters, retainers, springs and valve.

NOTE

- Do not compress the valve springs more than necessary to remove the cotters.
- Mark all parts to ensure original assembly.



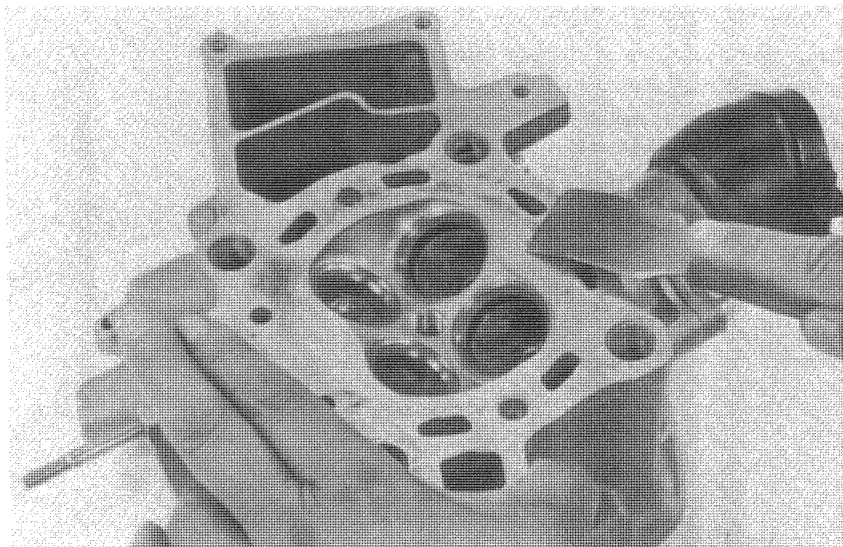


Remove carbon deposits from the combustion chambers.

Remove any gasket material from the head surfaces.

NOTE

- Do not damage the gasket surfaces.
- Avoid dropping gasket material into the jackets or oil passages.
- Gaskets will come off easier if soaked with solvent.



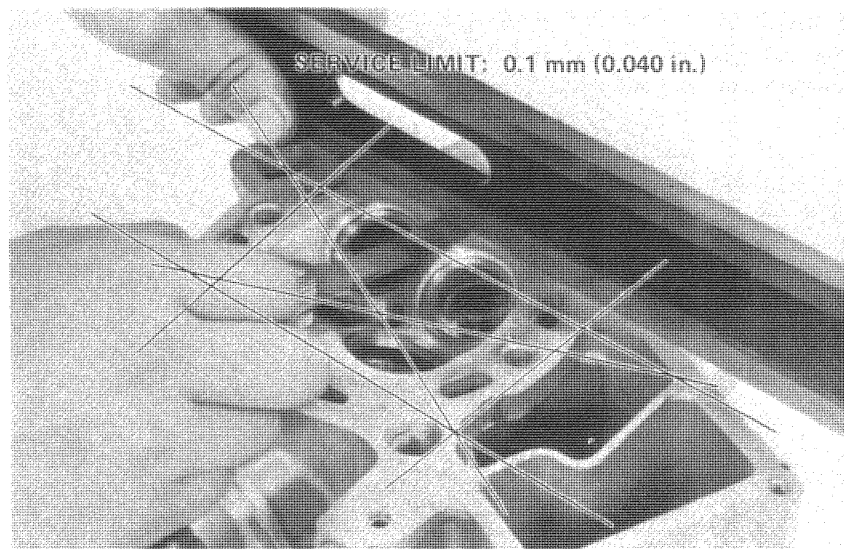
• CYLINDER HEAD INSPECTION

Check the spark plug hole and valve areas carefully for cracks.

Check the cylinder head for warpage with a straight edge and a feeler gauge.

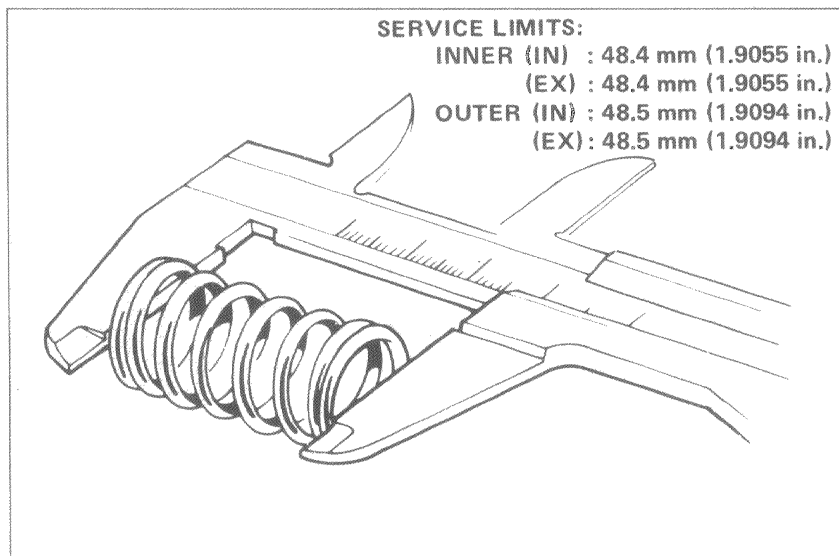
NOTE

Check for warpage in an X pattern.



• VALVE SPRING INSPECTION

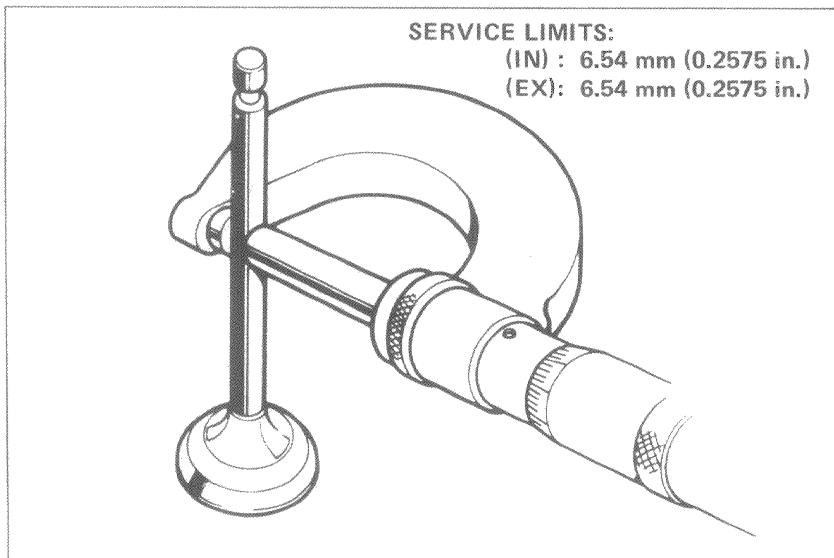
Measure the free length of the inner and outer valve springs.





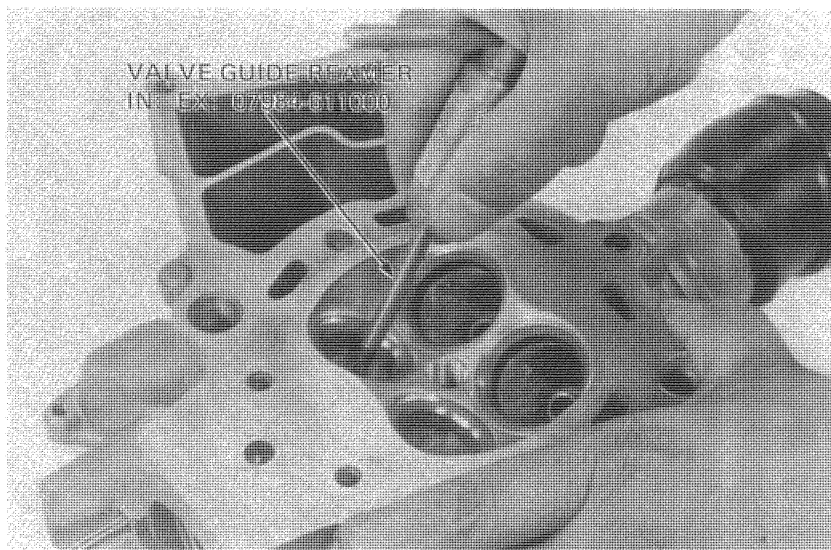
• VALVE INSPECTION

Clean the valves and inspect for trueness, burring, scoring, or abnormal stem end wear. Check the valve movement in the guide. Measure and record each valve stem O.D.



• VALVE GUIDE INSPECTION

Ream the guides to remove any carbon build-up before checking clearance.



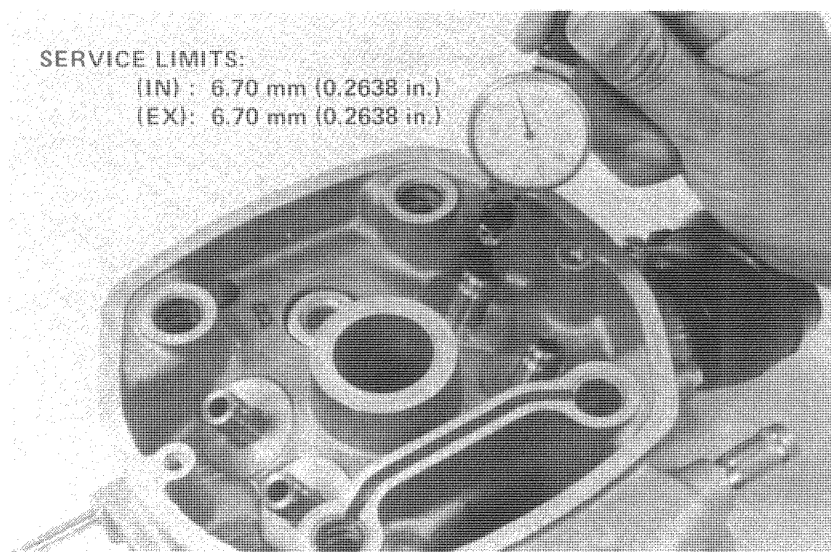
• STEM-TO-GUIDE CLEARANCE INSPECTION

Measure and record each valve guide I.D. using a ball gauge or inside micrometer. Calculate the stem to guide clearance.

SERVICE LIMITS: (IN) : 0.10 mm (0.040 in.)
(EX) : 0.10 mm (0.040 in.)

NOTE

If the stem to guide clearance exceeds the service limit, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace guides as necessary and ream to fit.





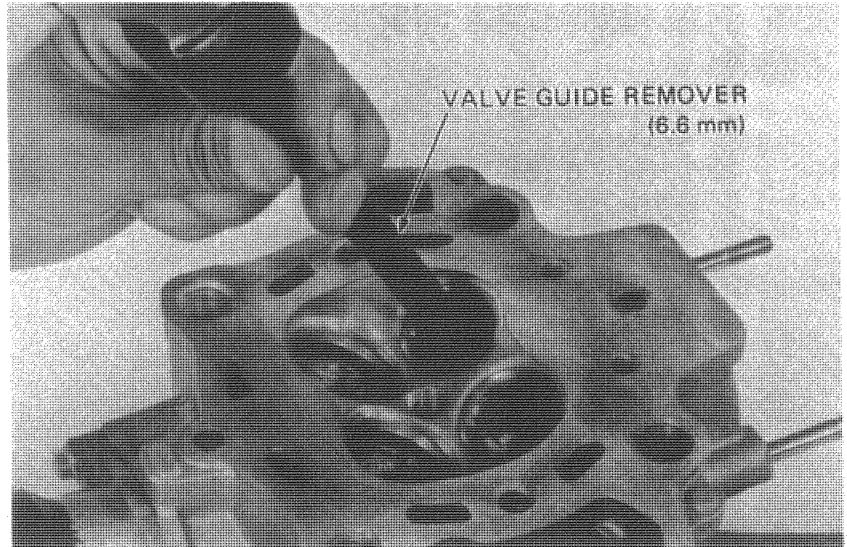
VALVE GUIDE REPLACEMENT

If the stem-to-guide clearance still exceeds the service limits with new guides, replace the valves and guides.

NOTE

Do not damage the cylinder head when replacing valve guides.

Support the cylinder head and drive out the guide from the valve port.



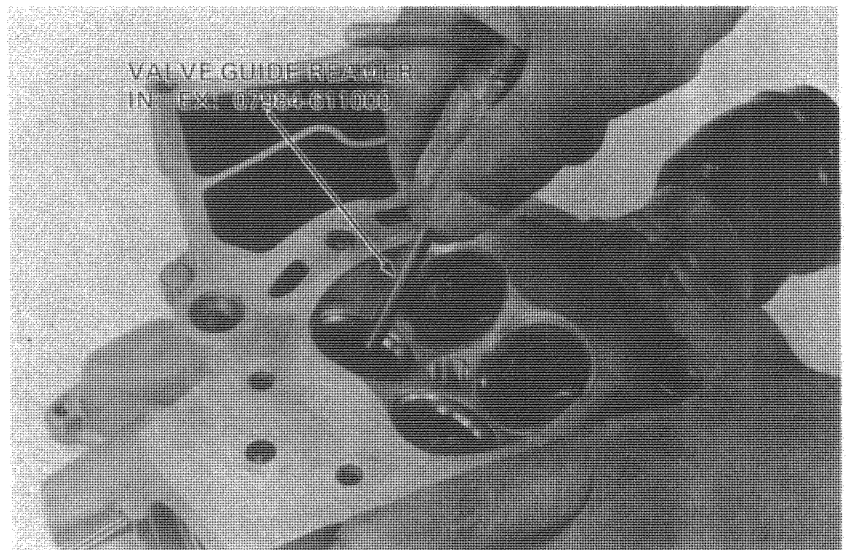
Place the ATTACHMENT on the VALVE GUIDE REMOVER. Drive the guides into place from the top of the head.



Ream the new valve guides after installation.

NOTE

- Use cutting oil on the reamer during this operation.
- It is important that the reamer be rotated when it is inserted or removed.
- Clean the head thoroughly of any particles.





VALVE SEAT INSPECTION AND GRINDING

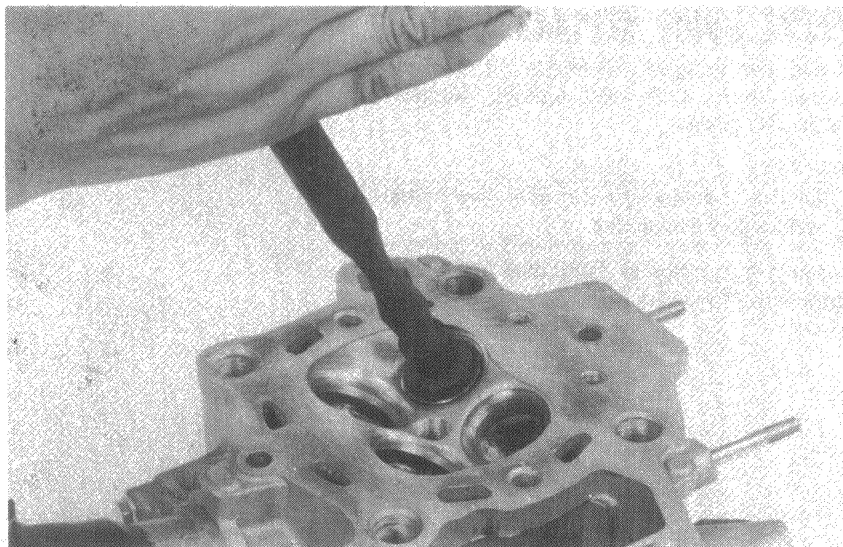
Clean all intake and exhaust valves thoroughly to remove carbon deposits.

Apply a light coating of valve lapping compound to each valve face. Lap each valve and seat using a rubber hose or other hand-lapping tool.

Remove the valve and inspect the face.

NOTE

The valves cannot be ground. If the valve face is rough, worn unevenly, or contacts the seat improperly, the valve must be replaced.



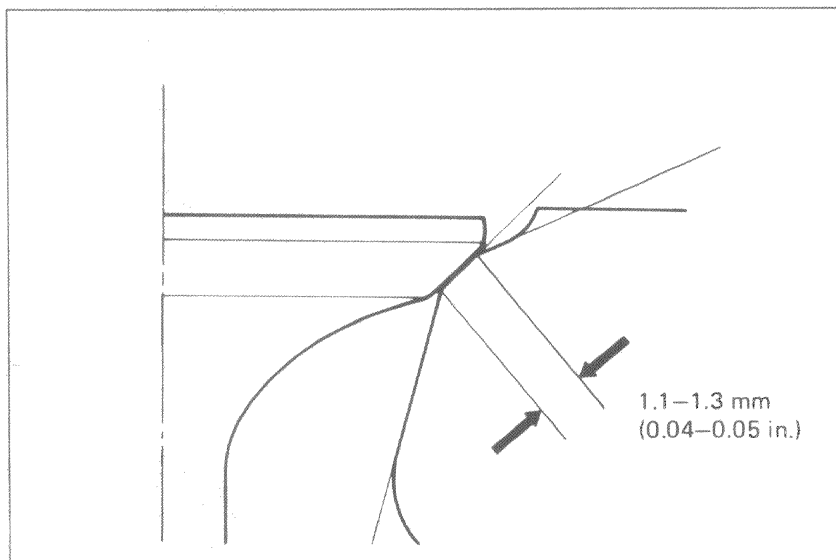
Inspect each valve seat width.

STANDARD : 1.1 – 1.3 mm
(0.04–0.05 in.)

SERVICE LIMIT : 2.0 mm (0.08 in.)

If the seat is too wide, too narrow or has low spots, the seat must be ground. (A power grinder is recommended for good valve sealing.)

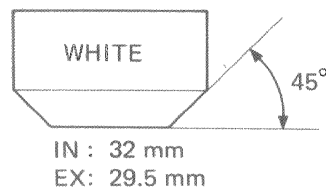
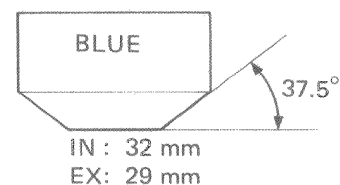
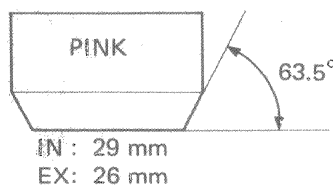
An even matt finish around the seat indicates good valve contact.



NOTE

- Follow the refacer manufacturer's operating instructions.
- Inspect each cutting stone for cracks. Reface the cutting stone to the correct angle.
- Each time a stone is removed and reinstalled on the grinder, it must be refaced on a dressing stand.

GRINDING ANGLES

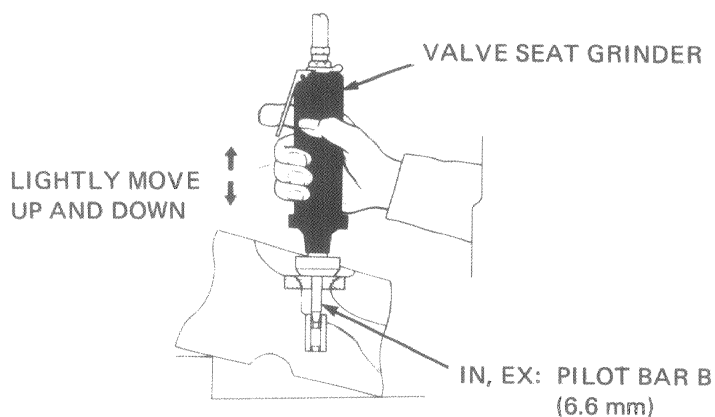




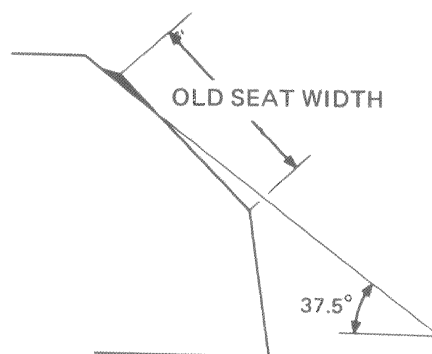
Insert the pilot bar into the valve guide firmly, and lubricate it lightly with thin oil.

WARNING

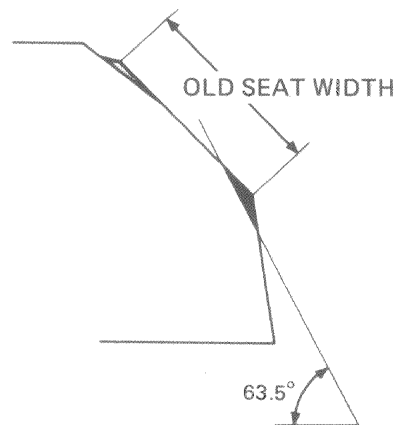
Prevent eye injuries, wear adequate eye protection when using a valve seat grinder.



Using a 37.5 degree stone, remove 1/4 of the existing valve seat material. Remove the grinder and inspect the area of the valve seat you have removed.

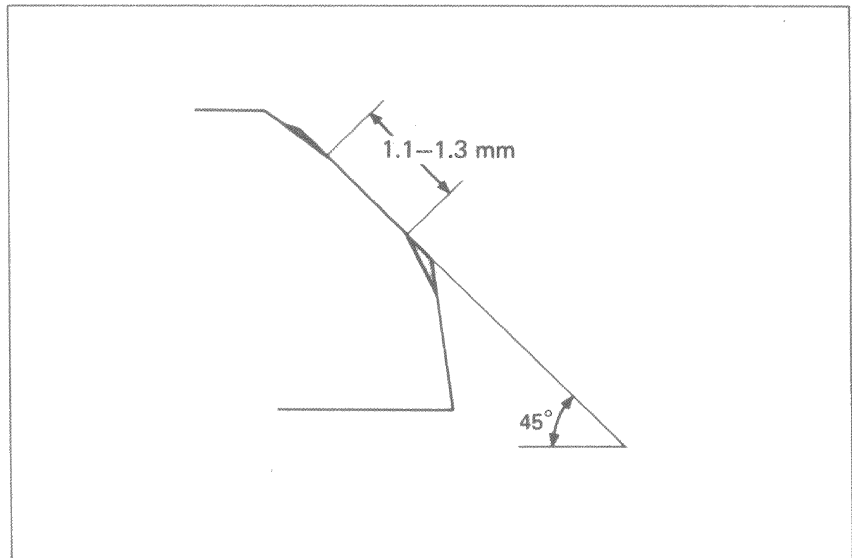


Use a 63.5 degree stone and remove the bottom 1/4 of the old seat. Remove the grinder and inspect the area you have just removed.

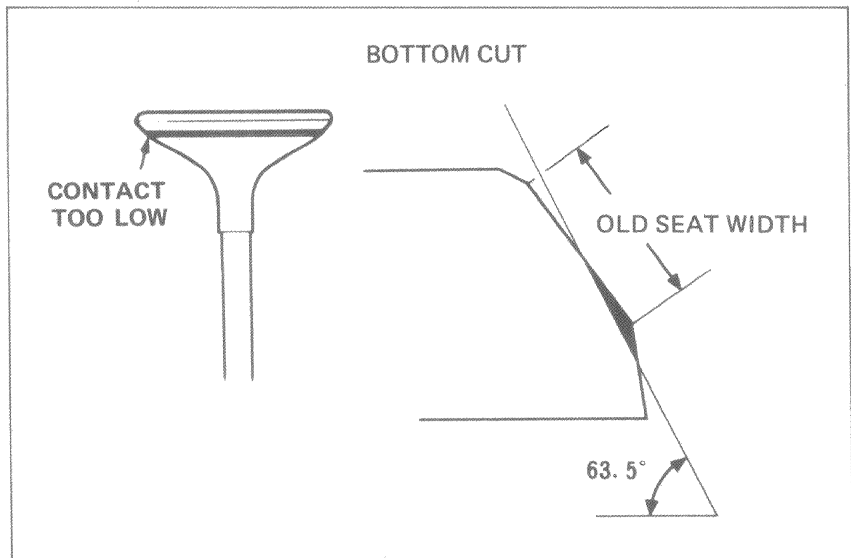




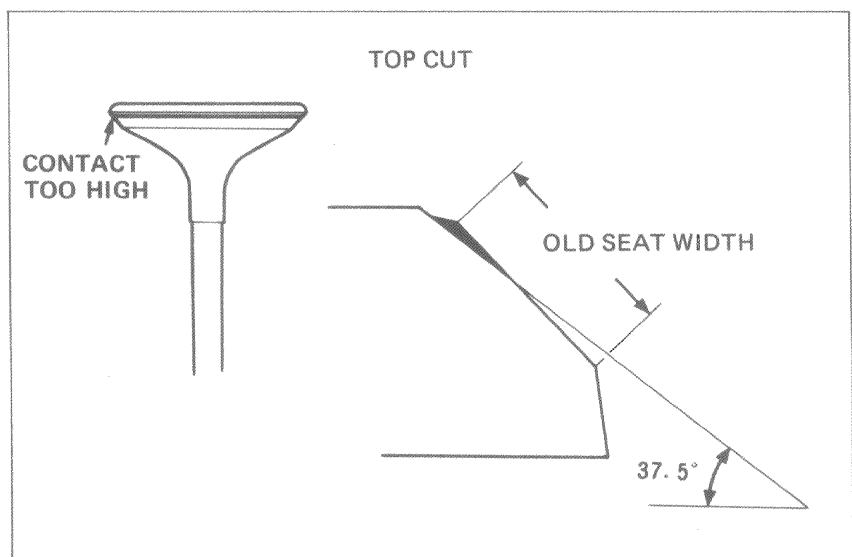
Install a 45 degree finish cut stone and cut the seat to the proper width.



If the contact area on the valve face is too low, the seat must be raised, using a 63.5 degree stone. Refinish the seat to 1.1-1.3 mm width using a 45 degree finishing stone.



If the contact area on the face of the valve is too high, the seat must be lowered, using a 37.5 degree cutting stone.



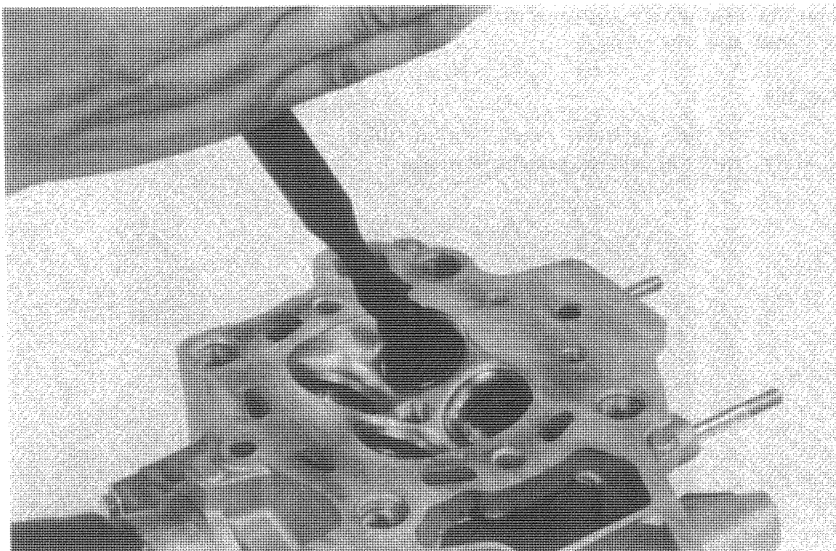


After cutting the seat, apply lapping compound to valve face, and lap the valve.

After lapping, wash all residual compound off the cylinder head and valve.

NOTE

- Lap the valve using light pressure.
- Do not allow lapping compound to enter the guides.



CYLINDER HEAD ASSEMBLY

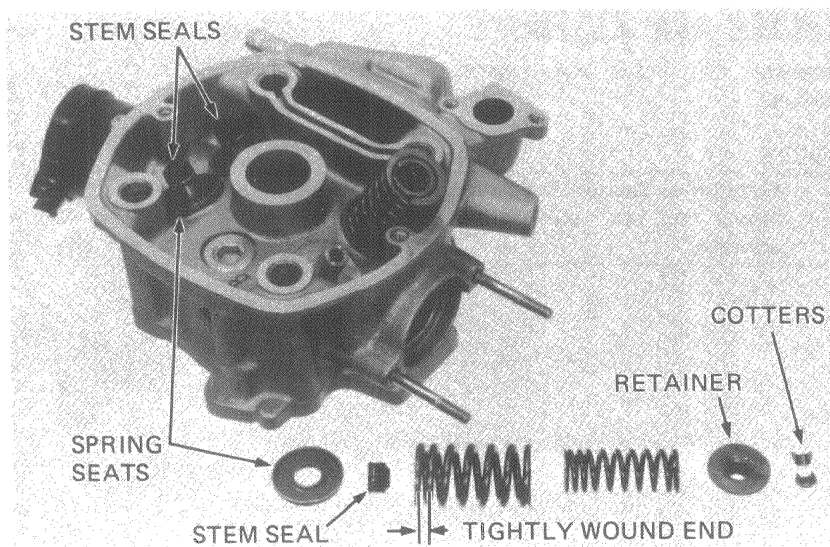
Install the valve stem seals and spring seats.

Lubricate the valve stems with oil, and insert the valves into the guides.

Install the valve springs and retainers.

NOTE

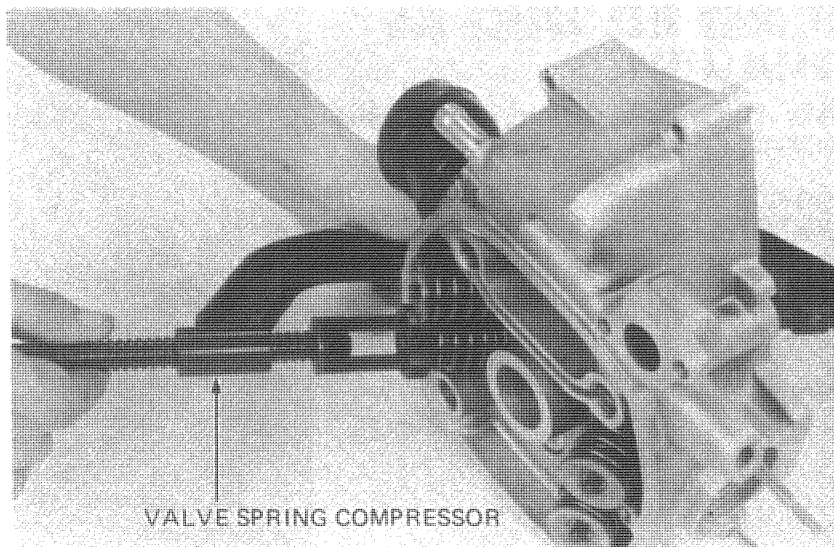
- Install the valve springs with the tightly wound coils facing the head.
- Replace the stem seals with new ones whenever disassembled.



Install the valve cotters.

CAUTION

To prevent loss of tension, do not compress the valve spring more than necessary.

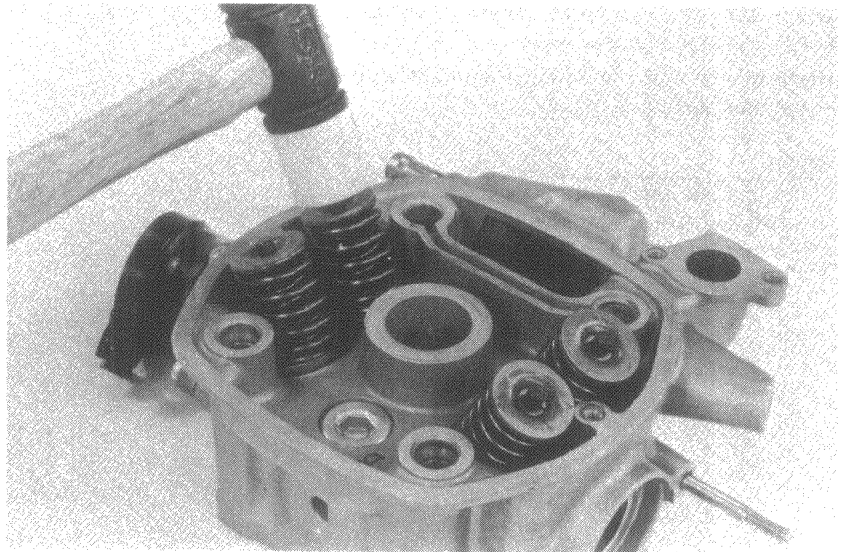




Tap the valve stems gently with a soft hammer to firmly seat the cotters.

NOTE

Support the cylinder head above the work bench surface to prevent damage.

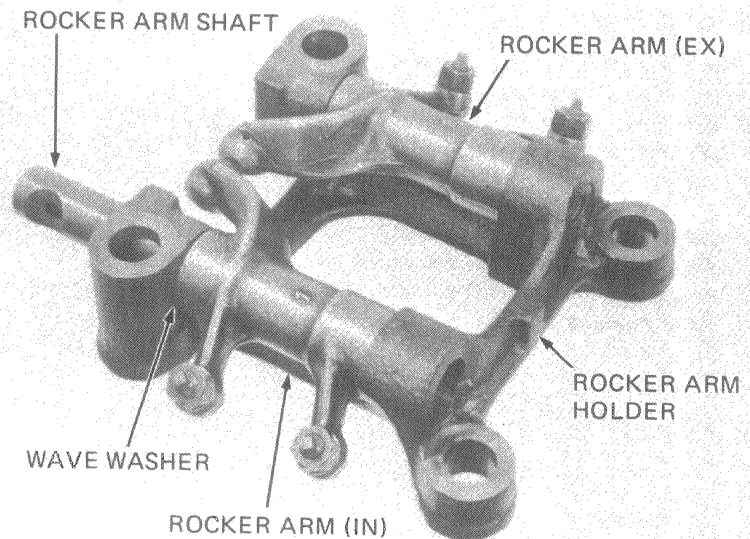


ROCKER ARM ASSEMBLY

Assemble the rocker arms, shafts and wave washers.

NOTE

- Note the rocker arm shaft direction.
- Apply oil to each shaft before assembly.

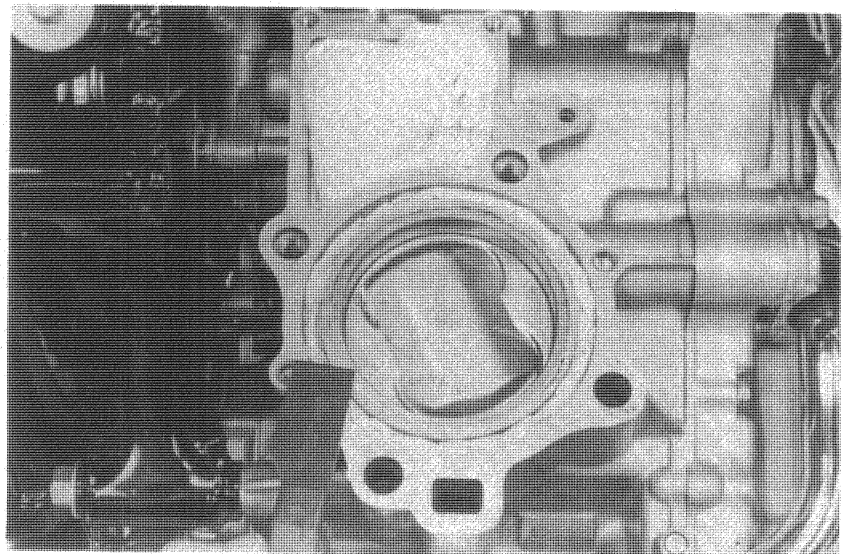


CYLINDER HEAD/ROCKER ARM INSTALLATION

Clean the cylinder surfaces of any gasket material.

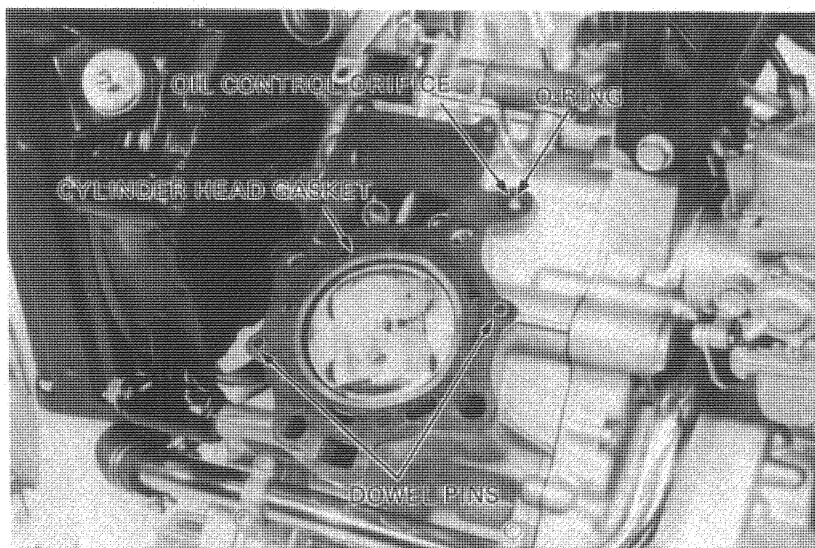
NOTE

Do not damage the gasket surfaces.





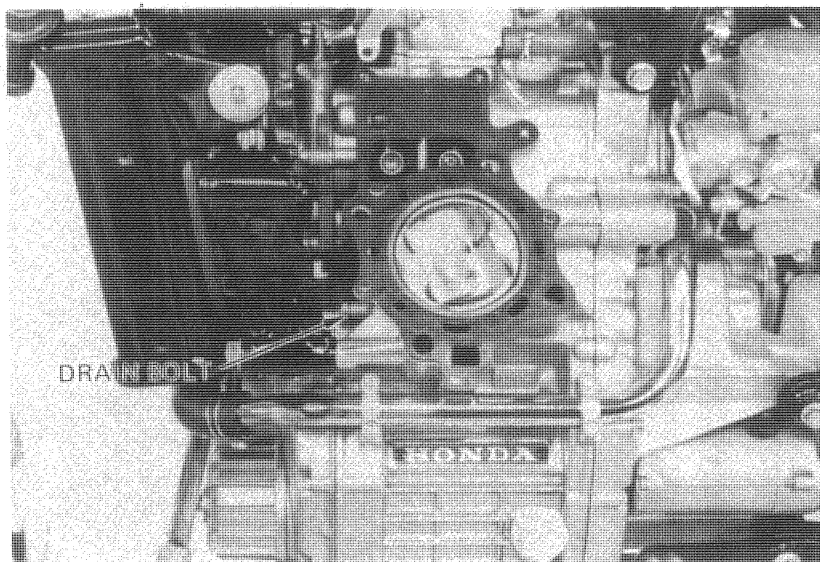
Install the O-rings and dowel pins.
Coat the cylinder and head surfaces with liquid sealer, and install the head gasket. Make sure that the oil orifices are not covered by gasket.



Install the cylinder drain bolts.
Remove the timing inspection cap.
Check the timing mark to be certain that the cylinder to be serviced is at TDC on the compression stroke.

NOTE

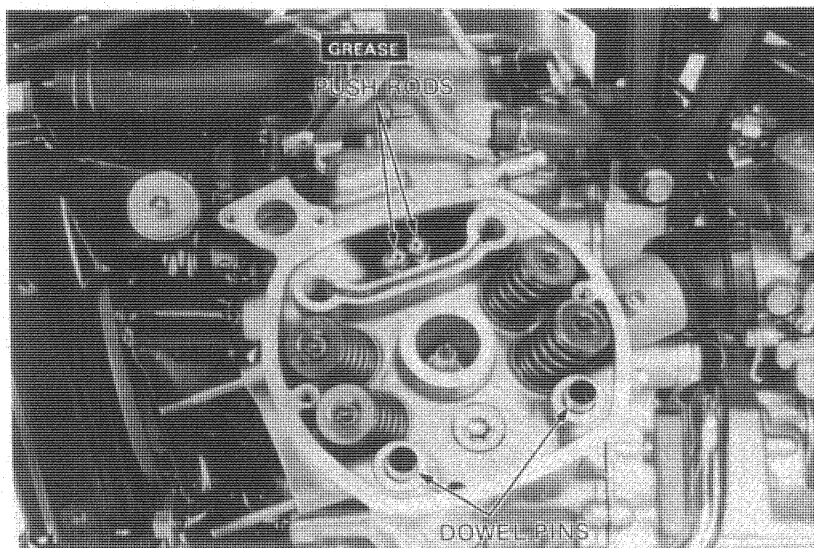
- Align the index mark with the "TR" mark for the right cylinder.
- Align the index mark with the "TL" mark for the left cylinder.



Install each cylinder head.
Install the dowel pins.
Insert the push rods into the rocker arm retainers.

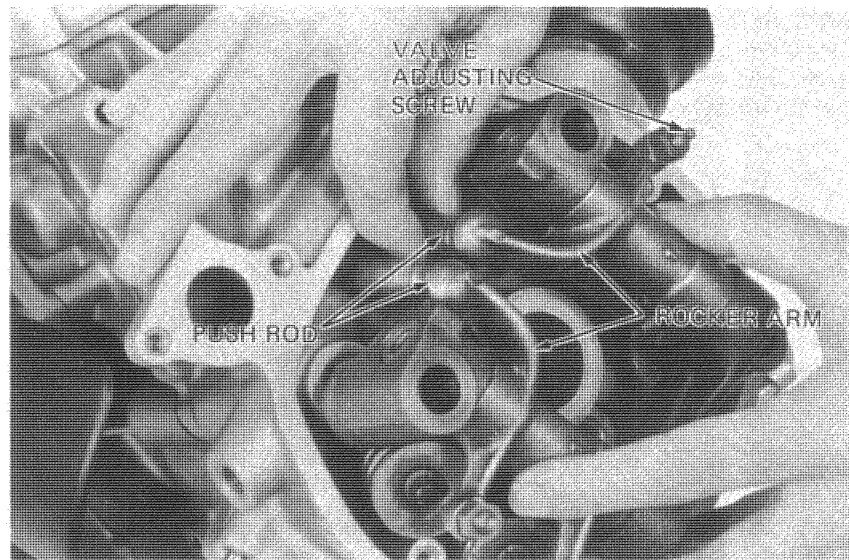
NOTE

- Apply molybdenum disulfide grease to the end of each push rod.





Loosen the valve adjusting screws.
 Install the rocker arm holder assembly, aligning the rocker arms with the push rods.



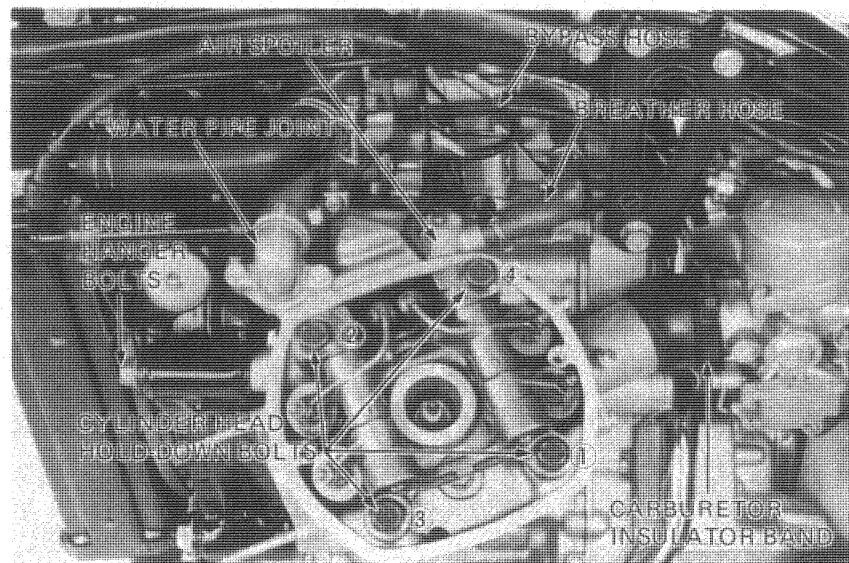
Torque the cylinder head bolts in the sequence shown.

TORQUE: 5.0–5.5 kg-m (33–40 ft-lbs)

NOTE

Tighten the bolts in 2–3 steps.

Install the water pipe joint.
 Install the thermostat bracket with 6 mm bolt.
 Install and torque the engine front hanger bolts.
TORQUE: 3.0–4.0 kg-m (22–29 ft-lbs)
 Route the thermometer wire, oil pressure gauge wire and thermostat by-pass hose through the air spoiler and connect.



Tighten the air spoiler bolts.
 Tighten the carburetor band.
 Adjust the valve clearance (Page 3-4).
 Torque the radiator drain bolt.
TORQUE: 0.15–0.30 kg-m
(1.1–2.2 ft-lbs, 13–26 in-lbs)

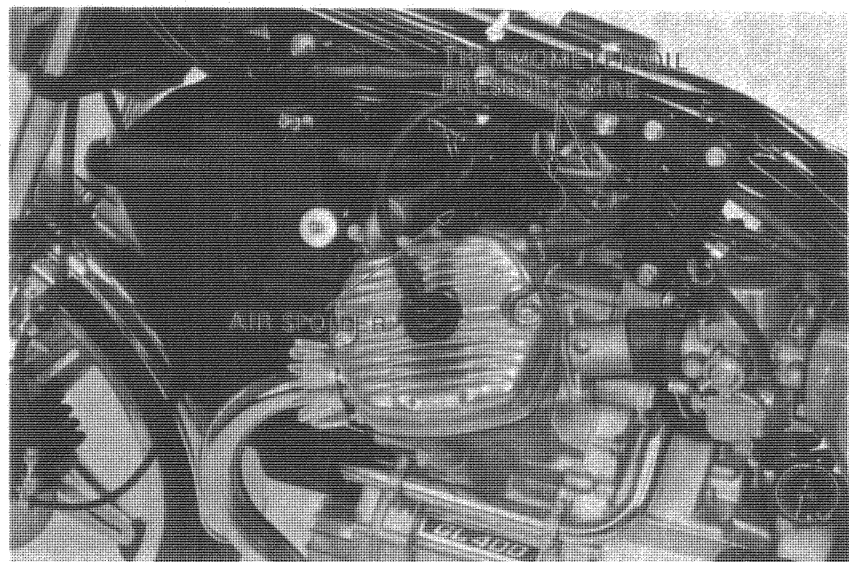
Connect the thermometer and oil pressure gauge wires.

Install the exhaust pipes.

Fill the radiator with coolant.

Check for oil, water and gas leaks.

Install the radiator cover.





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