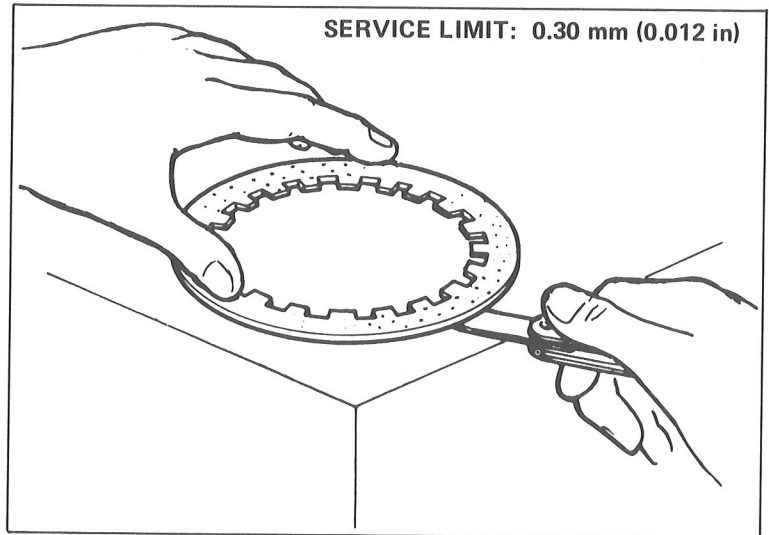




CLUTCH PLATE

Check for plate warpage on a surface plate, using a feeler gauge.

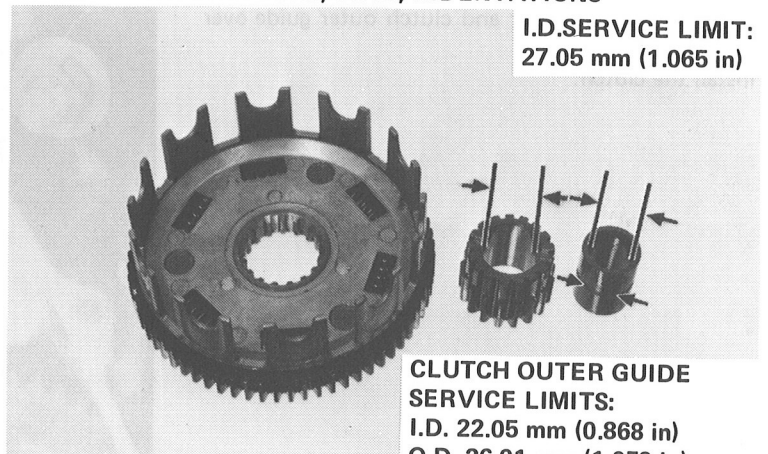


CLUTCH OUTER AND OUTER GUIDE

Check the slots in the outer drum for nicks, cuts or indentations made by the friction discs.

Measure the I. D. of the primary drive gear and the O. D., I. D. and length of the outer guide.

CHECK: NICKS, CUTS, INDENTATIONS



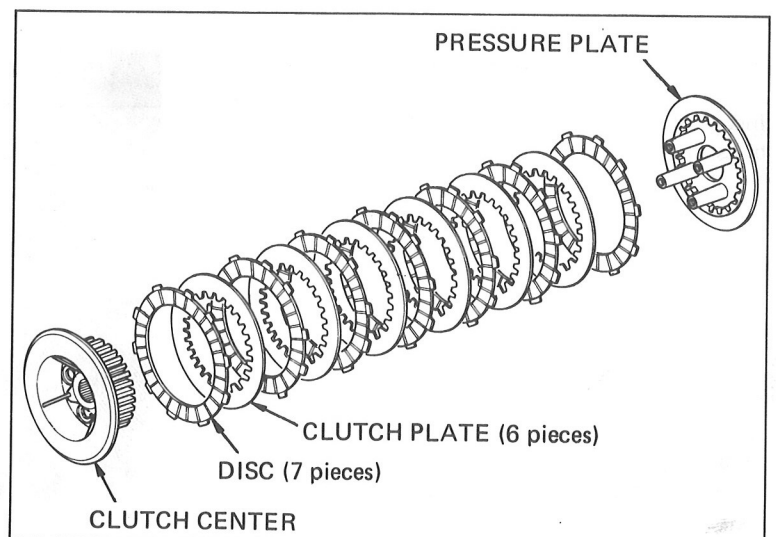
**CLUTCH OUTER GUIDE
SERVICE LIMITS:**
I.D. 22.05 mm (0.868 in)
O.D. 26.91 mm (1.059 in)
LENGTH: 33.10 mm (1.303 in)

INSTALLATION

Install the clutch discs, plates and pressure plate on the center drum.

NOTE

- Stack the discs and plates alternately as shown.
- Coat new clutch discs with engine oil.





FUEL SYSTEM

For example:

At a temperature of 30°C (86°F) and an altitude of 3.000 m (9840 ft), carburetor recommendations are as follows:

- Main jet
152 x 0.92 = 139.8 (#140 is closest)
- Jet needle
3 – 1 = 2 2nd groove
- Pilot screw opening
2-1/4 – 1/2 = 1-3/4 1-3/4 turns out

Carburetor specifications (STD)

Identification No.	PD11B
Main jet	# 152
Jet needle setting	3rd groove
Pilot screw opening	2-1/4

Optional main jets.

The following main jets are available for making carburetor adjustments:

SIZE	PARTS NO.	SIZE	PARTS NO.
# 138	99101-357-138	# 148	99101-357-148
# 140	99101-357-140	# 150	99101-357-150
# 142	99101-357-142	# 155	99101-357-155
# 145	99101-357-145	# 158	99101-357-158

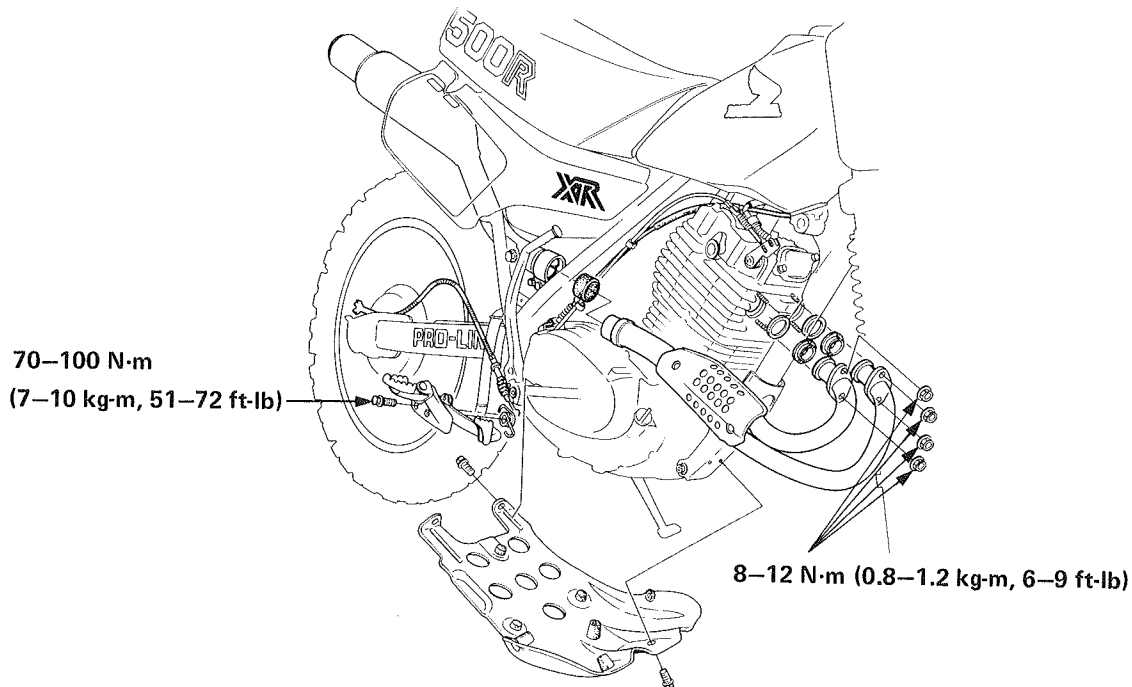
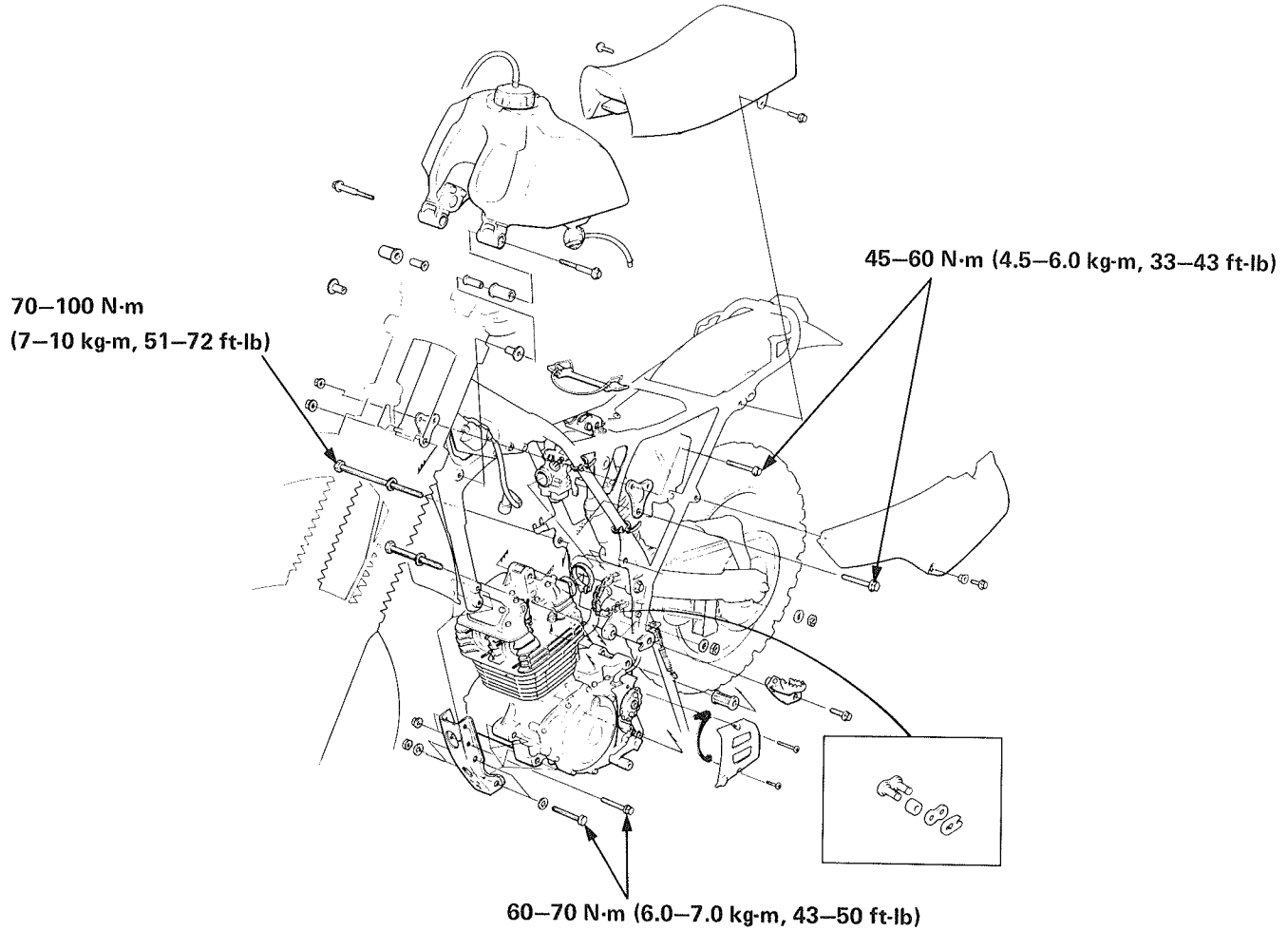


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ENGINE REMOVAL/INSTALLATION





SERVICE INFORMATION	5-1
ENGINE REMOVAL	5-2
ENGINE INSTALLATION	5-4

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- During removal and installation, support the vehicle with suitable blocks.
- A jack or adjustable support is required to maneuver the engine.
- Parts requiring engine removal for servicing:

Cylinder head	Section 6
Cylinder	Section 7
Crankshaft	Section 11
Balancer	Section 11
Transmission	Section 12

SPECIFICATIONS

Engine weight	40.5 kg (89.3 lb)
Oil capacity	2.0 lit (2.1 US qt, 1.8 Imp qt) after assembly 1.7 lit (1.8 US qt, 1.4 Imp qt) after draining

TORQUE VALUES

Engine hanger bolts:	
8 mm bolt	45 – 60 N·m (4.5 – 6.0 kg-m, 33 – 43 ft-lb)
10 mm bolt	60 – 70 N·m (6.0 – 7.0 kg-m, 43 – 50 ft-lb)
12 mm bolt	100 – 130 N·m (10.0 – 13.0 kg-m, 72 – 94 ft-lb)
Foot peg bolt	70 – 100 N·m (7.0 – 10.0 kg-m, 51 – 72 ft-lb)
Muffler band	15 – 25 N·m (1.5 – 2.5 kg-m, 11 – 18 ft-lb)
Exhaust manifold nut	8 – 12 N·m (0.8 – 1.2 kg-m, 6 – 9 ft-lb)
Rear axle nut	80 – 110 N·m (9.0 – 11.0 kg-m, 65 – 80 ft-lb)

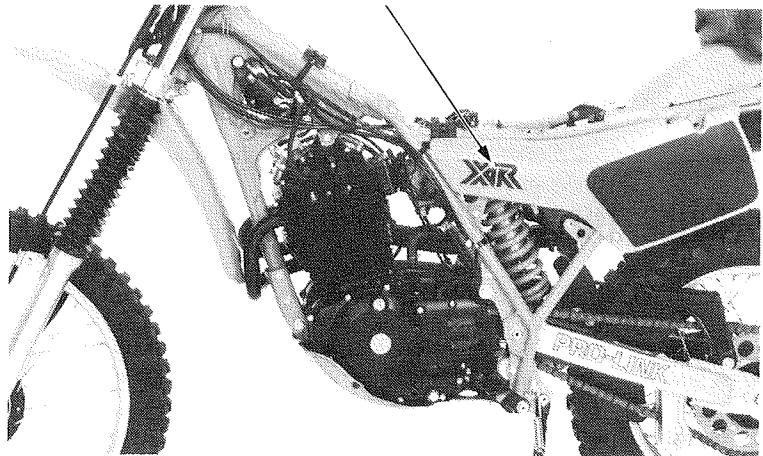


ENGINE REMOVAL/INSTALLATION

ENGINE REMOVAL

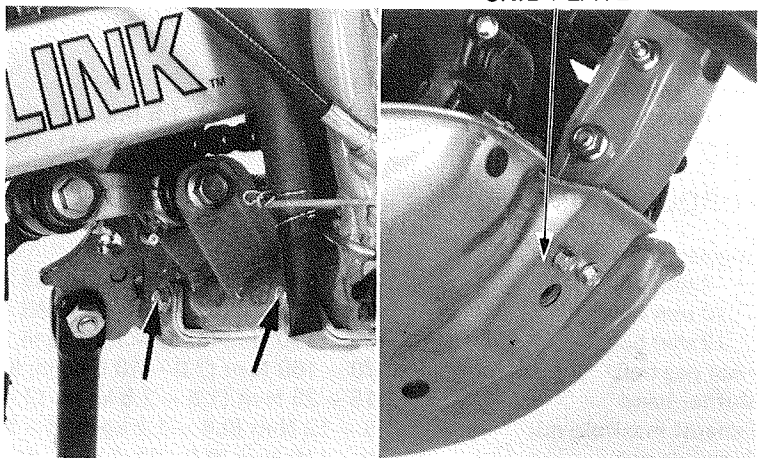
Drain the oil from the engine.
Remove the seat and fuel tank.
Remove the left and right side covers.

LEFT SIDE COVER



Remove the skid plate.

SKID PLATE

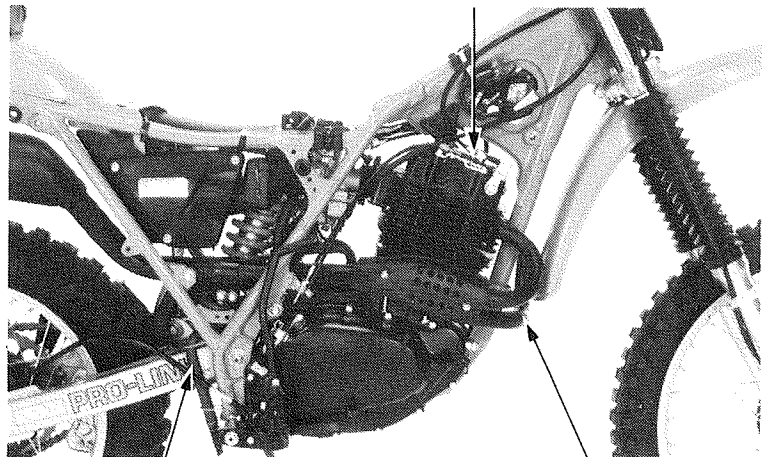


Disconnect the AC generator and pulse generator wire.

Disconnect the clutch cable.
Disconnect the manual starter decompressor cable.
Remove the exhaust pipe.

Disconnect the rear brake cable.
Remove the right foot peg and the brake pedal.

MANUAL DECOMPRESSOR CABLE



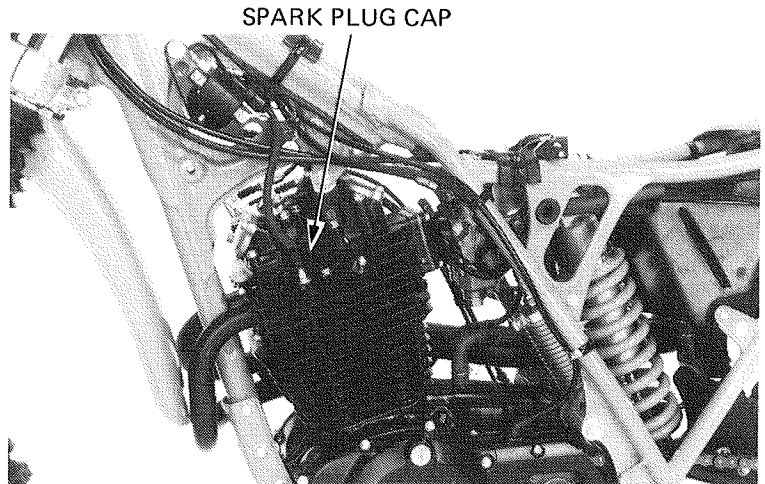
REAR BRAKE CABLE

EXHAUST PIPE



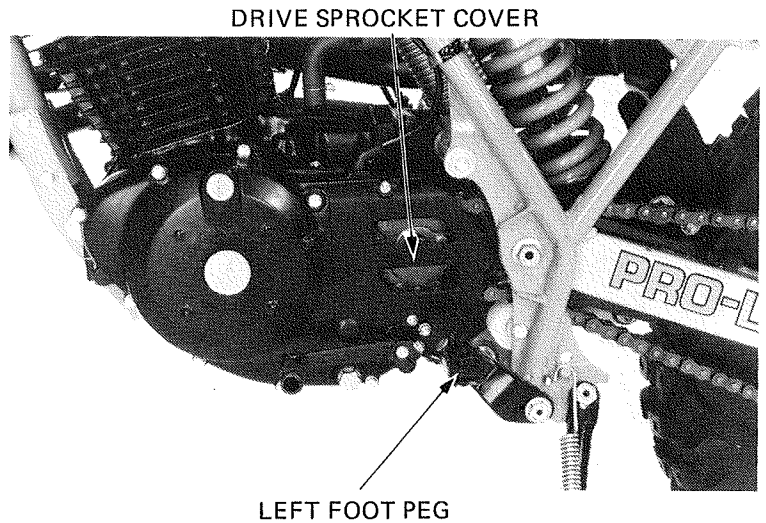
Remove the spark plug cap.
Remove the wire harness bands.

Disconnect the crankcase breather tube from the engine.
Remove the carburetor.



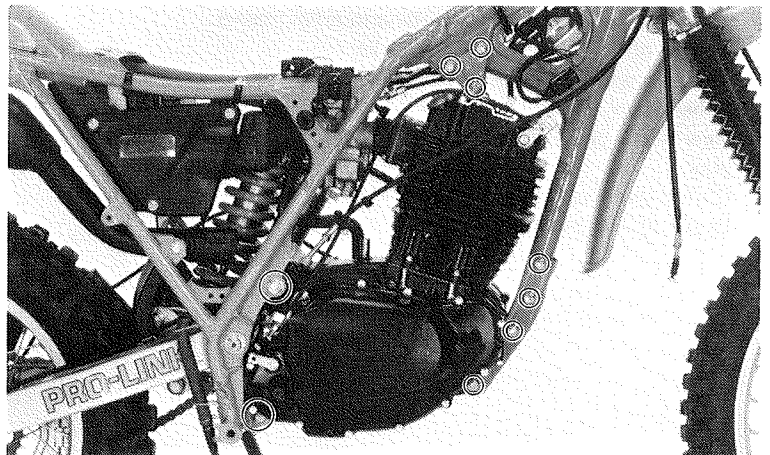
Remove the left foot peg.
Loosen the rear axle nut.
Turn the chain adjuster to loosen the chain.
Remove the drive sprocket cover.

Remove the chain clip and the master link.



Place a jack or padded block under the engine.
Remove the upper engine hanger bolts.

Remove the front engine hanger bracket.
Remove the rear engine hanger bolts.
Lower the jack and remove the engine.





ENGINE REMOVAL/INSTALLATION

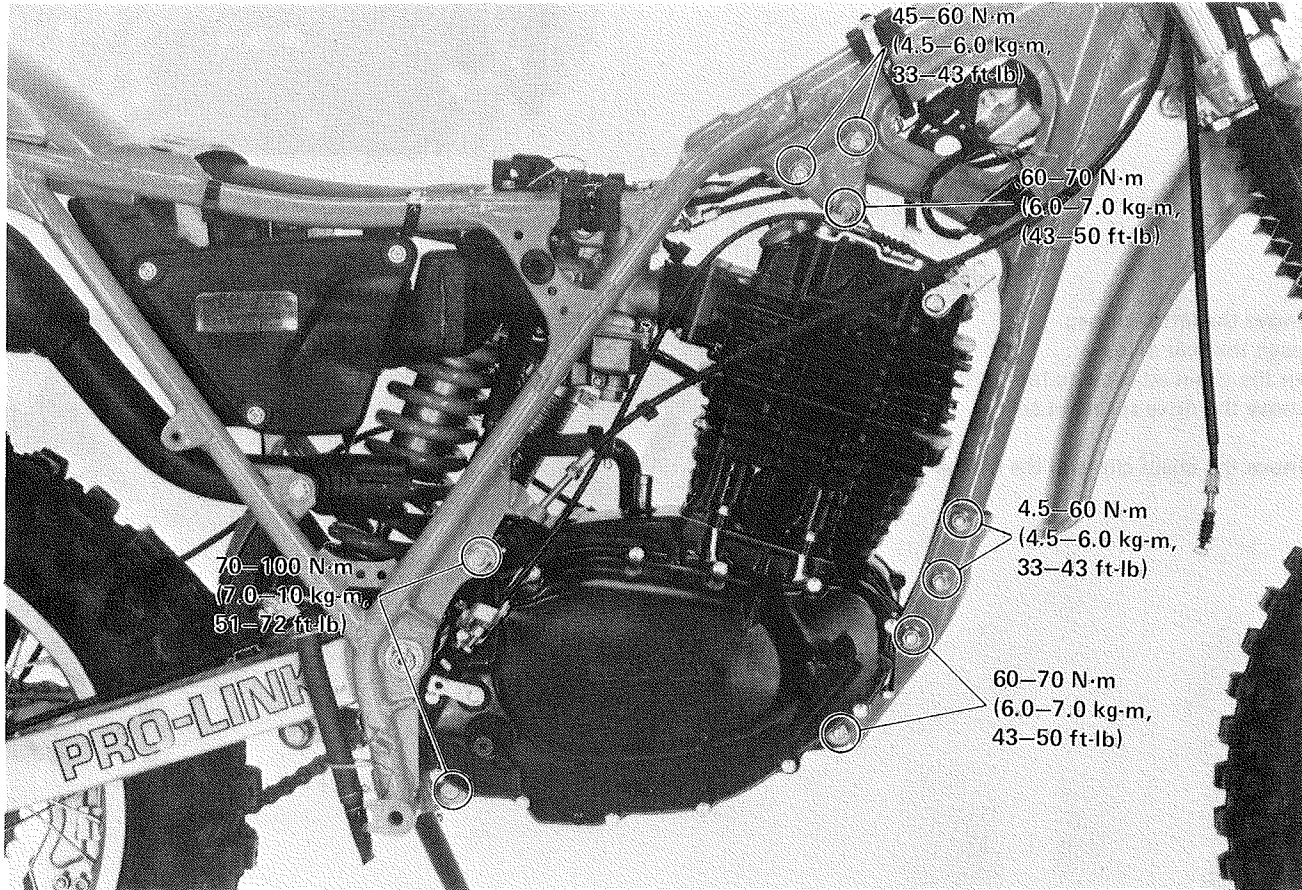
ENGINE INSTALLATION

Install the engine in the reverse order of removal, noting the following:

Replace any damaged or leaking exhaust pipe gaskets.

Tighten all bolts to the proper torque specifications.

Route all wire harnesses and cables properly (Page 1-8 and -9).



Perform the following inspections and adjustments:

- Engine oil (Page 2-2)
- Throttle grip free play (Page 3-5)
- Drive chain (Page 3-13)
- Rear brake pedal free play (Page 3-17)
- Clutch lever free play (Page 3-18)
- Check all electrical equipment.

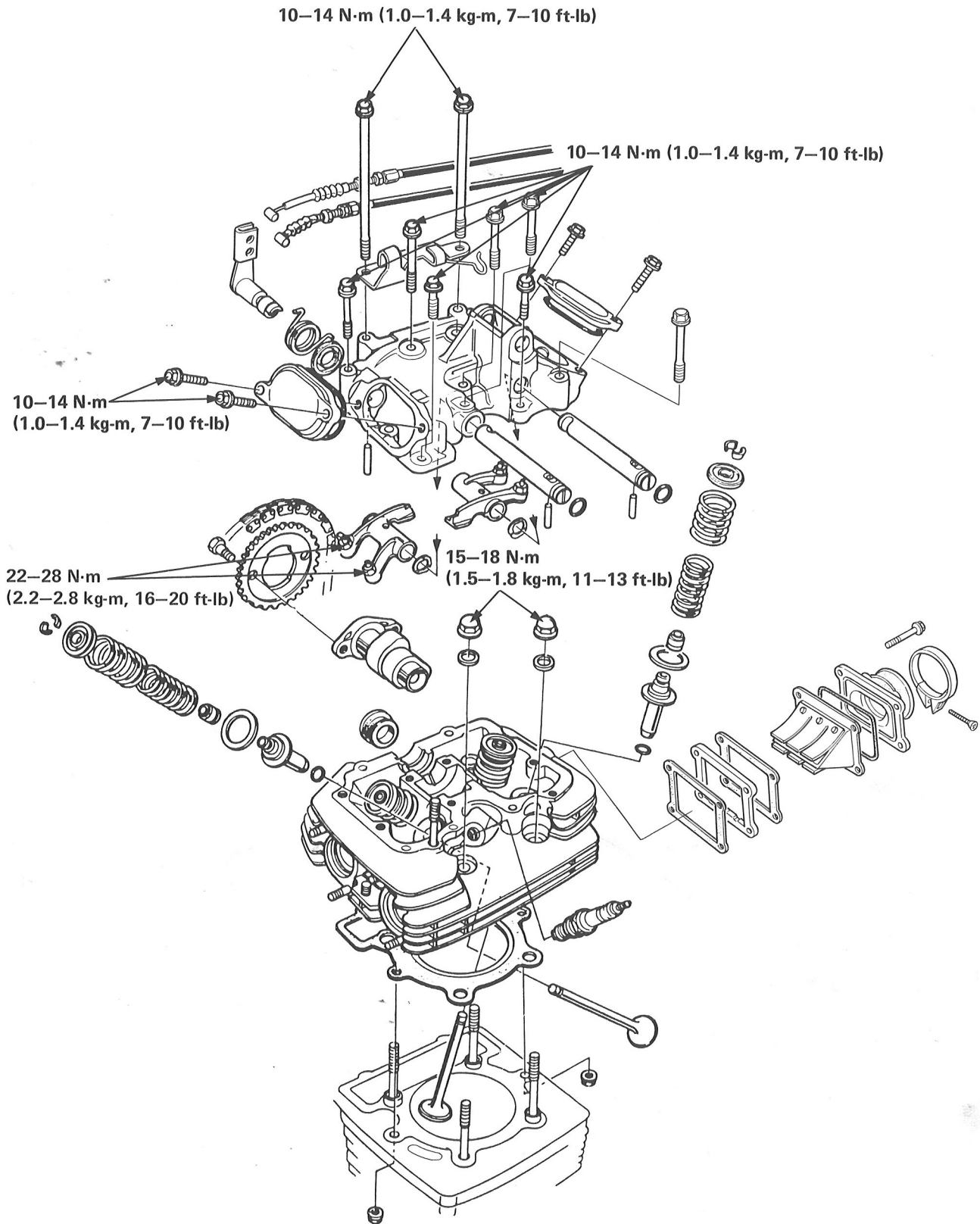


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CYLINDER HEAD/VALVES





SERVICE INFORMATION	6-1
TROUBLESHOOTING	6-3
CYLINDER HEAD COVER REMOVAL	6-4
CYLINDER HEAD COVER DISASSEMBLY	6-4
CAMSHAFT REMOVAL	6-6
CYLINDER HEAD REMOVAL	6-9
CYLINDER HEAD DISASSEMBLY	6-9
VALVE SEAT INSPECTION AND REFACING	6-12
CYLINDER HEAD ASSEMBLY	6-16
CYLINDER HEAD INSTALLATION	6-17
CAMSHAFT INSTALLATION	6-18
CYLINDER HEAD COVER ASSEMBLY	6-20
CYLINDER HEAD COVER INSTALLATION	6-20

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- This section covers maintenance of the cylinder head, valves, camshaft and rocker arms.
- The engine must be removed from the frame for top-end service.
- Camshaft lubricating oil is fed to the cylinder head through an oil control orifice in the engine case. Be sure these orifices are not clogged and that the O-rings and dowel pins are in place before installing the cylinder head.
- Before assembly, apply molybdenum disulfide grease to the camshaft bearings to provide initial lubrication.
- Pour clean engine oil into the oil pockets in the cylinder head to lubricate the cam.

TOOLS

SPECIAL

Valve guide reamer 07984-6570100

COMMON

Valve guide remover 6.6 mm 07742-0010200
 Valve spring compressor 07757-0010000 (or 07957-3290001)
 Valve guide driver B 07742-0020200 (or 07942-3290200)

TORQUE VALUES

Cylinder head nut 22 – 28 N·m (2.2 – 2.8 kg-m, 16 – 20 ft-lb)
 Cam sprocket bolt 17 – 23 N·m (1.7 – 2.3 kg-m, 12 – 17 ft-lb)
 Valve adjuster cover 10 – 14 N·m (1.0 – 1.4 kg-m, 7 – 10 ft-lb)
 Cylinder head cover 10 – 14 N·m (1.0 – 1.4 kg-m, 7 – 10 ft-lb)
 Valve adjuster lock nut 15 – 18 N·m (1.5 – 1.8 kg-m, 11 – 13 ft-lb)

VALVE SEAT CUTTER (The following are commercially available in the U.S.A.)

Valve seat cutter 35 mm 07780-0010400
 Valve seat cutter 40 mm 07780-0010500
 Valve flat cutter 35 mm 07780-0012300
 Valve flat cutter 38.5 mm 00780-0012400
 Valve interior cutter 30 mm 00780-0014000
 Valve interior cutter 37.5 mm 00780-0014100
 Cutter holder 6.6 mm 00781-0010200

**CYLINDER HEAD/VALVES****SPECIFICATIONS**

ITEM			STANDARD	SERVICE LIMIT
Compression			12.5 ± 1.5 kg/cm ² (172 ± 21 psi)	_____
Camshaft	Cam lift	IN	36.431 mm (1.4343 in)	36.23 mm (1.426 in)
		EX	36.466 mm (1.4357 in)	36.27 mm (1.428 in)
	Journal O.D.	Right	23.954–23.975 mm (0.9431–0.9439 in)	23.9 mm (0.94 in)
		Left	19.954–19.975 mm (0.7856–0.7864 in)	19.9 mm (0.78 in)
	Run out		_____	0.04 mm (0.002 in)
Side clearance		0.05–0.25 mm (0.002–0.010 in)	0.4 mm (0.02 in)	
Rocker arm	I.D.		12.000–12.018 mm (0.4724–0.4731 in)	12.05 mm (0.474 in)
Rocker arm shaft	O.D.		11.966–11.984 mm (0.4711–0.4718 in)	11.91 mm (0.469 in)
Rocker arm shaft-to-arm clearance			0.016–0.052 mm (0.0006–0.0020 in)	0.14 mm (0.006 in)
Valve spring	Free length	Inner	38.1 mm (1.50 in)	37.0 mm (1.46 in)
		Outer	36.24 mm (1.427 in)	35.3 mm (1.39 in)
	Preload/length	Inner	7.49 ± 0.5 kg/26 mm (16.5 ± 1.1 lb/1.02 in)	_____
		Outer	13.19 ± 0.8 kg/29.0 mm (29.1 ± 1.7 lb/1.14 in)	_____
Valve	Stem O.D.	IN	6.575–6.590 mm (0.2589–0.2594 in)	6.565 mm (0.2585 in)
		EX	6.560–6.570 mm (0.2583–0.2587 in)	6.550 mm (0.2579 in)
	Guide I.D.	IN	6.600–6.615 mm (0.2598–0.2421 in)	6.63 mm (0.261 in)
		EX	6.600–6.615 mm (0.2598–0.2421 in)	6.63 mm (0.261 in)
	Stem-to-guide Clearance	IN	0.010–0.040 mm (0.0004–0.0016 in)	0.065 mm (0.0026 in)
		EX	0.030–0.055 mm (0.0012–0.0022 in)	0.080 mm (0.0031 in)
	Valve face width	IN/EX	1.2–1.4 mm (0.05–0.06 in)	2.0 mm (0.08 in)
	Cylinder head	Warpage		_____
Valve seat width		IN/EX	1.2–1.4 mm (0.05–0.06 in)	2.0 mm (0.08 in)
Camshaft bearing	I.D.	Left	20.000–20.021 mm (0.7874–0.7882 in)	20.07 mm (0.790 in)
		Right	24.000–24.021 mm (0.9449–0.9457 in)	24.07 mm (0.948 in)



TROUBLESHOOTING

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

Uneven or Low Compression

1. Valve
 - Incorrect valve adjustment
 - Burned or bent valves
 - Incorrect valve timing
 - Broken valve spring
2. Cylinder head
 - Leaking or damaged head gasket
 - Warped or cracked cylinder head
3. Cylinder and piston (Refer to Section 7)
4. Decompressor out of adjustment

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 or worn rocker arm or camshaft
4. Loose or worn cam chain
5. Worn or damaged cam chain tensioner
6. Loose balancer chain
7. Worn cam sprocket teeth

Poor Idling

1. Compression too low
2. Decompressor out of adjustment

Hard Kick Starting

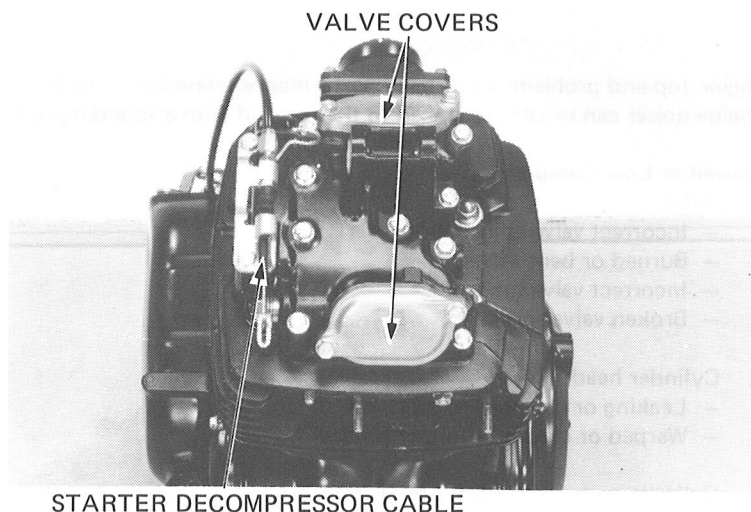
1. Decompressor out of adjustment



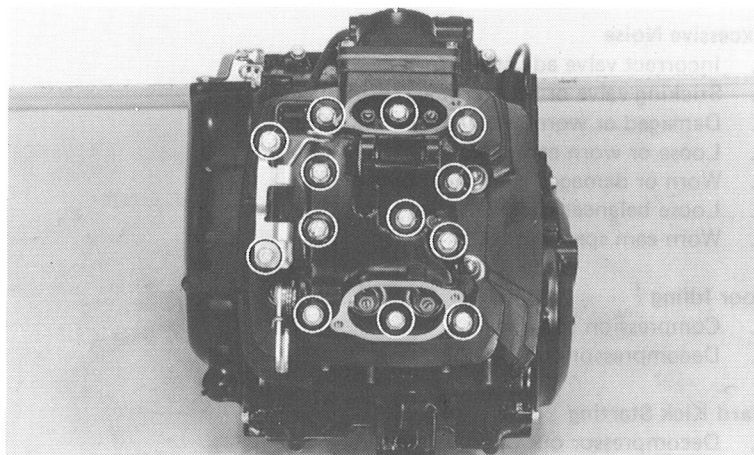
CYLINDER HEAD/VALVES

CYLINDER HEAD COVER REMOVAL

Remove the engine from the frame (See Section 5).
Loosen the decompressor cable lock nut and remove the cable from the holder.
Disconnect the cable from the valve lifter lever.
Remove the valve cover.



Remove the cylinder head cover bolts and nut.
Remove the cylinder head cover.

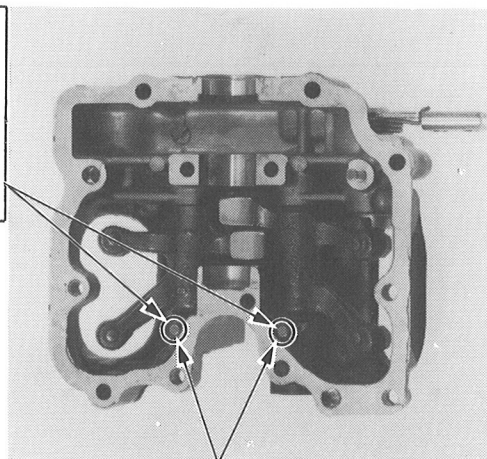
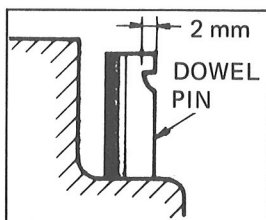


CYLINDER HEAD COVER DISASSEMBLY

Notch the dowel pins as shown using a rotary grinder.

CAUTION:

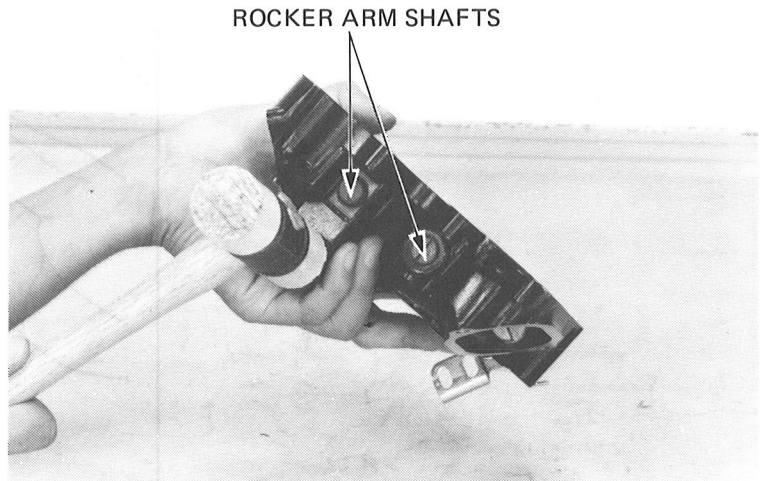
Be careful not to damage the cylinder head cover.



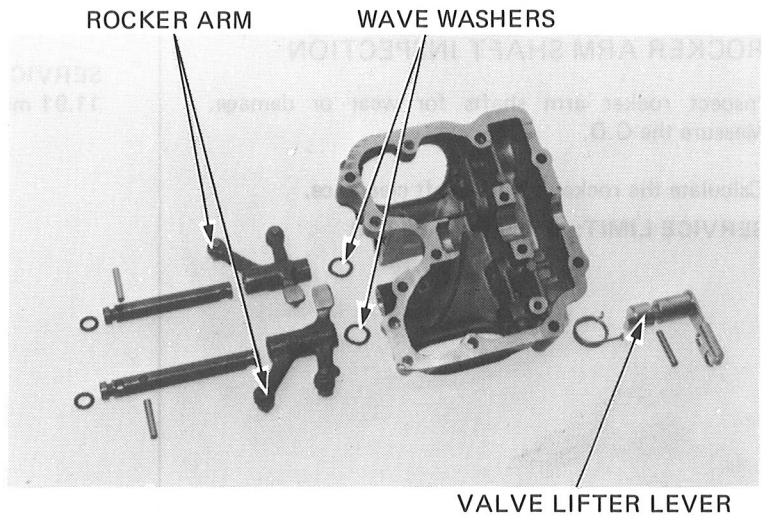
DOWEL PINS



Remove the rocker arm shafts by tapping them with a plastic hammer.



Remove the rocker arms and wave washers from the shafts.
Remove the valve lifter lever and spring.



ROCKER ARM INSPECTION

Inspect the rocker arms for damage, wear or clogged oil holes.

NOTE

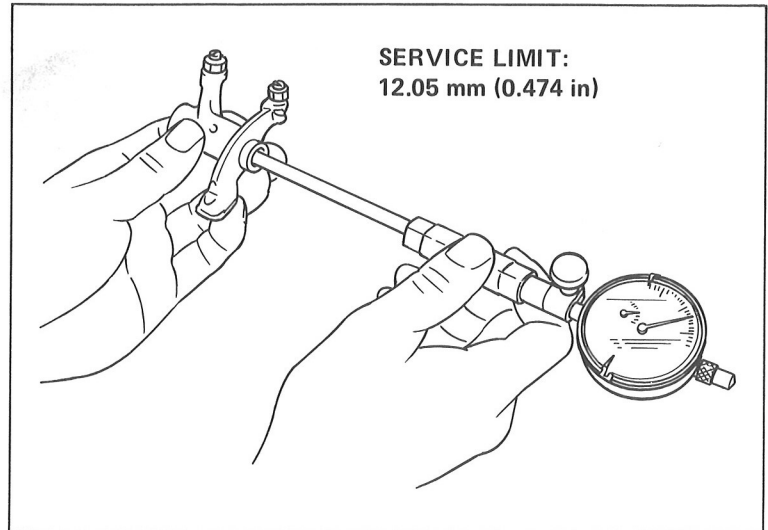
If any rocker arms require servicing or replacement, inspect the cam lobes for scoring, chipping or flat spots.





CYLINDER HEAD/VALVES

Measure the I.D. of each rocker arm.

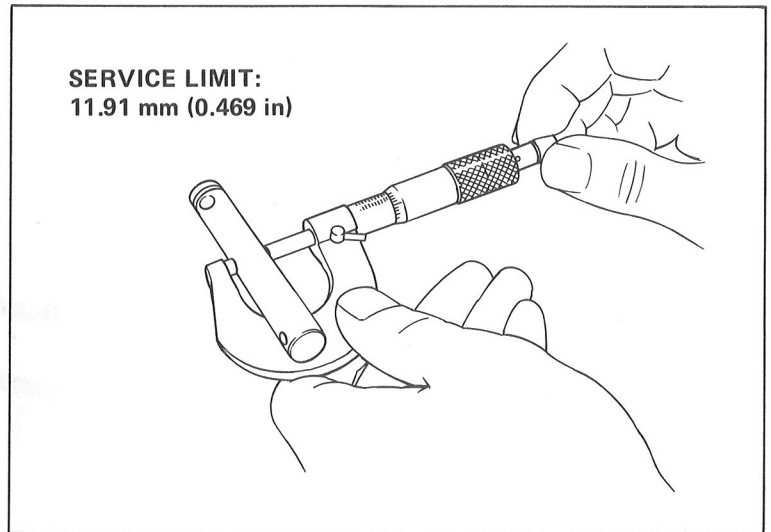


ROCKER ARM SHAFT INSPECTION

Inspect rocker arm shafts for wear or damage.
Measure the O.D.

Calculate the rocker arm-to-shaft clearance.

SERVICE LIMIT: 0.14 mm (0.006 in)



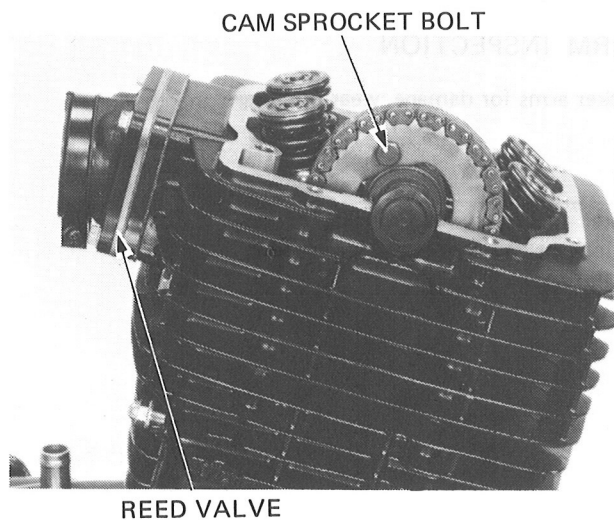
CAMSHAFT REMOVAL

Remove the crankshaft hole cap and timing hole cap.
Remove the reed valve.

Remove the camshaft plug.
Remove the cam sprocket bolts.

NOTE

Do not drop the bolts into the crankcase.

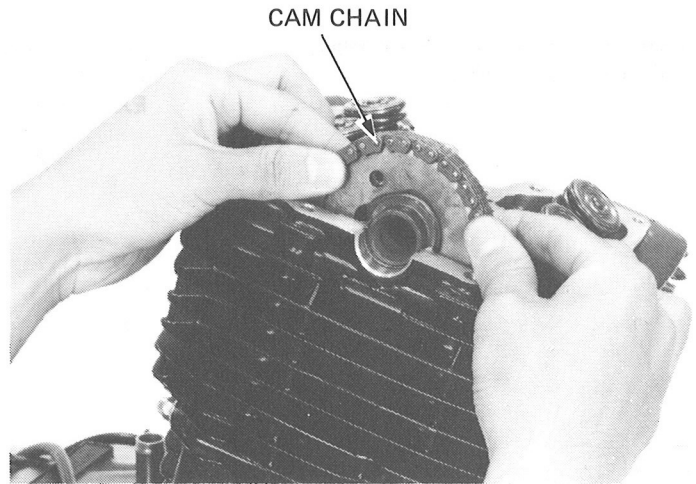




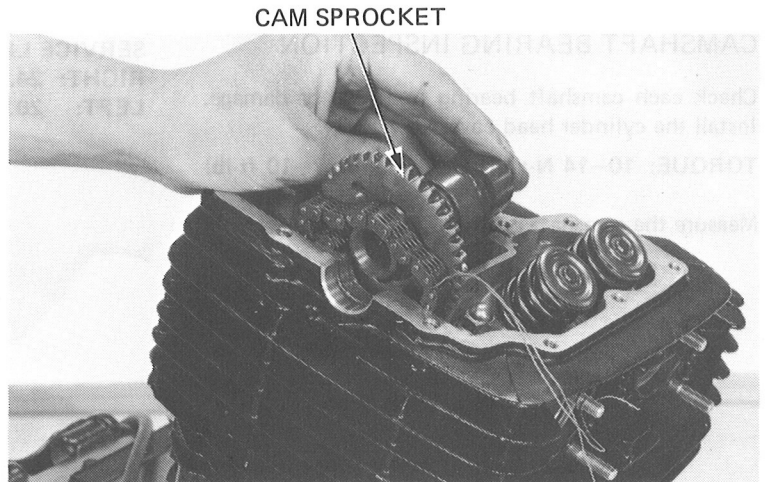
Turn the crankshaft counterclockwise until the cam sprocket cut-outs are even with the end of the cylinder head as shown.

Pull the cam sprocket off the camshaft and remove the cam chain from the cam sprocket.

Suspend the cam chain with a piece of wire to keep it from falling into the crankcase.



Pull the camshaft up as shown and remove the sprocket and camshaft.



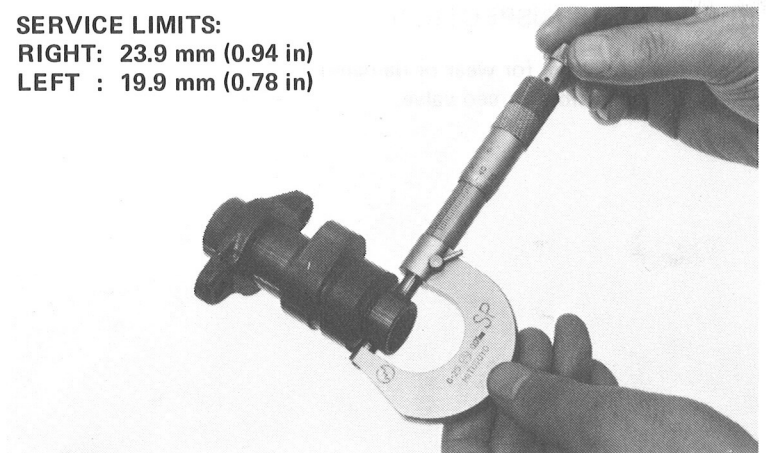
CAMSHAFT INSPECTION

Check the camshaft journals for wear or damage.
Measure the O.D. of each journal.

SERVICE LIMITS:

RIGHT: 23.9 mm (0.94 in)

LEFT : 19.9 mm (0.78 in)





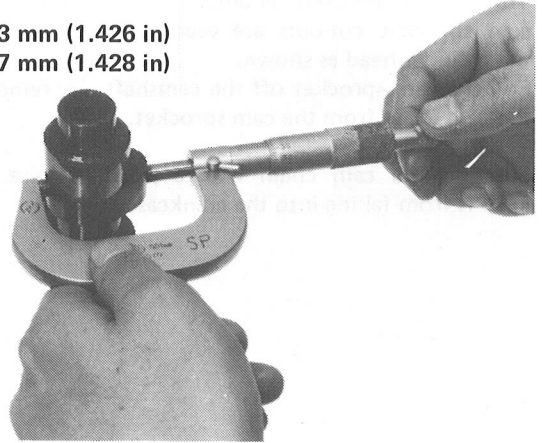
CYLINDER HEAD/VALVES

Check each cam lobe for wear or damage.
Measure the cam lobe height.

SERVICE LIMITS:

INTAKE : 36.23 mm (1.426 in)

EXHAUST : 36.27 mm (1.428 in)



CAMSHAFT BEARING INSPECTION

Check each camshaft bearing for wear or damage.
Install the cylinder head cover.

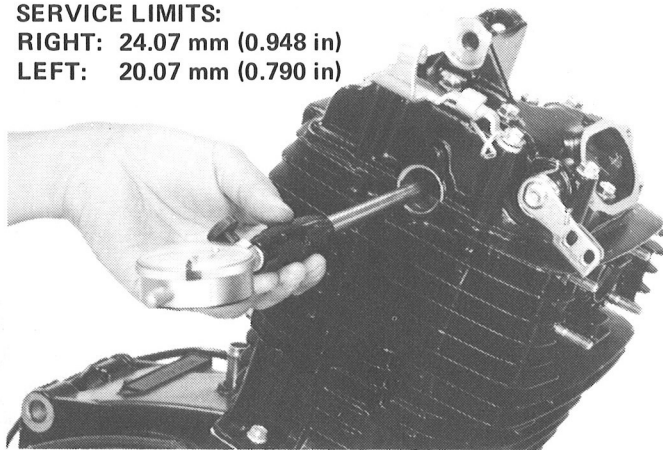
TORQUE: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

Measure the camshaft bearing I.D.

SERVICE LIMITS:

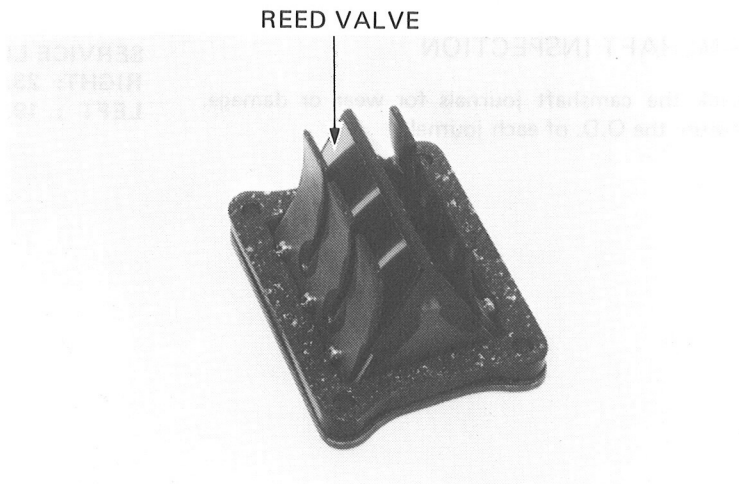
RIGHT: 24.07 mm (0.948 in)

LEFT: 20.07 mm (0.790 in)



REED VALVE INSPECTION

Check the reed valve for wear or damage.
Check the operation of reed valve.

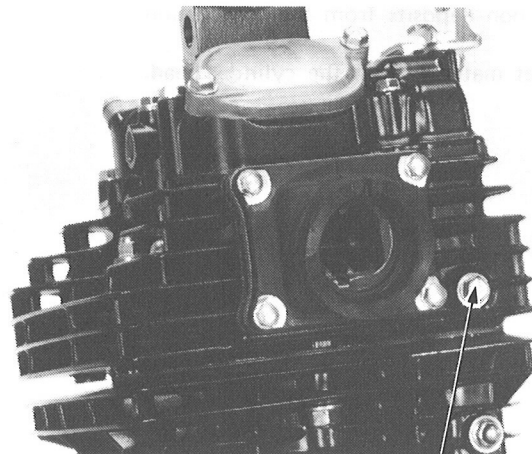




CYLINDER HEAD REMOVAL

Remove the cylinder head cover.
Remove the camshaft (Page 6-6).

Remove the cylinder head nuts.
Remove the tensioner bolt and washer.



TENSIONER BOLT

Remove the cap nuts and washer.

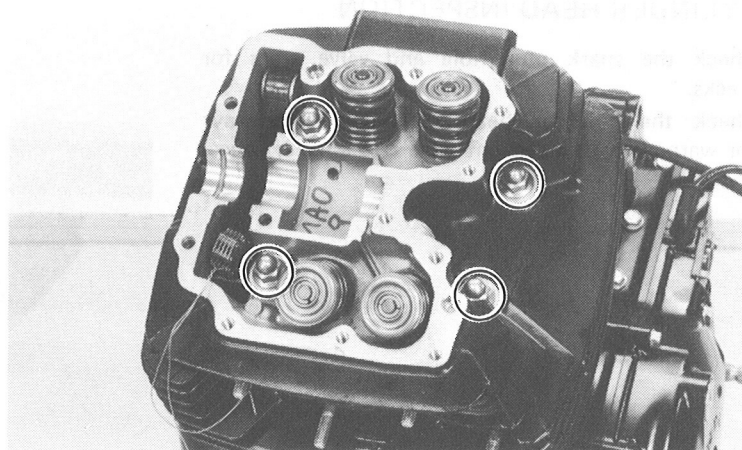
NOTE

Loosen the nuts in a crisscross pattern in two or more steps.

Remove the cylinder head.

NOTE

Avoid damaging the cylinder head mating surfaces.



CYLINDER HEAD DISASSEMBLY

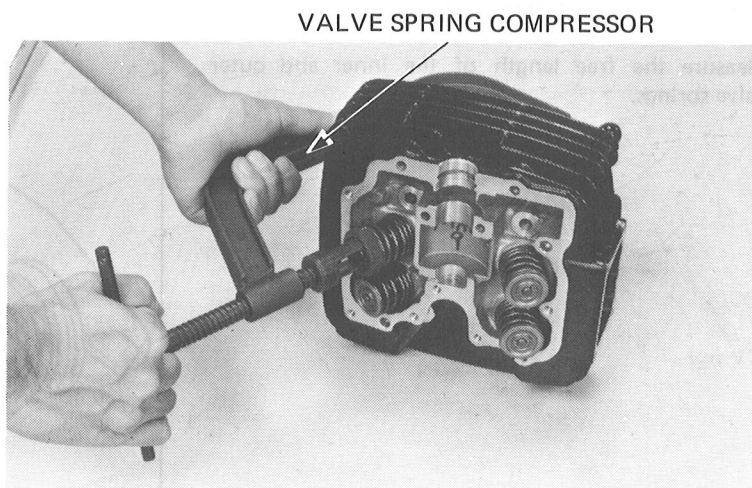
Remove the valve spring cotters, retainers, springs, and valves with a valve spring compressor.

CAUTION:

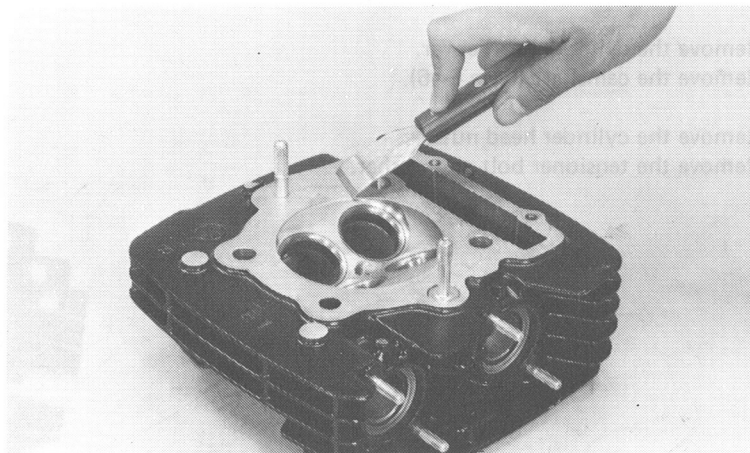
To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.

NOTE

Mark all parts to ensure correct assembly.



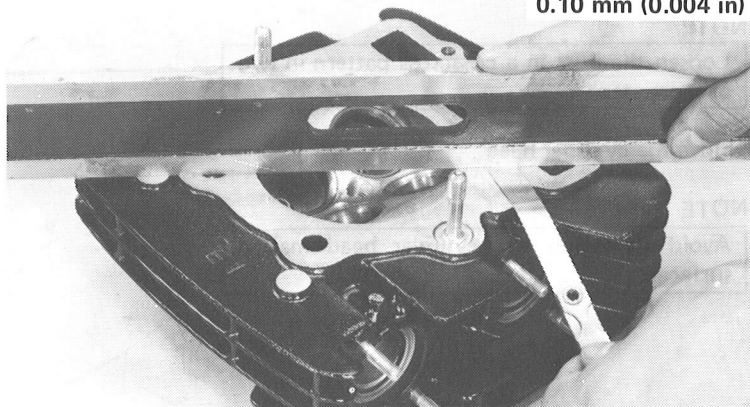
Remove the carbon deposits from the combustion chambers.
Clean any gasket material from the cylinder head.



CYLINDER HEAD INSPECTION

Check the spark plug hole and valve areas for cracks.
Check the cylinder head diagonally two ways for warpage with a straight edge and a feeler gauge.

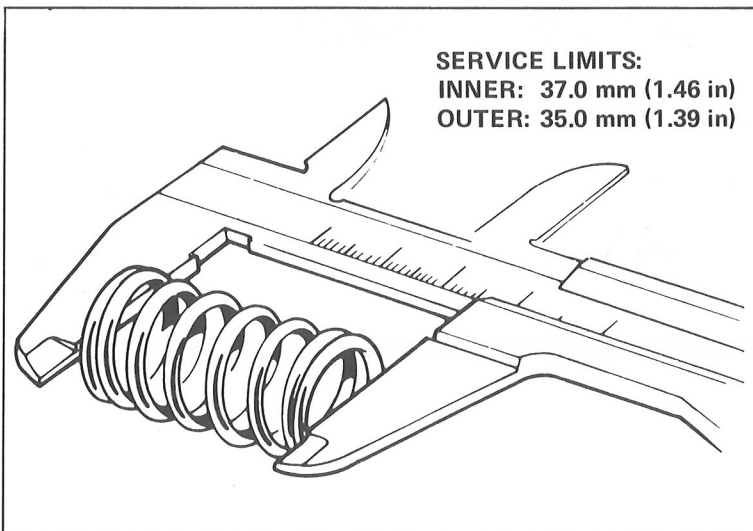
SERVICE LIMIT:
0.10 mm (0.004 in)



VALVE SPRING INSPECTION

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

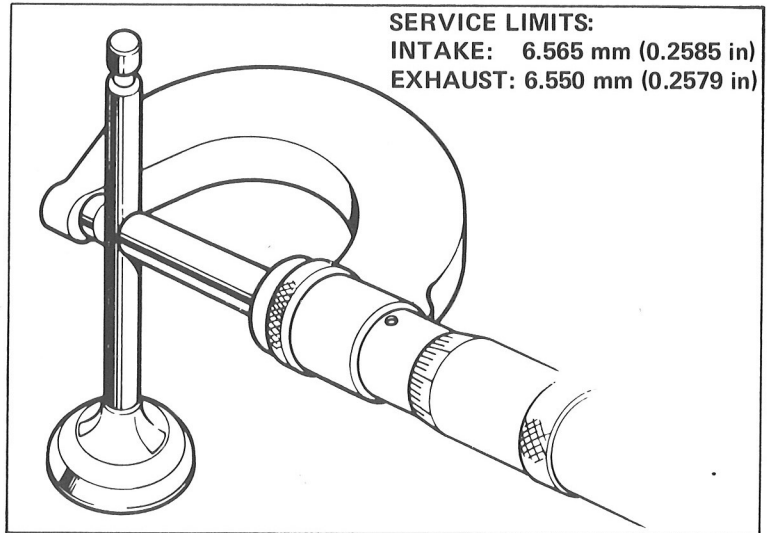
SERVICE LIMITS:
INNER: 37.0 mm (1.46 in)
OUTER: 35.0 mm (1.39 in)





VALVE/VALVE GUIDE INSPECTION

Inspect each valve for trueness, burning, scratches or abnormal stem wear.
Check the valve movement in the guide. Measure and record each valve stem O.D.



Measure and record each valve guide I.D. using a ball gauge or inside micrometer.

NOTE

Ream the guides to remove the carbon build-up before checking the valve guide I.D.

Calculate the stem-to-guide clearance.

VALVE STEM-TO-GUIDE CLEARANCE

SERVICE LIMITS:

INTAKE: 0.065 mm (0.0026 in)

EXHAUST: 0.080 mm (0.0031 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.

If stem-to-guide clearance still exceeds the service limit when new guides are installed, replace the valves.

NOTE

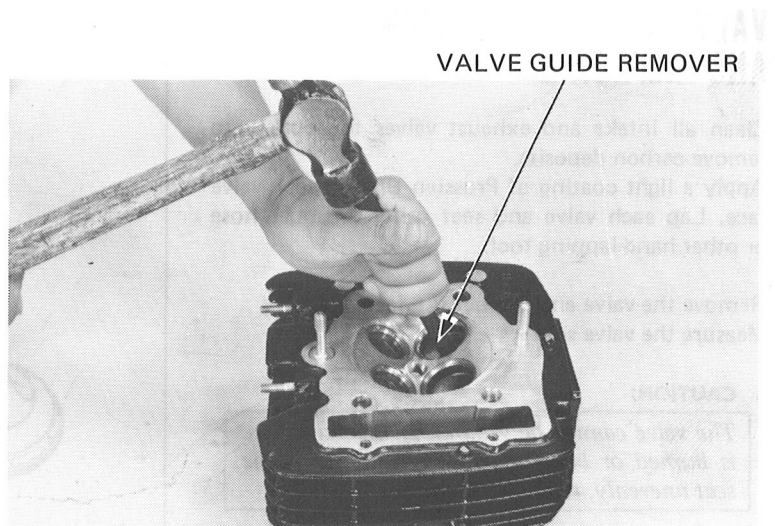
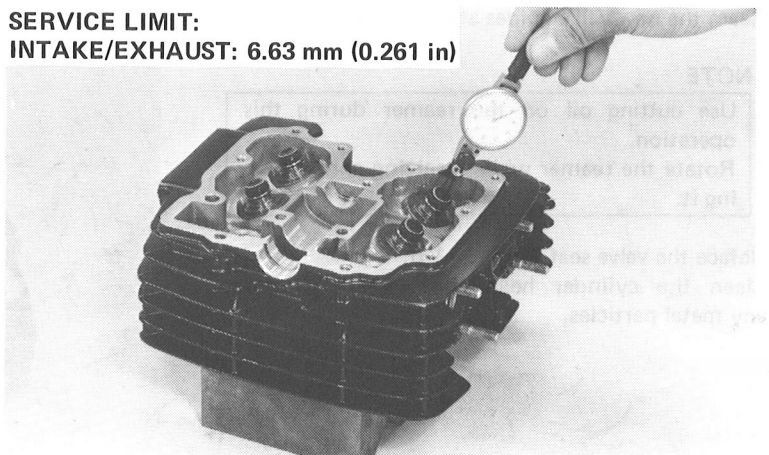
Reface valve seats whenever new valve guides are installed.

VALVE GUIDE REPLACEMENT

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

NOTE

When driving out the valve guide, do not damage the head.



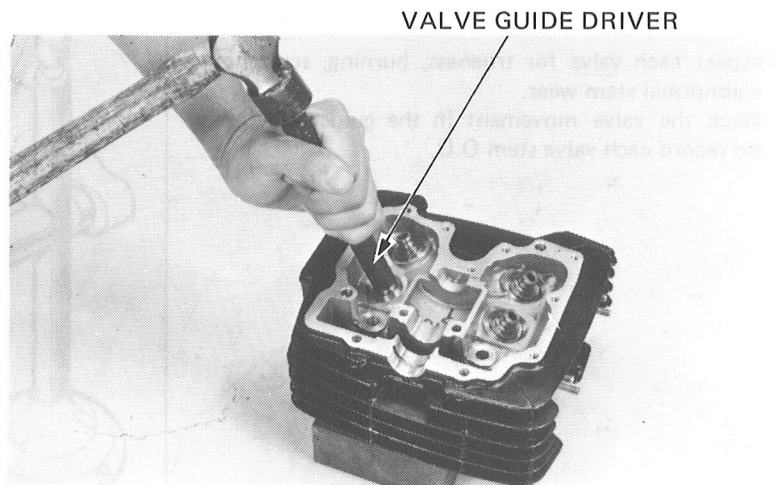


CYLINDER HEAD/VALVES

Install a new valve guide from the top of the head.

NOTE

Inspect the valve guide for damage.

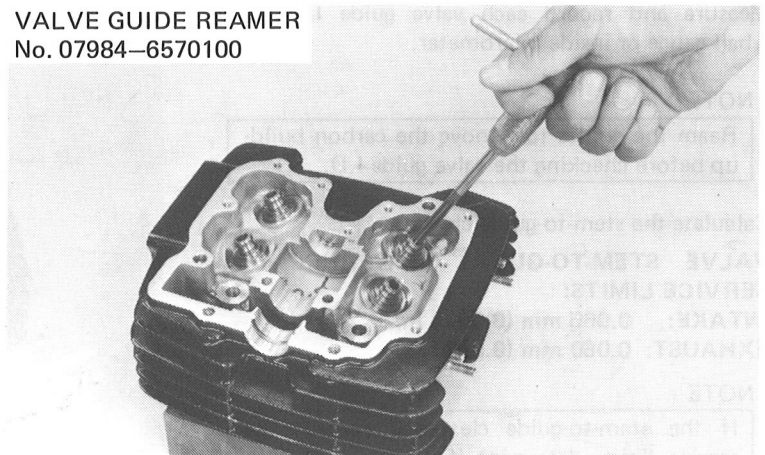


Ream the new valve guides after installation.

NOTE

Use cutting oil on the reamer during this operation.
Rotate the reamer while inserting and removing it.

VALVE GUIDE REAMER
No. 07984-6570100



Reface the valve seat (Page 6-13).
Clean the cylinder head thoroughly to remove any metal particles.

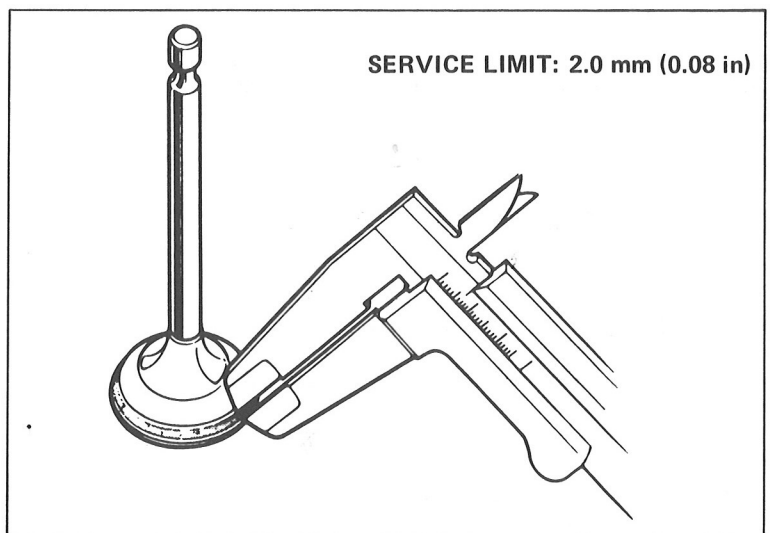
VALVE SEAT INSPECTION AND REFACING

Clean all intake and exhaust valves thoroughly to remove carbon deposits.
Apply a light coating of Prussian Blue 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.
Measure the valve seat.

CAUTION:

The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.





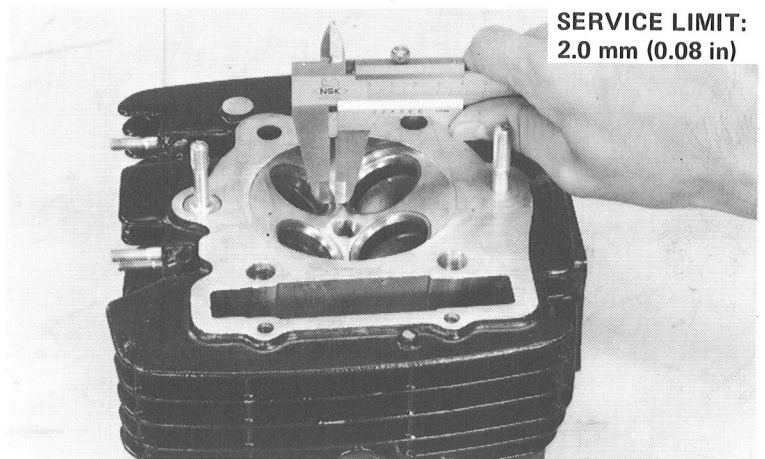
Inspect each valve seat.

STANDARD: 1.2–1.4 mm (0.05–0.06 in)

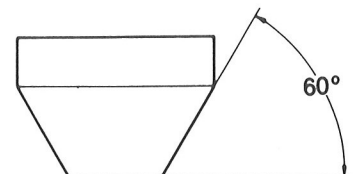
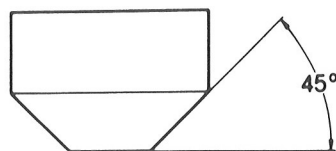
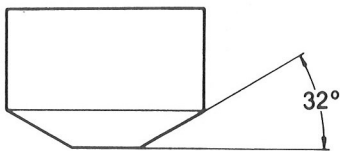
If the seat is too wide, too narrow, or has low spots, the seat must be refinished for good sealing.

NOTE

Follow the refacer manufacturer's operating instructions.



VALVE SEAT CUTTERS



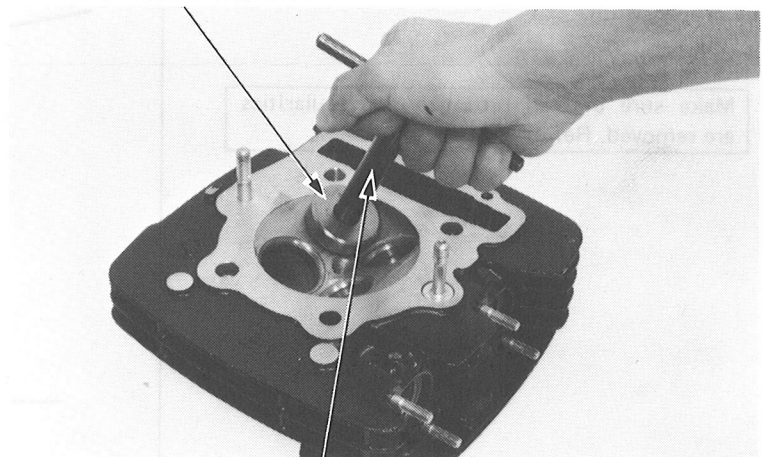
VALVE SEAT GRINDING

Using a 45 degree cutter, remove any roughness or irregularities from the seat.

NOTE

Reface the seat with a 45 degree cutter when the valve guide is replaced.

VALVE SEAT CUTTER

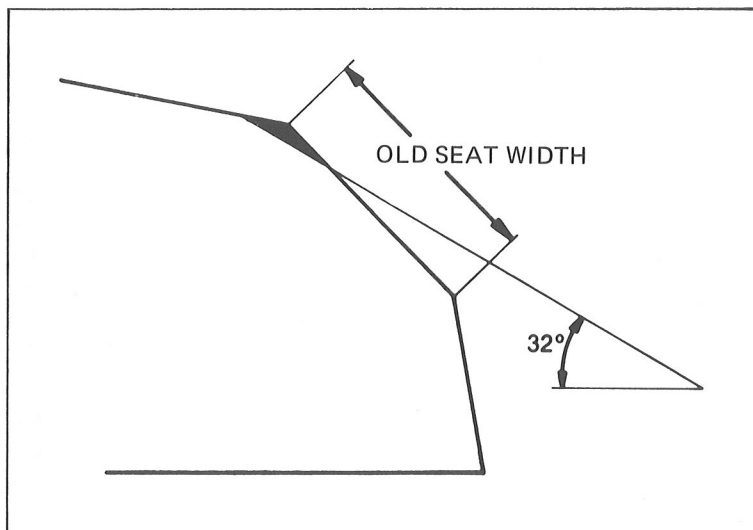


CUTTER HOLDER

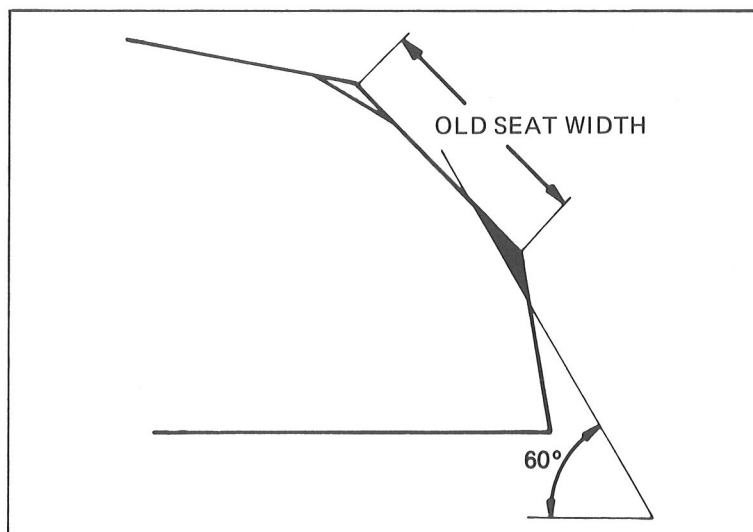


CYLINDER HEAD/VALVES

Using a 32 degree cutter, remove 1/4 of the existing valve seat material.



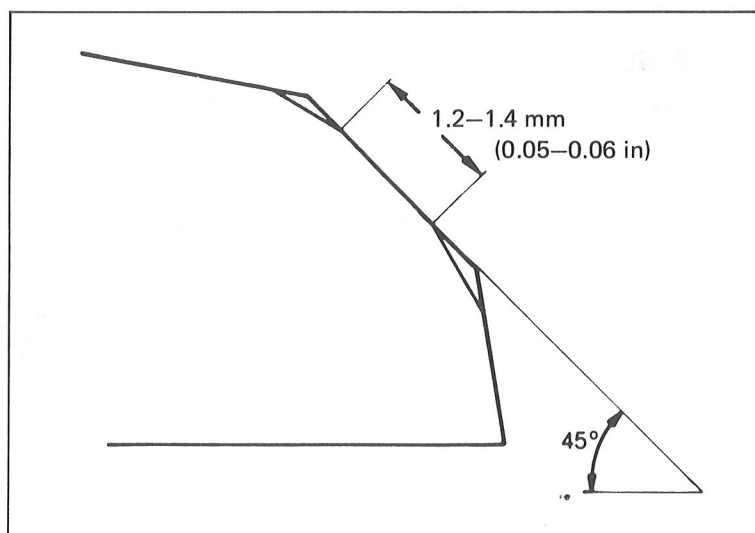
Use a 60 degree cutter and remove the bottom 1/4 of the old seat.



Use a 45 degree finish cutter and cut the seat to the proper width.

NOTE

Make sure that all pitting and irregularities are removed. Refinish if necessary.





NOTE

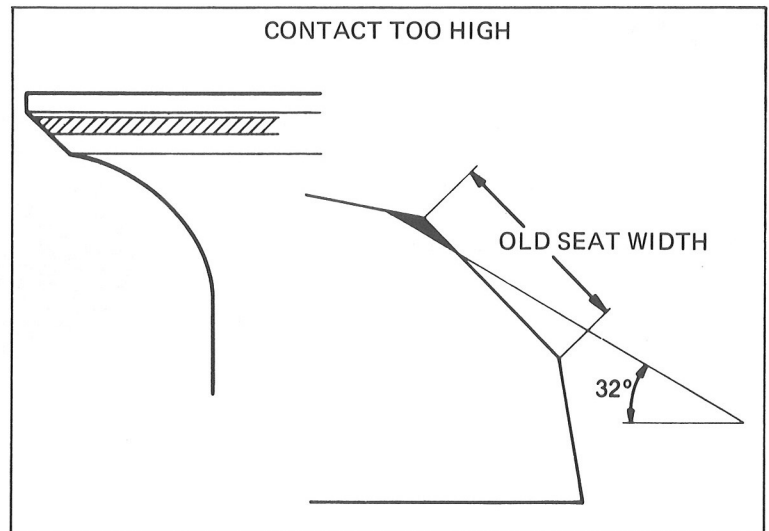
The location of the valve seat in relation to the valve face is very important for good sealing.

Apply a thin coating of Prussian Blue to the valve seat.

Press the valve through the valve guide and onto the seat to make a clear pattern.

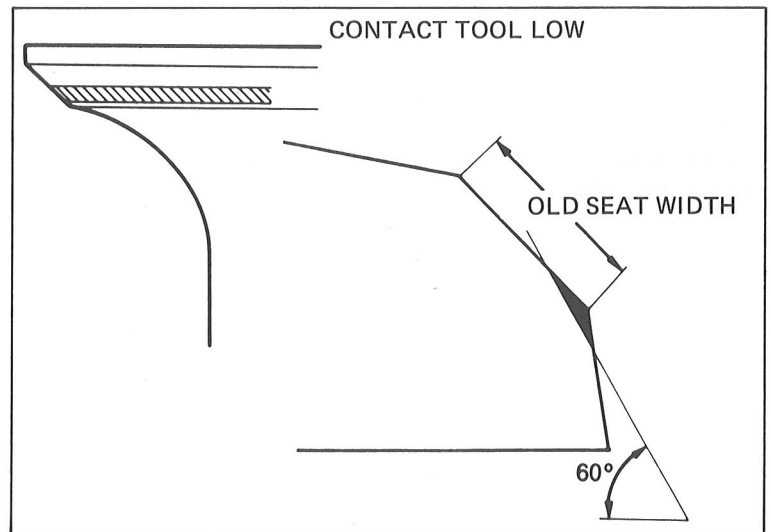
Remove to inspect the valve.

If the contact area is too high on the valve, the seat must be lowered using a 32 degree flat cutter.



If the contact area is too low on the valve, the seat must be raised using a 60 degree inner cutter.

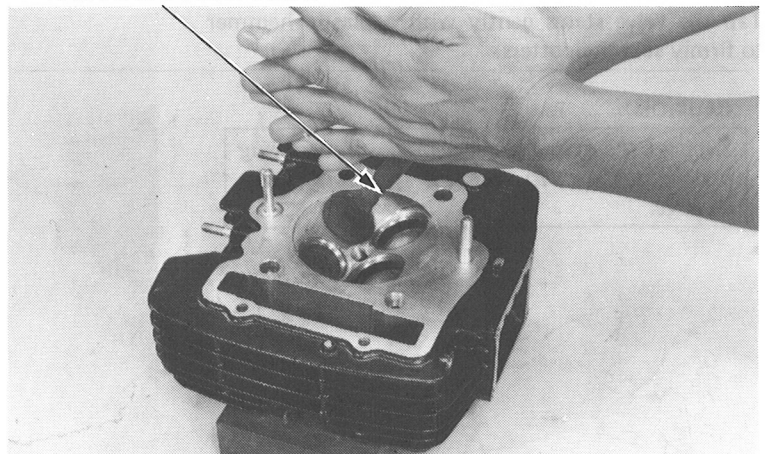
Refinish the seat to specifications, using a 45 degree finish cutter.



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

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

VALVE LAPPING TOOL





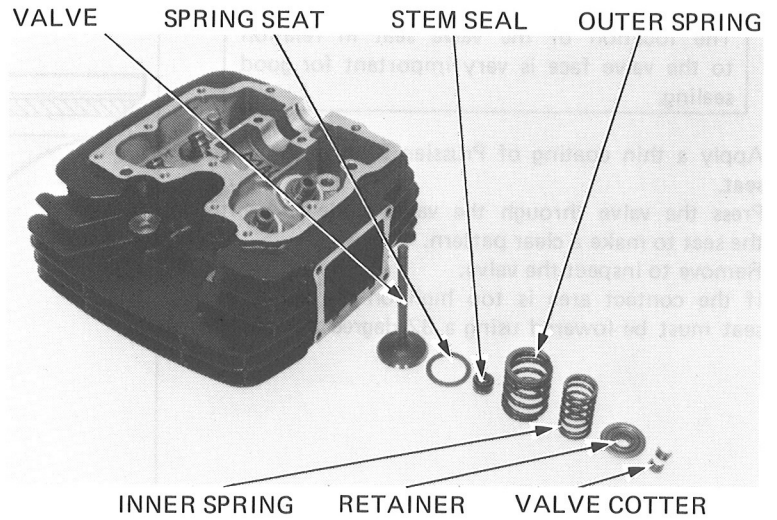
CYLINDER HEAD/VALVES

CYLINDER HEAD ASSEMBLY

NOTE

Install new valve stem seals when assembling.

Lubricate each valve stem with oil.
Insert the valves into the valve guides.
Install the valve springs and retainers.

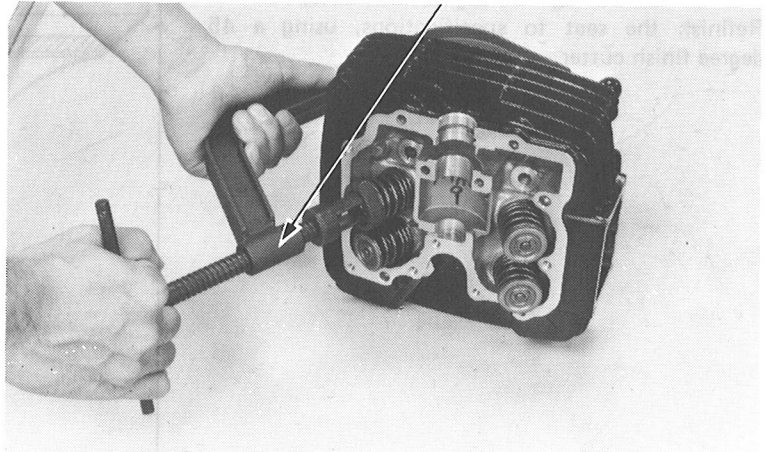


Install the valve cotters.

CAUTION:

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

VALVE SPRING COMPRESSOR

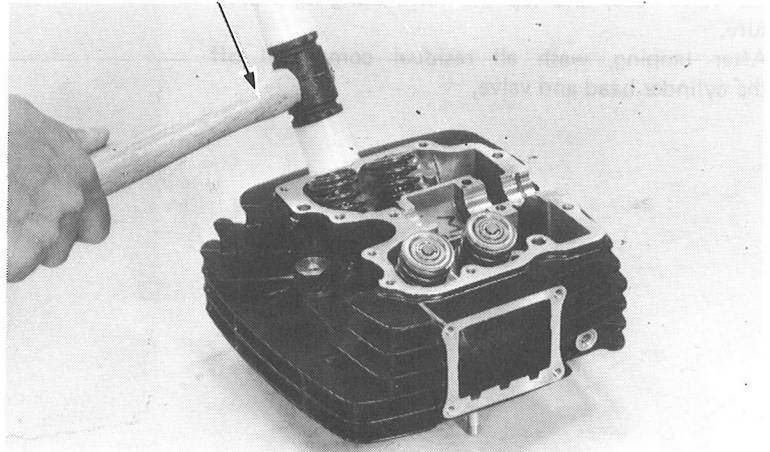


Tap the valve stems gently with a plastic hammer to firmly seat the cotters.

CAUTION:

Support the cylinder head above the working bench surface to prevent possible valve damage.

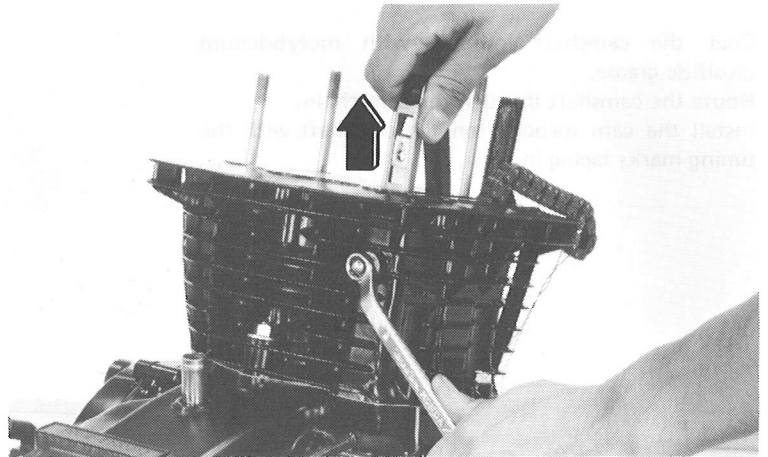
PLASTIC HAMMER



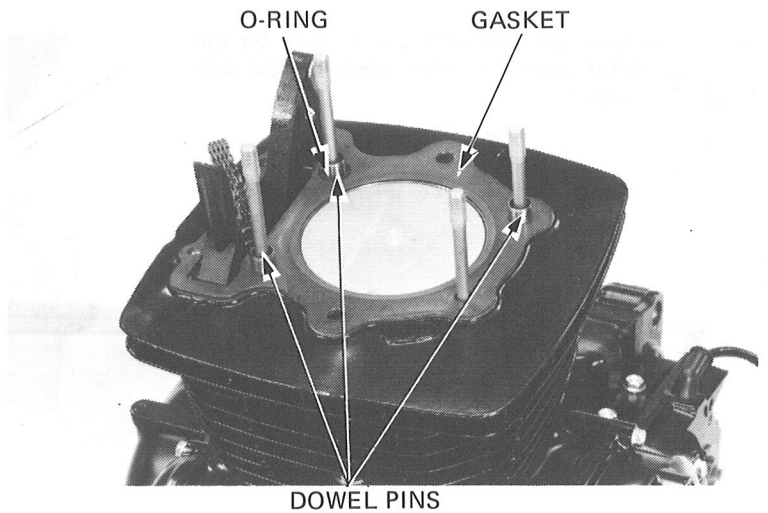


CYLINDER HEAD INSTALLATION

Loosen the cam chain tensioner lock nut and pull the tensioner all the way up.
Tighten the lock nut.



Clean any gasket material from the cylinder surface. Install the new O-rings, dowel pins and a new gasket.



Install the cylinder head.
Tighten the cylinder head nuts in a crisscross pattern in two or more steps.

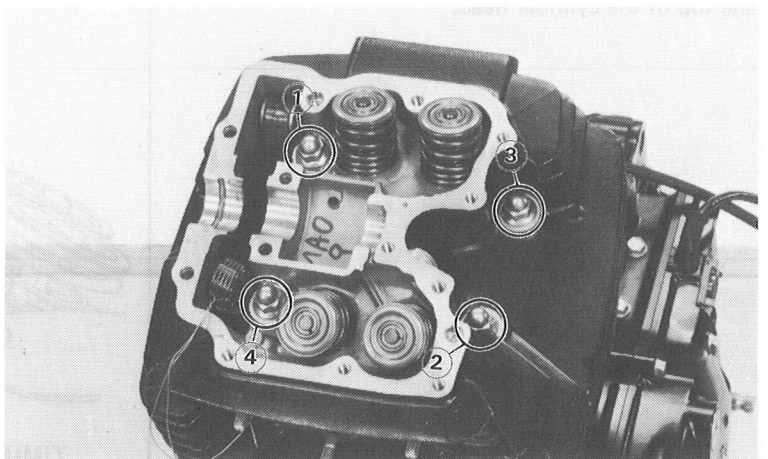
TORQUE: 22–28 N·m (2.2–2.8 kg·m, 16–20 ft·lb)

Install the carburetor insulator and reed valve.

NOTE

Install the insulator with the groove facing up.

Install the tensioner bolt.





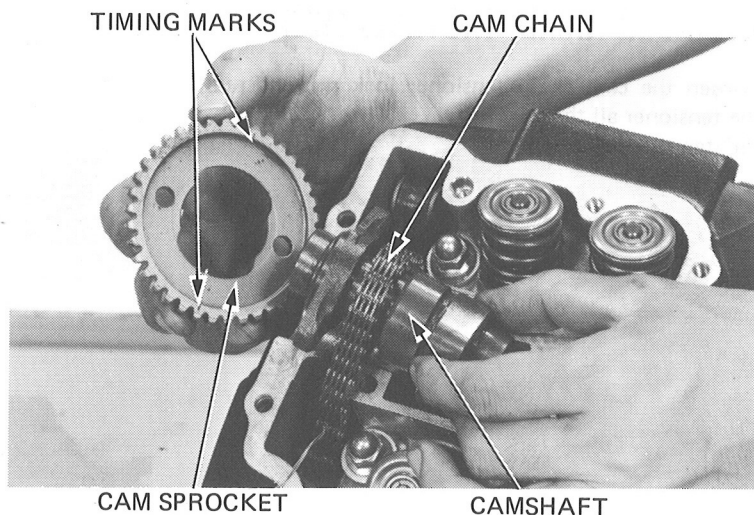
CYLINDER HEAD/VALVES

CAMSHAFT INSTALLATION

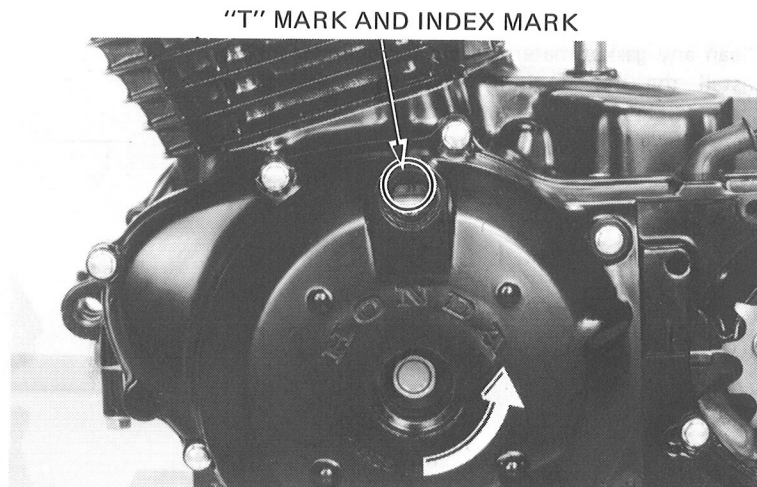
Coat the camshaft journals with molybdenum disulfide grease.

Route the camshaft through the cam chain.

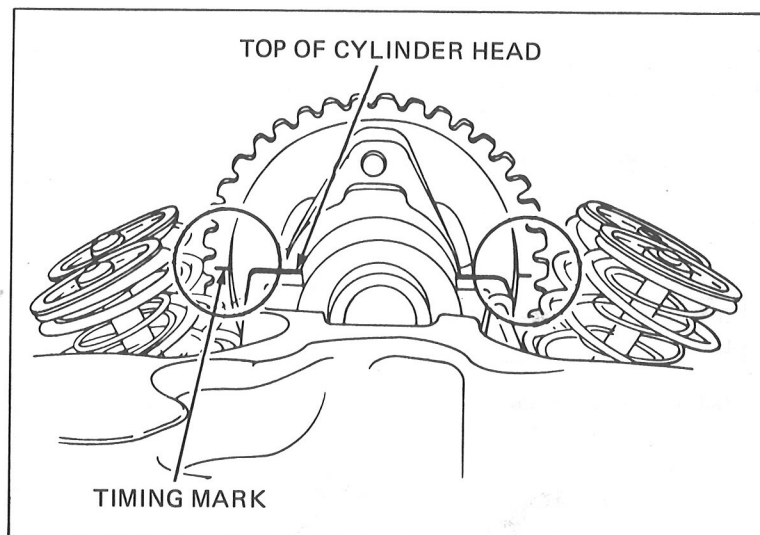
Install the cam sprocket on the camshaft with the timing marks facing inside.



Turn the crankshaft and align the T mark on the generator rotor with the index mark on the left crankcase cover.



Align the timing marks on the cam sprocket with the top of the cylinder head.



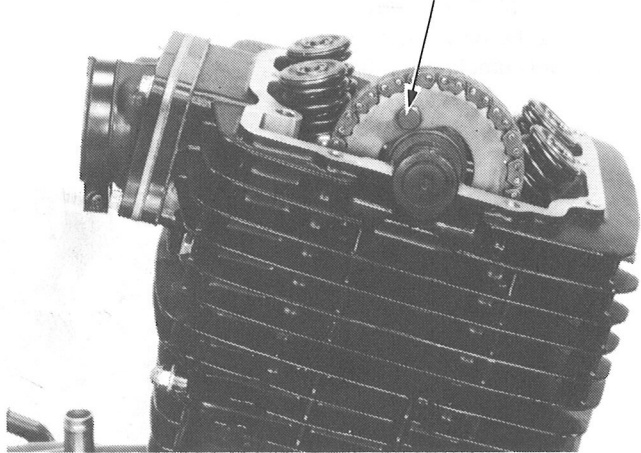


Slide the chain over the cam sprocket without rotating the sprocket.

Tighten the cam sprocket bolts.

TORQUE: 17–23 N·m (1.7–2.3 kg·m, 12–16 ft·lb)

17–23 N·m (1.7–2.3 kg·m, 12–16 ft·lb)



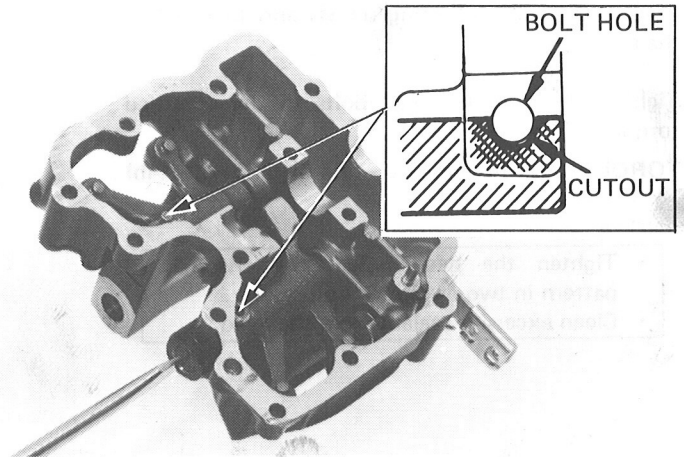
CYLINDER HEAD COVER ASSEMBLY

Install the rocker arms, rocker arm shafts, O-rings and wave washers.

Install the valve lifter lever, spring, and dowel pins.

Align the cut-out in the rocker arm shaft with the bolt hole in the head.

Install the new rocker arm shaft dowel pins.



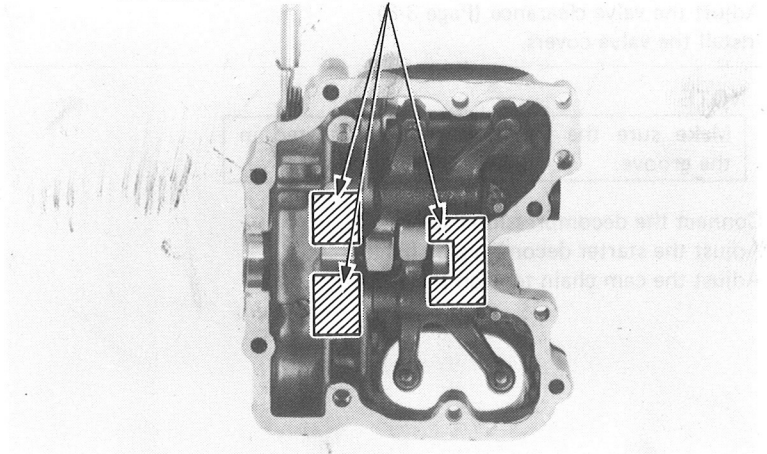
CYLINDER HEAD COVER INSTALLATION

Apply liquid sealer to the cylinder mating surfaces of the cylinder head.

CAUTION:

Keep sealant away from the camshaft bearing surfaces.

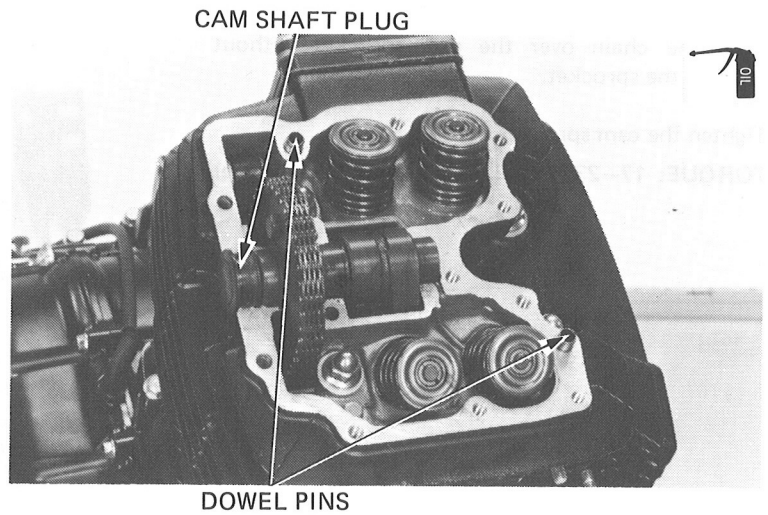
DO NOT APPLY SEALANT TO THESE AREAS



CYLINDER HEAD/VALVES



Install the camshaft plug and dowel pins. Pour clean engine oil into the oil pockets in the head so that the cam lobes are completely submerged.



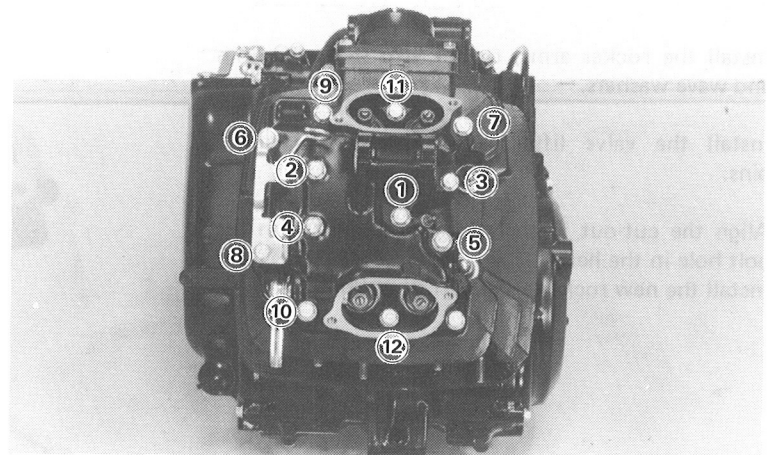
Loosen the valve adjusting screws and then install the cylinder head.

Tighten the cylinder head bolts to the specified torque.

TORQUE: 10–14 N·m (1.0 – 1.4 kg·m, 7–10 ft·lb)

NOTE

- Tighten the head bolts in a crisscross pattern in two or more steps.
- Clean excessive sealant from the head.

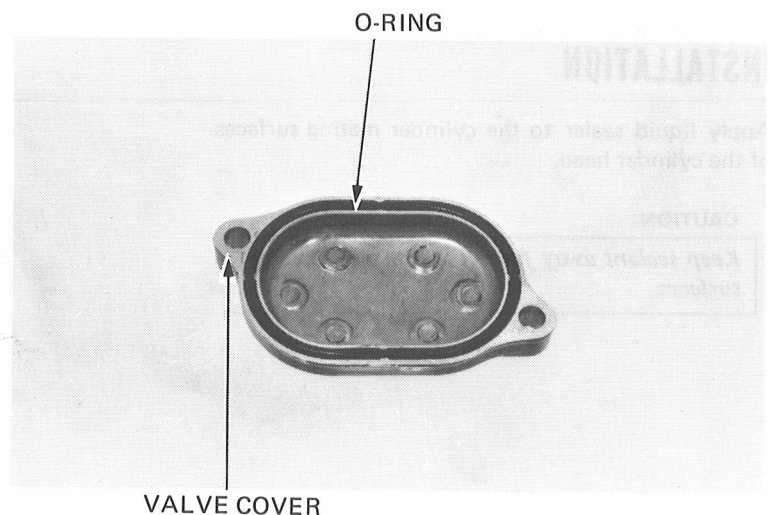


Adjust the valve clearance (Page 3-8).
Install the valve covers.

NOTE

- Make sure the O-ring is properly seated in the groove.

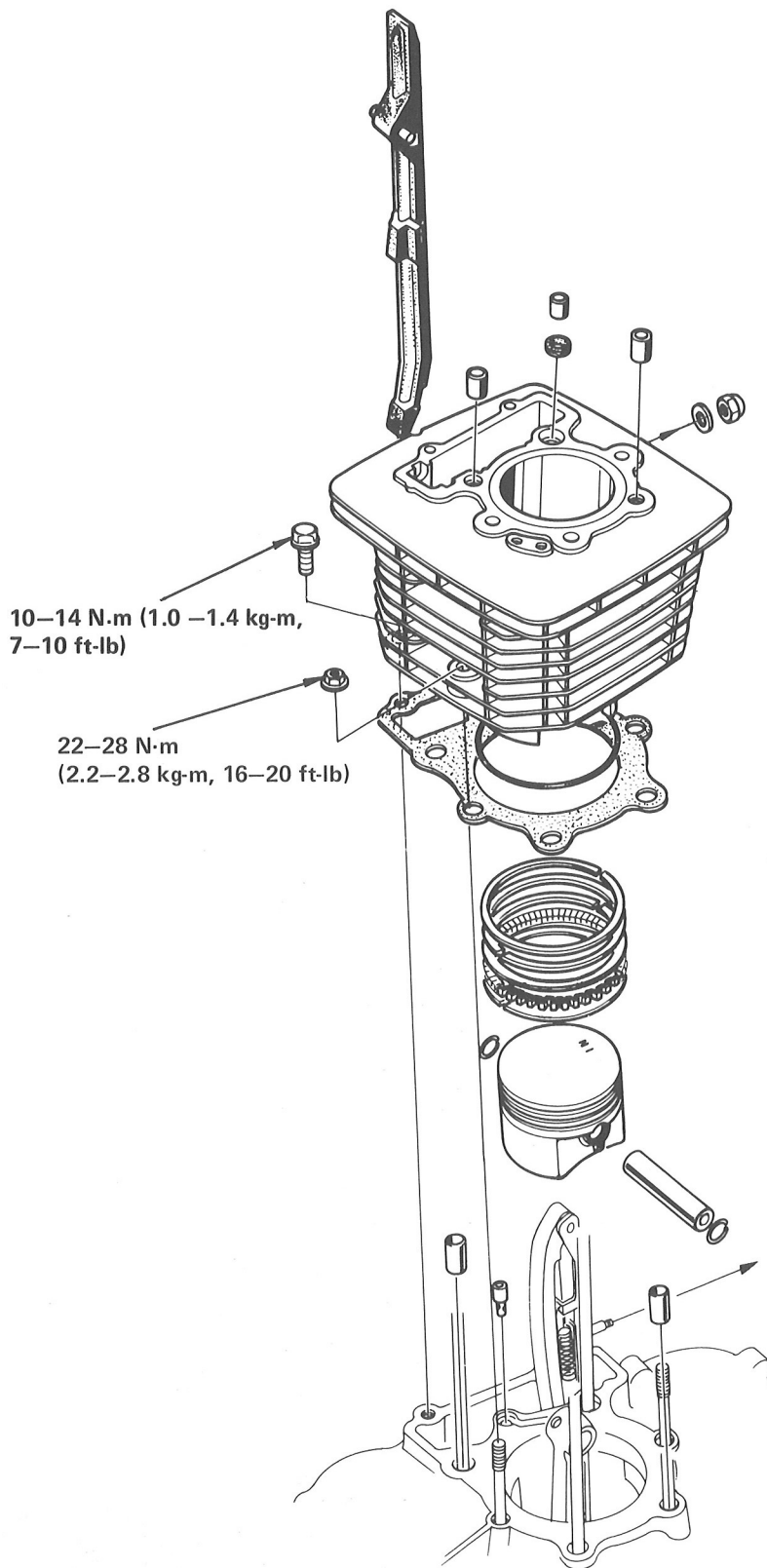
Connect the decompression cable.
Adjust the starter decompressor (Page 3-9).
Adjust the cam chain tension (Page 3-10).





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MEMO





7. CYLINDER/PISTON

SERVICE INFORMATION	7-1
TROUBLESHOOTING	7-2
CYLINDER REMOVAL	7-3
PISTON REMOVAL	7-5
PISTON INSTALLATION	7-9
CYLINDER INSTALLATION	7-9

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Camshaft lubricating oil is fed to the cylinder head through an orifice in the engine case. Be sure this orifice is not clogged and that the O-ring and dowel pins are in place before installing the cylinder head.

SPECIFICATIONS

ITEM	STANDARD	SERVICE LIMIT	
Cylinder	I.D.	89.00–89.01 mm (3.5039–3.5041 in)	
	Taper	—	
	Out of round	—	
	Warpage across top	—	
Piston, piston rings and piston pin	O.D. at skirt	88.97–88.99 mm (3.5027–3.5035 in)	
	Piston pin bore	21.002–21.008 mm (0.8268–0.8271 in)	
	Piston pin-to-piston clearance	0.002–0.014 mm (0.0001–0.0006 in)	
	Piston ring end gap	Top/second	0.30–0.50 mm (0.0118–0.0197 in)
		Oil (Side Rail)	0.2–0.9 mm (0.007–0.035 in)
	Piston ring-to-groove clearance	Top	0.030–0.065 mm (0.0012–0.0026 in)
		Second	0.015–0.045 mm (0.0006–0.0018 in)
	Cylinder-to-piston	Clearance	0.01–0.04 mm (0.0004–0.0016 in)
	Piston pin O.D.		20.994–21.000 mm (0.8265–0.8268 in)

TORQUE VALUES

- Cylinder bolt: 10–14 N·m (1.0–1.4 kg·m, 7–10 ft·lb)
Cylinder nut: 22–28 N·m (2.2–2.8 kg·m, 16–20 ft·lb)



CYLINDER/PISTON

TROUBLESHOOTING

Low or Unstable Compression

1. Worn cylinder or piston rings.

Excessive Smoke

1. Worn cylinder, piston, or piston rings
2. Improper installation of piston rings
3. Scored or scratched piston or cylinder wall

Overheating

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

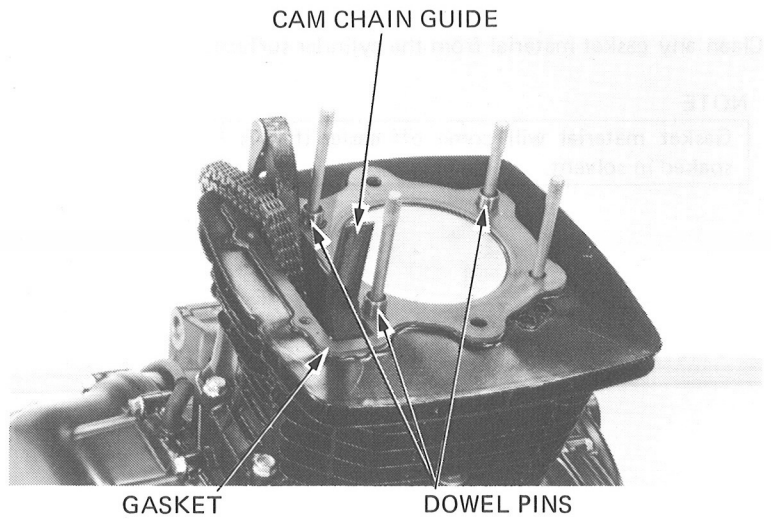
Knocking or Abnormal Noise

1. Worn piston and cylinder
2. Excessive carbon build-up on piston crown or combustion chamber

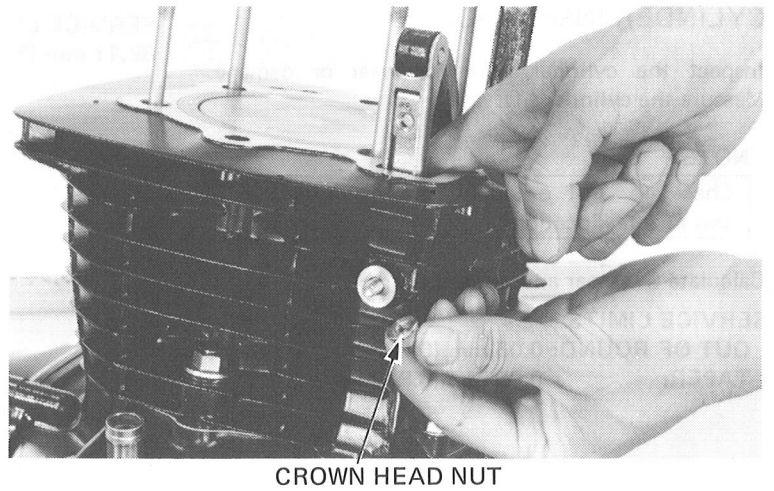


CYLINDER REMOVAL

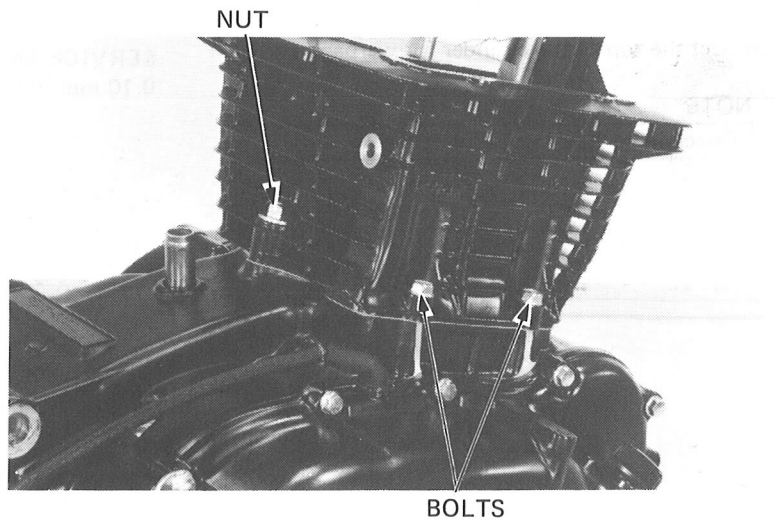
Remove the cylinder head (Section 6).
Remove the cylinder gasket, dowel pins and O-ring.
Remove the cam chain guide.



Remove the crown head nut.
Push the tensioner forward to clear the tensioner stud.



Remove the cylinder nuts and bolts.
Remove the cylinder.



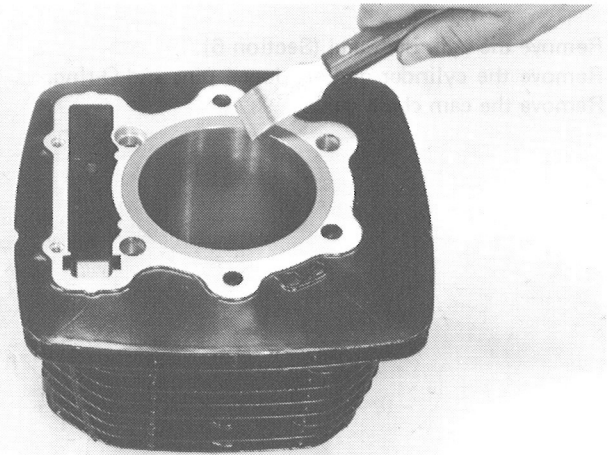


CYLINDER/PISTON

Clean any gasket material from the cylinder surface.

NOTE

Gasket material will come off easier if it is soaked in solvent.



CYLINDER INSPECTION

Inspect the cylinder bore for wear or damage.
Measure the cylinder I.D.

NOTE

Check for out of round on the X and Y axis at three locations.

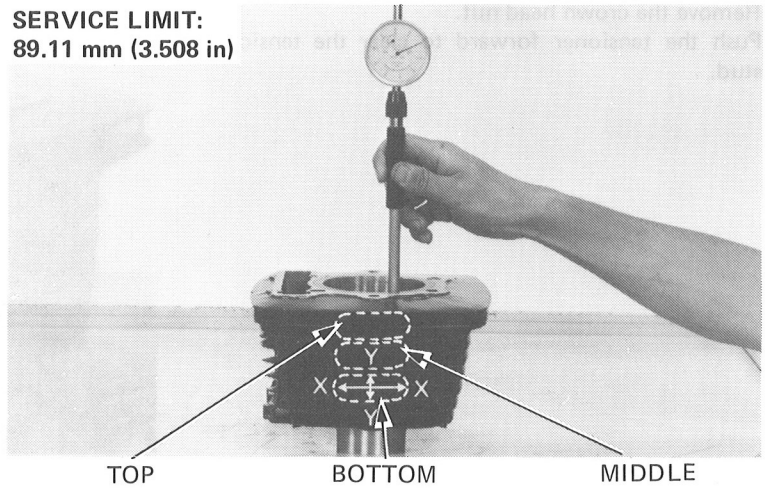
Calculate the taper and out of round.

SERVICE LIMITS:

OUT OF ROUND: 0.05 mm (0.002 in)

TAPER: 0.05 mm (0.002 in)

SERVICE LIMIT:
89.11 mm (3.508 in)

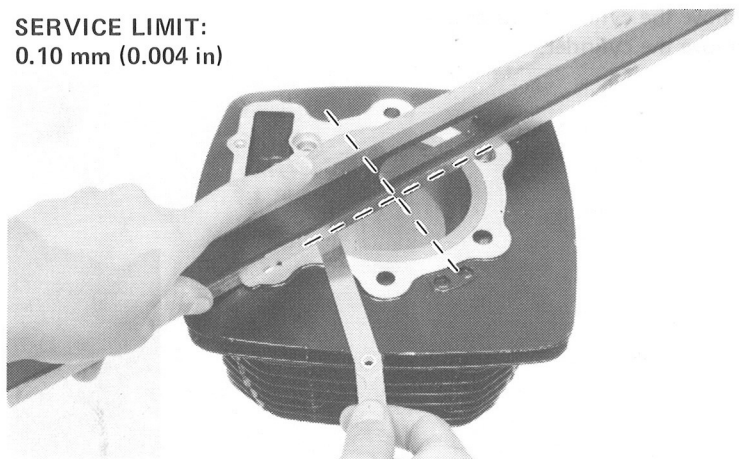


Inspect the top of the cylinder for warpage.

NOTE

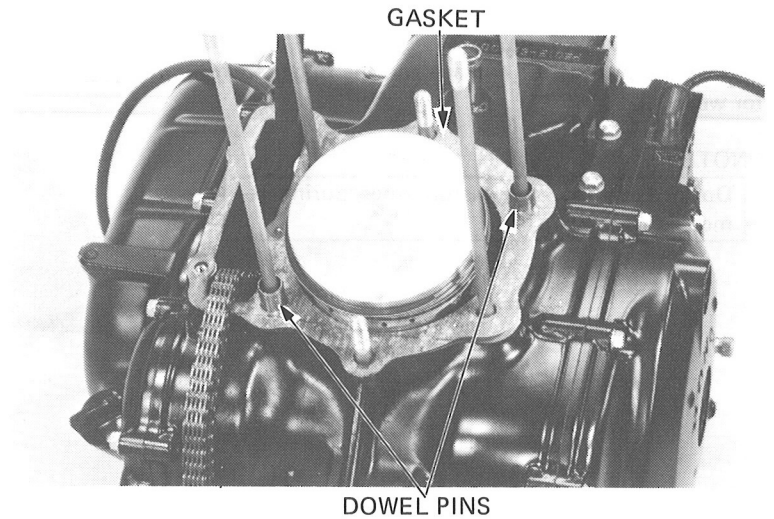
Check in an X pattern as shown.

SERVICE LIMIT:
0.10 mm (0.004 in)





Remove the base gasket, dowel pins and oil control orifice.



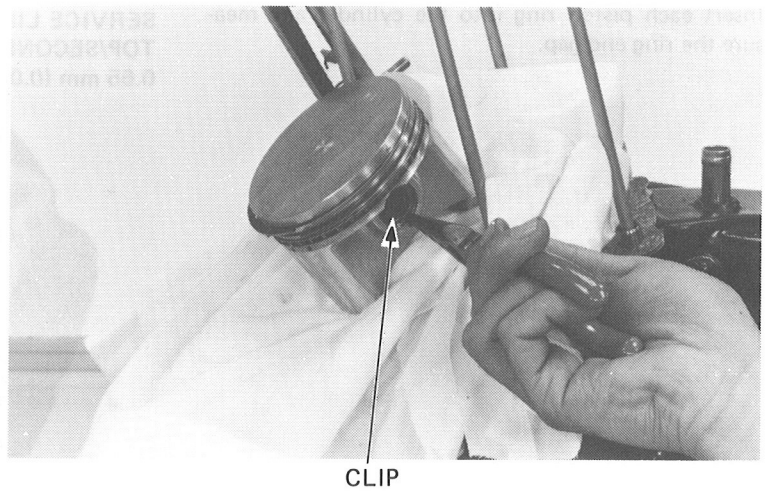
PISTON REMOVAL

Remove the piston pin clip with pliers.

NOTE

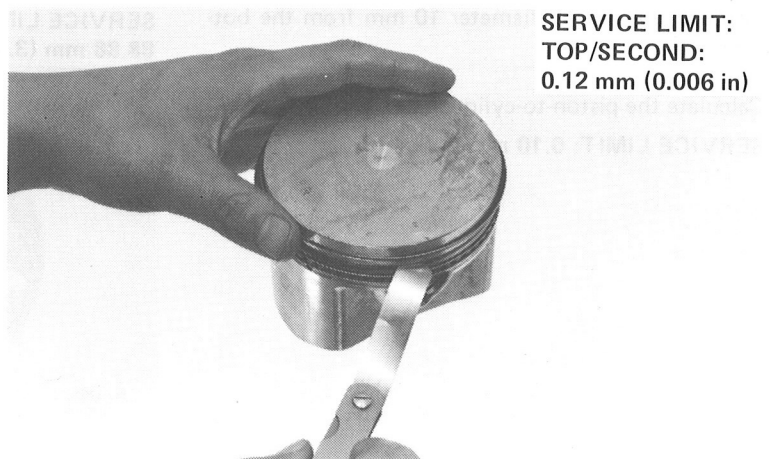
Place a shop towel in the crankcase to prevent clips and other objects from falling in.

Press the piston pin out of the piston.



PISTON/PISTON RING INSPECTION

Measure the piston ring-to-groove clearance.



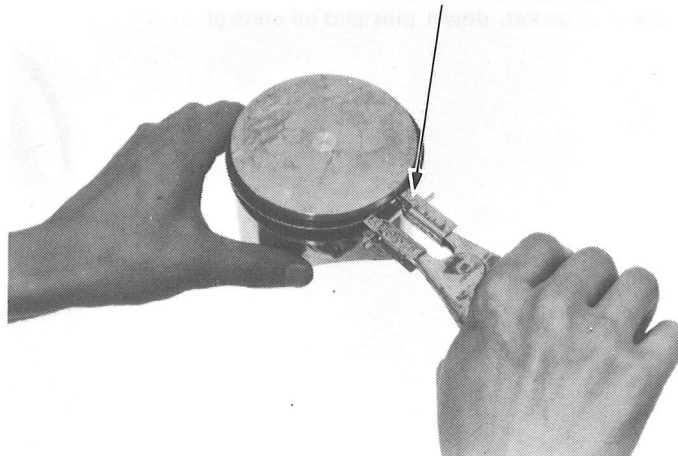


Remove the piston rings.
Inspect the pistons for damage and the ring grooves for wear.

NOTE

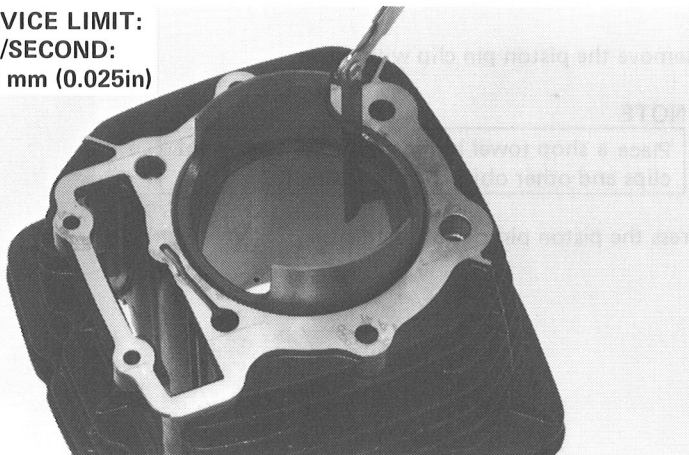
Do not damage the piston rings during removal.

PISTON RING PLIERS



Insert each piston ring into the cylinder and measure the ring end gap.

SERVICE LIMIT:
TOP/SECOND:
0.65 mm (0.025in)

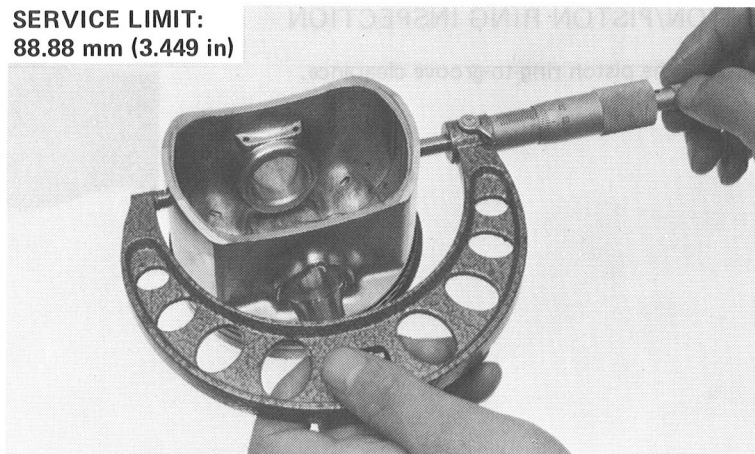


Measure the piston diameter 10 mm from the bottom.

Calculate the piston-to-cylinder clearance.

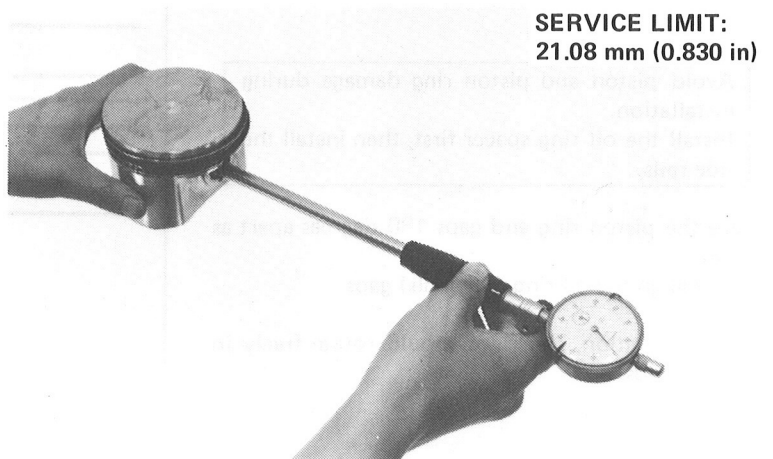
SERVICE LIMIT: 0.10 mm (0.004 in)

SERVICE LIMIT:
88.88 mm (3.449 in)





Measure the piston pin hole I.D.



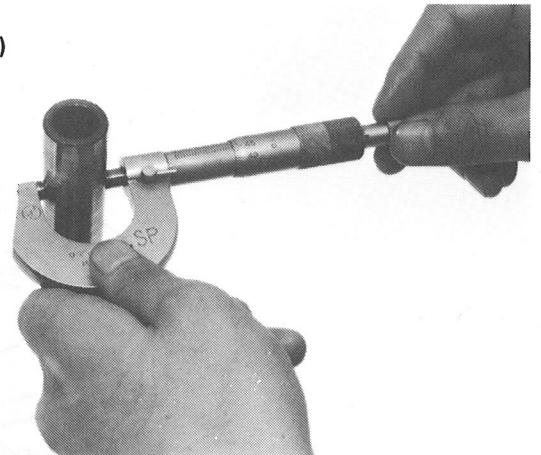
SERVICE LIMIT:
21.08 mm (0.830 in)

Measure the piston pin O.D.

Calculate the piston-to-piston pin clearance.

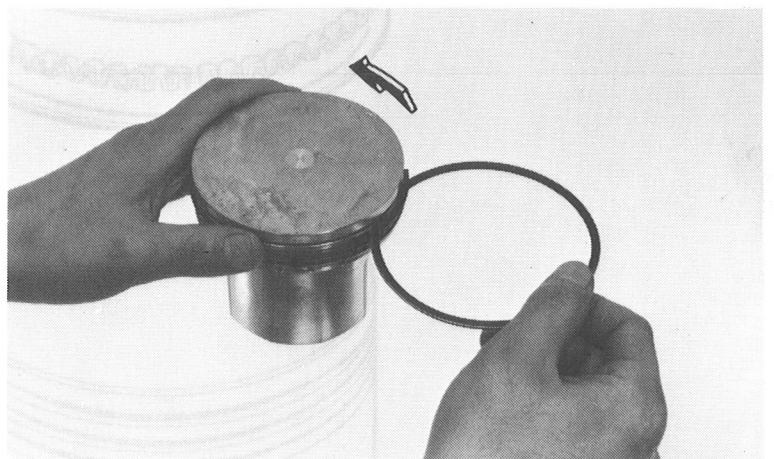
SERVICE LIMIT: 0.12 mm (0.005 in)

SERVICE LIMIT
20.96 mm (0.825 in)



PISTON RING INSTALLATION

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





CYLINDER/PISTON

Install the piston rings with the marks facing up.

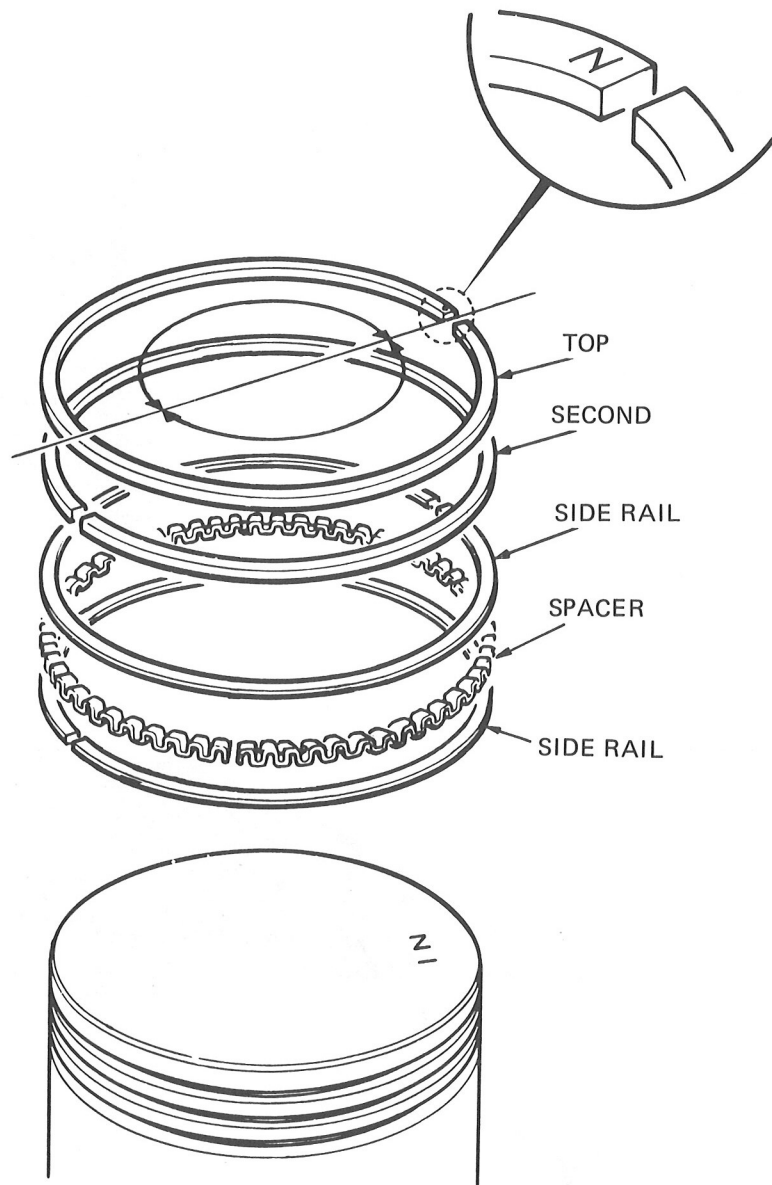
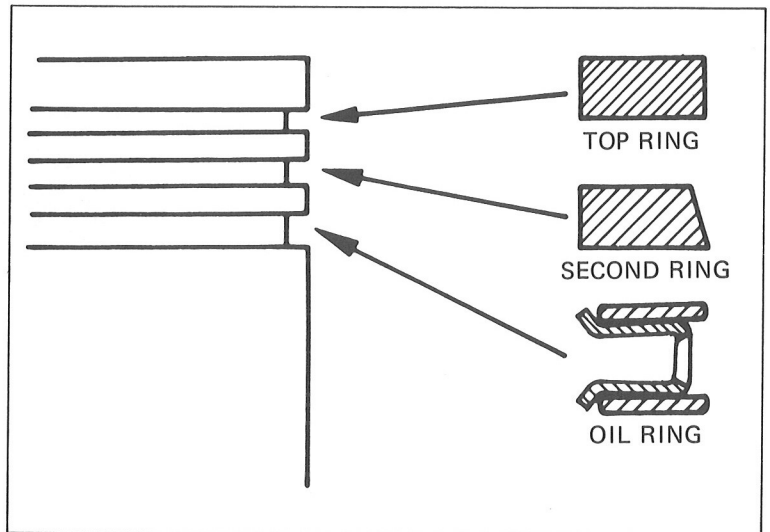
NOTE

Avoid piston and piston ring damage during installation.
Install the oil ring spacer first, then install the side rails.

Space the piston ring end gaps 180 degrees apart as shown.

Do not align the oil ring (side rails) gaps.

After installation, the rings should rotate freely in the ring lands.





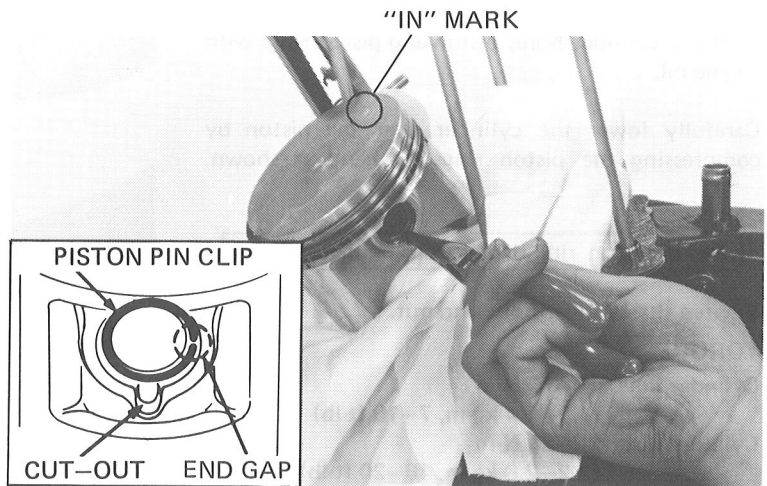
PISTON INSTALLATION

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

Install new piston pin clips.

NOTE

Do not align the piston pin clip end gap with the piston cut-out.



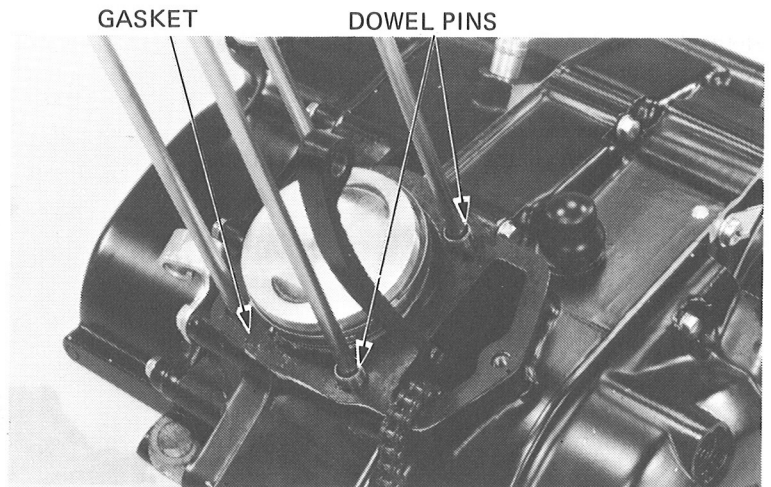
CYLINDER INSTALLATION

Install the cylinder gasket, dowel pins and oil control orifice.

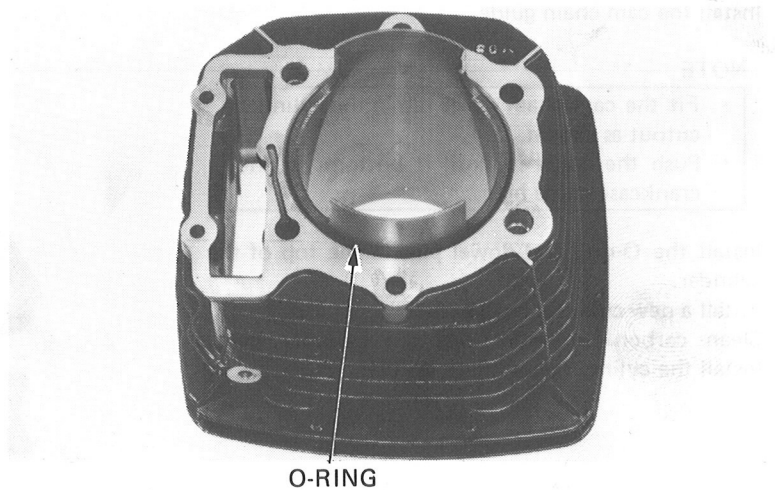
NOTE

Check that the oil control orifice is not clogged.

Remove the shop towel from the crankcase.



Check that the O-ring is in place on the cylinder.





CYLINDER/PISTON

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

Carefully lower the cylinder over the piston by compressing the piston rings by hand as shown.

NOTE

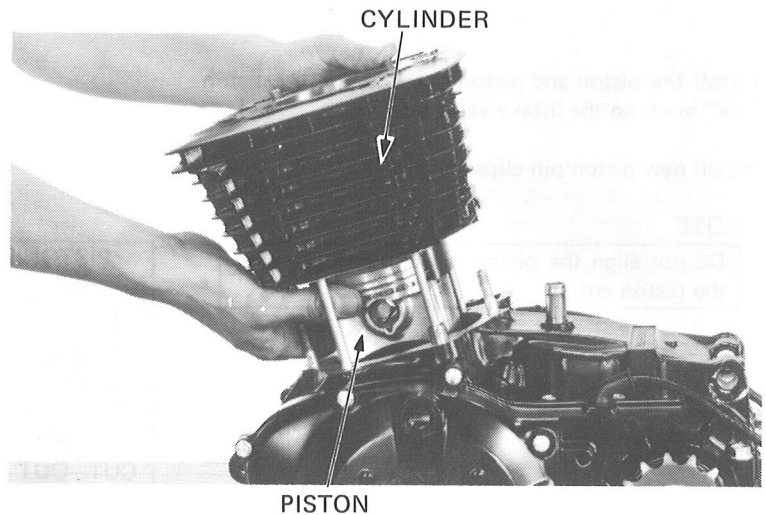
Avoid piston ring damage during installation.

Tighten the cylinder bolts and nut.

TORQUES:

Cylinder bolt: 10–14 N·m
(1.0–1.4 kg·m, 7–10 ft·lb)

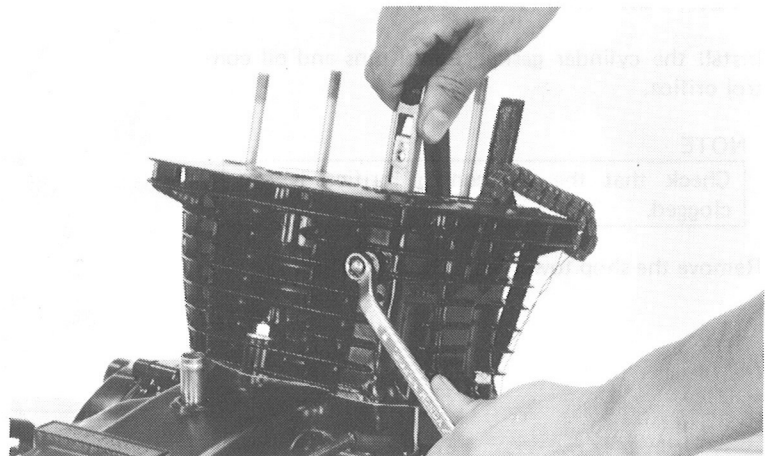
Cylinder nut: 22–28 N·m
(2.2–2.8 kg·m, 16–20 ft·lb)



Hold the tensioner up and insert the tensioner adjusting bolt into the cylinder hole.

Install the washer and nut.

Pull the tensioner all the way up and tighten the lock nut.



Install the cam chain guide.

NOTE

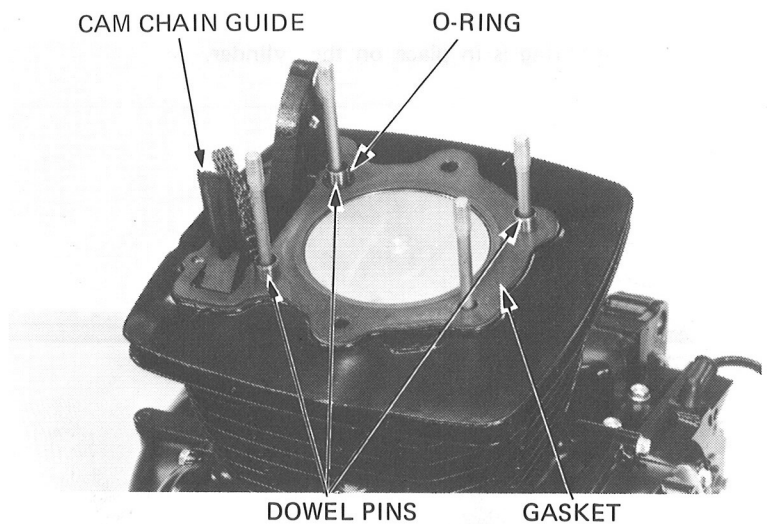
- Fit the cam chain guide tab in the cylinder cutout as shown.
- Push the guide in until it bottoms in the crankcase guide hole.

Install the O-ring and dowel pins in the top of the cylinder.

Install a new cylinder head gasket.

Clean carbon deposits from the cylinder head.

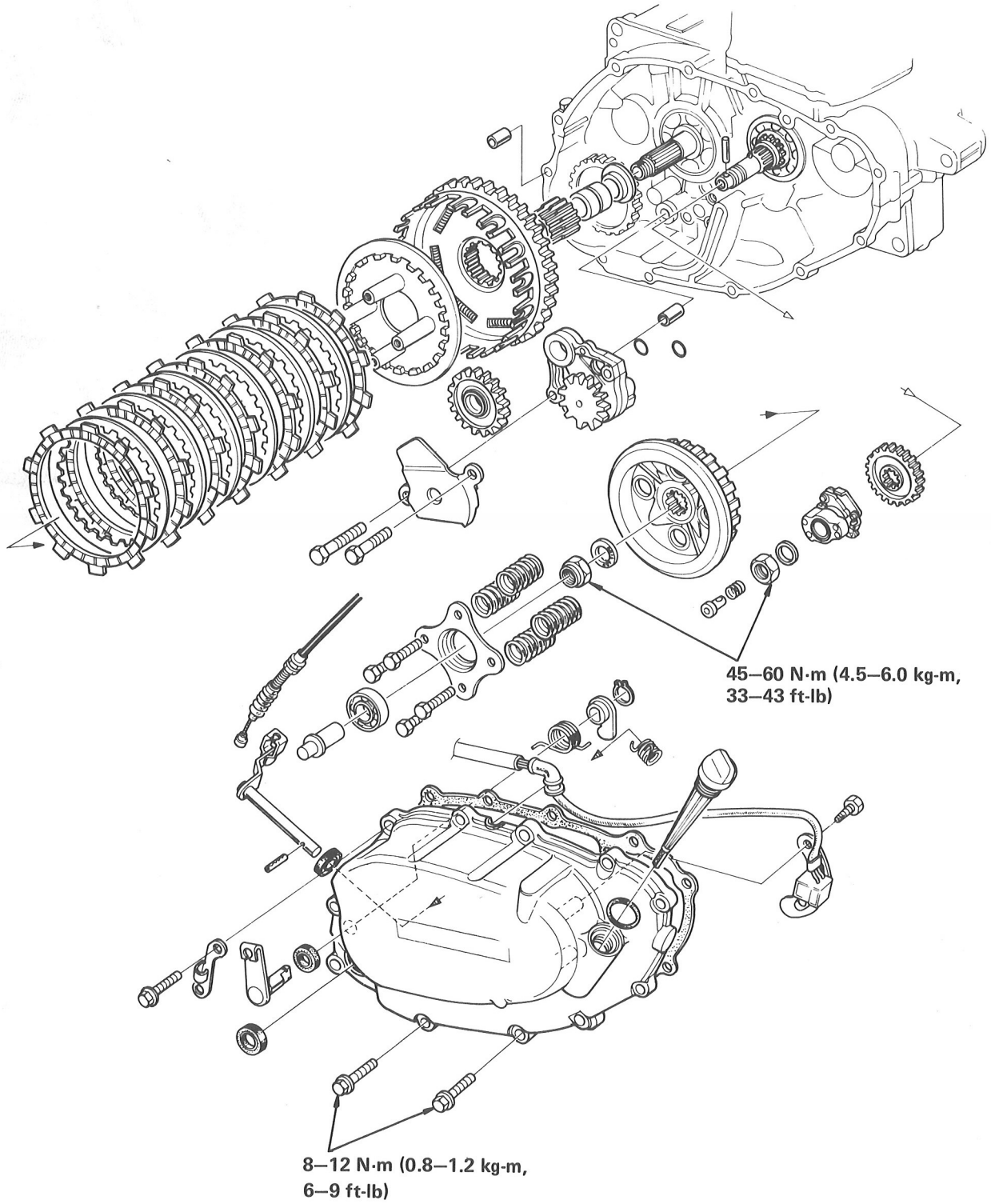
Install the cylinder head (Page 6–17).





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XR500R

MEMO





8. CLUTCH/OIL PUMP

SERVICE INFORMATION	8-1
TROUBLESHOOTING	8-2
RIGHT CRANKCASE COVER REMOVAL	8-3
CLUTCH	8-5
OIL PUMP	8-9
DRIVE GEAR REMOVAL	8-13
DRIVE GEAR INSTALLATION	8-13
RIGHT CRANKCASE COVER INSTALLATION	8-14

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- This section covers removal and installation of the clutch and oil pump, starting with the right crankcase cover. All these operations can be accomplished with the engine installed.
- When the existing clutch discs are replaced, coat new discs with engine oil prior to assembly.

SPECIAL TOOL

Clutch center holder 07923-4280000 (Not available in U.S.A)

TORQUE VALUES

Clutch lock nut 45-60 N·m (4.5-6.0 kg-m, 33-43 ft-lb)
 Drive gear 45-60 N·m (4.5-6.0 kg-m, 33-43 ft-lb)
 Right crankcase cover 8-12 N·m (0.8-1.2 kg-m, 6-9 ft-lb)

SPECIFICATIONS

ITEM	STANDARD	SERVICE LIMIT	
Clutch	Lever free play (at lever end)	15-25 mm (5/8 - 1 in)	—
	Spring free length	41 mm (1.61 in)	39.5 mm (1.56 in)
	Spring preload/length	23.75-26.25 kg/28.5 mm (52.4-57.8 lb/1.12 in)	—
	Disc thickness	2.62-2.78 mm (0.102-0.109 in)	2.3 mm (0.09 in)
	Plate warpage	—	0.3 mm (0.01 in)
	Primary drive gear I.D.	27.000-27.021 mm (1.0630-1.0638 in)	27.05 mm (1.065 in)
	Outer guide O.D.	26.959-26.980 mm (1.0614-1.0622 in)	26.91 mm (1.059 in)
	I.D.	22.000-22.035 mm (0.8661-0.8675 in)	22.05 mm (0.868 in)
Length	33.20-33.30 mm (1.307-1.311 in)	33.10 mm (1.303 in)	
Oil pump	Inner rotor-to-outer rotor clearance	0.15 mm (0.006 in) max.	0.20 mm (0.008 in)
	Outer rotor-to-body clearance	0.15-0.21 mm (0.006-0.008 in)	0.25 mm (0.01 in)
	Rotor-to-cover clearance	0.02-0.08 mm (0.001-0.003 in)	0.12 mm (0.005 in)
Starter idler gear	I.D.	15.016-15.034 mm (0.5912-0.5919 in)	15.10 mm (0.595 in)
Mainshaft-to-clutch outer guide clearance		0.020-0.068 mm (0.0008-0.0027 in)	0.12 mm (0.0047 in)



CLUTCH/OIL PUMP

TROUBLESHOOTING

Faulty clutch operation can usually be corrected by adjusting the clutch lever free play.

Clutch Slips When Accelerating

1. No free play
2. Discs worn
3. Spring weak

Clutch Will Not Disengage

1. Too much free play
2. Plates warped

Motorcycle Creeps With Clutch Disengaged

1. Too much free play
2. Plates warped.

Excessive Lever Pressure

1. Clutch cable kinked, damaged or dirty
2. Lifter mechanism damaged

Clutch Operation Feels Rough

1. Outer drum slots rough

Low Oil Pressure

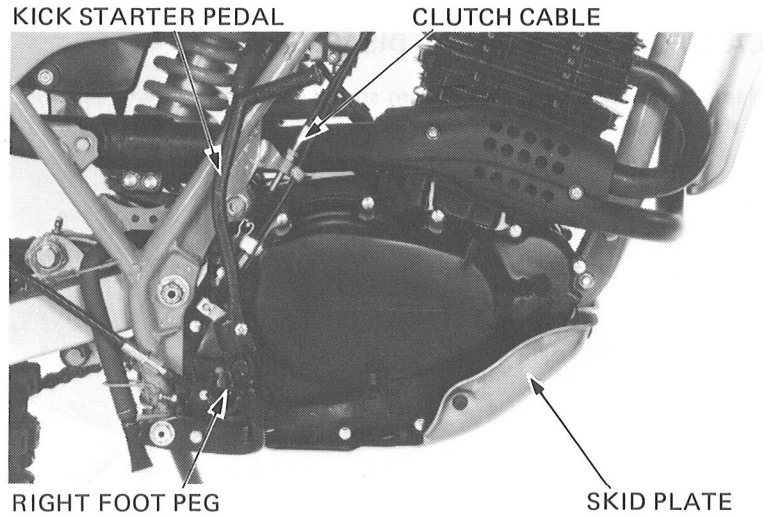
1. Faulty oil pump
2. Oil pump drive gear broken



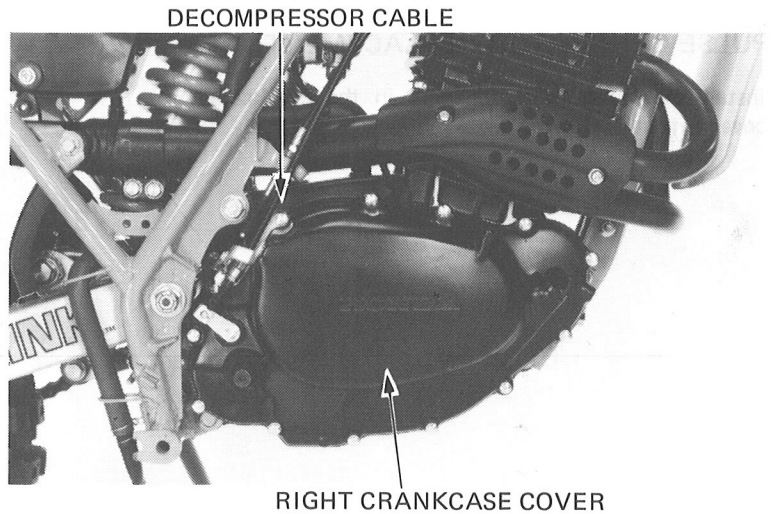
RIGHT CRANKCASE COVER REMOVAL

Remove the seat and fuel tank.
Drain oil from the engine.
Remove the skid plate.

Remove the kick starter pedal.
Remove the right foot peg bolt and foot peg.
Remove the rear brake pedal.
Disconnect the clutch cable and the pulse generator wires.

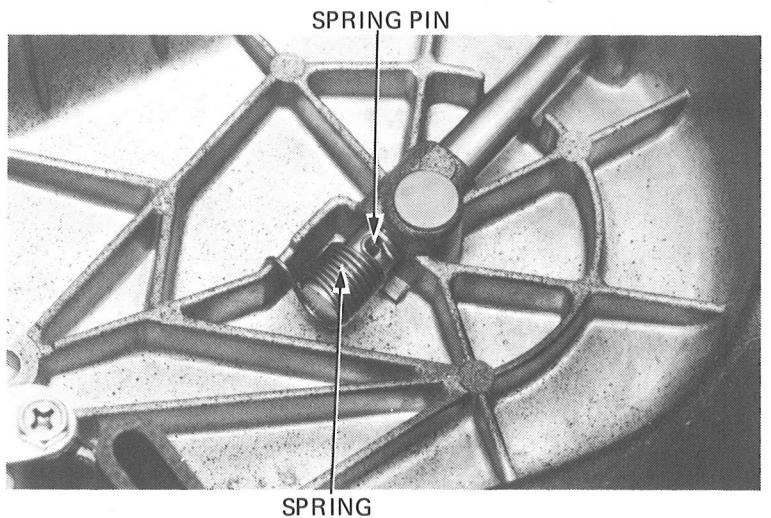


Disconnect the decompressor cable.
Remove the bolts holding the right crankcase cover, and remove the cover.



CLUTCH LIFTER ARM DISASSEMBLY

Remove the spring pin.
Remove the lifter arm and return spring.

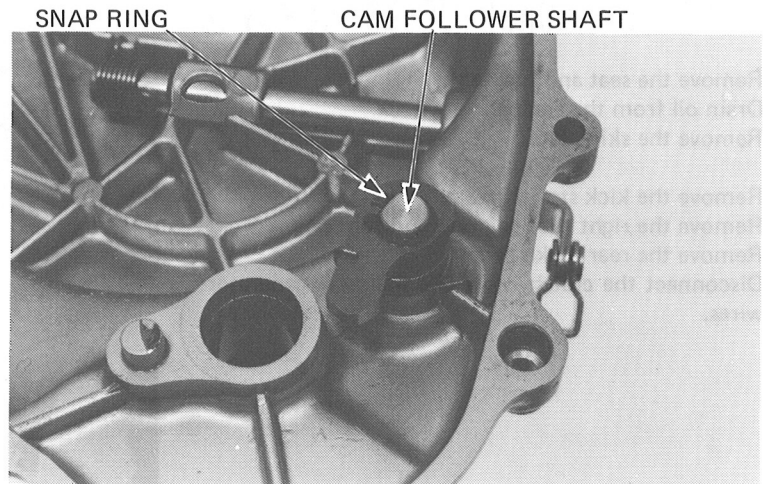




CLUTCH/OIL PUMP

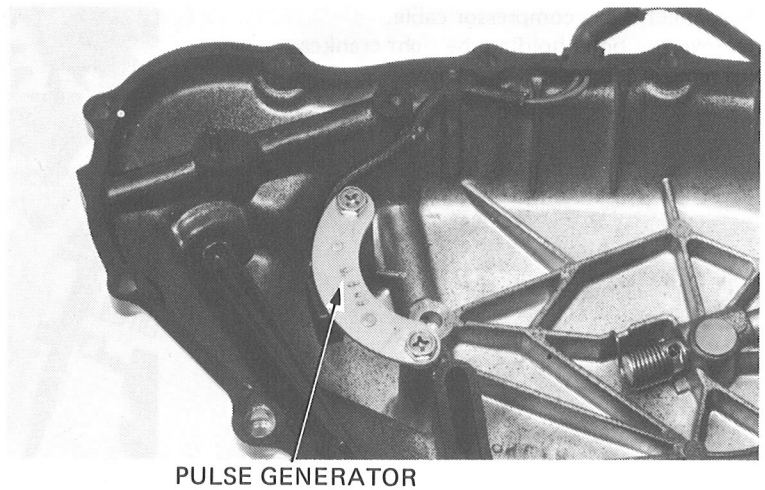
CAM FOLLOWER SHAFT DISASSEMBLY

Remove the snap ring, cam, return spring and camshaft.



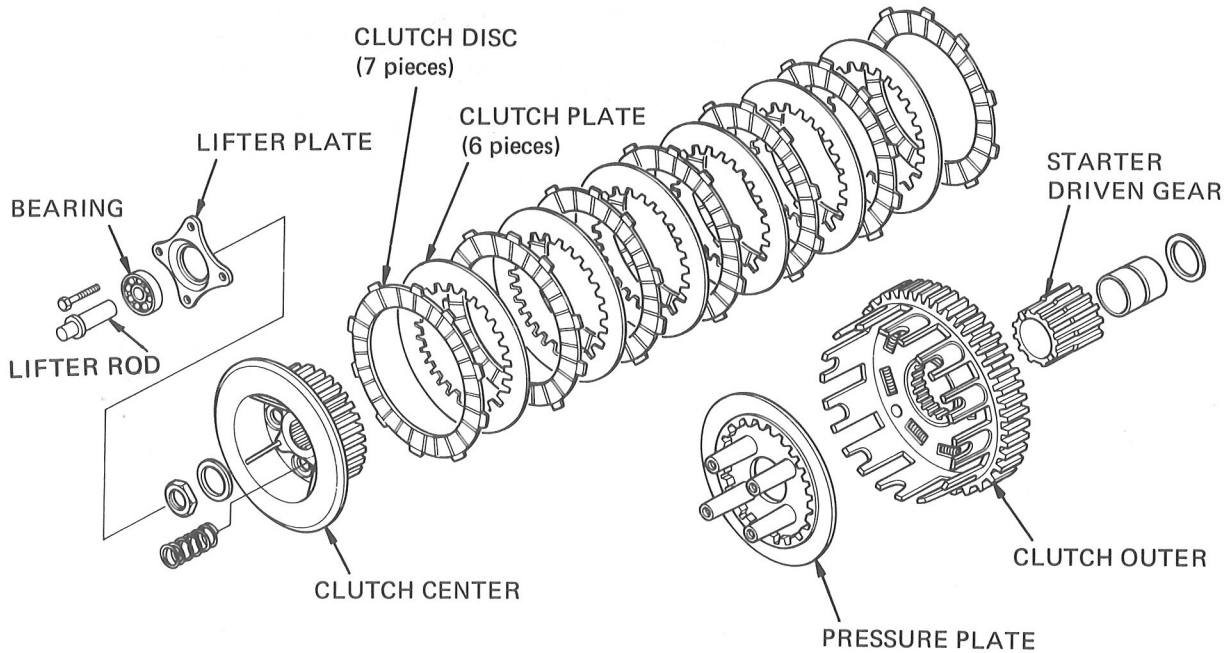
PULSE GENERATOR REPLACEMENT

Install the pulse generator wire in the crankcase cover cutout as shown.





CLUTCH

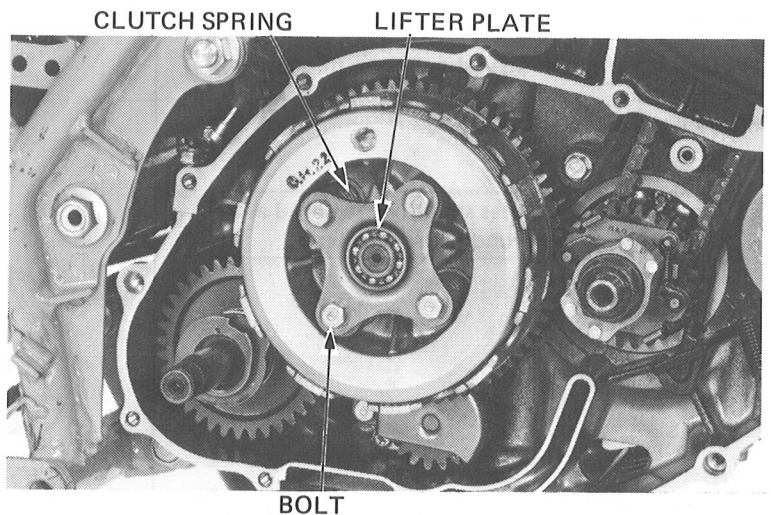


REMOVAL

Remove the lifter rod and bearing.
 Remove the four bolts.
 Remove the clutch lifter plate and springs.

NOTE

Loosen the bolts in a crisscross pattern in 2-3 steps.



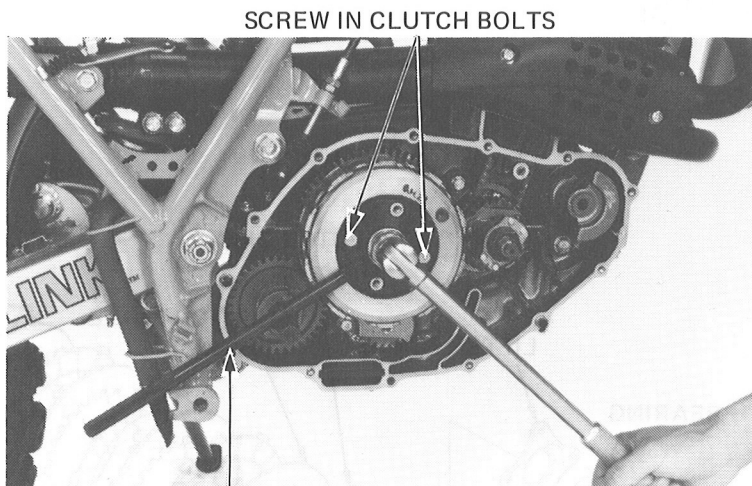


CLUTCH/OIL PUMP

Attach the clutch center holder to the pressure plate with two clutch bolts.

Remove the clutch nut and lock washer.

Remove the clutch center holder, clutch center, discs, plate, pressure plate, cover, guide, and thrust washer.



CLUTCH CENTER HOLDER
No. 07923-4280000

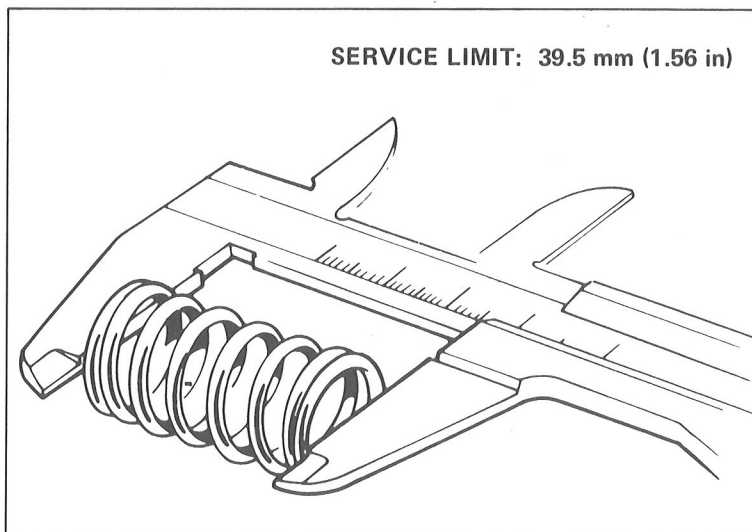
INSPECTION

SPRINGS

Measure the free length of each spring.
Replace if shorter than the service limit.

NOTE

Clutch spring should be replaced as a set if one or more is beyond the service limit.



CLUTCH DISC

Replace the discs if they show signs of scoring or discoloration.

Measure the disc thickness.

NOTE

Clutch discs and plates should be replaced as a set if any one is beyond the service limit.

