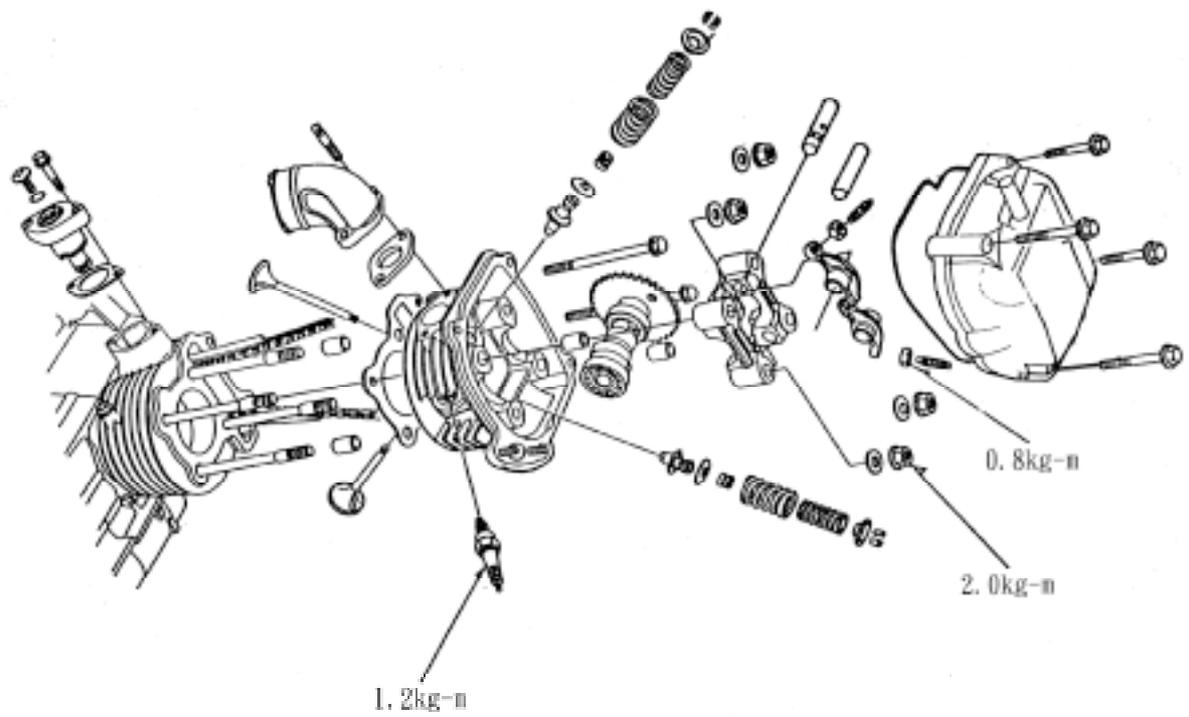


7. CYLINDER HEAD/VALVES



7. CYLINDER HEAD/VALVES

FILLY LX 50

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SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The cylinder head can be serviced with the engine installed in the frame.
- When assembling, apply molybdenum disulfide grease or engine oil to the valve guide movable parts, valve arm and camshaft sliding surfaces for initial lubrication.
- The camshaft is lubricated by engine oil through the cylinder head engine oil passages. Clean and unclog the oil passages before assembling the cylinder head.
- After disassembly, clean the removed parts and dry them with compressed air before inspection.
- After removal, mark and arrange the removed parts in order. When assembling, install them in the reverse order of removal.

SPECIFICATIONS

Item		Standard (mm)	Service Limit (mm)
Valve clearance (cold)	IN	0.04	□
	EX	0.04	□
Cylinder head compression		14kg/cm ²	□
Cylinder head warpage		□	0.05
Camshaft cam height	IN	26.438	26.038
	EX	25.807	25.407
Valve rocker arm I.D.	IN	10.000-10.015	10.10
	EX	10.000-10.015	10.10
Valve rocker arm shaft O.D.	IN	9.972-9.987	9.91
	EX	9.972-9.987	9.91
Valve seat width	IN	1.0	1.8
	EX	1.0	1.8
Valve stem O.D.	IN	4.975-4.990	4.9
	EX	4.955-4.970	4.9
Valve guide I.D.	IN	5.000-5.012	5.03
	EX	5.000-5.012	5.03
Valve stem-to-guide clearance	IN	0.010-0.037	0.08
	EX	0.030-0.057	0.1
Valve spring free length	Inner	31.1	30.1
	Outer	34.35	33.3

7. CYLINDER HEAD/VALVES

TORQUE VALUES

Cylinder head nut	1.8~2.2kgf-m	Apply engine oil to threads
Valve clearance adjusting nut	0.7~1.1kgf-m	Apply engine oil to threads

SPECIAL TOOLS

Valve spring compressor

TROUBLESHOOTING

- The poor cylinder head operation can be diagnosed by a compression test or by tracing engine top-end noises.

Poor performance at idle speed

- Compression too low

Compression too low

- Incorrect valve clearance adjustment
- Burned or bent valves
- Incorrect valve timing
- Broken valve spring
- Poor valve and seat contact
- Leaking cylinder head gasket
- Warped or cracked cylinder head
- Poorly installed spark plug

Compression too high

- Excessive carbon build-up in combustion chamber

White smoke from exhaust muffler

- Worn valve stem or valve guide
- Damaged valve stem seal

Abnormal noise

- Incorrect valve clearance adjustment
- Sticking valve or broken valve spring
- Damaged or worn camshaft
- Worn cam chain guide
- Worn camshaft and rocker arm

7. CYLINDER HEAD/VALVES

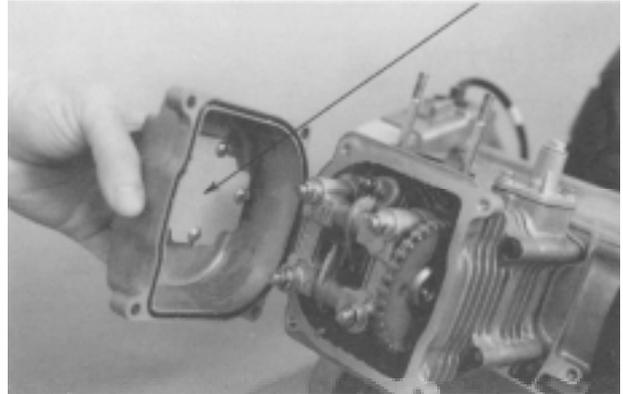
CAMSHAFT REMOVAL

Remove the center cover. (⇒2-3)

Remove the frame center.

Remove the four cylinder head cover bolts to remove the cylinder head cover.

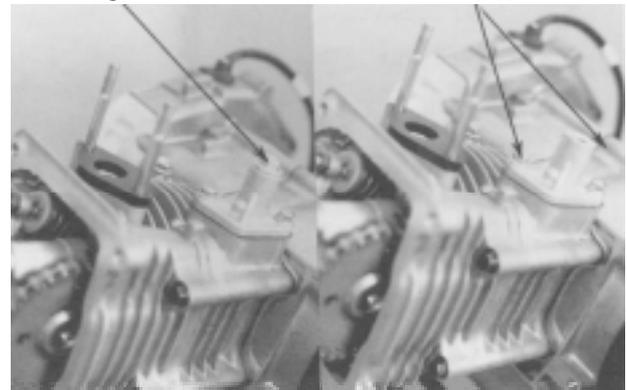
Cylinder Head Cover



Remove the cam chain tensioner sealing bolt and spring.
Remove the two bolts attaching the cam chain tensioner and the tensioner.

Sealing Bolt

Bolts



Turn the flywheel counterclockwise so that the "T" mark on the flywheel aligns with the index mark on the crankcase to bring the round hole on the camshaft gear facing up to the top dead center on the compression stroke.

Camshaft Gear



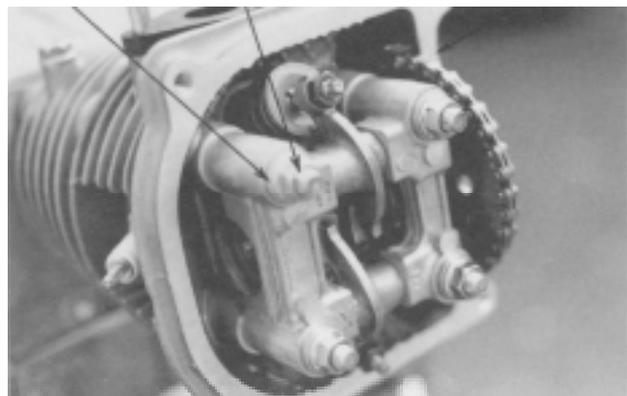
Round Hole

Punch Marks

Washer Nut

Remove the two cylinder head bolts.
Remove the four cylinder head nuts and washers.
Remove the camshaft holder.

* Diagonally loosen the cylinder head nuts in 2 or 3 times.

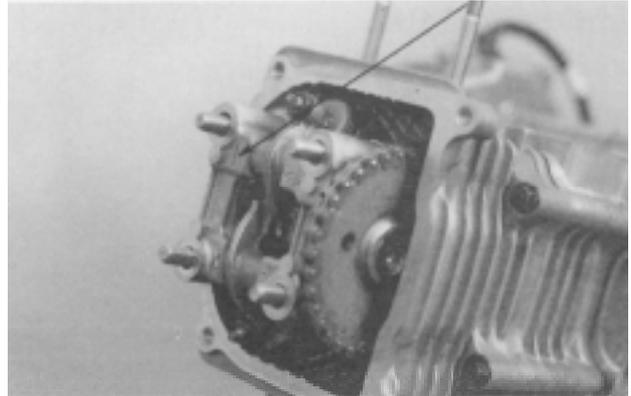


7. CYLINDER HEAD/VALVES

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Remove the camshaft holder and dowel pins.

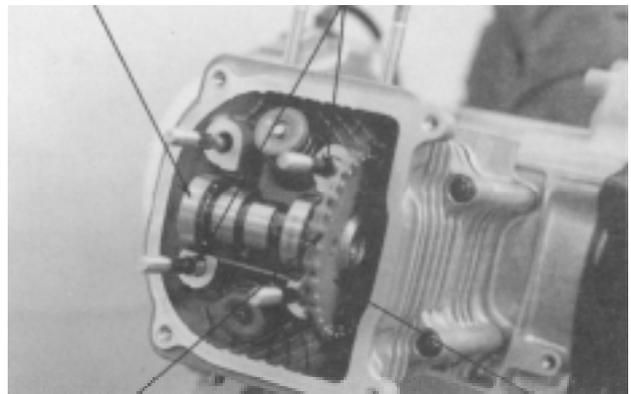
Camshaft Holder



Remove the camshaft gear from the cam chain and remove the camshaft.

Camshaft

Dowel Pins



Cam Chain

Camshaft Gear

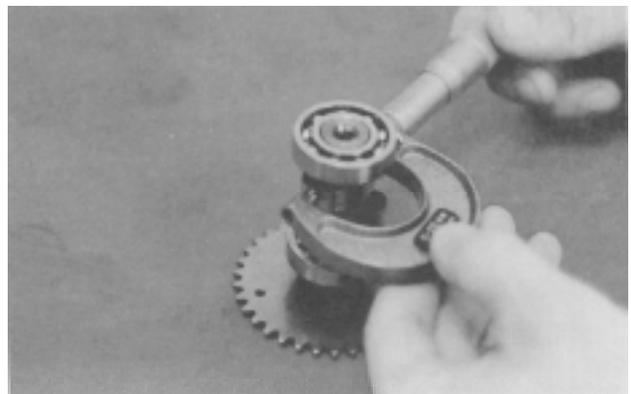
CAMSHAFT INSPECTION

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

Service Limits:

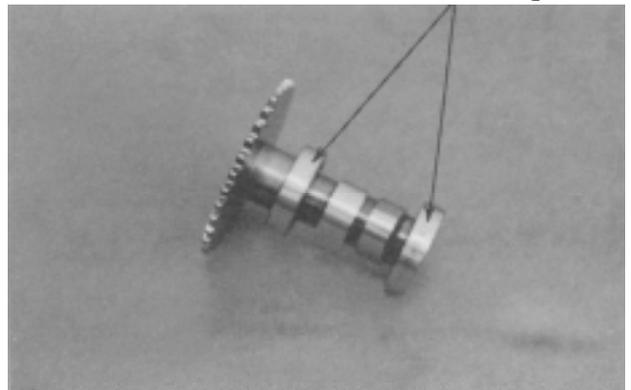
IN : 26.038mm replace if below

EX: 25.407mm replace if below



Check each camshaft bearing for play or damage. Replace the camshaft assembly with a new one if the bearings are noisy or have excessive play.

Camshaft Bearings

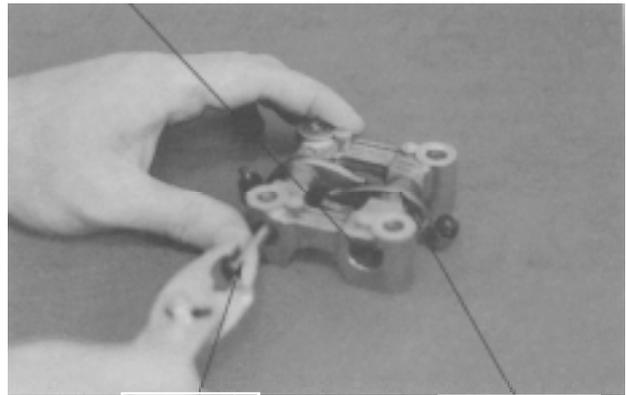


7. CYLINDER HEAD/VALVES

CAMSHAFT HOLDER DISASSEMBLY

Take out the valve rocker arm shafts using a 5mm bolt.
Remove the valve rocker arms.

Rocker Arm Shaft



5mm Bolt

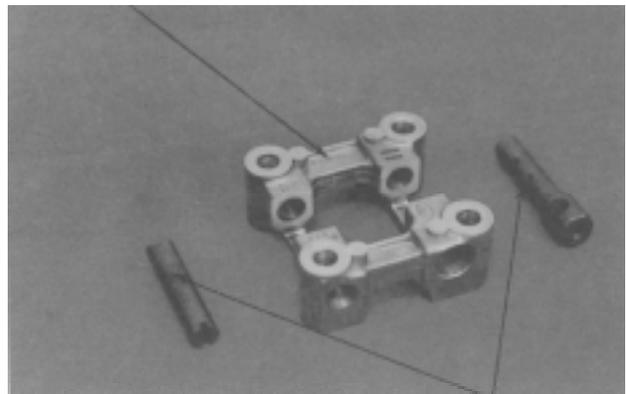
Rocker Arm

CAMSHAFT HOLDER INSPECTION

Inspect the camshaft holder, valve rocker arms and rocker arm shafts for wear or damage.

* If the valve rocker arm contact surface is worn, check each cam lobe for wear or damage.

Camshaft Holder



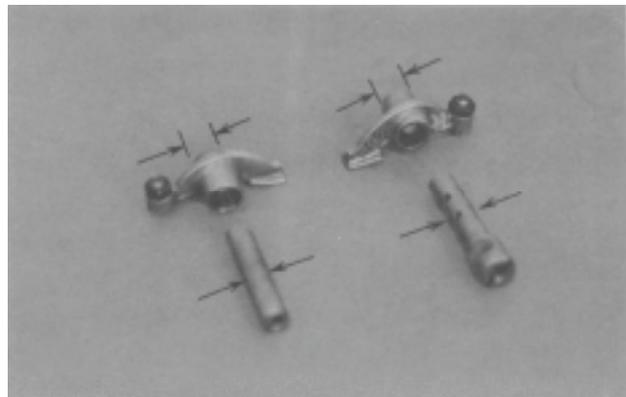
Rocker Arm Shafts

Measure the I.D. of each valve rocker arm.

Service Limits: IN: 10.10mm replace if over
EX: 10.10mm replace if over

Measure each rocker arm shaft O.D.

Service Limits: IN: 9.91mm replace if over
EX: 9.91mm replace if over



CYLINDER HEAD REMOVAL

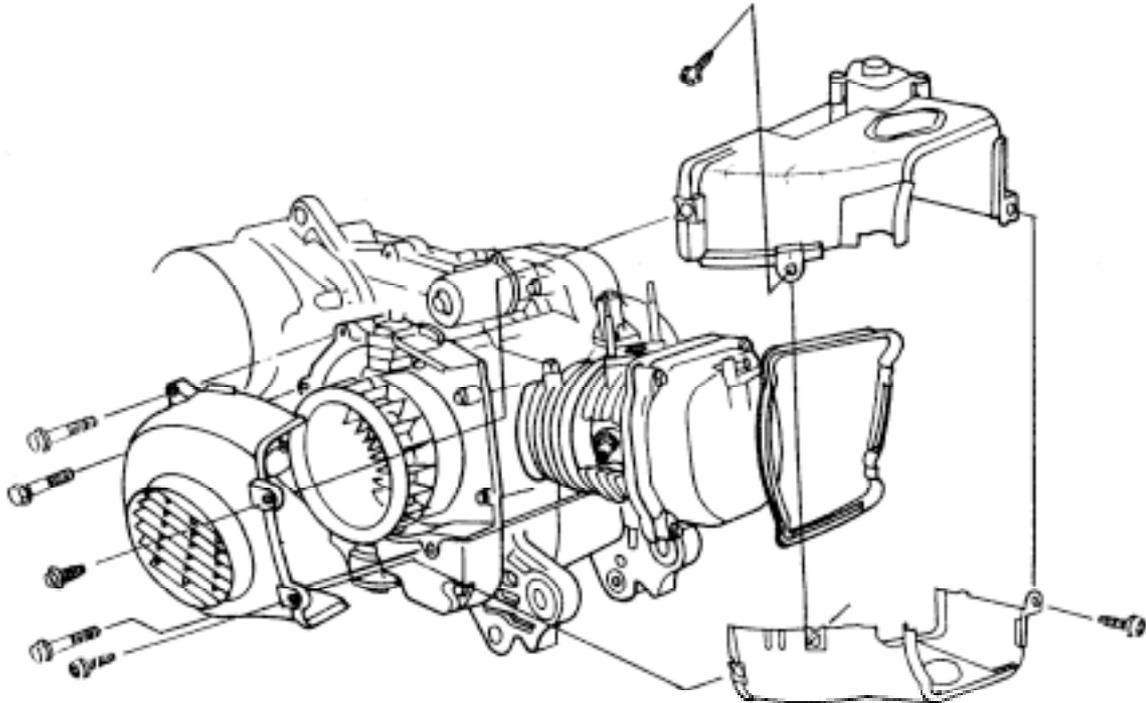
Remove the camshaft. (⇒7-3)
Remove the carburetor. (⇒5-5)
Remove the exhaust muffler. (⇒2-5)
Remove the carburetor intake manifold.

Intake Manifold



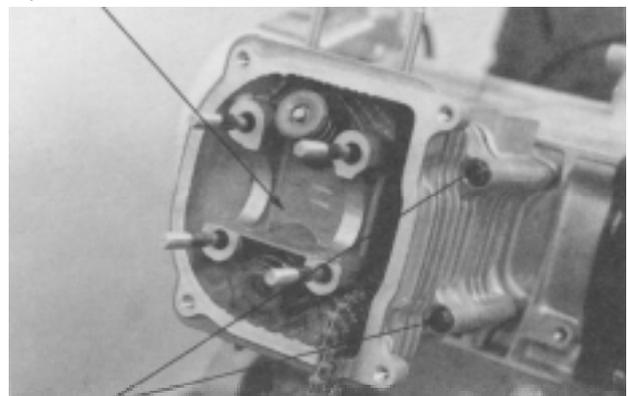
7. CYLINDER HEAD/VALVES

Remove the cooling fan cover. (⇒ 14-6)
Remove the engine cover bolts and screws.
Separate the engine cover joint claws.



Remove the cylinder head.

Cylinder Head



Bolts

Remove the dowel pins and cylinder head gasket.
Remove the cam chain guide.

Dowel Pins

Cylinder Head Gasket



Cam Chain Guide

7. CYLINDER HEAD/VALVES

CYLINDER HEAD DISASSEMBLY

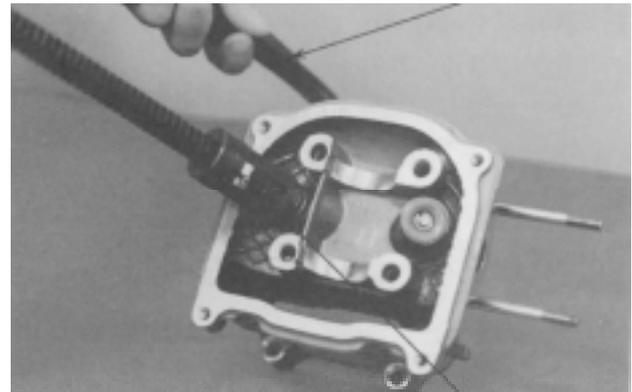
Remove the valve spring cotters, retainers, springs, spring seats and valve stem seals using a valve spring compressor.

- *
 - Be sure to compress the valve springs with a valve spring compressor.
 - Mark all disassembled parts to ensure correct reassembly.

Special

Valve Spring Compressor

Valve Spring Compressor Attachment



Valve Spring Compressor

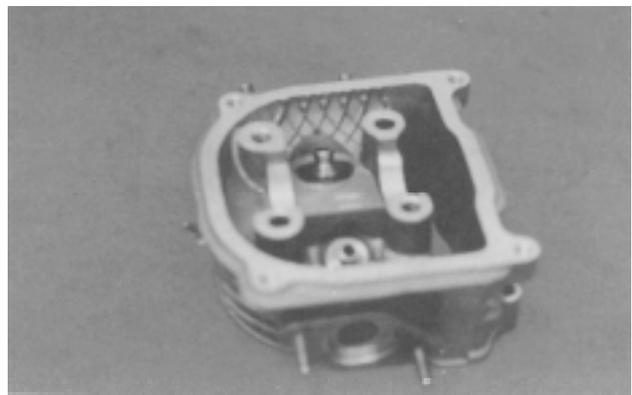
Valve Spring Compressor Attachment

Remove carbon deposits from the combustion chamber.

Clean off any gasket material from the cylinder head mating surface.

- *

Be careful not to damage the cylinder head mating surface.



INSPECTION

CYLINDER HEAD

Check the spark plug hole and valve areas for cracks.

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

Service Limit: 0.05mm repair or replace if over

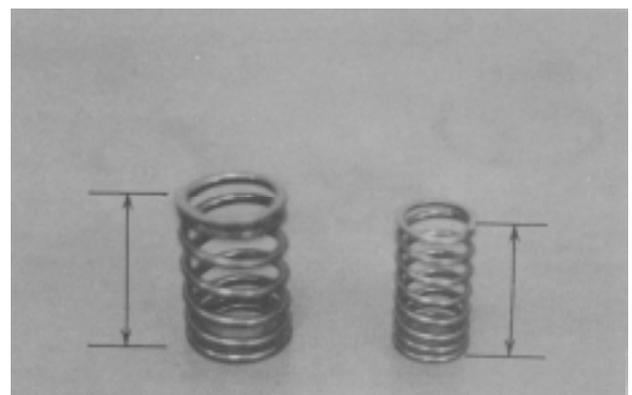
VALVE SPRING FREE LENGTH

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

Service Limits:

Inner : 30.1mm replace if below

Outer : 33.3mm replace if below



7. CYLINDER HEAD/VALVES

VALVE/ VALVE GUIDE

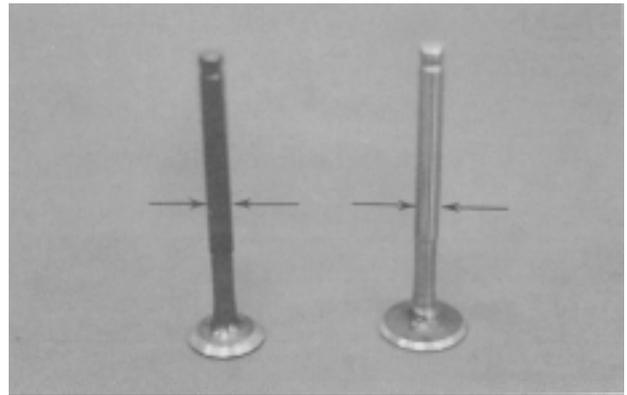
Inspect each valve for bending, burning, scratches or abnormal stem wear.

Check valve movement in the guide.

Measure each valve stem O.D.

Service Limits: IN : 4.9mm replace if below

EX: 4.9mm replace if below



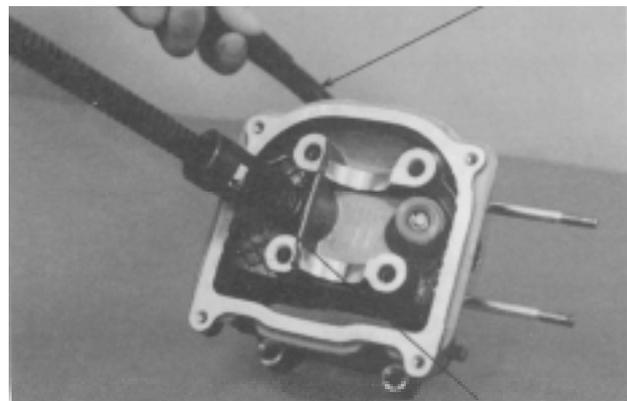
CYLINDER HEAD ASSEMBLY

- *
 - When assembling, a valve spring compressor must be used.
 - Install the cotters with the pointed ends facing down from the upper side of the cylinder head.

Special

Valve Spring Compressor

Valve Spring Compressor Attachment

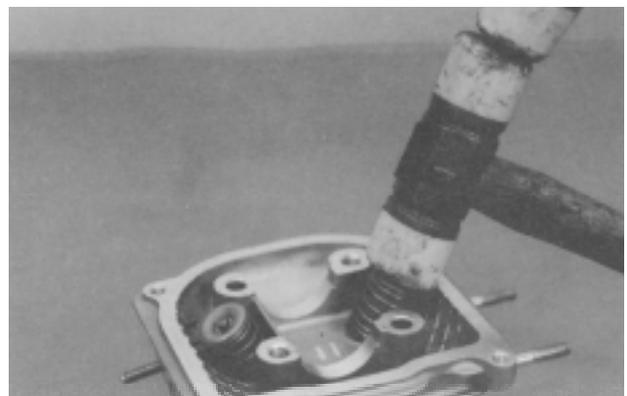


Valve Spring Compressor

Tap the valve stems gently with a plastic hammer for 2_ 3 times to firmly seat the cotters.

- *

Be careful not to damage the valves.

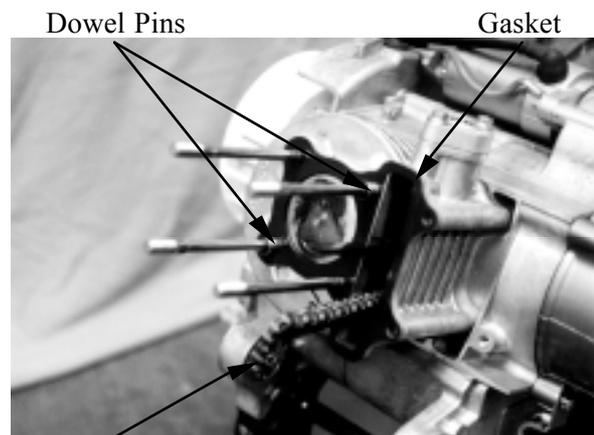


Valve Spring Compressor Attachment

CYLINDER HEAD INSTALLATION

Install the dowel pins and a new cylinder head gasket.

Install the cam chain guide.



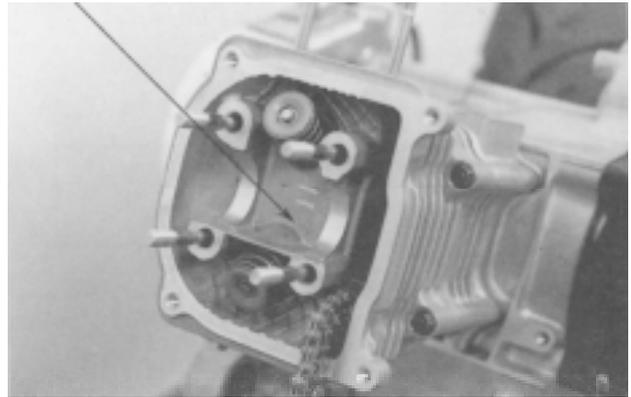
Cam Chain Guide

7. CYLINDER HEAD/VALVES

FILLY LX 50

Install the cylinder head.

Cylinder Head

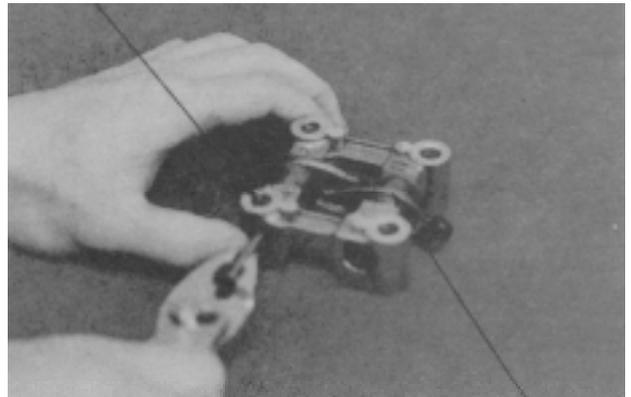


CAMSHAFT HOLDER ASSEMBLY

First assemble the camshaft holder.
Install the intake and exhaust valve rocker arms and rocker arm shafts.

- * • When installing the rocker arm shaft, align the shaft front end with the bolt hole of the camshaft holder.

Camshaft Holder



CAMSHAFT INSTALLATION

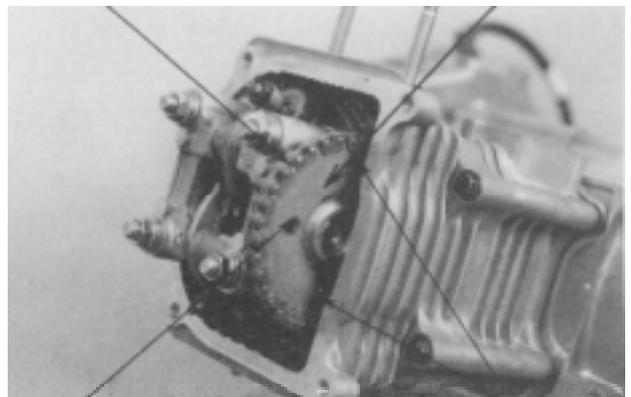
Turn the flywheel so that the "T" mark on the flywheel aligns with the index mark on the crankcase.

Keep the round hole on the camshaft gear facing up and align the punch marks on the camshaft gear with the cylinder head surface (Position the intake and exhaust cam lobes down.) and install the camshaft onto the cylinder head.

Install the cam chain over the camshaft gear.

Valve Rocker Arm
Camshaft Gear

Cam Chain

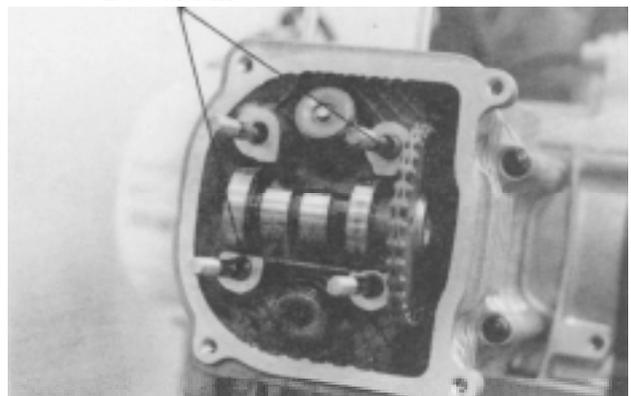


Round Hole

Punch Marks

Dowel Pins

Install the dowel pins.



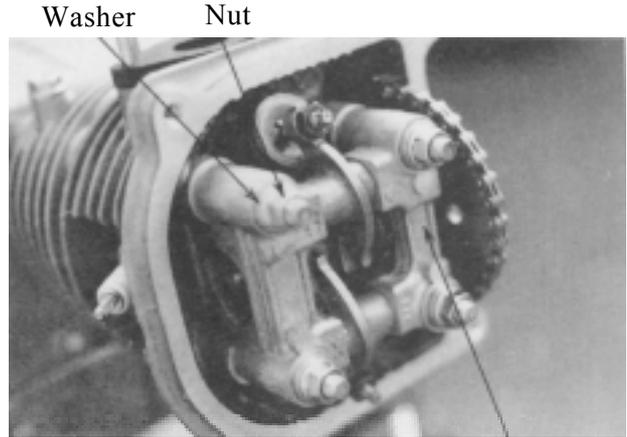
7. CYLINDER HEAD/VALVES

Install the camshaft holder, washers and nuts on the cylinder head.

Tighten the four cylinder head nuts and two bolts.

Torque: Cylinder head nut: 1.8~2.2kgf-m

- *
 - Apply engine oil to the threads of the cylinder head nuts.
 - Diagonally tighten the cylinder head nuts in 2_ 3 times.



Washer Nut

Camshaft Holder

CAM CHAIN TENSIONER INSTALLATION

First install a new cam chain tensioner gasket.

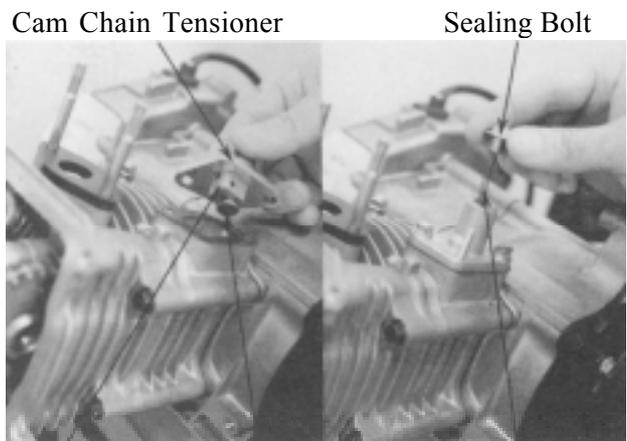
Install the tensioner using the two bolts.

Install the tensioner spring.

Install the O-ring and sealing bolt.

- *
 - When installing the tensioner, release the lock pawl and push the push rod all the way in.

Torque: 0.45~0.6kgf-m



Cam Chain Tensioner

Sealing Bolt

Lock Pawl Push Rod Spring

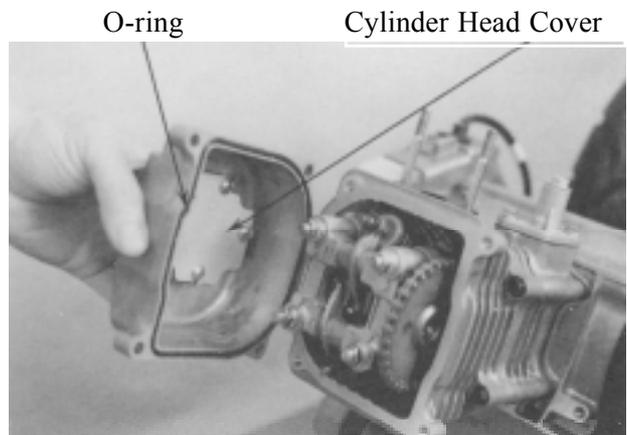
Adjust the valve clearance. (⇒3-5)

Install a new cylinder head cover O-ring and install the cylinder head cover.

- *
 - Be sure to install the O-ring into the groove properly.

Install and tighten the cylinder head cover bolts.

Torque: 0.8~1.2kgf-m



O-ring

Cylinder Head Cover