

8. CYLINDER/PISTON

CYLINDER /PISTON

SERVICE INFORMATION (Mongoose/KXR 90)-----	8- 3
SERVICE INFORMATION (Mongoose/KXR 50)-----	8- 4
CYLINDER/PISTON (Mongoose/KXR 90)-----	8- 5
CYLINDER HEAD (Mongoose/KXR 50) -----	8-10
CYLINDER/PISTON (Mongoose/KXR 50)-----	8-13

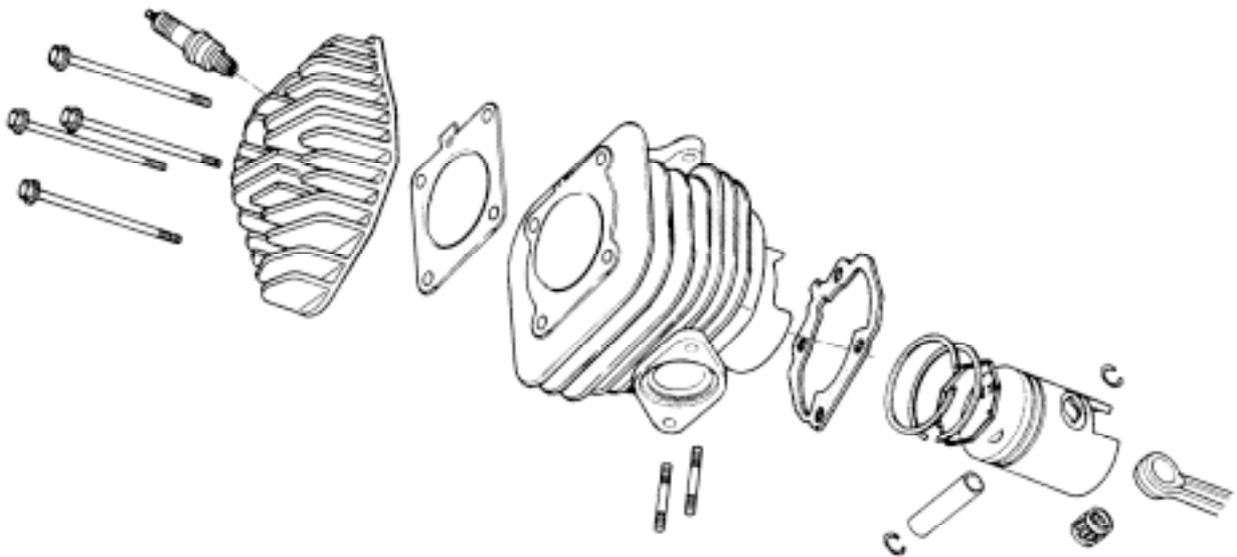


8. CYLINDER/PISTON

Mongoose/KXR 90

8. CYLINDER/PISTON

Mongoose/KXR 50



8. CYLINDER/PISTON

SERVICE INFORMATION (Mongoose/KXR 90)

GENERAL INSTRUCTIONS

- The cylinder and piston can be serviced with the engine installed in the frame.
- Before disassembly, clean the engine to prevent dust from entering the engine.
- Remove all gasket material from the mating surfaces.
- Do not use a driver to pry between the cylinder and cylinder head, cylinder and crankcase.
- Do not damage the cylinder inside and the piston surface.
- After disassembly, clean the removed parts before inspection. When assembling, apply the specified engine oil to movable parts.

SPECIFICATIONS

		Standard (mm)	Service Limit (mm)	
Cylinder	I.D.	47.00_ 47.01	47.1	
	Warpage	□	0.05	
	Cylindricity	□	0.05	
	True roundness	□	0.05	
Piston, piston ring	Ring-to-groove clearance	Top	0.015_ 0.055	0.09
		Second	0.015_ 0.055	0.09
	Ring end gap	Top	0.15_ 0.3	0.5
		Second	0.3_ 0.45	0.65
		Oil ring	0.2_ 0.7	0.9
	Piston O.D.		46.97_ 46.99	46.9
	Piston O.D. measuring position		4mm from bottom of skirt	□
	Piston-to-cylinder clearance		0.010_ 0.040	0.1
Piston pin hole I.D.		13.002_ 13.008	13.04	
Piston pin O.D		12.994_ 17.000	12.96	
Piston-to-piston pin clearance		0.002_ 0.014	0.02	
Connecting rod small end I.D. bore		13.016_ 13.034	13.06	

TROUBLESHOOTING

- When hard starting or poor performance at low speed occurs, check the crankcase breather for white smoke. If white smoke is found, it means that the piston rings are worn, stuck or broken.

Compression too low or uneven compression

- Worn, stuck or broken piston rings
- Worn or damaged cylinder and piston

Compression too high

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

Excessive smoke from exhaust muffler

- Worn or damaged piston rings
- Worn or damaged cylinder and piston

Abnormal noisy piston

- Worn cylinder, piston and piston rings
- Worn piston pin hole and piston pin

8. CYLINDER/PISTON

SERVICE INFORMATION (Mongoose/KXR 50)

GENERAL INSTRUCTIONS

- The cylinder head, cylinder and piston can be serviced with the engine installed in the frame.
- Before disassembly, clean the engine to prevent dust from entering the engine.
- Remove all gasket material from the mating surfaces.
- Do not use a driver to pry between the cylinder and cylinder head, cylinder and crankcase.
- Do not damage the cylinder inside and the piston surface.
- After disassembly, clean the removed parts before inspection. When assembling, apply the specified engine oil to movable parts.

SPECIFICATIONS

Item	Standard (mm)	Service Limit (mm)
Cylinder head warpage	□	0.10
Piston O.D.(3mm from bottom of piston)	38.960_ 38.965	38.90
Cylinder-to- piston clearance	0.035_ 0.05	0.10
Piston pin hole I.D.	12.002_ 12.008	12.03
Piston pin O.D.	11.994_ 12.0	11.98
Piston-to-piston pin clearance	0.002_ 0.014	0.03
Piston ring end gap (top/second)	0.10_ 0.25	0.40
Connecting rod small end I.D.	17.005_ 17.017	17.03
Cylinder bore	39.005_ 39.01	39.05

TORQUE VALUES

Cylinder head bolt	0.8_ 1.2kg-m
Spark plug	1.1_ 1.7kg-m

TROUBLESHOOTING

Compression too low, hard starting or poor performance at low speed

- Leaking cylinder head gasket
- Loose spark plug
- Worn, stuck or broken piston and piston rings
- Worn or damaged cylinder and piston

Compression too high, overheating or knocking

- Excessive carbon build-up in cylinder head or on piston head

Abnormal noisy piston

- Worn cylinder and piston
- Worn piston pin or piston pin hole
- Worn connecting rod small end bearing

Abnormal noisy piston rings

- Worn, stuck or broken piston rings
- Worn or damaged cylinder

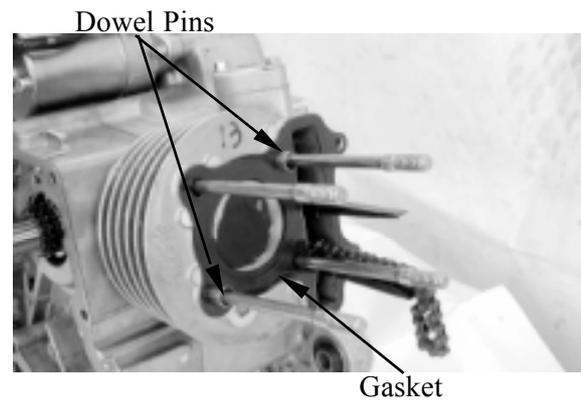
8. CYLINDER/PISTON

CYLINDER/PISTON (Mongoose/KXR 90)

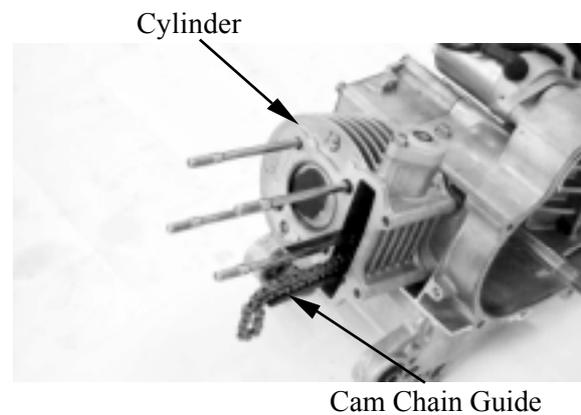
REMOVAL

Remove the cylinder head. (Refer to the chapter 7)

Remove the two dowel pins and cylinder head gasket.

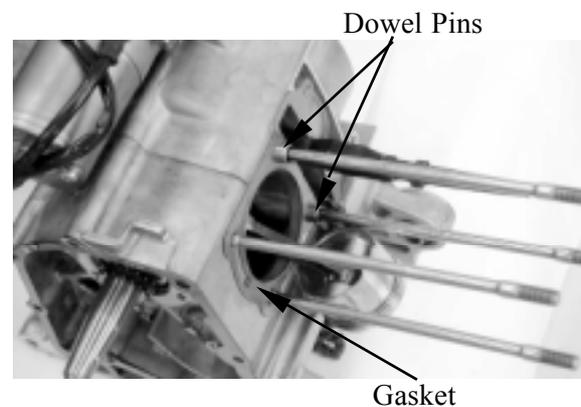


Remove cam chain guide and then remove cylinder.



Remove the cylinder gasket and dowel pins. Clean any gasket material from the cylinder surface.

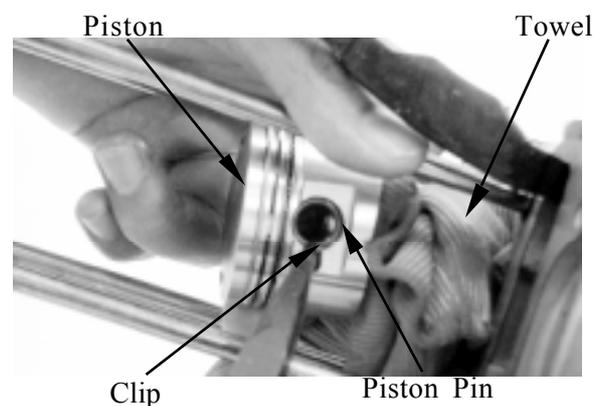
- Be careful not to drop foreign matters into the crankcase.



Remove the piston pin clip.

- Place a clean shop towel in the crankcase to keep the piston pin clip from falling into the crankcase.

Press the piston pin out of the piston and remove the piston.



8. CYLINDER/PISTON

INSPECTION

Inspect the piston, piston pin and piston rings.

Remove the piston rings.

- Take care not to damage or break the piston rings during removal.

Clean carbon deposits from the piston ring grooves.

Inspect the piston wall for wear/scratches/damage.

If any defects are found, replace the piston with a new one.

Install the piston rings onto the piston and measure the piston ring-to-groove clearance.

Service Limits: Top: 0.09mm replace if over
2nd: 0.09mm replace if over

Remove the piston rings and insert each piston ring into the cylinder bottom.

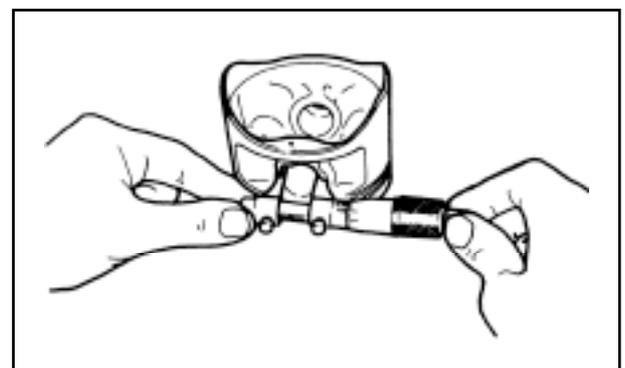
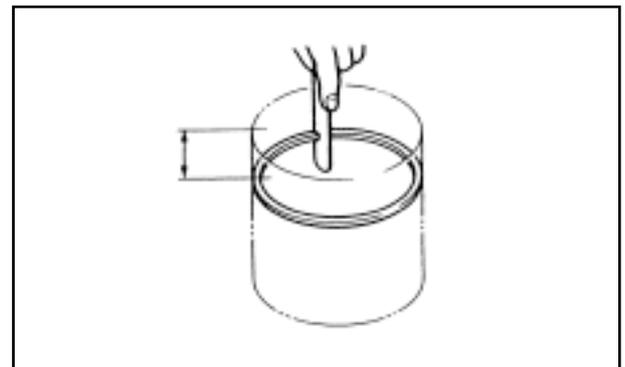
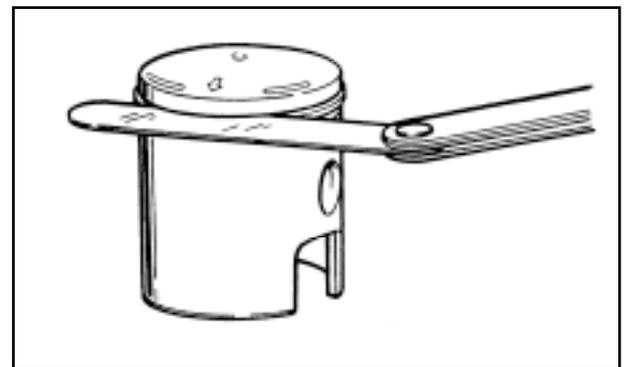
- Use the piston head to push each piston ring into the cylinder.

Measure the piston ring end gap.

Service Limit: Top: 0.5mm replace if over
2nd: 0.65mm replace if over
Oil ring: 0.9mm replace if over

Measure the piston pin hole I.D.

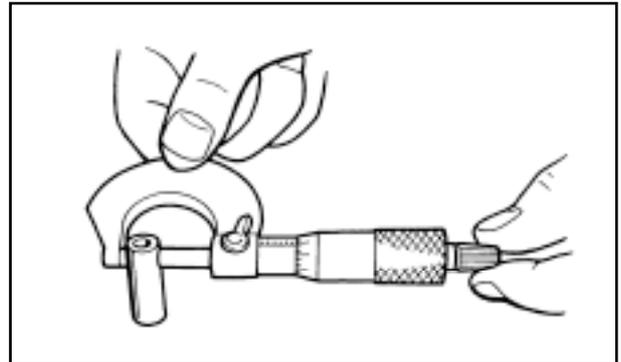
Service Limit: 13.04mm replace if over



8. CYLINDER/PISTON

Measure the piston pin O.D.

Service Limit: 12.96mm replace if below



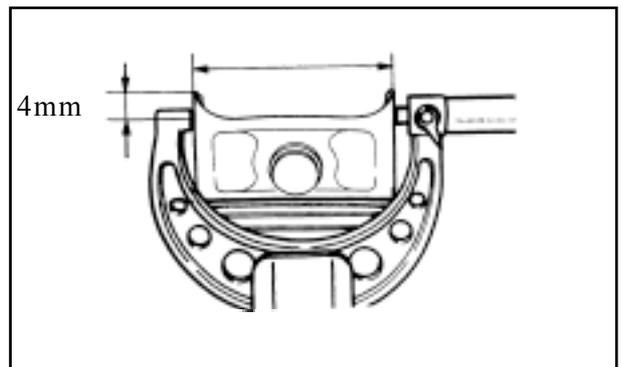
Measure the piston O.D.

° Take measurement at 10mm from the bottom and 90° to the piston pin hole.

Service Limit: 46.9mm replace if below

Measure the piston-to-piston pin clearance.

Service Limit: 0.02mm replace if over



CYLINDER INSPECTION

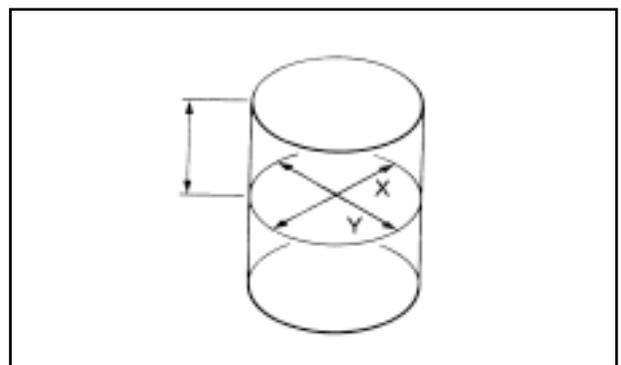
Inspect the cylinder bore for wear or damage. Measure the cylinder I.D. at three levels of top, middle and bottom at 90° to the piston pin (in both X and Y directions).

Cylinder I.D.:

Service Limit: 47.1mm replace if over

Measure the cylinder-to-piston clearance.

Service Limit: 0.1mm repair or replace if over



The true roundness is the difference between the values measured in X and Y directions. The cylindricity (difference between the values measured at the three levels) is subject to the maximum value calculated.

Service Limits:

True Roundness: 0.05mm repair or replace if over

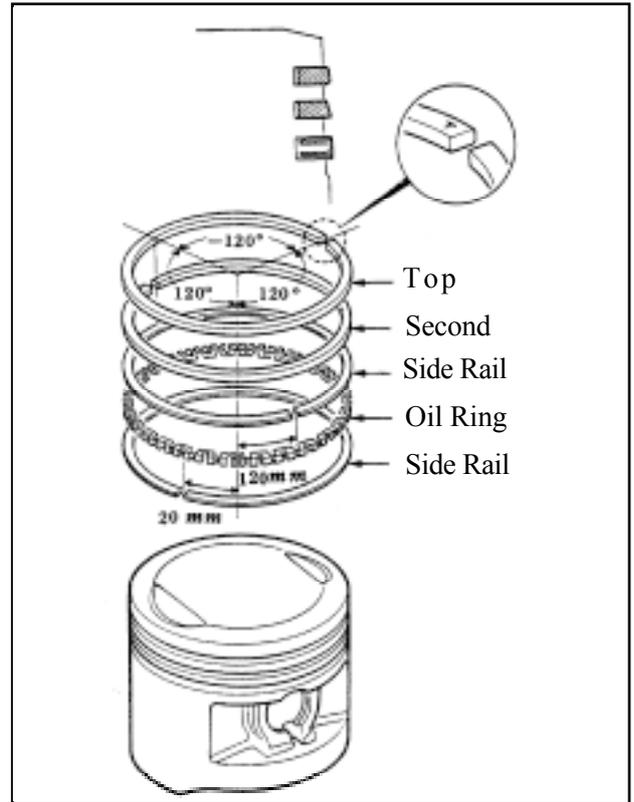
Cylindricity: 0.05mm repair or replace if over

8. CYLINDER/PISTON

PISTON RING INSTALLATION

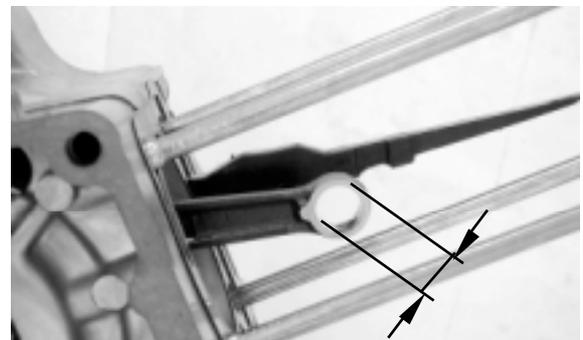
Install the piston rings onto the piston.
Apply engine oil to each piston ring.

- Be careful not to damage or break the piston and piston rings.
- All rings should be installed with the markings facing up.
- After installing the rings, they should rotate freely without sticking.

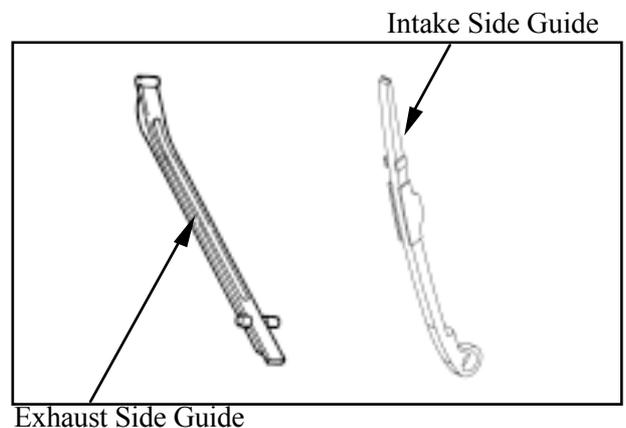


Measure the connecting rod small end I.D.
Service Limit: 13.06mm replace if over

Measure the connecting rod to piston pin clearance.
Service Limit: 0.06mm replace if over



Inspect the exhaust side and intake side chain guides.
Wear/Damage _ Replace.



8. CYLINDER/PISTON

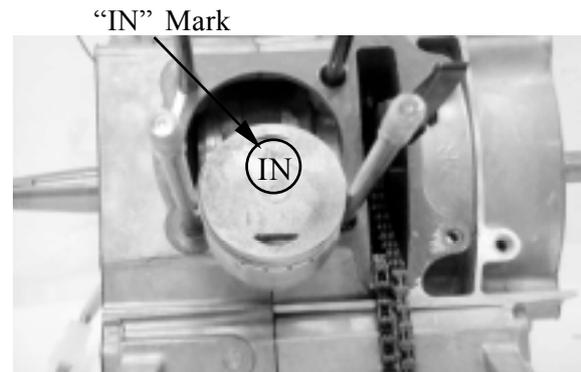
PISTON INSTALLATION

Remove any gasket material from the crankcase surface.

-  Be careful not to drop foreign matters into the crankcase.

Install the piston, piston pin and a new piston pin clip.

- 
 - Position the piston “IN” mark on the intake valve side.
 - Place a clean shop towel in the crankcase to keep the piston pin clip from falling into the crankcase.



CYLINDER INSTALLATION

Install the dowel pins and a new cylinder gasket on the crankcase.

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

Carefully lower the cylinder over the piston by compressing the piston rings.

- 
 - Apply proper clean engine oil around cylinder wall.
 - Be careful not to damage or break the piston rings.
 - Stagger the ring end gaps at 120° to the piston pin.

8. CYLINDER/PISTON

CYLINDER HEAD (Mongoose/KXR 50)

REMOVAL

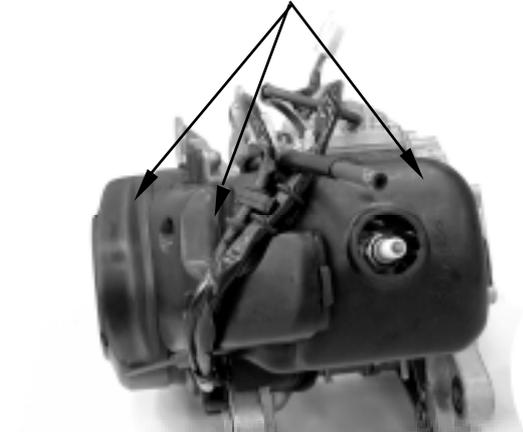
Remove the spark plug cap.
Remove the exhaust muffler. (⇒2-7)

Spark Plug Cap



Remove the three bolts attaching the fan cover to remove the fan cover.
Remove the bolt attaching the engine hood to remove the engine hood.
The installation sequence is the reverse of removal.

Fan Cover/Engine Hood

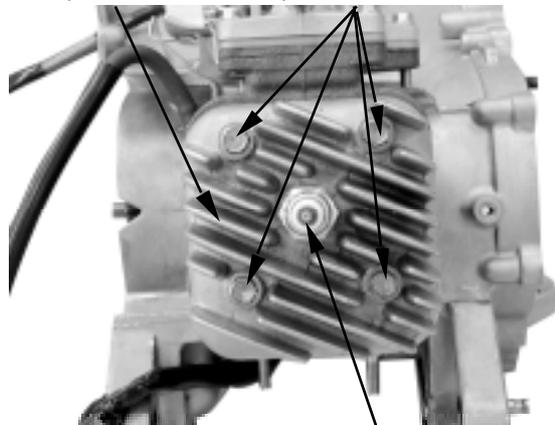


Remove the spark plug.
Remove the cylinder head bolts and the cylinder head.

ⓘ Loosen the bolts diagonally in 2 or 3 times.

Remove the cylinder head gasket.

Cylinder Head Cylinder head Bolts



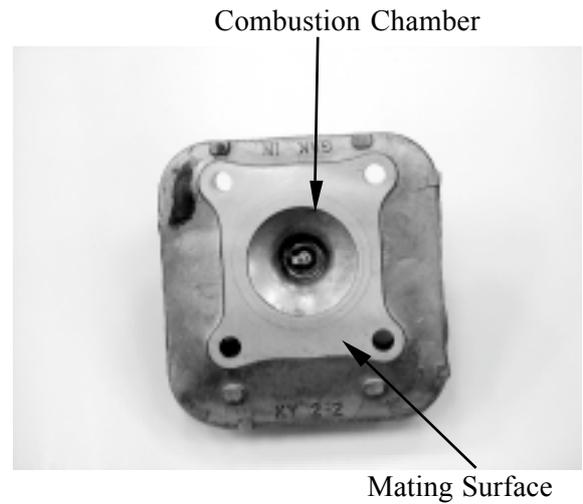
Spark Plug

8. CYLINDER/PISTON

COMBUSTION CHAMBER DECARBONIZING

Remove the carbon deposits from the combustion chamber

- ⊘ Avoid damaging the combustion chamber wall and cylinder mating surface.



CYLINDER HEAD INSPECTION

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

Service Limit: 0.10mm replace if over

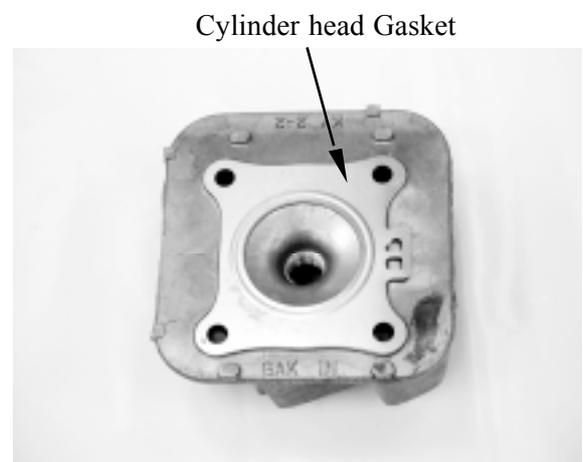


CYLINDER HEAD INSTALLATION

Install the cylinder head on the cylinder properly.

- ⊘ Be careful not to damage the mating surfaces.

Install a new cylinder head gasket onto the cylinder.



8. CYLINDER/PISTON

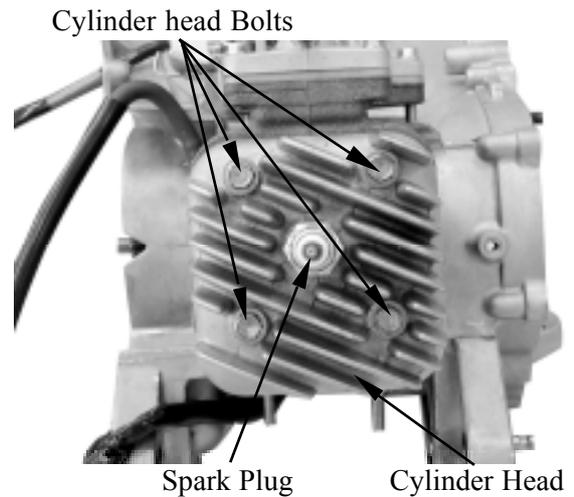
Cylinder Head Bolts Installation

Install and tighten the cylinder head bolts diagonally in 2 or 3 times.

Torque: 0.8_ 1.2kg-m

Install the spark plug.

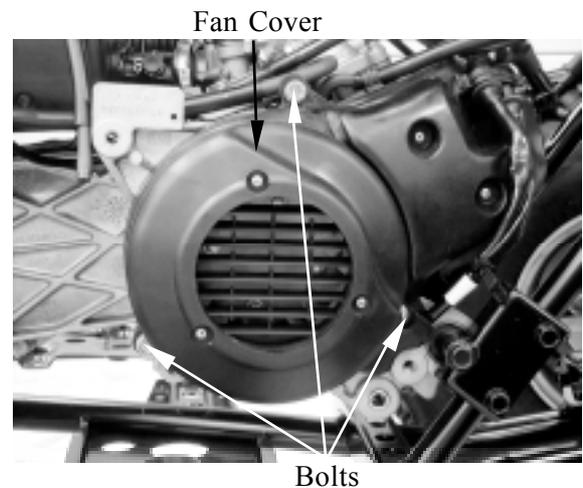
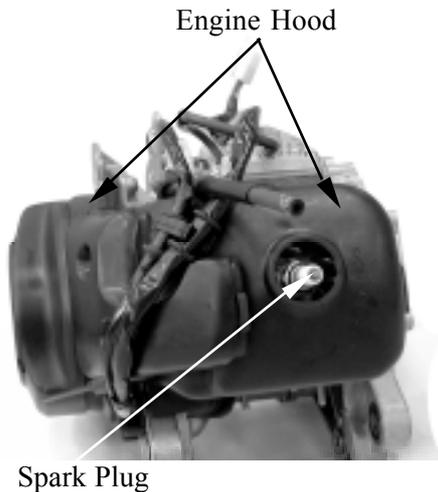
Torque: 1.1_ 1.7kg-m



Install the engine hood and fan cover.

Perform the following inspections after installation:

- Compression test
- Abnormal engine noise
- Cylinder air leaks



8. CYLINDER/PISTON

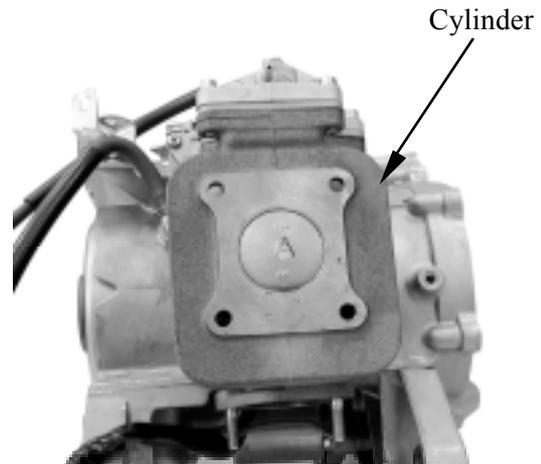
CYLINDER/PISTON (Mongoose/KXR 50)

CYLINDER REMOVAL

- Remove the cylinder head.
- Remove the exhaust muffler. (See page 2-7)
- Remove the reed valve. (See page 5-16)
- Remove the cylinder.
- Remove the cylinder gasket.



Do not pry between the cylinder and crankcase or strike the fins.

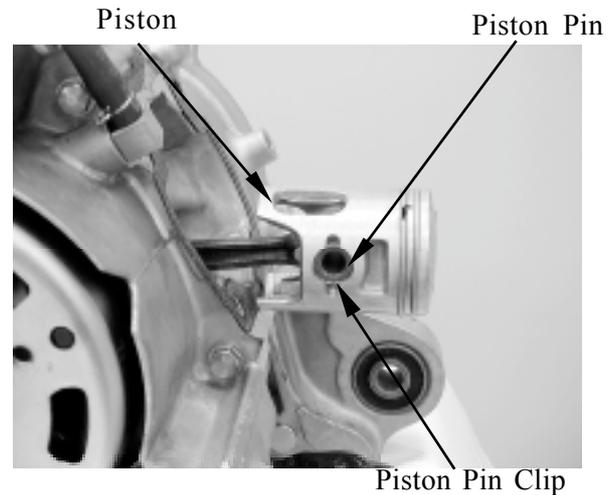


PISTON REMOVAL

Remove the piston pin clip to remove the piston pin and piston.



- Do not damage or scratch the piston.
- Do not apply side force to the connecting rod when removing the piston pin.
- Place clean shop towels in the crankcase to keep the piston pin clip from falling into the crankcase.



Spread each piston ring and remove by lifting it up at a point just opposite the gap. Remove the expander.



8. CYLINDER/PISTON

CYLINDER/PISTON INSPECTION

Check the cylinder and piston for wear or damage.

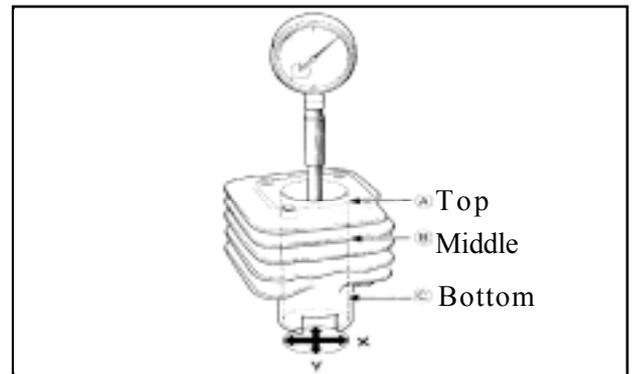
Clean carbon deposits from the exhaust port area.

⊘ Be careful not to damage the cylinder inside wall.



Measure the cylinder bore at three levels of A, B and C in both X and Y directions. Avoid the port area. Take the maximum figure measured to determine the cylinder bore.

Service Limit: 39.05mm replace if over



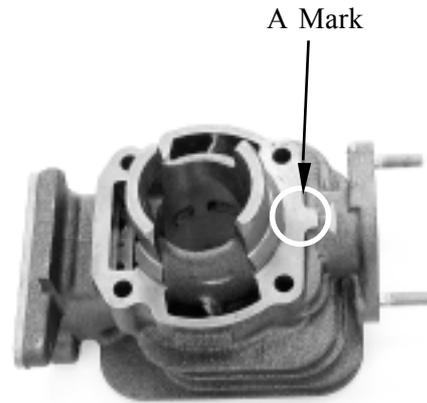
Inspect the top of the cylinder for warpage.

Service Limit: 0.10mm replace if over



8. CYLINDER/PISTON

Ⓢ The cylinder has an “A” mark or no mark on it. When replacing the cylinder with a new one, use a cylinder having the same mark as the old one.



Measure the piston O.D. at a point 3mm from the bottom of the piston skirt.
Service Limit: 38.90mm replace if below



Measure the piston-to-cylinder clearance.
Service Limit: 0.10mm replace if over

Measure the piston pin hole I.D.
Service Limit: 12.03mm replace if over

Measure the piston pin O.D.
Service Limit: 11.98mm replace if below

Measure the piston-to-piston pin clearance.
Service Limit: 0.03mm replace if over



8. CYLINDER/PISTON

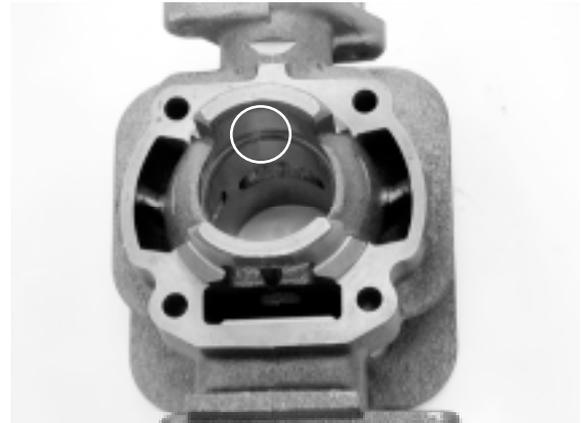
PISTON RING INSPECTION

Measure each piston ring end gap.

Service Limits: Top/Second

0.40mm replace if over

◦ \varnothing Set each piston ring squarely into the cylinder using the piston and measure the end gap.



CONNECTING ROD SMALL END INSPECTION

Install the piston pin and bearing in the connecting rod small end and check for excessive play.

Measure the connecting rod small end I.D.

Service Limit: 17.03mm replace if over



PISTON/CYLINDER INSTALLATION

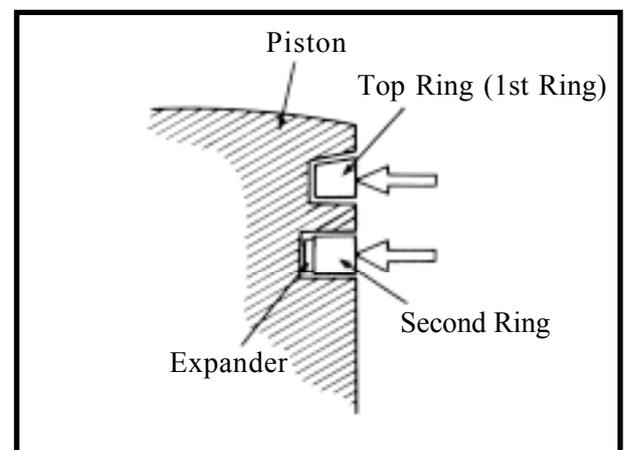
First install the expander in the second ring groove.

Then install the top and second rings in their respective ring grooves.

The piston rings should be pressed into the grooves with even force.

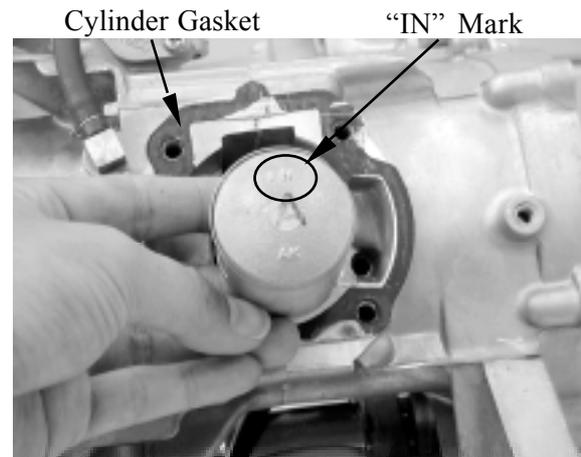
After installation, check and make sure that each ring is flush with the piston at several points around the ring.

A ring that will not compress means that the ring groove has carbon deposits in it and should be cleaned.



8. CYLINDER/PISTON

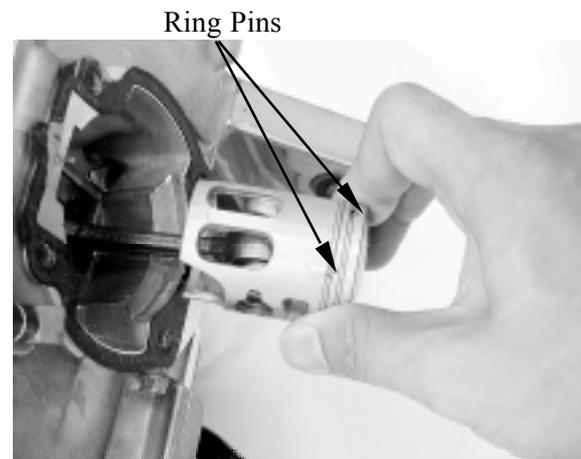
Install a new cylinder gasket on the mating surface between the cylinder and crankcase. Position the piston "IN" mark on the intake valve side.



Make sure that the ring end gaps are aligned with the piston ring pins in the ring grooves. Lubricate the cylinder inside and piston rings with engine oil and install the piston into the cylinder while compressing the piston rings.



Be careful not to damage the piston.



Install the cylinder head.

Torque: 0.8_ 1.2kg-m

The installation sequence is the reverse of removal .

