Engine Top End

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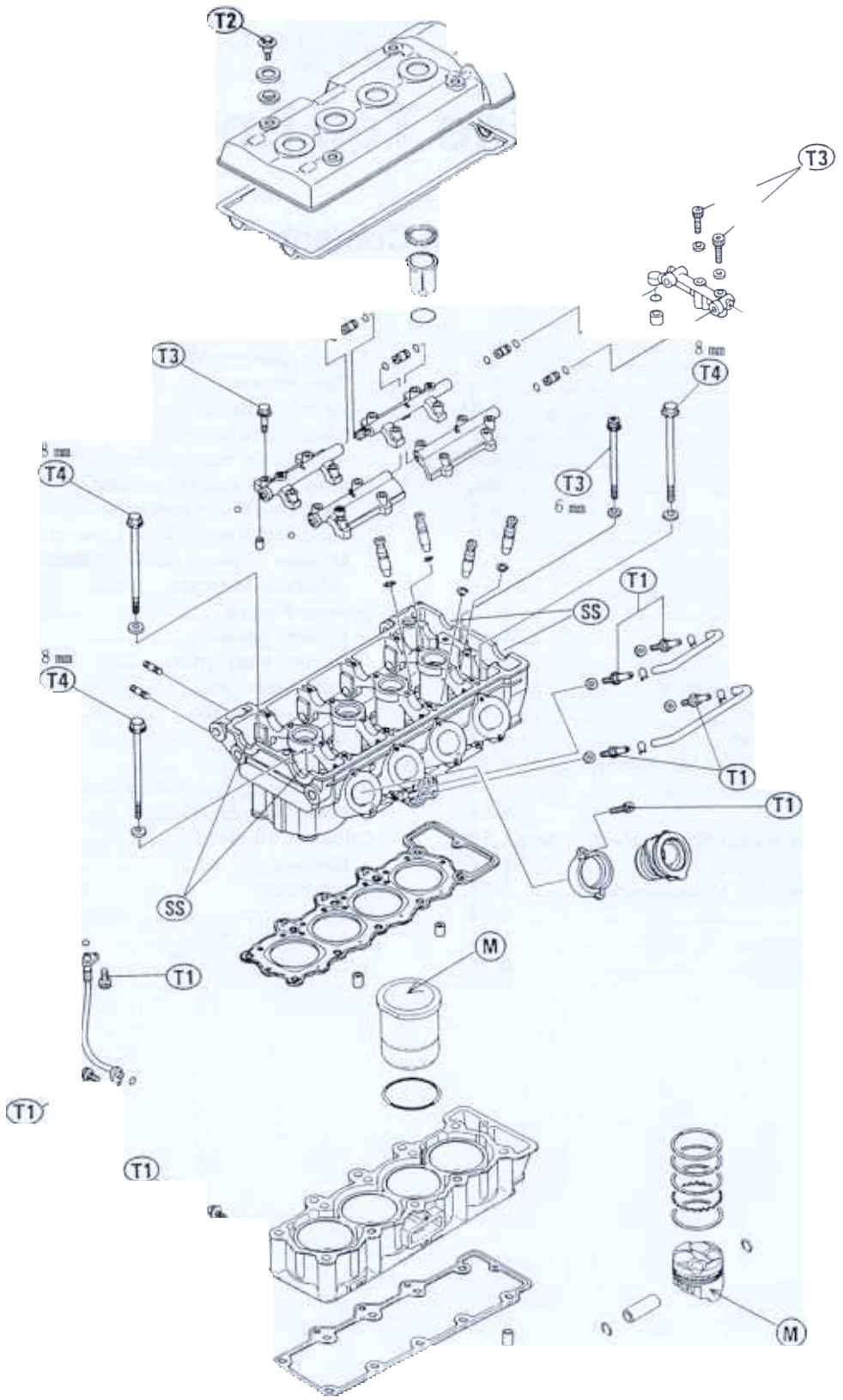
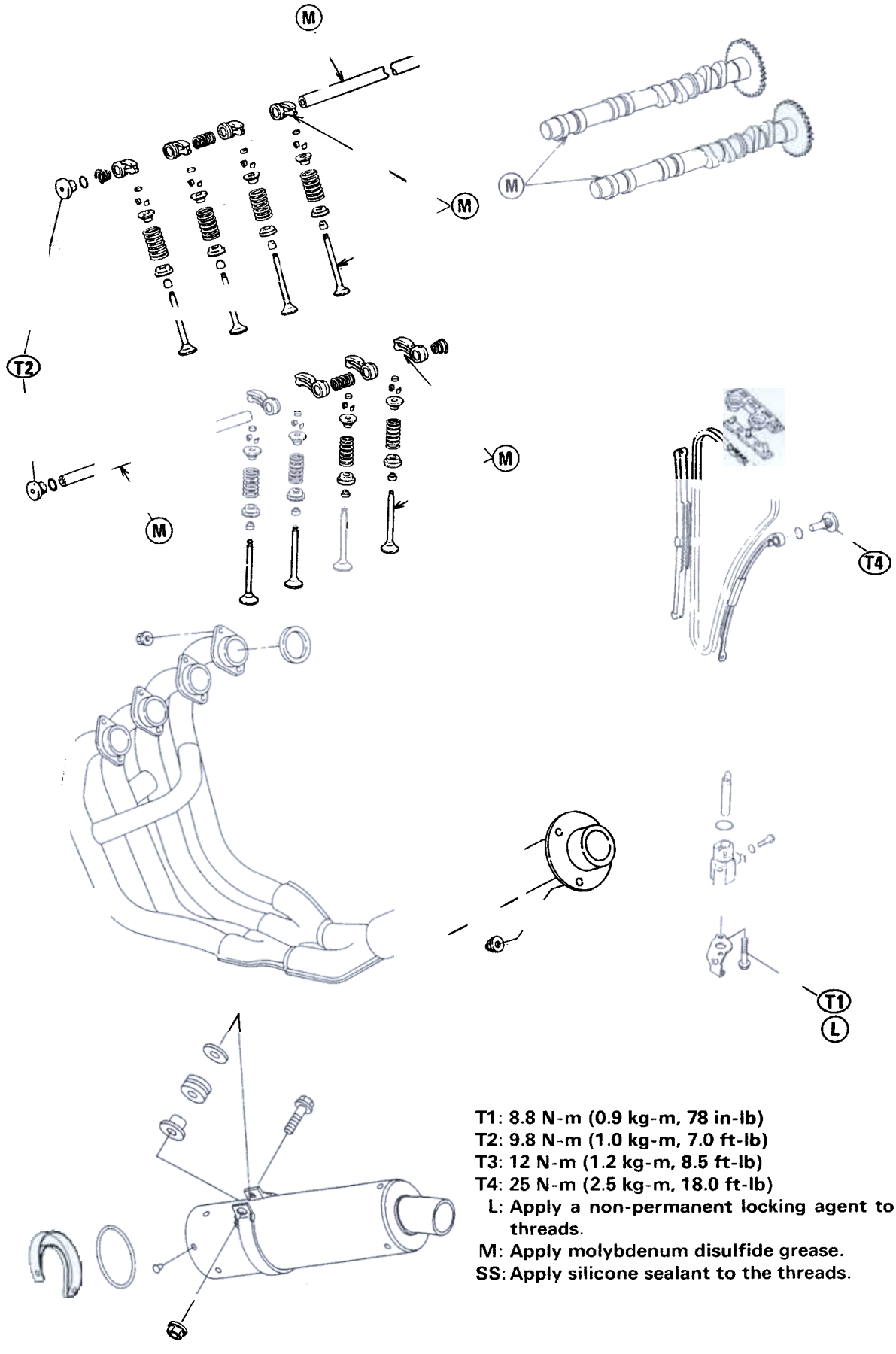
Exploded View



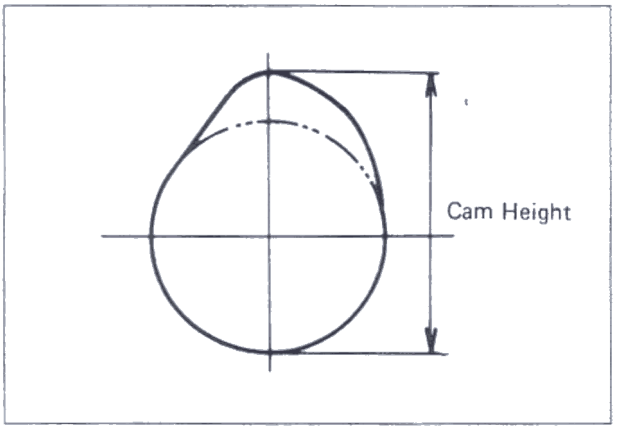


T1: 8.8 N-m (0.9 kg-m, 78 in-lb)
T2: 9.8 N-m (1.0 kg-m, 7.0 ft-lb)
T3: 12 N-m (1.2 kg-m, 8.5 ft-lb)
T4: 25 N-m (2.5 kg-m, 18.0 ft-lb)
L: Apply a non-permanent locking agent to the threads.
M: Apply molybdenum disulfide grease.
SS: Apply silicone sealant to the threads.

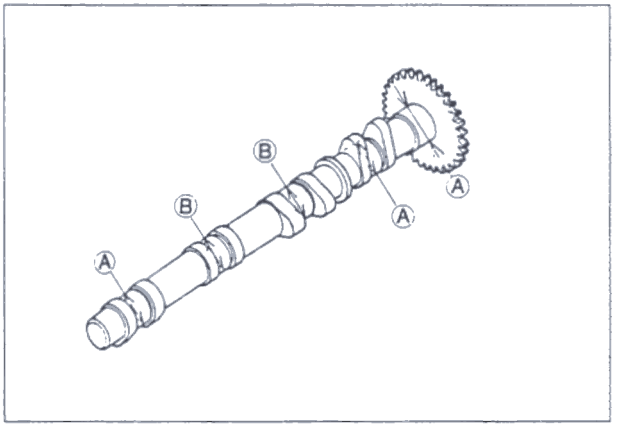
Specifications

Item		Standard	Service Limit
Camshaft:			
Cam height:			
Inlet		31.778 ~ 31.918 mm	31.68 mm
Exhaust		31.469 ~ 31.609 mm	31.37 mm
Camshaft, camshaft cap clearance:			
	A	0.028 ~ 0.071 mm	0.16 mm
	B	0.078 ~ 0.121 mm	0.21 mm
Camshaft journal diameter:	A	23.950 ~ 23.972 mm	23.92 mm
	B	23.900 ~ 23.922 mm	23.87 mm
Camshaft bearing inside diameter		24.000 ~ 24.021 mm	24.08 mm
Camshaft runout		- - -	0.1 mm TIR
Camshaft chain 20-link length		127.0 ~ 127.4 mm	128.9 mm
Cylinder Head:			
Cylinder compression (Usable range)		686 ~ 1 079 kPa (7.0 ~ 11.0 kg/cm², 99 ~ 156 psi) @330 r/min (rpm)	
Cylinder head warp		- - -	0.05 mm
Valves:			
Valve clearance:	Inlet	0.12 ~ 0.17 mm	- - -
	Exhaust	0.16 ~ 0.21 mm	- - -
Valve spring free length:		38.2 mm	36.4 mm
Valve head thickness:	Inlet	0.5 mm	0.25 mm
	Exhaust	0.7 mm	0.35 mm
Valve stem bend		0.02 TIR or under	0.05 mm TIR
Valve seat cutting angle		45°, 32°, 60°	- - -
Valve seat surface:			
Width:	Inlet	0.5 ~ 1.0 mm	- - -
	Exhaust	0.5 ~ 1.0 mm	- - -
Outside diameter:	Inlet	21.5 ~ 21.7 mm	- - -
	Exhaust	18.5 ~ 18.7 mm	- - -

Camshaft Height Measurement

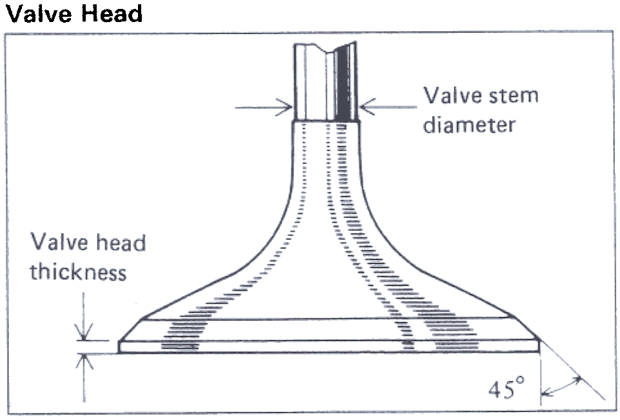


Camshaft Journal Diameter

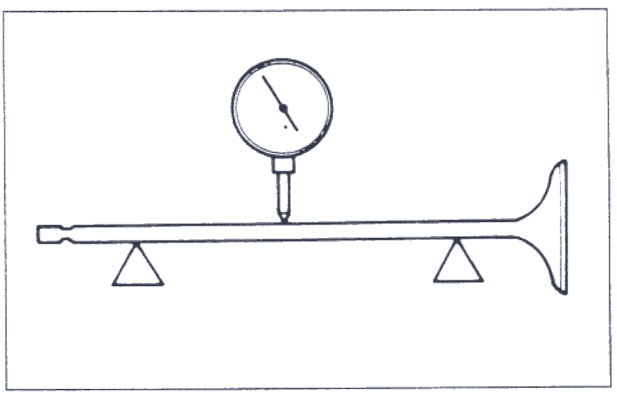


Item		Standard	Service Limit
Valve/valve guide clearance (wobble method):			
	Inlet	0.031 ~ 0.140 mm	0.34 mm
	Exhaust	0.085 ~ 0.180 mm	0.41 mm
Valve stem diameter:			
	Inlet	3.975 ~ 3.990 mm	3.96 mm
	Exhaust	3.955 ~ 3.970 mm	3.94 mm
Valve guide inside diameter		4.000 ~ 4.012 mm	4.08 mm
Cylinder, Piston:			
Cylinder inside diameter		57.000 ~ 57.012 mm	57.10 mm
Piston diameter		56.942 ~ 56.957 mm	56.79 mm
Piston/cylinder clearance		0.043 ~ 0.070 mm	– – –
Oversize piston and rings		+ 0.5 mm	– – –
Piston ring/groove clearance		0.030 ~ 0.070 mm	0.17 mm
Piston ring end gap:			
	Top	0.20 ~ 0.40 mm	0.70 mm
	Second	0.35 ~ 0.50 mm	0.80 mm

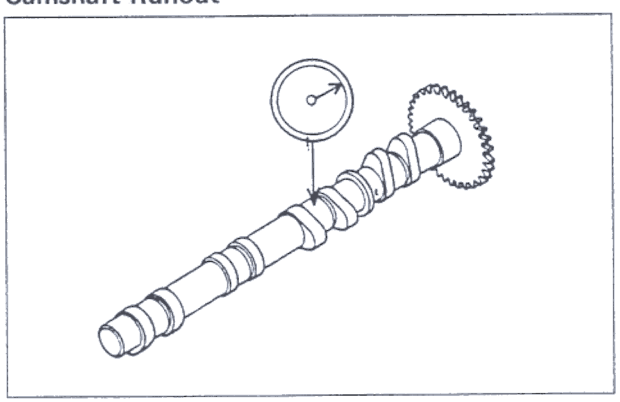
Valve Head



Valve Stem Bend

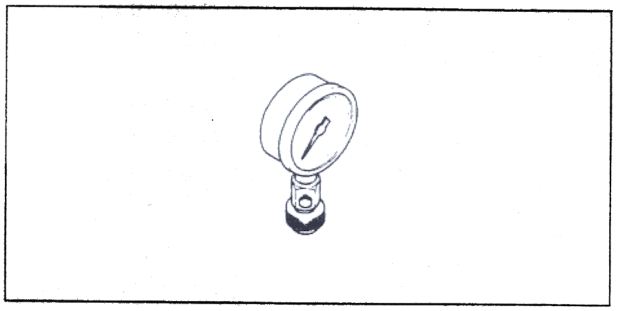


Camshaft Runout

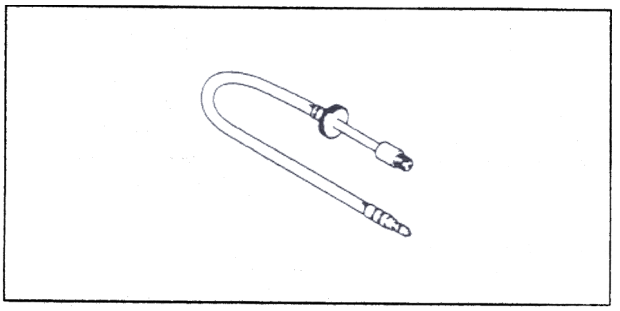


Special Tools

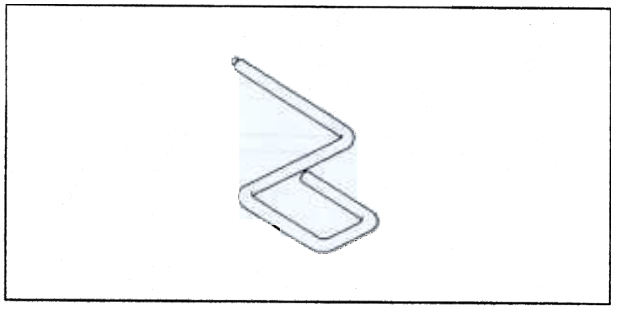
Compression Gauge: 57001-221



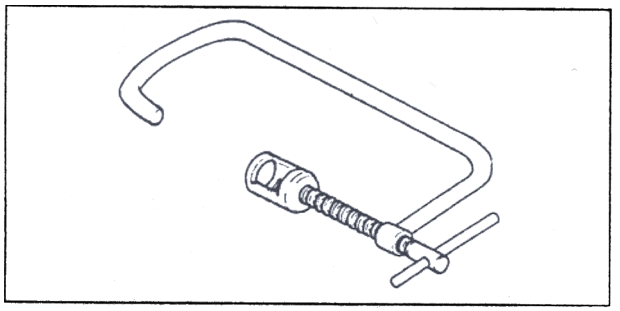
Compression Gauge Adapter, M10 X 1.0: 57001-1317



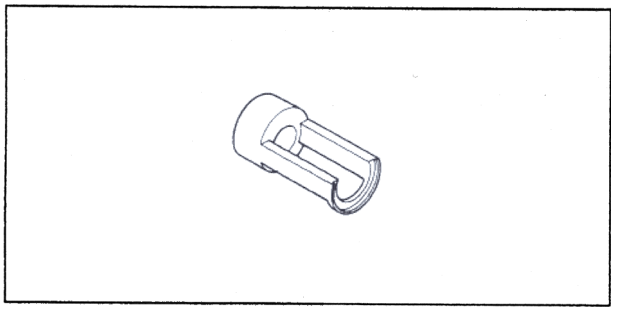
Rocker Arm Holder: 57001-1270



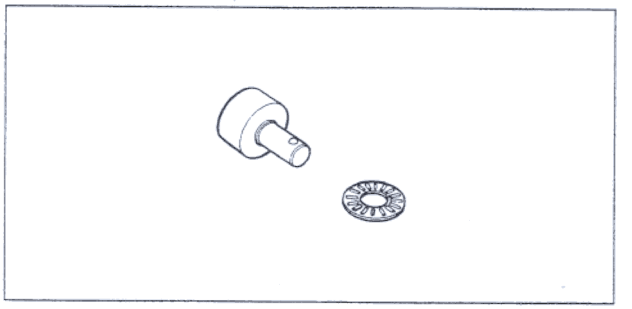
Valve Spring Compressor Assembly: 57001-241



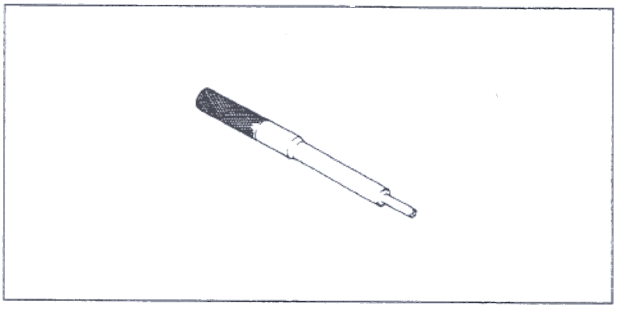
Valve Spring Compressor Adapter, Φ21: 57001-1272



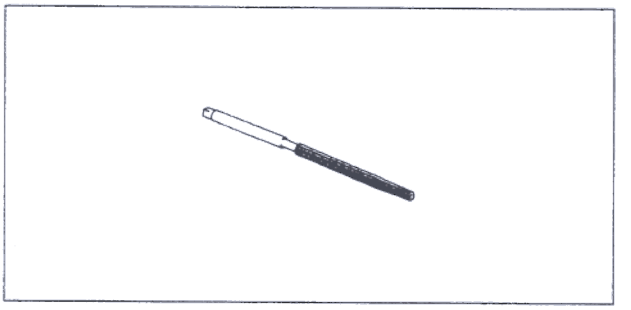
Valve Spring Compressor Joint: 57001-1271



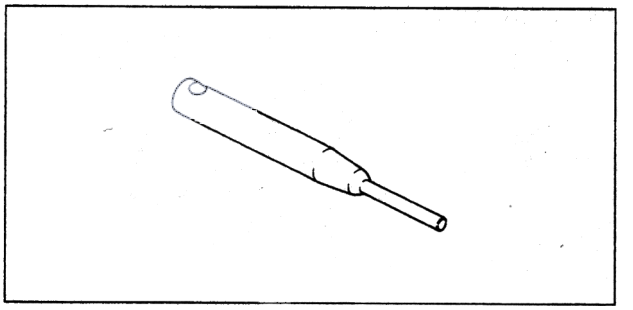
Valve Guide Arbor, Φ4: 57001-1273



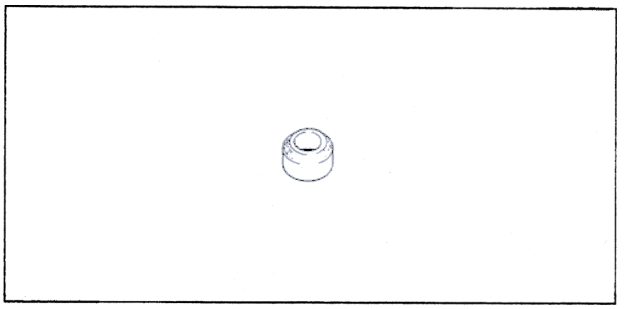
Valve Guide Reamer, Φ4: 57001-1274



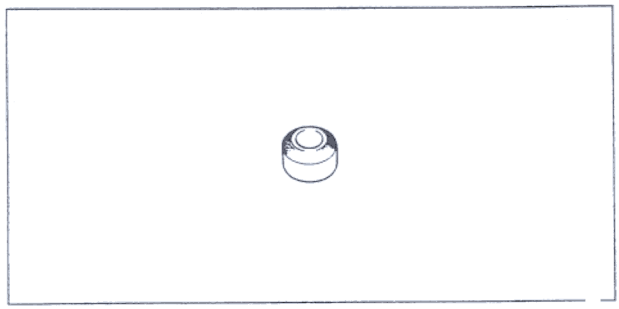
Valve Seat Cutter Holder, Φ4: 57001-1275



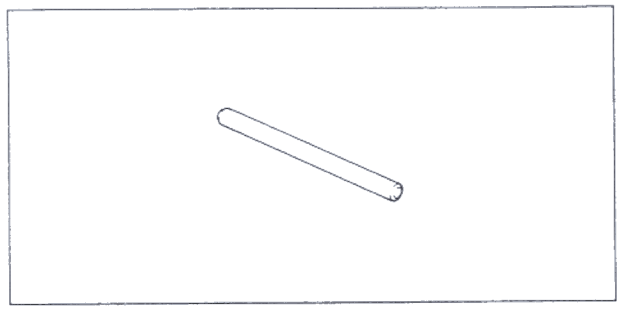
Valve Seat Cutter, 45° – Φ24.5: 57001-1113



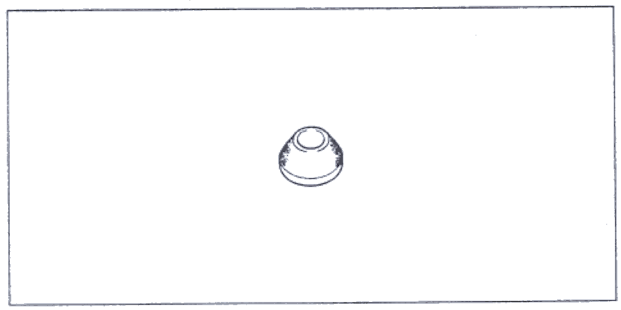
Valve Seat Cutter, 32° – Φ25: 57001-1118



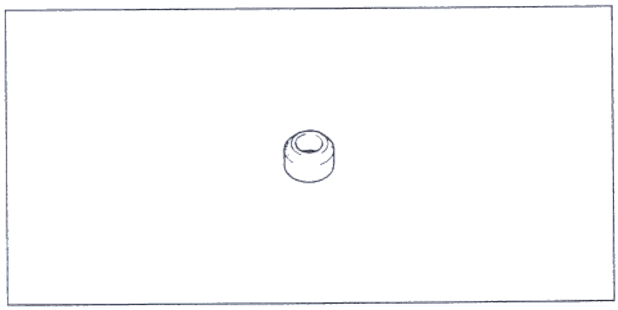
Valve Seat Cutter Holder Bar: 57001-1128



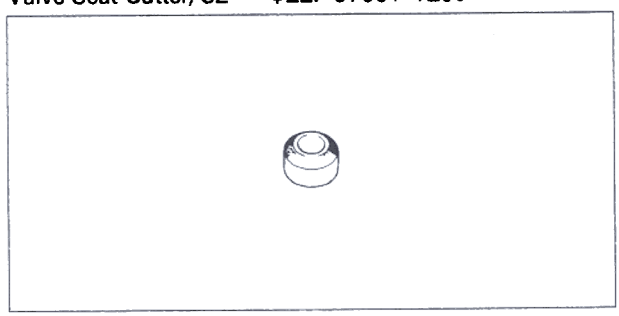
Valve Seat Cutter, 60° – Φ30: 57001-1123



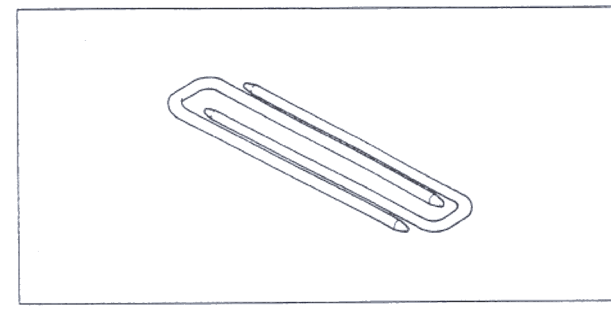
Valve Seat Cutter, 45° – Φ22: 57001-1205



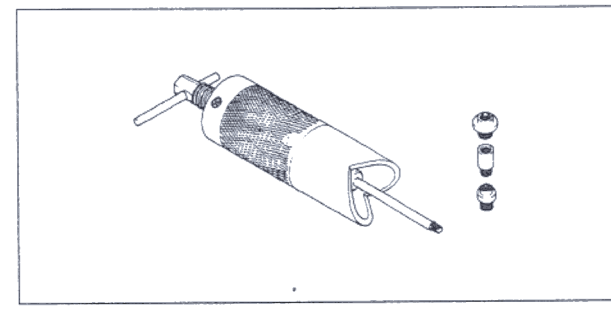
Valve Seat Cutter, 32° – Φ22: 57001-1206



Piston Base, Φ8: 57001-147

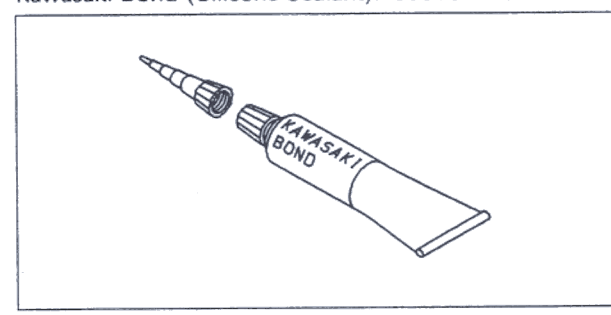


Piston Pin Puller Assembly: 57001-910



Sealant

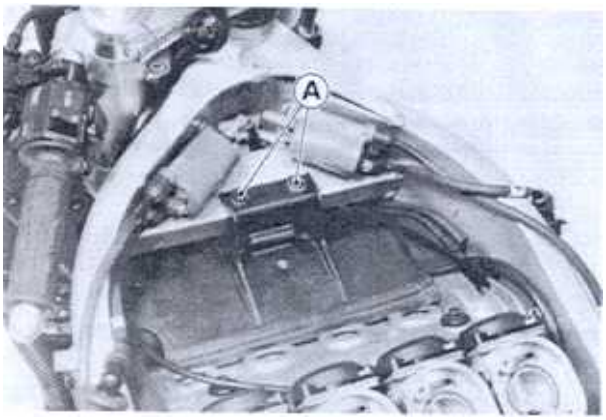
Kawasaki Bond (Silicone Sealant): 56019-120



Cylinder Head Cover

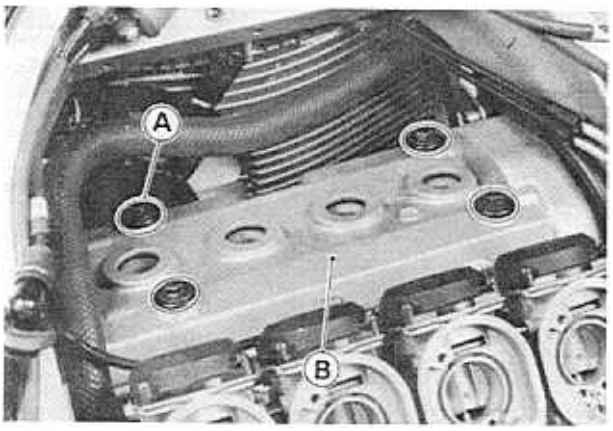
Removal

● Remove the following.
Fuel Tank (see Fuel System chapter)
Air Cleaner Housing (see Fuel System chapter)
Ignition Coils
Throttle Cable
Choke Cable
Baffle Plate



A. Baffle Plate Bolt

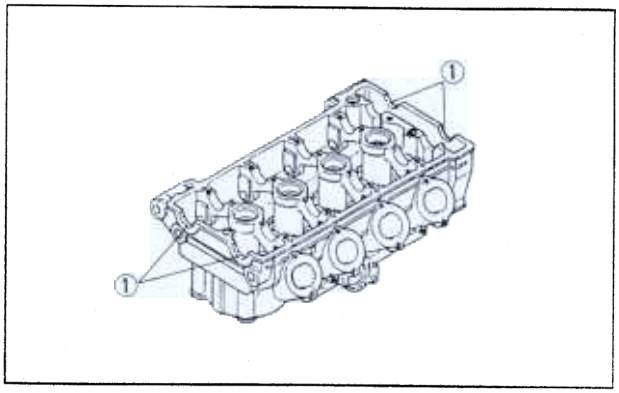
● Remove the cylinder head cover bolts and take off the cover.



A. Bolts B. Cylinder Head Cover

Installation

● Replace the head cover gasket with new one if it is damaged.
● Apply silicone sealant to the cylinder head as shown.
● Tighten the cover bolts to the specified torque (see Exploded View).

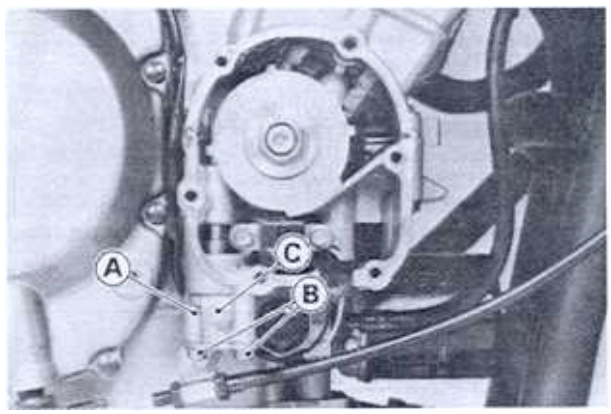


1. Silicone Sealant Applied Areas

Camshaft Chain Tensioner

Removal

- Remove the pickup coil cover.
- Remove the mounting bolts and take off the camshaft chain tensioner.



A. Camshaft Chain Tensioner
B. Mounting Bolts
C. Lock Bolt

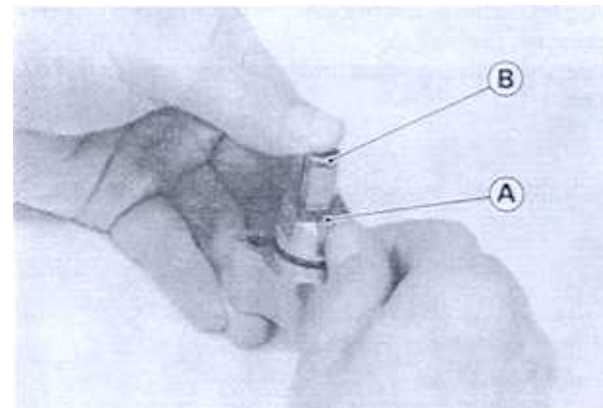
- Pull out the rod from the cam chain guide (rear side).

CAUTION

This is a non-return type cam chain tensioner. The push rod does not return to its original position once it moves out to take up cam chain slack. Observe all the rules listed below:
When removing the tensioner, do not take out the mounting bolts only halfway. Retightening the mounting bolts from this position could damage the tensioner and the camshaft chain. Once the bolts are loosened, the tensioner must be removed and reset as described in "Chain Tensioner Installation."
Do not turn over the crankshaft while the tensioner is removed. This could upset the cam chain timing, and damage the valves.

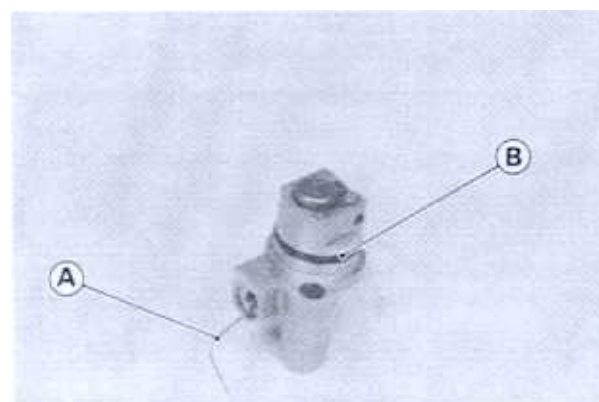
Installation

- Compressing the push rod, into the tensioner body and lock it.
- ○ Remove the lock bolt on the side of the tensioner body.
- ○ While pushing the taper part of the stopper, push the rod.



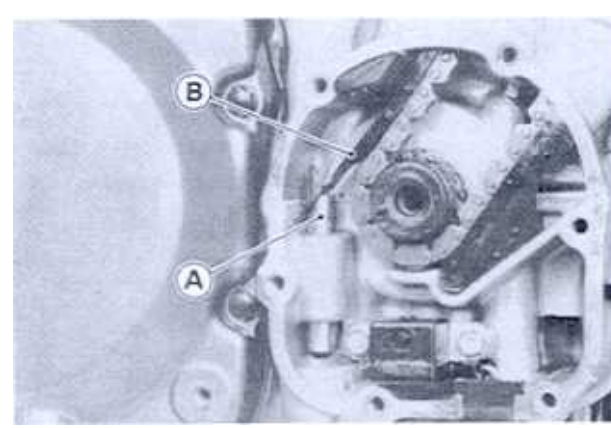
A. Taper Part (Stopper)
B. Push Rod

- Compressing the spring against the push rod head, insert a thin wire through the hole in the push rod to keep the spring in place.



A. Wire
B. O-ring

- Apply grease to the O-ring.
- Install the top end of a extension rod into a hole of the chain guide.



A. Extension Rod
B. Chain Guide

- Install the tensioner body on the engine.
- Apply a non-permanent locking agent to the mounting bolts and tighten them to the specified torque (see Exploded View).
- Pull the wire out and tighten the lock bolt.
- Install the pickup coil cover.

○Apply silicone sealant to the crankcase parting line and grommet (see 4-12).
○Apply a non-permanent locking agent to only one bolt (see 4-12).

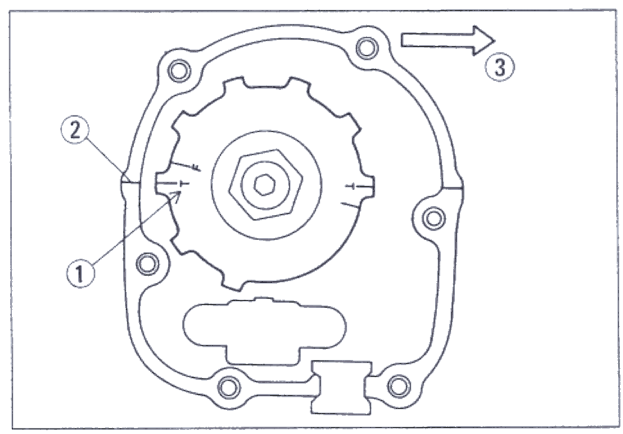
Camshaft

Camshaft Removal

●Remove the following.
Lower Fairings (see Frame chapter)
Pickup Coil Cover
Damper Rubber (from Rear Cam Chain Guide)
●Remove the following.
Carburetor (see Fuel System chapter)
Cylinder Head Cover (this chapter)
Spark Plug Retainer
Camshaft Chain Tensioner (this chapter)

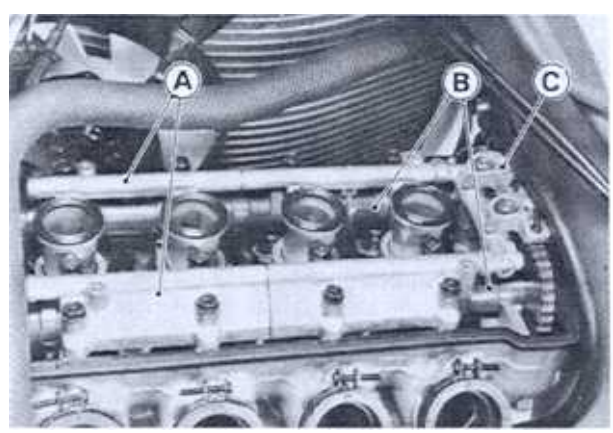
NOTE

○*Before removing the chain tensioner, position the crankshaft at #1, 4 piston TDC.*



1. TDC Mark
2. Timing Mark (Crankcase Parting Line)
3. Front

●Remove the camshaft cap bolts and take off the camshaft caps, camshafts and upper chain guide.



A. Camshaft Caps
B. Camshafts
C. Upper Chain Guide

●Stuff a clean cloth into the chain tunnel to keep any parts from falling into the crankcase.

CAUTION

The crankshaft may be turned, while the camshafts are removed. Always pull the chain taut while turning the crankshaft. This avoids kinking the chain on the lower (crankshaft) sprocket. A kinked chain could damage both the chain and the sprocket.

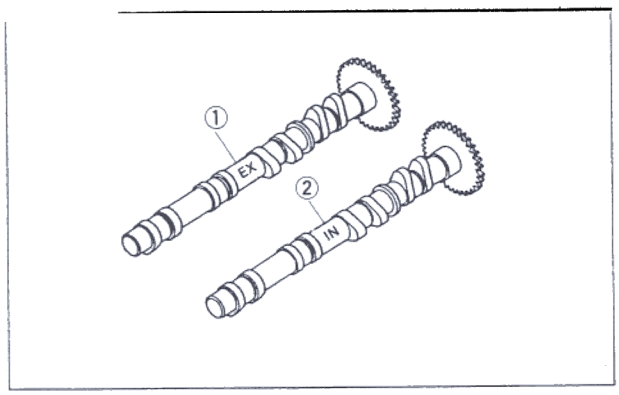
Camshaft Installation

●Installation is the reverse of removal. Note the following.

●Apply engine oil to all cam parts. If the camshaft(s) and/or cylinder head are replaced with new ones, apply a thin coat of molybdenum disulfide grease to the new cam part surfaces.

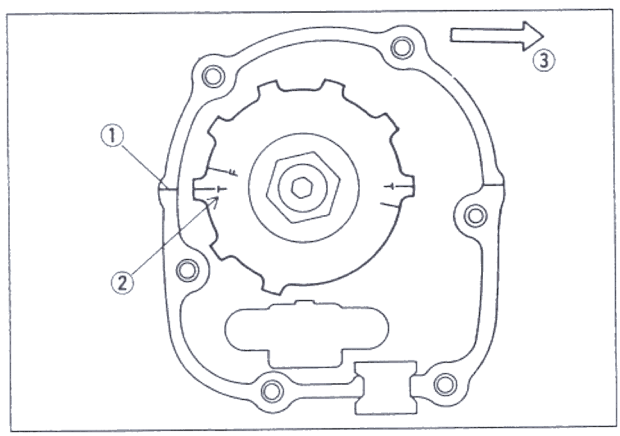
NOTE

○*The exhaust camshaft has an EX mark and the inlet camshaft has an IN mark. Be careful not to mix up these shafts.*



1. EX Mark
2. IN Mark

●Position the crankshaft at TDC for the #1 and #4 pistons, engage the cam chain with the camshaft sprockets as shown.

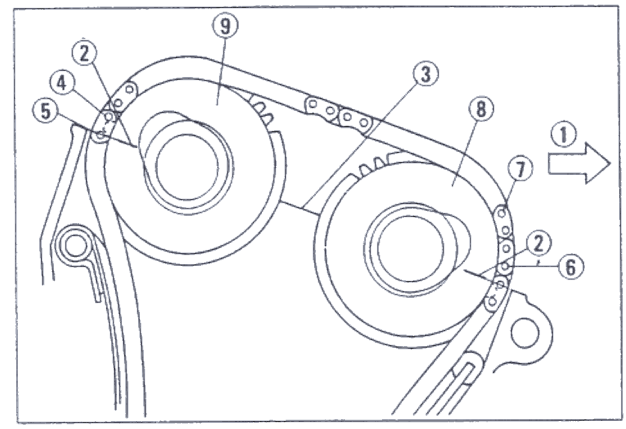


1. Timing Mark (Crankcase Parting Line)
2. TDC Mark for #1 and #4 Pistons (Near to F Mark)
3. Front

●Pull the tension side (exhaust side) of the chain taut to install the chain.

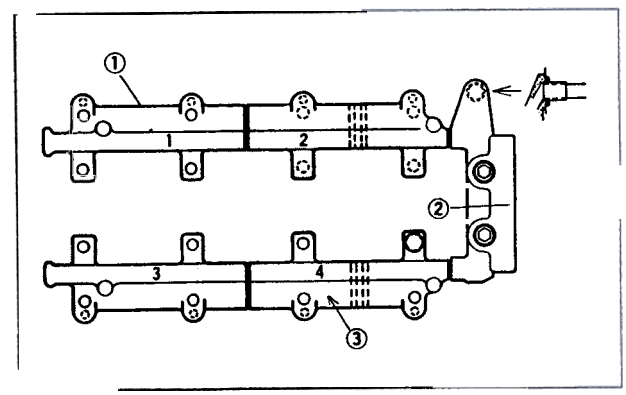
○The timing marks must be aligned with the cylinder head upper surface and positioned respectively as shown, after the camshaft chain slack is taken up by the tensioner.

Camshaft Chain Timing (right side view)



1. Front
2. Timing Mark
3. Cylinder Head Upper Surface
4. 29th
5. 30th
6. 1st
7. 2nd
8. Exhaust Camshaft
9. Inlet Camshaft

●The camshaft cap locations are numbered. Install the caps in the positions as shown.



1. Camshaft Cap
2. Upper Chain Guide
3. Location Number

CAUTION

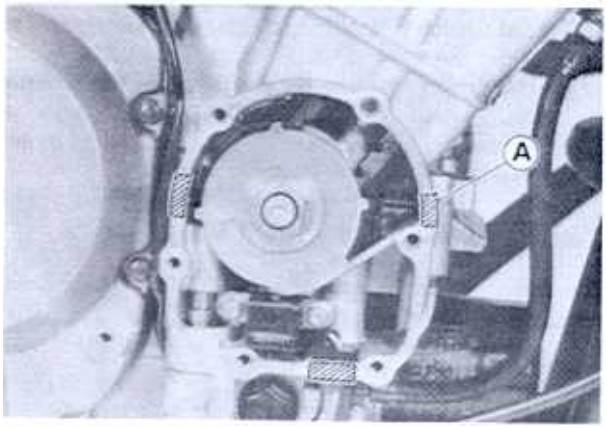
The camshaft caps are machined with the cylinder head. So, if a cap is installed in a wrong location, the camshaft may seize because of improper oil clearance in the bearings.

●Tighten the camshaft cap bolts to the specified torque (see Exploded View).

●Install the camshaft chain tensioner.

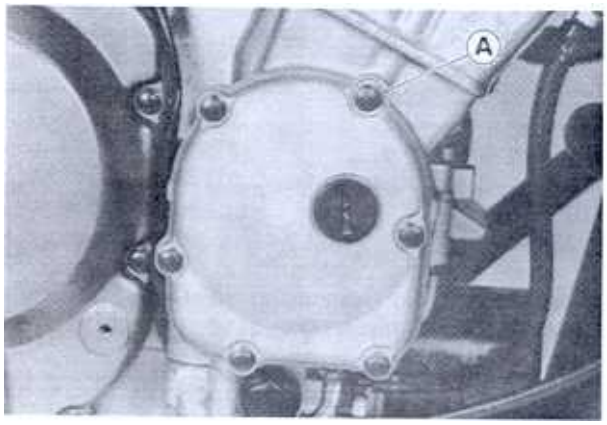
●Install the pickup coil cover, noting the following.

○Apply silicone sealant to the following.
Crankcase Parting Line
Grommet



A. Apply silicone sealant.

●Apply a non-permanent locking agent to the following bolt only.



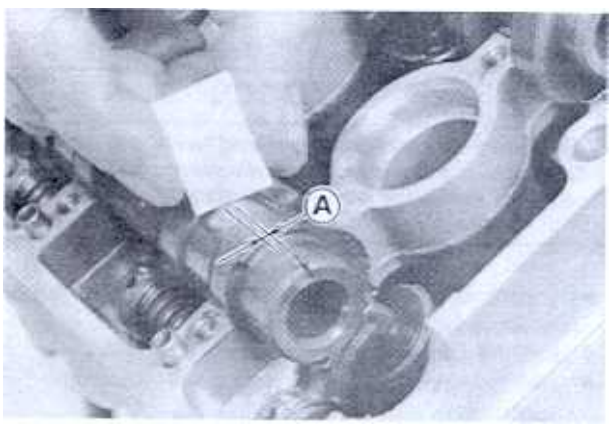
A. Apply a non-permanent locking agent.

Camshaft, Camshaft Cap Wear

●Measure each clearance between the camshaft and the camshaft cap using plastigage (press gauge).

NOTE

○*Tighten the camshaft cap bolts to the specified torque (see Exploded View).*



A. Plastigage Width

NOTE

○*Do not turn the camshaft when the plastigage is between the journal and camshaft cap.*

★If any clearance exceeds the service limit, measure the diameter of each camshaft journal with a micrometer.

Camshaft, Camshaft Cap Clearance

#1, #4 Journals	
Standard:	0.028 ~ 0.071 mm
Service Limit:	0.16 mm
#2, #3 Journals	
Standard:	0.078 ~ 0.121 mm
Service Limit:	0.21 mm

★If the camshaft journal diameter is less than the service limit (see Specifications), replace the camshaft with a new one and measure the clearance again.

★If the clearance still remains out of the limit, replace the cylinder head unit.

Camshaft Chain Wear

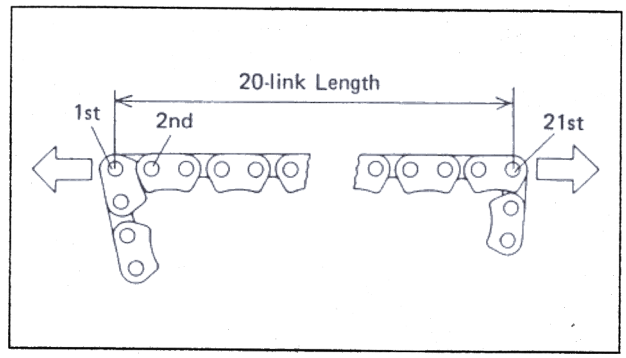
●Hold the chain taut with a force of about 5 kg in some manner, and measure a 20-link length. Since the chain may wear unevenly, take measurement at several places.

★If any measurement exceeds the service limit, replace the chain.

Camshaft Chain 20-Link Length

Standard:	127.0 ~ 127.4 mm
Service Limit:	128.9 mm

Chain Length Measurement



Rocker Arm, Rocker Shaft

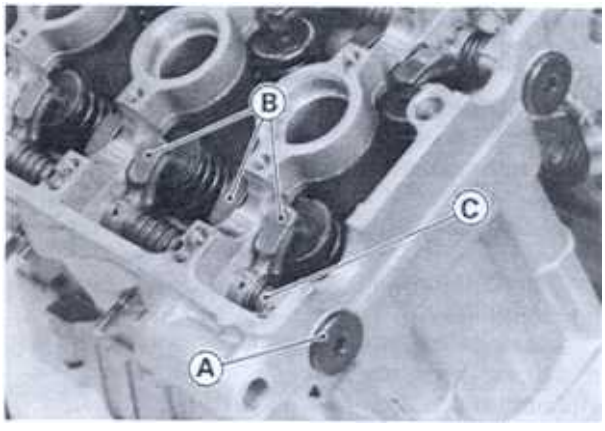
Rocker Arm and Rocker Shaft Removal

● Remove the camshafts (this chapter).

NOTE

○ *Mark the rocker arms so they may be put back in the same position.*

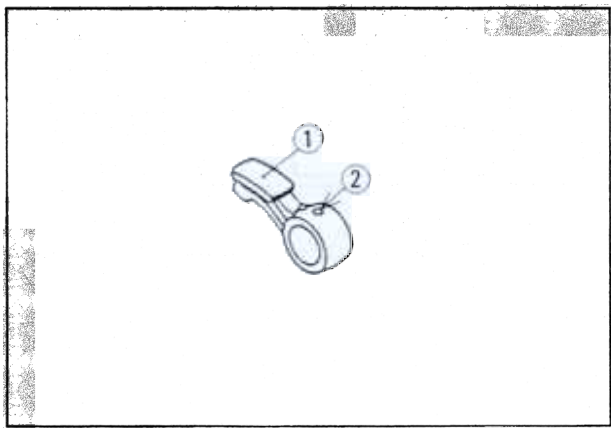
● Remove the rocker shaft plug and rocker shaft, and take off the rocker arms.



A. Plug
B. Rocker Arms
C. Rocker Shaft

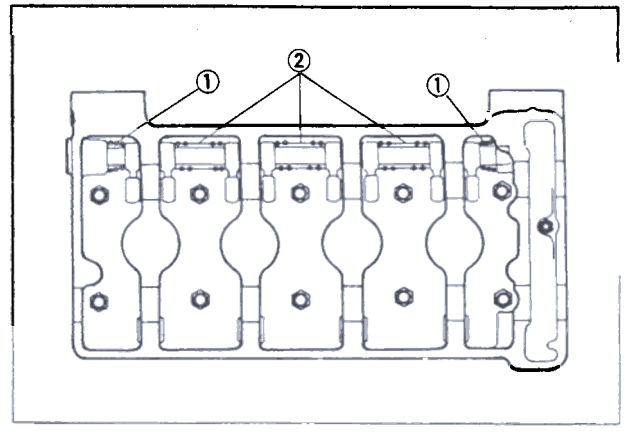
Rocker Arm and Rocker Shaft Installation Notes

● Blow the rocker arm oil passage clean with compressed air and apply oil to the rocker arm bore before installation.



1. Rocker Arm
2. Oil Pressure

● Apply engine oil to the rocker shaft, and insert the shaft running it through the cylinder head, the rocker arms and springs.
● Install the retainer spring on each rocker arm as shown.



1. Springs (conical)
2. Springs

● Tighten the following to the specified torque (see Exploded View).
Upper Chain Guide Bolts
Camshaft Cap Bolts
Rocker Shaft Plug

Rocker Arm and Rocker Shaft Inspection Note

● Inspect the rocker arms and rocker shafts.
★ If they are badly worn, replace them.

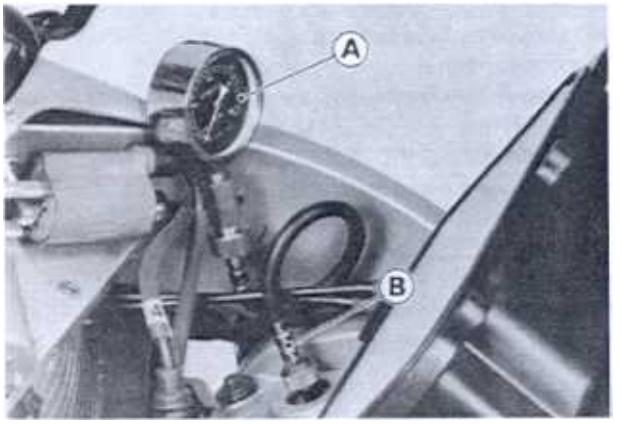
Cylinder Head

Cylinder Compression Measurement

NOTE

○ *Use the battery which is fully charged.*

- Warm up the engine thoroughly.
- Remove the following.
  Fuel Tank (see Fuel System chapter)
  Surge Tank (see Fuel System chapter)
  Spark Plugs
- Attach the compression gauge and adapter (special tools) firmly into the spark plug hole.



A. Compression Gauge: 57001-221
B. Adapter: 57001-1317

- Hold the throttle wide open and crank the engine with the starter.
- When the gauge stops rising, stop cranking and read the gauge.

Cylinder Compression

Usable Range:
686 ~ 1 079 kPa @330 r/min (rpm)
(7.0 ~ 11.0 kg/cm², 99 ~ 156 psi)

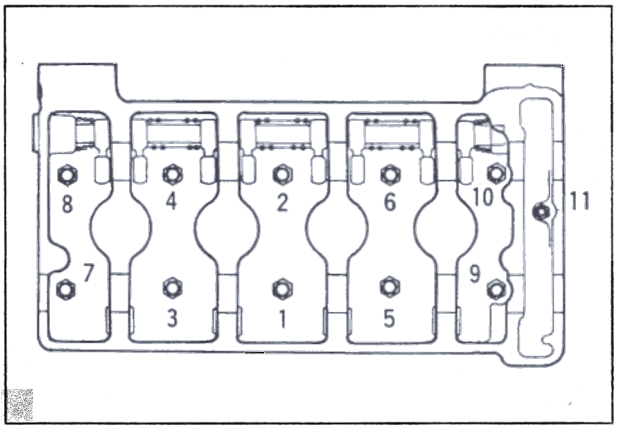
★If cylinder compression is higher than the specified range, check the following.
○ Carbon build-up on the cylinder head combustion chamber
○ Carbon build-up on the piston head
★If cylinder compression is lower than the specified range, check the following.
○ Valve not seating properly
○ Piston/cylinder clearance excessive
○ Gas leakage around the cylinder head gasket
○ Valve clearance too small
○ Piston ring/piston ring groove clearance

Removal

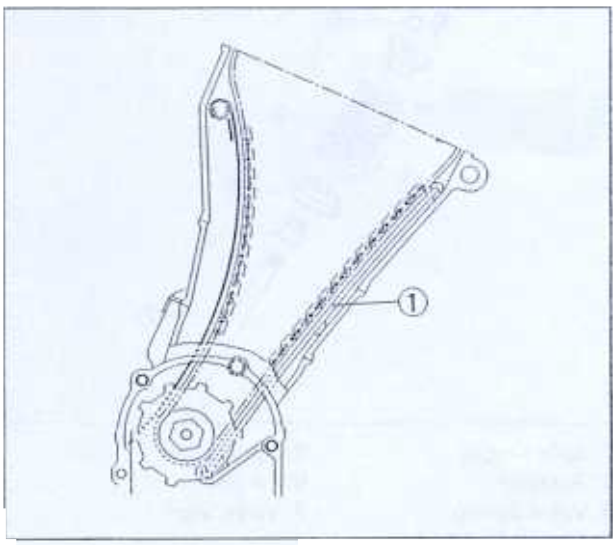
- Drain coolant (see Cooling System chapter)
- Remove the following.
  Radiator (see Cooling System chapter)
  Muffler
  Camshafts (see this chapter)
  Oil Hose (Cylinder Head)
  Engine Mounting Bracket Bolts, Nuts (Cylinder Head)
- Remove the cylinder head bolts and take off the cylinder head.

Installation

- Installation is the reverse of removal. Note the following.
- Install the new cylinder head gasket with a new one.
- When the engine is mounted on the frame, install the chain guide (rear side) into the cylinder head, and tighten the mounting bolt to the specified torque (see Exploded View).
- Beforehand install the chain guide into the cylinder head.
- Tighten the following bolts to the specified torque (see Exploded View).
  Camshaft Chain Guide Bolt (rear side)
  Cylinder Head Bolts
  Camshaft Cap Bolts
  Upper Chain Guide Bolts
  Oil Hose Mounting Bolts
  Engine Mounting Bolts
- Tighten the cylinder head bolts following the tightening sequence.



- Install the chain guide (front side).



1. Chain Guide (front side)

Valves

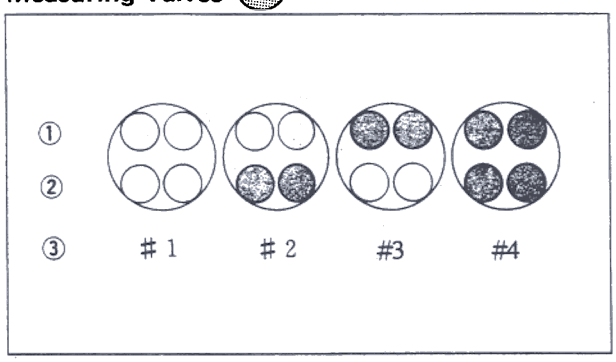
Valve Clearance Adjustment

NOTE

○*Valve clearance must be checked and adjusted when the engine is cold (at room temperature).*

●Remove the following.
Cylinder Head Cover
Spark Plug Retainer
●Using a thickness gauge, measure the valve clearance between the rocker arm and the cam.
○**When positioning #4 piston TDC at the end of the compression stroke:**
inlet valve clearance of #2 and #4 cylinders
exhaust valve clearance of #3 and #4 cylinders (see Camshaft Removal)

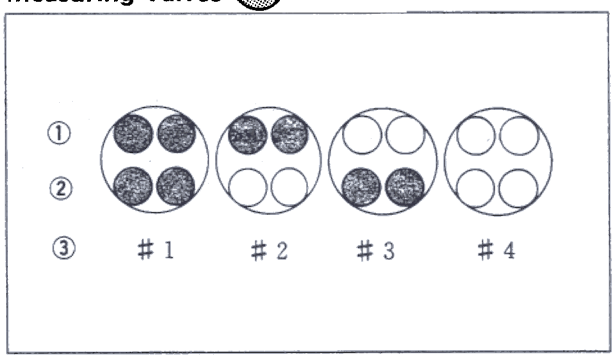
Measuring Valves



1. Exhaust Valves
2. Inlet Valves
3. Cylinder Numbers

○**When positioning #1 piston TDC at the end of the compression stroke:**
inlet valve clearance of #1 and #3 cylinders
exhaust valve clearance of #1 and #2 cylinders

Measuring Valves



1. Exhaust Valves
2. Inlet Valves
3. Cylinder Numbers

Valve Clearance (between Cam and Rocker Arm)

Standard:	**Inlet:**	**0.12 ~ 0.17 mm**
	Exhaust:	**0.16 ~ 0.21 mm**

●Apply engine oil to the O-ring, install the spark plug retainer.

★If the valve clearance is not within the specified range, first record the clearance, and then adjust it.

●To change the valve clearance, replace the shim with one of a different thickness.

NOTE

○*Mark and record shim locations so they can be reinstalled in their original positions.*

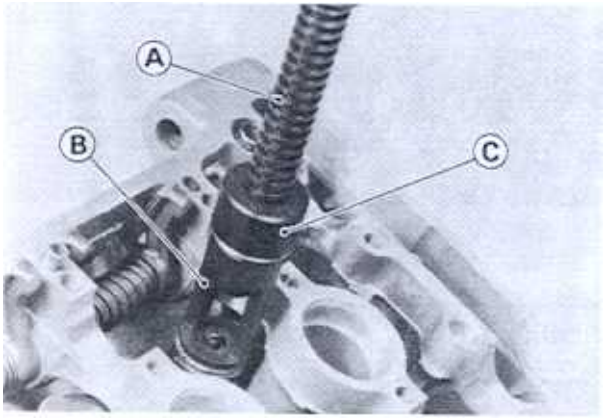
●To select a new shim which brings the valve clearance within the specified range.

○Remeasure any valve clearance that was adjusted. Readjust if necessary.

Valve Removal

●Perform the following.

○Using the valve spring compressor assembly (special tool), remove the valve.



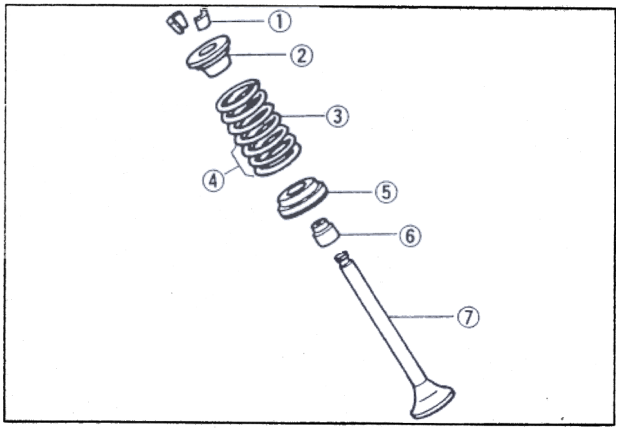
A. Valve Spring Compressor Assembly: 57001-241
B. Adapter: 57001-1272
C. Valve Spring Compressor Joint: 57001-1271

Valve Installation

●Replace the oil seal with a new one.

●Apply a thin coat of molybdenum disulfide grease to the valve stem before valve installation.

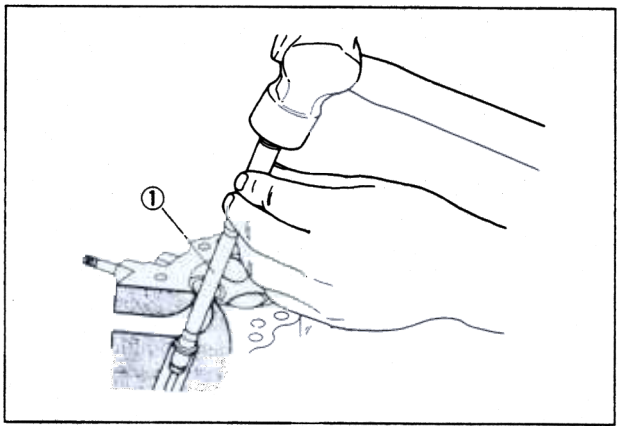
●Install the springs so that the closed coil end faces downwards.



1. Split Keeper
2. Retainer
3. Valve Spring
4. Closed Coil End
5. Spring Seat
6. Oil Seal
7. Valve Stem

Valve Guide Removal

●Using the valve guide arbor (special tool), tap out the valve guide.



1. Valve Guide Arbor: 57001-1273

NOTE

○*Heat the area around the valve guide to 120 ~ 150 °C (248 ~ 302°F).*

Valve Guide Installation

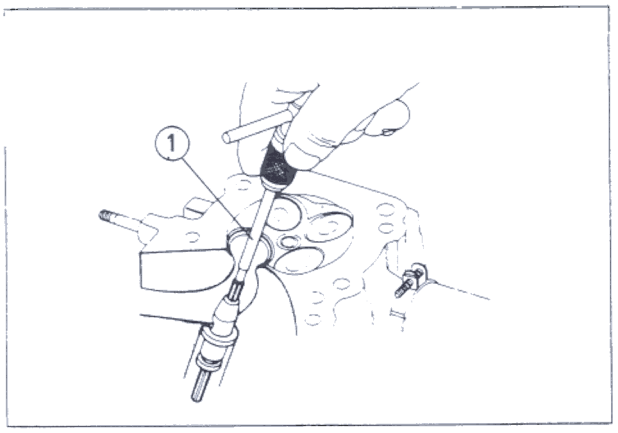
●Using the valve guide arbor (special tool), drive the valve guide until its flange touches the cylinder head.

NOTE

○*Heat the area around the valve guide hole to 120 ~ 150°C (248 ~ 302°F).*

○*Apply oil to the valve guide outer surface before valve guide installation.*

●Using the valve guide reamer (special tool), ream the valve guide.



1. Valve Guide Reamer: 57001-1274

Valve Seat Outside Diameter

●If the outside diameter of the seating pattern on the valve seat is too large or too small, repair the valve seat.

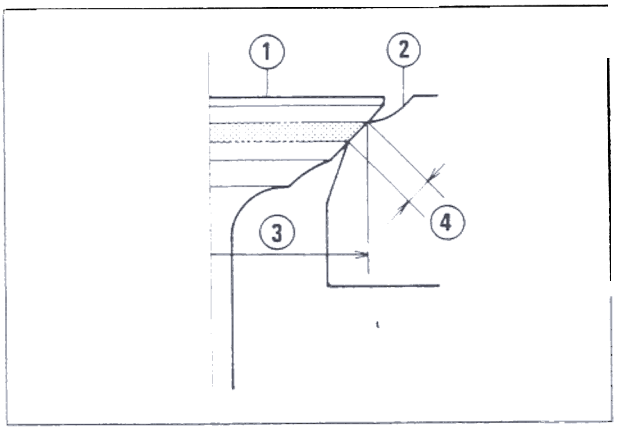
Valve Seat Outside Diameter

Standard:	**Inlet :**	**21.5 ~ 21.7 mm**
	Exhaust :	**18.5 ~ 18.7 mm**

Valve Seat Width Inspection

●Check the valve seat width.

○Measure the seat width of the portion where there is no build-up carbon (white portion) of the valve seat with a vernier caliper.

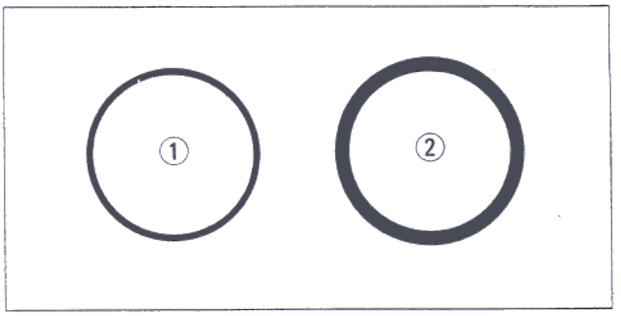


1. Valve
2. Valve Seat
3. Seating Surface Outside Diameter
4. Valve Seat Width

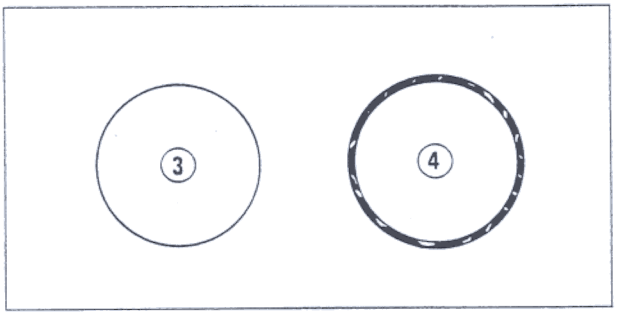
Valve Seat Width (IN and EX)

Standard: **0.5 ~ 1.0 mm**

★If the valve seat width is not within the specified range, repair the valve seat.



1. Good 2. Too wide



3. Too narrow 4. Uneven

Valve Seat Repair (Valve Lapping)

●Using the valve seat cutters (special tools), repair the valve seat.

Valve Seat Cutters

Inlet Valves:	**45° - Φ24.5**	**57001-1113**
	32° - Φ25	**57001-1118**
	60° - Φ30	**57001-1123**
Exhaust Valves:	**45° - Φ22**	**57001-1205**
	32° - Φ22	**57001-1206**
	60° - Φ30	**57001-1123**

Holder and Bar

Holder:	**57001-1275**
Bar:	**57001-1128**

★If the manufacture's instructions are not available, use the following procedure.

Seat Cutter Operating Care:

1. This valve seat cutter is developed to grind the valve for repair. Therefore the cutter must not be used for other purposes than seat repair.
2. Do not drop or shock the valve seat cutter, or the diamond particles may fall off.
3. Do not fail to apply engine oil to the valve seat cutter before grinding the seat surface. Also wash off ground particles sticking to the cutter with washing oil.

NOTE

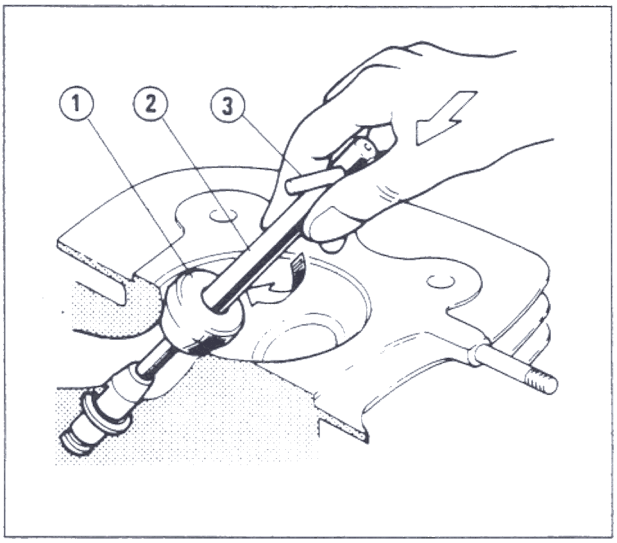
○ *Do not use a wire brush to remove the metal particles from the cutter. It will take off the diamond particles.*

4. Setting the valve seat cutter holder in position, operate the cutter in one hand. Do not apply too much force to the diamond portion.

NOTE

○ *Prior to grinding, apply engine oil to the cutter and during the operation, wash off any ground particles sticking to the cutter with washing oil.*

5. After use, wash it with washing oil and apply thin layer of engine oil before storing.



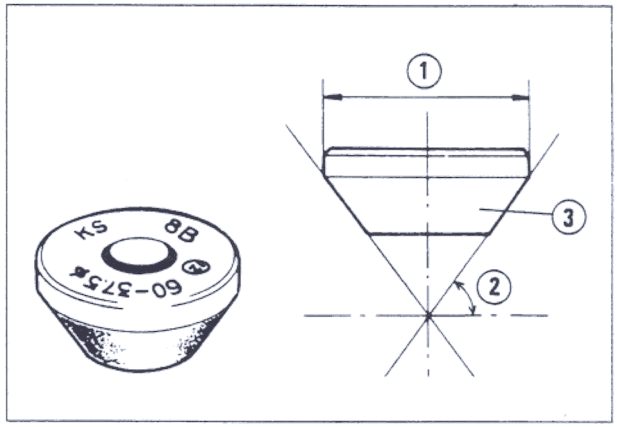
1. Cutter
2. Cutter Holder
3. Bar

Marks Stamped on the Cutter:

The marks stamped on the back of the cutter represent the following.

45° ..... Cutter angle

24.5Φ ..... Outer diameter of cutter



1. Outer Diameter of Cutter
2. Angle of Cutter
3. Cutter

Operating Procedures:

- ● Clean the seat area carefully.
- ● Coat the seat with machinist's dye.
- ● Fit a 45° cutter into the holder and slide it into the valve guide.
- ● Press down lightly on the handle and turn it right or left. Grind the seating surface only until it is smooth.

CAUTION

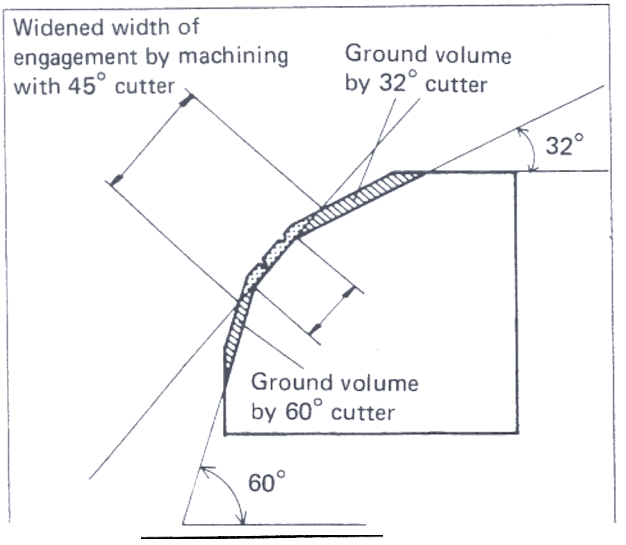
Do not grind the seat too much. Overgrinding will reduce valve clearance by sinking the valve into the head. If the valve sinks too far into the head, it will be impossible to adjust the clearance, and the cylinder head must be replaced.

- ● Measure the outside diameter of the seating surface with a vernier caliper.
- ★ If the outside diameter of the seating surface is too small, repeat the 45° grind until the diameter is within the specified range.
- ★ If the outside diameter of the seating surface is too large, make the 32° grind described below.
- ★ If the outside diameter of the seating surface is within the specified range, measure the seat width as described below.
- ● Grind the seat at a 32° angle until the seat O.D. is within the specified range.
- ○ To make the 32° grind, fit a 32° cutter into the holder, and slide it into the valve guide.
- ○ Turn the holder one turn at a time while pressing down very lightly. Check the seat after each turn.

CAUTION

The 32° cutter removes material very quickly. Check the seat outside diameter frequently to prevent overgrinding.

Valve Seat Repair



○After making the 32° grind, return to the seat O.D. measurement step above.

●To measure the seat width, use a vernier caliper to measure the width of the 45° angle portion of the seat at several places around the seat.

★If the seat width is too narrow, repeat the 45° grind until the seat O.D. measurement step above.

★If the seat width is too wide, make the 60° grind described below.

●Grind the seat at a 60° angle until the seat width is within the specified range.

○To make the 60° grind, fit 60° cutter into the holder, and slide it into the valve guide.

○Turn the holder, while pressing down lightly.

○After making the 60° grind, return to the seat width measurement step above.

●Lap the valve to the seat, once the seat width and O.D. are within the ranges specified above.

○Put a little coarse grinding compound on the face of the valve in a number of places around the valve head.

○Spin the valve against the seat until the grinding compound produces a smooth, matched surface on both the seat and the valve.

○Repeat the process with a fine grinding compound.

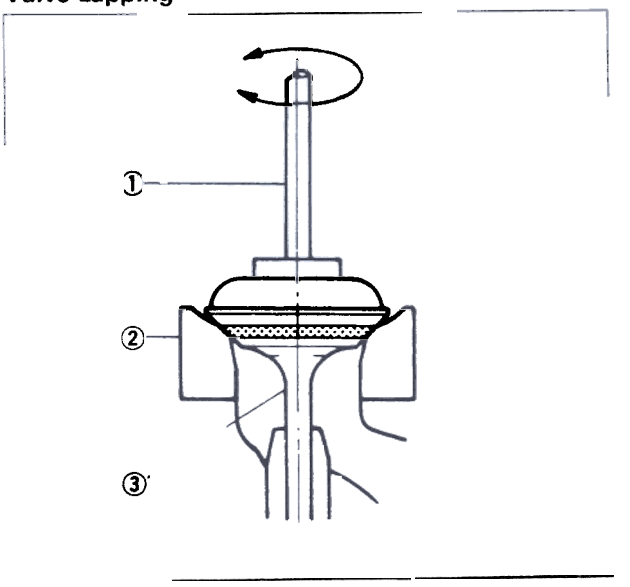
●The seating area should be marked about in the middle of the valve face.

★If the seat area is not in the right place on the valve, check to be sure the valve is the correct part. If it is, it may have been refaced too much; replace it.

●Be sure to remove all grinding compound before assembly.

●When the engine is assembled, be sure to adjust the valve clearance (see Valve Clearance Adjustment).

Valve Lapping



1. Lapper
2. Valve Seat
3. Valve

Measure Valve-to-Guide Clearance (Wobble Method)

If a small bore gauge is not available, inspect the valve guide wear by measuring the valve to valve guide clearance with the wobble method as indicated below.

●Insert a new valve into the guide and set a dial gauge against the stem perpendicular to it as close as possible to the cylinder head mating surface.

●Move the stem back and forth to measure valve/valve guide clearance.

●Repeat the measurement in a direction at a right angle to the first.

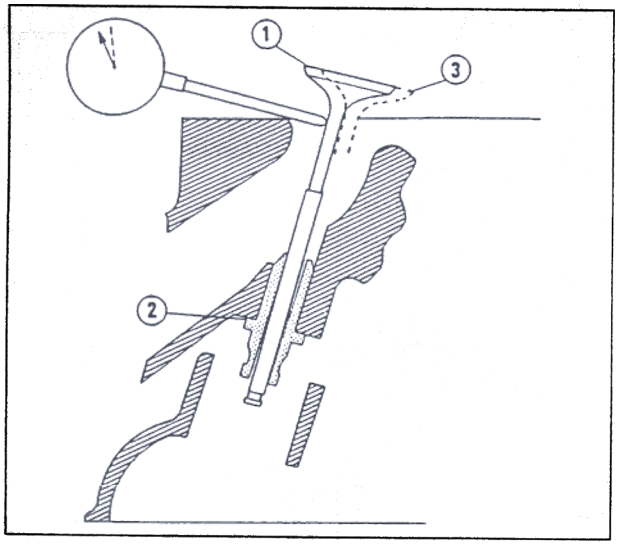
★If the reading exceeds the service limit, replace the guide.

NOTE

○*The reading is not actual valve/valve guide clearance because the measuring point is above the guide.*

Valve/Valve Guide Clearance (Wobble Method)

	Standard	Service Limit
Inlet	0.031 ~ 0.140 mm	0.34 mm
Exhaust	0.085 ~ 0.180 mm	0.41 mm



1. New Valve
2. Valve Guide
3. Move the Valve.

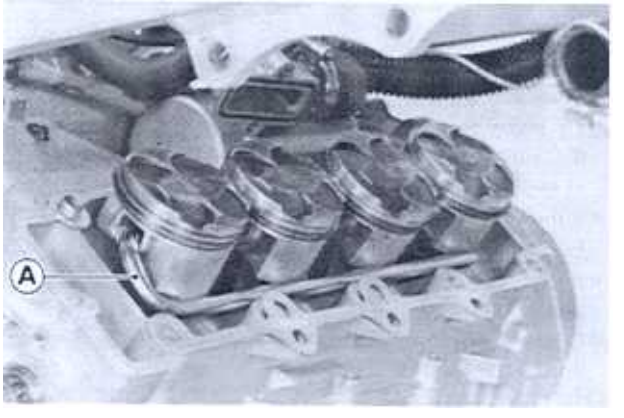
Cylinder, Pistons

Cylinder Removal

- Remove the following.
  Cylinder Head (see Cylinder Head Removal)
  Camshaft Chain Guide (exhaust side)
  Water Pipe
- Remove the cylinder.

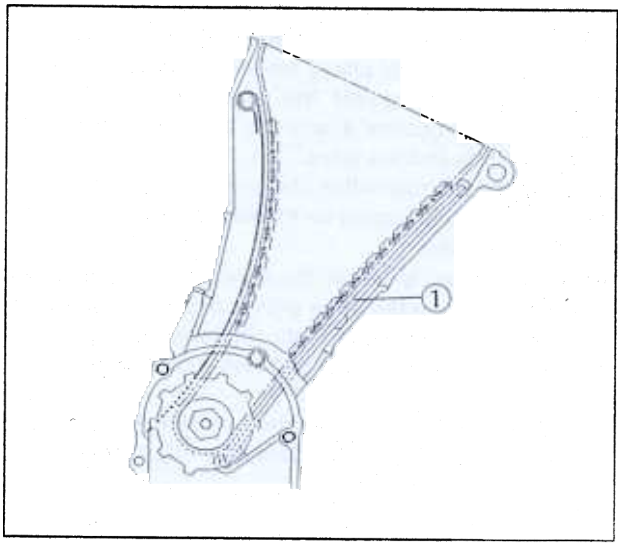
Cylinder Installation

- Install the new cylinder gasket.
- Apply engine oil to the cylinder bore.
- Using the piston base (special tools), install the cylinder block.



A. Piston Base: 57001-147

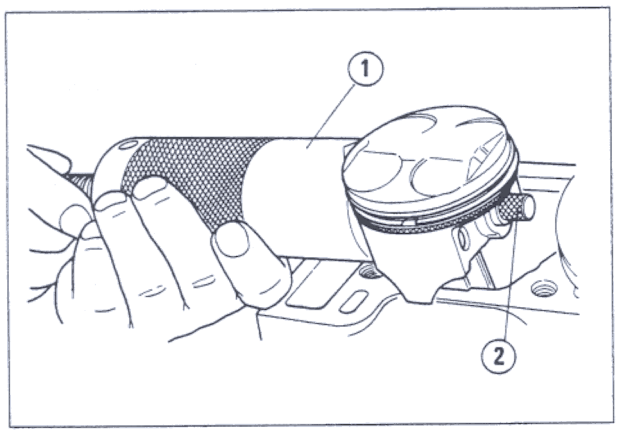
- Install the cylinder and the chain guide (exhaust side) as shown.



1. Chain Guide

Piston Removal

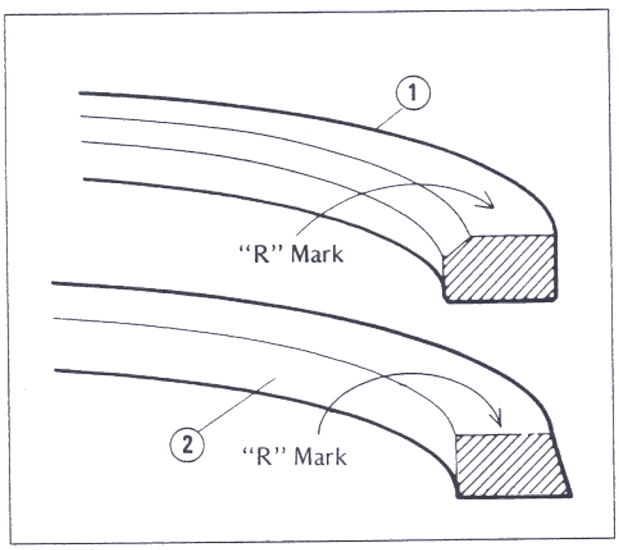
- Remove the cylinder (see this chapter).
- Place a clean cloth under the pistons and remove the piston pin snap rings from the outside of each piston.
- Using the piston pin puller assembly (special tool), remove the piston pins.



1. Piston Pin Puller Assembly: 57001-910
2. Adapter

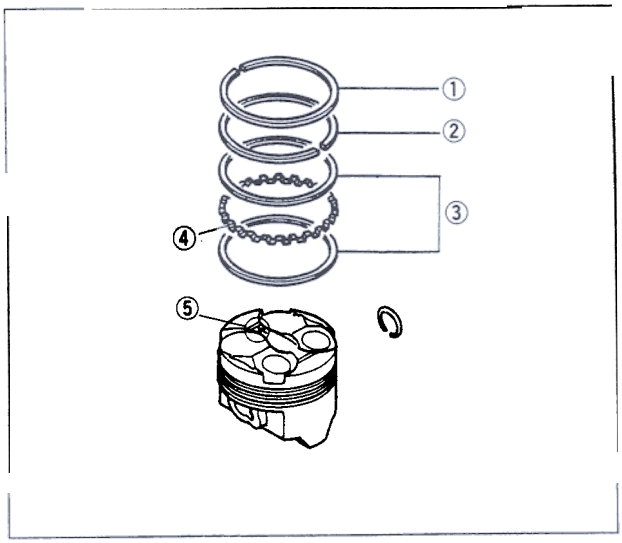
Piston Installation

- The top and second rings must be installed with the R marks on the rings facing up.



1. Top Ring
2. Second Ring

- The arrow on the piston head must point toward the front of the engine.
- The piston ring openings must be positioned as shown below. The openings of the oil ring steel rails must be about 30 ~ 40° of angle from the opening of the top ring.



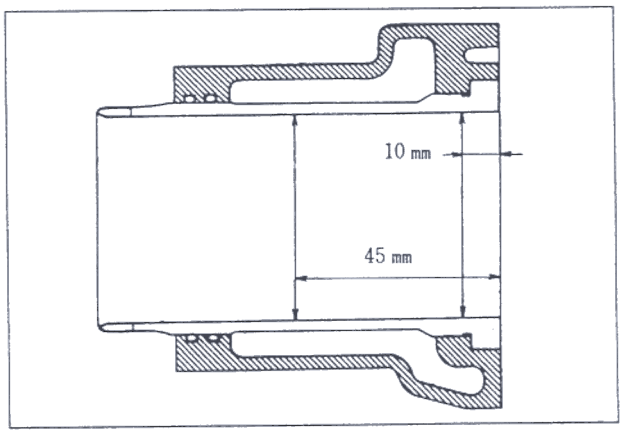
1. Top Ring
2. Second Ring
3. Oil Ring Steel Rails
4. Oil Ring Expander
5. Arrow

CAUTION

Do not reuse snap rings, as removal weakens and deforms them. They could fall out and score the cylinder wall.

Cylinder Wear

- Measure the cylinder inside diameter taking a side-to-side and a front-to back measurement at each of the two positions (total of four measurements) shown below.



Cylinder Inside Diameter:

Standard:	57.000 ~ 57.012 mm
Service Limit:	57.10 mm

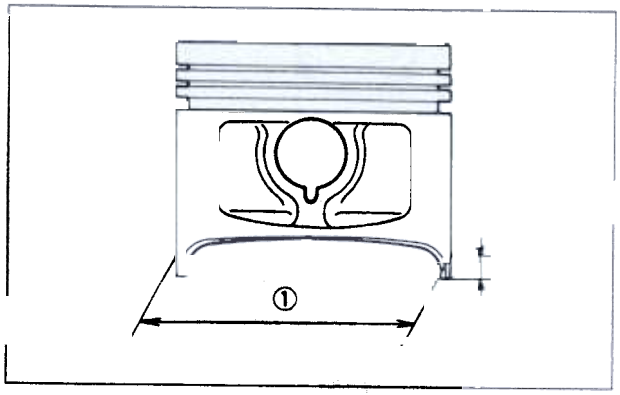
Piston Wear

- Measure the piston outside diameter 5 mm up from the bottom of the piston at a right angle to the direction of the piston pin.

Piston Outside Diameter

Standard:	56.942 ~ 56.957 mm
Service Limit:	56.79 mm

Piston Diameter Measurement



1. Piston Outside Diameter
2. 5mm up from bottom

Piston Ring, Piston Ring Groove Wear

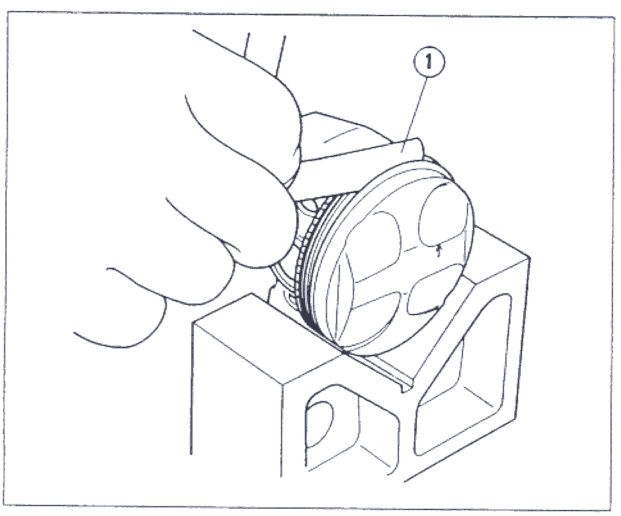
- Check for uneven groove wear by inspecting the ring seats.

★The rings should fit perfectly parallel to the groove surfaces. If not, the piston must be replaced.

- With the piston rings in their grooves, make several measurements with a thickness gauge to determine piston ring/groove clearance.

Piston Ring/Groove Clearance

Standard:	0.03 ~ 0.07 mm
Service Limit:	0.17 mm



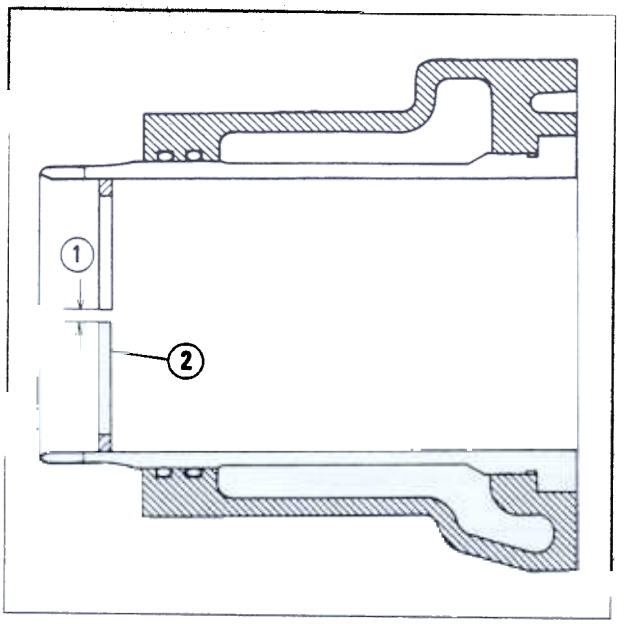
1. Thickness Gauge

Piston Ring End Gap

- Place the piston ring inside the cylinder, using the piston to locate the ring squarely in place. Set it close to the bottom of the cylinder, where cylinder wear is low.
- Measure the gap between the ends of the ring with a thickness gauge.

Piston Ring End Gap

	Standard	Service Limit
Top	0.20 ~ 0.40 mm	0.7 mm
Second	0.35 ~ 0.50 mm	0.8 mm

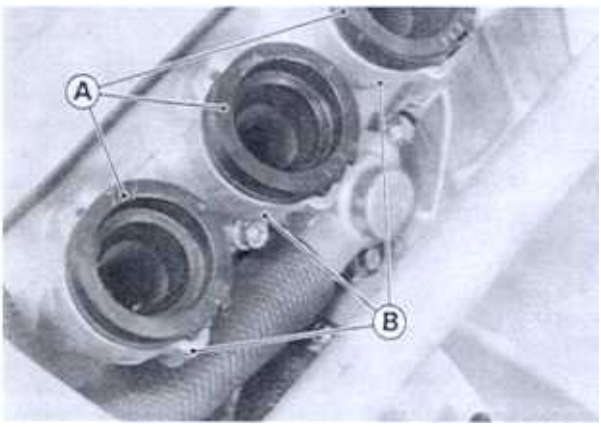


1. Gap
2. Piston Ring

Carburetor Holders

Removal

- Remove the following.
  - Clamps
  - Allen Bolts
- Remove the inlet pipes.

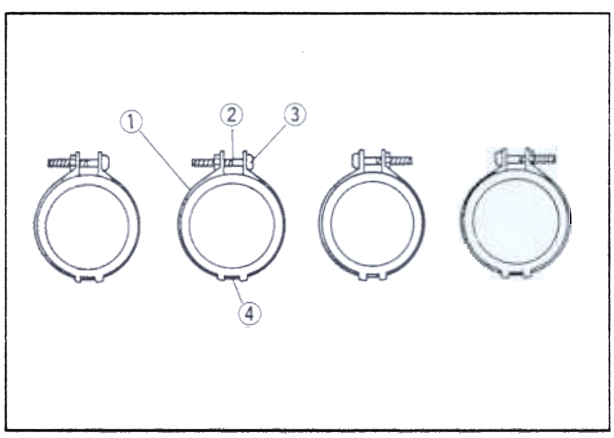


A. Carburetor Holders B. Inlet Pipes

- Take off the holders from the inlet pipes.

Installation

- Install the carburetor holder so that the pipe is upward.
- Install the holder clamps as shown being careful of the screw position and the screw head direction.



1. Holder Clamp
2. Screw
3. Screw Head
4. Stopper

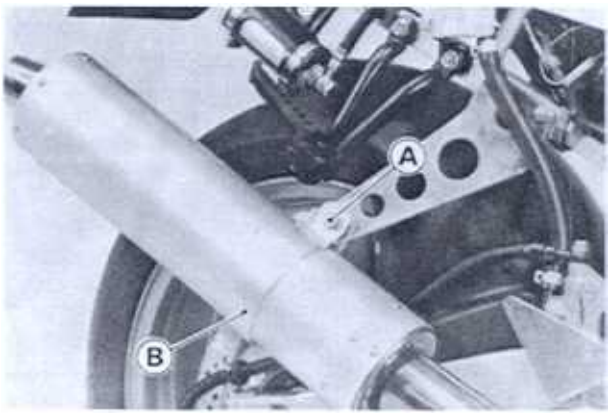
⚠WARNING

Be sure to install the holder clamp screws in the direction shown. Or, the screws could come in contact with the throttle linkage resulting in an unsafe riding condition.

Muffler

Removal

- Remove the following.
  - Lower Fairing
  - Radiator (Do not remove the hoses and not drain coolant.)
- Remove the nuts and take off the exhaust pipe holders.



A. Nuts B. Holder

- Remove the muffler mounting bolt and nut (rear step bracket).
- Remove the muffler.

Installation

- Installation is the reverse of removal.
- Replace the exhaust gaskets.