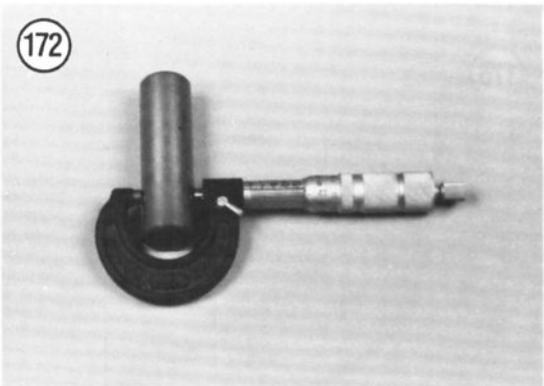
4. Oil the piston pin and install it in the connecting rod. Slowly rotate the piston pin and check for radial and axial play (**Figure 170**). If any play exists, the piston pin should be replaced, providing the rod bore is in good condition.
5. Measure the inside diameter of the piston pin bore with a snap gauge or caliper (**Figure 171**) and measure the outside diameter of the piston pin with a micrometer (**Figure 172**). Compare with dimensions given in **Table 1**. Replace the piston and piston pin as a set if either or both are worn.
6. Check the piston skirt for galling and abrasion which may have been caused by piston seizure. If a piston shows signs of partial seizure (bits of aluminum buildup on the piston skirt), the piston should be replaced and the cylinder bored (if necessary) to reduce the possibility of engine noise and further piston seizure.
7. Check the oil control holes in the piston pin area (**Figure 173**) for carbon or oil sludge buildup. Clean the holes with a small diameter drill bit and blow out with compressed air.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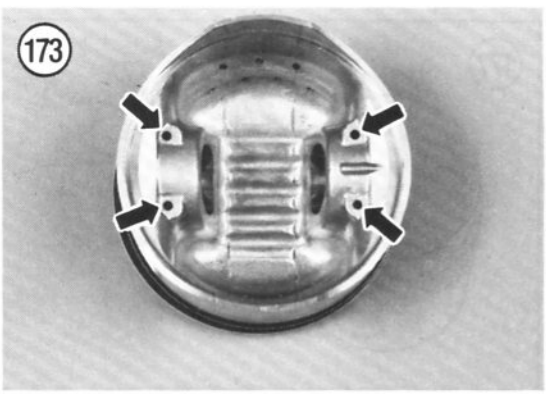
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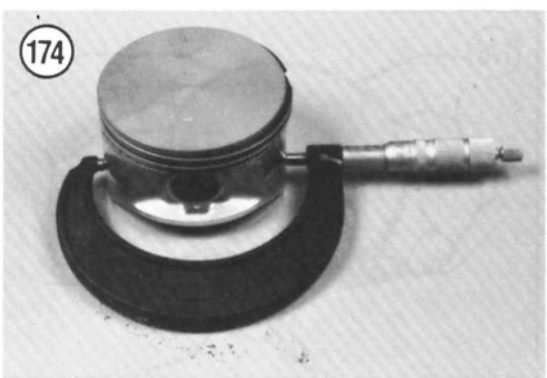
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Piston Clearance

1. Make sure the piston and the cylinder wall is clean and dry.
2. Measure the inside diameter of the cylinder bore at a point 13 mm (1/2 in.) from the upper edge with a bore gauge.
3. Measure the outside diameter of each piston across the skirt at right angles to the piston pin. Measure at a distance 20 mm (0.79 in.) up from the bottom of the piston skirt (**Figure 174**).
4. Piston clearance is the difference between the maximum piston diameter and the minimum cylinder diameter. Subtract the dimension of the piston from the cylinder dimension and compare to the dimension listed in **Table 1**. If the clearance exceeds that specified, the cylinders should be rebored to the next oversize and a new piston installed.
5. To establish a final overbore dimension with a new piston, add the piston skirt measurement to the specified clearance. This will determine the dimension for the cylinder overbore size. Remember, do not exceed the cylinder maximum service limit inside diameter indicated in **Table 1**.

Piston Installation

1. Apply molybdenum disulfide grease to the inside surface of the connecting rod.

NOTE

New piston pin clips should be installed during assembly. Install the clips with the gap away from the cutout in the piston.

2. Install one piston pin clip in the piston.
3. Oil the piston pin with assembly oil or fresh engine oil and install the piston pin in the piston until its end extends slightly beyond the inside of the boss (**Figure 175**).
4. Place the piston over the connecting rod. Remember that the arrow on top of the piston (**Figure 176**) must point toward the front of the engine.

CAUTION

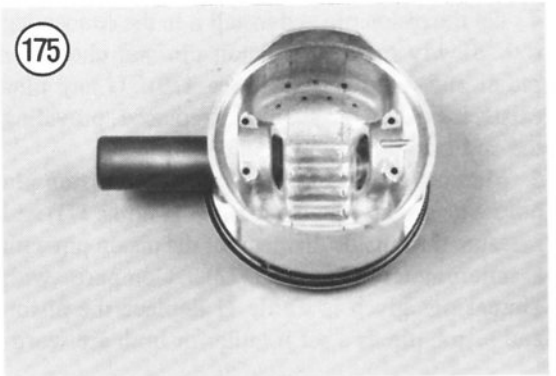
When installing the piston pin in Step 5, do not push the pin in too far or the piston pin clip installed in Step 2 will be forced into the piston metal, destroying the clip groove and loosening the clip.

5. Line up the piston pin with the hole in the connecting rod. Push the piston pin into the connecting rod. It may be necessary to move the piston around until the piston pin enters the connecting rod. Do not use force during installation or damage may occur. Push the piston pin in until it touches the pin clip on the other side of the piston.
6. If the piston pin does not slide easily, use the homemade tool used during removal, but eliminate the piece of pipe. Pull the piston pin in until it stops.
7. After the piston is installed, recheck and make sure that the arrow on top of the piston (**Figure 176**) is pointing toward the front of the engine.

NOTE

In the next step, install the second clip with the gap away from the cutout in the piston.

8. Install the second piston pin clip in the groove in the piston. Make sure both piston pin clips are seated in the grooves in the piston.
9. Check the installation by rocking the piston back and forth around the pin axis and from side-to-side along the axis. It should rotate freely back and forth, but not from side-to-side.
10. Install the piston rings as described in this chapter.
11. Install the cylinder and cylinder head as described in this chapter.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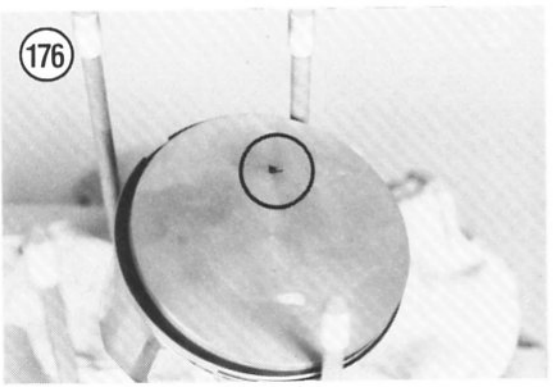
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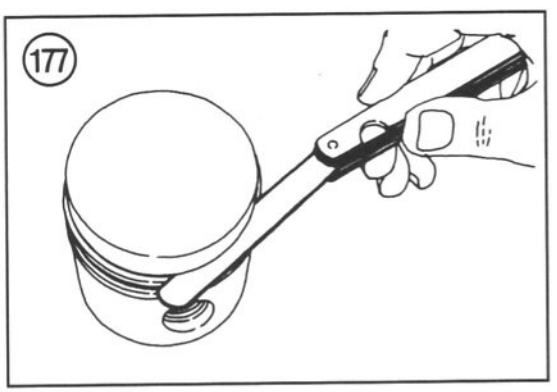
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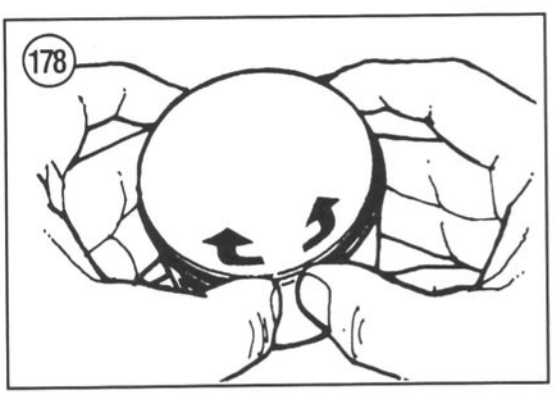
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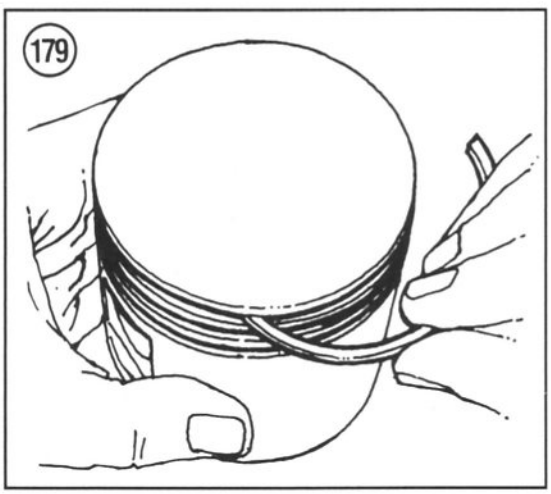
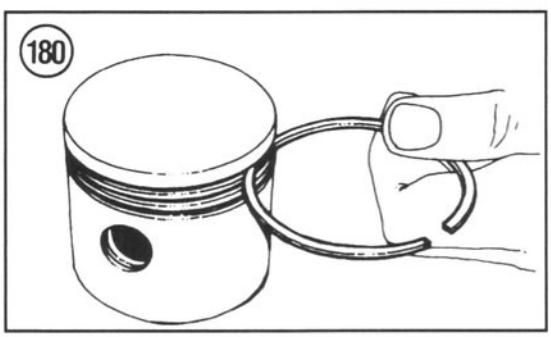
Piston Ring Replacement

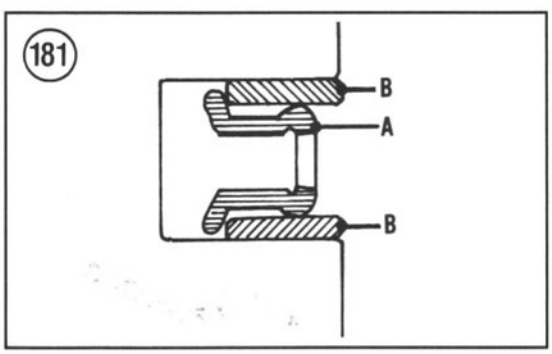
WARNING

The edges of all piston rings are very sharp. Be careful when handling them to avoid cutting fingers.

1. Measure the side clearance of each ring in its groove with a flat feeler gauge (**Figure 177**) and compare to dimensions given in **Table 1**. If the clearance is greater than specified, the rings must be replaced. If the clearance is still excessive with the new rings, the piston must also be replaced.







2. Remove the old top ring by spreading the ends with your thumbs just enough to slide the ring up over the piston (**Figure 178**). Repeat for the remaining rings.
3. Carefully remove all carbon buildup from the ring grooves with a broken piston ring (**Figure 179**). Inspect the grooves carefully for burrs, nicks or broken and cracked lands. Recondition or replace the piston if necessary.
4. Roll each ring around its piston groove as shown in **Figure 180** to check for binding. Minor binding may be cleaned up with a fine-cut file.
5. Measure the thickness of each ring with a micrometer and compare to dimensions given in **Table 1**. If the thickness is less than specified, the ring(s) must be replaced.
6. First, measure the free end gap of each ring with a vernier caliper and compare to dimensions given in **Table 1**. If the end cap is greater than specified, the ring(s) must be replaced.
7. After measuring the free end gap, place each ring, one at a time, into the cylinder and push it in about 20 mm (3/4 in.) with the crown of the piston to ensure that the ring is square in the cylinder bore. Measure the gap with a flat feeler gauge and compare to dimensions in **Table 1**. If the gap is greater than specified, the rings should be replaced.
8. When installing new rings, measure their end gap as described in Step 6 and Step 7 and compare to dimensions given in **Table 1**. If the end cap is greater than specified, return the rings for another set.

NOTE

Install the 2nd and top ring with its "T" mark facing up.

CAUTION

*Do **not** allow the 2 ends of the oil ring spacer to overlap in the piston groove.*

9. Install the oil ring spacer first (A, **Figure 181**), then both side rails (B, **Figure 181**). The new Suzuki factory oil ring side rails do not have top and bottom designations and can be installed either way. If reassembling used parts, install the side rails as they were removed.

10. Install the second compression ring (with slight side taper) (**Figure 182**), then the top—by carefully spreading the ends of the ring with your thumbs and slipping the ring over the top of the piston. Remember that the marks on the piston rings are toward the top of the piston.
11. Make sure the rings are seated completely in their grooves all the way around the piston and that the ends are distributed around the piston. The important thing is that the ring gaps are not aligned with each other when installed to prevent compression pressures from escaping past them.
12. If installing oversized compression rings, check the ring number (A, **Figure 183**) to make sure the correct rings are being installed. The ring oversize numbers should be the same as the piston oversize numbers.
13. If installing oversized oil rings, check the paint color spot (B, **Figure 183**) to make sure the correct oil rings are being installed. The paint color spots are as follows:
   a. Red: standard size.
   b. Blue: 0.5 mm oversize.
   c. Yellow: 1.0 mm oversize.
14. If new rings are installed, the cylinder must be deglazed or honed. This will help to seat the new rings. Refer honing service to a Suzuki dealer or competent machine shop. After honing, measure the end clearance of each ring in the cylinder bore and compare to dimensions in **Table 1**.

CAUTION

If the cylinder was deglazed or honed, clean the cylinder as described under ***Cylinder Inspection*** *in this chapter.*

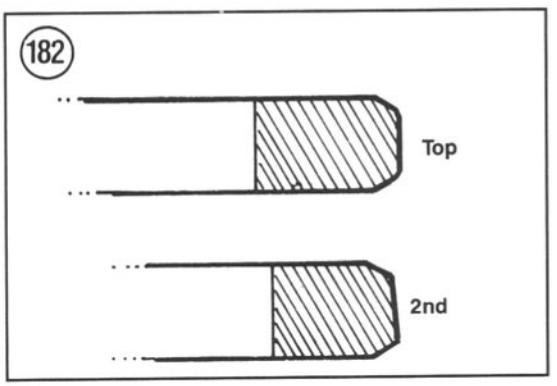
15. Follow the *Break-in Procedure* in this chapter if a new piston or new piston rings have been installed or the cylinder was rebored or honed.

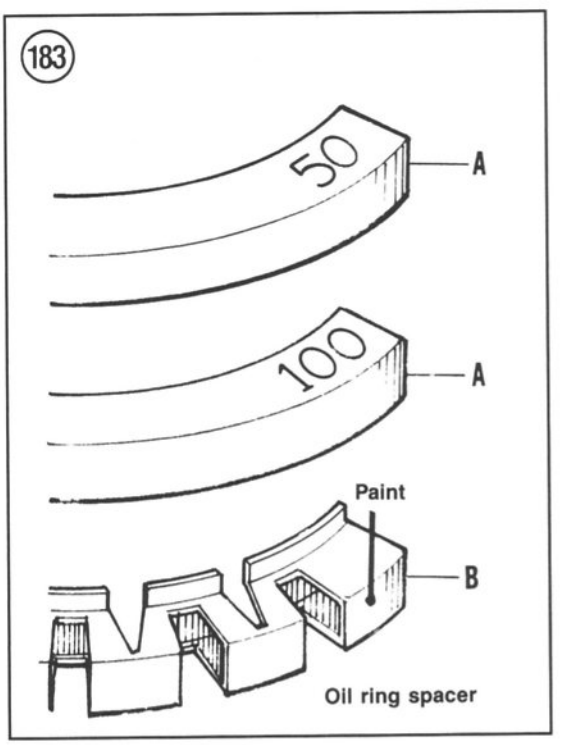
OIL PUMP

Refer to **Figure 184** for this procedure.

Removal/Installation

1. Remove the engine and separate the crankcase as described in this chapter.
2. Remove the circlip (**Figure 185**) securing the oil pump driven sprocket to the oil pump.
3. Remove the oil pump drive sprocket (**Figure 186**) from the oil pump.
4. Remove the drive pin (**Figure 187**) and the thrust washer (**Figure 188**).
5. Turn the crankcase over.
6. Remove the screws (**Figure 189**) securing the oil pump to the crankcase and remove the oil pump assembly.
7. Inspect the oil pump as described in this chapter.
8. Install the oil pump onto the crankcase.
9. Apply red Loctite Threadlocker (No. 271) to the mounting screws prior to installation. Install the screws and tighten securely.





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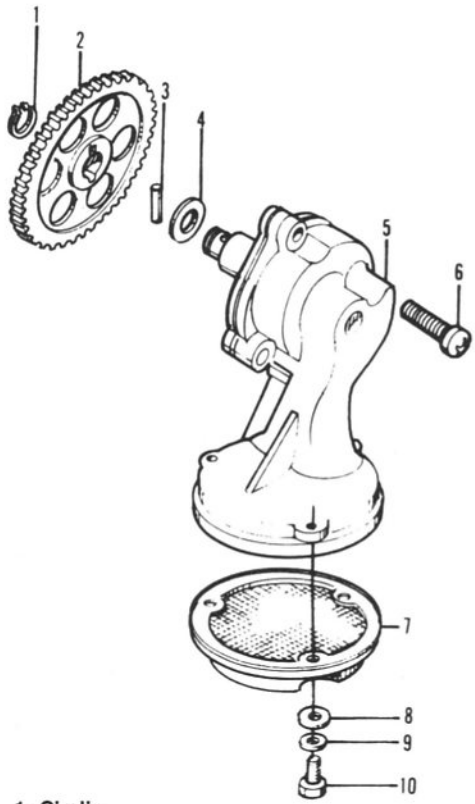
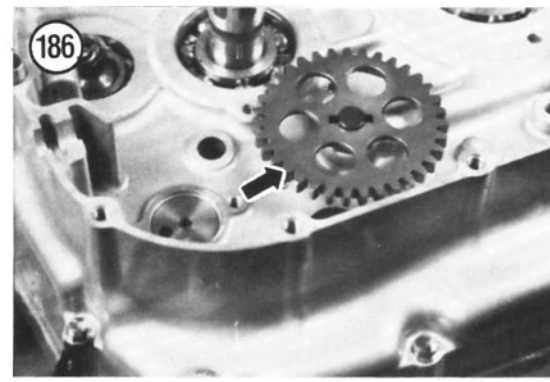
OIL PUMP ASSEMBLY



1. Circlip
2. Driven gear
3. Drive pin
4. Thrust washer
5. Oil pump assembly
6. Phillips screw
7. Strainer
8. Washer
9. Lockwasher
10. Bolt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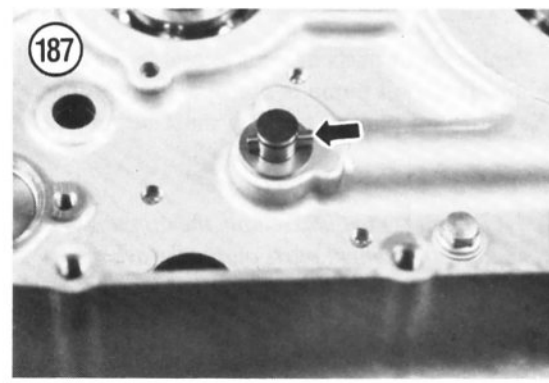
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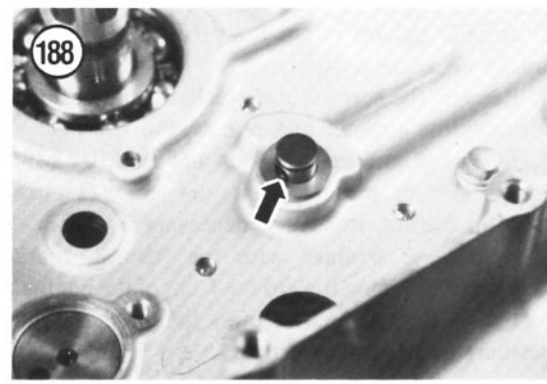
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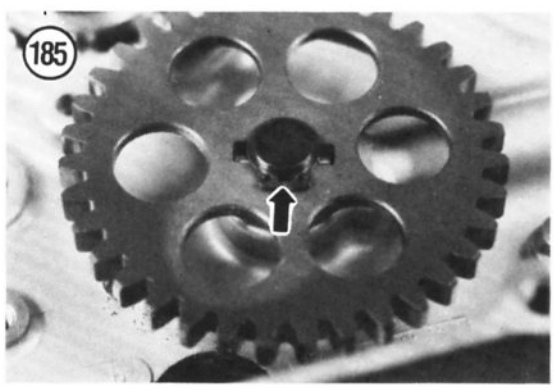
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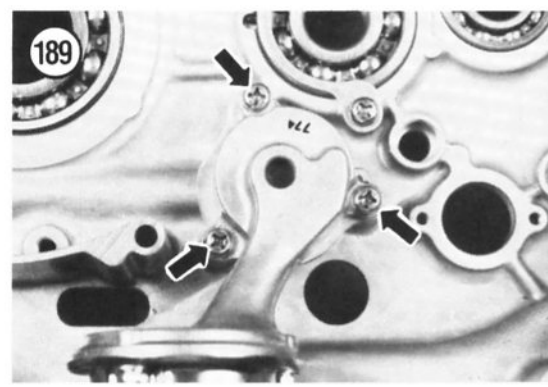
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10. Install the thrust washer (**Figure 188**) and the drive pin (**Figure 187**).
11. Align the notch in the oil pump drive sprocket with the drive pin and install the oil pump drive sprocket (**Figure 186**) onto the oil pump.
12. Pull up on the shaft and install the circlip (**Figure 185**) securing the oil pump driven sprocket to the oil pump. Make sure the circlip is properly seated in the shaft groove.
13. Assemble the crankcase as described in this chapter.

Inspection

Replacement parts are *not* available for the oil pump. If the oil pump is not operating properly, the entire oil pump assembly must be replaced.

CAUTION
Do not try to disassemble the oil pump as replacement parts and lockwashers are not available.

1. Rotate the drive shaft (**Figure 190**). If there is any binding or signs of wear; replace the oil pump assembly.
2. Inspect the oil pump body (**Figure 191**) for cracks or damage.
3. Remove the screws, lockwashers and washers securing the strainer and remove the strainer.
4. Clean the strainer in solvent and blow dry with compressed air. Inspect the strainer screen (**Figure 192**) for breaks, replace if necessary.
5. Install the strainer with the "front" mark (**Figure 193**) facing toward the front of the engine.
6. Install the strainer screws, lockwashers and washers and tighten securely.