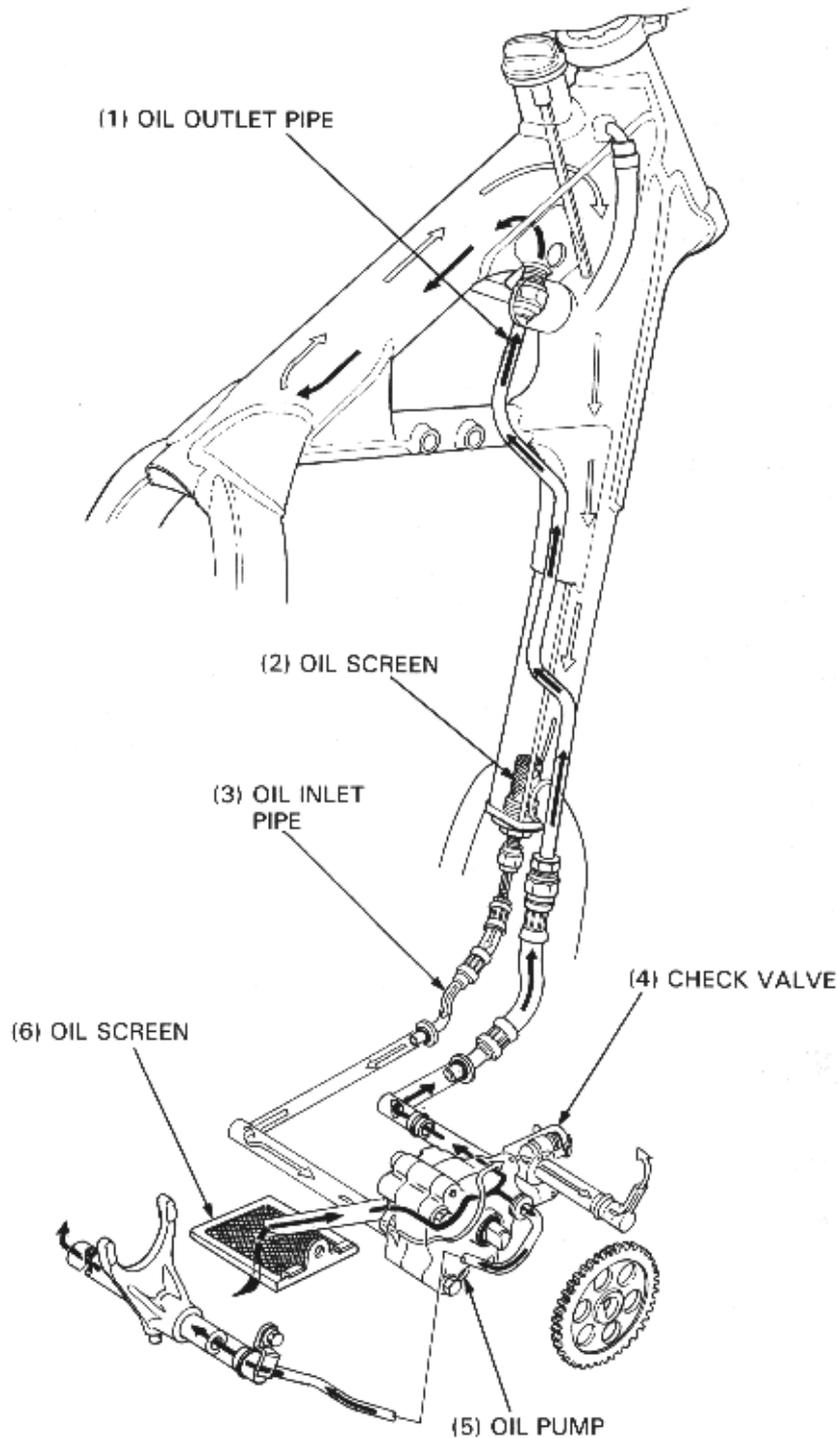


2. LUBRICATION

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LUBRICATION

SERVICE INFORMATION

GENERAL

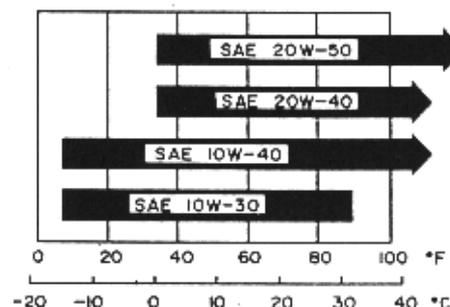
- This section describes inspection and replacement of engine oil and the oil filter, the cleaning of the oil strainer and oil pump servicing procedures.

CAUTION

- *Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.*

SPECIFICATIONS

Oil capacity	2.3 liters (2.4 U.S. qt, 2.0 Imp qt) at engine assembly 1.9 liters (2.0 U.S. qt, 1.7 Imp qt) at oil change 1.95 liters (2.06 U.S. qt, 1.72 Imp qt) at oil and oil filter change
Recommended oil	Honda 4-Stroke Oil or equivalent API Service Classification: SE or SF VISCOSITY: SAE 10 W-40 or 20 W-50



NOTE

- Use SAE 10 W-40 oil when the outside temperature is below 0° C (32° F).

Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range.

ITEM	STANDARD	SERVICE LIMIT
Oil pump tip clearance	0.15 mm (0.006 in) MAX.	0.20 mm (0.008 in)
Oil pump body clearance	0.15-0.21 mm (0.006-0.008 in)	0.25 mm (0.010 in)
Oil pump end clearance	0.02-0.08 mm (0.001-0.003 in)	0.12 mm (0.005 in)
Oil pump delivery	Pump A: 7.5 liters (7.9 U.S. qt)/min. at 5,300 rpm Pump B: 10.0 liters (10.6 U.S. qt)/min. at 5,300 rpm	—

TORQUE VALUES

Crankcase drain plug	25 N·m (2.5 kg-m, 18 ft-lb)
Down tube drain plug	35 N·m (3.5 kg-m, 25 ft-lb)
Oil filter cover bolt	9 N·m (0.9 kg-m, 7 ft-lb)
Oil strainer nut	40 N·m (4.0 kg-m, 29 ft-lb)
Oil inlet hose nut	40 N·m (4.0 kg-m, 29 ft-lb)

TROUBLESHOOTING

Oil level too low

- Normal oil consumption
- External oil leaks
- Worn piston rings

Oil contamination

- Oil not changed often enough
- Faulty head gasket

Low oil pressure

- Faulty oil pump
- Oil pump driven gear broken

ENGINE OIL LEVEL CHECK

Support the motorcycle upright on level ground.
Start the engine and let it idle for approximately 5 minutes.
Stop the engine then check the oil level with the oil filler cap/dipstick by inserting it in until the threads touch the filler neck.
Do not screw the cap in when making this check.
If the oil level is below the lower mark on the dipstick, fill to the upper level mark with the recommended oil.

ENGINE OIL CHANGE

NOTE

- Change the engine oil with the engine warm and the motorcycle on its side stand to assure complete and rapid draining.

Remove the oil filler cap and drain plugs on the frame down tube and the left crankcase.

CAUTION

- *Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.*

After the oil has drained, check that the drain plug sealing washers are in good condition, then install the plugs.

TORQUE:

Crankcase drain plug: 25 N-m (2.5 kg-m, 18 ft-lb)

Downtube drain plug: 35 N-m (3.5 kg-m, 25 ft-lb)

NOTE

- If maintenance is also scheduled for the oil filter and the strainer, do these before filling the frame oil tank with oil.
- The engine takes about 1.9 liters (2.0 U.S. qt, 1.7 Imp qt) at oil change. But since only a portion of that oil is held in the frame's oil tank, you cannot add the full amount initially.

Pour one liter (1.05 U.S. qt) of recommended oil (page 2-1) into the oil tank.

Install the oil filler cap/dipstick.

Start the engine and let it idle for a few minutes.

Stop the engine and add the recommended oil up to the upper level mark with the motorcycle upright.

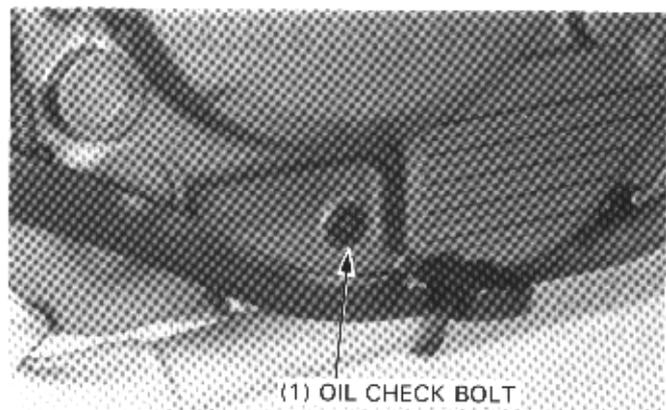
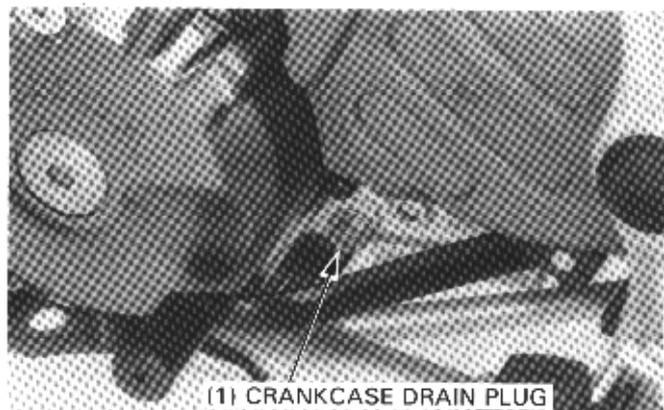
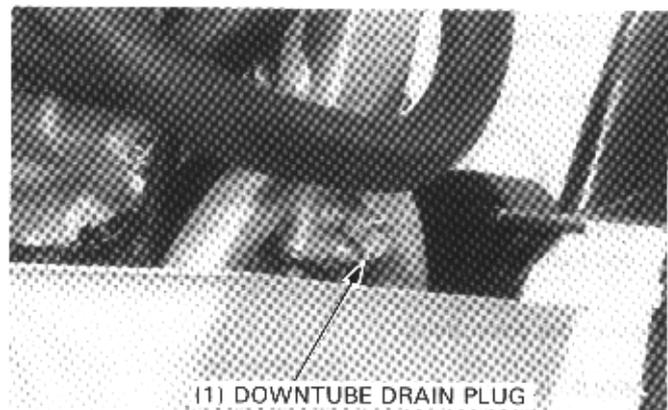
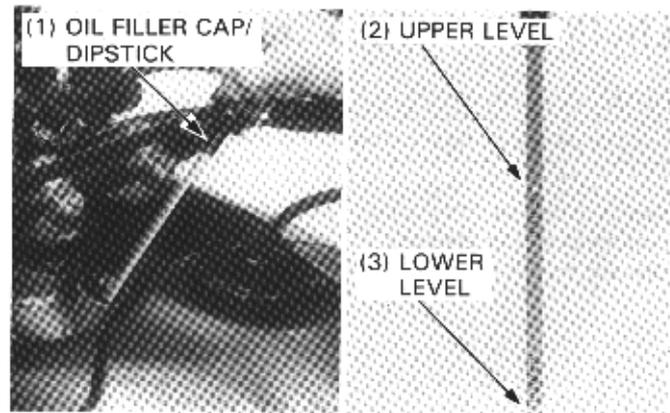
CRANKCASE OIL CHECK BOLT

NOTE

- The crankcase oil level check bolt is useful when checking the lubrication system; the oil pump adjusts the oil level so that the crankcase is always kept at the proper level. If this check shows otherwise, some portion of the lubrication system is not working properly.

Run the engine first, then stop the engine and wait a few minutes. Remove the oil check bolt.

The crankcase oil level is correct if the oil is flush with the bottom of the check bolt hole. Install the oil check bolt. Re-check the oil level with the oil filter cap/dipstick.



LUBRICATION

ENGINE OIL FILTER REPLACEMENT

NOTE

- Change the oil filter before filling the frame oil tank with oil.

Remove the oil filter cover from the right crankcase, then remove the filter element.
Discard the oil filter element.

Check that the O-ring on the oil filter cover is in good condition.
Install the spring, new oil filter element and oil filter cover.

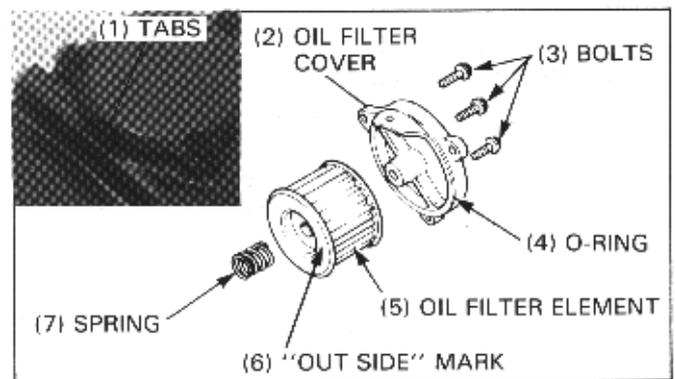
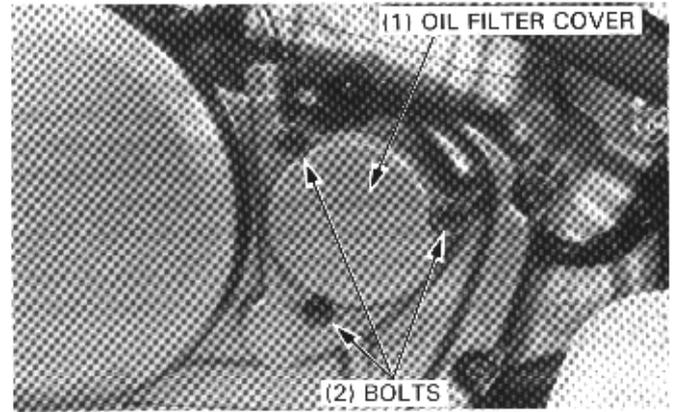
NOTE

- Install the element with the "OUT SIDE" mark facing out.
- Install the oil filter cover aligning the tabs on the filter cover and right crankcase cover.

Tighten the cover bolts.

TORQUE: 9 N·m (0.9 kg-m, 7 ft-lb)

Pour in the recommended oil (page 2-3) to the upper level on the fillter cap/dipstick.

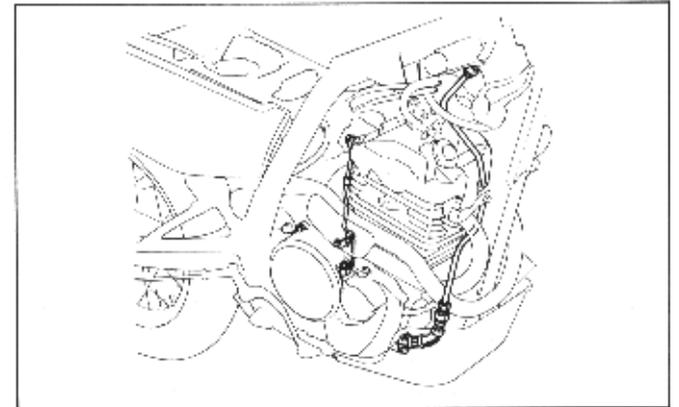


OIL PIPE INSPECTION

Inspect the oil pipes for damage, bends or clogging and replace if necessary.

Refer to the following page for oil pipe replacement.

- Oil pass pipe (page 6-3)
- Oil outlet pipe (page 5-4, 5)
- Oil inlet hose (page 5-4, 5)

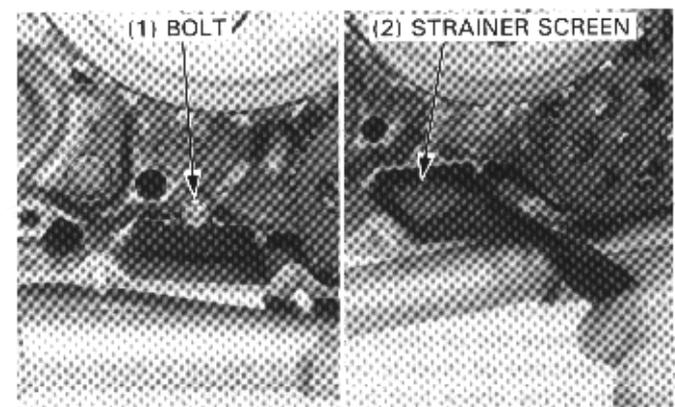


OIL STRAINER SCREEN CLEANING

NOTE

- Perform this maintenance before filling the engine with oil.

Remove the right crankcase cover (page 8-3).
Remove the oil strainer and clean it.
Install and secure the oil strainer with a bolt.
Install the right crankcase cover (page 8-9).
Fill the crankcase with the recommended oil (page 2-1).



OIL STRAINER NUT

NOTE

- Clean the screen on the oil strainer nut before filling the frame oil tank with oil.

Remove the oil drain bolt on the frame down tube to drain the oil.

Remove the skid plate (page 5-2).

Loosen the oil joint nut and disconnect the hose from the oil strainer nut.

Remove the oil strainer nut from the frame down tube.

Clean the screen on the oil strainer nut in solvent and blow dry with compressed air.

Check that the O-ring is in good condition.

Reinstall and tighten the oil strainer nut.

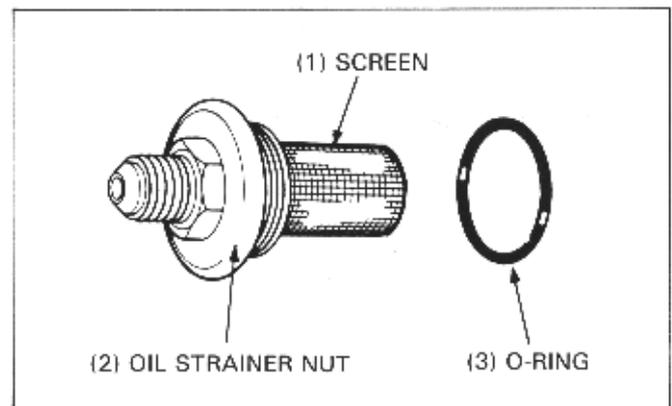
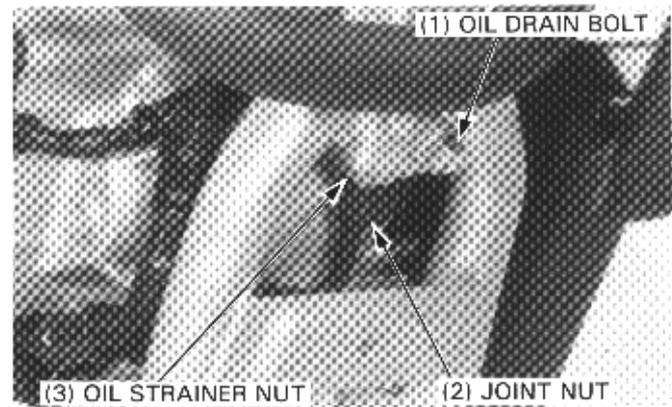
TORQUE: 40 N·m (4.0 kg-m, 29 ft-lb)

Connect the oil hose and secure it with the nut.

TORQUE: 40 N·m (4.0 kg-m, 29 ft-lb)

Reinstall the skid plate (page 5-5)

Fill the oil tank to the upper level with the recommended oil (page 2-1).

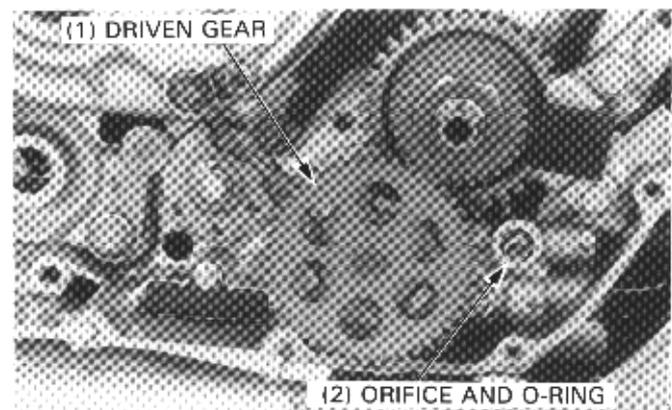


OIL PUMP

REMOVAL

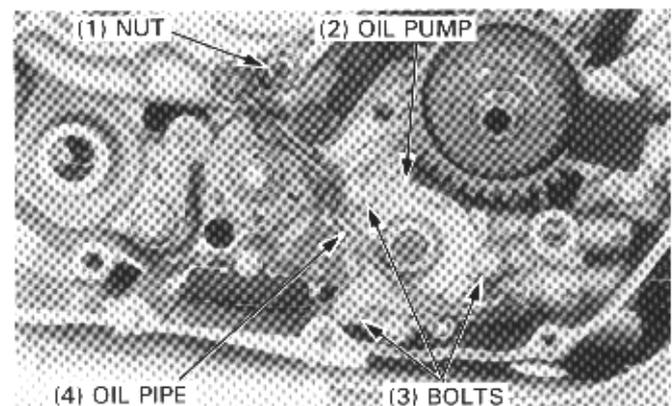
Remove the following:

- clutch (page 8-2)
- oil pump driven gear
- orifice and O-ring



Remove the following:

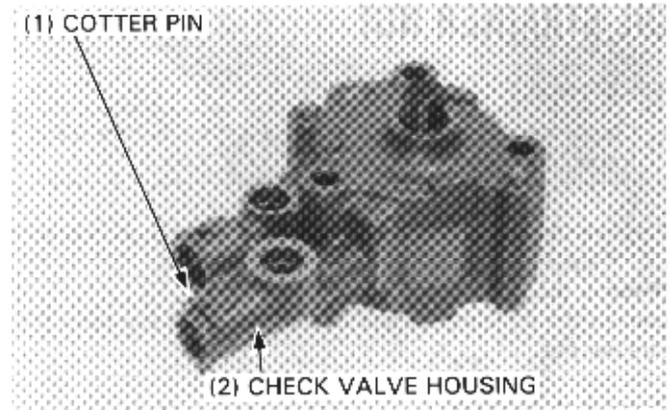
- bolt, nut and oil pipe
- oil pump attaching bolts and oil pump



LUBRICATION

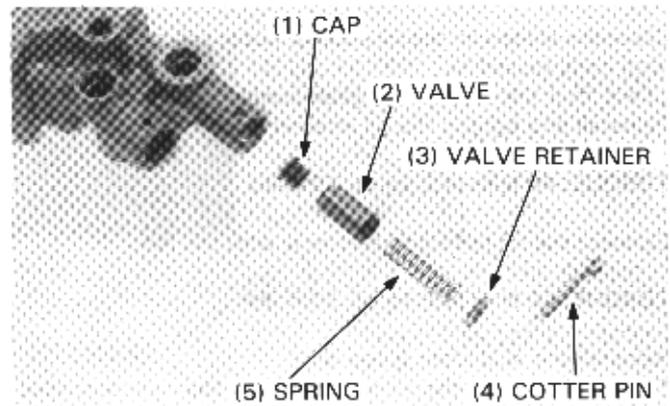
CHECK VALVE

Remove the cotter pin, valve retainer, spring and check valve from the check valve housing.
Discard the removed cotter pin.



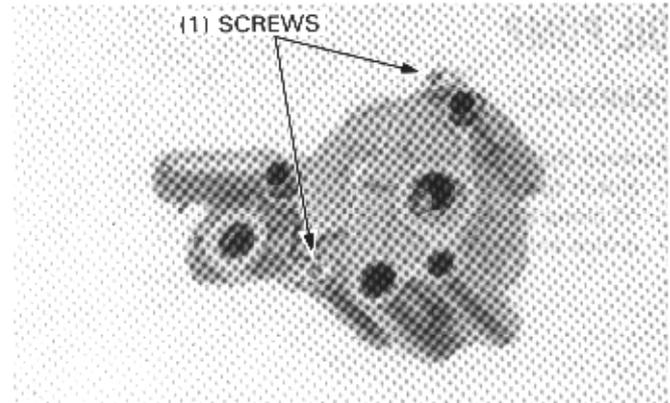
Inspect the valve and valve bore for scoring or contamination.
Clean or replace as necessary.

Install the check valve, spring and valve retainer into the check valve housing, and secure them with a new cotter pin.



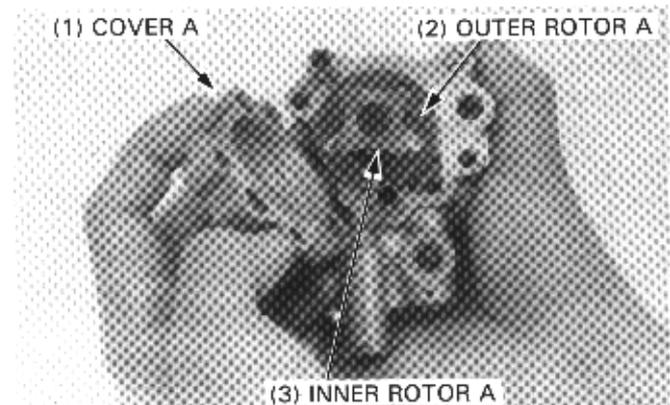
DISASSEMBLY

Remove the oil pump screws.



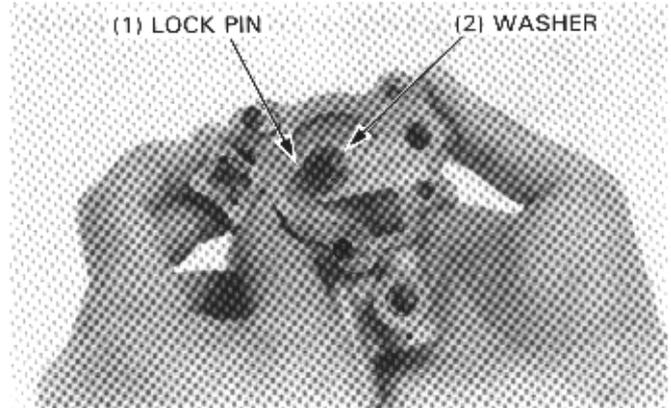
Remove the following from the oil pump body.

- Oil pump cover A
- Outer rotor A
- Inner rotor A



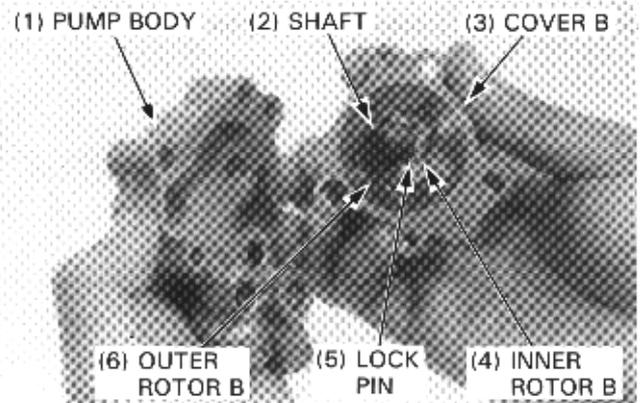
Remove the following:

- lock pin
- thrust washer



Separate the oil pump body from the oil pump cover B.
Remove the following from the cover B.

- Oil pump shaft and lock pin
- Inner rotor B
- Outer rotor B



INSPECTION

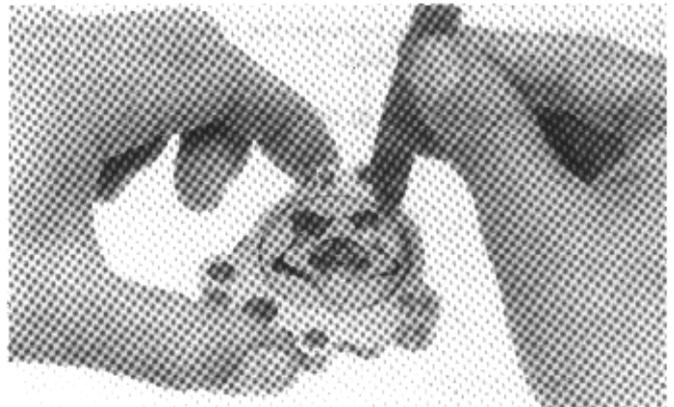
Measure the tip clearance between the inner and outer rotor As.

SERVICE LIMIT: 0.20 mm (0.008 in)



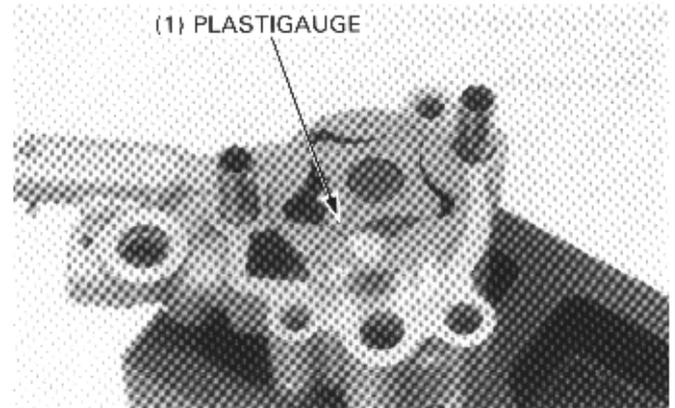
Measure the clearance between the outer rotor A and the pump body.

SERVICE LIMIT: 0.25 mm (0.010 in)

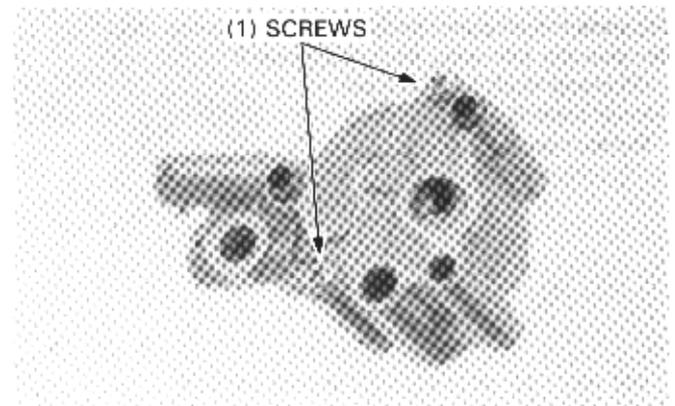


LUBRICATION

Wipe oil from the rotors and put a piece of plastigauge across them as shown.

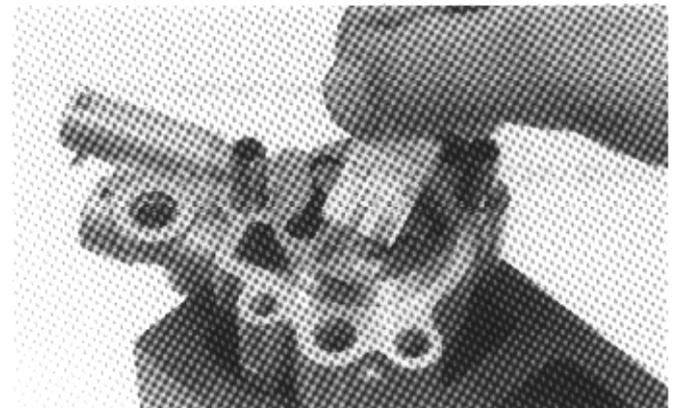


Install the oil pump cover A and tighten the oil pump screws.



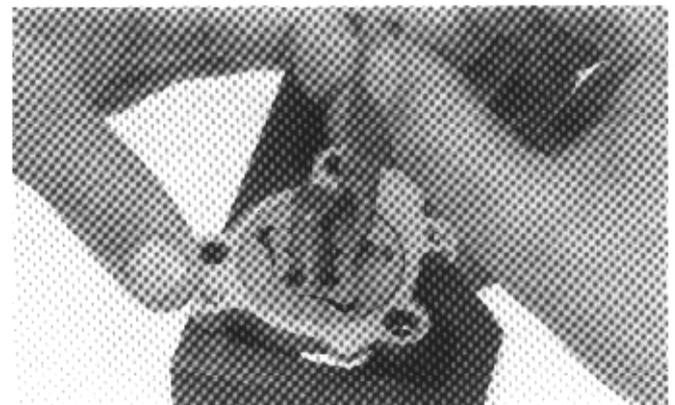
Remove the oil pump cover A and measure the width of the plastigauge. The widest thickness determines the pump end clearance.

SERVICE LIMIT: 0.12 mm (0.005 in).



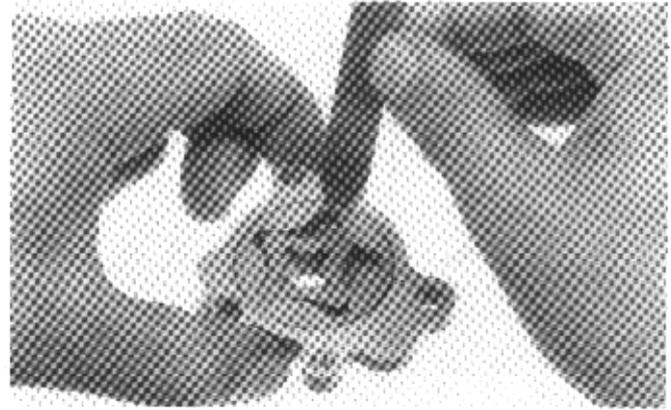
Measure the tip clearance between the inner and outer rotor Bs with the pump shaft installed.

SERVICE LIMIT: 0.20 mm (0.008 in)



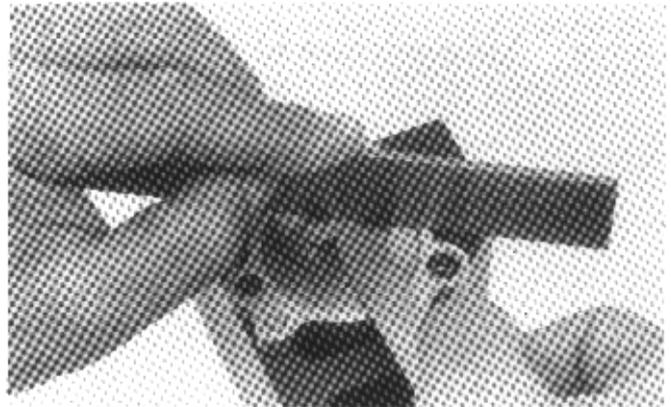
Measure the clearance between the outer rotor B and the pump B body.

SERVICE LIMIT: 0.25 mm (0.010 in)



Measure the end clearance of pump B.

SERVICE LIMIT: 0.12 mm (0.005 in)



AFTER '88:

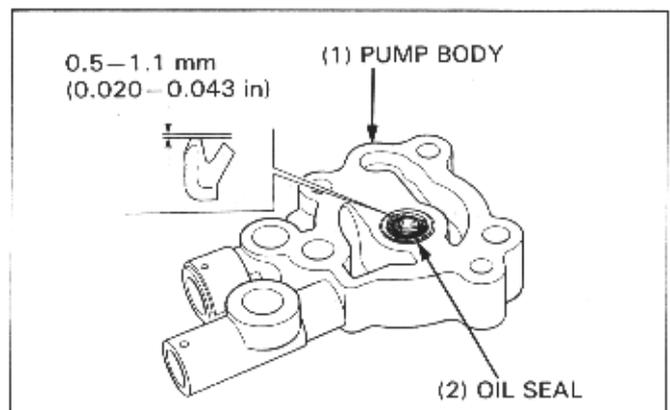
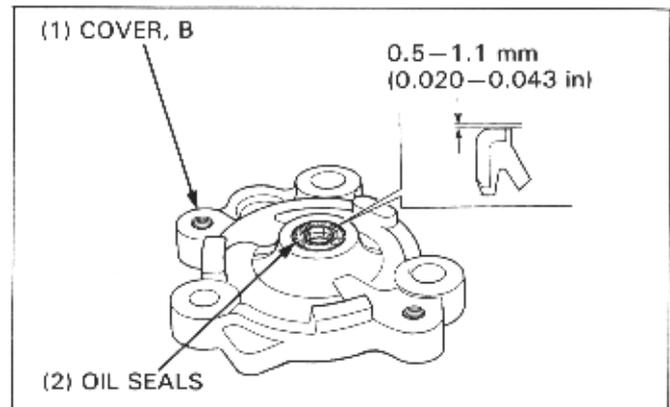
Replace the oil seals if they show any signs of wear or damage.

NOTE

- When removing the oil seal, note which surface of the oil seal faces out.

Install new oil seals into the holes squarely in the specified depth from the outer surfaces as shown.

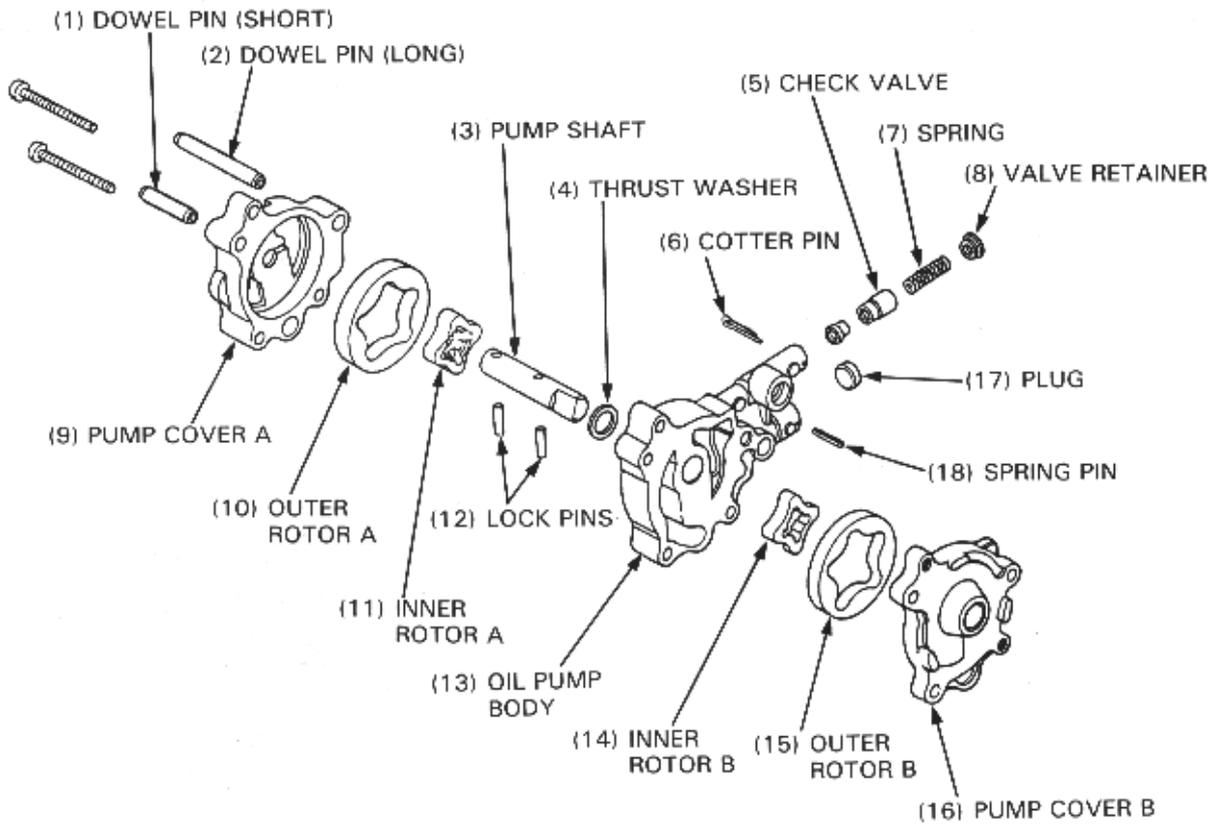
SPECIFIED DEPTHS: 0.5–1.1 mm (0.020–0.043 in)



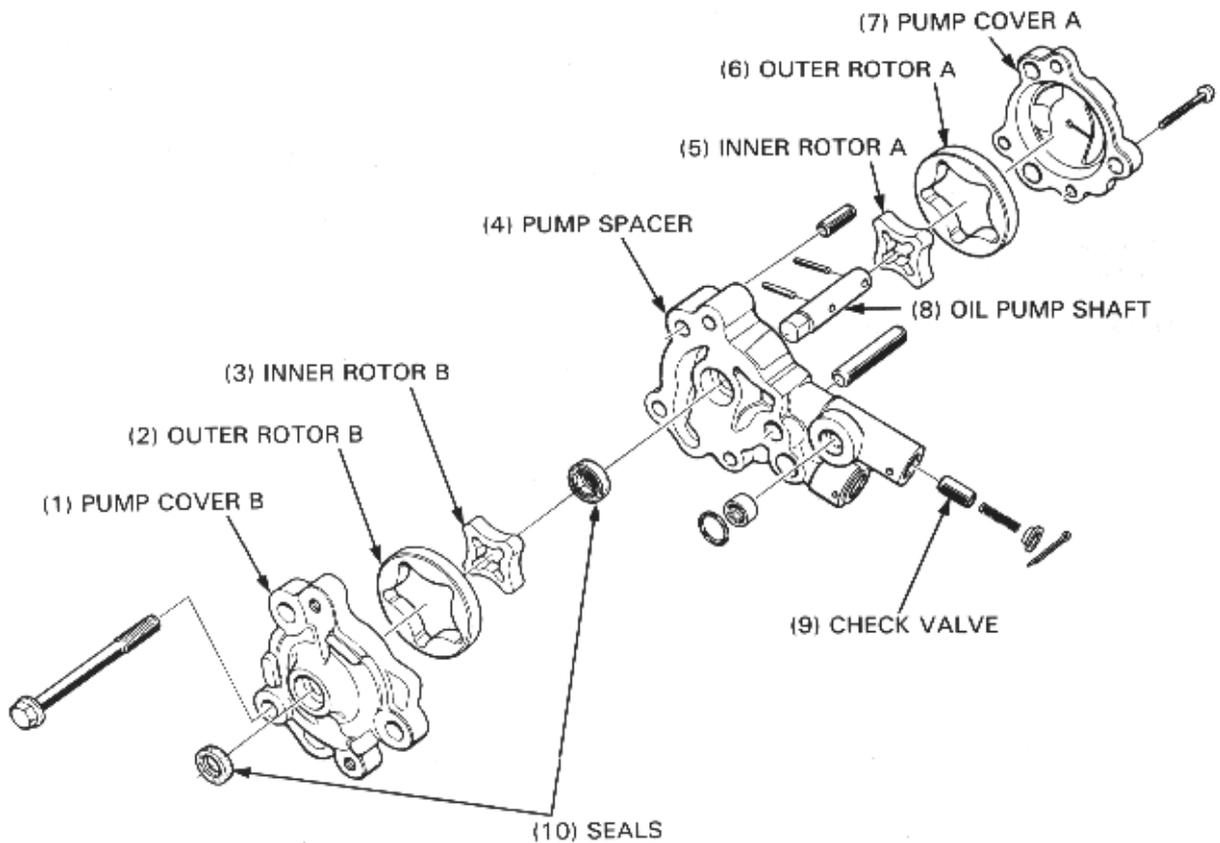
LUBRICATION

ASSEMBLY

'88:



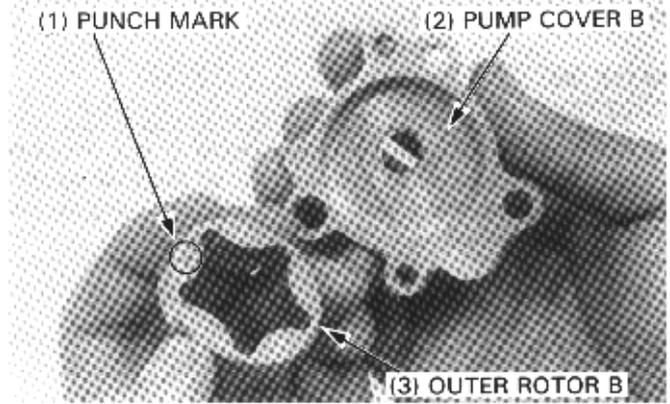
AFTER '88:



Install the outer rotor B in the oil pump cover B with the punch mark on the rotor facing inside.

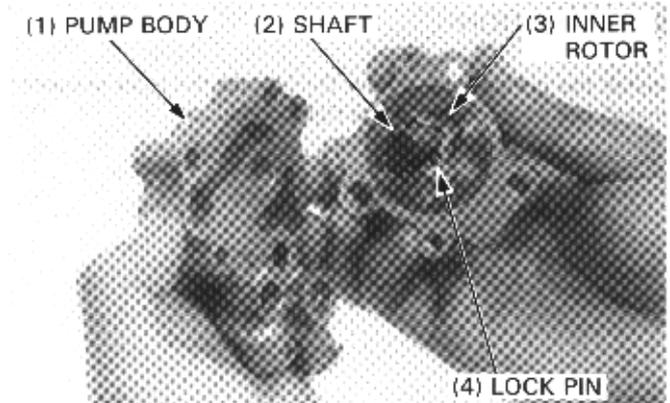
CAUTION

- Before installation, pour the clean engine oil into the oil pass hole in the oil pump body B until the oil flows out of the oil pass hole in the check valve housing side as turning the pump shaft.



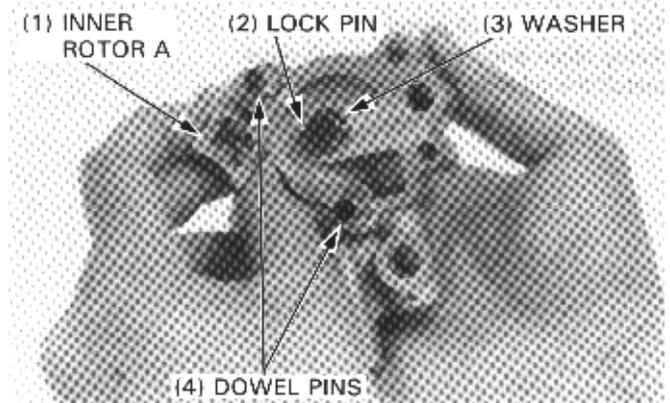
Install the inner rotor B in the pump cover B. Insert the lock pin through the oil pump shaft, and insert the shaft through the inner rotor and pump cover with the lock pin aligned with the groove in the inner rotor.

Install the oil pump body onto the pump cover B.

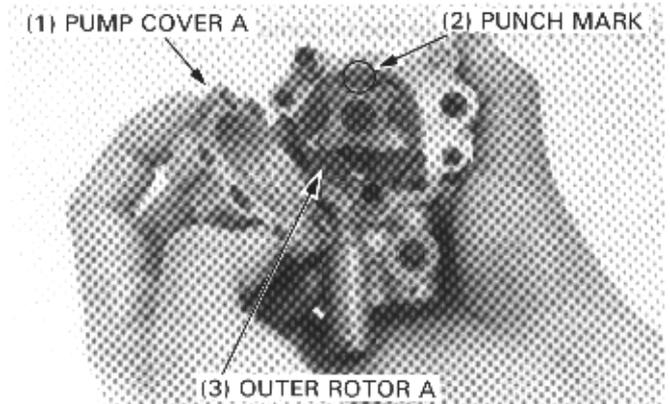


Insert the dowel pins through the pump body and pump cover B.

Install the thrust washer onto the pump shaft. Insert the lock pin through the hole in the shaft. Install the inner rotor A onto the shaft, aligning its groove with the lock pin.



Install the outer rotor A with the punch mark on the rotor faced outside. Install the pump cover A onto the pump body.

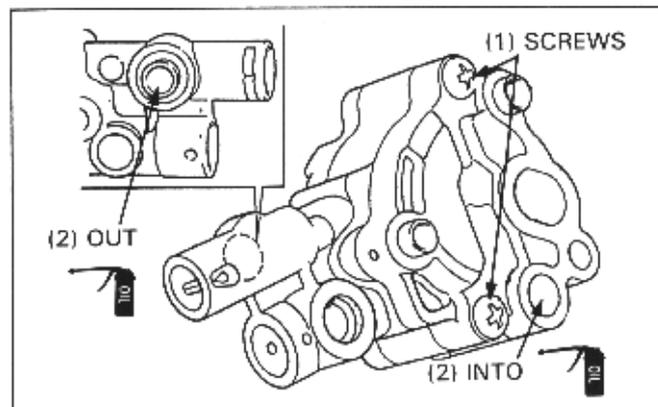


LUBRICATION

Tighten the oil pump screws securely.

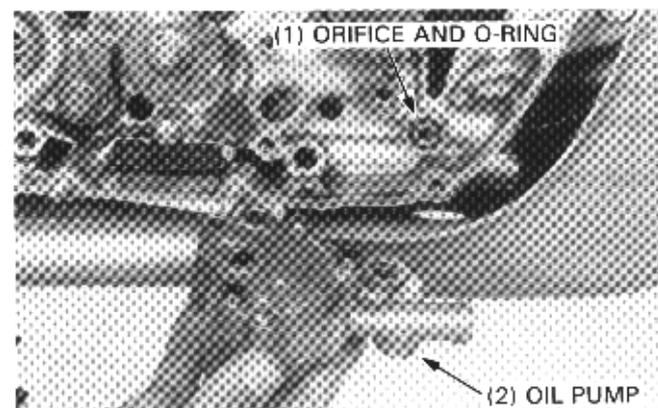
AFTER '88: CAUTION

- *Before installation, pour the clean engine oil into the oil pass hole in the oil pump body B until the oil flows out of the oil pass hole in the check valve housing side as turning the pump shaft counterclockwise.*

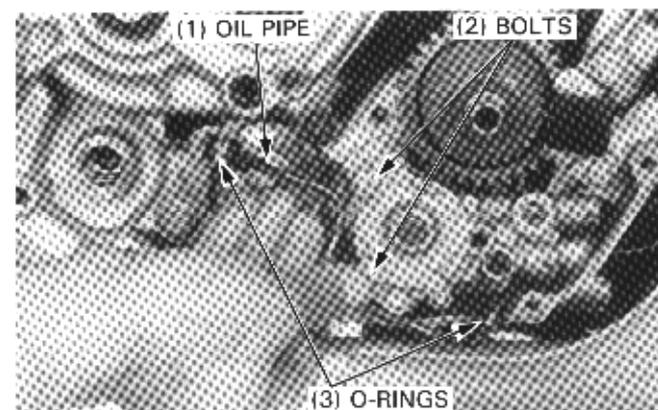


INSTALLATION

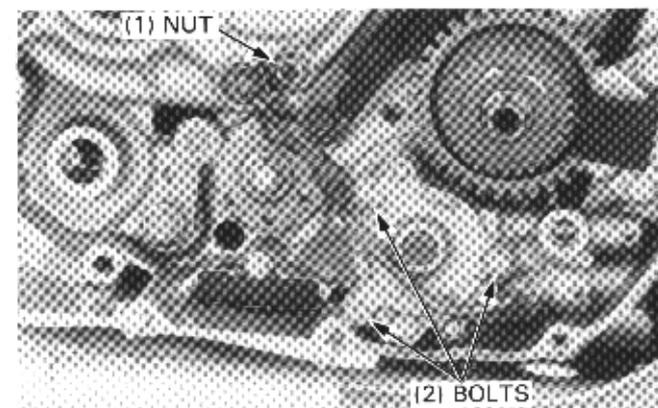
Install the orifice with a new O-ring into the right crankcase. Install the oil pump onto the right crankcase.



Tighten the two oil pump bolts loosely. Apply clean engine oil to new O-rings. Install the oil pipe with the new O-rings.



Tighten the oil pipe nut and oil pump bolts securely.



Apply clean engine oil to a new O-ring.
Install the orifice with the new O-ring.

Install the oil pump driven gear onto the oil pump shaft.
Install the following:
- clutch (page 8-5)
- right crankcase cover (page 8-9)

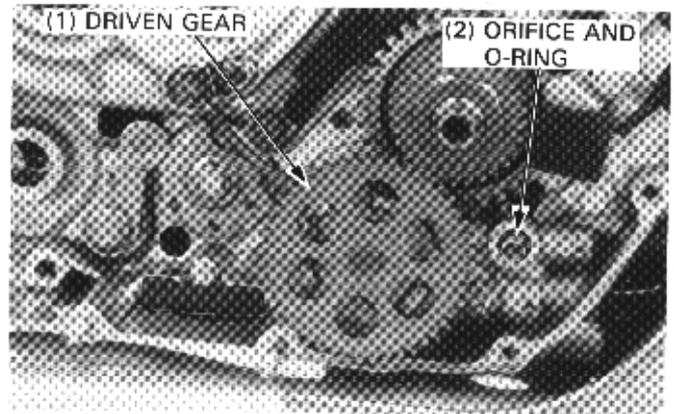
Fill the engine with the recommended oil (page 2-3).

AFTER '88:

After installation, support the motorcycle upright on firm, level ground and start the engine and let it idle for a minute. Loosen the oil pipe bolt on the right crankcase cover (page 8-10) and check that the oil flows out.

Tighten the oil pipe bolt.

TORQUE: 12 N·m (1.2 kg-m, 9 ft-lb)



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LUBRICATION

LUBRICATION POINTS

Unless otherwise specified, use general purpose grease. Apply oil or grease to any other sliding surfaces not shown here.

CONTROL CABLE LUBRICATION

Periodically disconnect the throttle and clutch cables at their upper ends. Clean the cable end mount in the throttle and clutch lever, then oil the cable ends and reinstall. It is not necessary to oil the cables; if a cable begins to bind, it must be replaced.

WHEEL BEARING

Grease new wheel bearings and dust seals before installation. Do not reinstall used wheel bearings or seals.

NOTE

Some sources of MoS₂ paste grease with 40% or more molybdenum are:

- Molykote® G-n Paste manufactured by Dow Corning, U.S.A.
 - Honda Moly 45 (U.S.A. only)
 - Rocol ASP manufactured by Rocol Limited, U.K.
 - Rocol Paste manufactured by Sumico Lubricant, Japan.
- Any other manufacturer's paste grease equivalent to the above may also be used.

