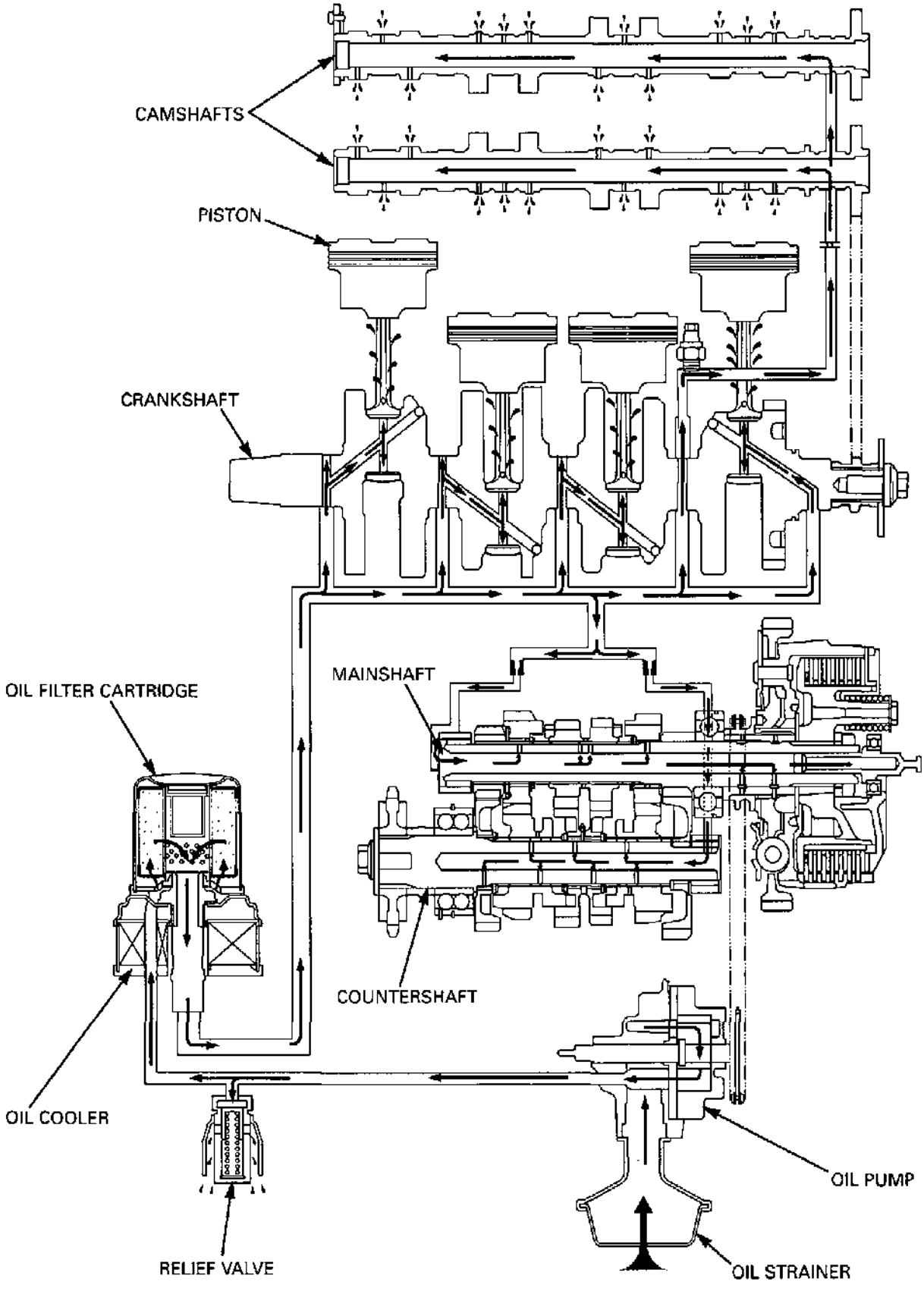
LUBRICATION SYSTEM DIAGRAM



4. LUBRICATION SYSTEM

SERVICE INFORMATION

GENERAL

⚠ 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.

- The oil pump can be serviced with the engine installed in the frame.
- The service procedures in this section must be performed with the engine oil drained.
- When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.
- After the oil pump has been installed, check that there are no oil leaks and that oil pressure is correct.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	3.0 liter (3.2 US qt, 2.6 Imp qt)	—
	After draining/filter change	3.3 liter (3.5 US qt, 2.9 Imp qt)	—
	After disassembly	3.7 liter (3.9 US qt, 3.3 Imp qt)	—
Recommended engine oil		Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil or equivalent motor oil API service classification SG or Higher JASO T 903 standard: MA Viscosity: SAE 10W–40	—
Oil pressure at oil pressure switch		490 kPa (5.0 kgf/cm², 71 psi) at 6,000 rpm (80°C/176°F)	—
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.22 (0.006 – 0.009)	0.35 (0.014)
	Side clearance	0.02 – 0.07 (0.001 – 0.003)	0.10 (0.004)

TORQUE VALUES

Oil main gallery sealing bolt	29 N•m (3.0 kgf•m, 22 lbf•ft)	Apply a locking agent to the threads.
Oil pressure switch	12 N•m (1.2 kgf•m, 9 lbf•ft)	Apply sealant to the threads.
Oil pressure switch wire terminal bolt/washer	2 N•m (0.2 kgf•m, 1.4 lbf•ft)	
Oil pump cover bolt	8 N•m (0.8 kgf•m, 5.8 lbf•ft)	CT bolt.
Oil cooler bolt (filter boss)	64 N•m (6.5 kgf•m, 47 lbf•ft)	Apply oil to the threads and flange surface.
Engine oil filter cartridge	26 N•m (2.7 kgf•m, 20 lbf•ft)	Apply oil to the threads and flange surface and O-ring.
Engine oil drain bolt	29 N•m (3.0 kgf•m, 22 lbf•ft)	
Oil pump driven sprocket bolt/washer	15 N•m (1.5 kgf•m, 11 lbf•ft)	Apply a locking agent to the threads.

TOOLS

Oil pressure gauge set	07506–3000000	Equivalent commercially available in U.S.A.
Oil pressure gauge attachment	07510–MJ10100	Equivalent commercially available in U.S.A.
Oil filter wrench	07HAA–PJ70100	

TROUBLESHOOTING

Oil level too low
- Oil consumption
- External oil leak
- Worn piston rings
- Improperly installed piston rings
- Worn cylinders
- Worn stem seals
- Worn valve guide

Low oil pressure
- Oil level low
- Clogged oil strainer
- Faulty oil pump
- Internal oil leak
- Incorrect oil being used

No oil pressure
- Oil level too low
- Oil pressure relief valve stuck open
- Broken oil pump drive chain
- Broken oil pump drive or driven sprocket
- Damaged oil pump
- Internal oil leak

High oil pressure
- Oil pressure relief valve stuck closed
- Clogged oil filter, gallery or metering orifice
- Incorrect oil being used

Oil contamination
- Oil or filter not changed often enough
- Worn piston rings

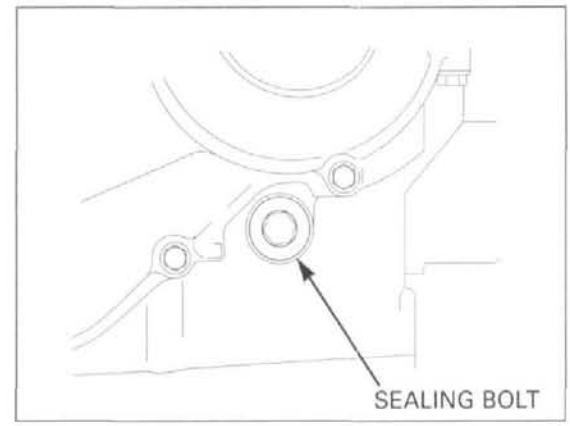
Oil emulsification
- Blown cylinder head gasket
- Leaky coolant passage
- Entry of water

OIL PRESSURE INSPECTION

If the oil pressure indicator light remains on a few seconds, check the indicator system before checking the oil pressure.

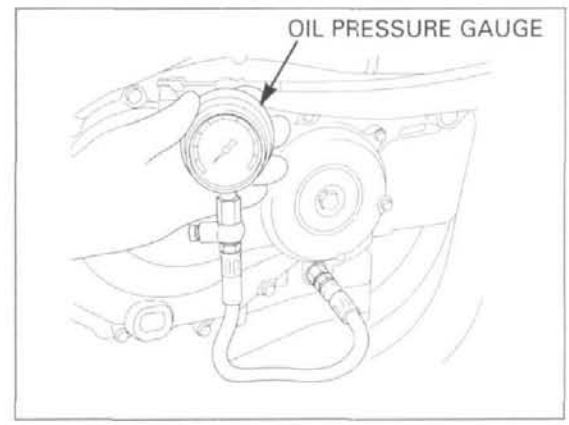
Check the oil level (page 3-14).

Warm up the engine to normal operating temperature (approximately 80°C/176°F).
Stop the engine and remove the oil main gallery sealing bolt.



Connect an oil pressure gauge and attachment to the main gallery.

TOOLS:
Oil pressure gauge set 07506–3000000 (*equivalent commercially available in U.S.A.*)
Oil pressure gauge attachment 07510–MJ10100 (equivalent commercially available in U.S.A.)



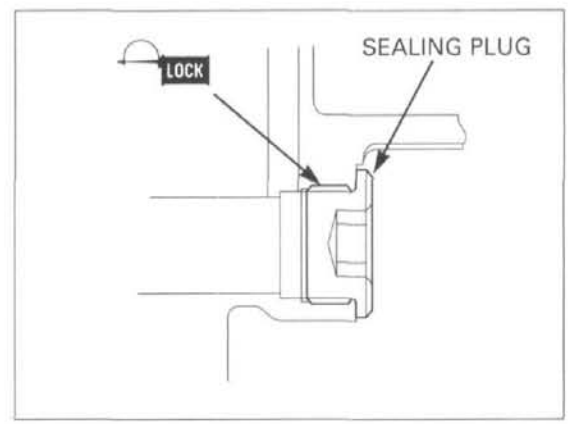
Start the engine and increase engine speed to 6,000 rpm and read the oil pressure.

OIL PRESSURE:
490 kPa (5.0 kgf/cm², 71 psi) at 6,000 rpm/ (80°C/176°F)

Stop the engine and remove the tools.

Apply a locking agent to the sealing plug threads.
Install and tighten the sealing plug to the specified torque.

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)

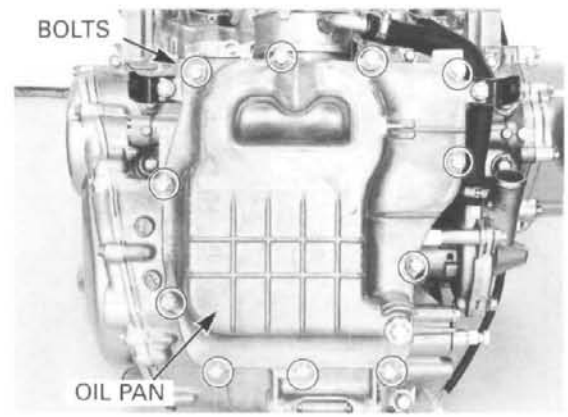


OIL STRAINER/PRESSURE RELIEF VALVE

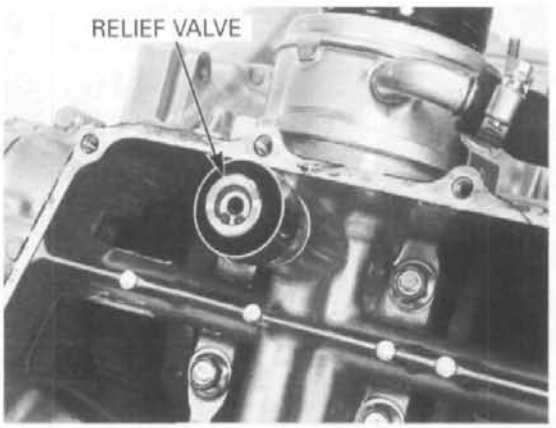
REMOVAL

Drain the engine oil (page 3-15).
Remove the exhaust pipe (page 2-28).

Remove the oil pan flange bolts and oil pan.



Remove the pressure relief valve and O-ring.



Remove the oil strainer and packing.

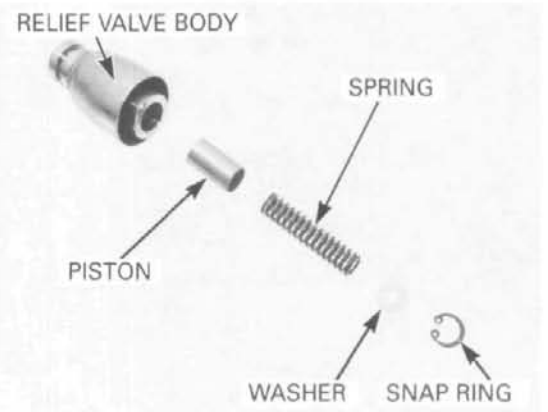
Clean the oil strainer screen.

INSPECTION

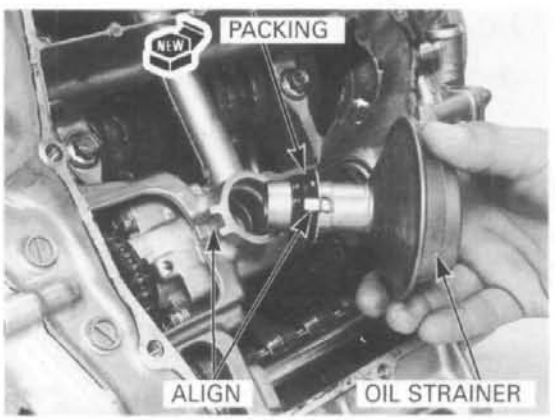
Check the operation of the pressure relief valve by pushing on the piston.
Disassemble the relief valve by removing the snap ring.

Inspect the piston for wear, unsmooth movement or damage.
Inspect the spring for fatigue or damage.

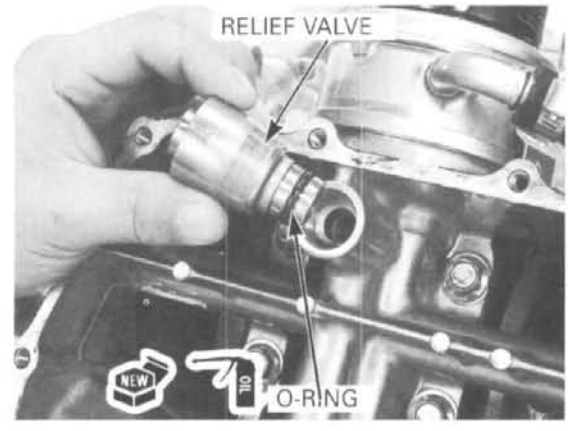
Assemble the relief valve in the reverse order of disassembly.



Apply oil to the new packing and install it onto the oil strainer.
Install the oil strainer into the crankcase while aligning its boss with the groove in the crankcase.

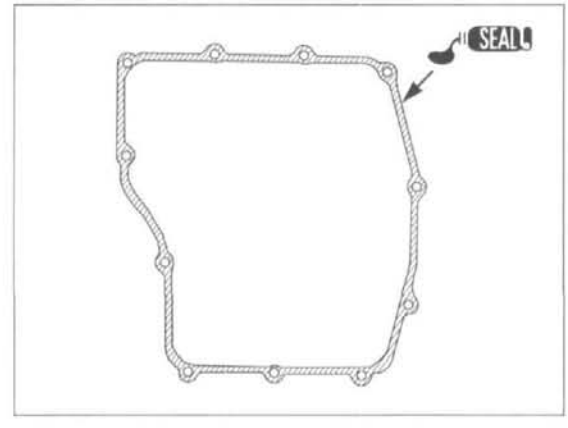


Apply oil to the new O-ring and install it onto the relief valve.
Install the relief valve into the crankcase.



Do not apply sealant more than necessary.

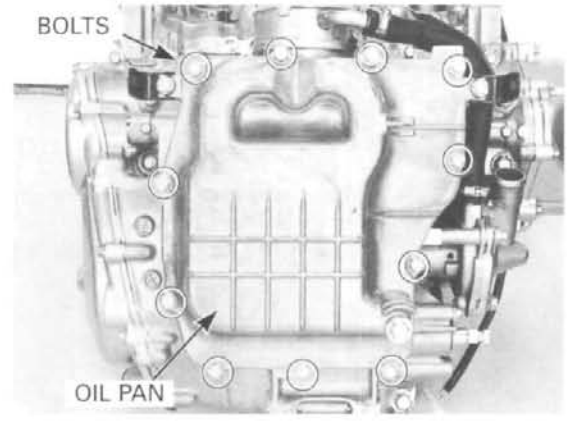
Clean the oil pan mating surface thoroughly.
Apply Three Bond 1207B or an equivalent to the mating surface.



Install the oil pan onto the lower crankcase.
Install the oil pan mounting bolts.
Tighten all of the bolts in a crisscross pattern in two to three steps.

Install the exhaust pipe (page 2-29).
Fill the crankcase with the recommended oil (page 3-14).

After installation, check that there are no oil leaks.

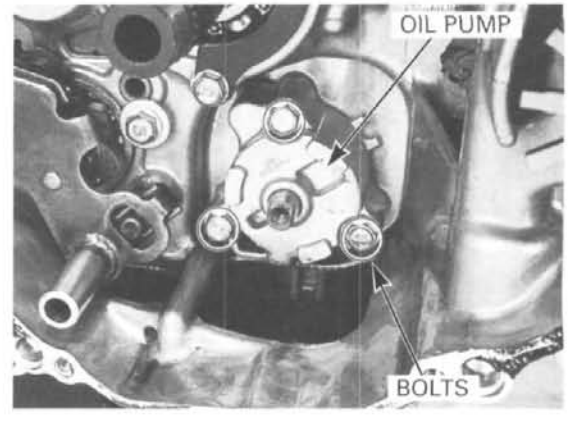


OIL PUMP

REMOVAL

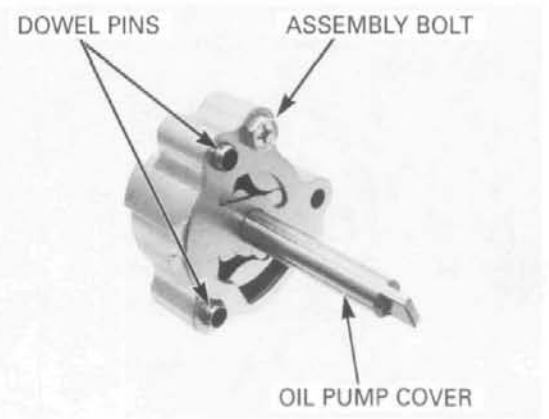
Remove the clutch and oil pump driven sprocket (page 9-4).

Remove the three flange bolts and oil pump assembly.

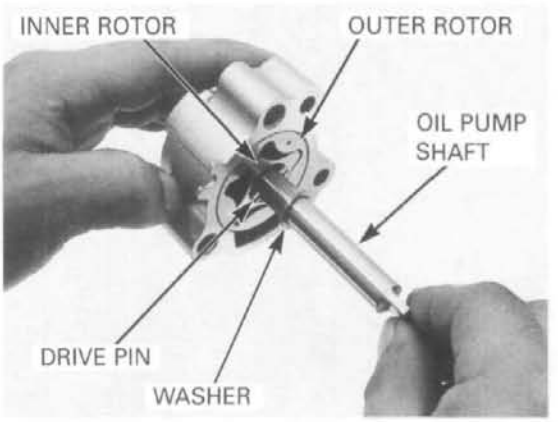


DISASSEMBLY

Remove the dowel pins.
Remove the oil pump assembly bolt and oil pump cover.



Remove the thrust washer, drive pin, oil pump shaft, outer rotor and inner rotor from the oil pump body.



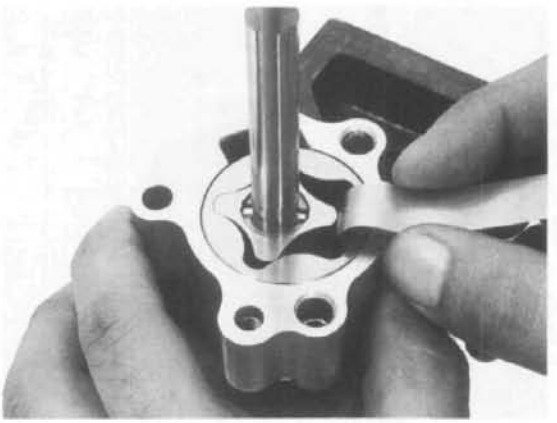
INSPECTION

If any portion of the oil pump is worn beyond the service limit, replace the oil pump as an assembly.

Temporarily install the oil pump shaft.
Install the outer and inner rotors into the oil pump body.

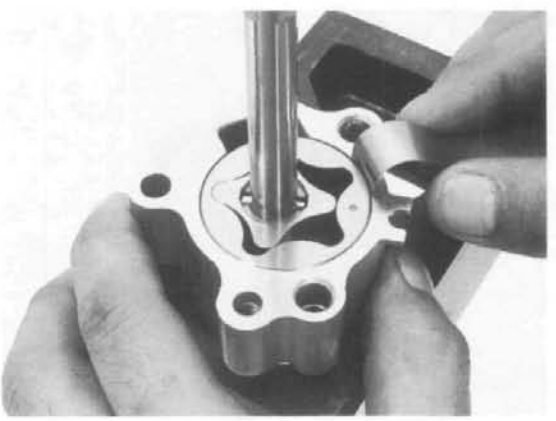
Measure the rotor tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



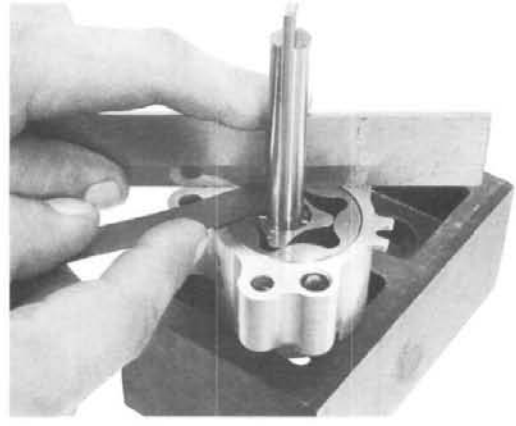
Measure the pump body clearance.

SERVICE LIMIT: 0.35 mm (0.014 in)

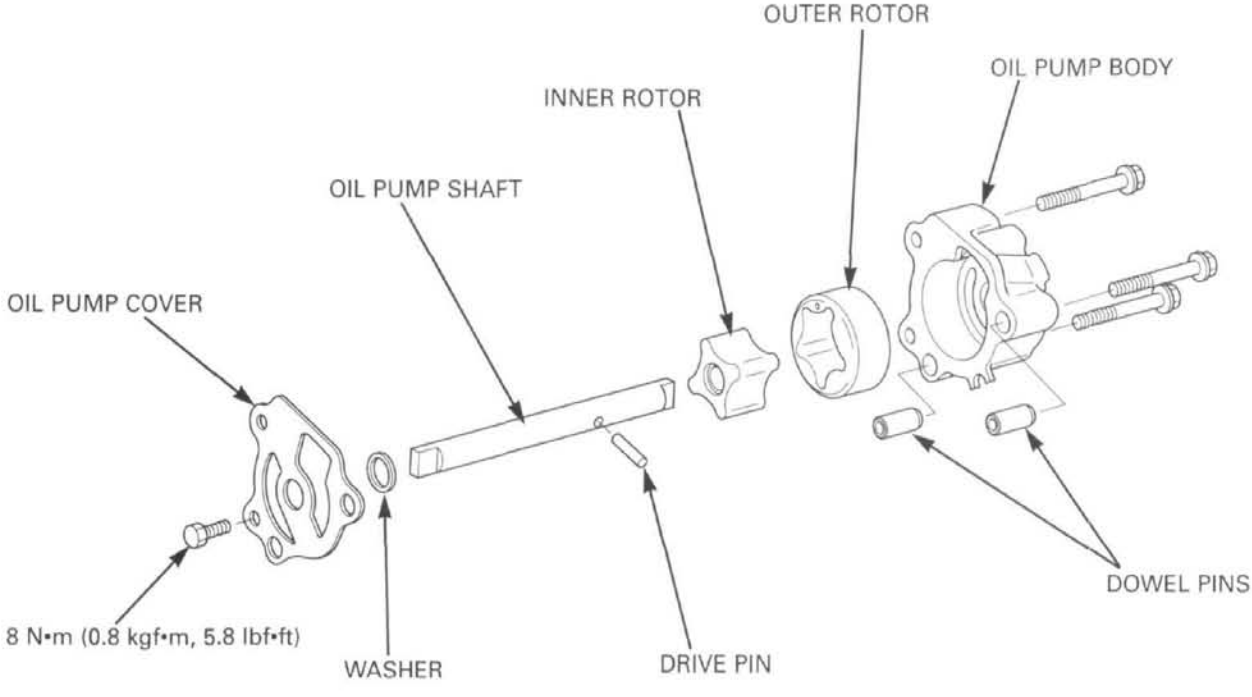


Measure the side clearance using a straight edge and feeler gauge.

SERVICE LIMIT: 0.10 mm (0.004 in)



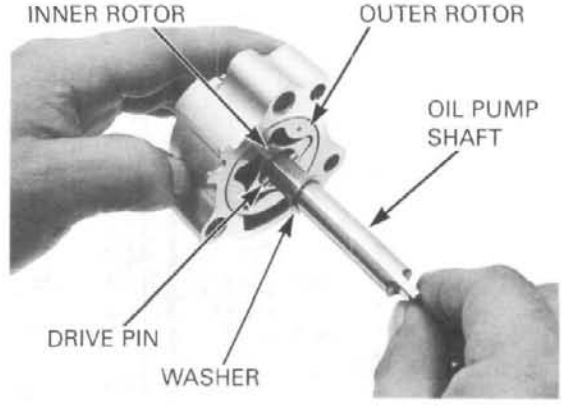
ASSEMBLY



Install the outer rotor with its punch mark facing the oil pump cover.

Install the outer rotor into the oil pump body with its punch mark facing the oil pump cover.
Install the inner rotor into the outer rotor with its drive pin groove facing the oil pump cover.
Install the oil pump shaft through the inner rotor and oil pump body.

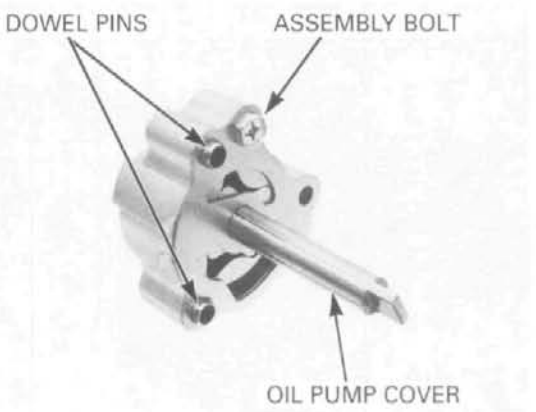
Install the drive pin into the hole in the pump shaft and align the pin with the groove in the inner rotor as shown.
Install the thrust washer.



Install the dowel pins.
Install the oil pump cover and tighten the bolt to the specified torque.

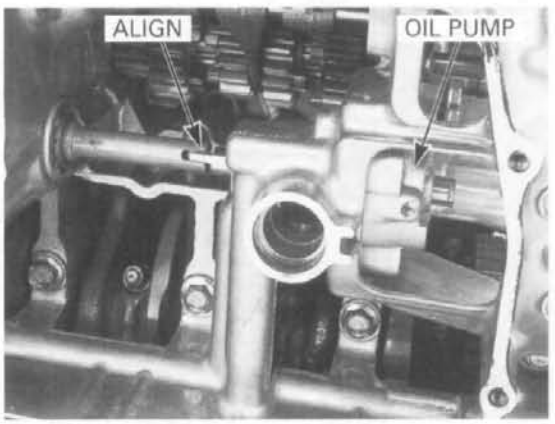
TORQUE: 8 N·m (0.8 kgf·m, 5.8 lbf·ft)

Check the oil pump operation by turning the pump shaft.
If necessary, reassemble the oil pump.



INSTALLATION

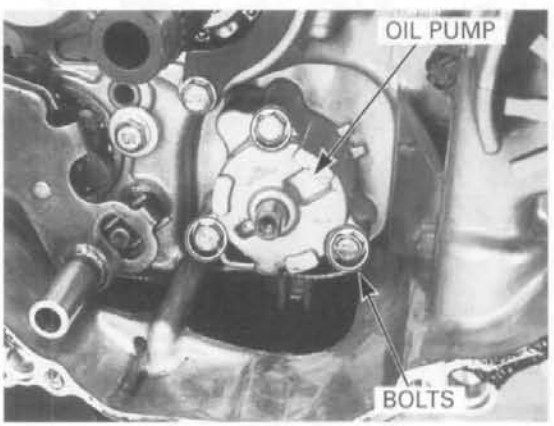
Install the oil pump onto the crankcase while aligning the pump shaft lug with the water pump shaft groove by turning the oil pump shaft.



Install and tighten the three flange bolts securely.

Install the clutch assembly (page 9-9)

After installation, fill the crankcase with the recommended oil and check that there are no oil leaks.
Check the oil pressure (page 4-3).



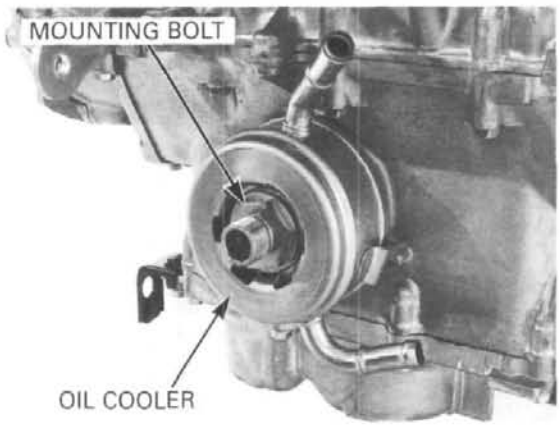
OIL COOLER

REMOVAL

Drain the engine oil and remove the oil filter cartridge (page 3-15).
Drain the coolant from the system (page 6-4).

Loosen the hose bands and disconnect the oil cooler water hoses from the cooler.

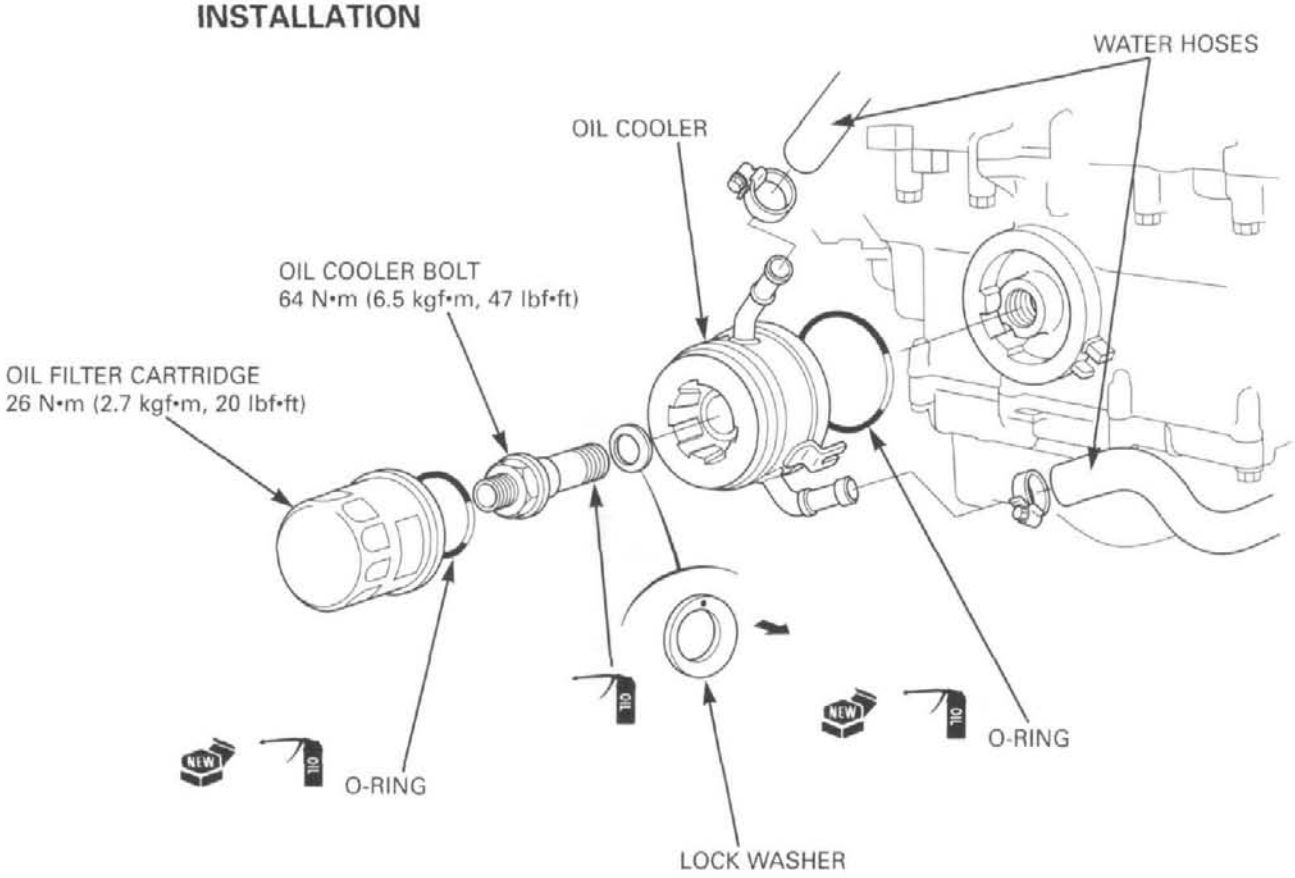
Remove the oil cooler bolt (filter boss), washer and oil cooler.
Remove the O-ring from the oil cooler.



INSPECTION

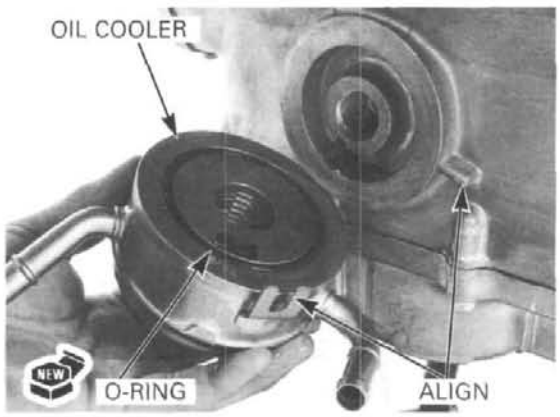
Check the oil cooler for damage.

INSTALLATION



Coat a new O-ring with engine oil and install it into the oil cooler groove.

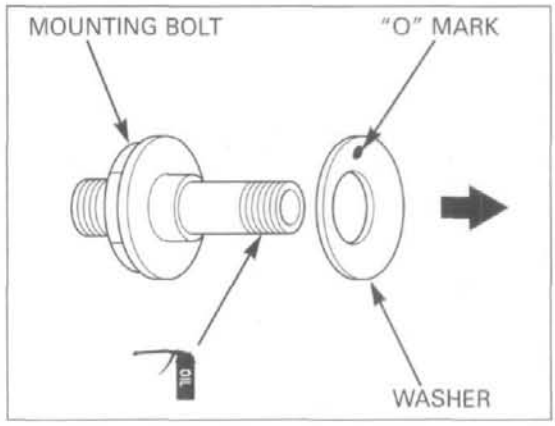
Install the oil cooler aligning its guide groove with the lug on the crankcase.



Apply oil to the oil cooler bolt threads and seating surface.

Install the lock washer with its concave side ("o" mark) facing the oil cooler.

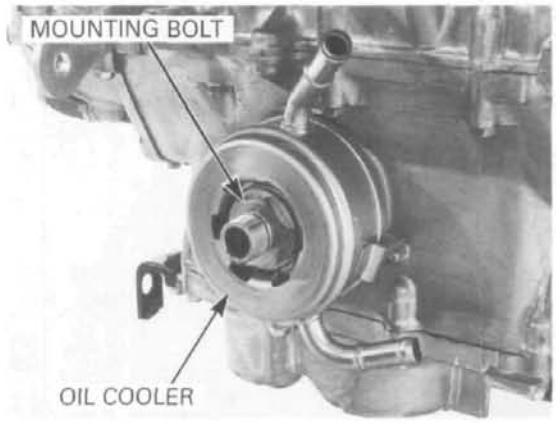
Install the lock washer and oil cooler bolt.



Make sure the oil cooler bolt collar slides inside the oil cooler.

Tighten the oil cooler bolt to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)



Connect the oil cooler water hoses and tighten the hose bands securely.

Install the oil filter cartridge and fill the crankcase with the recommended oil (page 3-14).
Fill the cooling system and bleed any air (page 6-4).