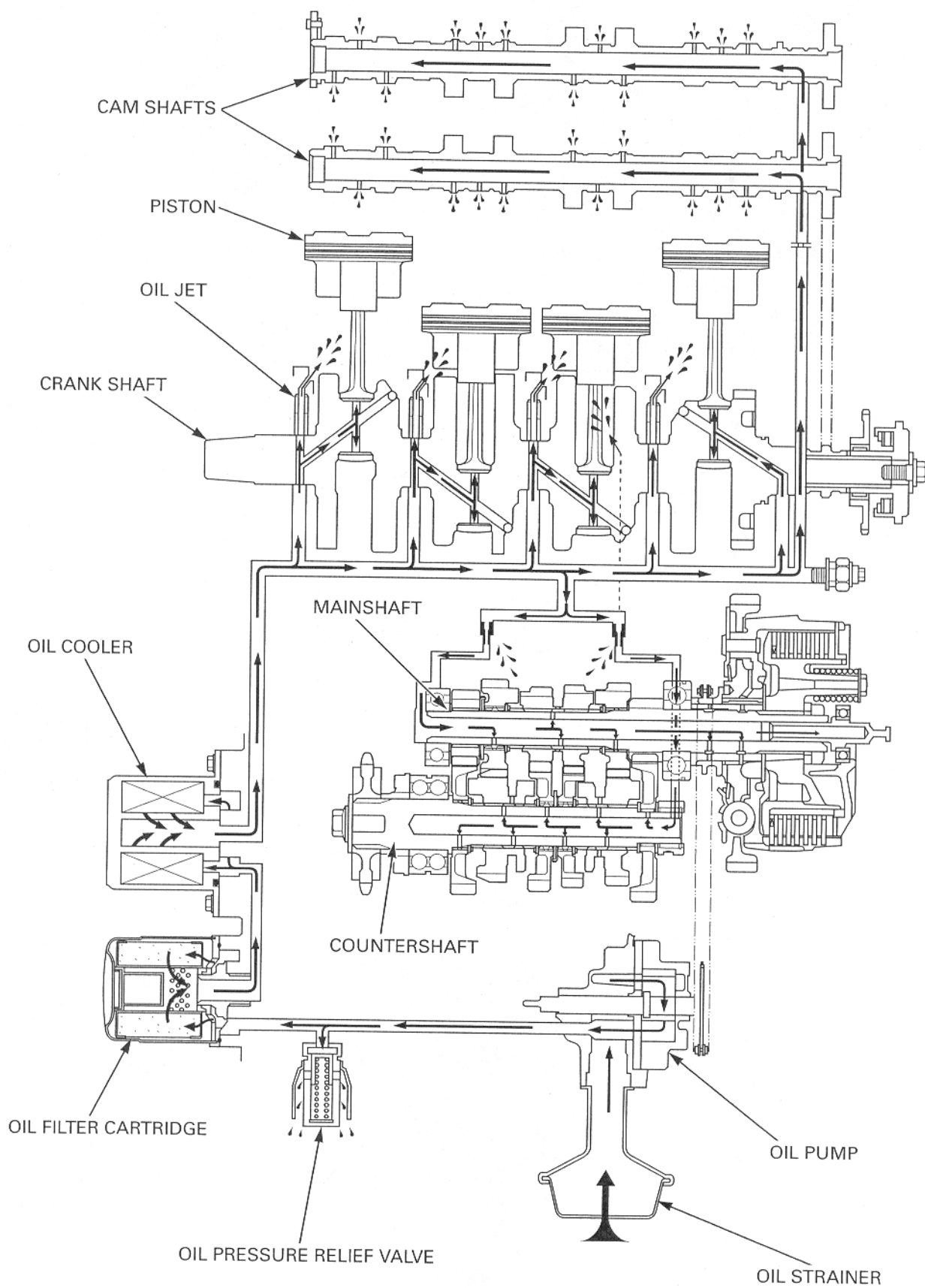


## 5. LUBRICATION SYSTEM

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# LUBRICATION SYSTEM DIAGRAM



## 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

ITEM		STANDARD	Unit: mm (in) SERVICE LIMIT
Engine oil capacity	After draining	2.6 liter (2.7 US qt, 2.3 Imp qt)	—
	After oil filter change	2.9 liter (3.1 US qt, 2.6 Imp qt)	—
	After disassembly	3.5 liter (3.7 US qt, 3.1 Imp qt)	—
Recommended engine oil		Pro Honda GN4 or HP4 (with out molybdenum additives) 4-stroke oil (U.S.A. & Canada) or Honda 4-stroke oil (Canada only), equivalent motorcycle oil API service classification SG, or higher except oils labeled as energy consening on the circular API service label JASO T 903 standard: MA Viscosity: SAE 10W – 40	—
Oil pressure at oil pressure switch		540 kPa (5.5 kgf/cm <sup>2</sup> , 78 psi) at 6,000 rpm/(80°C/176°F)	—
Oil pump	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.35 (0.014)
	Side clearance	0.04 – 0.09 (0.002 – 0.004)	0.17 (0.007)

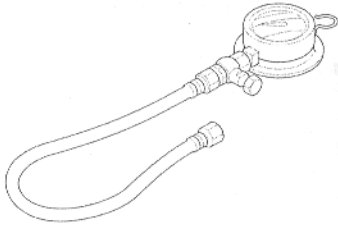
### TORQUE VALUES

Oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply sealant to the threads
Oil pressure switch wire terminal screw	2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Oil pump assembly flange bolt	7.8 N·m (0.8 kgf·m, 5.8 lbf·ft)	CT bolt
Engine oil filter cartridge	26 N·m (2.7 kgf·m, 20 lbf·ft)	Apply clean engine oil to the O-ring
Engine oil drain bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	
Oil pump driven sprocket bolt	15 N·m (1.5 kgf·m, 11 lbf·ft)	Apply a locking agent to the threads

## LUBRICATION SYSTEM

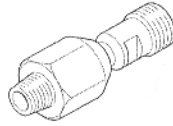
### TOOLS

Oil pressure gauge set  
07506-3000001



or equivalent commercially available in U.S.A.

Oil pressure gauge attachment  
07406-0030000



or equivalent commercially available in U.S.A.

## TROUBLE SHOOTING

### Oil level too low

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

### Low oil pressure

- Oil level low
- Clogged oil strainer
- 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, oil cooler 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.*

Remove the lower cowls (page 3-6).

Remove the screw and disconnect the oil pressure switch wire.

Remove the oil pressure switch while holding the switch base.

Install the oil pressure gauge attachment to the switch base.

Connect the oil pressure gauge to the oil pressure gauge attachment.

### TOOLS:

Oil pressure gauge set

07506-3000001 or equivalent commercially available in U.S.A.

Oil pressure gauge attachment

07406-0030000 or equivalent commercially available in U.S.A.

Check the oil level (page 4-15).

Warm the engine to normal operating temperature (approximately 80°C/176°F) and increase the engine speed to 6,000 min<sup>-1</sup> (rpm) and read the oil pressure.

### OIL PRESSURE:

**540 kPa (5.5 kgf/cm<sup>2</sup>, 78 psi) at 6,000 rpm/ (80°C/176°F)**

Stop the engine and remove the tools.

Apply a sealant to the oil pressure switch threads as shown.

Install and tighten the oil pressure switch to the specified torque while holding the switch base.

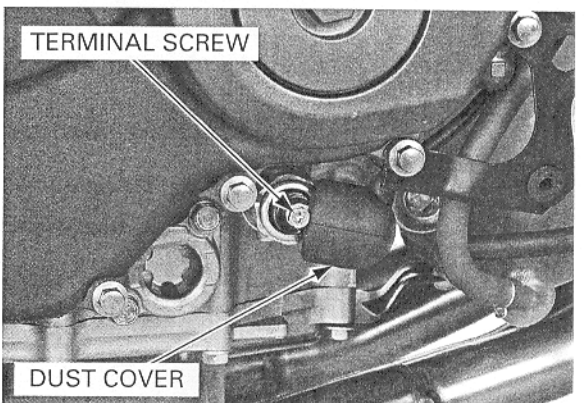
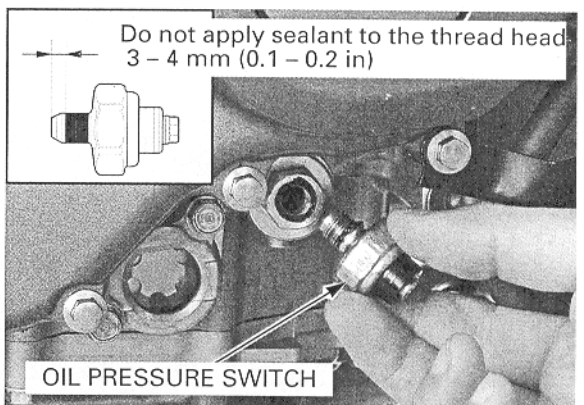
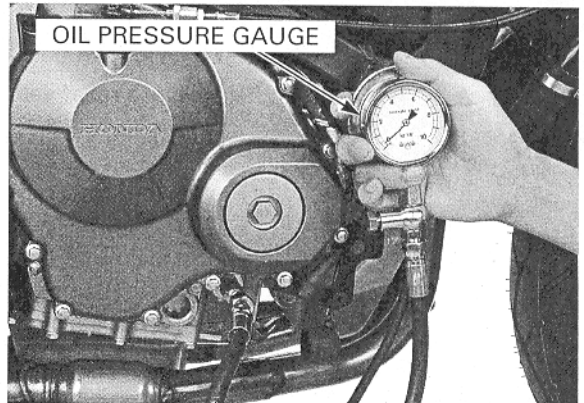
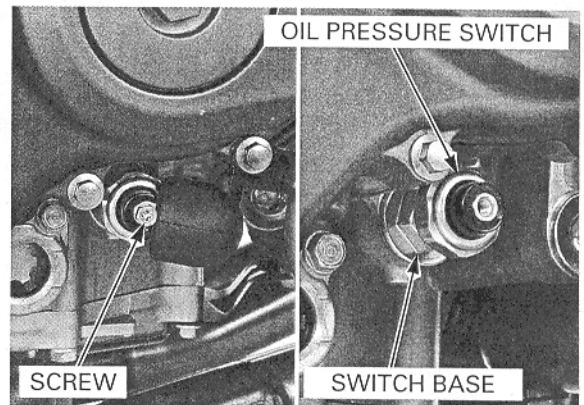
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Connect the oil pressure switch wire terminal to the switch and tighten the screw to the specified torque.

**TORQUE: 2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)**

Install the dust cover.

Install the lower cowls (page 3-6).



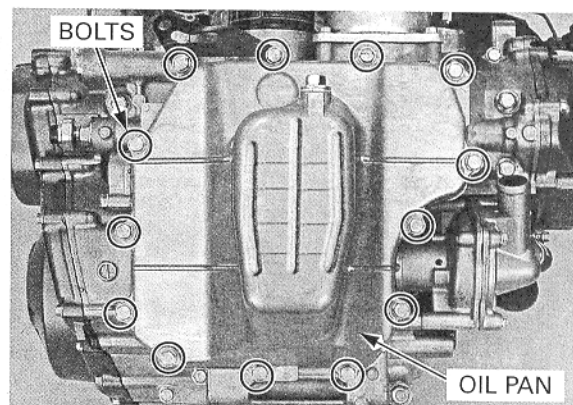
# OIL STRAINER/PRESSURE RELIEF VALVE

### REMOVAL

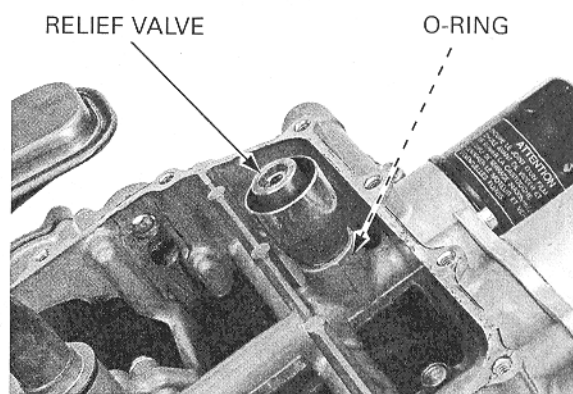
Drain the engine oil (page 4-16).

Remove the exhaust pipe (page 3-24).

Remove the oil pan flange bolts, stay and oil pan.

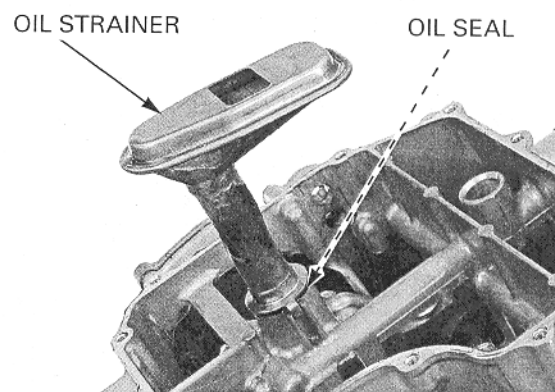


Remove the pressure relief valve and O-ring.



Remove the oil strainer and oil seal.

Clean the oil strainer screen.



### INSPECTION

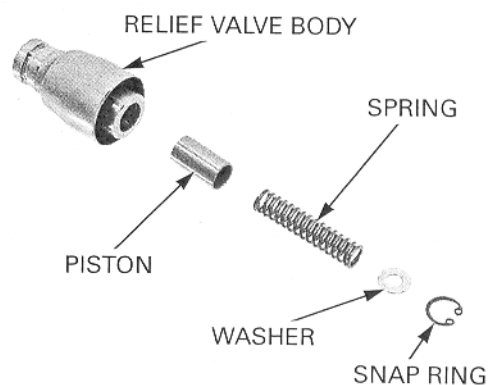
Check the operation of the pressure relief valve by pushing on the piston.

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.

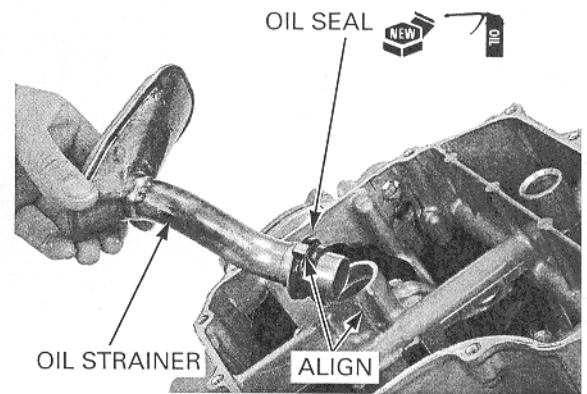
Assemble the relief valve in the reverse order of disassembly.



## INSTALLATION

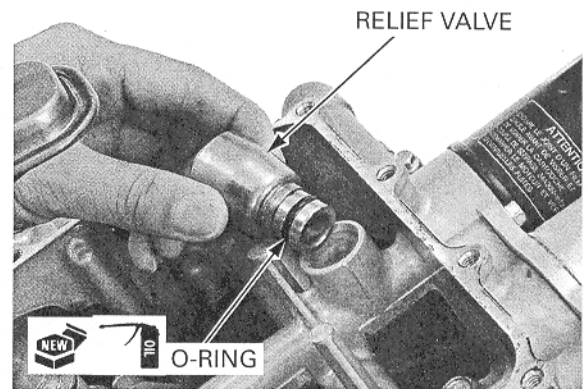
Apply oil to a new oil seal and install it onto the oil strainer.

Install the oil strainer into the crankcase while aligning the oil strainer boss with the groove of the crankcase.



Apply oil to a new O-ring and install it onto the relief valve.

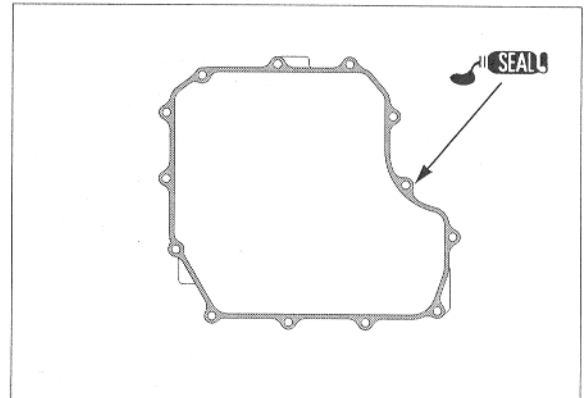
Install the relief valve into the crankcase.



Clean the oil pan mating surface thoroughly.

*Do not apply more sealant than necessary.*

Apply sealant (Three Bond 1207B or an equivalent) to the mating surface.

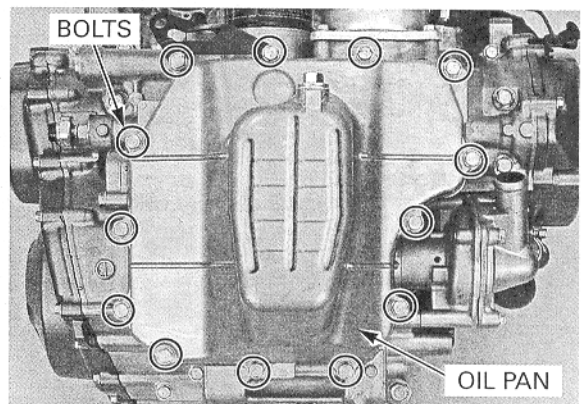


Install the oil pan onto the lower crankcase.  
Install the oil pan flange bolts and stay.  
Tighten the bolts in a crisscross pattern in two or three steps.

Install the exhaust pipe (page 3-26).

Fill the crankcase with the recommended oil (page 4-16).

After installation, check that there are no oil leaks.



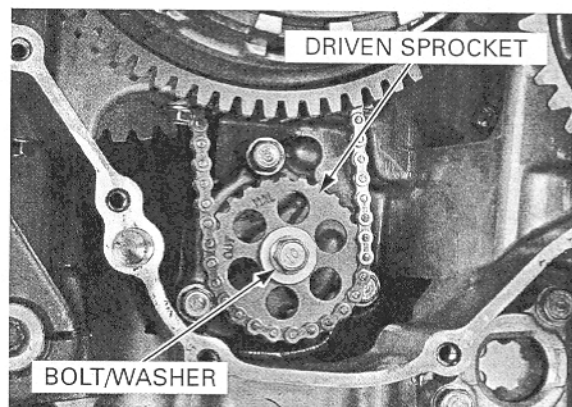
### OIL PUMP

#### REMOVAL

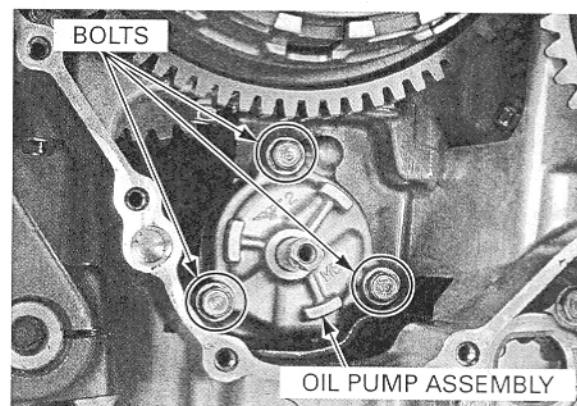
Drain the engine oil (page 4-16).

Remove the right crankcase cover (page 10-5).

Remove the bolt, washer and oil pump driven sprocket.



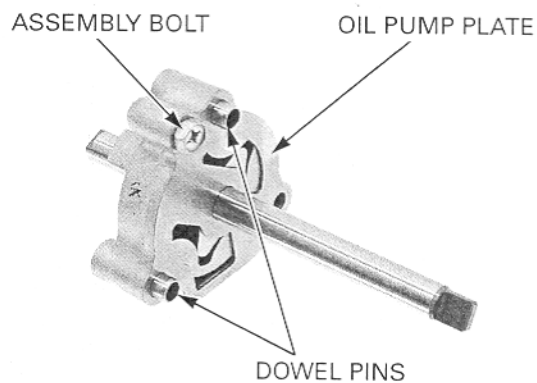
Remove the three flange bolts and oil pump assembly.



#### DISASSEMBLY

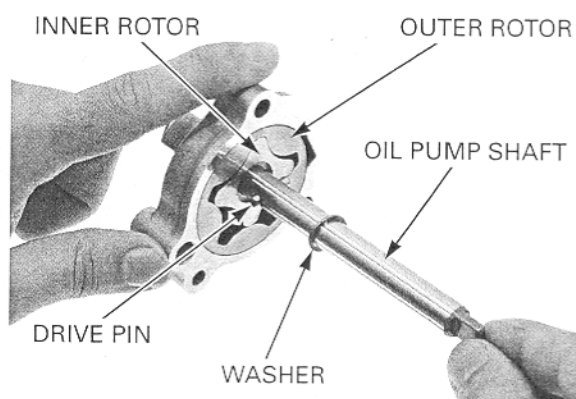
Remove the dowel pins.

Remove the oil pump assembly bolt and oil pump plate.



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

Clean all disassembly parts thoroughly.





## INSPECTION

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

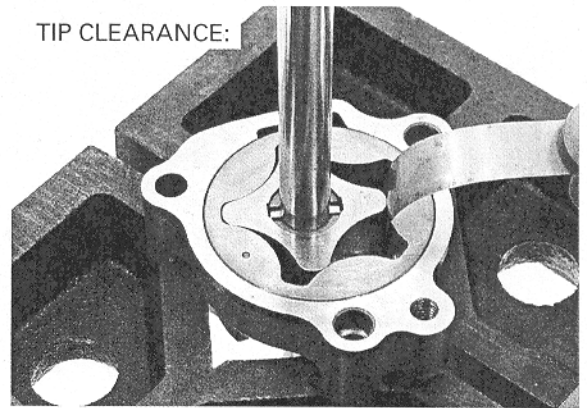
Temporarily install the outer and inner rotors into the oil pump body.

Temporarily install the drive pin and oil pump shaft.

Measure the rotor tip clearance.

**SERVICE LIMIT: 0.20 mm (0.008 in)**

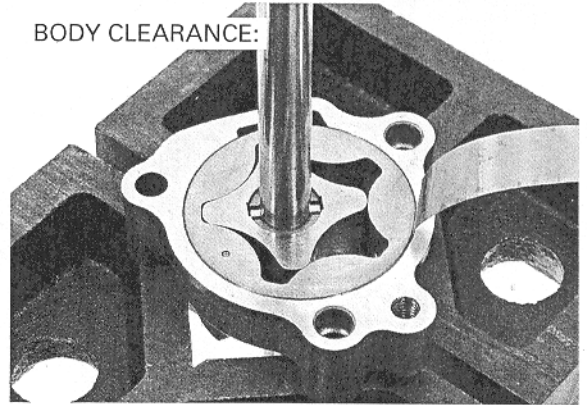
TIP CLEARANCE:



Measure the pump body clearance.

**SERVICE LIMIT: 0.35 mm (0.014 in)**

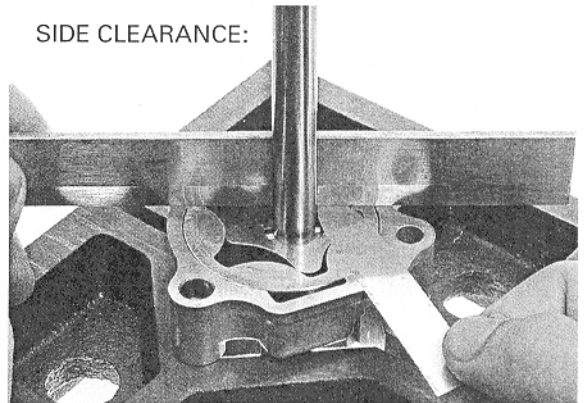
BODY CLEARANCE:



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

**SERVICE LIMIT: 0.17 mm (0.007 in)**

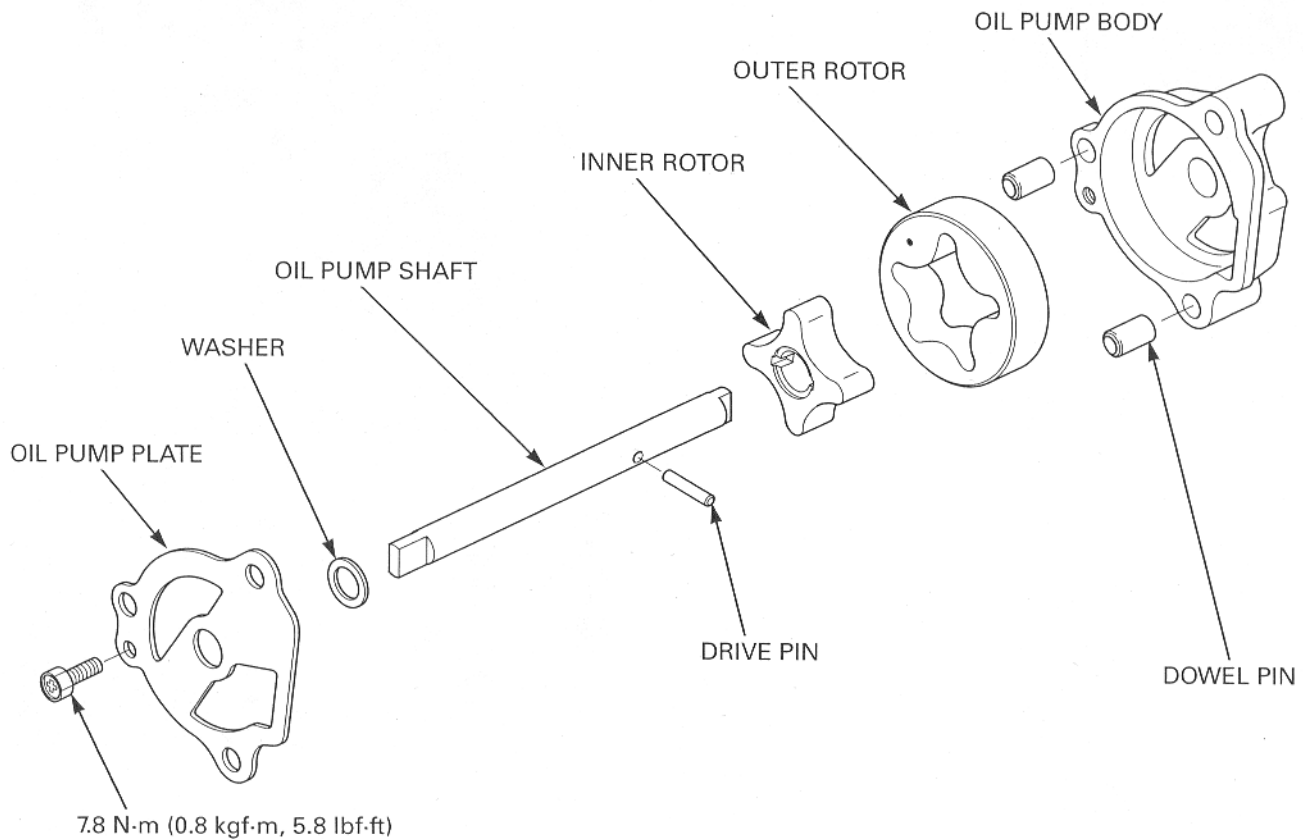
SIDE CLEARANCE:



## LUBRICATION SYSTEM

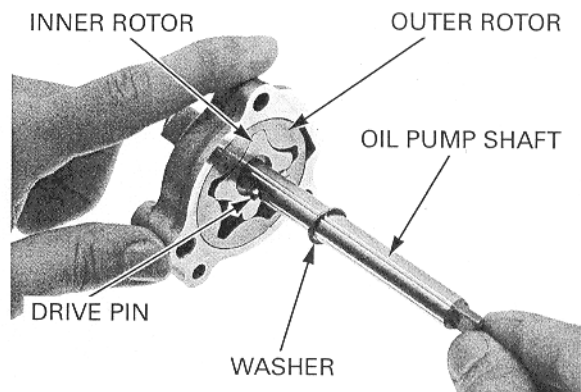
### ASSEMBLY

Dip all parts in clean engine oil.



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

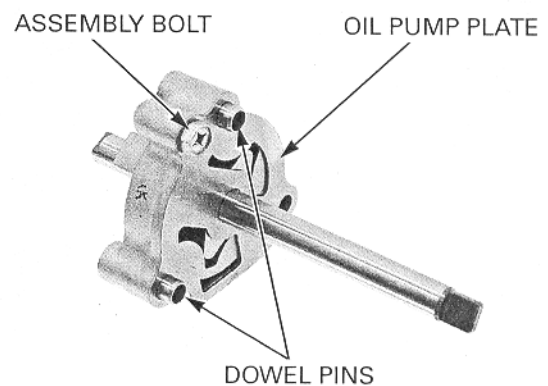
Install the drive pin into the hole in the oil pump shaft and align the drive pin with the groove in the inner rotor.  
Install the thrust washer.



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

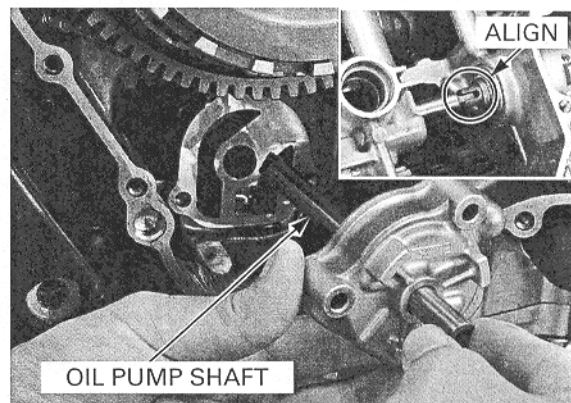
**TORQUE: 7.8 N·m (0.8 kgf·m, 5.8 lbf·ft)**

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

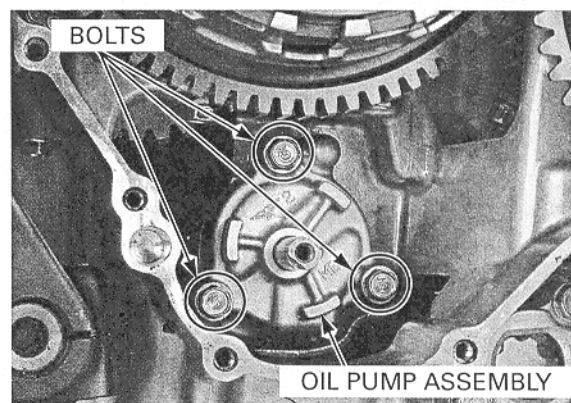


## INSTALLATION

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

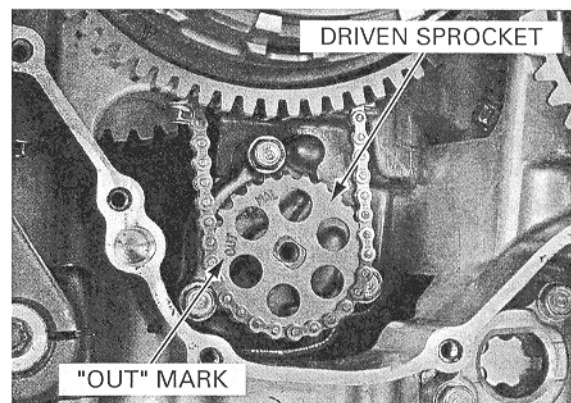


Install and tighten the three flange bolts securely.



Apply oil to the oil pump driven sprocket and drive chain

Install the driven sprocket with its "OUT" mark facing out.



Apply a locking agent to the oil pump driven sprocket bolt threads.

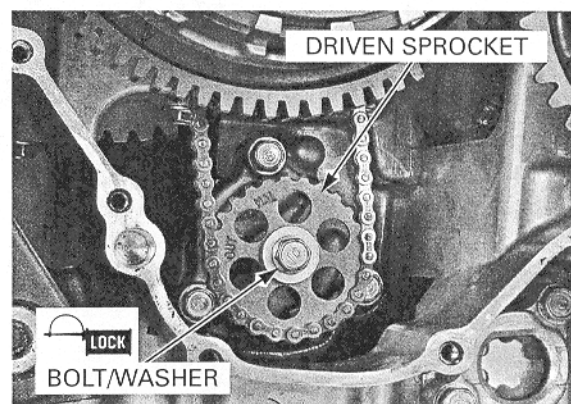
Install and tighten the driven sprocket bolt/washer to the specified torque.

**TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)**

Install the right crankcase cover (page 10-24).

After installation, fill the crankcase with the recommended oil (page 4-16) and check that there is no oil leaks.

Check the oil pressure (page 5-5).



### OIL COOLER

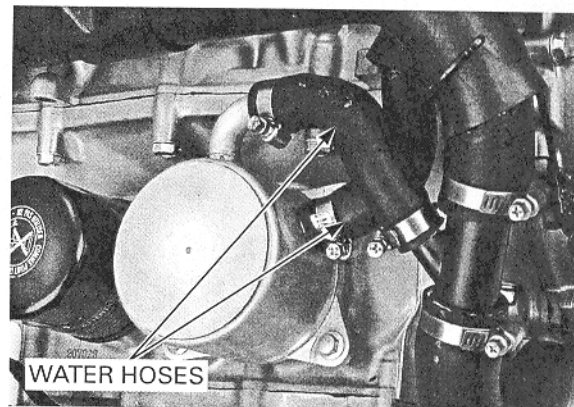
#### REMOVAL

Drain the engine oil (page 4-16).

Drain the coolant from the system (page 7-6).

Remove the exhaust pipe (page 3-24).

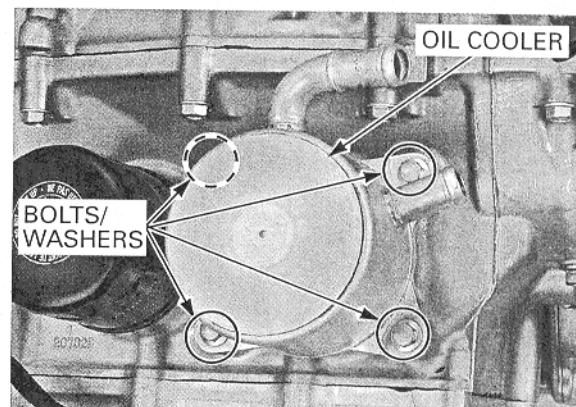
Loosen the hose clamp screws and disconnect the oil cooler water hoses from the oil cooler.



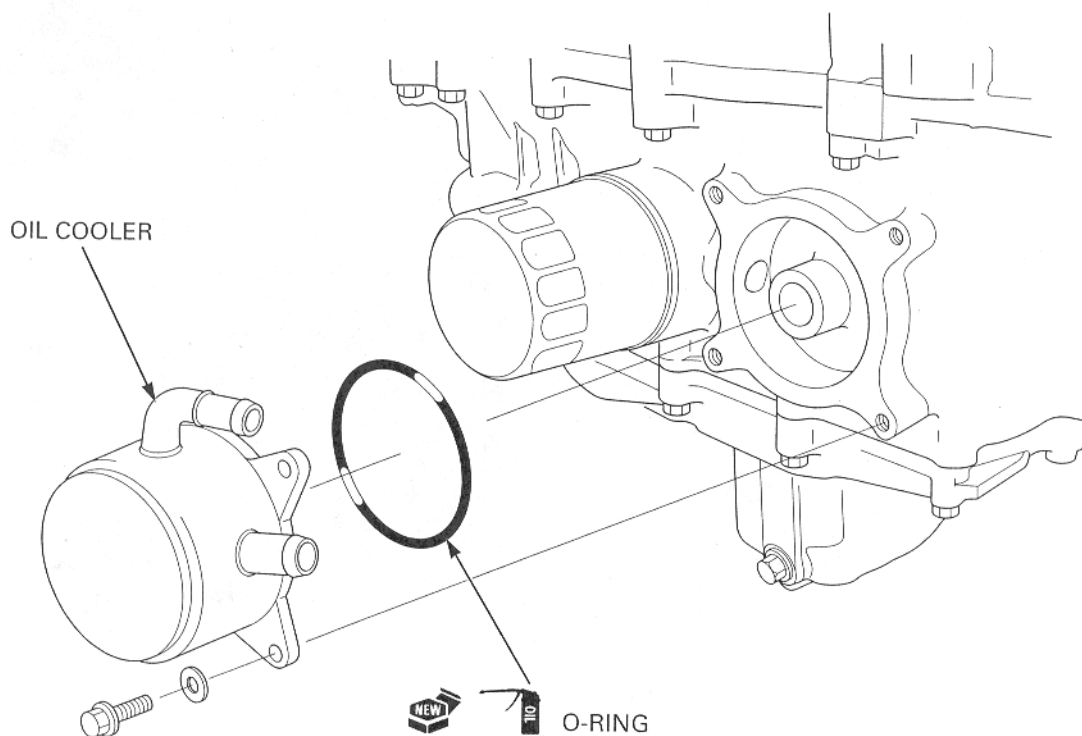
Remove the four bolts, washers and oil cooler.  
Remove the O-ring from the oil cooler.

#### INSPECTION

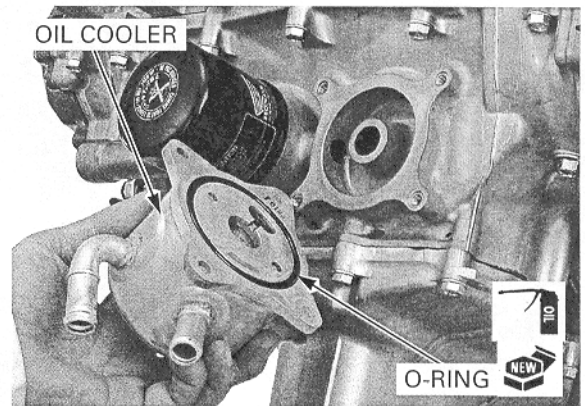
Check the oil cooler for damage.



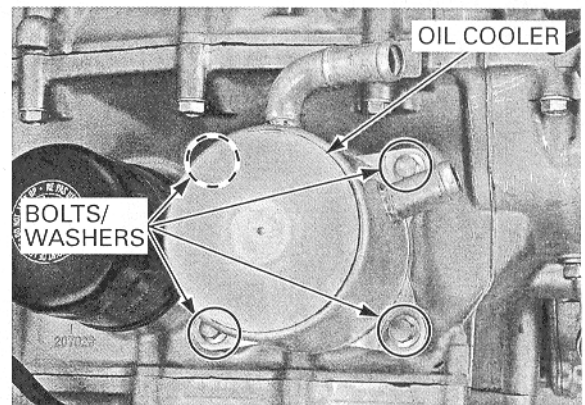
#### INSTALLATION



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



Install the oil cooler on the crankcase.  
Install the four washers and bolts.  
Tighten the bolts securely.



Connect the oil cooler water hoses into the oil cooler and tighten the hose clamp screws securely.

Install the exhaust pipe (page 3-26).

Fill the crankcase with the recommended oil (page 4-16) and check that there is no oil leaks.  
Fill the cooling system and bleed any air (page 7-6).

