

4. LUBRICATION SYSTEM

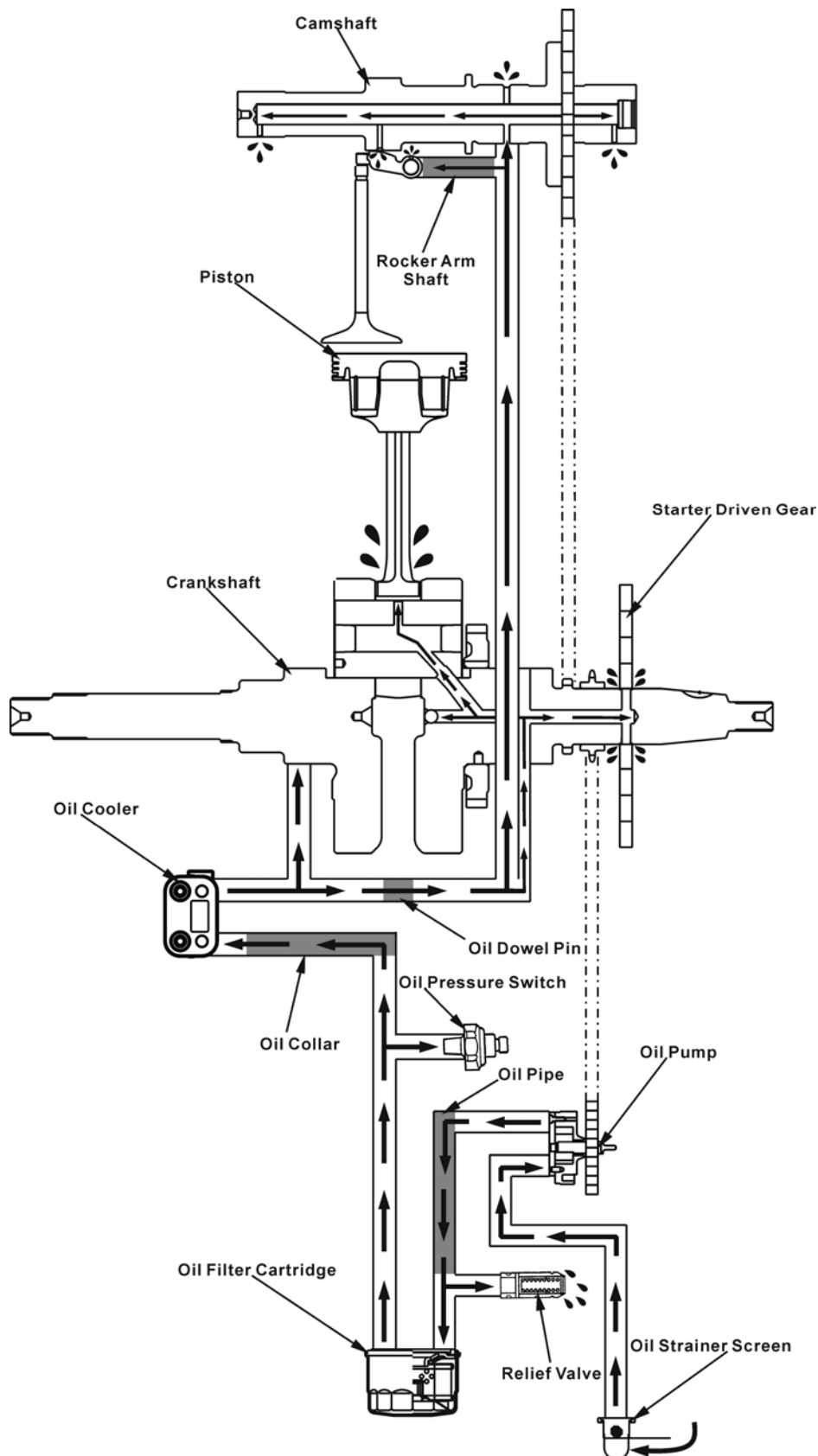
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LUBRICATION SYSTEM

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LUBRICATION SYSTEM DIAGRAM



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SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The oil pump service may be done with the engine installed in the frame.
- 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 engine has been installed check that there are no oil leaks and that oil pressure is correct.
- For oil pressure indicator inspection, refer to section 20 of this manual.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	2.0 liter (2.1 US qt, 1.8 Imp qt)	—
	At disassembly	2.5 liter (2.7 US qt, 2.2 Imp qt)	—
	At oil filter change	2.1 liter (2.2 US qt, 1.9 Imp qt)	—
Recommended engine oil		KYMCO 4-stroke oil or equivalent motor oil API service classification SJ Viscosity: SAE 5W-50	—
Oil pump rotor	Tip clearance	0.15 (0.006) max	0.2 (0.008)
	Body clearance	0.15 – 0.2 (0.006 – 0.008)	0.25 (0.01)
	Side clearance	0.04 – 0.09 (0.0016 – 0.0036)	0.12 (0.0048)

TORQUE VALUES

Oil pump screw	3 N•m (0.3kgf•m, 2 lbf•ft)	
Oil cooler bolt	35 N•m (3.5 kgf•m, 25 lbf•ft)	
Oil pressure switch	22 N•m (2.2 kgf•m, 16 lbf•ft)	Apply sealant to threads.
Oil strainer screen cap	15 N•m (1.5 kgf•m, 11 lbf•ft)	
Oil filter cartridge	Apply oil to the threads and seating surface.	
	10 N•m (1 kgf•m, 7 lbf•ft)	Apply oil to the threads and seating surface.

TOOLS

Oil filter wrench	E052
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TROUBLESHOOTING

Oil level low

- Oil consumption
- External oil leak
- Worn piston ring
- Incorrect piston ring installation
- Worn valve guide or seal

Oil contamination (White appearance)

- From coolant mixing with oil
 - Faulty water pump mechanical seal
 - Faulty head gasket
 - Water leak in crankcase

No oil pressure

- Oil level too low
- Oil pump drive chain broken
- Oil pump drive sprocket broken
- Oil pump damaged (pump shaft)
- Internal oil leak

Low oil pressure

- Pressure relief valve stuck open
- Clogged oil filter and strainer screen
- Oil pump worn or damaged
- Internal oil leak
- Incorrect oil being used
- Oil level too low

High oil pressure

- Pressure relief valve stuck closed
- Plugged oil filter, gallery, or metering orifice
- Faulty oil pump

Seized engine

- No or low oil pressure
- Clogged oil orifice/passage
- Internal oil leak
- Non-recommended oil used

Oil contamination

- Deteriorated oil
- Faulty oil filter
- Worn piston ring (White appearance with water or moisture)
 - Damaged water pump mechanical seal
 - Damaged head gasket
 - Oil relief not frequent enough

Oil pressure warning indicator does not work

- Faulty oil pressure switch
- Short circuit in the indicator wire
- Low or no oil pressure

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OIL PRESSURE SWITCH

CHECK

Start the engine.

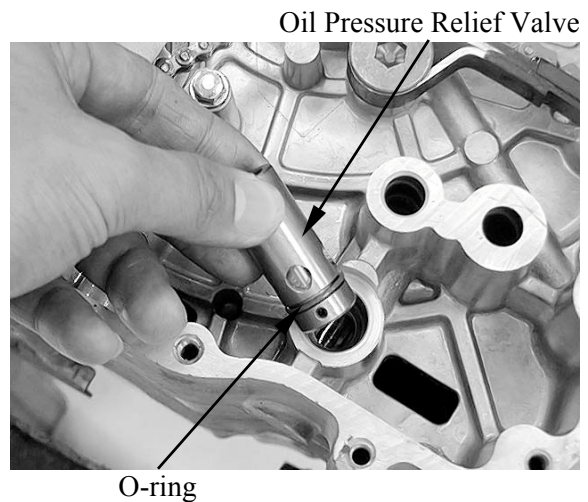
Check the oil pressure indicator goes out after one or two seconds. If the oil pressure indicator stay on, stop the engine immediately and determine the cause (section 20).



OIL PRESSURE RELIEF VALVE REMOVAL

Remove the right crankcase cover (page 12-3).

Remove the pressure relief valve and O-ring from the right crankcase

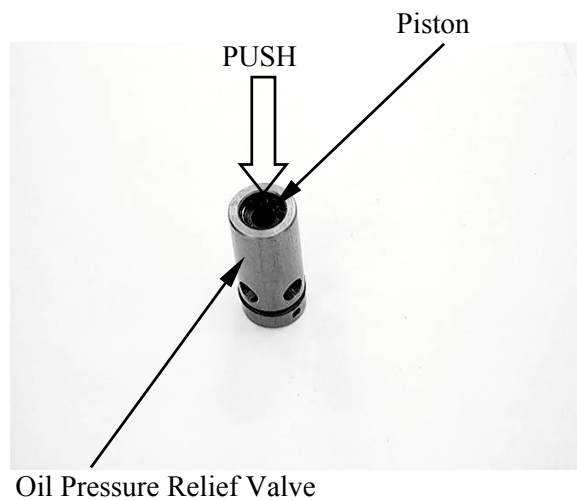


INSPECTION

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

INSTALLATION

Apply oil to a new O-ring and install the pressure relief valve groove, and install the relief valve to the right crankcase.



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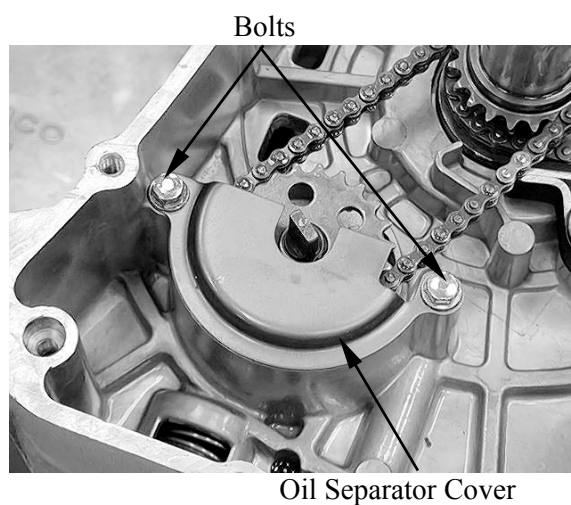
OIL PUMP

REMOVAL

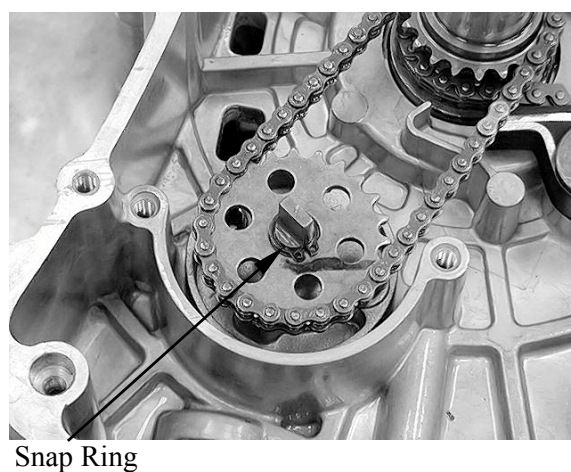
Remove the flywheel (page 12-4).

Remove the attaching bolt and oil separator cover.

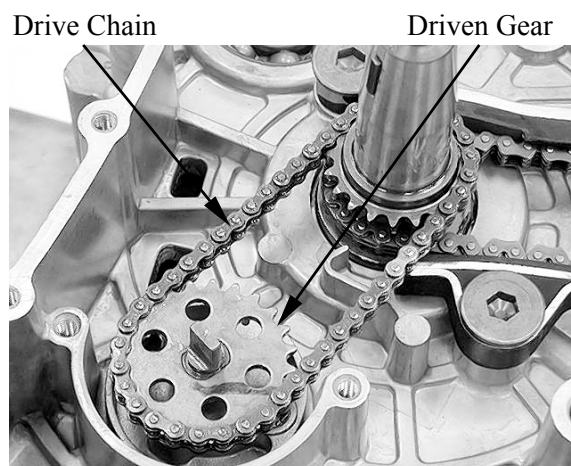
* When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine..



Remove snap ring.

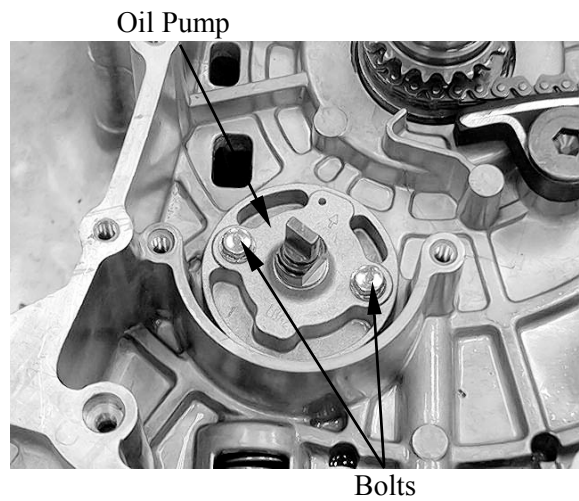


Remove the oil pump driven gear, then remove the oil pump drive chain.



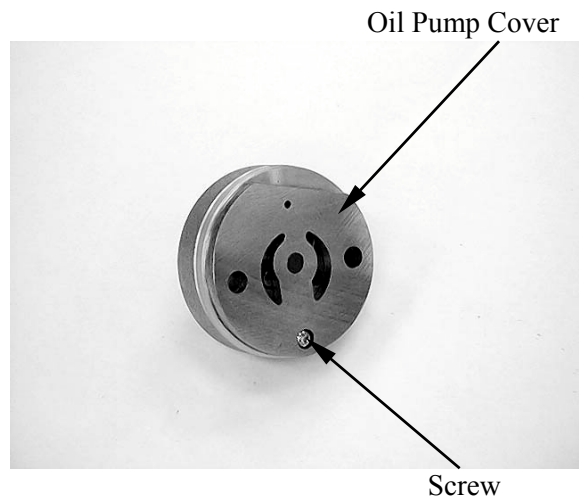
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Remove the two oil pump bolts to remove the oil pump.

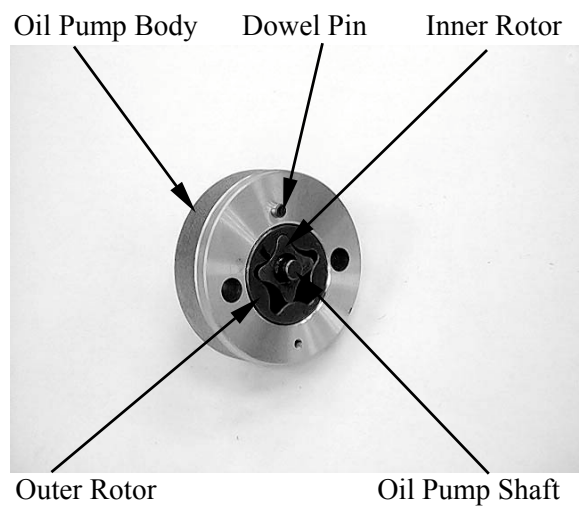


DISASSEMBLY

Remove the screw and oil pump cover.



Remove the dowel pin, oil pump shaft, oil pump outer rotor and inner rotor.



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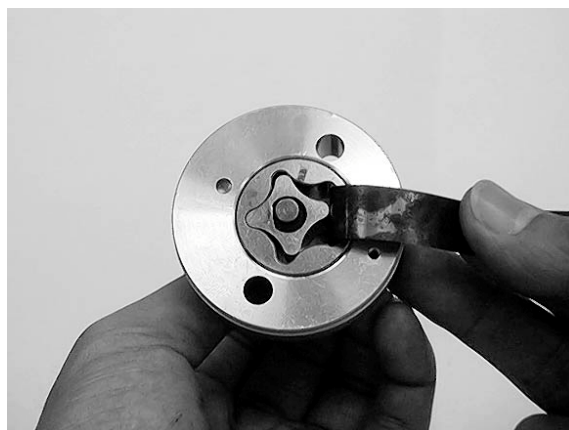
INSPECTION

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

Measure the tip clearance.

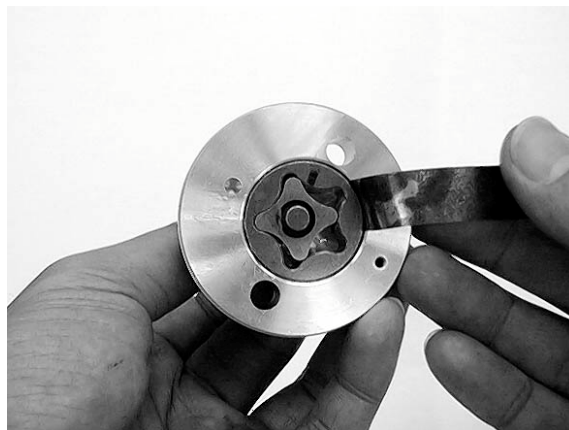
Service limit: 0.2 mm (0.008 in)

★ Measure at several points and use the largest reading to compare the service limit.



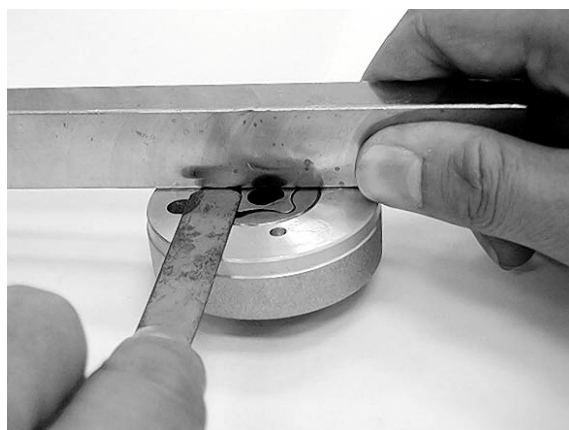
Measure the pump body clearance.

Service limit: 0.25 mm (0.01 in)



Measure the side clearance with the straight edge and feeler gauge.

Service limit: 0.12 mm (0.0048 in)



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ASSEMBLY

Dip all parts in clean engine oil.

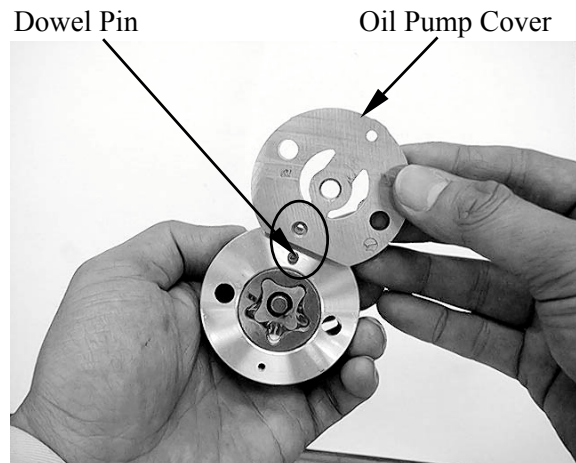
Install the outer rotor into the oil pump body.

Install the inner rotor into the outer rotor.

Install the oil pump shaft.

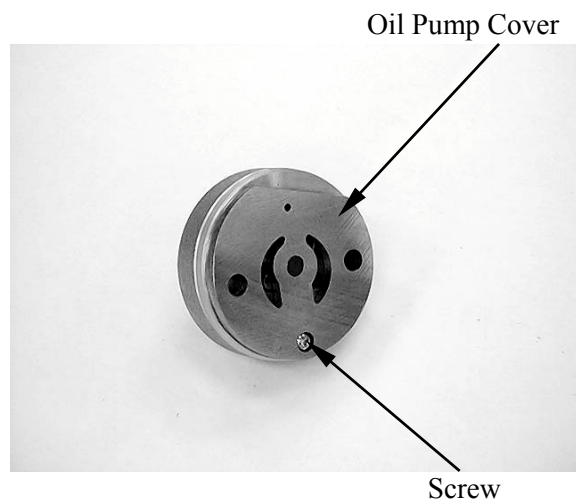
Install the dowel pin onto the oil pump body.

Install the oil pump cover onto the oil pump body by aligning the dowel pin.



Install and tighten the screw to the specified torque.

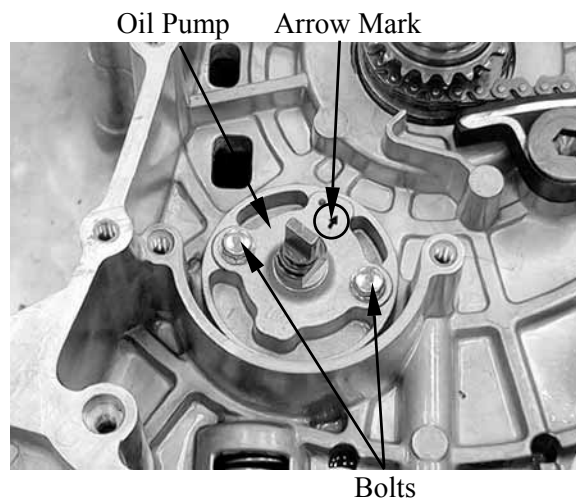
Torqur: 3 N•m (0.3kgf•m, 2 lbf•ft)



INSTALLATION

Install the oil pump and tighten the two bolts securely.

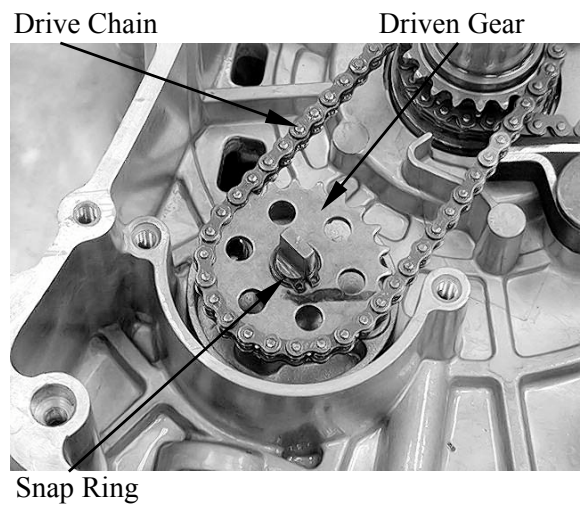
- * Make sure the pump shaft rotates freely and arrow on the oil pump is upside.



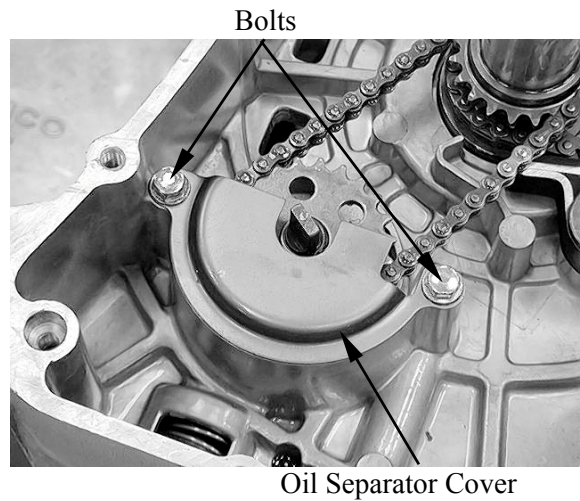
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Install the oil pump driven sprocket and drive chain.

Install the snap ring.



Install the oil separator cover properly and tighten two bolts securely as shown.



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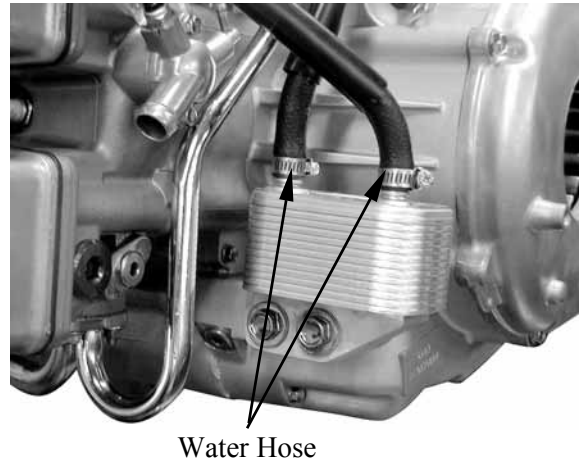
OIL COOLER

REMOVAL

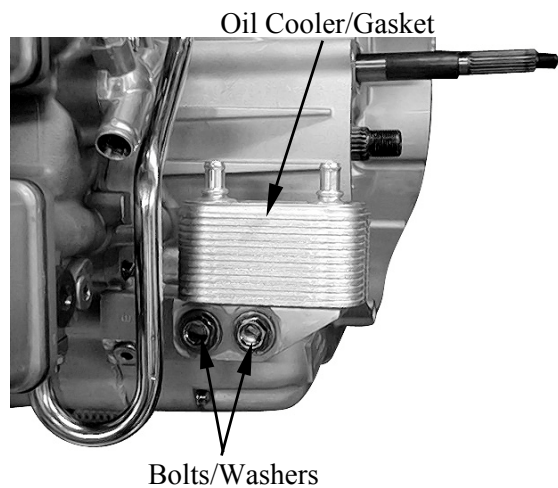
Drain the engine oil and remove the oil filter cartridge (page 3-13).

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

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

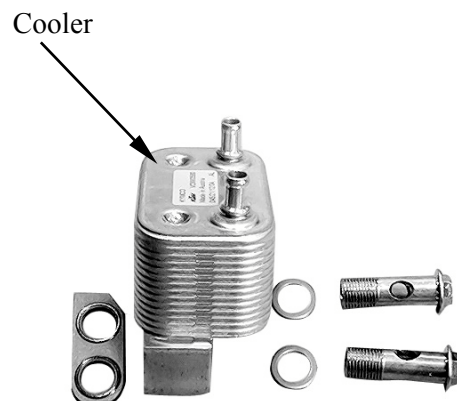


Remove the oil cooler mounting bolts, washers, oil cooler and gasket.



INSPECTION

Check the cooler for damage.



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INSTALLATION

Install the gasket and oil cooler.
Install the washers and tighten the oil cooler bolts to the specified torque.

Torque: 35 N•m (3.5 kgf•m, 25 lbf•ft)

Connect the oil cooler water hoses, tighten the hose band securely.

Install the oil filter cartridge and fill the crankcase with recommended engine oil (page 3-11).

Fill the cooling system and bleed air (page 6-6).

