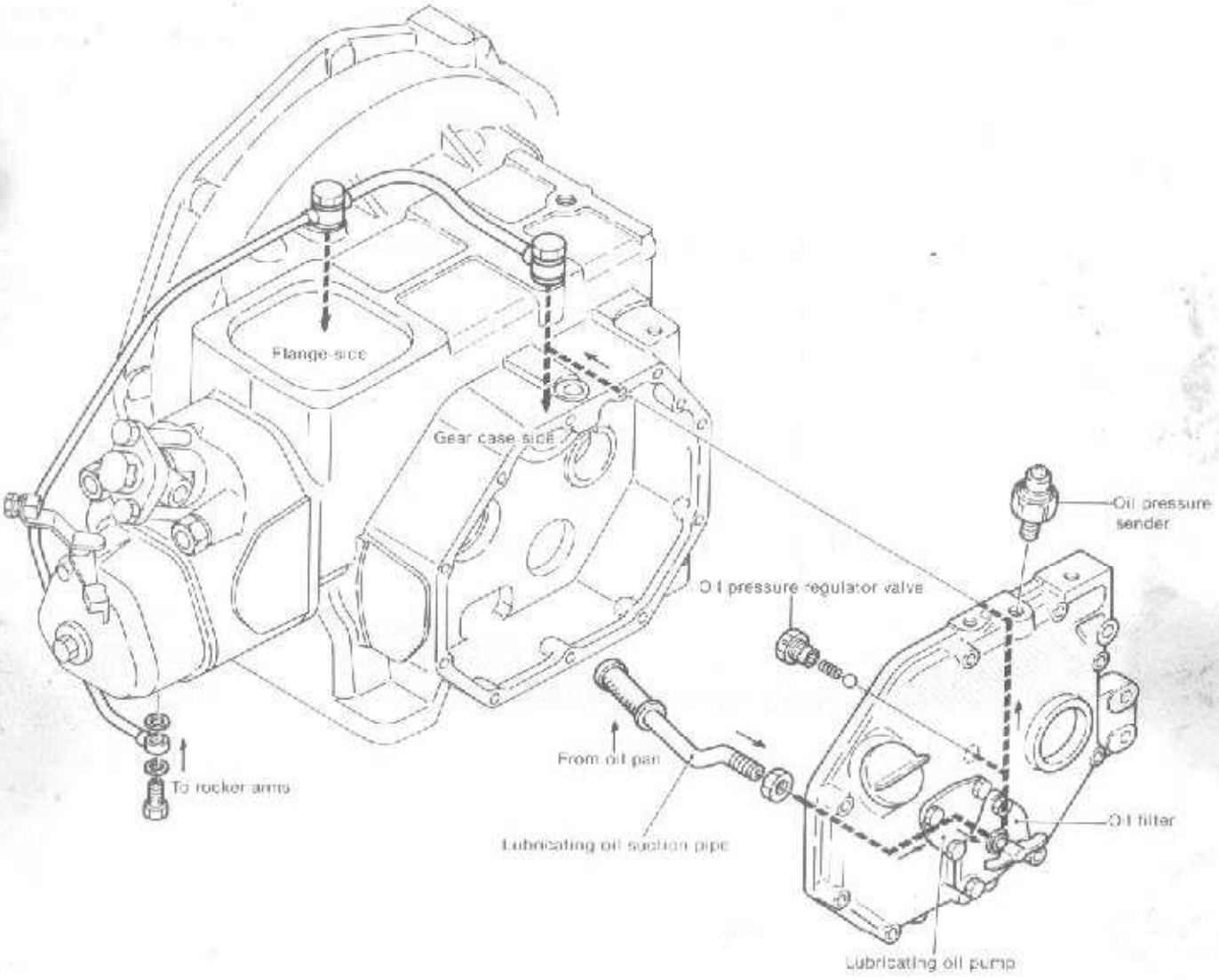
CHAPTER 6

LUBRICATION SYSTEM

1. Lubrication System

Engine parts are lubricated by a trochoid pump forced lubrication system. To keep the engine exterior uncluttered and to eliminate vibration damage to piping, exterior piping has been minimized by transporting the lubricating oil through passages drilled in the cylinder and cylinder head.



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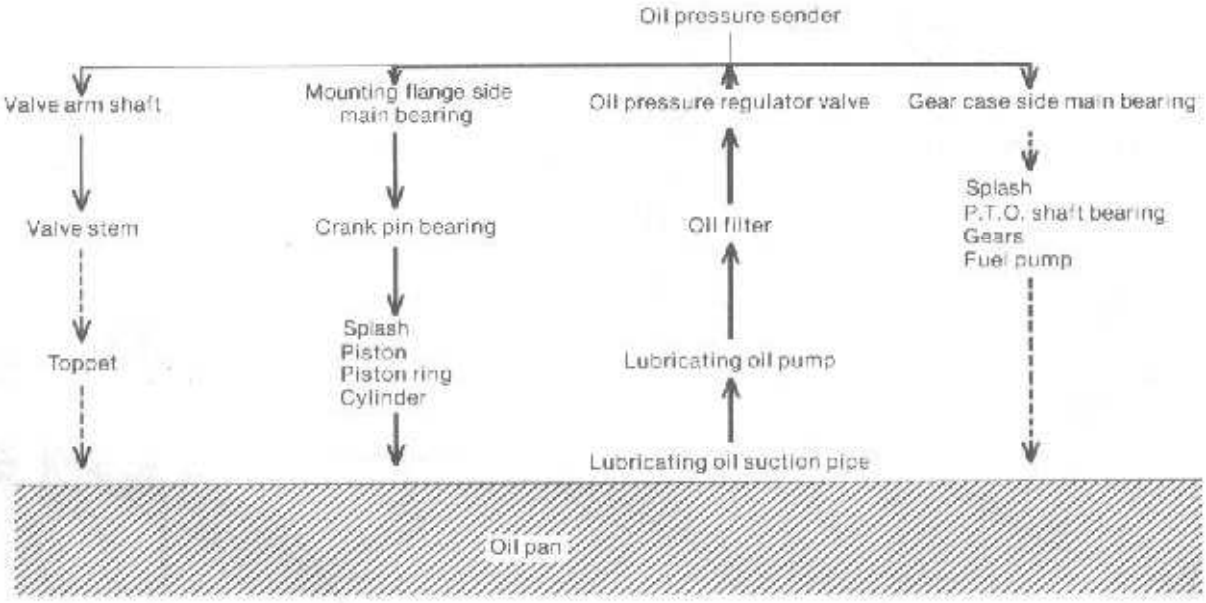
The lubricating oil is drawn back up through the lubricating oil suction pipe by the trochoid pump and fed to the oil filter, where impurities are filtered out. Then it is adjusted to the prescribed pressure by the oil pressure regulating valve.
One portion of the lubricating oil under regulated pressure is sent to the gear-side main bearing through the holes drilled in the cylinder side cover and the cylinder body. The other portion is sent to the mounting side main bearing and rocker arm through the lubricating oil pipe.
The lubricating oil, after lubricating the gear-side main bearing, splash-lubricates the PTO shaft bearing metal and various other gears.
The lubricating oil which is sent to the main bearing on the mounting flange side goes through the crankshaft and lubricates the crankpin bearing metal. It then splash-lubricates the piston, cylinder and piston pin.
From the rocker arm shaft, the lubricating oil flows through the small hole in the rocker arm to lubricate the push rods and part of the valve head.
The oil that has dropped to the push rod chamber from the rocker arm chamber lubricates the tappets, cam and cam bearing, and returns to the oil pan.
Moreover, an oil pressure switch is provided in the lubricating system to monitor normal circulation and pressure of the lubricating oil. When the lubricating oil pressure drops 0.1 kg/cm² (1.428 lb/in.²), the oil pressure switch illuminates the oil pressure lamp on the instrument panel to notify the operator.

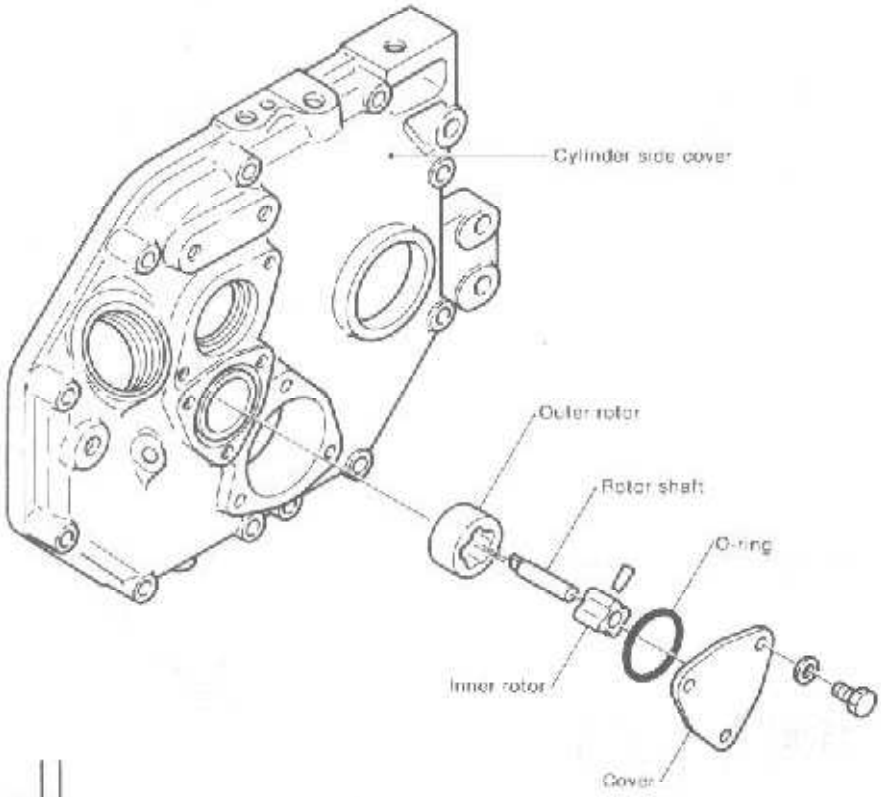


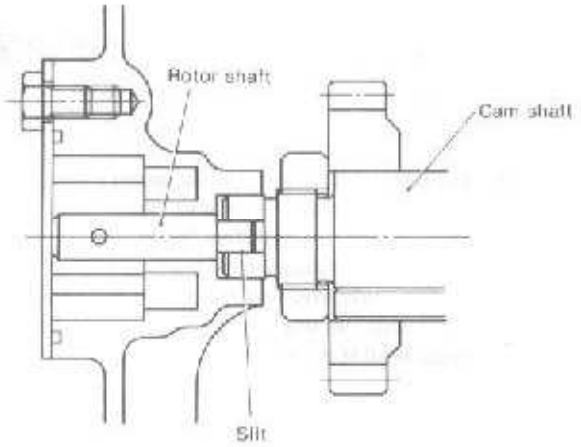
2. Oil Pump

2-1 Construction

The oil pump is a compact, low pressure variation trochoid pump comprising a trochoid curve inner rotor and outer rotor. Pumping pressure is provided by the change in volume between the two rotors caused by rotation of the rotor shaft.

The oil pump is installed on the cylinder side cover and is driven by a rotor shaft fitted to the slit in the end of the camshaft.





2-2 Specifications

	YSM8	YSM12
Lubricating oil feed volume	200 *l*/hr (at 3200 rpm)	220 *l*/hr (at 3000 rpm)
Lubricating oil pressure	2.5 kg/cm² ~ 3.5 kg/cm² (35.56 ~ 49.78 lb/in.²)	

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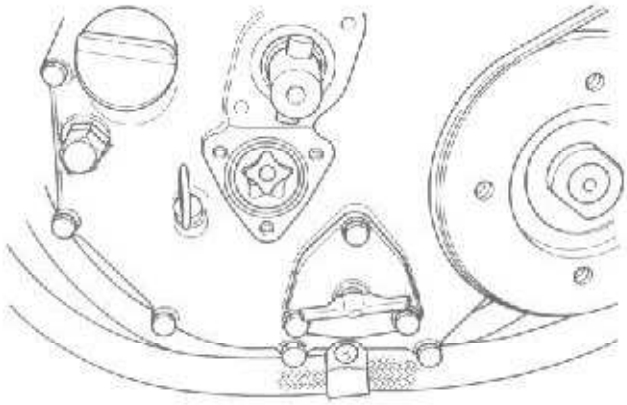
2-3 Inspection

When the discharge pressure of the oil pump is extremely low, check the oil level. If it is within the prescribed range, the oil pump must be inspected.

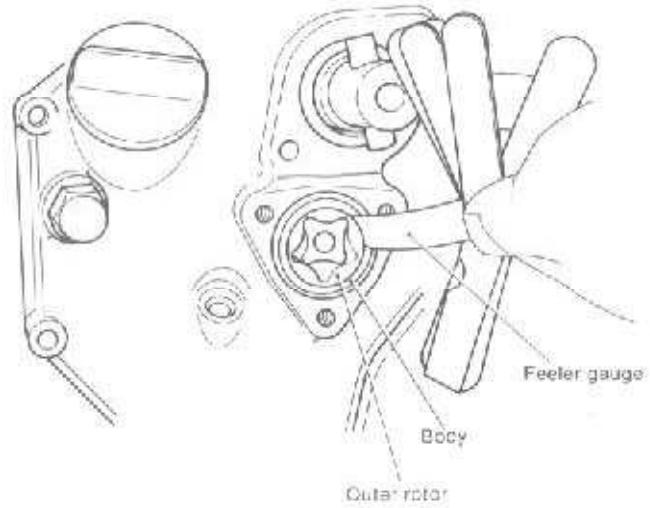


Lubricating oil pump

The lubricating oil pump is constructed integrally with the cylinder side cover and can be checked easily by removing its lid.

(1) Outer rotor and pump body clearance

Measure the clearance by inserting a feeler gauge between the outside of the outer rotor and the pump body casing. If the clearance exceeds the wear limit, replace the outer rotor and pump body as a set.

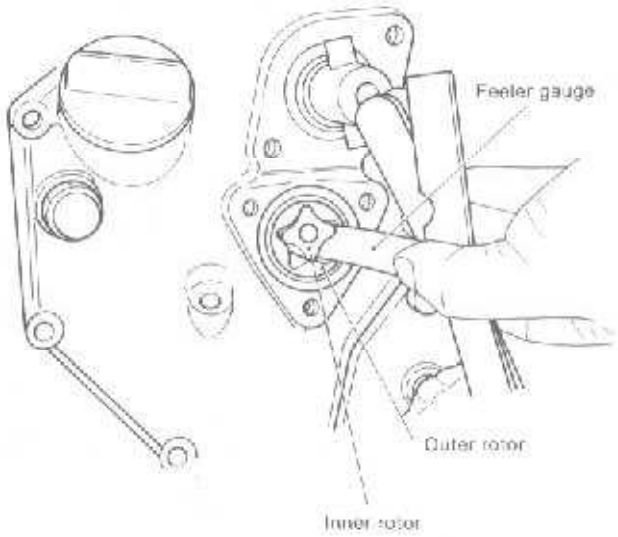


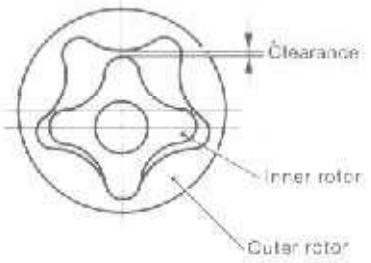
mm (in.)

Maintenance standard	0.050 ~ 0.105 (0.00197 ~ 0.00413)
Wear limit	0.15 (0.0059)

(2) Outer rotor and inner rotor clearance

Fit one of the teeth of the inner rotor to one of the grooves of the outer rotor and measure the clearance at the point where the teeth of both rotors are aligned. Replace the inner rotor and outer rotor ass'y if the wear limit is exceeded.





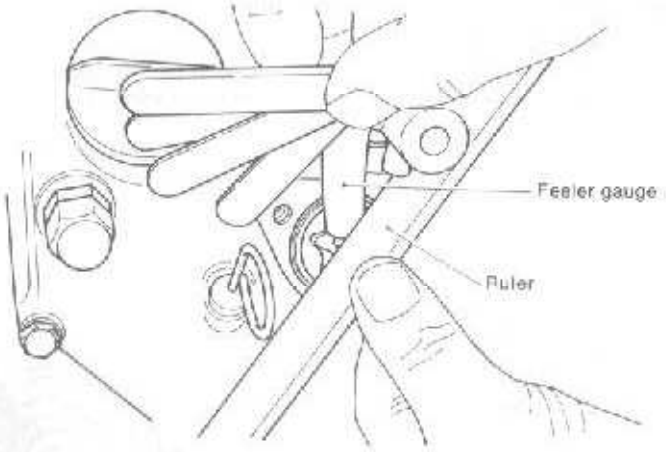
mm (in.)

Maintenance standard	0.050 ~ 0.105 (0.00197 ~ 0.00413)
Wear limit	0.15 (0.0059)

(3) Pump body and inner rotor, outer rotor side clearance

Install the inner rotor and outer rotor into the pump body casing so that they fit snugly.

Check the clearance by placing a ruler against the end of the body and inserting a feeler gauge between the ruler and the end of the rotor. Replace as a set if the wear limit is exceeded.

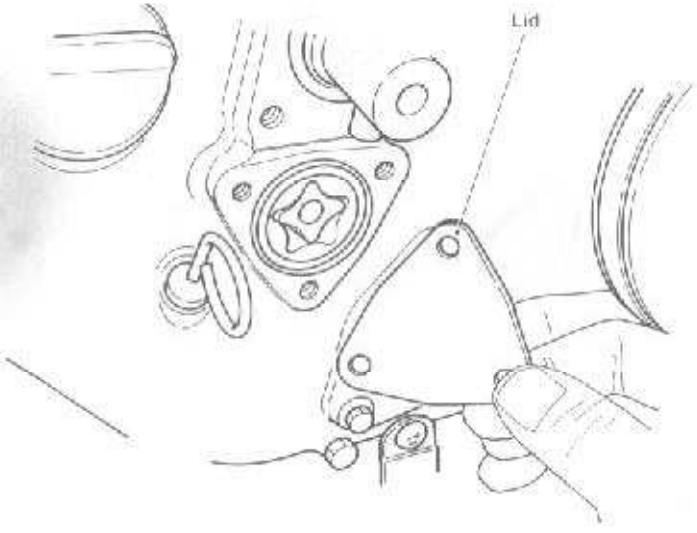


mm (in.)

Maintenance standard	0.06 ~ 0.10 (0.00236 ~ 0.00393)
Wear limit	0.13 (0.00511)

(4) Flatness of lubricating oil pump lid surface

Check the lubricating oil pump lid surface for flatness. If it is bent, replace the lid.



(5) Rotor shaft and body clearance

Measure the outside diameter of the rotor shaft and the inside diameter of the body shaft hole, and replace the rotor shaft and body as an ass'y if the clearance exceeds the wear limit.

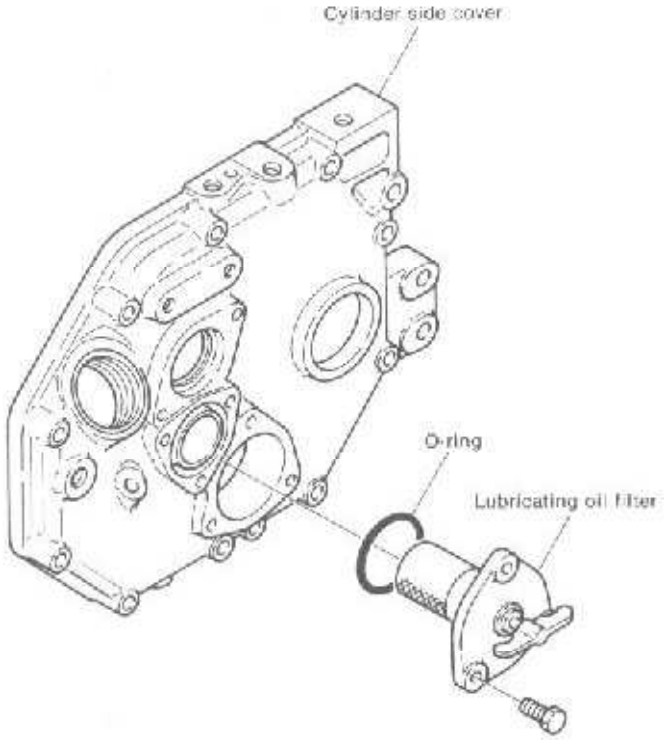
mm (in.)

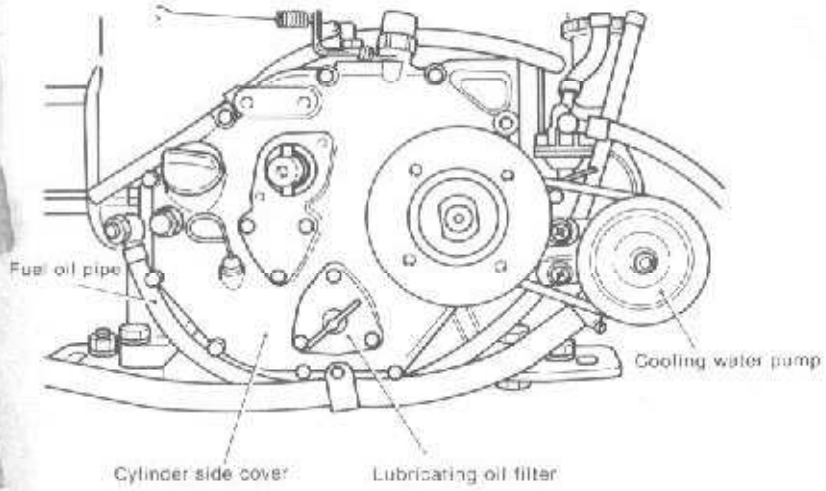
	Maintenance standard	Clearance when assembled	Maximum allowable clearance
Rotor shaft outside diameter	$29\ ^{-0.020}_{-0.040}$ (1.14016 ~ 1.14094)	0.12 ~ 0.161 (0.0047 ~ 0.0063)	0.35 (0.0138)
Rotor shaft hole inside diameter	$29.1\ ^{+0.021}_{0}$ (1.14566 ~ 1.14649)		

3. Oil Filter

3-1 Construction of lubricating oil filter

The lubricating oil filter is the auto-clean type, which features high efficiency and ease of maintenance. The lubricating oil from the periphery of the element is filtered through the 150-mesh openings and is sent from the center to the various parts through the hole in the gearcase.





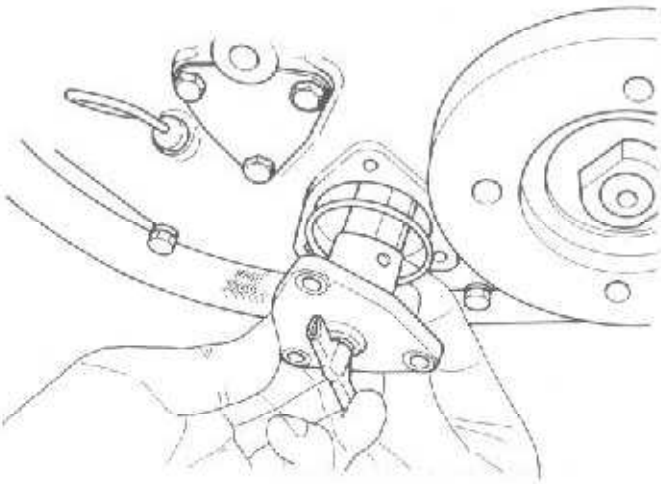
3-2 Specifications for lubricating oil filter

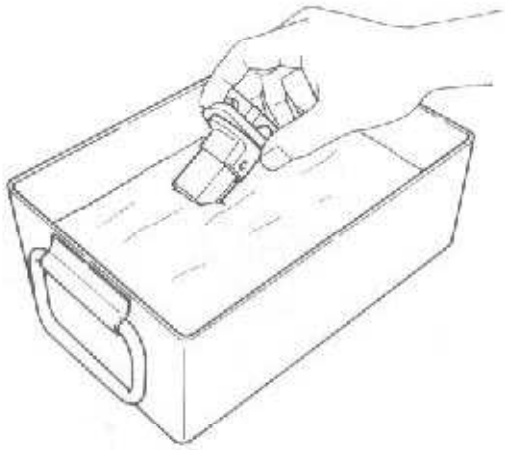
Filtering opening	150 meshes
Filtering capacity	300 l/H

3-3 Checking the lubricating oil filter

(1) Cleaning the lubricating oil filter
Since the filter element can be cleaned simply by turning the handle, make sure it is turned periodically.

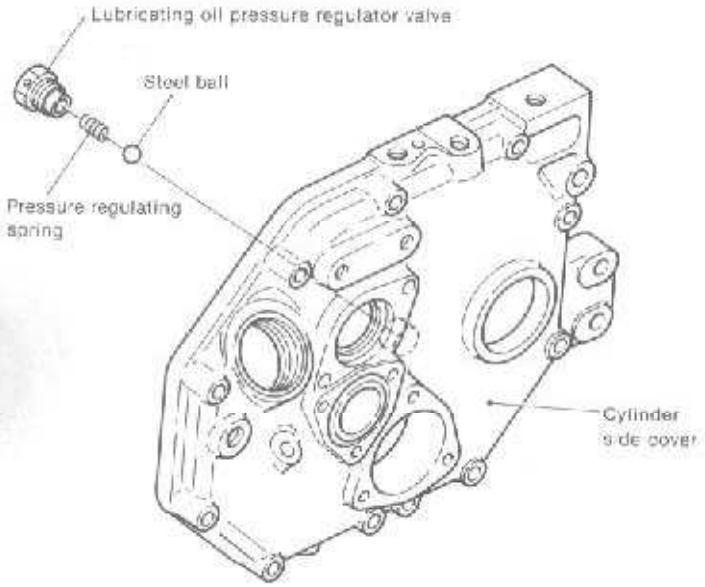
(2) Rinsing the lubricating oil filter
Periodically remove the filter and rinse its element in a clean cleansing oil while turning the handle.

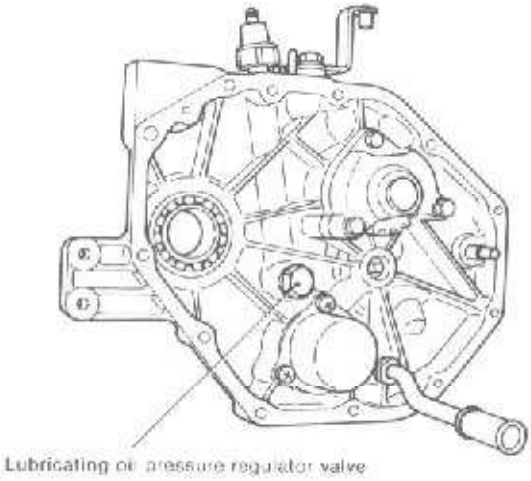


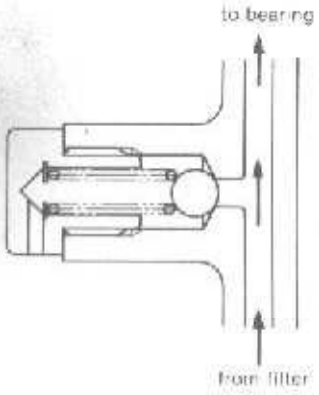


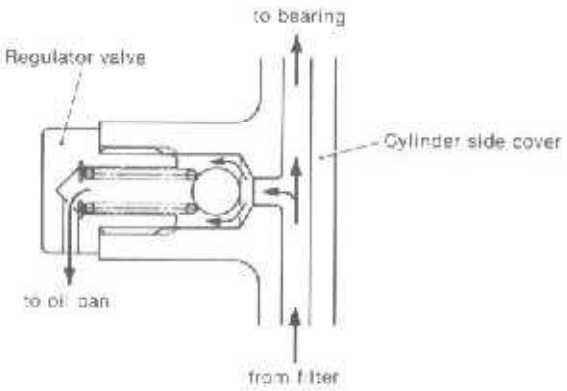
4. Oil Pressure Regulator Valve

4-1 Construction









The lubricating oil pressure regulator valve is installed between the drilled holes for connecting the oil filter to the bearing inside the cylinder side cover. It adjusts the oil pressure to a specified value during engine operation. If the pressure of the oil sent from the oil filter is greater than the spring force, the steel ball is pushed out of the valve seat through the gap thus produced and sends the oil toward the oil pan.

Standard Pressure	2.5 ~ 3.5 kg/cm² (35.56 ~ 49.78 lb/in²)

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