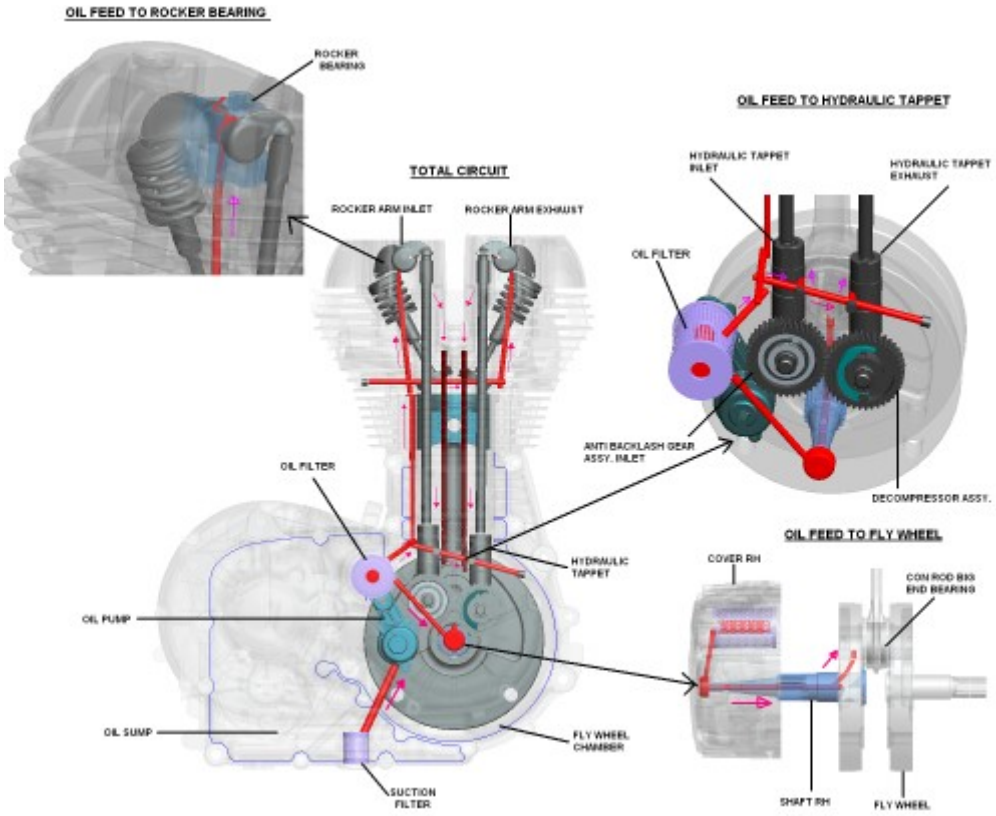
LUBRICATION SYSTEM



UPPER CYLINDER LUBRICATION

INLET SYSTEM

A. ROCKER ARM BEARING SET
B. PUSH ROD TIP
C. VAVLE STEM TIP

EXHAUST SYSTEM

A. ROCKER ARM BEARING SET
B. PUSH ROD TIP
C. VAVLE STEM TIP

CYLINDER HEAD
CYLINDER BARREL
CRANK CASE ORIFICE JET
HYDRALIC VALVE LIFTER INLET AND EXHAUST
CRANK CASE RH GALLERY

LOWER CYLINDER LUBRICATION

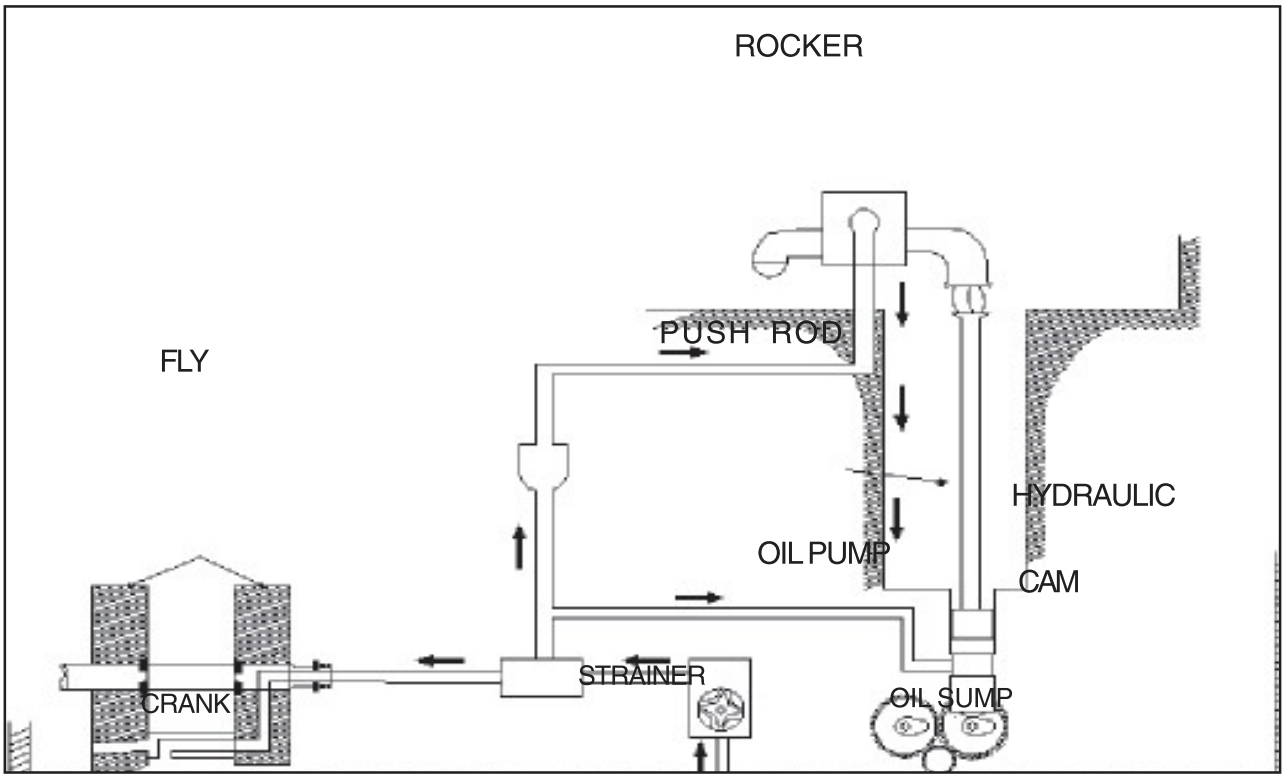
PISTON SKIRT, SMALL END, PISTON PIN & CYLINDER BARREL
CONNECTING ROD I CHANNEL
BIG END BEARING & PIN
CRANK SHAFT RH
JET CRANK SHAFT RH
CRANK CASE RH COVER GALLERY
OIL FILTER PAPER ELEMENT

ENGINE OIL SUMP

* OIL PUMP

OIL SUCTION FILTER

LUBRICATION SYSTEM



LUBRICATION SYSTEM :

Oil from the oil tank is circulated to various parts through a powerful oil pump, the capacity of which is 4.5 litres per minute @ 2750 rpm. The oil in the sump gets filtered through an oill strainer located in the crankcase and then pumped into the oil filter element located in the RH Cover. From here oil is circulated to 3 main areas. The first branch goes to flywheel to lubricate crank shaft as well as barrel piston assembly. The second branch goes to hydraulic tappet to maintain the oil pressure constantly. The third branch goes to rocker assembly and drains down to RH cover chamber through the push rod tunnel.

LUBRICATION OIL :

- ☆ Specification: MOTUL 3000 4T PLUS 15W50 API, JASO MA SL - GRADE ESTER-Semi Synthetic
- ☆ Oil capacity: 2.75 ℓ - Initial oil filling: through Oil filler Cap = 2.5 ℓ, through Crankcse LH Cover: 0.25 ℓ

Oil pump : TROCHOID TYPE

Trichoidal high flow oil pump delivers oil with a pressure of 4.5 Bar. This provides good lubrication to all the moving parts and enhances the life of the moving parts in the engine.

HYDRAULIC TAPPETS (ROLLER HYDRAULIC VALVE LIFTER (RHVL)

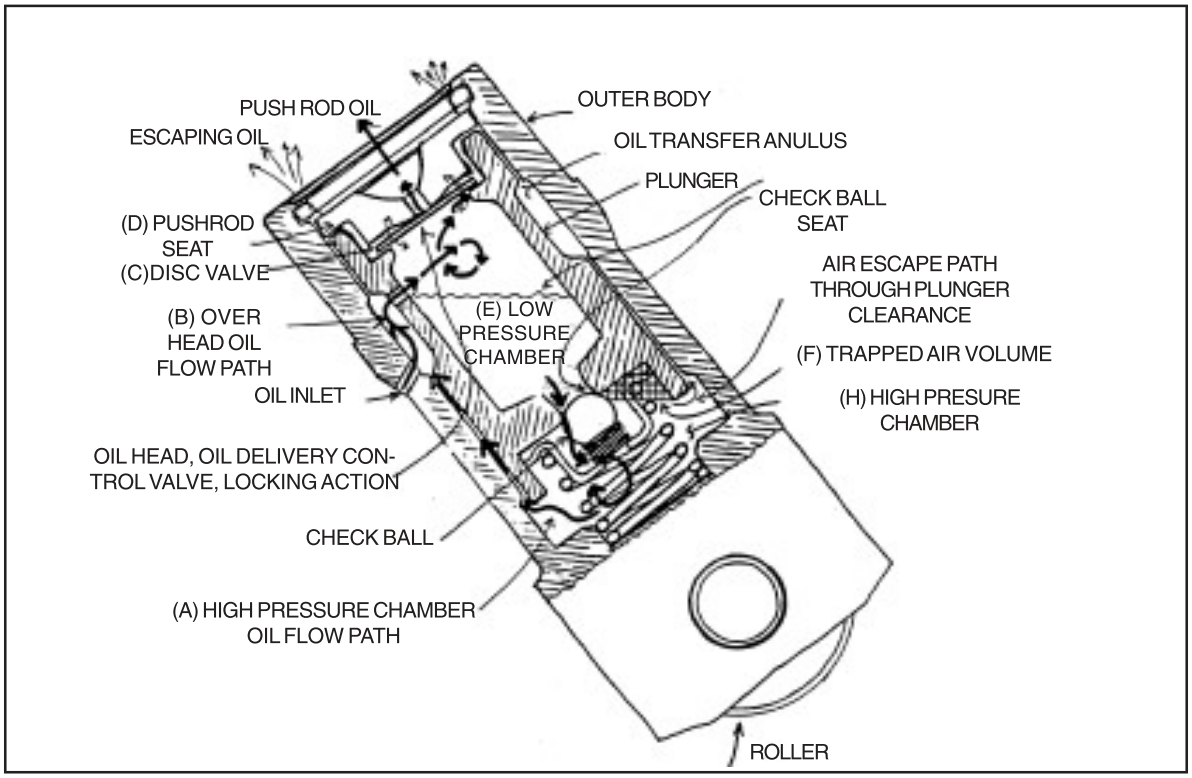
HYDRAULIC TAPPET :

The Hydraulic tappet, (also known as RHVL - Roller Hydraulic Valve Lifter) is located between the cam and pushrod in the valve train mechanism. It not only serves as a valve lifter most importantly, it automatically and constantly adjusts itself to compensate for any extra clearance in the valve train mechanism when the engine is running at various RPM. The automatic adjustment is achieved with the aid of hydraulic pressure inside the hydraulic tappet.

BENEFITS OF HYDRAULIC TAPPET :

- ☆ Eliminates the need for manual and periodic push rod height adjustments.
- ☆ Compensates for clearances in the valve train mechanism due to wear of moving parts OR due to variations in engine temperature.

ROLLER HYDRAULIC VALVE LIFTER



WORKING PRINCIPLE :

Oil enters the hydraulic tappets through a feed hole in the body and flows into the plunger through the plunger feed hole, filling the “low pressure chamber” (E, in Figure)

The oil also flows around the check ball and through the slots of the ball retainer to fill the cavity below the plunger, called the “high pressure chamber” (A, in Figure). Oil is forced down into this area by momentary low pressure which occurs once during each cam rotation.

As the hydrauilic tappet rises due to the cam rotation, the full load of the valve train is applied on the tappet. A predetermined and closely held clearance of .0002/.0003 inch (.0051/.0076 mm) between the outer diameter of the plunger and the inner diameter of the tappet body allows a controlled amount of oil to escape up from the high pressure chamber.

This oil compresses the plunger spring and allows a small relative movement of the plunger with respect to the body.

As cam further rotates, the tappets returns to its original position. At this time, the plunger spring provides the force to maintain zero back lash in the valve train mechanism and forces the plunger back to its original position. This allows engine oil to once again fill the high pressure chamber so that the cycle can be repeated during the next cam rotation.

The overhead oil supply is accurately metered from the “low pressure chamber”, which is at engine oil pressure, by using a flat metal disk (metering valve C, in Figure), which wobbles against a cylindrical radius curved surface on the bottom of the push rod seat (D, in Figure). Oil flows up through the hole in the push rod seat to lubricate the overhead valve train components (oil flow path B, in Figure).

The metering valve moves sufficiently to keep the push rod seat hole free and unclogged. When the engine is switched off, the valve seats on the shoulder of the plunger to minimize drain back of oil.

If the engine structure or valve train expands or contracts with changes in engine temperature or other differentials, the hydraulic tappets will automatically adjust its own internal length to compensate for these changes.

PRECAUTIONARY MEASURES :

The hydraulic tappets have minute holes for the oil to circulate and to also act at the hydraulic media, hence oil contamination must be at the minumum. The oil and the filters in the engine, must be changed periodically as specified.

Whenever the tappets are removed for service OR stored in spares, they must be kept upright (the push rod seating surface pointing upwards and the rollers at the bottom pointing downwards) to prevent the oil from draining off.