

GENERAL

See [Figure 3-114](#). Pressure created in the flywheel area on piston downstroke is released through the **reed valve** into the gearcase. From there a mixture of crankcase air and oil mist is vented up the push rod covers to the upper rocker box.

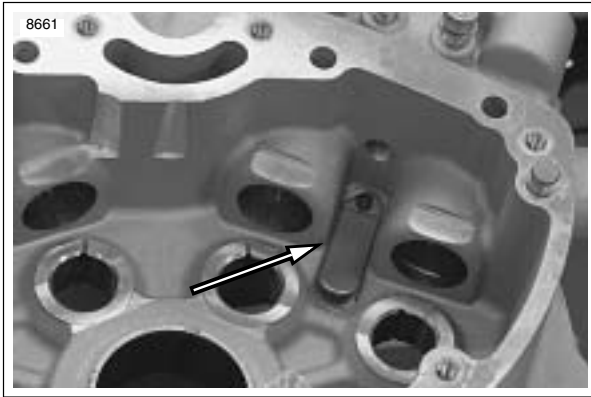
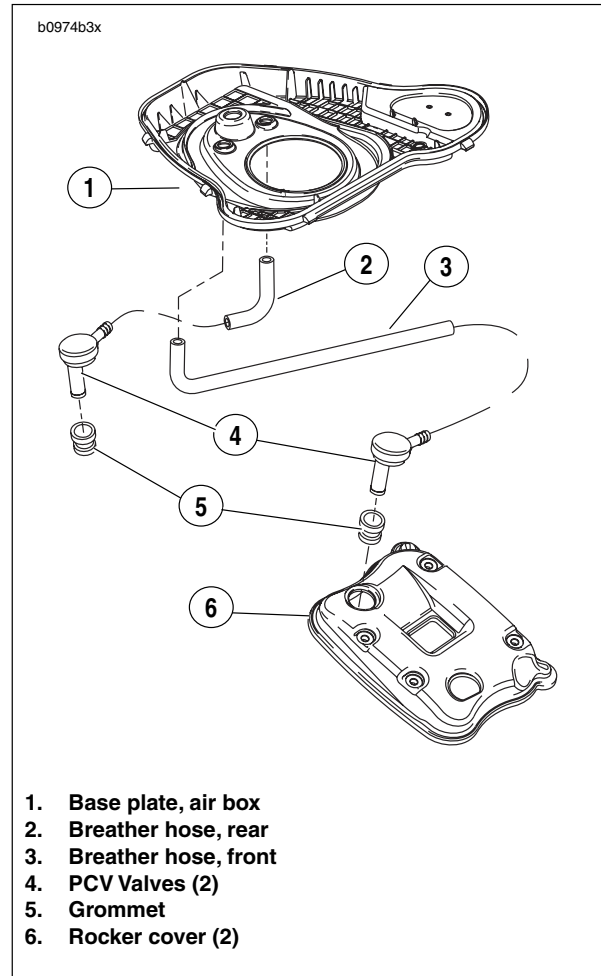


Figure 3-114. Reed Valve Assembly in Gearcase

See [Figure 3-115](#). Air is allowed to escape the rocker boxes by exiting the positive crankcase vent (PCV) valves (4) located on top of the rocker boxes. From the PCV valves the air enters the crankcase breather hoses (2 & 3). The crankcase breather hoses route through the air cleaner base plate (1) to the air box where it is directed inside the air filter element and back into the engine.

The oil mist collects and eventually returns to the crankcase through oil passageways in the cylinder head.



1. **Base plate, air box**
2. **Breather hose, rear**
3. **Breather hose, front**
4. **PCV Valves (2)**
5. **Grommet**
6. **Rocker cover (2)**

Figure 3-115. Crankcase Breathing System,

Reed Valve Replacement

NOTES

- Whenever the gearcase cover is removed, inspect the reed valve for cracks, chips and breakage.
 - See [Figure 3-116](#). The reed valve (3) opens on the downstroke to relieve crankcase pressure and closes on the upstroke to prevent vapors returning to the crankcase. The curved reed valve stop (2) limits the movement of the reed valve. See [3.13 CRANKCASE BREATHING SYSTEM](#).
1. Remove the fastener (1), the reed valve stop (2) and the reed valve (3).

2. See [Figure 3-117](#). To replace the assembly, align the edges of the reed valve (3) and the reed valve stop (2) to prevent premature failure of the reed valve.

NOTE

See [Figure 3-116](#). It is not necessary to replace the reed block (4) along with the reed valve. The block can only be replaced after separating the crankcase halves.

3. With the lower part of the curve on the stop facing out, Apply LOCTITE 222 (purple), install and tighten fastener to 5-7 **in-lbs** (0.6-0.8 Nm).
4. If it was necessary to replace the reed block, apply LOCTITE 222 (purple), install and tighten the fasteners to 25-35 **in-lbs** (2.8-4 Nm).

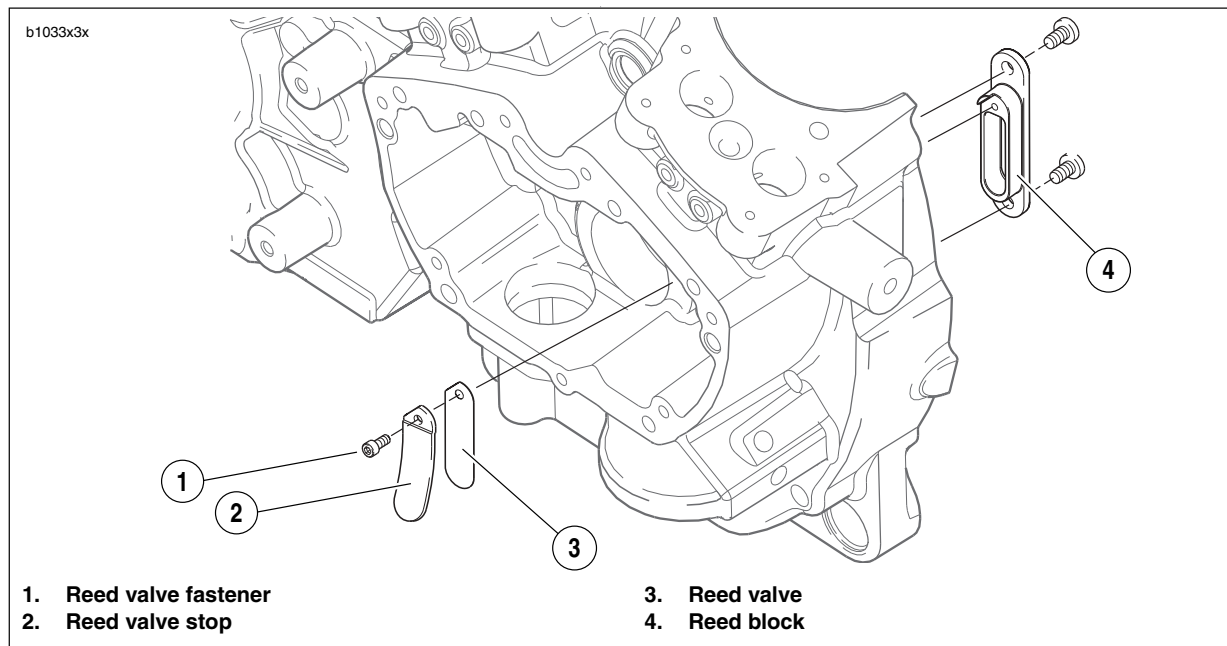


Figure 3-116. Reed Valve Assembly

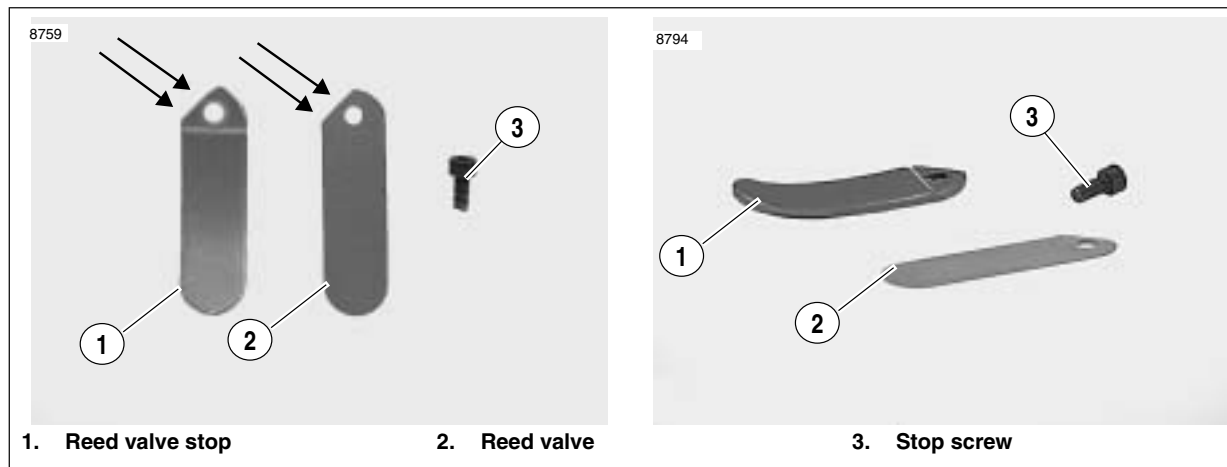


Figure 3-117. Reed Valve Stop and Reed Valve

GENERAL

1. Oil is gravity-fed from the oil reservoir to the gerotor-style oil pump through a feed hose. Oil enters the feed section and fills a cavity located under the feed pump.

NOTE

See **3.15 OIL PUMP** for a complete explanation of the gerotor pump sets.

2. The feed pump transfers oil from the inlet cavity through the external steel line to the oil cooler.
3. From the oil cooler oil flows to the oil filter mount.
4. Through the filter mount cavity oil flows to the oil filter.
5. Oil enters the peripheral cavity of the oil filter, passes through the filtering medium into the central cavity of the oil filter, and flows into the filter adapter (fitting which connects filter to filter mount).
6. Adequate oil pressure in the filter mount cavity activates the oil pressure signal light switch and shuts off the oil pressure signal light.
7. Oil flowing from the filter adapter opens the check ball. The check ball opens at 4-6 psi (28-41 kPa) oil pressure.
8. With the check ball open, oil flows into the crankcase feed galley.
9. Oil enters an intersecting passage in the gearcase cover and flow is then routed to the pinion bushing.
10. Oil enters a hole in the end of the pinion gear shaft and travels to the right flywheel where it is routed through the flywheel to the crankpin. Oil is forced through the crankpin to properly lubricate the rod bearing assembly.
11. Oil flow then continues through the gearcase cover to the main feed galley at the top of the gearcase cover. Drilled passages in the crankcase intersect the main feed galley and carry oil to all hydraulic lifters and piston jets.
12. Oil flows up passages in the push rods to the rocker arm shafts and bushings.
13. The valve stems are lubricated by oil supplied through drilled oil holes in the rocker arms.
14. Oil collected in the push rod areas of the cylinder heads flows down the push rod cover, through drain holes in the tappet blocks and into the gearcase. After providing lubrication to the gearcase components oil returns to the scavenge section of the oil pump through a passage located in the top of the pump. Oil is then returned to the oil tank.
15. Feed oil to the rocker area is returned to the crankcase through a passage in the head and cylinder.
16. Oil collected in the sump is splash-fed to the pistons, cylinder walls and flywheel components.
17. A pair of piston oil jets cools the bottoms of the pistons with a spray of oil.
18. Oil collected in the sump area returns to the scavenge section of the oil pump through a passage located in the rear section of the sump. Oil flow to the pump is accomplished by the scavenging effect of the pump and by the pressure created by the downward stroke of the pistons.
19. Return oil fills a cavity above the pump's return gears. The return gears pump oil back to the oil reservoir.

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See [Figure 3-118](#). The oil pump consists of two gerotor gear sets, feed and return, housed in one pump body. The feed set distributes oil to the engine, the scavenge set returns oil to the tank/swingarm reservoir.

A gerotor-type gear set has two parts — an inner and an outer gerotor. The inner gerotor has one less tooth than the outer gerotor. Both gerotors have fixed centers which are offset to each other.

In a gerotor gear set, oil is transferred from inlet to outlet as it is trapped between the rotating inner and outer gerotors.

Gravity-fed oil from the oil reservoir enters the pump through the feed line connector. It is forced by the gerotor feed set through a line to the oil cooler. Return oil from the flywheel compartment/gearcase is drawn back into the pump and is forced by the gerotor scavenge set back to the oil reservoir.

The oil pump seldom needs servicing. Before you disassemble an oil pump suspected of not producing adequate oil pressure, be sure that all possible related malfunctions have been eliminated:

NOTE

If any oil line fittings are found to be loose, or not oriented in the proper position, those fittings must be removed and thoroughly cleaned. After cleaning, apply LOCTITE 565 Sealant to the fitting and re-install to the correct orientation. When tightening oil lines, always support the oil line fitting with a wrench to maintain proper orientation and prevent damage to the oil line fitting.

1. Make sure all oil line connections are tight and that lines are not pinched or damaged.
2. Check level and condition of oil in reservoir/swingarm. Pressure will be affected if oil is diluted. In freezing weather, proper circulation of oil can be affected if the oil feed line becomes clogged with ice or sludge.
3. Check for a grounded oil pressure switch wire or faulty switch if oil indicator light fails to go out with engine running.

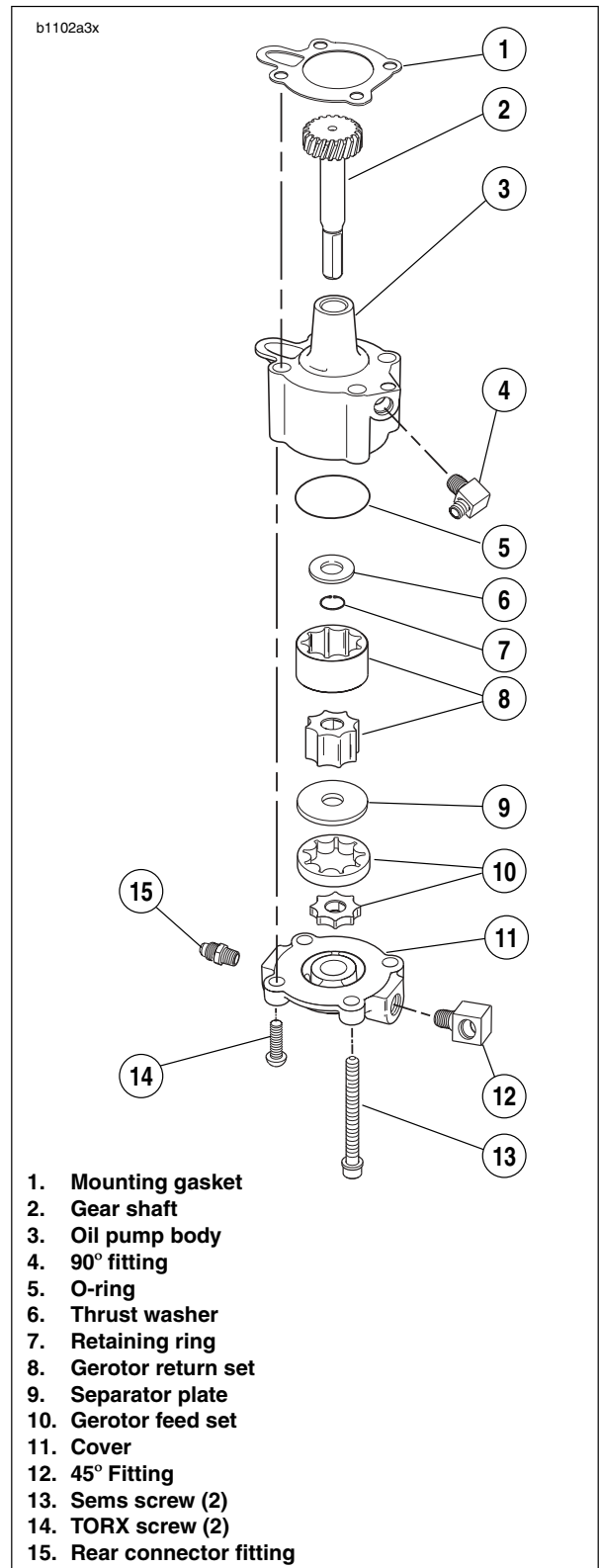


Figure 3-118. Oil Pump

REMOVAL/DISASSEMBLY

NOTE

Oil pump can be removed with engine in frame and without removing gearcase cover.

1. Remove chin fairing. See [2.38 CHIN FAIRING](#).
2. Drain oil reservoir. See [1.5 ENGINE LUBRICATION SYSTEM](#).
3. Remove and discard oil filter.
4. See [Figure 3-119](#). Disconnect feed line connections (1, 6) on both sides of the oil pump.
5. Detach return line connection (3).
6. Carefully remove mounting screws (5) and washers only. Pump will drop with screws removed. Discard mounting gasket.
7. Remove cover TORX screws (2). Lift cover off body.
8. Remove and discard o-ring.
9. Slide both pieces of gerotor feed set, separator plate and both pieces of gerotor scavenge set off gear shaft.
10. Remove and discard retaining ring. Remove thrust washer and gear shaft.

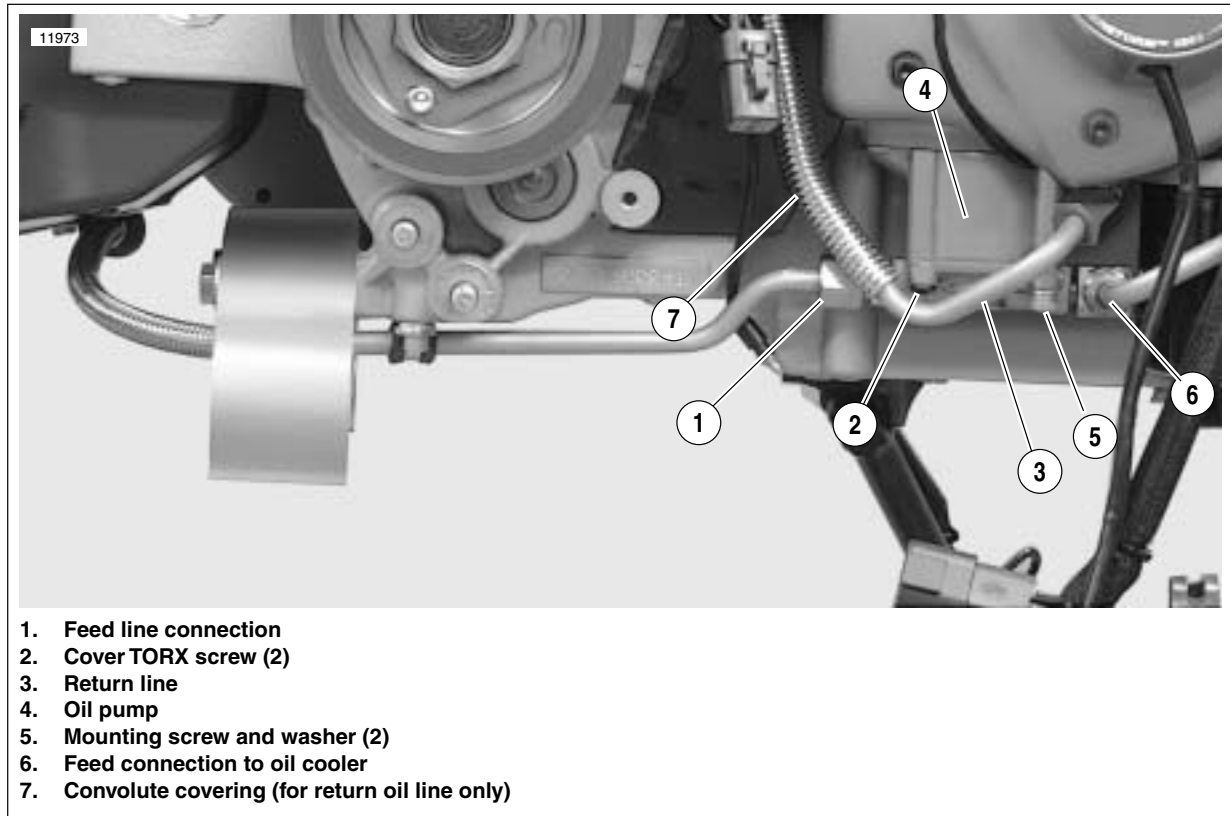


Figure 3-119. Oil Pump Hardware