

IMO Pump

Support Services and Spare Parts

Overview

The screw pump was the successor to the Woodward XX Herringbone gear pump. Horizontal and vertical configurations were used, depending on space available in the actuator cabinet. The pump has three moving parts:

- Power rotor
- Two idler rotors

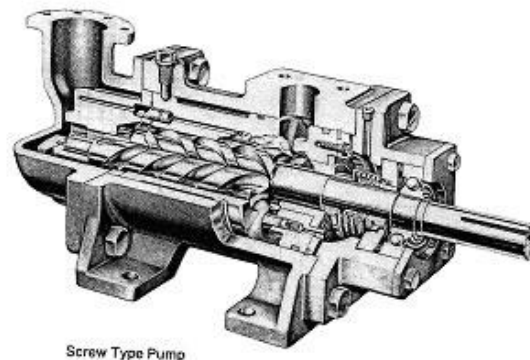


Figure 1. IMO Screw Type Pumping Unit

Oil is drawn in by the pump suction, through the inlet head. The oil fills the openings between the rotor threads and moves in a continuous flow to the outlet as the rotors turn. The idler rotors turn due to the action of the oil pumped and act as sealing elements.

The sealed closures formed by the meshing of the rotors enfold the oil being pumped. As the rotors turn these enclosures move axially providing a continuous uniform flow. Pressure oil is routed to the balance pistons at the inlet to provide hydraulic balance to the rotors.

Because the rotors are hydraulically balanced, bearing wear is minimal and little routine maintenance is required. Bearing and seal kits are available if needed. Please refer to the IMO pump model number when requesting a quote.

Pilot Valve – Operated Unloader

Early applications of the screw pump on Woodward governors came with a modified version of the “snap-action” pilot unloader system used on XX Herringbone pumps. The sequence of operation and adjustments for this unloader assembly is the same as described for the XX pumping system.

Solenoid-operated conversion kits by Emerson are available to eliminate this hard-to-adjust system and improve lead-lag operation.

Solenoid – Operated Unloader

The next generation of unloading systems used a solenoid-operated unloading system that was triggered by a pressure switch.



Figure 2. Solenoid – Operated Unloader (upper left) and Screw Pump (right)

When the system pressure drops below a pre-set level, the pressure switch contacts close. This energizes a four-way solenoid valve. When the solenoid valve is energized, oil pressure is switched to the port leading to the top of the unloader case, and the port leading to the bottom of the unloader case goes to drain.

With pressure at the top of the unloader piston, it moves downward, and the unloader rod moves away from the limit switch, closing the contacts. This starts the pump motor. When the pump starts, the piston is still above the unloader drain port, thus the pump starts in an unloaded position (pumping to drain).

As the unloader piston continues its downward movement, it covers the drain port, causing the pump to be loaded (pumping to the pressure accumulator). When the tank pressure reaches a pre-set point, the pressure switch contacts open, and the solenoid valve de-energizes. This switches the port leading to the top of the unloader case to drain and the port leading to the bottom of the case to pressure.

Pressure to the bottom of the unloader case moves the piston upward. As the piston moves, the unloader drain port is uncovered. The pump is now unloaded and again pumping to sump. As the piston continues its upward travel, the rod trips the limit switch, opening the contacts. This stops the pump motor. The system is now ready for the next pumping cycle.

Replacement parts for this unloader system are available from Emerson. Part numbers may be found in the exploded diagram in the Woodward pump system manual.

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