

Solenoid Operated Pump Unloader Kits

Woodward XX Pumps and IMO Pumps

The solenoid operated pilot valve kit has been designed to replace the mechanical pilot valves on XX Herringbone type gear pumps.

It can also be used on systems where IMO screw type pumps are used when the unloader assemblies are the same as those used in XX pump systems. Custom unloader kits are also available.

Benefits

- Remote alarm Indication (excellent for unmanned stations)
- Improved reliability
- Reduced maintenance
- Replaces obsolete parts – pilot valve and bushing assemblies



Figure 1. IMO Pump Before



Figure 2. Replaced IMO Pilot Unloader Valve

Our solenoid operated pump unloader kit contains everything that is required for an easy installation. The electronics are pre-wired and housed in a NEMA-12 enclosure. Fittings and tubing are provided. Only the field wiring connections need to be made.

A step-by-step installation manual is also provided. It contains wiring diagrams and complete explanations of the field connections.

The solenoid operated pump unloader kits are available in 4 different sizes to match any Woodward pump system.

Filter replacement kits are also available (recommended for older pump systems).



Figure 3. Single Pump Electric Unloader Kit



Figure 4. Dual Pump with Operator Interface – Cabinet Face Mounting



Figure 5. Dual Pump with Operator Interface – Sump Mount

Kit Description

The mechanical pilot valve assembly is replaced by a solenoid-operated hydraulic valve, and the mechanical pump motor switch is replaced by a pressure switch and time-delay relay. Two flow control valves enable the adjustment of loading and unloading rates.

The solenoid operated system reduces maintenance costs by eliminating the need for mechanical overhauls. More reliable operation is also attained with the solenoid-controlled system.

This system provides external indication when the pump has been running in the loaded state for an extended period of time (customer determined 0.10 to 10 minutes). This can be an indication of low oil levels, loading malfunctions, motor problems, or excessive oil usage in the governor system. An alarm relay contact closes when the system is in an alarm state.

The customer can use the dry contact for remote monitoring and alarm triggering (rated 10 amps at 120 VAC, 3 amps at 24 VDC, and 0.20 amps at 125 VDC).

Principles of Operation

When the system pressure drops, a pressure switch contact closes causing a time delay relay to pick-up and start the pump motor. At the same time, the solenoid valve is energized which ports the oil in the upper unloader assembly to tank (drain).

This allows the unloader piston to rise which causes the pump to load. The rate of loading is controlled by the needle valve between the 'T' outlet port and the tank.

When the solenoid valve is energized, the alarm timer also starts counting. If the pump remains loaded until the time delay expires (user defined, 3-5 minutes typical), the contact output is closed which can be used to trigger a customer defined alarm circuit.



Figure 6. Large Assembly – After



Figure 7. XX Pump Before



Figure 8. Large XX Flange – After

When the hydraulic system reaches the proper pressure, the pressure switch resets and the solenoid valve is de-energized. This admits system oil pressure into the upper unloader chamber. The pump motor is still running due to the delay-on-break timer. The unloader piston is forced down which causes the pump to unload. The oil being pumped is cycled back to the sump. The rate of unloading is controlled by the needle valve between the 'P' inlet port and the filter assembly.

When the delay-on-break time delay expires, the pump motor is turned off. This is usually 3-5 seconds after the pump has unloaded.

When in continuous run mode, the theory of operation remains the same except that the oil motor controls have no effect because the motor is running continuously. The loading and unloading functions are not affected.

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