

# DIAPHRAGM PUMP OPERATION

Each brand of pump has specific instructions. Read and follow instructions before operating your pump. Failure to follow these instructions may damage pump and void your warranty.

## HOW THE PUMP WORKS

On a diaphragm pump the diaphragm is what separates the pump oil from the spray material. Each piston **downstroke** lowers the piston-attached diaphragm, drawing spray material in pump head. As piston passes below cylinder sleeve side openings, oil is pulled into lower diaphragm cavity. During each piston **upstroke** the cushion of oil between the piston and the diaphragm hydraulically pushes and cushions the diaphragm as the piston tops out. This discharges the fluid in the pump head. The lower diaphragm cavity oil cushion also lubricates the diaphragm and piston ensuring minimal mechanical wear. *Remember* low oil level causes excessive mechanical wear on diaphragms and internal components. The transparent oil sight gauge makes oil checks easy. Keep filled to mark on sight gauge.

## BEFORE OPERATING SYSTEM

Open suction valve and check tightness of suction lines, fittings and filter. Be sure dump selector valve is in dump position.

## DO NOT RUN PUMP WITH A STARVED SUCTION

The diaphragm pump will not suffer if run dry due to an empty tank. However a “starved” suction due to a clogged strainer or a closed suction valve will cause premature failure of the pump diaphragms. **NOTE:** Only use filter screens that are between 10 & 20 mesh. Never use a fine filter screen with a diaphragm pump.

## SUCTION VALVE

To prevent pump damage, shut down system before closing suction valve. This valve is in the system to close off tank flow for emergency system repair or if strainer screen requires unexpected cleaning after a tank refill. (Strainer screen should be cleaned just before each tank refill.)

## MAINTAIN PROPER OIL LEVEL

The crankcase oil plays a dual role: it lubricates all moving parts & it is hydraulically functional in the pumping capacity. Oil supports the diaphragm during each pressure stroke. It is important to maintain the recommended oil level, marked on the oil sight gauge.

## **DO NOT OVER SPEED PUMP**

## **IMPORTANT!**

Diaphragm pumps are designed to operate at or below a specific speed. Over speeding will cause valves and diaphragms to prematurely fail and could cause other internal damage. Refer to the performance chart of your specific pump for maximum operating speed.

## **PULSATION DAMPENER INTRODUCTION**

It is the nature of diaphragm pumps to have some pulsation. This is caused by sudden changes in piston direction. The pulsation dampener has one function in the pumping system: reduce pulsation by providing a cushion of air to bump against. UDOR pulsation dampener uses a rubber bladder to separate the air cushion from the solution being pumped.

## **PULSATION DAMPENER SETTING**

The basic rule is to fill the pulsation dampener to 20% of the system working pressure. If you have your spraying pressure set at 100 psi, the setting for the pulsation dampener should be 20 psi. Always shut down the pump before adding air to the pulsation dampener or checking its pressure. Air supply can be from a compressor or a manual type pump. The dome containing air is small. Take care to apply the pressure gauge evenly on the air valve to prevent air from leaking out of the pulsation dampener. It is not uncommon to lose 5—10 psi when checking pulsation dampener pressure. NOTE: 2-cylinder diaphragm pumps may require more air than 20% of operating pressure. 20 psi is the minimum pulsation dampener pressure. **DO NOT RUN PUMP WITH LESS THAN 20 PSI IN THE PULSATION DAMPENER!**

# MAINTENANCE WILL SAVE YOU MONEY

Following a maintenance schedule will ensure performance of your pump and prolong its longevity.

## AFTER EACH USE

Flush pump with clean water. Most diaphragm “attacks” occur when chemicals are left sitting in the pump. These few minutes of cleaning are well spent, extending diaphragm life and minimizing chemical buildup throughout the system.

## AFTER EVERY 500 HOURS OF USE or AT SEASON'S END (whichever comes first)

- Install a new set of diaphragms.
- Inspect check valves for spring fatigue and seat wear.
- Change oil using non-detergent 30 weight oil or oil recommended by your manufacturer. Hand rotate while filling. This evacuates most unwanted air pockets.
- Run pump 5 minutes under “no-load” conditions. This evacuates remaining air pockets from diaphragm cavity.
- Re-check oil level.

## WINTER STORAGE

- Flush pump with clean water.
- With tank empty and suction & discharge valves “open”, run pump one minute to ensure complete drainage of pump heads and lines.
- Add antifreeze, re-circulate and leave in system to complete winterizing procedure. Allow antifreeze to replace any possible water in hoses and booms. If a handgun is in the system, run antifreeze through the hose and handgun into tank lid opening to clear and/or dilute water. Depending on the length of hose, more than one gallon of antifreeze may be required to protect the system from freezing. Water expands when it freezes and it WILL damage your system in freezing weather.

To protect against serious injury, NEVER spray flammable liquids, or flush pump with flammable liquids!



## TROUBLE SHOOTING

Problem	Cause	Remedy
<ul style="list-style-type: none"> <li>No pressure</li> <li>Very little pressure</li> <li>Pressure drops below working range when relief valve is open to boom or gun</li> </ul>	<ol style="list-style-type: none"> <li>Plugged strainer restricting flow</li> <li>Suction hose obstruction</li> <li>Collapsed suction hose inside or outside tank restricting flow</li> <li>Pump drawing air through suction line hoses or fittings</li> <li>Pressure relief valve stuck or worn</li> <li>Excessive tank foam due to low tank volume</li> <li>Nozzle volume is greater than pump capacity</li> <li>One or more check valves seating improperly</li> </ol>	<ol style="list-style-type: none"> <li>Clean screen</li> <li>Clear obstruction</li> <li>Replace collapsed hose</li> <li>Examine hoses &amp; fittings, ensure air tight fit with no leaks</li> <li>Repair or replace relief valve</li> <li>Refill tank</li> <li>Reduce nozzle orifice size or number of nozzles used</li> <li>Clean or replace check valves</li> </ol>
<ul style="list-style-type: none"> <li>Pressure gauge fluctuates wildly</li> <li>Excessive pulsation</li> </ul>	<ol style="list-style-type: none"> <li>Pulsation dampener pressure too low or too high</li> <li>Pump drawing air through suction line hoses or fittings</li> <li>Plugged strainer restricting flow</li> <li>Air not entirely evacuated from pump cavity</li> </ol>	<ol style="list-style-type: none"> <li>Adjust pulsation dampener pressure—refer to manufacturer's instructions</li> <li>Examine hoses &amp; fittings, ensure air tight fit and no leaks</li> <li>Clean screen</li> <li>Run pump with an open discharge to totally evacuate air</li> </ol>
<ul style="list-style-type: none"> <li>Pump does not draw water</li> </ul>	<ol style="list-style-type: none"> <li>Pump drawing air through suction line hoses or fittings</li> <li>Plugged strainer restricting flow</li> <li>One or more check valves seating improperly</li> </ol>	<ol style="list-style-type: none"> <li>Examine hoses &amp; fittings, ensure air tight fit and no leaks</li> <li>Clean screen</li> <li>Clean or replace check valves</li> </ol>
<ul style="list-style-type: none"> <li>Pump oil has milky color or oil plug pops out</li> </ul>	<ol style="list-style-type: none"> <li>One or more diaphragms have ruptured</li> </ol>	<ol style="list-style-type: none"> <li>Replace diaphragms</li> </ol>



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