

## INSTALLATION OF UNLOADER

### **OPERATION:**

A regulating unloader requires a **MINIMUM** BYPASS OF 5% OF UNLOADER RATED CAPACITY to function properly. If it is NOT allowed to bypass, the valve will be damaged more quickly. Determine the capacity and pressure desired for your system, then select a nozzle which will provide those requirements and still allow 5% bypass. Check it with a gauge, every few months. Also.. as the spray nozzle wears, your pressure drops... this reduces bypass flow too.. Install new nozzles as wear occurs and readjust to original pressure setting. When tank-feeding a pump, bypass to the tank as well.. It will be easier to troubleshoot.

### **INSTALLATION:**

The valve will function in any position, however, it is preferable to mount in a manner minimizing piping and keeping the adjusting nut easily accessible. It is also preferable to mount the valve directly onto the pump discharge manifold. **A RESTRICTION OF INLET, OUTLET OR BYPASS** flow will greatly reduce performance and could result in premature valve wear. All plumbing fittings should be at least the size of the port, preferably one size larger.

### **BYPASS CONNECTION:**

Care should be exercised when deciding the method of bypass. It is recommended that the bypass be directed to a baffled reservoir tank. Although not recommended, bypass fluid may be returned to the inlet line of the pump with proper care. Bypass lines to the inlet line of the pump should be of a length to provide sufficient volume to allow for several minutes bypass before friction causes the bypassing water to overheat, weakening the pump seals. It is necessary to install a Thermal Relief Valve in the bypass loop to provide pump protection in the event of excessive heat build up as a "hi limit" type control.

### **PRESSURE ADJUSTMENT:**

The unloader can be used to regulate system pressure. **Any adjustment of the valve must be done while the system is in operation and the nozzles are open.** The valve is designed to bypass a **MINIMUM** of 5% rated unloader capacity at all times. Check the amount of bypass by disconnecting the bypass. Fluid cushions the valve seat and reduces the shock of bypass spike when valve is put into bypass mode.

**WARNING:** If the entire output is directed through the nozzle (zero bypass):

- A: The regulating feature of the unloader is non-functioning.
- B: Excessively high-pressure spikes may occur when the trigger gun is released
- C: Life of the pump and all components is shortened and possibly dangerous due to potential hose blow out, fitting can burst, etc.

### **Adjust your system to operate Safely**

**CAUTION:** A properly sized pressure gauge must be used when attempting to adjust your unloader to its pressure setting. Position gauge between the pump and unloader, on the pump, or in an "alternate inlet" of the unloader valve. Some unloaders are equipped with "gauge port".. being careful of too much weight on connective fittings. When adjusting, be aware of spike pressure when you release the gun.. it can rise dangerously above rated operating pressures, depending on your system... Think Safety !

### **ADJUSTING- SET UP:**

1. Always adjust unloader springs to system pressure with the trigger gun open. Be sure, before adjusting, that the spray nozzle orifice is properly sized for the volume and pressure you desire.  
**CAUTION:** Never use the unloader to compensate for a worn nozzle as you risk bottoming out unloader, causing malfunction that can lead to severe system damage and possible bodily injury. You *must* control the unload spike. We strongly recommend the use of a pressure relief valve positioned between the pump and the unloader as a safety back up to unloader malfunction. For even more sensitivity and reliability, better quality regulating style relief valves are available and also strongly recommended. Do not use a "pop off" style relief valve which uses a rubber instead of stainless steel valve ball.
2. Make sure unloader adjusting nut is backed off (counter clockwise) to minimum pressure setting (adjuster will feel loose when no longer against spring inside).
3. Double check position of all fittings. One mistake could cause bodily injury.
4. Check water supply.
5. Check Hi-Pressure hose connections.
6. Start engine at low RPM's. Watch pressure gauge...make sure pump doesn't yet develop (pressure). System should go easily into bypass.
7. Increase engine to medium RPM's.
8. Open trigger gun. With water flowing out nozzle, adjust unloader to increase pressure in increments of 500 psi. Release the trigger gun after each adjustment to be sure unloader goes easily into bypass without system pressure spike of more than 200 psi over working pressure.  
At 1500 psi, increase the engine to maximum RPM's to complete adjustments.

### **CHECK UPS:**

Perform periodic system check up to assure the best performance from your pump system. Pumps, spray guns, valves and unloaders will all work better and last longer if proper configured, adjusted perfectly, and fed with clean water supply.

### **TROUBLESHOOTING:**

#### **Unloader Cycles or won't come up to pressure**

- Unloader not properly sized for system flow
- Outlet orifice too big
- Foreign material in valve
- Pressure piston assembly spring worn or broken
- Lower piston assembly spring worn or broken
- Insufficient bypass (a minimum of 5% is necessary)
- Pump seals worn
- Pump valves worn
- Pump starved for water

#### **Fluid leaking from Bottom of Lower Body**

- Cup seal worn or cut

#### **Fluid Leaking from Top Adjusting Bolt**

- O-ring around spring guide worn or cut

#### **Extreme Pressure Spikes**

- Adjusting nut turned completely into unloader
- Insufficient bypass ( a minimum of 5% is necessary)
- Restricted bypass - must be at least port size, preferably one size larger and a minimum of 24in. long or more

## **PRESSURE RELIEF VALVE**

During initial system start up, PRV may open to relieve pressure over it's set point. The set point will have to be adjusted up as system pressure is adjusted up at unloader.

1. Start with PRV set at 3/4 tight from minimum.
2. When PRV opens, shut system down to stop it's flow before re-setting the adjustment.

**NOTE:** Once system pressure is set at unloader valve, the PRV will have to be fine tuned also.  
Example: If system operates at 5000 psi with pressure spike of 5200 psi, PRV set point will have to be set at approximately 200 psi over spike pressure.

3. Back off PRV setting until it relieves with the unloader's spike pressure setting. Shut system down to stop it's flow. Increase setting of PRV 1/4 turn each test until it stops relieving with gun open and with no "bleeding" when gun is closed.

**CAUTION:** Do not allow PRV to be set at maximum.  
"Bottomed out" setting of Relief renders it useless It will not operate properly.

Call with ant question, any time. 619-448-8111