



## OPERATING INSTRUCTIONS

### MODEL PRH-04-THD

### PRESSURE REDUCING VALVE

#### APPLICATIONS:

Valve should only be used for non-corrosive fluids, or where the materials selected are compatible with the fluid and will not cause corrosive buildup, which could keep the main valve from opening. When liquids contain debris or other solid matter, which might cause internal clogging or improper operation of the valve, a strainer with a fine wire mesh should be installed before the inlet of the valve. In-line strainer fittings or basket strainers can be purchased from STRA-VAL to solve this problem. **Do not use this valve as a shutoff valve**, even though the valve, when new, is able to do so. In time as wear sets in, seat leakage may increase and result in an objectionable pressure rise at zero flow. As long as the flow through the valve is greater than the seat leakage, the valve could still regulate.

#### PRINCIPLE OF OPERATION

Fluid passing through the valve enters through the inlet port through the valve seat formed by the main valve and seat, and finally through the outlet port. Outlet pressure is sensed by the underside of the piston, which is able to move up and down with changes in outlet pressure. Pressure regulation is achieved when a force balance is maintained between the pressure acting on the underside of the piston and the spring force, which is adjusted to hold a particular outlet pressure. If the outlet pressure is below the set point, which is preset by the adjusting spring, the spring force overcomes the pressure force acting on the underside of the piston. This causes the main valve to open, thereby admitting higher inlet pressure fluid to raise the outlet pressure until the force balance is restored. As soon as the outlet pressure is restored, the main valve begins to close to limit the amount of higher inlet pressure fluid passing through the valve.

#### MAINTENANCE & REPAIR

When the valve is shipped from the factory it is usually ready for operation. On larger valves, all that may be required is to install the adjusting screw if it is strapped to the spring chamber and make a final pressure adjustment at the final operating conditions. This step is not required if the valve is ordered preset for a specific pressure setting and so marked.

Check to make sure that the discharge piping is not blocked off and that the valve does not operate against a shut-off condition. Check to make sure there is no visible leakage coming from the spring chamber. This would occur if the packing nut is set too loose or if the packing rings take a slight set. A simple adjustment of the packing nut by 1/6 or 1/4 turn is normally sufficient. This would have to be done with the spring chamber removed. If after extensive use the valve begins to lose its ability to regulate, or if there is excessive seat leakage due to wear, which would cause an excessive pressure rise on the outlet side of the valve, or if there is external seal leakage, the valve will require parts to be replaced and

the valve sent in for possible repair. Before removing the valve from service **Make sure that the valve is isolated from the piping completely in order avoid any personal injury**

Usually, only the v-packing rings will require replacement. However, if there is excessive seat leakage, then the main valve may also require replacement or just a minor re-cutting of the seating surfaces. With the valve removed from service, a quick test for mechanical operation is to see if the **main valve is free to move by hand**. This should be done with the spring chamber removed. If the main valve is **not** free to move, **the packing nut is either too tight** or the main valve is frozen in place or worn, and will therefore need to be disassembled.

#### DISASSEMBLY / ASSEMBLY INSTRUCTIONS

To disassemble the valve, it is best to remove the valve from the piping, since it is more convenient to work on the valve on a bench with a vise. Unscrew the spring chamber with a wrench in the area provided with wrench flats. With the spring chamber off, the packing nut may be removed and the Teflon v-packing rings extracted. Make sure the valve is not under pressure if it is still in the line. Be sure not to damage them as they perform a critical sealing function. If they are damaged or worn they need to be replaced. When reinstalling the v-packing rings, make sure that they are properly installed as shown in the illustration with the open part of the "v" facing the pressure side.

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The packing rings expand under pressure and therefore should not be over tightened. If the packing rings are over tightened, the valve will not be very responsive to pressure changes or not even regulate at all. It is usually sufficient to make the packing nut hand tight and add 1/4 to 1/2 turn with a wrench. Finally when the valve is installed in the line without the spring chamber any additional tightening may be performed while under pressure, if there still any leakage through the v-packing rings. After this adjustment is performed, the spring chamber and spring hardware may be installed. Next inspect the seat and main valve in the area where sealing contact is made. It may be necessary to just re-lap these parts with a fine grit lapping compound such as A#600 grit. If there is more severe wear or damage that can't be corrected by lapping, then the parts need to be replaced or re-machined making sure that the parts remain concentric. Also, inspect the main valve in the area where the teflon-v-packing rings perform their sealing function.

If the area is not too severely worn, the surface may be re-polished and restored to a smooth low friction surface finish. If this area is very rough or worn, the valve will not regulate properly and will stick because of excessive friction and wear. If in doubt, replace the entire main valve from the factory. It is generally recommended that the valve be overhauled by replacing the main valve, and v-packing rings, in order to restore the valve in an as new condition. If the main valve is purchased from the factory, it must be lapped into the body at final assembly for optimum regulating performance, particularly if the valve is operating in a low flow mode where the valve travel is very small and the clearance through the valve seat is very small.

After the valve is properly assembled, reset the adjusting screw until the desired outlet pressure is achieved at the flow range the valve will be operating, then tighten the adjusting screw lock nut. Little or no adjustment is required to compensate for changes in inlet pressure, as this valve is a balanced design.

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Adjust the spring compression by loosening the lock nut and turn the adjusting screw clockwise to increase the spring compression; this will increase the outlet pressure. Similarly, turning the screw counterclockwise will reduce the spring compression and correspondingly reduce the outlet pressure. A slow pressure build up will take place if the outlet is completely blocked off which may take place over a period of time depending on how effective the valve seat is performing and the volume of the discharge piping. For this reason **it is strongly recommended that a relief valve be installed on the outlet side of the valve to protect any equipment damage** that may take place because of this possible pressure build up in a shut off or blocked discharge condition. If the regulator fails to maintain the proper outlet pressure, there could be a number of probable causes as follows: Packing nut may be over tightened, Internal clogging of foreign objects or material, sediment, rust, etc. in the valve seat area. If disassembly is required make sure the valve piping is not under pressure and sufficiently cooled off for operating personnel to handle. When a valve is ordered with socket weld connections, the valve seat must be re-lapped by the customer after the valve is welded to the piping. Every precaution should be made to minimize distortion due to excessive heat during welding. Depending on the degree of distortion caused by welding, it is recommended that lapping be performed with several course grit grades first, and finally finishing with a #600 or better yet a #800 grit to get the best seat finish.

