

Pressure Reducing System with "Watchdog" Hydraulic Backup Valve

Description

The 72S-H Pressure Reducing System maintains a constant downstream pressure regardless of demand or changing upstream pressure. The pressure reducing pilot 8 senses downstream pressure, and modulates the main valve to maintain the set point. When downstream pressure falls below the setting of the pressure reducing pilot 8, the pilot opens allowing the main valve to open to increase pressure to the set point. When downstream pressure rises above the setting of the pressure reducing pilot 8, the pilot closes causing the main valve to throttle toward a closed position to maintain the set point.

The system also includes a "Watchdog" hydraulic backup valve. Should the pressure reducing valve fail to maintain the downstream pressure, the watch-dog begins to modulate at a slightly higher pressure setting via pilot 8X, protecting the system from excessive pressure and ensuring continuous water supply.

Installation

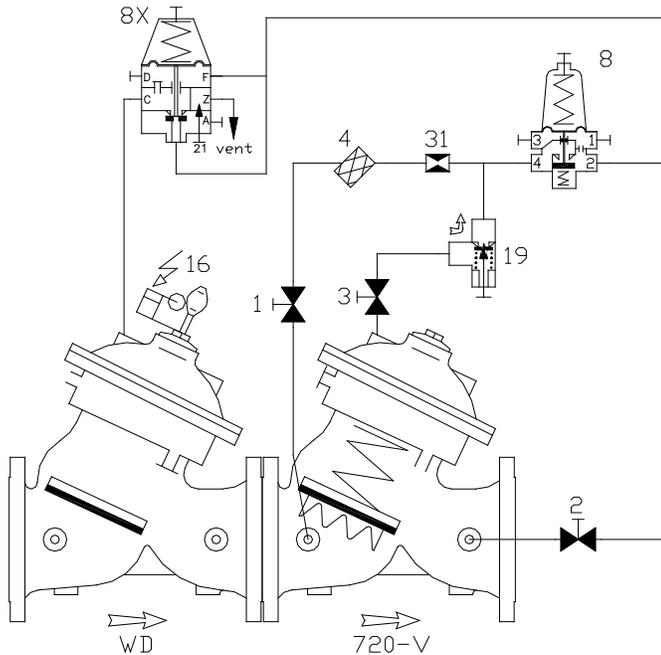
1. Allow enough room around the valve assembly for making adjustments and for future maintenance and disassembly work
2. Thoroughly flush the pipeline to remove dirt, scale, and debris. Failure to perform this operation may render the valve inoperable.
3. It is recommended that isolation valves be installed upstream and downstream of the Bermad control valve system branch to allow for future maintenance operations. A strainer, such as the Bermad model 70F, is also recommended upstream of the pressure reducing system, to prevent debris from damaging the valves during operation.
4. Install the valve in the pipeline with the valve flow arrow on the body casting in the proper direction. For best performance, do not install the valve horizontally with the cover facing down, so that air can be easily purged from the upper control chamber. Make certain the valve is positioned so the actuator can be easily removed for future maintenance requirements.
5. If applicable, run the appropriate conduit and cables to wire a limit switch or position transmitter. See relevant accessories IOM for more information.
6. This valve/system vents water to atmosphere, ensure that there is a floor drain near the valve(s) or install a line to re-direct the vented water to an acceptable area.
7. It is recommended to install a pressure gauge downstream of the pressure reducing valve system.
8. After installation carefully inspect/correct any damaged accessories, piping, tubing, or fittings.

Commissioning & Calibration

NOTE: The Model 72S-H is a system with two connected valves. This manual refers to the pressure reducing valve as the "720-V" and to the watchdog as the "WD". There must be sufficient flow through the valve and system to check and adjust the valve. Insure that a downstream demand is created. **Ball valves 1, 2 & 3 must be open at all times for automatic regulation mode. Needle valves 19 & 21 must be open at least 1/2 to 1 full turn open CCW from the closed position in order to regulate downstream pressure.**

1. The Model 72S-H should be factory set according to the design pressure request. The downstream set pressure is marked on pilot 8's label, and the set pressure for the emergency backup is marked on pilot 8X's label (15-20 psi higher than pilot 8 setting). If there are no marking on the pilot labels or a set-point adjustment is needed proceed to step 5.
2. Fully open the upstream isolation valve and partially open the downstream isolation valve, to fill the consumer line downstream of the pressure reducing system, in a slow and controlled manner. Allow the downstream pressure to stabilize; it should be at the set pressure of the 720-V as marked on pilot 8.
3. Confirm that the supply pressure and the flow through the system are typical. If necessary, create flow by opening a hydrant, or reduce the flow/pressure by adjusting the downstream/upstream isolation valves.
4. Vent air from the control loop by loosening a tube fitting at a highpoint near the 720-V cover, allowing all air to bleed. Retighten the tube fitting.
5. If no set point is marked on the pilots, or system requirements are different than the current set-points:
 - 5.1. Loosen the pilot 8 locknut (on the 720-V), and turn the adjusting screw out, CCW, to release all spring tension. The 72S should close.
 - 5.2. Loosen the pilot 8X locknut (on the WD), and turn the adjusting screw in, CW, for maximum spring compression. The 72S will remain closed.
 - 5.3. Slowly turn the pilot 8 adjusting screw in, CW; the 72S will open and downstream pressure will slowly increase. Set the pressure roughly 30 psi higher than the required set point. Allow the 72S to react and the pressure to stabilize.
 - 5.4. Slowly turn the pilot 8X adjusting screw out, CCW, until downstream pressure begins to fall. Continue slowly turning the adjusting screw until the pressure 15 psi above the required set point. Allow the 72S to react and the pressure to stabilize. Tighten the pilot 8X locknut.
 - 5.5. Slowly turn the pilot 8 adjusting screw out, CCW, until downstream pressure begins to fall again. Continue slowly turning the adjusting screw until the downstream pressure reaches the required set point. Allow the 72S to react and the pressure to stabilize. Tighten the pilot 8 locknut. Fully open the downstream isolating valve.
6. To decrease opening speed or to stabilize the valve reaction, turn needle valve 19 CW; to increase opening speed, turn needle valve 19 CCW. The same process applies to needle valve 21.
7. Set the limit switch cam to barely touch the limit switch roller wheel. The switch should close the circuit as soon as the WD begins to regulate. The signal should trigger an alarm in the Building Management System
8. Calibrating Pressure Reducing Systems that include parallel By-Pass PRVs, require calibrating each of the PRVs separately, while the parallel PRV system branches are closed. Calibration should refer to a shared pressure gauge, installed downstream from the system. For best & long term performance, larger PRV set points should be 5-10 psi to lower than smaller, low flow bypass, PRV set points.

Control Loop Diagram



PART LIST

1-3	Ball Valve
4	Y-Control Filter
8	2W Pressure Reducing Pilot
8X	3W Pressure Reducing Pilot
16	Limit Switch
19	Needle Valve, Opening Speed for 720-V
21	Needle Valve, Opening Speed for WD
31	Restriction Orifice (Red Marking)
720-V	Pressure Reducing Valve with V-Port
WD	"Watchdog" Hydraulic Backup Valve

Troubleshooting

Symptom

Either Valve Fails to Open

Possible Cause

- Insufficient inlet pressure.
- No downstream demand.
- Insufficient pilot 8 (for the 720-V) or pilot 8X (for the WD) spring compression.
- Ball valve 2 or 3 is closed.
- Needle valve 19 (for the 720-V) or 21 (for the WD) is closed.

Solution

- Check/create inlet pressure.
- Create demand/flow
- Readjust pilot 8 & 8X. See step 5 of the commissioning instructions.
- Open ball valve 2 & 3.
- Re-adjust needle valves 19 & 21. See step 6 of the commissioning instructions.

Either Valve Fails to Close or Regulate

- Filter 4 plugged/clogged.
- Excessive pilot 8 (for the 720-V) or pilot 8X (for the WD) spring compression.
- Ball valve 1 or 3 is closed.
- Regulated pressure pulsates or hunts.
- Debris trapped in main valve.
- * Diaphragm in main valve ruptured or diaphragm assembly loose.

- Remove filter 4 and clean screen.
- Readjust pilot 8 & 8X. See step 5 of the commissioning instructions.
- Open ball valves 1 & 3.
- Bleed air from valve cover. Ensure flow rate is above recommended minimum.
- Remove actuator assy. to inspect seat area/verify valve stroke/remove debris.
- *After closing ball valves 1 & 2, remove small cover plug at valve cover. Continuous flow indicates diaphragm leakage. Inspect, tighten, and/or replace Diaphragm.

***CAUTION:** Valve will be fully open. Close the downstream isolation valve or omit this test if this condition may cause system damage.