

## **PRESSURE REDUCING SYSTEM With Hydraulic Back-up Valve, Low Flow Bypass and Pressure Relief Valve**

**Model: BC-72S-B2H-P** (Sizes 1.5" - 8"; DN40-200)

### **Description**

72S-B2H is potable water pressure reducing system that combines hydraulically operated emergency backup valve, relief device and integral off peak flow modulation. The system reduces higher upstream pressure to lower constant downstream pressure regardless of fluctuating demand or varying upstream pressure. It protects the consumers from excessive pressure and ensures continues water supply in emergency situations.

The "Watchdog" backup valve is fully open in normal operation due to its double chamber configuration, minimizing head loss and maximizing flow through the valve. Should pressure rise downstream of the BERMAD BC-720-P because of valve failure, the "Watchdog" quickly responds and triggers an alarm, while providing stable pressure to consumers until the PRV is repaired.

### **Installation**

1. Ensure enough space around the system assembly for future maintenance and adjustments
2. Prior to valve installation, flush the pipeline to ensure a flow of clean fluid through the valves.
3. After flushing ensure that the main strainer and the control loop filter are clean.
4. For future maintenance, install Isolation Valves upstream and downstream of the control valve system
5. Install the system in the pipeline with the valves flow direction arrow in the actual flow direction. When applicable use the lifting ring provided on the valves cover for installing the valve
6. For best performance, it is recommended to install the system horizontally and upright. For different valve positions – consult Bermad
7. 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.
8. After installation carefully inspect/correct any damaged accessories, piping, tubing, or fittings.
9. Install a pressure gauge downstream of the system.
10. It is highly recommended to install a Bermad strainer (model 70F) upstream of the system, to prevent debris from damaging the valve's operation

### **Commissioning**

NOTE: the 72S-B2H is a system with two diaphragm valves. This manual refers to the main PRV in the downstream as "main valve" and to the back-up valve in the upstream as "Watchdog back-up valve".

Refer to the P&ID in the last page to identify each component.

1. Verify that you have typical upstream pressure.
2. Confirm that cock valves [1], [2], [3] & [1B], [2B] are open (handle parallel to cock-valve body), and open all service valves on the pressure gauges.
3. The pressure reducing system will have been calibrated at the factory and the set pressures will be indicated on the system different components:
  - 3.1. On the main valve pilot [2PBL] – indication for set pressure at normal-high flows.
  - 3.2. On the Direct Acting Pressure Reducing Valve [DPRV-CAP] – indication for set pressure at low and no-flow conditions.
  - 3.3. On the "Watchdog" back-up Valve pilot [#X] – indication for set pressure at emergency modulation.
  - 3.4. On the Direct Pressure Relief Valve [3HC-R] – indication for set pressure to relief excessive peak pressures.
4. If the system needs to be reset follow the instructions in the **Calibration** chapter of this document, if not continue with the Commissioning instructions.
5. Slowly fully open the upstream isolating valve and partially the downstream isolating valve to fill the pipe in a controlled fashion.
6. Vent air from the valve's control loop by loosening a cover tube fitting at the highest point, allowing all air to bleed. Retighten the tube fitting eyebolt.
7. Fully open the downstream isolation valve whilst verifying continued correct downstream pressure
8. The BC-72S-B2H-P pressure reducing system is now operational and in service
9. For indication of the back-up valve operation, connect the Limit Switch [S] to the building management system.
10. To avoid water potential water damage connect the pressure relief valve [3HC-R] and the back-up valve pilot [X] vent to proper drainage.



**Calibration**

1. If the set pressure is either different from the design or the requirements have been changed. The system will need to be readjusted.
2. Calibration of the system should be done according to the desired pressure when there is *low or no flow* in the system, according to this table:

| Set pressure       |     | Low or no-flow | Normal and high flows | Back-up | Relief  |
|--------------------|-----|----------------|-----------------------|---------|---------|
| Calibration device |     | [DPRV-CAP]     | [2PBL]                | [X]     | [3HC-R] |
| Calibration offset | bar | 0              | -0.5                  | +0.7    | +1.7    |
|                    | psi | 0              | -7                    | +10     | +25     |

3. Prepare the system to be calibrated:
  - 3.1. Loosen the main valve pilot [2PBL] adjustment screw locking nut and release the adjustment screw turning it **counter-clockwise** until it is completely loose.
  - 3.2. Close the 2 way ball valve [1B] while leaving the 2 way ball valve [2B] open.
  - 3.3. Loosen the back-up valve pilot [X] adjustment screw locking nut and tighten the adjustment screw turning it **clockwise** until it is completely in.
  - 3.4. Loosen the direct acting relief valve [3HC-R] adjustment screw locking nut and tighten the adjustment screw turning it **clockwise** until it is completely in.
4. Slowly fully open the upstream isolating valve and partially the downstream isolating valve, the main valve will close shortly after opening the upstream isolation valve.
5. Slowly turn the main valve pilot [2PBL] adjusting screw **clockwise** to allow the valve to open and fill downstream pipe-line, when the line is full create a typical flow by opening a faucet or other small consumer.
6. Continue to turn the main valve pilot [2PBL] adjusting screw **clockwise** and increase downstream pressure until you reach 0.7 bar (10 psi) above the set pressure at low flow conditions.
7. Calibration of the direct acting relief valve [3HC-R]:
  - 7.1. Slowly turn the pressure relief valve adjusting screw **counter-clockwise** until some water start to discharge from it.
  - 7.2. Turn the adjustment screw **clockwise** 1/2 a turn and tighten the locking nut.
8. Calibration of the "watchdog" back-up valve:
  - 8.1. Slowly turn the back-up valve pilot [X] adjusting screw **counter-clockwise** while monitoring the downstream pressure gauge, do so until the back-up valve starts to modulate the downstream pressure (you will notice the indicator switch [S] moving and some water will discharge from the pilot).
  - 8.2. As soon as this happens turn the screw back about 1/8 of a turn and tighten the locking nut.
9. Calibration of the main pressure reducing valve:
  - 9.1. Slowly turn the main pressure reducing valve pilot [2PBL] adjusting screw **clockwise** while monitoring the downstream pressure gauge, do so until the downstream pressure reaches 0.5 bar (7 psi) below the set pressure at low flow conditions.
  - 9.2. Allow the 720 main valve to react and the pressure to stabilize. When the correct pressure is confirmed retighten the adjustment screw locking nut.
10. Calibration of the Direct Acting Pressure Reducing valve by-pass:
  - 10.1. Make sure the flow through the system is limited to one faucet or small consumer.
  - 10.2. Close ball valve [2], this will shut-off the main pressure reducing valve.
  - 10.3. Open ball valve [1B].
  - 10.4. Adjust the downstream pressure by turning the [DPRV-CAP] adjustment cap.
  - 10.5. Re-open ball valve [2] and verify correct downstream pressure.
11. Vent air from the valve's control loop by loosening a cover tube fitting at the highest point, allowing all air to bleed. Retighten the tube fitting eyebolt.
12. Fully open the downstream isolation valve whilst verifying continued correct downstream pressure
13. The BC-72S-B2H-P pressure reducing system is now operational and in service
14. For indication of the back-up valve operation, connect the Limit Switch [S] to the building management system.
15. To avoid potential water damage connect the pressure relief valve [3HC-R] and the back-up valve pilot [X] vents to proper drainage.



**Trouble-Shooting**

| Symptom                                       | Possible cause   | Solution   |
|---|--|--|
| Either valves fails to open                   | Insufficient inlet pressure  | Check/create upstream pressure   |
|   | No downstream demand   | Create demand/flow   |
|   | Pilots #X or #2PBL out of calibration  | Readjust pilot #2PBL or #X according to the calibration instructions   |
|   | Ball valves 2 or 3 are closed  | Open ball valves 2 and 3   |
| Either valves fails to close or regulate      | Filter [4] plugged/clogged   | Clean filter [4]   |
|   | Pilots [X] or [2PBL] out of calibration  | Readjust pilot [2PBL] or [X] according to the calibration instructions   |
|   | Ball valves 1 or 3 are closed  | Open ball valves 1 and 3   |
|   | Regulated pressure pulsates or hunts   | Bleed air from the main valve cover.<br>Insure the by-pass [DPRV-CAP] is adjusted above the main valve and that ball valves 1B&2B are open.  |
|   | Debris trapped in the valve seat   | Remove actuator assy. To inspect seat area/verify valve stroke/remove debris.  |
|   | Diaphragm in main valve ruptured or diaphragm assembly loose   | After closing ball valves 1&2, remove small plug at valve cove, continues flow indicates diaphragm leakage. Inspect tighten and replace diaphragm.   |
| Watchdog [X] pilot discharges water from vent | The back-up watchdog valve is operational because the main valve fails to close or regulate.               | Check the main valve according to the list above.  |
|   | The back-up watchdog valve is operational because the low flow by-pass fails to close or regulate          | Close ball valve 1B, watchdog limit switch [S] moving up and normal downstream pressure indicates the main valve is regulating normally.<br>close ball valve 2B and check or replace [DPRV-CAP]. |
| Pressure relief valve [3HC-R] discharge water | One or more of the regulation components [2PBL], [X], [DPRV-CAP] fails to regulate or set to high pressure | Re-calibrate the system according to the calibration instructions.   |

**Preventative Maintenance**

1. System operating conditions and water quality will affect the valve and should be checked periodically to determine the required interval for preventative maintenance. The schedule below assumes good conditions and should be considered a minimum requirement.
2. Maintenance instructions:
  - 2.1.1. Tools required:
    - 2.1.1.1. Metric and imperial wrenches
    - 2.1.1.2. Anti seize grease
  - 2.2. Weekly:
    - 2.2.1. Visual inspection to locate leaks and external damages
    - 2.2.2. Check pressure gauge read correct pressures
  - 2.3. Yearly:
    - 2.3.1. Close isolating valves and clean strainer and control loop filters.
    - 2.3.2. Perform a functional test including a closing test to verify valve sealing.
  - 2.4. 3 – 5 Yearly:
    - 2.4.1. Inspect the internal condition of the valve.
    - 2.4.2. Open the stud nuts and remove the actuator as one unit from the valve body. Disassemble necessary control tubes
  - 2.5. Disassemble the actuator and examine its parts carefully for signs of wear, corrosion, or any other abnormal conditions
  - 2.6. Replace worn parts and all the Elastomers. Lubricate the bolts and studs threads with Anti seize grease.
3. It is highly recommended to stock a reserve actuator assembly for each size. This allows minimal field work and system downtime

**Spare parts**

Bermad has a convenient and easy to use ordering guide for valve spare-parts and control system components at

<http://www.bermad.com/downloads>

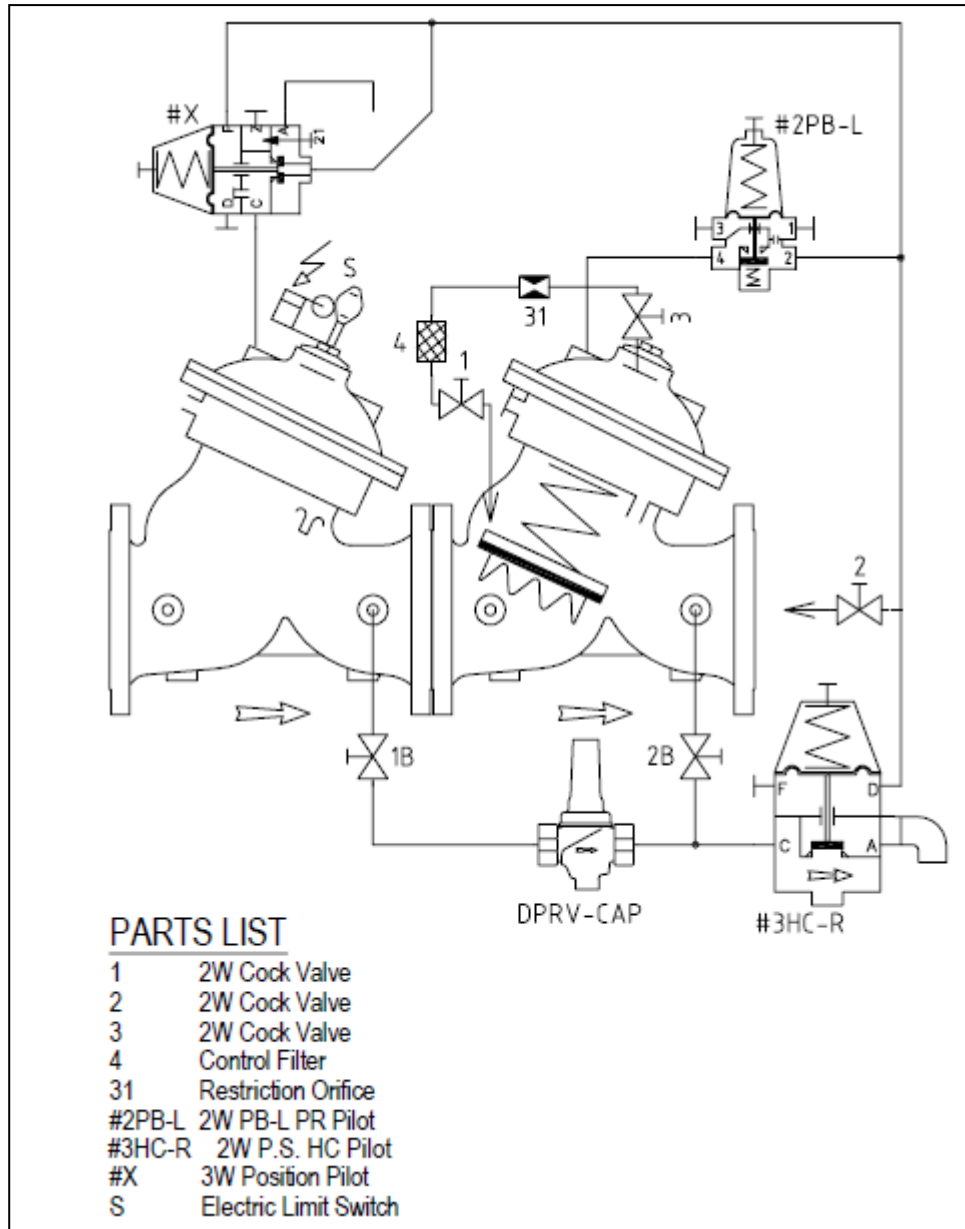
For solenoid valves refer to model and S/N on solenoid tags.



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