The Cla-val Model 90-48 Pressure Reducing Valve with Low Flow By-Pass automatically reduces a higher inlet pressure to a steady lower downstream pressure regardless of changing flow rate. The pressure reducing valve is hydraulically operated and controlled by a CRD pilot control, which senses pressure at the main valve outlet. An increase in outlet pressure forces the CRD pilot control to close and a decrease in outlet pressure opens the control. This causes the main valve cover pressure to vary, modulating the main valve and thereby maintaining constant outlet pressure. The control system is very sensitive to slight pressure changes and immediately controls the main valve to maintain the desired downstream pressure. Pressure setting adjustment is made with a single adjusting screw.

**INSTALLATION**
1. Allow sufficient room around the valve assembly to make adjustments and for servicing.
2. It is recommended that gate or line block valves be installed on both ends of the 90-48/690-48 valve assembly to facilitate isolating the valve for maintenance. Minimum one pipe diameter apart.

**NOTE: BEFORE THE VALVE IS INSTALLED, PIPE LINES SHOULD BE FLUSHED OF ALL CHIPS, SCALE, AND FOREIGN MATTER.**
3. Place the valve assembly in the line with flow through the valve in the direction indicated on the inlet plate or by flow arrows. Check all fittings and hardware for proper makeup and that no apparent damage is evident. Be sure main valve cover nuts/bolts are tight. Pressure in some applications can be very high so be thorough in checking and inspecting for proper installation and makeup.

4. Cla-Val Valves operate with maximum efficiency when mounted in horizontal piping with the cover UP; however, other positions are acceptable. Due to size and weight of cover and internal components of six inch and larger valves, installation with the cover up is advisable. This makes periodic inspection of internal parts readily accessible.

5. Cla-Val Valves and Controls require no lubrication or packing and a minimum of maintenance. However, a periodic inspection schedule should be established. Minimum of once per year. 2. Repair and maintenance procedures of the Cla-Val Hytrol Main Valve and pilot control components are included in a more detailed IOM manual. It can be downloaded from our web site (www.cla-val.com) or obtained by contacting a Cla-Val Regional Sales Office.

3. When ordering parts always refer to the catalog number and stock number on the valve nameplate.

**OPERATION AND START-UP**
1. Prior to pressurizing the valve assembly make sure the necessary gauges to measure pressure in the system are installed as required by the system engineer. A Cla-Val X101 Valve Position Indicator may be installed in the center cover port to provide a visual indication of the valve movement during start-up.

**CAUTION:** During start-up and test procedures a large volume of water may be discharged downstream. Check that the downstream venting is adequate to prevent damage to personnel and equipment. All adjustments in pressure should be made slowly while under flowing conditions. If the main valve closes too fast it may cause surging in upstream piping. If isolation valves (B) are installed in pilot system open these valves (see schematic).

3. Optional Cla-Val CV Flow Controls (C or S) provide adjustable regulation of flow in and out of the main valve chamber to minimize pulsations that sometime occur at very low flow rates. If CV Controls are installed, loosen jam nut and turn adjustment screw counterclockwise from closed position 3.5 turns for an initial setting.

4. Open the upstream gate or block valve just slightly to allow the main valve assembly and pilot system to fill with liquid. Downstream gate or block valve must be closed.

5. Carefully loosen tube fittings at highest points and bleed air from pilot control system. Carefully loosen the plug at top of main valve cover to bleed air from cover. If an indicator is installed, carefully loosen the air bleed valve at top of indicator. Tighten tube fittings.

6. Open the upstream gate or block valve fully.

7. Slowly open the downstream gate or block valve. Flow should occur and pressure should remain constant.

8. Adjust the Pilot Controls to desired pressure. To change pressure setting, turn the adjusting screw clockwise to increase pressure, counterclockwise to decrease pressure. There must be liquid flowing through the valve during pressure adjustments. When the desired setting has been made, tighten jam nut and replace CRD cover. Low flow by-pass control (4) must be set higher (minimum 5 psi) than main CRD (3).

9. To check the operation of the valve, open and close the downstream gate valve. The downstream pressure should remain constant.

10. If opening and closing speed controls (C or S) are installed in the valve pilot system, fine tune the opening and closing speed of the main valve while performing step 9. Turn the CV adjustment screw clockwise on the opening speed control to make the main valve open slower. Turn the adjustment screw counterclockwise on the closing speed control to make the main valve close slower. When adjustments have been completed tighten jam nuts.

**MAINTENANCE**
1. Cla-Val Valves and Controls require no lubrication or packing and a minimum of maintenance. However, a periodic inspection schedule should be established. Minimum of once per year.

2. Repair and maintenance procedures of the Cla-Val Hytrol Main Valve and pilot control components are included in a more detailed IOM manual. It can be downloaded from our web site (www.cla-val.com) or obtained by contacting a Cla-Val Regional Sales Office.

3. When ordering parts always refer to the catalog number and stock number on the valve nameplate.

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**SYMPTOM** | **PROBABLE CAUSE** | **REMEDY**
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Main valve fails to open | No pressure at valve inlet | Check inlet pressure |
Main valve diaphragm assembly inoperative | Disassemble, clean and polish stem, replace defective parts |
Pilot Valve (CRD) not opening: | 1. No spring compression | 1. Tighten adjusting screw |
2. Damaged spring | 2. Disassemble and replace |
3. Spring guide not in place | 3. Assembly properly |
4. Yoke dragging on inlet nozzle | 4. Assembly properly |
Flow Control (CV) disc inoperative, corrosion or excessive scale buildup on stem | Disassemble, clean and polish stem, replace worn parts |
Main valve fails to close | Foreign matter between disc and seat or worn disc, Scale on stem or diaphragm ruptured | |
Flow Clean Strainer plugged | Remove and clean or replace |
CK2 (isolation valves) closed | Open isolation valves |
Pilot Valve (CRD) remains open: | 1. Spring compressed solid | 1. Back off adjusting screw |
2. Mechanical obstruction | 2. Disassemble and remove obstruction |
3. Worn disc | 3. Disassemble remove and replace disc retainer assembly |
4. Yoke dragging on inlet nozzle | 4. Assembly properly |
5. Diaphragm damaged or loose diaphragm nut, Leakage from vent hole in cover | 5. Disassemble, replace diaphragm and/or tighten nut |
Fails to regulate | Air in main valve cover and/or tubing | Loosen top cover plug and fittings and bleed air |
Pilot Valve (CRD) yoke dragging on inlet nozzle | Assemble properly |
Pilot Valve (CRD) spring not in correct range to control | Check outlet pressure requirements and compare existing spring with Spring Chart |
CRD-40 Adjustment Range
15 to 150 psi

**CRD adjust range (psi) Spring Color psi change per turn**

<table>
<thead>
<tr>
<th>Range</th>
<th>Color</th>
<th>Change per Turn</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 - 30</td>
<td>Stainless Steel</td>
<td>3</td>
</tr>
<tr>
<td>15 - 75</td>
<td>Red</td>
<td>9</td>
</tr>
<tr>
<td>30 - 300</td>
<td>Green</td>
<td>27</td>
</tr>
</tbody>
</table>

* approximate. Use gauge at valve outlet to set

**KO Anti-Cavitation Trim Option**

**KO Anti-Cavitation Trim can be added to any standard Hytrol Valve**