



— MODEL — **93-01/693-01**

# Pressure Reducing & Solenoid Shutoff Valve

### INTRODUCTION

The Cla-Val Model 93-01/693-01 is an automatic valve designed to reduce a higher inlet pressure to a steady lower downstream pressure regardless of changing flow rate and/or varying inlet pressure. It is a hydraulically operated, pilot controlled, diaphragm type globe or angle valve.

When downstream pressure exceeds the pressure setting of the control pilot the main valve and pilot valve close drip tight. 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 that has a protective cap to discourage tampering. A solenoid control is provided to intercept the operation of the pressure reducing control to close or open the main valve.

### INSTALLATION

1. Allow sufficient room around the valve assembly to make adjustments and for disassembly.

2. It is recommended that either a gate or block valve be installed upstream and downstream of the 93-01/693-01 Valve to facilitate isolating the valve for maintenance.

**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 nameplate 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 valves and larger, installation with the cover up is advisable. This makes periodic inspection of internal parts readily accessible.

5. Caution must be taken in the installation of this valve to insure that galvanic and/or electrolytic action does not take place. The proper use of dielectric fittings and gaskets are required in all systems using dissimilar metals.

6. Comply with local and national electrical codes when wiring the Solenoid Control (5).

### 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 Model X101 Valve Position Indicator may be installed in the center cover port to provide a visual indication of the valve stem 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.

2. If isolation valves (B) are installed in pilot system, open these valves (see schematic).

3. The three-way Solenoid Control applies or relieves pressure in the cover chamber of the Auxiliary Hytrol Valve (4) in the control piping. The following action takes place:

4. When the Solenoid allows the main valve to open, the CRD Pressure Reducing Controls (3) is in command of Hytrol Main Valve.

5. Open the upstream gate or block valve just slightly to allow the valve assembly and control system to fill with liquid.

6. Carefully loosen tube fittings at highest points and bleed air from the system. Loosen the vent valve at the top of the main valve cover. If an X-101 Valve Position Indicator is installed, carefully loosen the vent valve at top of the Indicator. Bleed air from the cover and tighten plug or bleed screw. Tighten tube fittings.

7. Open fully the upstream gate or block valve carefully.

8. Slowly open the downstream gate or block valve. Flow should occur and discharge pressure should increase to the set point of the CRD Control and remain constant.

9. Adjust the CRD Control to desired outlet pressure. To change pressure setting, turn the adjusting screw clockwise to increase pressure, counter-clockwise to decrease pressure. There should be flow through valve during outlet pressure adjustments. When the desired setting has been made, tighten jam nut and replace cover.

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

11. 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 10. Turn the adjustment stem on the closing speed control "C" clockwise to make the main valve close slower. Turn the adjusting stem on the opening speed control "S" clockwise to make the main valve open slower. When adjustments have been completed, tighten the jam nuts.

12. To check the operation of the solenoid shutoff feature, alternately energize and de-energize the solenoid to open and close the main valve. The main valve should alternately close drip tight and open to set point of the CRD. The optional manual operator on solenoids overrides operation by shifting it to the energized position when small red knob is fully turned clockwise. By turning small red knob counter-clockwise fully normal solenoid operation is restored.

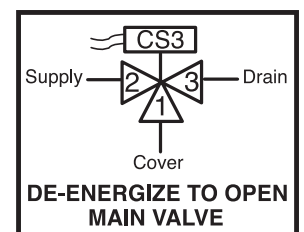
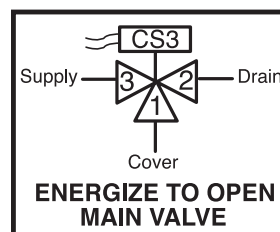
### MAINTENANCE

1. Cla-Val Valves and Controls require no lubrication or packing and a minimum of maintenance. However, a periodic inspection schedule should be established to determine how the fluid handled is affecting the efficiency of the valve assembly. Minimum of once per year

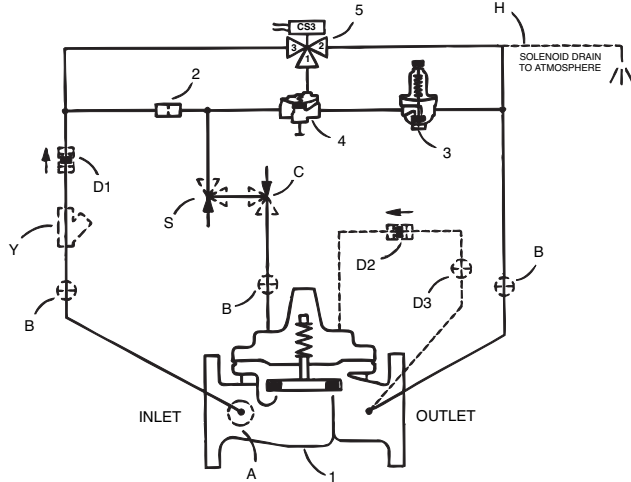
2. Repair and maintenance procedures of the Cla-Val Hytrol Main Valve and pilot control components are included in a more detailed IOM manual. It can be downloaded from our web site ([www.claval.com](http://www.claval.com)) or obtained by contacting a Cla-Val Regional Sales Office.

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

SOLENOID CONTROL (5)		ENERGIZED TO OPEN CLA-VAL 93-01	DE-ENERGIZED TO OPEN CLA-VAL 93-01
POSITION	PORT FLOW	AUXILIARY (4) AND MAIN VALVE (1)	AUXILIARY (4) AND MAIN VALVE (1)
ENERGIZED	1 TO 2	OPEN RELIEVES COVER PRESSURE	CLOSED APPLIES COVER PRESSURE
DE-ENERGIZED	1 TO 3	CLOSED APPLIES COVER PRESSURE	OPEN RELIEVES COVER PRESSURE



### 93-01/693-01 SCHEMATIC



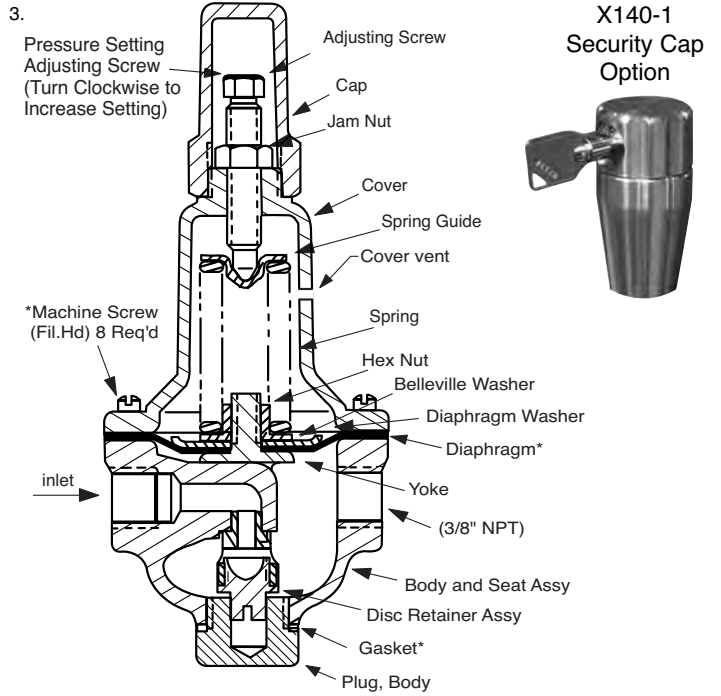
**BASIC COMPONENTS**

- 1 100-01 Hytrol (Main Valve)
- 100-20 600 Series Hytrol (Main Valve)
- 2 X58C Restriction Tube Fitting
- 3 CRD Pressure Reducing Control
- 4 100-01 Hytrol - Rev. Flow
- 5 CS3 Solenoid Control

**OPTIONAL FEATURES**

- A X46A Flow Clean Strainer
- B CK2 (Isolation Valves)
- C CV Flow Control - Closing
- D Check Valves with Isolation Valve
- H Solenoid Drain to Atmosphere
- S Opening Speed Control
- Y X43 "Y" Strainer

### CRD



CRD adjust range (psi)	Spring Color	psi change per turn*
2 - 30	Stainless Steel	3
15 - 75	Red	9
30 - 300	Green	27

\* approximate. Use gauge at valve outlet to set

### X58C

2.



### CRD

3.



### CS3

5.



### X46A

A.



### CK2

B.

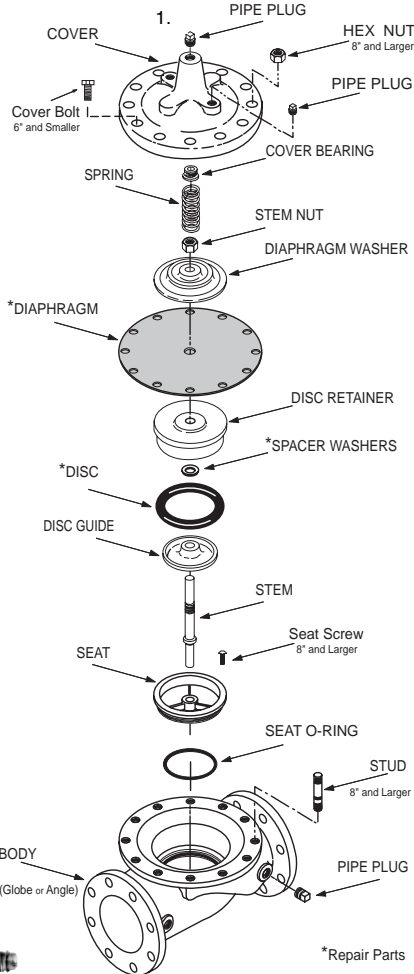


### CV

C.



### HYTROL MAIN VALVE



\*Repair Parts

SYMPTOM	PROBABLE CAUSE	REMEDY
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
	Pressure Reducing Control (CRD) not opening:	
	1. No spring compression 2. Damaged spring 3. Spring guide not in place 4. Yoke dragging on inlet nozzle	1. Tighten adjusting screw 2. Disassemble and replace 3. Assemble properly 4. Assemble properly
Main Valve Fails to Close	Flow Control (CV) disc inoperative, corrosion or excessive scale buildup on stem	Disassemble, clean and polish stem, Replace worn parts
	Foreign matter between disc and seat or worn disc. Scale on stem	Disassemble main valve remove foreign matter, clean or replace damaged parts
	Diaphragm damaged	Remove and clean or replace units
	X46 Flow Clean Strainer plugged, or X43 "Y" Strainer plugged	Remove and clean or replace units
	CK2 (isolation valves) closed	Open isolation valves
	Pressure Reducing Control (CRD) remains open:	
Fails to Regulate	1. High spring compression 2. Damaged spring 3. Spring guide not in place	1. Back off adjusting screw 2. Disassemble and remove obstruction 3. Disassemble and replace
	4. Yoke dragging on inlet nozzle 5. Diaphragm damaged or loose diaphragm nut. Leakage from vent hole in cover 6. Worn or damaged disc retainer assembly	4. Assemble properly 5. Disassemble, replace diaphragm and/or tighten nut 6. Remove and replace
	Air in main valve cover and/or tubing	Loosen top cover plug and/or tubing fining and bleed air
Solenoid Valve will not Operate	Pressure Reducing Control (CRD) yoke dragging on inlet nozzle	Assemble properly
	Pressure Reducing Control (CRD) spring not in correct range to control	Check outlet pressure requirements and compare existing spring with chart
<b>SOLENOID SYMPTOMS</b>		
Solenoid Voltage	Solenoid voltage	Check voltage across coil leads must be minimum of 85% of nameplate rating
	Burned out solenoid coil	Check for open circuit coil Replace coil

For a more detailed IOM Manual go to [www.cla-val.com](http://www.cla-val.com) or contact a Cla-Val Regional Sales Office.