



# Rate of Flow Controller & Pressure Reducing Valve

## INTRODUCTION

This manual titled the 49-01 Series Combination Rate of Flow Controller and Pressure Reducing Valve contains information for installation, operation and maintenance of the valve and control system.

The Cla-Val 49-01 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, as long as the flow rate is below a preset maximum. The automatic valve also prevents excessive flow by limiting flow to a preselected maximum rate.

The Cla-Val 49-01 is a single seated, hydraulically operated, pilot controlled diaphragm type globe or angle valve. The pilot system includes a direct acting, spring loaded, pressure reducing pilot (CRA) and a rate of flow differential control (CDHS-18).

## INSTALLATION

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

2. It is recommended that gate or line block valves be installed upstream and downstream of the Cla-Val valve assembly to facilitate isolating the valve for preventive maintenance.

**NOTE:** BEFORE THE VALVE IS INSTALLED, PIPE LINES SHOULD BE FLUSHED OF ALL CHIPS, SCALE AND FOREIGN MATTER.

3. Place valve in 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. For best control, it is recommended that the orifice plate restriction be installed 1 to 5 pipe diameters downstream of the main valve. The flow arrows should be pointing to the downstream side of the system.

5. A sensing line, supplied by other than Cla-Val, must be connected between the orifice plate holder and the Differential Control. See dotted lines on schematic drawing.

6. 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.

7. 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.

## OPERATION AND START-UP

1. Operation of the Cla-Val 49-01 Series Valve is fully automatic once the flow rate and reduced pressure settings have been made. Modulation in the main valve is brought about by the action of the pressure reducing and differential pilot controls. Throttling of either of these controls in response to changes in the flow rate or downstream pressure produces a change in the flow rate through the control system. This, in turn, causes changes in the main valve cover chamber pressure.

It is the constant variations of main valve cover chamber pressure which forces the main valve to seek new throttling positions in response to slight changes in the flow rate or downstream pressure.

The controls are so arranged that the reducing control is in command

of the main valve only when the flow rate is below the setting of the differential control. The valve, therefore, holds a constant delivery pressure. If, however, the flow rate reaches the preset maximum the differential control takes command and holds the flow rate at the desired maximum. Under these conditions of increased demand the downstream pressure falls below the normal reduced pressure.

2. Prior to pressurizing the valve assembly, make sure the necessary gauges are installed, to measure required pressure and flow, as designated 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 stem position during startup adjustment.

**CAUTION:** During startup 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.

3. With the downstream block valve closed, slowly open upstream block valve. If isolation valves are installed, as shown on the schematic, open these valves slowly.

4. Carefully loosen the pipe plug at top of cover assembly. If a Valve Position Indicator is installed, loosen the vent plug at top of Indicator. Bleed air from cover and retighten plug.

5. Carefully loosen tube fittings at highest points and bleed air from system. Retighten fittings.

**NOTE:** Be sure the sensing line (dotted line shown on schematic), which connects the orifice plate to the CDHS-18 and the CRA Control, is installed. This sensing line is supplied by the contractor or others. The 49-01 system will not function unless this sensing line is installed. The line should be routed without any high spots above the control connections. Be sure to bleed air from line at the control fittings.

6. Turn the CRA Control adjusting screw clockwise until spring is fully compressed. **DO NOT FORCE.** This puts the control in a full open mode.

7. Slowly open downstream block valve and adjust the CDHS-18 Control, turning the adjusting screw slowly counterclockwise until the main valve closes. Adjust for rate of flow by turning adjusting screw slowly clockwise.

8. Reduce flow rate to a value below the setting of CDHS-18 Control by closing downstream block valve or other means, then turn the adjustment screw on the CRA Control counterclockwise until the main valve begins to close. Adjust for outlet pressure requirements.

9. Check operation of controls by changing flow and pressure in the piping system.

10. If opening and closing speed controls (Cla-Val CV) are installed on the valve assembly, fine tune the opening and closing speed of the main valve while performing step 9.

11. The rate of flow and pressure reducing feature is outlined in Cla-Val engineering drawing 76573 included in this manual.

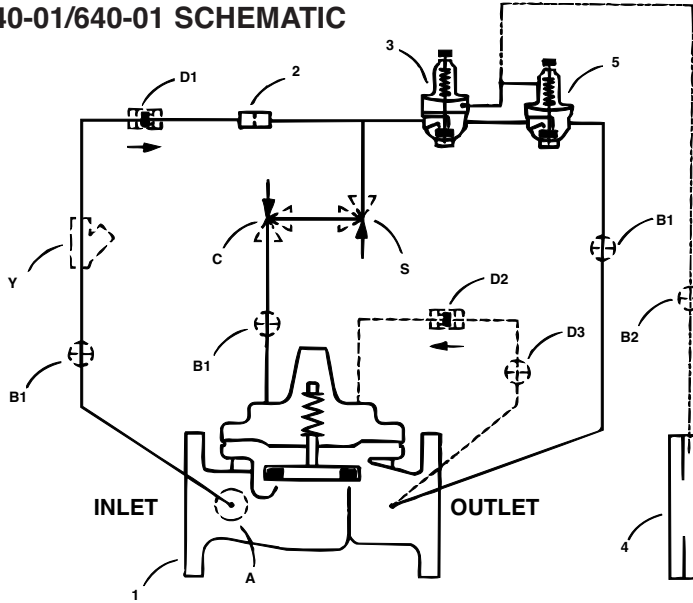
## MAINTENANCE

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.

2. Repair and adjustment procedures of the main valve and control components are included in separate sections of the manual. Accessory components are listed for reference.

3. Refer to the Service Suggestions Chart to identify operation symptoms.

# 40-01/640-01 SCHEMATIC



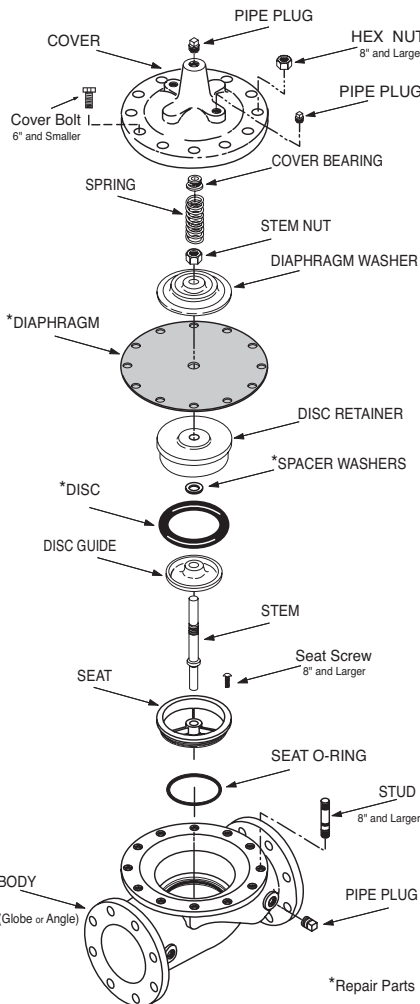
### BASIC COMPONENTS

- 1 100-01 Hytrol (Main Valve)
- 100-20 600 Series Hytrol (Main Valve)
- 2 X58C Restriction Fitting
- 3 CRA Pressure Reducing Control
- 4 X52A-1 Orifice Plate Assembly
- 4 CDHS18 Differential Control

### OPTIONAL FEATURES

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

## 1. HYTROL MAIN VALVE



X140-1  
Security Cap  
Option



X58C  
2.



CDHS18  
5.



CV  
C.



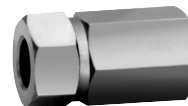
CRA  
3.



X46A  
A.



CDC-1  
D.



X52A-1  
4.

Flow →



CK2  
B.



X43  
Y.



## SERVICE SUGGESTIONS

SYMPTOM	PROBABLE CAUSE	REMEDY
Main valve won't open.	Controls not adjusted properly.	Readjust controls.
	Orifice port and/or orifice sensing line clogged.	Remove line and clean orifice port. Clean or replace line.
	Control line shutoff cock to cover, main valve outlet, and/or orifice sensing line closed.	Open shutoff cock.
	Either of the pilot valves stuck closed. Mineral deposits or foreign matter under disc retainer assembly.	Remove plug and disc retainer assembly. Clean or replace.
	Main valve stuck closed. Mineral buildup on stem. Stem damaged.	Disassemble valve, clean parts and/or replace damaged parts.
Main valve won't close.	Controls not adjusted properly.	Readjust controls.
	CRA and/or CDHS-18 Control has foreign matter or mineral buildup on yoke assembly.	Disassemble and clean parts.
	CDHS-18 Control has foreign matter or mineral buildup above diaphragm.	Disassemble and clean parts.
	Diaphragm of either control leaks or stuck. Diaphragm nut loose.	Disassemble and clean parts.
	Clogged restriction assembly.	Remove and clean.
	Clogged Flow Clean Strainer.	Remove and clean or replace.
	Control line shutoff cock from inlet to restrictor closed.	Open shutoff cock.
	CV Flow Control closed or clogged.	Readjust or disassemble and clean.
	Pilot control (CRA or CDHS-18) disc worn or nicked. Fails to seat.	Remove disc retainer assembly and replace.

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.