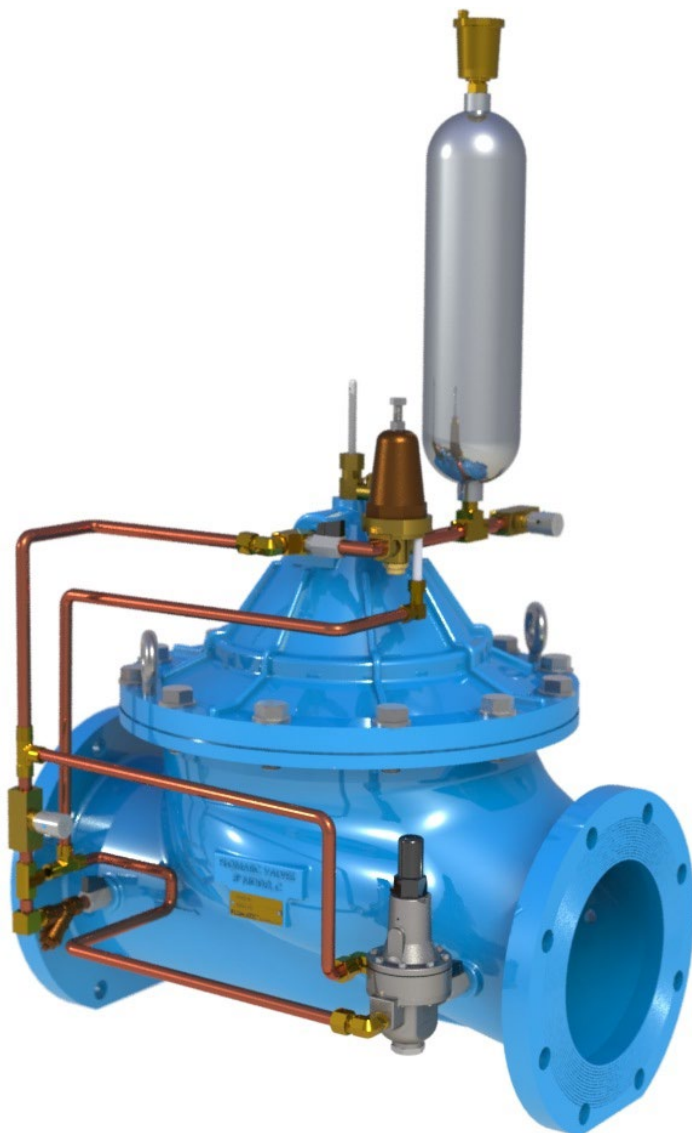


Automatic Control Valve Operation & Maintenance Manual

Model C501/CA501 Surge Arrestor Valve



Serial Number: _____

Valve Model: _____

Size: _____

Serial Number: _____

Low Pressure Pilot Setting : _____ PSI

Pressure Relief Pilot Setting: _____ PSI

System Pressure: _____ PSI

Installation Date: _____

Name: _____

Note:

**Place this Valve Product Manual in a safe place and with a person responsible for the operation and maintenance of this valve.
Refer to Model and Serial Number above when ordering parts.**

Automatic Control Valve Operation & Maintenance Manual

Model C501/CA501 Surge Arrestor Valve

The Model 501 Surge Arrestor Valve controls over pressure and under pressure conditions. The pilot operated control valve opens quickly to dissipate high surge pressure that exceeds a predetermined relief pressure setting that can occur during pump start. The control valve also opens quickly for low surge pressure conditions that can occur during normal pump shut down, electric power failure, and pump failure. The control valve will continue to remain open following low surge pressure conditions to dissipate return pressure surges. The control valve will close smoothly at an adjustable speed once system pressure has recovered within the normal operating pressure zone above the low surge pilot setting or below the high surge pressure pilot setting.

Part List

1. Shut-Off Valve (3)
2. Strainer
3. Orifice
4. Pilot Valve (Over Pressure)
5. Pilot Valve (Under Pressure)
6. Air/Vacuum Valve
7. Accumulator
8. Needle Valve or Flow Control
9. Testcock

SHIPMENT:

When shipped, controls are usually mounted on the main valve. If control subassemblies are shipped separately, all connections are tagged to insure correct assembly.

INSTALLATION:

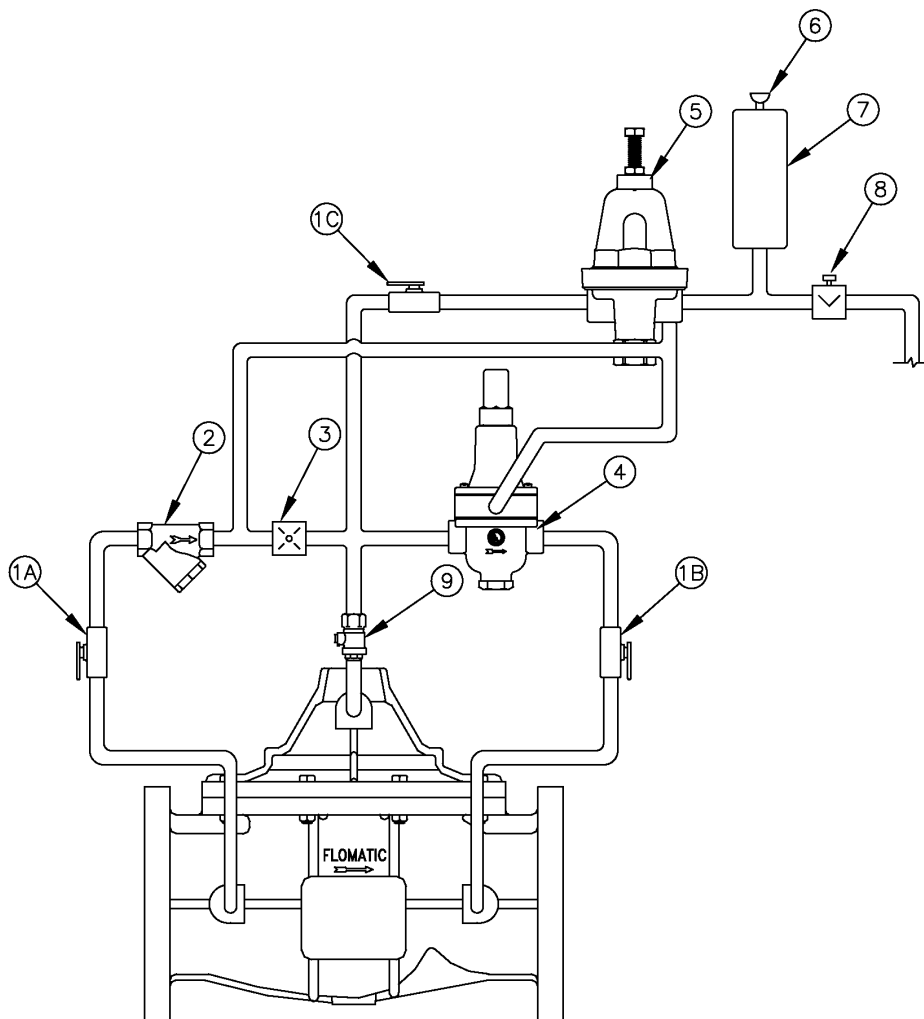
1. Model C501 is installed on a "Tee" from the main line into atmosphere (waste).
2. Flush the pipeline before inserting the valve.
3. Install the valve with the "arrow" on body pointing in the direction of flow (waste).
4. Attach subassemblies to main valve if necessary.
5. Allow enough clearance above valve for removal of piston assembly.

STARTUP AND ADJUSTMENT:

1. Install pressure gauge to observe inlet pressure.
2. Model C501 requires manual closure to bring the valve on-line. Open Shut-Off Valve (1A) and close Shut-Off Valve (1B). Re-open Shut-Off Valve (1B) after surge arrestor valve closes following step 4 or 5 to put the valve into automatic operation.

WARNING: Shut-Off Valve (1B) on downstream side must always be open for normal operation; otherwise, main valve will not function.

3. Slowly open main line inlet side shut-off valve about 1/8 open and observe pressure gauge.



Model C501/CA501 Surge Arrestor Valve

4. Open ¼" Test Cock (9) at top of valve. Re-close when water runs clear and absent of air bubbles. It may take several cycles to bleed the Surge Arrestor power chamber properly.
5. Open the main line shut off valve (Gate or Butterfly valve) at the inlet (High Pressure) side of the surge arrestor valve fully. If there is a main line shut-off valve at the outlet side of the surge arrestor valve, open slowly. Water will flow through the open valve initially and decrease as the valve closes gradually.
6. The controls of the Surge Arrestor Valve have been factory preset in accordance with the specified operating conditions as provided on order placement. However, minor field adjustments may be required as follows:
 1. With pump running and developing the maximum pumping pressure:
 - a. If the Surge Arrestor Valve is open and passing water, turn the adjusting screw of the Over Pressure Pilot (4) clockwise slowly until the main valve closes. Lock the adjusting screw in this position.
 - b. If the Surge Arrestor Valve is closed, turn the adjusting screw of the Over Pressure Pilot (4) counter-clockwise slowly until the valve opens and passes water; then clockwise as noted in (a) above.
 2. Shut down the pump and observe the pressure at which Under Pressure Pilot (5) starts to open the Surge Arrestor Valve. To increase under pressure setting, turn the adjusting screw of the Under Pressure Pilot (5) clockwise. To decrease under pressure setting, turn the adjusting screw of the Under Pressure Pilot (5) counter-clockwise.

OPERATION:

The over pressure pilot is a Normally Closed Model BPP Back Pressure Sustaining Pilot that remains closed when system pressure is below the pilot set point. The under pressure pilot is a Normally Open Model PRR Pressure Reducing Pilot that remains closed when the system pressure is above the pilot set point.

When the Model PRR Pressure Reducing Pilot (under pressure pilot), senses a subnormal pressure created by the low-pressure portion of the surge wave (immediately after pump shut down or power failure), it causes the main valve to open rapidly by exhausting control water from above the diaphragm of the main valve to an accumulator. This insures that the main valve is open in anticipation of the returning high-pressure portion of the surge wave to eliminate potential shock or hammer. When system pressure recovers within the normal operating pressure zone above the Model PRR under pressure pilot set point, the main valve closes slowly at a rate controlled by an adjustable flow control valve to prevent valve closing surges, and the accumulator will drain in preparation for the next cycle.

When the Model BPP Back Pressure Sustaining Pilot (over pressure pilot), senses high pressure equal to or above it's set point, it causes the main valve to open rapidly by exhausting control water from above the diaphragm of the main valve. When system pressure recovers within the normal operating pressure zone below the Model BPP over pressure pilot set point, the main valve closes slowly at a rate controlled by an adjustable flow control valve to prevent valve closing surges.

Automatic Control Valve Operation & Maintenance Manual

Model C501/CA501 Surge Arrestor Valve

TROUBLE SHOOTING GUIDE:

CAUSE	PROBLEM: Valve opens and will not close.	
	CORRECTION	
1. Main valve is air bound.	1. Open ¼” air bleeder located on top cover of valve to release air.	
2. Isolation valve at the inlet side of controls is closed.	2. Open isolation valve.	
3. Indicator stuffing box or sight glass is leaking (if equipped).	3. Tighten packing nut or replace packing seals.	
4. Fouled orifice (or needle valve).	4. Remove and clean orifice if required. Open needle valve wide (counter clockwise) to flush seat. Return to original setting after 4 or 5 seconds.	
5. Fouled Y-strainer.	5. Disassemble, clean or replace screen.	
6. Damaged under pressure or over pressure pilot valve seat.	6. Disassemble, clean and replace damaged parts.	
7. Ruptured diaphragm in main valve.	7. Disassemble and replace diaphragm.	
8. Debris lodged under seat of main valve.	8. Disassemble and remove. Replace damaged parts.	
9. Worn seat seal and/or seat ring in main valve.	9. Disassemble and replace damaged parts.	
10. Incorrect adjustment of Under Pressure Pilot (set too high).	10. Turn Under Pressure Pilot adjusting screw counter-clockwise slowly until valve resumes control and closes; (refer to Section 6.2 for Under Pressure Pilot set point adjustment).	
11. Incorrect adjustment of Over Pressure Pilot (set too low).	11. Turn Over Pressure Pilot adjusting screw clockwise slowly until valve resumes control and closes; (refer to Section 6.1.a & 6.1.b for Over Pressure Pilot set point adjustment).	
12. Leakage from one or more fittings in the controls.	12. Tighten or replace fitting.	
13. Damaged o-ring stem seal.	13. Disassemble and replace o-ring.	
PROBLEM: Valve is closed and will not open.		
1. Incorrect adjustment of Over Pressure Pilot (set too high).	1. Turn the Over Pressure Pilot adjusting screw counter-clockwise slowly until the valve opens, then turn clockwise until the valve closes at the desired set point; (refer to Section 6.1.a & 6.1.b for Over Pressure Pilot set point adjustment).	
2. Needle Valve open too far	2. Turn adjusting cap clockwise slowly until vavle opens and then clockwise until valve re-closes	
3. Isolation valve at the outlet side of the controls is closed.	3. Open isolation valve.	
4. Fouled pilot valve(s)	4. Disassemble and clean, rebuild as necessary.	
5. Worn or eroded orifice (or needle valve seat).	5. Replace orifice (or needle valve).	