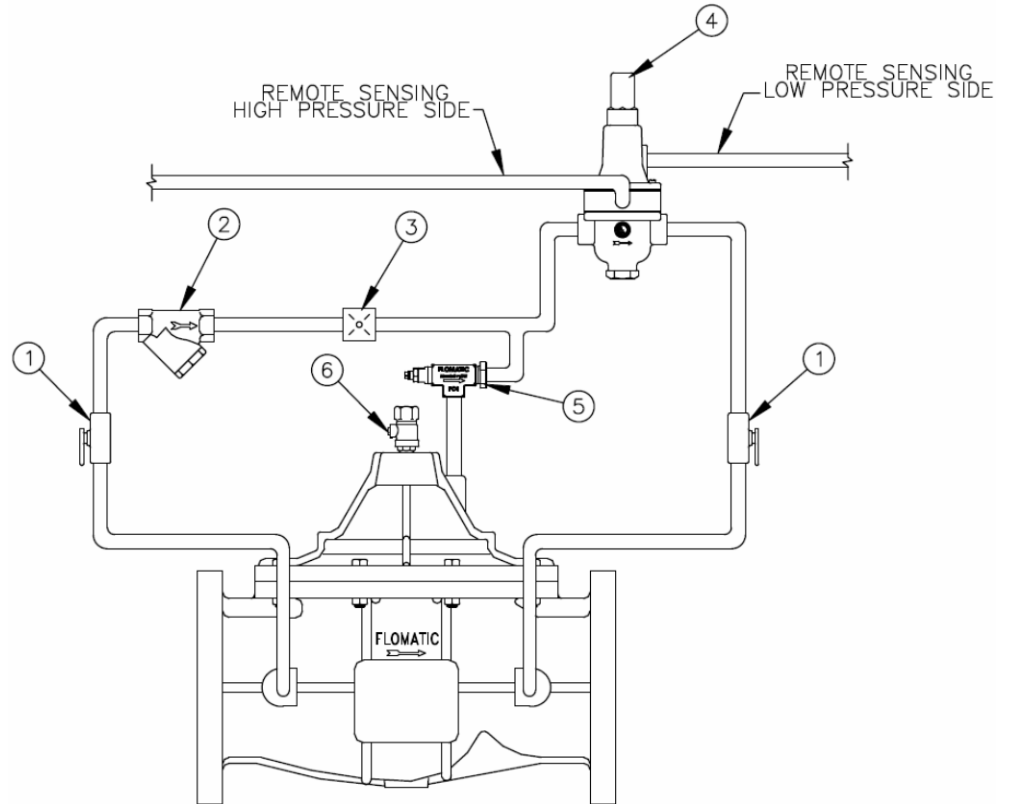


# Operation & Maintenance Manual

Place this manual with valve or person responsible for maintenance of the valve

## Part List

1. Isolation Valve
2. Y-Strainer
3. Orifice (restriction fitting)
4. Pilot (Model DPP)
5. Flow Control Valve (FC4)
6. ¼" Air Bleeder



## **Model C/CA/CF/CFA 306-Differential Back Pressure Valve**

### **YOUR PRODUCT INFORMATION:**

**Model Number:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Serial Number:** \_\_\_\_\_

**Valve Size:** \_\_\_\_\_

**Factory DPP Preset:** \_\_\_\_\_ **psi**

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## DIFFERENTIAL BACK PRESSURE VALVE

The Model C/CA/CF/CFA 306 Differential Back Pressure Valve maintains a constant differential pressure between two pressure points in a system.

The differential pressure pilot, which senses both upstream and downstream pressures, controls the throttled position of the main valve so that a preset (adjustable) differential is maintained regardless of changes in upstream and downstream pressures.

### SHIPMENT:

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

### INSTALLATION:

1. Flush the pipeline before inserting the valve.
2. **Exercise caution to prevent dirt/debris from entering valve and control piping.**
3. Install the valve with the "arrow" on the body pointing in the direction of flow.
4. Attach sub-assemblies to main valve if necessary.
5. Allow enough clearance above valve for removal of diaphragm assembly.

### START-UP:

1. Install pressure gauges to observe inlet and outlet pressures (optional).
2. Open both isolation valves on the control assembly.
3. Open 1/4" air bleeder at the top of the valve.
4. Open main line shut-off valve (usually a gate or butterfly valve) on the outlet side of the main valve about 1/4 open.
5. Slowly open main line shut-off valve on the inlet side.
6. Close 1/4" air bleeder when **all air has been removed** from valve cover.
7. Slowly open the main line shut-off valve on the outlet side the remainder of the way.
8. If the pressure differential setting is too wide turn the DPP adjustment screw slowly counter clockwise and if the pressure differential setting is too narrow turn the pilot adjusting screw slowly clockwise to adjust. Fluid must be flowing through valve to make pilot adjustments.

CAUTION: any adjustment should be done slowly.

### OPERATION:

The Model C/CA/CF/CFA 306 Differential Back Pressure Valve maintains a constant differential pressure between two pressure points in a system. The DPP, which senses both upstream and downstream pressures, controls the throttled position of the main valve so that a preset (adjustable) differential is maintained regardless of changes in upstream and downstream pressures.

If the differential pressure tends to decrease, the diaphragm assembly of the differential pressure valve moves towards the closed position and if the differential pressure tends to increase, it moves towards the open position.

This valve is commonly used to maintain a constant differential across a centrifugal pump to control the flow rate or on a chilled water circulating loop to maintain a constant differential pressure across the loop thereby increasing system efficiency.

## TROUBLE SHOOTING GUIDE

PROBLEM Valve opens and will not close resulting in decreased differential pressure.	
<p style="text-align: center;"><b>CAUSE</b></p> <ol style="list-style-type: none"> <li>1. Main valve is air bound.</li> <li>2. Isolation valve at the inlet side of controls is closed.</li> <li>3. Indicator stuffing box or sight glass is leaking (if equipped).</li> <li>4. Ruptured diaphragm in DPP (evidenced by leak from vent hole in spring chamber).</li> <li>5. Fouled orifice or needle valve.</li> <li>6. Fouled Y-strainer.</li> <li>7. Damaged DPP seat.</li> <li>8. Ruptured diaphragm in main valve.</li> <li>9. Sticks or stones lodged under seat of main valve.</li> <li>10. Worn seat packing and/or seat ring in main valve.</li> <li>11. Incorrect adjustment of DPP (set too narrow).</li> <li>12. Leakage from one or more fittings in the controls.</li> <li>13. Damaged o-ring stem seal.</li> </ol>	<p style="text-align: center;"><b>CORRECTION</b></p> <ol style="list-style-type: none"> <li>1. Open ¼" air bleeder located on top cover of valve to release air.</li> <li>2. Open isolation valve.</li> <li>3. Tighten packing nut or replace packing seals.</li> <li>4. Replace DPP diaphragm.</li> <li>5. Remove and clean orifice, or open needle valve wide (counter clockwise) to flush seat. Return to original setting after 4 or 5 seconds.</li> <li>6. Disassemble, clean or replace screen.</li> <li>7. Disassemble, clean and replace damaged parts.</li> <li>8. Disassemble and replace diaphragm.</li> <li>9. Disassemble and remove. Replace damaged parts.</li> <li>10. Disassemble and replace damaged parts.</li> <li>11. Turn DPP adjusting screw clockwise slowly until valve resumes control and the desired differential pressure is obtained.</li> <li>12. Tighten or replace fitting.</li> <li>13. Disassemble and replace o-ring.</li> </ol>
PROBLEM: Valve is closed and will not open.	
<p style="text-align: center;"><b>CAUSE</b></p> <ol style="list-style-type: none"> <li>1. Incorrect adjustment of DPP (set too wide).</li> <li>2. Needle valve (if installed) open too far.</li> <li>3. Isolation valve at the outlet side of the controls is closed.</li> <li>4. Fouled DPP valve</li> <li>5. Worn or eroded orifice (or needle valve seat).</li> </ol>	<p style="text-align: center;"><b>CORRECTION</b></p> <ol style="list-style-type: none"> <li>1. Turn DPP adjusting screw counter-clockwise slowly until valve opens and resumes control and the desired differential pressure is obtained.</li> <li>2. Turn adjusting cap clockwise slowly until valve opens and a reduced outlet pressure is observed. Lock in this position.</li> <li>3. Open isolation valve.</li> <li>4. Disassemble and clean, replace seat ring/packing if necessary.</li> <li>5. Replace orifice (or needle valve).</li> </ol>
C. PROBLEM: Valve hunts or chatters	
<ol style="list-style-type: none"> <li>1. Valve is oversized.</li> <li>2. Flow control valve (or needle valve at the outlet side) is out of adjustment or may be clogged with debris.</li> <li>3. BPP seat packing is damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Install a smaller back pressure sustaining valve in a bypass around the oversized valve to handle low flows and provide better control.</li> <li>2. Slowly turn adjusting cap counter clockwise until the outlet pressure becomes steady and/or remove to inspect for debris.</li> <li>3. Replace seat packing</li> </ol>
<b>Test To Isolate Source Of Problem</b> (After visual inspection of external leaks)	
<ol style="list-style-type: none"> <li>1. With the main line gate valves open and the differential back pressure valve under pressure, close the control isolation valve at the outlet side of the pilot control. <b>THE MAIN VALVE SHOULD CLOSE.</b>  <b>If the valve remains fully open the source of the problem could be:</b>  <i>(A) fouled orifice or needle; (B) fouled Y-strainer; (C) control isolation valve at inlet is closed; (D) ruptured main valve diaphragm.</i>  <b>If the valve is partially closed the source of the problem could be:</b>  <i>(A) damaged main valve seat packing or seat ring; (B) debris under seat; (C) main valve is air-bound; (D) damaged stem o-ring.</i>  <b>If the valve closes fully, the source of the problem could be:</b>  <i>(A) pilot valve out of adjustment; (B) damaged pilot valve stem or set ring; (C) partially fouled Y-strainer or needle valve.</i> </li> <li>2. With the main line gate valves open and the differential back pressure valve under pressure, close both isolation valves and open the air bleeder valve to release water from the chamber above the diaphragm of the main valve. Water will flow from the air bleeder as the diaphragm of the main valve moves to the full open position.  <b>If water continues to flow from the air bleeder, the source of the problem could be:</b>  <i>(A) damaged main valve diaphragm or stem seal o-ring; (B) loose locknut.</i> </li> </ol>	