SINGER VALVE
Result-Based Solutions. Globally.™

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SINGER MODEL 106/206-BPC

Booster Pump Control Valve Schematic A-0426H
Installation, Operating and Maintenance Instructions

DESCRIPTION:

Model 106/206-BPC is designed for installation on the discharge side of booster pumps to prevent starting and stopping surges. Main Valve (1) is a single seated, double chambered, hydraulically operated globe or angle pattern valve with a built-in check valve.

Unless otherwise specified, 106/206-BPC is assembled for service temperatures to 140 deg.F (60 deg.C).

DESCRIPTION OF OPERATION:

Pump is started and stopped against a closed valve. On pump start up Solenoid Valve (7) is energized. Solenoid Valve (7) connects the operating pressure below the diaphragm and vents the top of the diaphragm to atmosphere. Main Valve (1) starts opening. Speed of opening is determined by the setting of Opening Speed Control (5A), which restricts the flow out of the bonnet (above the diaphragm). Slow opening of Main Valve (1) introduces the flow into the system gradually and prevents starting surges.

On shutdown Solenoid Valve (7) is de-energized; the operating pressure is directed above the diaphragm and the bottom side of the diaphragm is vented to atmosphere. Main Valve (1) closes at a speed determined by the setting of Closing Speed Control (5B), which restricts the flow out of the bottom chamber. While the Main Valve closes, the pump is kept running by Limit Switch (6). When the valve is almost closed, Limit Switch (6) stops the pump.

Power Failure: This valve will not prevent surges caused by power failure. This valve has a built-in 'silent' check valve, meaning that the valve closes as soon as the flow drops to zero, not allowing any reverse velocity to develop. Power failure surges are normally handled by Anticipating Surge Relief Valves, such as Singer Model 106 (or 206) RPS-L&H. Contact Singer Valve for details or other options.

INSTALLATION:

1. See 106/206-PTC 'Installation' in this manual.
2. Connect Solenoid Valve (7) and Limit Switch (6) to the pump starting circuit. Check Solenoid Valve name plate for correct pressure. Check side of solenoid coil for correct voltage and service. Check Limit Switch name plate for switch rating. Connections in the limit switch should be to common and normally closed terminals. See suggested wiring diagram. Note that the limit switch assembly can be rotated by loosening Jam Nut (71).
3. Isolate the valve by closing main line isolating valves on the inlet and outlet of the valve. Pressurize the valve using the procedure below.
4. **INITIAL PRESSURIZING AND VENTING OF AIR:**

- DO NOT START THE PUMP before air has been vented from the bonnet.
- When the installation is ready for start-up and there is pressure available at either inlet or outlet side of the valve, crack open one of the main line isolating valves to pressurize the valve slowly.
- With Solenoid Valve (7) de-energized (valve in the closing mode), loosen the Bleed Screw (Item 63 on drawing A0707A) to vent air from the bonnet. Close the bleed valve when water appears.

ADJUSTING PROCEDURE:

1. Close both opening and closing speed controls.
2. Start the pump.
3. Open Opening Speed Control (5A) until desired opening speed is achieved. Avoid needlessly slow opening speed because such slow speeds make the speed control prone to plugging.

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Adjusting Procedure (Cont.):

4. When the valve is fully open, turn pump switch to off position. The pump should continue to run.
5. Open Closing Speed Control (5B) until desired closing speed is achieved. Avoid needlessly slow closing speed for reason explained above.
6. When Main Valve (1) approaches the closed position, observe carefully when Limit Switch (6) stops the pump. This should happen when the valve is about 1/8" (3 MM) open. If the valve is open more, a noticeable surge may be created, if the valve is open less, there is a possibility that the pump may be kept running. To adjust the valve opening where the Limit Switch stops the pump, adjust the Adjusting Collar (61). Move the collar down to stop the pump at a higher valve opening.

TROUBLESHOOTING:

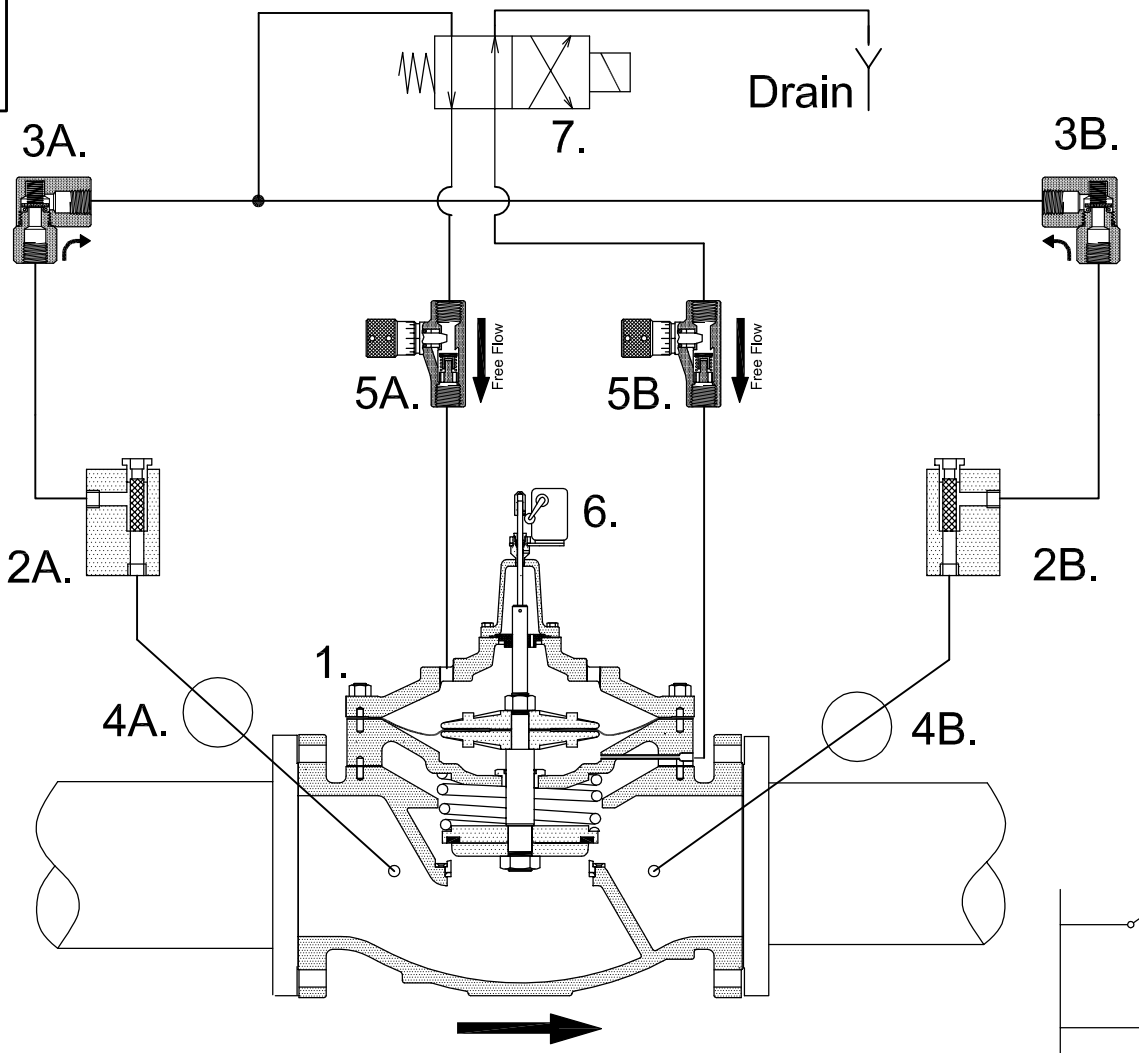
VALVE FAILS TO OPEN OR OPENS PARTIALLY:

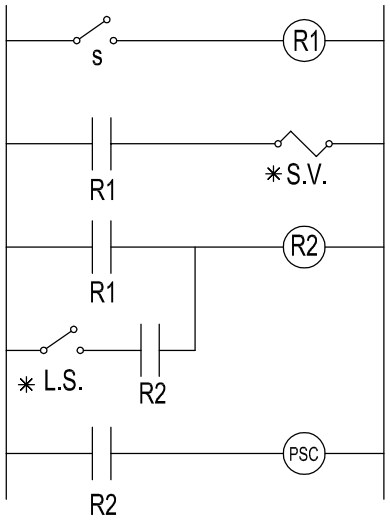
1. Solenoid Valve (7) should be energized, the operating pressure should be directed to the lower chamber (below the diaphragm) and the bonnet should be vented to atmosphere.
2. Remove the line between Opening Speed Control (5A) and Solenoid Valve (7). There should be no flow from the Solenoid Valve. There should be no flow from Opening Speed Control (5A) unless Main Valve (1) is now opening. If the Main Valve opens fully, there is likely a problem with the Solenoid Valve. If there is flow from the Solenoid Valve, the Solenoid Valve is either not energized (i.e. the valve is in the closing mode) or there is a problem in the Solenoid Valve. If there is continuous flow from Opening Speed Control (5A), the Main Valve diaphragm may be faulty.
3. If there is no flow from Opening Speed Control (5A) and no flow from the Solenoid Valve, open Opening Speed Control (5A) fully. If there is still no flow, carefully loosen a tube fitting between the Solenoid Valve and Closing Speed Control (5B) to see if the operating pressure is being directed to the lower chamber. If there is no pressure, check the pilot system to make sure that there is operating pressure in the pressure port of Solenoid Valve (7). Check Strainers, Check Valves, make sure that Isolating Valves (4A) and (4B) are open. Finally, if it is clear that the Solenoid Valve is not operating as it should, measure the voltage at the solenoid valve and if correct, test the coil of the solenoid valve. If the coil is sound and voltage is correct and present, inspect (or replace) the solenoid valve.

VALVE FAILS TO CLOSE OR CLOSES PARTIALLY:

1. Solenoid Valve (7) should be de-energized, the operating pressure should be directed to the bonnet (above the diaphragm) and the lower chamber (below diaphragm) should be vented to atmosphere.
2. Remove the line between Closing Speed Control (5B) and Solenoid Valve (7). There should be no flow from the Solenoid Valve. There should be no flow from the Closing Speed Control unless the valve is now closing. If the valve closes fully, there is likely a problem with the Solenoid Valve. If there is flow from the Solenoid Valve, the Solenoid Valve is either energized (i.e. the valve is in opening mode) or there is a problem in the Solenoid Valve. If there is continuous flow from Closing Speed Control (5B), the Main Valve diaphragm may be faulty or there may be leakage through the Adapter Bushing (9), meaning that Adapter Bushing Seal (19) is worn.
3. If there is no flow from Closing Speed Control (5B) and no flow from the Solenoid Valve, open the Closing Speed Control fully. If there is still no flow, carefully loosen a tube fitting between the Solenoid Valve and the Opening Speed Control to see if the operating pressure is being directed to the bonnet (above the diaphragm). If there is no pressure, check the pilot system to make sure that there is operating pressure in the pressure port of the Solenoid Valve. Check Strainers, Check Valves, make sure that Isolating Valves (4A) and (4B) are open. Finally, if it is clear that the Solenoid Valve is not operating as it should, check that there is no power applied to the solenoid coil. Inspect (or replace) the solenoid valve.

A-0426H





1 . Model 106/206-PTC Main Valve.
2 . Strainers - Inlet and Outlet - J0098A.
3 . Check Valve.
4 . Isolating Valves - Inlet and Outlet.
5A. Opening Speed Control.
5B. Closing Speed Control.
6 . Limit Switch.
7 . Solenoid Valve.

NOTE: This is 'minimum' required diagram. Additional safety and operational functions are frequently added.

S.	On-Off Switch.
*S.V.	Solenoid Valve.
*R1,R2	Auxiliary Relays.
*L.S.	Limit Switch-Connection(typical switch is S.P.D.T.)-N.C. Terminal.
PSC	Pump Motor Starting Contactors.

Solenoid Valve and Limit Switch are supplied on the valve.
Other items are supplied by others.

Booster Pump Control Valve.

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Drawn By:	Approved By:
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Date: August 17, 2004	Drawing: A-0426H

Model 106 or 206-BPC