SINGER VALVE
Result-Based Solutions. Globally.™

12850-87th Avenue
Surrey, BC. Canada. V3W 3H9
Ph: 604-594-5404
Fx: 604-594-8845
www.singervalve.com

SINGER MODEL 106/206-BPC-PR-R

Pump Control Valve with Pressure Reducing and Pressure Sustaining Functions Schematic A-7430C
Installation, Operating and Maintenance Instructions

DESCRIPTION:

Model 106/206-BPC-PR-R is installed in the outlet of a pump to prevent starting and stopping surges, to protect the system from over pressure by acting as a pressure reducing valve and to protect the pump and supply from damage caused by over pumping by acting as a pressure sustaining valve.

DESCRIPTION OF OPERATION:

For operation of Main Valve (1), refer to 106/206-PG 'Operation'.
The pump is started against a closed valve. Solenoid Valve (8) is energized and opens to connect the inlet pressure of Main Valve (1) to the sensing chamber of the Pressure Sustaining Pilot (9). The inlet pressure of the Main Valve is higher than the setpoint of Pilot (9) so Pilot (9) is open. If the downstream pressure is below the setpoint of the Pressure Reducing Pilot (14), Pilot (14) is open and Main Valve (1) will open. Opening speed is determined by the setting of Opening Speed Control (6). Flow into the system is increased slowly to prevent starting surges.
When the downstream pressure reaches the setpoint of Pressure Reducing Pilot (14), Pilot (14) starts to modulate the Main Valve to keep the downstream pressure at the desired value.
If the downstream pressure drops below the setpoint, Pressure Reducing Pilot (14) opens slightly to vent the bonnet of the Main Valve and opens the Main Valve further.
If downstream pressure increases above the setpoint, Pressure Reducing Pilot (14) closes slightly.
If the upstream pressure lowers to the setting of Pressure Sustaining Pilot (9), Pilot (9) modulates the Main Valve to maintain the upstream at the required minimum setting.
If the upstream pressure drops slightly below the setpoint, Pressure Sustaining Pilot (9) closes slightly. High pressure from the upstream of the Main Valve causes the Main Valve to close further.

If the upstream pressure rises above the setpoint, Pressure Sustaining Pilot (9) opens and allows the Main Valve to open until the inlet pressure starts falling or the Pressure Reducing Pilot takes over the control.
On shut-down Solenoid Valve (8) is de-energized and vents the sensing chamber of Pressure Sustaining Pilot (9) to atmosphere. Pilot (9) closes. The Main Valve starts closing at a speed determined by the setting of Closing Speed Control (6). As the valve closes, the pump continues to run. The flow into the system is reduced slowly to prevent stopping surges. When the valve is almost closed, Limit Switch (12) stops the pump.

INSTALLATION:

1. See 106/206-PG 'Installation'.
2. Connect Solenoid Valve (8) and Limit Switch (12) to the electrical system. Check Solenoid Valve name plate for correct pressure, check side of solenoid coil for correct voltage and service. See SUGGESTED WIRING DIAGRAM.
3. **PRESSURIZE THE VALVE SLOWLY. AIR MUST BE BLED FROM THE VALVE AS EXPLAINED IN 106/206-PG INSTRUCTIONS. FAILURE TO BLEED AIR MAY CAUSE PERMANENT DAMAGE OR FAULTY OPERATION.**

ADJUSTING PROCEDURE:

1. Close both opening and closing speed controls.
2. Start the pump.
3. Open Opening Speed Control (6) slowly until desired opening speed is achieved.
4. The valve should open until the outlet pressure reaches the setpoint of the Pressure Reducing Pilot or the inlet pressure drops to the setpoint of the Pressure Sustaining Pilot.
5. To perform fine adjustment of pilots, note setting of Opening Speed Control (6) and then open both speed controls fully.
6. The inlet pressure must be at least 10 psi (70 kPa) above the setting of Pressure Sustaining Pilot (9). To help the inlet pressure rise above the setting of the Pressure Sustaining Pilot, reduce demand drastically by partially closing an downstream isolating valve OR turn the adjusting screw of the Pressure Sustaining Pilot counterclockwise to reduce the setting.

12850-87th Avenue
Surrey, BC. Canada. V3W 3H9
Ph: 604-594-5404
Fx: 604-594-8845
www.singervalve.com

Adjusting Procedure (Cont.):

7. To adjust Pressure Reducing Pilot (14), turn the adjusting screw clockwise for increased downstream pressure and counterclockwise for reduced pressure. To make sure that the Pressure Reducing Pilot is controlling the Main Valve, turn the setting past the required setting and then bring it back to the required setting. If the pressure gauge follows turning of the adjusting screw past the setting and back, it is reasonable to assume that Pilot (14) is in command and is correctly set.
8. PRESSURE SUSTAINING PILOT ADJUSTMENT: The outlet pressure must be at least 10 psi (70 kPa) below the setting of Pressure Reducing Pilot (14). To help lower the outlet pressure below the setting of the Pressure Reducing Pilot, increase the demand or partially close an upstream isolating valve.
9. To adjust Pressure Sustaining Pilot (9), turn the adjusting screw clockwise for increased setting, counterclockwise for reduced setting. To assure that the Pressure Sustaining Pilot is in control, turn the adjusting screw past the required setting and return to the required setting. If the pressure gauge follows turning of the adjusting screw past the setting and back, it is reasonable to assume that Pilot (9) is in command and is correctly set.
10. Reset Opening Speed Control and close Closing Speed Control.
11. Turn pump switch to off position. The pump should continue to run.
12. Open the Closing Speed Control slowly until desired closing speed is achieved.
13. When the valve is almost fully closed, Limit Switch (12) should stop the pump without causing any objectionable surges. If the pump stops too early (and causes a surge) or does not stop at all, adjust the limit switch. Refer to drawing A0707A.

NOTE: Do not make the opening or closing speed slower than necessary to avoid surges; the same speeds that apply to starting and stopping also apply in pressure reducing. If the downstream pressure increases occasionally above setpoint and the valve then slowly resumes control, too slow a closing speed is the likely cause.

SERVICE SUGGESTIONS:

In addition to service suggestions listed under 106/206-PG (Main Valve), consider following:

TROUBLE: VALVE FAILS TO OPEN (when pump starts):

Possible Cause / Remedy

1. Opening Speed Control closed tight or obstructed, / Open to setting required and/or clean.
2. .Solenoid Valve does not open. / Check solenoid and wiring.
3. Pressure Reducing Pilot set too low. / Correct setting.
4. Isolating Valve (11) or (13) closed. / Open fully.
5. Pressure Sustaining Pilot set too high. / Correct setting.
6. Obstruction in pilot line between bonnet and downstream / Remove obstruction.

TROUBLE: VALVE FAILS TO CLOSE:

1. Closing Speed Control closed tight or obstructed. / Open to setting required and/or clean.
2. Solenoid Valve does not close. / Check solenoid and wiring.
3. Obstruction in pilot line between upstream and bonnet. / Remove obstruction.
4. Pilot Check Valve (10) faulty. / Repair or replace.
5. Problem in the Main Valve. / Refer to 106/206-PG instructions.

TROUBLE: CONTROL SLOW (sluggish):

Opening and/or closing speed control set too low. / Increase setting

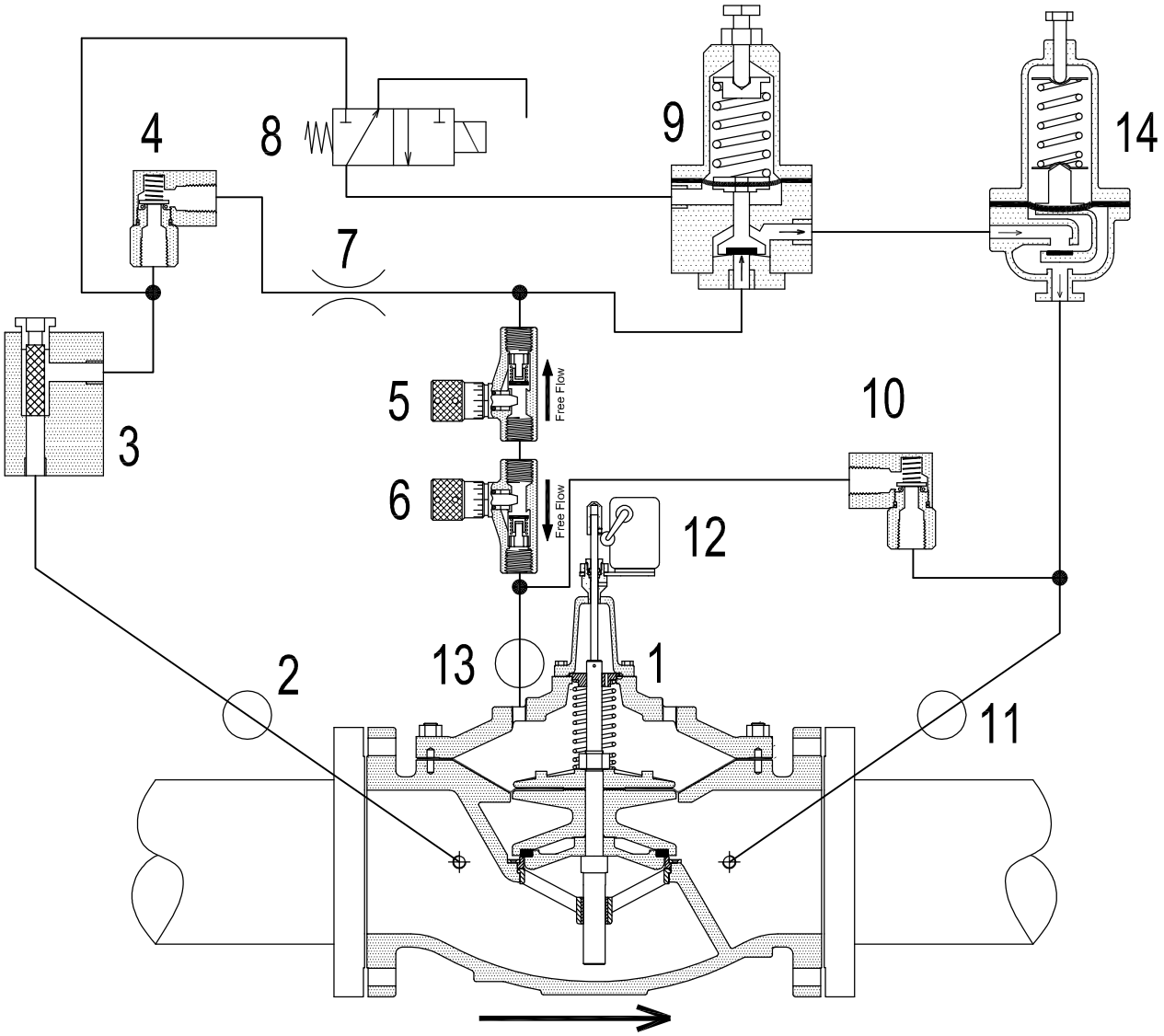
Every time opening or closing speed is adjusted, it must be checked that no surges are created. See 'Adjustment Procedure' above.

If satisfactory compromise can not be found for closing speed that avoids surges on pump shut down and gives acceptable downstream pressure control, contact SINGER VALVE for remedy.

TROUBLE: FAILS TO CHECK BACKFLOW:

Pilot Check Valves (4) and/or (10) faulty. / Repair or replace.

A-7430C



1. Main Valve - Singer Model 106/206-PG.
2. Isolating Valve .
3. Strainer - 40 mesh - J0098A.
4. Check Valve - Model 10.
5. Closing Speed Control.
6. Opening Speed Control.
7. Fixed Restriction - 1/8".
8. Solenoid Valve - Normally Closed.
9. Pressure Sustaining Pilot - Model 81-RP.
10. Check Valve - Model 10.
11. Isolating Valve .
12. Limit Switch - S.P.D.T.
13. Isolating Valve .
14. Pressure Reducing Pilot - Model 160.

Pump Control Valve with Pressure Reducing and Pressure Sustaining Functions.

Built-in mechanical check (sliding inner valve or 'drop check') is available as an option.

SINGER VALVE
Result-Based Solutions. Globally.™
www.singervalve.com 12850-87th Avenue. Surrey, B.C. V3W 3H9

Drawn By:	Approved By:
Kari Oksanen	Kari Oksanen
Date:	Drawing:
October 30, 1995	A-7430C

Model 106 or 206-BPC-PR-R