

SINGER MODEL A106-DLA-RPS

Air Operated Sewage Relief Valve

Schematic A-8736A

DESCRIPTION:

Model A106-DLA-RPS is a relief valve designed to provide protection for sewage pumping. Model A106-DLA-RPS is a fast acting relief valve that has some characteristics of a direct acting relief valve and pilot operated relief valve.

The valve is operated by external air pressure.

A Diaphragm Isolator protects the pilot system from the media.

DESCRIPTION OF OPERATION:

Pressure Reducing Pilot (4) maintains just enough pressure in the bonnet (above the piston) to keep the main valve closed under maximum pumping pressure. This makes the valve a direct acting relief valve that opens 'instantly' using the seat area as the sensing area and the bonnet volume as a 'spring'. Capacity under this mode is about 50 % of maximum capacity at a pressure increase of 20 % over the setpoint.

The valve also acts as a pilot operated pressure relief valve. When the header pressure exceeds the setting of Relief Pilot (5), the pilot opens. Since the pilot handles air, opening is very fast. The valve is capable of modulating the header pressure but it uses some air while modulating.

The valve requires air at a minimum pressure the same as the relief setting and a maximum pressure of 200 psi.

INSTALLATION:

1. This valve must be installed inlet vertical, outlet horizontal.
2. This valve operates deep in the cavitation zone. Severe vibration is to be expected. Piping and flanges used to mount this valve must be designed accordingly.
3. Close isolating valve (2B) and connect air supply to (2B). Check that the supply is safety relieved at 250 psi if there is any possibility of the pressure exceeding 200 psi.

START-UP AND ADJUSTMENT:

1. Check that Manual Override Valve (13) is set to vent the bottom of the piston to atmosphere as shown on Schematic A-8736A. Flow pattern is shown on the handle of the three-way ball valve. Use a padlock or similar to lock the valve to this position.
2. Open isolating valve (2B), open needle valve (3) 1/4 turn and observe pressure gauge (6A).

Start-up and Adjustment (Cont.):

1. Adjust pressure reducing pilot (4) to produce a pressure in gauge (6A) that is equal to 75 % of the desired relief setting. See Model 160 instructions.
2. Check that there is no flow from Pilot (5) to atmosphere. If there is flow, turn the adjusting screw of Pilot (5) clockwise until the flow stops. See Model 81-RP instructions.
3. Close needle valve (3). Pressure in gauge (6A) will increase 3-8 psi when needle valve (3) is closed.
4. Bring the header pressure to normal operating pressure.
5. To set the DIRECT ACTING pressure relief, check that there is no air leaking from Relief Pilot (5) to atmosphere. Open needle valve (3) to cause a very low continuous flow. Reduce pressure in gauge (6A) slowly (by turning adjusting screw of pilot [4] counterclockwise) until the main valve (1) just begins to open.
6. Close needle valve (3). This should increase the pressure in gauge (6A) by 3-8 psi and should close the main valve tight. To increase the relief setting, increase the pressure at gauge (6A) by slowly turning adjusting screw of pilot (4) clockwise. After each adjustment, open needle valve (3) momentarily. A 1 psi increase in pressure at gauge (6A) will increase the relief setting about 1.5 psi.
7. To set the PILOT relief setting, adjust Relief Pilot (5) when the header pressure is at normal operating pressure. Turn adjusting screw of Pilot (5) counterclockwise until flow just appears at the outlet of Pilot (5). Turn the adjusting screw clockwise 1/8 to 1/4 turn and check that there is no leak from the pilot.

CHARGING OF DIAPHRAGM ISOLATOR:

1. This valve was shipped from the factory with a mineral oil charge.
2. As long as Pressure Gauge (6B) shows correct header pressure, it is reasonable to expect that the Diaphragm Isolator is properly charged.
3. To charge the Diaphragm Isolator, de-pressurize the valve inlet. Connect water, glycerin or other suitable media under pressure (25-100 psi) to Bleed Valve (10). Bleed (12) until fluid appears. Close (10) and (12) tight.
4. Pressurize valve inlet to normal operating pressure and bleed one ounce (30 cm³) of fluid from Bleed Valve (12).
5. Install pipe plugs on the outlet of Bleed Valves (10) and (12).

TROUBLE SHOOTING AND MAINTENANCE:

Do not disassemble this valve if you are not fully aware of cautions required when working on pressurized sewage equipment.

Refer to the Main Valve Drawing for details.

OPENING THE VALVE MANUALLY:

This valve can be opened manually regardless of pressure in the valve inlet:

1. Remove lock from Manual Override Valve (13).
2. Close Isolating Valve (2B).
3. Turn Manual Override Valve (13) to position that pressurizes the bottom of the piston. Note that the flow pattern is shown on the handle of the Manual Override Valve (13).
4. Open Needle Valve (3) for a few seconds and close it.
5. Main Valve (1) should be fully open.

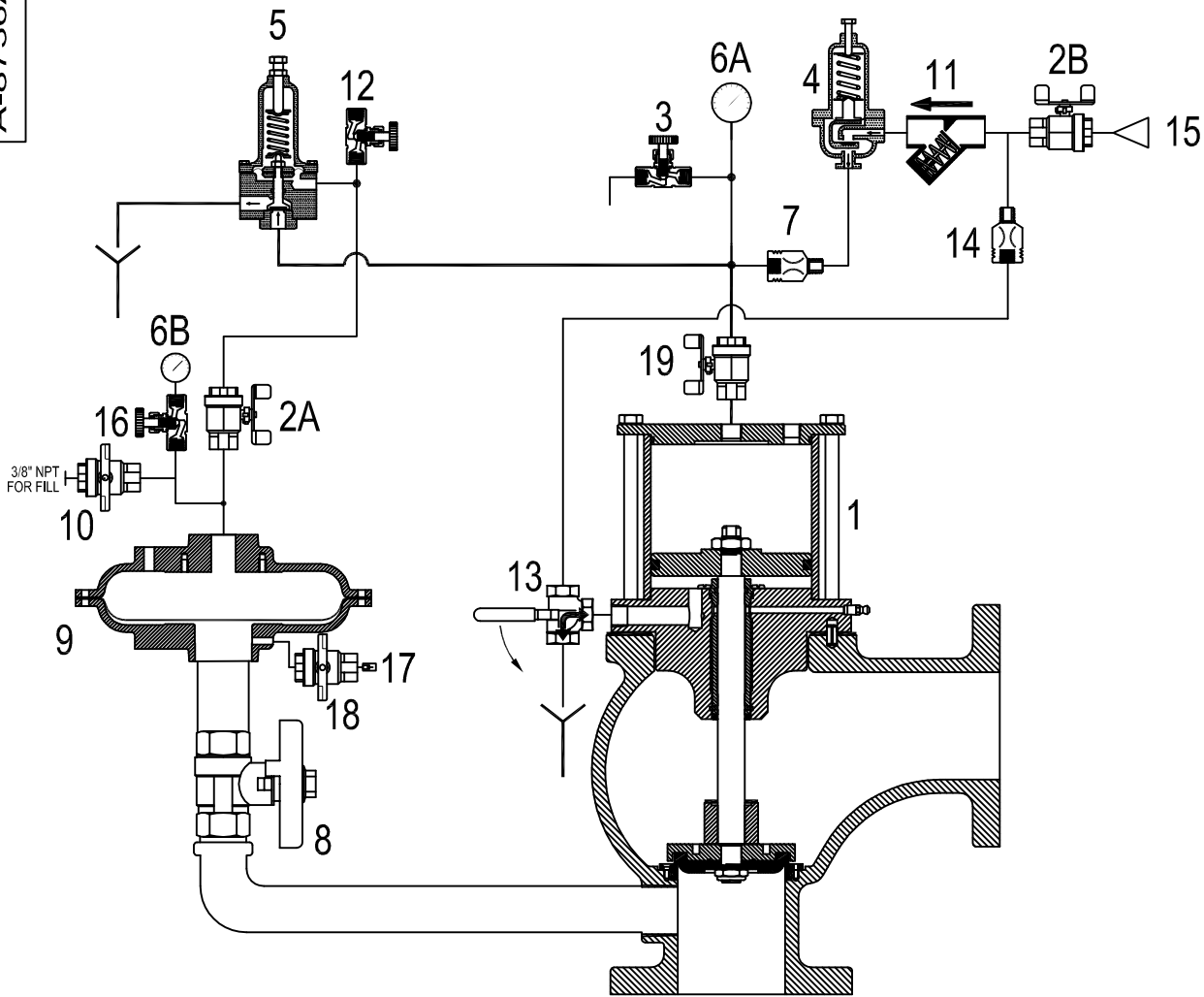
TO BRING THE MAIN VALVE BACK TO AUTOMATIC OPERATION:

1. Open Isolating Valve (2B).
2. Turn Manual Override Valve (13) to a position that vents the bottom of the piston to atmosphere. Note that the flow pattern is shown on the handle of the Manual Override Valve (13).
3. Check that Needle Valve (3) is closed tight.
4. Lock the Manual Override Valve into position.

PERIODIC MAINTENANCE:

Following should be performed every three months:

1. Cycle Relief Pilot (5) by loosening the Adjusting Screw Locknut and turning the adjusting screw exactly one turn counterclockwise. This should open the Main Valve.
2. Immediately return the adjusting screw to exactly the previous position and lock the locknut.
3. Check that there is no air leak from the outlet of the Relief Pilot.
4. Apply lubricant to the grease nipple of the Main Valve.
5. With the Main Valve either isolated from the header or not isolated, stroke the Main Valve as explained above.



CONNECT TO
COMPRESSED
AIR SOURCE (BY
OTHERS).

1. Main Valve - Model A106-DLA.
2. Isolating Valve.
3. Needle Valve.
4. Pressure Reducing Pilot - Model 160 c/w bracket.
5. Relief Pilot - Model 81-RP.
6. Pressure Gauge.
7. Fixed Restriction.
8. Isolating Valve
9. Diaphragm Isolator - DI-1.
10. Bleed Valve.
11. Check Valve, J0040A
12. Bleed Valve.
13. Manual Override Valve.
14. Fixed Restriction.
15. Air Supply.
16. 852B Needle Valve
17. Air Charge Valve.
18. Isolating Valve.
19. Isolating Valve.

08/12/2010, Renamed model.
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SINGER VALVE

Result-Based Solutions. Globally.

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Date:

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Drawing:

A-8736A

Model A106-DL-AIR

AIR OPERATED SEWAGE RELIEF VALVE