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I & M Mark 6127 Series

Installation & Maintenance Instructions for the Mark 6127Pressure Regulating Valve

Warning: Jordan Valve Control Valves must only be used, installed and repaired in accordance with these Installation & Maintenance Instructions. Observe all applicable public and company codes and regulations. In the event of leakage or other malfunction, call a qualified service person; continued operation may cause system failure or a general hazard. Before servicing any valve, disconnect, shut off, or bypass all pressurized fluid. Before disassembling a valve, be sure to release all spring tension.

INTRODUCTION

The Jordan Valve Mark 6127 Pressure-Reducing/ Sustaining Valve is designed to perform the following functions:

1. Reduce a higher upstream pressure into a lower, constant downstream pressure.
2. Prevent upstream pressure from falling below a predetermined minimum.

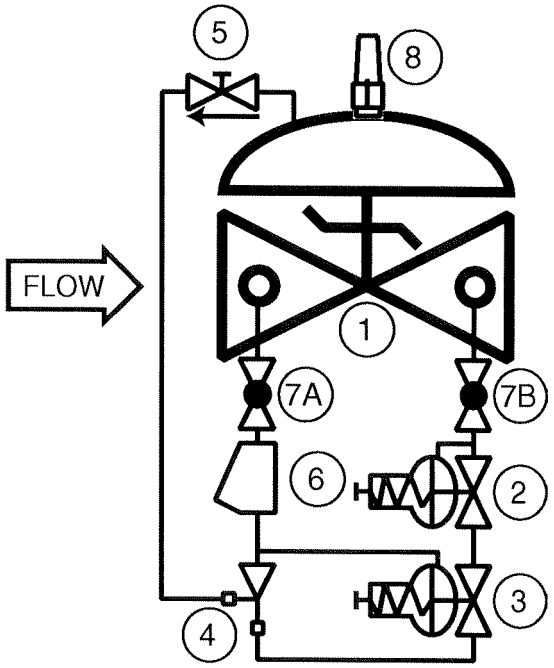
The 6127 consists of the following components:

1. **Main Valve**, a hydraulically-operated, diaphragm-actuated globe or angle valve which closes with an elastomer-on-metal seal.
2. **Pressure-Reducing Pilot**, a two way, normally-open pilot valve which senses downstream pressure under its diaphragm and balances it against an adjustable spring load. An increase in downstream pressure tends to make the pilot close.
3. **Pressure Sustaining Pilot**, a two way, normally-closed pilot valve which senses upstream pressure under its diaphragm and balances it against an adjustable spring load. An increase in upstream pressure tends to make the pilot open.
4. **Ejector**, a simple "tee" fitting with a fixed orifice in its upstream port. It provides the proper pressure to the diaphragm chamber of the main valve, depending on the position of the pressure-reducing pilot.
5. **Flow Control Valve**, a needle type valve which provides adjustable, restricted flow in one direction and free flow in the opposite direction On the 6127, the flow control valve is connected as an opening speed control.
6. **Y-Strainer** (standard on water service valves) or **Inline Strainer** (standard on fuel service valves).The strainer protects the pilot system from solid contaminants in the line fluid.

7 A/B. Two **Ball Valves** (standard on water service valves, optional on fuel service valves), useful for isolating the pilot system for maintenance or troubleshooting.

At user option, the Mark 6127 may also be equipped with the following:

1. Visual Indicator.
2. Limit Switch Assembly (includes visual indicator).
3. Closing Speed Control



THEORY OF OPERATION
(Refer to Schematic Diagram)

A. Pressure- Reducing Action

To understand how the Mark 6127 operates, it is best to start with the EJECTOR. Due to the orifice in its upstreamport, the ejector creates a pressure drop proportional to the flow through it. The flow through the ejector is in turn controlled by the degree of opening of the PRESSURE REDUCING PILOT. The wider the pilot opens, the greater the flow through the ejector and the lower the pressure downstream of the orifice. Conversely, the more the pilot closes, the lower the flow through the ejector and the greater the pressure downstream of the orifice.

Now note that the diaphragm chamber of the MAIN VALVE is connected to the branch port of the ejector and is thus downstream of the orifice. In this manner, the pressure in the diaphragm chamber of the main valve is in fact controlled by the pressure-reducing pilot. As the diaphragm pressure decreases, the main valve opens; as the diaphragm pressure increases, the main valve closes.

Putting it all together, as downstream pressure tends to increase above the set point of the pressure-reducing pilot, the pilot moves further closed. This results in an increase in pressure in the diaphragm chamber of the main valve. The main valve then closes slightly to restore the downstream pressure to the set point. Conversely, as downstream pressure tends to decrease below the set point, the pilot moves further open. This results in a decrease in pressure in the diaphragm chamber of the main valve. The main valve then opens wider to bring the downstream pressure back up to the set point. The net result of all this is a constant modulating action by the pilot and main valve and a downstream pressure which remains constant despite fluctuations in demand or inlet pressure.

B. Pressure- Sustaining Action

Action of the pressure-sustaining pilot is very similar to that of the pressure-reducing, except that normally upstream pressure is higher than the sustaining pilot's set point. The pilot is therefore full open and has no effect on the operation of the valve.

However, if demand should increase to such a point that supply pressure should fall to the pilot's set point, the pilot will begin to throttle, or modulate, and further close the main valve to keep the pressure from falling any further. Note that when this action occurs, downstream pressure will necessarily fall below the set point of the reducing pilot. Simply stated, the sustaining pilot is there to protect the pump or supply system from too low a pressure, and will come into effect only when called upon to do so.

INSTALLATION

The 6127 is furnished fully factory-assembled and ready for installation at the appropriate point in the system. The user is referred to the Main Valve section of this manual for full installation details.

Startup and Adjustment

The following procedures should be followed in the order presented in order to effect an initial startup of the Mark 6127:

1. Install pressure gauges of the proper range upstream and downstream of the Mark 6127.
2. Remove the plastic cap from the pressure reducing pilot, and loosen the adjusting screw jam nut. Turn the adjusting screw clockwise to a full stop.
3. Remove the plastic cap from the pressure sustaining pilot, and loosen the adjusting screw jam nut. Turn the adjusting screw clockwise to a full stop.
4. Turn the adjusting screw of the flow control valve fully clockwise, then back it off three full turns.
5. Start the pump, or otherwise start the system flowing. The main valve will at this time be either fully closed or open only a very small amount.
6. Carefully loosen one of the pipe plugs in the main valve bonnet until fluid appears around the threads. When only clear fluid (no air) is discharging, retighten the plug.
7. Open downstream valves to give as much demand as possible.
8. Slowly turn the adjusting screw of the pressure-sustaining pilot counterclockwise until upstream pressure falls to the desired minimum.
9. Check downstream pressure. If it is lower than desired, close downstream valves as required to build pressure to a value higher than desired.

10. Slowly turn the adjusting screw of the pressure-reducing pilot counterclockwise until downstream pressure decreases to the desired set point. Tighten the adjusting screw jam nut and replace the plastic cap.
11. If there are small-scale oscillations in the down stream pressure, slowly turn the adjusting screw of the flow control valve clockwise until the oscillations disappear. CAUTION: Never close this valve fully. To do so will prevent the main valve from opening.
12. If pressure readjustment should ever be required, the pressure-reducing pilot is adjusted clockwise to increase pressure; counterclockwise to decrease pressure.

MAINTENANCE

Due to the simplicity of design of the 6127, required maintenance is minimal. However, the following checks, periodically performed, will do much to keep the valve operating properly and efficiently.

1. Check for chipped or peeling paint.
2. Check for leaks at fittings and around flanges and connections. Tighten as required.
3. If the valve is equipped with a Y-strainer, check the screen for buildup of solid material. Clean as required. This point is most important, as a clogged strainer can keep the valve from operating properly. On new installations, it is recommended that the strainer be checked everyday or two until experience dictates a greater or lesser interval.

TROUBLESHOOTING

In the event of malfunction of the Mark 6127, the following guide should enable the technician to isolate the specific cause of the problem and take the appropriate corrective action.

A. MAIN VALVE FAILS TO OPEN:

1. Valve closed downstream of 6127. Open as required.
2. Downstream pilot system ball valve closed. Open as required.
3. Flow control valve fully closed. See Adjustment instructions.
4. Pressure-reducing pilot adjusted too far counterclockwise. See Adjustment instructions.
5. Pressure-sustaining pilot adjusted too far clock wise. See Adjustment instructions.
6. Stem of pressure-reducing pilot binding.
7. Diaphragm of pressure-sustaining pilot ruptured. This will be evidenced by a discharge of fluid from the vent hole in the pilot bonnet. Disassemble pilot and replace diaphragm.
8. Stem of pressure-sustaining pilot binding.
9. Stem of main valve binding.

B. MAIN VALVE FAILS TO CLOSE:

1. Upstream pilot system ball valve closed. Open as required.
2. Strainer clogged. Clean as required.
3. Pressure-reducing pilot adjusted too far clock wise. See Adjustment instructions.
4. Diaphragm of pressure-reducing pilot ruptured. This will be evidenced by a discharge of fluid from the vent port in the pilot bonnet. Disassemble pilot and replace diaphragm.
5. Close downstream pilot system ball valve.
   a. If main valve closes, proceed to Step 6.
   b. If main valve remains open, proceed to Step 7.
6. Pressure-reducing pilot stem binding or seat badly deteriorated. Disassemble pilot and deter mine cause.
7. Close both pilot system ball valves, and loosen a pipe plug in the main valve bonnet. A continuous discharge of fluid from the loosened plug indicates that the main valve diaphragm is ruptured. SEE NOTE BELOW.
8. Main valve stem binding or object in valve. Disassemble valve and determine cause.

NOTE: Certain valves, predominantly those in fuel service, are assembled "fail closed." In this case, a ruptured diaphragm would keep the valve from opening, rather than keep it from closing. To determine which type you have, examine the bridge mark cast into the side of the main valve body. If the bridge mark slants downward on the upstream end, the valve is "fail closed." If the bridge mark slants upward on the upstream end, the valve is "fail open."

C. MAIN VALVE OPEN AND CLOSES, BUT DOES NOT CONTROL DOWNSTREAM PRESSURE:

1. If pressure remains too high despite adjustment of the pressure-reducing pilot, refer to MAIN VALVE FAILS TO CLOSE, above.
2. If pressure remains too low despite adjustment of the pressure-reducing pilot, refer to MAIN VALVE FAILS TO OPEN, above.
3. If pressure oscillates, you may likely be in a period of very low demand. Frequently this problem will disappear as demand increases. In the meantime, further closing of the flow control valve may help damp out the oscillations. In an extreme case, try adjusting the pressure slightly higher.

D. MAIN VALVE OPENS AND CLOSES BUT DOES NOT SUSTAIN UPSTREAM PRESSURE.

1. Pressure-sustaining pilot adjusted too far counterclockwise. See Adjustment instructions.
2. Stem of pressure-sustaining pilot binding or seat deteriorated. Disassemble pilot and determine cause.

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