**THEORY OF OPERATION**

**Model 22S Controller with a Model 115-3 Digital Control Valve**

The Model 115-3 control valve is positioned based on the discrete electrical signals applied to the solenoid pilots (2 and 3) from the Model 22S Electronic Controller. With a pressure transducer located upstream of the valve, the controller will monitor this transducer output to control the upstream pressure. If the pressure drops below the set point, the controller will close the valve by opening solenoid 2, allowing inlet pressure to the valve diaphragm chamber. Simultaneously, the controller closes solenoid 3, blocking pressure on the diaphragm from venting downstream. The valve closes and the upstream pressure increases.

If the pressure rises above the set point, the controller will open the valve by closing solenoid 2, blocking inlet pressure from the diaphragm chamber. At the same time, solenoid 3 is opened, allowing discharge from the diaphragm chamber. The valve opens and upstream pressure decreases.

Finally, when pressure is at the set point, the controller closes both solenoids, thus no flow is allowed either on or off the diaphragm chamber. The valve is “hydraulically locked” in position and upstream pressure is stable.

The solenoids can be supplied to give one of the following “default” modes on absence or loss of electrical power:
- Default to closed
- Default to open
- Default in last position

**MODEL FEATURES**

- Allows for frequent set point change
- Wider range of flow than standard hydraulic control systems
- Valve scheduling for control parameter modification (Time, Day of Week, Process variables)
- Remote set point by digital or analog SCADA access
- 100-260Vac 50-60Hz with 24/12 VDC, or solar powered units available
- Full function PID controller
- Simplifies valve sizing
- LCD display
- Superior throttling characteristics compared to quarter turn valves
- Cavitation protection available when required
- Optional
  - Analog Output (4-20mA)
  - Intranet monitoring control and e-mailing (Ultra Controller Series only)
  - Hydraulic backup
  - Touch panel color graphic LCD (Ultra Controller Series only)
  - Valve Position Transmitter
  - Consult factory for others

**SIZING**

Consult the factory or refer to the ValveMaster Premier on the OCV website: controlvalves.com

**MAX. PRESSURE**

The pressures listed here are maximum pressures at 100°F. Also, working pressures of solenoids vary greatly, consult factory on application of OCV Model 115-3 valves when pressures exceed those stated in chart.

<table>
<thead>
<tr>
<th>END CONNECTIONS</th>
<th>DUCTILE IRON</th>
<th>STEEL/STN STL</th>
<th>LOW-LEAD BRONZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threaded</td>
<td>300 psi</td>
<td>300 psi</td>
<td>300 psi</td>
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<tr>
<td>Grooved</td>
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</tr>
<tr>
<td>150# Flanged</td>
<td>250 psi</td>
<td>285 psi</td>
<td>225 psi</td>
</tr>
<tr>
<td>300# Flanged</td>
<td>300 psi</td>
<td>300 psi</td>
<td>300 psi</td>
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</tbody>
</table>
SPECIFICATIONS (Typical Water Application)

The electronic pressure sustaining valve shall operate to control upstream pressure via discrete electrical signals from the controller.

DESIGN

The electronic pressure sustaining valve shall be a single-seated, line pressure operated, diaphragm actuated, pilot controlled, <globe, angle> valve. The valve shall seal by means of a corrosion-resistant seat and a resilient, rectangular seat disc. These, and other parts, shall be replaceable without removing the valve from the line. The stem of the main valve shall be guided top and bottom by integral bushings. Alignment of the body, bonnet and diaphragm assembly shall be by precision dowel pins. The diaphragm shall not be used as a seating surface, nor shall the pistons be used as an operating means. The pilot system shall be furnished complete and installed on the main valve. It shall include two needle valves, a Y-strainer, two solenoid valves and isolation ball valves. The electronic pressure sustaining valve shall be operationally and hydrostatically tested prior to shipment.

MATERIALS OF CONSTRUCTION

The main valve body and bonnet shall be ductile iron per ASTM A536, Grade 65-45-12. All ferrous surfaces shall be coated with 4 mils of epoxy. The main valve seat ring shall be low-lead Bronze. Elastomers (diaphragms, resilient seats and O-rings) shall be EPDM. The needle valve and isolation ball valves shall be brass, and control line tubing shall be copper. The solenoid valves shall have brass bodies, weatherproof enclosures and be suitable for operation on <voltage>.

OPERATING CONDITIONS

The electronic pressure sustaining valve shall be suitable for sustaining pressures of <X to X> psi at flow rates up to <X> gpm.

ACCEPTABLE PRODUCTS

The electronic pressure sustaining valve shall be a <size> Model 22S <globe pattern, angle pattern>, with <150# flanged, 300# flanged, threaded, grooved> end connections, as manufactured by OCV Control Valves, Tulsa, Oklahoma, USA.

**Valves 1-1/4” through 24” are certified to NSF/ANSI 372. Valves 4” through 24” are also certified to NSF/ANSI 61-G.**

For maximum efficiency, the OCV control valve should be mounted in a piping system so that the valve bonnet (cover) is in the top position. Other positions are acceptable but may not allow the valve to function to its fullest and safest potential. In particular, please consult the factory before installing 8” and larger valves, or any valves with a limit switch, in positions other than described. Space should be taken into consideration when mounting valves and their pilot systems.

A routine inspection & maintenance program should be established and conducted yearly by a qualified technician. Consult our factory at 1-888-628-8258 for parts and service.

**How to order your 22S valve**

When ordering please provide:
- Fluid to be controlled - Model Number - Size - Globe or Angle - End Connection - Body Material - Trim Material - Solenoid & Controller Voltages - Pressure
- Transducer Output/Flow Range - Power failure mode: Open / Close / Hold last position - Solenoid enclosure
- Weatherproof or Explosion Proof - Solenoid exhaust to downstream or atmosphere - Controller Options
- Special Requirements / Installation Requirements

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