

## Pump Control System Specification

### SCOPE:

This specification covers the manufacture and testing of hydraulic control systems designed to control quarter-turn pump control valves.

### OPERATION:

The pump control valve shall be equipped with a cylinder actuator and a control panel designed to control the opening and closing of the valve in conjunction with pump operation. After the pump is started, a time delay contact or pressure switch contact will energize a 4-way solenoid valve to open the pump control valve.

Pump stoppage will be initiated by de-energizing the solenoid valve and closing the pump control valve. When the valve is nearly closed, a limit switch mounted on the valve will shut down a pump control relay. After power failure, 2-way solenoid valves will cause the pump control valve to rapidly close to reduce pump backspin.

### VALVE EQUIPMENT:

The pump control valve shall be equipped with a quarter-turn cylinder actuator sized and designed for 60 to 150 psi water or oil supply pressure. The cylinder shall be constructed of type 316 stainless steel or non-metallic materials including the rod, heads, barrel, and piston in accordance with AWWA C540. The cylinder shall be bolted to a fully enclosed cast iron housing containing a crosshead and slotted lever. On valves 30 inch and larger, the mechanism shall include a link and lever mechanism with precision slots in the cover and housing to support the crosshead. A position indicator and limit switch assembly enclosed in a NEMA 4 housing shall be mounted to the actuator cover and include open and closed limit switches.

### HYDRAULIC CONTROL PANEL:

The pump control valve shall be controlled by a hydraulic control system mounted in a NEMA 4X enclosure with hinged door and front window. An ASCO 4-way single solenoid valve equipped with a manual override and pair of ASCO 2-way normally-open solenoid valves shall be fully piped with brass pipe and copper tubing to direct the supply media and drain to the hydraulic cylinder. The normal opening and closing speeds shall be independently controlled between 60 and 300 seconds with brass vernier-type flow control valves. An emergency bypass line shall be provided with a separate 1/4-turn speed control valve to close the pump control valve in 10-30 seconds after power failure to reduce pump backspin. The panel shall be equipped with a supply isolation valve and pressure gage.

### ELECTRICAL CONTROL PANEL:

An electrical control panel shall be provided to display valve position and provide a pump safety circuit. UL listed Start and Stop DPDT control relays and a 5-minute timing relay shall be mounted in a NEMA 4X enclosure to coordinate the operation of the pump control valve with the pump controls. The panel door shall contain "Open", "Close", "Run", and "Stop" transformer-type pilot lights and "Emergency Stop" and "Reset" pushbuttons. The timer shall automatically shut down and lock out the pump circuit if the pump fails to develop pressure or the pump control valve fails to open.

### MANUFACTURE AND TESTING:

Each hydraulic and electrical panel shall be piped and wired to the pump control valve and operated at the specified minimum supply pressure to verify the minimum open, close, and emergency close operating times. The pump safety circuit shall be tested by delaying the opening of the valve. After testing, the panel shall be equipped with as-built hydraulic and electrical schematics. The control system shall be as manufactured by an ISO 9001 Certified Company, Val-Matic Valve, Elmhurst, Illinois.

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