

Air/Oil Pump Control System Specification

SCOPE:

This specification covers the manufacture and testing of an air/oil control systems designed to control quarter-turn pump control valves.

OPERATION:

The pump control valve shall be equipped with an air/oil 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 timer or pressure switch contact will energize a 4-way solenoid valve to open the pump control valve. Pump shutdown will be initiated by de-energizing a 4-way 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 motor 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 air/oil cylinder actuator sized and designed for 80 to 125 psi air supply pressure. The cylinders shall be mounted on opposite ends of the actuator and constructed of stainless steel materials including the rod, heads, barrel, and piston in accordance with AWWA C540. The cylinders shall be bolted to a fully enclosed cast iron actuator housing containing a crosshead and slotted lever. On valves 24 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 4X housing shall be mounted to the actuator cover and include open and closed limit switches.

AIR/OIL HYDRAULIC CONTROL PANEL:

The pump control valve shall be controlled by an air/oil 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 piped to direct air supply pressure to open or close the air cylinder. A hydraulic circuit consisting of ASCO 2-way normally-open solenoid valves and flow control valves shall be fully piped with brass pipe and copper tubing to control the oil flow from the oil cylinder. The normal opening and closing speeds shall be independently controlled between 60 and 300 seconds with brass vernier-type flow control valves. A translucent oil reservoir with oil connections shall be provided for make-up oil from the oil cylinder rod volume. An emergency bypass oil circuit shall be provided with a separate 1/4-turn flow 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 (OPTIONAL):

An electrical control panel shall be provided (when specified) to display valve position and provide a pump safety circuit. UL listed Start and Stop 3PDT 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 leak tested at 80 psig and operated at the specified control voltage to verify the open, close, and emergency close functions. Final schematics shall be furnished in the control enclosures. The control system shall be as manufactured by an ISO 9001 Certified Company, Val-Matic Valve, Elmhurst, Illinois.

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