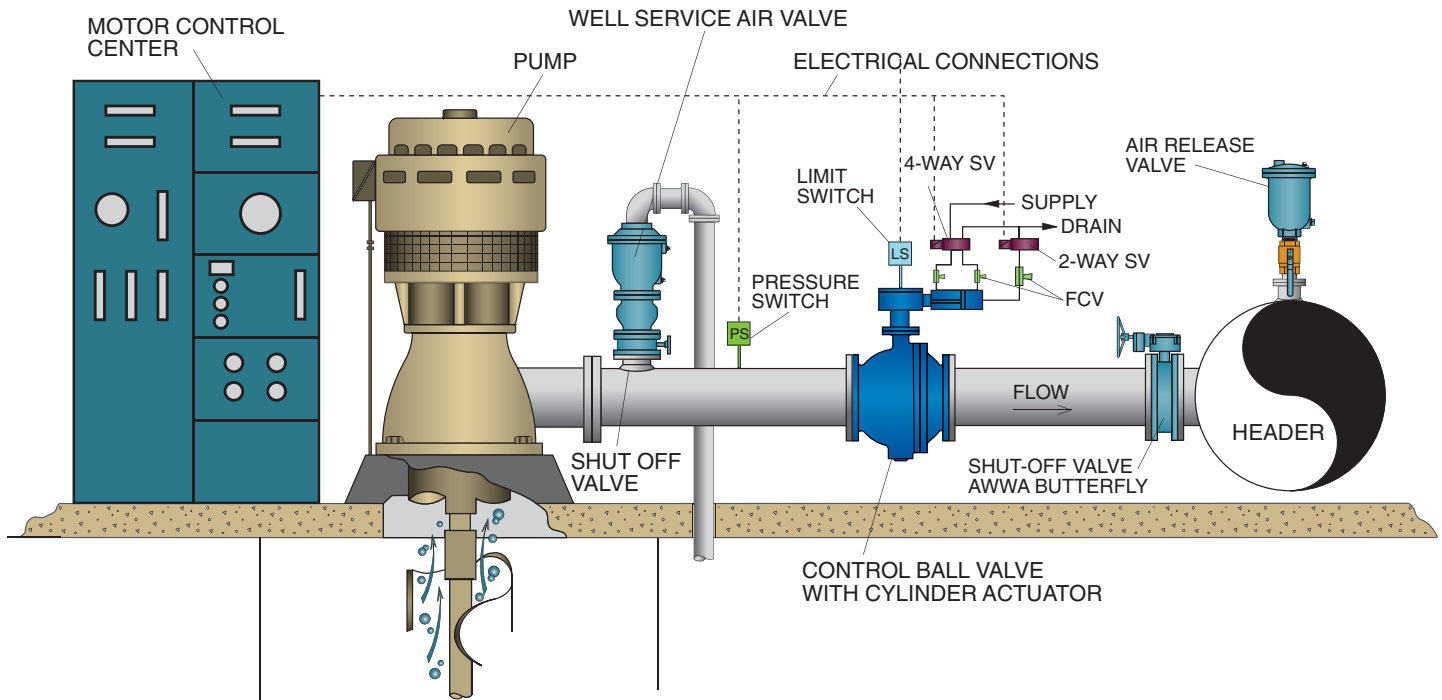


Pump Control Systems



Typical Pump Control System
(Single or Multiple Pump)

Pump Control Valves

For pumping systems where surge control is critical and energy savings is important, a pump control valve is typically used. The valve is wired to the pump controls and provides adjustable opening and closing times in excess of the system critical surge period. Unlike check valves, the pump control valve's speed of operation is not affected by line flow or pressure conditions. Stable operating times are essential in controlling surges in pumping systems. A Val-Matic Ener-G™ Ball Valve is the ideal pump control valve for pumping systems. Its equal percentage flow characteristics, rugged AWWA construction and virtually zero headloss make it the preferred choice. AWWA Butterfly Valves can also be used for clean water applications, and AWWA Eccentric Plug Valves for wastewater applications.

Sequence of Operation

When the pump is started and pressure builds, a pressure switch (PS) located on the pump discharge signals the control valve to open. During shutdown, the valve is signaled to close while the pump continues to run. When the valve nears the closed position, a limit switch (LS) located on the valve will stop the pump. After a power outage or pump trip, the flow will rapidly reverse. The valve must close rapidly to prevent backspinning the pump and rapid depletion of a hydro-pneumatic surge tank when utilized.

Cylinder Actuator Control

The control valve is equipped with a hydraulic cylinder actuator. The cylinder can be powered with pressurized water from the line or from an independent oil power system. Mounted on the valve or in a floor-mounted panel are the hydraulic controls electrically wired into the pump controls. Solenoid directional valves direct the operating medium to the cylinder ports to cycle the valve. The speed of opening and closing is controlled by independently adjustable flow control valves (FCV). The valve hydraulic controls are equipped with a bypass line to send the controlled cylinder flow around the normal flow control valve and through an alternate fast-closing flow control valve.

Motor Actuator Control

Alternatively, when a clean water supply is not available to power a cylinder actuator, such as a lift station application, the control valve can be supplied with a motor actuator. The operating times are adjustable in the field with special actuator motor controls. To protect the pump and system on power failure, the valve can either be supplied with a battery backup system or a Surgebuster® Check Valve. The Surgebuster® provides low headloss and non-slam characteristics.

Hydraulic Panel

The Val-Matic hydraulic control panel uses the highest quality components available and is designed to reliably operate the pump control ball valve with water or oil supply. Unlike a motor-operated control valve, the control panel allows field adjustment of the valve operating times so that the valve can be set to match the surge characteristics of the piping system. The controls are panel mounted and pre-wired to a terminal strip in a NEMA 4X junction box for easy installation. An optional NEMA 4X enclosure is available to secure and protect the equipment in the harshest of environments.

There are four pressure connections to the cabinet: Supply, Drain, Open, and Close. The supply connection is equipped with an isolation valve and pressure gauge for ease of troubleshooting the control system. The supply and drain headers are controlled by brass two-way normally-open solenoid valves piped with rigid brass pipe to provide rapid valve closure on electrical power failure to minimize backspinning of the pump. The emergency closure rate is adjustable in the 10-30 second range by the balancing valve in the bottom header. The normal open and closing of the pump control valve is controlled by the brass four-way solenoid valve and independently adjustable multi turn flow control valves. The flow control valves allow independent control of the operating times in the 30-600 second range.

The solenoid valves are wired to a NEMA 4X junction box using liquid-tight conduit. The solenoid valve wires are terminated inside of the junction box with terminals. Installation of the system is easy and fast since only one conduit connection is needed to connect the panel to the pump controls.

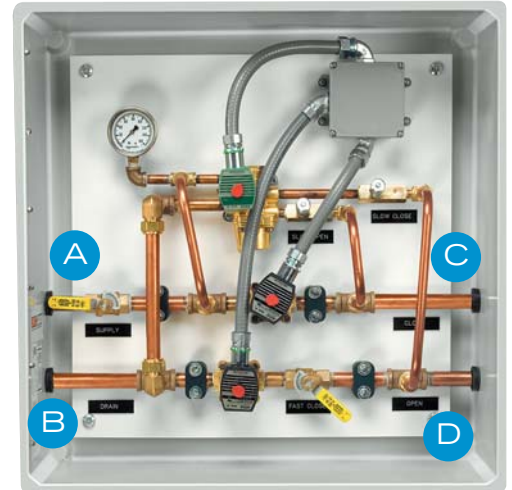
Electric Panel

The Val-Matic electrical control panel uses the highest quality components available and is designed to work with the hydraulic panel in controlling and monitoring the operation of the pump control valve. The relays and timers are panel mounted and pre-wired to a terminal strip in a hinged NEMA 4X enclosure for easy installation and to protect the equipment in the harshest of environments.

The control panel includes internal plug-in type Run and Stop Relays to control the operation of the pump. An adjustable Timing Relay monitors the operation of the system and automatically shuts down the pump if the pump does not build pressure or the valve fails to open. Transformer-type Pilot Lights are used to provide safe indication. The RUN, OPEN, and CLOSE pilot lights indicate valve and pump operation. The STOP light indicates that an alarm condition exists and the pump is locked out. Once the alarm condition is resolved, the RESET button is pressed to activate the system. An EMERGENCY STOP button is provided to stop the pump at the valve location. When the button is pressed, the valve closes at the normal rate, and automatically shuts off the pump when the closed limit switch is tripped.

PLC Panel

When additional control features or monitoring multiple functions and times are desired, programmable logic controllers (PLC's) are used. PLC's can be field programmed for unlimited input/output configurations and plug-and-play with all Modbus devices.



Hydraulic Panel

- A. Supply Pressure
- B. Drain
- C. Pressure to Close
- D. Pressure to Open

Exclusive Val-Matic Control System Features

- Waterproof and corrosion-resistant enclosures
- Rigid brass pipe and tubing - No hoses to wear or burst
- Supply line with isolation valve and pressure gauge
- Reliable ASCO solenoid valves and vernier flow control valves
- Heavy-Duty switches and transformer pilot lights



Electric Panel



PLC Panel