SURGE ANTICIPATING VALVE

With Solenoid Control

WW-735-55-M – Control Logic

General:
This document describes the operation and control logic of BERMAD WW-735-55-M Surge Anticipating Valve with Solenoid Control and provides the parameters (commands, inputs, timers, hardware, etc.) required for best integration with the pumping station's control system, allowing extra protection, management capabilities and ease of operation.

Attention:
This document and the information enclosed within it contain restricted and/or privileged information that is intended only for usage by the customer's qualified engineers, electricians or programmers and should serve only as guidelines for implementing proper control for the WW-735-55-M Surge Anticipating Valve.
Accordingly, only qualified and trained personnel shall take any action in reliance on this document, including installation, connection, operation and maintenance of WW-735-55-M Surge Anticipating Valve, and must do so in full compliance with all applicable regulations, standards and safety instructions related to this type of work.
The WW-735-55-M Surge Anticipating Valve should be properly sized, selected, installed and operated, as well as approved by the system's design engineer.

Valve's Application:
The WW-735-55-M is a diaphragm actuated, hydraulically operated with solenoid control, off-line Surge Anticipating Valve that immediately opens in response to an electric signal. The pre-opened valve dissipates the returning high pressure wave, eliminating the surge. The valve smoothly closes drip tight as quickly as the relief feature allows, thereby preventing closing surge. The valve also relieves excessive system pressure.
For further understanding of the application and the operation it is recommended to refer to WWW.BERMAD.COM for general information and training on hydraulic control valves, as well as product page, IOM and videos suitable for the specific type and size of the WW-735-55-M.

Main relevant accessory:

- A solenoid valve which in response to an electric command vents the pressure and water from the control chamber of the WW-735-55-M-S to open it quickly.

Modes of operation:

- Power Failure: The solenoid is activated to open the WW-735-55-M in response to power supply failure occurring while at least one pump was running.
  - This is the more common mode of operation.
- Any Pump Shutdown: The solenoid is activated to open the WW-735-55-M in response to every shutdown of the pump, even if power supply is available.

Control Sequence:

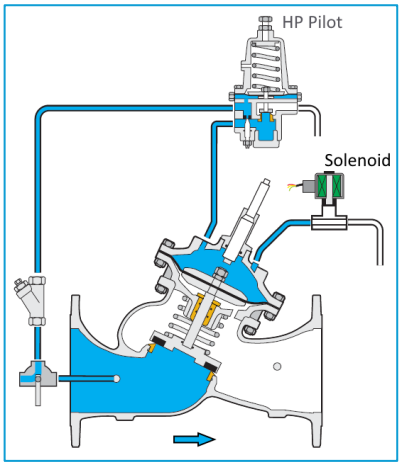
- Standby
  - When pumping is off and when during normal operation:
    - The solenoid is not activated.
    - The WW-735-55-M is closed.
- Pump Stop
  - Power Failure:
    - Power On input disconnection AND Pump On input disconnection.
    - Start of Delay Timer (TD1).
  - Any Pump Shutdown:
    - Pump On input disconnection.
    - Start of Delay Timer (TD1).
  - Delay Timer (TD1) reaches its set value:
    - The solenoid is activated.
    - Solenoid Activation Timer (TS1) is started.
    - The WW-735-55-M opens and discharges pressure and water from the pipeline.
  - Solenoid Activation Timer (TS1) reaches its set value:
    - The solenoid is deactivated.
    - The WW-735-55-M closes.
  - The WW-735-55-M will continue closing only when the system pressure is below the set-point of the HP pilot.

Requirements:

- UPS system:
  - Required to activate the solenoid during power failure.
  - Voltage – 24V.
  - Recommended minimal capacity – suitable for activating two 10W coils for 10 minutes.
    - For example: 2 x 12V-5AH lead acid batteries connected in serial.
    - Provides for two operation cycles without recharging, i.e.: subsequential power failures.
  - A larger capacity will be required when controlling more than two WW-735-55-M valves.
- Inputs:
  - Power On.
  - Pump On.
  - UPS battery status.
- Output:
  - Solenoid Activation – 24VDC (8-12W).
- Timers:
  - Delay Timer (TD1)
    - Time from Pump Stop trigger until Solenoid Activation output
    - Range: 0-60 seconds.
  - Solenoid Activation Timer (TS1)
    - Time of solenoid activation.
    - Range: 5-300 seconds.
  - Values should be determined by a surge analysis and by on-site experience.
- Recommended additional Outputs and Alarms:
  - Power supply not available
  - Solenoid coil is disconnected
  - Solenoid coil is overcurrent (short)
  - Battery not charging
  - Battery voltage
  - Battery voltage is below 22V

Control and Installation illustrations:

Typical control diagram
(700 Sigma series)



Typical installation in a pumping station
(example only)