



# Pressure Relief/Sustaining Valve

## Model: WW-430

- Prioritizing pressure zones
- Ensuring controlled pipeline fill-up
- Preventing pipeline emptying
- Pump overload & cavitation protection
- Safeguarding pump minimum flow
- Excessive line pressure protection



The Model WW-430 Pressure Relief/Sustaining Valve is a hydraulically operated, diaphragm actuated control valve that can fulfill either of two separate functions. When installed in-line, it sustains minimum pre-set, upstream (back) pressure regardless of fluctuating flow or varying downstream pressure.

When installed as a circulation valve, it relieves excessive line pressure when above maximum pre-set.

### Features and Benefits

- **Line pressure driven** – Independent operation
- **Flexible design** – Easy addition of features
- **Advanced globe or angle hydro-efficient design**
  - Unobstructed flow path
  - Single moving part
  - Non-turbulent flow
  - High flow capacity
- **Fully supported & balanced diaphragm**
  - Low actuation pressure
  - Excellent low flow regulation performance
  - Progressively restrains valve closing
  - Prevents diaphragm distortion
- **In-line serviceable**
  - Easy maintenance
  - Minimal down time

### Major Additional Features

- UL Listed and FM Approved for Fire Protection- **FP-430-UL/FM**
- Solenoid control – **WW-430-55**
- Quick pressure relief valve – **WW-43Q**
- Pressure sustaining & reducing valve – **WW-423**
- High sensitivity pilot – **WW-430-12**
- Level control & pressure sustaining valve – **WW-453**
- Electrically selected multi-level settings – **WW 430-45**
- High sensitivity hydraulic positioning – **WW 430-85**
- Electronic pressure sustaining valve – **WW 438-03**

See relevant BERMAD publications.



## Operation - Pressure Sustaining (In-Line)

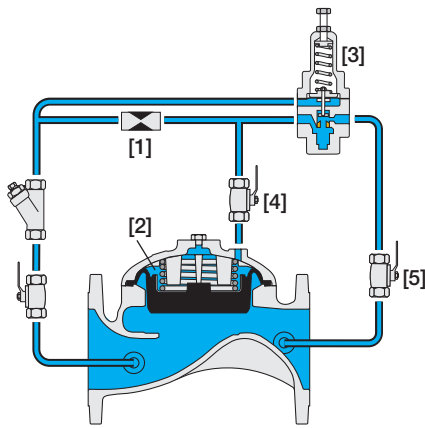
The Model WW-430 is a pilot controlled valve equipped with an adjustable, 2-Way pressure sustaining pilot.

The flow restriction [1] continuously allows flow from the main valve inlet into the control chamber [2]. The pilot [3] senses upstream pressure and should be set to minimum system pressure allowed.

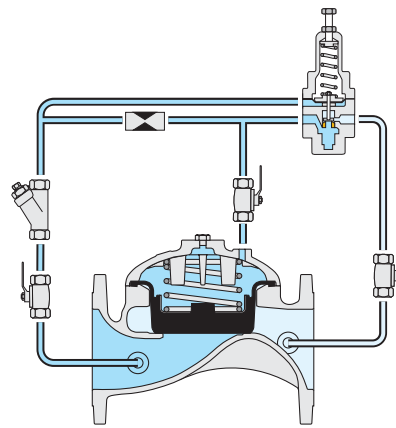
Should upstream pressure tend to fall below pilot setting, the pilot throttles, enabling pressure to accumulate in the control chamber, causing the main valve to throttle, sustaining upstream (back) pressure at pilot setting. Should upstream pressure be below pilot setting, the pilot closes, causing the main valve to close drip tight.

Should upstream pressure tend to rise above pilot setting, the pilot releases accumulated pressure causing the main valve to modulate open.

Closing cock valve [4] freezes valve opening rate. Downstream cock valve [5] enables manual closing.



Valve Regulates



Valve Closed  
(upstream pressure below pilot setting)

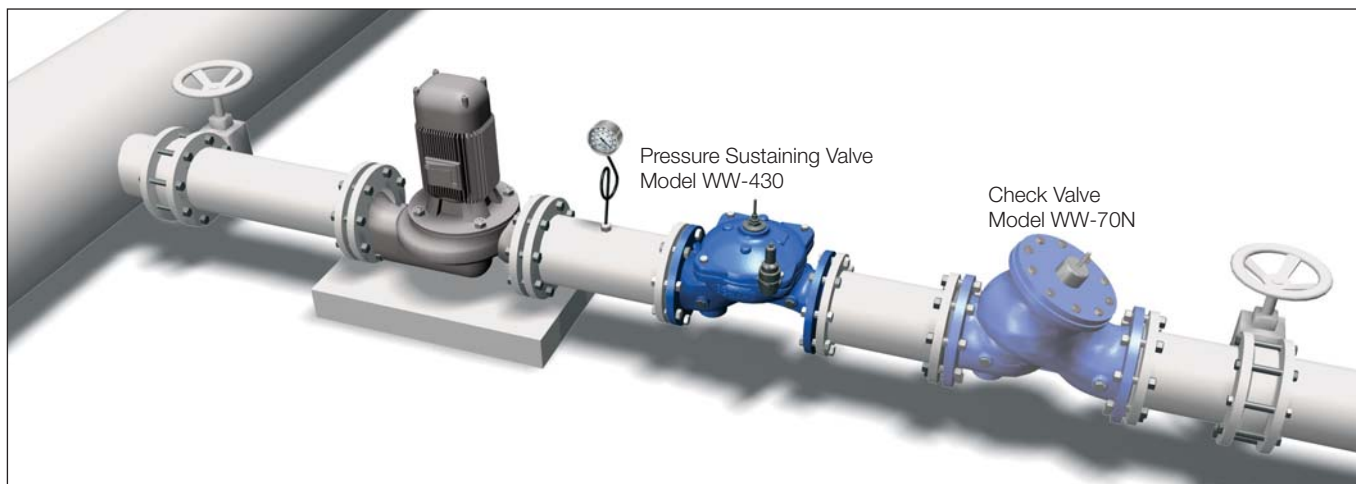
## Typical Applications

### Pump Overload and Cavitation Protection

The Model WW-430 sustains pump discharge pressure, preventing pump overload and cavitation damage caused by excessive demand.

By connecting the pilot sensing line to pump suction, the Model WW-430 becomes Model WW-430R which sustains pump suction pressure.

Where suction pressure regimes vary, the Model WW-436 is needed to limit pump flow by sustaining pump differential pressure.

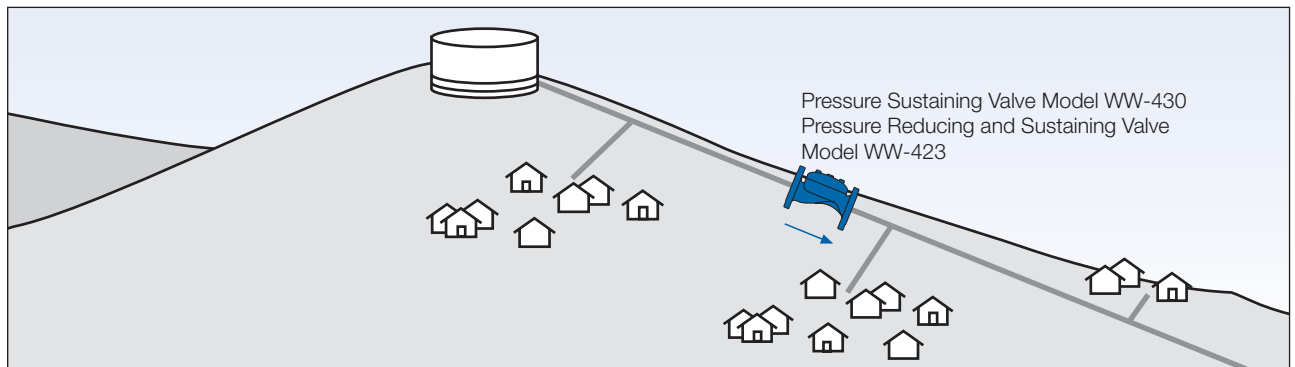




### Prioritizing One Zone over Another

This application is usually found in gravity fed systems. The Model WW-430 enables prioritizing the higher elevation zone over downhill consumers when they create excessive total demand.

By adding a pressure reducing feature to the primary pressure sustaining function, the Model WW-430 becomes a Model WW-423 that also protects downhill consumers from over pressure during low demand.



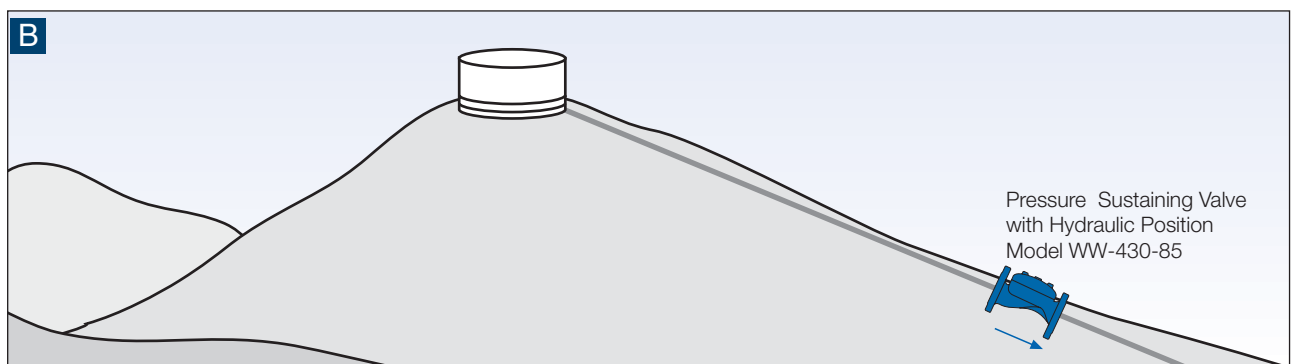
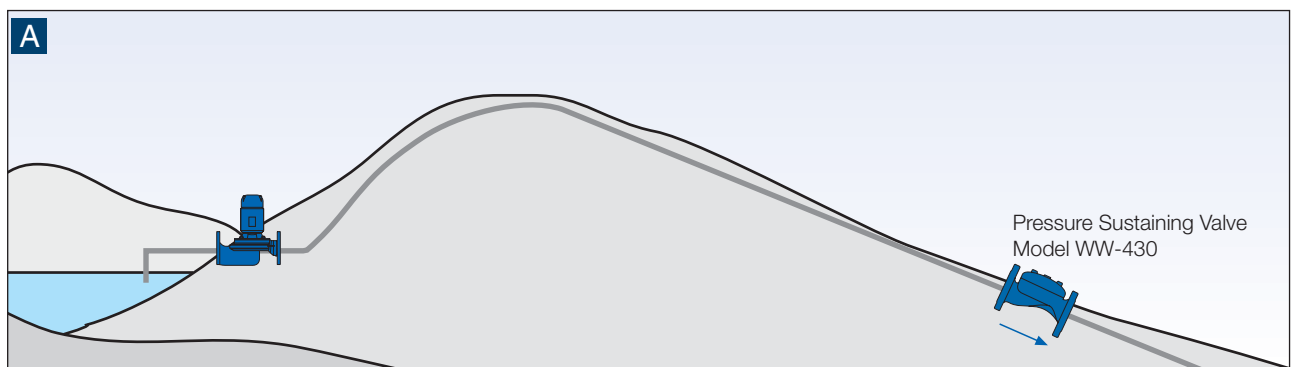
### Preventing Line Emptying

Line emptying presents a serious problem in water distribution networks. Preventing it in downhill networks requires setting the pilot slightly above the elevation differential between the highest point of the line and the valve.

Where a **pump** provides pressure **A**, the relatively high pressure causes the Model WW-430 to open wide. When the pump stops, pressure drops below pilot setting and the valve closes drip-tight preventing line emptying.

Where a **reservoir** provides pressure **B**, there is only a small potential for variation in pressure (the difference in high and low reservoir levels). The problem is made worse by having a significant part of that potential pressure lost on line friction. The standard Model WW-430 might not be enough. The solution is to install a valve with very low head loss, super sensitivity, accuracy and repeatability.

Install the Model WW-430-85 pressure sustaining with high sensitivity hydraulic positioning.





### Engineer Specifications

The Pressure Relief/Sustaining Valve shall fulfill either of two separate functions.

When installed in-line, it shall sustain minimum pre-set, upstream (back) pressure regardless of fluctuating flow or varying downstream pressure.

When installed as a circulation valve, it shall relieve excessive line pressure when above maximum pre-set.

**Main Valve:** The valve shall be hydraulically controlled, elastomeric type globe valve with a rolling-diaphragm. The valve shall have an unobstructed flow path with no stem guide or supporting ribs. Valve actuation shall be accomplished by a fully peripherally supported, one-piece balanced rolling-diaphragm, vulcanized with a rugged radial seal disk. The diaphragm assembly shall be the only moving part. The valve shall have a removable cover for quick in-line service enabling all necessary inspection and servicing. Valve pressure rating shall be PN16. Valve construction materials shall be: Epoxy FB coated Ductile Iron body and cover, NR diaphragm & Stainless Steel spring.

The valve shall be supplied as an assembly, hydraulically tested and factory adjusted to customer requirements at an ISO 9000 and 9001 certified hydraulic laboratory.

**Control System:** The valve shall be controlled in a 2-way system without a water bleed to the atmosphere. The control system shall consist of a 2-way adjustable (1.5-16.0 bar) direct acting pressure sustaining pilot, isolating cock valves on upstream, downstream, and control chamber ports and a filter. Washing the filter shall not require isolating the main valve. All tubing and fittings shall be Stainless Steel. The assembled valve shall be hydraulically tested and factory adjusted to customer requirements.

**Quality Assurance:** The valve manufacturer shall be certified according to the ISO 9001 Quality Assurance Standard. The main valve shall be certified as a complete drinking water valve according to WRAS, and other recognized standards.



## Operation - Pressure Relief (Circulation)

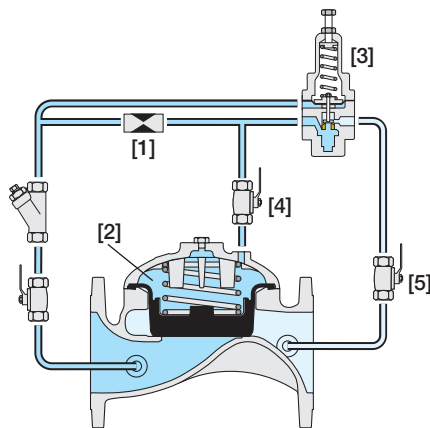
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The flow restriction [1] continuously allows flow from the main valve inlet into the control chamber [2]. The pilot [3] senses upstream pressure and should be set slightly above system working pressure.

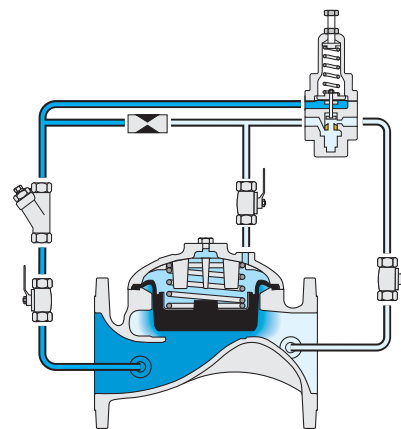
Should upstream pressure rise above pilot setting, the pilot releases pressure from the control chamber, causing the main valve to modulate open, relieving excessive upstream pressure.

Should upstream pressure fall, the pilot throttles, enabling pressure to accumulate in the control chamber, causing the main valve to throttle closed, sustaining upstream (back) pressure at the pilot setting. Should upstream pressure be below pilot setting, the pilot closes, causing the main valve to close drip tight.

Closing cock valve [4] freezes valve opening rate. Downstream cock valve [5] enables manual closing.



**Valve Closed**  
(upstream pressure is below setting)



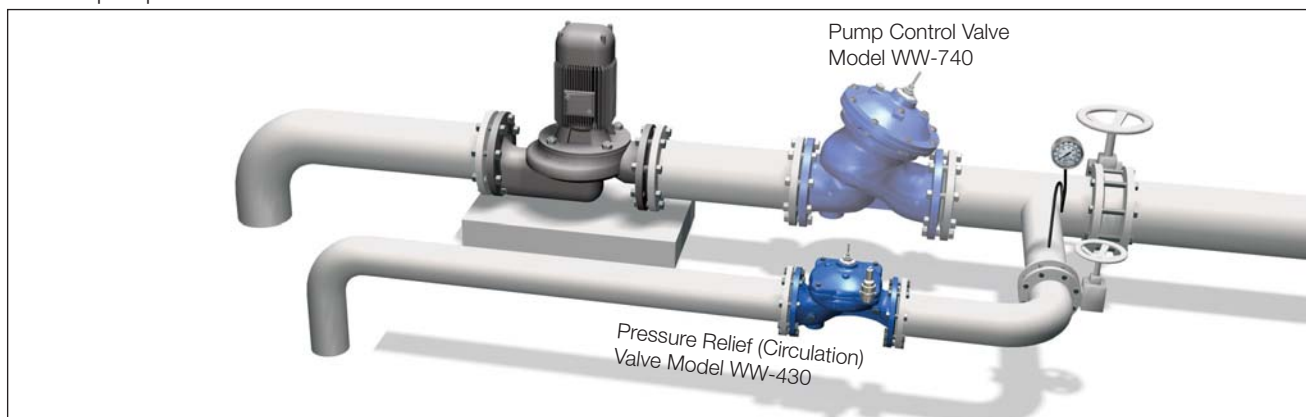
**Valve Regulates**

## Typical Applications

### Safeguarding Pump Minimum Flow

The Model WW-430 relieves over pressure caused by excessive pump discharge during low demand.

To keep a constant discharge pressure, the difference between pumped flow and consumer demand can be circulated back to pump suction.



Circulation valves are often exposed to severe cavitation because valve  $\Delta P$  and velocity are usually high while downstream pressure is very low. On the other hand, the valves operate under these conditions for relatively short periods. Increased valve durability for applications requiring long operating periods will be achieved by using cavitation resistant materials, adding a downstream orifice, installing an upstream pressure reducing valve, increasing valve size, or any combination of these choices.



