Pressure-Relief/Sustaining Valve

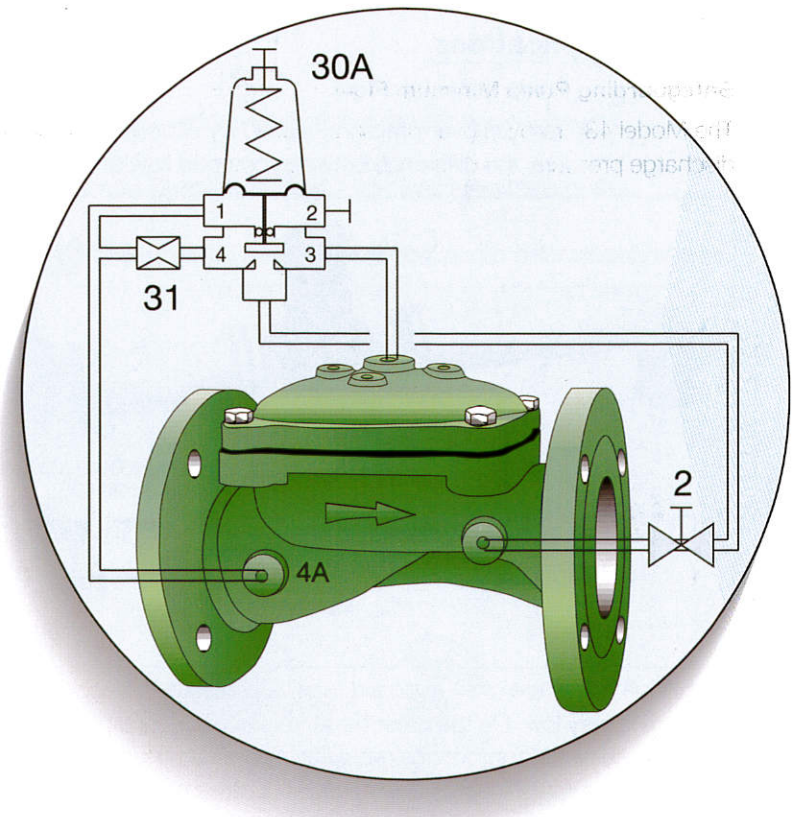
Description

Model 430 Pressure-Sustaining valve is an automatic control valve designed to relieve excess pressure or sustain a minimum up-stream back-pressure. It is a pilot-controlled, hydraulically operated diaphragm-type globe or angle 405 valve.

The pressure-regulating pilot senses up-stream pressure and modulates open or close, causing the main valve to throttle. The pressure-regulating pilot has an adjusting screw to preset the desired pressure. When up-stream pressure rises above the pilot setting, the pilot and the main valve modulate to open to relieve main line pressure and maintain pilot setting pressure.

When up-stream pressure falls below the pilot setting, pilot and main valve throttle closed to maintain the preset pilot setting pressure.

- Pressure setting range: 0.5 to 12 bar.

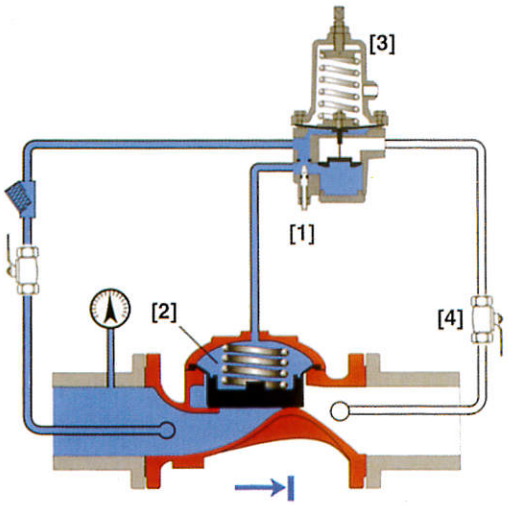


Control list

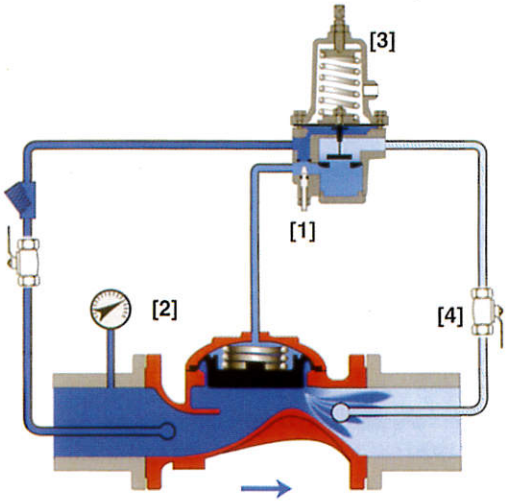
400-G	RAM 400-Globe
4A	In line, Self Flushing Filter (or Y-Strainer)
30A	2-way Pressure-Sustaining Relief Pilot Valve
31	Control Orifice
2	Cock Valve

Operation - Pressure-Relief (circulation)

The Model 430 is a pilot-controlled valve equipped with an adjustable, 2-way, pressure-sustaining pilot.
The needle valve [1] continuously allows flow from the main valve inlet into the upper 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 upper 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 upper 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.
The needle valve controls the closing speed. The downstream cock valve [4] enables manual controls closing.



Valve Closed
(upstream pressure is below setting)

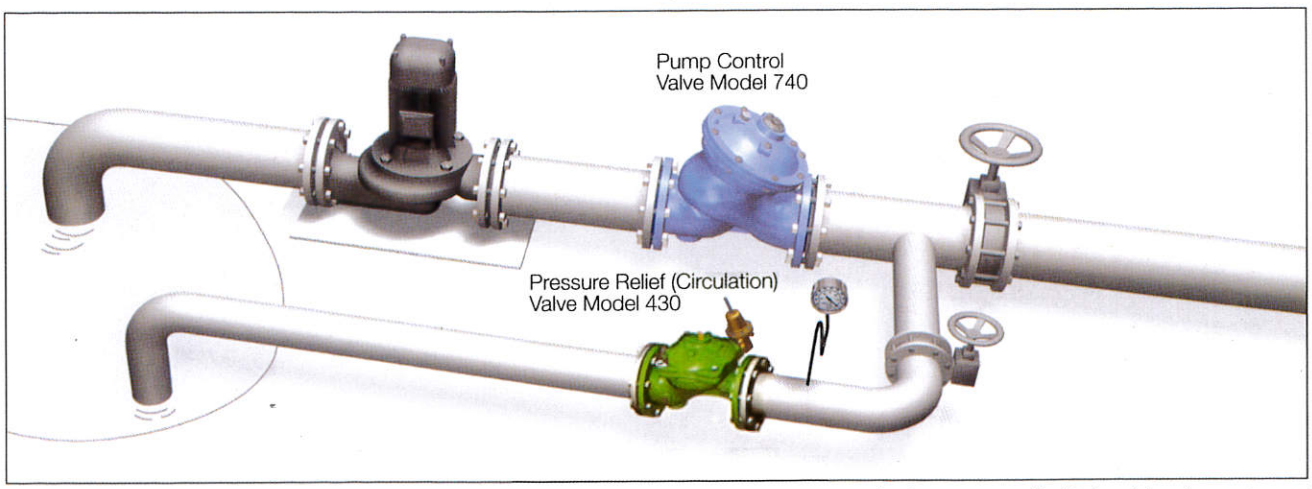


Valve Open (pressure-relief)

Typical Applications

Safeguarding Pump Minimum Flow

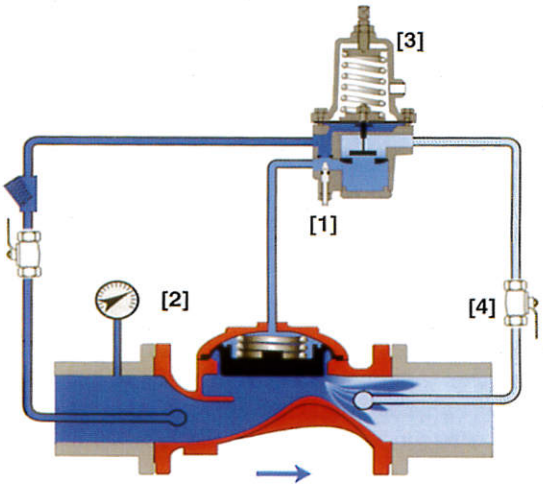
The Model 430 relieves over-pressure caused by excessive pump discharge during low demand. To keep a constant discharge pressure, the difference between pumped flow and consumer demand can be circulated back to pump suction.



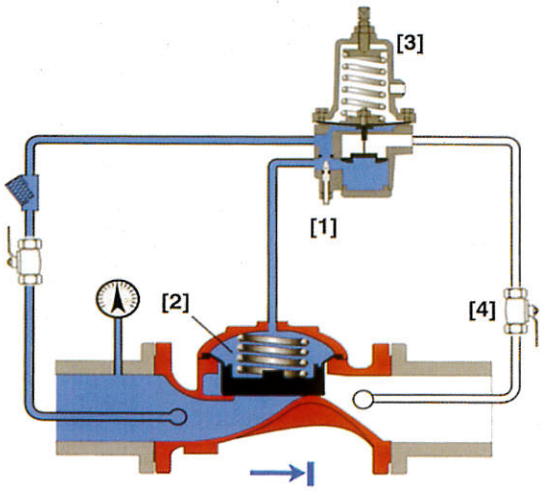
Circulation valves are often exposed to severe cavitation beacuse valve ΔP and velocity are usually high while downstream pressure is very low. On the other hand, the valves operates under these conditions for relatively short periods. Increased valve durability, for applications require long operating 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.

Operation - Pressure-Sustaining

The Model 430 is a pilot-controlled valve equipped with an adjustable, 2-way, pressure-sustaining pilot.
The needle valve [1] continuously allows flow from the main valve inlet into the upper 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 upper 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.
The needle valve controls the closing speed. The downstream cock valve [4] enables manual controls closing.



Valve Regulates

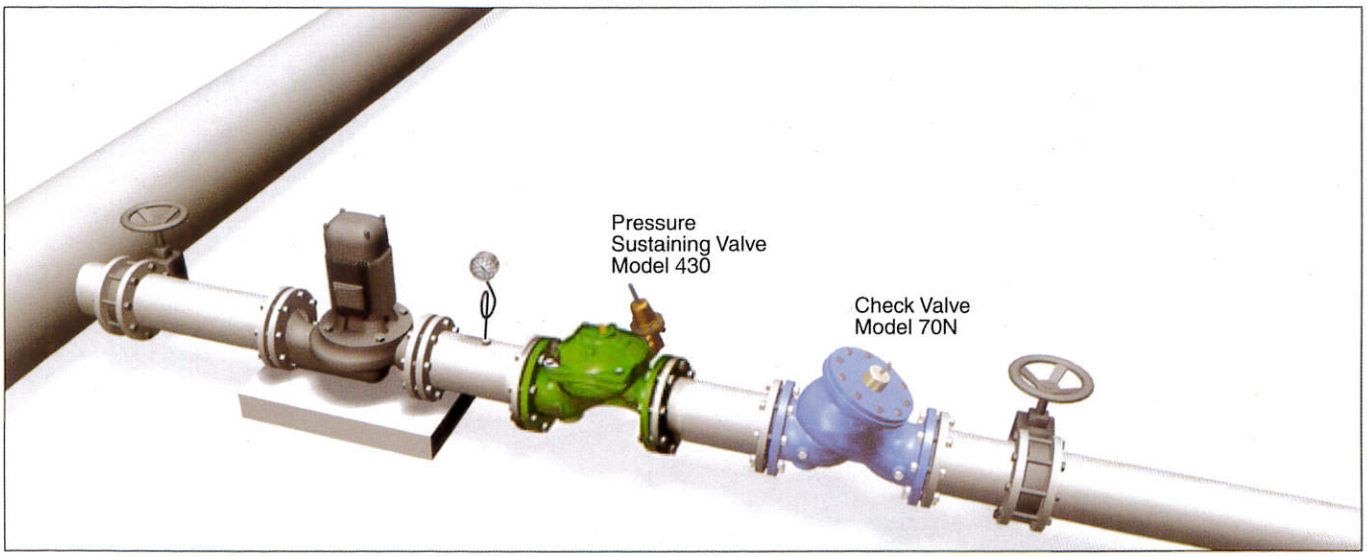


Valve Closed
(upstream pressure below pilot setting)

Typical Applications

Pump Overload and Cavitation Protection

The Model 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 430 becomes Model 730R which sustains pump suction pressure.
Where suction pressure regimes vary, the Model 736 is needed to limit pump flow by sustaining pump differential pressure.



Technical Data

Specifications

Valve Pattern: Globe, Angle

Sizes:
- Globe: 3/4", 1", 1 1/2", 2" 2 1/2", 3", 4", 6", 8", 10", 12"
- Angle: 2", 3", 4"

Pressure Rating:
0.5-16 kg/cm² (7-235 psi)

Sizes:

End Connections:
- **Female threaded** NPT/BSP
  Globe- 3/4", 1", 1 1/4, 2", 2 1/2"
  Angle- 2", 3"
- **Grooved (Victaulic):**
  Globe- 2", 3", 4"
  Angle- 3", 4"
- **Flanged:** ISO-16,ANSI125,BS-D, JIS 10K
  Globe: 2", 2 1/2", 3", 4", 6", 8", 10", 12"
  Angle: 2", 3", 4"

Max. Temperature Range:
Water up to 80°C (180°F)

Materials:
- Body and cover: 3/4", 1", 11/2" Bronze only 2"-12"CastIron (ISO185) Option,DuctileIron, Cast steel, Stainless steel, Bronze, Polyestery coated(4 Mil) (100 Micron) (200°C)
- Diaphragm: Nylon-fabric, Reinforced Natural Rubber. Options: Nitrile; Buna-N; EPDM
- Diaphragm retainer: Stainless steel (AISI304)
- Spring: Stainless steel (AISI304)

(Other materials and coatings available on request).

Tender 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 main valve shall be a center-guided, diaphragm-actuated, globe valve of either oblique (Y) or angle pattern design. The body shall have a replaceable, raised, stainless steel seat ring. The valve shall have an unobstructed flow-path, with no stem guides, bearings, or supporting ribs. The body and cover shall be ductile iron. All external bolts, nuts, and studs shall be Duplex® coated. All valve components shall be accessible and serviceable without removing the valve from the pipeline.

Control System: The control system shall consist of a 2-way adjustable, direct-acting, pressure-sustaining pilot valve, a needle valve, isolating cock valves, and a filter. All fittings shall be forged brass or stainless steel. The assembled valve shall be hydraulically tested and factory adjusted to customer requirements.

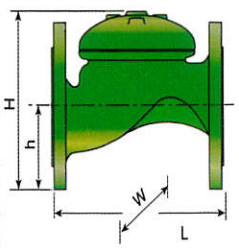
Quality Assurance: The valve manufacturer shall be certified according to the ISO 9001 Quality Assurance Standard. The valve shall be certified as a complete drinking water valve according to NSF, WRAS, and other recognized standards.

Dimensions and Weights

	Threaded					Grooved (Victaulic)				Flanged							
Size	3/4"	1"	1 1/2"	2"	2 1/2"	2"	3"	4"	6"	2"	2 1/2"	3"	4"	6"	8"	10"	12"
L(mm)	112	112	150	180	210	205	250	320	415	205	205	250	320	415	500	605	724
H(mm)	67.5	67.5	83	111	133	106	156	190	300	155	178	205	245	338	430	460	635
Hf*(mm)	-	-	-	205	226	200	255	300	400	245	260	315	355	455	580	610	930
W(mm)	72	72	90	120	129	120	175	200	300	155	178	200	225	315	390	405	580
h(mm)	20	20	27.5	38	46	32	46	60	80	78	89	100	112	140	170	202	240
Weight(kg)	0.95	0.95	1.5	4.0	5.7	5.0	10.6	16.2	50	9.0	10.5	19.0	28.0	68.0	125	144	290

*Hf = Height with optional flow stem (at open podition)

Globe Pattern



Pressure Loss Flow Chart - Globe Pattern