Pressure Sustaining and Reducing Valve

- Protecting lower pressure zones
- Prioritizing higher pressure zones
- Preventing pipeline emptying
- Ensuring controlled pipeline fill-up
- Pump overload & cavitation protection
- Compensating during groundwater drawdown

The Model 723 Pressure Sustaining and Reducing Valve is a hydraulically operated, diaphragm actuated control valve with two independent functions. It sustains minimum pre-set upstream pressure regardless of fluctuating flow or varying downstream pressure, and it prevents downstream pressure from rising above maximum pre-set regardless of fluctuating flow or excessive upstream pressure.

**Features and Benefits**
- Line pressure driven – Independent operation
- In-line serviceable – Easy maintenance
- Double chamber design
  - Moderated valve reaction
  - Protected diaphragm
- Flexible design – Easy addition of features
- Variety of accessories – Perfect mission matching
- "Y" or angle, wide body – Minimized pressure loss
- Semi-straight flow – Non-turbulent flow
- Stainless Steel raised seat – Cavitation damage resistant
- Obstacle free, full bore – Uncompromising reliability
- V-Port Throttling Plug – Low flow stability

**Major Additional Features**
- Solenoid control – 723-55
- Check feature – 723-20
- High sensitivity pilots – 723-12
- Solenoid control & check feature – 723-25
- Downstream over pressure guard – 723-48
- Proportional – 723-PD

See relevant BERMAD publications.
Operation

The Model 723 is a pilot controlled valve equipped with two adjustable, 2-Way pilots, pressure sustaining (PS) and pressure reducing (PR), operating independently in series.

The needle valve [1] continuously allows flow from the valve inlet into the upper control-chamber [2]. The PS pilot [3] and the PR pilot [4] together control outflow from the upper control chamber. Should upstream pressure fall below PS pilot setting, the pilot closes causing pressure to accumulate in the upper control chamber. The main valve throttles closed sustaining upstream pressure at the pilot setting. Should upstream pressure rise above PS pilot setting, the pilot releases accumulated pressure from the upper control chamber to the main valve outlet through the held open PR pilot, opening the main valve. Should opening the main valve cause downstream pressure to rise above PR pilot setting, the pilot closes, causing the main valve to throttle closed reducing downstream pressure to PR pilot setting. The needle valve controls the closing speed. The downstream cock valve [5] enables manual closing.

Engineer Specifications

The Pressure Sustaining and Reducing Valve shall sustain minimum pre-set upstream pressure regardless of fluctuating flow or varying downstream pressure, and shall also prevent downstream pressure from rising above maximum pre-set regardless of fluctuating flow or excessive upstream pressure.

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.

Actuator: The actuator assembly shall be double chambered with an inherent separating partition between the lower surface of the diaphragm and the main valve. The entire actuator assembly (seal disk to top cover) shall be removable from the valve as an integral unit. The stainless steel valve shaft shall be center guided by a bearing in the separating partition. The replaceable radial seal disk shall include a resilient seal and shall be capable of accepting a V-Port Throttling Plug by bolting.

Control System: The control system shall consist of two 2-way adjustable, direct acting pilots (pressure sustaining and pressure reducing), 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 main valve shall be certified as a complete drinking water valve according to NSF, WRAS, and other recognized standards.
Typical Applications

Water is pumped from a deep well to the reservoir through a line also supplying nearby consumers along the way. Water is then supplied from the reservoir to both higher and lower elevation consumers. Both parts of the system require pressure sustaining and reducing solutions.

Groundwater Draw Down System

In deep well pumping systems, the groundwater level varies according to: seasonal changes, seepage rate, and demand. These systems require a solution to a unique combination of issues:
- Consumer demand or filling an empty line results in pump overload and cavitation, requiring pressure sustaining.
- Deep well pumps boost a constant $\Delta P$, resulting in high ground level raising the discharge pressure, requiring pressure reducing.

The Model 723 provides a complete solution for both of these issues. Adding check feature “20”, saves the cost of a line-sized check valve.

Gravity Fed Supply Line

Where consumers at both higher and lower elevations use the same distribution network:
- Consumers located at higher elevation need protection against over demand by the lower zone.
- Lower zone consumers need protection against high gravity fed pressure.

The Model 723, being both a pressure sustaining and reducing valve, simultaneously fulfills both requirements.
Technical Data

Dimensions and Weights

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<th>A</th>
<th>B</th>
<th>C</th>
<th>L</th>
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Main Valve

Valve Patterns: "Y" (globe) & angle

Size Range: 11/4" – 32" (40–800 mm)

End Connections (Pressure Ratings):
- Flanged: ISO PN16, PN25 (ANSI Class 150, 300)
- Threaded: BSPT or NPT

Other: Available on request

Working Temperature: Water up to 80°C (180°F)

Standard Materials:
- Body & Actuator: Ductile Iron
- Internals: Stainless Steel, Bronze, & coated Steel
- Diaphragm: NBR Nylon fabric-reinforced
- Seals: NBR

Coating:
- Fusion Bonded Epoxy, RAL 5005 (Blue)
- NSF & WRAS approved or Electrostatic Polyurethane Powder, RAL 6017 (Green)

How to Order

Please specify the requested valve in the following sequence: (for more options, refer to Ordering Guide)

Control System

Standard Materials:
- Accessories:
  - Bronze, Brass, Stainless Steel & NBR
  - Tubing: Copper or Stainless Steel
- Fittings: Forged Brass or Stainless Steel
- Pilot Standard Materials:
  - Body: Brass, Bronze or Stainless Steel
  - Elastomers: NBR
  - Springs: Galvanized Steel or Stainless Steel
  - Internals: Stainless Steel

Pilot Valve Selection

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<th>#2Q</th>
<th>#2HC</th>
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<td>300-800 mm</td>
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</table>

- Standard model
- with high pressure setting kit

Flow Chart

For more flow charts, refer to Engineering Section

Data is for "Y" pattern, flat disk valves

Data is for Y-pattern, trunnion, PN16 valves

For more dimensions and weights tables, refer to Engineering Section

Weight is for PN16 basic valves

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