



Fast acting anti-water hammer valve with flanged outlet - Mod. Gemina

The CSA fast acting, surge prevention, pressure relief valve Mod. Gemina has been designed to avoid the devastating effects of water hammers in pipeline networks. The purpose is actually to prevent pressure from rising above a pre-set value, thanks to its capability of discharging the excessive volume of water through its flanged outlet.



Technical features and benefits

- Solid and compact design suitable for treated and raw water and to reduce blow-back.
- Negligible inertia of the internal mobile parts ensuring the absence of friction and long lasting performances.
- Perfect water tightness and excellent resistance to cavitation and harsh working conditions due to the floating obturator technology and to the use of special gaskets and high resistant stainless steel grades.
- Fast and accurate response without any hysteresis effect thanks to high frequency annealed springs.
- Wide selection of spring and ranges in pressure.
- Flanged outlet which allows to direct the water outflow through a discharge pipe.
- The valve is supplied with a pressure gauge and drainage ball valve, in order to facilitate the pressure measurement and setting procedure directly on the field.

Applications

- Downstream of pumping stations to cushion sudden overpressure as a result of pump start up and power failure (in case of one of more pumps in parallel).
- Downstream and upstream of main transmission lines, or pipe segments, not able to endure critical conditions such as sudden and unexpected rise in pressure, and to guarantee reliable system protection.
- Downstream of a pressure reducing valve as a safety device.
- Upstream of modulating and sectioning devices with rapid response time, likely to generate unwanted surges.
- In general, whenever unwanted upsurges may occur.

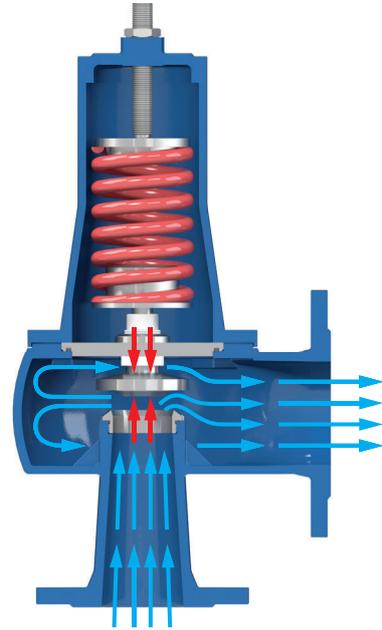
Operating principle

The valve must be pre-set at first, simply acting on the spring, to open whenever the pressure rises above a certain value considered critical for the system.



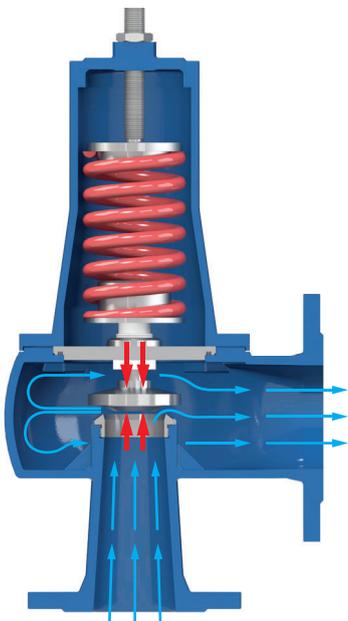
Valve normally closed

Without any incoming pressure the Gemina is a normally closed valve, as shown in the picture, where the obturator is kept pushed down to the seat by the force of the spring.



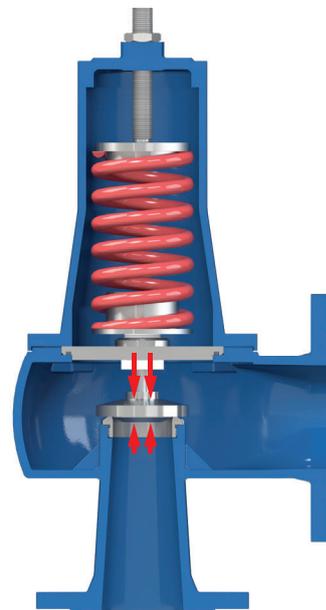
Valve fully open

Should the upstream pressure rise above the set point of the valve, obtained by the compression of the spring, the Gemina will open completely allowing the full passage through the seat.



Valve modulating

Should the upstream pressure fluctuate around the valve's set point the obturator, thanks to the difference in force between the spring pushing downwards and the incoming pressure underneath pushing upwards, will move throttling the flow through the seat in order to maintain the minimum required pressure value.



Valve fully closed (static conditions)

Should the water supply and upstream pressure begin to drop, the Gemina will react immediately to maintain and stabilize the required value even in static conditions, thanks to the pressure balanced mobile block.

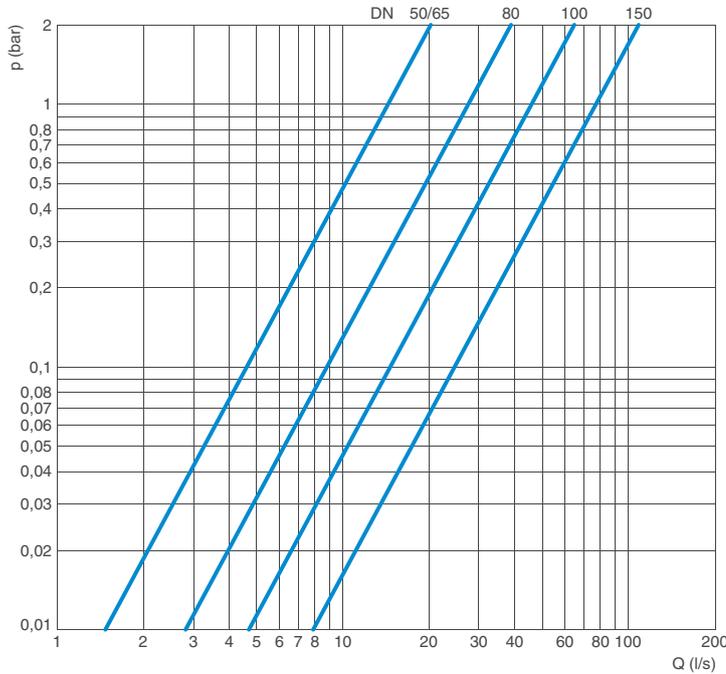


Technical data

| DN (mm) | 50/65 | 80 | 100 | 150 |
|------------------------|-------|-----|------|-----|
| Kv (m ³ /h) | 50 | 101 | 158 | 273 |
| Stroke (mm) | 17 | 21 | 23,5 | 35 |

Head loss coefficient

Kv coefficient representing the flow rate which is flowing through the valve fully open, and producing a head loss of 1 bar.



Head loss chart

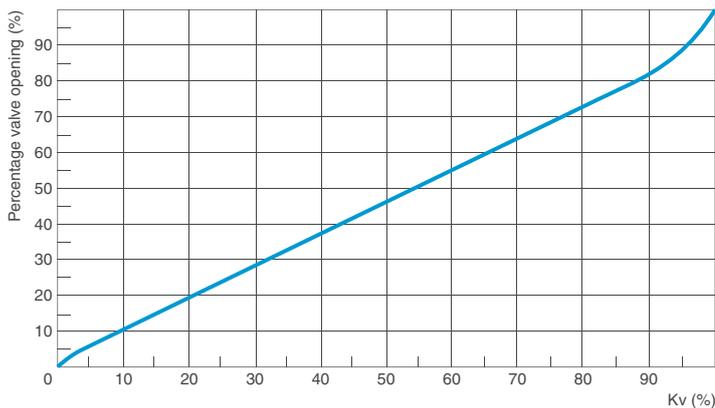
The chart indicates the head loss of the valves fully open versus flow rate in l/s.

| DN mm | PN bar | Setting bar | Overpressure bar |
|-------|--------|-------------|------------------|
| 50/65 | 10 | 1-8 | 0,8 |
| 50/65 | 16 | 8-16 | 1,5 |
| 50/65 | 25 | 16-25 | 2,2 |
| 80 | 10 | 1-8 | 1 |
| 80 | 16 | 8-16 | 2 |
| 80 | 25 | 16-25 | 2,5 |
| 100 | 10 | 1-8 | 1 |
| 100 | 16 | 8-16 | 2 |
| 100 | 25 | 16-25 | 2,5 |
| 150 | 10 | 1-8 | 2 |
| 150 | 16 | 8-16 | 2,5 |
| 150 | 25 | 16-25 | 3,5 |

Overpressure

The table shows the overpressure of the valve with different pressure set-points. The Gemina are supplied with three springs to cover the following pressure ranges:

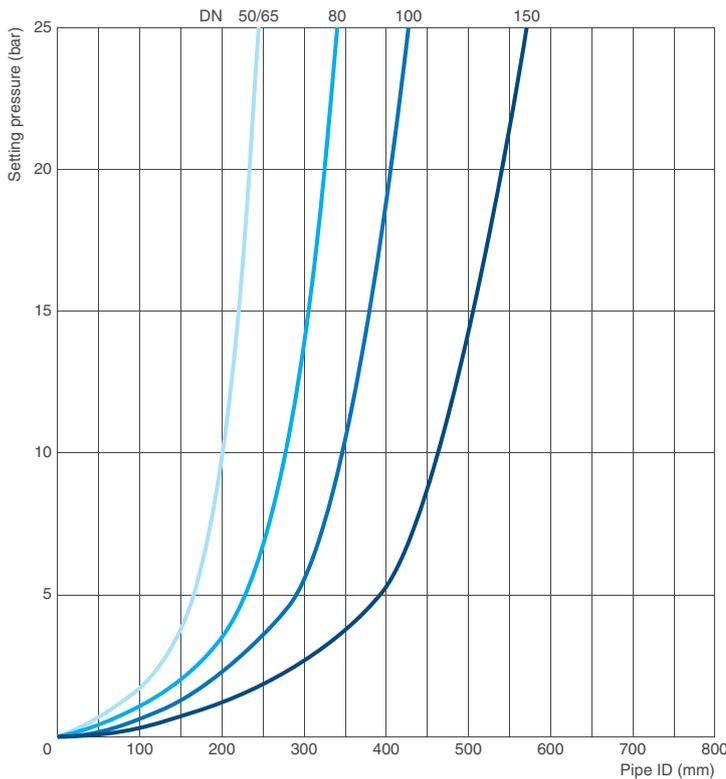
- 1-8 bar,
- 8-16 bar,
- 16-25 bar.



Kv to valve opening chart

The chart aside shows the opening percentage of the valves versus the Kv.

Technical data



Preliminary sizing chart

The function of the fast acting relief valve CSA Mod. Gemina is to protect piping systems, pumps, vessels and other equipment from excess in pressure and potential damages.

For the sizing overpressure values, blow-down effects and installation criteria must be taken into account, purely as an indication and for a preliminary assessment use the following chart showing the recommended valve's DN versus pressure setting and pipe ID. Ensure that the operating conditions fall on the left of the curve of the chosen valve.

| DN (mm) | 50/65 | 80 | 100 | 150 |
|----------------------|-------|----|-----|-----|
| Flow rate max. (l/s) | 12,5 | 26 | 41 | 72 |

Advised flow rates

The table shows the recommended maximum flow rates for the different sizes.

Working conditions

Treated and row water.
 Maximum temperature of 60°C.
 Maximum pressure 25 bar.
 Spring setting ranges: 1-8 bar, 8-16 bar, 16-25 bar.

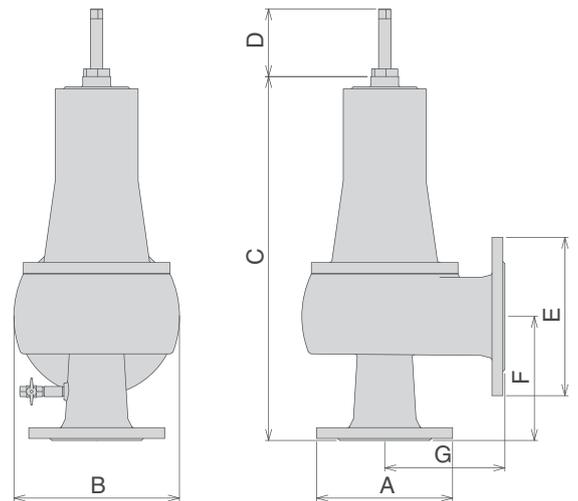
Standard

Certified and tested in compliance with EN 1074/5.
 Flanges according to AS4087-PN16/35.
 Epoxy painting blue RAL 5005 applied through fluidized bed technology. Changes on flanges and painting on request.

Weights and dimensions

| Inlet DN mm | A mm | B mm | C mm | D mm | E mm | F mm | G mm | Seat DN mm | Outlet DN mm | Weight Kg |
|-------------|------|------|------|------|------|-------|------|------------|--------------|-----------|
| 50/65 | 185 | 188 | 418 | 100 | 200 | 130 | 150 | 43,5 | 80 | 20 |
| 80 | 200 | 244 | 542 | 130 | 235 | 184 | 177 | 60 | 100 | 36 |
| 100 | 235 | 244 | 567 | 130 | 270 | 196,5 | 177 | 75 | 125 | 41 |
| 150 | 300 | 409 | 758 | 165 | 360 | 235 | 335 | 100 | 200 | 111 |

Values are approximate, consult CSA service for more details.

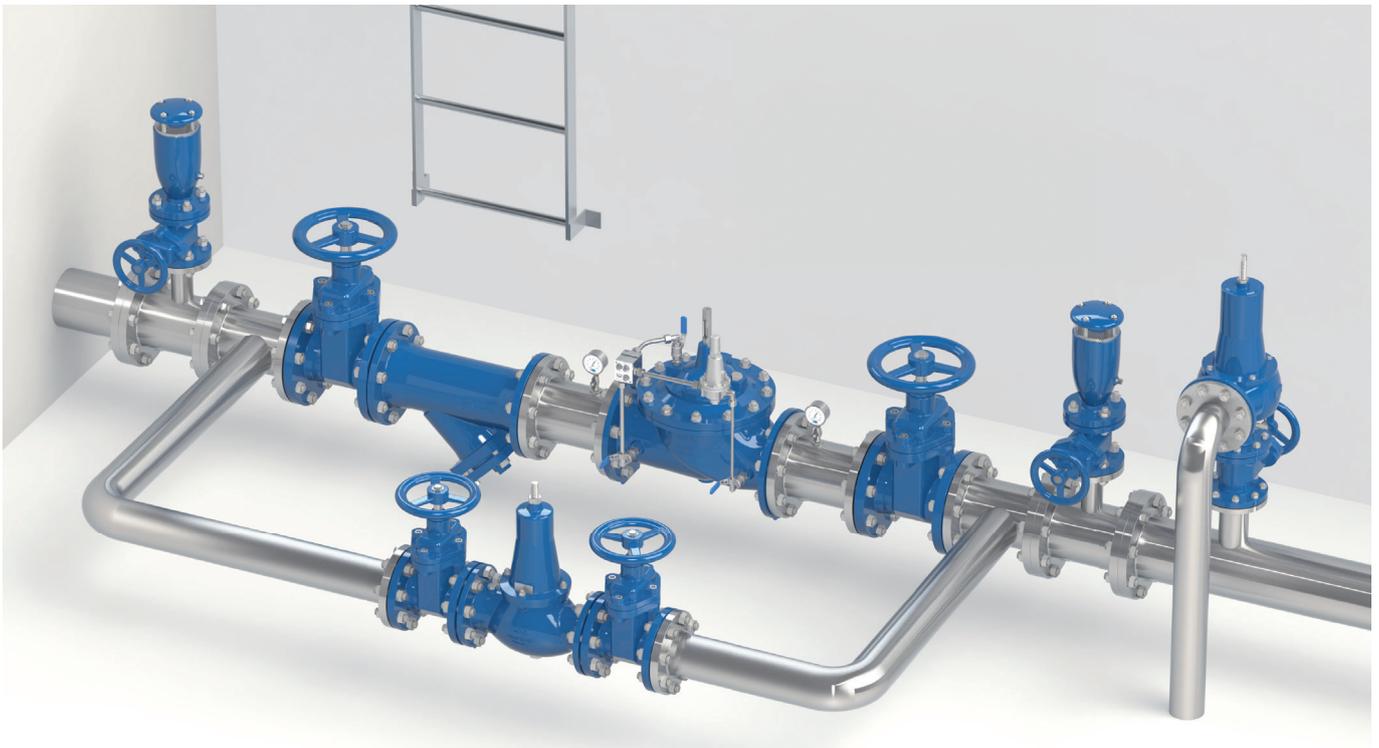


Examples of common applications

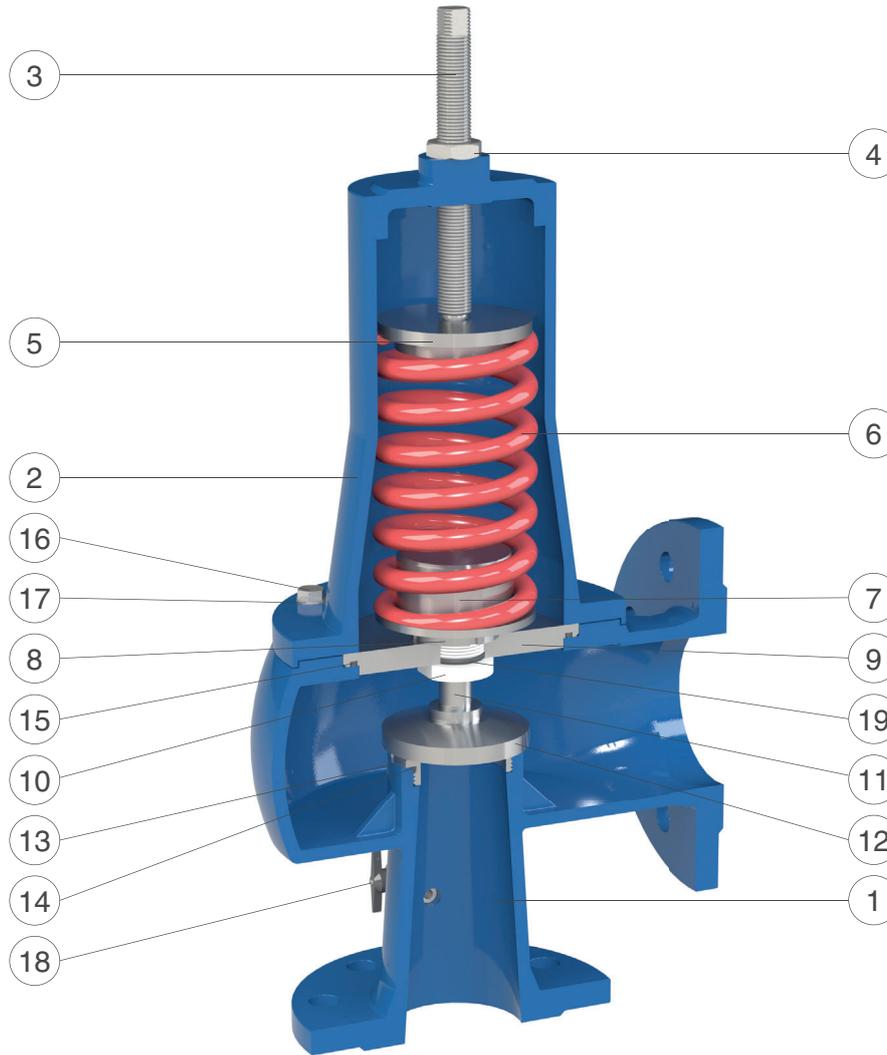
Pumping station. The following picture shows a characteristic application of the fast acting pressure relief valve Gemina, installed downstream of pumps check valves. Particular of the installation with an anti surge combination air valve CSA FOX or LYNX 3F AS for the protection against negative pressure conditions.



Pressure reduction valve station. In this second layout Gemina is installed downstream of a pressure reduction valve station to prevent in any case rise in pressure on the main line. The installation also includes the pressure reducing valve CSA XLC 310/410, a by-pass for maintenance and anti-surge combination air valves FOX or LYNX 3F AS upstream and downstream.



Technical details



| N. | Component | Standard material | Optional |
|----|-----------------------------|--|--------------------------|
| 1 | Body | ductile cast iron GJS 450-10 | |
| 2 | Cap | ductile cast iron GJS 450-10 and painted steel | |
| 3 | Driving screw | stainless steel AISI 304 | stainless steel AISI 316 |
| 4 | Nut | stainless steel AISI 304 | stainless steel AISI 316 |
| 5 | Spring support | stainless steel AISI 303 (304 for DN 150-200) | stainless steel AISI 316 |
| 6 | Spring | spring painted steel 52SiCrNi5 | |
| 7 | Spring housing | stainless steel AISI 303 (304 for DN 150-200) | stainless steel AISI 316 |
| 8 | Ring | stainless steel AISI 304 | stainless steel AISI 316 |
| 9 | Separation plate | s.s. AISI 304 (painted steel for DN 150-200) | stainless steel AISI 316 |
| 10 | Driving sleeve with O-ring | Delrin (s. s. AISI 304 for DN 150-200) and NBR | |
| 11 | Shaft | stainless steel AISI 304 | stainless steel AISI 316 |
| 12 | Obturator with plane gasket | st. st. AISI 303 (304 for DN 150-200) and polyurethane | stainless steel AISI 316 |
| 13 | Sealing seat | stainless steel AISI 304 (303 for DN 50/65) | stainless steel AISI 316 |
| 14 | O-ring | NBR | EPDM/Viton |
| 15 | O-ring | NBR | EPDM/Viton |
| 16 | Screws | stainless steel AISI 304 | stainless steel AISI 316 |
| 17 | Washers | stainless steel AISI 304 | stainless steel AISI 316 |
| 18 | Ball valve 1/4" | nickel-plated brass | stainless steel AISI 316 |
| 19 | O-ring | NBR | EPDM/Viton |