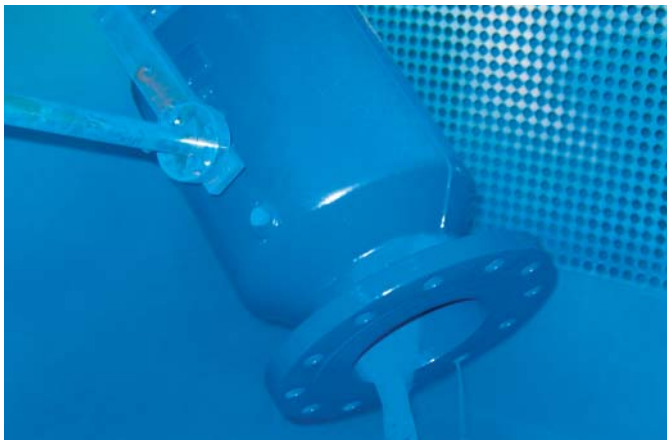
Automatic control valves
XLC 400 series

The company was founded in 1987 by transforming the former CSA, which was a trading company dealing with pipes and valves for water networks, into a manufacturing company, through the research and realization of pillar fire hydrants. Since then many other products have been added.
The history of our company is characterised by years of technical and commercial research, which have enabled us to offer a complete range of valves designed for controlling, regulating and protecting the pipelines under pressure in both waterworks and sewage lines as well as fire hydrants.
Our many industrial patents and innovative technical solutions, together with modern and attractive style of design, have made it possible to differentiate our products from those offered by competitors and have allowed us to become a point of reference in our sector.
Flexibility and reliability have been the key points of CSA's rapid growth over the last few years. We are perfectly aware that we are managing the world's most precious resource and, motivated by this responsibility and the commitment towards our customers, we have dedicated ourselves to constantly improving our products, placing them at the highest levels of quality.

Quality

In the manufacturing business today, quality is the fundamental requirement for achieving and maintaining a growing market share.
For this reason we have always aimed at developing a synergy between the various sectors of the company and thus ensuring:
-quick and precise answers;
-evaluation of data received and immediate response;
-rigorous control of incoming and outgoing products.
Since 1998 CSA is certified according to regulation ISO 9001 by RINA (Italian Naval Registry) recently converted into ISO 9001/2008.



During the research and realisation of new products, CSA has always focused his efforts on:
- Listening to the customer's needs and finding the best solution both at the design and operational phases.
- Guiding our R&D department to develop ranges of modern, reliable and complementary products.
- Adopting production techniques that, even while complying with the severest quality standards, would allow us to reduce delivery times.
- Guaranteeing complete technical support for our customers and prompt after-sales assistance.

This philosophy characterizes us not only as a valve manufacturer but also as a reliable partner whom you can always depend on for consulting and solutions.
The production cycle, aimed at the constant improvement of our products and complete customer satisfaction, ensures predetermined margins of tolerance by establishing production standards, which guarantee that the semi finished products reach the next production stage with the required specifications.
All our valves are made of ductile cast iron GJS 400-15 / 500-7 in absolute compliance with European standards, and are suitable for PN 25-40 bar.
The manufacturing process is carried out exclusively by means of numerically controlled lathes, mills, and horizontal machining units. Subsequent step-by-step controls are based on strict quality procedures.
Painting, pre-treated by sand blasting grade SA 2.5, is carried out inside a fluidized bed containing epoxy powder, which guarantees maximum surface protection. All our products are tested under water pressure and certified.

Automatic control valves XLC 400 series

The CSA range of automatic control valve consist of a globe pattern hydraulically operated valve, entirely produced in ductile cast iron with internal components in stainless steel. This valve, diaphragm actuated PN 25 class, is also called XLC 400 and represent the basic valve needed to perform a tremendous range of applications, that include pressure reduction, relief, sustain, flow control, level control and many more. Each function is obtained simply by changing the circuitry and pilots, that can be combined together.

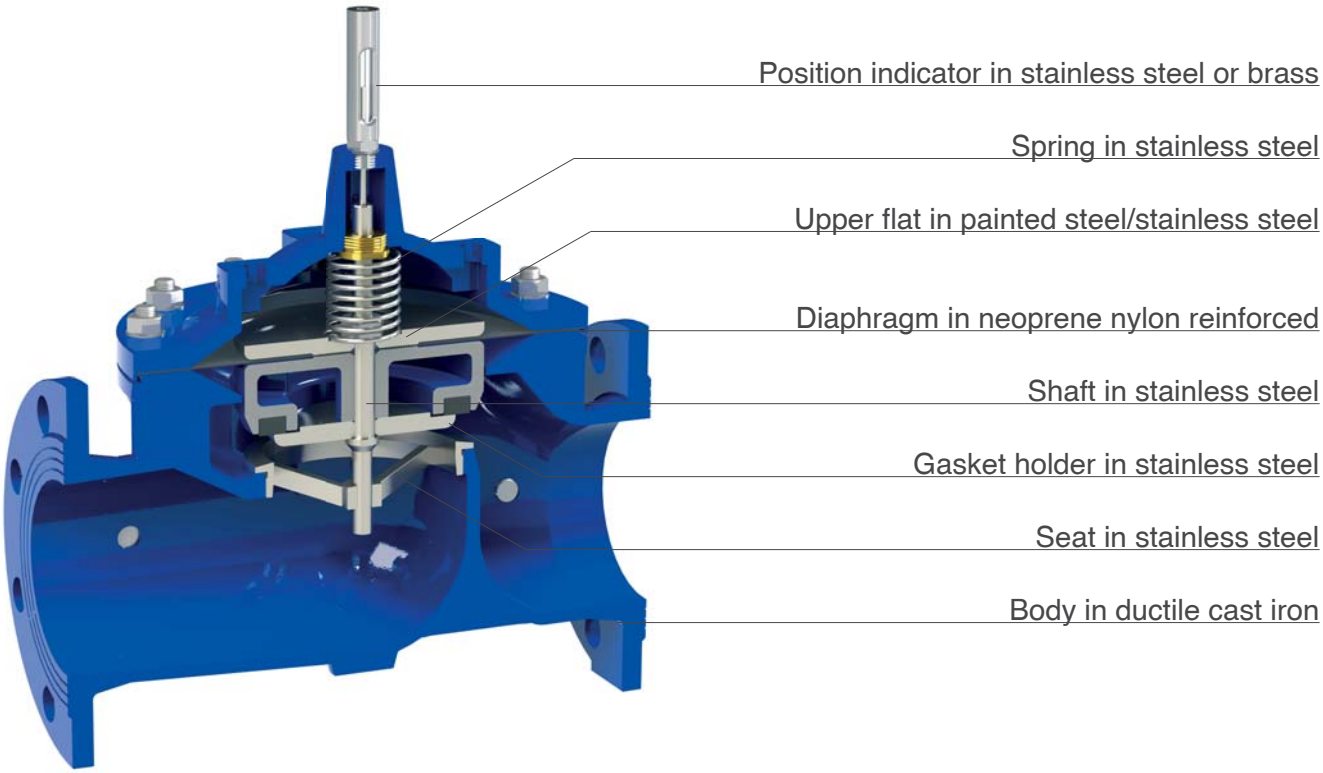
Technical features and benefits

- Body in ductile cast iron, PN 25 bar rated, full bore globe pattern design.
- Supplied with fixed flanges according to EN 1092/2, that can be changed to suit different pressure conditions.
- Designed to reduce head loss and minimize turbulence and noise during working conditions.
- Diaphragm with reinforced nylon fabric.
- Internal manufactured in stainless steel, obturator in ductile cast iron for large diameters.
- Maintenance can be easily performed from the top, without removing the valve from the pipe.
- Large expansion chamber to tolerate high pressure ratio.

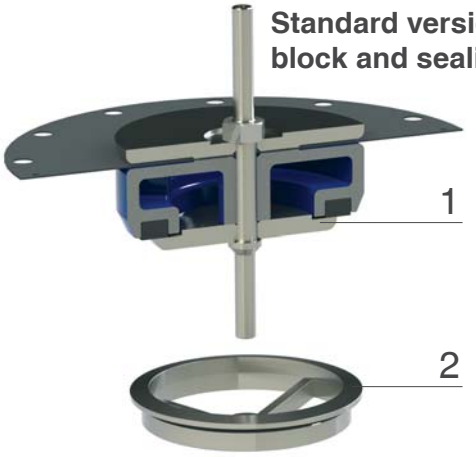
Applications

- Main transmission lines.
- Water distribution networks.
- Buildings.
- Industrial plants.

Technical features

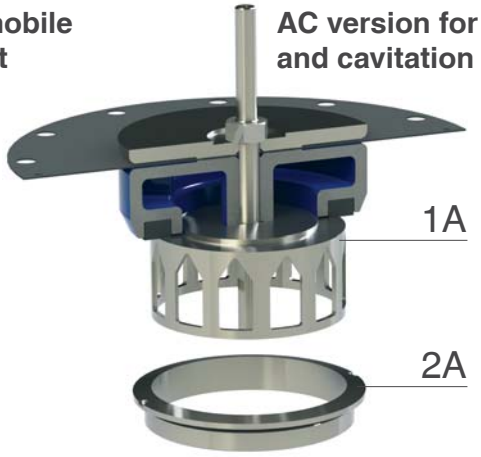


Standard version of mobile block and sealing seat



1. Gasket holder in stainless steel
2. Seat in stainless steel

AC version for low flow stability and cavitation prevention

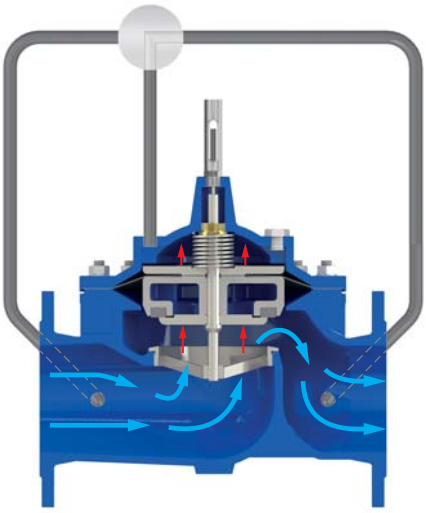


1. Anti-cavitation V-port
2. Seat in stainless steel for anti-cavitation system

The standard version of mobile block and sealing seat, depicted above, includes the obturator, diaphragm and a special gasket holder designed to guarantee the maximum accuracy also during the low opening of the valve. The mobile block with this version is guided in two points, on the cap and on the seat.

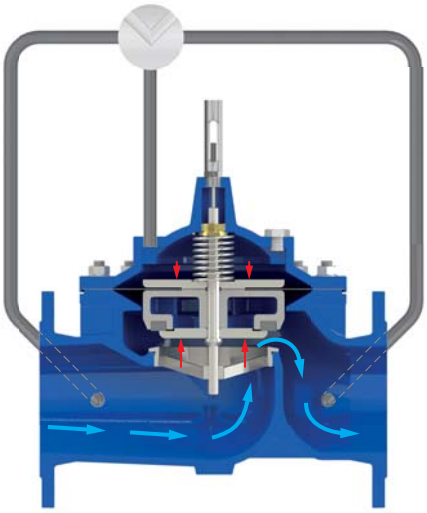
The AC system is obtained by means of a special seat and device which improves the guiding of the entire block, yet increasing the allowable pressure ratio and valve's performances, also in case of low flow rate avoiding vibrations and noise.

Operating principle on-off mode



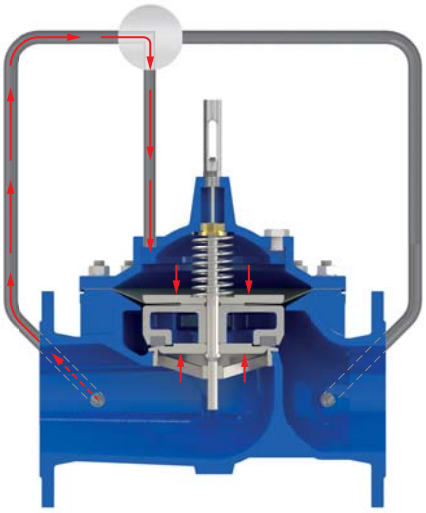
Valve opening

If the pressure inside the control chamber is put in communication with the atmosphere the entire upstream pressure will act on the obturator, pushing it upwards allowing the complete opening of the valve.



Valve modulating

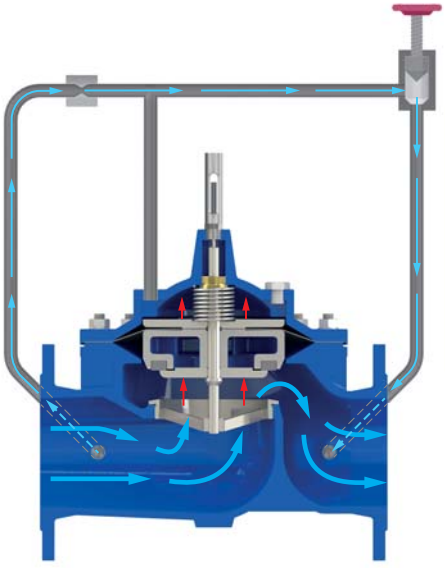
During working conditions if the control chamber is isolated from the upstream pressure the valve will remain in the same position, therefore producing the head loss corresponding to such opening percentage.



Valve closing

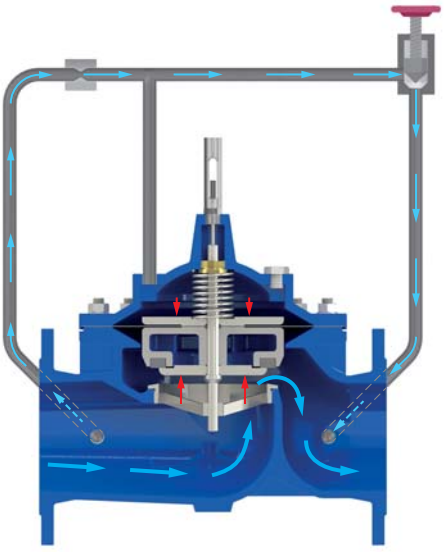
If the control chamber is put in communication with the upstream pressure, thanks to the difference in area between the upper flat with diaphragm, larger that the obturator underneath, the valve will close completely.

Operating principle modulating mode



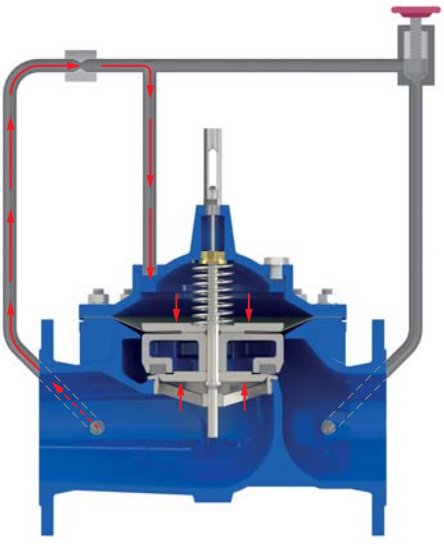
Valve opening

When the valve is set to modulate a restriction is required between the upstream pressure and control chamber, in addition to a modulating device as shown in the picture. If the latter is entirely open the pressure inside the control chamber will be relieved, allowing for the complete opening of the valve.



Valve modulating

During working conditions if the modulating device is throttled, reducing the flow passage through it, pressure will be applied inside the control chamber making the valve's mobile block reacting accordingly on the main valve XLC 400.



Valve closing

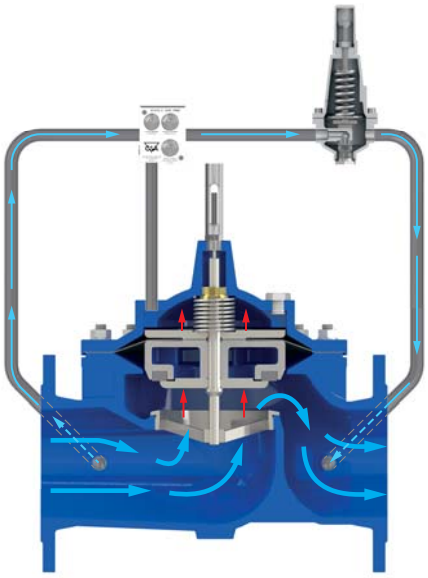
If the modulating device is completely closed, all the upstream pressure will be diverted into the control chamber. The mobile block will therefore be pushed down on the obturator, producing the interruption of flow through the XLC 400.

GR.I.F.O. 3/8G PN 25

The unit flow control “GR.I.F.O.” is a device, designed for modulation, that includes all the necessary functions required for the proper operation of CSA control valves. Entirely built in stainless steel, its compact design makes the circuit easy to be maintained and at the same time allows for a tremendous range of regulations.
GR.I.F.O. is composed of the following:
- a filter, with fine mesh in stainless steel AISI 316, to protect the hydraulic circuitry from possible dirt;
- three needles in stainless steel with check valves, responsible for the regulation of the main valve’s response time, opening and closing speed independently from each other;
- filtered and unfiltered pressure ports.

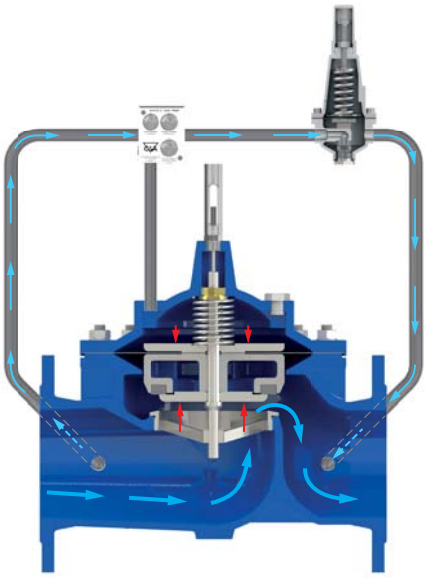
1. Closing speed regulation
2. Opening speed regulation
3. Adjustable orifice regulation
4. Unfiltered 1/8 G port
5. 3/8 G port
6. 3/8 G port
7. 3/8 G port
8. Filtered 1/8 G port
9. Filter

Operating principle modulating mode - pressure reduction



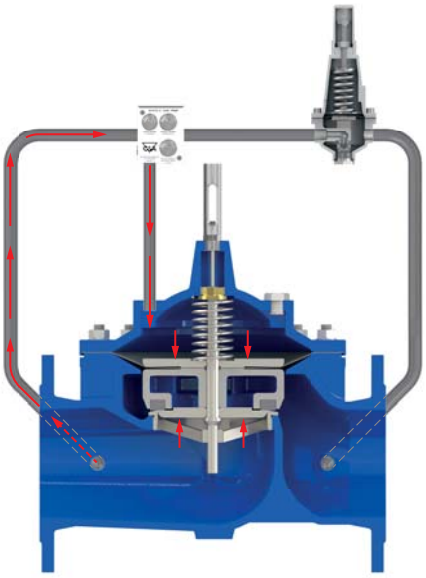
Valve opening

If the downstream pressure value becomes lower than the pilot’s set point the passage through the latter will increase, thus relieving pressure out of the main valve chamber XLC 400 with consequent opening as shown in the picture above.



Valve modulating

As a consequence of gradual change and variation in demands the pilot will keep adjusting, this is to regulate the flow in and out of the main chamber. The XLC 400 will then follow the movements of the pilot producing the necessary head-loss required for the downstream pressure reduction.



Valve closing

If the downstream pressure value becomes higher than the pilot’s set point the passage through the pilot will decrease, thus conveying flow and pressure to the main chamber of the XLC 400 valve with consequent closure as shown in the picture above.

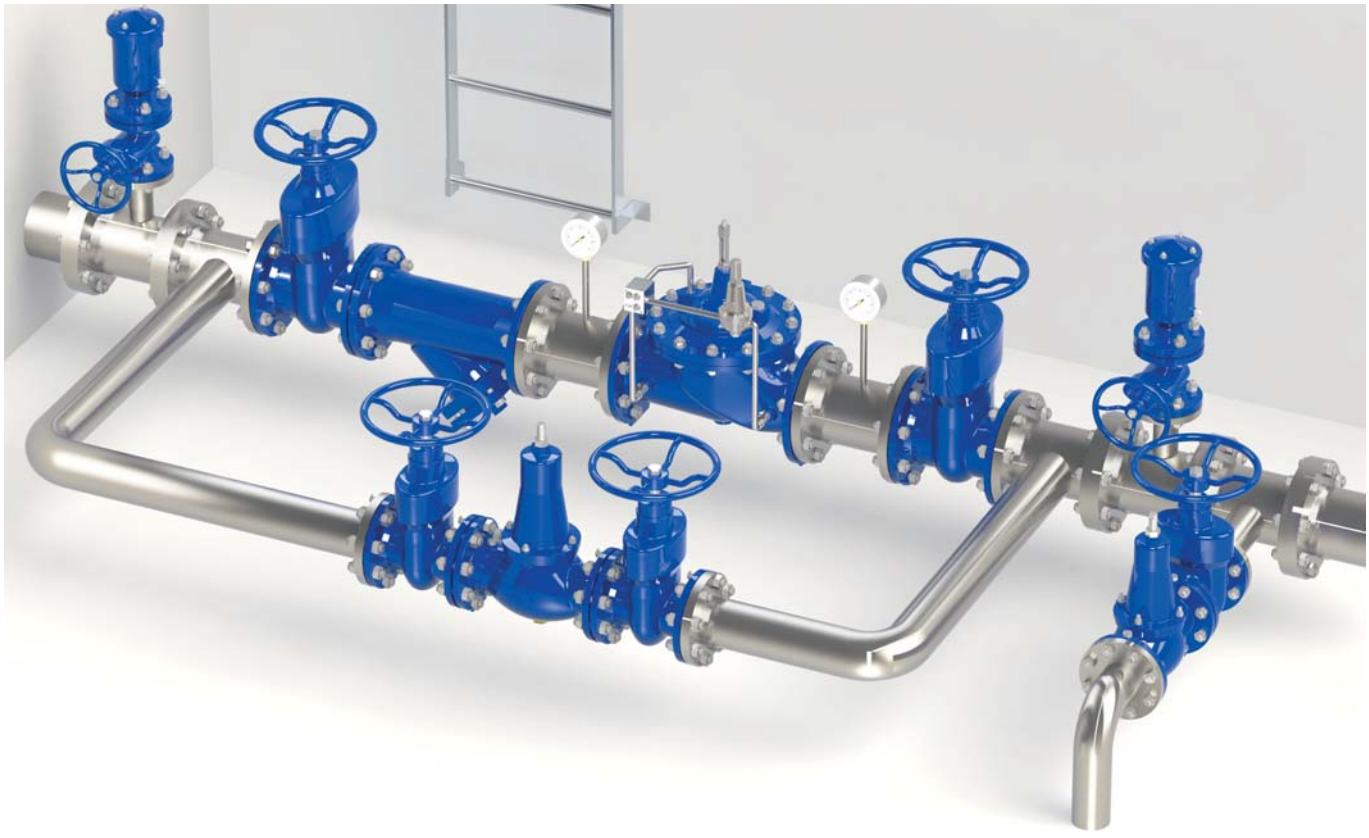
Downstream pressure reducing stabilizing valve **Mod. XLC 410**

The CSA XLC 410 control valve will reduce and stabilize the downstream pressure to a preset value, regardless of variations in demand and upstream pressure fluctuations.

Most popular configurations	
XLC 410-FR	downstream pressure reducing with back-flow prevention
XLC 410-ND	downstream pressure reducing stabilizing valve with programmer and two set points
XLC 412	downstream pressure reducing and up-stream pressure sustaining valve
XLC 415	downstream pressure reducing stabilizing valve with solenoid control

Installation layout

The picture depicted below shows the recommended installation layout of the CSA XLC 410.
The sectioning devices and by-pass are very important for maintenance operations, as well as the filter to prevent dirt from reaching the control valve. The direct acting pressure reducer CSA Mod. VRCD is the best choice on the by-pass due to long periods of inactivity. A pressure relief, CSA model VSM or XLC 420, must be present to prevent under any circumstances rise in pressure on the downstream line.



Pressure management valve
Mod. XLC 410-T

The CSA XLC 410-T pressure reducing valve, working in combination with a controller, will automatically maintain and reduce the downstream pressure either at the valve location or at the critical point according to the flow rate variations, whose values are preset and adjustable all the time with a dedicated web interface.

Installation layout

The picture below shows the recommended installation layout of XLC 410-T, showing the valve and the controller along with flow measurement and pressure measurement devices, necessary for the data acquisition and working principle. A by-pass with CSA XLC 410, air valves and pressure relief valve are also recommended for better performances and reliability of the system.

Upstream pressure sustaining-relief valve **Mod. XLC 420**

The CSA XLC 420 control valve will sustain, if installed in-line, and relief if installed in derivation from the main line, the upstream pressure to a pre-set value regardless of variations in demand.

Most popular configurations	
XLC 420-FR	upstream pressure relief/sustaining valve with back-flow prevention
XLC 421	upstream pressure relief surge anticipating control valve
XLC 424	combination of upstream pressure sustaining and min.-max. level control valve
XLC 425	upstream pressure sustaining-relief valve with solenoid control

Installation layout

The picture depicted below shows the recommended installation layout of the CSA XLC 420, used as a pressure relief in derivation from the main line to protect a pumping station. The sectioning device is very important for maintenance operations, whenever possible a filter too is needed to prevent dirt from reaching the control valve. The set point should always remain within 0,5-1 bar above the maximum steady state pressure value of the pumps.

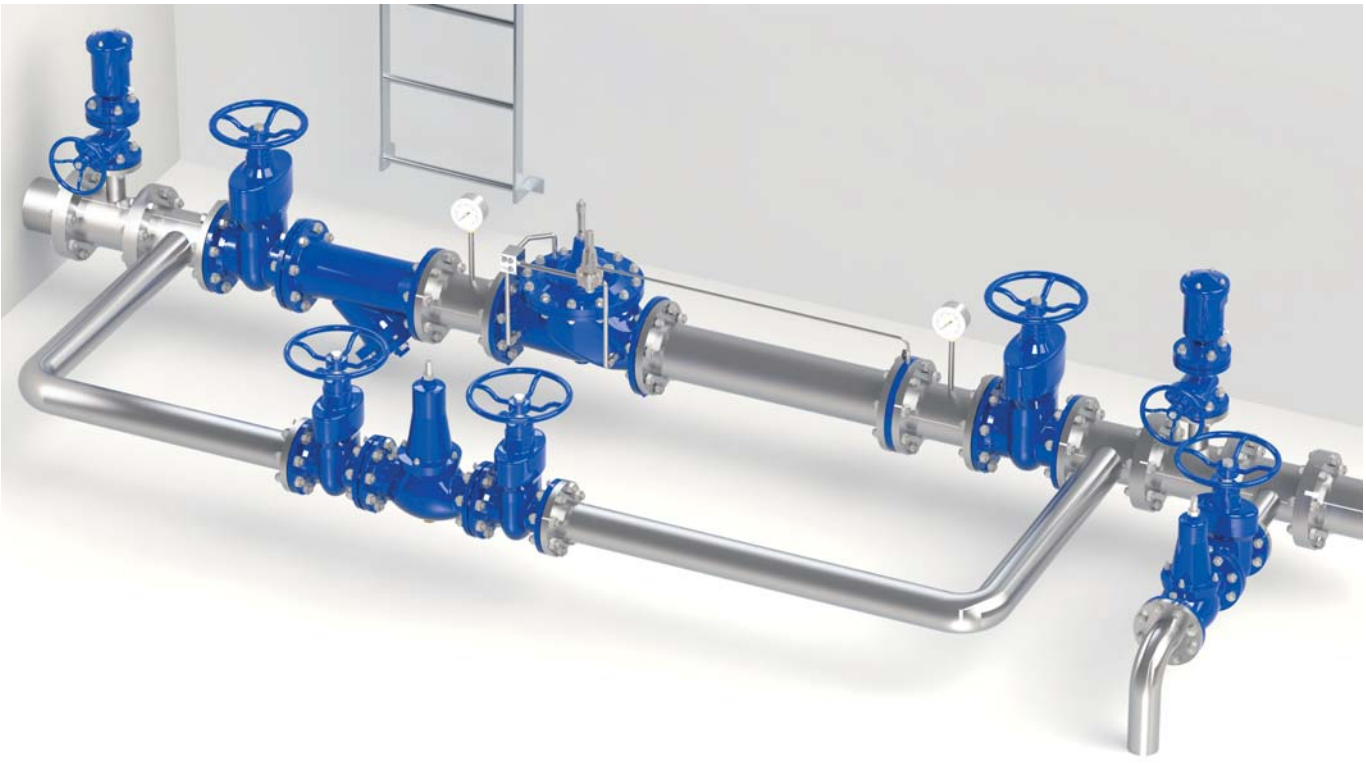
Flow rate automatic control valve **Mod. XLC 430**

The CSA XLC 430 flow control valve will automatically limit the flow to a preset value, regardless of pressure variations. In case of flow rate lower than the required set point the valve will be fully opened. For the proper installation the flanged orifice, supplied with the valve, must be installed at least 5 DN downstream.

Most popular configurations	
XLC 431	pressure reducing flow control valve
XLC 434	flow control valve with minimum-maximum level control
XLC 435	flow control valve with solenoid control

Installation layout

The picture below shows the recommended layout of the CSA XLC 430, flow control valve. The flange orifice, calculated and machined according to the project's requirements, is linked to the valve's pilot and has to be installed 5 DN downstream for the best performance and accuracy. The variation on the flow rate set point value, obtained by adjusting the pilot, is ±32%.



Minimum-Maximum level control valve **Mod. XLC 440**

The CSA XLC 440 minimum-maximum level control valve will automatically operate a on-off regulation to maintain the tank level within an adjustable range, going from approximately 15 cm up to 4 m. Thanks to a CSA needle valve the reaction time can be adjusted, to prevent water hammer effects during the closing phase.

Most popular configurations	
XLC 440-FR	minimum-maximum level control valve with back-flow prevention system
XLC 445	minimum-maximum level with solenoid control valve

Installation layout

The picture below shows the recommended layout of the CSA XLC 440, minimum-maximum level control valve. The connection between the valve and the pilot is obtained by means of two pipes, one linked to the upstream pressure and the other to the chamber. The stilling tank allows for the proper control without accessing directly to the tank. The valve is supplied with the CSA minimum-maximum pilot system adjustable with a range between 0,15 and 4 m.

On-off solenoid control valve **Mod. XLC 450**

The CSA XLC 450 solenoid control valve will either open or close in response to a signal from remote or by an external controller. Thanks to a CSA needle valve the reaction time can be adjusted, to prevent water hammer effects during the closing phase.

Most popular configurations	
XLC 450-P	on-off solenoid control valve with battery operated programmer

Installation layout

The solenoid control valve XLC 450 can be used whenever the on-off regulation is needed, the impulse is received by external equipments, sensors. The picture below shows a way of using CSA XLC 450 to control the tank in connection with a switch, sensing the level variation. The valve is usually supplied with the manual opening and closing circuit, to allow for regulations even in case of power failure.

Step by step solenoid control valve **Mod. XLC 453**

The CSA XLC 453 step by step solenoid control valve, usually installed in combination with a PLC or managed directly from the remote monitoring system, will perform a regulation in response to the signals sent to the solenoid valves. Thanks to a CSA needle valve, the reaction time can be adjusted to prevent water hammer effects, during the modulating/closing phase. The valve, as shown in the picture, can be supplied with an additional circuit for emergency situations of manual opening and closing.

Installation layout

The picture below shows the CSA XLC 453 installed in combination with a flow meter and linked to CSA PLC. The latter will constantly send impulses to the valve's solenoids to make it throttle as required. The purpose is to maintain the same flow regardless of pressure variations, or obtain a pressure management function according to variations in demand to reduce water loss and leakage. Another common application of XLC 453 is to regulate the water level of tanks, where the PLC is connected to sensors.

Constant level control valve **Mod. XLC 460**

The CSA XLC 460 constant level control valve will automatically maintain the tank level within a range of approximately 15 cm. Thanks to a CSA needle valve the reaction time can be adjusted, to prevent water hammer effects during the closing phase. It is important to follow the instructions enclosed in the set up and installation manual, for the proper layout and minimum pressure required.

Most popular configurations	
XLC 426	upstream pressure sustaining level control valve
XLC 460-rotoway	constant level control valve with stainless steel pilot
XLC 465	constant level control valve with on-off solenoid control

Installation layout

The picture below shows the recommended installation layout of XLC 460, linked to the pilot through a single pipe, two pipes in case of the version with stainless steel pilots. The filter is always needed upstream to prevent dirt from entering the main valve, affecting the performance. A minimum pressure of 0,4 bar is always needed on the pilot to make the valve work properly.

High sensitivity altitude control valve **Mod. XLC 470**

The CSA XLC 470 altitude control valve will maintain the level of a water tower or a tank, regardless of upstream pressure variations, acting with an accuracy of few cm of water column.
The modulating control ensures a smooth regulation and absence of water hammer, as the valve will react proportionally to the variations in demand.

Most popular configurations	
XLC 427	upstream pressure sustaining altitude control valve
XLC 470-FR	altitude control valve with back-flow prevention mechanism
XLC 475	altitude valve with on-off solenoid control

Installation layout

The picture below shows the recommended installation layout of XLC 470, where the control is obtained without any external piping and simply through a pilot sensing the static pressure coming from the water tower. A minimum of 1,8 meters static pressure, in addition to head loss during valve's opening, will be needed to make this model work properly.

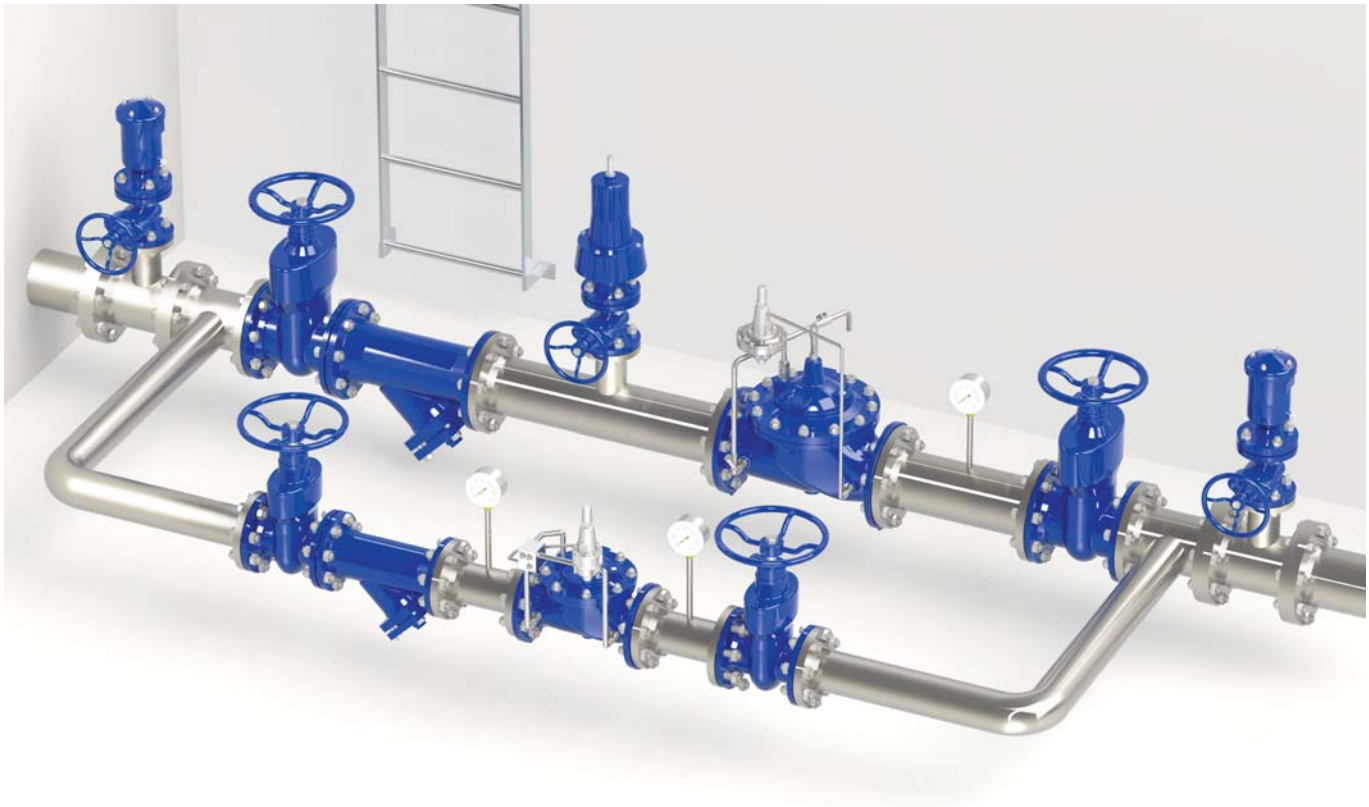
Excess flow automatic control valve **Mod. XLC 480**

The CSA XLC 480 burst control valve, hydraulically operated without any other auxiliary device, will sense an excess in flow diverting the upstream pressure to the main control chamber, and causing a complete closure, to be manually reset after that. As long as the flow rate remains below the set point, preset and adjustable, the valve will remain fully open minimizing head loss.

Most popular configurations	
XLC 481	burst control and pressure reducing valve
XLC 480-FR	burst flow and flow prevention mechanism
XLC 485	burst flow and solenoid control valve

Installation layout

The valve XLC 480 may cause pressure surge upon closure depending on the location, fluid velocity, differential pressure. A pressure relief valve installed upstream, CSA mod. VSM or fast acting VRCA is therefore recommended, along with a pressure sustaining valve CSA mod. XLC 420 or VSM on the by-pass line during maintenance operation. CSA anti hammer air valves mod. FOX 3F RFP are also needed for air control and water hammer protection during the valve closure and the pipe filling.



Battery operated pressure reducing valve with two set points **Mod. XLC 410-ND**

The CSA XLC 410-ND control valve will reduce and stabilize the downstream pressure to a pre-set value regardless of variations in demand and upstream pressure fluctuations. Thanks to the presence of two independent circuits and pilots, controlled by a programmer, the valve can switch from the higher to the lower pressure in response to a signal.
A maximum of three programs per day are available. Should the downstream pressure exceeds the pilot's set point the valve will close drip tight assuring the proper operation also in static conditions.

Downstream pressure reducing and upstream pressure sustaining valve **Mod. XLC 412**

The CSA XLC 412 control valve will reduce and stabilize the downstream pressure and, at the same time, sustain the upstream pressure to a preset value. The combination of these two functions, where the master pilot is the upstream pressure sustaining, is done regardless of variations in demand.
If the downstream pressure increases above, or the upstream pressure decreases below, the set point of the corresponding pilots the valve will close drip tight assuring the proper operation also in static conditions.

Downstream pressure reducing stabilizing valve with solenoid control **Mod. XLC 415**

The CSA XLC 415 control valve will reduce and stabilize the downstream pressure to a preset value regardless of variations in demand and upstream pressure fluctuations. Thanks to a solenoid the valve will be able to open or close completely, in response to a signal sent from remote or by a controller. Should the downstream pressure exceeds the pilot's set point the valve will close drip tight, assuring the proper operation also in static conditions.

Upstream pressure relief surge anticipating control valve **Mod. XLC 421**

The CSA XLC 421 control valve, installed in derivation from the main line, will act as a pressure relief of the upstream pressure. Thanks to another pilot, in case of pump failure the valve will sense the drop in pressure and, as a consequence of that, the chamber will be put in communication with the atmosphere, before the rise in pressure coming from the second phase of the transient. For the proper sizing and water hammer analysis please contact CSA.

Upstream pressure sustaining level control valve **Mod. XLC 424**

The CSA XLC 424 control valve sustains the upstream pressure to a preset value regardless of variations in demand and, at the same time, it controls and regulates the minimum and maximum level inside a tank.
In case of decrease of the upstream pressure below the set point the valve will close drop-tight ensuring the proper operation also in static conditions.

Upstream pressure sustaining-relief valve with solenoid control **Mod. XLC 425**

The CSA XLC 425 control valve will sustain, if installed in-line, and relief if installed in derivation from the main line, the upstream pressure to a preset value regardless of variations in demand. Thanks to the solenoid control the valve will be able to close or open, in response to a signal sent from remote or by an external controller.
If the upstream pressure decreases below the pilot set point the valve will close drip tight, assuring the proper operation also in static conditions.

Pressure reducing flow automatic control valve **Mod. XLC 431**

The CSA XLC 431 pressure reducing flow control valve automatically reduces and stabilizes the downstream pressure to a preset value and, at the same time, it limits the flow to a requested set point, regardless of pressure variations. If the downstream pressure rises above the downstream pilot setting, the valve will close drop tight to ensure the proper operation also in static conditions. For the proper installation the flanged orifice, supplied with the valve, must be installed at least 5 DN downstream.

Flow control valve with minimum-maximum level control **Mod. XLC 434**

The CSA XLC 434 level regulation flow control valve limits the flow to a requested set point, regardless of pressure variations. At the same time, thanks to a three ways on-off level control pilot CSA mod. Rotoway, she controls the minimum-maximum level inside a tank. During the opening phase of the pilot, in case of flow rate lower than the set point the valve will be fully opened. For the proper installation the flanged orifice, supplied with the valve, must be placed at least 5 DN downstream.
Please consult CSA technical support for the proper sizing and minimum pressure needed to ensure the best performance of this valve.

Flow automatic control valve with solenoid control **Mod. XLC 435**

The CSA XLC 435 flow control valve limits the flow to a requested set point, regardless of pressure variations. Thanks to a solenoid the valve will either close or open in response to a signal, sent from remote or by an external controller. In case of flow rate lower than the set point the valve will be fully opened. For the proper installation the flanged orifice, supplied with the valve, must be placed at least 5 DN downstream.

On-off solenoid control valve with battery operated programmer **Mod. XLC 450-P**

The solenoid control CSA XLC 450-P will either open or close in response to the signal sent by a battery operated programmer. Thanks to a CSA needle valve the reaction time can be adjusted to prevent water hammer effects, during the closing phase. A maximum of three programs per day can be used. The valve can be supplied on request with an additional circuit, for emergency situations of manual opening and closing.

Constant level automatic control valve **Mod. XLC 460 - rotoway**

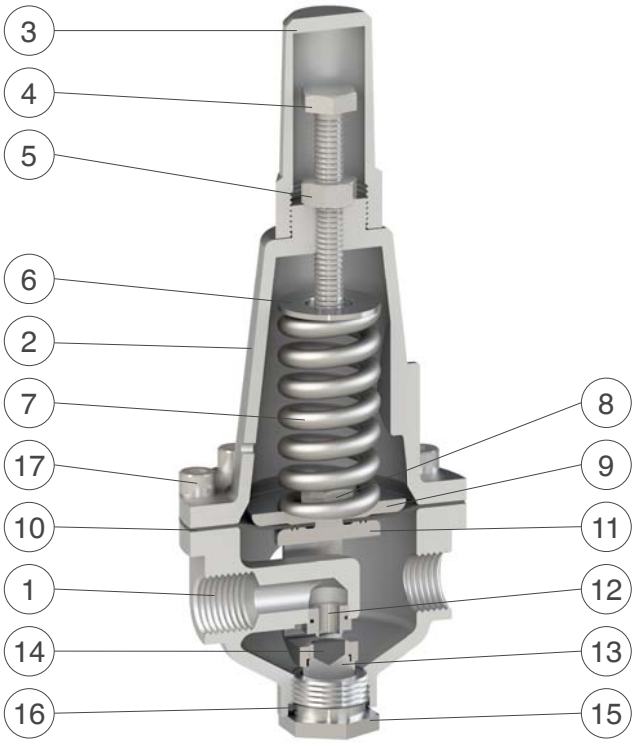
The CSA XLC 460-rotoway constant level control valve will automatically maintain the tank level within a range of approximately 15 cm, by means of a three ways pilot entirely built in stainless steel. Thanks to a CSA needle valve the reaction time can be adjusted to prevent water hammer effects during the closing phase. It is important to follow the instructions enclosed in the set up and installation manual, for the proper layout and minimum pressure required.

Constant level control valve with on-off solenoid control **Mod. XLC 465**

The CSA XLC 465 constant level control valve automatically maintains the tank level within a range of approximately 15 cm, and in combination with a solenoid, also enables a on-off control in response to a signal from remote or by a controller. Thanks to a CSA needle valve the reaction time can be adjusted, to prevent water hammer effects during the closing phase. It is important to follow the instructions enclosed in the set up and installation manual for the proper layout and minimum pressure required.

Direct acting pressure reducing-stabilizing valve Mod. Microstab MRV

The Microstab MRV model is a two ways direct acting downstream pressure reducing-stabilizing valve. Diaphragm operated, the MRV will maintain an outlet pressure, preset and adjustable, to a fixed value regardless of variation of the upstream pressure and demand. This product is normally used for the regulation of XLC 400 and 300 series and, due to its high sensitivity and accuracy, materials and long lasting performances, as a stand-alone for water distribution systems, industrial installation, buildings. Supplied with a wide choice of optional materials and spring range, MRV is available with the PN 16 and 25 bar versions.



N.	Component	Material
1	Body	nickel-plated bronze/st. steel
2	Cover	nickel-plated bronze/st. steel
3	Hood	stainless steel
4	Regulating screw	stainless steel
5	Nut	stainless steel
6	Spring guide	stainless steel
7	Spring	painted steel 52SiCrNi5/st. st.
8	Self-locking nut	stainless steel
9	Upper flat	stainless steel
10	Diaphragm	neoprene
11	Obturator holder	stainless steel
12	Sealing seat	stainless steel
13	Gasket holder	stainless steel
14	Plane gasket	NBR
15	Tap	stainless steel
16	O-ring	NBR
17	Screw	stainless steel

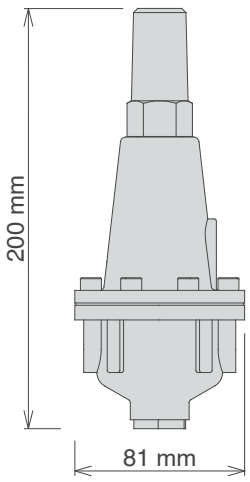
The list of materials and components is subject to changes without notice.

Working conditions

Treated water maximum 70°C.
Minimum pressure : 0,5 bar in addition to head loss.
Maximum pressure: 25 bar.

Technical data

Kv equal to 0,82 m^3/h.
Recommended flow rate: 0,5 m^3/h.
Weight 1,55 Kg.
Normally supplied with 3/8" F.



Standard

Design and testing in accordance with EN 1074.

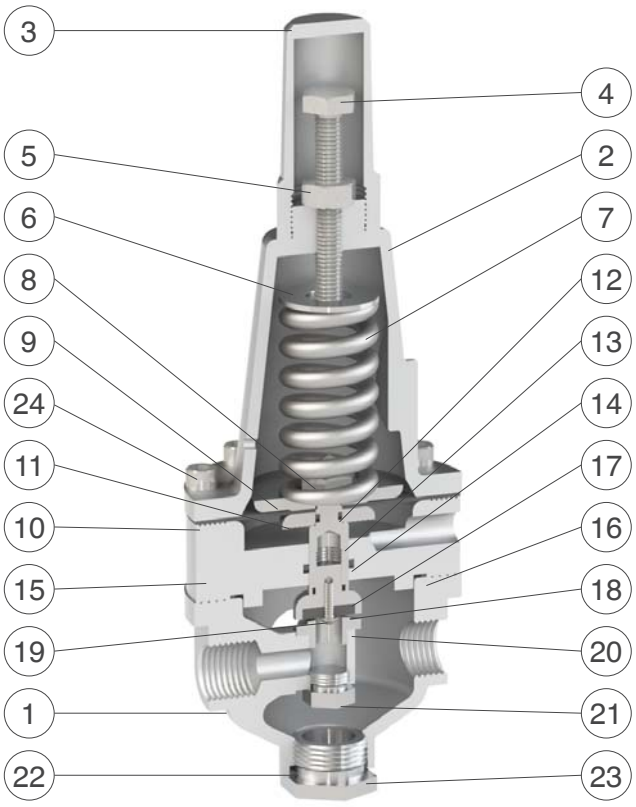
Downstream pressure adjustment

Spring	Pressure range [bar]
blue	0,7 - 7
red	1,5 - 15

Higher values available on request.

Direct acting pressure sustaining-relief valve
Mod. Microstab MSM

The Microstab MSM model is a two ways direct acting upstream pressure sustaining-relief valve. Diaphragm operated, the MSM will maintain an inlet pressure, preset and adjustable, to a fixed value regardless of variation of the downstream pressure and demand. This product is normally used for the regulation of XLC 400 and 300 series and, due to its high sensitivity and accuracy, materials and long lasting performances, as a stand-alone unit for water distribution systems, industrial installation, buildings. Supplied with a wide choice of optional materials and spring range, MSM is available with the PN 16 and 25 bar versions.



N.	Component	Material
1	Body	nickel-plated bronze/st. steel
2	Cover	nickel-plated bronze/st. steel
3	Hood	stainless steel
4	Regulating screw	stainless steel
5	Nut	stainless steel
6	Spring guide	stainless steel
7	Spring	painted steel 52SiCrNi5/st. st.
8	Self-locking nut	stainless steel
9	Upper flat	stainless steel
10	Diaphragm	neoprene
11	Diaphragm lower disk	stainless steel
12	O-ring	NBR
13	Shaft	stainless steel
14	O-ring	NBR
15	Intermediate body	stainless steel
16	O-ring	NBR
17	Gasket container	stainless steel
18	Gasket	NBR
19	Screw	stainless steel
20	Sealing seat	stainless steel
21	Tap	stainless steel
22	Tap	stainless steel
23	O-ring	NBR
24	Screws	stainless steel

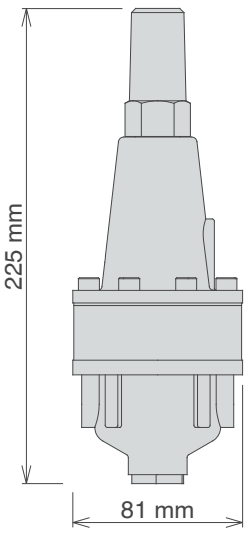
The list of materials and components is subject to changes without notice.

Working conditions

Treated water maximum 70°C.
Minimum pressure : 0,5 bar in addition to head loss.
Maximum pressure: 25 bar.

Technical data

Kv equal to 0,9 m^3/h.
Recommended flow rate: 0,5 m^3/h.
Weight 2,23 Kg.
Normally supplied with 3/8" F.



Standard

Design and testing in accordance with EN 1074.

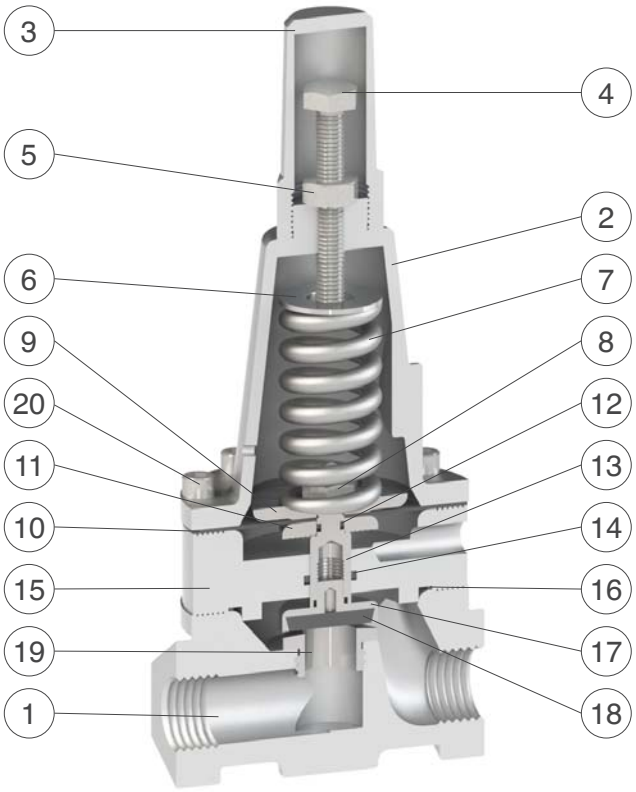
Upstream pressure adjustment

Spring	Pressure range [bar]
blue	0,7 - 7
red	1,5 - 15

Higher values available on request.

Direct acting quick pressure relief valve
Mod. Microstab PSM

The Microstab PSM model is a two ways fast acting relief valve. Diaphragm operated, the PSM will discharge the excess inlet pressure, according to a preset and adjustable value of the spring set point, regardless of variations of the downstream pressure and demand. This product is normally used for the regulation of XLC 400 and 300 series and, due to its high sensitivity and accuracy, materials and long lasting performances, as a stand-alone unit for water distribution systems, industrial installation, buildings. Supplied with a wide choice of optional materials and spring range, PSM is available with the PN 16 and 25 bar versions.



N.	Component	Material
1	Body	nickel-plated bronze/st. steel
2	Cover	nickel-plated bronze/st. steel
3	Hood	stainless steel
4	Regulating screw	stainless steel
5	Nut	stainless steel
6	Spring guide	stainless steel
7	Spring	painted steel 52SiCrNi5/st. st.
8	Self-locking nut	stainless steel
9	Upper flat	stainless steel
10	Diaphragm	neoprene
11	Diaphragm lower disk	stainless steel
12	O-ring	NBR
13	Shaft	stainless steel
14	O-ring	NBR
15	Intermediate body	stainless steel
16	O-ring	NBR
17	Gasket container	stainless steel
18	Gasket	NBR
19	Sealing seat	stainless steel
20	Screws	stainless steel

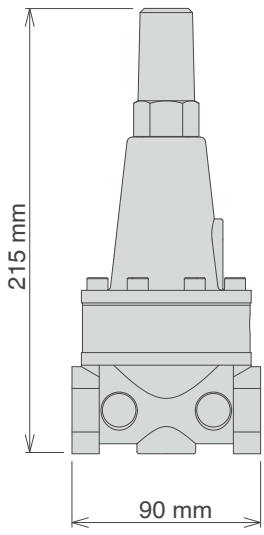
The list of materials and components is subject to changes without notice.

Working conditions

Treated water maximum 70°C.
Minimum pressure : 0,5 bar in addition to head loss.
Maximum pressure: 25 bar.

Technical data

Kv equal to 3,5 m^3/h.
Recommended flow rate: 2,1 m^3/h.
Weight 2,37 Kg.
Normally supplied with 1/2" F.



Standard

Design and testing in accordance with EN 1074.

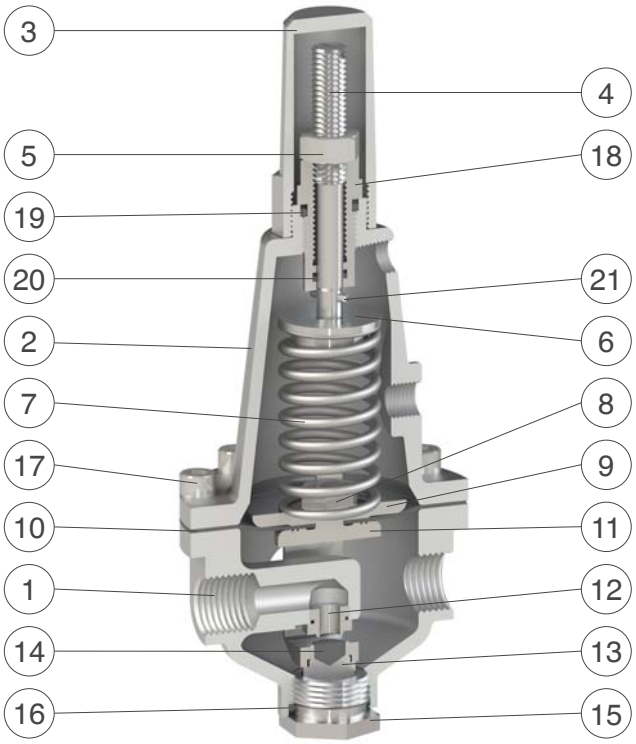
Relif pressure adjustment

Spring	Pressure range [bar]
blue	0,7 - 7
red	1,5 - 15

Higher values available on request.

Flow control valve
Mod. Microstab MLP

The Microstab MLP model is a two ways direct acting flow control valve. Diaphragm operated, the MLP will limit the maximum flow rate, preset and adjustable, to a fixed value regardless of upstream pressure variations. This product is normally used for the regulation of XLC 400 and 300 series and, due to its high sensitivity and accuracy, materials and long lasting performances, as a stand-alone unit for water distribution systems, industrial installation, buildings. Supplied with a wide choice of optional materials, and available with the PN 16 and 25 bar version, MLP is provided with a flow rate regulation chart for on-site adjustments according to the compression of the spring.



N.	Component	Material
1	Body	nickel-plated bronze/st. steel
2	Cover	nickel-plated bronze/st. steel
3	Hood	stainless steel
4	Driving screw	stainless steel
5	Nut	stainless steel
6	Spring guide	stainless steel
7	Spring	stainless steel
8	Self-locking nut	stainless steel
9	Upper flat	stainless steel
10	Diaphragm	neoprene
11	Obturator holder	stainless steel
12	Sealing seat	stainless steel
13	Gasket holder	stainless steel
14	Plane gasket	NBR
15	Tap	stainless steel
16	O-ring	NBR
17	Screw	stainless steel
18	Water tight spacer	stainless steel
19	O-ring	stainless steel
20	O-ring	stainless steel
21	Stop pin	stainless steel

The list of materials and components is subject to changes without notice.

Working conditions

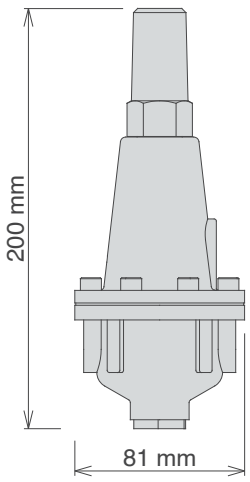
Treated water maximum 70°C.
Minimum pressure : 0,5 bar in addition to head loss.
Maximum pressure: 25 bar.

Standard

Design and testing in accordance with EN 1074.

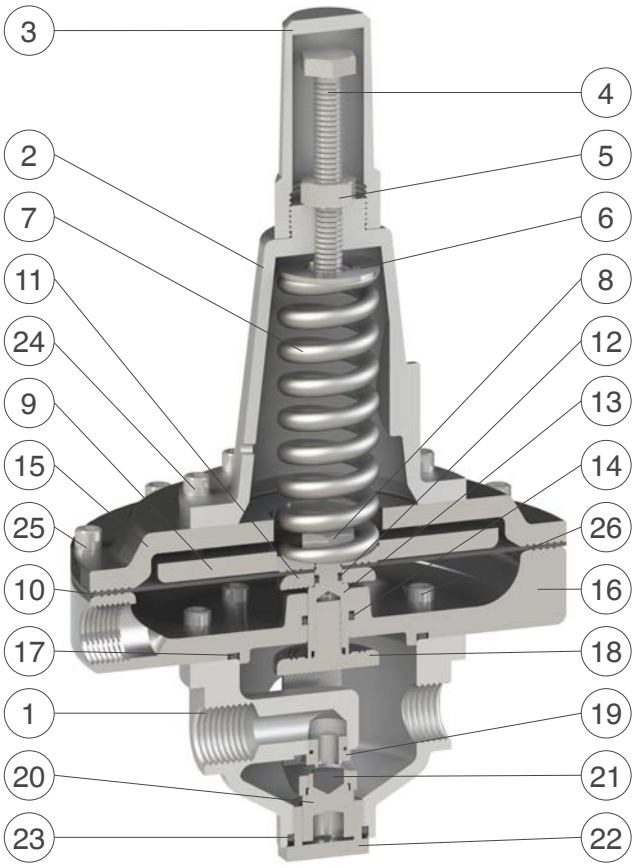
Technical data

Kv equal to 0,9 m^3/h.
Weight 1,65 Kg.
Normally supplied with 3/8" F.



High sensitivity altitude pilot
Mod. Microstab MPZ

The Microstab MPZ model is a two ways direct acting altitude valve with remote sensing intermediate chamber. Diaphragm operated, the MRV will maintain a preset and adjustable tank level , whose static value is sensed through a pressure port, with an accurate and proportional modulating effect acting against the spring force located on the cover. This product is normally used for the regulation of XLC 470 control valves, designed for proportional level control. Supplied with a wide choice of optional materials and spring range, MPZ can also be used as independent altitude level control valve.



N.	Component	Material
1	Body	nickel-plated bronze/st. steel
2	Cover	nickel-plated bronze/st. steel
3	Hood	stainless steel
4	Regulating screw	stainless steel
5	Nut	stainless steel
6	Spring guide	stainless steel
7	Spring	painted steel 52SiCrNi5/st. st.
8	Self-locking nut	stainless steel
9	Upper flat	stainless steel
10	Diaphragm	neoprene
11	Diaphragm lower disk	stainless steel
12	O-ring	NBR
13	Shaft	stainless steel
14	O-ring	NBR
15	Upper flange	nickel-plated brass/st. steel
16	Lower flange	nickel-plated brass/st. steel
17	O-ring	NBR
18	Obturator holder	stainless steel
19	Sealing seat	stainless steel
20	Gasket holder	stainless steel
21	Plane gasket	NBR
22	Tap	stainless steel
23	O-ring	NBR
24	Screws	stainless steel
25	Screws	stainless steel
26	Screws and O-rings	stainless steel and NBR

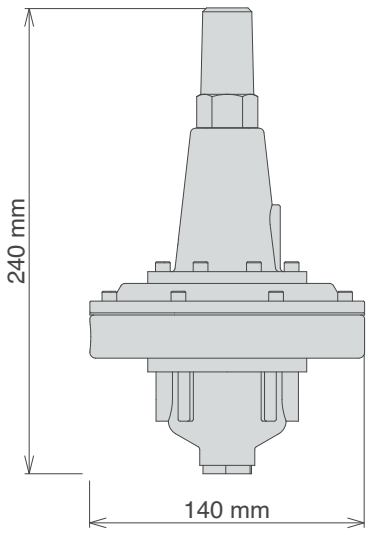
The list of materials and components is subject to changes without notice.

Working conditions

Treated water maximum 70°C.
Minimum pressure : 0,5 bar in addition to head loss.
Maximum pressure: 25 bar.

Technical data

Kv equal to 0,82 m^3/h.
Weight 4,65 Kg.
Normally supplied with 3/8" F.



Standard

Design and testing in accordance with EN 1074.

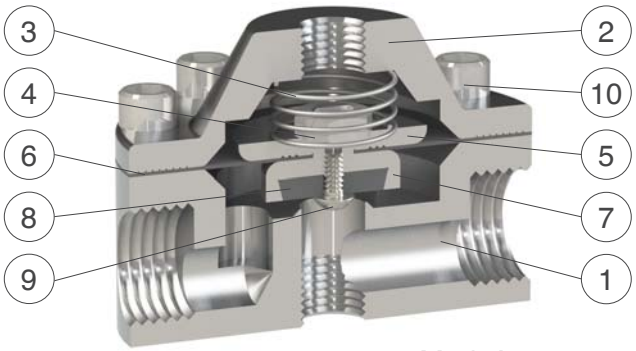
Level adjustment

Spring	Level adjustment [m]
blue	3,8 - 18
red	6 - 40

Different values available on request.

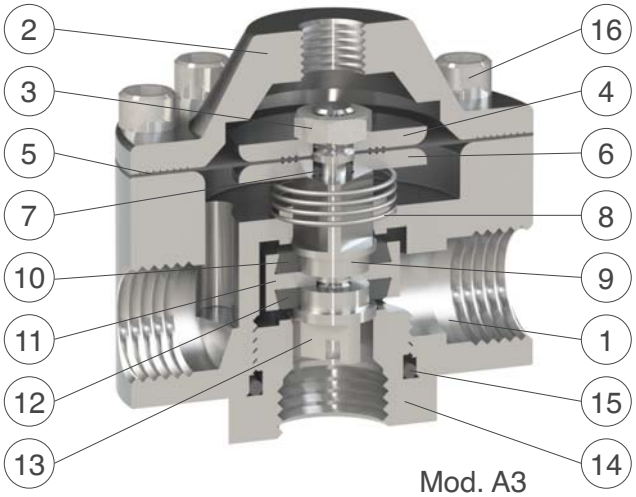
Two and three ways flow accelerators Mod. A2 and A3

The CSA hydraulic auxiliary valves also called flow accelerators are available in a two and three ways versions, namely A2 and A3, depending on the application and on the valve size for which it is required. This unit is a diaphragm actuated valve, operated in response to pressure applied to its control chamber, designed to be used on the circuits of the CSA XLC control valves series in order to enhance hydraulic capacity increasing at the same time performances and reliability.
Used for a wide number of applications, the CSA A2 and A3 stand out for long lasting performances due to the choice of high quality materials and its design features.



Mod. A2

N.	Component	Material
1	Body	stainless steel
2	Cover	stainless steel
3	Spring	stainless steel
4	Nut	stainless steel
5	Disk	stainless steel
6	Diaphragm	neoprene
7	Obturator	stainless steel
8	Plane gasket	NBR
9	Screw	stainless steel
10	Screws	stainless steel



Mod. A3

N.	Component	Material
1	Body	stainless steel
2	Cover	stainless steel
3	Nut	stainless steel
4	Disk	stainless steel
5	Diaphragm	neoprene
6	Disk	stainless steel
7	O-ring	NBR
8	Spring	stainless steel
9	Shaft	stainless steel
10	Gasket	NBR
11	Obturator	stainless steel
12	Gasket	NBR
13	Guiding nut	stainless steel
14	Lower seat	stainless steel
15	O-ring	NBR
16	Screws	stainless steel

The list of materials and components is subject to changes without notice.

Working conditions

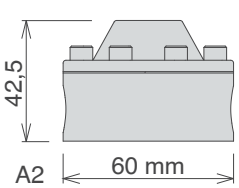
Treated water maximum 70°C.
Maximum pressure: 25 bar.

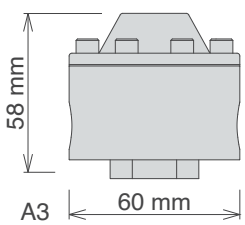
Standard

Design and testing in accordance with EN 1074.

Technical data

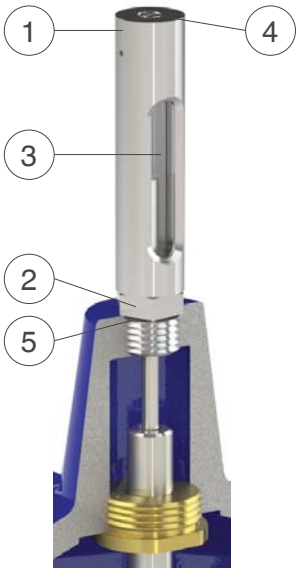
A2 Kv: 1,4 m^3/h.
A3 globe pattern Kv: 0,93 m^3/h.
A3 angle pattern Kv: 1,1 m^3/h.
A2 weight: 0,58 Kg. A3 weight: 0,74 Kg.
Normally supplied with 3/8" F.



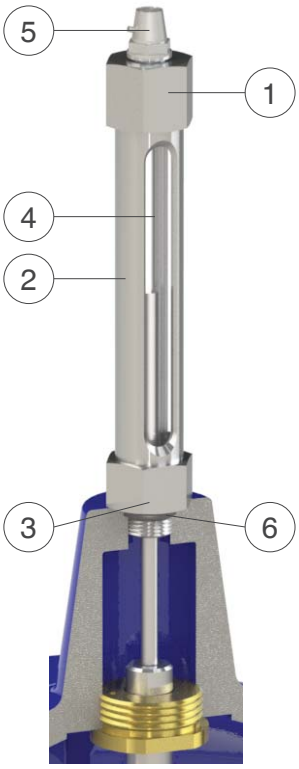


Visual position indicator
Mod. CSPV

The CSA position indicator Mod. CSPV is designed to visually and easily display the valve position. The valve's stem shows the opening percentage of the valve moving into a transparent Pyrex tube with a solid stainless steel/nickel plated brass housing. This one, open on two opposite sides for a clear vision, is provided with a manual air release system on top in order to allow air release during set up and maintenance. Supplied as a standard position indicator tool for CSA valves in two versions (the second one for DN 300-400), the Mod. CSPV can be replaced by the linear 4-20 mA or on-off position transmitters.



For DN 50 - 250



For DN 300 - 400

N.	Component	Material
1	Upper part	stainless steel
2	Lower part	stainless steel
3	Glass pipe	Pyrex glass
4	Pin	stainless steel
5	O-ring	NBR/EPDM/Viton

N.	Component	Material
1	Upper part	stainless steel
2	Central part	stainless steel
3	Lower part	stainless steel
4	Glass pipe	Pyrex glass
5	Air release valve 1/8 G	stainless steel
6	O-ring	NBR/EPDM/Viton

The list of materials and components is subject to changes without notice.

Working conditions

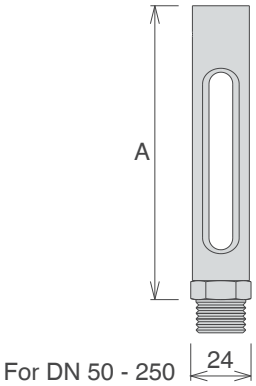
Treated water maximum 70°C.
Maximum pressure: 25 bar.

Standard

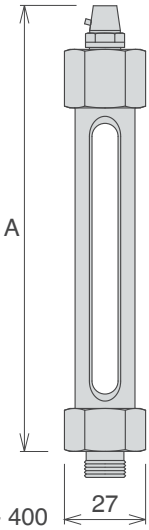
Design and testing in accordance with EN 1074.

Weight and dimensions

Valve DN	A [mm]	Weight [Kg]
from 50 to 125	82	0,23
from 150 to 250	110	0,27
from 300 to 400	180	0,36



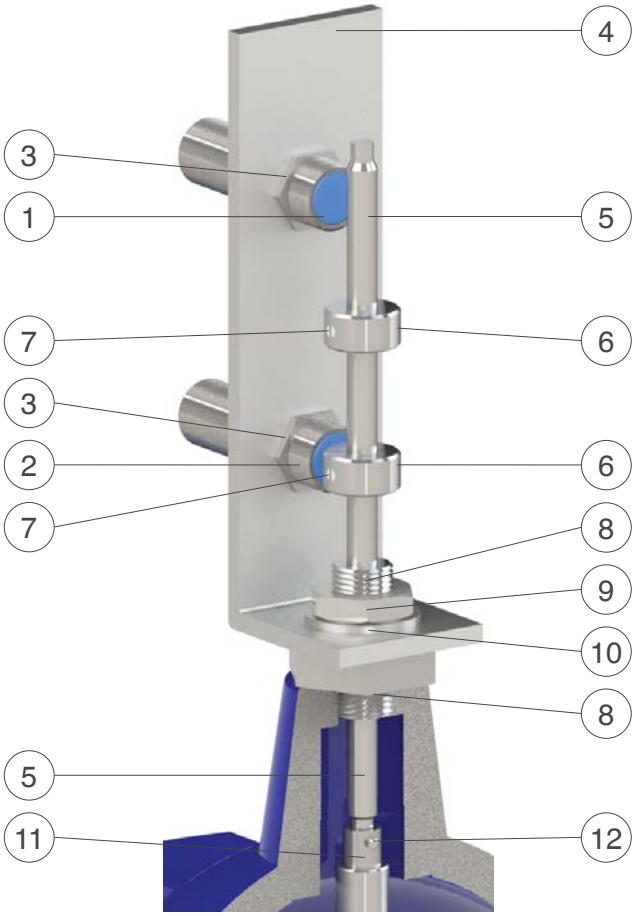
For DN 50 - 250



For DN 300 - 400

On-off position transmitter assembly
Mod. CSPO

The CSA position indicator assembly model CSPO has been designed to be installed on XLC control valves series with the possibility of providing a on-off signal in relation to the open and/or closed position. Usually supplied with step by step or pressure management XLC control valve, although it can be assembled on any existing CSA valve simply by replacing few components. The CSPO is operated by means of magnets fixed on the control valve's indication stem whose movement will provide the required signal.



N.	Component	Material
1	Open valve proximity sensor	nickel-plated brass
2	Close valve proximity sensor	nickel-plated brass
3	Locking nuts	aluminium
4	Bracket	stainless steel
5	Stem	stainless steel
6	Sensor indicator disks	stainless steel
7	Screws	stainless steel
8	Guiding nut	stainless steel
9	Nut	stainless steel
10	Washer	stainless steel
11	Connecting screw	stainless steel
12	Stop pin	stainless steel

The list of materials and components is subject to changes without notice.

Working conditions

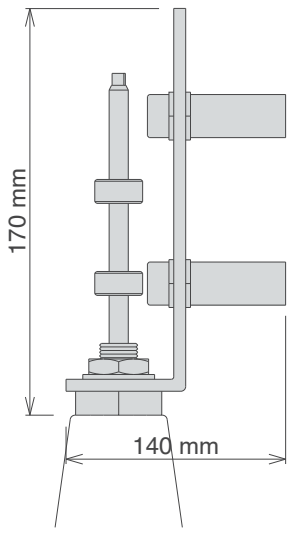
Treated water maximum 70°C.
Maximum pressure: 25 bar.

Standard

Design and testing in accordance with EN 1074.

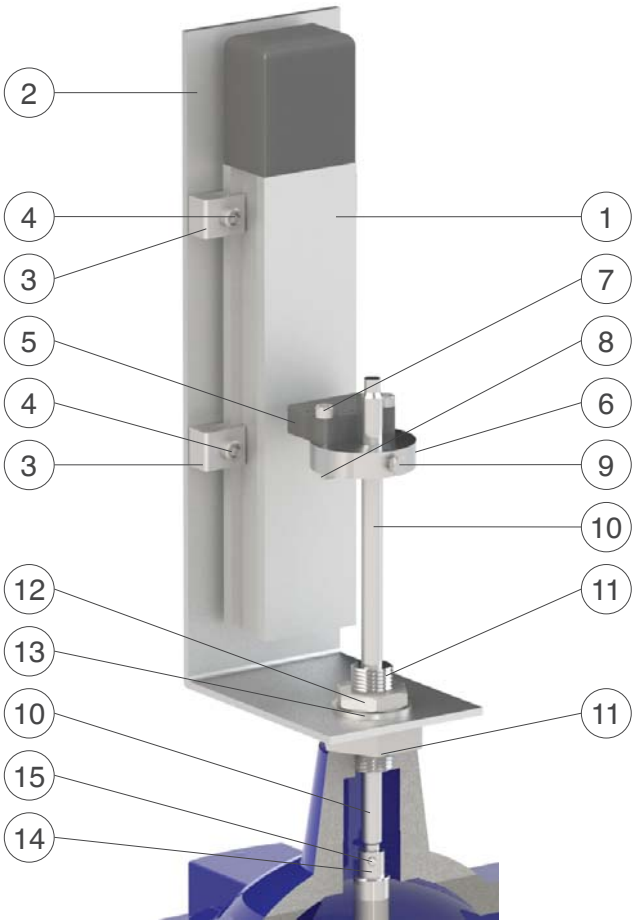
Technical data

Power supply: 12-24 Vdc.
Protection: IP69, IP68.



Contactless linear position transducer with magnetostrictive technology - Mod. CSPL

The linear position transmission system model CSPL has been designed to be installed on XLC control valves series with the possibility of providing a 4-20 mA output in relation to the opening percentage. Usually supplied with step by step or pressure management XLC control valve, although it can be assembled on any existing CSA valve simply by replacing few components. The CSPL is operated by means of a magnet fixed on the control valve's indication stem whose movement will impart the required signal.



N.	Component	Material
1	Position transducer	aluminium
2	Bracket	stainless steel
3	Bracket connections	aluminium
4	Screws	stainless steel
5	Magnet	stainless steel
6	Magnet support	stainless steel
7	Screws	stainless steel
8	Nuts	stainless steel
9	Screw	stainless steel
10	Stem	stainless steel
11	Guiding nut	stainless steel
12	Nut	stainless steel
13	Washer	stainless steel
14	Connecting screw	stainless steel
15	Stop pin	stainless steel

The list of materials and components is subject to changes without notice.

Working conditions

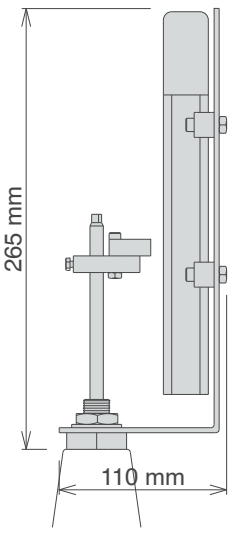
Treated water maximum 70°C.
Maximum pressure: 25 bar.

Standard

Design and testing in accordance with EN 1074.

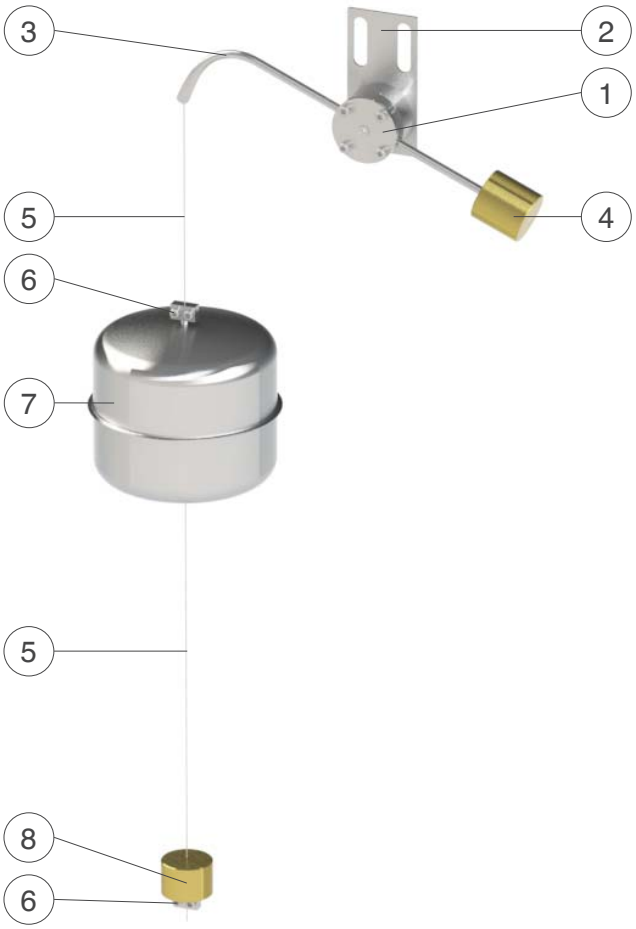
Technical data

Power supply: 24 Vdc ± 20%.
Output signal: 4-20 mA.
Protection: IP67.



Three ways on-off level vertical float for minimum and maximum tank regulation - Mod. Rotoway

The CSA assembly for minimum and maximum level control, named Rotoway, is composed of a main three ways body in stainless steel and all the accessories to provide a fully independent unit designed to operate on CSA control valves XLC series. The internals and construction details make Rotoway suitable for long operating cycles also in presence of high differential pressure and calcium carbonate, with the level control regulation available up to 4 m length. The operating principle is based upon the movement of the float that impart the force to the lever to switch from one position to the other. The float is guided by the wire onto which two mechanical stoppers, corresponding to the minimum and maximum levels, are set tight and adjustable.



N.	Component	Material
1	Rotoway pilot	stainless steel, bronze, Delrin
2	Mounting plate	stainless steel
3	Rod	stainless steel
4	Counterweight	brass
5	Wire	stainless steel
6	Stop collars	brass
7	Float	stainless steel
8	Counterweight	brass

The list of materials and components is subject to changes without notice.

Front view
The picture shows the front view of the three ways Rotoway case, the screws in the middle is used to adjust and balance the lever linked to the float mechanism.

Rear view
The picture shows the rear view of the three ways Rotoway case with pressure port connections, S for drain, C for chamber and M for upstream, used to operate the CSA XLC control valves according to the set up and installation manual.

Working conditions

Treated water maximum 70°C.
Maximum pressure: 16 bar.

Standard

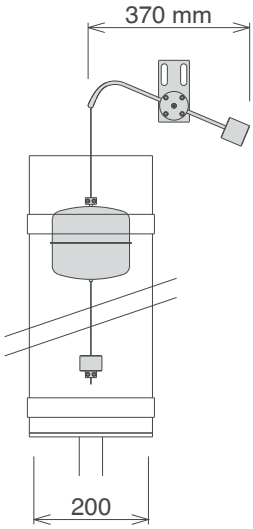
Design and testing in accordance with EN 1074.

Technical data

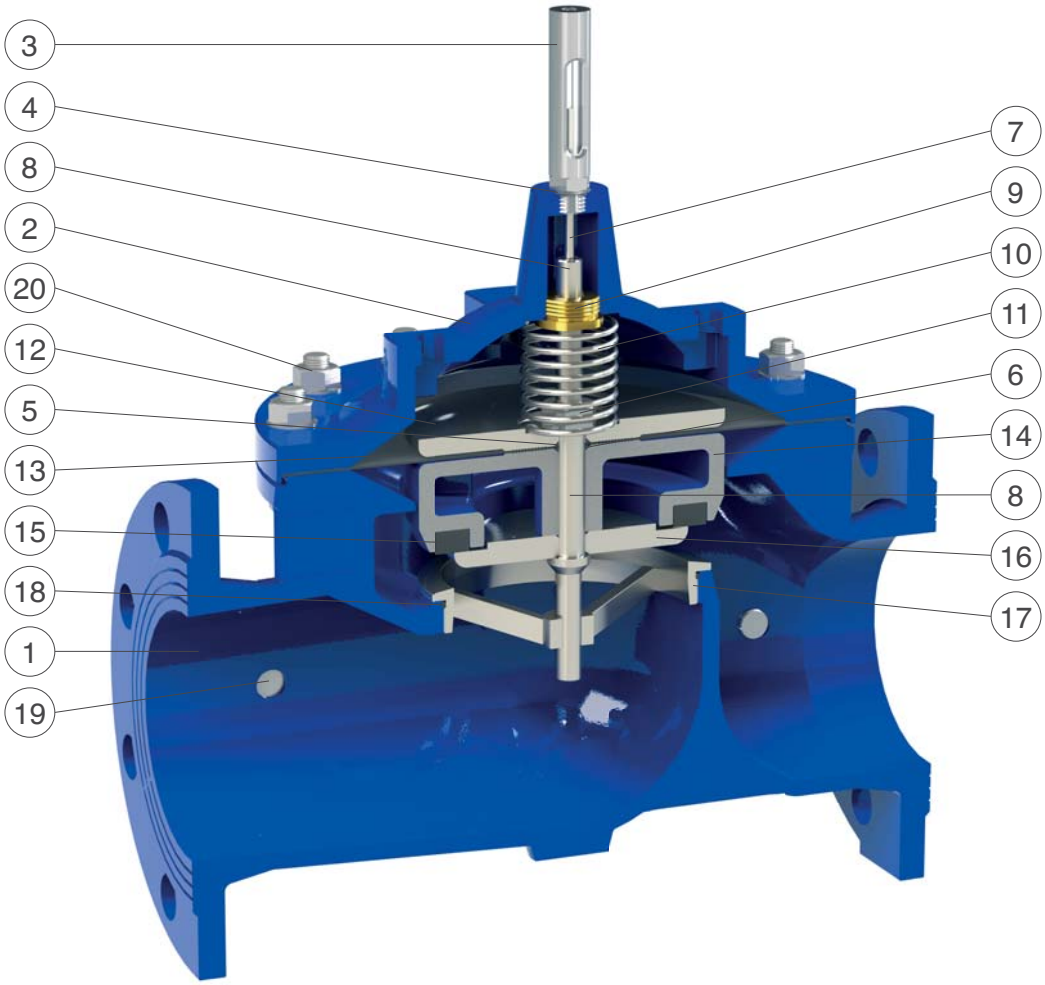
Normally supplied with 1/8" F.

Installation

The Rotoway assembly is usually located on top of water level inside the tank, although it can be installed as a stilling container outside of the main reservoir for better performances and maintenance purposes. The picture on the right shows the recommended size of the pipe, required for such application.



Technical details



N.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 500-7 or GJS 450-10	
2	Cap	ductile cast iron GJS 500-7 or GJS 450-10	
3	Position indicator	s.s. AISI 303 (nickel-plated brass from DN 300)	stainless steel AISI 303
4	Position indicator o-ring	NBR	EPDM/Viton
5	Upper flat o-ring	NBR	EPDM/Viton
6	Obturator o-ring	NBR	EPDM/Viton
7	Indicator stem	stainless steel AISI 303	
8	Main shaft	stainless steel AISI 303	stainless steel AISI 316
9	Guide ring	bronze CuSn5Zn5Pb5	stainless s. AISI 304/316
10	Spring	stainless steel AISI 302	
11	Locking nut	stainless steel AISI 304	stainless steel AISI 316
12	Upper flat	painted steel Fe 37	stainless s. AISI 304/316
13	Diaphragm	neoprene-Nylon	
14	Obturator	AISI 303 (DN 50-65), Fe 37, GJS 500-7 (from DN 150)	stainless s. AISI 304/316
15	Plane gasket	NBR	
16	Gasket holder	stainless steel AISI 303 (304 from DN 150)	stainless steel AISI 316
17	Seat	stainless steel AISI 303 (316 from DN 150)	stainless steel AISI 316
18	Seat o-ring	NBR	EPDM/Viton
19	Pressure outlet taps	stainless steel AISI 316	
20	Studs, nuts and washers	stainless steel AISI 304	stainless steel AISI 316

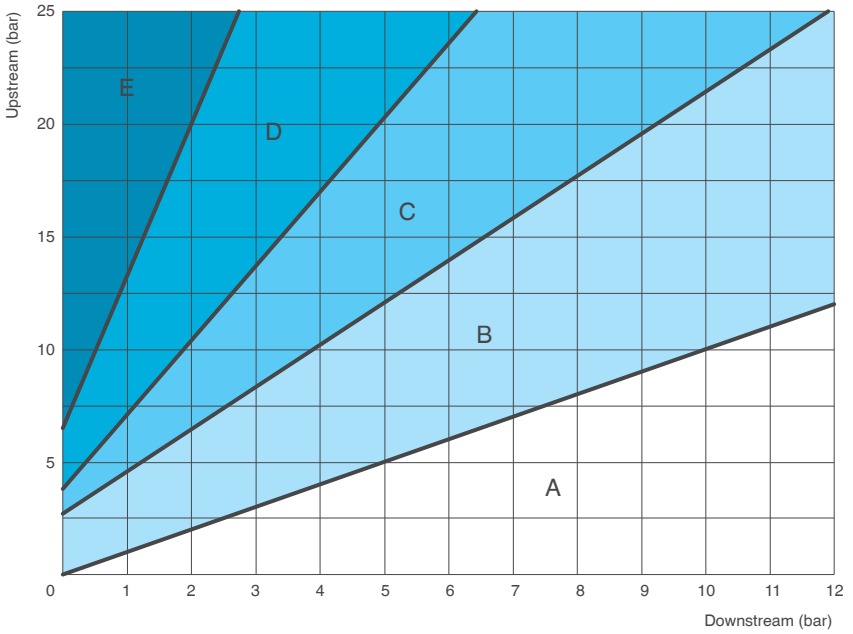
The list of materials and components is subject to changes without notice.

Technical data

DN (mm)	40	50	65	80	100	125	150	200	250	300	400
Kv (m^3/h)	40,6	40,6	68	100	169	187	410	662	1126	1504	2682
Stroke (mm)	15	15	18	21	27	27	43	56	70	84	111

Head loss coefficient

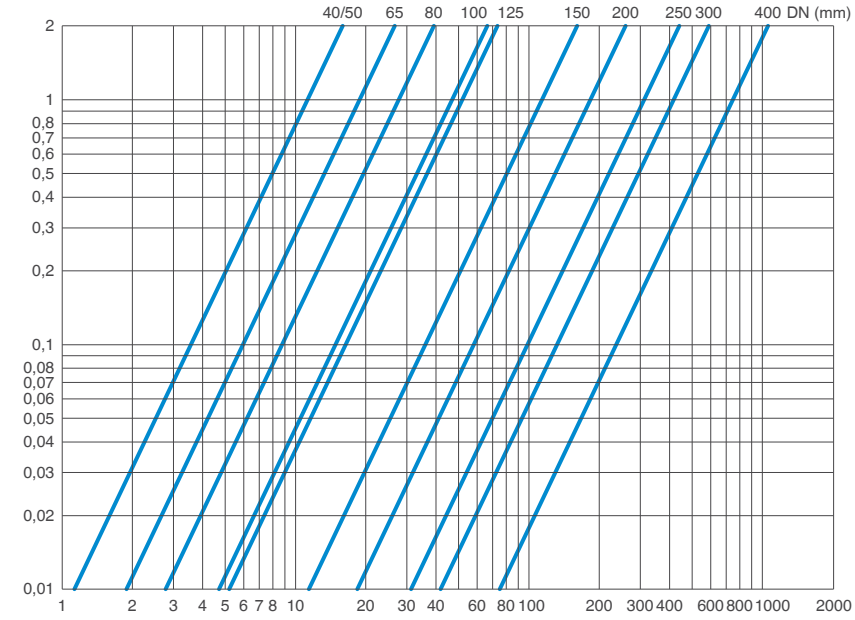
Kv coefficient representing the flow rate which is flowing through the valve fully open, and producing a head loss of 1 bar.



Cavitation chart

The cavitation phenomenon is very important during the proper valve sizing process since it may lead to substantial damages, in addition to vibration and noise. The cavitation chart has to be used to determine whether the intersection of the line, connecting upstream and downstream pressure conditions, lies within one of the 5 zones to be identified as follows:

- A: Out of the possible working conditions;
- B: Recommended working conditions;
- C: Incipient cavitation;
- D: Damage cavitation;
- E: Choked and unpredictable conditions, please consult CSA for further assistance.



Head loss chart

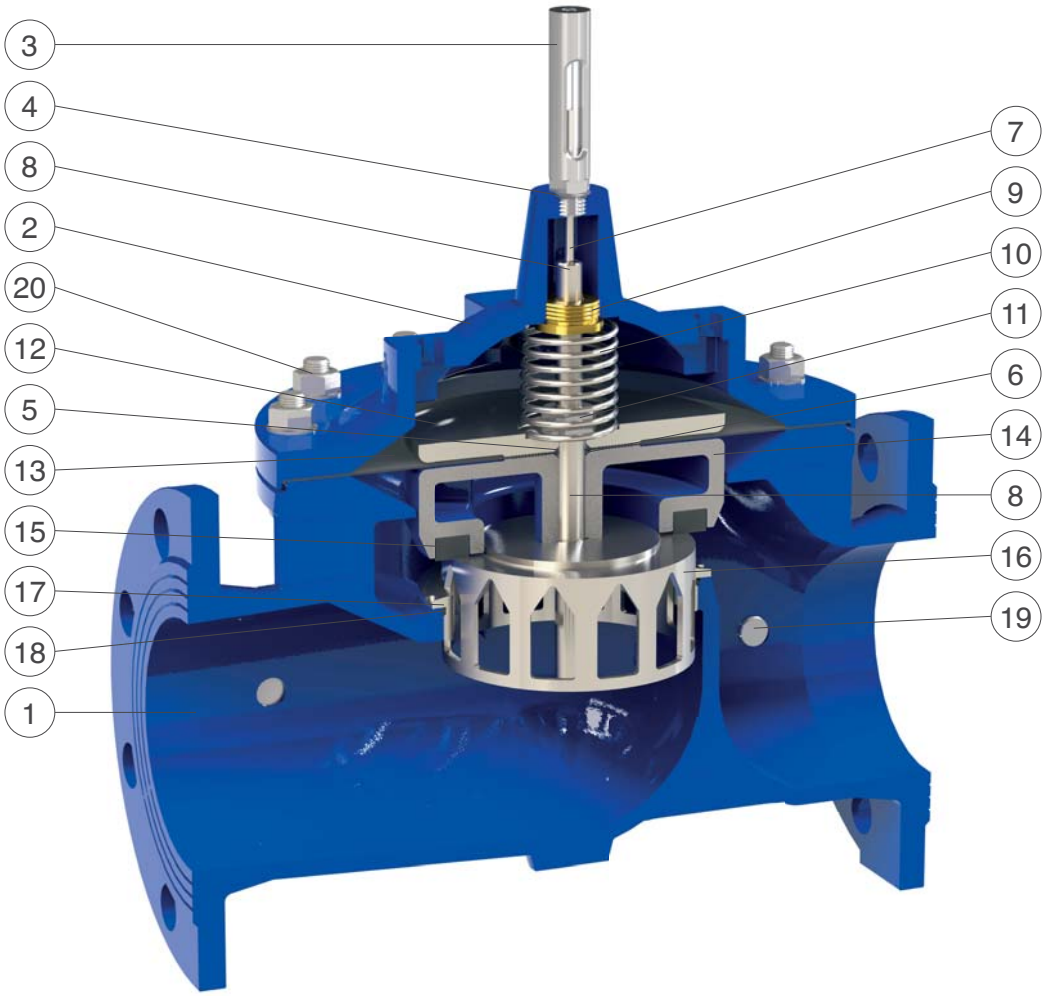
The chart indicates the head loss of XLC 400 automatic control valves fully open versus flow rate in l/s.

Recommended flow rate

The following chart shows the recommended flow rate for the proper sizing of XLC 400 control valves.

DN (mm)			50	65	80	100	125	150	200	250	300	400
Flow rate (l/s)	Low head loss (0,1-0,15 bar)	Min.	0,6	1,0	1,5	2,3	2,5	5,2	9,4	14	21	37
		Max.	3,9	6,6	10	16	16	35	63	98	140	250
	Recommended	Min.	1,0	1,8	2,7	4,3	4,6	9,5	17	27	39	70
		Max.	8,8	15	22	35	37	80	141	220	317	565
	Pressure relief	Max.	13	23	35	54	60	123	219	343	494	879

Technical details - Anti-cavitation version

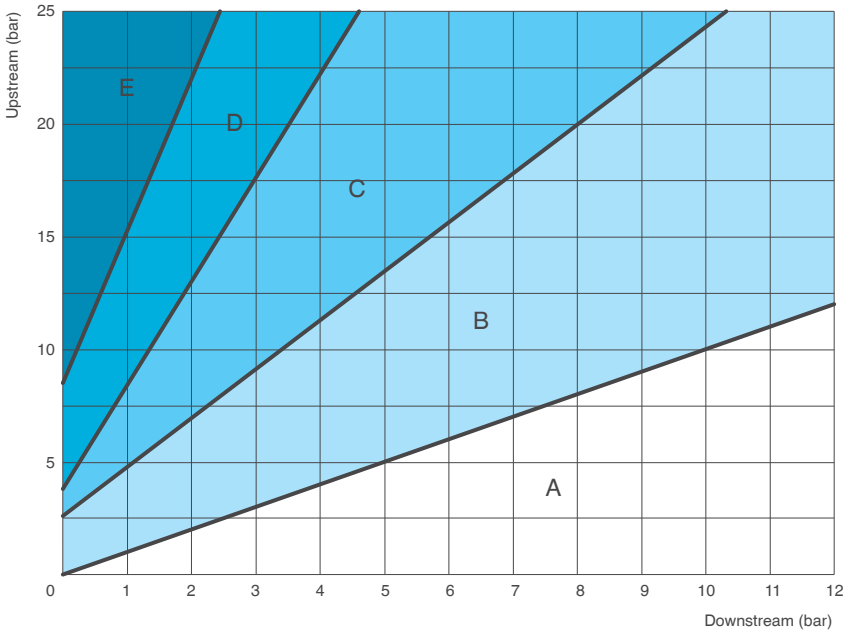


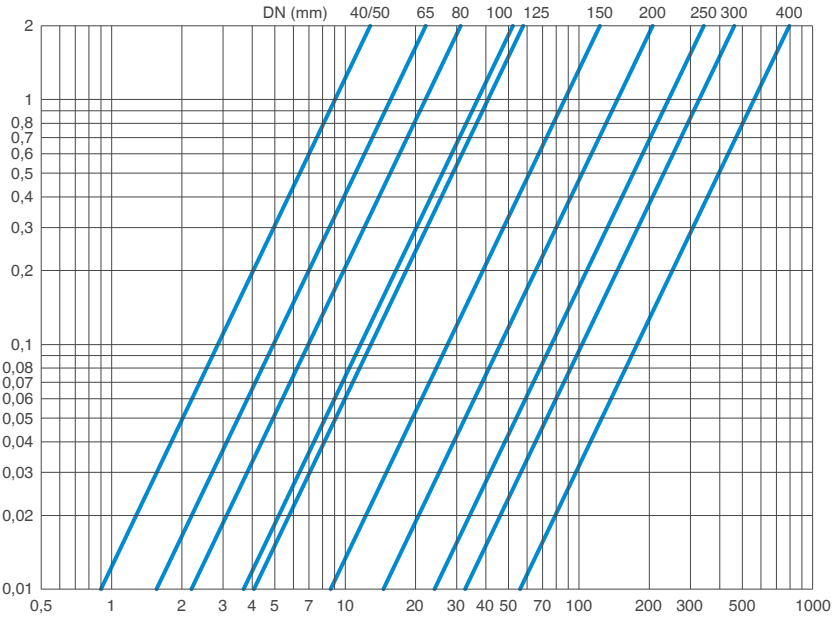
N.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 500-7 or GJS 450-10	
2	Cap	ductile cast iron GJS 500-7 or GJS 450-10	
3	Position indicator	s.s. AISI 303 (nickel-plated brass from DN 300)	stainless steel AISI 303
4	Position indicator o-ring	NBR	EPDM/Viton
5	Upper flat o-ring	NBR	EPDM/Viton
6	Obturator o-ring	NBR	EPDM/Viton
7	Indicator stem	stainless steel AISI 303	
8	Main shaft	stainless steel AISI 303	stainless steel AISI 316
9	Guide ring	bronze CuSn5Zn5Pb5	stainless s. AISI 304/316
10	Spring	stainless steel AISI 302	
11	Locking nut	stainless steel AISI 304	stainless steel AISI 316
12	Upper flat	painted steel Fe 37	stainless s. AISI 304/316
13	Diaphragm	neoprene-Nylon	
14	Obturator	AISI 303 (DN 50-65), Fe 37, GJS 500-7 (from DN 150)	stainless s. AISI 304/316
15	Plane gasket	NBR	
16	Anti-cavitation V-port	stainless steel AISI 303 (304 from DN 150)	stainless steel AISI 316
17	Seat for anti-cavitation system	stainless steel AISI 303 (316 from DN 150)	stainless steel AISI 316
18	Seat o-ring	NBR	EPDM/Viton
19	Pressure outlet taps	stainless steel AISI 316	
20	Studs, nuts and washers	stainless steel AISI 304	stainless steel AISI 316

The list of materials and components is subject to changes without notice.

Technical data - Anti-cavitation version

DN (mm)	40	50	65	80	100	125	150	200	250	300	400
Kv (m^3/h)	32,5	32,5	56	79	132	146	312	523	867	1173	2012
Stroke (mm)	15	15	18	21	27	27	43	56	70	84	111





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.

Cavitation chart

The cavitation phenomenon is very important during the proper valve sizing process since it may lead to substantial damages, in addition to vibration and noise. The cavitation chart has to be used to determine whether the intersection of the line, connecting upstream and downstream pressure conditions, lies within one of the 5 zones to be identified as follows:

- A: Out of the possible working conditions;
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- C: Incipient cavitation;
- D: Damage cavitation;
- E: Choked and unpredictable conditions, please consult CSA for further assistance.

Head loss chart

The chart indicates the head loss of XLC 400 automatic control valves fully open versus flow rate in l/s.

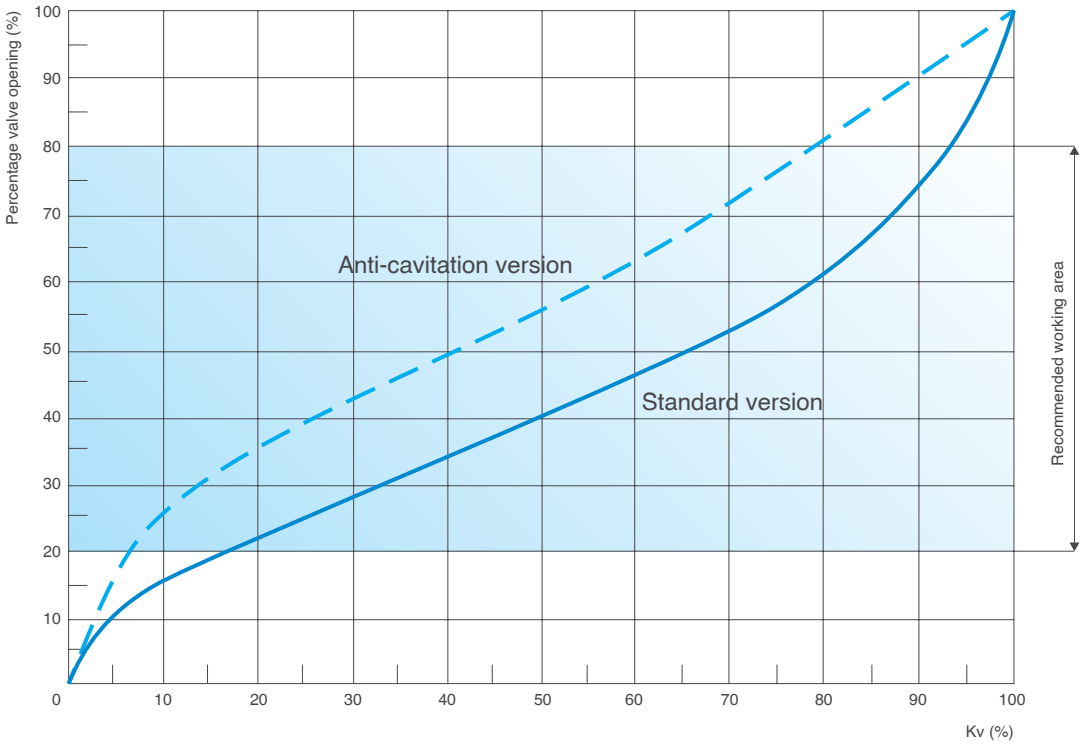
Recommended flow rate

The following chart shows the recommended flow rate for the proper sizing of XLC 400 control valves.

DN (mm)			50	65	80	100	125	150	200	250	300	400
Flow rate (l/s)	Low head loss (0,1-0,15 bar)	Min.	0,4	0,7	1,1	1,7	1,8	3,9	7,3	11	15	26
		Max.	3,1	5,4	8,2	13	14	28	52	81	116	200
	Recommended	Min.	0,8	1,3	2,1	3,5	3,8	7,6	13	22	31	58
		Max.	7,4	12	17	28	30	65	115	182	263	457
	Pressure relief	Max.	11	19	29	45	50	100	180	281	410	720

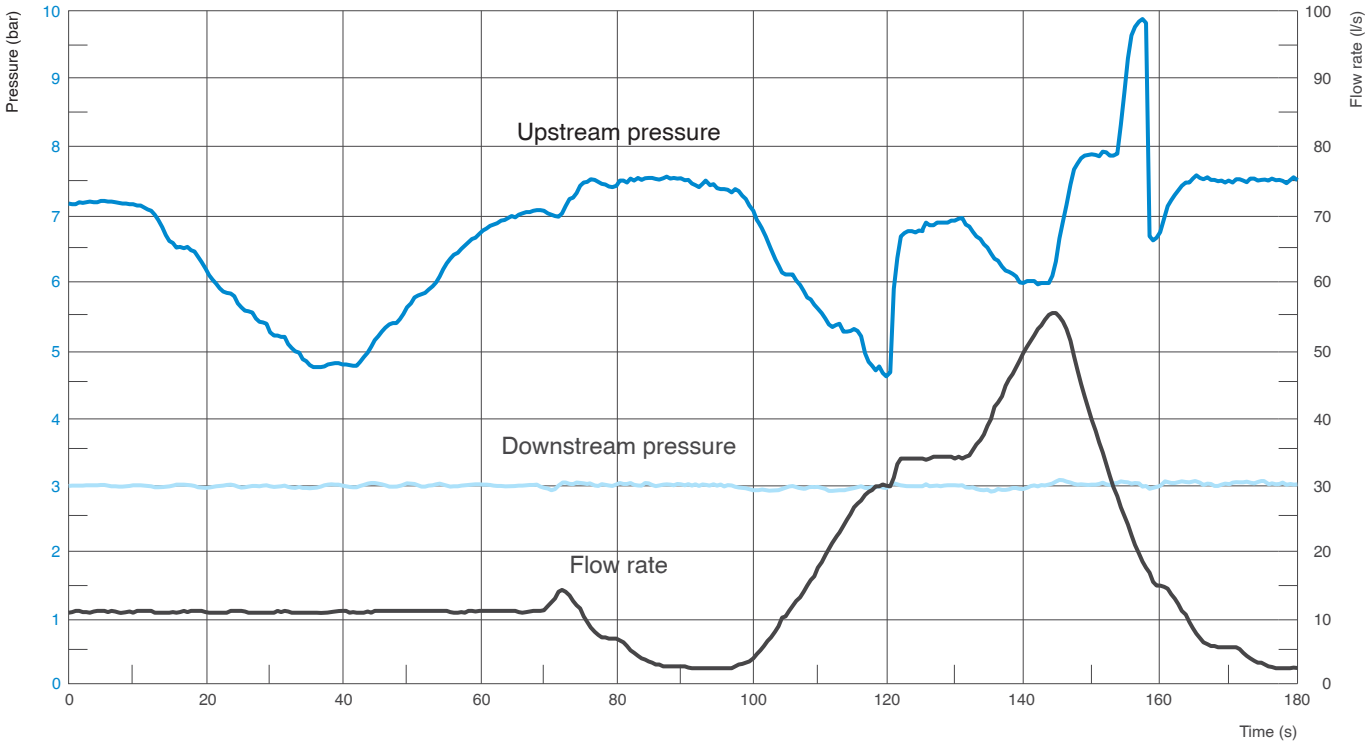
Kv to valve opening chart

The following chart shows the opening percentage of XLC 400 and XLC 400-AC (provided with anti-cavitation system) versus the Kv.



Pressure reducing performance chart

Actual hydraulic laboratory results.



Technical data

The CSA XLC 400 and 400-AC series represent the state of the art of hydraulic engineering. Designed with European certified ductile iron and produced with potable water approved components only, XLC line of control valves can be supplied with 4-20 mA position transmitter of the opening percentage, or on-off sensors. Turbines and power generation systems combined with CSA electronic equipments and solutions are available on request.

Working conditions

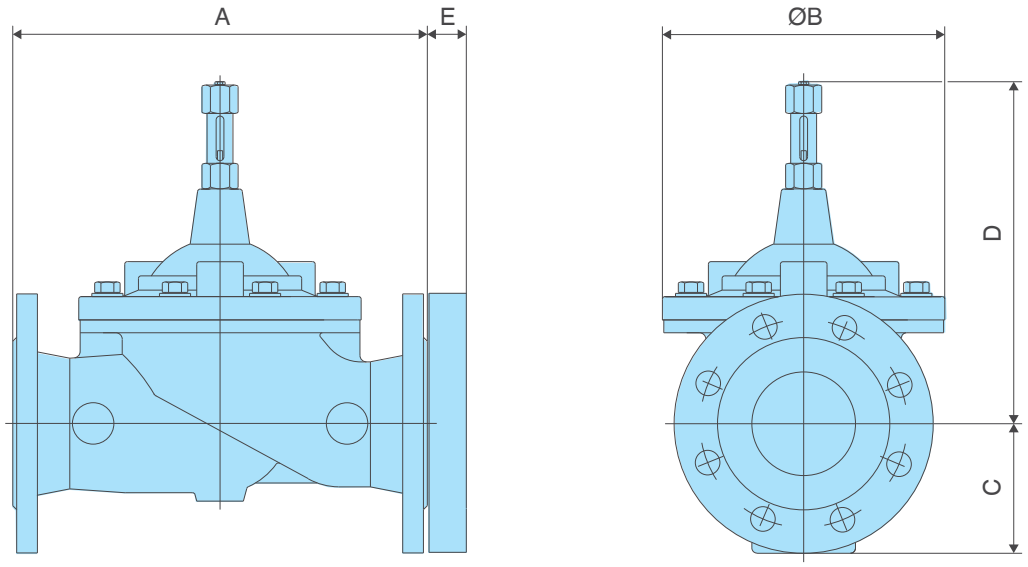
Treated filtered water with a maximum temperature of 70°C.
Minimum pressure on the pilot : 0,5 bar plus head loss.
Maximum pressure : 25 bar.

Standard

Designed in compliance with EN 1074.
Pressure rating 25 bar.
Flanges according to EN 1092/2 (different drilling standard on request).
Epoxy painting applied through FBT technology blue RAL 5005.

Available size and pattern

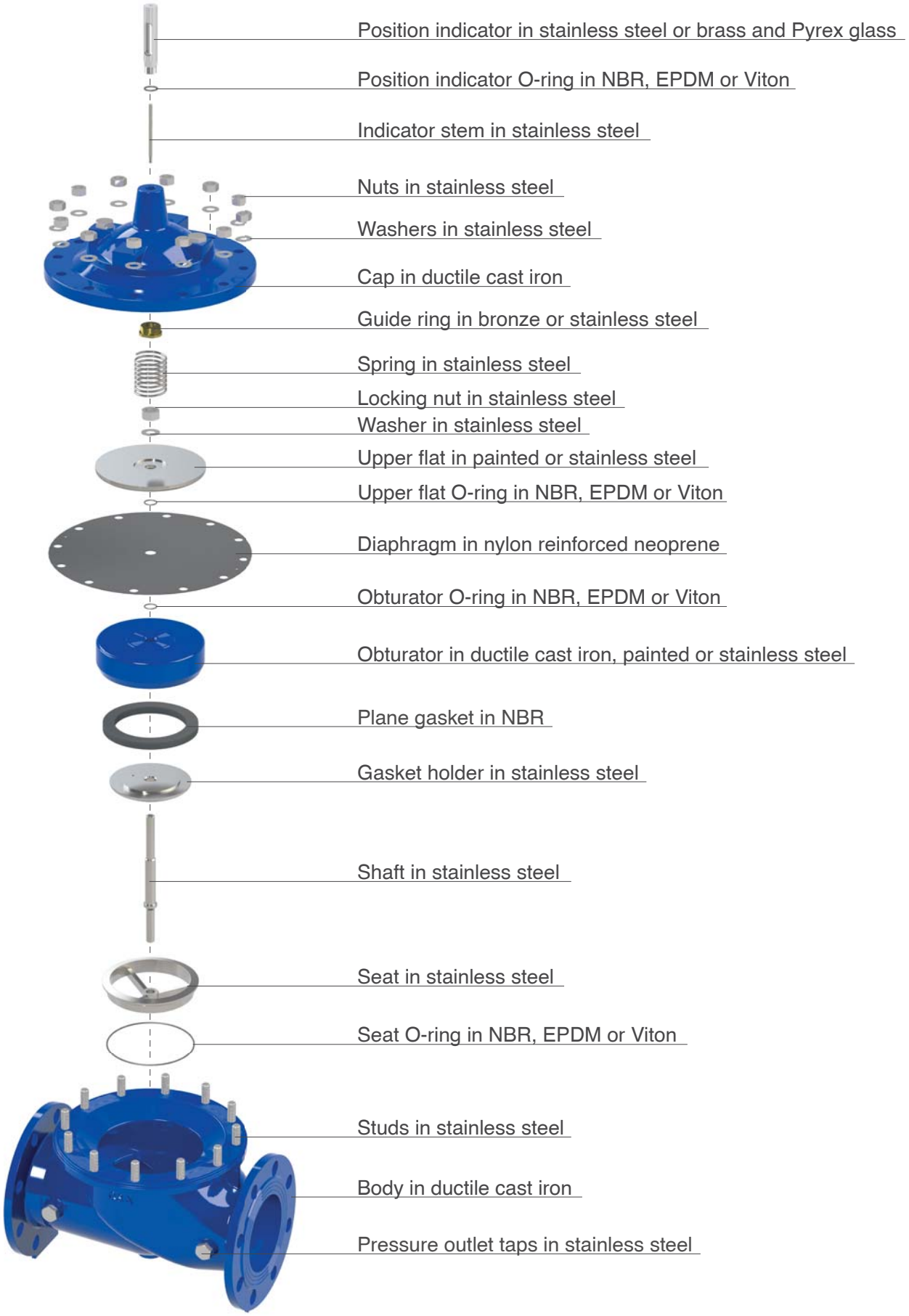
DN 40-DN 400 globe pattern.



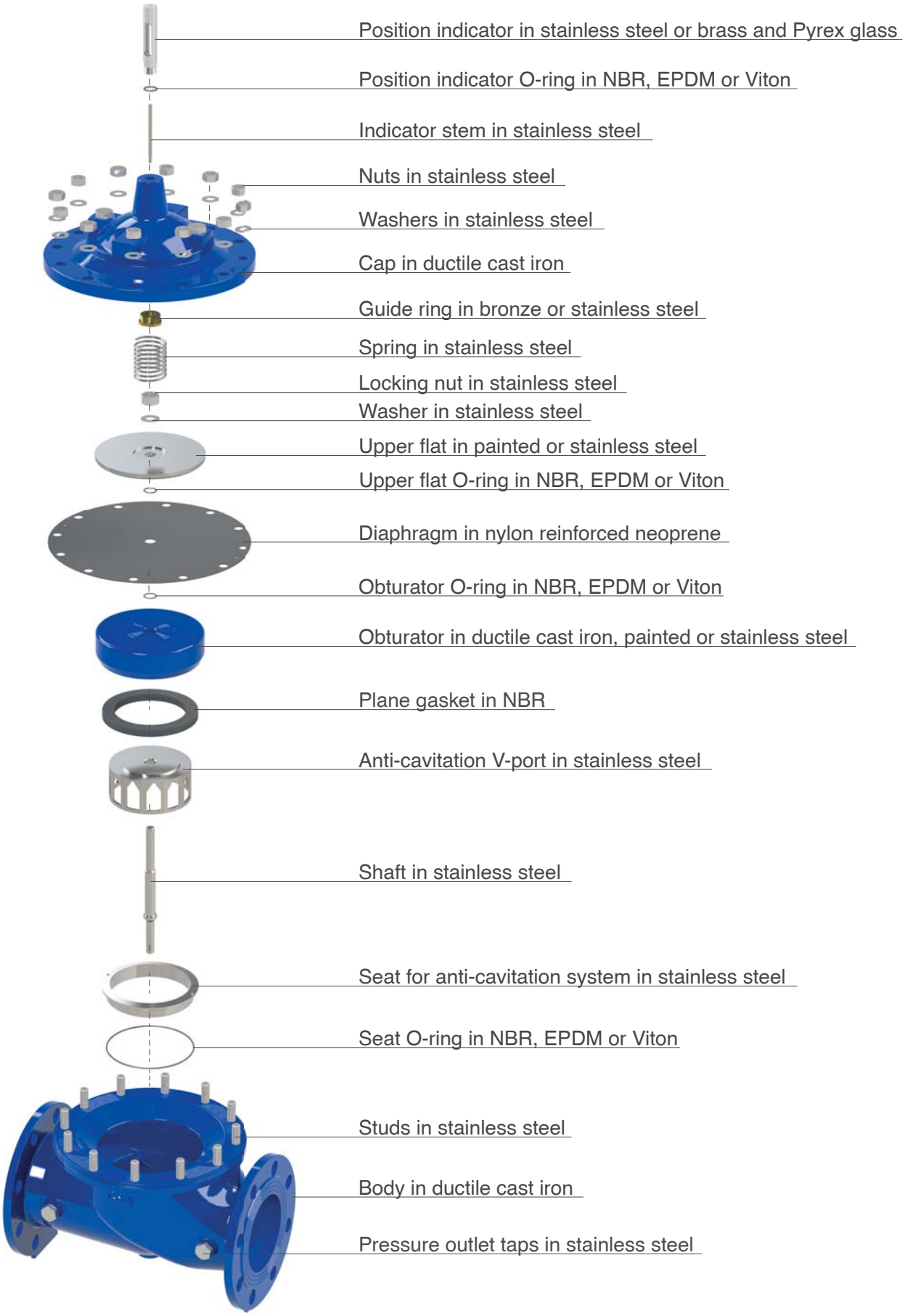
DN (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	Weight (Kg)
40	230	162	83	233	30	18
50	230	162	83	233	30	18
65	290	194	93	255	30	23,5
80	310	218	100	274	30	28
100	350	260	118	316	30	39
125	400	304	135	383	30	47
150	480	370	150	431	30	84
200	600	454	180	523	30	138
250	730	570	213	620	40	264
300	850	710	242	670	40	405
400	1100	895	310	870	40	960

The dimension E in the picture above refers only to applications where it is necessary to add a flanged orifice downstream or upstream of the valve, for example for flow control or cavitation prevention.

Spare parts breakdown



Spare parts breakdown - Anti-cavitation version



Advanced testing facilities

Designed to reproduce real conditions of modern water distribution systems the CSA testing facility is able to assess the dynamic performances of automatic control valves, direct acting pressure control valves, air valves and anti water hammer valves.
Provided with a high capacity booster pumps station, and linked to an advanced high frequency pressure transducers and flow meters, the testing rig allows for a real time visualization of pressure and flow evolutions. Water hammer events can also be simulated and recorded to prove the efficacy of CSA fast acting relief valve, in addition to level control for which, using an auxiliary stilling tank, a part of the pipeline system is entirely dedicated.
The PLC and control station allows for the operation of step by step and solenoid operated valves to determine the sensitivity of such kind of application and pressure management solutions. Thanks to this important and powerful tool valves can be customized, simulated and set according to the project requirements assuring the perfect performance and accuracy.

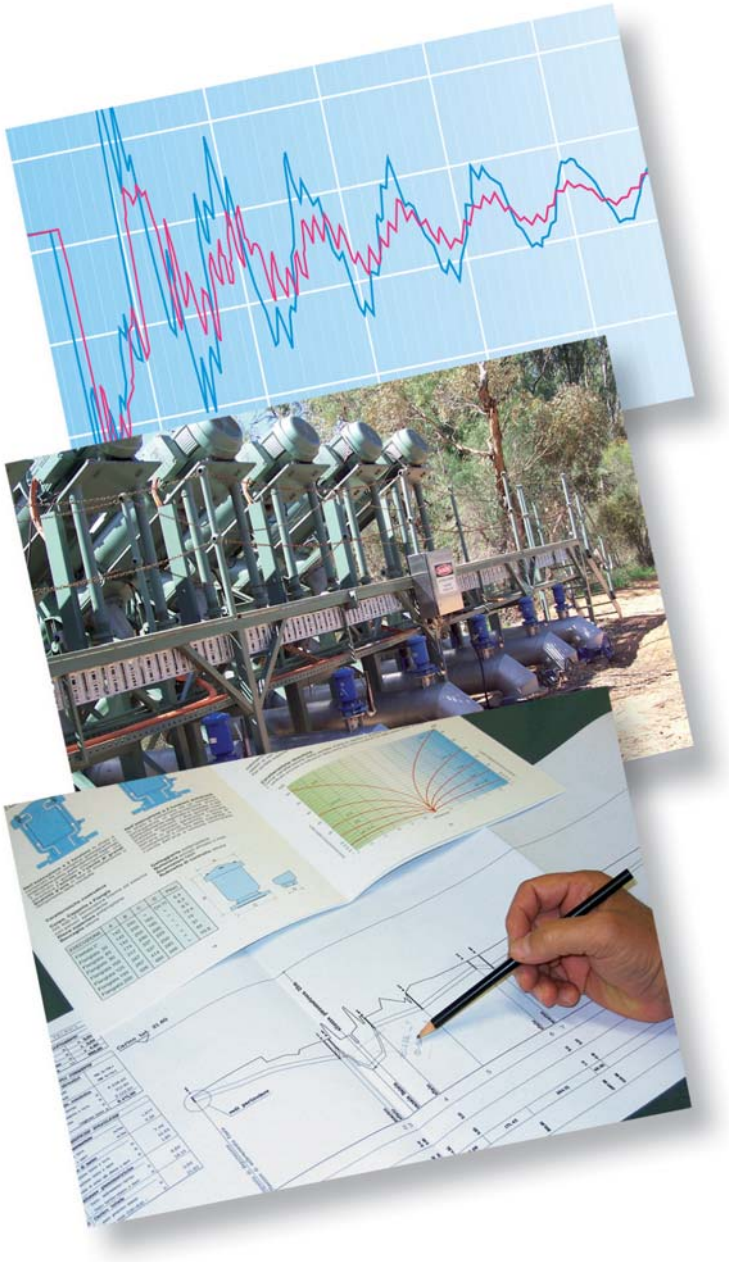
The testing process

All our valves undergo severe tests according to EN standards to ensure they are mechanically resistent, watertight, and high performing. After testing every valve is identified by means of a metallic tag or sticker, and duly registered and certified.

CSA HYCONSULT

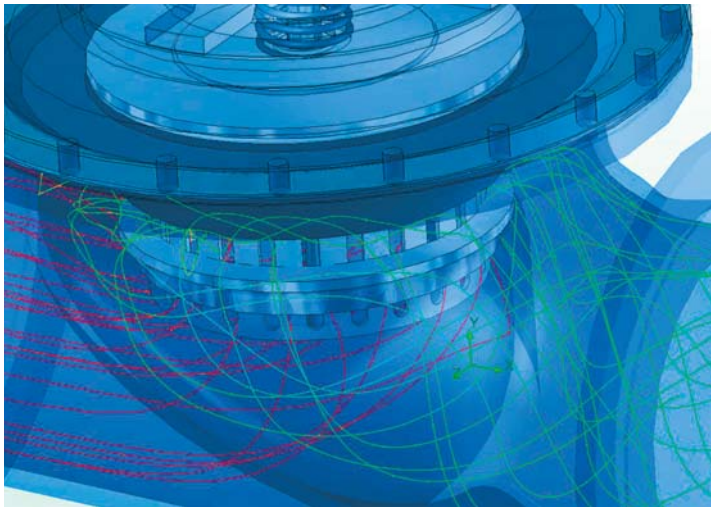
Water hammer analysis
CSA Hyconsult

CSA Hyconsult was founded to provide designers and consultants, involved in the design of water distribution and sewage systems, with accurate and unique technical support.
CSA Hyconsult has specialized in hydraulic modelling and transients analysis, entirely through the use of modern computational tools and advanced algorithms. Simulations are essential to predict system responses to events under a wide range of conditions without disrupting the actual system.
Using simulations, problems can be anticipated in possible or existing situations, and solutions can be evaluated in order to invest time, money and material in the most productive manner.



Research and innovation

CSA has always regarded knowledge as being indispensable for the kind of research that consistently feeds innovation at all levels. The R&D department at CSA constantly strives to improve product performance and continually searches for new solutions to meet our customer's needs. Twenty years of experience in valve design and sizing, supported by advanced computational tools, cooperation with external entities at the highest level, and test facilities for the verification of theoretical results which are available for our customers, guarantee our professionalism and reliability.



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