



Automatic control valves ITALICA 300 series

The CSA Italica 300 control valve series consist of a needle body with axial flow hydraulically operated through pilots, exclusive unit flow control device CSA GR.I.F.O II, filter with large meshing surface and an innovative body that can be installed in every direction. Entirely produced in ductile cast iron with internal components in stainless steel the valve is designed to perform a tremendous range of applications including 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. All information herewith contained referring to operating principle, case studies and installation guidelines.



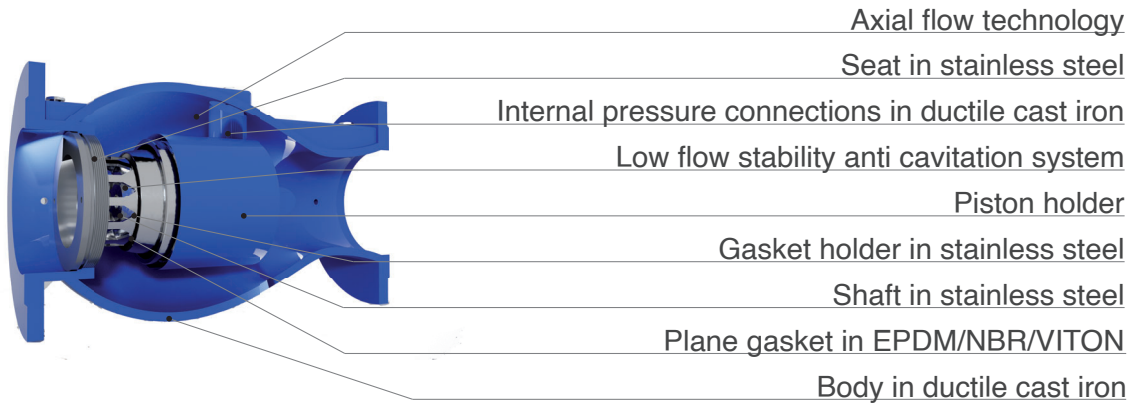
Technical features and benefits

- Axial flow pattern body in ductile cast iron, PN 25 bar rated, globe pattern design in compliance with EN 1074 standards and available from DN 50 mm up to DN 600 mm.
- Designed to reduced head loss and minimize turbulence under a wide flow range.
- Piston actuated with reduced maintenance
- Stainless steel seat and mobile block with low flow stability and anti cavitation system
- Silent operation and absence of vibrations, suitable for buildings and urban applications.
- Reliable and innovative technology to minimize and reduce the complexity of standard control valves therefore the risk of failure,
- Different versions of the modulating assembly, more in details the seat and the gasket holder, to provide excellent resistance to cavitation, low flow stability and noise reduction
- Large filter in stainless steel AISI 316

Applications

- Main transmission lines and water distribution networks.
- Industrial plants.
- Irrigation.
- Cooling system.
- Buildings

Technical features



The mobile block includes the obturator, shaft and gasket holder, the latter engineered with different versions to guarantee the maximum accuracy and best performances in accordance to the results of the sizing, resistance to cavitation and design requirements.



AC version for low flow stability and cavitation prevention

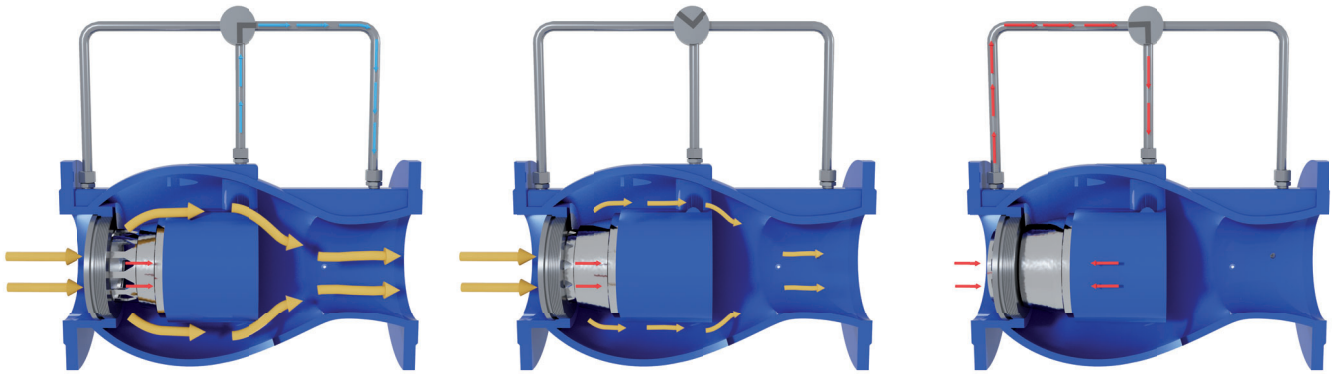
The anti-cavitation trim AC mobile block includes seat and a gasket holder (1a, 2a) designed to increase the allowable pressure ratio and resistance to cavitation, improving at the same time the valve's stability to guarantee the maximum accuracy also in case of no flow.



CP anti-cavitation version

The CP system includes a different seat and gasket holder (1b, 2b) engineered for double energy dissipation between upstream and downstream, whose holes can be customized according to the project in hand and required performances

Operating principle on-off mode



Valve opening

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

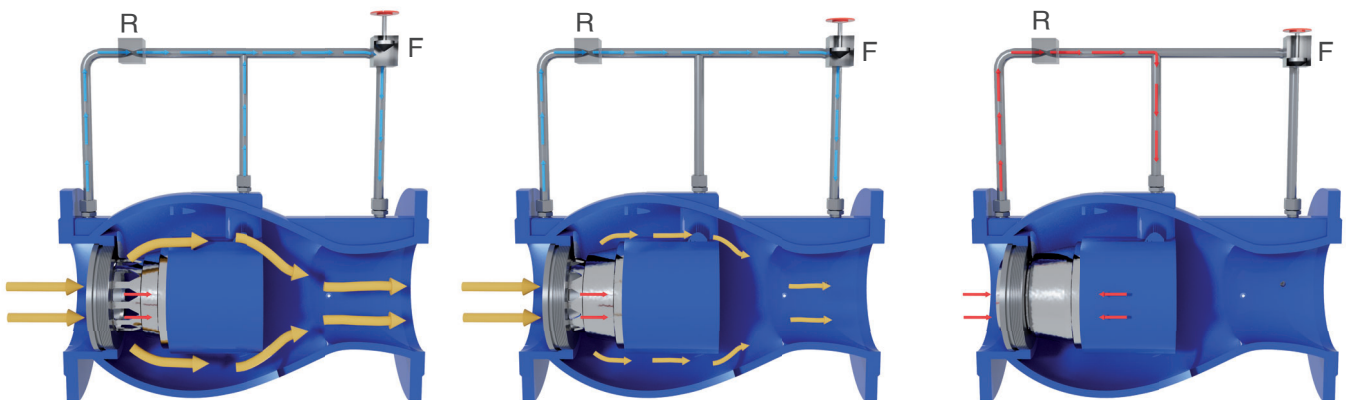
Valve isolated from the line

Should the control chamber be isolated from the line pressure and the rest of the circuitry 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 than the obturator underneath, the valve will close completely.

Operating principle modulating mode



Valve opening

When the main valve is required to modulate a restriction (R) is needed between the upstream line pressure and the control chamber, in addition to a regulator (F) on the circuit. Should the latter open completely pressure inside the control chamber will be put in communication with downstream, allowing for the full opening of the main valve.

Valve modulating

If the flow regulator (F) is throttled pressure will build up between it and the control chamber, causing the valve to modulate accordingly to an intermediate position. This is obtained thanks to the pressure difference created by the restriction (R) and to the difference in section between the upper flat acting on the diaphragm and the obturator.

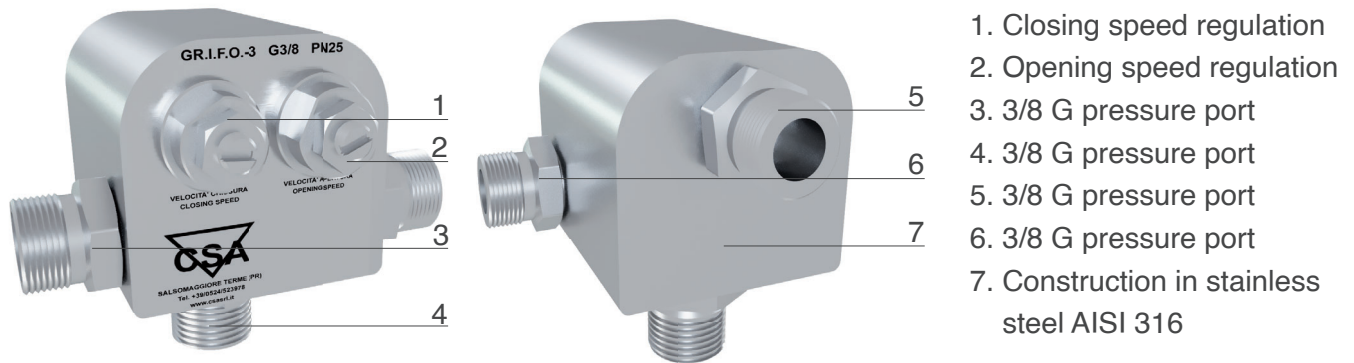
Valve closing

Should the flow regulator (F) be completely closed, the upstream line pressure is all diverted to the main control chamber. The mobile block is moved by the force exerted on the upper diaphragm flat pushing the obturator down onto the seat, interrupting the flow through the main valve.

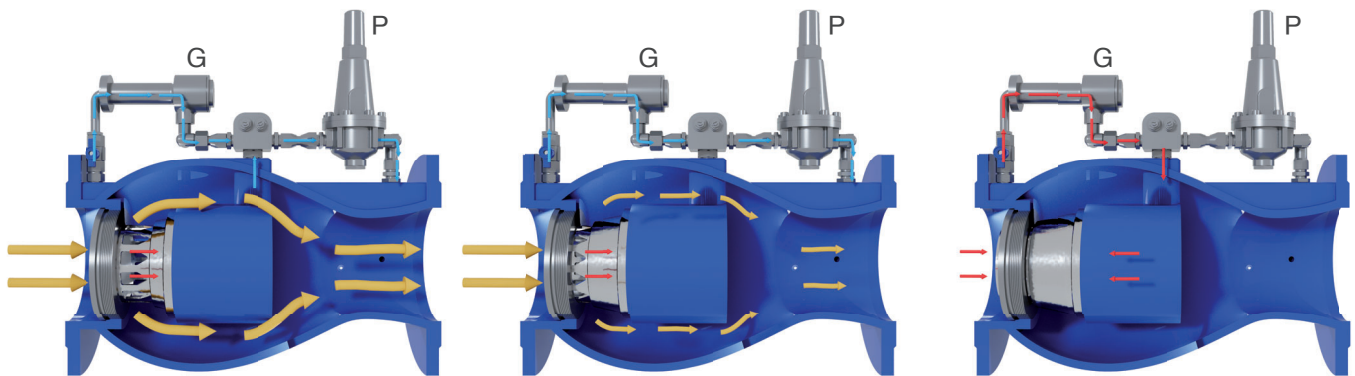
GR.I.F.O. 2 flow control device

The CSA exclusive unit flow control device GR.I.F.O. (patent pending) has been designed to enhance flow stability and accuracy on CSA hydraulic control valves Italice 300 series thanks to a combination of an exclusive and smart adjustable needle valves and check valves. Entirely built in stainless steel, impervious to corrosion, compact and provided with several pressure ports, GR.I.F.O. allows for a tremendous range of regulation reducing at the same time the complexity of the circuit compared to the other solutions available on the market.

GR.I.F.O. is composed two adjustable needle flow stabilizers valves in stainless steel with check valves, needed for the regulation of the main valve's response time, opening and closing speed independently one from the other.



Operating principle modulating mode - example of pressure reduction



Valve opening

Should the downstream pressure drop below the pilot's (P) preset and adjustable set point the latter will open, allowing flow and pressure to be relieved out of the main chamber. The mobile block will be lifted increasing the passage between the obturator and the seat trying to re-establish the desired downstream pressure value.

Valve modulating

As a consequence of gradual change in demands the pilot (P) will keep regulating the flow in and out of the main chamber to compensate for pressure variations. The mobile block will reproduce the pilot's movement, throttling the passage between the seat and obturator to produce the head-loss required for the pressure reduction.

Valve closing

Should the downstream pressure rise above the pilot's (P) set point the latter will close, allowing pressure to be built up inside the main chamber. The mobile block will be pushed down trying to restore the desired downstream value. In case of static conditions pilot will be fully closed with the valve maintaining the downstream pressure.

Downstream pressure reducing stabilizing automatic needle control valve Mod. Italice 310



The CSA Italice 310 is an axial flow hydraulically operated automatic control valve that reduces and stabilizes the downstream pressure to a constant value, regardless of variation in demands and upstream pressure conditions. Normally equipped with low flow stability and cavitation reduction cage Italice is entirely made in ductile cast iron with FBT epoxy coating and stainless steel parts. Thanks to the exclusive axial flow pattern the valve is designed to reduce head loss, noise and cavitation damage.

Applications

- Downstream of pumps to reduce the pressure on the main supply line.
- Installed in derivation from the main line to stabilize the pressure of secondary line and water users.
- As a protection against rise in pressure of industrial equipment and civil installations.
- On the inlet supply line of storage tanks to stabilize pressure and flow required for the level control.
- On each floor of buildings, irrigation, and whenever a pressure reduction is required

Accessories

- Pressure measurement kit.
- Self-flushing filter.
- Double stage energy dissipation device for severe cavitation

Note to the engineer

- Inlet and outlet pressure, and flow rate are required for the proper sizing.
- The valve can be installed in horizontally or in a vertical position, above 200 mm the horizontal position is recommended
- A minimum length of 3 DN downstream of the valve is recommended for the best accuracy.

Additional features

- Italice 310-FR downstream pressure reducing with back-flow prevention.
- Italice 310-H downstream pressure reducing with high sensitivity pilot.
- Italice 310-G downstream pressure reducing with over pressure guard.

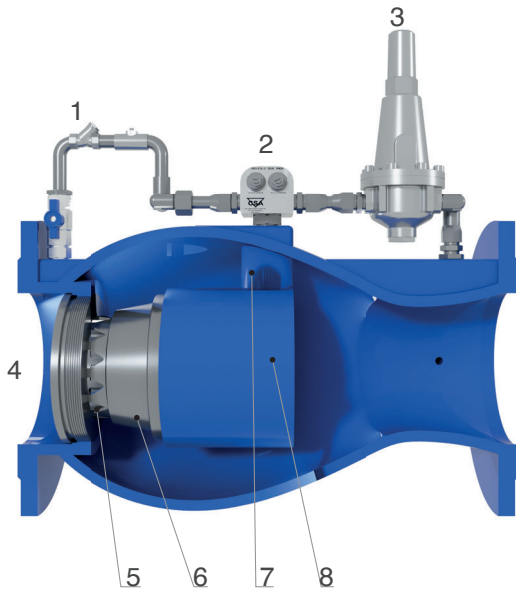
Working conditions

- Fluid: treated water.
- Minimum operating pressure: 0,7 bar.
- Maximum operating pressure: 25 bar.
- Maximum temperature: 70°C.

Downstream pressure pilot adjustment range

- Blue spring: 0,7 to 7 bar.
- Red spring: 1,5 to 15 bar.
- Values lower than 0,7 available with high sensitivity pilots.

Operating principle

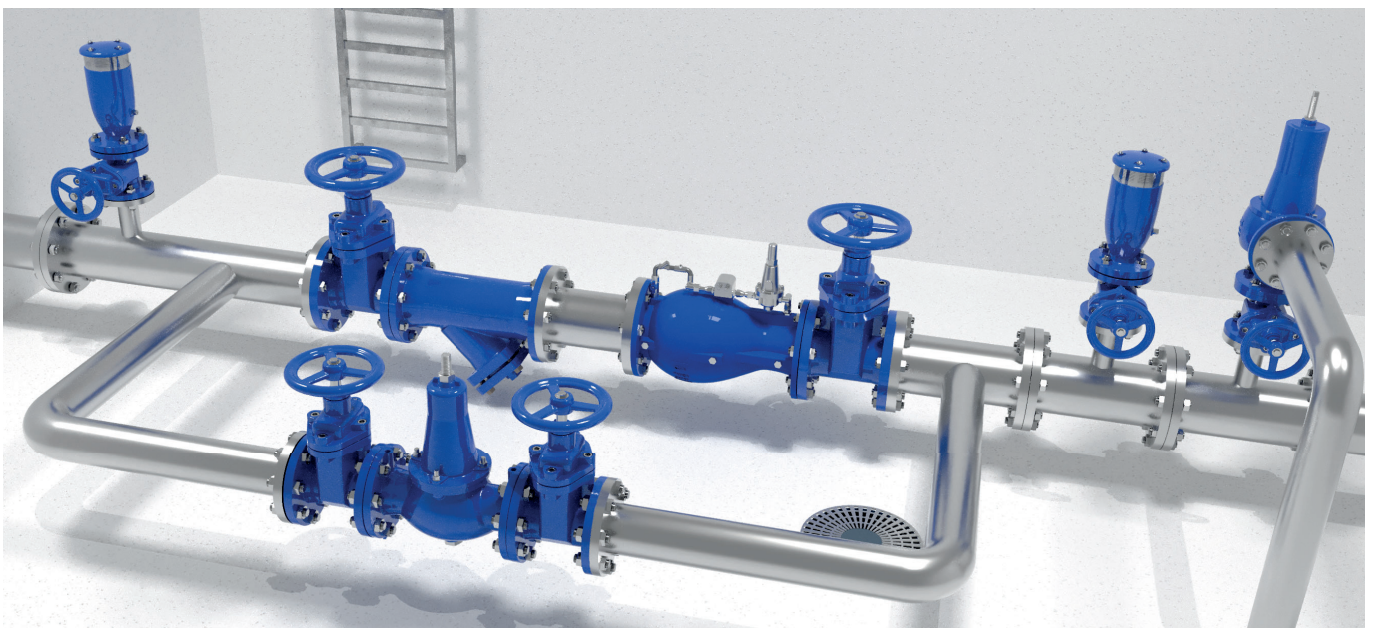


The CSA Italice 310 is an automatic control valve operated by a 2 ways pilot (3) in stainless steel AISI 316 with pre-set set and adjustable value. Should the downstream pressure rise above the pilot set point the latter will throttle and limit the flow to direct inlet pressure to the main chamber (8), thus pushing down the obturator (6) towards the seat (4), to generate the head loss required for the valve to reduce and stabilize the downstream pressure to a constant value. Should the downstream pressure fall below the pilot set point the obturator (6) will move according to the flow direction increasing the passage through the seat (4), thus reducing the head loss followed by the rise in pressure. The flow in and out of the main chamber (8) is controlled by the CSA unit regulation device with filter GR.I.F.O. (2) provided with needle valves and flow stabilizers, essential for the valve's response time and accuracy also in case of rapid variation in demand. The large filtration unit (1) ensures long lasting performances minimizing the maintenance operations.

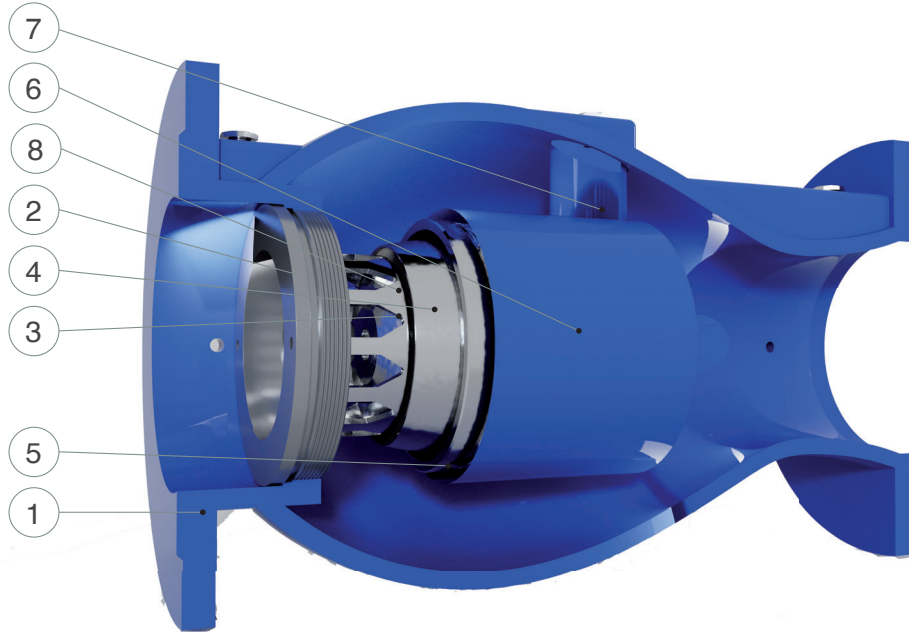
Installation layout

The CSA Italice 310 installation lay-out includes sectioning devices, filter to prevent dirt from reaching the control valve and a by-pass for maintenance Operations. The direct acting CSA pressure reducing valve VRCD is the best choice on the by-pass thanks to its reliability also after long periods of inactivity.

Anti-surge combination air valves FOX 3F AS are recommended upstream and downstream as well as a pressure relief valve Gemina downstream to prevent rise in pressure on the main line.



Italica 300 - Standard version - Technical details



N.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Seat	stainless steel AISI 316	
3	AC system	stainless steel AISI 304/303	stainless steel AISI 316
4	Piston	stainless steel AISI 304/303	stainless steel AISI 316
5	Guiding bush	Bronze	
6	Control chamber	ductile cast iron GJS 450-10	
7	Pressure ports	stainless steel AISI 304	
8	Plane gasket	EPDM	

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

Italica 300 - Standard version - Technical data

DN (mm)	50	80	100	150	200	250	300	400	500	600
Kv (m³/h)	18	43,2	64,8	195	336	803	1245	2376	3456	4636

Head loss coefficient

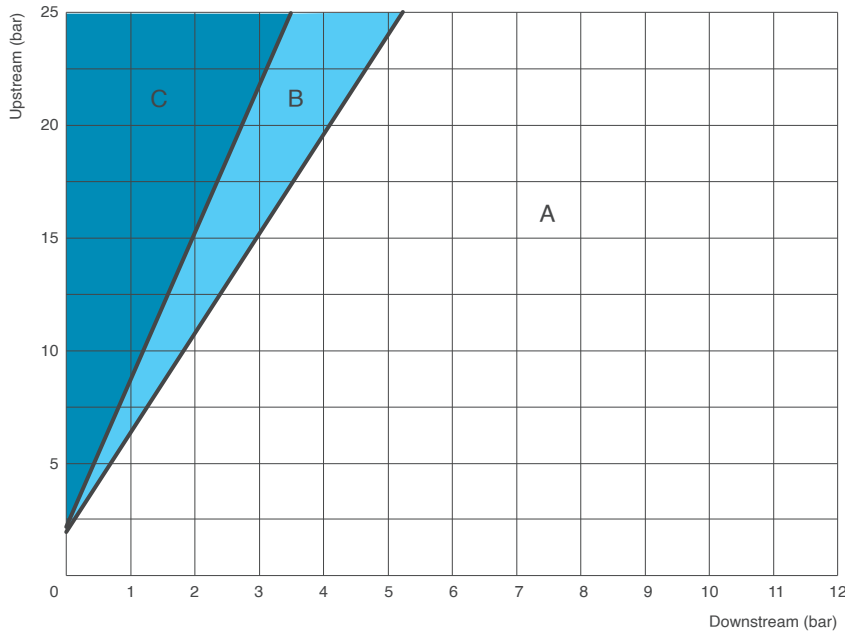
Kv coefficient representing the flow rate which is flowing through the valve fully open, and producing a head loss of 1 bar.

Cavitation chart

The cavitation analysis is very important since it may lead to substantial damages, in addition to vibration and noise. The cavitation chart has to be used to determine whether the working point obtained by the intersection of the lines, connecting upstream (y axis) and downstream (x axis) pressure conditions, lies within one of the 3 zones to be identified as follows:

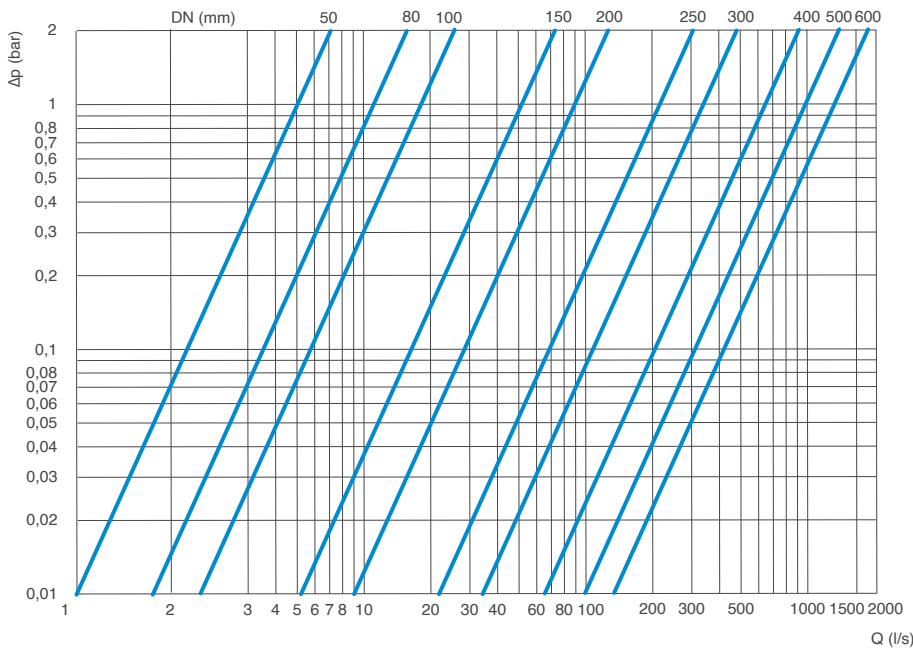
- A: Recommended working conditions;
- B: Noise cavitation;
- C: Damage cavitation.

The chart is to be used for valves modulating with an opening percentage between 35-40% at standard water temperature and elevation below 300 m.



Head loss chart

The chart indicates the head loss of Italica 300 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 Italica 300 control valves standard version

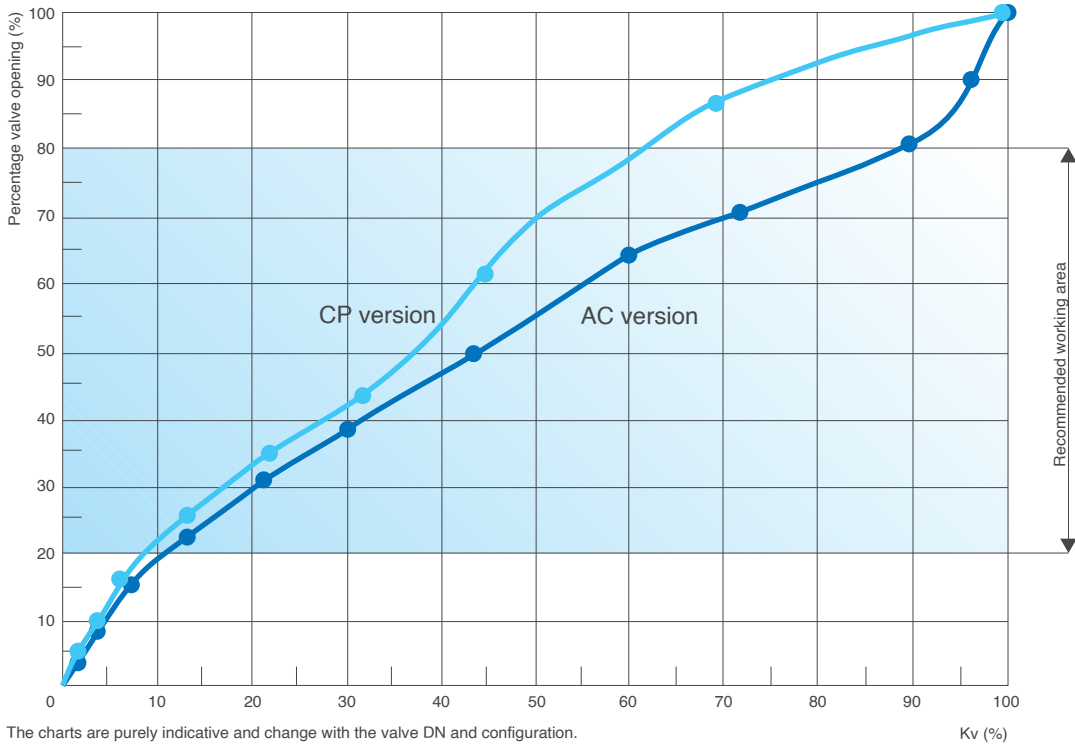
DN (mm)			50	80	100	150	200	250	300	400	500	600
Flow rate (l/s)	Recommended	Min.	0.3	0.5	1	2	3.2	5	7	11	14	21
		Max.	4	9.4	15	44	75	179	277	528	768	1030
	Pressure relief	Max.	6	14	21	63	108	254	401	761	1105	1490

All values are approximate, consult CSA service for more details.

Italica 300 - AC and CP versions - Technical data

Kv to valve opening chart

The following chart shows the opening percentage of ITALICA 300-AC and ITALICA 300-CP versus the Kv.



Working conditions

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

Standard

Certified and tested in compliance with EN 1074/5.
 Pressure rating 25 bar.
 Flanges according to EN 1092/2 (different drilling on request).
 Epoxy painting applied through FBT technology blue RAL 5005.

Weights and dimensions

DN (mm)	A (mm)	B (mm)	C (mm)	Weight (Kg)	
				Body	Total
50	230	165	117	10,5	12
80	310	200	170	20	23
100	350	220	219	24,5	27
150	480	300	275	45	60
200	600	340	330	74,5	85
250	730	405	403	142	157
300	850	485	453	200	225
400	1100	645	637	430	480
500	1250	715	715	760	900
600	1450	840	922	1160	1350

All values are approximate, consult CSA service for more details.

